

Michael Schmoller Wisconsin Department of Natural Resources South Central Region 3911 Fish Hatchery Road Fitchburg, WI 53711

Subject:

Polynuclear Aromatic Hydrocarbons (PAHs) Background Study, Madison-Kipp Corporation, 201 Waubesa Street, Madison, Wisconsin. Facility ID No. 113125320, BRRTS No. 02-13-001569

Dear Mr. Schmoller:

A *Polynuclear Aromatic Hydrocarbons Evaluation* report (2013 Report) for the Madison-Kipp facility located at 201 Waubesa Street (Site), dated January 21, 2013, was submitted to the Wisconsin Department of Natural Resources (WDNR). This report included an evaluation of the on-site and off-site polynuclear aromatic hydrocarbon (PAH) data collected from surface soil located on and within the immediate vicinity of the Madison Kipp facility. The purpose of the 2013 Report was to determine whether the facility was the source of PAHs in soils that exceeded WDNR's non-industrial direct contact residual contaminant level (RCL).

Evaluation of the off-site data presented in the 2013 Report concluded that PAHs in off-site soils were representative of urban background conditions and consisted of higher molecular weight PAHs attributed to coal fines, cinder materials, urban dust and asphalt. PAHs present in on-site soils had a distinctly different chemical profile that included lower molecular weight PAHs found in petroleum hydrocarbons such as cutting oil, waste oil, and diesel.

WDNR requested additional off-site background PAH sampling at locations further away from the Madison Kipp facility as documented in its *Review of March 2013 Madison Kipp Site Investigation and Interim Actions Report, February 2012 – January 2013* letter dated June 20, 2013. On behalf of Madison Kipp Corporation, a *Polynuclear Aromatic Hydrocarbon (PAH) Work Plan* (Work Plan) was submitted to the WDNR on August 1, 2013. This letter documents the activities completed in accordance with the Work Plan.

#### Sampling Activities

As requested by WDNR in the June 20, 2013 letter, soil borings were advanced off site of the Madison-Kipp property at locations that included those recommended by

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February 7, 2014

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Our ref:

WI001368.0013

the WDNR and consistent with modifications provided by the City of Madison. The approximate soil boring locations are shown on Figure 1.

The following presents a description of the completed activities:

- Secured access for the proposed soil boring/sample locations from the City of Madison.
- Located and cleared utilities, including contacting Digger's hotline prior to collecting the soil samples.
- Advanced 23 soil borings off site as shown on Figure 1 and Figures 2-19. The soil borings were advanced on City of Madison right-of-way and on Lowell Elementary School property.
- The soil borings were collected utilizing hand auger techniques. Soil samples were collected from each soil boring at depths of 0 to 1 foot below ground surface. Samples were collected in clean, laboratory-supplied sample containers, and placed in a cooler filled with ice. Each sample was submitted for laboratory analysis of PAHs by United States Environmental Protection Agency (U.S. EPA) SW-846 Method 8270C for the same parameter list as the previous PAH sampling and analysis work described in the 2013 Report. The samples were submitted using appropriate chain-of-custody procedures. Soil boring logs are provided in Attachment A.

#### Soil Sampling Results

Each of the soil samples contained one or more PAH above the WDNR's non-industrial direct contact RCL. Nine of the 24 samples (23, plus one duplicate) contained one or more PAH above the WDNR's industrial direct contact RCL. Table 1 provides a summary of the analytical results.

#### **Data Evaluation**

The overall objective of the PAH background sampling was to collect background data to confirm or refute the previous conclusions provided in the 2013 Report, that the residential PAH concentrations were background and typical of Madison, Wisconsin.

A forensic evaluation was completed to compare the background sample results reported in this letter to the data from the off-site residential samples previously

summarized in the 2013 Report. Specifically, the evaluation consisted of (i) determining the concentration distributions for the two data sets, (ii) statistically testing the means, and (iii) determining if there is a spatial relationship between total PAH concentrations and the distance from the Madison Kipp site.

Below is a description of the data evaluated, methodology and findings and conclusions of this sampling and results comparison with those contained in the 2013 Report.

#### 1) Data

- a. The data set consisted of 24 samples collected during 2013 (23 locations and one duplicate). These samples were collected at distances ranging from approximately 435 to 9,500 feet from the approximate center of the Madison-Kipp site, with an average distance of 2,100 feet. The 2013 background samples (BG, n=24 samples, 0 to 1 foot below grade) were evaluated for internal consistency and PAH profiles from the samples were compared with previous PAH profiles to determine consistency or inconsistency with the assessment provided in the 2013 Report.
- b. A subset of the larger data set from the 2013 Report, designated as the RES data set, consisted of 60 samples that were not on the Madison-Kipp site and were collected from the upper two feet of soil. These samples were collected from approximately 120 to 500 feet away from the approximate center of the Madison-Kipp site, with an average distance of 290 feet. The total PAH concentrations of off-site residential samples (RES, n=60 samples, 0 to 2 feet below grade) presented in the 2013 Report were evaluated to determine if they were consistent with the background data set (BG, n=24 samples, 0 to 1 foot below grade) collected as part of this background study.
- c. The 2013 Report data set included samples that were collected both on the Madison-Kipp site as well as samples collected from off-site locations. PAH profiles were calculated for samples having 10 or more PAHs detected in each sample, as described in the 2013 Report. Mean PAH profiles were determined for six different groups that had fairly unique patterns, Groups 1 through 6, as previously described in the 2013 Report. Group 1 included 86% of the samples collected (having 10 or more PAHs). A large percent (98%) of the residential samples collected from 0 to 2 feet, having 10 or more PAHs were also classified as Group 1. Group 1 showed the strongest correlation with coal fines and cinder materials, with urban dust and asphalt

also showing strong correlations. Group 1 did not show *any* correlation with cutting oil, waste oil, or diesel contaminated soil.

#### 2) Methodology

- All samples included in the current evaluation (BG and RES) were rank ordered by total PAH concentration and were also segregated into BG and RES groups for calculating distribution statistics.
- b. Each group was evaluated using ProUCL (U.S. EPA Version 4.00.02) to determine if they met the goodness-of-fit criteria for normal, gamma, or Lnnormal distributions in order to conduct subsequent statistical hypothesis testing. The Ln-normal distribution was determined to be the most appropriate fit for the data based on the goodness-of-fit parameters.
- c. The total PAH data for the BG and RES samples were Ln-normal transformed and statistical tests (i.e. t-tests) were performed on the two transformed data sets.
- d. Location data was obtained for all samples. The approximate center of the Madison-Kipp site was established from State Plane coordinates, and the radial distance for each sample from this location was determined. A log-log linear regression was performed to test the null hypothesis that "there is no linear relationship between the log-total PAH concentration and log-distance from the Madison-Kipp site" using regression statistics.

#### 3) Findings and Conclusions

- a. The PAH profiles for the BG data set are internally consistent with little variability. The mean PAH profile for the BG data set is shown on Figure 20. The internal variability of this PAH profile is illustrated on Figure 21, where the bars are used to illustrate +/- one standard deviation of the mean proportion for each PAH.
- b. PAH profiles for the BG data set (Figure 20) are consistent with the Mean PAH profile for Group 1 samples from the 2013 Report, which is shown on Figure 22. A statistical evaluation of the relative PAH proportions in the mean BG profile and the Group 1 profile reveals that they are statistically similar, indicating that the residential PAHs (RES) were derived from a similar source as the background samples (BG). This is illustrated on Figure 23. Each data point on this figure represents the proportion of each PAH

pair from the Group 1 PAH profile from the 2013 Report (x-axis) and the BG profile (y-axis). The regression line has a slope of nearly 1, and the Coefficient of Determination (R<sup>2</sup>) is 0.97, indicating that there is a nearly perfect correlation between the BG and RES data sets.

- c. PAH profiles for the BG, RES, and the Group 1 data set are consistent with coal or cinder sources (coal combustion) based on the relative proportions of the various discrete PAH compounds analyzed. These PAH profiles are *not* consistent with cutting oil, coal tar or diesel sources, as discussed in the 2013 Report.
- d. Standard t-tests were conducted assuming both equal variance and unequal variance between the two data sets (unequal variance is the most appropriate choice). Both tests indicated that there is no statistically significant difference between the RES and BG distribution; the data distributions are the same.
- e. The geometric mean for the total PAH concentration for the BG and RES data sets are 1.61 and 1.39 milligrams per kilogram (mg/kg), respectively. The arithmetic means for the BG and RES data sets are 3.49 mg/kg and 1.88 mg/kg, respectively. Although the RES sample means are somewhat lower than the BG sample means, the overall distributions are very similar.
- f. It is reasonable to conclude that the samples in the RES data set were drawn from the same population represented by the BG data set, and that there is no significant difference between the two. Figure 24 shows the total PAH concentrations (y-axis) vs. the rank-ordered sequence of all 84 data points. This shows that there is a good overlap between the two data sets, without significant skewing of one data set toward the high or low end of the concentration spectrum.
- g. There is no trend (visual or statistical) regarding total PAH concentration versus distance from the Madison-Kipp site (i.e. concentrations do not increase or decrease in a statistically significant or mathematically predictable manner as samples are collected farther from the site).

The Log-Log linear relationship was tested (to minimize high influence for physically distant or high concentration data points). A regression line was generated for each of the data sets (BG and RES). The Coefficient of Determination (R²) was calculated for each regression line, and neither was close to being statistically significant. Hence, it is concluded that there is no

relationship between distance and total PAH concentration. This conclusion is illustrated on Figure 25.

#### Closing

Based on the results and evaluation of the off-site PAH background sampling reported herein, the conclusions presented in the 2013 Report have been confirmed. The residential PAH concentrations from samples collected from properties adjacent to the Madison-Kipp property are background and typical of Madison, Wisconsin. Therefore, no additional investigation or remediation with respect to these results is necessary on behalf of Madison-Kipp.

We trust that this information meets your needs. Should you require additional information, please contact one of the undersigned.

ARCADIS U.S., Inc.

Eric M. Cherry Principal Scientist

Jennine Trask, PE Project Manager

Copies (electronic):

David Crass - Michael, Best, & Friedrich LLP Mark Meunier - Madison-Kipp Corporation John Hausbeck - City of Madison Brian Magee - ARCADIS

Drask

Attachments:

Table Figures Soil Boring Logs

Table

Table 1. Summary of Off-Site PAH Background Sampling Results, Madison-Kipp Corporation, Madison, Wisconsin.

Sample Name	Non-Industrial	Industrial	HA-1	HA-2	HA-3	HA-5	HA-6	HA-7	HA-8
Sample Date	Direct	Direct	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/16/2013
Sample Depth	Contact RCL	Contact RCL	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'
1-Methylnaphthalene			<0.098	<0.044	<0.0094	<0.01	0.04 J	0.039 J	0.053
2-Methylnaphthalene	229	368	< 0.074	< 0.033	< 0.0071	< 0.0075	0.038 J	0.044	0.064
Acenaphthene	3,440	33,000	< 0.072	< 0.033	< 0.0069	< 0.0074	0.073	0.02 J	< 0.0075
Acenaphthylene	487	487	< 0.053	< 0.024	< 0.0051	0.0076 J	0.019 J	0.083	0.02 J
Anthracene	17,200	100,000	0.23 J	0.063 J	< 0.0064	0.015 J	0.37	0.14	0.053
Benzo_a_anthracene	0.148	2.11	0.57	0.29	0.013 J	0.056	0.56	0.54	0.14
Benzo_a_pyrene	0.0148	0.211	0.82	0.31	0.027 J	0.07	0.53	0.34	0.14
Benzo_b_fluoranthene	0.148	2.11	0.98	0.4	0.026 J	0.054	0.65	0.42	0.11
Benzo_g,h,i_perylene			0.57	0.28	0.016 J	0.045	0.35	0.42	0.18
Benzo_k_fluoranthene	1.48	21.1	0.53	0.21	0.027 J	0.074	0.33	0.4	0.15
Chrysene	14.8	211	0.91	0.3	0.024 J	0.073	0.63	0.6	0.18
Dibenz(a,h)anthracene	0.0148	0.211	0.26 J	0.1 J	< 0.0074	0.021 J	0.15	0.18	0.062
Fluoranthene	2,290	22,000	1.6	0.62	0.044	0.13	1.7	0.92	0.27
Fluorene	2,290	22,000	< 0.057	< 0.026	< 0.0054	< 0.0058	0.16	0.022 J	0.012 J
Indeno_1,2,3-cd_pyrene	0.148	2.11	0.44	0.2	0.018 J	0.038 J	0.33	0.28	0.12
Naphthalene	5.15	26	< 0.062	<0.028	< 0.0059	< 0.0063	0.041 J	0.043	0.03 J
Phenanthrene	115	115	0.65	0.2	0.016 J	0.053	1.3	0.39	0.19
Pyrene	1,720	16,500	1.2	0.47	0.036 J	0.11	1.2	1.2	0.25

Only detected constituents are noted. Constituent concentrations are reported as milligrams per kilogram (mg/kg).

