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Remedial Action Options Report
67th Place Industrial Park
1960 South 67th Place
West Allis, Wisconsin
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ARCADIS

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1.0 Introduction

This Remedial Action Options Report (RAOR) was prepared for the 67th Place Industrial Park (former Novak Site) located at 1960 South 67th Place in the city of West Allis, Wisconsin ("site"). ARCADIS was retained by the city of West Allis Community Development Authority to complete a RAOR. This RAOR incorporates previous investigation data collected by ARCADIS, The Environmental Management Company (TEMCO), and CGC, Inc. (CGC). The site is enrolled in the Voluntary Party Liability Exemption (VPLE) program. ARCADIS is requesting approval from the Wisconsin Department of Natural Resources (WDNR) to begin implementation of the proposed remedies.

Air Reduction Company (AIRCO) occupied the site between 1932 and 1984. AIRCO manufactured carbide gas, which produced lime slurry as a byproduct of its operation. The lime slurry was disposed of in onsite lagoons that covered approximately ±6 acres. In 1985, Mr. John Novak purchased the property. Mr. Novak rented the land out to various businesses including a waste storage and transfer facility, an oil/hazardous waste trucking terminal, and a salvage/junk yard. The city of West Allis Community Development Authority acquired the property in 2006.

The site investigation results identified volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and Resource Conservation Recovery Act (RCRA) metals as the contaminants of concern (COCs) in soil. VOCs and PAHs were identified in groundwater, in addition to elevated pH levels within the footprint of the former lime slurry lagoons. The extent of soil and groundwater contamination is defined and limited to the site.

Future redevelopment of the site will be a mix of commercial and light industrial. The site closure strategy consists of the following:

- Vapor monitoring
- Groundwater monitoring to support natural attenuation as a long-term remedy
- Soil management as part of the redevelopment

- Institutional controls (placement of the site on the WDNR Geographic Information System (GIS) Registry for Closed remediation Sites for residual soil and groundwater contamination).

- Engineered barriers (i.e., asphalt and concrete pavement, buildings, an impermeable liner, and landscape with two feet of clean soil) to address the direct contact pathway.

The investigation activities and remediation evaluation were completed in accordance with Chapters NR 700-746 (Environmental Protection) and NR 140 (Groundwater Quality) of the Wis. Adm. Code. The NR 712 Certification is presented in Appendix A.

2.0 Background

The following sections present the site location, description, and background information. The background information was summarized from the previous site investigations.

2.1 Site Location and Description

The site consists of an approximate 11.6-acre parcel of land at 1960 South 67th Place, in West Allis, Wisconsin (Figure 1). The site is bounded by the Union Pacific Railroad tracks and Metal Technologies Incorporated (heavy industrial) to the north, Becher Place to the east, West Allis Fire Department and residential housing to the south, and St. Augustine Catholic Church and School and residential housing to the west. The surrounding land use is predominantly residential properties. The site is located in the southeastern ¼ of U.S. Public Land Survey Section 3, Township 6 North, Range 21 East in Milwaukee County. The site is currently vacant and zoned as a M1 Manufacturing District.

2.2 Site History

AIRCO (AIRCO Industrial and AIRCO Welding Products) occupied the site between 1932 and 1984. The Site Layout is illustrated on Figure 2. AIRCO manufactured carbide gas, which produced lime slurry as a byproduct of its operation. The lime slurry was disposed of in onsite pits or lagoons that covered approximately ±6 acres on the eastern portion and southwest portion of the property. The property formerly included five metal and masonry buildings of varying sizes between approximately 3,600 to 5,500 square feet and two large storage silos located in the central portion of the property. Mr. John Novak purchased the property in 1985. Mr. Novak rented the land out to various businesses including a waste storage and transfer facility, an oil/hazardous waste trucking terminal, and a salvage/junk yard. The city of West Allis Community Development Authority acquired the property in 2006.

2.3 Carbide Gas Production

Calcium carbide is combined with water which results in calcium hydroxide in an aqueous solution (limewater) and acetylene gas. The reaction is $CaC_2 + H_2O$ ---> $Ca(OH)_2 + 2C_2H_2$. Limewater is a clear, saturated water solution of calcium hydroxide. As a saturated solution, the pH of calcium hydroxide is 12.4. The product of acetylene gas is then combusted by applying flame, and the resulting reaction occurs: $2C_2H_2$ +

$5O_2$ --> $4CO_2 + 2H_2O$. Some of the carbon dioxide will react with the lime water and precipitate out forming lime slurry, which is a whitish to bluish gray substance known as calcium carbonate. The resulting chemical reaction is $Ca(OH)_2 + CO_2$ --> $CaCO_3 + H_2O$. Limestone and chalk share similar chemical composition with lime slurry of $CaCO_3$.

2.4 Summary of Previous Investigations

Below is a summary of the site investigation activities completed by TEMCO and geotechnical investigation activities completed by CGC at the site between February 2004 and July 2007. A summary of the soil and groundwater analytical results is provided in a later section.

Novak Property Phase I Environmental Site Assessment, Prepared by TEMCO, Dated March 2004

The following recognized environmental conditions (RECs) were identified in the Phase I Environmental Site Assessment (ESA):

- Alliance Transportation Services stored and washed trucks used for transporting hazardous waste. An inspection by the WDNR in March 1993 revealed poor facility housekeeping, soil stained across the site, and presence of a lime slurry lagoon.

- Jay's Fuel Oil was a site occupant. WDNR was notified of a fuel oil spill. WDNR estimated 20 gallons were spilled. Additionally, puddles of oil were found on the ground as a result of leaking equipment on an oil truck. Key Engineering performed a Phase II assessment in April 1998. Soil samples were collected associated with the oil spill. Free-phase product was removed from the site to the extent practicable. Low-level residual soil impacts remain. No soil impacts reported above applicable soil standards based on the protection of groundwater or direct contact exposure pathway. Key Engineering requested case closure by the WDNR on behalf of Jay's Fuel Oil. The WDNR denied closure.

- Trace of lime deposits found in water along the retaining wall at the east side of the site. The pH measured onsite was 13, laboratory analytical result was 12. An action plan was submitted by Mr. Novak (property owner) to address the release of the lime.

- WDNR completes a site inspection in October 2000. WDNR observed petroleum spills on soil, trace of lime with a pH between 12 and 13 (no wastewater discharge permit in place), and lime being mined and sold to a tannery. Source Services a tenant using property for consolidation of waste prior to transferring to a landfill (no scrap or waste material general permit in place). WDNR notified Mr. Novak requesting neutralizing the water in the puddle along the sidewalk of West Becher Street to less than a pH of 9, fill the ruts along the retaining wall/street sidewalk to prevent pooling, and pump the water in the lime lagoon to the sanitary sewer on a daily basis to reduce seepage from the site.

- A review of historical aerial photographs during the late 1980s and early 1990's revealed, a black discoloration along the western edge of the lime slurry lagoon and several out of service storage tanks along the eastern edge of the wooded area in the western part of the site.

- A review of City of West Allis Department of Building Inspection revealed a 10,000-gallon acetone storage tank was installed and a pump house was constructed in 1947.

Preliminary Phase II Environmental Site Assessment, Novak Property, Prepared by TEMCO, Dated March 2004

On February 20, 2004, TEMCO, located in Cedarburg, Wisconsin advanced 10 soil borings (SB-1 through SB-10) from 1.5 to 12 feet below grade using direct push technology to evaluate subsurface conditions based on past site operations. Soil borings were advanced in the central area of the site, where the building complex was located; southern and eastern portions of the site, where the former lime slurry lagoons were located, and peripheral areas where equipment, waste containers, tanks, salvage, and scrap material were historically stored.

Soil samples were collected from ground surface to 4 feet for laboratory analysis of diesel range organics (DRO), gasoline range organics (GRO), VOCs, PAHs, RCRA metals, and PCBs.

Preliminary Subsurface Exploration, Prepared by CGC, Inc., Dated December 2005

Between December 22 and 27, 2004, CGC advanced 11 soil borings (GSB-1 through GSB-11) onsite with depths ranging from 25 to 45 feet below grade. The soil borings were completed to evaluate subsurface conditions across the site to aid in the siting of a potential building and to present preliminary geotechnical–related recommendations for general site development, foundation, floor slab, and pavement design/construction.

Site Investigation Report, Lime Pit Site, Prepared by TEMCO, Dated March 2006

Between May 26 and 27, 2004, TEMCO advanced 15 soil borings (SB-11 through SB-25) from 3 to 16 feet below grade using direct push technology. Between August 2 and 10, 2004, TEMCO installed 14 monitoring wells (MW-1 through MW-14) using a hollow stem auger rig. The monitoring wells were screened between 5 to 20 feet, 5 to 25 feet, and 15 to 25 feet. The soil borings and monitoring wells were installed to evaluate subsurface soil and groundwater conditions based on past operations.

Soil samples were collected from ground surface to a maximum depth of 20 feet below grade and submitted for laboratory analysis of VOCs and PAHs from locations in the central and peripheral areas of the site and for laboratory analysis of RCRA metals and PCBs from locations in the former lime slurry lagoons.

Groundwater samples were collected on August 23, 2004 and May 10, 2005 and submitted for laboratory analysis of VOCs and PAHs. On May 10, 2005, groundwater samples were collected and submitted for total RCRA metals analysis.

Addendum to Site Investigation Report, Lime Pit Site, Prepared by TEMCO, Dated January 2009

The WDNR reviewed and approved the TEMCO *Site Investigation Report* dated March 2006 in a correspondence dated April 19, 2006. This WDNR correspondence requested additional investigation under the former building footprints and downgradient of the site. Therefore, on January 9, 2007, TEMCO advanced 12 soil borings (SB-26 through SB-37) from 8 to 10 feet below grade using direct push technology to evaluate subsurface soil conditions beneath the former building footprints. On January 10, 2007, TEMCO installed an additional two monitoring wells (MW-15 and MW-16) using a hollow stem auger rig downgradient of the site in the parkway along West Becher Place.

Soil samples were collected from 3 to 6 feet below grade and submitted for laboratory analysis of VOCs and PAHs. Groundwater samples were collected on February 12, 2007 by TEMCO from Monitoring Well MW-15 and MW-16 and submitted for laboratory analysis of VOCs and PAHs.

Supplemental Subsurface Exploration, Prepared by CGC, Inc., Dated January 2009

Between October 4 and 9, 2007, CGC advanced 14 soil borings (GSB-1A through GSB-14A) onsite with depths ranging from 15 to 20 feet below grade. The soil borings were completed to confirm preliminary findings from the 2005 geotechnical investigation and to provide further delineation of the subsurface conditions within the northwest quadrant of the site to aid in siting of a potential building and to present geotechnical–related recommendations for general site development, foundation, floor slab and pavement design/construction.

On July 27, 2007, CGC completed 14 exploratory test (TP-1 through TP-14) pits onsite with depths ranging from 3 to 5 feet below grade. The test pits were completed to assist in evaluating the characteristics of the near surface fills onsite, with the focus placed on areas surrounding the northwest quadrant of the site being considered for future pavement construction.

3.0 Geology and Hydrogeology

The geology of the site was evaluated by means of drilling and sampling exploratory borings and test pits. In addition, existing geologic maps and soil reports were reviewed to provide information regarding regional geologic conditions. Information regarding hydrogeologic conditions was obtained during investigation from monitoring wells and site observations. The following sections present a summary of the local geology and hydrogeology.

3.1 Topography

The site surface topography generally grades from southwest to northeast. The ground elevation at the southwest portion of the site ranges from approximately 729 feet above mean sea level (ft amsl) to approximately 725 ft amsl. The lowest onsite ground elevations are located at the northeast corner at approximately 720 ft amsl. The site, as a whole, is located at a higher elevation than adjoining West Becher Street, which is approximately 20 feet lower or approximately at an elevation of approximately 700 ft amsl.

3.2 Regional and Local Geology

The geology of the site and surrounding areas consists of glacial-derived unconsolidated deposits overlying dolomite bedrock (WGNHS, 1976). The site appears to be located within a north-south trending lateral moraine clay till. The soil at the site is part of the Oak Creek Formation, which was deposited by the Lake Michigan Lobe during the Wisconsin Glaciation period, approximately 13,200 to 14,500 years ago as it moved west-southwest across southeast Wisconsin.

Geologic Cross Section A-A', B-B', and C-C' were prepared to present the site geology and are presented as Figure 3 through 5, respectively. The locations of the geologic cross sections are presented as Figure 6. In general, two subsurface units were encountered during the subsurface investigation. The unconsolidated units displayed somewhat variable characteristics but were correlated between borings based on observed similarities such as grain size, color, consistency and structure.

The site geology can be generally grouped into the following two distinct units of unconsolidated materials with some variations within each unit:

- **Fill material.** Fill material consisted of brown, grey, or black silt, sand and gravel in a clay matrix. Waste material (construction debris, asphalt fragments, cinders, foundry sand) were also identified at select locations. The fill material was generally observed across the site from ground surface to approximately 5 feet below grade. Fill material over the location of the lime slurry lagoons was observed from approximately 12 to 15 feet below grade. The lime slurry lagoons were predominately encountered along the eastern half of the site, but also the southwest corner of the site. The grey to bluish grey lime slurry was observed below the water table at depths between approximately 12 to 19 feet below grade along the eastern half of the site. Historical reports state the lime slurry extended to approximately 25 feet below grade. The lime slurry at the southwest corner of the site was observed at depths between approximately 12 to 18 feet below grade.

- **Clay.** Mottled clay with trace to some silt, sand, and gravel overlays a laterally extensive, uniform clay till. Where encountered, the mottle clay extended from approximately 5 feet to 10 feet below grade. The clay till serves as an aquitard beneath the site. The clay unit was observed at depths ranging from approximately 10 to 25 feet below grade.

Also, a wetland was likely present at the site, as indicated by a localized, black, stiff, organic silt layer observed only along the eastern portion of the site beneath the lime slurry. The organic silt unit was observed to be between 1 to 3 feet thick.

Bedrock was not encountered during site investigation activities. However, the bedrock underlying the unconsolidated deposits consists of sedimentary rock (in descending elevation) dolomite, shale, and sandstone that range from Devonian to Cambrian in age (SEWRC, 2002). Bedrock is expected at depths ranging from 120 to 170 feet below grade.

3.3 Hydrogeology

Depth to water measurements were collected from 14 monitoring wells on May 10, 2005. Groundwater elevations are summarized in Table 1. Groundwater was generally encountered at a depth of 3.3 to 9.1 feet below grade, with shallower depths of approximately 1 foot below grade at MW-8 and MW-10 near the west central portion of the site and at a greater depth of 12 feet below grade at MW-12 at the northeast corner of the site. Groundwater is generally encountered in the fill material. A

groundwater contour map using the May 10, 2005 data is presented as Figure 7. Groundwater flow is generally to the east, towards West Becher Street.

Monitoring Wells MW-4, MW-5, and MW-12 are located approximately 70 to 120 feet from the eastern property line. Groundwater is observed between approximately 7 to 12 feet below grade at these wells. The site is located approximately 20 feet above the adjoining street (West Becher Street). Since groundwater intersects the slope, seeps are present. Additionally, there are two locations of along the slope that have been scoured out by surface runoff creating channelized flow to the base of the slope. At the base of the slope, a concrete retaining wall is present measuring 0.5 to 1.5 feet tall. Water is retained onsite behind the wall along most of the site, but converges at the northeast corner of the site where surface water has been observed to flow over the retaining wall onto the parkway and sidewalk. Soil staining from the lime and surface water discharge from the seeps have been observed during rain events and from spring through fall.

4.0 Investigation Results

The following sections present an evaluation of the results of analytical testing conducted for soil and groundwater samples collected between February 2004 and February 2007.

4.1 Soil Analytical Results

The following sections present a summary of the historical and current groundwater analytical result. Soil DRO, GRO, VOCs analytical results are summarized in Table 2. Soil PAHs and benzo(a)pyrene equivalent Residual contaminant levels (RCL) calculations and results are summarized in Tables 3 and 4, respectively. Soil PCBs and metal analytical results are summarized in Tables 5 and 6, respectively.

4.1.1 Soil Regulatory Criteria

RCLs for DRO and GRO are set forth in NR 720 Wis. adm. code. The DRO and GRO RCLs are based on the hydraulic conductivity of the soils at a site. At sites with soils exhibiting a hydraulic conductivity of 1×10^{-6} centimeters per second (cm/s) or greater, the generic RCL for DRO and GRO is 100 milligrams per kilogram (mg/kg). At sites with soils exhibiting a hydraulic conductivity of less than 1×10^{-6} cm/s, the RCL for DRO and GRO is 250 mg/kg. The majority of the soils likely exhibit a hydraulic conductivity greater than 1×10^{-6} cm/sec, consequently, a DRO or GRO RCL of 100 mg/kg was used to evaluate the analytical results. Soil DRO and GRO analytical results and RCLs are summarized in Table 2.

The WDNR has not promulgated soil cleanup standards for a large number of compounds. NR 720 Wis. adm. code presents generic RCLs for five VOCs (benzene, toluene, xylenes, ethylbenzene, and 1,2-dichloroethane). The United States Environmental Protection Agency has developed an internet website (http://risk/lsd/ornl/gov/epa/ssl1/htm) for calculating soil screening levels (SSLs) for four different exposure pathways: ingestion, inhalation of particulates, inhalation of vapors, and migration to groundwater. The WDNR has developed a guidance document for calculating SSLs using this web site and WDNR-default parameters for industrial and non-industrial sites. ARCADIS has calculated SSLs for evaluating the soil analytical data. The RCLs and calculated SSLs for VOCs are summarized in Table 2. Calculations are presented in Appendix B.

Industrial and non-industrial direct contact RCLs, and RCLs based on protection of groundwater have been proposed for several PAH compounds in a WDNR guidance document (WDNR 1997). Soil PAH analytical results were also compared to industrial direct contact RCLs developed using the benzo(a)pyrene equivalency equations provided by the WDNR. The benzo(a)pyrene calculations are presented in Appendix B. Soil PAH analytical results and RCLs are summarized in Table 3. Soil benzo(a)pyrene equivalent RCL calculations and results are summarized in Table 4.

Title 40 Code of Federal Regulations §761.61 provides cleanup and disposal options for PCB remediation waste. Soil PCB analytical results were compared to the bulk remediation waste cleanup level for low occupancy with a cap of less than or equal to 25 mg/kg and a total PCB concentration greater than or equal to 50 mg/kg to determine soil disposal options. Soil PCB analytical results and cleanup levels are summarized in Table 5.

NR 720 presents generic RCLs for four metals (arsenic, cadmium, chromium, and lead). Soil total metal analytical results and RCLs are summarized in Table 6.

4.1.2 DRO and GRO

Soil DRO and GRO analytical results are summarized in Table 2 and presented on Figure 8. DRO was reported above the RCL of 100 mg/kg in six soil samples (SB-1, SB-4, and SB-6 through SB-9) ranging from 160 mg/kg to 450 mg/kg from 0 to 4 feet below grade. All GRO analytical results were reported below laboratory detection limits or below the RCL. The DRO impacts appear to be associated with the fill material at the site.

4.1.3 VOC

Thirty-seven soil samples were collected and submitted for laboratory analysis of VOCs between February 2004 and January 2007. Soil VOC analytical results are summarized in Table 2 and presented on Figure 8. All soil VOC analytical results were reported below the NR 720 RCLs or SSLs except for naphthalene reported above inhalation of vapors and soil to groundwater pathway SSLs at Soil Borings SB-6 at 130,000 micrograms to kilogram (µg/kg). The VOC results indicated that VOCs are not widely present at the site.

4.1.4 PAH

Fifty-two soil samples were collected and submitted for laboratory analysis of PAHs between February 2004 and January 2007. Soil PAH analytical results are summarized in Table 3. One or more PAH compounds were detected in the soil at concentrations above the soil to groundwater pathway or industrial RCL in 24 out of 52 samples collected and analyzed. Based on the depths and distribution of the impacts, the PAHs appear to be associated with the fill material and are distributed across the site.

4.1.4.1 Benzo(a)Pyrene Equivalent Evaluation

The PAH Guidance Document notes, "*cleanup levels for 'total PAHs' are inherently site-specific and generic values tend to be overly conservative*" (page 2). Based on the wide-spread distribution of the PAH compounds identified in the surface soil, site-specific RCLs were developed for total PAH compounds to further evaluate PAH distribution and risk. ARCADIS used a methodology presented in the PAH Guidance Document (WDNR, 1997), which utilizes a benzo(a)pyrene equivalent and reductive potency factors. According to the WDNR PAH guidance document, the benzo(a)pyrene equivalent method is "*conceptually consistent with the intent of the target risk requirements of ch. NR 720.11(3) and 720.19(5), Wis. adm. code, where risks are presumed to be additive*." The PAH Guidance Document states, "the soil cleanup levels generated by using relative potency factors are unlikely to underestimate the potential human health risk associated with these compounds" (Page 4).

Site-specific RCLs were calculated for the site based on the information collected regarding the composition of the PAH mixture at the site combined with the relative potency factors (RPF) that reflect the toxicity of each PAH compound relative to benzo(a)pyrene. An RCL based on the benzo(a)pyrene-equivalent (BaP_{equiv}) concentration was developed using the risk-based equations for carcinogenic compounds and the cancer slope factor for benzo(a)pyrene provided in the PAH Guidance Document. According to NR 720.19(5)(a), the target risk for the non-industrial and industrial scenarios can be modified for *in situ* contaminated soil using an excess cancer risk of 1×10^{-7} for the non-industrial scenario and 1×10^{-6} for the industrial scenario. Concentrations equal to one-half the detection limit were used where sample results were reported below laboratory detection limits. This approach is consistent with the use of non-detect results in other WDNR-approved statistical tools, such as the Mann-Kendall spreadsheet.

In calculating an RCL utilizing the BaP_{equiv}, approach, the target risk is distributed equally among the PAH compounds and a combined target excess cancer risk level is calculated. The combined target cancer risk level is therefore determined by multiplying the target risk for individual compounds by the number of compounds in the assessment, provided the result does not exceed 1×10^{-5}, as specified in NR 720.19(5)(a)(2). Seventeen PAH compounds were detected in the soil samples collected. Because 17×10^{-6} is greater than 1×10^{-5}, the target risk for the site was set at 1×10^{-5}. Applying the target risk of 1×10^{-5} to the equation provided in Attachment B of the PAH Guidance Document yields a non-industrial direct contact RCL for BaP_{equiv} of 880 µg/kg, or 0.88 mg/kg and an industrial direct contact RCL of 3,900 µg/kg, or 3.9 mg/kg.

To determine if surface soil concentrations at the site exceed the site-specific RCLs for BaP_{equiv}, the PAH concentrations in the soil samples were converted to equivalent concentrations (with regard to toxic potency) of benzo(a)pyrene. This was accomplished by multiplying the concentration of each PAH compound in a given sample by that compound's RPF. RPFs were obtained from Nisbet and LaGoy (1992) and are listed on page 3 of the PAH Guidance Document. The RPFs are unitless and vary from 0.001 to 1. An RPF of 0.001 indicates that the compound is only 1/1,000th as toxic as benzo(a)pyrene, while an RPF of 1.0 indicates, the compound has the same toxicity as benzo(a)pyrene. The resultant products were then summed to yield the BaP_{equiv} concentration for that sample.

The BaP_{equiv} non-industrial and industrial RCLs for the site were determined to be 880 µg/kg and 3,900 µg/kg, respectively. The calculations and BaP_{equiv} data are summarized in Table 6. All of the sample PAH concentrations were below the BaP_{equiv} non-industrial RCL (Table 4).

4.1.5 PCB

Six soil samples were collected and submitted for laboratory analysis of PCBs to determine where the cleanup level for low occupancy may be exceeded and potential disposal options. Soil PCB analytical results are summarized in Table 5 and presented on Figure 9. All soil PCB results were reported below laboratory detection limits, except at Monitoring Well MW-14 for Aroclor 1254 reported at 0.26 mg/kg. This concentration is below the high occupancy cleanup level without further conditions of ≤1 mg/kg.

4.1.6 Metals and Cyanide

Seven soil samples were collected for analysis of metals, including one or more metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Total metals analytical results are summarized in Table 6 and presented on Figure 10. Metal concentrations were reported below NR720 RCLs, except for arsenic and lead. Five soil samples contained arsenic concentrations that exceeded the NR 720 non-industrial direct contact RCL of 0.039 mg/kg. Arsenic concentrations ranged from below detection limits to 7.1 mg/kg. Two soil samples contained lead concentrations that exceeded the NR 720 non-industrial direct contact RCL of 50 mg/kg. Lead concentrations ranged from below detection limits to 65.4 mg/kg. The detected metals are likely associated with the fill material.

4.2 Groundwater Analytical Results

The following sections present a summary of the historical and current groundwater analytical result. Groundwater VOCs and pH analytical results are summarized in Tables 7 and 8, respectively. Groundwater PAHs and total metal analytical results are summarized in Tables 9 and 10, respectively.

