

**Madison-Kipp Corporation**

**Basis of Design for Proposed  
Groundwater Extraction and  
Treatment System**

Madison-Kipp Corporation  
Madison, Wisconsin

April 2014



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## **Basis of Design for Proposed Groundwater Extraction and Treatment System**

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Madison, Wisconsin

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**Acronyms and Abbreviations**

bls	Below land surface
cfm	Cubic feet per minute
cis-1,2-DCE	cis-1,2-dichloroethylene
COC	Contaminants of concern
GAC	Granular activated carbon
GETS	Groundwater extraction and treatment system
gpm	Gallons per minute
HP	Horsepower
Hz	Hertz
lbs	Pounds
µg/L	Micrograms per liter
mg/L	Milligrams per liter
MMSD	Madison Metropolitan Sewerage District
PCE	Tetrachloroethene
PH	Phase
PVC	Polyvinyl chloride
TCE	Trichloroethylene
TDH	Total dynamic head
Trans-1,2-DCE	trans-1,2-dichloroethylene
VC	Vinyl chloride
VGAC	Vapor granular active carbon
VOC	Volatile organic compound
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollutant Discharge Elimination System

## **Introduction**

ARCADIS has been retained to assist the Madison-Kipp Corporation with environmental remediation activities at the facility located at 201 Waubesa Street in Madison, Wisconsin (Site) (Figure 1). Investigation and remediation activities at the Site are being conducted under the Wisconsin Department of Natural Resources (WDNR) Bureau for Remediation and Redevelopment Tracking System #0213001569 and Facility ID #113125320.

Investigation and remediation activities have been ongoing at the Site since 1994. Activities completed prior to February 2013 have been previously documented in the *Site Investigation Work Plan*, dated May 31, 2012, the *Site Investigation and Interim Actions Report*, February 2012 – January 2013, dated March 15, 2013 and addenda.

The current groundwater monitoring well network includes 61 sampling intervals. The sampling intervals collect samples from four geologic units including from shallowest to deepest: The Unconsolidated Aquifer; Lone Rock Formation; Wonewoc Formation; and the Eau Claire Formation. Figure 2 presents the location of the Site monitoring wells.

Based on the October 2013 data, the hydraulic gradient direction in the Unconsolidated Aquifer is to the southeast. The hydraulic gradient direction in the Lower Lone Rock Formation is generally to the south and southeast in the southern half of the Site, and to the north in the northern half of the Site. The hydraulic gradient direction in the Lower Wonewoc Formation is to the east-southeast. The hydraulic direction of east-southeast is consistent with the regional hydraulic gradient. The direction of the vertical gradients for the Site was nearly consistently downward and within the same order of magnitude from the unconsolidated to the bedrock, as well as within each bedrock formation and between bedrock formations. This finding is consistent with a mathematical groundwater flow model commissioned by Dane County (WGNHS, 1999).

As summarized in the October 15, 2013 *Groundwater Remedial Strategy* letter approved by WDNR in electronic correspondence dated October 16, 2013, Madison-Kipp will incorporate groundwater extraction to minimize off-Site volatile organic carbon (VOC) migration, facilitate the removal of VOC mass and provide hydraulic influence. This remedial action includes the following:

- Pre-design Investigations
  - Installation of one groundwater extraction well (GWE-1) in the northern parking lot to a depth of approximately 185 feet below land surface (bls).

- Completion of a step test to determine the necessary operational requirements of the extraction well and to guide design specifications for the groundwater extraction and treatment system (GETS).
- Design and Construction
  - Preparation of a basis of design for the GETS, including a step test summary.
  - Installation and operation of a GETS.
- Monitoring
  - Hydraulic gradients
  - Mass removal
  - VOC concentration trends

This basis of design has been prepared to describe the methods and results of the step test that was conducted on January 20, 2014, and to outline the proposed GETS.

This basis of design includes equipment sizing for the development of a preliminary treatment building layout and electrical load calculations. System optimization is also considered in relation to the existing soil vapor extraction system and process wastewater operations at the Madison-Kipp facility (Facility). A Facility water reuse evaluation is being completed under a separate scope. The intention will be to confirm effluent water quality from the GETS is sufficient for reuse at the facility. This evaluation is ongoing and will be finalized concurrently with the GETS design. Extracted groundwater (which is treated in the GETS system) that cannot be reused for Facility operations will be discharged to the storm sewer.

This document has been prepared in accordance with Wisconsin Administrative Code Chapter NR 712.09. The submittal certification is included as Appendix A.

### **Groundwater Extraction Well Design and Installation**

Groundwater Extraction Well GWE-1 was designed to intersect the key bedrock zones where the chlorinated VOCs contaminant mass was identified during previous investigation activities including a shallow zone from approximately 60 to 90 feet bls, an

intermediate zone from 110 to 140 feet bls, and a deeper depth at approximately 160 feet bls. The groundwater extraction well was also designed with considerations for the spatial variability of source zone contaminant mass distribution and the heterogeneity of the fracture network and rock matrix characteristics. Figure 3 presents the construction details of Groundwater Extraction Well GWE-1.

Five bedrock samples were submitted to Giles Engineering & Associates, Waukesha, Wisconsin, for grain-size and hydrometer analysis to select an appropriately sized screen slot and filter pack across the different formations. One bedrock sample was submitted from the Lone Rock Formation (68 to 69 feet) and four bedrock samples were submitted from the Wonewoc Formation (96 to 97 feet, 117 to 118 feet, 145 to 146 feet, and 165 to 166 feet).

Groundwater Extraction Well GWE-1 was installed by Cascade Drilling, in Schofield, Wisconsin, between December 5, 2013 and January 9, 2014. The purpose of this groundwater extraction well was to facilitate removal of groundwater by targeting the known primary fracture intervals in the bedrock. The borehole was blind drilled using mud rotary drilling techniques. A 14-inch diameter borehole was advanced from ground surface to 34 feet bls through the unconsolidated soils and to 55 feet bls into competent bedrock. The remainder of the borehole was advanced as a 12-inch diameter borehole to approximately 185 feet bls.

The Groundwater Extraction Well GWE-1 was installed with an 8-inch diameter Schedule 80 polyvinyl chloride (PVC) casing. A 10-foot Schedule 80 PVC sump was installed from approximately 175 to 185 feet bls. The sump was flush-threaded into a 0.020-inch slot size (20-slot) screen installed across the Wonewoc Formation from approximately 113 to 175 feet bls. A 0.010-inch slot size (10 slot) screen was threaded into the 20-slot screen and extended across the Lone Rock Formation from approximately 60 to 113 feet bls. The screens were constructed of Johnson Large Diameter Free-Flow 316™ “v”-shaped trapezoidal stainless steel wire, continuously wrapped. A solid Schedule 80 PVC riser was threaded into the 10-slot screen from approximately 60 feet to 1.5 feet bls. The riser was capped with a well seal with penetrations for the pump drop pipe and support cable and two drop pipes to facilitate the collection of groundwater elevation measurements and samples while the pump operates. The well was temporarily completed at the surface with an 18-inch diameter steel traffic-rated well compartment with an 18-inch diameter deep skirt set in concrete. Figure 3 presents the well construction. A Grundfos 40S50-15, 5 horsepower (HP) pump with shroud, capable of pumping up to a maximum of 60 gallons per minute (gpm) at 200 feet of total dynamic head (TDH), was installed in the extraction well with a 2-inch diameter steel drop pipe.

Groundwater Extraction Well GWE-1 was developed by Cascade Drilling between January 10 and 11, 2014. Well development was completed using a decontaminated Grundfos RSQ15-220 submersible pump surging each 10-foot interval for a minimum of 30 minutes, followed by pumping out the turbid water. This procedure was completed twice for each 10-foot interval until clear, non-turbid water was obtained. Approximately 21,000 gallons of water was removed to complete the well development. The water was transported off-site for treatment at CWT of Wisconsin, in West Allis, Wisconsin or Crystal Springs, in Milwaukee, Wisconsin.

### **Step Test at Groundwater Extraction Well GWE-1**

On January 20, 2014, ARCADIS performed a step test on Groundwater Extraction Well GWE-1, including pumping rates of 20, 40, and 60 gpm. The step test was performed to meet the following objectives:

- Determine the zone of hydraulic response that was used to estimate the groundwater capture zone around Groundwater Extraction Well GWE-1.
- Determine the maximum sustained flow rate that can maintain the water level above the top of the well screen, while achieving the zone of hydraulic response, at Groundwater Extraction Well GWE-1 (e.g., keep the screen fully submerged during long term groundwater extraction).

Water levels at Groundwater Extraction Well GWE-1 and 14 monitoring wells (MW-2D, MW-3D, MW-3D2, MW-4D2, MW-5D, MW-5D2, MW-5D3, MW-6D, MW-9D2, MP-13 (81 to 85 feet), MP-14 (135 to 140 feet), MP-15 (120 to 125 feet), MW-17, and MW-22D) (Figure 2) were monitored during the test using pressure transducers equipped with data loggers to evaluate drawdown. Additionally, groundwater samples were collected from Groundwater Extraction Well GWE-1 at the beginning of the test sequence and end of each pumping rate period for laboratory analysis of VOCs and total and dissolved (field filtered) iron and manganese. Groundwater samples were also collected and submitted for laboratory analysis of total suspended solids at the end of each pumping rate period and for total and dissolved (field filtered) polychlorinated biphenyls at the end of the 40 gpm test. Groundwater samples were collected to determine if variations in groundwater chemistry were observed at variable flow rates. The analytical data were also used for the design of the proposed treatment system. Contaminant concentrations were used for major process equipment specification; while, water chemistry data were used for process treatment evaluation including the potential for scaling. A summary of the groundwater analytical results are presented in Table 1.

The proposed pumping test was attempted on January 24, 2014. However, due to inclement weather, the complete pump test work plan was not completed. An evaluation of the available step test data indicate a sufficient hydraulic response in the monitoring well network and adequate groundwater sampling was completed during the step test to proceed with the basis of design. Additional groundwater sampling at Groundwater Extraction Well GWE-1 was completed on February 12, 2014 to collect total suspended solids and supplemental water chemistry data for design purposes. A pumping test will be performed during startup of the GETS to confirm the step test data.

Below is a summary of the key observations from the groundwater analytical results collected during the step test activities that were used to develop the basis of design:

- Tetrachloroethene (PCE) concentrations ranging from 1,200 micrograms per liter ( $\mu\text{g/L}$ ) to 3,200  $\mu\text{g/L}$  were the highest detected concentrations during the step test.
- PCE concentrations were generally stable throughout the 20 gpm test. PCE concentrations increased between the 20 and 40 gpm tests, but were generally stable between 40 and 60 gpm tests.
- Iron and manganese concentrations indicated a low potential for scaling.
- Total dissolved solid concentrations remained stable between each step test. The total dissolved solid concentrations were evaluated for potential system maintenance.
- Total and dissolved polychlorinated biphenyls were not detected above the laboratory detection limits as anticipated; consequently, the treatment system does not need to consider removal of these compounds.

Drawdown in Groundwater Extraction Well GWE-1 was 5.8 feet after the 20 gpm test, 13.9 feet after the 40 gpm test, and 15.8 feet after the 60 gpm test. Below is a summary of the static groundwater elevation and groundwater elevation at the end of each pumping rate period for on-Site and off-Site monitoring wells in relation to the distance from the extraction well, with key observations.

- The objective to determine the zone of hydraulic response that will be used to estimate the groundwater influence around Groundwater Extraction Well GWE-1 was achieved.

- Drawdown was observed in all wells where water levels were measured with the exception of Monitoring Well MW-4D2 in the southwest parking lot and Multiport Well MP-14 (135 to 140 feet bls) located in the western parking lot. The lack of measureable drawdown at these locations may be attributed to where the screen is located and lack of fractures or connected fractures (MW-4D2) or related to the short duration of the step tests (MP-14). Longer term pumping may result in drawdown at these locations.
- As expected, more drawdown was observed in the monitoring wells and multiport wells located closest to the extraction well and less drawdown in the wells located farther from the extraction well, and the drawdown increased in each well with an increase in the pumping rate.
- Drawdown in the north parking lot (where the highest contaminant mass has been reported) in wells located up to 313 feet from the extraction well ranged from 0.37 to 1.26 feet when pumping at 20 gpm; 0.71 to 2.41 feet when pumping at 40 gpm; and 0.95 to 3.26 feet when pumping at 60 gpm.
- Drawdown in wells located off-Site or greater than 350 feet from the extraction well ranged from 0.12 to 0.40 feet when pumping at 20 gpm in wells located up to 815 feet from the extraction well; 0.23 to 0.72 feet when pumping at 40 gpm; and 0.31 to 1.0 feet when pumping at 60 gpm (with the exception of the wells where no drawdown was observed).
- The objective to determine a sustained flow rate that achieves the hydraulic response objective above and maintains the water level above the top of the well screen at Groundwater Extraction Well GWE-1 was achieved. The top of the screen in GWE-1 is approximately 60 feet bls. The maximum drawdown observed in GWE-1 at 60 gpm was 15.8 feet from the static levels of 22 feet bls. Therefore, water levels remained above the top of the screen during the short step test.

Based on the observed drawdown in the wells monitored (Figure 4), minimizing off-Site VOC migration, removal of VOC mass, and creating hydraulic influence will be achieved with the extraction well at a pumping rate of 45 gpm.

### **Groundwater Extraction Effectiveness**

The step test indicates sufficient drawdown and influence of contaminant mass will be achieved with the operation of GWE-1 at 45 gpm. Overall effectiveness of the GETS, to minimize off-Site VOC migration, facilitate the removal of VOC mass, and provide

hydraulic influence, will be confirmed during operation of the full-scale GETS as follows:

- Hydraulic response and minimizing off-Site VOC migration will be evaluated by the collection of groundwater level measurements from the groundwater monitoring well network.
- Removal of contaminant mass will be evaluated using the GETS influent concentrations over time.
- A long term monitoring and sampling plan will be developed and submitted to the WDNR for review and approval following one year of system operation.

### **Influent Water Quality and Treatment Objectives**

The table below summarizes the analytical results of the sample collected at the end of the 40 gpm test for the five COCs. These results are the highest concentrations reported from the step test and were used for the anticipated treatment system influent concentration. Complete analytical data is included in Appendix B.

#### **GETS Design Basis, Groundwater Analytical Results, Madison-Kipp Corporation.**

<b>VOCs</b>	<b>Concentration (µg/L)</b>
PCE	3,200
TCE	610
cis-1,2-DCE	1,400
trans-1,2-DCE	21
VC	56

The purpose of the proposed GETS is to reduce the primary contaminants of concern (COCs) at the Site, including PCE, trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE), trans-1,2-dichloroethylene (trans-1,2-DCE) and vinyl chloride (VC) from groundwater extracted from Groundwater Extraction Well GWE-1 to meet necessary storm water discharge requirements regulated through the Wisconsin Pollutant Discharge Elimination System (WPDES) Permit and water quality requirements for Facility reuse and subsequent sanitary discharge from the Facility processes. Additional information is provided in subsequent sections.

## **Treated Groundwater Discharge**

### **On-Site Reuse – Facility Water**

A complete wastewater assessment is currently in process for the Facility. A full evaluation of the water needs and available water use locations will be summarized for Madison-Kipp. It is anticipated that reuse of extracted groundwater will be implemented for Facility processes noted below.

Currently on Site, city water is used for Facility processes at three primary process locations including:

- Cooling towers;
- Process cooling for hot oil machines, die cast machines, trim presses and dies; and,
- Die lube stations (requiring reverse osmosis treatment).

The full-scale groundwater treatment system is designed to treat 45 gpm of impacted groundwater. Facility water consumption is being evaluated for reuse of treated groundwater in the manufacturing process at the Facility.

The initial assessment indicates the treated groundwater can be used as the primary supply of water for all of the Facility processes listed above. While the final determinate of water reuse alternatives for the Facility will be identified in the full scale design, preliminary evaluation indicates approximately 22 gpm can be reused for Facility processes. Water from the City of Madison is currently used for these processes and will be used to supplement the extracted groundwater to maintain Facility operations in the event extracted groundwater is not available for Facility process.

Currently the Facility is permitted under an Industrial Wastewater Discharge Permit through the Madison Metropolitan Sewerage District (MMSD). Upon confirmation of reuse of extracted groundwater for Facility operations this permit will require revision to incorporate the GETS. Additional monitoring for the COCs may be required to ensure compliance with Site discharge limits with the MMSD.

### **Storm Sewer Discharge**

As presented above, approximately 22 of the 45 gpm of treated groundwater discharged from the GETS can be reused for the Facility. A storm sewer discharge will

be required for the remaining 23 gpm of treated groundwater during normal operation. However, there will be periods of time (i.e. Facility shutdowns due to holidays or maintenance) when the Facility cannot reuse the treated groundwater. Therefore, a discharge permit application for the full 45 gpm capacity will be prepared.

Storm sewer discharge will require completion of a WPDES Discharge Permit application and a permit application for non-stormwater discharge from the City of Madison. The City of Madison storm sewer identification number is IN5941-041 for the proposed discharge location in Waubesa Street.

The design effluent discharge limits from the GETS for the COCs will meet the established WPDES discharge permit requirements as presented below.

**WPDES Discharge Permit Effluent Limits.**

<b>COCs</b>	<b>Discharge Standard in WPDES<sup>1</sup> (µg/L)</b>
PCE	50
TCE	50
cis-1,2-DCE	NE
trans-1,2-DCE	NE
VC	10

1 Monthly average  
NE Not Established

In addition to VOCs, the WPDES permit requires total maximum daily load monitoring of total phosphorus and total suspended solids. Samples will be required to be collected and reported annually on the discharge monitoring report.

**GETS Design**

The proposed GETS design includes volatilization of VOC contaminants in an air stripper to achieve suitable quality water for potential reuse at the Site for Facility operations or for discharge to the local storm sewer in accordance with state and discharge limits. Off-gas vapors from the air stripper will also be treated using vapor phase granular activated carbon (GAC) before discharge to the atmosphere. Effluent sampling will be used to evaluate the need for treatment of gas vapors in accordance with State regulations.

Process modelling for the designed air stripper confirmed the proposed full-scale GETS is anticipated to remove greater than 99 percent of the influent VOC contaminants. The proposed air stripper manufacturer and model is included as Appendix C.

