REMEDIAL INVESTIGATION/REPORT

EIS Brake Parts

West Bend, Wisconsin

Delta No. 10-87-285

Delta
Environmental
Consultants, Inc.

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1.0 INTRODUCTION

1.1 Purpose and Authorization

The purpose of this report is to present the results of the Remedial Investigation (RI) conducted at the EIS Brake Parts property in West Bend, Wisconsin. This remedial investigation follows Delta Environmental Consultants, Inc. (Delta's) Remedial Investigation and Feasibility Study Work Plan dated December 30, 1987. The work plan was approved by the Wisconsin Department of Natural Resources (WDNR) in a letter dated February 11, 1988.

The work described in this report was authorized by EIS Brake Parts January 4, 1988.

1.2 Scope of Services

The scope of services performed in regard to this project included:

- Advancing five soil borings to define the extent of contamination in an area suspected of waste disposal (i.e., the old dumping area).
- Collecting soil samples from the old dumping area and chemically analyzing them for selected parameters.
- Field-screening soil samples with a photoionization device (PID) to determine the presence of volatile organic chemical contamination.
- Installing seven monitoring wells.
- Surveying the locations and casing elevations of each of the monitoring wells.
- Obtaining water level elevation measurements on several occassions.
- Obtaining representative ground water samples from the site's monitoring wells and chemically analyzing them for selected parameters.
- Conducting slug and recovery tests in the monitoring wells and evaluating local ground water flow in the shallow unconfined aquifer.
- Interpretation of data collected and preparation of this report.

2.0 BACKGROUND INFORMATION

2.1 Site Description

The site is located at 133 Oak Street in West Bend, Washington County, Wisconsin (Figures 1 and 2). The site is bounded on the north by Oak Street, on the east by the Chicago and Northwestern Railroad, on the west by Second Avenue and on the south by Decorah Road (Figure 3). Praefke Brake and Supply Company operates an asbestos brake shoe manufacturing facility at the site. The brake shoe manufacturing operation occupies building #1 (Figure 3); building #2 is empty. Building #3 presently houses an auto repair shop and building #4 is abandoned. A metal storage shed is located southwest of building #1.

The site is paved on the northern property line adjacent to building #1; the western edge is wooded and slopes steeply upward to a residential area. The south end of the property, near building #4, is undeveloped and wooded. Along the east side of the property, between building #1 and building #2 and the railroad, is a grassy lane.

2.2 Site History

The site originally operated in the 1920s as a facility which finished wood for caskets. During the 1940s, the site housed an operation that treated and varnished poles used for soldier's tents in World War II. Since the 1950s, the site has housed a brake shoe manufacturing operation which continues today.

Other operations have coexisted at this property at various times in the past. These include a metal painting firm (1985 to 1987), a garage door manufacturer, and a junk yard. This junk yard contained used cars, tractors, paper products, plastic wastes, and scrap metal. The junk yard was abandoned and the junk removed in 1976 or 1977.

2.3 Previous Investigations

Two investigations have been conducted at this site in the past by Warzyn Engineering. A "walk-through" audit of the facility was performed on December 23, 1986 followed by a limited subsurface investigation in January 1987. The following is a brief summary of the results of these investigations.

The audit identified several locations which could potentially contain hazardous chemicals or present potential environmental problems. These included several buried tanks, a metal storage shed which contains solvents and stamping dyes, and an area at the back of the property where a scrap metal yard once existed. Warzyn recommended soil sampling at various locations to further investigate the presence of contaminants.

In January 1987, Warzyn performed an initial investigation which consisted of seven test pits, three soils borings, two floor borings, and three surface soil samples (Figure 4). Test pits 1, 2, 6, and 7 were dug north of building #4. Test pits 4 and 5 were dug south of building #4 while test pit 3 was dug west of building #4. Two core samples were taken through the floor in building #1. Three soil borings were drilled near the gas tank, storage shed and fuel tank, respectively. Three additional surface soil samples were collected on the grassy area along the railroad tracks. The logs of these borings and pits are provided in Appendix A.

The investigation results indicated relatively high concentrations of 1,1,1-trichloroethane, carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethane, toluene, 1,1,1-trichloroethene, and xylene in the soil (Table 1). The major areas of concern, based upon Warzyn's data, were near test pits 1, 2, 6, 7, and the northwest side of the site where soil borings B-1, B-2, and B3 were advanced. Other borings and test pit samples detected little contamination. No ground water samples were collected during the Warzyn investigation.

Delta was contracted to conduct an environmental investigation to determine the presence and nature of ground water contamination at the site. Six shallow monitoring wells were installed and sampled in September 1987. Delta's report titled "Environmental Investigation" (dated November 16, 1987), describes the findings of that initial investigation. Several contaminants were identified in the ground water (Table 2) and tentatively related to a source location on-site. Among others, the chemicals 1,1-dichloroethylene, carbon tetrachloride, 1,1,2-trichloroethylene, and benzene were found in concentrations exceeding Wisconsin or U.S. EPA water quality standards.

The data (e.g., soil boring logs, monitor well construction details, chemical data, etc.) presented in Delta's November 1987 report are incorporated into this report.

2.4 Water Supply Inventory

The area surrounding the site is supplied by the city of West Bend water supply system. Delta contacted the city of West Bend Water Utilities Department and obtained the following information regarding West Bend's municipal wells. Presently, the city of West Bend utilizes 10 wells to supply water (Figure 5). These wells (numbered 4 to 13) are screened in both the shallow sand and gravel aquifer and the deeper dolomite aquifer (see Section 4.1 for further discussion of these aquifers). The city has used three deep wells in the past (wells 1, 2, and 3), but has since abandoned these wells. No private water wells were identified in the area during the investigation.

3.0 PROJECT RESULTS

3.1 Soil Borings

Six soil borings (MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6A) were drilled in September 1987 as part of the initial investigation. These borings were completed as monitoring wells. Six soil borings were drilled in March 1988 and completed as monitor wells (MW-A, MW-6B, MW-C, MW-D1, MW-D2, MW-E). Two soil borings were drilled in association with MW-C, i.e., MW-C, and B-C2. B-C2 was grouted to the surface and MW-C was completed as a monitor well. An additional soil boring was drilled May 25, 1988 and completed as monitor well MW-F. The logs of these borings are provided in Appendix B.

On March 16, 1988, five soil borings (B-1, -2, -3, -4, -5) were drilled to define the extent of soil contamination at the old dumping area (Figure 6). The lithologic logs of the soil borings are provided in Appendix B.

The soil borings were drilled using four-inch diameter hollow stem auger and split spoon sampling techniques. All equipment was steam-cleaned between borings to minimize the chance of cross-contamination. The borings were continuously logged to the water table. The borings were backfilled with natural cuttings.

All recovered soil samples were scanned with a photoionization device (PID) to screen for volatile chemicals. The results of the PID scan are given in Table 3.

Soil samples from borings B-1,-2,-3,-4, and B-5 were submitted for analysis of purgeable halocarbon/aromatics (using EPA Method 601/602) and phenols (using EPA Method 604). The EPA

recommended holding times for the soil samples (extraction should occur within 14 days after the date of collection) was exceeded by 12 days. Delta instructed the lab to complete the analyses. Two additional soil borings, B-6 and B-7, were drilled at the locations shown in Figure 6 on May 25, 1988 with the same installation procedures used in the previous borings. Boring B-6 was installed to provide a new data point with which to compare to the other borings. Boring B-7 was installed next to boring B-5 to verify the analytical results obtained from B-5. The results of the chemical analysis of the soil samples are provided in Appendix C and summarized in Table 4.

The WDNR requested a dioxin analysis of the most contaminated sample. A dioxin analysis was done on a sample from B-5. No dioxin was detected in that analysis.

The soils encountered in the soil borings were primarily silty-sand to fine-sand overlying a gray, lean clay.

3.2 Monitoring Wells

Thirteen monitoring wells have been installed at this site (Figure 3). Six of the wells (MW-1, -2, -3, -4, -5, -6A) were installed in September 1987. Wells MW-A, -6B, -C, -D1, -D2, and MW-E were installed in March 1988. Well MW-F was installed May 25, 1988. The monitoring well construction details are provided in Appendix D. Briefly, the wells were constructed of two inch diameter Schedule 40 PVC riser pipe with 10 foot screens for all of the wells except MW-6B and MW-D2 which have 5 foot screens. The natural soils were allowed to collapse around the screen as the augers were withdrawn to two feet above the screen, followed by a three foot bentonite seal and grouted to the surface with a neat cement-bentonite grout. The well risers are housed at the surface within a steel protective casing and locking cap. All well materials were steam-cleaned before installation. The wells were developed with a bailer after installation.

3.3 Ground Water Measurements and Observations

The monitoring wells elevations and locations were surveyed by a land surveyor. The ground water levels were measured several times during the course of the investigation. The water level data are presented in Table 5.

Figures 7A and 7B are contour maps of the ground water table surface using the groundwater level data of May 25, 1988 and June 22, 1988. This data indicates a northeasterly flow of ground water beneath the site with an approximate horizontal gradient of 0.016.

The vertical gradient was measured in the well nests MW-6 and MW-D. The vertical gradient measured at nest MW-6 was -8.3×10^{-3} (May 25, 1988) and -6.6×10^{-3} (June 22, 1988). The vertical gradient at nest MW-D was -5.7×10^{-2} (May 25, 1988) and -7.3×10^{-2} (June 22, 1988). The negative gradients reflect an upward component of flow, indicating that the nearby Milwaukee River is a discharge zone for the shallow ground water.

Slug tests were conducted in wells MW-2, -5, -6B, -C, -D1, -D2. The results of the slug test analyses are provided in Table 7 and Appendix E. An average hydraulic conductivity of 1.28×10^{-5} feet per second (3.9×10^{-4} cm/sec) was calculated.

3.4 Ground Water Sampling

The wells have been sampled September 25 and 26, 1987, March 23, 1988, and May 25 and 26, 1988. Samples were submitted to the laboratory and analyzed for purgeable halocarbons/aromatics (EPA Method 601/602), phenols (EPA Method 604) (the 1987 samples were also analyzed for phthalate esters (EPA Method 606), total cyanide and cadmium). The results of the ground water sampling are provided in Appendix F and summarized in Tables 2, 8a, and 8b.

3.5 Other Test Results

A permeability, sieve, and hydrometer analysis was performed on a thin-walled tube sample (Shelby tube) taken from the clay unit encountered in boring D-2 at a depth of 35 feet. The results of these tests are provided in Appendix G. The coefficient of permeability measured for the lean clay unit is 3.3×10^{-10} ft/sec (1×10^{-8} cm/sec).

A sieve analysis was conducted on two soil samples of the fine sand from MW-1 and MW-6. The results of those analyses are included in Appendix G.

4.0 DISCUSSION OF RESULTS

4.1 Hydrogeology

Southeastern Wisconsin's geology consists of surficial glacial deposits underlain by eastward dipping Paleozoic sedimentary units over Precambrian bedrock. The three major aquifers found in southeastern Wisconsin are the sand and gravel aquifer, the Silurian dolomite, and sandstone aquifers. The Precambrian basement rocks are occassionally utilized as a local source of water but will not be included in this discussion.

In the West Bend region, the sand and gravel aquifer consists primarily of unconsolidated deposits within the glacial drift that is associated with the interlobate Kettle Moraine area. The Kettle Moraine is a large deposit of clay, silt, sand, and gravel associated with the Wisconsin glacial stage. The city of West Bend is located at the eastern edge of this moraine.

The sand and gravel aquifer is essentially continuous but varies in thickness over the region from 50 to 400 feet. In the West Bend area, the sand and gravel aquifer is about 100 feet thick. Regionally, ground water within the sand and gravel aquifer flows northwestward from Big Cedar Lake (a recharge area) towards the Milwaukee River (a discharge area).

The top of the Silurian dolomite is an erosional surface; therefore, its thickness can vary from 0 to over 200 feet (Mikulic, 1977). The Silurian dolomite aquifer is light gray to brown-gray, fractured and is a source of water for over 56 wells in Washington County (Kammerer, 1981). Based upon well data, bedrock beneath West Bend consists of the Silurian dolomite of the Niagaran series at a depth of about 100-200 feet (Young and Batton, 1980; Layne-Northwest, 1979).

The deepest main aquifer in southeastern Wisconsin is the sandstone aquifer composed of Cambrian and Ordovician sandstones and dolomites (Kammerer, 1981). The sandstone aquifer provides water to nine wells in Washington County.

Locally, the geology beneath the site is as illustrated in Figure 8 (see Figure 6 for location of cross-sections). A shallow, silty-fine sand aquifer is encountered in all the soil borings. This sand aquifer ranges in thickness from 15 feet (MW-2) to 35 feet (MW-6A).

A gray, lean clay aquitard is found below the sand aquifer. The gray, lean clay aquitard is derived from Wisconsin-age glacial lake deposits (Young and Batten, 1980, p.8). The EIS Brake Parts facility is located at the southwestern edge of a large area of glacial lake deposits.

The lean clay aquitard is continuous over the site as evidenced by its presence in B-C2, MW-D2, MW-6B, and MW-2. The lean clay aquitard was also encountered in Layne Northwest's (1979) test holes east of the site. Appendix H provides logs for those test holes. Test hole 45 encountered the "gray, heavy clay" at a depth consistent with soil boring B-C2.

Little information is available regarding the local thickness of this lean clay aquitard. It is at least 13 feet thick in Layne Northwest's (1979) test hole #45 and at least 12 feet thick in boring MW-C. Data from test hole #42 suggest the gray clay is over 25 feet thick. Review of the well log from municipal well #1 (Appendix H) (see Figure 5 for location) suggests the lean clay aquitard is about 30 feet thick and is underlain by sand and gravel and additional clay layers. Based upon this limited data, we conclude that the lean clay aquitard is at least 12 feet thick locally, as indicated in soil boring MW-3, and probably is much thicker, as suggested by Figure 4 of Young and Batten (1980).

As mentioned in Section 3.0, a soil sample of this lean clay unit had a permeability of 3.3×10^{-10} ft/sec (1×10^{-8} cm/sec) (Appendix G). Its low permeability provides a very effective retardant with respect to hydraulic communication between the silty-fine sand unit and underlying sediments.

As illustrated in Figure 8, we suggest that sand and gravel exists beneath this lean clay aquitard. This lower sand and gravel aquifer is estimated to be about 60 - 100 feet thick beneath the site, based upon municipal well logs (Appendix H), and overlies the Silurian dolomite.

4.2 Ground Water Flow Analysis

The ground water flow direction is in a northerly direction towards the Milwaukee River (Figures 2, 7A and 7B) with a horizontal hydraulic gradient of approximately 0.016. The regional discharge zone for ground water near the site is the Milwaukee River, located approximately 250 feet north of MW-C. A local seasonal discharge zone may be expressed by the ephemeral stream located east of the site (Figure 2).

The hydraulic conductivity for the silty-fine sand aquifer is estimated from the slug test data, contained in Appendix E and summarized in Table 7. The average value for the hydraulic conductivity (K) of the fine-medium sand unit is 1.28×10^{-5} feet/second (3.9×10^{-4} cm/second).