4.2.1 Groundwater Regulatory Criteria

Groundwater cleanup criteria are set forth in NR 140 Wis. adm code. For each regulated constituent, two standards have been established: an Enforcement Standard (ES) and a Preventive Action Limit (PAL). If a constituent concentration is below the ES but exceeds the PAL, the WDNR may require a response ranging from no action to a request for continued monitoring. If an ES is exceeded, the WDNR may require further investigation, monitoring, and/or remediation. Groundwater cleanup criteria have not been established by the WDNR for every constituent detected at this site. The ES and PAL for each constituent for which a standard has been adopted are presented on the respective groundwater analytical tables.

4.2.2 VOC

Groundwater samples were collected from 16 monitoring wells and submitted for laboratory analysis of VOCs between August 2004 and February 2007. Groundwater VOC analytical results are summarized in Table 7 and presented on Figure 11.

Generally, groundwater impacts were observed in the eastern portion of the site within the footprint of the former lime slurry lagoon that was backfilled to grade with imported fill material. Groundwater concentrations were reported below laboratory detection limits at Monitoring Wells MW-2, MW-3, MW-7 through MW-10, MW-15, and MW-16 in the last sampling event. In May 2005, when most of the monitoring wells were last sampled, groundwater concentrations were reported below the ES, but above the PAL at Monitoring Wells MW-4 (benzene 0.79 micrograms per liter [µg/L] and trichloroethene 0.53 µg/L), MW-5 (benzene 1.6 µg/L, naphthalene 34 µg/L, MW-6 (benzene 1.4 µg/L, naphthalene 19 µg/L), MW-12 (benzene 1.8 µg/L, naphthalene 16 µg/L), and MW-14 (benzene 1.2 µg/L, naphthalene 28 µg/L). The extent of groundwater impacts are delineated onsite and detected concentrations are relatively low. The VOC concentrations are likely attributable to sample turbidity since the wells were sampled using disposal polyethylene bailers. Samples collected through low-flow techniques would likely exhibit lower turbidity and lower PAH concentrations

4.2.3 pH

Past site operations included the production of carbide gas. As discussed earlier, carbide gas produces a by-product called limewater. Limewater is corrosive and as a saturated solution, may have a pH near 12. The PAL for the indicator parameter, pH, is one pH unit above or below the pH of the background water quality per NR 140.20(2) Wis. adm. code.

All accessible monitoring wells were sampled for pH. The pH at Monitoring Wells MW-1, MW-3 through 6, MW-9, MW-10, and MW-12 through MW-14 were measured on February 23, 2009 and Monitoring Wells MW-15 and Mw-16 were measured on March 17, 2009. A water sample was collected from the monitoring, poured into a dedicated polyethylene beaker, and measured using a calibrated pH probe. Water pH results are summarized in Table 8 and presented on Figure 11.

Monitoring Wells MW-1, MW-4 through MW-6, MW-12, and MW-14 are located within the limits of the former lime slurry lagoons. The pH at these wells ranged from 9.2 to 12.6, with the exception of MW-12 at 6.9. Monitoring Wells MW-3, MW-9, and MW-13 are located outside the limits of the former lagoons onsite with Monitoring Wells MW-15 and MW-16 located offsite to the east. These wells can serve as providing background levels for pH. The pH at these wells ranged from 6.5 to 8.1 (typical of the groundwater in southeast Wisconsin). The site-specific PAL for pH was determined as 5.5 to 9.1, calculated as one pH unit below 6.5 and one pH unit above 8.1.

4.2.4 PAH

Groundwater samples were collected from 16 monitoring wells and submitted for laboratory analysis of PAHs between August 2004 and February 2007. Groundwater PAH analytical results are summarized in Table 9 and presented on Figure 12. One or more PAHs were reported above the PAL in at least one sampling event from all monitoring wells except Monitoring Well MW-16. In May 2005, groundwater concentrations were reported above the ES at Monitoring Well MW-2 (benzo(a)pyrene 96 µg/L, benzo(b)fluoranthene 127 µg/L, chrysene 86 µg/L), MW-6 (benzo(a)pyrene 0.47 µg/L, benzo(b)fluoranthene 0.67 µg/L, chrysene 0.61 µg/L), and MW-8 (chrysene 0.54 µg/L). The PAHs concentrations are likely attributable to sample turbidity since the wells were sampled using disposal polyethylene bailers. Samples collected through low-flow techniques would likely exhibit lower turbidity and lower PAH concentrations.

4.2.5 RCRA Total Metals

Groundwater samples were collected from Monitoring Wells MW-4, MW-8, MW-11, and MW-14 and submitted for laboratory analysis of RCRA total metals in May 2005. Groundwater metal analytical results are summarized in Table 10 and presented on Figure 13. One or more total metal concentrations (cadmium, chromium, lead, mercury, selenium, and silver) were reported above the PAL at Monitoring Wells MW-4 and MW-14, located within the limits of the former lime slurry lagoon. Lead was the only analyte detected above the PAL at Monitoring Well MW-8 located near the former building tenant operations. Dissolved metal concentrations from field filtering may likely result in lower concentrations.

4.3 Surface Water

Groundwater intersects the slope along the east property boundary and has formed seeps. Additionally, there are two locations of along the slope that have been scoured out by surface runoff creating channelized flow to the base of the slope. At the base of the slope, a concrete retaining wall is present measuring 0.5 to 1.5 feet tall. Water is retained onsite behind the wall along most of the site, but converges at the northeast corner of the site where surface water has been observed to flow over the retaining wall onto the parkway and sidewalk. Soil retaining from the lime and surface water discharge from the seeps have been observed during rain events and from spring through fall. A lime slurry lagoon was present along the eastern portion of the site. Monitoring Wells MW-1, MW-4 through MW-6, MW-12, and MW-14 are located within the limits of the former lime slurry lagoons. The pH at these wells ranged from 9.2 to

12.6, with the exception of MW-12 at 6.9. The water that overflows the retaining wall has the potential to have elevated pH and exhibit corrosive properties.

4.4 Soil Vapor Monitoring

Baseline soil vapor monitoring for methane was conducted at the site from all accessible wells. Due to snow cover, a number of monitoring wells are currently not accessible. The methane monitoring activities consisted of evaluating Monitoring Wells MW-1, MW-3 through MW-6, and MW-9 through MW-16 for the presence of methane. The monitoring well locations are presented on Figure 2. The methane monitoring was conducted using a flame ionization detector (FID) with a charcoal filter and an Industrial Scientific Corporation Model MDU420 (MDU) dual methane monitor with a charcoal filter. The FID is capable of measuring methane in parts per million and the MDU is capable of measuring percent of the lower explosive limit (LEL) as methane to a sensitivity of 1.0 percent LEL. Results of the methane monitoring are summarized in Table 11.

The methane monitoring methodology consisted of sealing the well at the top of the casing, waiting 5 minutes for potential methane vapors to collect and equilibrate within the casing, and then connecting the field instrument to the well head. A methane concentration of 10,000 parts per million (ppm) is equivalent to 1 percent by volume. A methane concentration measured above 1.25 percent by volume (or 12,500 ppm) is generally used as an indicator of requiring additional delineation and monitoring. The highest methane concentration was measured at Monitoring Well MW-4 9,549 ppm on March 2, 2009. To date, this concentration has not been repeatable with methane concentrations ranging from 1,186 ppm and 1,756 ppm. All results are well below the limits for further delineation. Additional monitoring will be conducted to evaluate the concentrations over time and from all accessible wells.

5.0 Summary of Findings

The following bulleted list summarizes the results of the supplemental site investigation:

- Soil underlying the site consists of low permeable fill material (clayey matrix) underlain by clay till. The fill material is generally 5 feet thick. However, the fill extends to approximately 12 to 18 feet along the east side and southwest corner of the site. The lime slurry lagoons were predominately encountered along the eastern half of the site between approximately 12 to 19 feet below grade (historical reports state up to approximately 25 feet below grade), and at the southwest corner of the site from approximately 12 to 18 feet below grade.

- Groundwater was generally encountered at depths between 3.3 and 9.1 feet below grade.

- Naphthalene was reported in the VOC scan in one soil sample above inhalation of vapors and soil to groundwater pathway SSLs. Overall, VOC impacts were below SSLs and should not warrant further investigation.

- Soil PAH concentrations were detection widespread across the site. However, all soil PAH concentrations were below the BaP_{equiv} non-industrial RCL of 880 µg/kg, and should do not warrant further investigation.

- All soil PCB analytical results were reported below the bulk PCB remediation waste and high occupancy cleanup level without further conditions of ≤1 mg/kg.

- Arsenic concentrations ranged from below detection limits to 7.1 mg/kg and lead concentrations ranged from below detection limits to 65.4 mg/kg. The maximum concentrations of arsenic and lead were observed in the fill material and do not warrant further investigation.

- Generally, limited groundwater impacts were observed in the eastern portion of the site within the footprint of the former lime slurry lagoon that was backfilled to grade with imported fill material. Benzene and naphthalene

were reported above the PAL at MW-4, MW-5, MW-6, MW-12, and MW-14. No other VOCs were detected at concentrations exceeding the ES. The extent of groundwater VOC impacts are defined and limited to the site.

- The indicator parameter pH, ranged from 9.2 to 12.6 in MW-1, MW-4 through MW-6 and MW-14 (located within the limits of the former lime slurry lagoons). The site-specific PAL for pH was determined as 5.5 to 9.1.

- One or more PAHs were reported above the PAL in at least one sampling event from all monitoring wells except Well MW-16. Groundwater concentrations were only reported above the ES at MW-2, MW-6, and MW-8, indicated that PAHs in groundwater were relatively limited. The PAHs concentrations are likely attributable to sample turbidity since the wells were sampled using disposal polyethylene bailers. Samples collected through low-flow techniques would likely exhibit lower turbidity and lower PAH concentrations.

- One or more total metal concentrations (cadmium, chromium, lead, mercury, selenium, and silver) were reported above the PAL at Monitoring Wells MW-4, MW-8, and MW-14. Dissolved metal concentrations with field filtering will likely result in lower reported concentrations.

- Seeps and channelized flow caused by surface runoff were observed along the slope on the east site of the site. Water is retained onsite behind the concrete retaining wall along most of the site, but converges at the northeast corner of the site where surface water has been observed to flow over the retaining wall onto the parkway and sidewalk. Soil staining from the lime and surface water discharge from the seeps have been observed during rain events and from spring through fall. The water has the potential to have elevated pH.

- The highest methane concentration was measured in Monitoring Well MW-4 9,549 ppm on March 2, 2009. To date, this concentration has not been repeatable and is well below the 1.25 percent by volume (or 12,500 ppm) that is generally used as an indicator of requiring additional methane delineation and monitoring.

6.0 Development of Site Remedial Strategy

The development and implementation of a remedial program will be required to satisfy the requirements of NR 720 through NR 726. This RAOR is based on the site being redeveloped for commercial and light industrial land use. Redevelopment has already included the demolition of the existing buildings. Considerations in developing the site remedial strategy include:

- The geology at the site consists of low permeable fill material (clayey matrix) underlain by clay till. The fill material is generally 5 feet thick. However, the fill extends to approximately 12 to 15 feet along the east side of the site were the larger lime slurry lagoon was located. Beneath the fill, lime slurry is still present from approximately 12 to 19 feet below grade, but may be up to 25 feet below grade along the eastern portion of the site and from approximately 12 to 18 feet below grade at the southwest corner of the site.

- Groundwater was generally encountered at depths between 3.3 and 9.1 feet below grade.

- The Phase I ESA identified several RECs, which included potential discrete source areas (spills, tanks) as well as more diffuse sources such as the fill material located across the site and the lime slurry associated with the former lagoons. All structures and potential sources such as tanks have been removed.

- Investigations completed at the site following the Phase I ESA identified impacted soil, groundwater, surface water, and soil vapor. Investigation activities have been conducted to evaluate and delineate impacts in each of these media. The investigation results suggest that impacts are diffuse and widely disbursed across the site, and are generally associated with the fill material (including the lime slurry) and surface spills.

- The extents of soil and groundwater impacts are defined and limited to the site. The potential impacts to surface water are limited to seeps along the east property boundary. The soil vapor data suggest that limited impacts are present.

- The constituents of concern (COCs) in soil include naphthalene, arsenic, and lead. Although widespread, the concentrations of these constituents are relatively low.

- The COCs in groundwater include benzene, naphthalene, several PAHs, and pH as an indicator parameter. As with the soil COCs, the groundwater constituents are relatively low in concentrations.

- Methane was detected in soil gas above background levels at one location; however the concentration does not exceed guidance limits.

To satisfy the remediation requirements specified in NR 722.09(2)(a), soils must be remediated to the standards established in NR 720. Two types of standards have been established: numerical standards and performance standards. Numerical standards, referred to as RCLs, are concentration-based standards. If soil impacts are remediated to concentrations below the RCLs, then adequate soil remediation has been completed. In using performance-based standards, as allowed under NR 720, a level of performance is established rather than remediating to a numerical concentration. For example, the installation and maintenance of an engineered barrier (e.g., concrete floor slab, asphalt parking lot, soil cover) to minimize direct contact with and/or surface water infiltration through contaminated soil. The use of performance-based standards can be advantageous at a site where impacts are widespread and relatively low. Given the absence of discrete soil source areas at the site, performance-based standards appear appropriate as soil remediation objectives.

Groundwater will be remediated to the ch. NR 140 groundwater quality objectives. Groundwater impacts at the site can be depicted as a single, diffuse plume, likely associated with the fill material and lime slurry. The identified COCs can likely be addressed through a unified approach to groundwater quality management.

Soil gas impacts are relatively limited at the site. However, given the historical filling activities that have occurred, vapor intrusion will continue to be evaluated as remediation and redevelopment of the site progress.

Due to the topography of the area and the site hydrogeology, groundwater along the east property boundary occasionally is expressed as seeps from the face of the incline connecting the ground surface of the site to West Becher Place. This expressed groundwater becomes surface water, flowing along the east side of the property. Preliminary data from the seeps indicates that the expressed water can exhibit high

pH. ARCADIS is still evaluating the surface water and potential remedial action options for this impacted media. Management of the seeps will be addressed through an addendum to this RAOR.

7.0 Identification of Remedial Action Objectives

Based on the considerations listed above, the following remedial action objectives have been established for the site.

- Prevent or eliminate the potential for direct contact with the residual soil impacts.

- Remediate groundwater to meet the ch. NR 140 groundwater quality standards within a reasonable period of time.

The site is currently vacant and undeveloped. The city of West Allis Community Development Authority is soliciting proposals to develop this property. If the property is developed, additional remediation objectives will apply to address receptors associated with construction and occupancy of the site. These objectives include:

- Protection of site construction workers and the future users of the site from exposure with contaminated soils and groundwater.

- Evaluate the methane data to determine where and what engineer barrier may be necessary to prevent or minimize/eliminate the potential for vapor intrusion into any new buildings that may be constructed at the site.

Limiting potential exposure to surface water exhibiting elevated pH is also a remedial action objective. As stated earlier, ARCADIS is still evaluating the surface water and potential remedial action options for this impacted media. Management of the seeps will be addressed through an addendum to this RAOR.

8.0 Technology Screening

The purpose of technology screening is to identify which remedial technologies should be considered for the more detailed analysis of alternatives, per Chapter NR 722.07. Screening out technologies that are likely to be declared infeasible for a variety of reasons (e.g., unproven/emerging status, high life-cycle cost, incompatibility with site conditions, difficulty in obtaining permits and approvals, etc.) saves time and cost during the remedial action alternatives evaluation, using the primary balancing criteria outlined in Chapter NR 722.07(4). This technology screening was performed consistent with the requirements of Chapter NR 722.07(2).

The intent of this section is not to provide an in-depth discussion of the advantages and disadvantages of each technology. Instead, the rationale for advancing the technology to the detailed analysis of remedial action options or the reasons for eliminating it from further consideration is synopsized.

Based on the development and identification of remedial action objectives, the following RAOs were identified for technology screening:

- Natural attenuation
- Engineering controls
- Institutional controls
- Source soil excavation

8.1 Natural Attenuation

Natural attenuation includes the use of a groundwater monitoring program for the COCs and key geochemical parameters to evaluate and demonstrate the ongoing effectiveness of naturally occurring in-situ processes capable of destroying, transforming or otherwise reducing contaminant concentrations below required standards. The groundwater monitoring program is designed to collect data in specific areas of a groundwater plume (e.g., source, transition zone, and clean downgradient areas). Much literature and regulatory guidance is available for the proper design, sampling, and evaluation of data collected to support monitoring for natural attenuation.

Natural attenuation monitoring is accepted for further consideration for the following reasons:

- The relatively low cost (compared to other technologies) and ease of implementation.
- Data indicates that conditions are conducive to aerobic degradation of the limited concentrations petroleum-based VOCs and PAHs that currently exist at the site.
- This RAO can be easily combined with other RAOs in an overall strategy for addressing the various impacted media.
- The COCs are contained within low permeability silty clay soil and fill materials, which is limiting migration.

8.2 Engineering Controls

Engineering controls are a common method for addressing large areas of low-level impacts, such as those at the site. Engineering controls can consist of relatively simple cover systems, such as clean fill material and vegetation, to limit direct contact with the underlying impacted media. Engineering controls can also include elements of a redevelopment (e.g., buildings, asphalt or concrete pavements, impermeable liners, or vegetated soil covers) and soil vapor control systems that are used to limit vertical upward and downward migration of contaminants. Engineering controls are useful in addressing the soil to groundwater and direct contact (i.e., direct contact, ingestion, inhalation of volatiles or soil particulates) pathways.

Engineering controls is accepted for further consideration for the following reasons:

- The widespread and diffuse nature of the impacts at the site is conducive to this type of RAO.
- The existing site is vacant and unoccupied. Access is controlled with fencing and gates to limit direct contact, and can be used as a short-term engineered barrier.
- The city of West Allis plans to redevelop the site. The site will be redeveloped and include new buildings, paved parking areas, and

landscaping. These development elements can easily be integrated into an engineered barrier.

- This technology is among the least disruptive to both aboveground and underground area structures.

8.3 Institutional Controls

Institutional controls are used to establish obligations regarding implementation and management of other RAOs and notify future parties of the impacts. Institutional controls include:

- Zoning restrictions to limit land use to commercial or industrial.
- Cap maintenance plans, which establish methods for providing long term maintenance of engineered barriers.
- Soil management plans, which are used to establish means and methods for excavating soil being managed in-place at a site.
- Use of the WDNR Geography Information System Registry for Closed Remediation sites (GIS Registry) to document locations of residual soil and groundwater impacts.

Institutional controls are accepted for further consideration for the following reasons:

- Institutional controls are easily adopted, and provide means and methods for managing impacts left in place.
- The use of engineered controls would require the companion use of institutional controls to satisfy long-term notification and management requirements.

8.4 Soil Excavation

Soil excavation is a common way to manage discrete areas of impacted soil. Although soil impacts at the site are diffuse in nature, soil excavation can be used in a targeted manner to remove contaminant mass and facilitate redevelopment. If impacted soil is

managed in place, but is later excavated as part of some other activity, a soil management plan can provide the means and methods for conducting the work.

Soil excavation, where the soil is either disposed of offsite or reconsolidated onsite, is accepted for further consideration for the following reason:

- The remedy is presumptive to address limited areas of soil contamination where soil is excavated as part of the site redevelopment.
- Excavation and offsite disposal does not require complex systems or equipment and can be readily executed by a number of local contractors.

9.0 Remedial Action Selection

The site is currently vacant and undeveloped. However, the city of West Allis plans to redevelop the site for commercial/industrial occupancy. ARCADIS used the results of the technology evaluation from the previous section to develop two remediation strategies. Remediation Strategy No. 1 would be applicable for maintain the site in its current configuration and usage, and includes the following elements:

- Management of the affected soil in-place, using the existing site features and cover, to reduce potential for direct contact.
- Management of the affected groundwater through a monitored natural attenuation (MNA) program.
- Adoption of institutional controls, including a cap maintenance plan and soil management plan, to manage the soil in-place and provide provisions for management if soil needs to be excavated.
- If closure is pursued prior to redevelopment, use of the WDNR GIS registry of closed remediation sites as an additional institutional control.

Remediation Strategy No. 2 takes into account the site's redevelopment. Elements of the development would take the place of the existing site features and serve as engineered barriers. This strategy would include the following elements:

- Management of the affected soil in-place, using the features of the development. These features would be constructed to serve as engineered barriers to reduce the potential for direct contact.
- Conduct targeted excavation, as needed, to facilitate redevelopment. Excavations would include construction of footings, foundations, or utilities. Removal of soil with poor engineering properties may also be conducted to facilitate construction. When possible, the excavated material would be consolidated on-site and covered with an engineered barrier. If on-site management is not feasible, the excavated material would be transported off-site for proper disposal.
- Additional evaluation of vapor intrusion as a potential pathway, and development of vapor mitigation as appropriate.

- Adoption of institutional controls, including a cap maintenance plan and soil management plan, to manage the soil in-place. The soil management plan would provide provisions for management of soil during redevelopment and if soil is excavated at some time after development is completed.

- Management of the affected groundwater through a MNA program.

- Listing of the site on the WDNR GIS registry of closed remediation sites as an additional institutional control.

Both strategies include similar elements, and would offer comparable implementability and effectiveness in the long term. Selection in the short term would be based on the city of West Allis' ability to solicit interest in development and occupancy of the site. Even if Remediation Strategy No. 1 is initially adopted in the short term, it would be the city of West Allis' intent to develop the property, implementing the additional elements of Remediation Strategy No. 2.

10.0 Remedial Action Plan

The remedial action plan presented in this section assumes that Remediation Strategy No. 2 will be implemented in the long term, and assumes that the city of West Allis proceeds with development.

10.1 In-Place Management of Soil

The proposed redevelopment at the site includes commercial and light industrial buildings, paved parking areas, and landscaping. These development elements will serve as engineered barriers, reducing the potential for direct contact. The location of each of these elements will be determined as development planning moves forward. The elements of the development will be designed to meet the requirements of the WDNR guidance document "*Guidance for Cover Systems as Soil Performance Standard Remedies*."

10.2 Targeted Soil Excavation

Redevelopment activities may include soil excavated for utility installation and foundations. Soils may be excavated that exhibit poor geotechnical qualities. If a source of elevated methane (i.e., organic-containing material) is identified, the soil may be excavated to remove the need for a vapor collection system. If sufficient room on-site exists, the excavated soil may be managed on-site. If the site grading or develop plan does not include sufficient room, the excavated soil would be transported off-site for disposal.

10.3 Vapor Monitoring and Mitigation

bi weekly ?

Talk to Tom W. Sooner than later.

Vapor monitoring will be completed bimonthly between March and June 2009 to determine the presence of methane using the existing monitoring well network (16 wells). Based on the concentrations measured at MW-4, additional wells may be installed to delineate the extent and potential source of the vapors. Additionally, groundwater at select wells may be sampled for dissolved gases (ethene, ethane, methane) to assist in evaluating the risk of vapor intrusion.

The vapor data will be evaluated to determine of buildings will need to be constructed with vapor mitigation systems. The existing data suggests that, at more, a passive subslab venting system with no liner would provide sufficient mitigation. Vapor

intrusion controls will be designed, as necessary, based on the location and concentrations of COCs at the site.

10.4 Institutional Controls

ARCADIS has prepared a combined Material Handling and Cap Maintenance Plan, presented in Appendix C. The Material Handling portion of the plan provides a summary of the means and methods to be used in excavating, characterizing and managing soil during development and after development is completed. The Cap Maintenance portion of the plan provides a summary of inspection and maintenance activities for the completed engineered barrier.

Once the criteria for project closure have been met, ARCADIS will prepare a request for project closure in accordance with ch. NR 726. The closure request will include provisions for listing the site on the WDNR GIS Registry of Closed Remediation Sites.

10.5 Monitored Natural Attenuation Groundwater Monitoring Plan

Groundwater VOC, PAH, and metal impacts are delineated. ARCADIS proposes a groundwater monitoring program will be implemented to demonstrate natural attenuation and stable and/or decreasing contaminant trends. Groundwater samples will be laboratory analyzed for VOCs, PAHs, dissolved RCRA metals, in-field pH, and natural attenuation field parameters using low-flow sampling techniques. The monitoring well network (16 monitoring wells) will be sampled for two consecutive events for the aforementioned parameters. Two additional quarters of monitoring will be collected for in-field pH and field parameter measurements. Groundwater samples will be collected following standard sampling procedures and submitted to a WDNR-approved laboratory for analyses. The list of laboratory analyses may be reduced if groundwater analytical results are reported below the PAL following the first sampling event.

10.6 Project Reporting

Following the implementation of the groundwater monitoring program for the site, annual progress reports will be prepared detailing the groundwater quality including trend analysis. Recommendations for additional remedial measures or augmentation of the selected remedial action, if necessary, will be included with the annual report.