Vapor phase GAC (VGAC) vessels are designed to be plumbed in series with a lead/lag vessel configuration, and will be monitored closely to allow for process adjustment and carbon change-out, outlined below. The treated water discharge will be plumbed for Facility reuse with the balance discharged to the storm sewer located on Waubesa Street, south of the north parking lot entrance. The storm sewer proposed for discharge is illustrated on Figure 2.

### **Pretreatment**

Influent groundwater from Groundwater Extraction Well GWE-1 will be collected in an equalization tank, T-100, with an approximate capacity of 2,000 gallons. Analyses of groundwater sampled from Groundwater Extraction Well GWE-1 indicate total suspended solids were present at a concentration of 1.5 milligrams per liter. The equalization tank will also be monitored for solids retention and cleanout procedures will be specified in the GETS operation and maintenance plan.

Groundwater will be transferred from the equalization tank to a small pretreatment mix tank, T-200, with a capacity of approximately 550 gallons, to allow for addition of a sequestrant. Sequestrant is chemical added to the influent groundwater to prevent scaling of process equipment. Initial evaluation of the langlier saturation index for the groundwater indicates the water has minimal scaling tendencies; however, based on previous process experience and sampling conducted on February 12, 2014 outlined in the table below, pretreatment of the influent groundwater will be completed to minimize long-term operation and maintenance costs. Figure 5 and Appendix D show a proposed Remediation Building layout and Piping and Instrumentation Diagrams, respectively.

**Groundwater Chemistry Results, Groundwater Extraction Well GWE-1, Madison-Kipp Corporation.**

Analyte	Result	Unit
Iron (Total)	35	µg/L
Manganese (Total)	64	µg/L
Iron (Dissolved)	12	µg/L
Manganese (Dissolved)	61	µg/L
Hardness as CaCO <sub>3</sub>	760	mg/L
Alkalinity	470	mg/L
TSS	1.5	mg/L
TDS	1,100	mg/L
Temp	48	F
pH	6.6	

Initial specification of sequestrant indicated approximately 0.25-0.5 pounds (lbs) of sequestrant should be added to 1,000 gallons of influent groundwater using a chemical feed pump. One stainless steel mixer is designed for the mixing of sequestrant with the extracted groundwater at the mix tank, T-200. The 0.25 HP mixer is designed to operate at 1,150 revolutions per minute. The mixer will operate using 3 phase (PH), 60 hertz (Hz), and 460 volt power.

A stainless steel process transfer pump with viton gaskets is designed with the following parameters: maximum capacity of 60 gpm flow and 50 TDH. The 1.5 HP pump will operate using 3 PH, 60 Hz, and 460 volt power to transfer water from the mix tank, T-200, to the air stripper.

**First Stage Air Stripper**

Pre-treated groundwater will be pumped to the air stripper. The air stripper is designed for volatilization of VOCs; specifications for this unit are outlined below.

**Air Stripper Design Specifications, Groundwater Extraction Well GWE-1.**

<b>Design Criteria</b>	<b>Design Hydraulic Flow Rate 45 GPM</b>
Active Area of Air Stripper (ft <sup>3</sup> )	2.8
Length of Air Stripper (in)	27
Width of Air Stripper (in)	27
Height of Air Stripper (in)	102
Number of Trays	6
System Vapor Flow Rate cubic feet per minute	210

One pressure blower will supply the air stripper. The 5 HP blower is designed to operate at 210 cubic feet per minute (cfm) at 1.2 pound per square inch operating pressure into the air stripper. The blower will operate using 3 PH, 60 Hz, and 460 volt power. Effluent vapor from the air stripper will be processed through the VGAC before discharge to the atmosphere.

A stainless steel discharge pump with viton gaskets is designed with the following parameters: capacity of 60 gpm flow and 50 TDH. The 1.5 HP pump will operate using 3 PH, 60 Hz, 460 volt power. This pump will discharge water to the discharge point. Specifications for this pump will be completed upon finalization of the discharge location for the GETS to both the Facility and the final storm water manhole.

**VGAC Treatment**

VGAC will be used to remove residual VOCs in the air stream from the air stripper based on the design air flow rate of 210 cfm.

- VGAC treatment will include two 68-inch diameter vessels. Each vessel will hold approximately 2,000 lbs of carbon, for a total of 4,000 lbs of carbon. Vessels will be plumbed in series with a lead/lag vessel configuration. Evaluation for consolidation of the proposed VGAC units for the GETS system and the existing soil vapor extraction treatment system is ongoing.
- Loading to the VGAC vessel series is estimated to be 8.3 cfm per square foot of cross-sectional vessel area for average flow conditions.
- Vessels will be designed with multiple sample ports for breakthrough monitoring. Carbon change out will be scheduled upon initial COC breakthrough at the effluent

sample port in the lead vessel to allow for sufficient treatment capacity. Once the lead vessel carbon has been replaced, the lag vessel will then become the lead vessel, and the original lead vessel will become the lag vessel.

- Carbon consumption was based on models run by Tigg Corporation in Oakdale, Pennsylvania. Based on throughput from that system, carbon consumption was calculated to be 21.6 lbs of carbon per day, approximately 7,900 lbs of carbon per year. Carbon consumption was modelled using effluent vapor concentrations from the air stripper model provided in Appendix C, at the design flow rate of 210 cfm, and a relative humidity of 50 percent.

### Electrical Load

The following table provides electrical load requirements for system components for a 460 volt system (note: lighting, outlets, controls and heaters are estimates):

Equipment*	Required Load (Amps)
Extraction Well Pump	8
Air Stripper Blower	16
Mixer	0.3
Transfer Pumps (1)	2.4
Air Stripper Discharge Pump	2.4
Building Requirements	
Lighting/Outlets/Controls	20
Heaters	40

\*Assume 460 volt system

### Schedule

With concurrence from WDNR regarding the information contained herein, the design of the GETS would be completed this spring with subsequent permitting, installation and startup of the system anticipated in summer 2014.

**Table 1. Step Test Groundwater Discharge Analytical Results, Madison-Kipp Corporation, 201 Waubesa Street, Madison, Wisconsin**

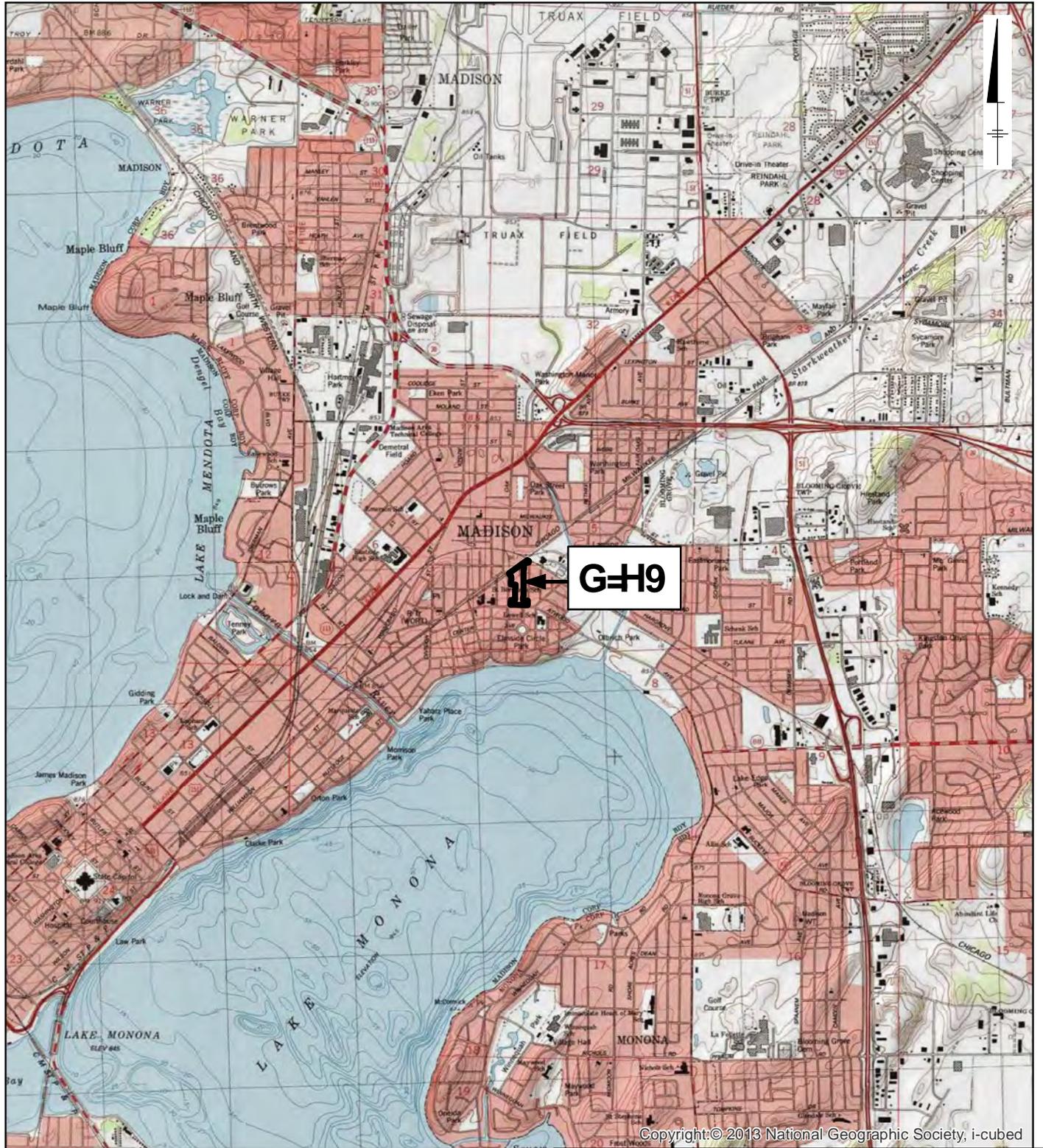
Sample ID Sample Date	Preventive Action Limit	Enforcement Standard	Pre Step Test 1/20/2014	End 20 gpm Test 1/20/2014	End 40 gpm Test 1/20/2014	End 60 gpm Test 1/20/2014
<b>VOCs (µg/L)</b>						
cis-1,2-Dichloroethene	7	70	650	700	1,400	1,300
Tetrachloroethene	0.5	5	1,200	1,400	3,200	3,100
trans-1,2-Dichloroethene	20	100	9.8	10	21	20
Trichloroethene	0.5	5	270	300	610	570
Vinyl chloride	0.02	0.2	20	21	56	51
<b>Metals (µg/L)</b>						
Iron	150	300	350 B	38 J B	35 J B	35 J B
Iron (Dissolved)	150	300	50 J B	18 J B	12 J B	20 J B
Manganese	60	300	26	39	64	86
Manganese (Dissolved)	60	300	21	25	61	79
Total Dissolved Solids mg/L	NE	NE	NA	1,100	1,100	1,200
<b>Total PCBs (µg/L)</b>						
Aroclor 1016	0.003	0.03	NA	NA	<0.023	NA
Aroclor 1221	0.003	0.03	NA	NA	<0.06	NA
Aroclor 1232	0.003	0.03	NA	NA	<0.037	NA
Aroclor 1242	0.003	0.03	NA	NA	<0.04	NA
Aroclor 1248	0.003	0.03	NA	NA	<0.045	NA
Aroclor 1254	0.003	0.03	NA	NA	<0.026	NA
Aroclor 1260	0.003	0.03	NA	NA	<0.034	NA
<b>Dissolved PCBs (µg/L)</b>						
Aroclor 1016	0.003	0.03	NA	NA	<0.023	NA
Aroclor 1221	0.003	0.03	NA	NA	<0.06	NA
Aroclor 1232	0.003	0.03	NA	NA	<0.037	NA
Aroclor 1242	0.003	0.03	NA	NA	<0.04	NA
Aroclor 1248	0.003	0.03	NA	NA	<0.045	NA
Aroclor 1254	0.003	0.03	NA	NA	<0.026	NA
Aroclor 1260	0.003	0.03	NA	NA	<0.034	NA

Footnotes on Page 2.

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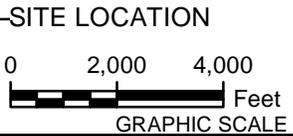
Only VOCs detected in one or more water samples are listed on the table. Refer to laboratory analytical reports for a complete list of constituents analyzed.

- 100 Concentration exceeds the NR 140 Wis. adm. code Preventive Action Limit.
- \$\$\$** Concentration exceeds the NR 140 Wis. adm. code Enforcement Standard.
- < Constituent not detected above noted laboratory detection limit.
- B Compound was found in the blank and the sample.
- gpm Gallons per minute.
- J Result is between the method detection limit and the limit of quantitation.
- mg/L Milligrams per liter.
- µg/L Micrograms per liter.
- NA Not analyzed.
- NE Not established.
- PCBs Polychlorinated Biphenyls.
- VOCs Volatile Organic Compounds.



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CITY: MPLS DIV/GROUP: IM DB: MG LD: CK  
 MADISON-KIPP PATH: G:\GIS\Projects\Madison\Kipp\2013\W\DNUR\Updates\Fig1\_Sitelocation.mxd



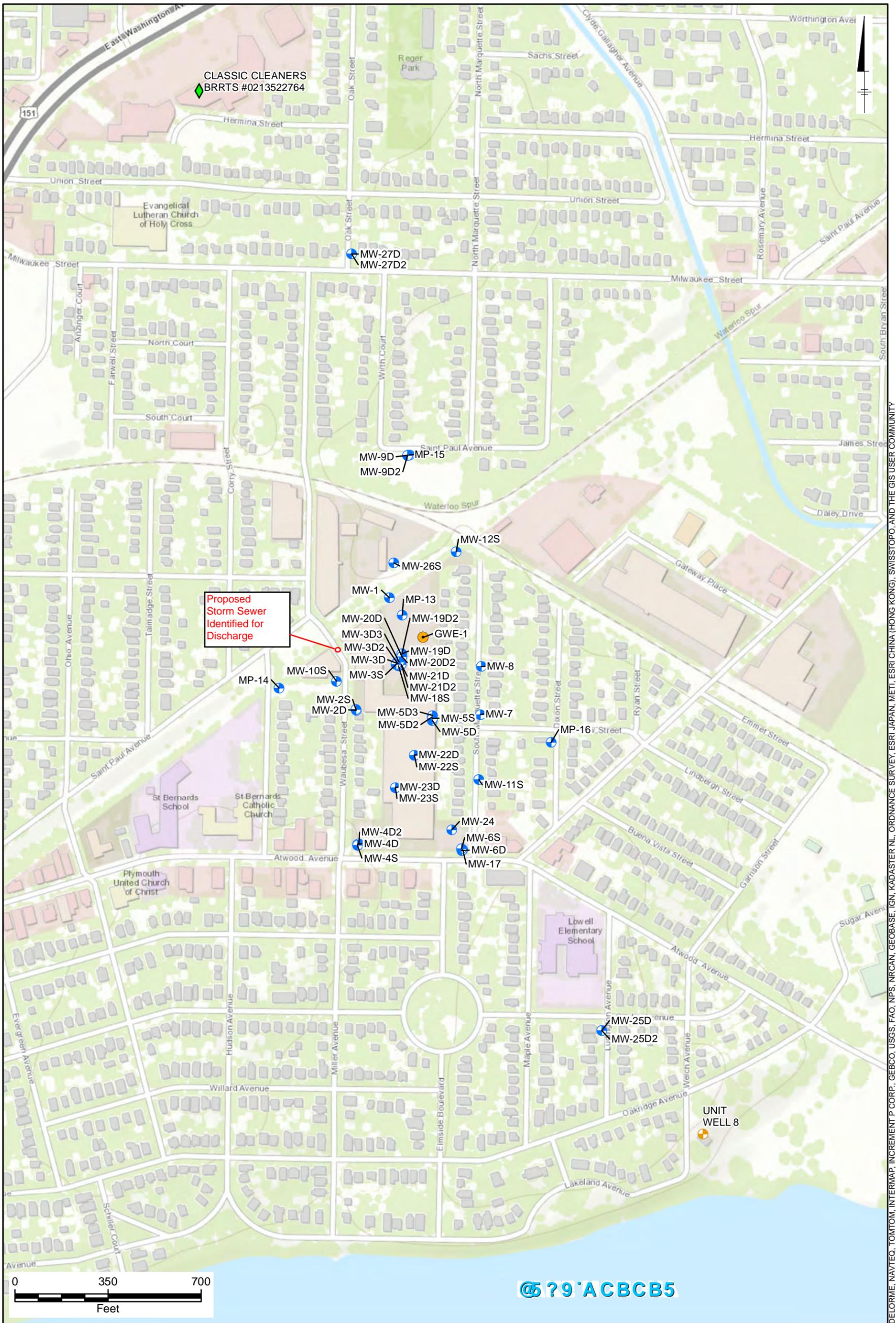
NOTE:  
 TOPO BASE MAP OBTAINED FROM  
 ESRI ONLINE MAPPING, USING  
 ARCMAP 10 ACCESSED 10/4/2013

MADISON-KIPP CORPORATION  
 201 WAUBESA STREET  
 MADISON, WISCONSIN

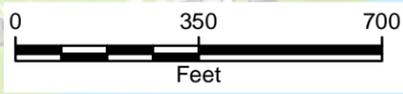
G=H9 @C75HCBA5D



1/9  
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CITY: MPLS DIV/GROUP: IMDV DB: MG LD: TS MADISON-KIPP G:\GIS\Projects\MadisonKipp\Map\2014-02\Fig1\_WellLocations\_20140219.mxd



© 2014 ARCADIS

- ⑨; 9B8
- ◆ CLOSED SITE (COMPLETED CLEANUP)
- EXTRACTION WELL
- ⊕ MUNICIPAL UNIT WELL 8
- MONITORING WELL

MADISON-KIPP CORPORATION 201 WAUBESA STREET MADISON, WISCONSIN
<b>K 9 @ @ C 7 5 H C B G ' A 5 D</b>
<span style="font-size: 24pt; font-weight: bold; vertical-align: middle;">2</span>

SERVICE LAYER CREDITS: SOURCES: ESRI, DELORME, NAVTEQ, TOMTOM, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEBCO, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI, JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, AND THE GIS USER COMMUNITY