A rough check on the hydraulic conductivities obtained from the slug test data can be made using Hazen's approximation (Freeze and Cherry, 1979, p. 350). Using the data from the sieve analysis of the soil samples collected from MW-1 and MW-6 (Appendix G), hydraulic conductivity (K) can be estimated in the following manner:

$$K = A(d_{10})^2 \qquad (1)$$

Where:

K = hydraulic conductivity (cm/s)
d_{10} = the grain size diameter at which 10% by weight of the soils are finer and 90% are coarser.
A = 1.0

MW-1 d_{10} = approximately 0.05 mm
$K = 2.5 \times 10^{-3}$ cm/s = 8.2×10^{-5} ft/s

MW-6 d_{10} = approximately 0.1 mm
$K = 1 \times 10^{-2}$ cm/s = 3.28×10^{-4} ft/s

An average K value, as determined from Hazen's approximation, is 2.05×10^{-4} ft/s (6.25×10^{-3} cm/s). This compares favorably with the hydraulic conductivity estimated from the slug test data.

The average linear ground water flow velocity can be determined using the relationship:

$$v = \frac{K}{n}\frac{dh}{dl} \qquad (2)$$

Where:

v = average linear ground water flow velocity.
dh/dl = hydraulic gradient = 0.016
K = hydraulic conductivity = approximately 1.28×10^{-5} feet/second
n = effective porosity = 30% to 50% for sands.

Using the values cited above, the average linear ground water flow velocity is 6.83×10^{-7} feet/second (0.059 feet/day) to 4.10×10^{-7} feet/second (0.035 feet/day).

4.3 Extent of Contamination

4.3.1 Extent of Soil Contamination

Based upon the results of the PID screening and chemical analysis of the soil samples recovered from the soil borings B-1, -2, -3, -4, -5, -6, B-7, and the soil borings associated with the monitor well installation, the extent of soil contamination appears to be confined to that area immediately west of MW-3 (Figure 9). Some soil contamination may exist underneath and adjacent to the storage shed near MW-2 (Figure 3).

The extent of soil contamination is determined from the following observations:

- Warzyn's test pits TP1, TP6, and TP7 encountered contaminated soils.
- Warzyn's soil borings B-1, B-2, and B-3 encountered contaminated soil.
- Warzyn's test pits TP-3, TP-4, and TP-5 did not encounter contaminated soil, based on field screening with PID.
- Delta's soil borings B-1, B-3, B-4, and B-5 encountered contaminated soil while borings B-2 and B-6 did not have contaminated soil.

The soil contamination near MW-3 is well defined horizontally and vertically. The horizontal extent of contamination is shown in Figure 9. The vertical extent of contamination is to the depth of the water table as indicated by the soil samples collected at or just above the water table (Table 3).

The extent of soil contamination near MW-2 is not well defined. However, Warzyn's work identified disperse 1,1,1-trichloroethane and toluene contamination in the area of Warzyn's borings B-1, B-2, and B-3 (Table 1). The concentrations observed by Warzyn in these borings were less than 100 ug/kg. In our opinion, there is not a point source for contamination near MW-2; contamination is primarily from 1,1,1-trichloroethane and appears to be dispersed around the storage shed.

The degree of contamination is greatest near soil borings B-3, B-4, and B-5 (Table 4). Pentachlorophenol (PCP) contamination is highest in B-3 (2400 mg/kg) and significant concentrations were observed in B-4 (240 mg/kg) and B-5 (250 mg/kg). It appears that the highest soil contamination is at a depth of 5-10 feet below grade, based upon the results of the soil samples (Table 3).

The primary contaminants appear to be polyaromatic hydrocarbons (PAHs) (Table 4) that are believed to be associated with dumping from the days when the plant functioned as a wood treating facility. According to the plant manager, and based upon the appearance of the area, no dumping has occurred at this area since the 1940s.

The fuel oil #2 that was detected in soil boring B-5 is probably the medium with which the PCP was applied to the wood. The other contaminants observed in the soil borings are associated with wood treating operations.

In our opinion, the fact that the EPA holding times were exceeded on selected soil samples does not reduce the validity of the chemical data since the sample results appear internally consistent, generally consistent with the data of Warzyn, and consistent with the PID screening. Contamination was not detected in soil boring B-7, which was drilled to provide a check on the values measured in B-5. The most likely explanation for this is that the soil contamination measured in B-5 is laterally variable. Boring B-7 was drilled approximately two feet north of the B-5 location and did not encounter the contamination detected in B-5.

4.3.2 Extent of Ground Water Contamination

Two plumes of contamination have been identified (Figure 10) that coalesce into one plume. This conclusion is based upon the ground water flow direction (Figures 7A and 7B) and the ground water sample results (Table 8).

The first plume originates from the old disposal area adjacent to MW-3 and is characterized primarily by 1,1-dichloroethane, chloroform, 1,1,1-trichloroethane, carbon tetrachloride, ethyl benzene, and locally pentachlorophenol.

The second plume originates from that area bound by MW-2, MW-5, and MW-6A. It is characterized primarily by 1,1,1-trichloroethane and 1,1,2-trichloroethylene.

We have determined that there are three contaminants of greatest concern. These are 1,1,1-trichloroethane, 1,1,2-trichloroethylene, and pentachlorophenol. The Wisconsin and EPA enforcement

limits for all of the contaminants are included in Table 2. The chemical and physical properties of these contaminants are included in Table 9.

The horizontal extent of PCP contamination is shown in Figure 11. This is based upon the lack of PCP contamination in all monitoring wells other than MW-3 and upon the properties of the contaminant itself. Pentachlorophenol is only slightly soluble in water and has a high octanol-water partition coefficient (Kow) (Table 9). These properties serve to inhibit its horizontal migration.

The downgradient extent of the PCP can be estimated by utilizing the retardation equation.

$$R_D = 1 + 3.2\ f\ foc\ (Kow)^{0.72} \rho\ \frac{1-N_t}{N_t} \qquad (3)$$

(Schwarzenbach et al, 1983)

Where:

R_D = retardation coefficient
f = Fraction of material <125 um
foc = fraction of organic carbon on <125 /m material
ρ = bulk density (g/cm^3)
N_t = porosity
K_{ow} = octanol/water partition coefficient

For this site, we assume f = 0.05, f_{oc} = 0.001, and estimate ρ = 2.6 g/cm^3, Nt = 0.30, and Kow for PCP = 100,000 (Table 9). Inserting these values into equation 3 yields a retardation coefficient of 7.62. The movement of the PCP is related to the groundwater flow velocity in this manner.

$$V_S = \frac{V}{Rd} \qquad (4)$$

Where:

V_S = average velocity of solute
V = average linear ground water flow velocity (from equation 2).

This analysis predicts that the PCP contamination will migrate at an average rate of about 2.8 feet per year. If one assumes dumping occurred about 1940, the downgradient extent of the PCP should be about 135 feet. The horizontal extent of PCP contamination in Figure 11 is based upon the above discussion and the results of ground water sampling.

The horizontal extent of 1,1,1-trichloroethane (TCA) contamination is shown in Figure 12. Monitoring wells MW-3, MW-D1, MW-D2, MW-A, MW-6A, MW-6B, and MW-F contain measurable levels of TCA contamination. As illustrated in Figure 12, there appears to be two sources of TCA contamination, the old dumping area adjacent to MW-3 and the area bounded by MW-2, MW-5, and MW-6A.

The extent of 1,1,2-trichloroethylene (TCE) contamination is shown in Figure 13. This is based upon the contamination detected in MW-6A, MW-6B, MW-A, and MW-F. Low levels of TCE were detected in MW-3 (March), MW-D1, and MW-D2 and may be associated with a minor source near MW-3.

In summary, the horizontal extent of ground water contamination has been defined. There are two plumes of contamination emanating from the EIS Brake Parts facility. These plumes contain organic chemicals including 1,1,1-trichloroethane, 1,1,2-trichloroethylene and locally near the site pentachlorophenol.

Due to the very low permeability of the clay aquitard, the observed upward gradients, and the fact that the Milwaukee River is the discharge point for the shallow aquifer, the vertical extent of contamination is confined to the shallow silty-fine sand aquifer in which the monitor wells are screened. Based upon the results of the ground water sampling program, contamination is largely within the upper 10 feet of the shallow aquifer.

5.0 RECOMMENDATIONS

We recommend a soil boring be drilled to the water table at the northernmost corner of the storage shed adjacent to MW-2. Soil samples should be collected continuously to the water table and field screened with a PID. Those samples exhibiting measurable concentrations of contaminants should be analyzed for purgeable halocarbons/aromatics (using EPA Method 601/602). This will provide an accurate determination of the degree of soil contamination adjacent to the storage shed, and verify the data of Warzyn.

The soil boring should be completed as a monitoring well. A water sample should be collected from this well and analyzed for purgeable halocarbons/aromatics (using EPA Method 601/602). This will quantify the amount of contamination originating from the storage shed.

Other than the above recommendations, it is our opinion that the extent of soil and ground water contamination has been adequately defined for this site. We recommend that a Risk Assessment and Feasibility Study be completed for this site. These tasks are necessary to define appropriate remedial actions.

We recommend the existing monitoring wells remain in place until the Risk Assessment and Feasibility Study is completed. Additional water quality and water level data may be needed. and may be useful in monitoring any remedial action.

6.0 METHODS AND PROCEDURES

6.1 Soil Classifications

As the samples were obtained in the field, they were visually and manually classified by the crew chief in accordance with ASTM:D 2488-84. Representative portions of the samples were then returned to the laboratory for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata, the "N" value, water level information, and pertinent information regarding the method of maintaining and advancing the drill hole are attached.

6.2 Soil Sampling

Soil sampling was done in accordance with ASTM:D 1586-84. Using this procedure, a 2 inch O.D. split barrel sampler is driven into the soil by a 140 pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler an additional 12 inches is known as the penetration resistance, or the "N" value. The "N" value is an index of the relative density of cohesionless soils and the consistency of cohesive soils.

6.3 Ground Water Sampling

All monitoring wells were sampled from suspected cleanest to most contaminated according to the following steps.

Field Protocol

Step 1 - Measure water level.

Step 2 - Evacuate three to five volumes with stainless steel bailer.

Step 3 - Collect water samples using a stainless steel bailer.

Step 4 - Cool water samples to 4^{o} and transport to laboratory, following all documentation and Chain of Custody procedures.

Step 5 - Clean equipment. Water level measurement equipment will be cleaned with clean tap water followed by deionized water rinse.

All pertinent information was recorded on a sampling information form.

6.4 Water Level Measurements

All ground water level measurements are obtained by using an electronic measuring device which indicates when a probe is in contact with the ground water in the well. Measurements are obtained by lowering the divide into the well until it indicates that the water surface has been encountered and by measuring the distance from the top of the inside riser pipe to the probe. All of the measurements are recorded to the nearest 0.01 foot; however, the manufacturer's reported accuracy for the instrument is 0.04 foot.

6.5 PID Scan

The following discussion describes the TIP analytical instrument and follows PHOTOVAC, Inc's User Manual, dated October 1986. An hNu instrument functions in a similar manner.

A TIP is an analytical instrument designed to sense certain important impurities in air and other gases. The name TIP stands for "Total Ionizable Present"; this implies that the instrument senses any "ionizable" chemicals. In the case of the TIP, "ionizable" actually means photoionizable. The TIP relies on an internal ultraviolet lamp which photoionizes molecules of certain chemicals. The TIPs ultraviolet lamp has an energy of about 10.6 electron volts (eV) and can detect organic chemicals which enter the air as gases or vapors and have ionization potentials below 10.5 eV, that is, the vast majority of those compounds which are regulated as "Pollutants". Gasoline and some solvent vapors are included in the group of gases detected by the TIP. We utilize the TIP to detect the presence and concentration of organic vapors in soil samples or other samples at the site.

7.0 REMARKS

The recommendations contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

This report was prepared by **DELTA ENVIRONMENTAL CONSULTANTS, INC.**

Kenneth Shimko

Date: 24 August, 1988

Kenneth Shimko
Hydrogeologist/Project Manager

Reviewed by:

Daniel L. Sanville

Date: 8/29/88

Daniel L. Sanville, P.E.
Investigation Department Manager

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TABLE 1

Warzyn Chemical Data
EIS Brake Parts
West Bend, Wisconsin
Delta No. 10-87-285

(Refer to Figure 4 and Appendix A for sample location)

Sample (Sample Depth)	Parameter	Concentrations ug/kg
B1/S5 (14 feet)	1,1,1-trichloroethane	75
B2/S1 (2.5 feet)	Toluene	66.4
B2/S4 (10 feet)	1,1,1-trichloroethane	84.1
B3/S1 (2 feet)	1,1,1-trichloroethane	66.4
C2/S1 (0.4 feet)	1,1,1-trichloroethane	86.7
TP1 - 3 (7 feet)		
	Carbon Tetrachloride	2590
	Chloroform	454
	Ethylbenzene	958
	Tetrachloroethene	1120
	Toluene	2819
	1,1,1-trichloroethane	1100
	Xylenes	8400
	Total Cyanide	10.9
TP2-2 (5 feet)	Total Cyanide	10.9 mg/kg
TP6-1 Dup (2 feet)		
	Benzyl alcohol	240000
	Hexachloroethane	490000
	Benzoic acid	53000 (J)
	Napthalene	4100 (J)
	Hexachlorobutadiene	9500
	Diethylphthalatic	76000
	Di-n-butylphthalate	1100000
	Butyl benzylphthalate	8000000
	Bix (2-ethylhexyl) phthalate	93000
	Di-n-octyl phthalate	90000

(J) Estimated value

TP6-1 Dup (2 feet) (Continued)

Tentatively Identified Compounds

	Parameter	Concentration ug/kg
	Benzene, 1,2 - dimethyl - (or isomer)	1200000
	Methanol, dibutoxy-	210000
	Unknown	31000
	Unknown	46000
	1,2-Benzenedicarboxylic acid	41000
	Unknown	36000
	Unknown	14000
	Unknown	24000
	Unknown	41000
	Benzenesulfonamide, 4-methyl-	320000
	Unknown	73000
	Hexadecanoic acid, 2-methyl-, methyl ester	120000
	Unknown	310000
	Unknown	410000
	Unknown	410000
	Unknown	320000
	1-phenanthrecarboxylic acid, 7-ethenyl-1,2,3,4 (CAS #56051684)	390000
	Unknown	960000
	Unknown	340000
	Unknown	340000
TP7-1 (6 feet)	Cadmium	0.13 (EP TOX)
TP7-2 (9 feet)		
	Naphthalene	13000 (J)
	2-Methylnapthalene	31000
	Pentachlorophenol	21000
	Phenanthrene	5000 (J)
	Xylenes	7000

Tentatively Identified Compounds

Unknown alkane	
Unknown	29000
Unknown alkane	11000
Tridecane	13000
Naphthalene, 1-methyl-	54000
Unknown alkane	23000
Naphthalene, 1,8-dimethyl- Or isomer	12000
Tetradecane	25000
Naphthalene, 1,8-dimethyl- or isomer	58000
Napthalene, 1,5-dimethyl- or isomer	27000

	Parameter	Concentrations (ug/kg)
	Decane, 2,3,6-trimethyl- or isomer	18000
	Pentadecane	59000
	Unknown alkane	45000
	Heptadecane	45000
	Unknown	13000
	Unknown alkane	27000
	Nonadecane	16000
	Unknown alkane	11000
TP7-3 (10 feet)	Carbon tetrachloride	2340
	Ethyl benzene	724
	Xylenes	29200

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TABLE 2

Results of Ground Water Sampling
(data from September 1987)
(Concentrations in ug/L)
EIS Brake Parts
West Bend, Wisconsin
Delta No. 10-87-285