100 Exceeds the WDNR's non-industrial direct contact residual contaminant level (RCL).

Exceeds the WDNR's industrial direct contact residual contaminant level.

Constituent not detected above noted laboratory detection limit.

-- Criteria not established.

J Consituent concentration is an estimated value.

PAHs Polynuclear aromatic hydrocarbons.

WDNR Wisconsin Department of Natural Resources.

Table 1. Summary of Off-Site PAH Background Sampling Results, Madison-Kipp Corporation, Madison, Wisconsin.

Sample Name	HA-9	HA-10	HA-11	HA-12	HA-13	HA-14	HA-15	HA-16	HA-17
Sample Date	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/16/2013
Sample Depth	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'
1-Methylnaphthalene	0.045	0.044	0.05	<0.0092	<0.0092	<0.0096	<0.0094	<0.01	<0.0091
2-Methylnaphthalene	0.073	0.061	0.08	< 0.007	< 0.007	< 0.0072	< 0.0071	< 0.0076	< 0.0069
Acenaphthene	0.015 J	0.011 J	0.033 J	< 0.0068	<0.0068	0.011 J	< 0.0069	0.0081 J	< 0.0067
Acenaphthylene	0.013 J	0.014 J	0.039	< 0.005	< 0.005	0.018 J	0.013 J	0.011 J	< 0.0049
Anthracene	0.099	0.094	0.15	0.0065 J	< 0.0063	0.059	0.029 J	0.035 J	0.011 J
Benzo_a_anthracene	0.2	0.43	0.84	0.024 J	0.021 J	0.25	0.1	0.15	0.029 J
Benzo_a_pyrene	0.19	0.4	0.87	0.04	0.031 J	0.25	0.11	0.19	0.041
Benzo_b_fluoranthene	0.19	0.39	0.83	0.031 J	0.022 J	0.25	0.14	0.27	0.046
Benzo_g,h,i_perylene	0.22	0.19	0.59	0.029 J	0.026 J	0.16	0.092	0.1	0.024 J
Benzo_k_fluoranthene	0.2	0.48	1.2	0.043	0.035 J	0.18	0.051	0.059	0.041
Chrysene	0.24	0.58	1.2	0.034 J	0.031 J	0.25	0.11	0.2	0.047
Dibenz(a,h)anthracene	0.082	0.17	0.27	< 0.0073	0.015 J	0.062	0.036 J	0.043	< 0.0072
Fluoranthene	0.45	0.93	2.1	0.064	0.052	0.47	0.2	0.35	0.096
Fluorene	0.027 J	0.018 J	0.042	< 0.0053	< 0.0053	0.013 J	< 0.0054	0.0082 J	< 0.0052
Indeno_1,2,3-cd_pyrene	0.14	0.28	0.52	0.026 J	0.022 J	0.15	0.076	0.08	0.021 J
Naphthalene	0.052	0.028 J	0.039	<0.0058	<0.0058	< 0.006	< 0.0059	< 0.0064	< 0.0057
Phenanthrene	0.44	0.53	1.2	0.024 J	0.018 J	0.22	0.086	0.15	0.054
Pyrene	0.42	1	1.7	0.056	0.035 J	0.4	0.15	0.28	0.073

Only detected constituents are noted. Constituent concentrations are reported as milligrams per kilogram (mg/kg).

100 Exceeds the WDNR's non-industrial direct contact residual contaminant level (RCL).

Exceeds the WDNR's industrial direct contact residual contaminant level.

Constituent not detected above noted laboratory detection limit.

-- Criteria not established.

J Consituent concentration is an estimated value.

PAHs Polynuclear aromatic hydrocarbons.

WDNR Wisconsin Department of Natural Resources.

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Page 3 of 3

Table 1. Summary of Off-Site PAH Background Sampling Results, Madison-Kipp Corporation, Madison, Wisconsin.

Sample Name	HA-18	HA-19	HA-20	HA-21	HA-22	HA-23	HA-24
Sample Date	12/16/2013	12/16/2013	12/16/2013	12/16/2013	12/17/2013	12/17/2013	12/17/2013
Sample Depth	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'
1-Methylnaphthalene	<0.0092	<0.0099	<0.01	<0.047	<0.0096	<0.01	<0.047
2-Methylnaphthalene	< 0.0069	< 0.0075	< 0.0076	0.049 J	< 0.0072	< 0.0076	< 0.036
Acenaphthene	<0.0068	< 0.0073	< 0.0074	0.051 J	< 0.0071	< 0.0074	0.037 J
Acenaphthylene	< 0.005	< 0.0054	< 0.0054	0.12 J	< 0.0052	0.019 J	0.1 J
Anthracene	0.018 J	0.0075 J	0.013 J	0.22	< 0.0066	0.029 J	0.25
Benzo_a_anthracene	0.053	0.027 J	0.042	0.57	0.024 J	0.18	1.2
Benzo_a_pyrene	0.072	0.036 J	0.059	0.65	0.027 J	0.19	1.3
Benzo_b_fluoranthene	0.053	0.039 J	0.055	0.52	0.039	0.17	1.1
Benzo_g,h,i_perylene	0.051	< 0.013	0.047	0.46	0.014 J	0.12	0.66
Benzo_k_fluoranthene	0.074	0.032 J	0.036 J	0.55	0.023 J	0.18	1.5
Chrysene	0.084	0.035 J	0.054	0.64	0.028 J	0.18	1.5
Dibenz(a,h)anthracene	< 0.0073	< 0.0079	< 0.0079	0.15 J	< 0.0076	0.057	< 0.037
Fluoranthene	0.14	0.068	0.095	1.3	0.052	0.31	2.6
Fluorene	< 0.0053	< 0.0057	<0.0058	0.078 J	< 0.0055	0.0074 J	0.071 J
Indeno_1,2,3-cd_pyrene	0.049	0.02 J	0.037 J	0.37	0.022 J	0.11	0.72
Naphthalene	<0.0058	< 0.0063	< 0.0063	0.06 J	< 0.0061	< 0.0064	< 0.03
Phenanthrene	0.064	0.029 J	0.028 J	0.69	0.017 J	0.1	1
Pyrene	0.12	0.059	0.092	0.99	0.044	0.27	2.3

Only detected constituents are noted. Constituent concentrations are reported as milligrams per kilogram (mg/kg).

100 Exceeds the WDNR's non-industrial direct contact residual contaminant level (RCL).

Exceeds the WDNR's industrial direct contact residual contaminant level.

Constituent not detected above noted laboratory detection limit.

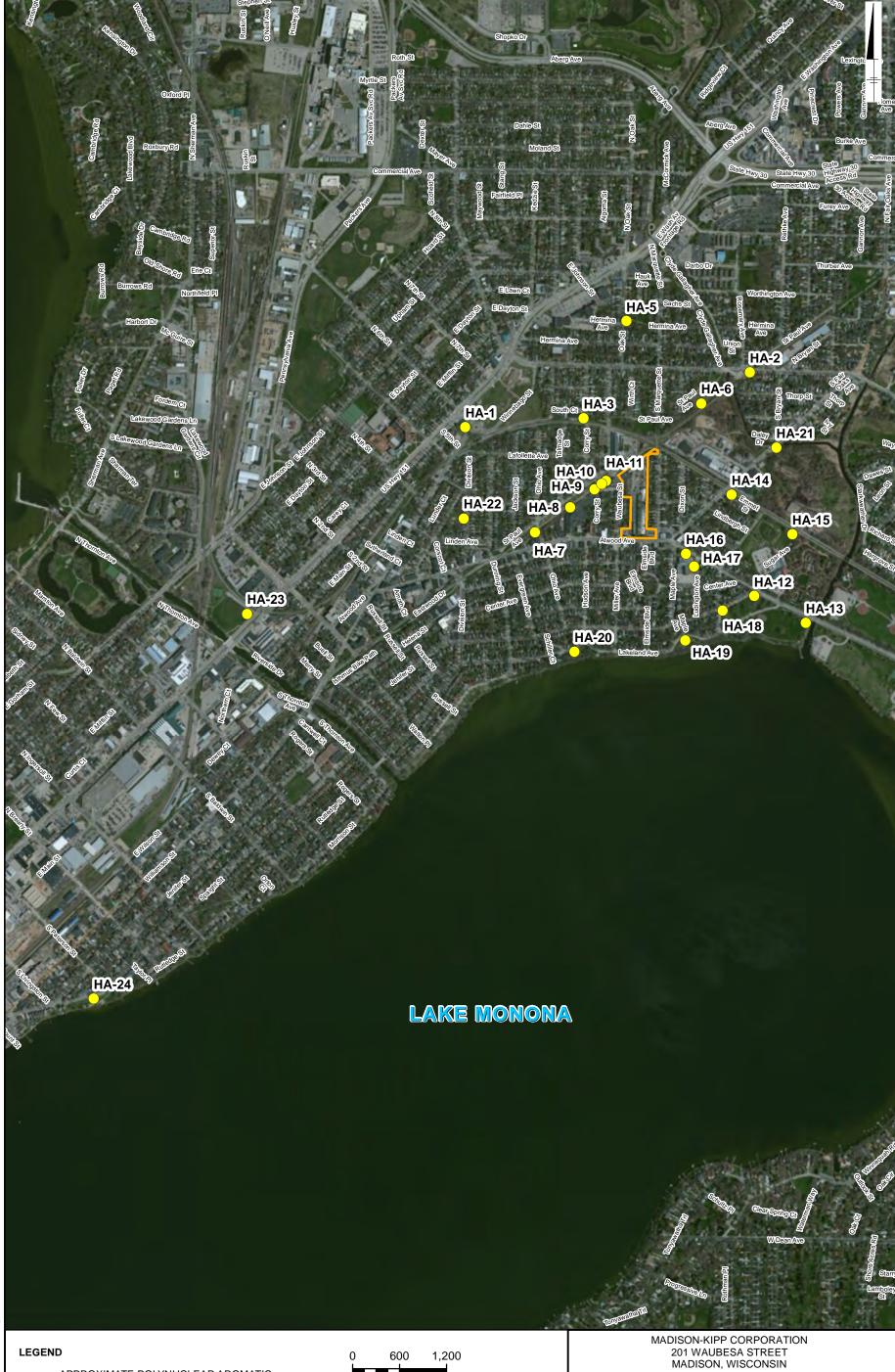
-- Criteria not established.

J Consituent concentration is an estimated value.

PAHs Polynuclear aromatic hydrocarbons.

WDNR Wisconsin Department of Natural Resources.