CITY:(Read) DIV:(GROUP):(Read) DB:(Read) LD:(Opt) PIC:(Opt) PW:(Reqd) TM:(Opt) LVR:(Opt)ON=-:OFF=-REF\*  
 G:\Project\MadisonKipp\W001368\2014\caad\Design Drawings\Well Construction Details\4.dwg LAYOUT:5 SAVED: 3/13/2014 12:17 PM ACADVER: 18.1S (LMS TECH) PAGES: 1 PLOTTED: 3/26/2014 12:56 PM BY: YATES, VIVIAN  
 XREFS: IMAGES: PROJECTNAME: ---

0 FT ——— GROUND SURFACE ———  
 0.5 FT ——— TOP OF CASING ———  
 1.5 FT ——— BOTTOM OF VAULT  
 TOP OF GROUT ———

22.0 FT ——— WATER TABLE ———

40.0 FT ——— TOP OF BENTONITE ———

55.0 FT ——— TOP OF #10 RED FLINT FINE SAND ———  
 60.0 FT ——— TOP OF 10 SLOT SCREEN ———

70.0 FT ——— BOTTOM OF WATER LEVEL METER DROP PIPE ———

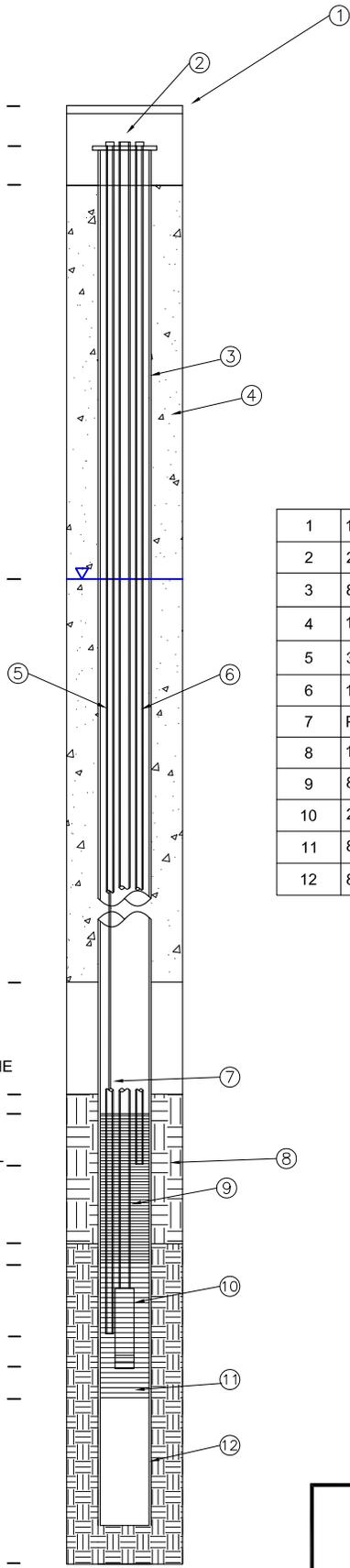
111.0 ——— TOP OF #30 RED FLINT MEDIUM SAND ———  
 113.0 ——— TOP OF 20 SLOT SCREEN ———

160.0 FT ——— BOTTOM OF PRESSURE TRANSDUCER ———

165.0 FT ——— PUMP INTAKE ———

175.0 FT ——— BOTTOM OF SCREEN ———

186.2 FT ——— BOREHOLE BOTTOM ———



1	18 IN STEEL TRAFFIC RATED WELL COMPARTMENT
2	2 IN STEEL DROP PIPE FOR PUMP
3	8 IN SCH 80 PVC
4	14 IN BOREHOLE (0 - 55 FT)
5	3/4 IN DROP PIPE FOR PRESSURE TRANSDUCER
6	1 IN DROP PIPE FOR WATER LEVEL METER
7	PRESSURE TRANSDUCER AND CABLE
8	12 IN BOREHOLE (55 - 185 FT)
9	8 IN 10 SLOT STAINLESS STEEL SCREEN (60 - 113 FT)
10	2 IN DIAMETER 5HP SUBMERSIBLE PUMP WITH SHROUD (165 FT)
11	8 IN 20 SLOT STAINLESS STEEL SCREEN (113 - 175 FT)
12	8 IN SUMP SCH 80 PVC

**NOTES:**

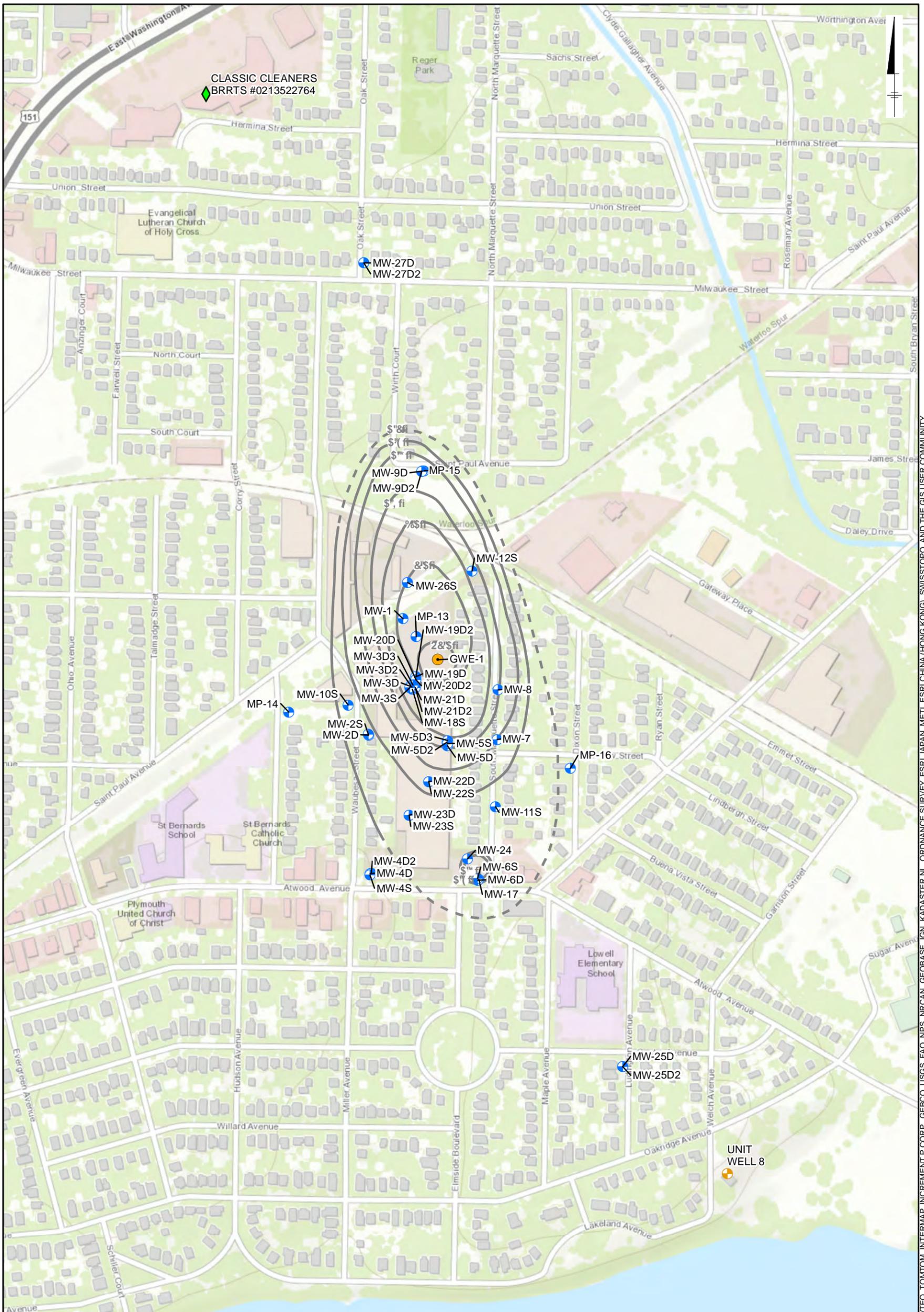
1. FT - FEET
2. IN - INCH
3. PVC - POLYVINYL CHLORIDE
4. SCH - SCHEDULE
5. HP - HORSEPOWER

MADISON-KIPP CORPORATION  
 201 WAUBESA STREET  
 MADISON, WISCONSIN

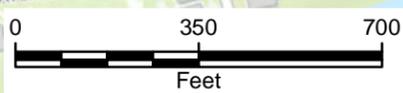
**EXTRACTION WELL DETAIL**

**GWE-1 EXTRACTION WELL DETAIL**  
 NOT TO SCALE





CITY: MPLS DIV/GROUP: IMDV DB: MG LD: TS MADISON-KIPP G:\GIS\Projects\MadisonKipp\Map\2014-09\Step Test2\_Download\_20140326.mxd



988

- 988 CLOSED SITE (COMPLETED CLEANUP)
- EXTRACTION WELL
- MUNICIPAL UNIT WELL 8
- MONITORING WELL
- DRAWDOWN CONTOUR (DASHED WHERE INFERRED)

NOTES:  
 1) CONTOURS REPRESENT THE DRAWDOWN FROM STATIC GROUNDWATER ELEVATIONS AND THE END OF THE 40 GPM TEST.  
 2) GPM - GALLONS PER MINUTE

MADISON-KIPP CORPORATION  
 201 WAUBESA STREET  
 MADISON, WISCONSIN

988

SERVICE LAYER CREDITS: SOURCES: ESRI, DELORME, NAVTEQ, TOMTOM, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEBCO, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, AND THE GIS USER COMMUNITY





**Appendix A**

Submittal Certification

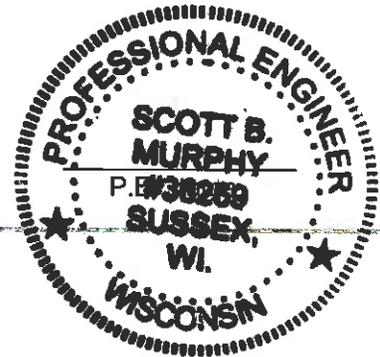
**Submittal Certification**

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

**Basis of Design for Proposed Groundwater Extraction and Treatment System  
Madison-Kipp Corporation  
201 Waubesa Street  
Madison, Wisconsin**

I, Scott B Murphy, 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."

Scott B Murphy Principal Engineer  
Signature, title and P.E. number 36269





## **Appendix B**

Step Test Analytical Reports

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.  
TestAmerica Chicago  
2417 Bond Street  
University Park, IL 60484  
Tel: (708)534-5200

TestAmerica Job ID: 500-70505-1  
Client Project/Site: MadisonKipp - WI001368.0011

For:  
ARCADIS U.S., Inc.  
126 North Jefferson Street  
Suite 400  
Milwaukee, Wisconsin 53202

Attn: Ms. Toni Schoen



Authorized for release by:  
1/29/2014 11:50:19 AM

Sandie Fredrick, Project Manager II  
(920)261-1660  
[sandie.fredrick@testamericainc.com](mailto:sandie.fredrick@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Case Narrative

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

**Job ID: 500-70505-1**

**Laboratory: TestAmerica Chicago**

## Narrative

**Job Narrative**  
**500-70505-1**

### Comments

No additional comments.

### Receipt

The samples were received on 1/23/2014 10:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.9° C.

### GC/MS VOA

Method(s) 8260B: The following samples were diluted to bring the concentration of target analytes within the calibration range: End Step 1 (500-70505-3), End Step 2 (500-70505-4), End Step 3 (500-70505-5), Pre Step Test (500-70505-2). Elevated reporting limits (RLs) are provided.

No other analytical or quality issues were noted.

### Metals

No analytical or quality issues were noted.

### Field Service / Mobile Lab

No analytical or quality issues were noted.

### General Chemistry

No analytical or quality issues were noted.

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# Detection Summary

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: Trip Blank

Lab Sample ID: 500-70505-1

No Detections.

## Client Sample ID: Pre Step Test

Lab Sample ID: 500-70505-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
trans-1,2-Dichloroethene	9.8		2.0	0.50	ug/L	2		8260B	Total/NA
Trichloroethene	270		1.0	0.38	ug/L	2		8260B	Total/NA
Vinyl chloride	20		1.0	0.20	ug/L	2		8260B	Total/NA
cis-1,2-Dichloroethene - DL	650		20	2.4	ug/L	20		8260B	Total/NA
Tetrachloroethene - DL	1200		20	3.4	ug/L	20		8260B	Total/NA
Iron	350	B	100	12	ug/L	1		6020	Total Recoverable
Manganese	26		2.5	0.76	ug/L	1		6020	Total Recoverable
Iron	50	J B	100	12	ug/L	1		6020	Dissolved
Manganese	21		2.5	0.76	ug/L	1		6020	Dissolved

## Client Sample ID: End Step 1

Lab Sample ID: 500-70505-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
trans-1,2-Dichloroethene	10		2.0	0.50	ug/L	2		8260B	Total/NA
Trichloroethene	300		1.0	0.38	ug/L	2		8260B	Total/NA
Vinyl chloride	21		1.0	0.20	ug/L	2		8260B	Total/NA
cis-1,2-Dichloroethene - DL	700		20	2.4	ug/L	20		8260B	Total/NA
Tetrachloroethene - DL	1400		20	3.4	ug/L	20		8260B	Total/NA
Iron	38	J B	100	12	ug/L	1		6020	Total Recoverable
Manganese	39		2.5	0.76	ug/L	1		6020	Total Recoverable
Iron	18	J B	100	12	ug/L	1		6020	Dissolved
Manganese	25		2.5	0.76	ug/L	1		6020	Dissolved
Total Dissolved Solids	1100		10	5.6	mg/L	1		SM 2540C	Total/NA

## Client Sample ID: End Step 2

Lab Sample ID: 500-70505-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
trans-1,2-Dichloroethene	21		5.0	1.3	ug/L	5		8260B	Total/NA
Trichloroethene	610		2.5	0.95	ug/L	5		8260B	Total/NA
Vinyl chloride	56		2.5	0.50	ug/L	5		8260B	Total/NA
cis-1,2-Dichloroethene - DL	1400		50	6.0	ug/L	50		8260B	Total/NA
Tetrachloroethene - DL	3200		50	8.5	ug/L	50		8260B	Total/NA
Iron	35	J B	100	12	ug/L	1		6020	Total Recoverable
Manganese	64		2.5	0.76	ug/L	1		6020	Total Recoverable
Iron	12	J B	100	12	ug/L	1		6020	Dissolved
Manganese	61		2.5	0.76	ug/L	1		6020	Dissolved
Total Dissolved Solids	1100		10	5.6	mg/L	1		SM 2540C	Total/NA

## Client Sample ID: End Step 3

Lab Sample ID: 500-70505-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
trans-1,2-Dichloroethene	20		5.0	1.3	ug/L	5		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Chicago

# Detection Summary

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

**Client Sample ID: End Step 3 (Continued)**

**Lab Sample ID: 500-70505-5**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	570		2.5	0.95	ug/L	5		8260B	Total/NA
Vinyl chloride	51		2.5	0.50	ug/L	5		8260B	Total/NA
cis-1,2-Dichloroethene - DL	1300		50	6.0	ug/L	50		8260B	Total/NA
Tetrachloroethene - DL	3100		50	8.5	ug/L	50		8260B	Total/NA
Iron	35	J B	100	12	ug/L	1		6020	Total Recoverable
Manganese	86		2.5	0.76	ug/L	1		6020	Total Recoverable
Iron	20	J B	100	12	ug/L	1		6020	Dissolved
Manganese	79		2.5	0.76	ug/L	1		6020	Dissolved
Total Dissolved Solids	1200		10	5.6	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Chicago



# Method Summary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CHI
6020	Metals (ICP/MS)	SW846	TAL CHI
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CHI

**Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL CHI = TestAmerica Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

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# Sample Summary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-70505-1	Trip Blank	Water	01/20/14 00:00	01/23/14 10:30
500-70505-2	Pre Step Test	Water	01/20/14 12:25	01/23/14 10:30
500-70505-3	End Step 1	Water	01/20/14 16:45	01/23/14 10:30
500-70505-4	End Step 2	Water	01/20/14 19:45	01/23/14 10:30
500-70505-5	End Step 3	Water	01/20/14 22:30	01/23/14 10:30

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# Client Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