Parameter	MDL	NR[1]	EPA[2]	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	Dup	Trip Blk
Chloroethane	1.0	---	---	---	---	1.2	---	---	---	---	---
Methylene Chloride	1.0	150	---	2.0	1.3	2.5	1.3	---	1.1	1.8	1.8
1,1-dichloroethylene	0.3	.24	7	---	---	5.7	---	---	2.7	---	---
1,1-dichloroethane	0.2	---	---	---	---	66[3]	---	---	1.1	---	---
Chloroform	0.5	---	---	0.6	---	30	0.6	---	1.2	0.7	1.4
1,2-dichloroethane	0.2	.5	5	---	---	0.3	---	---	---	---	---
1,1,1-Trichloroethane	0.5	200	200	---	0.6	180[3]	---	---	180[4]	0.5	---
Carbon Tetrachloride	0.3	---	5	---	---	33	---	---	---	---	---
1,1,2-Trichloroethylene	0.5	1.8	5	---	---	2.8	---	---	230[4]	---	---
Benzene	1.0	.67	5	---	---	---	---	---	---	3.4	---
Toluene	1.0	343	---	---	---	4.9	---	---	---	---	---
Ethyl Benzene	1.0	---	---	---	---	2.4	---	---	---	---	---
2,4-Dichlorophenol	2.4	---	---	---	---	13	---	---	---	---	---
Pentachlorophenol	9.3	---	---	---	---	590	---	---	---	---	---
Bis(2-ethyl hexyl) phthalate	5.0	---	---	6.1	---	---	---	---	---	---	---

MDL - Method Detection Limit
1 - Ground Water Enforcement Standards for Wisconsin. (Preventive Action Limits are lower. Administrative Code NR 140, Ground Water Quality effective October 1, 1987
2 - EPA Maximum Contaminant Levels (MCL) from EPA final rules on Volatile Organic Compounds (52FR25690)
3 - MDL is 2 times higher due to sample dilution
4 - MDL is 5 times higher due to sample dilution

TABLE 3

Results of PID Screening of Soil Borings B-1 to B-7
EIS Brake Parts
West Bend, Wisconsin
Delta No. 10-87-285

Boring	Depth (feet)	PID	Headspace[1]
B-1	0-2	0	1
	2-4	0	0
	4-6	0	0
	6-8	0	0.5
	8-10	0	0(2)
	10-12	4	0
	12-14	1	1.0(2)
B-2	0-2	0	1.0
	2-4	0	1.0
	4-6	0	0.5
	6-8	0	2.2
	8-10	0	0.5
	10-11	0	---(2)
	11-12	0	---(2)
	12-13	0	1.0(2)
B-3	0-2	0	2.0
	2-4	4	---(2)
	4-6	14	5.5(2)
B-4	0-2	0	1.0
	2-4	0	0.5
	4-6	0	0.5
	6-8	6	1.0
	8-10	12	1.0(2)
	10-12	0	1.0
B-5	0-2	0	1.0
	2-4	0	1.0
	4-6	0	1.5
	6-8	50	---
	8-10	140	---(2)
	10-12	50	4.0

B-6	0-2	0	---
	2-4	0	---
	4-6	0	---
	6-8	0	---
	8-10	0	---
	10-12	0	---
	12-14	0	---(2)
B-7	0-2	0	---
	2-4	0	---
	4-6	0	---
	6-8	0	---
	8-10	0	---
	10-12	25	---(2)

(1) "---" headspace measurement of sample not conducted.
(2) sample collected for chemical analysis

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TABLE 4

Results of Soil Sample - Chemical Analysis
EIS Brake Parts
West Bend, Wisconsin
Delta No. 10-87-285

Parameter	MDL	B1	B2	B3	B4	B5	B5-2	B6	B7
Toluene	120 ug/kg	280	ND	ND	ND	750	1200	ND	ND
Ethylbenzene	120 ug/kg	ND	ND	650	ND	ND	ND	ND	ND
Pentachlorophenol	11 mg/kg	ND	ND	2400	240	250	20	ND	ND
Napthalene	5.2 mg/kg	ND	ND	50	200	560	43	--	--
Phenanthrene	7.4 mg/kg	ND	ND	87	170	360	23	--	--
Fluoranthene	6.8 mg/kg	ND	ND	ND	ND	27	ND	--	--
Fluorene	9.0 mg/kg	ND	ND	ND	ND	ND	8.3	--	--
Fuel Oil #2	5.0 mg/kg	---	--	--	--	--	3400	--	--
2,3,7,8 - Tetrachlorodibenzo P - Dioxin	0.3 ug/kg	---	--	--	--	--	ND	--	--

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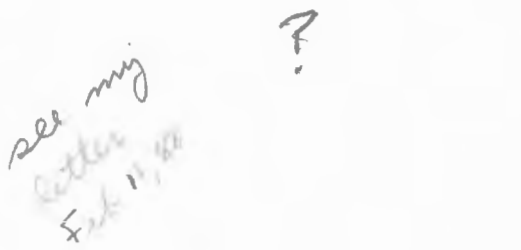

TABLE 5

Ground Water Elevation Measurements
EIS Brake Parts
West Bend, Wisconsin
Delta No. 10-87-285

Well	Top of Riser Elevation (feet)	Depth to Ground Water 9/25/87	5/4/88	5/25/88	6/22/88	GW ELEVATION 9/25/87	5/4/88	5/25/88	6/22/88
MW-1	915.35	10.83	10.86	11.19	11.60	904.52	904.49	904.16	903.75
MW-2	909.88	12.88	11.87	12.71	13.37	897.80	898.01	897.17	896.51
MW-3	914.50	11.69	11.65	12.11	12.47	902.81	902.85	902.39	902.03
MW-4	906.16	3.93	3.85	4.36	4.52	902.23	902.31	901.80	901.64
MW-5	907.82	14.79	14.88	15.33	15.92	893.03	892.94	892.49	891.90
MW6A	906.96	18.32	18.39	18.47	18.82	888.64	888.57	888.49	888.14
MW-6B	906.80	---	18.16	18.21	18.58	---	888.64	888.59	888.22
MW-A	905.50	---	19.69	19.81	20.20	---	885.81	885.69	885.30
MW-C	894.23	---	13.16	13.42	13.80	---	881.07	880.81	880.43
MWD1	913.21	---	20.61	20.98	21.5	---	892.59	892.45	891.70
MWD2	913.40	---	19.94	20.31	20.88	---	893.46	893.09	892.52
MW-E	915.21	---	10.99	11.35	11.72	---	904.22	903.86	903.49
MW-F		---	---	13.28	13.42	---	---	879.77	879.63

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TABLE 6

Vertical Ground Water Gradient Measurements
EIS Brake Parts
West Bend, Wisconsin
Delta No. 10-87-285

		Ground Water Elevation		Vertical Gradient	
Well Nest	Screen Midpoint	5/25/88	6/22/88	5/25/88	6-22-88
MW-6				-8.3×10^{-3}	-6.6×10^{-3}
MW-6A	885.86	888.49	888.14		
MW-6B	873.80	888.59	888.22		
MW-D				-0.057	-0.073
MW-D1	891.21	892.45	891.70		
MW-D2	879.90	893.09	892.52		

TABLE 7

Slug Test Results
EIS Brake Parts
West Bend, Wisconsin
Delta No. 10-87-285

Well	Hydraulic Conductivity (ft/s)
MW-2	1.45×10^{-5}
MW-5	1.16×10^{-5}
MW-6B	1.51×10^{-5}
MW-C	1.60×10^{-5}
MW-D1	6.39×10^{-6}
MW-D2	1.35×10^{-5}

Average = 1.28×10^{-5} feet/second

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NR140 ENFORCEMENT STANDARD LEVELS

TABLE 8A

Results of Ground Water Sampling
March 1988 (ug/l)
West Bend, Wisconsin
Delta No. 10-87-285

Parameter	MDL (ug/l)	NR	EPA	MW-1	MW-2	MW-3/MW3D	MW-4	MW-5	MW6A	MW6B	MWA	MWC	MWD1	MWD2	MWE	MW-F	Travel Blank	Bailer Blank
Methylene Chloride	3.0	150	---	---	---	17/19	---	3.3	18	---	---	---	---	---	---	---	---	3.3
1,1-Dichloroethylene	0.3	.24	7	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---
1,1-Dichloroethane	0.2	850	85	---	---	43/43	---	---	---	---	---	---	---	---	---	---	---	---
Chloroform	0.5	---	---	---	---	24/22	---	---	---	---	---	---	---	---	---	---	---	---
1,1,1-trichloroethane	0.5	200	200	---	---	65/61	---	---	140	9.2	24	---	---	24	2.4	---	---	1.3
Carbon Tetrachloride	0.3	---	5	---	---	35/33	---	---	---	---	---	---	---	---	---	---	---	---
1,1,2-Trichloroethylene	0.5	1.8	5	---	---	2.4/2.1	---	---	78	4.5	300	---	1.7	1.8	0.5	---	---	---
Benzene	1.0	.67	5	---	1.4	---	---	---	3.7	1.4	---	---	---	---	4.2	---	---	---
Chlorobenzene	---	---	---	---	---	6.0/ND	---	---	---	---	---	---	---	---	---	---	---	---
Toluene	1.0	343	---	---	---	4.7/6.4	---	---	---	---	---	---	---	---	---	---	---	---
Ethyl Benzene	1.0	1360 ---	---	---	---	ND/11	---	---	---	---	---	---	---	---	---	---	---	---
PCP Pentachlorophenol	14	---	---	---	---	16,000/ 12,000	---	---	---	---	---	---	---	---	---	---	---	---
1,2-Dichloropropane	0.2	---	---	---	---	---	---	---	---	---	---	---	---	---	0.3	---	---	---

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1,2-dichloroethene?
2,4-dichlorophenol ?
chloroform

TABLE 8B

Results of Ground Water Sampling
May 1988 (ug/l)
West Bend, Wisconsin
Delta No. 10-87-285

Parameter	MDL(ug/l)	NR	EPA	MW-1	MW-2	MW-3	MW-4	MW-5	MW6A	MW6B	MWA	MWC	MWD1	MWD2	MWE	MWF	Blank 1	Blank 3
Methylene Chloride	1.0	150	--	---	---	9.2	---	---	---	---	---	---	1.4	---	1.4	---	---	6.3
1,1-Dichloroethylene	0.3	.24	7	---	---	---	---	---	11	---	---	---	---	0.5	---	---	---	---
1,1-Dichloroethane	0.2	850	85	---	---	43	---	---	---	---	---	---	---	---	---	---	---	---
Chloroform	0.5	--	--	---	---	11	---	---	---	---	---	---	---	0.5	---	---	---	---
1,1,1-Trichloroethane	0.5	200	200	---	---	50	---	---	210	6.5	7.8	---	---	24	3.8	2.8	12	---
Carbon Tetrachloride	0.3	--	5	---	---	14	---	---	---	---	---	---	0.3	---	---	---	---	---
1,1,2-Trichloroethylene	0.5	1.8	5	---	---	---	---	---	180	2.0	180	---	0.5	0.6	---	1.6	---	---
Benzene	1.0	.67	5	---	---	---	---	---	---	---	---	---	---	---	2.9	---	170	---
Toluene	1.0	343	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.9
Ethyl Benzene	1.0	--	--	---	---	7.4	---	---	---	---	---	---	---	---	---	---	---	---
Pentachlorophenol	14	--	--	---	---	590	---	---	---	---	---	---	---	---	---	---	---	---

Blank 1 - Duplicate sample of MWA
Blank 2 was ND for all parameters
Blank 3 - Travel blank
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TABLE 9

Contaminant Chemical and Physical Properties
EIS Brake Parts
West Bend, Wisconsin
Delta No. 10-87-285

Parameter	Density	Water Solubility	Vapor Pressure (mm/hg)	KOW	Boiling Pts
Chloroethane	.9028	Slight	1064		12.5°C
Methylene Chloride	1.3350	Slight	350		40.1°C
1,1-Dichloroethane	1.1796	Slight	182		57.59°C
Chloroform	1.4916	Slight	160		61.2°C
1,2-Dichloroethane	1.2560	Slight	62		84°C
1,1,1-Trichloroethane	1.3492	Insoluble	100		75°C
Carbon Tetrachloride	1.5942	Insoluble	91.3		76.74°C
1,1,2-Trichloroethylene	1.4620	Slight	58	0.20	86.7°C
Benzene	.8787	Slight	77	135	80.1°C
Chlorobenzene	1.105	Slight	8.8		131.6°C
Toluene	.8669	Insoluble	22		110.7°C
Ethyl Benzene	.8672	Insoluble	7.1	1413	136.2°C
Pentachlorophenol	1.978	Slight	nil	$1x10^5$	310°C

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FIGURE 1
SITE LOCATION MAP
EIS BRAKE PARTS
WEST BEND WISCONSIN
DELTA NO. 10-87-285

