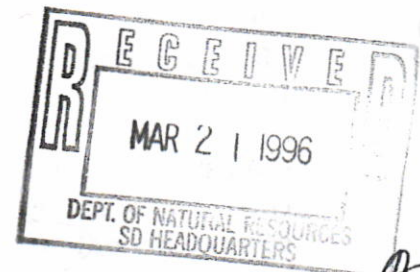




2701 INTERNATIONAL LANE, SUITE 210, MADISON, WI 53704
(608) 244-1788 FAX: (608) 244-7823

March 20, 1996

Mr. Patrick McCutcheon
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711



RE: Progress Report
Site Investigation
Madison-Kipp Corporation Waubesa Street Facility
Madison, Wisconsin

Dear Mr. McCutcheon:

This letter presents an update on the site investigation of chlorinated compounds at the above facility. A brief summary of the results of the investigation and our conclusions and recommendations is followed by a detailed account of the investigation and specific recommendations.

SUMMARY OF INVESTIGATION RESULTS, CONCLUSIONS AND RECOMMENDATIONS

Several phases of investigation have been conducted at the above site since the initial collection of Geoprobe groundwater samples in September 1994. To date, soil sample analyses indicate an area of impacted soil at the north end of a former ditch, shown on Figure 1. The ditch was adjacent to the location of a former above ground tetrachloroethene (PCE) tank, also shown on Figure 1. The tank was taken out of service several years ago, the ditch was filled and the area paved in 1995. Groundwater samples collected at the site monitor wells have indicated exceedances of Wisconsin Enforcement Standards (ESs) for several chlorinated volatile organic compounds (VOCs) at all sample locations. Most notably, exceedances of the ES for PCE have been detected at all site monitor wells, with the results at piezometer MW-2 indicating that the contaminants have migrated into the sandstone bedrock.

Groundwater flow is predominantly to the south, toward Lake Monona, at the site. Consequently, the movement in the groundwater of contaminants originating at the suspected source area would follow Madison-Kipp property until Atwood Avenue. Based upon these observations, Dames & Moore is recommending the installation of a monitor well nest (at the water table and within the bedrock) at the location indicated on Figure 2. These wells will be developed and sampled, with the samples analyzed for VOCs. Concurrently, the existing site monitor wells will be resampled.

Based upon the assumed source area and the knowledge of groundwater flow and quality conditions, Dames & Moore is also recommending that a pilot study be conducted for purposes of initiating soil remediation and groundwater containment and remediation at the site. An

Mr. Pat McCutcheon
WDNR
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evaluation of aquifer permeability has not been conducted at the site; however, hydraulic conductivity testing ~~conducted~~ at the Madison Brass site resulted in an average hydraulic conductivity of 0.85 ft/day, typical of the silty sand observed at the Madison-Kipp site.

The depth to groundwater at the site is approximately 20 feet; additionally, the potential source area is adjacent to the Madison-Kipp manufacturing structure. Consequently, excavation is not considered to be a viable option for soil remediation. Additionally, the chlorinated compounds present and the low permeabilities are not conducive to conventional in-situ options such as bioremediation and soil vapor extraction (SVE). However, Madison-Kipp recognizes the need to proceed with remedial activities as soon as possible. At the time of the mobilization for the collection of the additional groundwater samples adjacent to Atwood Avenue, we will also install a 6-inch recovery well in the approximate location indicated on Figure 2. This well will be screened within both the unsaturated and saturated zones. A dual phase pilot study will be performed on this well. The purpose of this pilot study will be to evaluate potential remedial options for soil and groundwater, as well as to initiate groundwater removal and containment. Upon completion of the pilot study and groundwater analyses, a full evaluation of remedial options will be compiled and presented to the WDNR.

What?
The investigations conducted have indicated exceedances in Wisconsin ESs for several chlorinated VOCs. However, various conditions at the site and in the area have fortunately contributed to a reduced risk of migration and exposure. The water table is relatively flat, and the unconsolidated deposits are of low permeability material. Consequently, the mobility of the contaminants is reduced. The low permeability in combination with depth to groundwater (approximately 20 feet) effectively eliminate the risk of exposure that could result from contact with groundwater or volatilization from the water table. Additionally, the businesses and residences in the area are on municipal water.

DETAILED ACCOUNT OF INVESTIGATION

The site investigation at the Madison-Kipp Corporation's Waubesa Street facility was initiated due to the detection of low concentrations of chlorinated volatile organic compounds (VOCs) at monitor well MW-3 (see Figure 1), during an investigation in 1993 at Madison Brass Works. Several phases of investigation were subsequently conducted at the Kipp site. Initially, several Geoprobe groundwater samples were collected at the locations shown on Figure 3. The results of this investigation resulted in the advancement and collection of several hand-augered soil samples in October 1994 at the locations indicated on Figure 4. The results of the analyses of soil and groundwater samples were summarized in a letter report submitted to the WDNR in December 1995; those results are summarized in the attached Tables 1 and 2.

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Page 3

In January 1995, five soil borings were advanced in the locations indicated on Figure 5; one of these borings was converted to water table monitor well MW-1. The results of this phase of the investigation are summarized in Tables 3 through 9. An updated report was provided to the WDNR in April 1995.

Since the completion of the April 1995 report, two additional phases of investigation have been completed. Geoprobe soil and groundwater samples were collected in June 1995 at the locations indicated on Figure 6. Head spaces of soil and groundwater samples were analyzed using a field gas chromatograph (GC). The results of the head space analyses are shown in Tables 10 through 15. Based upon these results, three soil samples were submitted for laboratory analyses. The results of these analyses are presented in Table 16; laboratory data sheets are provided in Attachment A. Additionally, locations were selected for the installation of two additional water table wells and one piezometer, as shown on Figure 7. Wells MW-2A and MW-3 are water table wells, and are screened within unconsolidated deposits. Well MW-2 is a piezometer. The total depth of this well is 44.5 feet (15 feet below MW-2A), and it is screened within sandstone. These wells were installed in July 1995, with samples collected in August. Well construction documentation is included in Attachment B.

Table 17 presents the results of the analyses of groundwater samples collected in August from the site monitor wells. As the table indicates, groundwater samples from all four site wells yielded exceedances of ESs for several chlorinated VOCs. Analyses of soil samples indicate a potential source area at the north end of the former drainage ditch. Groundwater flow at the site (shown on Figure 8) is predominantly to the south. Consequently, the likely movement of most of the contaminants in groundwater would be within the limits of the Madison-Kipp property until Atwood Avenue, as shown on Figure 2.

The results of soil sample analyses reveal a source area for chlorinated VOCs in the vicinity of soil sample locations SB-3 (see Figure 5) and Geoprobe sample location GP-4 (Figure 6). This area is coincident with a former drainage ditch, which extended from the building at the south end (upgradient, adjacent to the former above ground PCE tank), northward until it terminated at the northeast corner of the building. At the terminus, a pipe transferred runoff from the ditch to the storm sewer. The identification of the former PCE tank as a likely source of a release combined with the overland flow conditions which existed at the time, result in the identification of this area as a source for the transport of chlorinated compounds to the water table.