11.0 References

Southeast Wisconsin Regional Planning Commission and WGNHS. 2002. Groundwater Resources of Southeast Wisconsin. Technical Paper 37.

U.S. Environmental Protection Agency, 1993. Guidance for Evaluating the Technical Impracticability of Groundwater Restoration. Office of Solid Waste and Emergency Response, Washington, DC. EPA/540-R-93-080.

United States Geological Survey. 1971. Milwaukee Quadrangle Wisconsin Maps. 7.5 Minute Series: 1:24,000.

Wisconsin Administrative Code Chapters NR 700 through 754.

Wisconsin Administrative Code Chapters NR 140, 141, and 149.

Wisconsin Department of Natural Resources. 1997. Soil Cleanup Levels for Polycyclic Aromatic Hydrocarbons (PAHs) Interim Guidance. Publication RR-519-97.

Wisconsin Geological and Natural History Survey. 1984. Pleistocene Stratigraphic Units of Wisconsin. Paper 84-1.

Wisconsin Geological and Natural History Survey. 1976. Glacial Deposits of Wisconsin. Map scale 1:500,000.

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Table 1. Groundwater Elevations, 67th Place Industrial Park, West Allis, Wisconsin.

Well	Date	Top of Casing Elevation (feet msl)	Top of Screen Elevation (feet msl)	Bottom of Screen Elevation (feet msl)	Depth to Water (btoc)	Groundwater Elevation (feet msl)	
MW-1	8/23/2004	731.52	726.52	708.70	10.16	721.36	
	5/10/2005				9.53	721.99	
MW-2	8/23/2004	730.83	725.83	707.40	8.36	722.47	
	5/10/2005				7.50	723.33	
MW-3	8/23/2004	725.15	720.15	702.00	15.16	709.99	
	5/10/2005				6.45	718.70	
MW-4	8/23/2004	723.94	718.94	701.00	10.47	713.47	
	5/10/2005				9.51	714.43	
MW-5	8/23/2004	723.89	718.89	700.70	12.19	711.70	
	5/10/2005				12.29	711.60	
MW-6	8/23/2004	724.84	719.84	701.60	10.77	714.07	
	5/10/2005				10.77	714.07	
MW-7	8/23/2004	726.73	711.73	698.50	9.08	717.65	x 2
	5/10/2005				9.43	717.30	
MW-8	8/23/2004	721.70	716.70	701.90	1.80	719.90	x 2
	5/10/2005				0.58	721.12	
MW-9	8/23/2004	724.95	719.95	701.70	7.48	717.47	
	5/10/2005				6.65	718.30	
MW-10	8/23/2004	727.07	722.07	704.10	9.70	717.37	
	5/10/2005				4.36	722.71	
MW-11	8/23/2004	728.65	723.65	700.30	8.53	720.12	
	5/10/2005				8.32	720.33	
MW-12	8/23/2004	723.63	718.63	700.20	15.27	708.36	
	5/10/2005				15.57	708.06	
MW-13	8/23/2004	727.44	722.44	704.30	8.78	718.66	
	5/10/2005				7.71	719.73	
MW-14	8/23/2004	725.75	720.75	702.40	9.50	716.25	
	5/10/2005				8.35	717.40	

btoc Below top of casing.
msl Mean sea level.

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Table 2. Soil DRO, GRO, and VOC Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID Sample Date Sample Depth (feet)	NR 720 RCL	Ingestion SSL	Inhalation of Dust SSL	Inhalation of Vapors SSL	Groundwater Pathway SSL	SB-1 02/20/04 0-4	SB-2 02/20/04 0-4	SB-3 02/20/04 0-4
DRO (mg/kg)	100	NE	NE	NE	NE	**160**	58	14
GRO (mg/kg)	100	NE	NE	NE	NE	<10	<10	<10
VOC (µg/kg)								
Naphthalene	NE	313,000	294,000,000	41,000	3,100	250	<25	<25
Toluene	1,500	1,250,000	489,000,000,000	5,000,000	720	<25	<25	<25
Tetrachloroethene	NE	1,230	197,000,000	1,300	4.1	<25	<25	<25
1,2,4-Trimethylbenzene	NE	782,000	587,000,000	30,000	14,000	<25	<25	<25
Xylenes	4,100	3,130,000	9,790,000,000	170,000	7,900	<25	<25	<25

Bold	Concentration exceeds the NR 720 Wis.Adm. Code RCL.
Italic	Concentrations exceeds the inhalation of vapors SSL.
Underline	Concentration exceeds the soil to groundwater pathway SSL.
DRO	Diesel range organics.
GRO	Gasoline range organics.
NA	Not analyzed.
NE	Not established.
µg/kg	Micrograms per kilogram.
mg/kg	Milligrams per kilogram.
RCL	Residual contaminant level.
SSL	Soil screening level.
VOCs	Volatile organic compounds.
Wis. Adm. Code	Wisconsin Administrative Code.

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Table 2. Soil DRO, GRO, and VOC Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	SB-10	SB-11	SB-12	SB-13
Sample Date	**02/20/04**	**02/20/04**	**02/20/04**	**02/20/04**	**02/20/04**	**02/20/04**	**02/20/04**	**05/27/04**	**05/27/04**	**05/27/04**
Sample Depth (feet)	**0-4**	**0-4**	**0-4**	**0-4**	**0-4**	**0-4**	**0-4**	**0-4**	**0-4**	**0-3**
DRO (mg/kg)	**190**	28	**450**	**450**	**350**	**200**	84	NA	NA	NA
GRO (mg/kg)	<10	<10	11	<10	<10	<10	<10	NA	NA	NA
VOC (µg/kg)										
Naphthalene	38 J	<25	*130,000*	157	1,540	257	69	1,330	1,330	2,460
Toluene	<25	<25	29	<25	<25	<25	<25	<25	<25	<25
Tetrachloroethene	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
1,2,4-Trimethylbenzene	<25	<25	37	<25	<25	<25	<25	<25	<25	<25
Xylenes	<25	<25	32	<25	<25	<25	<25	<25	<25	<25

Bold	Concentration exceeds the NR 720 Wis.Adm. Code RCL.
Italic	Concentrations exceeds the inhalation of vapors SSL.
Underline	Concentration exceeds the soil to groundwater pathway SSL.
DRO	Diesel range organics.
GRO	Gasoline range organics.
NA	Not analyzed.
NE	Not established.
µg/kg	Micrograms per kilogram.
mg/kg	Milligrams per kilogram.
RCL	Residual contaminant level.
SSL	Soil screening level.
VOCs	Volatile organic compounds.
Wis. Adm. Code	Wisconsin Administrative Code.

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Table 2. Soil DRO, GRO, and VOC Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-14	SB-15	SB-18	SB-19	SB-20	SB-22	SB-24	SB-26	SB-27
Sample Date	**05/27/04**	**05/27/04**	**05/27/04**	**05/27/04**	**05/27/04**	**05/27/04**	**05/27/04**	**01/09/07**	**01/09/07**
Sample Depth (feet)	**0-4**	**0-4**	**4-8**	**0-4**	**0-4**	**4-8**	**3-4**	**3-4**	**3-4**
DRO (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOC (µg/kg)									
Naphthalene	25 J	<25	107	338	633	320	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25	<25	<25	<25
Tetrachloroethene	<25	<25	<25	<25	<25	<25	<25	<25	<25
1,2,4-Trimethylbenzene	<25	<25	<25	<25	<25	<25	<25	<25	<25
Xylenes	<25	<25	<25	<25	<25	<25	<25	<25	<25

Bold	Concentration exceeds the NR 720 Wis.Adm. Code RCL.
Italic	Concentrations exceeds the inhalation of vapors SSL.
Underline	Concentration exceeds the soil to groundwater pathway SSL.
DRO	Diesel range organics.
GRO	Gasoline range organics.
NA	Not analyzed.
NE	Not established.
µg/kg	Micrograms per kilogram.
mg/kg	Milligrams per kilogram.
RCL	Residual contaminant level.
SSL	Soil screening level.
VOCs	Volatile organic compounds.
Wis. Adm. Code	Wisconsin Administrative Code.

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Table 2. Soil DRO, GRO, and VOC Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-28	SB-29	SB-30	SB-31	SB-32	SB-33	SB-34	SB-35	SB-36	SB-37
Sample Date	**01/09/07**	**01/09/07**	**01/09/07**	**01/09/07**	**01/09/07**	**01/09/07**	**01/09/07**	**01/09/07**	**01/09/07**	**01/09/07**
Sample Depth (feet)	**3-4**	**2-3**	**5-6**	**3-4**	**3-4**	**3-4**	**5-6**	**3-4**	**3-4**	**3-4**
DRO (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOC (µg/kg)										
Naphthalene	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
Tetrachloroethene	<25	<25	<25	<25	49 J	<25	<25	<25	<25	<25
1,2,4-Trimethylbenzene	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
Xylenes	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25

Bold	Concentration exceeds the NR 720 Wis.Adm. Code RCL.
Italic	Concentrations exceeds the inhalation of vapors SSL.
Underline	Concentration exceeds the soil to groundwater pathway SSL.
DRO	Diesel range organics.
GRO	Gasoline range organics.
NA	Not analyzed.
NE	Not established.
µg/kg	Micrograms per kilogram.
mg/kg	Milligrams per kilogram.
RCL	Residual contaminant level.
SSL	Soil screening level.
VOCs	Volatile organic compounds.
Wis. Adm. Code	Wisconsin Administrative Code.

Table 3. Soil PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	Proposed	Proposed	Proposed	SB-1	SB-2	SB-3	SB-4	SB-5
Sample	Groundwater	Direct Contact	Direct Contact	02/20/04	02/20/04	02/20/04	02/20/04	02/20/04
Sample	Protection RCL	Non-Industrial RCL	Industrial RCL	0-4	0-4	0-4	0-4	0-4
PAHs (mg/kg)								
Acenaphthene	38	900	60,000	< 0.056	<0.28	<0.028	<0.56	<0.14
Acenaphthylene	0.7	18	360	**2.9**	<0.32	<0.032	<0.64	<0.16
Anthracene	3,000	5,000	300,000	3	0.77 J	<0.046	1.04 J	<0.23
Benz(a) anthracene	17	0.088	3.9	*6.2*	*1 J*	0.04 J	*1.6 J*	*0.53 J*
Benzo(a) pyrene	48	0.0088	0.39	*8.4*	*1.1 J*	*0.045 J*	*1.6 J*	*0.6 J*
Benzo(b) fluoranthene	360	0.088	3.9	*6.2*	*1.5*	*0.09 J*	*2.3 J*	*1*
Benzo (g,h,i) perylene	6,800	1.8	39	*6.6*	0.46 J	<0.032	<0.64	0.22 J
Benzo(k) fluoranthene	870	0.88	39	*2.7*	<0.45	<0.045	<0.9	0.25 J
Chrysene	37	8.8	390	6.9	0.89 J	<0.046	1.6 J	0.64 J
Dibenz (a,h) anthracene	38	0.0088	0.39	*1.6*	<0.47	<0.047	<0.94	<0.235
Fluoranthene	500	600	40,000	12	2.4	0.084 J	3.8	1.1
Fluorene	100	600	40,000	0.83 J	<0.32	<0.032	<0.64	<0.16
Indeno (1,2,3-cd) pyrene	680	0.088	3.9	*5.9*	<0.56	<0.056	<1.12	<0.28
1-Methyl naphthalene	23	1,100	70,000	<0.094	<0.47	<0.047	<0.94	<0.235
2-Methyl naphthalene	20	600	40,000	<0.044	<0.22	<0.022	<0.44	<0.11
Naphthalene	0.4	20	110	<0.078	<0.39	<0.039	<0.78	<0.195
Phenanthrene	1.8	18	390	**6.4**	1.7	0.041 J	**2.2 J**	0.43 J
Pyrene	8,700	500	30,000	11	2.1	0.079 J	3.4	0.98

Bold	Concentration exceeds the WDNR Proposed Groundwater Protection RCL for PAHs.
Italic	Concentration exceeds the WDNR Proposed Non-Industrial Direct Contact RCL for PAHs.
Underline	Concentration exceeds the WDNR Proposed Industrial Direct Contact RCL for PAHs.
mg/kg	Milligrams per kilogram.
PAHs	Polycyclic aromatic hydrocarbons.
RCL	Residual contaminant level.

Table 3. Soil PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-6	SB-7	SB-8	SB-9	SB-10	SB-11	SB-12	SB-13	SB-14	SB-15
Sample	02/20/04	02/20/04	02/20/04	02/20/04	02/20/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04
Sample	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-3	0-4	0-4
PAHs (mg/kg)										
Acenaphthene	15	<1.4	20	3.1 J	<1.4	7.4 J	18	6.9	<0.028	<0.028
Acenaphthylene	<1.6	**1.9 J**	**2.5 J**	<1.6	<1.6	<3.2	**4 J**	**3.6 J**	0.035 J	0.056 J
Anthracene	29	5.1 J	49	11	6.2J	17	66	23	<0.046	<0.046
Benz(a) anthracene	***23***	*11*	***75***	*16*	*11*	***32***	***99***	***41***	*0.092 J*	*0.14*
Benzo(a) pyrene	*21*	*14*	*46*	*15 J*	*11*	*26*	***80***	*35*	*0.11 J*	*0.16*
Benzo(b) fluoranthene	*25*	*16*	*90*	*20*	*13*	*31*	*94*	*49*	*0.17*	*0.25*
Benzo (g,h,i) perylene	*9.2*	*6.2*	*30*	*5.7*	*3.9 J*	*15*	*43*	*17*	<0.032	0.084 J
Benzo(k) fluoranthene	*9.8*	*7.8*	*30*	*5.2 J*	*4.2 J*	*14*	*41*	*19*	0.064 J	0.091 J
Chrysene	*23*	*12*	***68***	*16*	*11*	*30*	***90***	***40***	0.11 J	0.18
Dibenz (a,h) anthracene	*2.9 J*	<2.35	*9.7*	<2.35	<2.35	<4.7	*13 J*	*5.6 J*	<0.047	<0.047
Fluoranthene	50	22	180	33	21	76	180	69	0.2	0.32
Fluorene	19	1.6 J	25	4.4 J	1.9 J	8.7 J	29	8.1	<0.032	<0.032
Indeno (1,2,3-cd) pyrene	*9.4*	*6 J*	*32*	*6.4 J*	*4.6 J*	*14 J*	*40*	*17*	<0.056	0.081 J
1-Methyl naphthalene	4.8 J	<2.35	2.7 J	<2.35	<2.35	<4.7	<4.7	<2.35	<0.047	<0.047
2-Methyl naphthalene	9.5	<1.1	2.9 J	<1.1	<1.1	<2.2	<2.2	<1.1	<0.022	<0.022
Naphthalene	***37***	<1.95	**5 J**	<1.95	<1.95	<3.9	<3.9	<1.95	<0.039	<0.039
Phenanthrene	***59***	**11**	***150***	***24***	**13**	***54***	***140***	***53***	0.13	0.14
Pyrene	45	19	170	29	18	69	170	71	0.2	0.34

Bold	Concentration exceeds the WDNR Proposed Groundwater Protection RCL for PAHs.
Italic	Concentration exceeds the WDNR Proposed Non-Industrial Direct Contact RCL for PAHs.
Underline	Concentration exceeds the WDNR Proposed Industrial Direct Contact RCL for PAHs.
mg/kg	Milligrams per kilogram.
PAHs	Polycyclic aromatic hydrocarbons.
RCL	Residual contaminant level.

Table 3. Soil PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-16	SB-17	SB-18		SB-19	SB-20	SB-21	SB-22	SB-23	SB-24
Sample	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04
Sample	0-4	0-4	0-4	4-8	0-4	0-4	0-3	4-8	0-4	3-4
PAHs (mg/kg)										
Acenaphthene	<0.028	<0.028	<0.28	<0.028	<1.4	1.3 J	7.4 J	0.2	<0.028	<0.028
Acenaphthylene	<0.032	<0.032	<0.32	0.069 J	<1.6	<0.64	<3.2	0.055 J	<0.032	<0.032
Anthracene	0.053 J	<0.046	<0.46	<0.046	3 J	3.8	23	0.57	0.11 J	<0.046
Benz(a) anthracene	*0.11*	<0.033	*0.91J*	*0.15*	*4.2 J*	*5.6*	***46***	*0.98*	*0.42*	<0.033
Benzo(a) pyrene	*0.095 J*	<0.043	*0.9 J*	*0.26*	*3.6 J*	*5.1*	*39*	*0.88*	*0.43*	<0.043
Benzo(b) fluoranthene	*0.14*	<0.042	*1.2 J*	*0.33*	*4.2 J*	*6.1*	*48*	*1.2*	*0.65*	<0.042
Benzo (g,h,i) perylene	0.033 J	<0.032	0.32 J	0.11	1.6 J	*2.3*	*17*	0.26	0.14	<0.032
Benzo(k) fluoranthene	<0.045	<0.045	0.47 J	0.1 J	<2.25	*2.5 J*	*20*	*0.41*	*0.21*	<0.045
Chrysene	0.11 J	<0.046	0.88 J	0.16	4.5 J	5.3	***44***	0.92	0.46	<0.046
Dibenz (a,h) anthracene	<0.047	<0.047	<0.47	<0.047	<2.35	<0.94	*5.7 J*	*0.09 J*	*0.057 J*	<0.047
Fluoranthene	0.24	0.047 J	1.9	0.2	11	12	90	1.6	0.83	<0.030
Fluorene	<0.032	<0.032	<0.32	<0.032	<1.6	1.7 J	7.8 J	0.25	<0.032	<0.032
Indeno (1,2,3-cd) pyrene	<0.056	<0.056	<0.56	*0.11 J*	<2.8	*2.4 J*	*17*	*0.28*	*0.16 J*	<0.056
1-Methyl naphthalene	<0.047	<0.047	<0.47	<0.047	<2.35	<0.94	<4.7	<0.047	<0.047	<0.047
2-Methyl naphthalene	<0.022	<0.022	<0.22	<0.022	<1.1	<0.44	<2.2	0.031 J	<0.022	<0.022
Naphthalene	<0.039	<0.039	<0.39	<0.039	<1.95	<0.78	<3.9	0.04 J	<0.039	<0.039
Phenanthrene	0.15	<0.036	1.2	0.1 J	**11**	**12**	***58***	1.3	0.39	<0.036
Pyrene	0.26	0.050 J	2	0.26	11	12	91	1.7	0.99	<0.039

Bold	Concentration exceeds the WDNR Proposed Groundwater Protection RCL for PAHs.
Italic	Concentration exceeds the WDNR Proposed Non-Industrial Direct Contact RCL for PAHs.
Underline	Concentration exceeds the WDNR Proposed Industrial Direct Contact RCL for PAHs.
mg/kg	Milligrams per kilogram.
PAHs	Polycyclic aromatic hydrocarbons.
RCL	Residual contaminant level.

Table 3. Soil PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-25	SB-26	SB-27	SB-28	SB-29	SB-30	SB-31	SB-32	SB-33	SB-34
Sample	05/27/04	01/09/07	01/09/07	01/09/07	01/09/07	01/09/07	01/09/07	01/09/07	01/09/07	01/09/07
Sample	0-4	3-4	3-4	3-4	2-3	5-6	3-4	3-4	3-4	5-6
PAHs (mg/kg)										
Acenaphthene	<0.028	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017
Acenaphthylene	<0.032	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019
Anthracene	<0.046	<0.011	<0.011	0.013 J	0.036	<0.011	<0.011	<0.011	<0.011	<0.011
Benz(a) anthracene	<0.033	<0.012	<0.012	0.029 J	0.038	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a) pyrene	<0.043	<0.0081	<0.0081	*0.023 J*	*0.026 J*	<0.0081	<0.0081	<0.0081	<0.0081	<0.0081
Benzo(b) fluoranthene	<0.042	<0.0075	<0.0075	0.038	0.04	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075
Benzo (g,h,i) perylene	<0.032	<0.0085	<0.0085	0.021 J	0.023 J	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085
Benzo(k) fluoranthene	<0.045	<0.014	<0.014	0.017 J	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
Chrysene	<0.046	<0.020	<0.020	0.035 J	0.045 J	<0.020	<0.020	<0.020	<0.020	<0.020
Dibenz (a,h) anthracene	<0.047	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Fluoranthene	<0.030	<0.0074	0.0081 J	0.074	0.068	<0.0074	<0.0074	<0.0074	<0.0074	<0.0074
Fluorene	<0.032	<0.0095	<0.0095	<0.0095	0.011 J	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095
Indeno (1,2,3-cd) pyrene	<0.056	<0.0095	<0.0095	0.014 J	0.013 J	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095
1-Methyl naphthalene	<0.047	<0.011	<0.011	<0.011	0.059	<0.011	<0.011	<0.011	<0.011	<0.011
2-Methyl naphthalene	<0.022	<0.012	<0.012	<0.012	0.043	<0.012	<0.012	<0.012	<0.012	<0.012
Naphthalene	<0.039	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017
Phenanthrene	<0.036	<0.0089	<0.0089	0.033	0.26	<0.0089	<0.0089	<0.0089	<0.0089	<0.0089
Pyrene	<0.039	<0.011	<0.011	0.055	0.068	<0.011	<0.011	<0.011	<0.011	<0.011

Bold	Concentration exceeds the WDNR Proposed Groundwater Protection RCL for PAHs.
Italic	Concentration exceeds the WDNR Proposed Non-Industrial Direct Contact RCL for PAHs.
Underline	Concentration exceeds the WDNR Proposed Industrial Direct Contact RCL for PAHs.
mg/kg	Milligrams per kilogram.
PAHs	Polycyclic aromatic hydrocarbons.
RCL	Residual contaminant level.

Table 3. Soil PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-35	SB-36	SB-37	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Sample	01/09/07	01/09/07	01/09/07	08/02/04	08/02/04	08/02/04	08/03/04	08/03/04	08/03/04	08/03/04
Sample	3-4	3-4	3-4	18 -20	12-14	9-11	12-14	13.5-14	15-17	3-5
PAHs (mg/kg)										
Acenaphthene	<0.017	<0.017	<0.017	<0.041	<0.041	<0.041	<0.041	0.097 J	<0.041	<0.041
Acenaphthylene	<0.019	<0.019	<0.019	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042
Anthracene	<0.011	<0.011	<0.011	<0.034	<0.034	<0.034	<0.034	0.2	<0.034	<0.034
Benz(a) anthracene	0.013 J	<0.012	<0.012	<0.054	<0.054	<0.054	<0.054	*0.34*	<0.054	<0.054
Benzo(a) pyrene	<0.0081	<0.0081	<0.0081	<0.059	<0.059	<0.059	<0.059	*0.32*	<0.059	<0.059
Benzo(b) fluoranthene	0.0098 J	<0.0075	<0.0075	<0.042	<0.042	<0.042	<0.042	*0.41*	<0.042	<0.042
Benzo (g,h,i) perylene	<0.0085	<0.0085	<0.0085	<0.082	<0.082	<0.082	<0.082	0.11 J	<0.082	<0.082
Benzo(k) fluoranthene	<0.014	<0.014	<0.014	<0.079	<0.079	<0.079	<0.079	0.12 J	<0.079	<0.079
Chrysene	<0.020	<0.020	<0.020	<0.038	<0.038	<0.038	<0.038	0.33	<0.038	<0.038
Dibenz (a,h) anthracene	<0.011	<0.011	<0.011	<0.076	<0.076	<0.076	<0.076	<0.076	<0.076	<0.076
Fluoranthene	0.021 J	<0.0074	<0.0074	<0.042	<0.042	<0.042	<0.042	0.83	<0.042	<0.042
Fluorene	<0.0095	<0.0095	<0.0095	<0.041	<0.041	<0.041	<0.041	0.14	<0.041	<0.041
Indeno (1,2,3-cd) pyrene	<0.0095	<0.0095	<0.0095	<0.069	<0.069	<0.069	<0.069	*0.13 J*	<0.069	<0.069
1-Methyl naphthalene	<0.011	<0.011	<0.011	<0.037	<0.037	<0.037	<0.037	0.048 J	<0.037	<0.037
2-Methyl naphthalene	<0.012	<0.012	<0.012	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072
Naphthalene	<0.017	<0.017	<0.017	<0.040	<0.040	<0.040	<0.040	0.31	<0.040	<0.040
Phenanthrene	0.014 J	<0.0089	<0.0089	0.022 J	<0.020	<0.020	<0.020	0.75	<0.020	<0.020
Pyrene	0.018 J	<0.011	<0.011	<0.058	<0.058	<0.058	<0.058	0.74	<0.058	<0.058

Bold	Concentration exceeds the WDNR Proposed Groundwater Protection RCL for PAHs.
Italic	Concentration exceeds the WDNR Proposed Non-Industrial Direct Contact RCL for PAHs.
Underline	Concentration exceeds the WDNR Proposed Industrial Direct Contact RCL for PAHs.
mg/kg	Milligrams per kilogram.
PAHs	Polycyclic aromatic hydrocarbons.
RCL	Residual contaminant level.