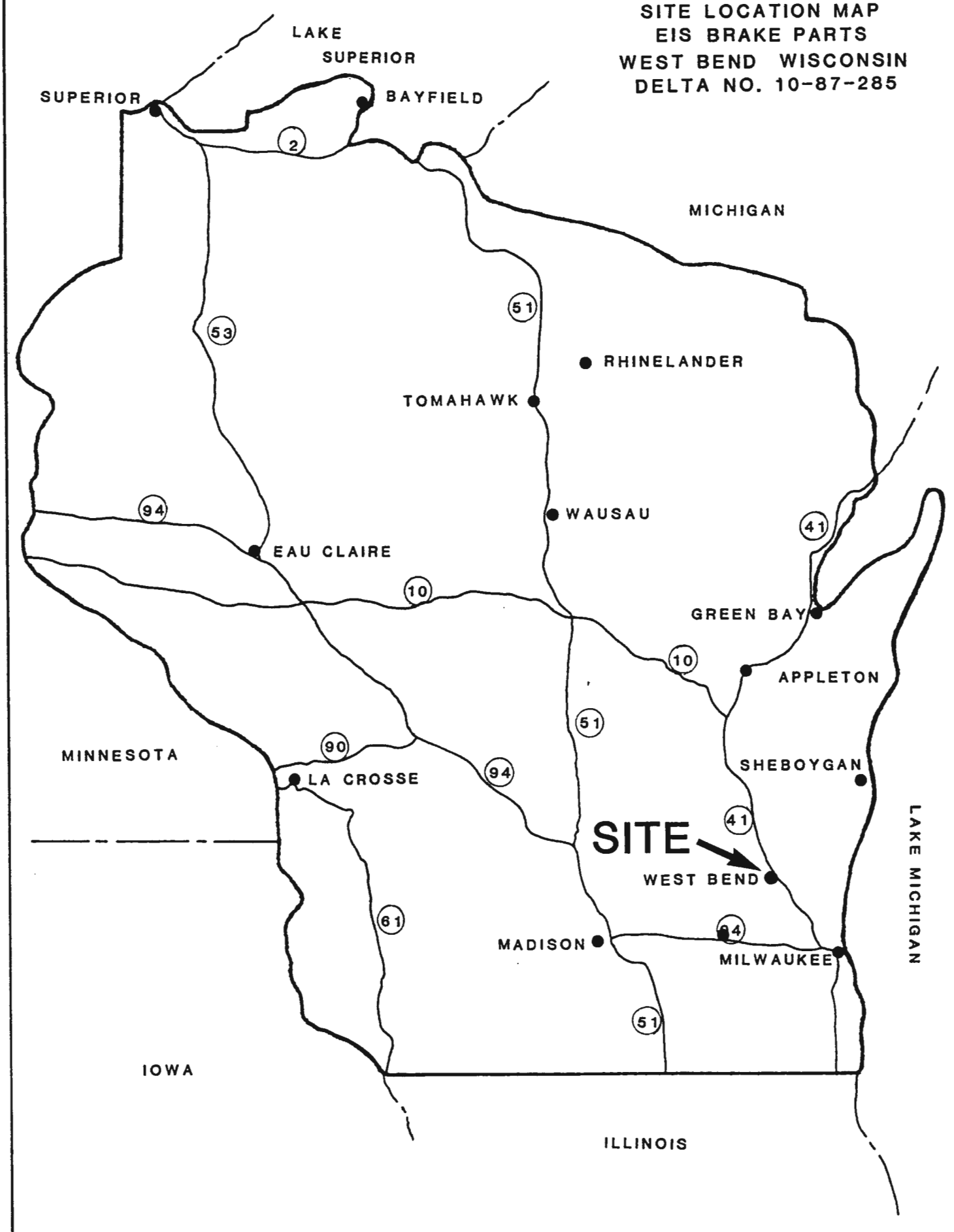

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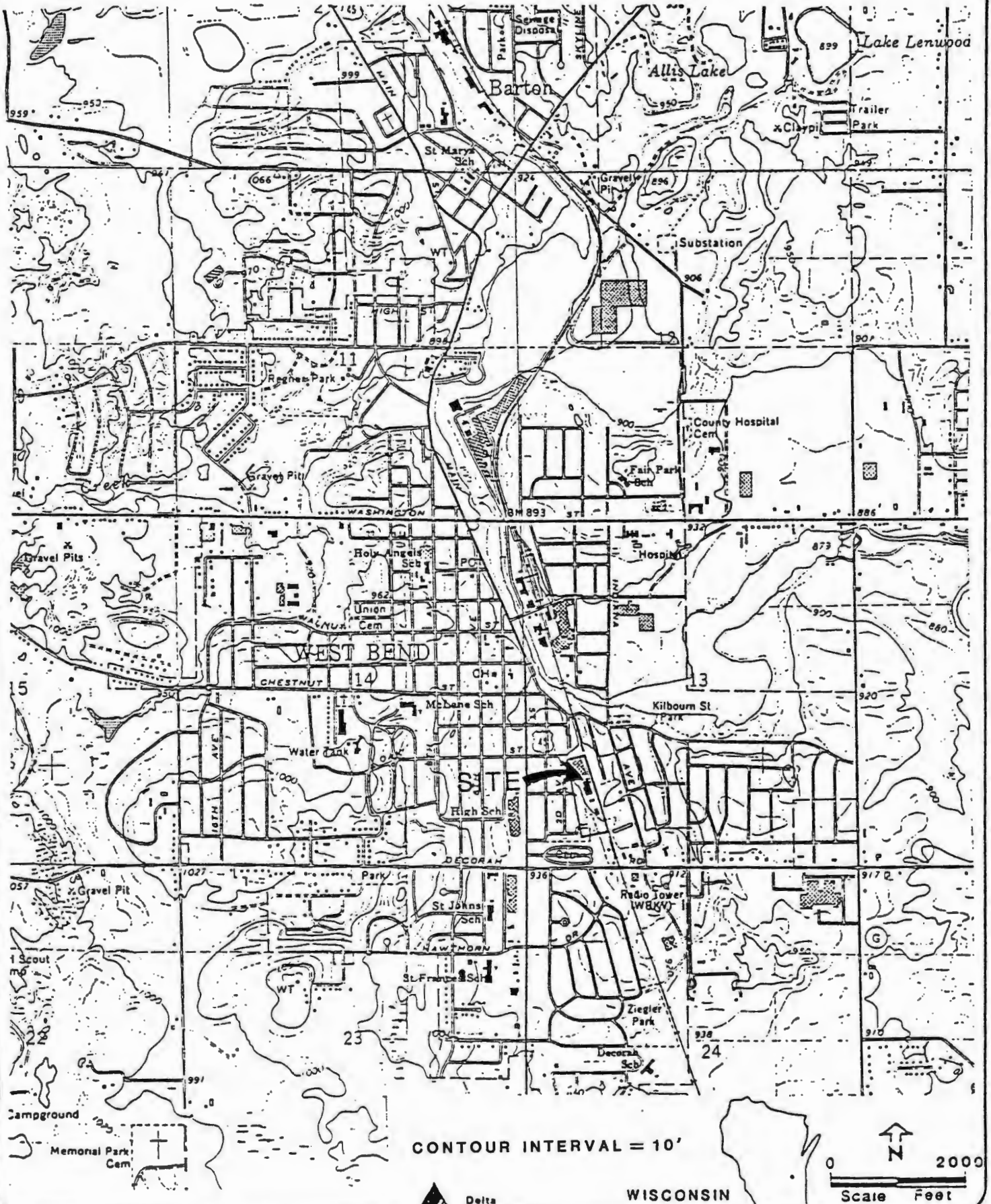
FIGURE 2
TOPOGRAPHIC MAP OF SITE
EIS BRAKE PARTS
WEST BEND, WISCONSIN
DELTA NO. 10-87-285



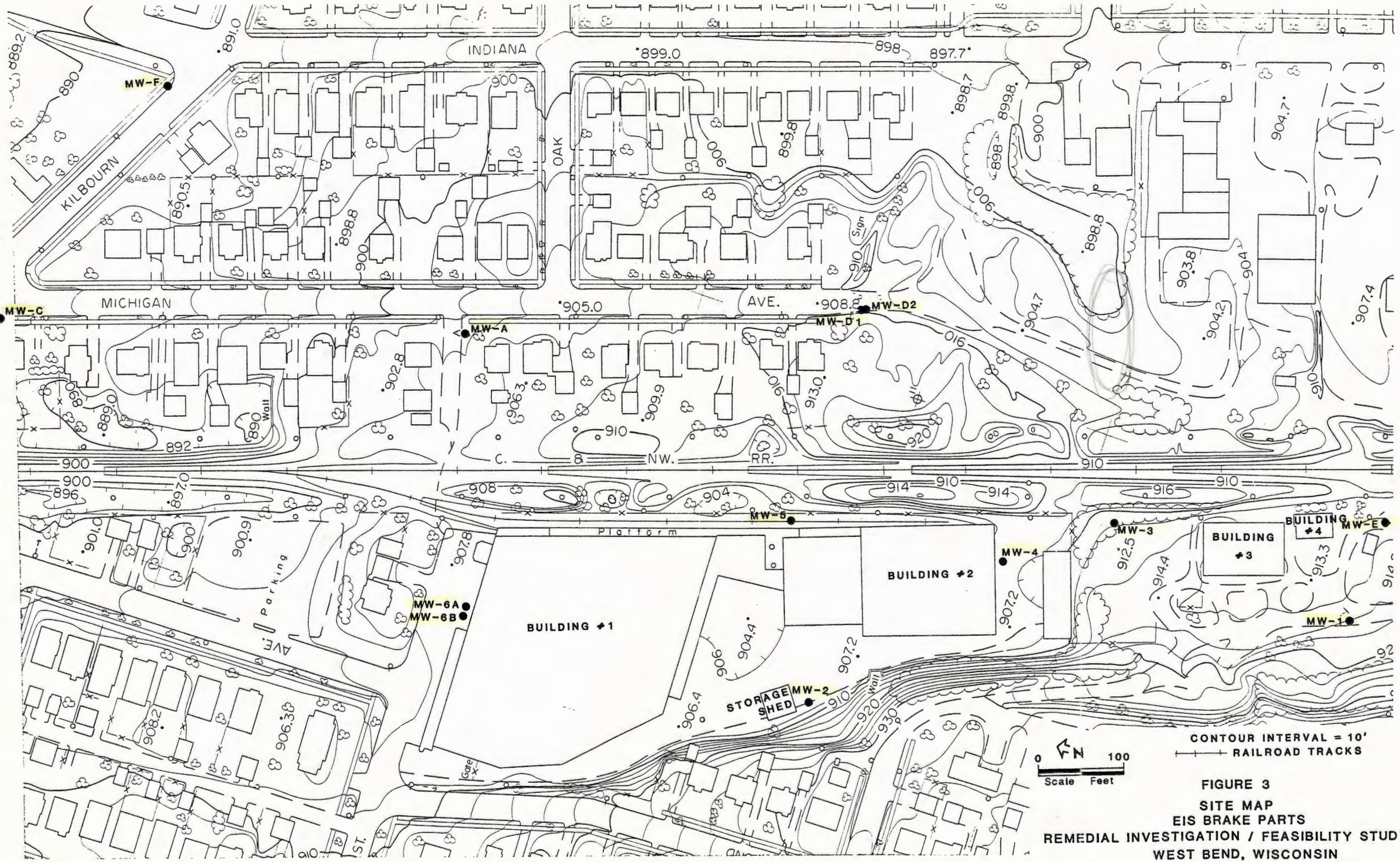


FIGURE 3

SITE MAP
EIS BRAKE PARTS
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
WEST BEND, WISCONSIN
DELTA NO. 10-87-285

FIGURE 4

SAMPLING LOCATIONS FOR WARZYN'S INVESTIGATION EIS BRAKE PARTS WEST BEND, WISCONSIN DELTA NO. 10-87-285

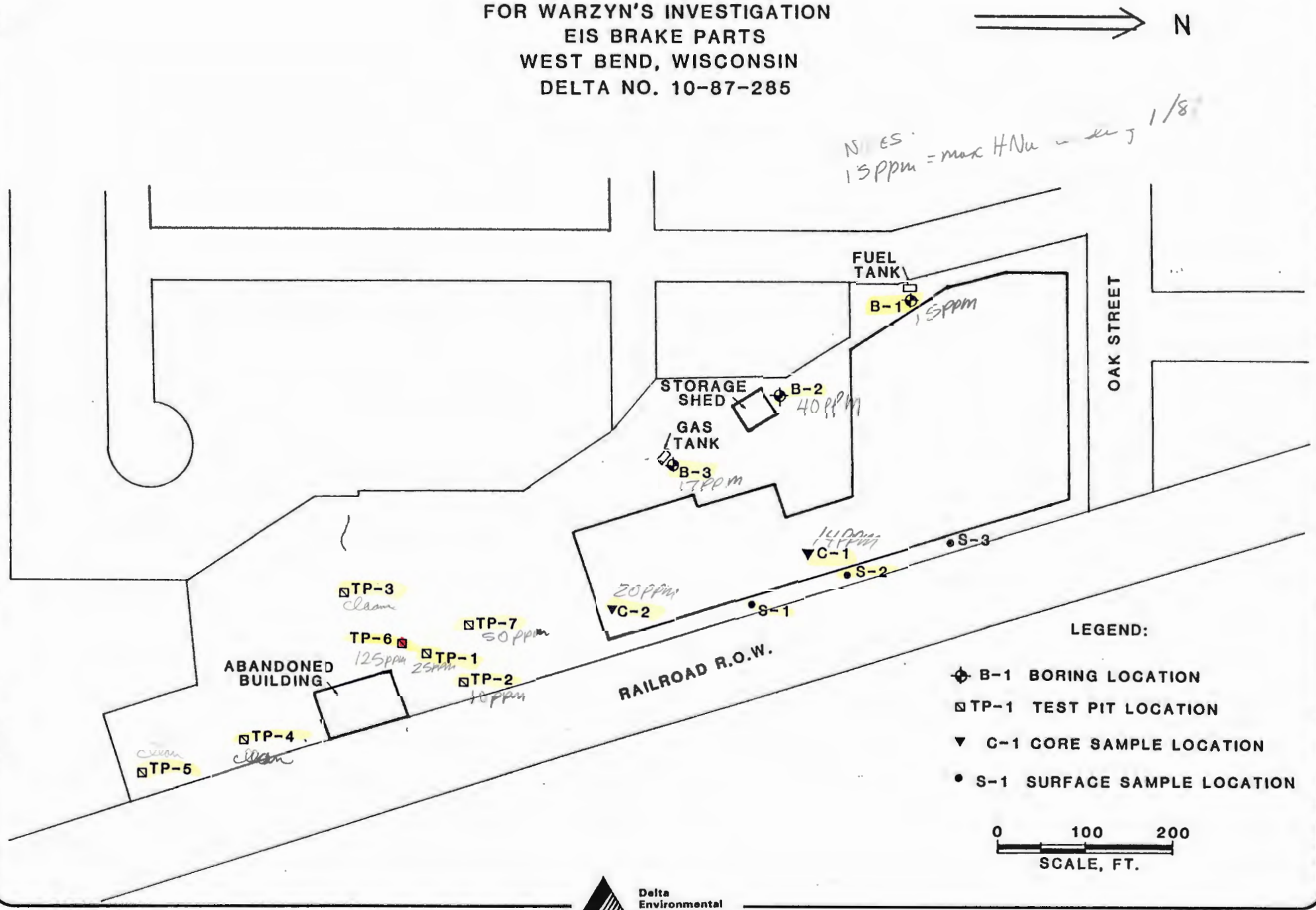


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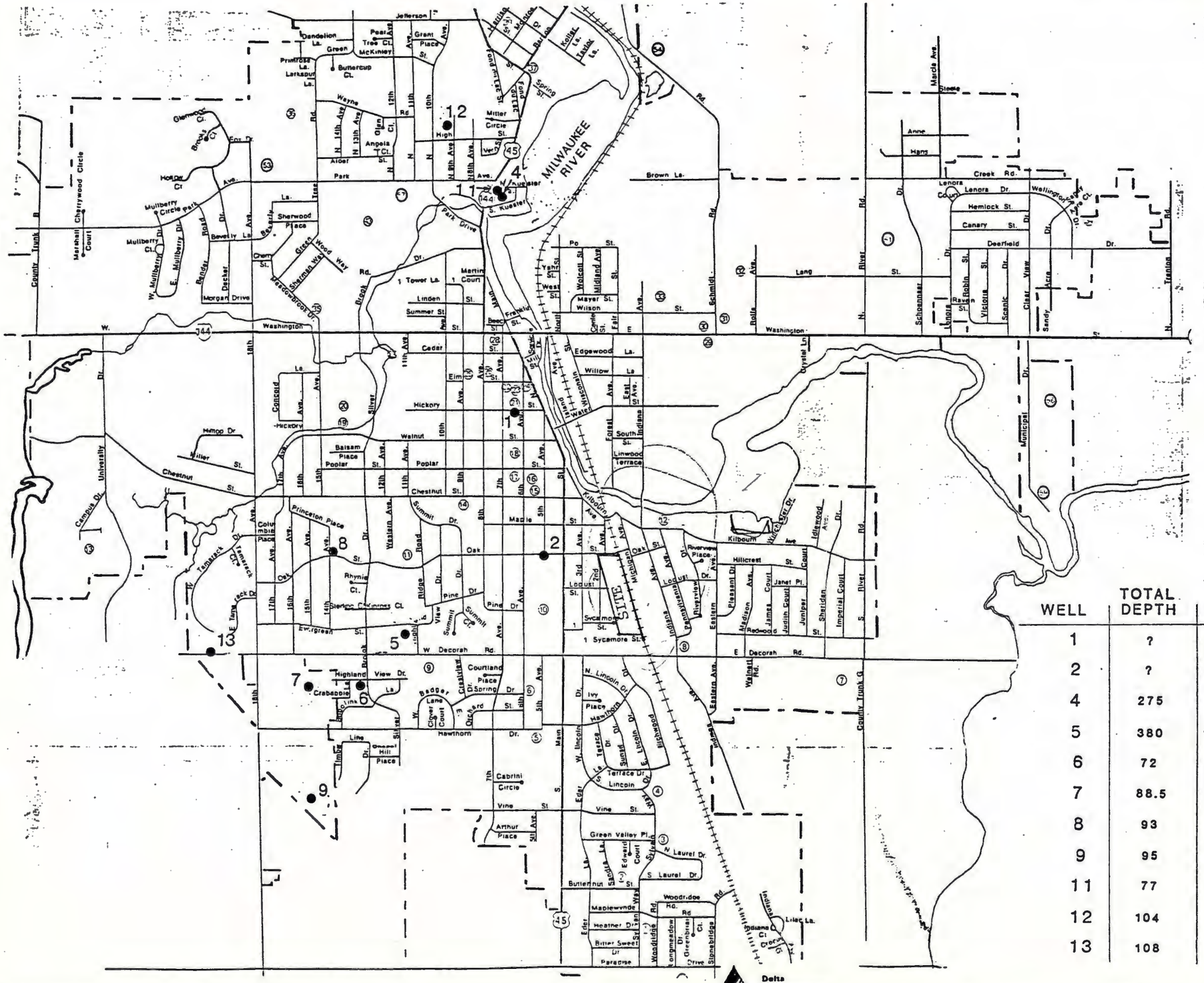
FIGURE 5