As summarized in Tables 1,9 and 17, chlorinated VOCs have impacted groundwater at the site. The highest concentrations detected were immediately downgradient from the identified source area. Although ES exceedances have been identified at the farthest downgradient sample location, the possibility exists that migration off-site has not occurred, based upon groundwater flow direction, low hydraulic gradient, and aquifer permeability. However, as is discussed below, a

Mr. Pat McCutcheon
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Page 4

recommendation is made for additional downgradient sampling.

CONCLUSIONS AND RECOMMENDATIONS

The downgradient extent of contamination has not been defined. Dames & Moore recommends that a boring be advanced adjacent to Atwood Avenue, in the location indicated on Figure 1. This boring will be advanced 3 to 5 feet below the water table, at which depth a groundwater sample will be collected using a Hydropunch sampling device. The boring will then be advanced to approximately 5 to 10 feet into the bedrock (depending upon ability to advance using an auger), at which depth another groundwater sample will be collected. These samples will be forwarded to a WDNR-certified environmental laboratory for analyses of VOCs.

Figure 9 shows a west-to-east cross section from the Madison Brass Works site to soil boring SB-5, at the northeast corner of the Madison-Kipp parking lot. As the figure indicates, a silty clay layer is present throughout the site. PCE has been detected in the soil below this clay layer, within a silty strata. As can be determined from Figure 6, the affected soil (west of boring GP-4) is between the storm sewer and the building. Figure 9 shows contaminants to be present 15 to 18 feet below ground surface. Consequently, soil remediation by means of removal is not a viable option. However, as discussed in the summary, the fine-grained nature of the impacted materials will result in low effectiveness of SVE for soil remediation. Additionally, chlorinated compounds degrade anaerobically; bioremediation would therefore not be an appropriate alternative. Based upon this analysis, Dames & Moore recommends the installation of a 6-inch well in the location indicated on Figure 1 for the purpose of conducting a dual phase pilot test. A dual phase approach will apply a vacuum to the soil, as would an SVE system; however, it will also draw groundwater out of the same well being used for the vapor removal.

Dames & Moore will observe the efficacy of the system for a period of several days, during which time we will assess the concentrations in the vapors being removed, and the volume of groundwater removed. Upon completion of this assessment, and the receipt of the analyses of the groundwater sampling to be completed adjacent to Atwood Avenue, a progress report will be submitted to the WDNR, summarizing the results and presenting our recommendations for additional site activities.



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We understand the Southern District work load to be extensive at this point; however, it is our desire to proceed with the recommendations stated above as soon as possible. If you have any questions about the information presented in this letter or our recommendations, please call.

Sincerely,

DAMES & MOORE

A handwritten signature in cursive script that reads "David P. Trainor".

David P. Trainor, P.E., P.G.
Project Director

A handwritten signature in cursive script that reads "Robert J. Nauta".

Robert J. Nauta, P.G.
Hydrogeologist

cc: H.F. Hauser - Madison-Kipp Corporation
David Crass, Esq. - Michael, Best & Friedrich

TABLES

TABLE 1
GEOPROBE GROUNDWATER SAMPLE RESULTS
 September 1994
 All concentrations in $\mu\text{g/L}$

PARAMETER	MK-2	MK-3	MK-6	PAL	ES
sec-Butylbenzene	14	< 1.0	< 1.0	--	--
cis-1,2 Dichloroethene	2,200	< 1.0	< 1.0	7	70
trans-1,2 Dichloroethene	28	< 1.0	< 1.0	20	100
Isopropylbenzene	12	< 1.0	< 1.0	--	--
Tetrachloroethene	860	< 1.0	1.8	0.5	5
Toluene	< 10	4.6	< 1.0	68.6	343
Trichloroethene	470	< 1.0	< 1.0	0.5	5
1,2,4-Trimethylbenzene	27	< 1.0	< 1.0	--	--
1,3,5-Trimethylbenzene	18	< 1.0	< 1.0	--	--
Vinyl Chloride	400	< 1.0	< 1.0	0.02	0.2

Note: Concentrations exceeding the ES have been shaded.

TABLE 2
HEAD SPACE RESULTS - HAND AUGER BORINGS
 October 1994

PARAMETERS	HA-1			HA-2			HA-3		
	Depth (Inches)			Depth (Inches)			Depth (Inches)		
	6	18	36	6	18	36	6	18	40
Tetrachloroethene	X	X	X	X	X	X			
Trichloroethene		X	X						
Ethylbenzene	X		X		X	X	X	X	X
Toluene		X	X						
1,2-Dichloroethene		X	X						
Vinyl chloride	X	X	X	X	X	X	X	X	X
1,1,2,2-Tetrachloroethane	X		X					X	

Note: X denotes the presence of this compound in the head space sample.

TABLE 5
HEAD SPACE RESULTS - SOIL BORING SB-3
 January 1995
 All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	DEPTH IN FEET							
	4-6	6-8	8-10	10-12	12-14	14-16	16-18	
Tetrachloroethene	7,540	987	1,754	3,629	1,380	4,057	6,456	
Trichloroethene				3,933				
Toluene		20.9	9.6	9.9		25.2	13.9	
1,2-Dichloroethene	2,668	3,665	2,557	6,422	1,927	4,523	10,280	
Vinyl chloride		42.2	120	99.3	308		63.7	

TABLE 6
HEAD SPACE RESULTS - SOIL BORING SB-4
 January 1995
 All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	DEPTH IN FEET							
	6-8	8-10	10-12	12-14	14-16	16-18	18-20	
Tetrachloroethene	1,405		400	291				
Trichloroethene		638	14.1					
Ethylbenzene	17.8		5,829	3,636	596	70.2	10.3	
Toluene	50	18,590	277	62.7	5.1	9.3		
1,2-Dichloroethene	572	179			6,785	4,095	885	
1,1,1 Trichloroethane	105,300	83,520			1,268	474	198	
Vinyl chloride	593	2,265	186	447	214	148	284	

TABLE 7
HEAD SPACE RESULTS - SOIL BORING SB-5
January 1995
All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	DEPTH IN FEET		
	0-8	8-10	10-12
Tetrachloroethene			
Trichloroethene	57.6		
Ethylbenzene		141	114
Toluene	3,229	9.0	
1,2-Dichloroethene	3,735	1,070	139
1,1,1 Trichloroethane	147	58,200	2,214
Vinyl chloride	522	109	129

TABLE 8
SUMMARY OF SOIL SAMPLE RESULTS - SOIL BORINGS
January 1995

PARAMETERS	SAMPLE LOCATION AND DEPTH (ft.)				
	SB-1 6-8	SB-2 14-16	SB-3 14-16	SB-4 14-16	SB-5 10-12
n-Butylbenzene	< 1.2	< 1.1	< 1.1	1.3	< 1.1
sec-Butylbenzene	< 1.2	< 1.1	1.2	< 1.1	< 1.1
cis-1,2 Dichloroethene	< 1.2	1.4	3.1	< 1.1	< 1.1
p-Isopropyltoluene	< 1.2	< 1.1	1.1	< 1.1	< 1.1
Methylene Chloride	1.6	2.8	1.5	1.9	24
Tetrachloroethene	5.5	1.5	46	7.0	9.9
Trichloroethene	< 1.2	< 1.1	9.1	3.8	< 1.1
1,2,4-Trimethylbenzene	< 1.2	< 1.1	1.2	< 1.1	< 1.1

Note: All units in $\mu\text{g/kg}$.