Table 3. Soil PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	MW-8		MW-9	MW-10	MW-11	MW-12	MW-13	MW-14
Sample	08/09/04	08/09/04	08/09/04	08/09/04	08/09/04	08/09/04	08/09/04	08/09/04
Sample	2-3	4-6	8.5-9	4-6	4-6	4-6	4-6	4-6
PAHs (mg/kg)								
Acenaphthene	0.110 J	<0.041	<0.041	<0.041	<0.041	1.4	<0.041	0.37
Acenaphthylene	0.31	<0.042	<0.042	<0.042	<0.042	0.24	<0.042	<0.042
Anthracene	0.41	<0.034	<0.034	<0.034	<0.034	5.7 J	<0.034	0.17
Benz(a) anthracene	*1.2*	<0.054	<0.054	<0.054	<0.054	*11*	<0.054	*0.38*
Benzo(a) pyrene	*1.3*	<0.059	<0.059	<0.059	<0.059	*9.7*	<0.059	*0.38*
Benzo(b) fluoranthene	*1.8*	<0.042	<0.042	<0.042	<0.042	*12*	<0.042	*0.38*
Benzo (g,h,i) perylene	0.3	<0.082	<0.082	<0.082	<0.082	*4.6 J*	<0.082	<0.082
Benzo(k) fluoranthene	*0.95*	<0.079	<0.079	<0.079	<0.079	*4.1 J*	<0.079	0.27
Chrysene	1.5	<0.038	<0.038	<0.038	<0.038	*11*	<0.038	0.43
Dibenz (a,h) anthracene	*0.12 J*	<0.076	<0.076	<0.076	<0.076	*0.63*	<0.076	<0.076
Fluoranthene	3.4	<0.042	<0.042	<0.042	<0.042	28	<0.042	0.8
Fluorene	0.17	<0.041	<0.041	<0.041	<0.041	2.3 J	<0.041	0.24
Indeno (1,2,3-cd) pyrene	*0.31*	<0.069	<0.069	<0.069	<0.069	*4.3 J*	<0.069	0.074 J
1-Methyl naphthalene	0.041 J	<0.037	<0.037	<0.037	<0.037	0.21	<0.037	0.110 J
2-Methyl naphthalene	<0.072	<0.072	<0.072	<0.072	<0.072	0.24	<0.072	0.220 J
Naphthalene	0.078 J	<0.040	<0.040	<0.040	<0.040	**0.6**	<0.040	0.18
Phenanthrene	1.4	<0.020	<0.020	<0.020	<0.020	***20***	0.021 J	0.68
Pyrene	3	<0.058	<0.058	<0.058	<0.058	24	<0.058	0.93

Bold	Concentration exceeds the WDNR Proposed Groundwater Protection RCL for PAHs.
Italic	Concentration exceeds the WDNR Proposed Non-Industrial Direct Contact RCL for PAHs.
Underline	Concentration exceeds the WDNR Proposed Industrial Direct Contact RCL for PAHs.
mg/kg	Milligrams per kilogram.
PAHs	Polycyclic aromatic hydrocarbons.
RCL	Residual contaminant level.

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Table 4. Soil Benzo(a)pyrene Equivalent Residual Contaminant Level Calculations and Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	Relative	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8
Sample Date	Potency	02/20/04	02/20/04	02/20/04	02/20/04	02/20/04	02/20/04	02/20/04	02/20/04
Sample Depth (Feet)	Factor	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4
PAHs (mg/kg)									
Acenaphthene	0.001	*0.028*	*0.14*	*0.014*	*0.28*	*0.07*	15	*0.7*	20
Acenaphthylene	0.001	2.9	*0.16*	*0.016*	*0.32*	*0.08*	*0.8*	1.9	2.5
Anthracene	0.01	3	0.77	*0.023*	1.04	*0.115*	29	5.1	49
Benz(a) anthracene	0.1	*6.2*	1	0.04	1.6	0.53	23	11	75
Benzo(a) pyrene	1	*8.4*	1.1	0.045	1.6	0.6	21	14	46
Benzo(b) fluoranthene	0.1	*6.2*	1.5	0.09	2.3	1	25	16	90
Benzo (g,h,i) perylene	0.1	*6.6*	0.46	*0.016*	*0.32*	0.22	9.2	6.2	30
Benzo(k) fluoranthene	0.1	*2.7*	*0.225*	*0.0225*	*0.45*	0.25	9.8	7.8	30
Chrysene	0.001	6.9	0.89	*0.023*	1.6	0.64	23	12	68
Dibenz (a,h) anthracene	1	*1.6*	*0.235*	*0.0235*	*0.47*	*0.1175*	2.9	*1.175*	9.7
Fluoranthene	0.001	12	2.4	0.084	3.8	1.1	50	22	180
Fluorene	0.001	0.83	*0.16*	*0.016*	*0.32*	*0.08*	19	1.6	25
Indeno (1,2,3-cd) pyrene	0.1	5.9	*0.28*	*0.028*	*0.56*	*0.14*	9.4	6	32
1-Methyl naphthalene	0.001	*0.047*	*0.235*	*0.0235*	*0.47*	*0.1175*	4.8	*1.175*	2.7
2-Methyl naphthalene	0.001	*0.022*	*0.11*	*0.011*	*0.22*	*0.055*	9.5	*0.55*	2.9
Naphthalene	0.001	*0.039*	*0.195*	*0.0195*	*0.39*	*0.0975*	37	*0.975*	5
Phenanthrene	0.001	6.4	1.7	0.041	2.2	0.43	59	11	150
Pyrene	0.001	11	2.1	0.079	3.4	0.98	45	19	170
BaP_{equiv} (µg/kg)		12.83	1.70	0.09	2.62	0.94	32.09	20.00	82.52
BaP_{equiv} (mg/kg)		0.0128	0.0017	0.0001	0.0026	0.0009	0.0321	0.0200	0.0825

Minimum (mg/kg)	0.00001
Maximum (mg/kg)	0.12600
Sample Count	41
Standard Deviation	0.02611
95% Upper Confidence Level	0.008
Non-Industrial Ingestion RCL	880 µg/kg
Industrial Ingestion RCL	3,900 µg/kg

BaP_{equiv} Calculated benzo(a)pyrene equivalent concentration.
µg/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.

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Table 4. Soil Benzo(a)pyrene Equivalent Residual Contaminant Level Calculations and Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-9	SB-10	SB-11	SB-12	SB-13	SB-14	SB-15	SB-16	SB-17
Sample Date	02/20/04	02/20/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04
Sample Depth (Feet)	0-4	0-4	0-4	0-4	0-3	0-4	0-4	0-4	0-4
PAHs (mg/kg)									
Acenaphthene	3.1	*0.7*	7.4	18	6.9	*0.014*	*0.014*	*0.014*	*0.014*
Acenaphthylene	*0.8*	*0.8*	*1.6*	4	3.6	0.035	0.056	*0.016*	*0.016*
Anthracene	11	6.2	17	66	23	*0.023*	*0.023*	0.053	*0.023*
Benz(a) anthracene	16	11	32	99	41	0.092	0.14	0.11	*0.0165*
Benzo(a) pyrene	15	11	26	80	35	0.11	0.16	0.095	*0.0215*
Benzo(b) fluoranthene	20	13	31	94	49	0.17	0.25	0.14	*0.021*
Benzo (g,h,i) perylene	5.7	3.9	15	43	17	*0.016*	0.084	0.033	*0.016*
Benzo(k) fluoranthene	5.2	4.2	14	41	19	0.064	0.091	*0.0225*	*0.0225*
Chrysene	16	11	30	90	40	0.11	0.18	0.11	*0.023*
Dibenz (a,h) anthracene	*1.175*	*1.175*	*2.35*	13	5.6	*0.0235*	*0.0235*	*0.0235*	*0.0235*
Fluoranthene	33	21	76	180	69	0.2	0.32	0.24	0.047
Fluorene	4.4	1.9	8.7	29	8.1	*0.016*	*0.016*	*0.016*	*0.016*
Indeno (1,2,3-cd) pyrene	6.4	4.6	14	40	17	*0.028*	0.081	*0.028*	*0.028*
1-Methyl naphthalene	*1.175*	*1.175*	*2.35*	*2.35*	*1.175*	*0.0235*	*0.0235*	*0.0235*	*0.0235*
2-Methyl naphthalene	*0.55*	*0.55*	*1.1*	*1.1*	*0.55*	*0.011*	*0.011*	*0.011*	*0.011*
Naphthalene	*0.975*	*0.975*	*1.95*	*1.95*	*0.975*	*0.0195*	*0.0195*	*0.0195*	*0.0195*
Phenanthrene	24	13	54	140	53	0.13	0.14	0.15	*0.018*
Pyrene	29	18	69	170	71	0.2	0.34	0.26	0.05
BaP_{equiv} (µg/kg)	21.73	15.98	39.37	126.00	55.38	0.17	0.25	0.15	0.06
BaP_{equiv} (mg/kg)	0.0217	0.0160	0.0394	0.1260	0.0554	0.0002	0.0002	0.0002	0.0001

Minimum (mg/kg)	0.00001
Maximum (mg/kg)	0.12600
Sample Count	41
Standard Deviation	0.02611
95% Upper Confidence Level	0.008
Non-Industrial Ingestion RCL	880 µg/kg
Industrial Ingestion RCL	3,900 µg/kg

BaP_{equiv} Calculated benzo(a)pyrene equivalent concentration.
µg/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.

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Table 4. Soil Benzo(a)pyrene Equivalent Residual Contaminant Level Calculations and Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-18		SB-19	SB-20	SB-21	SB-22	SB-23	SB-27	SB-28	SB-29
Sample Date	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	05/27/04	01/09/07	01/09/07	01/09/07
Sample Depth (Feet)	0-4	4-8	0-4	0-4	0-3	4-8	0-4	3-4	3-4	2-3
PAHs (mg/kg)										
Acenaphthene	*0.014*	*0.014*	*0.7*	1.3	7.4	0.2	*0.014*	*0.0085*	*0.0085*	*0.0085*
Acenaphthylene	*0.016*	0.069	*0.8*	*0.32*	*1.6*	0.055	*0.016*	*0.0095*	*0.0095*	*0.0095*
Anthracene	*0.023*	*0.023*	3	3.8	23	0.57	0.11	*0.0055*	0.013	0.036
Benz(a) anthracene	0.91	0.15	4.2	5.6	46	0.98	0.42	*0.0006*	0.029	0.038
Benzo(a) pyrene	0.9	0.26	3.6	5.1	39	0.88	0.43	*0.00405*	0.023	0.026
Benzo(b) fluoranthene	1.2	0.33	4.2	6.1	48	1.2	0.65	*0.00375*	0.038	0.04
Benzo (g,h,i) perylene	0.32	0.11	1.6	2.3	17	0.26	0.14	*0.00425*	0.021	0.023
Benzo(k) fluoranthene	0.47	0.1	*1.125*	2.5	20	0.41	0.21	*0.007*	0.017	*0.007*
Chrysene	0.88	0.16	4.5	5.3	44	0.92	0.46	*0.01*	0.035	0.045
Dibenz (a,h) anthracene	*0.0235*	*0.0235*	*1.175*	*0.47*	5.7	0.09	0.057	*0.0055*	*0.0055*	*0.0055*
Fluoranthene	1.9	0.2	11	12	90	1.6	0.83	0.0081	0.074	0.068
Fluorene	*0.016*	*0.016*	*0.8*	1.7	7.8	0.25	*0.016*	*0.00475*	*0.00475*	0.011
Indeno (1,2,3-cd) pyrene	*0.028*	0.11	*1.4*	2.4	17	0.28	0.16	*0.00475*	*0.014*	0.013
1-Methyl naphthalene	*0.0235*	*0.0235*	*1.175*	*0.47*	*2.35*	*0.0235*	*0.0235*	*0.0055*	*0.0055*	0.059
2-Methyl naphthalene	*0.011*	*0.011*	*0.55*	*0.22*	*1.1*	0.031	*0.011*	*0.006*	*0.006*	0.043
Naphthalene	*0.0195*	*0.0195*	*0.975*	*0.39*	*1.95*	0.04	*0.0195*	*0.0085*	*0.0085*	*0.0085*
Phenanthrene	1.2	0.1	11	12	58	1.3	0.39	*0.00445*	0.033	0.26
Pyrene	2	0.26	11	12	91	1.7	0.99	*0.0055*	0.055	0.068
BaP_{equiv} (µg/kg)	1.22	0.36	6.10	7.54	60.04	1.29	0.65	0.01	0.04	0.04
BaP_{equiv} (mg/kg)	0.0012	0.0004	0.0061	0.0075	0.0600	0.0013	0.0006	0.00001	0.00004	0.00004

Minimum (mg/kg)	0.00001
Maximum (mg/kg)	0.12600
Sample Count	41
Standard Deviation	0.02611
95% Upper Confidence Level	0.008
Non-Industrial Ingestion RCL	880 µg/kg
Industrial Ingestion RCL	3,900 µg/kg

BaP_{equiv} Calculated benzo(a)pyrene equivalent concentration.
µg/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.

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Table 4. Soil Benzo(a)pyrene Equivalent Residual Contaminant Level Calculations and Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	SB-35	SB-36	SB-37	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Sample Date	01/09/07	01/09/07	01/09/07	08/02/04	08/02/04	08/02/04	08/03/04	08/03/04	08/03/04	08/03/04
Sample Depth (Feet)	3-4	3-4	3-4	18 -20	12-14	9-11	12-14	13.5-14	15-17	3-5
PAHs (mg/kg)										
Acenaphthene	*0.0085*	*0.0085*	*0.0085*	*0.0205*	*0.0205*	*0.0205*	*0.0205*	0.097	*0.0205*	*0.0205*
Acenaphthylene	*0.0095*	*0.0095*	*0.0095*	*0.021*	*0.021*	*0.021*	*0.021*	*0.021*	*0.021*	*0.021*
Anthracene	*0.0055*	*0.0055*	*0.0055*	*0.017*	*0.017*	*0.017*	*0.017*	0.2	*0.017*	*0.017*
Benz(a) anthracene	0.013	0.006	0.006	*0.027*	*0.027*	*0.027*	*0.027*	0.34	*0.027*	*0.027*
Benzo(a) pyrene	*0.00405*	*0.00405*	*0.00405*	*0.0295*	*0.0295*	*0.0295*	*0.0295*	0.32	*0.0295*	*0.0295*
Benzo(b) fluoranthene	0.0098	*0.00375*	*0.00375*	*0.021*	*0.021*	*0.021*	*0.021*	0.41	*0.021*	*0.021*
Benzo (g,h,i) perylene	*0.00425*	*0.00425*	*0.00425*	*0.041*	*0.041*	*0.041*	*0.041*	0.11	*0.041*	*0.041*
Benzo(k) fluoranthene	*0.007*	*0.007*	*0.007*	*0.0395*	*0.0395*	*0.0395*	*0.0395*	0.12	*0.0395*	*0.0395*
Chrysene	*0.01*	*0.01*	*0.01*	*0.019*	*0.019*	*0.019*	*0.019*	0.33	*0.019*	*0.019*
Dibenz (a,h) anthracene	*0.0055*	*0.0055*	*0.0055*	*0.038*	*0.038*	*0.038*	*0.038*	*0.038*	*0.038*	*0.038*
Fluoranthene	0.021	0.0037	0.0037	0.021	0.021	0.021	0.021	0.83	0.021	0.021
Fluorene	*0.00475*	*0.00475*	*0.00475*	*0.0205*	*0.0205*	*0.0205*	*0.0205*	0.14	*0.0205*	*0.0205*
Indeno (1,2,3-cd) pyrene	*0.00475*	*0.00475*	*0.00475*	*0.0345*	*0.0345*	*0.0345*	*0.0345*	0.13	*0.0345*	*0.0345*
1-Methyl naphthalene	*0.0055*	*0.0055*	*0.0055*	*0.0185*	*0.0185*	*0.0185*	*0.0185*	0.048	*0.0185*	*0.0185*
2-Methyl naphthalene	*0.006*	*0.006*	*0.006*	*0.036*	*0.036*	*0.036*	*0.036*	*0.036*	*0.036*	*0.036*
Naphthalene	*0.0085*	*0.0085*	*0.0085*	*0.02*	*0.02*	*0.02*	*0.02*	0.31	*0.02*	*0.02*
Phenanthrene	0.014	0.00445	0.00445	0.022	0.01	0.01	0.01	0.75	0.01	0.01
Pyrene	0.018	0.0055	0.0055	*0.029*	*0.029*	*0.029*	*0.029*	0.74	*0.029*	*0.029*
BaP_{equiv} (µg/kg)	0.01	0.01	0.01	0.08	0.08	0.08	0.08	0.47	0.08	0.08
BaP_{equiv} (mg/kg)	0.00001	0.00001	0.00001	0.0001	0.0001	0.0001	0.0001	0.0005	0.0001	0.0001

Minimum (mg/kg)	0.00001
Maximum (mg/kg)	0.12600
Sample Count	41
Standard Deviation	0.02611
95% Upper Confidence Level	0.008
Non-Industrial Ingestion RCL	880 µg/kg
Industrial Ingestion RCL	3,900 µg/kg

BaP_{equiv} Calculated benzo(a)pyrene equivalent concentration.
µg/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.

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Table 4. Soil Benzo(a)pyrene Equivalent Residual Contaminant Level Calculations and Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	MW-8	MW-12	MW-13	MW-14
Sample Date	08/09/04	08/09/04	08/09/04	08/09/04
Sample Depth (Feet)	2-3	4-6	4-6	4-6
PAHs (mg/kg)				
Acenaphthene	0.11	1.4	*0.0205*	0.37
Acenaphthylene	0.31	0.24	*0.021*	*0.021*
Anthracene	0.41	5.7	*0.017*	0.17
Benz(a) anthracene	1.2	11	*0.027*	0.38
Benzo(a) pyrene	1.3	9.7	*0.0295*	0.38
Benzo(b) fluoranthene	1.8	12	*0.021*	0.38
Benzo (g,h,i) perylene	0.3	4.6	*0.041*	*0.041*
Benzo(k) fluoranthene	0.95	4.1	*0.0395*	0.27
Chrysene	1.5	11	*0.019*	0.43
Dibenz (a,h) anthracene	0.12	0.63	*0.038*	*0.038*
Fluoranthene	3.4	28	*0.021*	0.8
Fluorene	0.17	2.3	*0.0205*	0.24
Indeno (1,2,3-cd) pyrene	0.31	4.3	*0.0345*	0.074
1-Methyl naphthalene	0.041	0.21	*0.0185*	0.11
2-Methyl naphthalene	*0.036*	0.24	*0.036*	0.22
Naphthalene	0.078	0.6	*0.02*	0.18
Phenanthrene	1.4	20	0.021	0.68
Pyrene	3	24	*0.029*	0.93
BaP_{equiv} (µg/kg)	1.89	14.07	0.08	0.54
BaP_{equiv} (mg/kg)	0.0019	0.0141	0.0001	0.0005

Minimum (mg/kg)	0.00001
Maximum (mg/kg)	0.12600
Sample Count	41
Standard Deviation	0.02611
95% Upper Confidence Level	0.008
Non-Industrial Ingestion RCL	880 µg/kg
Industrial Ingestion RCL	3,900 µg/kg

BaP_{equiv} Calculated benzo(a)pyrene equivalent concentration.
µg/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.

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Table 5. Soil PCB Analytical Results, 67th Place Industrial Property, West Allis, Wisconsin.

Sample ID Sample Date Sample Depth (feet)	Bulk Remediation Waste High-Occupancy Cleanup Level without Further Conditions	TSCA Regulated Waste Limit	SB-6 02/20/04 0-4	SB-7 02/20/04 0-4	SB-8 02/20/04 0-4	SB-9 02/20/04 0-4	MW-8 08/09/04 2-3	MW-14 08/09/04 4-6
PCBs (mg/kg)								
Aroclor 1016			<0.0158	<0.0507	<0.0023	<0.0024	<0.061	<0.1
Aroclor 1221	NE	NE	<0.0316	<0.0788	<0.00299	<0.054	<0.061	<0.1
Aroclor 1232	NE	NE	<0.0548	<0.101	<0.0322	<0.00744	<0.061	<0.1
Aroclor 1242	NE	NE	<0.0122	<0.0349	<0.00597	<0.0108	<0.061	<0.1
Aroclor 1248	NE	NE	<0.0377	<0.0113	<0.0207	<0.00624	<0.061	<0.1
Aroclor 1254	NE	NE	<0.0548	<0.0293	<0.0103	<0.00312	<0.061	0.26
Aroclor 1260	NE	NE	<0.0852	<0.0146	<0.00712	<0.084	<0.061	<0.1
Total PCBs	NE	50	0.2921	0.3206	0.08158	0.16800	0.427	0.32
Total Detected PCBs	≤1	NE	ND	ND	ND	ND	ND	0.26

mg/kg Milligrams per kilogram.
ND Not detected.
NE Not established.
PCB Polychlorinated Biphenyls.
TSCA Toxic Substance Control Act.

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Table 6. Soil RCRA Metal Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample	NR 720	NR 720	SB-6	SB-7	SB-8	SB-9	SB-12	SB-18	SB-22
Sample Date	Non-Industrial	Industrial	02/20/04	02/20/04	02/20/04	02/20/04	05/27/04	05/27/04	05/27/04
Sample	RCL	RCL	0-4	0-4	0-4	0-4	0-4	4-8	4-8
Total Metals (mg/kg)									
Arsenic	0.039	1.6	<3	**3.06**	<3	**3.18**	**4.0**	*1.1*	**7.1**
Barium	NE	NE	69	42.6	34.3	54.2	42	1.1	36
Cadmium	8	510	<0.6	<0.6	<0.6	<0.6	0.67	<0.25	0.95
Chromium	16,000	NE	19.6	8.99	9.95	16.8	10.0	2.6	8.2
Lead	50	500	*62.4*	32.1	41.3	*65.4*	19	<0.25	26
Mercury	NE	NE	0.080	0.137	0.1957	0.047	0.031	<0.02	0.055
Selenium	NE	NE	<3	<3	<3	<3	<0.5	0.84	<0.5
Silver	NE	NE	<3	<3	<3	<3	<0.25	<0.25	<0.25

100	Concentration exceeds NR 720 Wis. adm. code non-industrial residual contaminant level.
100	Concentration exceeds NR 720 Wis. adm. code industrial residual contaminant level.
mg/kg	Milligrams per kilogram.
NE	Not established.
RCL	Residual contaminant level.
RCRA	Resource Conservation Recovery Act.

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Table 7. Groundwater VOC Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Well ID	Preventive	Enforcement	MW-1		MW-2		MW-3		MW-4	
Sample Date	Action Limit	Standard	08/23/04	05/10/05	08/23/04	05/10/05	08/23/04	05/10/05	08/23/04	05/10/05
VOCs (µg/L)										
1,1,1-Trichloroethane	40	200	<0.16	<0.42	<0.16	<0.42	<0.16	<0.42	<0.16	<0.42
1,1-Dichloroethane	85	850	<0.3	<0.91	<0.3	<0.91	<0.3	<0.91	<0.3	<0.3
cis-1,2 Dichloroethene	7	70	<0.29	<0.27	<0.29	<0.27	<0.29	<0.27	0.32 J	0.39 J
1,2,4-Trimethylbenzene	96	480	<0.51	<1.1	<0.51	<1.1	<0.51	<0.32	<0.51	0.39 J
1,3,5-Trimethylbenzene	96	480	<0.66	<0.83	<0.66	<0.83	<0.66	<0.83	<0.66	<0.83
Benzene	0.5	5	*0.61 J*	0.47 J	<0.29	<0.26	<0.29	<0.26	*1.4*	*0.79 J*
Chloroform	0.6	6	<0.25	<0.78	<0.25	<0.78	<0.25	<0.78	<0.25	<0.78
Ethylbenzene	140	700	<0.56	<0.3	<0.56	<0.3	<0.56	<0.3	<0.56	<0.56
Isopropylbenzene	NE	NE	<0.19	<0.56	<0.19	<0.56	<0.19	<0.56	<0.19	<0.56
Methyl tert-butyl ether	12	60	<0.2	<0.36	<0.2	<0.36	<0.2	<0.36	<0.2	<0.2
Naphthalene	10	100	3.2	2.52 J	<0.6	<0.85	<0.6	<0.85	8.4	4.1
n-Butylbenzene	NE	NE	<0.39	<0.61	<0.39	<0.61	<0.39	<0.61	<0.39	<0.39
n-Propylbenzene	NE	NE	<0.32	<0.56	<0.32	<0.56	<0.32	<0.56	<0.32	<0.56
p-Isopropyltoluene	NE	NE	<0.3	<0.5	<0.3	<0.5	<0.3	<0.5	<0.3	<0.5
sec-Butylbenzene	NE	NE	<0.21	<0.25	<0.21	<0.25	<0.21	<0.25	<0.21	<0.21
tert- Butylbenzene	NE	NE	<0.31	<0.34	<0.31	<0.34	<0.31	<0.34	<0.31	<0.31
Toluene	200	1,000	<0.57	<0.52	<0.57	<0.52	<0.57	<0.52	1.25 J	1.16 J
Trichloroethene	0.5	5	<0.27	<0.37	<0.27	<0.37	<0.27	<0.37	0.37 J	*0.53 J*
Xylenes	1,000	10,000	<0.64	<0.79	<0.64	<0.79	<0.64	<0.79	<0.64	0.51 J

Italic	Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
Bold	Concentration exceeds the NR 140 Wis. Adm. Code enforcement standard.
J	Concentration is between the limit of detection and limit of quantitation.
µg/L	Micrograms per liter.
ND	Not detected.
NE	Not established.
VOC	Volatile Organic Compounds.