**Client Sample ID: Trip Blank**

**Lab Sample ID: 500-70505-1**

**Date Collected: 01/20/14 00:00**

**Matrix: Water**

**Date Received: 01/23/14 10:30**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<0.25		1.0	0.25	ug/L			01/24/14 14:48	1
1,1,1-Trichloroethane	<0.20		1.0	0.20	ug/L			01/24/14 14:48	1
1,1,1,2,2-Tetrachloroethane	<0.23		1.0	0.23	ug/L			01/24/14 14:48	1
1,1,2-Trichloroethane	<0.28		1.0	0.28	ug/L			01/24/14 14:48	1
1,1-Dichloroethane	<0.19		1.0	0.19	ug/L			01/24/14 14:48	1
1,1-Dichloroethene	<0.31		1.0	0.31	ug/L			01/24/14 14:48	1
1,1-Dichloropropene	<0.34		1.0	0.34	ug/L			01/24/14 14:48	1
1,2,3-Trichlorobenzene	<0.24		1.0	0.24	ug/L			01/24/14 14:48	1
1,2,3-Trichloropropane	<0.45		1.0	0.45	ug/L			01/24/14 14:48	1
1,2,4-Trichlorobenzene	<0.31		1.0	0.31	ug/L			01/24/14 14:48	1
1,2,4-Trimethylbenzene	<0.14		1.0	0.14	ug/L			01/24/14 14:48	1
1,2-Dibromo-3-Chloropropane	<0.87		2.0	0.87	ug/L			01/24/14 14:48	1
1,2-Dibromoethane	<0.36		1.0	0.36	ug/L			01/24/14 14:48	1
1,2-Dichlorobenzene	<0.27		1.0	0.27	ug/L			01/24/14 14:48	1
1,2-Dichloroethane	<0.28		1.0	0.28	ug/L			01/24/14 14:48	1
1,2-Dichloropropane	<0.20		1.0	0.20	ug/L			01/24/14 14:48	1
1,3,5-Trimethylbenzene	<0.18		1.0	0.18	ug/L			01/24/14 14:48	1
1,3-Dichlorobenzene	<0.15		1.0	0.15	ug/L			01/24/14 14:48	1
1,3-Dichloropropane	<0.13		1.0	0.13	ug/L			01/24/14 14:48	1
1,4-Dichlorobenzene	<0.15		1.0	0.15	ug/L			01/24/14 14:48	1
2,2-Dichloropropane	<0.32		1.0	0.32	ug/L			01/24/14 14:48	1
2-Chlorotoluene	<0.21		1.0	0.21	ug/L			01/24/14 14:48	1
4-Chlorotoluene	<0.20		1.0	0.20	ug/L			01/24/14 14:48	1
Benzene	<0.074		0.50	0.074	ug/L			01/24/14 14:48	1
Bromobenzene	<0.25		1.0	0.25	ug/L			01/24/14 14:48	1
Bromochloromethane	<0.40		1.0	0.40	ug/L			01/24/14 14:48	1
Bromodichloromethane	<0.17		1.0	0.17	ug/L			01/24/14 14:48	1
Bromoform	<0.28		1.0	0.28	ug/L			01/24/14 14:48	1
Bromomethane	<0.31		1.0	0.31	ug/L			01/24/14 14:48	1
Carbon tetrachloride	<0.26		1.0	0.26	ug/L			01/24/14 14:48	1
Chlorobenzene	<0.14		1.0	0.14	ug/L			01/24/14 14:48	1
Chloroethane	<0.34		1.0	0.34	ug/L			01/24/14 14:48	1
Chloroform	<0.20		1.0	0.20	ug/L			01/24/14 14:48	1
Chloromethane	<0.18		1.0	0.18	ug/L			01/24/14 14:48	1
cis-1,2-Dichloroethene	<0.12		1.0	0.12	ug/L			01/24/14 14:48	1
cis-1,3-Dichloropropene	<0.18		1.0	0.18	ug/L			01/24/14 14:48	1
Dibromochloromethane	<0.32		1.0	0.32	ug/L			01/24/14 14:48	1
Dibromomethane	<0.33		1.0	0.33	ug/L			01/24/14 14:48	1
Dichlorodifluoromethane	<0.20		1.0	0.20	ug/L			01/24/14 14:48	1
Ethylbenzene	<0.13		0.50	0.13	ug/L			01/24/14 14:48	1
Hexachlorobutadiene	<0.26		1.0	0.26	ug/L			01/24/14 14:48	1
Isopropyl ether	<0.15		1.0	0.15	ug/L			01/24/14 14:48	1
Isopropylbenzene	<0.14		1.0	0.14	ug/L			01/24/14 14:48	1
Methyl tert-butyl ether	<0.24		1.0	0.24	ug/L			01/24/14 14:48	1
Methylene Chloride	<0.68		5.0	0.68	ug/L			01/24/14 14:48	1
Naphthalene	<0.16		1.0	0.16	ug/L			01/24/14 14:48	1
n-Butylbenzene	<0.13		1.0	0.13	ug/L			01/24/14 14:48	1
N-Propylbenzene	<0.13		1.0	0.13	ug/L			01/24/14 14:48	1
p-Isopropyltoluene	<0.17		1.0	0.17	ug/L			01/24/14 14:48	1

TestAmerica Chicago

# Client Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: Trip Blank

Lab Sample ID: 500-70505-1

Date Collected: 01/20/14 00:00

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
sec-Butylbenzene	<0.15		1.0	0.15	ug/L			01/24/14 14:48	1
Styrene	<0.10		1.0	0.10	ug/L			01/24/14 14:48	1
tert-Butylbenzene	<0.14		1.0	0.14	ug/L			01/24/14 14:48	1
Tetrachloroethene	<0.17		1.0	0.17	ug/L			01/24/14 14:48	1
Toluene	<0.11		0.50	0.11	ug/L			01/24/14 14:48	1
trans-1,2-Dichloroethene	<0.25		1.0	0.25	ug/L			01/24/14 14:48	1
trans-1,3-Dichloropropene	<0.21		1.0	0.21	ug/L			01/24/14 14:48	1
Trichloroethene	<0.19		0.50	0.19	ug/L			01/24/14 14:48	1
Trichlorofluoromethane	<0.19		1.0	0.19	ug/L			01/24/14 14:48	1
Vinyl chloride	<0.10		0.50	0.10	ug/L			01/24/14 14:48	1
Xylenes, Total	<0.068		1.0	0.068	ug/L			01/24/14 14:48	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
1,2-Dichloroethane-d4 (Surr)	102		75 - 125					01/24/14 14:48	1
4-Bromofluorobenzene (Surr)	100		75 - 120					01/24/14 14:48	1
Dibromofluoromethane	93		75 - 120					01/24/14 14:48	1
Toluene-d8 (Surr)	104		75 - 120					01/24/14 14:48	1

## Client Sample ID: Pre Step Test

Lab Sample ID: 500-70505-2

Date Collected: 01/20/14 12:25

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<0.50		2.0	0.50	ug/L			01/24/14 15:42	2
1,1,1-Trichloroethane	<0.40		2.0	0.40	ug/L			01/24/14 15:42	2
1,1,2,2-Tetrachloroethane	<0.46		2.0	0.46	ug/L			01/24/14 15:42	2
1,1,2-Trichloroethane	<0.56		2.0	0.56	ug/L			01/24/14 15:42	2
1,1-Dichloroethane	<0.38		2.0	0.38	ug/L			01/24/14 15:42	2
1,1-Dichloroethene	<0.62		2.0	0.62	ug/L			01/24/14 15:42	2
1,1-Dichloropropene	<0.68		2.0	0.68	ug/L			01/24/14 15:42	2
1,2,3-Trichlorobenzene	<0.48		2.0	0.48	ug/L			01/24/14 15:42	2
1,2,3-Trichloropropane	<0.90		2.0	0.90	ug/L			01/24/14 15:42	2
1,2,4-Trichlorobenzene	<0.62		2.0	0.62	ug/L			01/24/14 15:42	2
1,2,4-Trimethylbenzene	<0.28		2.0	0.28	ug/L			01/24/14 15:42	2
1,2-Dibromo-3-Chloropropane	<1.7		4.0	1.7	ug/L			01/24/14 15:42	2
1,2-Dibromoethane	<0.72		2.0	0.72	ug/L			01/24/14 15:42	2
1,2-Dichlorobenzene	<0.54		2.0	0.54	ug/L			01/24/14 15:42	2
1,2-Dichloroethane	<0.56		2.0	0.56	ug/L			01/24/14 15:42	2
1,2-Dichloropropane	<0.40		2.0	0.40	ug/L			01/24/14 15:42	2
1,3,5-Trimethylbenzene	<0.36		2.0	0.36	ug/L			01/24/14 15:42	2
1,3-Dichlorobenzene	<0.30		2.0	0.30	ug/L			01/24/14 15:42	2
1,3-Dichloropropane	<0.26		2.0	0.26	ug/L			01/24/14 15:42	2
1,4-Dichlorobenzene	<0.30		2.0	0.30	ug/L			01/24/14 15:42	2
2,2-Dichloropropane	<0.64		2.0	0.64	ug/L			01/24/14 15:42	2
2-Chlorotoluene	<0.42		2.0	0.42	ug/L			01/24/14 15:42	2
4-Chlorotoluene	<0.40		2.0	0.40	ug/L			01/24/14 15:42	2
Benzene	<0.15		1.0	0.15	ug/L			01/24/14 15:42	2
Bromobenzene	<0.50		2.0	0.50	ug/L			01/24/14 15:42	2
Bromochloromethane	<0.80		2.0	0.80	ug/L			01/24/14 15:42	2

TestAmerica Chicago

# Client Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: Pre Step Test

Lab Sample ID: 500-70505-2

Date Collected: 01/20/14 12:25

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	<0.34		2.0	0.34	ug/L			01/24/14 15:42	2
Bromoform	<0.56		2.0	0.56	ug/L			01/24/14 15:42	2
Bromomethane	<0.62		2.0	0.62	ug/L			01/24/14 15:42	2
Carbon tetrachloride	<0.52		2.0	0.52	ug/L			01/24/14 15:42	2
Chlorobenzene	<0.28		2.0	0.28	ug/L			01/24/14 15:42	2
Chloroethane	<0.68		2.0	0.68	ug/L			01/24/14 15:42	2
Chloroform	<0.40		2.0	0.40	ug/L			01/24/14 15:42	2
Chloromethane	<0.36		2.0	0.36	ug/L			01/24/14 15:42	2
cis-1,3-Dichloropropene	<0.36		2.0	0.36	ug/L			01/24/14 15:42	2
Dibromochloromethane	<0.64		2.0	0.64	ug/L			01/24/14 15:42	2
Dibromomethane	<0.66		2.0	0.66	ug/L			01/24/14 15:42	2
Dichlorodifluoromethane	<0.40		2.0	0.40	ug/L			01/24/14 15:42	2
Ethylbenzene	<0.26		1.0	0.26	ug/L			01/24/14 15:42	2
Hexachlorobutadiene	<0.52		2.0	0.52	ug/L			01/24/14 15:42	2
Isopropyl ether	<0.30		2.0	0.30	ug/L			01/24/14 15:42	2
Isopropylbenzene	<0.28		2.0	0.28	ug/L			01/24/14 15:42	2
Methyl tert-butyl ether	<0.48		2.0	0.48	ug/L			01/24/14 15:42	2
Methylene Chloride	<1.4		10	1.4	ug/L			01/24/14 15:42	2
Naphthalene	<0.32		2.0	0.32	ug/L			01/24/14 15:42	2
n-Butylbenzene	<0.26		2.0	0.26	ug/L			01/24/14 15:42	2
N-Propylbenzene	<0.26		2.0	0.26	ug/L			01/24/14 15:42	2
p-Isopropyltoluene	<0.34		2.0	0.34	ug/L			01/24/14 15:42	2
sec-Butylbenzene	<0.30		2.0	0.30	ug/L			01/24/14 15:42	2
Styrene	<0.20		2.0	0.20	ug/L			01/24/14 15:42	2
tert-Butylbenzene	<0.28		2.0	0.28	ug/L			01/24/14 15:42	2
Toluene	<0.22		1.0	0.22	ug/L			01/24/14 15:42	2
<b>trans-1,2-Dichloroethene</b>	<b>9.8</b>		2.0	0.50	ug/L			01/24/14 15:42	2
trans-1,3-Dichloropropene	<0.42		2.0	0.42	ug/L			01/24/14 15:42	2
<b>Trichloroethene</b>	<b>270</b>		1.0	0.38	ug/L			01/24/14 15:42	2
Trichlorofluoromethane	<0.38		2.0	0.38	ug/L			01/24/14 15:42	2
<b>Vinyl chloride</b>	<b>20</b>		1.0	0.20	ug/L			01/24/14 15:42	2
Xylenes, Total	<0.14		2.0	0.14	ug/L			01/24/14 15:42	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		75 - 125		01/24/14 15:42	2
4-Bromofluorobenzene (Surr)	102		75 - 120		01/24/14 15:42	2
Dibromofluoromethane	95		75 - 120		01/24/14 15:42	2
Toluene-d8 (Surr)	104		75 - 120		01/24/14 15:42	2

### Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>cis-1,2-Dichloroethene</b>	<b>650</b>		20	2.4	ug/L			01/24/14 16:10	20
<b>Tetrachloroethene</b>	<b>1200</b>		20	3.4	ug/L			01/24/14 16:10	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		75 - 125		01/24/14 16:10	20
4-Bromofluorobenzene (Surr)	103		75 - 120		01/24/14 16:10	20
Dibromofluoromethane	96		75 - 120		01/24/14 16:10	20
Toluene-d8 (Surr)	102		75 - 120		01/24/14 16:10	20

TestAmerica Chicago

# Client Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: Pre Step Test

Lab Sample ID: 500-70505-2

Date Collected: 01/20/14 12:25

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	350	B	100	12	ug/L		01/24/14 08:30	01/24/14 15:02	1
Manganese	26		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 15:02	1

### Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	50	J B	100	12	ug/L		01/24/14 08:30	01/24/14 15:06	1
Manganese	21		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 15:06	1

## Client Sample ID: End Step 1

Lab Sample ID: 500-70505-3

Date Collected: 01/20/14 16:45

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<0.50		2.0	0.50	ug/L			01/24/14 16:37	2
1,1,1-Trichloroethane	<0.40		2.0	0.40	ug/L			01/24/14 16:37	2
1,1,2,2-Tetrachloroethane	<0.46		2.0	0.46	ug/L			01/24/14 16:37	2
1,1,2-Trichloroethane	<0.56		2.0	0.56	ug/L			01/24/14 16:37	2
1,1-Dichloroethane	<0.38		2.0	0.38	ug/L			01/24/14 16:37	2
1,1-Dichloroethene	<0.62		2.0	0.62	ug/L			01/24/14 16:37	2
1,1-Dichloropropene	<0.68		2.0	0.68	ug/L			01/24/14 16:37	2
1,2,3-Trichlorobenzene	<0.48		2.0	0.48	ug/L			01/24/14 16:37	2
1,2,3-Trichloropropane	<0.90		2.0	0.90	ug/L			01/24/14 16:37	2
1,2,4-Trichlorobenzene	<0.62		2.0	0.62	ug/L			01/24/14 16:37	2
1,2,4-Trimethylbenzene	<0.28		2.0	0.28	ug/L			01/24/14 16:37	2
1,2-Dibromo-3-Chloropropane	<1.7		4.0	1.7	ug/L			01/24/14 16:37	2
1,2-Dibromoethane	<0.72		2.0	0.72	ug/L			01/24/14 16:37	2
1,2-Dichlorobenzene	<0.54		2.0	0.54	ug/L			01/24/14 16:37	2
1,2-Dichloroethane	<0.56		2.0	0.56	ug/L			01/24/14 16:37	2
1,2-Dichloropropane	<0.40		2.0	0.40	ug/L			01/24/14 16:37	2
1,3,5-Trimethylbenzene	<0.36		2.0	0.36	ug/L			01/24/14 16:37	2
1,3-Dichlorobenzene	<0.30		2.0	0.30	ug/L			01/24/14 16:37	2
1,3-Dichloropropane	<0.26		2.0	0.26	ug/L			01/24/14 16:37	2
1,4-Dichlorobenzene	<0.30		2.0	0.30	ug/L			01/24/14 16:37	2
2,2-Dichloropropane	<0.64		2.0	0.64	ug/L			01/24/14 16:37	2
2-Chlorotoluene	<0.42		2.0	0.42	ug/L			01/24/14 16:37	2
4-Chlorotoluene	<0.40		2.0	0.40	ug/L			01/24/14 16:37	2
Benzene	<0.15		1.0	0.15	ug/L			01/24/14 16:37	2
Bromobenzene	<0.50		2.0	0.50	ug/L			01/24/14 16:37	2
Bromochloromethane	<0.80		2.0	0.80	ug/L			01/24/14 16:37	2
Bromodichloromethane	<0.34		2.0	0.34	ug/L			01/24/14 16:37	2
Bromoform	<0.56		2.0	0.56	ug/L			01/24/14 16:37	2
Bromomethane	<0.62		2.0	0.62	ug/L			01/24/14 16:37	2
Carbon tetrachloride	<0.52		2.0	0.52	ug/L			01/24/14 16:37	2
Chlorobenzene	<0.28		2.0	0.28	ug/L			01/24/14 16:37	2
Chloroethane	<0.68		2.0	0.68	ug/L			01/24/14 16:37	2
Chloroform	<0.40		2.0	0.40	ug/L			01/24/14 16:37	2
Chloromethane	<0.36		2.0	0.36	ug/L			01/24/14 16:37	2
cis-1,3-Dichloropropene	<0.36		2.0	0.36	ug/L			01/24/14 16:37	2
Dibromochloromethane	<0.64		2.0	0.64	ug/L			01/24/14 16:37	2

TestAmerica Chicago

# Client Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: End Step 1

Lab Sample ID: 500-70505-3

Date Collected: 01/20/14 16:45

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromomethane	<0.66		2.0	0.66	ug/L			01/24/14 16:37	2
Dichlorodifluoromethane	<0.40		2.0	0.40	ug/L			01/24/14 16:37	2
Ethylbenzene	<0.26		1.0	0.26	ug/L			01/24/14 16:37	2
Hexachlorobutadiene	<0.52		2.0	0.52	ug/L			01/24/14 16:37	2
Isopropyl ether	<0.30		2.0	0.30	ug/L			01/24/14 16:37	2
Isopropylbenzene	<0.28		2.0	0.28	ug/L			01/24/14 16:37	2
Methyl tert-butyl ether	<0.48		2.0	0.48	ug/L			01/24/14 16:37	2
Methylene Chloride	<1.4		10	1.4	ug/L			01/24/14 16:37	2
Naphthalene	<0.32		2.0	0.32	ug/L			01/24/14 16:37	2
n-Butylbenzene	<0.26		2.0	0.26	ug/L			01/24/14 16:37	2
N-Propylbenzene	<0.26		2.0	0.26	ug/L			01/24/14 16:37	2
p-Isopropyltoluene	<0.34		2.0	0.34	ug/L			01/24/14 16:37	2
sec-Butylbenzene	<0.30		2.0	0.30	ug/L			01/24/14 16:37	2
Styrene	<0.20		2.0	0.20	ug/L			01/24/14 16:37	2
tert-Butylbenzene	<0.28		2.0	0.28	ug/L			01/24/14 16:37	2
Toluene	<0.22		1.0	0.22	ug/L			01/24/14 16:37	2
<b>trans-1,2-Dichloroethene</b>	<b>10</b>		2.0	0.50	ug/L			01/24/14 16:37	2
trans-1,3-Dichloropropene	<0.42		2.0	0.42	ug/L			01/24/14 16:37	2
<b>Trichloroethene</b>	<b>300</b>		1.0	0.38	ug/L			01/24/14 16:37	2
Trichlorofluoromethane	<0.38		2.0	0.38	ug/L			01/24/14 16:37	2
<b>Vinyl chloride</b>	<b>21</b>		1.0	0.20	ug/L			01/24/14 16:37	2
Xylenes, Total	<0.14		2.0	0.14	ug/L			01/24/14 16:37	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		75 - 125		01/24/14 16:37	2
4-Bromofluorobenzene (Surr)	102		75 - 120		01/24/14 16:37	2
Dibromofluoromethane	95		75 - 120		01/24/14 16:37	2
Toluene-d8 (Surr)	105		75 - 120		01/24/14 16:37	2

### Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>cis-1,2-Dichloroethene</b>	<b>700</b>		20	2.4	ug/L			01/24/14 17:04	20
<b>Tetrachloroethene</b>	<b>1400</b>		20	3.4	ug/L			01/24/14 17:04	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		75 - 125		01/24/14 17:04	20
4-Bromofluorobenzene (Surr)	101		75 - 120		01/24/14 17:04	20
Dibromofluoromethane	96		75 - 120		01/24/14 17:04	20
Toluene-d8 (Surr)	101		75 - 120		01/24/14 17:04	20

### Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Iron</b>	<b>38</b>	<b>J B</b>	100	12	ug/L		01/24/14 08:30	01/24/14 15:10	1
<b>Manganese</b>	<b>39</b>		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 15:10	1

### Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Iron</b>	<b>18</b>	<b>J B</b>	100	12	ug/L		01/24/14 08:30	01/24/14 15:14	1
<b>Manganese</b>	<b>25</b>		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 15:14	1

TestAmerica Chicago

# Client Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: End Step 1

Lab Sample ID: 500-70505-3

Date Collected: 01/20/14 16:45

Matrix: Water

Date Received: 01/23/14 10:30

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1100		10	5.6	mg/L			01/27/14 22:48	1

## Client Sample ID: End Step 2

Lab Sample ID: 500-70505-4

Date Collected: 01/20/14 19:45

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.3		5.0	1.3	ug/L			01/24/14 17:31	5
1,1,1-Trichloroethane	<1.0		5.0	1.0	ug/L			01/24/14 17:31	5
1,1,2,2-Tetrachloroethane	<1.2		5.0	1.2	ug/L			01/24/14 17:31	5
1,1,2-Trichloroethane	<1.4		5.0	1.4	ug/L			01/24/14 17:31	5
1,1-Dichloroethane	<0.95		5.0	0.95	ug/L			01/24/14 17:31	5
1,1-Dichloroethene	<1.6		5.0	1.6	ug/L			01/24/14 17:31	5
1,1-Dichloropropene	<1.7		5.0	1.7	ug/L			01/24/14 17:31	5
1,2,3-Trichlorobenzene	<1.2		5.0	1.2	ug/L			01/24/14 17:31	5
1,2,3-Trichloropropane	<2.3		5.0	2.3	ug/L			01/24/14 17:31	5
1,2,4-Trichlorobenzene	<1.6		5.0	1.6	ug/L			01/24/14 17:31	5
1,2,4-Trimethylbenzene	<0.70		5.0	0.70	ug/L			01/24/14 17:31	5
1,2-Dibromo-3-Chloropropane	<4.4		10	4.4	ug/L			01/24/14 17:31	5
1,2-Dibromoethane	<1.8		5.0	1.8	ug/L			01/24/14 17:31	5
1,2-Dichlorobenzene	<1.4		5.0	1.4	ug/L			01/24/14 17:31	5
1,2-Dichloroethane	<1.4		5.0	1.4	ug/L			01/24/14 17:31	5
1,2-Dichloropropane	<1.0		5.0	1.0	ug/L			01/24/14 17:31	5
1,3,5-Trimethylbenzene	<0.90		5.0	0.90	ug/L			01/24/14 17:31	5
1,3-Dichlorobenzene	<0.75		5.0	0.75	ug/L			01/24/14 17:31	5
1,3-Dichloropropane	<0.65		5.0	0.65	ug/L			01/24/14 17:31	5
1,4-Dichlorobenzene	<0.75		5.0	0.75	ug/L			01/24/14 17:31	5
2,2-Dichloropropane	<1.6		5.0	1.6	ug/L			01/24/14 17:31	5
2-Chlorotoluene	<1.1		5.0	1.1	ug/L			01/24/14 17:31	5
4-Chlorotoluene	<1.0		5.0	1.0	ug/L			01/24/14 17:31	5
Benzene	<0.37		2.5	0.37	ug/L			01/24/14 17:31	5
Bromobenzene	<1.3		5.0	1.3	ug/L			01/24/14 17:31	5
Bromochloromethane	<2.0		5.0	2.0	ug/L			01/24/14 17:31	5
Bromodichloromethane	<0.85		5.0	0.85	ug/L			01/24/14 17:31	5
Bromoform	<1.4		5.0	1.4	ug/L			01/24/14 17:31	5
Bromomethane	<1.6		5.0	1.6	ug/L			01/24/14 17:31	5
Carbon tetrachloride	<1.3		5.0	1.3	ug/L			01/24/14 17:31	5
Chlorobenzene	<0.70		5.0	0.70	ug/L			01/24/14 17:31	5
Chloroethane	<1.7		5.0	1.7	ug/L			01/24/14 17:31	5
Chloroform	<1.0		5.0	1.0	ug/L			01/24/14 17:31	5
Chloromethane	<0.90		5.0	0.90	ug/L			01/24/14 17:31	5
cis-1,3-Dichloropropene	<0.90		5.0	0.90	ug/L			01/24/14 17:31	5
Dibromochloromethane	<1.6		5.0	1.6	ug/L			01/24/14 17:31	5
Dibromomethane	<1.7		5.0	1.7	ug/L			01/24/14 17:31	5
Dichlorodifluoromethane	<1.0		5.0	1.0	ug/L			01/24/14 17:31	5
Ethylbenzene	<0.65		2.5	0.65	ug/L			01/24/14 17:31	5
Hexachlorobutadiene	<1.3		5.0	1.3	ug/L			01/24/14 17:31	5
Isopropyl ether	<0.75		5.0	0.75	ug/L			01/24/14 17:31	5
Isopropylbenzene	<0.70		5.0	0.70	ug/L			01/24/14 17:31	5

TestAmerica Chicago

# Client Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: End Step 2

Lab Sample ID: 500-70505-4

Date Collected: 01/20/14 19:45

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methyl tert-butyl ether	<1.2		5.0	1.2	ug/L			01/24/14 17:31	5
Methylene Chloride	<3.4		25	3.4	ug/L			01/24/14 17:31	5
Naphthalene	<0.80		5.0	0.80	ug/L			01/24/14 17:31	5
n-Butylbenzene	<0.65		5.0	0.65	ug/L			01/24/14 17:31	5
N-Propylbenzene	<0.65		5.0	0.65	ug/L			01/24/14 17:31	5
p-Isopropyltoluene	<0.85		5.0	0.85	ug/L			01/24/14 17:31	5
sec-Butylbenzene	<0.75		5.0	0.75	ug/L			01/24/14 17:31	5
Styrene	<0.50		5.0	0.50	ug/L			01/24/14 17:31	5
tert-Butylbenzene	<0.70		5.0	0.70	ug/L			01/24/14 17:31	5
Toluene	<0.55		2.5	0.55	ug/L			01/24/14 17:31	5
<b>trans-1,2-Dichloroethene</b>	<b>21</b>		5.0	1.3	ug/L			01/24/14 17:31	5
trans-1,3-Dichloropropene	<1.1		5.0	1.1	ug/L			01/24/14 17:31	5
<b>Trichloroethene</b>	<b>610</b>		2.5	0.95	ug/L			01/24/14 17:31	5
Trichlorofluoromethane	<0.95		5.0	0.95	ug/L			01/24/14 17:31	5
<b>Vinyl chloride</b>	<b>56</b>		2.5	0.50	ug/L			01/24/14 17:31	5
Xylenes, Total	<0.34		5.0	0.34	ug/L			01/24/14 17:31	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		75 - 125		01/24/14 17:31	5
4-Bromofluorobenzene (Surr)	105		75 - 120		01/24/14 17:31	5
Dibromofluoromethane	94		75 - 120		01/24/14 17:31	5
Toluene-d8 (Surr)	103		75 - 120		01/24/14 17:31	5

### Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>cis-1,2-Dichloroethene</b>	<b>1400</b>		50	6.0	ug/L			01/24/14 17:59	50
<b>Tetrachloroethene</b>	<b>3200</b>		50	8.5	ug/L			01/24/14 17:59	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		75 - 125		01/24/14 17:59	50
4-Bromofluorobenzene (Surr)	104		75 - 120		01/24/14 17:59	50
Dibromofluoromethane	98		75 - 120		01/24/14 17:59	50
Toluene-d8 (Surr)	101		75 - 120		01/24/14 17:59	50

### Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Iron</b>	<b>35</b>	<b>J B</b>	100	12	ug/L		01/24/14 08:30	01/24/14 15:17	1
<b>Manganese</b>	<b>64</b>		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 15:17	1

### Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Iron</b>	<b>12</b>	<b>J B</b>	100	12	ug/L		01/24/14 08:30	01/24/14 15:21	1
<b>Manganese</b>	<b>61</b>		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 15:21	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>1100</b>		10	5.6	mg/L			01/27/14 22:50	1

TestAmerica Chicago

# Client Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: End Step 3

Lab Sample ID: 500-70505-5

Date Collected: 01/20/14 22:30

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.3		5.0	1.3	ug/L			01/24/14 18:26	5
1,1,1-Trichloroethane	<1.0		5.0	1.0	ug/L			01/24/14 18:26	5
1,1,2,2-Tetrachloroethane	<1.2		5.0	1.2	ug/L			01/24/14 18:26	5
1,1,2-Trichloroethane	<1.4		5.0	1.4	ug/L			01/24/14 18:26	5
1,1-Dichloroethane	<0.95		5.0	0.95	ug/L			01/24/14 18:26	5
1,1-Dichloroethene	<1.6		5.0	1.6	ug/L			01/24/14 18:26	5
1,1-Dichloropropene	<1.7		5.0	1.7	ug/L			01/24/14 18:26	5
1,2,3-Trichlorobenzene	<1.2		5.0	1.2	ug/L			01/24/14 18:26	5
1,2,3-Trichloropropane	<2.3		5.0	2.3	ug/L			01/24/14 18:26	5
1,2,4-Trichlorobenzene	<1.6		5.0	1.6	ug/L			01/24/14 18:26	5
1,2,4-Trimethylbenzene	<0.70		5.0	0.70	ug/L			01/24/14 18:26	5
1,2-Dibromo-3-Chloropropane	<4.4		10	4.4	ug/L			01/24/14 18:26	5
1,2-Dibromoethane	<1.8		5.0	1.8	ug/L			01/24/14 18:26	5
1,2-Dichlorobenzene	<1.4		5.0	1.4	ug/L			01/24/14 18:26	5
1,2-Dichloroethane	<1.4		5.0	1.4	ug/L			01/24/14 18:26	5
1,2-Dichloropropane	<1.0		5.0	1.0	ug/L			01/24/14 18:26	5
1,3,5-Trimethylbenzene	<0.90		5.0	0.90	ug/L			01/24/14 18:26	5
1,3-Dichlorobenzene	<0.75		5.0	0.75	ug/L			01/24/14 18:26	5
1,3-Dichloropropane	<0.65		5.0	0.65	ug/L			01/24/14 18:26	5
1,4-Dichlorobenzene	<0.75		5.0	0.75	ug/L			01/24/14 18:26	5
2,2-Dichloropropane	<1.6		5.0	1.6	ug/L			01/24/14 18:26	5
2-Chlorotoluene	<1.1		5.0	1.1	ug/L			01/24/14 18:26	5
4-Chlorotoluene	<1.0		5.0	1.0	ug/L			01/24/14 18:26	5
Benzene	<0.37		2.5	0.37	ug/L			01/24/14 18:26	5
Bromobenzene	<1.3		5.0	1.3	ug/L			01/24/14 18:26	5
Bromochloromethane	<2.0		5.0	2.0	ug/L			01/24/14 18:26	5
Bromodichloromethane	<0.85		5.0	0.85	ug/L			01/24/14 18:26	5
Bromoform	<1.4		5.0	1.4	ug/L			01/24/14 18:26	5
Bromomethane	<1.6		5.0	1.6	ug/L			01/24/14 18:26	5
Carbon tetrachloride	<1.3		5.0	1.3	ug/L			01/24/14 18:26	5
Chlorobenzene	<0.70		5.0	0.70	ug/L			01/24/14 18:26	5
Chloroethane	<1.7		5.0	1.7	ug/L			01/24/14 18:26	5
Chloroform	<1.0		5.0	1.0	ug/L			01/24/14 18:26	5
Chloromethane	<0.90		5.0	0.90	ug/L			01/24/14 18:26	5
cis-1,3-Dichloropropene	<0.90		5.0	0.90	ug/L			01/24/14 18:26	5
Dibromochloromethane	<1.6		5.0	1.6	ug/L			01/24/14 18:26	5
Dibromomethane	<1.7		5.0	1.7	ug/L			01/24/14 18:26	5
Dichlorodifluoromethane	<1.0		5.0	1.0	ug/L			01/24/14 18:26	5
Ethylbenzene	<0.65		2.5	0.65	ug/L			01/24/14 18:26	5
Hexachlorobutadiene	<1.3		5.0	1.3	ug/L			01/24/14 18:26	5
Isopropyl ether	<0.75		5.0	0.75	ug/L			01/24/14 18:26	5
Isopropylbenzene	<0.70		5.0	0.70	ug/L			01/24/14 18:26	5
Methyl tert-butyl ether	<1.2		5.0	1.2	ug/L			01/24/14 18:26	5
Methylene Chloride	<3.4		25	3.4	ug/L			01/24/14 18:26	5
Naphthalene	<0.80		5.0	0.80	ug/L			01/24/14 18:26	5
n-Butylbenzene	<0.65		5.0	0.65	ug/L			01/24/14 18:26	5
N-Propylbenzene	<0.65		5.0	0.65	ug/L			01/24/14 18:26	5
p-Isopropyltoluene	<0.85		5.0	0.85	ug/L			01/24/14 18:26	5
sec-Butylbenzene	<0.75		5.0	0.75	ug/L			01/24/14 18:26	5

TestAmerica Chicago

# Client Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: End Step 3

Lab Sample ID: 500-70505-5

Date Collected: 01/20/14 22:30

Matrix: Water

Date Received: 01/23/14 10:30

### Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	<0.50		5.0	0.50	ug/L			01/24/14 18:26	5
tert-Butylbenzene	<0.70		5.0	0.70	ug/L			01/24/14 18:26	5
Toluene	<0.55		2.5	0.55	ug/L			01/24/14 18:26	5
<b>trans-1,2-Dichloroethene</b>	<b>20</b>		5.0	1.3	ug/L			01/24/14 18:26	5
trans-1,3-Dichloropropene	<1.1		5.0	1.1	ug/L			01/24/14 18:26	5
<b>Trichloroethene</b>	<b>570</b>		2.5	0.95	ug/L			01/24/14 18:26	5
Trichlorofluoromethane	<0.95		5.0	0.95	ug/L			01/24/14 18:26	5
<b>Vinyl chloride</b>	<b>51</b>		2.5	0.50	ug/L			01/24/14 18:26	5
Xylenes, Total	<0.34		5.0	0.34	ug/L			01/24/14 18:26	5
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
1,2-Dichloroethane-d4 (Surr)	102		75 - 125					01/24/14 18:26	5
4-Bromofluorobenzene (Surr)	104		75 - 120					01/24/14 18:26	5
Dibromofluoromethane	95		75 - 120					01/24/14 18:26	5
Toluene-d8 (Surr)	104		75 - 120					01/24/14 18:26	5

### Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>cis-1,2-Dichloroethene</b>	<b>1300</b>		50	6.0	ug/L			01/24/14 18:53	50
<b>Tetrachloroethene</b>	<b>3100</b>		50	8.5	ug/L			01/24/14 18:53	50
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
1,2-Dichloroethane-d4 (Surr)	105		75 - 125					01/24/14 18:53	50
4-Bromofluorobenzene (Surr)	102		75 - 120					01/24/14 18:53	50
Dibromofluoromethane	95		75 - 120					01/24/14 18:53	50
Toluene-d8 (Surr)	103		75 - 120					01/24/14 18:53	50

### Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Iron</b>	<b>35</b>	<b>J B</b>	100	12	ug/L		01/24/14 08:30	01/24/14 15:24	1
<b>Manganese</b>	<b>86</b>		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 15:24	1

### Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Iron</b>	<b>20</b>	<b>J B</b>	100	12	ug/L		01/24/14 08:30	01/24/14 15:27	1
<b>Manganese</b>	<b>79</b>		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 15:27	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>1200</b>		10	5.6	mg/L			01/27/14 22:52	1

TestAmerica Chicago

# Definitions/Glossary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# QC Association Summary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## GC/MS VOA

### Analysis Batch: 220915

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-70505-1	Trip Blank	Total/NA	Water	8260B	
500-70505-2	Pre Step Test	Total/NA	Water	8260B	
500-70505-2 - DL	Pre Step Test	Total/NA	Water	8260B	
500-70505-3	End Step 1	Total/NA	Water	8260B	
500-70505-3 - DL	End Step 1	Total/NA	Water	8260B	
500-70505-4	End Step 2	Total/NA	Water	8260B	
500-70505-4 - DL	End Step 2	Total/NA	Water	8260B	
500-70505-5	End Step 3	Total/NA	Water	8260B	
500-70505-5 - DL	End Step 3	Total/NA	Water	8260B	
LCS 500-220915/4	Lab Control Sample	Total/NA	Water	8260B	
MB 500-220915/6	Method Blank	Total/NA	Water	8260B	

## Metals

### Prep Batch: 220898

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-70505-2	Pre Step Test	Dissolved	Water	3005A	
500-70505-2	Pre Step Test	Total Recoverable	Water	3005A	
500-70505-3	End Step 1	Dissolved	Water	3005A	
500-70505-3	End Step 1	Total Recoverable	Water	3005A	
500-70505-4	End Step 2	Dissolved	Water	3005A	
500-70505-4	End Step 2	Total Recoverable	Water	3005A	
500-70505-5	End Step 3	Dissolved	Water	3005A	
500-70505-5	End Step 3	Total Recoverable	Water	3005A	
LCS 500-220898/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 500-220898/1-A	Method Blank	Total Recoverable	Water	3005A	