WEST BEND CITY WELLS
EIS BRAKE PARTS -
WEST BEND, WISCONSIN
DELTA NO. 10-87-285



WELL	TOTAL DEPTH	COMMENTS:
1	?	SCREENED IN DOLOMITE
2	?	"
4	275	"
5	380	SCREENED IN DOLOMITE
6	72	SCREENED IN SAND & GRAVEL
7	88.5	"
8	93	"
9	95	"
11	77	"
12	104	"
13	108	SCREENED IN SAND & GRAVEL

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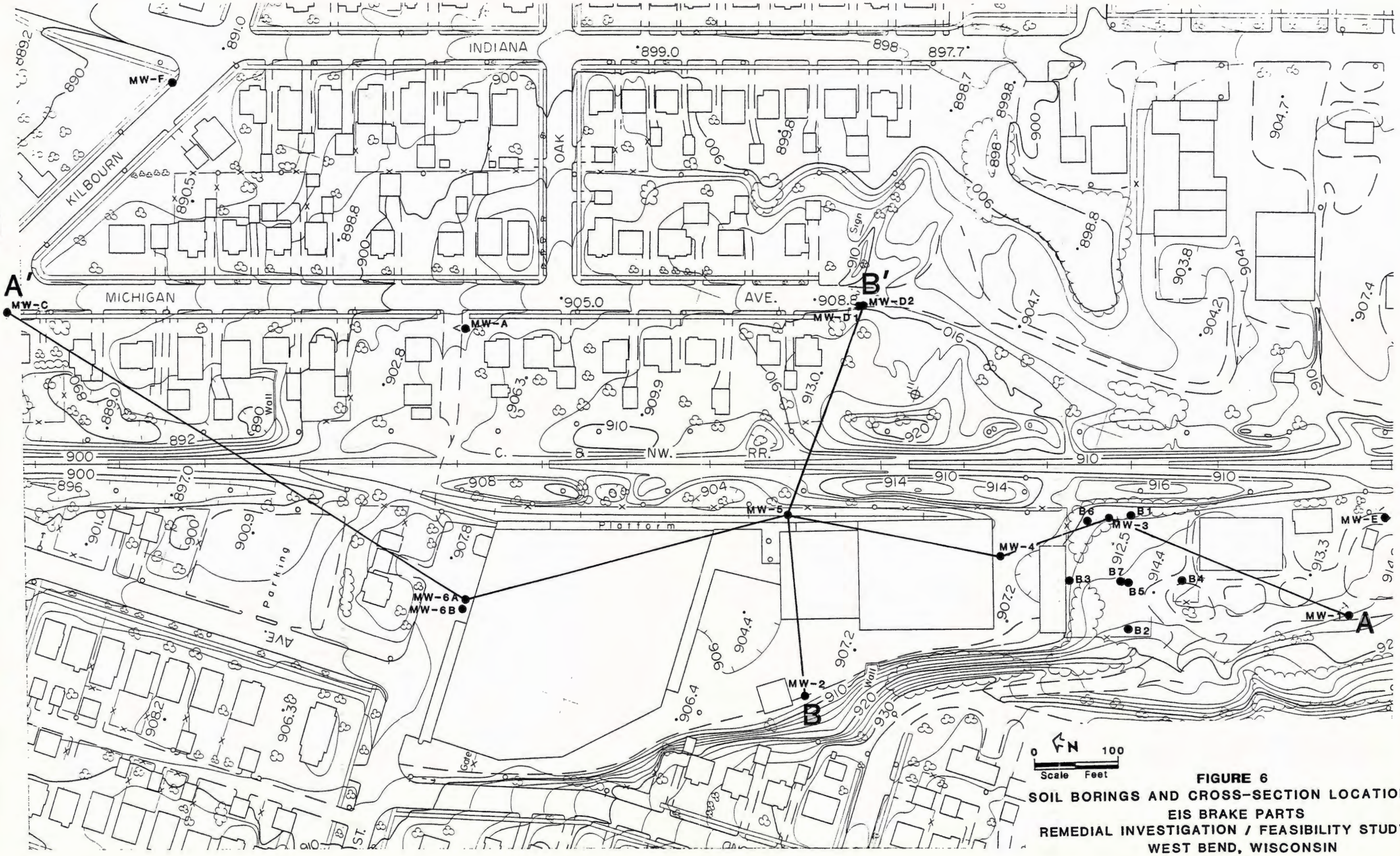

FIGURE 6
SOIL BORINGS AND CROSS-SECTION LOCATIONS
EIS BRAKE PARTS
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
WEST BEND, WISCONSIN
DELTA NO. 10-87-285

FIGURE 7a
GROUND WATER CONTOUR MAP
MAY 1988
EIS BRAKE PARTS
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
WEST BEND, WISCONSIN
DELTA NO. 10-87-285

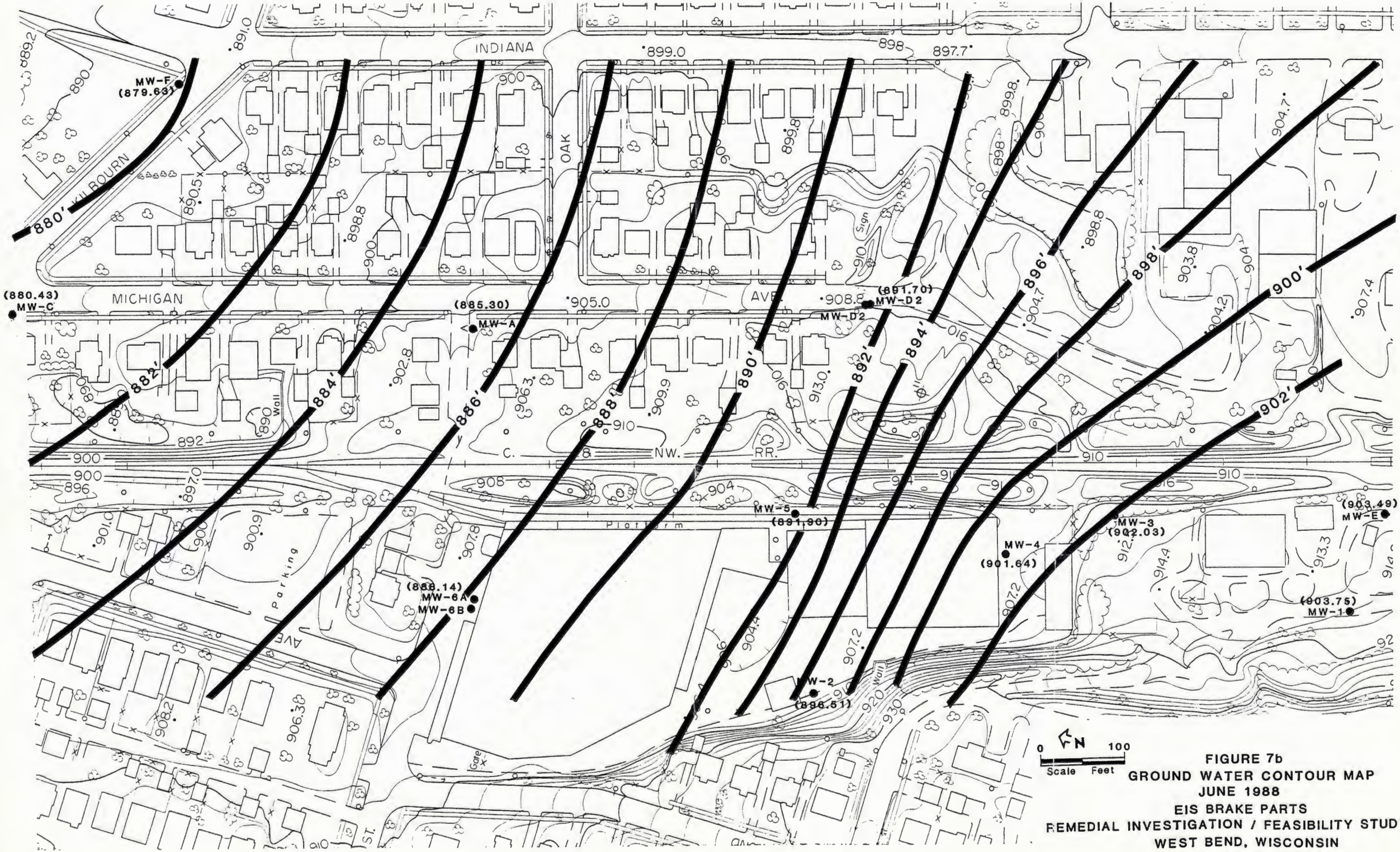

FIGURE 7b
GROUND WATER CONTOUR MAP
JUNE 1988
EIS BRAKE PARTS
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
WEST BEND, WISCONSIN
DELTA NO. 10-87-285

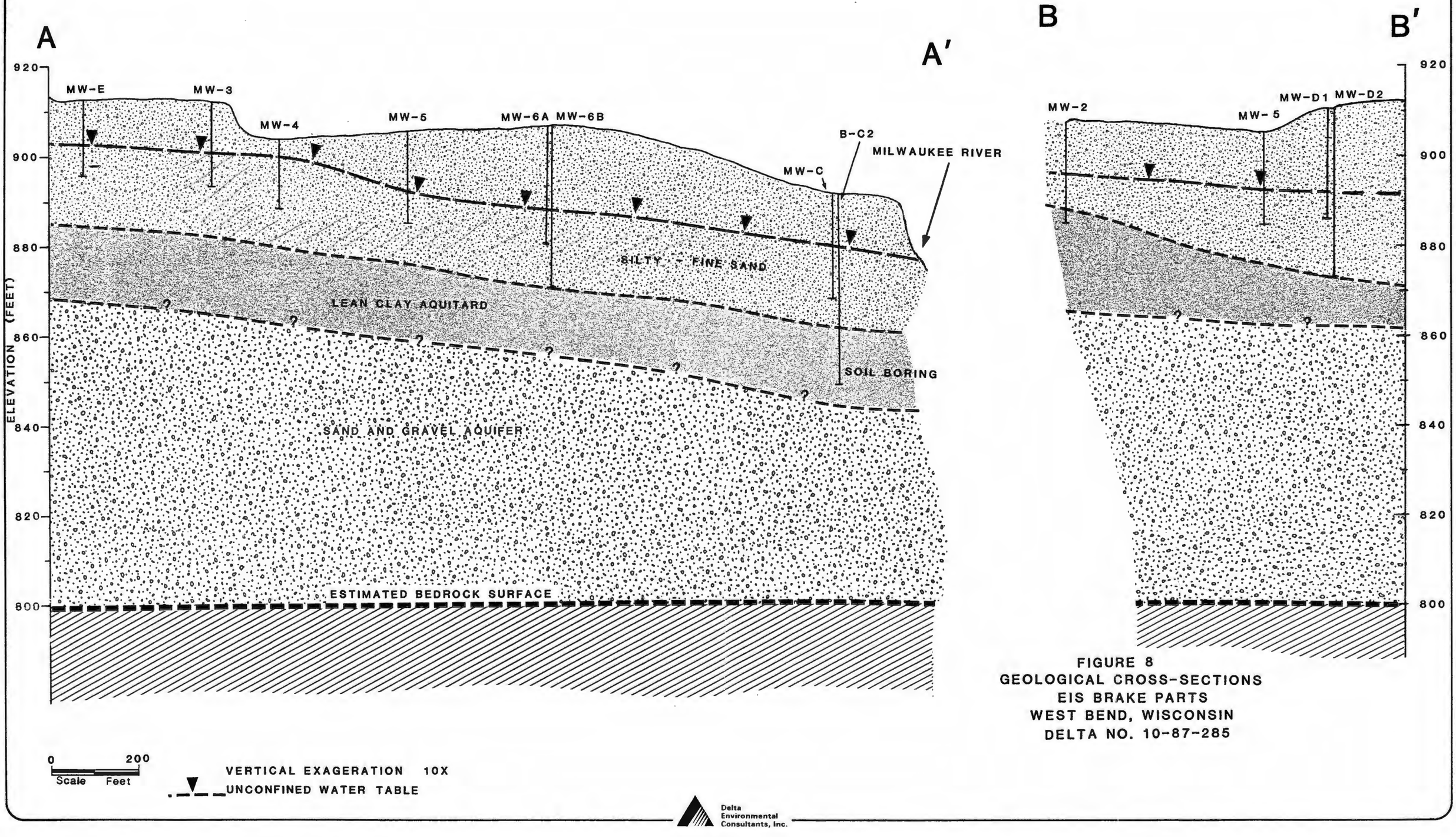

FIGURE 8
GEOLOGICAL CROSS-SECTIONS
EIS BRAKE PARTS
WEST BEND, WISCONSIN
DELTA NO. 10-87-285

Delta Environmental Consultants, Inc.