**Figures** 

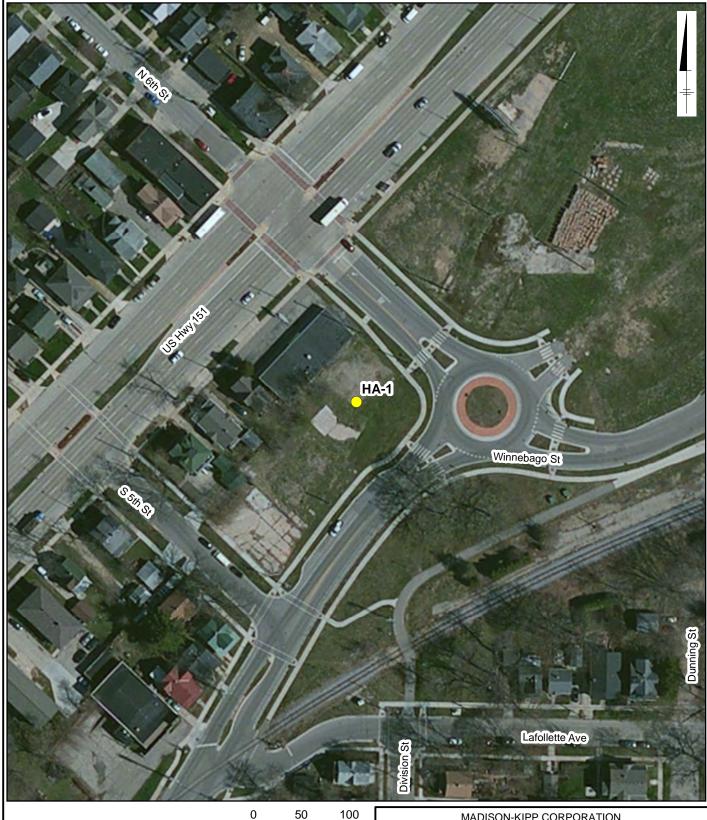


APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

SITE BOUNDARY

**PAH SOIL SAMPLE LOCATIONS** 







SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

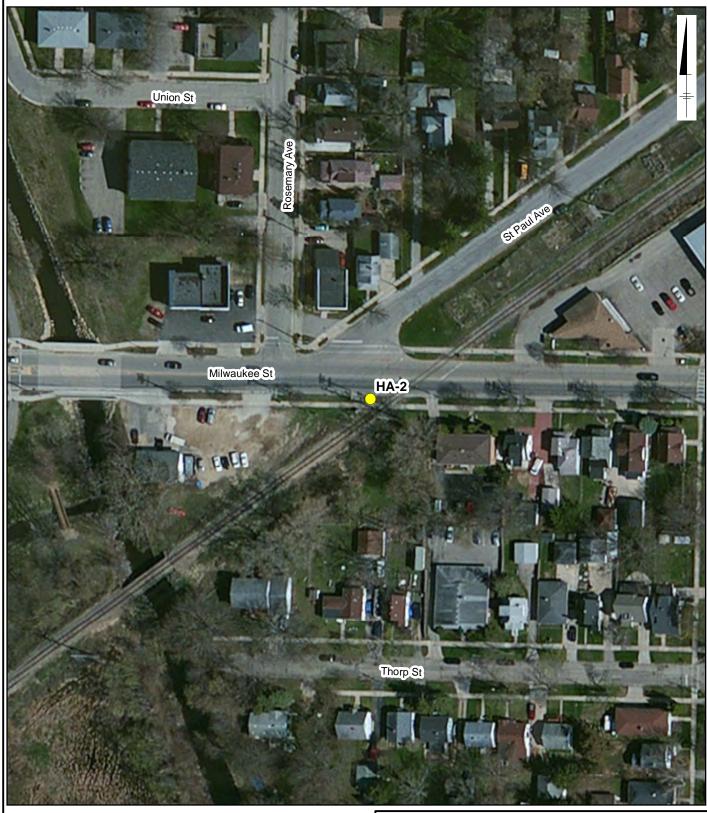
APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

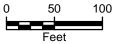
## PAH SOIL SAMPLE LOCATIONS



FIGURE

2





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

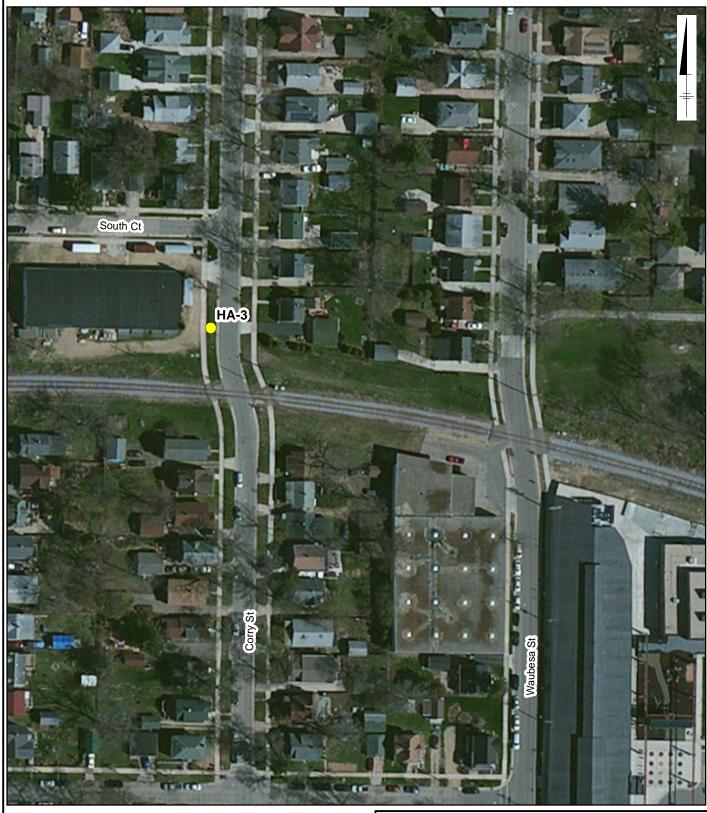
SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

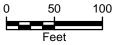
## PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

3





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

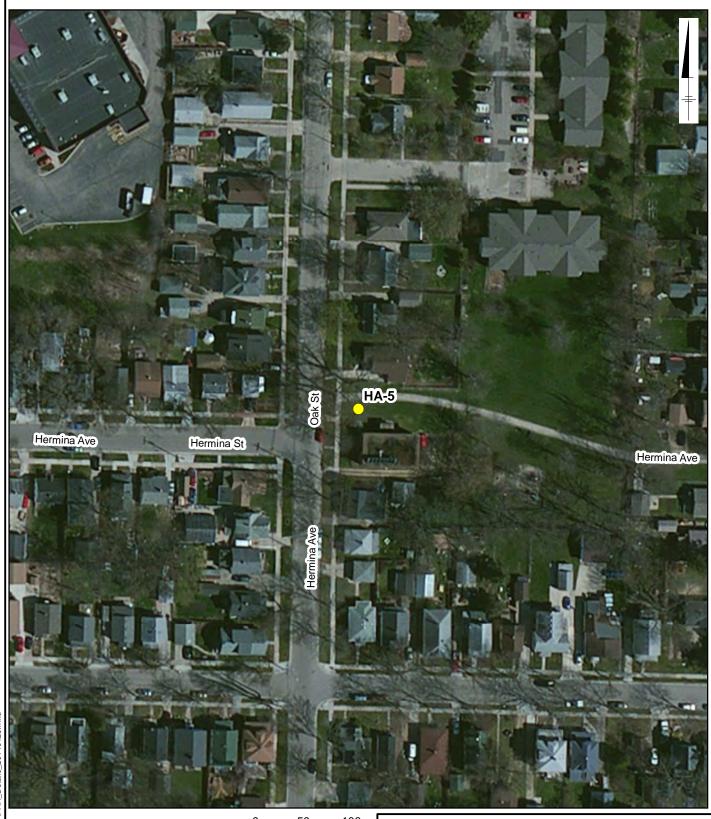
APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

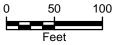
PAH SOIL SAMPLE LOCATIONS



FIGURE

4





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

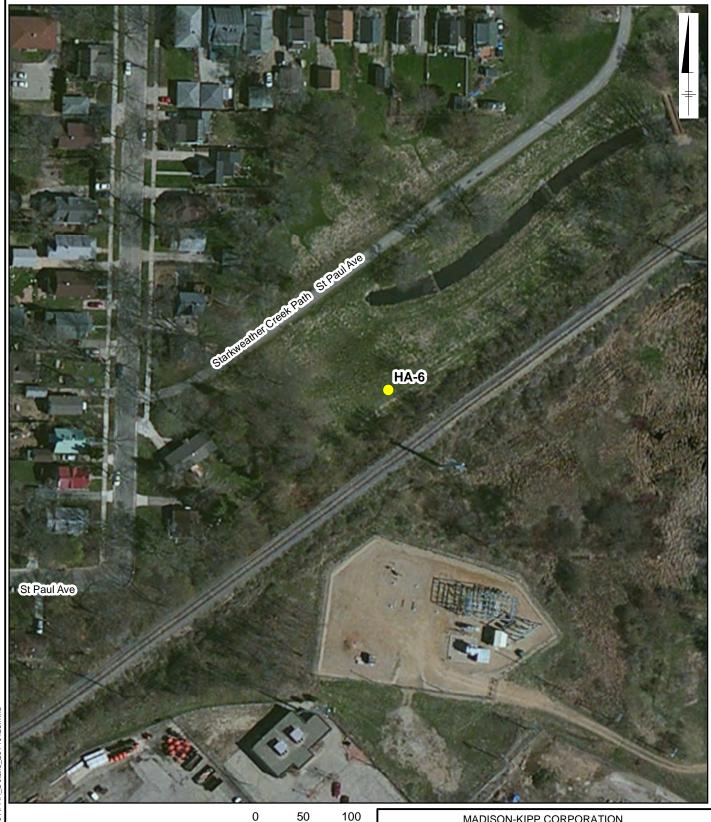
## PAH SOIL SAMPLE LOCATIONS



FIGURE

5

CITY: MPLS DIV/GROUP: IM/DV DB: MG LD: CK MADISON-KIPP G\\GIS\Pojects\MadisonKipp\ArcMap\\2014-01\PAH\_Details\_20140123.mxd



0 50 10 LEGEND Feet

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

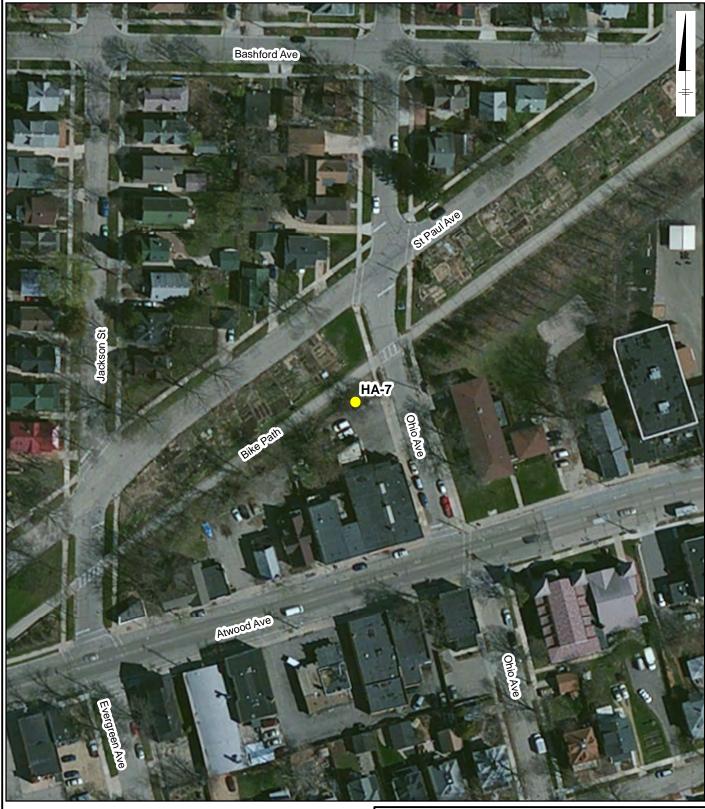
MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

## PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

6



CITY: MPLS DIV/GROUP: IM.DV DB: MG LD: CK MADISON-KIPP G:\G\G\\\C\\PAH\_Detai\s\_20140123.mxd

LEGEND



APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

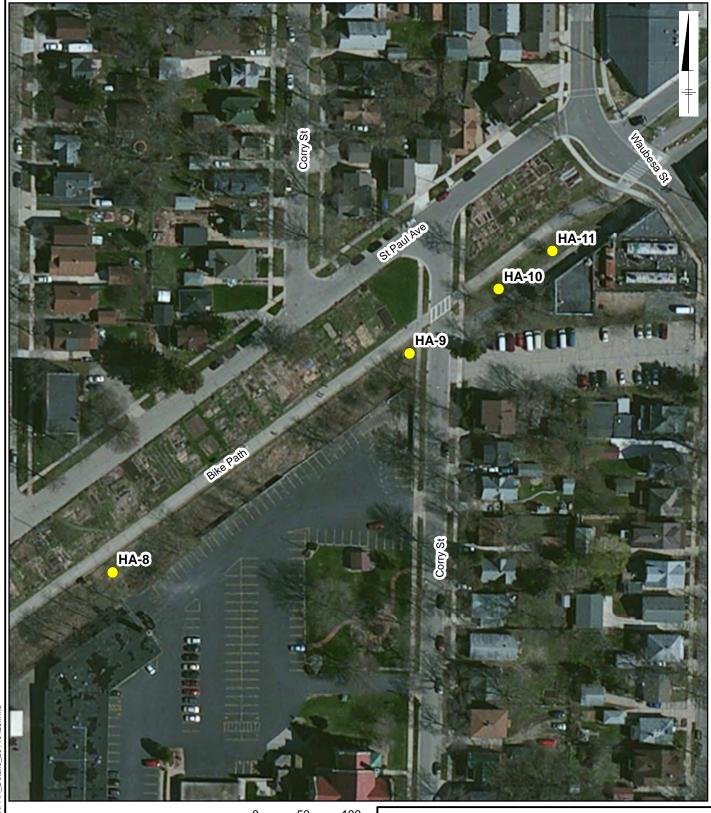
MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