### Analysis Batch: 221057

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-70505-2	Pre Step Test	Dissolved	Water	6020	220898
500-70505-2	Pre Step Test	Total Recoverable	Water	6020	220898
500-70505-3	End Step 1	Dissolved	Water	6020	220898
500-70505-3	End Step 1	Total Recoverable	Water	6020	220898
500-70505-4	End Step 2	Dissolved	Water	6020	220898
500-70505-4	End Step 2	Total Recoverable	Water	6020	220898
500-70505-5	End Step 3	Dissolved	Water	6020	220898
500-70505-5	End Step 3	Total Recoverable	Water	6020	220898
LCS 500-220898/2-A	Lab Control Sample	Total Recoverable	Water	6020	220898
MB 500-220898/1-A	Method Blank	Total Recoverable	Water	6020	220898

## General Chemistry

### Analysis Batch: 221149

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-70505-3	End Step 1	Total/NA	Water	SM 2540C	
500-70505-4	End Step 2	Total/NA	Water	SM 2540C	
500-70505-5	End Step 3	Total/NA	Water	SM 2540C	
LCS 500-221149/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 500-221149/1	Method Blank	Total/NA	Water	SM 2540C	

TestAmerica Chicago

# Surrogate Summary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	12DCE	BFB	DBFM	TOL
		(75-125)	(75-120)	(75-120)	(75-120)
500-70505-1	Trip Blank	102	100	93	104
500-70505-2	Pre Step Test	100	102	95	104
500-70505-2 - DL	Pre Step Test	102	103	96	102
500-70505-3	End Step 1	102	102	95	105
500-70505-3 - DL	End Step 1	104	101	96	101
500-70505-4	End Step 2	102	105	94	103
500-70505-4 - DL	End Step 2	106	104	98	101
500-70505-5	End Step 3	102	104	95	104
500-70505-5 - DL	End Step 3	105	102	95	103
LCS 500-220915/4	Lab Control Sample	101	104	98	106
MB 500-220915/6	Method Blank	105	102	96	104

### Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane

TOL = Toluene-d8 (Surr)

# QC Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 500-220915/6**

**Matrix: Water**

**Analysis Batch: 220915**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<0.25		1.0	0.25	ug/L			01/24/14 13:53	1
1,1,1-Trichloroethane	<0.20		1.0	0.20	ug/L			01/24/14 13:53	1
1,1,2,2-Tetrachloroethane	<0.23		1.0	0.23	ug/L			01/24/14 13:53	1
1,1,2-Trichloroethane	<0.28		1.0	0.28	ug/L			01/24/14 13:53	1
1,1-Dichloroethane	<0.19		1.0	0.19	ug/L			01/24/14 13:53	1
1,1-Dichloroethene	<0.31		1.0	0.31	ug/L			01/24/14 13:53	1
1,1-Dichloropropene	<0.34		1.0	0.34	ug/L			01/24/14 13:53	1
1,2,3-Trichlorobenzene	<0.24		1.0	0.24	ug/L			01/24/14 13:53	1
1,2,3-Trichloropropane	<0.45		1.0	0.45	ug/L			01/24/14 13:53	1
1,2,4-Trichlorobenzene	<0.31		1.0	0.31	ug/L			01/24/14 13:53	1
1,2,4-Trimethylbenzene	<0.14		1.0	0.14	ug/L			01/24/14 13:53	1
1,2-Dibromo-3-Chloropropane	<0.87		2.0	0.87	ug/L			01/24/14 13:53	1
1,2-Dibromoethane	<0.36		1.0	0.36	ug/L			01/24/14 13:53	1
1,2-Dichlorobenzene	<0.27		1.0	0.27	ug/L			01/24/14 13:53	1
1,2-Dichloroethane	<0.28		1.0	0.28	ug/L			01/24/14 13:53	1
1,2-Dichloropropane	<0.20		1.0	0.20	ug/L			01/24/14 13:53	1
1,3,5-Trimethylbenzene	<0.18		1.0	0.18	ug/L			01/24/14 13:53	1
1,3-Dichlorobenzene	<0.15		1.0	0.15	ug/L			01/24/14 13:53	1
1,3-Dichloropropane	<0.13		1.0	0.13	ug/L			01/24/14 13:53	1
1,4-Dichlorobenzene	<0.15		1.0	0.15	ug/L			01/24/14 13:53	1
2,2-Dichloropropane	<0.32		1.0	0.32	ug/L			01/24/14 13:53	1
2-Chlorotoluene	<0.21		1.0	0.21	ug/L			01/24/14 13:53	1
4-Chlorotoluene	<0.20		1.0	0.20	ug/L			01/24/14 13:53	1
Benzene	<0.074		0.50	0.074	ug/L			01/24/14 13:53	1
Bromobenzene	<0.25		1.0	0.25	ug/L			01/24/14 13:53	1
Bromochloromethane	<0.40		1.0	0.40	ug/L			01/24/14 13:53	1
Bromodichloromethane	<0.17		1.0	0.17	ug/L			01/24/14 13:53	1
Bromoform	<0.28		1.0	0.28	ug/L			01/24/14 13:53	1
Bromomethane	<0.31		1.0	0.31	ug/L			01/24/14 13:53	1
Carbon tetrachloride	<0.26		1.0	0.26	ug/L			01/24/14 13:53	1
Chlorobenzene	<0.14		1.0	0.14	ug/L			01/24/14 13:53	1
Chloroethane	<0.34		1.0	0.34	ug/L			01/24/14 13:53	1
Chloroform	<0.20		1.0	0.20	ug/L			01/24/14 13:53	1
Chloromethane	<0.18		1.0	0.18	ug/L			01/24/14 13:53	1
cis-1,2-Dichloroethene	<0.12		1.0	0.12	ug/L			01/24/14 13:53	1
cis-1,3-Dichloropropene	<0.18		1.0	0.18	ug/L			01/24/14 13:53	1
Dibromochloromethane	<0.32		1.0	0.32	ug/L			01/24/14 13:53	1
Dibromomethane	<0.33		1.0	0.33	ug/L			01/24/14 13:53	1
Dichlorodifluoromethane	<0.20		1.0	0.20	ug/L			01/24/14 13:53	1
Ethylbenzene	<0.13		0.50	0.13	ug/L			01/24/14 13:53	1
Hexachlorobutadiene	<0.26		1.0	0.26	ug/L			01/24/14 13:53	1
Isopropyl ether	<0.15		1.0	0.15	ug/L			01/24/14 13:53	1
Isopropylbenzene	<0.14		1.0	0.14	ug/L			01/24/14 13:53	1
Methyl tert-butyl ether	<0.24		1.0	0.24	ug/L			01/24/14 13:53	1
Methylene Chloride	<0.68		5.0	0.68	ug/L			01/24/14 13:53	1
Naphthalene	<0.16		1.0	0.16	ug/L			01/24/14 13:53	1
n-Butylbenzene	<0.13		1.0	0.13	ug/L			01/24/14 13:53	1
N-Propylbenzene	<0.13		1.0	0.13	ug/L			01/24/14 13:53	1

TestAmerica Chicago

# QC Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 500-220915/6**

**Matrix: Water**

**Analysis Batch: 220915**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
p-Isopropyltoluene	<0.17		1.0	0.17	ug/L			01/24/14 13:53	1
sec-Butylbenzene	<0.15		1.0	0.15	ug/L			01/24/14 13:53	1
Styrene	<0.10		1.0	0.10	ug/L			01/24/14 13:53	1
tert-Butylbenzene	<0.14		1.0	0.14	ug/L			01/24/14 13:53	1
Tetrachloroethene	<0.17		1.0	0.17	ug/L			01/24/14 13:53	1
Toluene	<0.11		0.50	0.11	ug/L			01/24/14 13:53	1
trans-1,2-Dichloroethene	<0.25		1.0	0.25	ug/L			01/24/14 13:53	1
trans-1,3-Dichloropropene	<0.21		1.0	0.21	ug/L			01/24/14 13:53	1
Trichloroethene	<0.19		0.50	0.19	ug/L			01/24/14 13:53	1
Trichlorofluoromethane	<0.19		1.0	0.19	ug/L			01/24/14 13:53	1
Vinyl chloride	<0.10		0.50	0.10	ug/L			01/24/14 13:53	1
Xylenes, Total	<0.068		1.0	0.068	ug/L			01/24/14 13:53	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	105		75 - 125		01/24/14 13:53	1
4-Bromofluorobenzene (Surr)	102		75 - 120		01/24/14 13:53	1
Dibromofluoromethane	96		75 - 120		01/24/14 13:53	1
Toluene-d8 (Surr)	104		75 - 120		01/24/14 13:53	1

**Lab Sample ID: LCS 500-220915/4**

**Matrix: Water**

**Analysis Batch: 220915**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
1,1,1,2-Tetrachloroethane	50.0	56.3		ug/L		113	75 - 120
1,1,1-Trichloroethane	50.0	51.4		ug/L		103	70 - 123
1,1,1,2,2-Tetrachloroethane	50.0	58.5		ug/L		117	70 - 128
1,1,2-Trichloroethane	50.0	52.4		ug/L		105	69 - 120
1,1-Dichloroethane	50.0	50.0		ug/L		100	68 - 121
1,1-Dichloroethene	50.0	49.1		ug/L		98	58 - 122
1,1-Dichloropropene	50.0	51.7		ug/L		103	70 - 120
1,2,3-Trichlorobenzene	50.0	46.8		ug/L		94	56 - 137
1,2,3-Trichloropropane	50.0	54.2		ug/L		108	70 - 120
1,2,4-Trichlorobenzene	50.0	48.3		ug/L		97	65 - 121
1,2,4-Trimethylbenzene	50.0	53.6		ug/L		107	75 - 121
1,2-Dibromo-3-Chloropropane	50.0	54.8		ug/L		110	60 - 121
1,2-Dibromoethane	50.0	51.6		ug/L		103	70 - 120
1,2-Dichlorobenzene	50.0	51.9		ug/L		104	75 - 120
1,2-Dichloroethane	50.0	50.8		ug/L		102	69 - 120
1,2-Dichloropropane	50.0	50.1		ug/L		100	70 - 120
1,3,5-Trimethylbenzene	50.0	54.3		ug/L		109	75 - 123
1,3-Dichlorobenzene	50.0	51.7		ug/L		103	70 - 120
1,3-Dichloropropane	50.0	53.1		ug/L		106	70 - 120
1,4-Dichlorobenzene	50.0	50.2		ug/L		100	75 - 120
2,2-Dichloropropane	50.0	52.2		ug/L		104	67 - 125
2-Chlorotoluene	50.0	53.6		ug/L		107	70 - 120
4-Chlorotoluene	50.0	53.2		ug/L		106	70 - 120
Benzene	50.0	48.6		ug/L		97	70 - 120

TestAmerica Chicago

# QC Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 500-220915/4**

**Matrix: Water**

**Analysis Batch: 220915**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromobenzene	50.0	52.6		ug/L		105	70 - 120
Bromochloromethane	50.0	49.0		ug/L		98	67 - 122
Bromodichloromethane	50.0	54.8		ug/L		110	70 - 120
Bromoform	50.0	49.1		ug/L		98	70 - 125
Bromomethane	50.0	49.2		ug/L		98	50 - 150
Carbon tetrachloride	50.0	50.7		ug/L		101	70 - 125
Chlorobenzene	50.0	51.2		ug/L		102	70 - 120
Chloroethane	50.0	48.1		ug/L		96	50 - 150
Chloroform	50.0	50.6		ug/L		101	70 - 120
Chloromethane	50.0	48.0		ug/L		96	50 - 134
cis-1,2-Dichloroethene	50.0	48.6		ug/L		97	70 - 120
cis-1,3-Dichloropropene	50.0	56.2		ug/L		112	70 - 120
Dibromochloromethane	50.0	58.2		ug/L		116	70 - 120
Dibromomethane	50.0	50.8		ug/L		102	70 - 120
Dichlorodifluoromethane	50.0	47.4		ug/L		95	40 - 140
Ethylbenzene	50.0	53.0		ug/L		106	75 - 120
Hexachlorobutadiene	50.0	48.4		ug/L		97	65 - 135
Isopropylbenzene	50.0	54.9		ug/L		110	70 - 120
Methyl tert-butyl ether	50.0	49.1		ug/L		98	58 - 122
Methylene Chloride	50.0	41.7		ug/L		83	65 - 125
Naphthalene	50.0	47.8		ug/L		96	55 - 132
n-Butylbenzene	50.0	53.6		ug/L		107	75 - 120
N-Propylbenzene	50.0	53.7		ug/L		107	70 - 120
p-Isopropyltoluene	50.0	53.6		ug/L		107	70 - 120
sec-Butylbenzene	50.0	53.6		ug/L		107	70 - 120
Styrene	50.0	52.9		ug/L		106	75 - 120
tert-Butylbenzene	50.0	54.2		ug/L		108	70 - 120
Tetrachloroethene	50.0	51.2		ug/L		102	70 - 123
Toluene	50.0	53.4		ug/L		107	70 - 120
trans-1,2-Dichloroethene	50.0	49.3		ug/L		99	70 - 124
trans-1,3-Dichloropropene	50.0	57.5		ug/L		115	70 - 120
Trichloroethene	50.0	49.9		ug/L		100	70 - 120
Trichlorofluoromethane	50.0	49.4		ug/L		99	63 - 134
Vinyl chloride	50.0	48.1		ug/L		96	62 - 138
Xylenes, Total	100	106		ug/L		106	70 - 120

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	101		75 - 125
4-Bromofluorobenzene (Surr)	104		75 - 120
Dibromofluoromethane	98		75 - 120
Toluene-d8 (Surr)	106		75 - 120

# QC Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 500-220898/1-A  
 Matrix: Water  
 Analysis Batch: 221057

Client Sample ID: Method Blank  
 Prep Type: Total Recoverable  
 Prep Batch: 220898

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	14.5	J	100	12	ug/L		01/24/14 08:30	01/24/14 14:55	1
Manganese	<0.76		2.5	0.76	ug/L		01/24/14 08:30	01/24/14 14:55	1

Lab Sample ID: LCS 500-220898/2-A  
 Matrix: Water  
 Analysis Batch: 221057

Client Sample ID: Lab Control Sample  
 Prep Type: Total Recoverable  
 Prep Batch: 220898

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	1000	1030		ug/L		103	80 - 120
Manganese	500	493		ug/L		99	80 - 120

## Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 500-221149/1  
 Matrix: Water  
 Analysis Batch: 221149

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<5.6		10	5.6	mg/L			01/27/14 22:01	1

Lab Sample ID: LCS 500-221149/2  
 Matrix: Water  
 Analysis Batch: 221149

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	250	258		mg/L		103	80 - 120

# Lab Chronicle

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: Trip Blank

Date Collected: 01/20/14 00:00

Date Received: 01/23/14 10:30

Lab Sample ID: 500-70505-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	220915	01/24/14 14:48	JLH	TAL CHI

## Client Sample ID: Pre Step Test

Date Collected: 01/20/14 12:25

Date Received: 01/23/14 10:30

Lab Sample ID: 500-70505-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		2	220915	01/24/14 15:42	JLH	TAL CHI
Total/NA	Analysis	8260B	DL	20	220915	01/24/14 16:10	JLH	TAL CHI
Total Recoverable	Prep	3005A			220898	01/24/14 08:30	LA1	TAL CHI
Total Recoverable	Analysis	6020		1	221057	01/24/14 15:02	BJH	TAL CHI
Dissolved	Prep	3005A			220898	01/24/14 08:30	LA1	TAL CHI
Dissolved	Analysis	6020		1	221057	01/24/14 15:06	BJH	TAL CHI

## Client Sample ID: End Step 1

Date Collected: 01/20/14 16:45

Date Received: 01/23/14 10:30

Lab Sample ID: 500-70505-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		2	220915	01/24/14 16:37	JLH	TAL CHI
Total/NA	Analysis	8260B	DL	20	220915	01/24/14 17:04	JLH	TAL CHI
Total Recoverable	Prep	3005A			220898	01/24/14 08:30	LA1	TAL CHI
Total Recoverable	Analysis	6020		1	221057	01/24/14 15:10	BJH	TAL CHI
Dissolved	Prep	3005A			220898	01/24/14 08:30	LA1	TAL CHI
Dissolved	Analysis	6020		1	221057	01/24/14 15:14	BJH	TAL CHI
Total/NA	Analysis	SM 2540C		1	221149	01/27/14 22:48	CLB	TAL CHI

## Client Sample ID: End Step 2

Date Collected: 01/20/14 19:45

Date Received: 01/23/14 10:30

Lab Sample ID: 500-70505-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	220915	01/24/14 17:31	JLH	TAL CHI
Total/NA	Analysis	8260B	DL	50	220915	01/24/14 17:59	JLH	TAL CHI
Total Recoverable	Prep	3005A			220898	01/24/14 08:30	LA1	TAL CHI
Total Recoverable	Analysis	6020		1	221057	01/24/14 15:17	BJH	TAL CHI
Dissolved	Prep	3005A			220898	01/24/14 08:30	LA1	TAL CHI
Dissolved	Analysis	6020		1	221057	01/24/14 15:21	BJH	TAL CHI
Total/NA	Analysis	SM 2540C		1	221149	01/27/14 22:50	CLB	TAL CHI

# Lab Chronicle

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Client Sample ID: End Step 3

Lab Sample ID: 500-70505-5

Date Collected: 01/20/14 22:30

Matrix: Water

Date Received: 01/23/14 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	220915	01/24/14 18:26	JLH	TAL CHI
Total/NA	Analysis	8260B	DL	50	220915	01/24/14 18:53	JLH	TAL CHI
Total Recoverable	Prep	3005A			220898	01/24/14 08:30	LA1	TAL CHI
Total Recoverable	Analysis	6020		1	221057	01/24/14 15:24	BJH	TAL CHI
Dissolved	Prep	3005A			220898	01/24/14 08:30	LA1	TAL CHI
Dissolved	Analysis	6020		1	221057	01/24/14 15:27	BJH	TAL CHI
Total/NA	Analysis	SM 2540C		1	221149	01/27/14 22:52	CLB	TAL CHI