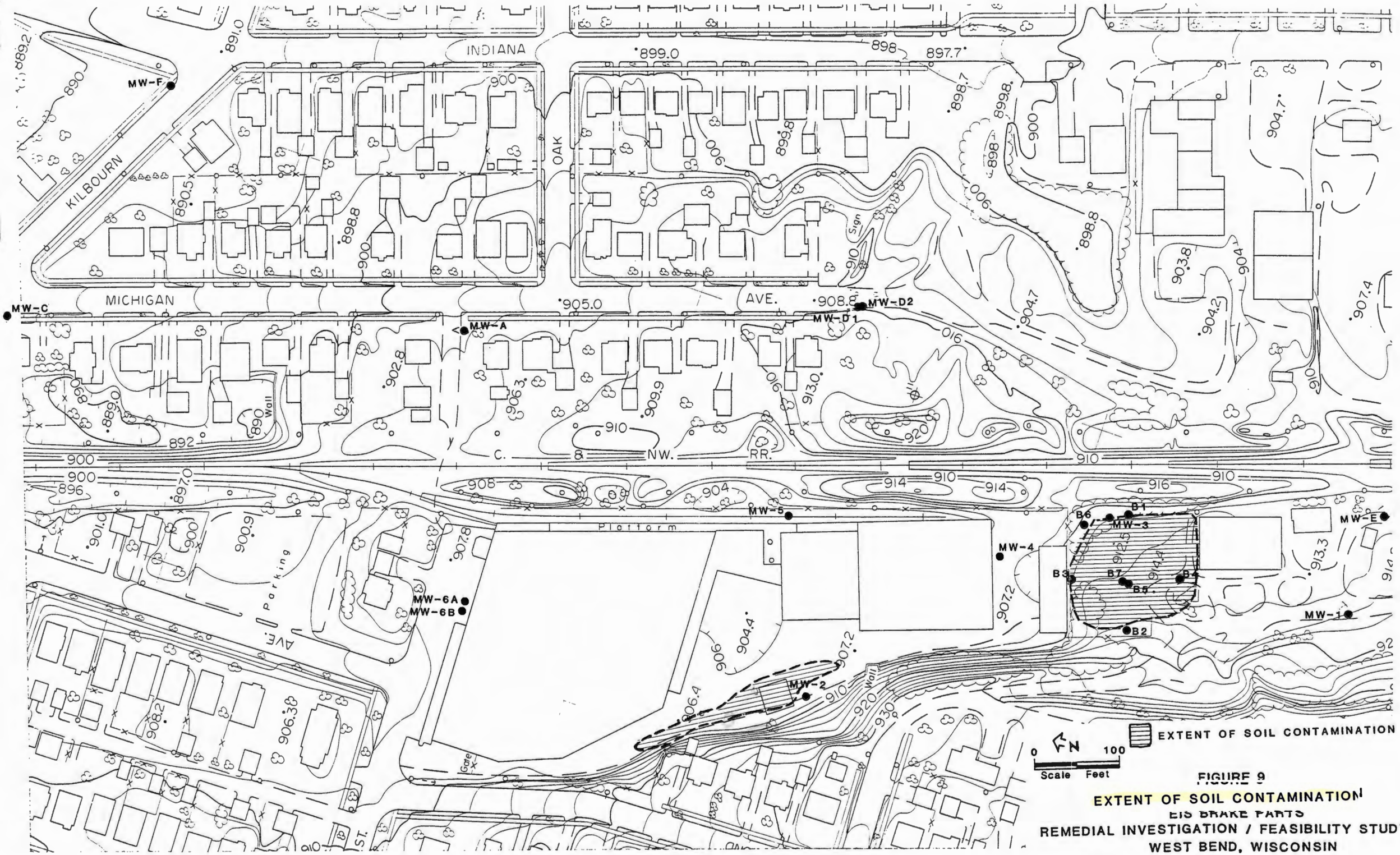

FIGURE 9

EXTENT OF SOIL CONTAMINATION

EIS BRAKE PARTS

REMEDIAL INVESTIGATION / FEASIBILITY STUDY

WEST BEND, WISCONSIN

DELTA NO. 10-87-285

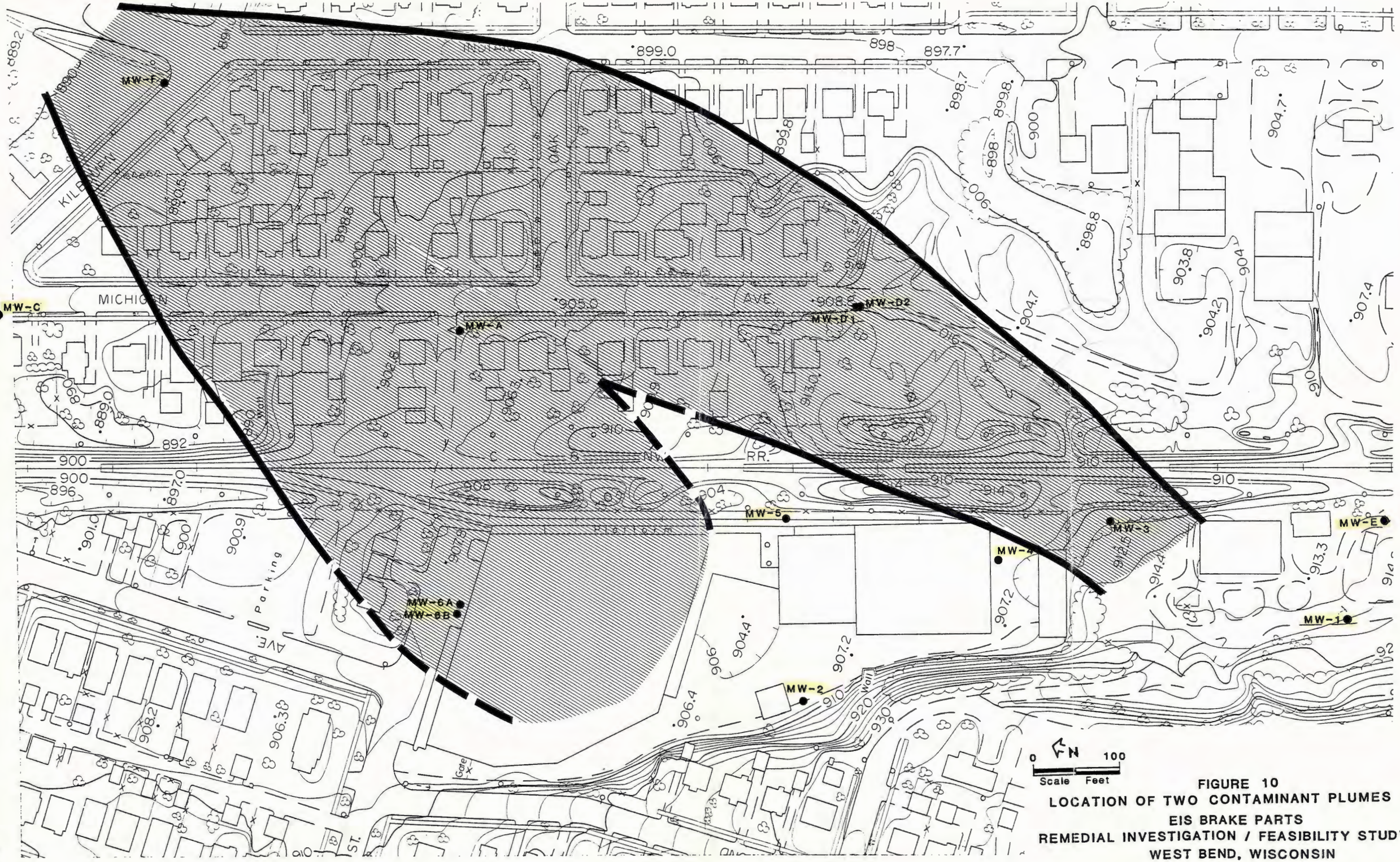

FIGURE 10
LOCATION OF TWO CONTAMINANT PLUMES
EIS BRAKE PARTS
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
WEST BEND, WISCONSIN
DELTA NO. 10-87-285