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Table 7. Groundwater VOC Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Well ID	MW-5		MW-6		MW-7		MW-8		MW-9	
Sample Date	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**
VOCs (µg/L)										
1,1,1-Trichloroethane	<0.16	<0.42	<0.16	<0.42	<0.16	<0.42	<0.16	<0.42	<0.16	<0.42
1,1-Dichloroethane	<0.3	<0.3	<0.3	<0.3	<0.3	<0.91	<0.3	<0.91	0.3	<0.91
cis-1,2 Dichloroethene	<0.29	<0.27	<0.29	<0.27	<0.29	<0.27	<0.29	<0.27	<0.29	<0.27
1,2,4-Trimethylbenzene	0.61 J	0.65 J	0.71 J	0.73 J	<0.51	<0.32	<0.51	<0.32	<0.51	<0.32
1,3,5-Trimethylbenzene	<0.66	<0.83	<0.66	<0.83	<0.66	<0.83	<0.66	<0.83	<0.66	<0.83
Benzene	*1.8*	*1.6*	*1.6*	*1.4*	<0.29	<0.26	<0.29	<0.26	<0.29	<0.26
Chloroform	<0.25	<0.78	<0.25	<0.78	<0.25	<0.78	<0.25	<0.78	<0.25	<0.78
Ethylbenzene	<0.56	0.31 J	1.03 J	0.97	<0.56	<0.3	<0.56	<0.3	<0.56	<0.3
Isopropylbenzene	<0.19	<0.56	<0.19	<0.56	<0.19	<0.56	<0.19	<0.56	<0.19	<0.56
Methyl tert-butyl ether	0.2	<0.2	0.29 J	<0.2	<0.2	<0.36	0.46 J	0.4 J	<0.2	<0.36
Naphthalene	*31*	*34*	*16*	*19*	<0.6	<0.85	<0.6	<0.85	<0.6	<0.85
n-Butylbenzene	<0.39	<0.39	<0.39	<0.39	<0.39	<0.61	<0.39	<0.61	<0.39	<0.61
n-Propylbenzene	<0.32	<0.56	<0.32	<0.56	<0.32	<0.56	<0.32	<0.56	<0.32	<0.56
p-Isopropyltoluene	0.52 J	<0.5	<0.3	<0.5	<0.3	<0.5	<0.3	<0.5	<0.3	<0.5
sec-Butylbenzene	<0.21	<0.21	<0.21	<0.21	<0.21	<0.25	<0.21	<0.25	<0.21	<0.25
tert- Butylbenzene	<0.31	<0.31	<0.31	<0.31	<0.31	<0.34	<0.31	<0.34	<0.31	<0.34
Toluene	1.26 J	1.24 J	1.9	1.6	<0.57	<0.52	<0.57	<0.52	<0.57	<0.52
Trichloroethene	0.42 J	<0.37	<0.27	<0.37	<0.27	<0.37	<0.27	<0.37	<0.27	<0.37
Xylenes	0.66 J	0.77 J	6.7	6.2	<0.64	<0.79	<0.64	<0.79	<0.64	<0.79

Italic	Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
Bold	Concentration exceeds the NR 140 Wis. Adm. Code enforcement standard.
J	Concentration is between the limit of detection and limit of quantitation.
µg/L	Micrograms per liter.
ND	Not detected.
NE	Not established.
VOC	Volatile Organic Compounds.

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Table 7. Groundwater VOC Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Well ID	MW-10		MW-11			MW-12		MW-13	
Sample Date	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**	**05/10/05**	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**
VOCs (µg/L)									
1,1,1-Trichloroethane	<0.16	<0.42	<0.16	<0.42	<0.42	<0.16	<0.42	3.3	6.2
1,1-Dichloroethane	<0.3	<0.91	<0.3	<0.91	<0.91	<0.3	<0.91	<0.3	<0.91
cis-1,2 Dichloroethene	<0.29	<0.27	<0.29	<0.27	<0.27	<0.29	<0.27	<0.29	<0.27
1,2,4-Trimethylbenzene	<0.51	<0.32	<0.51	<0.32	<0.32	<0.51	<0.32	<0.51	<0.32
1,3,5-Trimethylbenzene	<0.66	<0.83	<0.66	<0.83	<0.83	<0.66	<0.83	<0.66	<0.83
Benzene	<0.29	<0.26	<0.29	<0.26	<0.26	*1.8*	*1.8*	<0.29	<0.26
Chloroform	<0.25	<0.78	*1.78J*	<0.78	*1.73 J*	<0.25	<0.78	<0.25	<0.78
Ethylbenzene	<0.56	<0.3	<0.56	<0.3	<0.3	<0.56	<0.3	<0.56	<0.3
Isopropylbenzene	<0.19	<0.56	<0.19	<0.56	<0.56	<0.19	<0.56	<0.19	<0.56
Methyl tert-butyl ether	<0.2	<0.36	<0.2	<0.36	<0.36	<0.2	<0.36	<0.2	<0.36
Naphthalene	<0.6	<0.85	<0.6	<0.85	<0.85	*21*	*16*	0.62 J	<0.85
n-Butylbenzene	<0.39	<0.61	<0.39	<0.61	<0.61	<0.39	<0.61	<0.39	<0.61
n-Propylbenzene	<0.32	<0.56	<0.32	<0.56	<0.56	<0.32	<0.56	<0.32	<0.56
p-Isopropyltoluene	<0.3	<0.5	<0.3	<0.5	<0.5	<0.3	<0.5	<0.3	<0.5
sec-Butylbenzene	<0.21	<0.25	<0.21	<0.25	<0.25	<0.21	<0.25	<0.21	<0.25
tert- Butylbenzene	<0.31	<0.34	<0.31	<0.34	<0.34	<0.31	<0.34	<0.31	<0.34
Toluene	<0.57	<0.52	<0.57	<0.52	<0.52	0.59 J	<0.52	<0.57	<0.52
Trichloroethene	<0.27	<0.37	<0.27	<0.37	<0.37	0.32 J	<0.37	<0.27	<0.37
Xylenes	<0.64	<0.79	<0.64	<0.79	<0.79	<0.64	<0.79	<0.64	<0.79

Italic	Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
Bold	Concentration exceeds the NR 140 Wis. Adm. Code enforcement standard.
J	Concentration is between the limit of detection and limit of quantitation.
µg/L	Micrograms per liter.
ND	Not detected.
NE	Not established.
VOC	Volatile Organic Compounds.

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Table 7. Groundwater VOC Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Well ID	MW-14		MW-15	MW-16
Sample Date	**08/23/04**	**05/10/05**	**02/12/07**	**02/12/07**
VOCs (µg/L)				
1,1,1-Trichloroethane	<0.16	<0.42	<0.5	<0.5
1,1-Dichloroethane	<0.3	<0.91	<0.56	<0.56
cis-1,2 Dichloroethene	<0.29	<0.27	<0.68	<0.68
1,2,4-Trimethylbenzene	7.8	13	<4.2	<4.2
1,3,5-Trimethylbenzene	2.05 J	3	<0.37	<0.37
Benzene	*1.2*	*1.2*	<0.47	<0.47
Chloroform	<0.25	<0.78	<0.48	<0.48
Ethylbenzene	3.2	5.6	<0.38	<0.38
Isopropylbenzene	1	1.9	<0.48	<0.48
Methyl tert-butyl ether	<0.2	<0.36	<0.52	<0.52
Naphthalene	*17*	*28*	<1.8	<1.8
n-Butylbenzene	0.49 J	0.72 J	<0.52	<0.52
n-Propylbenzene	1.4	2.4	<0.38	<0.38
p-Isopropyltoluene	0.44 J	0.79 J	<0.35	<0.35
sec-Butylbenzene	0.53 J	0.91	<0.36	<0.36
tert- Butylbenzene	<0.31	<0.34	<0.34	<0.34
Toluene	5.3	6	<0.46	<0.46
Trichloroethene	<0.27	<0.37	<0.44	<0.44
Xylenes	12.3	19.4	<0.67	<0.67

Italic	Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
Bold	Concentration exceeds the NR 140 Wis. Adm. Code enforcement standard.
J	Concentration is between the limit of detection and limit of quantitation.
µg/L	Micrograms per liter.
ND	Not detected.
NE	Not established.
VOC	Volatile Organic Compounds.

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Table 8. Groundwater pH Results, 67th Place Industrial Park, West Allis, Wisconsin.

Well Sample Date	Preventive Action Limit	MW-1 02/23/09	MW-3 02/23/09	MW-4 02/23/09	MW-5 02/23/09	MW-6 02/23/09	MW-9 02/23/09	MW-10 02/23/09	MW-12 02/23/09	MW-13 02/23/09	MW-14 02/23/09	MW-15 03/17/09	MW-16 03/17/09
pH	5.5-9.1	*12.6*	6.9	*9.2*	*11.8*	*12.3*	6.5	6.8	6.9	6.8	*12.5*	8.1	8.1

Italic Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.

Table 9. Groundwater PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	Preventive	Enforcement	MW-1		MW-2		MW-3		MW-4	
Sample Date	Action Limit	Standard	08/23/04	05/10/05	08/23/04	05/10/05	08/23/04	05/10/05	08/23/04	05/10/05
PAH (ug/L)										
Acenaphthene	NE	NE	0.35	0.075	0.60 J	9.7	<0.032	<0.016	1.3	0.52
Acenaphthylene	NE	NE	0.059	<0.012	0.50 J	4.4	0.023 J	<0.012	0.11	0.036 J
Anthracene	600	3,000	0.15	0.023 J	1.7	18	0.033 J	<0.013	0.45	0.15
Benz(a)anthracene	NE	NE	0.17	<0.012	6.4	80	0.10	0.023 J	0.14	0.023 J
Benzo(a)pyrene	0.02	0.2	*0.17*	<0.008	**8.6**	**96**	*0.14*	0.017 J	*0.12*	<0.008
Benzo(b)fluoranthene	0.02	0.2	**0.29**	<0.009	**13**	**127**	**0.24**	*0.027 J*	*0.19*	0.013 J
Benzo(g,h,i)perylene	NE	NE	0.21	<0.01	6.8	50	0.34	0.023 J	0.12	<0.01
Benzo(k)fluoranthene	NE	NE	0.12	<0.009	3.7	46	0.068 J	0.026 J	0.064 J	<0.009
Chrysene	0.02	0.2	**0.22**	<0.011	**7.9**	**86**	*0.14*	0.017 J	*0.16*	0.015 J
Dibenz(a,h)anthracene	NE	NE	<0.037	<0.009	<0.37	9.2	<0.037	<0.009	<0.037	<0.009
Fluoranthene	80	400	0.55	0.022 J	16	*219*	0.28	0.035	0.65	0.18
Fluorene	80	400	0.29	0.064	0.40 J	5.8	0.019 J	<0.015	1.0	0.36
Indeno(1,2,3-cd)pyrene	NE	NE	<0.021	<0.015	5.6	56	<0.021	<0.015	<0.021	<0.015
1-Methyl naphthalene	NE	NE	0.44	0.041 J	<0.26	<1.8	0.027 J	<0.018	0.76	0.31
2-Methyl naphthalene	NE	NE	0.46	0.048 J	<0.3	<2.1	0.059 J	<0.021	0.90	0.32
Naphthalene	10	100	2.1	0.24	<0.26	<2.8	0.063 J	<0.028	5.0	2.0
Phenanthrene	NE	NE	0.84	0.11	3.2	40	0.13 J	0.013 J	2.2	0.67
Pyrene	50	250	0.42	0.04 J	13	*164*	0.34	0.027 J	0.53	0.11

Italic	Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
Bold	Concentration exceeds the NR 140 Wis. Adm. Code enforcement standard.
J	Concentration is between the limit of detection and limit of quantitation.
µg/L	Micrograms per liter.

Table 9. Groundwater PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	MW-5		MW-6		MW-7		MW-8		MW-9	
Sample Date	08/23/04	05/10/05	08/23/04	05/10/05	08/23/04	05/10/05	08/23/04	05/10/05	08/23/04	05/10/05
PAH (ug/L)										
Acenaphthene	2.2	1.7	2.7	2.0	<0.032	<0.016	<0.032	<0.016	<0.032	<0.016
Acenaphthylene	0.40 J	0.28	0.23 J	0.18	<0.015	<0.012	<0.015	0.014J	0.085	0.019J
Anthracene	0.53 J	0.43	1.1	0.88	<0.023	<0.013	<0.023	0.014 J	0.088	0.029 J
Benz(a)anthracene	<0.31	0.027 J	0.17 J	0.58	<0.031	0.018 J	<0.031	0.041	0.38	0.091
Benzo(a)pyrene	<0.08	<0.008	*0.10 J*	**0.47**	0.016 J	0.010 J	0.011 J	*0.037*	**0.57**	*0.11*
Benzo(b)fluoranthene	*0.13 J*	0.013 J	*0.17*	**0.67**	*0.029*	0.016 J	*0.023 J*	*0.064*	**0.96**	*0.18*
Benzo(g,h,i)perylene	*<0.16*	<0.01	<0.08	0.26	*0.041 J*	<0.01	<0.016	0.045	0.88	0.11
Benzo(k)fluoranthene	*<0.24*	<0.009	<0.12	0.25	*<0.024*	<0.009	<0.024	0.023 J	0.32	0.072
Chrysene	*0.15 J*	0.017 J	*0.17*	**0.61**	*0.023 J*	0.013 J	0.014 J	**0.54**	**0.52**	*0.11*
Dibenz(a,h)anthracene	<0.37	<0.009	<0.185	0.053	<0.037	<0.009	<0.037	<0.009	<0.037	0.013 J
Fluoranthene	0.68 J	0.34	0.93	2.1	0.046 J	0.029 J	<0.024	0.11	0.83	0.19
Fluorene	2.1	1.7	2.5	2.0	<0.015	<0.015	<0.015	<0.015	0.027 J	<0.015
Indeno(1,2,3-cd)pyrene	<0.21	<0.015	<0.105	0.28	<0.02	<0.015	<0.021	0.025 J	0.56	0.083
1-Methyl naphthalene	2.2	2.1	2.0	0.98	0.070 J	<0.018	<0.026	<0.018	<0.026	<0.018
2-Methyl naphthalene	3.2	2.1	1.7	1.0	<0.03	<0.021	<0.03	<0.021	0.037 J	<0.021
Naphthalene	*33*	*28*	*12*	*8.2*	0.029 J	<0.028	<0.026	0.030 J	0.035 J	<0.028
Phenanthrene	3.0	2.2	3.9	3.3	<0.045	0.017 J	<0.045	0.038	0.26	0.055
Pyrene	0.49 J	0.20	0.54	1.4	0.074	0.023 J	<0.023	0.1	0.83	0.16

Italic	Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
Bold	Concentration exceeds the NR 140 Wis. Adm. Code enforcement standard.
J	Concentration is between the limit of detection and limit of quantitation.
µg/L	Micrograms per liter.

Table 9. Groundwater PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	MW-10		MW-11		MW-12		MW-13		MW-14	
Sample Date	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**	**08/23/04**	**05/10/05**
PAH (ug/L)										
Acenaphthene	<0.032	<0.016	<0.032	<0.016	1.6	2.3	<0.032	<0.016	1.7	1.6
Acenaphthylene	<0.015	<0.012	<0.015	<0.012	0.31	0.32	0.017 J	<0.012	0.088 J	0.075
Anthracene	<0.023	<0.013	<0.023	<0.013	0.39	0.42	0.029 J	<0.013	0.51	0.41
Benz(a)anthracene	<0.031	0.023 J	<0.031	0.014 J	<0.16	0.037	0.14	0.015 J	<0.16	0.028 J
Benzo(a)pyrene	<0.008	0.017 J	0.011 J	0.009 J	<0.04	*0.023 J*	*0.16*	0.012 J	<0.04	0.016 J
Benzo(b)fluoranthene	0.010 J	*0.030*	*0.020 J*	0.016 J	*0.065 J*	*0.037*	**0.32**	0.018 J	<0.045	*0.030*
Benzo(g,h,i)perylene	0.039 J	0.041	<0.016	0.059	<0.08	0.045	0.28	0.052	<0.08	0.042
Benzo(k)fluoranthene	<0.024	0.010 J	<0.024	<0.009	<0.12	0.016 J	0.11	0.010 J	<0.12	0.012 J
Chrysene	0.008 J	0.018 J	0.016 J	<0.011	*0.071 J*	*0.042*	**0.20**	<0.011	*0.048 J*	*0.028 J*
Dibenz(a,h)anthracene	<0.037	<0.009	<0.037	<0.009	<0.19	<0.009	<0.037	<0.009	<0.19	<0.009
Fluoranthene	0.094	0.038	0.12	0.026 J	0.66	0.50	0.50	0.019 J	0.47	0.31
Fluorene	<0.015	<0.015	<0.015	<0.015	1.6	2.2	0.022 J	<0.015	1.2	1.0
Indeno(1,2,3-cd)pyrene	<0.021	<0.015	<0.021	<0.015	<0.11	0.016 J	<0.021	<0.015	<0.105	<0.015
1-Methyl naphthalene	<0.026	<0.018	<0.026	<0.018	1.1	1.5	<0.026	<0.018	4.0	4.2
2-Methyl naphthalene	<0.03	<0.021	<0.03	<0.021	1.4	1.5	<0.03	<0.021	6.2	7.4
Naphthalene	<0.026	<0.028	<0.026	<0.028	*10*	9.4	0.059 J	<0.028	*14*	*15*
Phenanthrene	<0.045	<0.011	<0.045	<0.011	2.4	2.7	0.13 J	<0.011	2.0	1.3
Pyrene	0.14	0.034	0.20	0.038	0.54	0.30	0.67	0.017 J	0.30 J	0.017

Italic	Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
Bold	Concentration exceeds the NR 140 Wis. Adm. Code enforcement standard.
J	Concentration is between the limit of detection and limit of quantitation.
µg/L	Micrograms per liter.

Table 9. Groundwater PAH Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID	MW-15	MW-16
Sample Date	02/12/07	02/12/07
PAH (ug/L)		
Acenaphthene	<0.015	<0.015
Acenaphthylene	<0.016	<0.016
Anthracene	<0.013	<0.013
Benz(a)anthracene	0.020 J	<0.015
Benzo(a)pyrene	<0.015	<0.015
Benzo(b)fluoranthene	*0.021 J*	<0.014
Benzo(g,h,i)perylene	<0.015	<0.015
Benzo(k)fluoranthene	<0.023	<0.023
Chrysene	<0.016	<0.016
Dibenz(a,h)anthracene	<0.015	<0.015
Fluoranthene	0.029 J	<0.015
Fluorene	<0.019	<0.019
Indeno(1,2,3-cd)pyrene	<0.014	<0.014
1-Methyl naphthalene	<0.018	0.020J
2-Methyl naphthalene	0.031 J	0.030 J
Naphthalene	0.029 J	0.027J
Phenanthrene	0.018 J	<0.017
Pyrene	0.028 J	<0.015

Italic	Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
Bold	Concentration exceeds the NR 140 Wis. Adm. Code enforcement standard.
J	Concentration is between the limit of detection and lim t of quantitation.
µg/L	Micrograms per liter.

Table 10. Groundwater Total Metal Analytical Results, 67th Place Industrial Park, West Allis, Wisconsin.

Sample ID Sample Date	Preventive Action Limit	Enforcement Standard	MW-4 05/10/05	MW-8 05/10/05	MW-11 05/10/05	MW-14 05/10/05
Total Metals (µg/L)						
Arsenic	1	10	<7.4	<7.4	<7.4	<7.4
Barium	400	2,000	250	96	120	360
Cadmium	0.5	5	*0.9 J*	<0.7	<0.7	*3.1*
Chromium	10	100	*10*	3.3 J	5.7 J	*12*
Lead	1.5	15	<4.115	*4.4 J*	<4.1	*5.1 J*
Mercury	0.2	2	*0.2 J*	<0.066	<0.066	*0.48*
Selenium	10	50	*21*	<7.2	<7.2	*21*
Silver	10	50	<3	<3	<3	*21*

Italic Concentration exceeds the NR 140 Wis. Adm. Code preventive action limit.
J Concentration is between the limit of detection and limit of quantitation.
µg/L Micrograms per liter.

Table 11. Methane Monitoring Results, 67th Place Industrial Park, West Allis, Wisconsin.

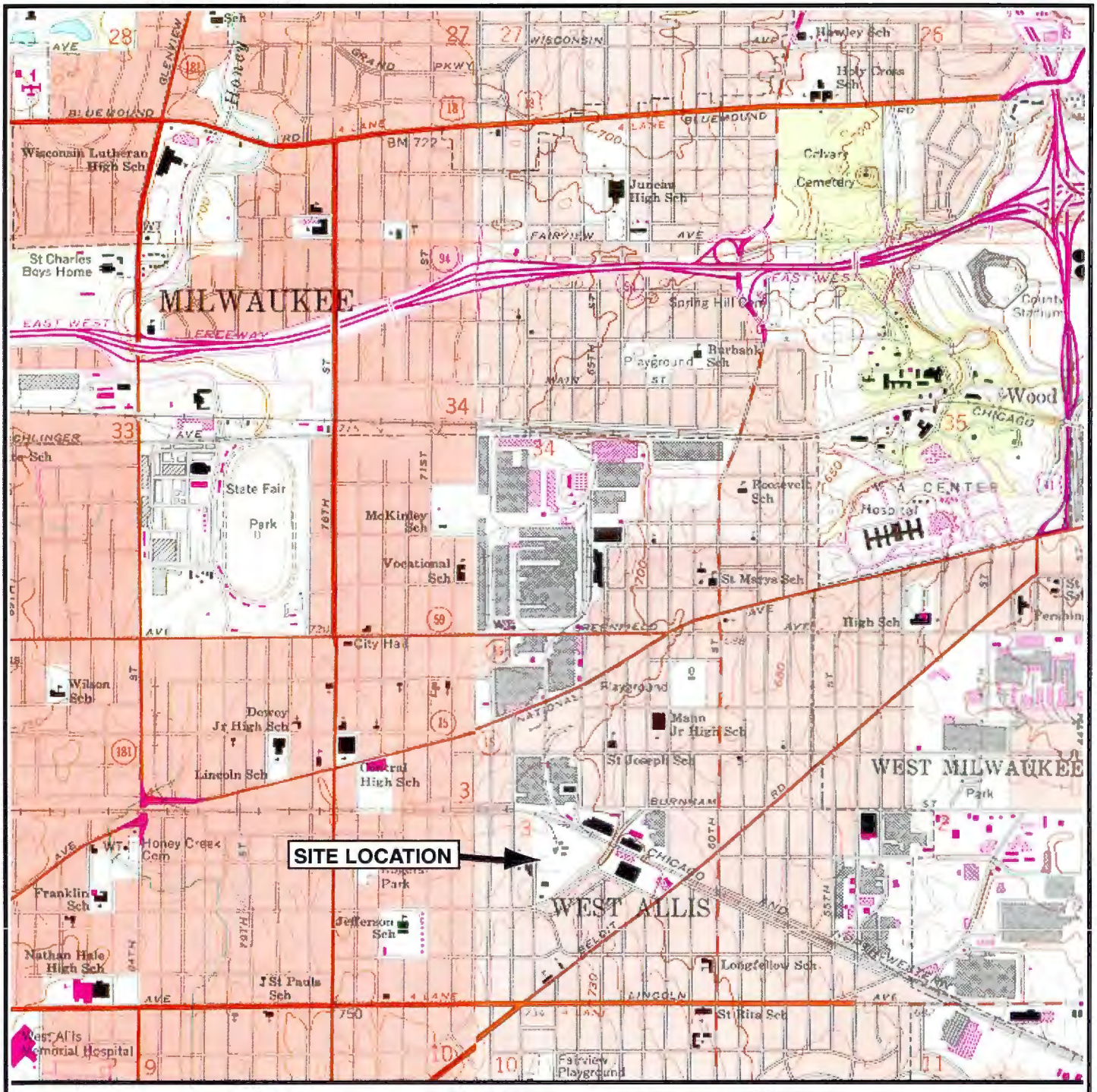
Well	Instrument	Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
FID (ppm)	FID	01/29/09	278	---	0.14	1,756	---	---	---	---	---	1.24
FID (ppm)	FID	03/02/09	246	---	0	9,549	52.05	104	---	---	0	0
LEL (%)	MDU	03/02/09	0	---	0	9	0	0	---	---	0	0
FID (ppm)	FID	03/17/09	1,667	---	0	1,186	99.94	0	---	---	0	0
LEL (%)	MDU	03/17/09	3	---	0	3	0	0	---	---	0	0

FID Flame ionization detector.
LEL Lower explosive limit.
MDU Methane detector unit.
ppm Parts per million.
% Percent.

