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March 27, 2017

Mr. Mike Schmoller
Hydrogeologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Subject: Polychlorinated Biphenyls (PCBs) in Rain Garden – Investigative Actions Summary

Dear Mr. Schmoller:

As requested by Madison Kipp Corporation (MKC), TRC has been investigating the presence and possible migration of polychlorinated biphenyls (PCBs) to the rain garden just north of the MKC facility which is located at 201 Waubesa Street, Madison, Wisconsin (the site, Figure 1). This letter summarizes the most recent actions taken to investigate potential source(s) of PCBs found in the rain garden.

Background

Between 2014 and 2015, MKC excavated PCB-impacted soil from areas of the rain garden and collected post-excavation confirmation samples. Confirmation samples were analyzed for PCBs using the United States Environmental Protection Agency (U.S. EPA) SW-846 Method 8082. The excavation limits were backfilled when sample results indicated concentrations were below the established Wisconsin Department of Natural Resources' (WDNR) industrial direct contact residual contaminant level (RCL) of 0.744 milligrams per kilogram (mg/kg). Locations containing soil with concentrations above 0.744 mg/kg were documented on the WDNR's geographic information system soil registry at Case Closure for this portion of the site (WDNR Bureau for Remediation and Redevelopment Tracking System (BRRTS) #02-13-562649). Following the 2014 and 2015 activities, on July 6, 2016, MKC was granted Final Case Closure for BRRTS #02-13-562649 with Continuing Obligations. It should also be noted that the property containing the rain garden is owned by the City of Madison (the City), and is leased by MKC.

On October 19, 2016, the City collected three soil samples from within the rain garden extents (Sample Identification Numbers: S1, S2, and S3). The samples were analyzed for PCBs using Method 8082. Figure 2 includes the approximate location of the samples based on field notes provided by the City. Each soil sample was collected from the top foot of soil in the rain garden. Soil results indicated that of the three soil samples collected, only sample S1 (7.03 mg/kg) exceeded the WDNR industrial direct contact RCL of 0.744 mg/kg for PCBs at the rain garden.

Analytical results were discussed with the WDNR, and MKC requested that TRC review the information and proceed with an excavation of the soil adjacent sample S1. As described in the Rain Garden Excavation and Restoration Work Plan (TRC 2016): as of June 2016 the WDNR industrial direct contact RCL was changed to 0.714 mg/kg, but based on discussions between the WDNR and MKC, the previously used 0.744 mg/kg will continue to be used for the rain garden portion of the site.

Investigative Actions – Rain Garden

On December 19, 2016, TRC mobilized to the rain garden and conducted a 5-foot by 5-foot by 2-foot in depth excavation near the outfall of the storm sewer pipe as proposed in the Rain Garden Excavation and Restoration Work Plan (TRC 2016). Soil samples were taken from the sidewalls and base of the excavation, and a sediment sample was obtained from the end of the pipe. The samples were analyzed for PCBs using Method 8082 and analytical laboratory results reported that PCBs were present above the WDNR industrial direct contact RCL for the site in samples SW-NE, SW-NW, SW-SE, and Pipe. A summary of the analytical results can be found in Table 1, and the sample locations can be seen in Figure 2. In addition, a photo log of the December 19, 2016 work is included in Attachment 1.

The exceedance of the WDNR industrial direct contact RCL prompted TRC to further investigate the extents of the PCB contamination in the rain garden. On December 21, 2016, five step-out soil samples from the extents of the December 19, 2016 excavation limits were collected from the rain garden and analyzed for PCBs. The sample locations are shown on Figure 2. Each sample was collected from approximately ground surface to one foot below ground surface. The laboratory analytical results indicated that PCB impacts above the industrial direct contact RCL extended to the northwest, northeast and southeast of the excavation and storm sewer outfall pipe. The additional sample locations (Sample Identification Numbers: NE, NW, SE, East 1, and East 2) are shown on Figure 2 with their corresponding total PCB concentrations.

Investigative Actions – MKC Property

Following results of the step-out sampling, MKC and TRC began investigating if PCB-containing sediment is present in the storm sewer upgradient of the outfall, because of the detection of PCBs in the Pipe sample collected on December 19, 2016. The additional investigation activities included visual inspection of the storm sewer catch basins and manholes, and collection of samples where sediment was present.