TABLE 9
SUMMARY OF GROUNDWATER SAMPLE RESULTS
January 1995
All concentrations in $\mu\text{g/L}$

PARAMETERS	SAMPLE LOCATION AND DEPTH (ft.)						PAL	ES
	SB-1 18-22	SB-2 29-31	SB-3 19-23	SB-4 19-23	SB-5 19-22	MW-1 14-24		
Benzene	< 1.0	< 10	< 100	< 1.0	< 1.0	1.1	0.5	5
cis-1,2 Dichloroethene	< 1.0	730	6,900	250	1.2	97	7	70
trans-1,2 Dichloroethene	< 1.0	12	< 100	< 10	< 1.0	2.8	20	100
Methylene Chloride	< 1.0	10	130	11	< 1.0	< 1.0	15	150
Tetrachloroethene	17	720	190	1,000	38	150	0.5	5
Trichloroethene	< 1.0	330	300	440	7.9	59	0.5	5
Vinyl Chloride	< 1.0	62	400	< 10	< 1.0	9.0	0.02	0.2

Note: Concentrations exceeding the ES have been shaded

TABLE 10
HEAD SPACE RESULTS - GP-1
 June 1995
 All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	DEPTH IN FEET							
	1-3	4-6	7-9	10-12	13-15	16-18	19-21	
1,2-Dichloroethene	3							
Tetrachloroethane	53	47	50	42	106	107	53	
1,1,1-Trichloroethane	1	1	1	0.5	1	1	1	
Trichloroethene	66	23	7	4	4	3	30	

TABLE 11
HEAD SPACE RESULTS - GP-2
 June 1995
 All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	DEPTH IN FEET							
	1-3	4-6	7-9	10-12	13-15	16-18	19-21	
1,2-Dichloroethene								
Tetrachloroethane	51	67	85	94	42	62	80	
1,1,1-Trichloroethane	1							
Trichloroethene	28	2	2			1	1	

TABLE 12
HEAD SPACE RESULTS - GP-3
June 1995
 All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	DEPTH IN FEET							
	1-3	4-6	7-9	10-12	13-15	16-18	19-21	
1,2-Dichloroethene								
Tetrachloroethane	103	89	58	81	82	100	97	
1,1,1-Trichloroethane							1	
Trichloroethene	20	6	2	4	4	10	43	

TABLE 13
HEAD SPACE RESULTS - GP-4
June 1995
 All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	DEPTH IN FEET					
	1-3	5-7	9-11	13-15	17-19	
1,2-Dichloroethene						
Tetrachloroethane	54	70	71	58	48	
1,1,1-Trichloroethane						
Trichloroethene	42	1	2	1	18	

TABLE 14
HEAD SPACE RESULTS - GP-5
June 1995

All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	DEPTH IN FEET				
	1-3	5-7	9-11	13-15	17-19
1,2-Dichloroethene					
Tetrachloroethane	76	100	105	84	50
1,1,1-Trichloroethane					
Trichloroethene	4	19	12	7	33

TABLE 15
HEAD SPACE RESULTS - GP-6, GP-7 & GP-8
June 1995

All concentrations in $\mu\text{g/L}$ of head space gas

PARAMETER	SAMPLE LOCATION AND DEPTH IN FEET						
	GP-6 20-22	GP-7 20-22	GP-8 1-3	GP-8 5-7	GP-8 9-11	GP-8 13-15	GP-8 17-19
1,2-Dichloroethene							
Tetrachloroethane	51	8	102	78	70	80	95
1,1,1-Trichloroethane							
Trichloroethene	6		6	1	1	2	6

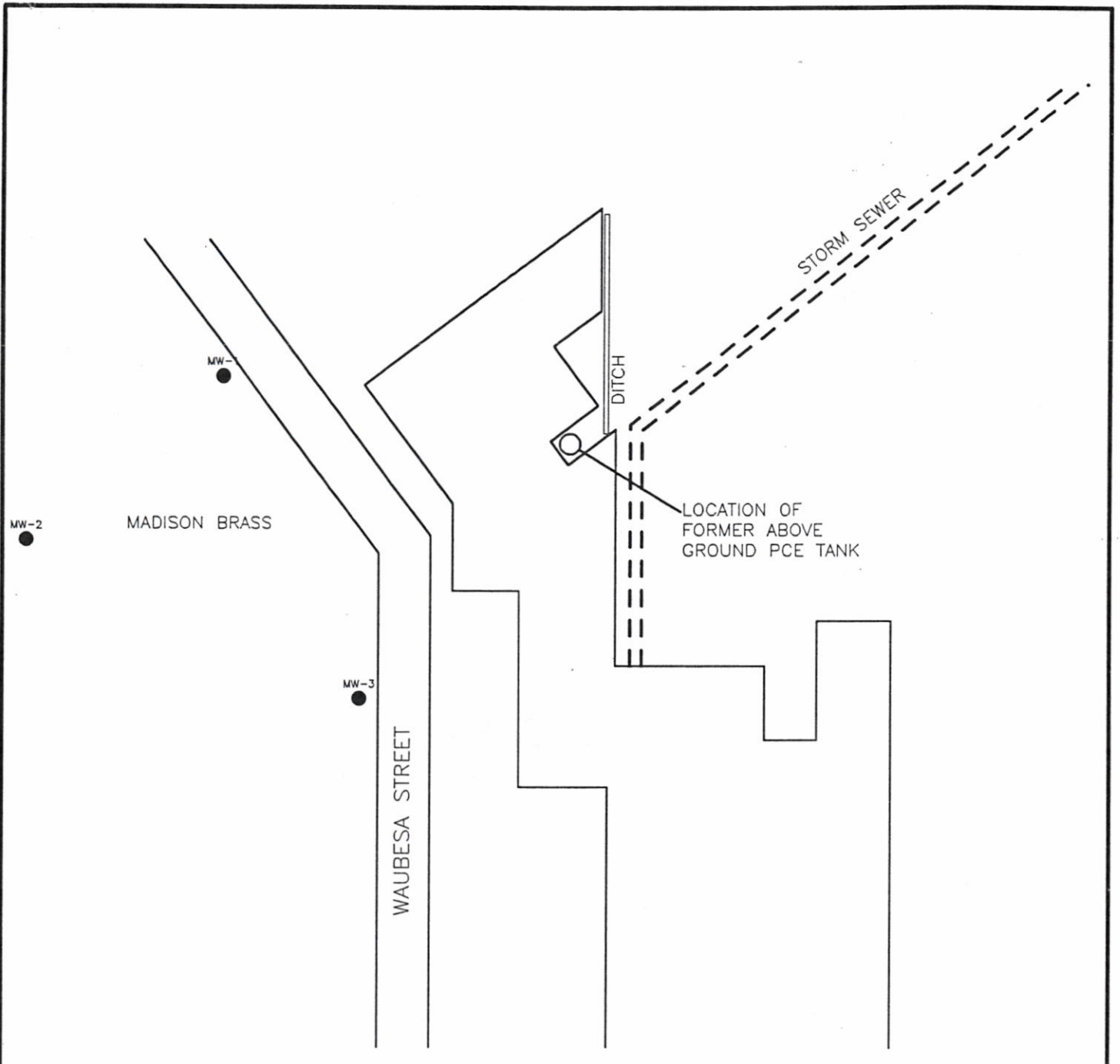
TABLE 16
RESULTS OF SOIL ANALYSES
JUNE 1995
All concentrations in $\mu\text{g/L}$