## **PAH SOIL SAMPLE LOCATIONS**



**FIGURE** 

7



**LEGEND** 

0 50 100 Feet

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

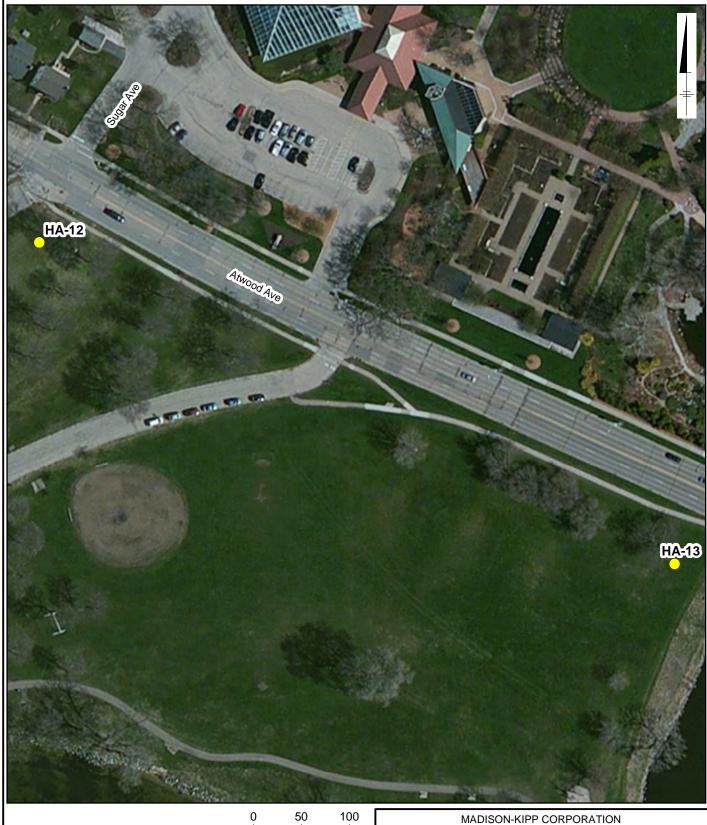
MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

## PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

8





APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

## PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

9



LEGEND



SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID,

IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

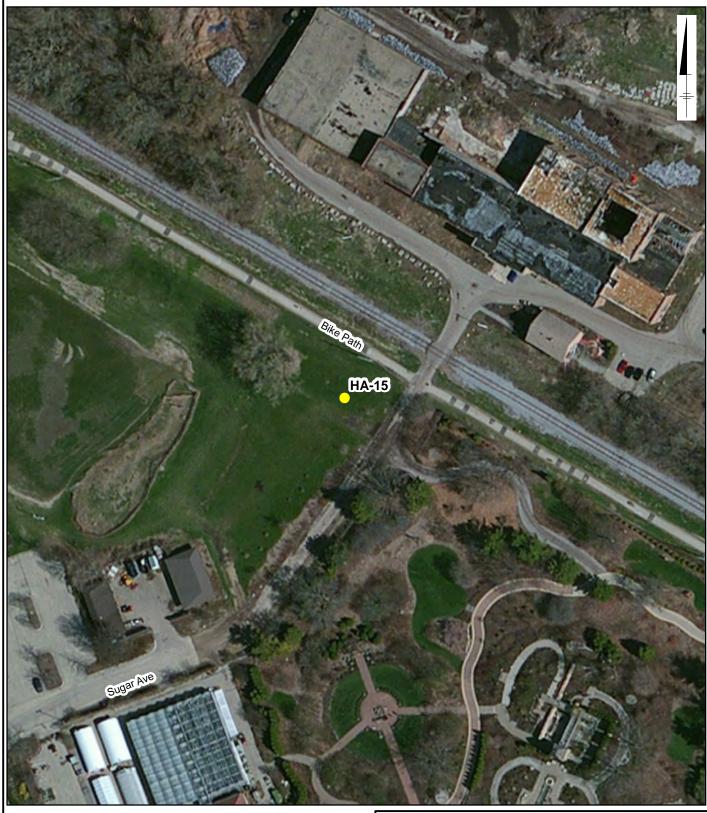
MADISON, WISCONSIN

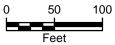
## **PAH SOIL SAMPLE LOCATIONS**



**FIGURE** 

10





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

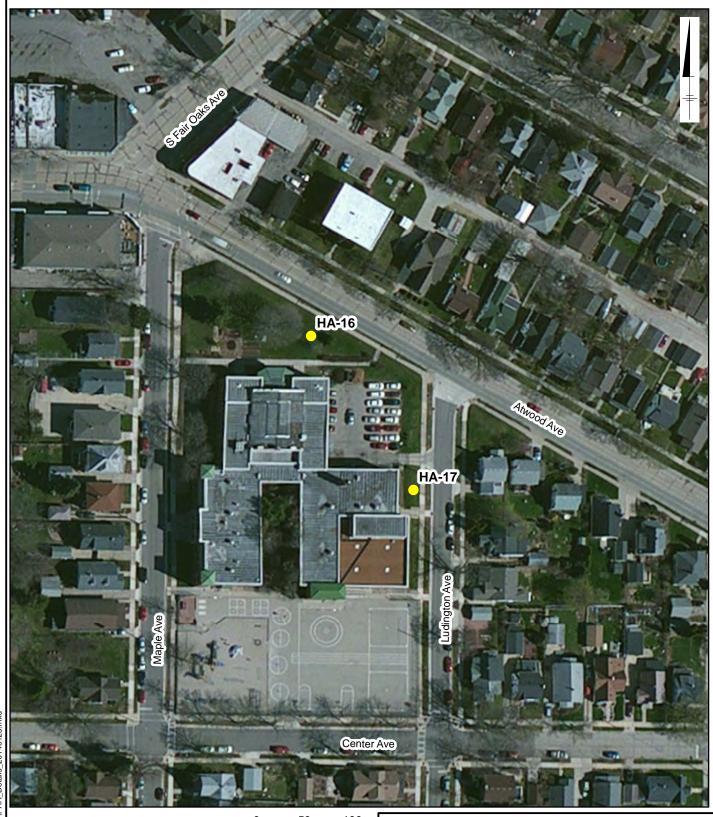
SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

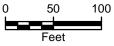
PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

11





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

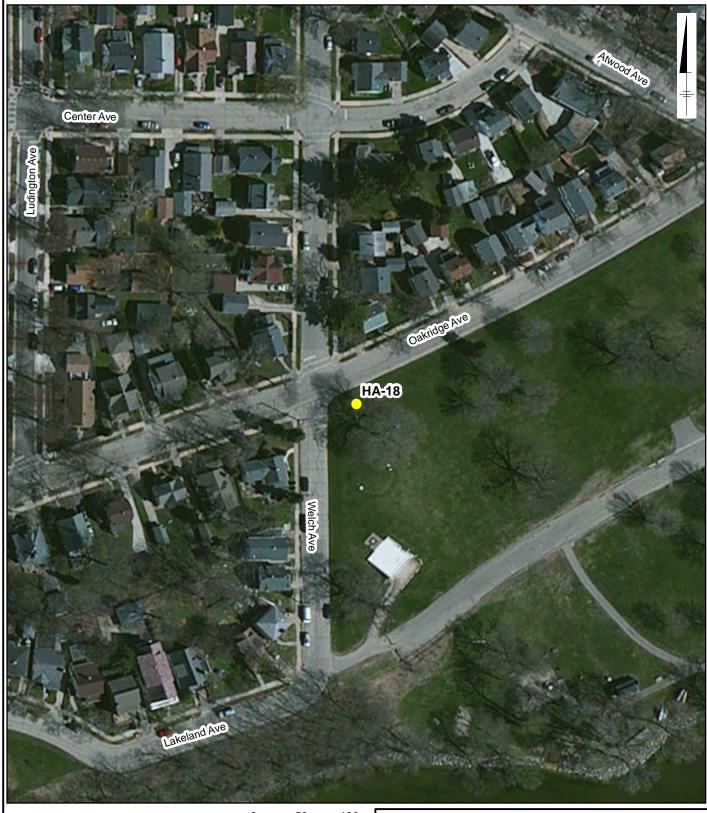
SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

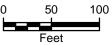
## PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

**12** 





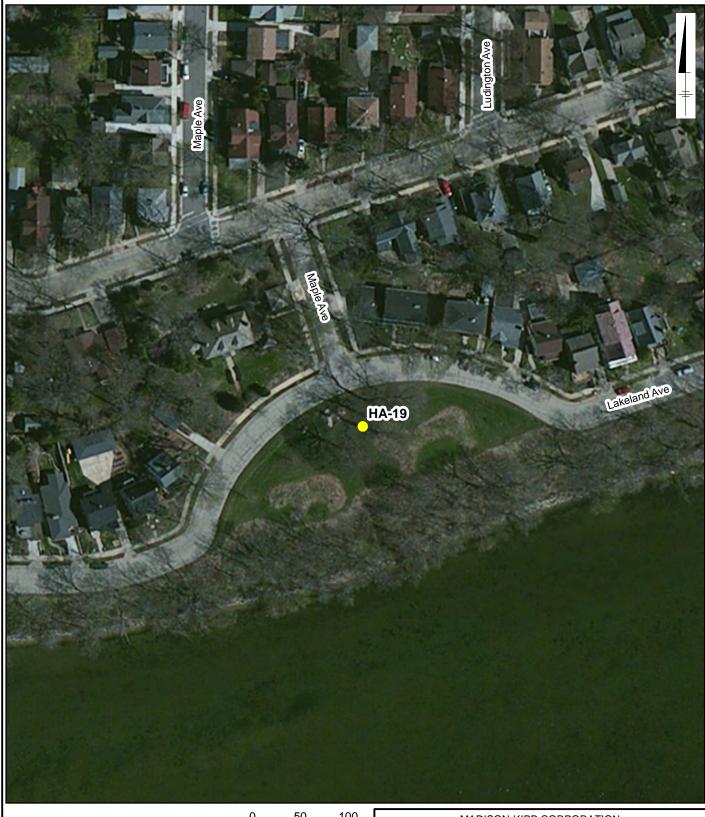
MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

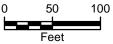
APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

PAH SOIL SAMPLE LOCATIONS



FIGURE





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

APPROXIMATE POLYNUCLEAR AROMATIC

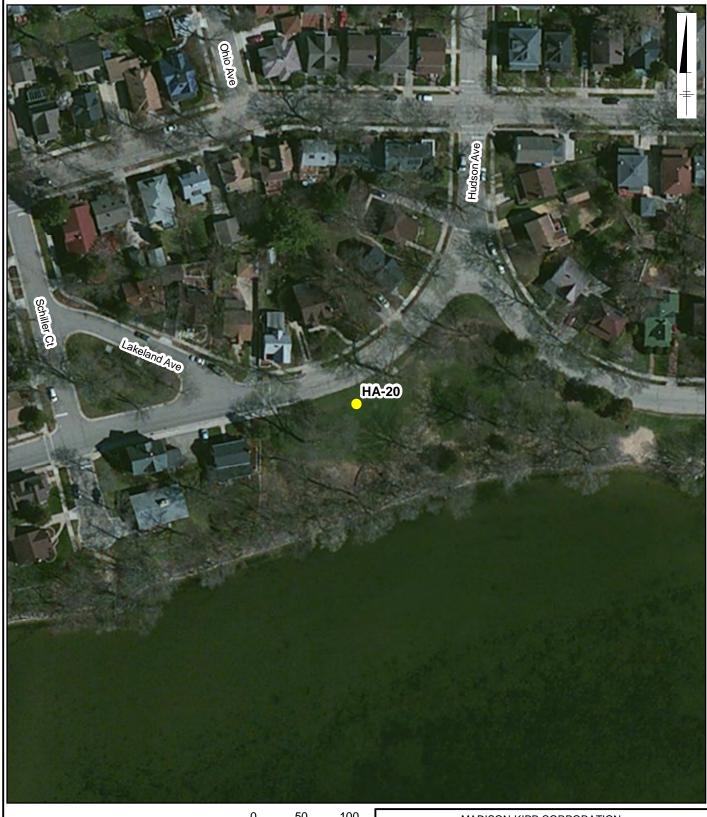
## PAH SOIL SAMPLE LOCATIONS

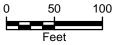


**FIGURE** 

HYDROCARBON (PAH) SAMPLE LOCATIONS

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

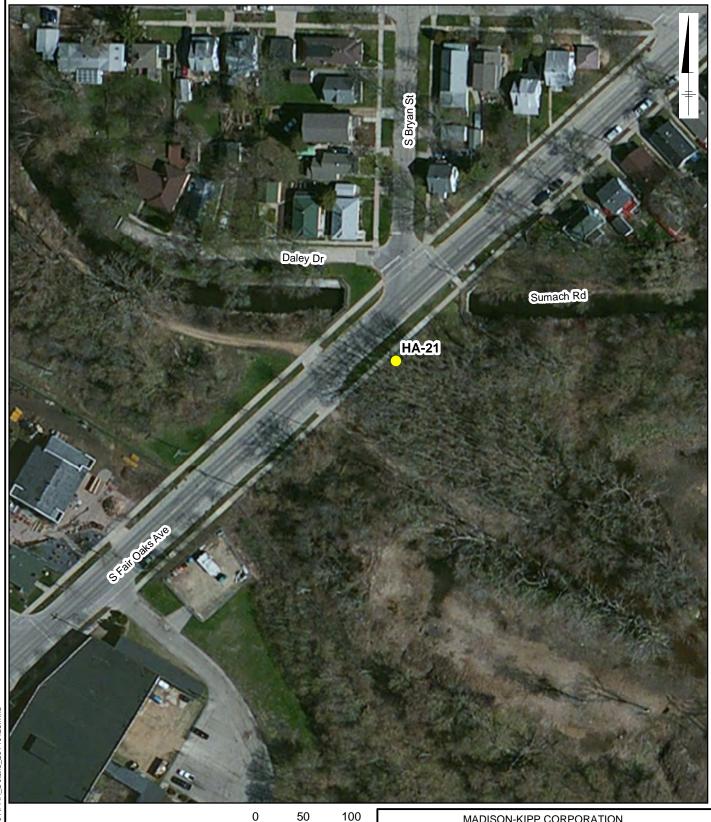
APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

> SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

PAH SOIL SAMPLE LOCATIONS



**FIGURE** 



LEGEND Feet

APPROXIMATE POLYNUCLEAR AROMATIC

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID,

IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

HYDROCARBON (PAH) SAMPLE LOCATIONS

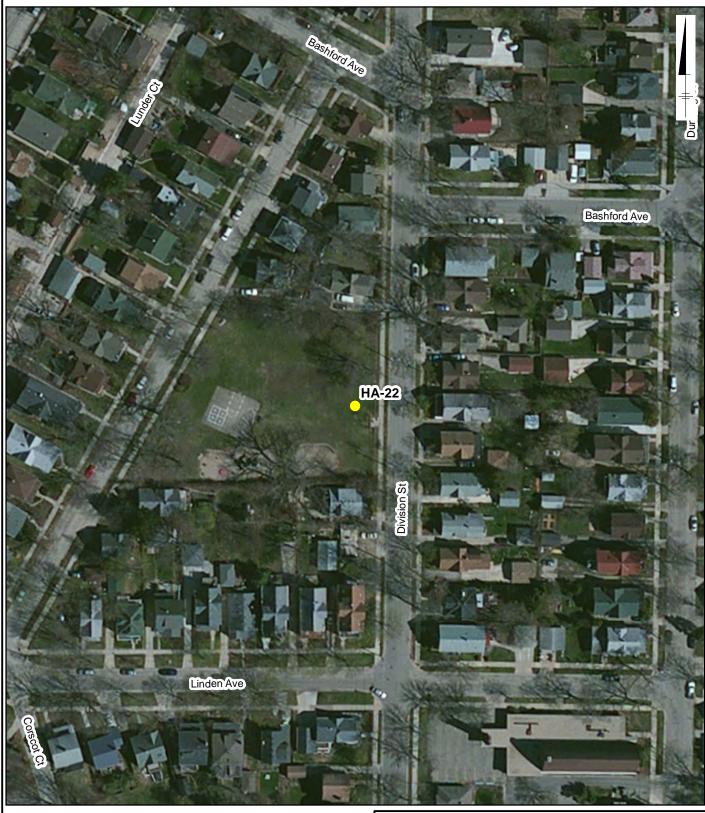
MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

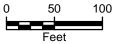
## **PAH SOIL SAMPLE LOCATIONS**



**FIGURE** 

16





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

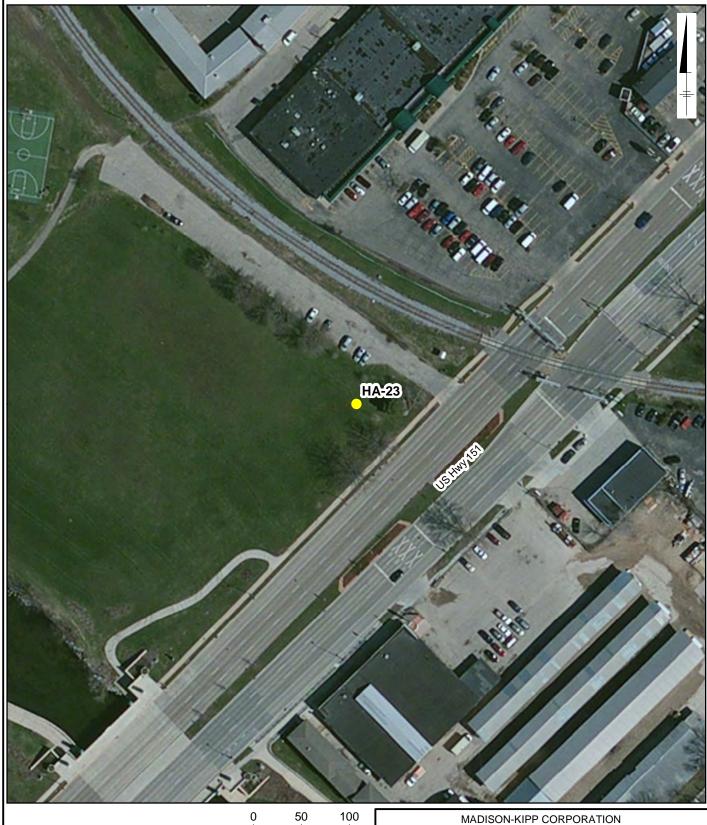
SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

**17** 



0 50 100 Feet

MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID,

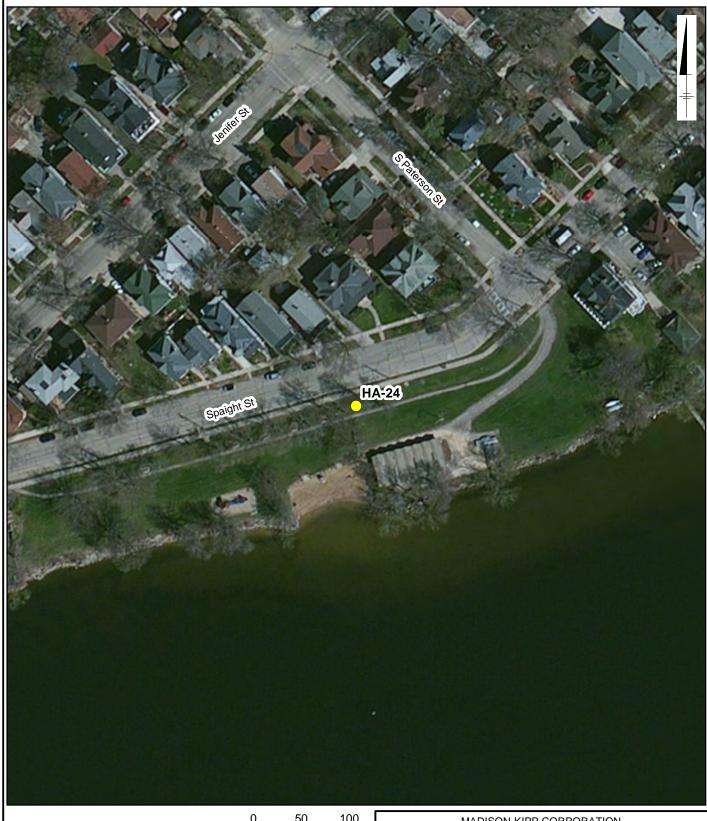
IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

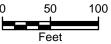
PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

18





MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

APPROXIMATE POLYNUCLEAR AROMATIC HYDROCARBON (PAH) SAMPLE LOCATIONS

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX, GETMAPPING, AEROGRID,

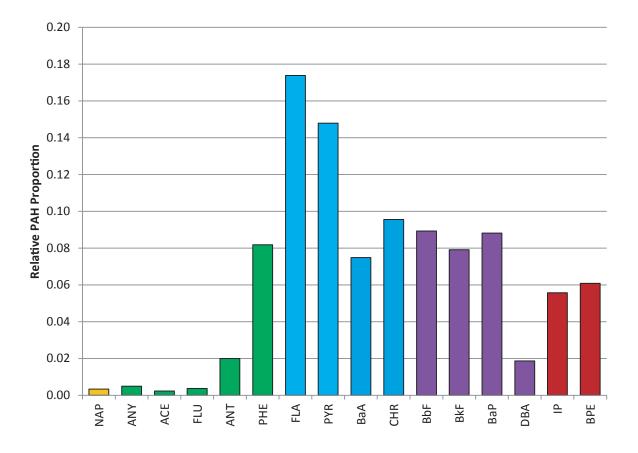
IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY

PAH SOIL SAMPLE LOCATIONS



**FIGURE** 

19



Naphthalene NAP Acenaphthylene ANY ACE Acenaphthene FLU Fluorene **ANT** Anthracene PHE Phenanthrene FLA Fluoranthene **PYR** Pyrene

BaA Benzo(a)anthracene

CHR Chrysene

BbF Benzo(b)fluoranthene
BkF Benzo(k)fluoranthene
BaP Benzo(a)pyrene

DBA Dibenzo(a,h)anthracene
IP Indeno(1,2,3-c,d)pyrene
BPE Benzo(g,h,i)perylene

Color coding indicates the number of aromatic rings: 2-yellow, 3-green, 4-blue, 5-purple, 6-red.

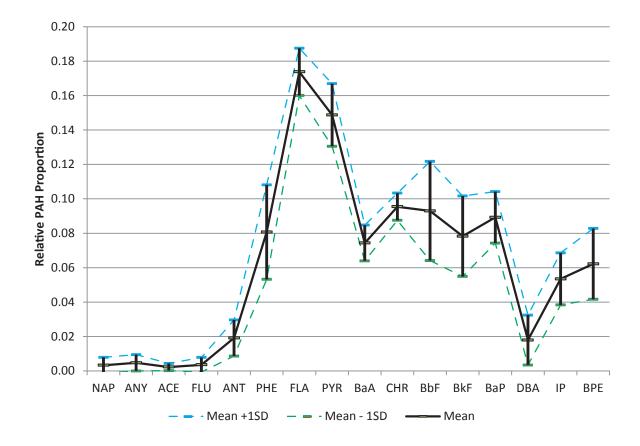
MADISON KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

**BACKGROUND (BG) MEAN PAH PROFILE** 



FIGURE

**20** 



Naphthalene NAP Acenaphthylene ANY ACE Acenaphthene FLU Fluorene **ANT** Anthracene PHE Phenanthrene FLA Fluoranthene **PYR** Pyrene

BaA Benzo(a)anthracene

CHR Chrysene

BbF Benzo(b)fluoranthene
BkF Benzo(k)fluoranthene
BaP Benzo(a)pyrene

DBA Dibenzo(a,h)anthracene
IP Indeno(1,2,3-c,d)pyrene
BPE Benzo(g,h,i)perylene

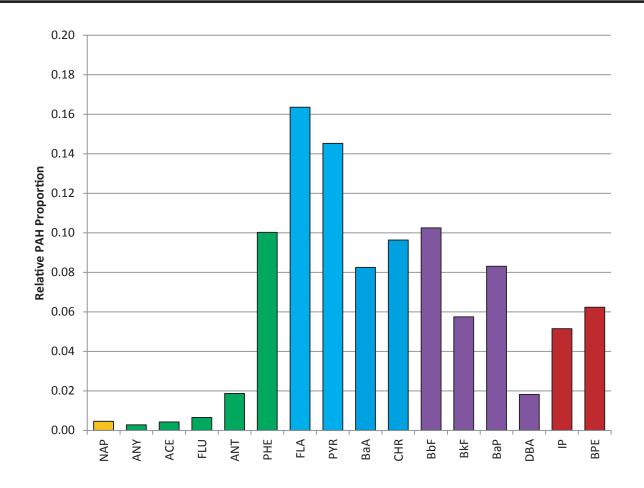
MADISON KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

VARIABILITY OF PAH PROPORTIONS IN BACKGROUND DATA SET (n=24)



**FIGURE** 

21



Naphthalene NAP Acenaphthylene ANY ACE Acenaphthene FLU Fluorene ANT Anthracene PHE Phenanthrene FLA Fluoranthene **PYR** Pyrene

Benzo(a)anthracene BaA

CHR Chrysene

BbF Benzo(b)fluoranthene Benzo(k)fluoranthene BkF BaP Benzo(a)pyrene

DBA Dibenzo(a,h)anthracene Indeno(1,2,3-c,d)pyrene IΡ Benzo(g,h,i)perylene BPE

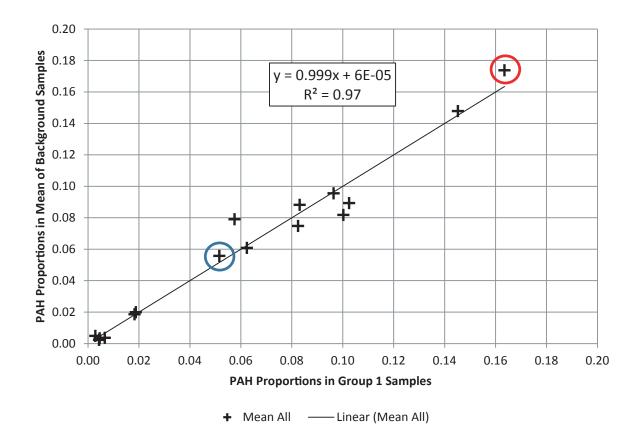
Color coding indicates the number of aromatic rings: 2-yellow, 3-green, 4-blue, 5-purple, 6-red.