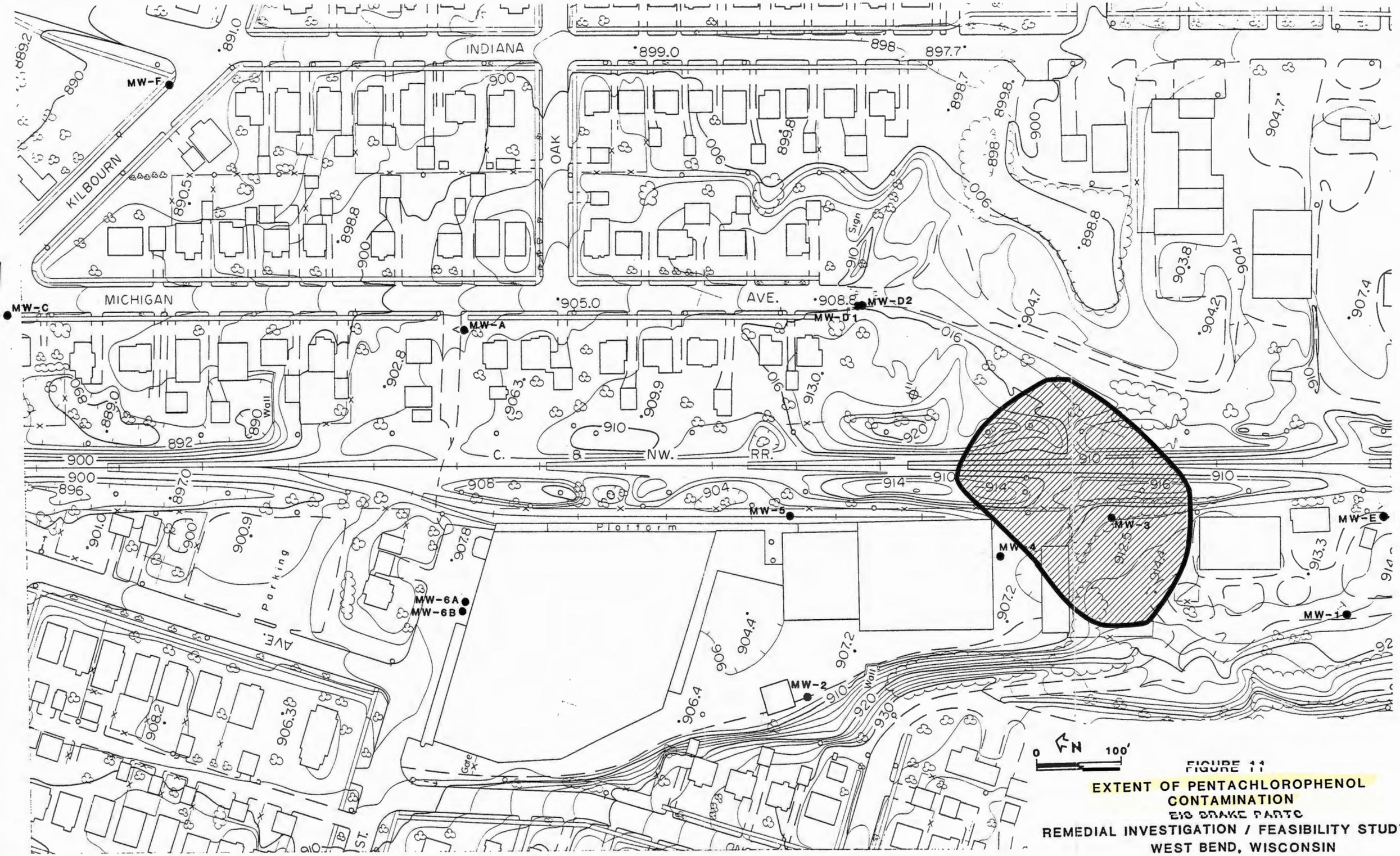

FIGURE 11

EXTENT OF PENTACHLOROPHENOL CONTAMINATION

E10 BRAKE PARTS

REMEDIAL INVESTIGATION / FEASIBILITY STUDY

WEST BEND, WISCONSIN

DELTA NO. 10-87-285

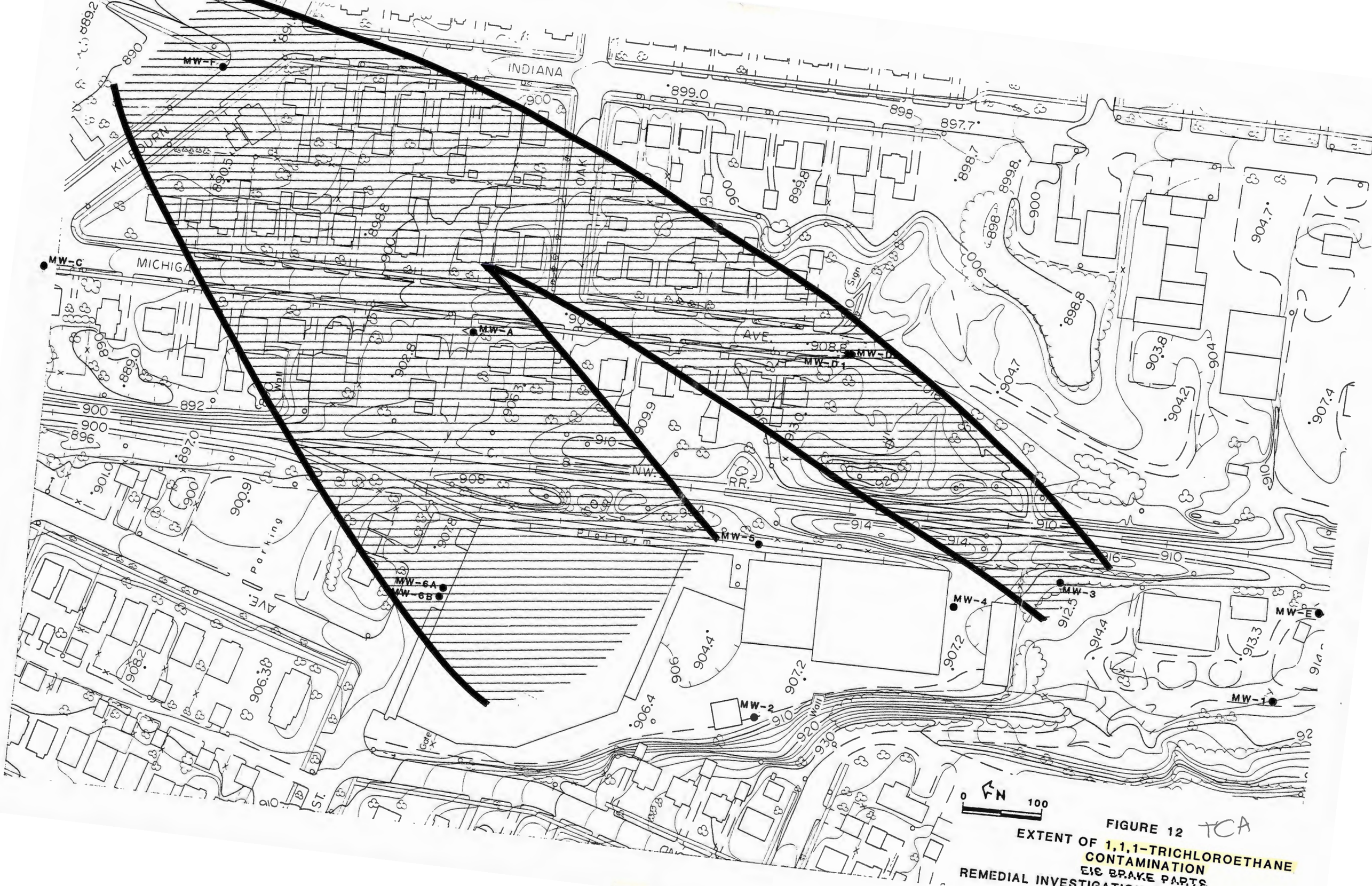

FIGURE 12 TCA

EXTENT OF 1,1,1-TRICHLOROETHANE CONTAMINATION

EIS BRAKE PARTS

REMEDIAL INVESTIGATION / FE

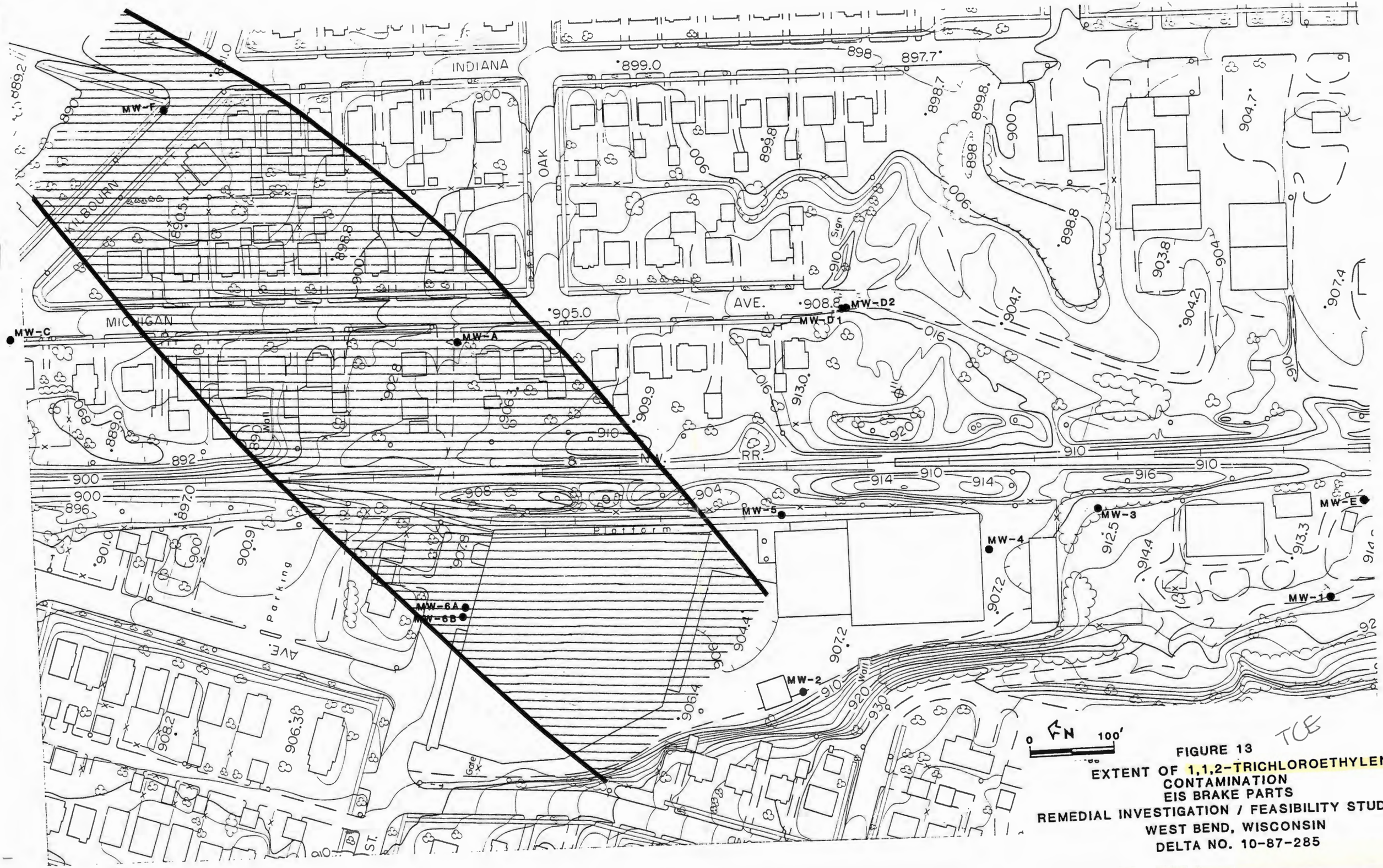

FIGURE 13
EXTENT OF 1,1,2-TRICHLOROETHYLENE CONTAMINATION
EIS BRAKE PARTS
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
WEST BEND, WISCONSIN
DELTA NO. 10-87-285

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Boring No. B-1
Surface Elevation
Job No. MC-205752
Sheet 1 of 1

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE No.	Type	Recovery	Moisture	N	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES UNU PPM	W	LL	PL	D
						FILL: Light brown, fine silty sand, little fine gravel, trace wood chips					
1	SS	12"	M	2			10				
2	SS	10"	M	2	5	Very loose to medium dense, light brown fine SAND; trace silt (SP)	12				
3	SS	14"	M	11			5				
4	SS			21	10		12				
5	SS		W	7	15		15				
						End of Boring - 15.0 Feet					
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling 13.0'
Upon Completion of Drilling
Time After Drilling 1/4 hr.
Depth to Water 12.5'
Elev. 12.5'

GENERAL NOTES

Start 1/9/87 Complete 1/9/87
Crew Chief JOS Rig CME 45
Drilling Method HSA 0-15'

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Boring No. B-2
Surface Elevation
Job No. MC-205752
Sheet 1 of 1

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-8100

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		HNU PPM	W	LL	PL	D
1	SS	18"	M	15		FILL: Mixture of green brown mottled lean clay and dark brown fine silty sand, trace gravel, weak chemical odor	40				
2	SS	1"	W	8	5		17				
3	SS	18"	M	7		FILL: Brown sandy clay/clayey sand, with seams of silty/sand, trace gravel	9				
4	SS	18"	W	13	10	Medium dense, light brown fine to coarse SAND; little silt, trace to little fine gravel (SP-SM)	12				
5	SS	18"	W	19	15	End of Boring - 15.0 Feet	13				
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling 12.0'
Upon Completion of Drilling
Time After Drilling 1/4 hr.
Depth to Water 12.0'
Depth to Cave In 12.0'

GENERAL NOTES

Start 1/9/87 Complete 1/9/87
Crew Chief JOS Rig CME 45
Drilling Method HSA 0-15'

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Boring No. B-3
Surface Elevation
Job No. MC-205752
Sheet 1 of 1

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE No.	Type	Recovery	Moisture	N	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES HNU PPM	W	LL	PL	D
1	SS	18"	M	12		Medium dense to dense, light brown fine SAND; trace silt, trace gravel, occasional cobbles (SP)	13				
2	SS	18"	M	20	5	Weak chemical odor present in 2.5', 5.0' samples	17				
3	SS	18"	M	50			5				
4	SS	18"	W	35	10		12				
5	SS	18"	M	7	15	Gray lean CLAY; trace gravel (CL)	7				
						End of Boring - 15.0 Feet					
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling 8.5'
Upon Completion of Drilling
Time After Drilling
Depth to Water
Depth to Cave In

GENERAL NOTES

Start 1/9/87 Complete 1/9/87
Crew Chief JOS Rig CME 45
Drilling Method HSA 0-15'

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Boring No. C-1
Surface Elevation
Job No. MC-205752
Sheet ____ of ____

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
	Recovery		Moisture								
No.	Type	↓	↓	N	Depth		HNU PPM	W	LL	PL	D
						6" Core CONCRETE					
					1	Brown sand and gravel, trace broken cast iron and foundry sand					
					2						
					3	Brown silty SAND					
							14				
					4	CONCRETE FLLOOR					
						Boring 35" North of Wall 65' East of Loading Dock #4					
					5						
					6						
					7						
					8						
					9						
					10						

WATER LEVEL OBSERVATIONS

While Drilling
Upon Completion of Drilling
Time After Drilling
Depth to Water
Depth to Cave In

GENERAL NOTES

Start ..... Complete .....
Crew Chief ..... Rig .....
Drilling Method .....
.....
.....

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Boring No. C2
Surface Elevation
Job No. MC-205752
Sheet 1 of 1

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	M	Depth	4" CONCRETE	HNU PPM	W	LL	PL	D
						CONCRETE					
1	M	--	--	--	0.5		20				
						Brown fine SAND; little silt (SP-SM)					
2	M	--	--	--	1.0		12				
3	M	--	--	--	1.5		12				
4	M	--	--	--	2.0		10				
5	M	--	--	--	2.5		12				
						Light brown fine SAND; trace silt (SP)					
					3.0	End of Boring - 2.8 Feet					

WATER LEVEL OBSERVATIONS

While Drilling
Upon Completion of Drilling
Time After Drilling
Depth to Water

GENERAL NOTES

Start ..... Complete .....
Crew Chief ..... Rig .....
Drilling Method .....

WARZYN ENGINEERING INC

LOG OF TEST PIT

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Pit No. 1
Surface Elevation NA
Job No. MC-205752
Date

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-8100

SAMPLE No.	Recovery Type	Moisture	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES UNU PPM	W	LL	PL	D
			1	6" FROZEN GRAVEL AND PEBBLES					
				FILL: Light brown, very fine gray sand, trace of pebbles					
		M	2	A foundry brick encountered @ 5'					
			3						
			4						
	G	M	5		25				
	G	M	6	FILL: Gray fine sand	25				
	G	M/W	7	WOOD CHIPS: Black, brown, odor @ 8' wood appears cleaner, grading with sand	25				
			8						
			9	FILL: Fine moist, wet, gray sand					
			10						
	G	W	11		25				
			12	Brown fine SAND					
			13	Total Pit Depth 12' (18" x 13")					
			14						
			15						
			16						
			17						
			18						
			19						
			20						

WATER LEVEL OBSERVATIONS

ile Excavating 11.5'
Upon Completion of Excavating
ae After Excavating
th to Water
Depth to Cave In

GENERAL NOTES

Equipment Used: Backhoe

Geologist:

WARZYN ENGINEERING INC

LOG OF TEST PIT

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Pit No. 2
Surface Elevation
Job No. MC-205752
Date 1/9/87

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE No.	Recovery Type	Recovery ↓	Moisture ↓	Moisture	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES Unit PP	W	LL	PL	D
					1	6" FROZEN GRAVEL AND PEBBLES					
						FILL: Light brown, fine grained sand, trace of moist clay					
			M		2						
					3						
					4						
			M		5						
					6						
					7						
			M		8						
	G				9	WOOD CHIPS: Brown, slight odor, to moist to wet fine GRAY SAND @ 8.5'	10				
2	G		M		10		3				
					11						
					12	TOPSOIL: Black silty soil, root and fibrous, odor, trace of fine brown black sand					
					13						
					14	Total Pit Depth 11.5' (18" x 13")					
					15						
					16						
					17						
					18						
					19						
					20						

WATER LEVEL OBSERVATIONS

While Excavating
Upon Completion of Excavating
Time After Excavating
Depth to Water
Depth to Cave In

GENERAL NOTES

Equipment Used:

Geologist:

WARZYN ENGINEERING INC

LOG OF TEST PIT

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Pit No. 3
Surface Elevation
Job No. MC-205752
Date

2448 SOUTH 102ND STREET, SUITE 100, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE Type	Recovery	Moisture		Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu	W	LL	PL	D
				1	FILL: Black brown fibroud fill, thin black plastic chips					
				2	Light brown fine SAND					
				3						
				4						
				5						
				6						
				7						
				8	Total Pit Depth 7' (18" X 13")					
				9	NOTE: Asphalt chunks in area					
				10						
				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

WATER LEVEL OBSERVATIONS

While Excavating
Upon Completion of Excavating
Time After Excavating
Depth to Water
Depth to Cave In

GENERAL NOTES

Equipment Used:

Geologist:

NARZYN ENGINEERING INC

LOG OF TEST PIT

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Pit No. 4
Surface Elevation
Job No. MC-205752
Date

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE No.	Recovery Type	Moisture	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu	W	LL	PL	D
			1	Brown silty SAND; interbedded with traces of red brown silty clay					
		M	2						
			3	Light gray - light brown SAND					
			4						
		M	5						
			6						
			7						
		M	8						
			9						
		M/W	10						
			11						
			12	Total Pit Depth 11' (18" x 13")					
			13						
			14						
			15						
			16						
			17						
			18						
			19						
			20						

WATER LEVEL OBSERVATIONS

While Excavating
Upon Completion of Excavating
Time After Excavating
Depth to Water
Depth to Cave In

GENERAL NOTES

Equipment Used:

Geologist:

WARZYN ENGINEERING INC

LOG OF TEST PIT

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Pit No. 5
Surface Elevation
Job No. MC-205752
Date

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-8100

SAMPLE No.	Recovery Type	Recovery ↓	Moisture ↓	Moisture	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qp	W	LL	PL	D
					1	FILL: Concrete, asphalt, gravel, sand					
			M		2						
					3						
					4						
			M		5						
					6	Light brown, fine SAND; with trace of silty clay					
					7						
			M		8						
					9	Total pit depth 8'					
					10						
					11						
					12						
					13						
					14						
					15						
					16						
					17						
					18						
					19						
					20						

WATER LEVEL OBSERVATIONS

While Excavating
Upon Completion of Excavating
Time After Excavating
Depth to Water
Depth to Cave In

GENERAL NOTES

Equipment Used:

Geologist:

VARZYN ENGINEERING INC

LOG OF TEST PIT

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Pit No. 6
Surface Elevation
Job No. MC-205752
Date 1/9/87

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Recovery Type	Recovery	Moisture	Depth		HNU PPM	W	LL	PL	D
				1	2-4" FROZEN GRAVEL FILL: Light brown, light gray, fine sand					
				2	@ 2 1/2' multi-colored glue like substance strone odor (Glob of glue 2' x 3')					
G				3	@ 4-4 1/2' Fine black silty sand	125				
				4						
				5						
				6	Light brown fine SAND					
				7						
				8						
				9						
				10						
				11	Total pit depth 10' (13" x 13")					
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

WATER LEVEL OBSERVATIONS

While Excavating 10'
Upon Completion of Excavating
Time After Excavating
Depth to Water
Depth to Cave In

GENERAL NOTES

Equipment Used: Backhoe

Geologist:

VARZYN ENGINEERING INC

LOG OF TEST PIT

Project: Crivello Audit
133 Oak Street
Location: West Bend, Wisconsin

Pit No. 7
Surface Elevation
Job No. MC-205752
Date 1/9/87

2448 SOUTH 102ND STREET, SUITE 130, MILWAUKEE, WI 53227 • TELEPHONE (414) 321-0100

SAMPLE Type	Recovery	Moisture		Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES OVM PPM	W	LL	PL	D
				1	FILL: Light brown, light gray fine sand					
		M		2						
				3						
				4						
		M		5						
				6						
G		M		7	WOOD CHIPS: Black, brown, odor	30				
				8	FILL: Light brown, light gray fine sand					
				9						
G		M		10	TOPSOIL: Black silty sand	40				
		W		11	Light gray, fine SAND and GRAVEL	50				
				12						
				13	Total depth 12 1/2' (18" x 13")					
				14						
				15						
				16						
				17						
				18						
				19						
				20						

WATER LEVEL OBSERVATIONS

Encountered Excavating 11.5'
Upon Completion of Excavating
Time After Excavating
Caved Water
Caved to Cave In

GENERAL NOTES

Equipment Used:

Geologist:

WARZYN ENGINEERING
ANALYTICAL LABORATORY RESULTS

PROJECT: WARZYN ENGINEERING INC.
WEST BEND AUDIT
LOCATION: MILWAUKEE, WISCONSIN

PROJECT#: 205752
DATE SAMPLED: 01/09/87
CK'D: CAW APP'D: MJL
DATE ISSUED: 2-3-87 LARRY JOY

LAB #	SAMPLE DESCRIPTION	TOTAL CYANIDE	PHENOLS
13979	TP2 - 2	10.9	<2.43

RESULTS ARE REPORTED IN MG/KG AS RECEIVED.

WARZYN ENGINEERING
VOLATILE ORGANIC COMPOUND RESULTS
PROJECT: WEST BEND AUDIT
LOCATION: MILWAUKEE, WISCONSIN
C#: 205752

COMPOUND (UNITS: UG/KG)	13976 TP1-3 01/09/87	13983 TP7-2 01/09/87	13984 TP7-3 01/09/87	13985 DRAIN 1 01/09/87	13986 DRAIN 2 01/09/87
BENZENE	<250	<500	<500	<50	<50
BROMODICHLOROMETHANE	<250	<500	<500	<50	<50
BROMOFORM	BMDL(<500)	<1000	<1000	<100	<100
CARBON TETRACHLORIDE	2590	<500	2340	BMDL(<50)	<50
CHLOROBENZENE	<250	<500	<500	<50	<50
CHLORODIBROMOMETHANE	<250	<500	<500	<50	<50
CHLOROETHANE	<250	<500	<500	<50	<50
2-CHLOROETHYVINYL ETHER	<5000	<10000	<10000	<1000	<1000
CHLOROFORM	454	<500	<500	<50	<50
1,2-DICHLOROBENZENE	<1250	<2500	<2500	<250	<250
1,3-DICHLOROBENZENE	<1250	<2500	<2500	<250	<250
1,4-DICHLOROBENZENE	<1250	<2500	<2500	<250	<250
1,1-DICHLOROETHANE	BMDL(<250)	<500	<500	<50	<50
1,2-DICHLOROETHANE	<250	<500	<500	<50	<50
1-1-DICHLOROETHENE	<250	<500	<500	<50	<50
1,2-DICHLOROETHENE	<250	<500	<500	<50	<50
T-1,3-DICHLOROPROPENE	<250	<500	<500	<50	<50
C-1,3-DICHLOROPROPENE	<250	<500	<500	<50	<50
1,2-DICHLOROPROPANE	<250	<500	<500	<50	<50
ETHYLBENZENE	958	<500	724	<50	BMDL(<50)
METHYL BROMIDE	<500	<1000	<1000	<100	<100
METHYL CHLORIDE	<250	<500	<500	<50	<50
METHYLENE CHLORIDE	<250	<500	<500	<50	<50
1,1,2,2-TETRACHLOROETHANE	<250	<500	<500	<50	<50
TETRACHLOROETHENE	1120	<500	<500	<50	<50
TOLUENE	2819	<500	<500	<50	<50
1,1,1-TRICHLOROETHANE	1100	<500	<500	<50	BMDL(<50)
1,1,2-TRICHLOROETHANE	<250	<500	<500	<50	<50
TRICHLOROETHENE	BMDL(<250)	<500	<500	<50	<50
VINYL CHLORIDE	<250	<500	<500	<50	<50
XYLENES	8400	7000	29200	<50	<50

BMDL = DETECTED, BUT LESS THAN REPORTED DETECTION LIMIT.