Storm Sewer Description

The MKC storm sewer catch basins and manholes were inspected, and Figure 3 shows the overall system. A specific identification label for each catch basin/manhole (MH-#) within the system was assigned for discussion purposes as shown on Figure 3. In addition, the pipe discharging into the rain garden will be referred to as "Outfall." Overall, as shown on Figure 3, the storm sewer consists of two main conveyance pipe sections (S1 and S2) from manhole structure MH-5A to MH-3W and from MH-3W to the Outfall point. Additional catch basins and laterals tie into the main sections from the facility's roof and parking lot/walk way areas (S3 and S4).

The system contains catch basins/manhole structures that convey and accept surface runoff. Pipe section S1 is installed in the southern half of the property along the west edge of the main facility (extends from MH-5A to MH-3W) and contains four infiltration points from the surface (MH-4A, MH-4B, MH-5A and MH-5B). Surface water drains from the southwestern parking lot and from a portion of the roof.

Pipe section S2 is installed in the northern half of the property, and runs from MH-3W to MH-1A, where the Outfall connects and ultimately conveys storm water to the rain garden. To the west of pipe section S2, there are three catch basins (MH-2W, MH-2A, and MH-1NW) with laterals that collect and convey water to the MH-1A (identified as pipe section S3). There are four roof drains that discharge into either MH-3W, MH-1NW, or directly into S2 and are conveyed to MH-1A. An additional roof gutter collects water and discharges immediately above MH-2W.

Sediment Sampling MH-1A

On December 28, 2016, a sediment sample was collected from manhole MH-1A just upgradient of the Outfall into the rain garden. The laboratory analysis indicated that the sample (Storm Sewer) exceeded the WDNR industrial direct contact RCL for total PCBs. The location of the Storm Sewer sample is shown on Figure 3. During sampling, the manhole contained water within the structure which impaired visual observation of the condition of

the base of the manhole, and in particular how well the structure is sealed from contact with the underlying soil.

To ensure that sediment had not back-flowed from the garden over the history of the storm sewer at the site, the elevations at the Outfall (into the rain garden) and the invert of the pipe at MH-1A were surveyed. The Outfall pipe (invert) was found to be approximately 1.48 feet lower in elevation than the storm sewer pipe invert in MH-1A, which indicates that sediment likely has not traveled from the rain garden to the upgradient manhole. Based on the detection of PCBs at MH-1A, further sampling was conducted upstream of MH-1A.

Sediment Sampling MH-1NW, -2W, and -3W

Based on results from MH-1A, additional sampling was completed on February 15, 2017 in manholes MH-1NW, MH-2W, and MH-3W, which flow into MH-1A. The samples collected are identified as MH-1NW Bottom, MH-2W, and MH-3W, and the locations are shown on Figure 3. Samples MH-2W and MH-3W showed exceedances of the WDNR industrial direct contact RCL.

A summary of visual inspection of each of the catch basins/man holes is provided below:

- Catch basin MH-1NW is constructed primarily out of concrete with a wood panel along the north side. The basin accepts surface runoff and contains two inlets, and one outlet that flows towards manhole MH-1A. The two inlets are a roof drain and pipe section S3.
- Catch basin MH-2W is a small, approximately one-foot square by approximately one-foot deep catch basin. The basin has no inlets and has one four-inch PVC outlet pipe that extends east toward MH-2A (pipe section S3). Surface water is directed from the roof through a 4-inch pipe which discharges immediately above and into the basin. The basin appears to be cast-in-place-concrete, and the wood framework was still in the place. The base of the basin was covered with sediment and organics and was not inspected.
- Manhole MH-3W is located northwest of the loading dock. The structure is constructed of concrete and contains two inlets and an outlet (pipe section S2). This structure was installed within the past few years. The main inlet was constructed out of concrete and accepts flow from pipe section S1. The second inlet is a roof drain is directly plumbed into the manhole.

Sediment Sampling MH-4A and MH-5A

Based on the detection of PCBs in MH-3W, on March 9, 2017, TRC inspected the basins in the southern portion of the site (Pipe Section S1).

The northern most basin (MH-4A) and southern most basin (MH-5A) in this section were sampled and the samples are identified as MH4-Top and MH5-Pipe. MH4-Top was collected from the surface near the basin grate as no sediment was found in the basin itself. Sample MH5-Pipe was collected from the pipe section located between MH-5A and MH-5B. The approximate location of each sample is shown on Figure 3. Laboratory results indicated that the total PCB concentration in sample MH5-Pipe was above the industrial direct contact RCL. The total PCB concentration at MH4-Top was below the RCL.