MADISON KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

# 2013 REPORT - GROUP 1 MEAN **PAH PROFILE**



**FIGURE** 



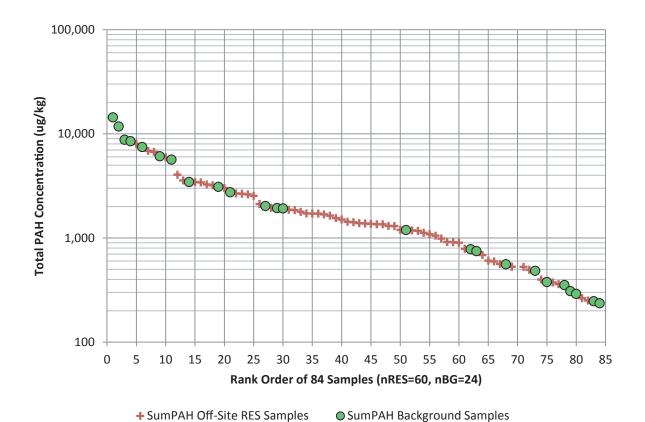
Note each data point represents the relative PAH proportion of a given PAH compound with the X-Y coordinate representing the proportion in the mean Group 1 and background (BG) data set, respectively. As such, the blue circle represents benzo(k)fluoranthene and the red circle represents fluoranthene.

MADISON KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

COMPARISON OF PAH PROPORTIONS IN BACKGROUND SAMPLES AND GROUP 1 SAMPLES



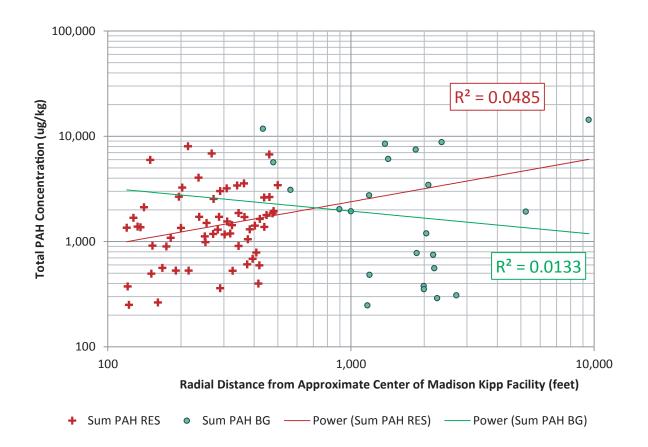
**FIGURE** 



MADISON KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

TOTAL PAH CONCENTRATION DISTRIBUTION OF 84 SAMPLES





MADISON KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN

TOTAL PAH CONCENTRATION VS
DISTANCE FROM MADISON KIPP FACILITY



## **ARCADIS**

Soil Boring Logs

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Signature

Alina Walcek

Firm ARCADIS

126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc		ral Reso	ources									OIL Boom 44				RMA	ATION 7-98
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Signature

Alina Walcek

Firm ARCADIS

126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

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Signature

Alina Walcek

Firm ARCADIS

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Signature

Alina Walcek

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126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

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Signature

Alina Walcek

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126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc		ral Reso	ources									SOIL B Form 44				RMA Rev.	ATION 7-98
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1	13125	320		Da	ane			13					City of					
Sam															Soil Pro	perties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		And	l/Rock Descript Geologic Origit Each Major Uni	n Fo	r	NSCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		0.0			D: fine-grained sand re (roots), very dark			SM			0.9						

Signature

Alina Walcek

Firm ARCADIS

126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc		ral Reso	ources									SOIL B Form 44				RMA Rev.	
				Re	oute T	Co: Watershed/ Remediation		_		ste M Oth	anager	nent [						
						Kemediano	11/10					l					ge 1	of 1 
		ect Nan						License	/Permit/N	Monite 4	oring N	lumber		Bo	oring N	umber		
		-	pp Cor	poratio	n										A-8			
Boring	g Drille	ed By:						Date D	rilling Sta	rted		Date	Drilling	Compl	eted	Drilli	ing M	lethod
Nam		Scott						12/16/2	2013			12/10	5/2013			Han	d Au	ıger
Firm						vices, Inc.		E' 10			1	G 6				ļ.,		
WIUi	nique V	Vell No	). DN	R Well II	D No.	Well Name			tatic Wate		el		ce Eleva					Diameter
									Feet MSL			NA	Feet 1			2	11	nches
Local (		_	┙`	mated:		Boring Location	on 🕽					Local	Grid Lo	ocation				
State I	Plane -	399795	.0	N 214	3227.1	<u> </u>		La	ıt					N			E	
		of S	Section	, T	N, I	₹		Lon					Feet [	S	Fee	et 🗌	W	
Facilit	•			County			Co	ounty Coo	le	Civi	Town	/City/oi	Village					
	13125	320		П	ane			13					City of					
Sam	-														Soil Pro	perties		
	. & (ii)	nts	eet		G.	:1/D 1 D : .				§	ram		Compressive Strength					<b>(2)</b>
Number and Type	Ati red	Blow Counts	Depth in Feet			il/Rock Descript Geologic Origi		r		Graphic Log	Well Diagram	PID (ppm)	ess	ıre		ity		RQD/ Comments
d T d	ngth	o wo	pth			Each Major Uni			USCS	   idq		D (I	dung Leug	Moisture Content	Liquid Limit	Placticity Index	P 200	ZD/ Juliu
_ S B	Length Att. & Recovered (in)	BI							ñ	Ü	×	PI	St	Σ̈́	Lic	Pla	P.	చ
			0.0	0.0 - 1.0'				c	ML									
				medium	plasticit	grained sand, trace ci y, frost to 1 inch, str					1							
				YR 4/6),	color li	ghtens with depth.												
			-															
											1							
			-								l							
	12											0.9						
											1							
			  -								1							

Signature

Alina Walcek

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126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc		ral Reso	ources									OIL B Form 44				RMA Rev.	ATION 7-98
				R	oute 7	o: Watershed/					nagem	ent	]					
						Remediatio	)II/K			Othe	ш						ge 1	of 1
		ect Nan						License	/Permit/N	Monito	ring N	umber		Во	oring Nu	ımber		
I	Madis	on-Kip	p Cor	poratio	n									H	A-9			
Borin	g Drille	ed By:						Date D	rilling Sta	ırted		Date I	Drilling	Compl	eted	Drilli	ing M	lethod
Nam	ne:	Scott						12/16/2	2013			12/16	/2013			Han	d Au	ıger
Firm						vices, Inc.										<u> </u>		
WI Uı	nique V	Vell No	o. DN	R Well I	D No.	Well Name			tatic Wate		el		e Eleva					Diameter
									Feet MSL			NA	Feet I	MSL		2	iı	nches
Local (		_		mated:	_	Boring Location	on X					Local	Grid Lo	ocation				
State I	Plane <u>'</u>	400023	.2	N 214	3536.1	E		La	ıt					N			E	
		of S	Section	, T	N, l	₹		Lon					Feet [	S	Fee	et 🗌	W	
Facilit	•			County			Co	ounty Coo	le	Civil	Town/	•	Village					
	13125	320		П	ane			13		_			City of					
Sam															Soil Pro	perties		
	%: (ii)	nts	Depth in Feet		C	1/D 1 D :				] g	Well Diagram		Compressive Strength					<b>20</b> 0
Number and Type	Ati red	Blow Counts	in I			l/Rock Descript Geologic Origi		r		Graphic Log	jag	PID (ppm)	ess	ıre		ity		RQD/ Comments
d T	ngth	OW (	pth			Each Major Uni			USCS	 iphi		) Q	mp	Moisture Content	Liquid Limit	Placticity Index	P 200	ZD/
Z E	Length Att. & Recovered (in)	Bl							ñ	Ü	×	Ы	Str	Σ̈́	Ľ.	Pla	P.	
			0.0	0.0 - 1.0'		D.C		,	SM									
						<ul> <li>D: fine-grained sand edium plasticity.</li> </ul>	i, trac	e clay,										
			-															
			-															
	40											0.5						
	12											0.6						
			-															

Signature

Alina Walcek

Firm ARCADIS

	of Wisc	consin of Natur	al Reso	ources								SOIL B Form 44				RMA	ATION 7-98
				Route	To: Watershed Remediati		_	_	aste Ma Othe	_	nent	]			Pa	ge 1 o	of 1
Facili	ty/Proje	ect Nan	ne					/Permit/	Monito	ring N	umher		R <sub>i</sub>	oring N			
				poration			License	/I CIIIIU	vionito	ing iv	umoci			A-10	annoci		
	g Drille	-	<b>ур Сог</b>	poration			Data Da	rilling St	ortod		Data I	Drilling			Deilli	ing M	lethod
Nam	•	•							arteu			_	Compi	eteu		_	
Firm		Scott Soils:	and En	gineering S	ervices. Inc.		12/16/2	2013			12/10	5/2013			Han	a Au	iger
WI U	nique V	Vell No		R Well ID N			Final S	tatic Wat	er Leve	el	Surfac	ce Eleva	ition		Borel	nole I	Diameter
							l F	Feet MSI	_		NA	Feet I	MSL		2	iı	nches
Local	Grid Oı	rigin	estii (estii	mated: )	or Boring Locat	ion	<u> </u>				Local	Grid Lo	ocation				
		400090	_	N 214362			La	ıt				Г	N			E	
	_		Section	, T	 I, R		Lon					Feet	$\exists s$	Fee	et $\square$	W	
Facilit	ty ID			County		C	ounty Coc		Civil	Town	City/or	Village					
1	131253	320		Dan	<b>:</b>		13					City of	f Mad	ison			
Sam	_													Soil Pro	perties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		Soil/Rock Descrip nd Geologic Orig Each Major Ur	gin Fo		USCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		0.0	sized light bl	AND: fine-grained sar e pieces, trace clay, fr city, very dark brown	rost to	6 inches,	SM			0.7						

Signature

Alina Walcek

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126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc		ral Reso	ources									OIL Boom 44				RMA Rev.	ATION 7-98
				Re	oute T	To: Watershed/ Remediation		_		ste Ma	nagem	ent	]					
						Kemediane	)11/ IX(				ш						ge 1	of 1 
		ect Nan						License	/Permit/N	Monito	ring N	umber			oring N	ımber		
		-	pp Cor	poratio	n										A-11			
Borin	g Drille	ed By:						Date D	rilling Sta	ırted		Date I	Orilling	Compl	eted	Drilli	ing M	lethod
Nam	ne:	Scott						12/16/2	2013			12/16	/2013			Han	d Au	ıger
Firm						vices, Inc.		71 10				~ ^				ļ.,		
WI Uı	nıque V	Vell No	o. DN	R Well II	D No.	Well Name			tatic Wate		el		e Eleva					Diameter
									Feet MSL			NA	Feet I	MSL		2	iı	nches
Local (		_		mated:	_	Boring Location	on 🗶					Local	Grid Lo	ocation				
State I	Plane <u>'</u>	400129	.5	N 214	3684.8	<u> </u>		La	ıt					N			E	
		of S	Section	, T	N, I	R		Lon					Feet [	S	Fee	et 🗌	W	
Facilit	•			County			Co	ounty Coc	le	Civil	Town/	•	Village					
1	13125	320		D	ane			13					City of					
Sam															Soil Pro	perties		
a	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		Soi	il/Rock Descrip	tion			go	Well Diagram	li (ii	Compressive Strength					ıts
Per Typ	th A vere	Cc	h in			Geologic Origi		r	Š	hic I	Dia	ıdd)	pres	ture	t t	icity		)/ mer
Number and Type	eco	3lov	)ept		-	Each Major Uni	t		USCS	Graphic Log	Vell	PID (ppm)	Com	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	I W		0.0	0.0 - 1.0'					SM	1:::::	>		O 91	7	1	P I		
				SILT AN	ID SAN	D: fine-grained sand		e coarse	5141									
						trace gravel up to 1 i bround, medium plas		, very										
				dark brov	wn (7.5Y	YR 2.5/2).												
			-															
			-															
	12											1.2						
			F								ł							