Table 11. Methane Monitoring Results, 67th Place Industrial Park, West Allis, Wisconsin.

Well	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
FID (ppm)	0.25	0	0.3	6,778	---	---
FID (ppm)	0	0	0	24.87	---	---
LEL (%)	0	0	0	0	---	---
FID (ppm)	0	0	1.65	3.10	0	0
LEL (%)	0	0	0	0	0	0

FID	Flame ionization detector.
LEL	Lower explosive limit.
MDU	Methane detector unit.
ppm	Parts per million.
%	Percent.



SOURCE: Composite of USGS 7.5 Minute Topographic Maps, MILWAUKEE (1971) and WAUWATOSA (1994), WISCONSIN Quadrangles

WISCONSIN

SCALE IN FEET

67TH PLACE INDUSTRIAL PARK
1960 SOUTH 67TH PLACE
WEST ALLIS, WISCONSIN

SITE LOCATION MAP

ARCADIS

FIGURE
1

17MAR09-ENVIRONMENT-TS-LMB
PRESSTEEL\WI1074\LIMEPIT\GRAPHICS\SITE_LOC.AI

W. BURNHAM ST.

GRAVEL ENTRANCE

RAILROAD TRACKS

UNION PACIFIC RAILROAD

CHAIN LINK FENCE (TYP.)

ASPHALT

GRAVEL & ASPHALT

BROKEN ASPHALT AND GRAVEL ENTRANCE

GATE

CONCRETE WALL

W. BECHER PLACE

W. ROGERS STREET

S. 67TH PLACE

ASPHALT

W. McGEOCH AVENUE

MW-9 GSB-1A GSB-1 GSB-2A SB-16 MW-7 GSB-2 GSB-5A GSB-3A GSB-4A SB-15 SB-4 SB-17 GSB-6A SB-24 MW-8 GSB-3 MW-6 GSB-7A SB-18 MW-10 SB-28 SB-26 SB-27 TP-12 TP-9 SB-14 GSB-5 SB-2 MW-13 TP-13 TP-10 GSB-4 SB-25 SB-1 GSB-8A SB-29 SB-37 SB-35 SB-36 GSB-6 MW-12 SB-19 MW-15 GSB-10A SB-9 GSB-9A SB-30 SB-3 SB-7 GSB-7 TP-7 MW-5 TP-6 GSB-8 SB-31 TP-11 TP-8 SB-5 SB-8 MW-16 SB-32 SB-33 SB-34 MW-14 MW-11 SB-23 GSB-9 SB-20 SB-10 GSB-12A GSB-14A GSB-11A TP-14 GSB-13A TP-1 GSB-10 TP-3 SB-13 SB-6 MW-4 MW-1 TP-2 TP-4 TP-5 SB-21 GSB-11 SB-11 SB-12 SB-22 MW-2 MW-3 TP-1

0 50 100
SCALE IN FEET

LEGEND

- MONITORING WELL
- GEOTECHNICAL SOIL BORING
- SOIL BORING
- TEST PIT
- ESTIMATED EXTENT OF LIME SLURRY
- FOUND CONCRETE MONUMENT W/BRASS CAP
- FOUND 1" IRON PIPE
- FOUND CHISELED CROSS
- SET 1" IRON PIPE
- POWER POLE
- LIGHT POLE
- GUY POLE
- GUY WIRE
- ELECTRIC RISER
- MISCELLANEOUS METER
- SIGN
- WATER VALVE
- ELECTRIC MANHOLE
- MANHOLE
- STORM INLET
- PVC PIPE
- BURIED STORM SEWER
- BURIED SANITARY SEWER
- BURIED WATER MAIN
- OVERHEAD ELECTRIC
- OVERHEAD TELEPHONE
- CHAIN LINK FENCE
- PARCEL BOUNDARY
- FORMER BUILDING

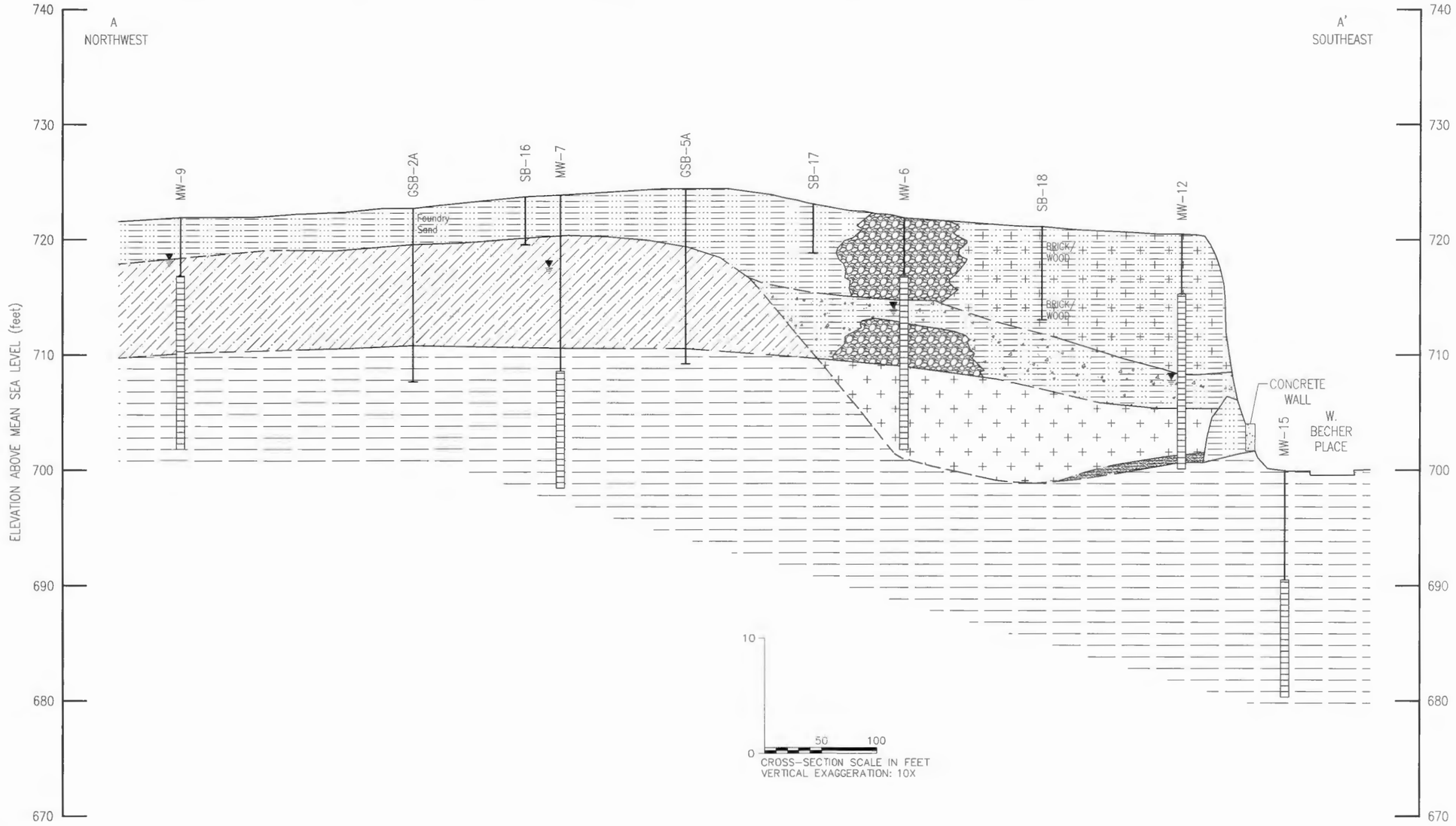
MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD–29).

CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

SITE PLAN VIEW

ARCADIS

FIGURE 2



LEGEND

- FILL: SILTY CLAY, BROWN, GREY, BLACK, TRACE TO SOME SAND & GRAVEL
- SILTY CLAY WITH SAND AND GRAVEL: BROWN TO BLACK, SOME TO ABUNDANT SAND AND GRAVEL
- LIME SLURRY: GREY TO BLUISH GREY, WET
- ORGANIC SILT: BLACK, STIFF, WET
- ROCK AND GRAVEL
- FILL WITH LIME SLURY
- MOTTLED CLAY
- CLAY: GREY, SILTY, WET
- DEPTH TO WATER 5/10/05 (TEMCO)
- WELL SCREEN
- SOIL BORING

NOTES

1. SOIL CLASSIFICATION IS BASED ONLY ON DRILLED LOCATIONS AND IS INFERRED BETWEEN DRILLING LOCATIONS.

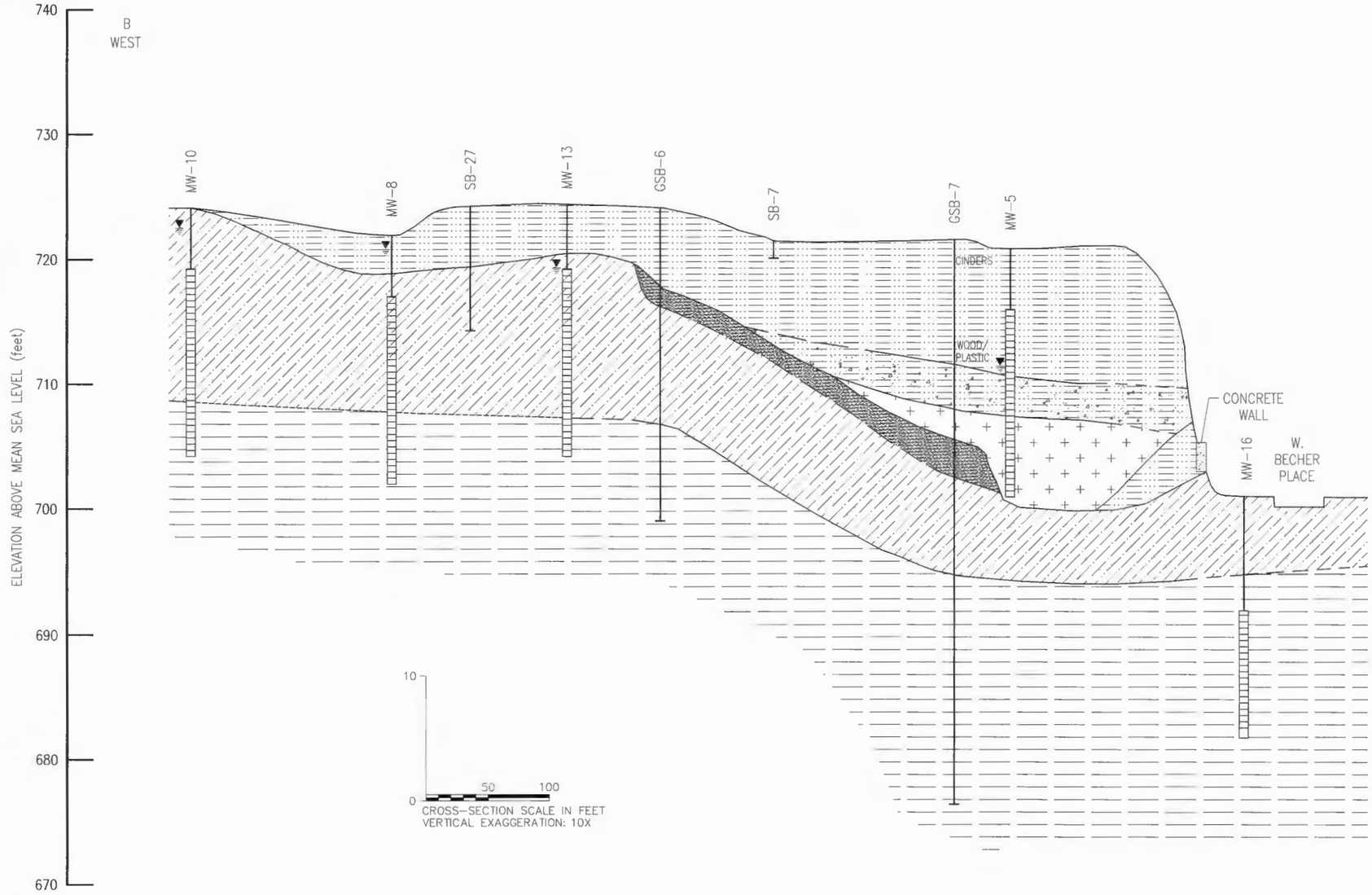
CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN

67TH PLACE INDUSTRIAL PARK

GEOLOGIC CROSS-SECTION A-A'

ARCADIS

FIGURE
3



LEGEND

- FILL: SILTY CLAY, BROWN, GREY, BLACK, TRACE TO SOME SAND & GRAVEL
- SILTY CLAY WITH SAND AND GRAVEL: BROWN TO BLACK, SOME TO ABUNDANT SAND AND GRAVEL
- LIME SLURRY: GREY TO BLUISH GREY, WET
- ORGANIC SILT: BLACK, STIFF, WET
- MOTTLED CLAY
- CLAY: GREY, SITLY, WET
- DEPTH TO WATER (5/10/05 TEMCO)
- WELL SCREEN
- SOIL BORING

NOTES

1. SOIL CLASSIFICATION IS BASED ONLY ON DRILLED LOCATIONS AND IS INFERRED BETWEEN DRILLING LOCATIONS.

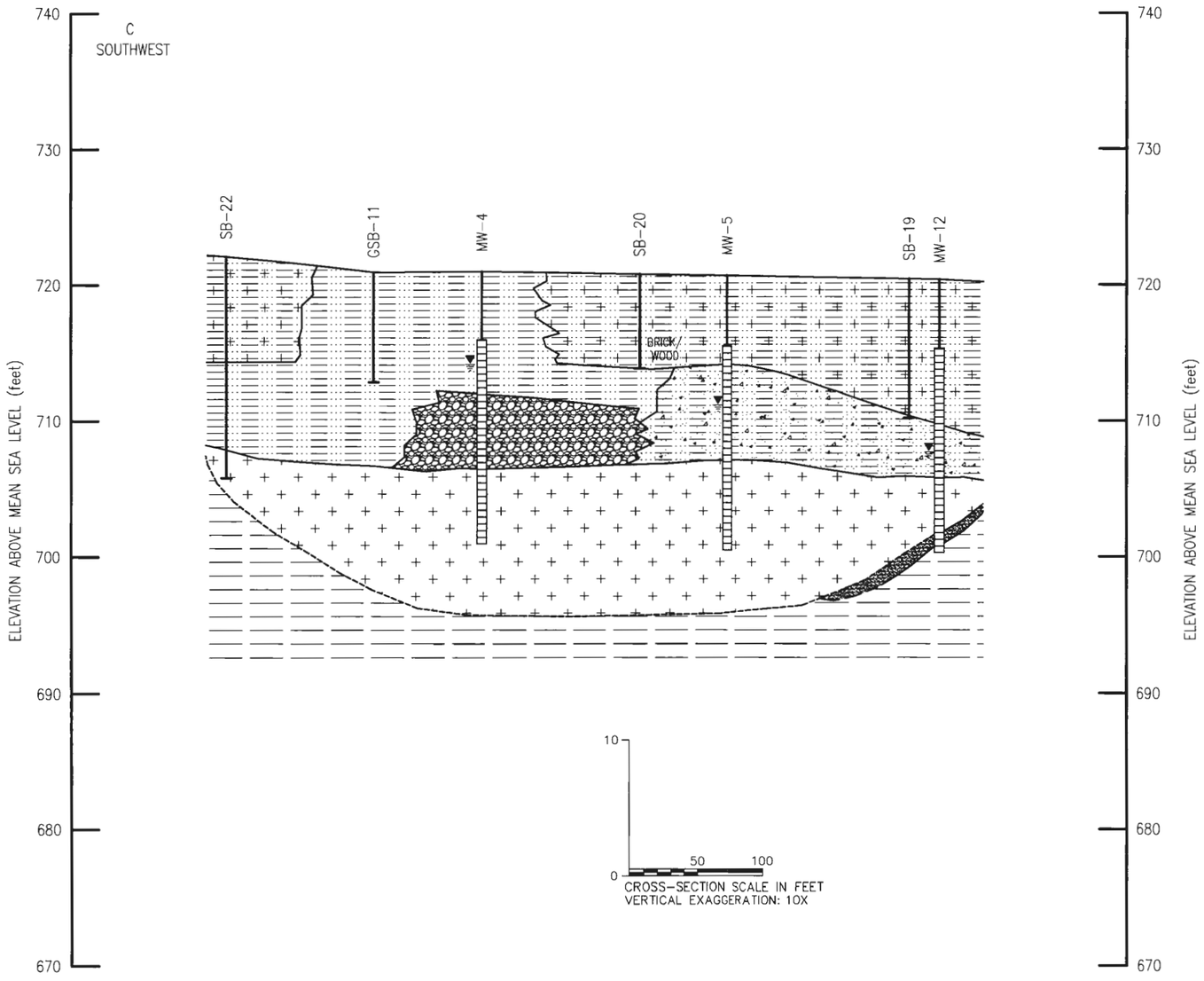
CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN

67TH PLACE INDUSTRIAL PARK

GEOLOGIC CROSS-SECTION B-B'

ARCADIS

FIGURE
4



LEGEND

- FILL: SILTY CLAY, BROWN, GREY, BLACK, TRACE TO SOME SAND & GRAVEL
- SILTY CLAY WITH SAND AND GRAVEL: BROWN TO BLACK, SOME TO ABUNDANT SAND AND GRAVEL
- LIME SLURRY: GREY TO BLUISH GREY, WET
- ORGANIC SILT: BLACK, STIFF, WET
- ROCK AND GRAVEL
- FILL WITH LIME SLURY
- CLAY; GREY, SILTY, WET
- DEPTH TO WATER (5/10/05 TEMCO)
- WELL SCREEN
- SOIL BORING

NOTES
1. SOIL CLASSIFICATION IS BASED ONLY ON DRILLED LOCATIONS AND IS INFERRED BETWEEN DRILLING LOCATIONS.

CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

GEOLOGIC CROSS-SECTION C-C'

ARCADIS

FIGURE
5

CITY:MILWAUKEE DIV/GROUP:ENVIRONMENTAL DB:R. ROBBENNOLT LD:T. ALESSI PM:B. VERBURG TM:T. SCHOEN
G:\Project\PressSteel\W1\1074\LimePit\CADD\bienverburg\LIME P1?C sec.dwg LAYOUT: D-SIZE N-S SAVED: 3/17/2009 1:48 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: CANON 11X17 FINAL PLOTSTYLETABLE: BLACKGRAY.CTB PLOTTED: 3/19/2009 3:13 PM BY: ROBBENNOLT, REBECCA
XREFS: IMAGES: C-C'.TIF PROJECTNAME: —

W. BURNHAM ST.

GRAVEL ENTRANCE

RAILROAD TRACKS

UNION PACIFIC RAILROAD

CHAIN LINK FENCE (TYP.)

ASPHALT

GRAVEL & ASPHALT

BROKEN ASPHALT AND GRAVEL ENTRANCE

CONCRETE WALL

GATE

W. BECHER PLACE

W. ROGERS STREET

S. 67TH PLACE

W. McGEOCH AVENUE

ASPHALT

MW-9 MW-7 MW-6 MW-8 MW-10 MW-13 MW-12 MW-15 MW-16 MW-5 MW-14 MW-11 MW-4 MW-1 MW-2 MW-3

GSB-1A GSB-1 GSB-2A GSB-2 GSB-5A GSB-3A GSB-4A GSB-6A GSB-3 GSB-7A GSB-4 GSB-8A GSB-5 GSB-6 GSB-9A GSB-8 GSB-10A GSB-7 GSB-9 GSB-11A GSB-12A GSB-10 GSB-13A GSB-14A GSB-11

SB-16 SB-4 SB-17 SB-18 SB-24 SB-28 SB-26 SB-27 SB-14 SB-2 SB-25 SB-1 SB-29 SB-37 SB-35 SB-36 SB-19 SB-30 SB-3 SB-9 SB-7 SB-31 SB-5 SB-8 SB-32 SB-33 SB-34 SB-23 SB-20 SB-10 SB-13 SB-6 SB-21 SB-11 SB-12 SB-22

TP-12 TP-9 TP-13 TP-10 TP-11 TP-8 TP-7 TP-6 TP-14 TP-1 TP-3 TP-4 TP-5 TP-2

0 50 100
SCALE IN FEET

LEGEND

- MONITORING WELL
- GEOTECHNICAL SOIL BORING
- SOIL BORING
- TEST PIT
- FOUND CONCRETE MONUMENT W/BRASS CAP
- FOUND 1" IRON PIPE
- FOUND CHISELED CROSS
- SET 1" IRON PIPE
- POWER POLE
- LIGHT POLE
- GUY POLE
- GUY WIRE
- ELECTRIC RISER
- MISCELLANEOUS METER
- SIGN
- FIRE HYDRANT
- WATER VALVE
- ELECTRIC MANHOLE
- MANHOLE
- STORM INLET
- PVC PIPE
- BURIED STORM SEWER
- BURIED SANITARY SEWER
- BURIED WATER MAIN
- OVERHEAD ELECTRIC
- OVERHEAD TELEPHONE
- CHAIN LINK FENCE
- PARCEL BOUNDARY
- FORMER BUILDING

MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD–29).

SW. COR. OF THE SE. 1/4, SECT. 3, T.6N., R.21E.

CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

LOCATION OF GEOLOGIC CROSS-SECTION

ARCADIS

FIGURE
6

CITY:MILWAUKEE DIV/GROUP:ENVIRONMENTAL DB:R. ROBBENNOLT PM:B. VERBURG TM:T. SCHOEN
G:\Project\PresStas\WI\10741\LimePit\CADD\benverburg\LIME PIT\Lime Pit SITE BASE Crosss-section.dwg LAYOUT: FIGURE 2 SAVED: 3/18/2009 3:40 PM BY: ROBBENNOLT, REBECCA
XREFS: IMAGES: PROJECTNAME:
Lime Pit SITE BASE MONITORING LOCATIONS.JPG
BORING LOCATIONS.JPG
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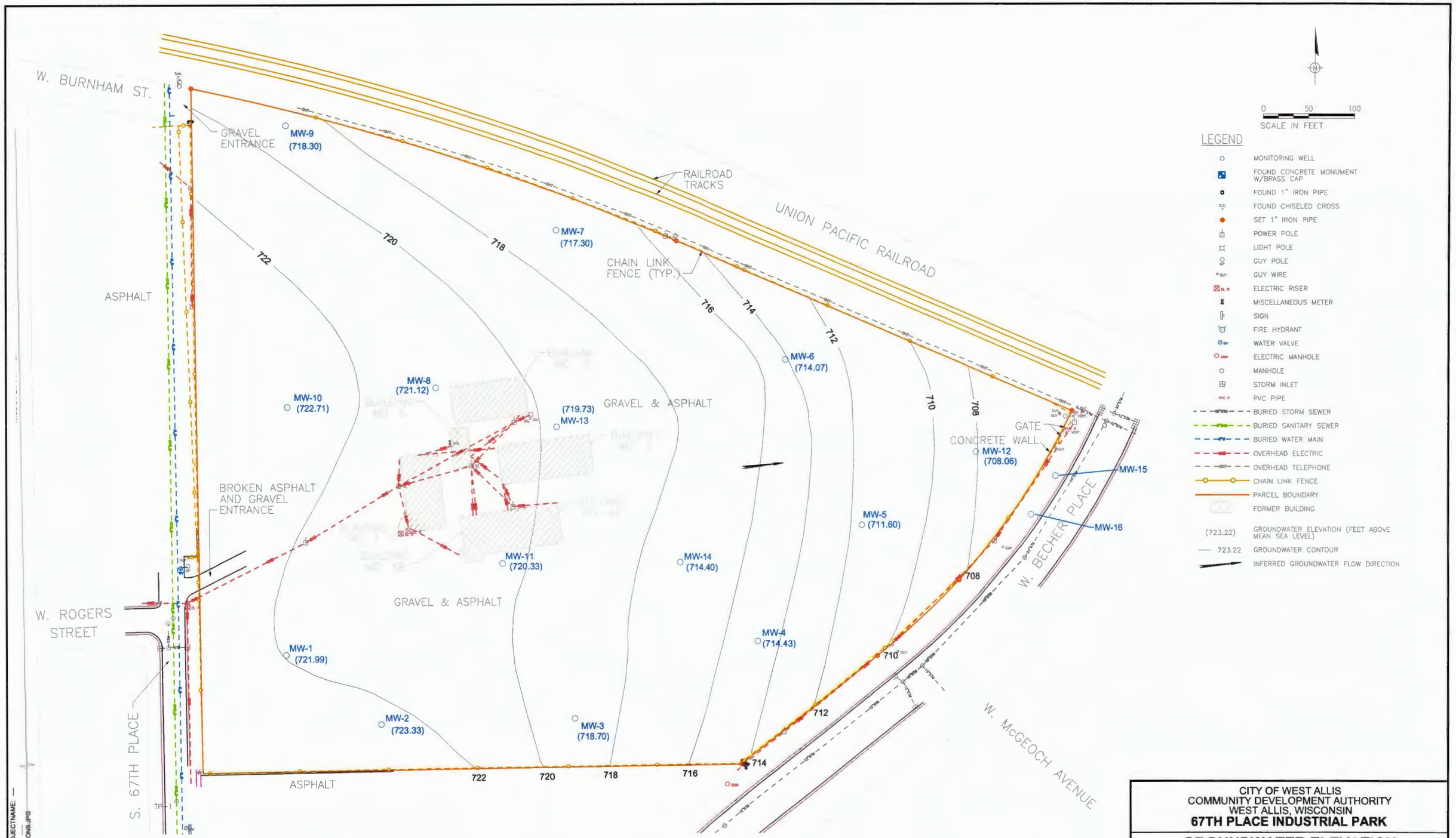


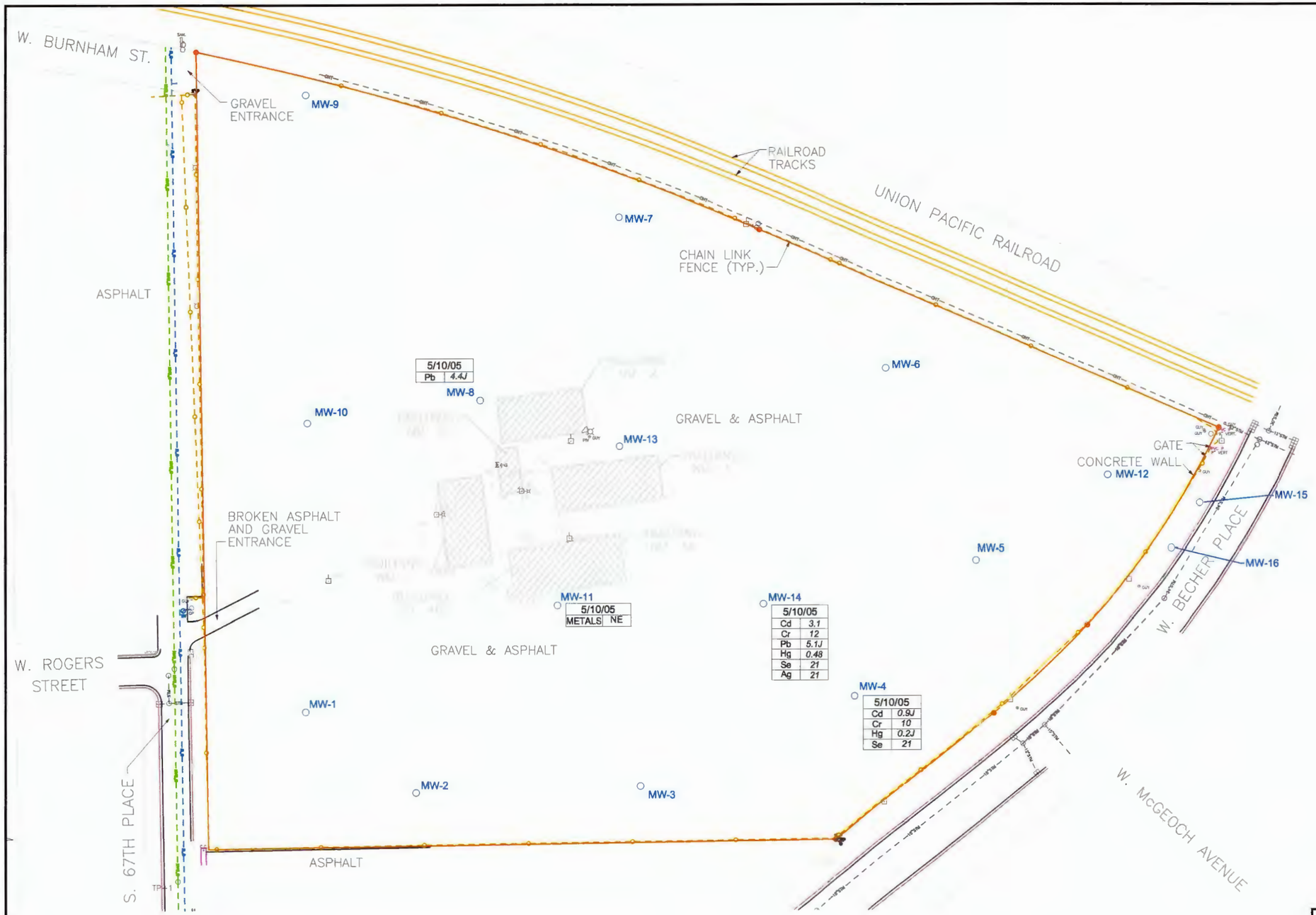
MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD–29).

CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

GROUNDWATER ELEVATION CONTOUR MAP MAY 10, 2005

ARCADIS

FIGURE 7



LEGEND

- MONITORING WELL
- FOUND CONCRETE MONUMENT W/BRASS CAP
- FOUND 1" IRON PIPE
- FOUND CHISELED CROSS
- SET 1" IRON PIPE
- POWER POLE
- LIGHT POLE
- GUY POLE
- GUY WIRE
- ELECTRIC RISER
- MISCELLANEOUS METER
- SIGN
- FIRE HYDRANT
- WATER VALVE
- ELECTRIC MANHOLE
- MANHOLE
- STORM INLET
- PVC PIPE
- BURIED STORM SEWER
- BURIED SANITARY SEWER
- BURIED WATER MAIN
- OVERHEAD ELECTRIC
- OVERHEAD TELEPHONE
- CHAIN LINK FENCE
- PARCEL BOUNDARY
- FORMER BUILDING

Cd	CADMIUM
Cr	CHROMIUM
Pb	LEAD
Hg	MERCURY
Se	SELENIUM
Ag	SILVER
J	ANALYTE DETECTED BETWEEN LIMIT OF DETECTION AND LIMIT OF QUANTITZATION
NE	CONCENTRATION DETECTED BELOW PREVENTATIVE ACTION LIMIT
ITALICS	CONCENTRATION EXCEEDS NR140 WIS. ADM. CODE PREVENTATIVE ACTION LIMIT

CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).

MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD–29).

CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

GROUNDWATER TOTAL METAL ANALYTICAL RESULTS

ARCADIS

FIGURE
13

W. BURNHAM ST.

GRAVEL ENTRANCE

RAILROAD TRACKS

UNION PACIFIC RAILROAD

CHAIN LINK FENCE (TYP.)

ASPHALT

GRAVEL & ASPHALT

BROKEN ASPHALT AND GRAVEL ENTRANCE

GATE

CONCRETE WALL

W. BECHER PLACE

W. ROGERS STREET

S. 67TH PLACE

W. McGEOCH AVENUE

ASPHALT

TP-1

SOIL BORINGS UNDER FORMER BUILDINGS SHOWN FOR CLARITY

SB-26 3-4'	VOC	ND
SB-27 3-4'	VOC	ND
SB-28 3-4'	VOC	ND
SB-29 2-3'	VOC	ND
SB-30 5-6'	VOC	ND
SB-31 3-4'	VOC	ND
SB-32 3-4'	VOC	NE
SB-33 3-4'	VOC	ND
SB-34 5-6'	VOC	ND
SB-35 3-4'	VOC	ND
SB-36 3-4'	VOC	ND
SB-37 3-4'	VOC	ND

SB-1 0-4'	VOC	NE
	DRO	160
	GRO	ND
SB-2 0-4'	VOC	ND
	DRO	NE
	GRO	ND
SB-3 0-4'	VOC	ND
	DRO	NE
	GRO	ND
SB-4 0-4'	VOC	NE
	DRO	190
	GRO	ND
SB-5 0-4'	VOC	ND
	DRO	NE
	GRO	ND
SB-6 0-4'	N	130000
	DRO	450
	GRO	NE
SB-7 0-4'	VOC	NE
	DRO	450
	GRO	ND
SB-8 0-4'	VOC	NE
	DRO	350
	GRO	ND
SB-9 0-4'	VOC	NE
	DRO	200
	GRO	ND
SB-10 0-4'	VOC	NE
	DRO	NE
	GRO	ND
SB-11 0-4'	VOC	NE
SB-12 0-4'	VOC	NE
SB-13 0-3'	VOC	NE
SB-14 0-4'	VOC	NE
SB-15 0-4'	VOC	ND
SB-18 4-8'	VOC	NE
SB-19 0-4'	VOC	NE
SB-20 0-4'	VOC	NE
SB-22 4-8'	VOC	NE
SB-24 3-4'	VOC	ND

SB-1, SB-2, SB-3, SB-4, SB-5, SB-6, SB-7, SB-8, SB-9, SB-10, SB-11, SB-12, SB-13, SB-14, SB-15, SB-16, SB-17, SB-18, SB-19, SB-20, SB-21, SB-22, SB-23, SB-24, SB-25, SB-26, SB-27, SB-28, SB-29, SB-30, SB-31, SB-32, SB-33, SB-34, SB-35, SB-36, SB-37

0 50 100
SCALE IN FEET

LEGEND

- SOIL BORING
- FOUND CONCRETE MONUMENT W/BRASS CAP
- FOUND 1" IRON PIPE
- FOUND CHISELED CROSS
- SET 1" IRON PIPE
- POWER POLE
- LIGHT POLE
- GUY POLE
- GUY WIRE
- ELECTRIC RISER
- MISCELLANEOUS METER
- SIGN
- FIRE HYDRANT
- WATER VALVE
- ELECTRIC MANHOLE
- MANHOLE
- STORM INLET
- PVC PIPE
- BURIED STORM SEWER
- BURIED SANITARY SEWER
- BURIED WATER MAIN
- OVERHEAD ELECTRIC
- OVERHEAD TELEPHONE
- CHAIN LINK FENCE
- PARCEL BOUNDARY
- FORMER BUILDING

VOC	VOLATILE ORGANIC COMPOUNDS
DRO	DIESEL RANGE ORGANICS
GRO	GASOLINE RANGE ORGANICS
N	NAPHTHALENE
ND	NOT DETECTED
NE	CONCENTRATION DETECTED, BUT BELOW THE RESIDUAL CONTAMINANT LEVEL OR SOIL SCREENING LEVEL
BOLD	CONCENTRATION EXCEEDS NR 720 WIS. ADM. CODE RESIDUAL CONTAMINANT LEVEL OR SOIL SCREENING LEVEL

ONLY CONCENTRATIONS ABOVE NR 720 RESIDUAL CONTAMINENT LEVEL OR SOIL SCREENING LEVEL REPORTED.
ALL VOC CONCENTRATIONS REPORTED IN MICROGRAMS PER KILOGRAM (µg/kg).
ALL DRO AND GRO CONCENTRATIONS REPORTED IN MILLIGRAMS PER KILOGRAM (mg/Kg).

MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD–29).

CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

SOIL DRO, GRO, AND VOC ANALYTICAL RESULTS

ARCADIS

FIGURE
8

W. BURNHAM ST.

GRAVEL ENTRANCE

MW-9

RAILROAD TRACKS

UNION PACIFIC RAILROAD

MW-7

CHAIN LINK FENCE (TYP.)

ASPHALT

SB-4

MW-6

MW-8 2-3' | PCB | ND

MW-8

MW-10

GRAVEL & ASPHALT

SB-2

MW-13

SB-1

GATE

CONCRETE WALL

MW-12

MW-15

BROKEN ASPHALT AND GRAVEL ENTRANCE

SB-3

SB-7 0-4' | PCB | ND

SB-9

SB-9 0-4' | PCB | ND

SB-7

MW-5

SB-8 0-4' | PCB | ND

MW-16

SB-5

SB-8

MW-11

MW-14

MW-14 4-6' | Ar 1254 | 0.26

W. BECHER PLACE

SB-10

GRAVEL & ASPHALT

W. ROGERS STREET

SB-6

SB-6 0-4' | PCB | ND

MW-4

MW-1

MW-2

MW-3

S. 67TH PLACE

ASPHALT

TP-1

W. McGEOCH AVENUE

0 50 100

SCALE IN FEET

LEGEND

- MONITORING WELL
- SOIL BORING
- FOUND CONCRETE MONUMENT W/BRASS CAP
- FOUND 1" IRON PIPE
- FOUND CHISELED CROSS
- SET 1" IRON PIPE
- POWER POLE
- LIGHT POLE
- GUY POLE
- GUY WIRE
- ELECTRIC RISER
- MISCELLANEOUS METER
- SIGN
- FIRE HYDRANT
- WATER VALVE
- ELECTRIC MANHOLE
- MANHOLE
- STORM INLET
- PVC PIPE
- BURIED STORM SEWER
- BURIED SANITARY SEWER
- BURIED WATER MAIN
- OVERHEAD ELECTRIC
- OVERHEAD TELEPHONE
- CHAIN LINK FENCE
- PARCEL BOUNDARY
- FORMER BUILDING
- PCB — POLYCHLORINATED BIPHENYLS
- Ar 1254 — AROCLOR 1254
- ND — NOT DETECTED

CONCENTRATIONS REPORTED IN MILLIGRAMS PER KILOGRAM (mg/Kg).

MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD–29).

CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

SOIL PCB ANALYTICAL RESULTS

ARCADIS

FIGURE 9

CITY:MILWAUKEE DIV/GROUP:ENVIRONMENTAL DB:R. ROBBENNOLT PM:B. VERBURG TM:T. SCHOEN
G:\Project\PreasSteel\W11074\LimePit\CADD\beverburg\LIME PITSOILPCB.dwg LAYOUT: LAYOUT1 SAVED: 3/19/2009 3:28 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: CANON 11X17 FINAL PLOTSTYLETABLE: BLACKGRAY-THIN.CTB PLOTTED: 3/19/2009 3:29 PM BY: ROBBENNOLT, REBECCA
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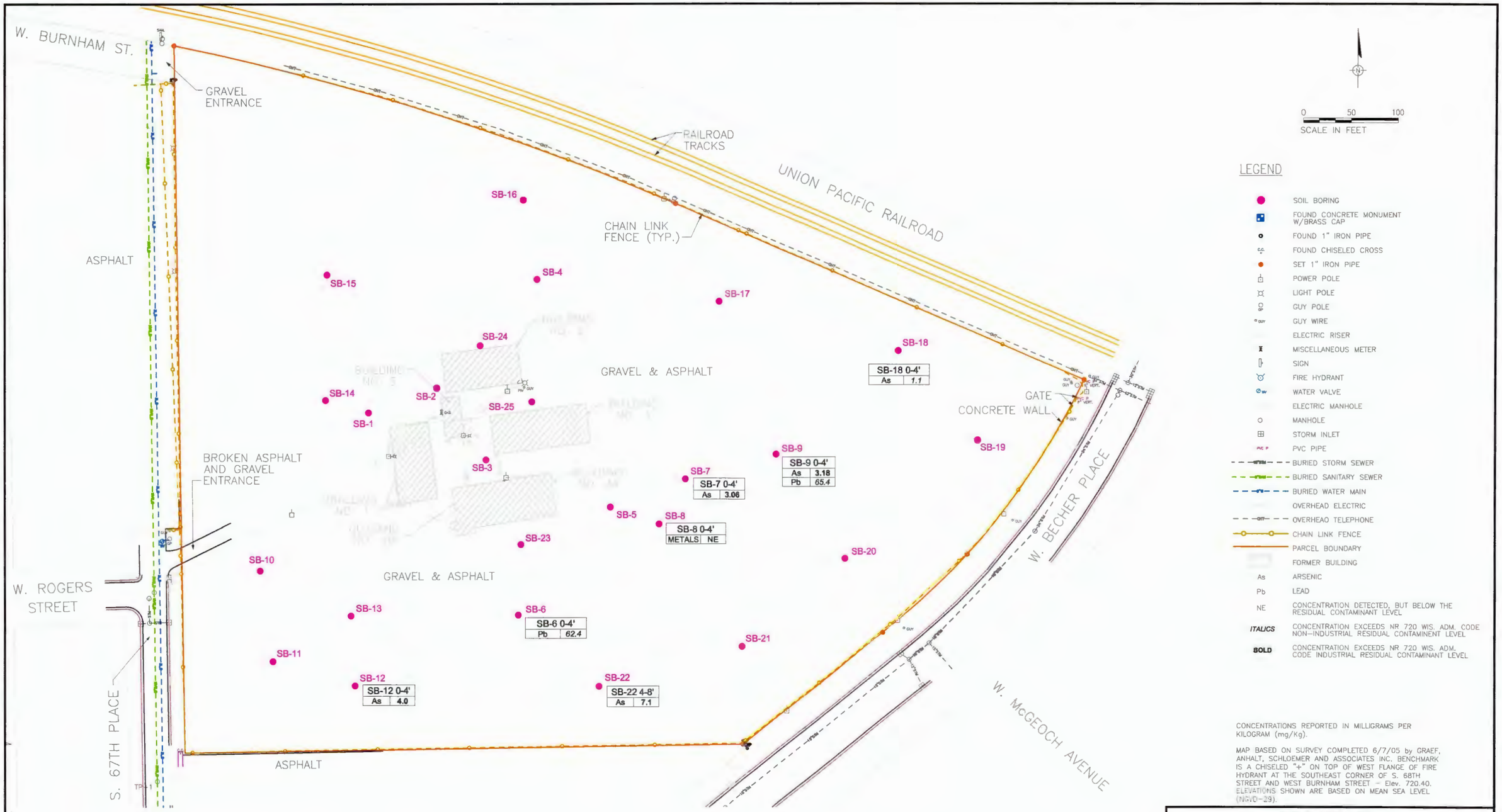
Lime Pit SITE BORING LOCATIONS.JPG



CONCENTRATIONS REPORTED IN MILLIGRAMS PER KILOGRAM (mg/Kg).

MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD-29).

CITY OF WEST ALLIS
COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN

67TH PLACE INDUSTRIAL PARK

SOIL METAL ANALYTICAL RESULTS

ARCADIS

FIGURE 10

CITY:MILWAUKEE DIV/GROUP:ENVIRONMENTAL DB:R. ROBBENNOLT PM:B. VERBURG TM:T. SCHOEN
G:\Project\PresSteel\W11074\LimePit\CADD\benverburg\LIME PIT\SOILMETALS.dwg LAYOUT: LAYOUT1 SAVED: 3/19/2009 8:09 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: CANON 11X17 FINAL PLOTSTYLETABLE: BLACKGRAY-THIN.CTB PLOTTED: 3/19/2009 3:30 PM BY: ROBBENNOLT,
REBECCA
XREFS:
IMAGES: PROJECTNAME: —
Lime Pit SITE BASING LOCATIONS.JPG

W. BURNHAM ST.

GRAVEL ENTRANCE

ASPHALT

RAILROAD TRACKS

UNION PACIFIC RAILROAD

CHAIN LINK FENCE (TYP.)

GRAVEL & ASPHALT

GATE

CONCRETE WALL

BROKEN ASPHALT AND GRAVEL ENTRANCE

W. ROGERS STREET

S. 67TH PLACE

W. BECHER PLACE

W. McGEOCH AVENUE

ASPHALT

MW-9	
5/10/05	
VOC	ND
2/23/09	
pH	6.5

MW-7	
5/10/05	
VOC	ND

MW-10	
5/10/05	
VOC	ND
2/23/09	
pH	6.8

MW-8	
5/10/05	
VOC	NE

MW-13	
5/10/05	
VOC	NE
2/23/09	
pH	6.8

MW-6	
5/10/05	
B	*1.4*
N	*19*
2/23/09	
pH	12.3

MW-12	
5/10/05	
B	*1.8*
N	*16*
2/23/09	
pH	6.9

MW-15	
2/12/07	
VOC	ND
3/17/09	
pH	8.1

MW-16	
2/12/07	
VOC	ND
3/17/09	
pH	8.1

MW-5	
5/10/05	
B	*1.6*
N	*34*
2/23/09	
pH	11.8

MW-11	
5/10/05	
VOC	ND

MW-14	
5/10/05	
B	*1.2*
2/23/09	
pH	12.5

MW-1	
5/10/05	
VOC	NE
2/23/09	
pH	12.6

MW-2	
5/10/05	
VOC	ND

MW-3	
5/10/05	
VOC	ND
2/23/09	
pH	6.9

MW-4	
5/10/05	
B	*0.79J*
TCE	*0.53J*
2/23/09	
pH	9.2

0 50 100
SCALE IN FEET

LEGEND

- MONITORING WELL
- FOUND CONCRETE MONUMENT W/BRASS CAP
- FOUND 1" IRON PIPE
- FOUND CHISELED CROSS
- SET 1" IRON PIPE
- POWER POLE
- LIGHT POLE
- GUY POLE
- GUY WIRE
- ELECTRIC RISER
- MISCELLANEOUS METER
- SIGN
- FIRE HYDRANT
- WATER VALVE
- ELECTRIC MANHOLE
- MANHOLE
- STORM INLET
- PVC PVC PIPE
- BURIED STORM SEWER
- BURIED SANITARY SEWER
- BURIED WATER MAIN
- OHE OVERHEAD ELECTRIC
- OHT OVERHEAD TELEPHONE
- CHAIN LINK FENCE
- PARCEL BOUNDARY
- FORMER BUILDING

B	BENZENE
N	NAPHTHALENE
J	ANALYTE DETECTED BETWEEN LIMIT OF DETECTION AND LIMIT OF QUANTITZATION.
ND	NOT DETECTED
NE	CONCENTRATION DETECTED BUT BELOW PREVENTATIVE ACTION LIMIT CONCENTRATION
ITALICS	CONCENTRATION EXCEEDS NR140 WIS. ADM. CODE PREVENTATIVE ACTION LIMIT
BOLD	CONCENTRATION EXCEEDS NR140 WIS. ADM. CODE ENFORCEMENT STANDARD
VOC	VOLATILE ORGANIC COMPOUNDS

ALL VOC CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
VOC EXCEEDANCE CONCENTRATIONS REPORTED FROM MOST RECENT SAMPLING EVENT.

MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD–29).