Each of the catch basins/man holes and storm sewer sections were visually inspected and observations were:

- MH-4A is a rectangular concrete catch basin with one inlet and outlet pipe. The basin receives flow from the surface and the upgradient portion of S1. Water is conveyed from this basin downgradient through a concrete pipe to MH-3W.
- MH-4B has a cast-in-place round grate, and so the manhole could not be inspected.
- MH-5A is a round manhole that collects surface runoff. Steel piling and aggregate were observed on the S1 outlet side of the manhole. In addition, a black corrugated pipe was found to be entering the manhole from the north.
- MH-5B is located just down gradient of MH-5A and is not a catch basin or manhole. It directly conveys surface water through a section of PVC pipe into pipe section S1.

Conclusion/Recommendation

In summary, additional soil and sediment samples within the MKC storm sewer and within the rain garden have been collected over the past few months. PCB impacts above the WDNR-established direct contact RCL have been found in the storm sewer and in the rain garden beyond the extents of the December 19, 2016 excavation. The storm sewer has never been cleaned, and so sediment observed in the sewer likely represents a long historical build-up of fine and coarse grain sediment.

Based on the sampling results, it is recommended that the following actions be taken:

- The storm sewer catch basins/manhole structures and pipes should be cleaned to remove the historical build-up of sediment.

  - The catch basins/manhole structures will be further inspected following the cleaning process and repairs may be recommended to ensure that only surface runoff is entering the storm sewer.

- A sediment filter bag or equivalent will be installed on the discharge side of the roof downspout pipe discharging into MH-2W. The filter bag will be used to capture sediment discharging over time from the roof drain. Accumulated sediment will be monitored following rain events and a sample collected if sufficient quantity is available. Note, sediment accumulation from the roof into the filter bag may require an extended period of time for sufficient quantity to collect as required for sampling.
- Following the cleaning of the storm sewer and repairs to the catch basins/manholes (if required), it is recommended that a temporary drain guard (filter fabric) be installed on the catch basins that accept surface flow to capture any solids entering the catch basins/manholes from the surface. This will be used to monitor the amount and type of solids entering the storm sewer from the surface flow. Samples will be collected and analyzed for PCBs if a sufficient type (e.g., not organic debris such as leaves) and volume of material accumulates.

The rain garden initial excavation and further investigation conducted in December 2016 concluded that PCB impacts above the WDNR industrial direct contact RCL remain in the rain garden. The impacts appear to be shallow, within the first few inches, and the underlying material appears to be undisturbed since the 2014-2015 excavation activities. It is recommended that the following actions be taken to remove the impacts remaining and restore the rain garden for planting:

- Excavate the rain garden to 12 inches below ground surface over the extents shown on Figure 4. The extents of excavation are based on the samples collected by the City of Madison Engineering (October 2016) and additional samples collected by TRC in December 2016. All locations with samples containing PCBs above the RCL will be removed as part of the proposed excavation.
- Collect confirmation samples following excavation. Samples shall be collected along the sidewalls (seven proposed samples) and the base (three proposed samples) of the proposed excavation limits and analyzed for PCBs. Each sidewall sample shall be collected from between ground surface and one (1) foot below ground surface. Figure 4 indicates the proposed confirmation sample locations with respect to the proposed excavation limits.
- Restore the rain garden to its previous grade once impacted soil has been removed.

Based on the results of the additional investigations, TRC and MKC request the review of the proposed recommendations. If you have questions or comments please feel free to contact Andrew Stehn (608-826-3665) or Katherine Vater (608-826-3663).

Sincerely,

TRC Environmental Corporation

Andrew M. Stehn

Andrew Stehn
Project Engineer

Katherine Vater

Katherine Vater, P.E.
Project Manger

Attachments: Table
Figures
Attachment 1 - Photographs

cc: John Hausbeck, Public Health (electronic)
Mark Sheppard, Madison-Kipp Corporation (electronic)
Alina Satkoski, Madison-Kipp Corporation (electronic)

Table 1
Soil and Sediment Analytical Results Summary
Madison-Kipp Corporation
Madison, Wisconsin