Signature

## Alina Walcek

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126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc	consin of Natur	ral Reso	ources									SOIL B Form 44				RMA Rev.	ATION 7-98
				Ro	ute T	Co: Watershed/ Remediatio				ste Ma	nagem er 🗀	ent	]			D-	1 .	-£ 1
E '1'	, /D .	, NT										1		l D	· N		ge 1 o	)1 1
	•	ect Nan		4	_			License	/Permit/N	vionito	ring N	umber			oring Nu	ımber		
		_	op Cor	poration	1										A-12			
	g Drille	ed By:							rilling Sta	arted			Drilling	Compl	eted		-	lethod
Nam		Scott			<b>a</b>			12/16/2	2013			12/16	5/2013			Han	d Au	ıger
Firm		Soils Vell No		<b>igineerin</b> g R Well II		wices, Inc. Well Name		Final St	tatic Wate	er I ev	el e	Surfac	ce Eleva	tion		Borel	hole I	Diameter
**1 0	inque v	V C11 1 VO	.   1	ic wen it	7110.	Well Ivalle			Feet MSL			NA	Feet 1			2		nches
Local	Crid O	rigin	] (estin	mated:	) or	Boring Location	n V		- COUNTED				Grid Lo					iches
		398672			5 <b>587.</b> 3	•	′¹¹_ <b>^</b>	<b>∆</b> La	ıt.			Locai		¬N			Е	
State			Section	, T	N, I	~~		Lon					Feet [	_ ^ ^ □ s	Fee	.t 🗀	W	
Facilit	ty ID	01 1	Jection	County	11, 1	· ·	Co	ounty Coc	C	Civil	Town/		Village		1.00	ы <u> </u>	vv	
	13125:	320		-	ane			13					City of		ison			
Sam	ple		<u> </u>												Soil Pro	perties		
	ii) &	ts	j j							<b>b</b> 0	<u> </u>		e					
ု ခွ	Att. ed (	Blow Counts	Depth in Feet			il/Rock Descript				Log	Well Diagram	) III	Compressive Strength	بو		<b>S</b>		nts
nbe	gth	×	oth i			Geologic Origii Each Major Uni		r	SS		l Di	PID (ppm)	Compress Strength	Moisture Content	uid iit	Placticity Index	00	RQD/ Comments
Number and Type	Length Att. & Recovered (in)	Blo	Del						USCS	Graphic Log	Wel	III	Cor	Moisture Content	Liquid Limit	Plactic Index	P 200	RQD/ Comir
			0.0	0.0 - 1.0'					SM									
						D: fine-grained sand brown (7.5YR 5/8).	, med	lium										
	12											0.7						
			-															

Signature

Alina Walcek

Firm ARCADIS

126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc		ral Reso	ources									SOIL B Form 44				RMA Rev.	ATION 7-98
				Ro	ute T	o: Watershed/ Remediatio				ste Ma	anager er [	nent _	]					6.1
							11/10										ge 1 (	of I 
	•	ect Nan						License	/Permit/	Monito	oring N	lumber			oring N	umber		
		_	op Cor	poration	1										A-13			
Borin	g Drille	ed By:						Date D	rilling St	arted		Date 1	Drilling	Compl	eted	Drilli	ing M	lethod
Nan	ne:	Scott						12/16/2	2013			12/16	5/2013			Han	d Aı	ıger
Firm				gineering												<u> </u>		
WI U	nique V	Vell No	DN.	R Well ID	No.	Well Name			tatic Wat		el		ce Eleva					Diameter
								F	Feet MSI	,		NA	Feet 1	MSL		2	iı	nches
Local				mated:	) or	Boring Location	n 🕽	(				Local	Grid Lo	ocation				
State 1	Plane -	398337	.8	N 2146	248.8	EE		La	ıt					N			E	
		of S	Section	, T	N, I	₹		Lon	g				Feet [	$\Box$ S	Fee	et 🔲	W	
Facilit	-			County			Co	ounty Coc	le	Civil	Town	/City/or	_					
1	13125	320		Da	ane			13					City of					
Sam															Soil Pro	perties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		And	l/Rock Descript Geologic Origit Each Major Uni	n Fo	r	NSCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		0.0			D: fine-grained sand ellowish brown (10Y			SM			0.8						

Signature

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126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc		ral Reso	ources							OIL Born 44				RMA Rev.	ATION 7-98
				Route T	o: Watershed/V			ste Ma Othe	-	ent	]					
					Remediation										ge 1 c	of 1
	•	ect Nan				Licens	e/Permit/I	Monito	ring N	umber		Bo	oring Nu	ımber		
ľ	Madis	on-Kip	op Cor	poration								H	A-14			
Boring	g Drille	ed By:				Date D	rilling Sta	arted		Date 1	Drilling	Compl	eted	Drilli	ng M	lethod
Nam	ne:	Scott				12/16/	2013			12/16	5/2013			Han	d Au	ıger
Firm				gineering Serv						~ ^						
WI Uı	nıque V	Vell No	o. DN	R Well ID No.	Well Name		static Wat		el		ce Eleva					Diameter
							Feet MSL	,		NA	Feet I			2	i	nches
Local (					Boring Location	<b>X</b>				Local	Grid Lo	ocation				
State I	Plane -	399969	.3	N 2145288.4	E	L	at				L	N			Е	
		of S	Section	, T N, I	₹	Lo	C				Feet [	S	Fee	et 🗌	W	
Facilit	-	320		County		County Co	de	Civil	Town/	-	Village					
	13125	320		Dane		13					City of				—	
Sam													Soil Pro	perties		
	Length Att. & Recovered (in)	ınts	Depth in Feet	Soi	il/Pook Dosovinti	on		gc	Well Diagram		ive					S
Number and Type	ı At ered	Blow Counts			l/Rock Descripti Geologic Origin			Graphic Log	)iag	PID (ppm)	Compressive Strength	ure		Placticity Index		RQD/ Comments
Junb T D	ngth cov(	MO.	epth		Each Major Unit		USCS	aphi		) A	Compress Strength	Moisture Content	Liquid Limit	nctic dex	P 200	Q) min
- Z g	Le Re	Bl					Ď	<u>5</u>	×	<u> </u>	St C	Σŏ	ËË	Pla	Ъ	
			0.0	0.0 - 1.0'	D: fine-grained sand,	madium	SM									
					ellowish brown (10YI											
			_													
			-													
	12									0.5						
										0.5						
			-													

Signature

Alina Walcek

Firm ARCADIS

	of Wisc		ral Reso	ources									OIL B Form 44				RMA Rev.	ATION 7-98
				Ro	ute T	o: Watershed/ Remediatio		_		ste Ma Othe	-	nent	]			D	1	C 1
	. 75										ш			1.5			ge 1 o	
	•	ect Nan						License	/Permit/	Monito	ring N	umber			oring N	umber		
		_	op Cor	poration	1										A-15			
Borin	g Drille	ed By:						Date Di	illing St	arted		Date 1	Orilling	Compl	eted	Drilli	ng M	lethod
Nan		Scott						12/16/2	2013			12/16	/2013			Han	d Au	ıger
Firm						ices, Inc.		71 10				~ ^				ļ		
WIU	nıque V	Vell No	o. DN	R Well II	) No.	Well Name			atic Wat		el		e Eleva					Diameter
									eet MSI	•		NA	Feet 1			2	i1	nches
Local			_	mated:	1	Boring Location	n X	(				Local	Grid Lo	ocation				
State 1	Plane 🔄	399465	.3	N 2146	6069.5	E		La	ıt					N			E	
		of S	Section	, T	N, F	<b>t</b>		Lon					Feet [	$\Box$ s	Fee	et 🔲	W	
Facilit	-			County			Co	ounty Coc	le	Civil	Town/	-	Village					
1	131253	320		D:	ane			13		<u>L</u>			City of					
Sam															Soil Pro	perties		
Number and Type								r	NSCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		0.0			D: fine-grained sand 1 inch, very dark bi			SM			0.5						

Signature

Alina Walcek

Firm ARCADIS

	of Wisc		ral Reso	ources										OIL Boom 44				RMA Rev.	ATION 7-98
				Rou	ite T	o: Watershed/ Remediatio			_	aste M	Iana her	igem	ent	]			_		0.4
						Remediano	11/10					<u> </u>						ge 1 o	of 1 
	•	ect Nan						License	/Permit/	Moni	torin	ıg Nı	umber		Bo	oring N	ımber		
I	Madis	on-Kip	pp Cor	poration											H	A-16			
Borin	g Drille	ed By:						Date D	rilling St	arted			Date I	Orilling	Compl	eted	Drilli	ng M	lethod
Nan	ne:	Scott						12/16/2	2013				12/16	/2013			Han	d Au	ıger
Firm				gineering															
WI U	nique V	Vell No	o. DN	R Well ID	No.	Well Name			tatic Wat		vel			ce Eleva			Borel		Diameter
								F	Feet MSI	_			NA	Feet I	MSL		2	iı	nches
Local			(estin	Boring Location	n 🗶	(					Local	Grid Lo	ocation						
State 1	Plane 5	399207	.2	<u> </u>		La	ıt						N			E			
		of S	Section	₹		Lon	g				]	Feet [	$\Box$ s	Fee	et 🔲	W			
Facilit	-				Co	ounty Coc	le	Civ	il To	own/	-	Village							
1	13125	320				13						City of	f Madi	ison					
Sam															Soil Pro	perties			
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	tion n Fo t	r	USCS	Graphic Log	0	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments			
	12		0.0	0.0 - 1.0' SILT AND medium pla		D: fine-grained sand y.	l, trac	e clay,	SM				1.9						

Signature

Alina Walcek

Firm ARCADIS

126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc		ral Reso	ources									OIL B Form 44				RMA	ATION 7-98
				Ro	ute T	o: Watershed/ Remediatio				ste Ma	nagen	nent	]			_		
						Remediano	11/10				ш						ge 1 o	of 1 
	•	ect Nan						License	/Permit/I	Monito	ring N	umber			oring Nu	ımber		
		_	op Cor	poratio	1										A-17			
Borin	g Drille	ed By:						Date Di	rilling Sta	arted		Date I	Orilling	Compl	eted	Drilli	ing M	lethod
Nan		Scott						12/16/2	2013			12/16	/2013			Han	d Au	ıger
Firm						rices, Inc.		E: 10				О С	T.I			<u> </u>		<u> </u>
WIU	nique V	Vell No	DN.	R Well II	) No.	Well Name			tatic Wat		el		e Eleva					Diameter
									Feet MSL	,		NA	Feet I			2	i1	nches
Local			_	nated:	1	Boring Location	n 🗶	(				Local	Grid Lo	ocation —				
State 1	Plane -	399046	.8	N 2144	<b>1816.</b> 0	E		La	ıt					_] N			E	
		of S	Section	, T	N, F	₹		Lon					Feet [	S	Fee	et 🔃	W	
Facilit	-	•••		County			Co	ounty Coc	le	Civil	Town/	-	Village					
	13125	320		D.	ane			13		<u> </u>			City of					
Sam															Soil Pro	perties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		And	l/Rock Descript Geologic Origin Each Major Uni	n Fo	r	USCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		0.0			D: fine-grained sand y, very dark brown (			SM			0.6						