### Laboratory References:

TAL CHI = TestAmerica Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

# Certification Summary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp - WI001368.0011

TestAmerica Job ID: 500-70505-1

## Laboratory: TestAmerica Chicago

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alabama	State Program	4	40461	04-30-14
California	NELAP	9	01132CA	04-30-14
Georgia	State Program	4	N/A	04-30-14
Hawaii	State Program	9	N/A	04-30-14
Illinois	NELAP	5	100201	04-30-14
Indiana	State Program	5	C-IL-02	04-30-14
Iowa	State Program	7	82	05-01-14
Kansas	NELAP	7	E-10161	10-31-14
Kentucky (UST)	State Program	4	66	04-30-14
Louisiana	NELAP	6	30720	06-30-14
Massachusetts	State Program	1	M-IL035	06-30-14
Mississippi	State Program	4	N/A	04-30-14
North Carolina DENR	State Program	4	291	12-31-14
North Dakota	State Program	8	R-194	04-30-14
Oklahoma	State Program	6	8908	08-31-14
South Carolina	State Program	4	77001	04-30-14
Texas	NELAP	6	T104704252-09-TX	02-28-14
USDA	Federal		P330-12-00038	02-06-15
Wisconsin	State Program	5	999580010	08-31-14
Wyoming	State Program	8	8TMS-Q	04-30-14



ID#:

# CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

500-70505

500-70505 COC

Send Results to:	Name: <u>Joni Schoen Arcadis</u>	Telephone: <u>414.276.7742</u>	Preservative: <u>B C C E</u>							<b>Keys</b> <b>Preservation Key:</b> A. H <sub>2</sub> SO <sub>4</sub> B. HCL C. HNO <sub>3</sub> D. NaOH E. None F. Other: _____ G. Other: _____ H. Other: _____ <b>Matrix Key:</b> SO - Soil W - Water T - Tissue SE - Sediment SL - Sludge A - Air NL - NAPL/Oil SW - Sample Wipe Other: _____	
	Address: <u>126 N Jefferson St #400</u>	Fax: <u>414.276.7603</u>	# of Containers: <u>3</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>				
	City: <u>Milwaukee</u> State: <u>WI</u> Zip: <u>53202</u>	E-mail Address: <u>joni.schoen@arcadis-us.com</u>	Container Information: <u>1 3 3 9</u>								
	Project Name/Location (City, State): <u>MPL (Madison, WI)</u>	Project #: <u>W10130810011</u>	<b>PARAMETER ANALYSIS &amp; METHOD</b>								
Sampler's Printed Name: <u>Nicole Duedel</u>	Sampler's Signature: <u>[Signature]</u>									<b>REMARKS</b>	
Sample ID	Collection		Type (✓)		Matrix	VOCs	Total Fe, Mn	Dissolved Fe, Mn	TDS		
1	-	-	-	-	W	1	-	-	-		
2	1/24/14	1225	✓	-	W	3	1	1	-		
3	1/20/14	1645	✓	-	W	3	1	1	1		
4	1/20/14	1945	✓	-	W	3	1	1	2		
5	1/20/14	2230	✓	-	W	3	1	1	1		

Special Instructions/Comments:

 Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: <u>Test America</u>	Cooler Custody Seal (✓)	Printed Name: <u>Nicole Duedel</u>	Printed Name: <u>JEFF LUNT</u>	Printed Name:	Printed Name:
<input checked="" type="checkbox"/> Cooler packed with ice (✓)	<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Signature: <u>[Signature]</u>	Signature: <u>[Signature]</u>	Signature:	Signature:
Specify Turnaround Requirements: <u>Standard</u>	Sample Receipt:	Firm: <u>ARCADIS</u>	Firm/Courier: <u>TA</u>	Firm/Courier:	Firm:
Shipping Tracking #: <u>804259121267</u>	Condition/Cooler Temp: <u>1.9</u>	Date/Time: <u>1/22/2014 14:20</u>	Date/Time: <u>1/23/14 1030</u>	Date/Time:	Date/Time:

## Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 500-70505-1

**Login Number: 70505**

**List Number: 1**

**Creator: Lunt, Jeff T**

**List Source: TestAmerica Chicago**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	1.9
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



**NORTHERN LAKE SERVICE, INC.**  
 Analytical Laboratory and Environmental Services  
 400 North Lake Avenue - Crandon, WI 54520  
 Ph: (715)-478-2777 Fax: (715)-478-3060

# ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460  
 WDATCP Laboratory Certification No. 105-330  
 EPA Laboratory ID No. WI00034

Printed: 01/30/14 Code: NNNN-S Page 1 of 1

**Client:** ARCADIS Inc (Milw)  
 Attn: Toni Schoen  
 126 North Jefferson Street #400  
 Milwaukee, WI 53202 6120

**NLS Project:** 212182

**NLS Customer:** 12668

**Fax:** 414 276 7603 **Phone:** 414 276 7742

**Project:** Madison-Kipp W601368

End Step 2 (Filtered) NLS ID: 767520

Matrix: WW

Collected: 01/20/14 19:45 Received: 01/23/14

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
PCBs (water) by EPA 8082	see attached					01/28/14	SW846 8082	721026460
Organics Extraction (Water) for Organochlorine Pesticides/PCBs	yes					01/27/14	SW846 3510C	721026460

End Step 2 (Unfiltered) NLS ID: 767521

Matrix: WW

Collected: 01/20/14 19:45 Received: 01/23/14

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
PCBs (water) by EPA 8082	see attached					01/28/14	SW846 8082	721026460
Organics Extraction (Water) for Organochlorine Pesticides/PCBs	yes					01/27/14	SW846 3510C	721026460

Values in brackets represent results greater than or equal to the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than or equal to the LOQ are considered to be in the region of "Certain Quantitation". LOD and/or LOQ tagged with an asterisk(\*) are considered Reporting Limits. All LOD/LOQs adjusted to reflect dilution.

LOD = Limit of Detection      LOQ = Limit of Quantitation      ND = Not Detected (< LOD)      1000 ug/L = 1 mg/L  
 DWB = Dry Weight Basis      NA = Not Applicable      %DWB = (mg/kg DWB) / 10000  
 MCL = Maximum Contaminant Levels for Drinking Water Samples. Shaded results indicate >MCL.

Reviewed by:



Authorized by:  
 R. T. Krueger  
 President

**ANALYTICAL RESULTS: PCBs by Method EPA 8082**

Customer: ARCADIS Inc (Milw) NLS Project: 212182

Project Description: Madison-Kipp

Project Title: W601368

Template: PCBW Printed: 01/30/2014 17:01

Sample: 767520 End Step 2 (Filtered) Collected: 01/20/14 Analyzed: 01/28/14 - Analytes: 7

Notes: AD

ANALYTE NAME	RESULT	UNITS	DIL	LOD	LOQ	Note
PCB-1016	ND	ug/L	1	0.023	0.077	
PCB-1221	ND	ug/L	1	0.060	0.20	
PCB-1232	ND	ug/L	1	0.037	0.12	
PCB-1242	ND	ug/L	1	0.040	0.13	
PCB-1248	ND	ug/L	1	0.045	0.15	
PCB-1254	ND	ug/L	1	0.026	0.086	
PCB-1260	ND	ug/L	1	0.034	0.11	
TCMX (SURR)	73%					S

**NOTES APPLICABLE TO THIS ANALYSIS:**

S = This compound is a surrogate used to evaluate the quality control of a method.

AD = Additional non-target compounds were detected.

Sample: 767521 End Step 2 (Unfiltered) Collected: 01/20/14 Analyzed: 01/28/14 - Analytes: 7

Notes: AD

ANALYTE NAME	RESULT	UNITS	DIL	LOD	LOQ	Note
PCB-1016	ND	ug/L	1	0.023	0.077	
PCB-1221	ND	ug/L	1	0.060	0.20	
PCB-1232	ND	ug/L	1	0.037	0.12	
PCB-1242	ND	ug/L	1	0.040	0.13	
PCB-1248	ND	ug/L	1	0.045	0.15	
PCB-1254	ND	ug/L	1	0.026	0.086	
PCB-1260	ND	ug/L	1	0.034	0.11	
TCMX (SURR)	67%					S

**NOTES APPLICABLE TO THIS ANALYSIS:**

S = This compound is a surrogate used to evaluate the quality control of a method.

AD = Additional non-target compounds were detected.



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Chicago

2417 Bond Street

University Park, IL 60484

Tel: (708)534-5200

TestAmerica Job ID: 500-71522-1

Client Project/Site: MadisonKipp WI001368.0011.00002

Revision: 1

For:

ARCADIS U.S., Inc.

126 North Jefferson Street

Suite 400

Milwaukee, Wisconsin 53202

Attn: Ms. Toni Schoen



Authorized for release by:

2/18/2014 6:47:10 PM

Sandie Fredrick, Project Manager II

(920)261-1660

[sandie.fredrick@testamericainc.com](mailto:sandie.fredrick@testamericainc.com)

### LINKS

Review your project  
results through

Total Access

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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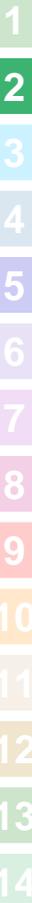
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# Case Narrative

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

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**Job ID: 500-71522-1**

---

**Laboratory: TestAmerica Chicago**

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**Narrative**

**Job Narrative**  
**500-71522-1**

**Comments**

No additional comments.

**Receipt**

The sample was received on 2/13/2014 10:35 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8° C.

Except: Sample ID updated to GWE-1 per client.

**Metals**

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

**General Chemistry**

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



# Detection Summary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

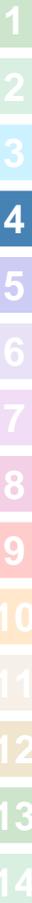
**Client Sample ID: GWE-1**

**Lab Sample ID: 500-71522-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Hardness as calcium carbonate	760		1.3	0.66	mg/L	1		SM 2340B	Total
Alkalinity	470	B	5.0	1.1	mg/L	1		SM 2320B	Recoverable Total/NA
Total Suspended Solids	1.5	J	2.5	0.70	mg/L	1		SM 2540D	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Chicago



# Method Summary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

Method	Method Description	Protocol	Laboratory
SM 2340B	Total Hardness (as CaCO3) by calculation	SM	TAL CHI
SM 2320B	Alkalinity	SM	TAL CHI
SM 2540D	Solids, Total Suspended (TSS)	SM	TAL CHI

**Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

**Laboratory References:**

TAL CHI = TestAmerica Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

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# Sample Summary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

---

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-71522-1	GWE-1	Water	02/12/14 11:45	02/13/14 10:35

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# Client Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

**Client Sample ID: GWE-1**

**Lab Sample ID: 500-71522-1**

Date Collected: 02/12/14 11:45

Matrix: Water

Date Received: 02/13/14 10:35

**Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	760		1.3	0.66	mg/L		02/17/14 08:00	02/18/14 10:08	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	470	B	5.0	1.1	mg/L			02/14/14 09:59	1
Total Suspended Solids	1.5	J	2.5	0.70	mg/L			02/14/14 09:39	1

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# Definitions/Glossary

Client: ARCADIS U.S., Inc.  
Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

## Qualifiers

### General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
♠	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# QC Association Summary

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

## Metals

### Prep Batch: 223548

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-71522-1	GWE-1	Total Recoverable	Water	3005A	

### Analysis Batch: 223680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-71522-1	GWE-1	Total Recoverable	Water	SM 2340B	223548

## General Chemistry

### Analysis Batch: 223284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-71522-1	GWE-1	Total/NA	Water	SM 2540D	
LCS 500-223284/2	Lab Control Sample	Total/NA	Water	SM 2540D	
MB 500-223284/1	Method Blank	Total/NA	Water	SM 2540D	

### Analysis Batch: 223380

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-71522-1	GWE-1	Total/NA	Water	SM 2320B	
LCS 500-223380/27	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 500-223380/2	Method Blank	Total/NA	Water	SM 2320B	

# QC Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

## Method: SM 2320B - Alkalinity

Lab Sample ID: MB 500-223380/2  
 Matrix: Water  
 Analysis Batch: 223380

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	4.51	J	5.0	1.1	mg/L			02/14/14 09:38	1

Lab Sample ID: LCS 500-223380/27  
 Matrix: Water  
 Analysis Batch: 223380

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	100	94.8		mg/L		95	80 - 120

## Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 500-223284/1  
 Matrix: Water  
 Analysis Batch: 223284

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<0.70		2.5	0.70	mg/L			02/14/14 09:30	1

Lab Sample ID: LCS 500-223284/2  
 Matrix: Water  
 Analysis Batch: 223284

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	200	203		mg/L		101	80 - 120

# Lab Chronicle

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

**Client Sample ID: GWE-1**

**Lab Sample ID: 500-71522-1**

**Date Collected: 02/12/14 11:45**

**Matrix: Water**

**Date Received: 02/13/14 10:35**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			223548	02/17/14 08:00	LA1	TAL CHI
Total Recoverable	Analysis	SM 2340B		1	223680	02/18/14 10:08	BJH	TAL CHI
Total/NA	Analysis	SM 2540D		1	223284	(Start) 02/14/14 09:39 (End) 02/14/14 09:41	BAH	TAL CHI
Total/NA	Analysis	SM 2320B		1	223380	02/14/14 09:59	JLE	TAL CHI

**Laboratory References:**

TAL CHI = TestAmerica Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200



# Certification Summary

Client: ARCADIS U.S., Inc.  
 Project/Site: MadisonKipp WI001368.0011.00002

TestAmerica Job ID: 500-71522-1

## Laboratory: TestAmerica Chicago

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alabama	State Program	4	40461	04-30-14
California	NELAP	9	01132CA	04-30-14 *
Georgia	State Program	4	N/A	04-30-14
Hawaii	State Program	9	N/A	04-30-14
Illinois	NELAP	5	100201	04-30-14
Indiana	State Program	5	C-IL-02	04-30-14 *
Iowa	State Program	7	82	05-01-14 *
Kansas	NELAP	7	E-10161	10-31-14
Kentucky (UST)	State Program	4	66	04-30-14
Louisiana	NELAP	6	30720	06-30-14
Massachusetts	State Program	1	M-IL035	06-30-14
Mississippi	State Program	4	N/A	04-30-14
North Carolina DENR	State Program	4	291	12-31-14
North Dakota	State Program	8	R-194	04-30-14
Oklahoma	State Program	6	8908	08-31-14
South Carolina	State Program	4	77001	04-30-14
Texas	NELAP	6	T104704252-09-TX	02-28-14
USDA	Federal		P330-12-00038	02-06-15
Wisconsin	State Program	5	999580010	08-31-14
Wyoming	State Program	8	8TMS-Q	04-30-14

\* Expired certification is currently pending renewal and is considered valid.





## Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 500-71522-1

**Login Number: 71522**

**List Source: TestAmerica Chicago**

**List Number: 1**

**Creator: Kelsey, Shawn M**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.8c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	





## **Appendix C**

GETS Equipment Documentation

QED Air Stripper Model ver. 2.0	3/7/2014
---------------------------------	----------

<b>Site Data</b>
------------------

Name: Vi vi an Yates

e-mail: vi vi an. yates@arcadi s-  
us. com

Project: Madi son-Ki pp Ai r Strip per

Uni ts: Engl ish

Al ti tude: 400 ft

Ai r Temp: 48 F

Flow: 45 gpm

Water Temp: 48 F

Stripper: EZ-Tray 4. x - [Click for details](#)

Stripper Ai r Flow: 210 cfm

Stripper Max Flow: 50 gpm

<b>Water Results</b>
----------------------

Contami nant	Infl uent (ppb)	Target (ppb)	4-Tray Resul ts (ppb)	4-Tray % Removal	6-Tray Resul ts (ppb)	6-Tray % Removal
tri chl oroethyl ene (TCE)	570	0	5. 3	99. 070	< 1	100. 000
tetrachl oroethyl ene (PERC, PCE)	3100	0	5. 8	99. 813	< 1	100. 000
c-1, 2-di chl oroethyl ene	1300	0	30. 0	97. 692	5. 0	99. 615
vi nyl chl ori de (chl oroethyl ene)	51	0	< 1	100. 000	< 1	100. 000
t-1, 2-di chl oroethyl ene	20	0	< 1	100. 000	< 1	100. 000

<b>Air Results</b>
--------------------

Contami nant	4-Tray (ppmV)	4-Tray (lb/hr)	6-Tray (ppmV)	6-Tray (lb/hr)
tri chl oroethyl ene (TCE)	2. 8494	0. 01272	2. 8733	0. 01283
tetrachl oroethyl ene (PERC, PCE)	12. 3694	0. 06972	12. 3915	0. 06984
c-1, 2-di chl oroethyl ene	8. 6848	0. 02862	8. 8553	0. 02918
vi nyl chl ori de (chl oroethyl ene)	0. 5400	0. 00115	0. 5409	0. 00115
t-1, 2-di chl oroethyl ene	0. 1331	0. 00044	0. 1361	0. 00045

<b>Notes</b>
--------------

Copyright -- QED Treatment Equipment, PO Box 3726, Ann Arbor, MI 48106.

PH-> 1-800-624-2026 or 1-734-995-2547, FX-> 1-734-995-1170. E-mail -  
>[info@qedenv.com](mailto:info@qedenv.com). WEB->[www.qedenv.com](http://www.qedenv.com).