LOCATION		RAIN GARDEN														STORM SEWER BASINS					
DATE COLLECTED		10/19/2016			12/19/2016						12/21/2016					12/28/2016	2/15/2017			3/9/2017	
SAMPLE IDENTIFICATION		S1	S2	S3	PIPE	SW-NE	SW-NW	SW-SE	SW-SW	BASE	NW	NE	SE	EAST 1	EAST 2	STORM SEWER	MH-1NW-BOTTOM	MH-2W	MH-3W	MH4-TOP	MH5-PIPE
PCB AROCLORS	UNITS																				
1016	mg/kg	<0.591	<0.0323	<0.0292	<0.0095	<0.010	<0.013	<0.0099	<0.0091	<0.0088	<0.011	<0.0090	<0.0085	<0.010	<0.0097	<0.011	<0.0086	<0.014	<0.0086	<0.0078	<0.010
1221	mg/kg	<0.591	<0.0323	<0.0292	<0.0053	<0.0057	<0.0071	<0.0055	<0.0050	<0.0049	<0.0061	<0.0050	<0.0047	<0.0056	<0.0054	<0.0059	<0.0048	<0.0078	<0.0047	<0.0043	<0.0058
1232	mg/kg	<0.591	<0.0323	<0.0292	<0.0036	<0.0039	<0.0048	<0.0037	<0.0034	<0.0033	<0.0042	<0.0034	<0.0032	<0.0038	<0.0037	<0.0040	<0.0033	<0.0053	<0.0032	<0.0030	<0.0039
1242	mg/kg	**7.030**	0.120	0.0543J	<0.0057	<0.0061	<0.0076	<0.0059	<0.0054	<0.0052	<0.0065	<0.0054	<0.0050	<0.0060	<0.0058	<0.0063	<0.0051	<0.0083	<0.0051	<0.0046	<0.0062
1248	mg/kg	<0.591	<0.0323	<0.0292	**9.2**	**2.2**	**4.0**	0.51	0.034J	0.021J	**2.2**	0.16	**1.3**	**0.88**	**1.2**	**3.6**	0.28	**120**	<0.0061	0.028J	**0.93**
1254	mg/kg	<0.591	0.128	.0.0779	<0.0057	<0.0061	<0.0076	0.28	<0.0054	<0.0052	**1.7**	0.097J	<0.0050	0.38	<0.0058	<0.0063	0.41	<0.0083	**1.6**	<0.0046	<0.0062
1260	mg/kg	<0.591	0.0435J	<0.0292	0.37	0.10J	0.20	<0.0032	<0.0029	<0.0028	<0.0036	<0.0029	<0.0028	<0.0033	<0.0032	<0.0034	<0.0028	<0.0045	<0.0028	<0.0025	<0.0034
PCB Total	mg/kg	**7.030**	0.292	0.132	**9.6**	**2.3**	**4.2**	**0.79**	0.034J	0.021J	**3.9**	0.26	**1.3**	**1.3**	**1.2**	**3.6**	0.69	**120**	**1.6**	0.028J	**0.93**

Notes:
Bold - Concentration above the WDNR Established Industrial Direct Contact Residual Contaminant Level for Madison-Kipp Corporation - 0.744 mg/kg
J - estimated concentration above the adjusted method detection limit and below the adjusted reporting limit

Updated by: T. Perkins 03/17/2017
Checked by: A. Stehn 03/17/2017

Plot Date: 3/23/2017, 16:02:56 PM by BDEEGAN -- LAYOUT: ANSI B (11"x17")
Path: E:\MadisonKIPPCorp\2016_268304\268304-001slm.mxd

Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet (Foot US)
Map Rotation: 0

TRC - GIS

BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES, "USA TOPO MAPS" WEB BASEMAP SERVICE LAYER.

LEGEND

SITE PROPERTY BOUNDARY

MUNICIPAL SUPPLY WELL

0 2,000 4,000 FEET

1 " = 2,000 '
1:24,000

N

TRC
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Phone: 608.826.3600

PROJECT:

MADISON-KIPP CORPORATION
201 WAUBESA STREET
MADISON, WISCONSIN

TITLE:

SITE LOCATION MAP

DRAWN BY:	R SUEMNICHT
CHECKED BY:	A STEHN
APPROVED BY:	K VATER
DATE:	MARCH 2017
PROJ. NO.:	268304
FILE:	268304-001slm.mxd

FIGURE 1

LEGEND

- CITY SAMPLE OCTOBER 2016
- TRC SOIL SAMPLE LOCATIONS-TOTAL PCBS >0.744 mg/µg
- TRC SOILS SAMPLE LOCATIONS-TOTAL PCBS <0.744 mg/µg
- EXCAVATION AREA