PARAMETER	SAMPLE LOCATION & DEPTH (ft)		
	GP-4 1 - 3 ft.	GP-5 1 - 3 ft.	GP-6 20 - 22 ft.
Tetrachloroethene	300	79	18
Toluene	2.9	ND	ND
Trichloroethene	26	5.5	ND

TABLE 17
GROUNDWATER QUALITY
AUGUST 1995

PARAMETER	MW-1	MW-2	MW-2A	MW-3	E.S.	P.A.L.
Benzene	0.14	ND	0.047	2.7	5	0.5
Chloroethane	1.5	ND	ND	ND	400	80
Chloroform	ND	4.1	ND	0.42	6	0.6
Chloromethane	0.065	4.9	0.11	ND	NE	NE
1,1,-Dichloroethene	1.3	ND	ND	0.11	7	0.7
cis-1,2-Dichloroethene	87	3.6	0.11	89	70	7
trans-1,2-Dichloroethene	ND	ND	ND	3.9	100	20
Ethylbenzene	3.4	ND	0.049	0.054	700	140
Methylene chloride	ND	ND	0.031	0.032	150	15
1,1,1,2-Tetrachloroethane	0.028	ND	ND	0.053	NE	NE
Tetrachloroethene	140	1100	90	2600	5	0.5
Toluene	0.028	ND	0.14	0.26	343	68.6
1,1,2-Trichloroethane	ND	ND	ND	0.057	0.6	0.06
Trichloroethene	79	84	0.32	94	5	0.5
1,2,4-Trimethylbenzene	ND	ND	0.041	0.04	NE	NE
Vinyl chloride	11	ND	ND	17	0.2	0.02
Xylenes	ND	ND	0.053	0.072	620	124

E.S. - Wisconsin enforcement standard.
P.A.L. - Wisconsin preventive action limit.
ND - Non-detect.
NE - E.S. and P.A.L. not established.
Shaded entries indicate E.S. exceedance.



LEGEND:

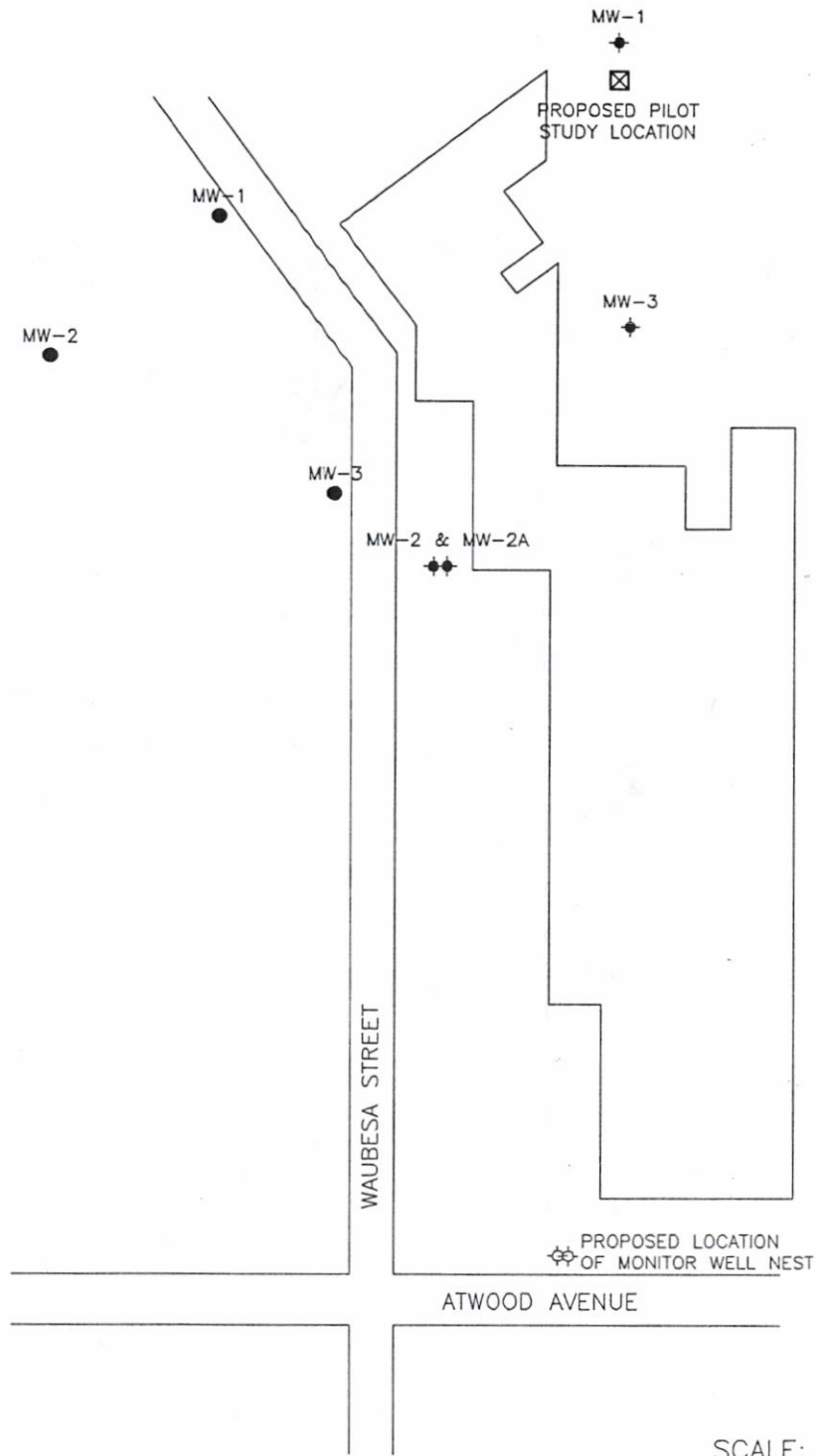
● MADISON BRASS MONITOR WELL



SCALE: 1' = 100'

MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 1 INITIAL SITE CONDITIONS	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No. 20011-005