The QED modeler estimates unit performance for the listed contaminants. **Results assume -**

1. Contaminants are in the dissolved-phase, within a water matrix
2. Stripper Influent air is contaminant-free
3. Influent liquid does not have surfactants, oil, grease, other immiscible phase(s) or other Henry's constant altering additions present, such as dissolved phase polar organic contaminants
4. The air stripper is operated within the given parameters listed above and as instructed in the E-Z Tray O&M manual

Stripper performance shall meet or exceed either the required effluent concentration(s) or effluent estimates, whichever is greater, for the conditions supplied and assumes the influent concentrations of each contaminant are less than 25% solubility in water. QED makes no claim of the model's accuracy beyond

*the 25% solubility in water limit.*

## Contact Us

*Fill out your contact and project information and click Send to have a QED Treatment application specialist contact you.*

Name -   
Company -   
Phone -  Fax -   
e-mail -  Project -

Application Notes

## Save Data

*Use the following URL to reconstruct your data form for future remodeling with changes. This URL can be saved in any text file for record keeping and later retrieval. This run's URL:*

`http://64.9.197.49/cgi-bin/remodel.pl?u=e&tw=48&ta=48&f=45&a=400&s=4.x&n=Viviana&e=vivian.yates@arcadis-us.com&p=Madison&c=189,570;182,3100;81,1300;195,51;178,20;`



1 Willow Avenue  
Oakdale, PA 15071  
p. 724-703-3020  
f. 724-703-3026

### Report Basis

Flow Rate	210 CFM
Temperature	80 °F
Relative Humidity	50 %
Adsorption Pressure	1 ATM

### Component

### Inlet Concentration

trichloroethylene	0.013 LBS/hour
perchloroethylene	0.070 LBS/hour
cisdichloroethylene	0.029 LBS/hour
transdichloroethylene	0.000 LBS/hour

Report: 21.56 lbs. activated carbon per day saturated at conditions

Average Loading at Saturation 12.498 lbs./100 lbs. Carbon

**Note:** Contact TIGG Corporation if comments are needed on preferential adsorption of contaminants above.

PROPRIETARY AND CONFIDENTIAL

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## Run 1

### Report Basis

Flow Rate	210 CFM
Temperature	80 °F
Relative Humidity	50 %
Adsorption Pressure	1 ATM

### Component

### Inlet Concentration

trichloroethylene	0.013 LBS/hour
perchloroethylene	0.070 LBS/hour
cisdichloroethylene	0.029 LBS/hour

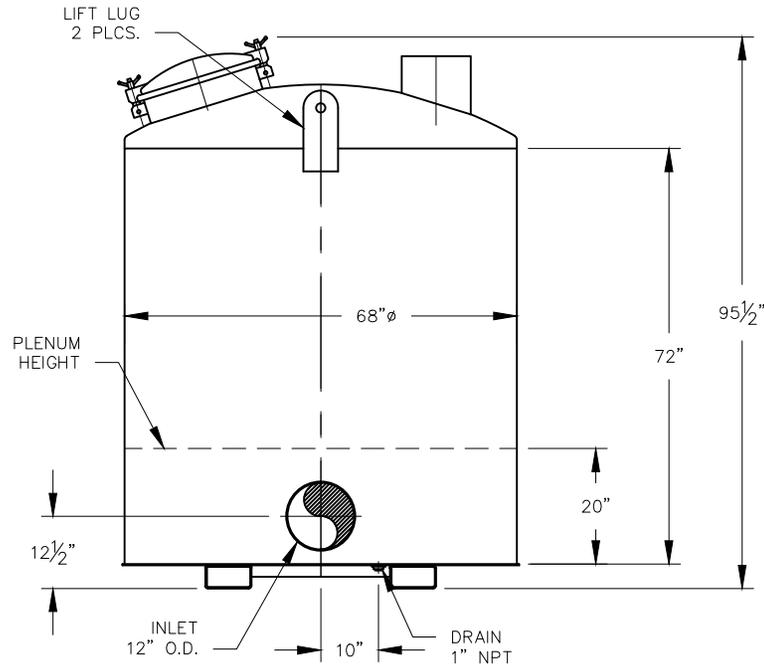
transdichloroethylene 0.000 LBS/hour

Band	Chemicals	Y	LBS/100 LBS Carbon	Overall LBS/100 LBS Carbon
1	trichloroethylene	0.12	0.203	0.203
	perchloroethylene	0.51	30.867	30.867
	cisdichloroethylene	0.37	0.040	0.040
	transdichloroethylene	0.01	0.000	0.000
	5.430 Pounds Carbon Per Day			
2	trichloroethylene	0.52	14.270	4.100
	perchloroethylene	0.00	0.000	22.317
	cisdichloroethylene	0.47	0.330	0.120
	transdichloroethylene	0.01	0.003	0.001
	7.511 Pounds Carbon Per Day			
3	trichloroethylene	0.00	0.000	1.438
	perchloroethylene	0.00	0.000	7.826
	cisdichloroethylene	0.99	4.971	3.270
	transdichloroethylene	0.01	0.036	0.024
	21.417 Pounds Carbon Per Day			
4	trichloroethylene	0.00	0.000	1.428
	perchloroethylene	0.00	0.000	7.773
	cisdichloroethylene	0.00	0.000	3.248
	transdichloroethylene	1.00	3.858	0.050
	21.565 Pounds Carbon Per Day			

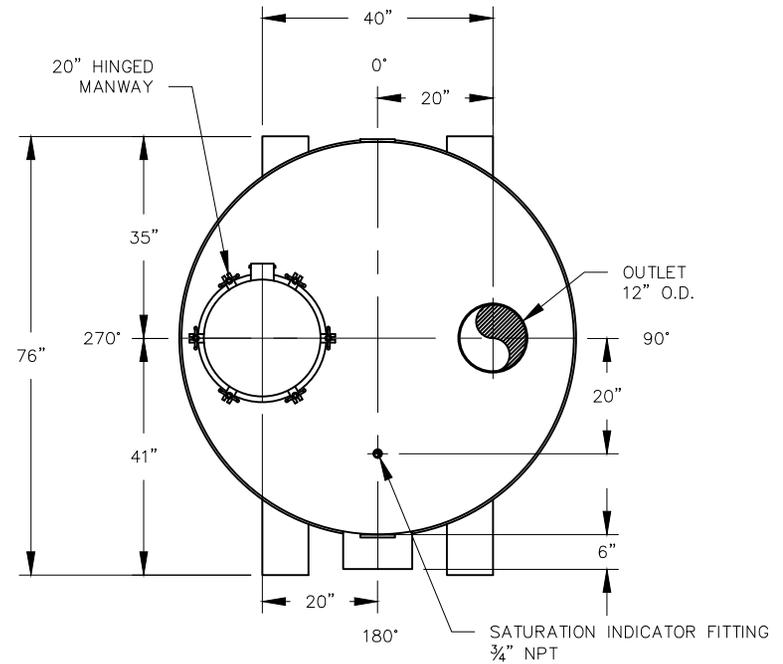
Report: 21.56 lbs. activated carbon per day saturated at conditions

Average Loading at Saturation 12.498 lbs./100 lbs. Carbon

Vapor Phase



ELEVATION



PLAN

\* STAINLESS STEEL BED RETENTION PLATE, 140°F WITH PE PLATE

**VESSEL STANDARDS**

VESSEL MATERIALS : SA-36	VESSEL ACCESS : 20" HINGED MANWAY
LINING : EPOXY	LIQUID DRAIN ASSEMBLY : 1" NPT W/ HDPE PLUG
EXTERIOR PAINT : EPOXY BASE W/ URETHANE TOP COAT	MAX. MEDIA FILL : 109 FT <sup>3</sup>
HEAD THICKNESS : 3/16" NOM.	SHIP WT. EMPTY : 2000 LBS
SHELL THICKNESS : 1/4" NOM.	MAX. OPERATING PRESSURE : 15 PSIG
INTERNALS : STAINLESS STEEL PLENUM	MAX. OPERATING TEMPERATURE : 180°F

7	ADD LIFT LUGS	CB	4/27/11
6	UPDATE VESSEL STANDARDS	JB	8/24/10
5	CHANGE MANWAY TO HINGED STYLE	JB	9/12/06
4	REVISE CARBON FILL	JB	1/20/04
3	REMOVE VENT	JB	5/14/03
2	CHANGE EXTERIOR PAINT	JB	5/7/03
1	TITLE BLOCK	JB	1/10/03
NO.	REVISION	BY	DATE

PROJECT	
N-2500-PDB	
PROJ. NO.	SALES
P.O. NO.	
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DRAWN BY	ZS
DESIGN BY	BL
CHKD. BY	BL
DATE	9/12/06
SCALE	NTS



PLAN & ELEVATION

N-2500-PDB-1001 REV. 7



## **Appendix D**

GETS Piping and Instrumentation  
Diagram

CITY: MILWAUKEE DIV/GROUP: ENV DB: V. YATES LD: S. MURPHY PIC: PM.J. TRASK TM: R. ROBBENOLT LYNON: OFF=REF-  
 G:\A\Project\Madison\Kipp\W001368\2014\cad\Design Drawings\FID\_recover.dwg LAYOUT: P0 - SAVED: 3/28/2014 8:19 AM ACADVER: 1815 (LMS TECH) PAGES: 18 PAGES: 18 PLOTSTYLETABLE: PLOTSTYLETABLE: PLOTTED: 3/28/2014 8:22 AM BY: ROBBENOLT, REBECCA  
 XREFS: border PROJECTNAME: FR-75-NK.jpg

**LEGEND:**

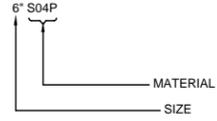
	WATER PROCESS PIPING
	SECONDARY PROCESS PIPING
	AIR PROCESS PIPING
	INSTRUMENT SIGNAL
	SKID/Vault LIMITS
	TREATMENT BUILDING LIMITS
	PROVISIONAL
	BUTTERFLY VALVE
	BALL VALVE
	GATE VALVE
	SWING CHECK VALVE
	FLOW METER (MECH.)
	ACTUATED VALVE
	MOTOR
	REDUCER
	AIR FILTER
	CALIBRATION CYLINDER
	MIXER

	TRANSFER PUMP
	EXTRACTION PUMP
	SUMP PUMP
	BLOWER

**ABBREVIATIONS:**

FCV	FLOW CONTROL VALVE
FM	FLOW METER
GAC	GRANULAR ACTIVATED CARBON
GAL	GALLON(S)
GPM	GALLONS PER MINUTE
M	MOTOR
VGAC	VAPOR GAC VESSEL
VFD	VARIABLE FREQUENCY DRIVE

**PIPELINE DESIGNATION**



**MATERIAL:**

CST	- CARBON STEEL PIPE
HDPE	- HIGH DENSITY POLYETHYLENE
POP	- POLYPROPYLENE
PVC	- POLYVINYL CHLORIDE
SCH 40	- SCHEDULE 40

**INSTRUMENT IDENTIFICATION LETTERS**

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL, CLOSED	
D =	DIFFERENTIAL			
E = VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = PULSE		ORIFICE, RESTRICTION	OPEN	
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTEGRATE, TOTALIZE			
R = RADIATION		RECORD	RUN	
S = SPEED, FREQUENCY	SAFETY	SWITCH		
T = TEMPERATURE				
U = MULTIVARIABLE		MULTIFUNCTION		MULTIFUNCTION
V = VACUUM, MECH. ANALYSIS				
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED		UNCLASSIFIED
Y = EVENT, STATUS OR PRESENCE	Y AXIS			
Z = POSITION, DIMENSION	Z AXIS	UNCLASSIFIED		

- LEGENDS NOTES:**
- ANY FIRST LETTER COMBINED WITH MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE. EXAMPLES: PD = PRESSURE DIFFERENTIAL FQ = FLOW TOTALIZED OR INTEGRATED. EXCEPTION IS THE MODIFIER 'J' FOR MULTIPOINT SCANNING.
  - FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER 'A' NEAR THE INSTRUMENT SYMBOL, SPECIFY THE NATURE OF THE ANALYSIS. EXAMPLE: PH
  - MEANING OF A 'USER'S CHOICE' LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.
  - UNCLASSIFIED LETTER MAY HAVE A FEW DIFFERENT MEANINGS ON A PROJECT, THE MEANING SHALL BE SPECIFIED NEAR EACH INSTRUMENT SYMBOL USING THE UNCLASSIFIED LETTER.
  - THE MODIFIER 'SCAN' APPLIES TO MULTIPOINT PRINTING INSTRUMENTS, SUCH AS CJRS (MULTIPOINT CONDUCTIVITY RECORDER WITH ALARM SWITCHES).

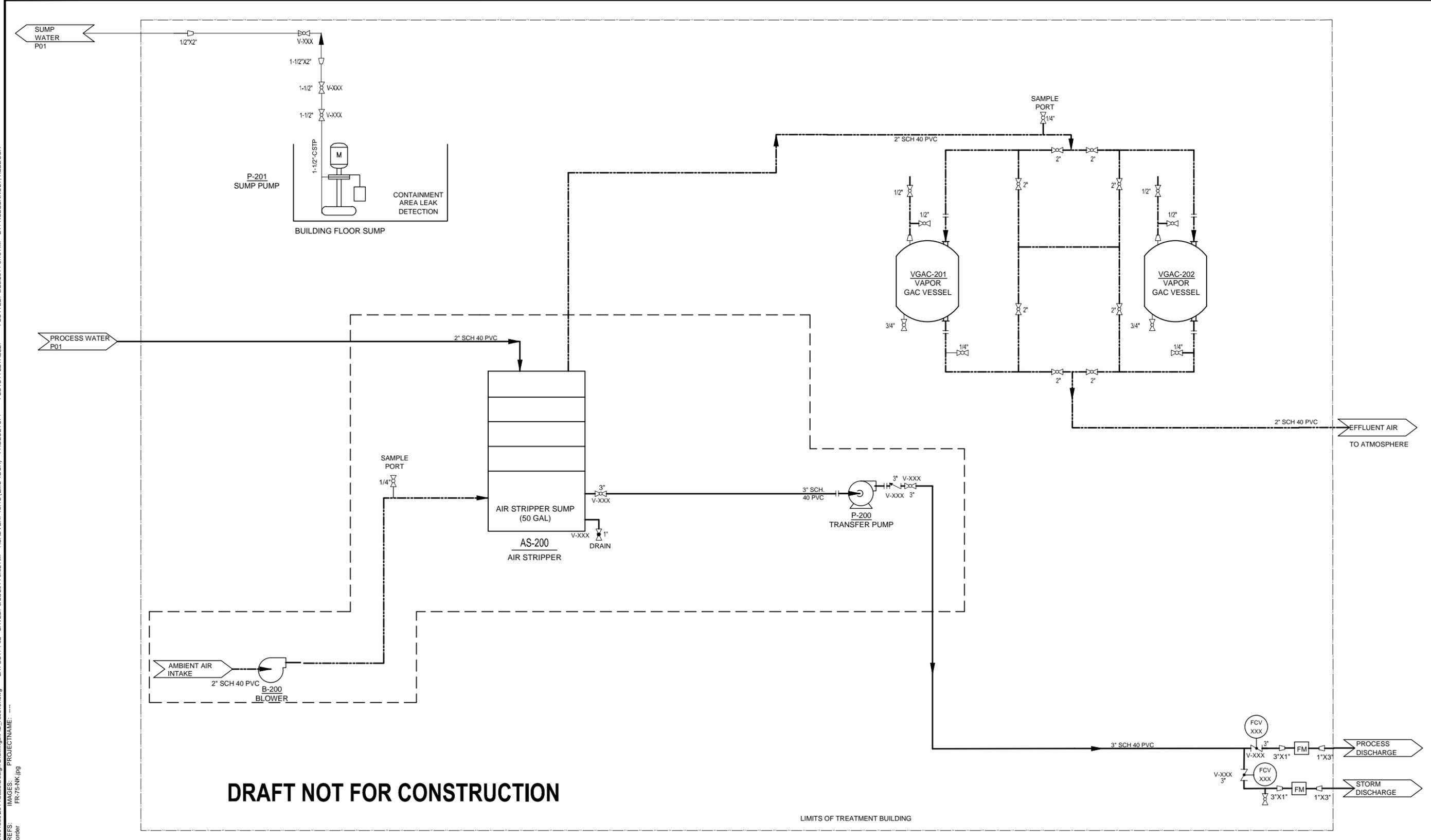
- GENERAL NOTES:**
- ALL ANALOG SETPOINTS SHALL BE FIELD ADJUSTED BY OPERATOR AT HMI INTERFACE SCREEN.
  - ALARMS THAT SHUT DOWN EXTRACTION WELLS AND TREATMENT EQUIPMENT MUST BE CLEARED BY OPERATOR BEFORE BEING RESTARTED.
  - THIS DRAWING IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
  - WHERE APPLICABLE, WYES AND REDUCERS SHALL BE INSTALL IN LIEU OF PIPE TAPPING.

**DRAFT NOT FOR CONSTRUCTION**

SCALE(S) AS INDICATED  THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>0</td><td>03/07/14</td><td>BASIS OF DESIGN</td><td>VY</td><td>RR</td></tr> <tr><td>No.</td><td>Date</td><td>Revisions</td><td>By</td><td>Ckd</td></tr> </table>	0	03/07/14	BASIS OF DESIGN	VY	RR	No.	Date	Revisions	By	Ckd	Professional Engineer's Name <b>SCOTT MURPHY</b> Professional Engineer's No. 36269 State WI Date Signed Project Mgr. Checked by RR VY RR	 ARCADIS U.S., INC.	MADISON-KIPP CORPORATION • MADISON, WISCONSIN GROUNDWATER EXTRACTION AND TREATMENT SYSTEM <b>PIPING AND INSTRUMENTATION DIAGRAM</b> PROCESS	ARCADIS Project No. W001368.0011.00004 Date MARCH, 2014 ARCADIS 125 N. JEFFERSON ST. SUITE 400 MILWAUKEE, WI 53202 TEL. 414.276.7742	<b>P0</b>
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No.	Date	Revisions	By	Ckd												



CITY: MILWAUKEE DIV: GROUP: ENV DB: V. YATES LD: S. MURPHY PIC: PM: J. TRASK TM: R. ROBBENOLT LVR: ON= "OFF" REF: FR-75-NK (ipg) XREFS: border  
 G:\Project\Madison\Kipp\W001368\2014\cad\Design Drawings\PID\_recover.dwg LAYOUT: P02 SAVED: 3/28/2014 8:02 AM ACADYVER: 18.1S (LMS TECH) PAGES: 18 PLOTSTYLETABLE: PLOTSTYLETABLE: PLOTTED: 3/28/2014 8:18 AM BY: ROBBENOLT, REBECCA



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Professional Engineer's Name <b>SCOTT MURPHY</b>		
Professional Engineer's No. 36269		
State WI	Date Signed	Project Mgr. JT
Designed by RR	Drawn by VY	Checked by RR



MADISON-KIPP CORPORATION • MADISON, WISCONSIN  
 GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

**PIPING AND INSTRUMENTATION DIAGRAM**

PROCESS

ARCADIS Project No. W001368.0011.00004
Date MARCH, 2014
ARCADIS 126 N. JEFFERSON ST. SUITE 400 MILWAUKEE, WI 53202 TEL. 414.276.7742

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