Signature

Alina Walcek

Firm ARCADIS

126 N. Jefferson St., Suite 400 Milwaukee, WI (414) 276-7742

	of Wisc	consin of Natur	ral Reso	ources										OIL B form 44				RMA Rev.	ATION 7-98
				Ro	ute T	o: Watershed/ Remediatio				ste M Otl		agem	ent				Do	ge 1 c	of 1
Facili	try/Duoi	ect Nan							/Permit/N				una la au		D.	oring Nu		ge i (	)1 1
	•			<b>4:</b>				License	/Permit/N	/IOIII	OH	ing Ni	ımber			•	ımber		
		_	op Cor	poration	1											A-18	T =		
	g Drille	-							rilling Sta	irted				Drilling	Compl	eted		-	lethod
Nam		Scott			a			12/16/2	2013				12/16	/2013			Han	d Au	iger
Firm		Vell No		<b>igineerin</b> R Well II		vices, Inc. Well Name		Final St	tatic Wate	or I e	vel		Surfac	e Eleva	tion		Borel	nole I	Diameter
<b>W1</b> O	inque v	ven ivo	, DI	K Wen II	Wen rame			Feet MSL		VCI		NA	Feet l			2		nches	
T 1	0:10		7 (osti	mated:	1) or	Boring Location			CCI WISE					Grid Lo					iches
Local		rigin[ <b>398481</b>	_		) or 5 <b>182.</b> 4	· ·	)11[ <b>X</b>		. 4				Locai		N N			Е	
State	Piane :					~~		La					,		_	г	,		
Facilit	ty ID	01 2	Section	, T	N, I	ζ	Co	Lon ounty Coc	C	Civi	1 Т	Town/0		Feet _ Village	S	Fee	et	W	
	13125.	320		-	ane			13		CIVI		0 1111/1		City of		ison			
Sam																Soil Pro	perties		
		×	ಕ								Е		0						
g g	λπ. sd (i	onut	ı Fe			l/Rock Descript				Log	,	ıgra	m)	SSIV	d)		<b>x</b>		nts
Tyr	gth /	Ŭ	th ii			Geologic Origii Each Major Uni		r	S.	hic		Dig	dd)	ipre ngtł	stur tent	ji it	icit. x	9	RQD/ Comments
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet			Each Major Oni	ι		USCS	Graphic Log	1	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comir
	<u> </u>		0.0	0.0 - 1.0'					ML	Т	$\dagger$			-			H_		
				SILT: trac		trace fine-grained sa													
						pround gravel up to 1 ark brown (7.5YR 2.		, meaium											
			-																
			-																
	12												0.8						
			-																

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	of Wisc		ral Reso	ources									SOIL B Form 44				RMA	ATION 7-98
				Ro	ute T	o: Watershed/ Remediatio				ste M Oth	anagei	nent	]					
						Kemediano	11/10										ge 1 o	of 1
	•	ect Nan						License	/Permit/	Monite	oring N	Number		Bo	oring N	ımber		
I	Madis	on-Kip	p Cor	poration	1									H	A-19			
Borin	g Drille	ed By:						Date D	rilling St	arted		Date	Drilling	Compl	eted	Drill	ing M	lethod
Nan	ne:	Scott						12/16/2	2013			12/10	5/2013			Han	d At	ıger
Firm						rices, Inc.												
WI U	nique V	Vell No	o. DN	R Well ID	No.	Well Name			tatic Wat		el		ce Eleva			Borel		Diameter
								F	Feet MSI			NA	Feet l	MSL		2	iı	nches
Local			<b>⊣</b> `	nated:	) or	Boring Location	n 🗶	(				Local	Grid Lo	ocation				
State 1	Plane 5	398101	.3	N 2144	712.2	EE		La	ıt					N			E	
		of S	Section	, T	N, I	₹		Lon	g				Feet [	$\Box$ S	Fee	et 🔲	W	
Facilit	-			County			Co	ounty Coc	le	Civi	Towr	/City/or	_					
1	13125	320		D	ane			13					City of	f Madi	ison			
Sam															Soil Pro	perties		
Number and Type	ample  Grand Type  Reconstruction  Blow Counts  Blow Counts  Blow Counts  And Geologic Originate  Each Major Un  Each Major Un								NSCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		0.0	sand, loos	e, medi	D: fine-grained sand um plasticity, brown on (7.5YR 2.5/3).			SM			1.0						

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	of Wisc	consin of Natur	al Reso	ources									SOIL B Form 44				RMA Rev.	ATION 7-98
				Rout	То	o: Watershed/V Remediation				aste M Oth	-	nent [	]			Da	ige 1 d	of 1
Facili	ty/Proje	ect Nan	ne .						/Permit/		oring N	Jumber		R	oring N		gc 1 (	
				poration				License	/I CITIII()	WIOIII	Jing 1	vannoer			A-20	unioci		
	g Drille		фСог	poration				Data Da	rilling St	artad		Data	Drilling			Drill	ing M	lethod
Nam	_	-							_	arteu			_	Compi	eieu		-	
Firm		Scott Soils:	and En	gineering S	ervi	ces. Inc.		12/16/2	2013			12/10	5/2013			Han	a At	iger
WI U	nique V	Vell No		R Well ID N		Well Name		Final St	atic Wa	ter Lev	el	Surfa	ce Eleva	ition		Borel	hole I	Diameter
								F	eet MSI			NA	Feet l	MSL		2	i	nches
Local	Grid Oı	rigin	estii (estii	mated: )	or l	Boring Locatio	n <b>x</b>	1				Local	Grid Lo	ocation				
		397949	_	N 214329		E		La	ıt					N			E	
	_		Section	, T	N, R			Lon					Feet	_ ∫s	Fee	et $\square$	W	
Facilit	ty ID			County			Co	ounty Coc		Civil	Town	/City/or	Village					
1	131253	320		Dan	e			13					City of	f Mad	ison			
Sam	_														Soil Pro	perties		
Number and Type	mple    Condition							r	USCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		0.0		(root	: fine-grained sand, ts), medium plastic 3).			SM			0.9						

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	of Wisc		ral Reso	ources								SOIL B Form 44				RMA	ATION 7-98
				Route	To: Watershed				ste Ma	anagen er 🗀	nent	]					6.1
					Temedian					ш						ge 1 (	of I
		ect Nan					License	e/Permit/	Monito	ring N	umber			oring N	umber		
		_	op Cor	poration										A-21			
Borin	g Drille	ed By:					Date D	rilling St	arted		Date I	Drilling	Compl	eted	Drilli	ing M	lethod
Nam	ne:	Scott					12/16/2	2013			12/16	/2013			Han	d Au	ıger
Firm				gineering S													
WI Uı	nıque V	Vell No	o. DN	R Well ID N	o. Well Name			tatic Wat		el		ce Eleva					Diameter
							I	Feet MSI	•		NA	Feet I	MSL		2	iı	nches
Local (	Grid O	rigin	(estin	nated: )	or Boring Location	on[]	K				Local	Grid Lo	ocation				
State I	Plane <u>'</u>	400570	.6	N 214585	8.0 E		La	nt					N			E	
		of S	Section	, T 1	I, R		Lon	g				Feet [	$\Box$ S	Fee	et 🔲	W	
Facilit	-			County		C	ounty Coo	le	Civil	Town	-	Village					
1	13125.	320		Dan	2		13					City of					
Sam	_													Soil Pro	perties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		Soil/Rock Descrip nd Geologic Origi Each Major Un	in Fo		USCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		0.0	trace subangu	AND: fine-grained sandar to subround gravel, w plasticity, frost to 1 2.5/2).	less t	han 1	SM			0.9						

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	of Wisc		ral Reso	ources									SOIL B Form 44				RMA	ATION 7-98
				Ro	oute T	o: Watershed/ Remediatio				ste Ma	anagen	nent	]					6.1
											ш						ge 1 o	of I 
		ect Nan						License	/Permit/I	Monito	ring N	umber			oring N	umber		
		_	p Cor	poratio	n										A-22			
Borin	g Drille	ed By:						Date Di	rilling Sta	ırted		Date I	Drilling	Compl	eted	Drilli	ing M	lethod
Nan		Scott						12/17/2	2013			12/17	//2013			Han	d Au	ıger
Firm						rices, Inc.		E' 10			,	G C	- F1			ļ.,		
WIU	nique V	Vell No	DN.	R Well II	) No.	Well Name			tatic Wat		el		ce Eleva					Diameter
									Feet MSL	r		NA	Feet 1			2	iı	nches
Local			<b>」</b>	nated:	1	Boring Location	on X	{				Local	Grid Lo	ocation —				
State 1	Plane -	399640	.4	N 214	1865.9	E		La	ıt					_] N			E	
		of S	Section	, T	N, F	₹		Lon					Feet [	S	Fee	et 🔲	W	
Facilit	-	•••		County			Co	ounty Coc	le	Civil	Town/	-	Village					
	13125	320		<u>υ</u>	ane			13	1	<u> </u>			City of					
Sam															Soil Pro	perties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		And	l/Rock Descript Geologic Origin Each Major Uni	n Fo	r	USCS	Graphic Log	Well Diagram	PID (ppm)	Compressive Strength	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comments
	12		-	trace suba	angular	D: fine-grained sand to subround gravel u I inch, very dark bro	ip to 1	1.5	SM			814.0						

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	of Wisc		ral Reso	ources								OIL B Form 44				RMA	ATION 7-98
				Route	To: Watershed					ınagem	ent	]					
					Remediation	on/Re			Othe							ge 1 o	of 1
		ect Nan					License	e/Permit/N	Monito	ring N	umber		Во	oring Nu	umber		
ľ	Madis	on-Kip	op Cor	poration									H	A-23			
Boring	g Drille	ed By:					Date D	rilling Sta	ırted		Date I	Orilling	Compl	eted	Drilli	ng M	lethod
Nam	ie:	Scott					12/17/	2013			12/17	/2013			Han	d Av	ıger
Firm				gineering S											<u> </u>		
WI Uı	nique V	Vell No	o. DN	R Well ID N	o. Well Name			tatic Wate		el		e Eleva					Diameter
								Feet MSL			NA	Feet I	MSL		2	iı	nches
Local (					or Boring Location	on X					Local	Grid Lo	ocation				
State I	Plane -	398402	.2	N 213910	<b>7.8</b> E		La	at					N			E	
		of S	Section		N, R		Lon	_				Feet [	S	Fee	et 🔃	W	
Facilit	•			County		Co	unty Coo	le	Civil	Town/	•	Village					
	131253	320		Dane	<u>e</u>		13					City of					
Sam														Soil Pro	perties		
	Length Att. & Recovered (in)	nts	Depth in Feet		3 :1/D 1 D :				g	Well Diagram		Compressive Strength					<b>20</b> 0
Number and Type	ı Atı ered	Blow Counts	in I		Soil/Rock Descrip nd Geologic Origi		r		Graphic Log	iag	PID (ppm)	ress	ure nt		ity		RQD/ Comments
d T d	ngth	ow o	pth		Each Major Uni			USCS	 ıphi		D (I	mp	Moisture Content	Liquid Limit	Placticity Index	P 200	ZD/
_ S B	Le	BI						ñ		×	Ы	Str	Σ̈́	Lin	Pla		
			0.0	0.0 - 0.1'				ОН									
				SOD													
									1111								
				0.1 - 1.0' SILT AND SA	AND: fine-grained sand	l, trace	e clay,	SM									
					lar to subround gravel uwn (7.5YR 2.5/2).	up to 1	inch,										
			-	, ery dani oro	····· (												
			-														
	40										260.0						
	12										260.0						
			-														

Signature

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State o Depart			ral Reso	ources							OIL B Form 44				RMA Rev.	ATION 7-98
				Route T	o: Watershed/V			ste Ma	nagem	ent	]			_		0.4
						_			ш						ge 1	of I
Facilit	•					License	e/Permit/N	Monito	ring N	umber			oring N	ımber		
		_	pp Cor	poration									A-24			
Boring	g Drille	ed By:				Date D	rilling Sta	arted		Date I	Drilling	Compl	eted	Drilli	ing M	lethod
Nam		Scott				12/17/	2013			12/17	/2013			Han	d Au	ıger
Firm				gineering Serv		E: 10		_		О. С	T)			<u> </u>	1 1	<u> </u>
WIUn	nque v	Vell No	).   DN	R Well ID No.	Well Name		tatic Wate		el		ce Eleva					Diameter
							Feet MSL	,		NA	Feet I	MSL		2	iı	nches
Local C			_ `		Boring Location	n X				Local	Grid Lo	ocation				
State P	lane 🤄	393475	.8	N <u>2137183.8</u>	E	La	at					N			E	
		of S	Section	, T N, R	<u> </u>	Lor					Feet [	S	Fee	et 🔲	W	
Facility				County		County Co	de	Civil	Town/	•	Village					
	31253	320		Dane		13					City of					
Samp													Soil Pro	perties		
	& (in)	nts	Depth in Feet	g .	1/D 1 D 1 1			g	Well Diagram		Compressive Strength					<b>100</b>
Number and Type	At red	Blow Counts	]. II.		l/Rock Descripti Geologic Origin			Graphic Log	iag	PID (ppm)	ress	ure nt		ity		RQD/ Comments
d T	ngth	OW	pth		Each Major Unit		USCS	aphi		) Q	mp	Moisture Content	Liquid Limit	Placticity Index	P 200	RQD/ Comm
- S &	Length Att. & Recovered (in)	Bl					ă ă	<u> </u>	×	Ы	Str	žΰ	Lin	Pla	P.	
			0.0	0.0 - 1.0'	D. 6		SM									
				trace subangular t	D: fine-grained sand, to subround gravel up											
				frost to 1 inch, me	edium plasticity.											
			-													
			-													
	12									138.0						
	12									138.0						
			_													

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