FIGURES



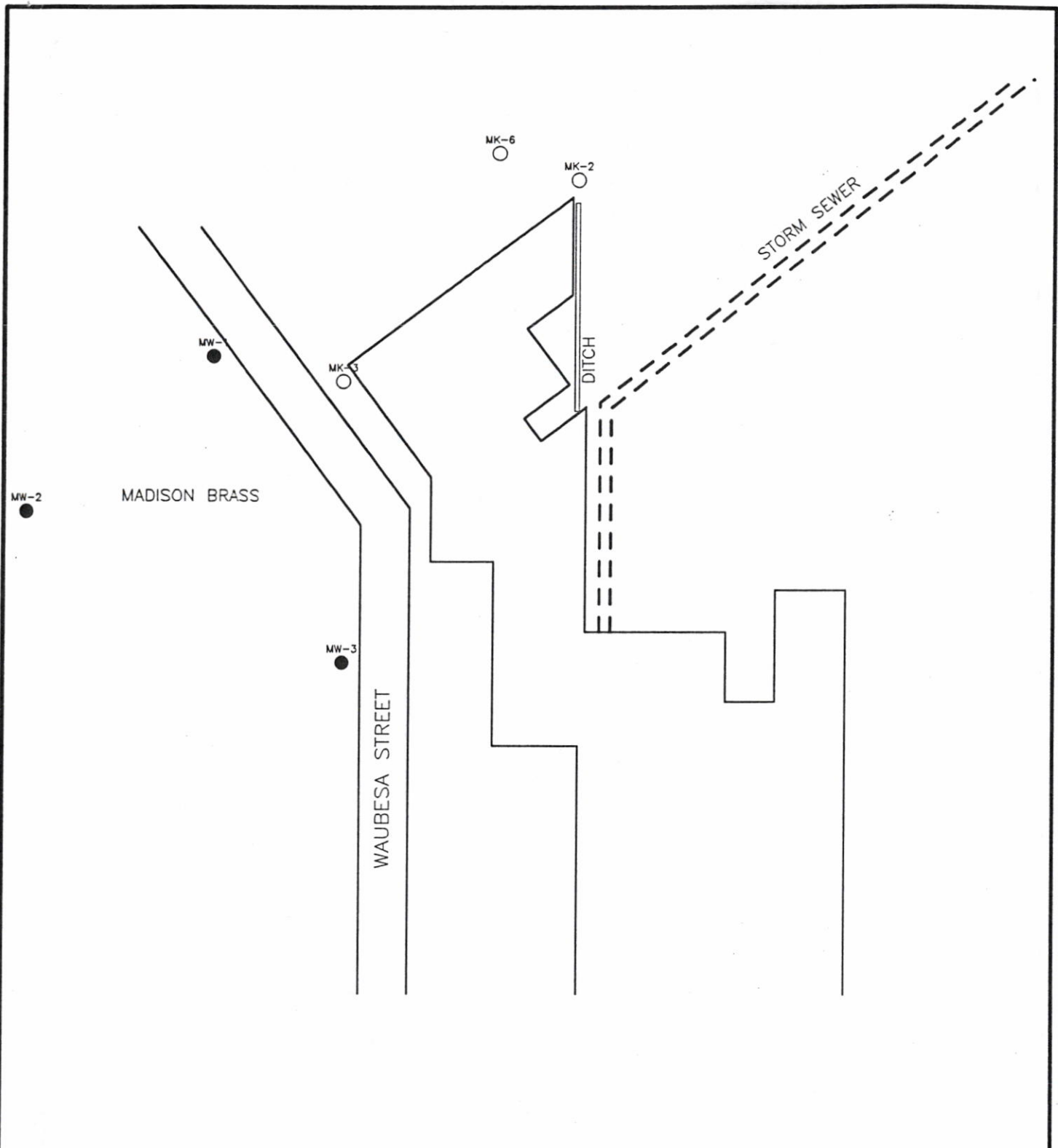
SCALE: 1' = 150'



LEGEND:

- MADISON BRASS MONITOR WELL
- ◆ MADISON-KIPP MONITOR WELL
- ◇ PROPOSED GROUNDWATER SAMPLE LOCATION
- ⊠ PROPOSED LOCATION FOR PILOT STUDY

MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 2 SITE MONITOR WELLS AND LOCATIONS OF PROPOSED SITE ACTIVITIES	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No.: 20011-00E



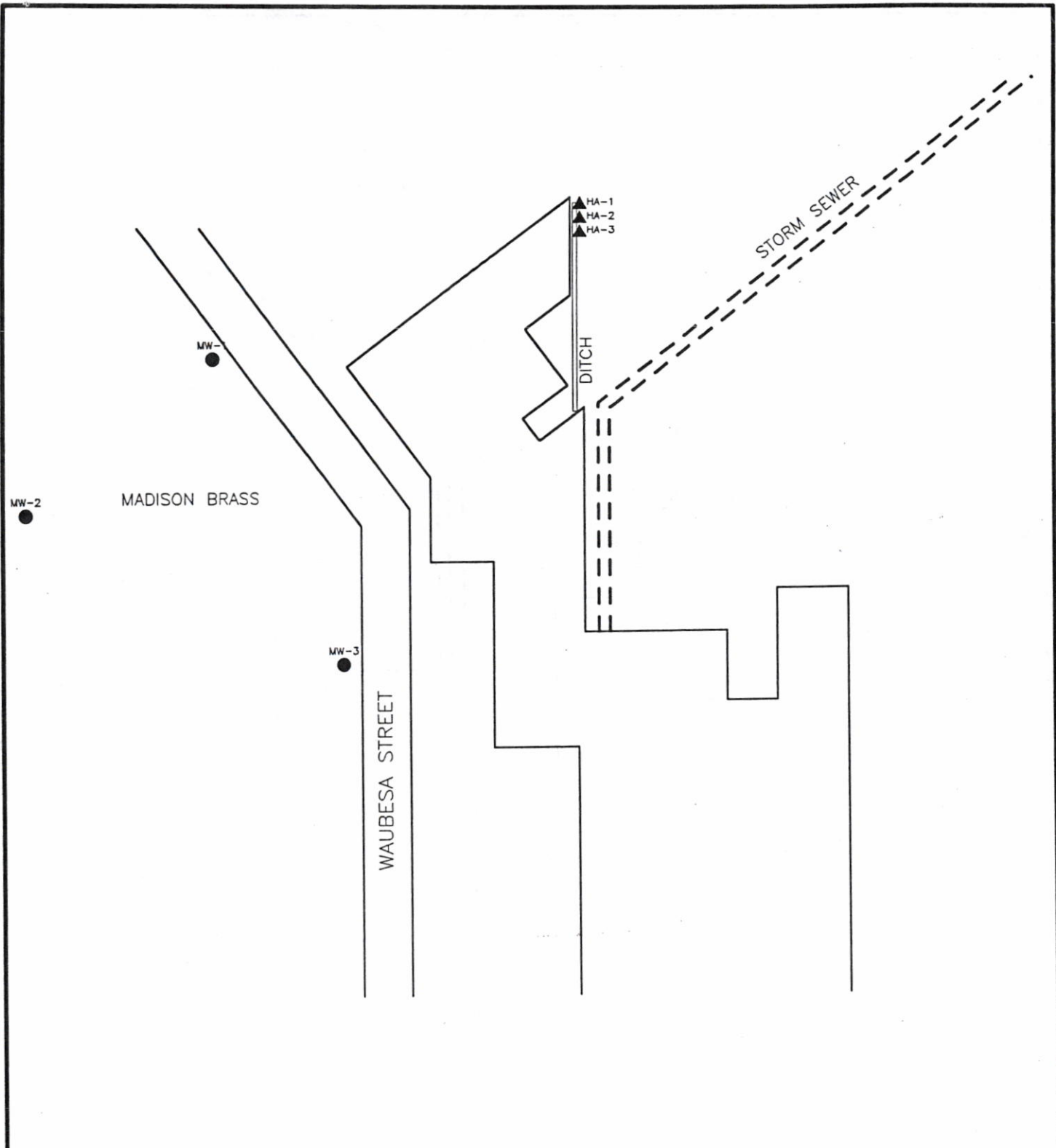
LEGEND:

- MADISON BRASS MONITOR WELL
- INITIAL GEOPROBE LOCATIONS



SCALE: 1' = 100'

MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 3 INITIAL SITE INVESTIGATION	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No. 20011-005



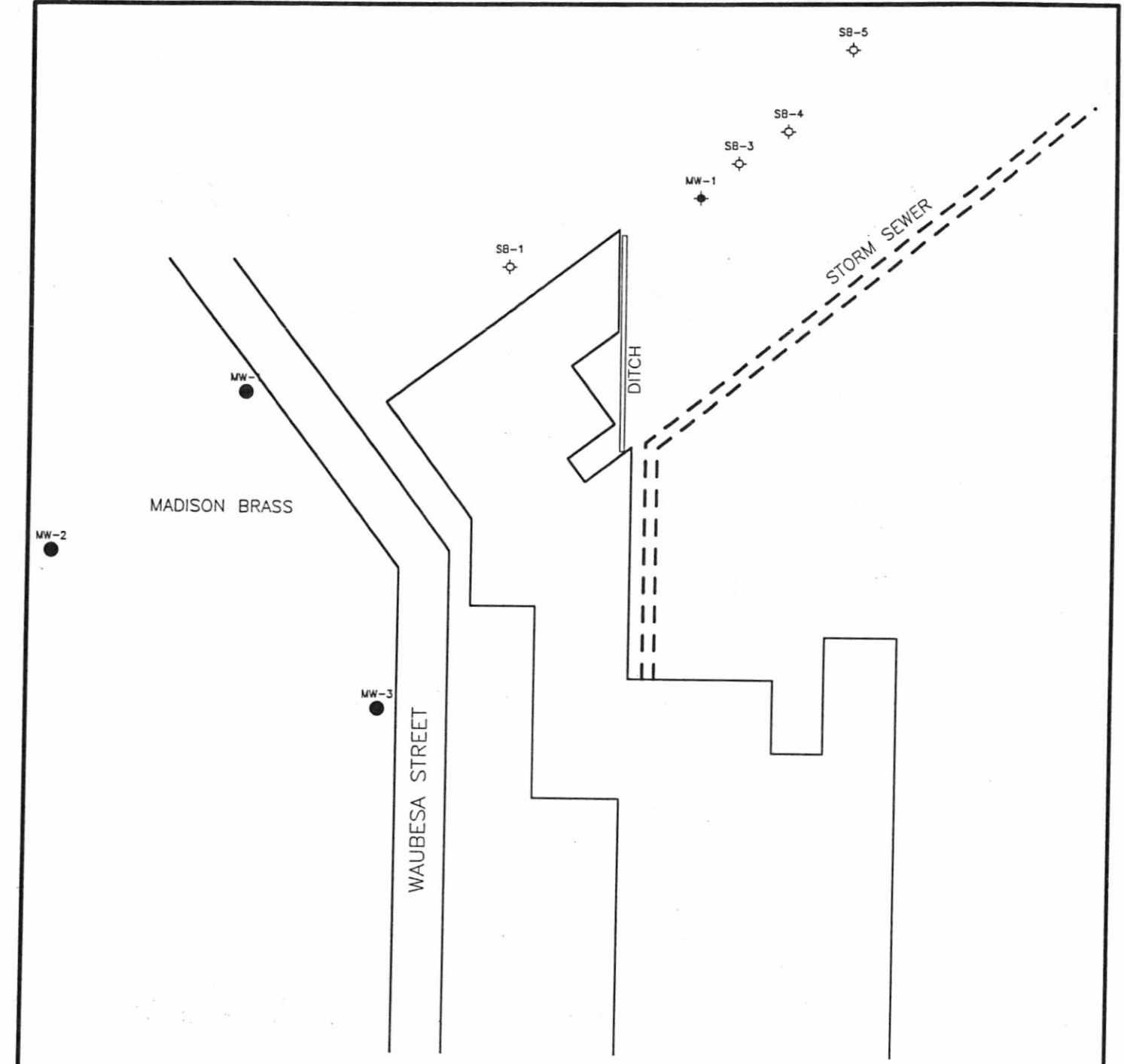
LEGEND:

- MADISON BRASS MONITOR WELL
- ▲ HAND AUGER SAMPLE LOCATIONS



SCALE: 1" = 100'

MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 4 HAND-AUGERED SAMPLE LOCATIONS	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No. 20011-005



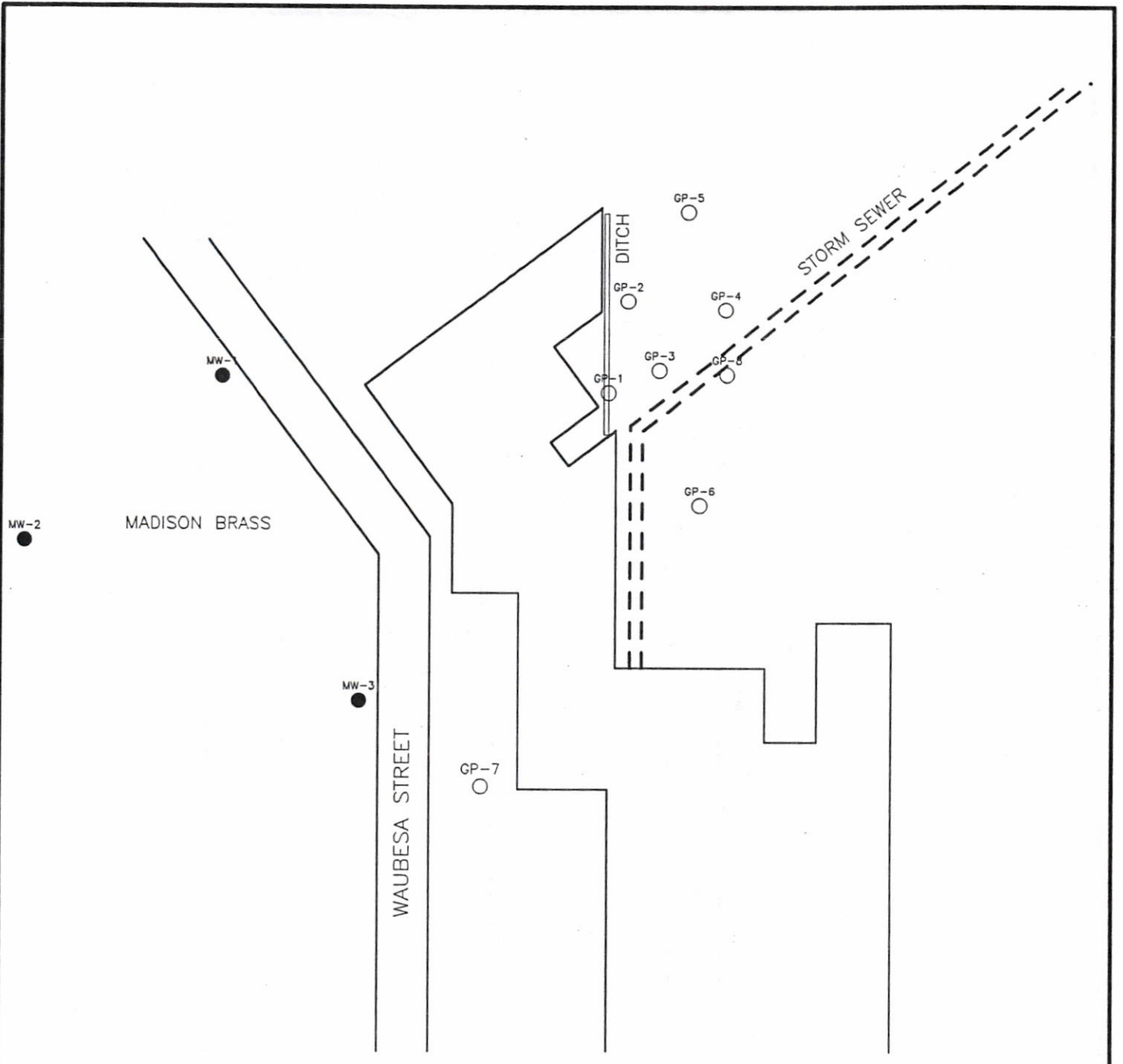
LEGEND:

- MADISON BRASS MONITOR WELL
- ◇ SOIL BORING
- ◆ MADISON-KIPP MONITOR WELL



SCALE: 1' = 100'

MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 5 INITIAL SITE BORINGS	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No. 20011-005



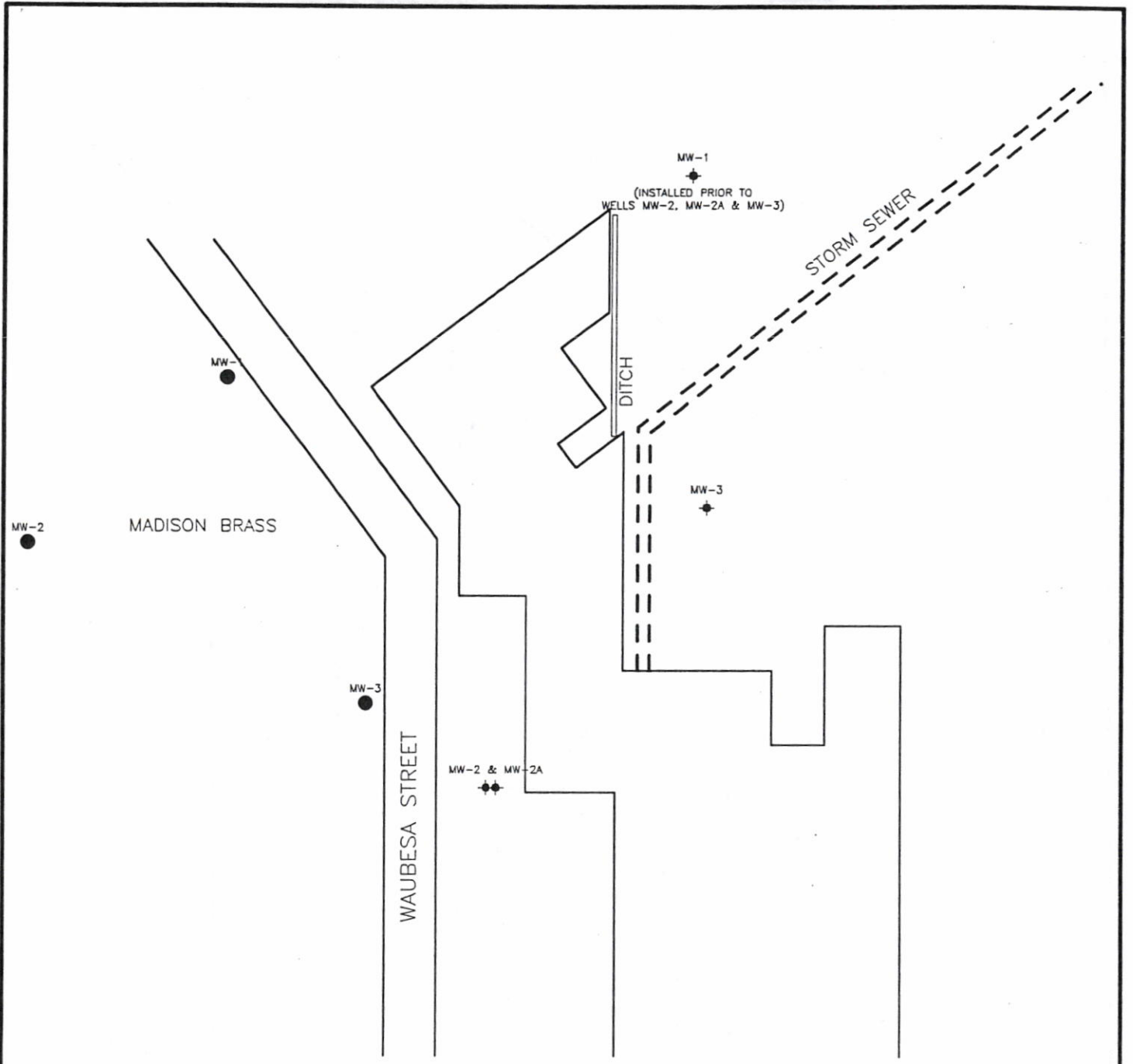
LEGEND:

- MADISON BRASS MONITOR WELL
- PHASE 2 GEOPROBE LOCATIONS



SCALE: 1' = 100'

MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 6 PHASE 2 GEOPROBE LOCATIONS	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No. 20011-005