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COMMUNITY DEVELOPMENT AUTHORITY
WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

GROUNDWATER VOC and pH ANALYTICAL RESULTS

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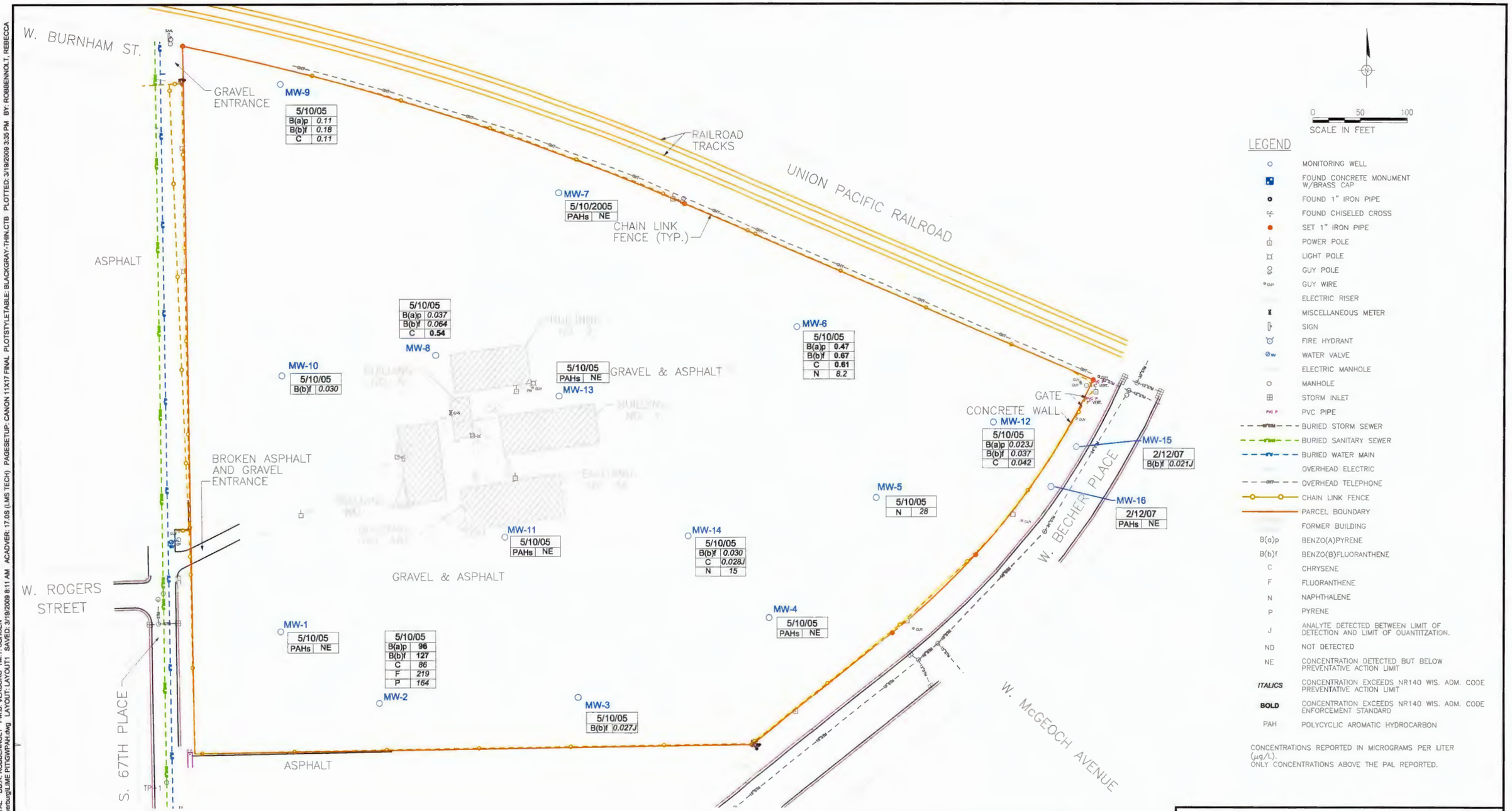
FIGURE **11**

CITY:MILWAUKEE DIV/GROUP:ENVIRONMENTAL DB:R. ROBBENNOLT PM:B. VERBURG TM:T. SCHOEN
G:\Apro\ject\PrasSteel\WI1074\LimePit\CADD\banverburg\LIME PIT\GWVOCExceedances.dwg LAYOUT: FIGURE 2 SAVED: 3/19/2009 8:10 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: CANON 11X17 FINAL PLOTSTYLETABLE: BLACKGRAY-THIN.CTB PLOTTED: 3/19/2009 3:31 PM BY:
ROBBENNOLT, REBECCA

XREFS: IMAGES: PROJECTNAME: —
Lime Pit SITE BORING LOCATIONS.JPG
BORING LOCATIONS.JPG



LEGEND

- MONITORING WELL
- FOUND CONCRETE MONUMENT W/BRASS CAP
- FOUND 1" IRON PIPE
- FOUND CHISELED CROSS
- SET 1" IRON PIPE
- POWER POLE
- LIGHT POLE
- GUY POLE
- GUY WIRE
- ELECTRIC RISER
- MISCELLANEOUS METER
- SIGN
- FIRE HYDRANT
- WATER VALVE
- ELECTRIC MANHOLE
- MANHOLE
- STORM INLET
- PVC PIPE
- BURIED STORM SEWER
- BURIED SANITARY SEWER
- BURIED WATER MAIN
- OVERHEAD ELECTRIC
- OVERHEAD TELEPHONE
- CHAIN LINK FENCE
- PARCEL BOUNDARY
- FORMER BUILDING

B(a)p	BENZO(A)PYRENE
B(b)f	BENZO(B)FLUORANTHENE
C	CHRYSENE
F	FLUORANTHENE
N	NAPHTHALENE
P	PYRENE
J	ANALYTE DETECTED BETWEEN LIMIT OF DETECTION AND LIMIT OF QUANTITZATION.
ND	NOT DETECTED
NE	CONCENTRATION DETECTED BUT BELOW PREVENTATIVE ACTION LIMIT
ITALICS	CONCENTRATION EXCEEDS NR140 WIS. ADM. CODE PREVENTATIVE ACTION LIMIT
BOLD	CONCENTRATION EXCEEDS NR140 WIS. ADM. CODE ENFORCEMENT STANDARD
PAH	POLYCYCLIC AROMATIC HYDROCARBON

CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
ONLY CONCENTRATIONS ABOVE THE PAL REPORTED.

MAP BASED ON SURVEY COMPLETED 6/7/05 by GRAEF, ANHALT, SCHLOEMER AND ASSOCIATES INC. BENCHMARK IS A CHISELED "+" ON TOP OF WEST FLANGE OF FIRE HYDRANT AT THE SOUTHEAST CORNER OF S. 68TH STREET AND WEST BURNHAM STREET – Elev. 720.40. ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL (NGVD–29).

CITY OF WEST ALLIS
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WEST ALLIS, WISCONSIN
67TH PLACE INDUSTRIAL PARK

GROUNDWATER PAH ANALYTICAL RESULTS

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FIGURE 12

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Appendix A

NR 712 Report Certification

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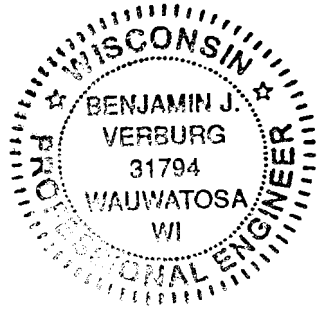
NR 712 Certifications

This attachment was prepared to satisfy the requirements of Wisconsin Administrative Code Chapter NR 712.09 and is applicable to the following document, dated March 20, 2009.

Remedial Action Options Report
67th Place Industrial Park
1960 South 67th Place
West Allis, Wisconsin

"I, Ben Verburg, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."



Ben Verburg, Principal Engineer, 31794
Signature, title and P.E. number

P.E. stamp

"I, Toni Schoen, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

Toni L. Schoen, Hydrogeologist
Signature and title

3-20-09
Date

ARCADIS

Appendix B

Soil Screening Level Calculations

Waste and Cleanup Risk Assessment

SSG Home SSG Search

Soil Screening Guidance for Chemicals

Equation Values for Ingestion

Noncarcinogenic Parameter	Value	Carcinogenic Age-adjusted Parameter	Value	Carcinogenic Nonadjusted Parameter	Value
Target Hazard Quotient (unitless)	0.2	Target Risk (unitless)	1.0E-7	Target Risk (unitless)	1.0E-6
Body Weight (kg)	15	Adult Body Weight (kg)	70	Body Weight (kg)	70
		Child Body Weight (kg)	15		
Exposure Duration (yr)	6	Adult Exposure Duration (yr)	24	Exposure Duration (yr)	25
		Child Exposure Duration (yr)	6		
Exposure Frequency (day/yr)	350	Exposure Frequency (day/yr)	350	Exposure Frequency (day/yr)	250
Intake Rate (mg/day)	200	Adult Intake Rate (mg/day)	100	Intake Rate (mg/day)	100
		Child Intake Rate (mg/day)	200		
		Average Lifetime (yr)	70	Average Lifetime (yr)	70
		Age-adjusted Ingestion Factor (mg-yr/kg-day)	114.29		

Soil Screening Levels for Ingestion (mg/kg)

Analyte	Cas Number	Oral RfD	Oral Slope Factor	Noncarcinogenic	Carcinogenic (Age-adjusted)	Carcinogenic (Nonadjusted)
Benzene	71432	4.00E-03	5.50E-02 [a]	6.26E+01	1.16E+00	5.20E+01
Chloromethane	74873		1.30E-02 [b]		4.91E+00	2.20E+02
Dichloroethane, 1,1-	75343	2.00E-01 [v]		3.13E+03		
Dichloroethylene, 1,1-	75354	5.00E-02 [a]	[w]	7.82E+02		
Dichloroethylene, 1,2-cis-	156592	1.00E-02 [b]		1.56E+02		
Dichloroethylene, 1,2-trans-	156605	2.00E-02 [a]		3.13E+02		
Ethylbenzene	100414	1.00E-01 [a]		1.56E+03		
Methylene Chloride	75092	6.00E-02 [a]	7.50E-03 [a]	9.39E+02	8.52E+00	3.82E+02
Naphthalene	91203	2.00E-02 [a]		3.13E+02		
Tetrachloroethylene	127184	1.00E-02 [a]	5.20E-02 [v]	1.56E+02	1.23E+00	5.50E+01
Toluene	108883	8.00E-02 [a]		1.25E+03		
Trichloroethane, 1,1,1-	71556	2.00E-01 [v]		3.13E+03		
Trichloroethylene	79016	3.00E-04 [v]	4.00E-01 [v]	4.69E+00	1.60E-01	7.15E+00
Trimethylbenzene, 1,2,4-	95636	5.00E-02		7.82E+02		

Vinyl Chloride	75014	3.00E-03 [a]	1.50E+00 [a]	4.69E+01	4.26E-02	1.91E+00
Xylene, Mixture	1330207	2.00E-01 [a]		3.13E+03		

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Waste and Cleanup Risk Assessment

SSG Home SSG Search

Soil Screening Guidance for Chemicals

Equation Values for Inhalation of Fugitive Dust

Particulate Emission Factor Parameter	Value	Noncarcinogenic Parameter	Value	Carcinogenic Parameter	Value
Surface Area (acres)	10.0	Target Hazard Quotient (unitless)	0.2	Target Risk (unitless)	1.0E-7
City (climate zone)	Chicago(VII)	Exposure Duration (yr)	30	Exposure Duration (yr)	30
Q/C (g/m^2-s per kg/m^3)	59.64691	Exposure Frequency (day/yr)	350	Exposure Frequency (day/yr)	350
Fraction of vegetative cover (unitless)	0.5			Average Lifetime (yr)	70
Mean annual windspeed (m/s)	5				
Equivalent threshold value of windspeed at 7m (m/s)	11				
Function dependent on U_m/U_t (unitless)	0.2707				

Soil Screening Levels for Inhalation of Fugitive Dust (mg/kg)

Analyte	Cas Number	Inhalation RfC	Inhalation Unit Risk	Particulate Emission Factor	Noncarcinogenic	Carcinogenic
Benzene	71432	3.00E-02 [a]	7.8E-06 [a]	4.69E+08	2.94E+06	1.46E+04
Chloromethane	74873	9.00E-02 [a]	1.8E-06 [b]	4.69E+08	8.81E+06	6.34E+04
Dichloroethane, 1,1-	75343	5.00E-01 [b,c]		4.69E+08	4.89E+07	
Dichloroethylene, 1,1-	75354	2.00E-01 [a]	[w]	4.69E+08	1.96E+07	
Dichloroethylene, 1,2-cis-	156592			4.69E+08		
Dichloroethylene, 1,2-trans-	156605			4.69E+08		
Ethylbenzene	100414	1.00E+00 [a]		4.69E+08	9.79E+07	
Methylene Chloride	75092	3.00E+00 [b]	4.7E-07 [a]	4.69E+08	2.94E+08	2.43E+05
Naphthalene	91203	3.00E-03 [a]		4.69E+08	2.94E+05	
Tetrachloroethylene	127184	6.00E-01 [x]	5.8E-07 [x]	4.69E+08	5.87E+07	1.97E+05
Toluene	108883	5.00E+00 [a]		4.69E+08	4.89E+08	
Trichloroethane, 1,1,1-	71556	2.20E+00 [x]		4.69E+08	2.15E+08	
Trichloroethylene	79016	4.00E-02 [x]	1.1E-04 [x]	4.69E+08	3.91E+06	1.04E+03
Trimethylbenzene, 1,2,4-	95636	6.00E-03		4.69E+08	5.87E+05	
Vinyl Chloride	75014	1.00E-01 [a]	8.8E-06 [a]	4.69E+08	9.79E+06	1.30E+04
Xylene, Mixture	1330207	1.00E-01 [a]		4.69E+08	9.79E+06	

Waste and Cleanup Risk Assessment

Soil Screening Guidance for Chemicals

Equation Values for Inhalation of Volatiles

Volatilization Factor Parameter	Value	Soil Saturation Concentration Parameter	Value	Noncarcinogenic Parameter	Value	Carcinogenic Parameter	Value
Surface Area (acres)	10.0			Target Hazard Quotient (unitless)	0.2	Target Risk (unitless)	1.0E-7
City (climate zone)	Chicago(VII)			Exposure Duration (yr)	30	Exposure Duration (yr)	30
Q/C (g/m^2-s per kg/m^3)	59.64691			Exposure Frequency (day/yr)	350	Exposure Frequency (day/yr)	350
Fraction organic carbon (unitless)	0.006	Fraction organic carbon (unitless)	0.006			Average Lifetime (yr)	70
Dry soil bulk density (g/cm^3)	1.5	Dry soil bulk density (g/cm^3)	1.5				
Soil particle density (g/cm^3)	2.65	Soil particle density (g/cm^3)	2.65				
Water-filled soil porosity (L_{water}/L_{soil})	0.2	Water-filled soil porosity (L_{water}/L_{soil})	0.2				
Exposure Interval (s)	9.5e08						

Soil Screening Levels for Inhalation of Volatiles (mg/kg)

Analyte	Cas Number	Inhalation RfC	Inhalation Unit Risk	Volatilization Factor	Soil Saturation Concentration	Noncarcinogenic	Carcinogenic
Benzene	71432	3.0E-02 [a]	7.8E-06 [a]	3.3E+03	9.1E+02	2.1E+01	1.0E-01
Chloromethane	74873	9.0E-02 [a]	1.8E-06 [b]	1.9E+03	2.1E+03	3.6E+01	2.6E-01
Dichloroethane, 1,1-	75343	5.0E-01 [b,c]		3.0E+03	1.8E+03	3.1E+02	
Dichloroethylene, 1,1-	75354	2.0E-01 [a]	[w]	1.7E+03	1.5E+03	7.1E+01	
Dichloroethylene, 1,2-cis-	156592			3.6E+03	1.3E+03		
Dichloroethylene, 1,2-trans-	156605			2.8E+03	3.2E+03		
Ethylbenzene	100414	1.0E+00 [a]		6.4E+03	4.0E+02	1.3E+03	
Methylene Chloride	75092	3.0E+00 [b]	4.7E-07 [a]	3.2E+03	2.8E+03	2.0E+03	1.6E+00
Naphthalene	91203	3.0E-03 [a]		6.6E+04		4.1E+01	
Tetrachloroethylene	127184	6.0E-01 [v]	5.8E-07 [v]	3.0E+03	2.4E+02	3.8E+02	1.3E+00
Toluene	108883	5.0E+00 [a]		4.8E+03	6.7E+02	5.0E+03	
Trichloroethane, 1,1,1-	71556	2.2E+00 [v]		2.6E+03	1.2E+03	1.2E+03	
Trichloroethylene	79016	4.0E-02 [v]	1.1E-04 [v]	3.9E+03	1.3E+03	3.2E+01	8.6E-03
Trimethylbenzene, 1,2,4-	95636	6.0E-03		2.4E+04	1.3E+03	3.0E+01	
Vinyl Chloride	75014	1.0E-01 [a]	8.8E-06 [a]	1.2E+03	1.2E+03	2.6E+01	3.4E-02
Xylene, Mixture	1330207	1.0E-01 [a]		8.1E+03		1.7E+02	

Waste and Cleanup Risk Assessment

http://rais.ornl.gov/cgi-bin/epa/ssl2.cgi
Last updated on Tuesday, March 18th, 2008.

Soil Screening Guidance for Chemicals

Equation Values for Soil to Ground Water

Partitioning Equation Parameter	Value
Dilution factor (unitless)	2
Fraction organic carbon in soil (unitless)	0.001
Water-filled soil porosity (L_{water}/L_{soil})	0.2
Dry soil bulk density (kg/L)	1.5
Soil particle density (kg/L)	2.65

Soil Screening Levels for Soil to Ground Water (mg/kg)

Analyte	Cas Number	Ground Water Concentration* (mg/L)	Ground Water Concentration Source	Soil Screening Level
Benzene	71432	1.0E-02	MCL	2.3E-03
Chloromethane	74873	1.3E-02	HBL	2.9E-03
Dichloroethane, 1,1-	75343	1.5E+01	HBL	2.9E+00
Dichloroethylene, 1,1-	75354	1.4E-02	MCLG	5.0E-03
Dichloroethylene, 1,2-cis-	156592	1.4E-01	MCLG	2.7E-02
Dichloroethylene, 1,2-trans-	156605	2.0E-01	MCLG	4.9E-02
Ethylbenzene	100414	1.4E+00	MCLG	7.7E-01
Methylene Chloride	75092	1.0E-02	MCL	1.6E-03
Naphthalene	91203	1.5E+00	HBL	3.1E+00
Tetrachloroethylene	127184	1.0E-02	MCL	4.1E-03
Toluene	108883	2.0E+00	MCLG	7.2E-01
Trichloroethane, 1,1,1-	71556	4.0E-01	MCLG	1.4E-01
Trichloroethylene	79016	1.0E-02	MCL	3.7E-03
Trimethylbenzene, 1,2,4-	95636	3.7E+00	HBL	1.4E+01
Vinyl Chloride	75014	4.0E-03	MCL	1.3E-03
Xylene, Mixture	1330207	1.5E+01	HBL	7.9E+00

*Ground Water Concentration=Ground Water Concentration Source × Dilution Factor

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Appendix C

Material Handling And Cap Maintenance Plan

Material Handling and Cap Maintenance Plan

This Material Handling and Cap Maintenance Plan ("Plan") is applicable to the 67th Place Industrial Park located at 1960 South 67th Place in the city of West Allis, Milwaukee County, Wisconsin ("Site"). Figure 1 is a Site Location Map. Residual soil contamination remains onsite that exceed the direct contact residual contaminant levels (RCLs) for total lead, total arsenic, naphthalene, and other polycyclic aromatic hydrocarbons (PAHs) which resulted from historic spills and releases of petroleum products. Residual groundwater contamination also remains in the same area and consists of PAHs and a few select volatile organic compounds above the ch. NR 140 Wis. adm. code preventive action limit and pH above the ch. NR 140 enforcement standard.

A copy of this Plan shall be kept on file in the offices of: (1) the Wisconsin Department of Natural Resources (WDNR), Southeast Region; (2) the owner of the Site, its successors and assigns (hereinafter identified collectively as the "Owner"); (3) the Site manager, if any; and (4) the Site. The Plan shall be made available by the Owner to future developers, contractors, utilities and maintenance personnel, and any other public or private persons or entities authorized to perform underground excavation work at the Site.

The cap elements which are the subject of this Plan are approved engineered barriers which may consist of 2 feet of clean soil (e.g., backfill, topsoil, and seed for landscaping), buildings, and concrete or asphalt pavement over the soils that exceed the direct contact RCLs. Figure 2 is a plan view which presents the location and extent of the engineered barrier requirements.

The purpose of this Plan is to describe the procedures and controls that shall be followed to maintain the function of the engineered barriers and to properly manage potentially contaminated materials encountered during construction and maintenance activities. Maintaining the function of the engineered barriers will provide continued protection of human health and the environment by minimizing potential exposure to the residual contamination.

The WDNR and its successor and assigns (hereinafter identified collectively as the "Department") shall be notified of any activity that is not in accordance with this Plan.

Required Activities

Annual Cap Inspections. Not less than annually, the Site shall be inspected by the Owner to ensure that the integrity of the engineered barriers is maintained and that no significant fissures or cracks develop in the gravel or concrete caps, which could allow potential exposure to the residual contamination. Disturbances of the engineered barriers or significant fissures or cracks in the gravel or concrete cap shall be noted by the Owner on the "Annual Cap Inspection Form" (attached). All inspection reports shall be maintained on file by the Owner, the Site manager, if any, and at the Site.

Repairs to Capped Areas. If, during the annual inspections or other routine inspections of the Site, the engineered barriers are observed to have been disturbed or significant fissures or cracks are observed in the gravel or concrete caps, the Owner shall arrange to have repairs made to such areas, in a manner consistent with this Plan. Such repairs shall be carried out within a reasonable period of time, not to exceed 120 days, subject to weather and seasonal considerations. The Owner shall document the repairs to capped areas on the "Corrective Action Form" (attached). All Corrective Action Forms shall be maintained on file by the Owner, the Property manager, if any, and at the Property. A copy of the completed Corrective Action Form shall be filed with the Department.

Allowed Activities

The following allowed activities must comply with all listed requirements:

1. **Construction or Installation of Buildings, Structures or Other Improvements.** Buildings, structures or other improvements may be constructed or installed on the Site using footings or other foundations that are placed into the area of residual contamination in the following manner:

   A) The contractor performing the work shall be provided a copy of this Plan by Owner and shall prepare a health and safety plan, appropriate to the work being performed.

   B) Soils that are excavated shall be separated and segregated to the extent practicable so that they may be replaced upon completion of the work. All excavated contaminated soil shall be, at a minimum, placed onto plastic sheeting and covered, or placed into a watertight container such as a covered roll-off box.

C) Upon completion of the work, previously excavated soil may be backfilled, provided, however, that the backfilled soil maintains the compaction characteristics of the surrounding soil. The soil, as well as any additional clean soil or granular fill material necessary to backfill to grade, shall be backfilled in such a manner as to maintain the original depth of the contaminated soil. The backfill area shall be restored in a manner consistent with the original cap condition. If groundwater is recovered, it shall be managed and disposed of as a contaminated material in accordance with state and federal requirements.

D) A memorandum or report shall be prepared describing the work performed, identifying the person(s) performing the work and the date of the work, and confirming that the Plan was adhered to in completion of the work. A copy of the report shall be kept on file by the Owner and the Property manager, if any, and shall be filed with the Department.

2. **Replacement and Repair of Engineered Barriers.** If it becomes necessary or desirable to replace or repair the cap, the repair or replacement shall be undertaken in the following manner:

A) The contractor performing the work shall be provided a copy of this Plan by Owner and shall prepare a health and safety plan, appropriate to the work being performed.

B) Contaminated soil that is excavated shall be separated and segregated to the extent practicable so that they may be replaced upon completion of the work. Any such excavation of contaminated soil shall be conducted in accordance with the health and safety plan. All excavated contaminated soils shall be, at a minimum, placed onto plastic sheeting and covered, or placed into a watertight container such as a covered roll-off box.

C) Upon completion of the work, previously excavated soil may be backfilled, provided, however, that the backfilled soil maintains the compaction characteristics of the surrounding soil. The soil, as well as any additional clean soil or granular fill material necessary to backfill to grade, shall be backfilled in such a manner as to maintain the original depth of the contaminated soil. The backfill area shall be restored in a manner consistent with the original cap condition. If groundwater is

recovered, it shall be managed and disposed of as a contaminated material in accordance with state and federal requirements.

D) A memorandum report shall be prepared describing the work performed, identifying the person(s) performing the work and the date of the work, and confirming that the Plan was adhered to in completion of the work. A copy of the report shall be kept on file by the Owner, the Property manager, if any, and at the Property, and shall be filed with the Department.

3. **Utility Installations or Repairs.** No utility repairs or installation of new or replacement utilities shall be conducted on the Site until after the utility and any contractor(s) for the utility have acknowledged receipt of a copy of this Plan. The utility repairs or installation(s) shall be conducted in strict conformance with the standards set forth below with respect to excavations into and/or beneath the Cap, and such excavations are to be undertaken in the following manner:

A) The contractor performing the work shall be provided with a copy of this Plan by Owner and shall prepare a health and safety plan, appropriate to the work being performed.

B) Contaminated soil that is excavated for purposes of utility installation or repair shall be separated and segregated to the extent practicable so that they may be replaced upon completion of the work. All excavated contaminated soil shall be, at a minimum, placed onto plastic sheeting and covered, or placed into a watertight container such as a covered roll-off box.

C) Upon completion of such work, the excavated contaminated soil may be placed back into the excavation, provided, however, that any excavated soil placed back into the excavation shall maintain the compaction characteristics of the surrounding soil. The area of the excavation shall be restored in a manner consistent with the original cap condition.

D) Any excavation of contaminated soil beneath the engineered barriers shall be conducted in accordance with the health and safety plan. Any other soils which have been commingled, mixed or otherwise have come into contact with soils excavated from beneath the engineered barrier shall be properly characterized and managed in accordance

with state law with notice to the Department. Any groundwater affected by such activities shall be managed in accordance with state law after notice to the Department.

E) If the utility installation or construction involves any disturbance of the seals used to seal the entrance of utility lines and the structures on the Site, such seals shall be replaced with new seals of like or superior quality.

F) A memorandum report shall be prepared describing the work performed, identifying the person(s) performing the work and the date of the work, and confirming that the Plan was adhered to in completion of the work. A copy of the report shall be kept on file with the utility, the Owner, the Site manager, if any, and at the Site and shall be filed with the Department.

4. **Offsite Disposal of Excavated Soils.** If it becomes necessary or desirable to dispose of excavated soils from the allowed construction, repair, and installation activities, the excavation and resulting soils shall be managed in accordance with NR 718.13.

Request for Deviations

Owner shall not conduct any activities at the Site that are not in compliance with this Plan, unless written approval to do so is obtained from the WDNR.