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO & PARTNERS, JUNE 2014.
2. THE CITY OF MADISON ENGINEERING COLLECTED THREE SAMPLES WITHIN THE RAIN GARDEN ON OCTOBER 19, 2016.
3. THE LOCATIONS OF THE SAMPLES COLLECTED BY THE CITY OF MADISON ENGINEERING ARE APPROXIMATE BASED ON PROVIDED FIELD NOTES.
4. TRC ON BEHALF OF MADISON-KIPP CORPORATION COLLECTED ELEVEN SAMPLES WITHIN THE RAIN GARDEN BETWEEN DECEMBER 19, 2016 AND DECEMBER 21, 2016, DURING EXCAVATION OF IMPACTED SOIL. EACH SAMPLE WAS ANALYZED FOR PCBS USING METHOD 8020 AND COMPARED TO THE WDNR INDUSTRIAL DIRECT CONTACT RCL OF 0.744 mg/µg.

N

0 10 20 Feet

1" = 10'
1:120

PROJECT:
MADISON-KIPP CORPORATION
201 WAUBESA STREET
MADISON, WISCONSIN

TITLE:
PROPOSED SAMPLE LOCATIONS MAP

DRAWN BY:	B DEEGAN	PROJ NO.:	268304
CHECKED BY:	A STEHN		
APPROVED BY:	K VATER		**FIGURE 2**
DATE:	MARCH 2017		

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FILE NO.: 268304-004.mxd

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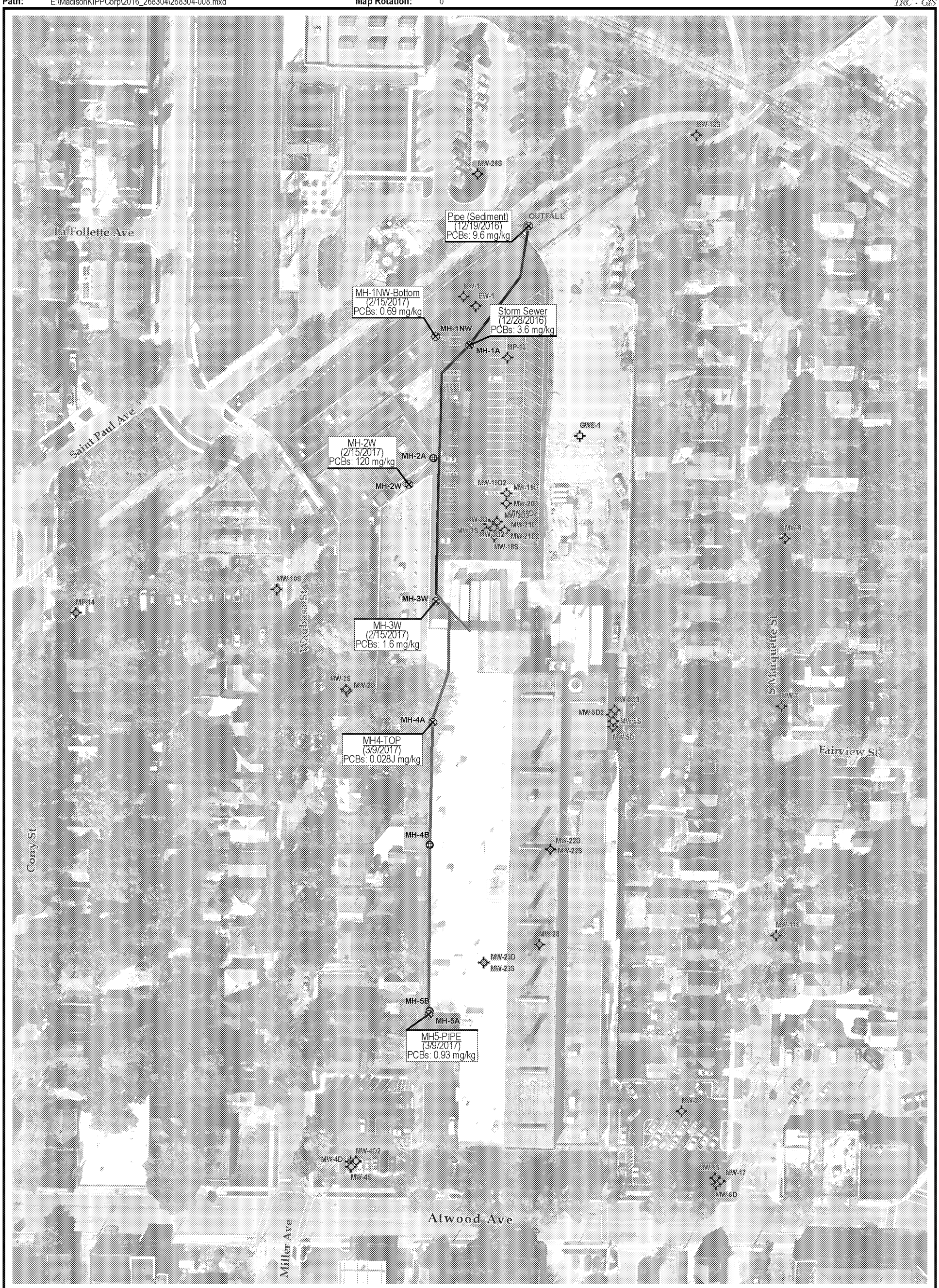
Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet (Foot US)
Map Rotation: 0
TRC - GIS