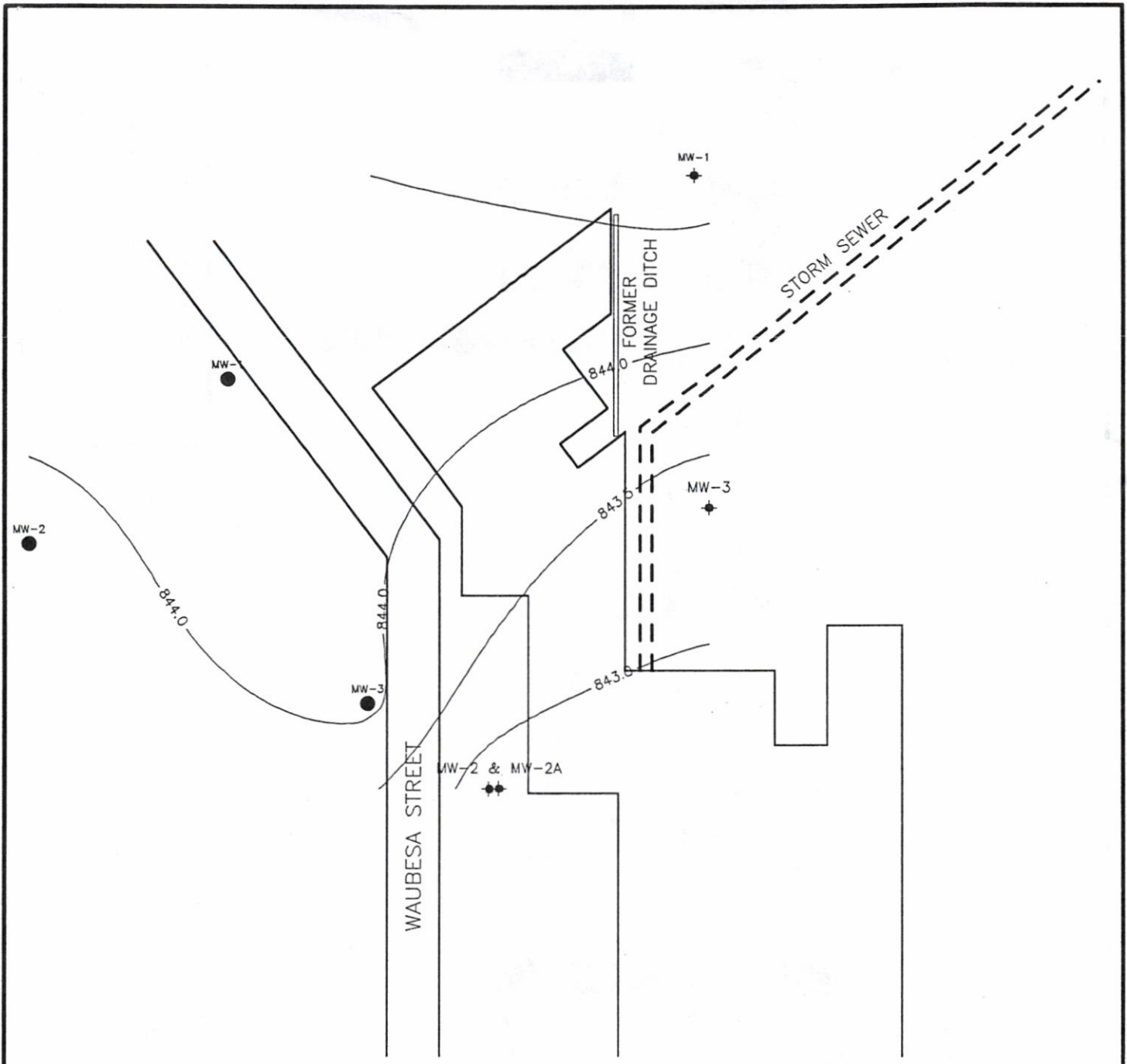
LEGEND:

- MADISON BRASS MONITOR WELL
- ◆ MADISON-KIPP MONITOR WELL



SCALE: 1' = 100'

MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 7 MADISON-KIPP MONITOR WELLS	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No. 20011-005



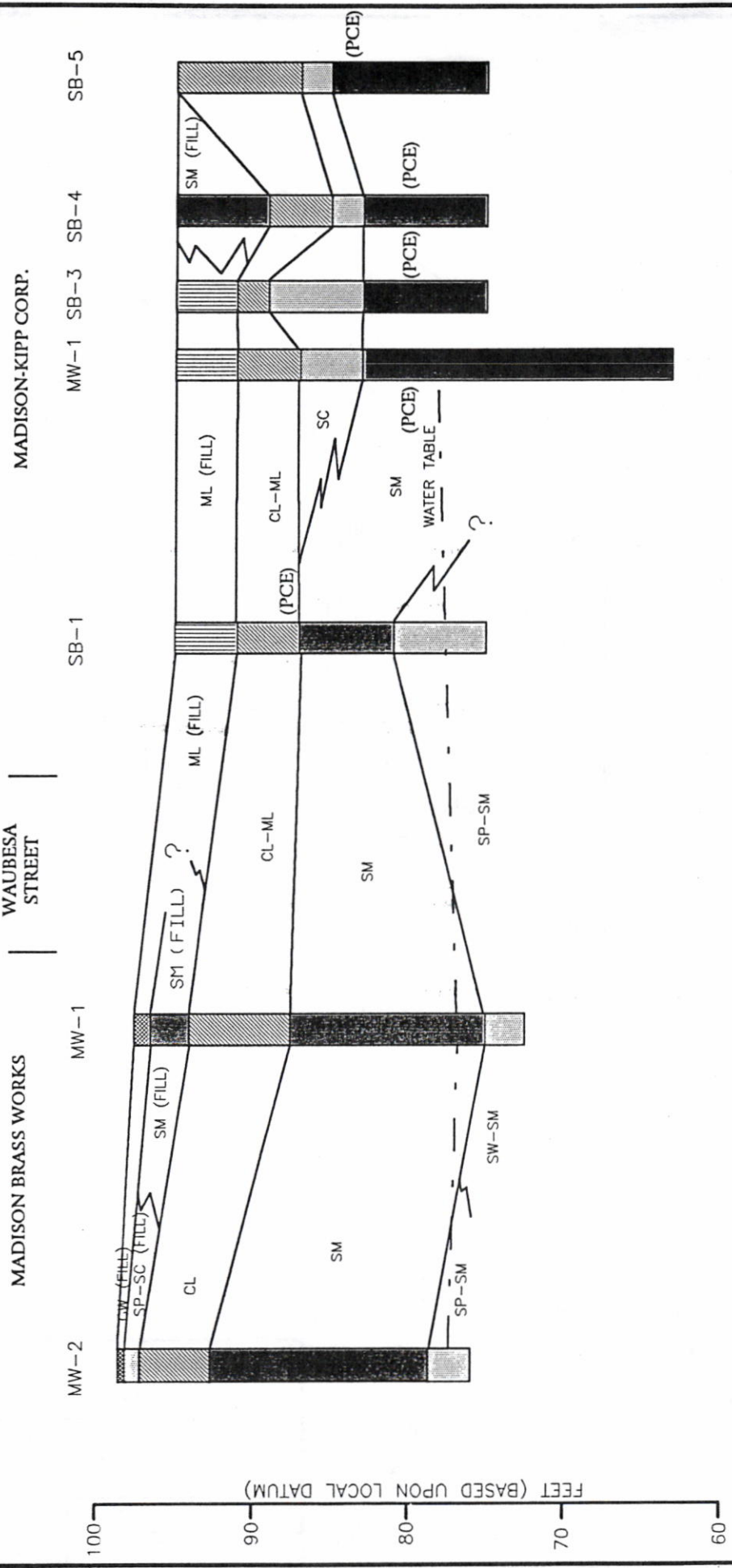
LEGEND:

- MADISON BRASS MONITOR WELL
- ◆ MADISON-KIPP MONITOR WELL
- 844.0- WATER TABLE ELEVATION IN FEET, MSL



SCALE: 1' = 100'

MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 8 WATER TABLE MAP	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No. 20011-005



MADISON-KIPP CORPORATION MADISON, WISCONSIN	
FIGURE 9 GEOLOGIC CROSS SECTION	
GENERATED BY: RJN	DAMES & MOORE
DATE: MARCH 1996	PROJ. No.: 20011-005

(PCE) INDICATES THAT PCE WAS DETECTED IN THE SOIL AT THAT LOCATION

HORIZONTAL SCALE: 1" = 80'