Plot Date: 3/24/2017, 08:39:39 AM by BDEEGAN -- LAYOUT: ANSI B (11"x17")
Path: E:\MadisonKIPPCorp\2016_268304\268304-008.mxd
Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet (Foot US)
Map Rotation: 0

TRC - GIS



LEGEND

- SITE PROPERTY BOUNDARY
- SEWER SEDIMENT GRAB SAMPLE
- GROUNDWATER EXTRACTION WELL
- MONITORING WELL
- MANHOLE/CATCH BASIN
- OUTFALL
- S-1 PIPE SECTION
- S-2 PIPE SECTION
- S-3 PIPE SECTION
- S-4 PIPE SECTION

BASE MAP FROM ESRI, "WORLD TOPOGRAPHIC MAP" WEB BASEMAP SERVICE LAYER.

0 100 200 FEET

1 " = 100 '
1:1,200

N

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PROJECT:
MADISON-KIPP CORPORATION
201 WAUBESA STREET
MADISON, WISCONSIN

TITLE:
SEWER SEDIMENT SAMPLE LOCATIONS WITH TOTAL PCBS RESULTS

DRAWN BY:	J PAPEZ
CHECKED BY:	A STEHN
APPROVED BY:	K VATER
DATE:	MARCH 2017
PROJ. NO.:	268304
FILE:	268304-008.mxd

FIGURE 3

LEGEND

- PROPOSED CONFIRMATION SOIL SAMPLE LOCATIONS
- EXCAVATION AREA-DECEMBER 2016
- PROPOSED EXCAVATION AREA

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO & PARTNERS, JUNE 2014.
2. THE PROPOSED EXCAVATION LIMITS ARE BASED ON SOIL SAMPLES COLLECTED BY THE CITY OF MADISON ENGINEERING (OCTOBER 2016) AND TRC (DECEMBER 2016). FIGURE 2 INCLUDED IN THE POLYCHLORINATED BIPHENYLS (PCBS) IN *RAIN GARDEN-INVESTIGATIVE ACTIONS SUMMARY* LETTER (TRC, 2017), INCLUDES THE APPROXIMATE LOCATION OF EACH SAMPLE COLLECTED FOR REFERENCING.

N

0 10 20 Feet

1" = 10'
1:120

PROJECT:
MADISON-KIPP CORPORATION
201 WAUBESA STREET
MADISON, WISCONSIN

TITLE:
PROPOSED EXCAVATION AND CONFIRMATION SAMPLE LOCATIONS MAP

DRAWN BY:	B DEEGAN	PROJ NO.:	268304
CHECKED BY:	A STEHN		
APPROVED BY:	K VATER		**FIGURE 4**
DATE:	MARCH 2017		

TRC

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FILE NO.: 268304-007.mxd

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Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet (Foot US)
Map Rotation: 0

TRC - GIS

Attachment 1

Photographs

Photographic Log

Client Name:	Site Location:	Project No.:
Madison Kipp Corporation	201 Waubesa St. Madison, WI 53704	TRC: 268304.0000.0000

Photo No.	Date
1	12/19/2016

Description
Outfall into the Rain Garden pre-excavation (Facing Southeast).

Photo No.	Date
2	12/19/2016

Description
Outfall area following the Rain Garden excavation completed on 12/19/16 (Facing East).

Photographic Log

Client Name:	Site Location:	Project No.:
Madison Kipp Corporation	201 Waubesa St. Madison, WI 53704	TRC: 268304.0000.0000

Photo No.	Date
3	12/19/2016

Description
Outfall area following the Rain Garden excavation completed on 12/19/16 (Facing North).

Photo No.	Date
4	12/19/2016

Description
Outfall area following the Rain Garden excavation completed on 12/19/16 (Facing North).