WARZYN ENGINEERING
VOLATILE ORGANIC COMPOUND RESULTS
PROJECT: WEST BEND AUDIT
LOCATION: MILWAUKEE, WISCONSIN
C#: 205752

To Larry [illegible] 2-3-87

COMPOUND (UNITS: UG/KG)	13994 B1/S5 01/09/87	13995 B2/S1 01/09/87	13998 B2/S4 01/09/87	14001 B3/S1 01/09/87	14006 C2/S1 01/09/87
BENZENE	<50	<50	<50	<50	<50
BROMODICHLOROMETHANE	<50	<50	BMDL(<50)	<50	<50
BROMOFORM	<100	<100	BMDL(<100)	<100	<100
CARBON TETRACHLORIDE	<50	<50	<50	<50	<50
CHLOROBENZENE	<50	<50	<50	<50	<50
CHLORODIBROMOMETHANE	<50	<50	BMDL(<50)	<50	<50
CHLOROETHANE	<50	<50	<50	<50	<50
2-CHLOROETHYVINYL ETHER	<1000	<1000	<1000	<1000	<1000
CHLOROFORM	<50	<50	<50	<50	<50
1,2-DICHLOROBENZENE	<250	<250	<250	<250	<250
1,3-DICHLOROBENZENE	<250	<250	<250	<250	<250
1,4-DICHLOROBENZENE	<250	<250	<250	<250	<250
1,1-DICHLOROETHANE	<50	<50	<50	<50	<50
1,2-DICHLOROETHANE	<50	<50	BMDL(<50)	<50	<50
1-1-DICHLOROETHENE	<50	<50	<50	<50	<50
1,2-DICHLOROETHENE	<50	<50	<50	<50	<50
T-1,3-DICHLOROPROPENE	<50	<50	<50	<50	<50
C-1,3-DICHLOROPROPENE	<50	<50	<50	<50	<50
1,2-DICHLOROPROPANE	<50	<50	BMDL(<50)	<50	<50
ETHYLBENZENE	<50	<50	<50	<50	<50
METHYL BROMIDE	<100	<100	<100	<100	<100
METHYL CHLORIDE	<50	<50	<50	<50	<50
METHYLENE CHLORIDE	<50	<50	BMDL(<50)	<50	BMDL(<50)
1,1,2,2-TETRACHLOROETHANE	<50	<50	<50	<50	<50
TETRACHLOROETHENE	<50	<50	<50	<50	<50
TOLUENE	<50	66.4	<50	<50	<50
1,1,1-TRICHLOROETHANE	75.0	<50	84.1	66.4	86.7
1,1,2-TRICHLOROETHANE	<50	<50	<50	<50	<50
TRICHLOROETHENE	<50	<50	<50	<50	<50
VINYL CHLORIDE	<50	<50	<50	<50	<50
XYLENES	<50	BMDL(<50)	<50	<50	<50

BMDL = DETECTED, BUT LESS THAN REPORTED DETECTION LIMIT.

HAZLETON LABORATORIES Chemical & Biological Sciences Division
3301 KINSMAN BLVD. • P.O. BOX 7545 • MADISON, WISCONSIN 53707 • PHONE (608) 241-4471 • TLX 703958 HAZRAL MDS UD

REPORT OF ANALYSIS

N ELWOOD
RZYN ENGINEERING, INC.
SCIENCE COURT
IVERSITY RESEARCH PARK
DISON, WI 53705

SAMPLE NUMBER: 70101535
DATE ENTERED: 01/13/87
REPORT PRINTED: 01/20/87

IL: WEI #14005; C-1

RCHASE ORDER NUMBER: 205758-01/13/87

CB

COMPOUND NAME	PPM (WET BASIS)
PCB 1260	LESS THAN 0.01
PCB 1254	LESS THAN 0.01
PCB 1248	LESS THAN 0.01
PCB 1242	LESS THAN 0.01
PCB 1232	LESS THAN 0.01
PCB 1016	LESS THAN 0.01
PCB 1221	LESS THAN 0.01
MOISTURE	13.4%

THOD REFERENCES

CB
HEMISTRY LABORATORY MANUAL FOR BOTTOM SEDIMENTS AND ELUTRIATE TESTING, U. S. VIRONMENTAL PROTECTION AGENCY, CHICAGO, IL., MARCH 1979, CRL METHOD NUMBERS 8 THRU 207.

WARZYN ENGINEERING
ANALYTICAL LABORATORY RESULTS

PROJECT: WARZYN ENGINEERING INC.
WEST BEND AUDIT
LOCATION: MILWAUKEE, WISCONSIN

PROJECT#: 205752
DATE SAMPLED: 01/09/87
CK'D: CAW APP'D: M.JL
DATE ISSUED: 2-3-87

LAB #	13980	13982
SAMPLE DESCRIPTION	TP6-1	TP7-1
ARSENIC	<0.005	<0.005
BARIUM	<1.00	<1.00
CADMIUM	<0.02	0.13
CHROMIUM	<0.10	<0.10
LEAD	<0.50	<0.50
MERCURY	<0.0005	<0.0005
SELENIUM	<0.001	<0.001
SILVER	<0.05	<0.05

RESULTS ARE REPORTED IN MG/L ON AN EP TOXICITY EXTRACTION.

HAZLETON LABORATORIES AMERICA, INC.
Chemical & BioMedical Sciences Division
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REPORT OF ANALYSIS

DAN ELWOOD
WARZYN ENGINEERING, INC.
1 SCIENCE COURT
UNIVERSITY RESEARCH PARK
MADISON, WI 53705

SAMPLE NUMBER: 70101886
DATE ENTERED: 01/15/87
REPORT PRINTED: 02/10/87

WASTE SOIL: WEI #13981; TP6-1 DUP, 01/09/87

PURCHASE ORDER NUMBER: 205752-01/14/87

ACID FRACTION
(SEE B/N FRACTION - SEMIVOLATILE COMPOUND LIST)

BASE/NEUTRAL FRACTION

SEMIVOLATILE COMPOUNDS

COMPOUND NAME	MCG/KG
PHENOL	LESS THAN 28000
BIS(-2-CHLOROETHYL)ETHER	LESS THAN 28000
2-CHLOROPHENOL	LESS THAN 28000
1,3-DICHLOROBENZENE	LESS THAN 28000
1,4-DICHLOROBENZENE	LESS THAN 28000
BENZYL ALCOHOL	240000
1,2-DICHLOROBENZENE	LESS THAN 28000
2-METHYLPHENOL	LESS THAN 28000
BIS(2-CHLOROISOPROPYL)ETHER	LESS THAN 28000
4-METHYLPHENOL	LESS THAN 28000
N-NITROSO-DI-N-PROPYLAMINE W.E.R.L. #796 ✓	LESS THAN 28000
HEXACHLOROETHANE	490000 cas# 67-72-1
NITROBENZENE	LESS THAN 28000
ISOPHORONE	LESS THAN 28000
2-NITROPHENOL	LESS THAN 28000
2,4-DIMETHYLPHENOL	LESS THAN 28000
BENZOIC ACID # 233	53000 J cas# 65-85-0
BIS(2-CHLOROETHOXY)METHANE	LESS THAN 28000
2,4-DICHLOROPHENOL	LESS THAN 28000
1,2,4-TRICHLOROBENZENE	LESS THAN 28000
NAPHTHALENE # 1050	4100 J cas# 91-20-3
4-CHLOROANILINE	LESS THAN 28000
HEXACHLOROBUTADIENE # 801 ✓	95000 cas# 118-74-1
4-CHLORO-3-METHYLPHENOL	LESS THAN 28000
2-METHYLNAPHTHALENE	LESS THAN 28000
HEXACHLOROCYCLOPENTADIENE	LESS THAN 28000
2,4,6-TRICHLOROPHENOL	LESS THAN 28000
2,4,5-TRICHLOROPHENOL	LESS THAN 140000
2-CHLORONAPHTHALENE	LESS THAN 28000

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SAMPLE NUMBER: 70101386

WASTE SOIL: WEI #13981; TP6-1 DUP, 01/09/87

BASE/NEUTRAL FRACTION (CONTINUED)

2-NITROANILINE	LESS THAN 140000
DIMETHYL PHTHALATE	LESS THAN 28000
ACENAPHTHYLENE	LESS THAN 28000
3-NITROANILINE	LESS THAN 140000
ACENAPHTHENE	LESS THAN 28000
2,4-DINITROPHENOL	LESS THAN 140000
4-NITROPHENOL	LESS THAN 140000
DIBENZOFURAN	LESS THAN 28000
2,4-DINITROTOLUENE	LESS THAN 28000
2,6-DINITROTOLUENE	LESS THAN 28000
DIETHYLPHTHALATE	76000
4-CHLOROPHENYL-PHENYLETHER	LESS THAN 28000
FLUORENE	LESS THAN 28000
4-NITROANILINE	LESS THAN 140000
4,6-DINITRO-2-METHYLPHENOL	LESS THAN 140000
N-NITROSODIPHENYLAMINE*(1)	LESS THAN 28000
4-BROMOPHENYL-PHENYLETHER	LESS THAN 28000
HEXACHLOROBENZENE	LESS THAN 28000
PENTACHLOROPHENOL	LESS THAN 140000
PHENANTHRENE	LESS THAN 28000
ANTHRACENE	LESS THAN 28000
DI-N-BUTYLPHTHALATE	1,100,000
FLUORANTHENE	LESS THAN 28000
PYRENE	LESS THAN 28000
BUTYLBENZYLPHTHALATE	8,000,000
3,3'-DICHLOROBENZIDINE	LESS THAN 56000
BENZO(A)ANTHRACENE	LESS THAN 28000
BIS(2-ETHYLHEXYL)PHTHALATE	93000
CHRYSENE	LESS THAN 28000
DI-N-OCTYL PHTHALATE	90000
BENZO(B)FLUORANTHENE	LESS THAN 28000
BENZO(K)FLUORANTHENE	LESS THAN 28000
BENZO(A)PYRENE	LESS THAN 28000
INDENO(1,2,3-CD)PYRENE	LESS THAN 28000
DIBENZO(A,H)ANTHRACENE	LESS THAN 28000
BENZO(G,H,I)PERYLENE	LESS THAN 28000

*(1) CANNOT BE SEPARATED FROM DIPHENYLAMINE.

'J' INDICATES AN ESTIMATED VALUE. MASS SPECTRAL DATA INDICATED THE PRESENCE OF A COMPOUND THAT MEETS THE IDENTIFICATION CRITERIA BUT THE RESULT IS LESS THAN THE SPECIFIED DETECTION LIMIT BUT GREATER THAN ZERO.

TENTATIVELY IDENTIFIED COMPOUNDS

COMPOUND NAME	SCAN NUMBER	ESTIMATED CONCENTRATION MCG/KG
BENZENE, 1,2-DIMETHYL-(OR ISOMER)	305	1,200,000

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SAMPLE NUMBER: 70101886

WASTE SOIL: WEI #13981; TP6-1 DUP, 01/09/87

BASE/NEUTRAL FRACTION (CONTINUED)

METHANOL, DIBUTOXY-	738	210000
UNKNOWN	997	31000
UNKNOWN	1219	46000
1,2-BENZENEDICARBOXYLIC ACID	1362	41000
UNKNOWN	1560	36000
UNKNOWN	1823	14000
UNKNOWN	1859	24000
UNKNOWN	1930	41000
BENZENESULFONAMIDE, 4-METHYL-	2137	320000
UNKNOWN	2319	73000
HEXADECANOIC ACID, 2-METHYL-, METHYL ESTER	2491	120000
UNKNOWN	2509	310000
UNKNOWN	2577	41·0000
UNKNOWN	2591	410000
UNKNOWN	2606	320000
1-PHENANTHRECARBOXYLIC ACID, 7-ETHENYL-1,2,3,4 (CAS #56051684)	2624	390000
UNKNOWN	2696	960000
UNKNOWN	2708	340000
UNKNOWN	2775	340000

METHOD REFERENCES

ACID FRACTION
METHODS FOR ORGANIC ANALYSIS OF MUNICIPAL AND INDUSTRIAL WASTEWATER, EPA PUBLICATION NO. 600/4-82-057, METHOD 625, U.S. EPA, CINCINNATI, OH (REVISED OCTOBER 1984)
U.S. EPA METHOD 625 (FEDERAL REGISTER, VOLUME 49, NO. 209, PG. 43385-43406, OCTOBER 26, 1984)
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REPORT OF ANALYSIS

)AN ELWOOD
WARZYN ENGINEERING, INC.
1 SCIENCE COURT
NIVERSITY RESEARCH PARK
ADISON, WI 53705

SAMPLE NUMBER: 70101887
DATE ENTERED: 01/15/87
REPORT PRINTED: 02/10/87

ASTE SOIL: WEI #13983; TP7-2, 01/09/87

URCHASE ORDER NUMBER: 205752-01/14/87

CID FRACTION
(SEE B/N FRACTION - SEMIVOLATILE COMPOUND LIST)

BASE/NEUTRAL FRACTION

SEMIVOLATILE COMPOUNDS

COMPOUND NAME	MCG/KG
PHENOL	LESS THAN 27000
BIS(-2-CHLOROETHYL)ETHER	LESS THAN 27000
2-CHLOROPHENOL	LESS THAN 27000
1,3-DICHLOROBENZENE	LESS THAN 27000
1,4-DICHLOROBENZENE	LESS THAN 27000
BENZYL ALCOHOL	LESS THAN 27000
1,2-DICHLOROBENZENE	LESS THAN 27000
2-METHYLPHENOL	LESS THAN 27000
BIS(2-CHLOROISOPROPYL)ETHER	LESS THAN 27000
4-METHYLPHENOL	LESS THAN 27000
N-NITROSO-DI-N-PROPYLAMINE	LESS THAN 27000
HEXACHLOROETHANE	LESS THAN 27000
NITROBENZENE	LESS THAN 27000
ISOPHORONE	LESS THAN 27000
2-NITROPHENOL	LESS THAN 27000
2,4-DIMETHYLPHENOL	LESS THAN 27000
BENZOIC ACID	LESS THAN 130000
BIS(2-CHLOROETHOXY)METHANE	LESS THAN 27000
2,4-DICHLOROPHENOL	LESS THAN 27000
1,2,4-TRICHLOROBENZENE	LESS THAN 27000
NAPHTHALENE	13000 J
4-CHLOROANILINE	LESS THAN 27000
HEXACHLOROBUTADIENE	LESS THAN 27000
4-CHLORO-3-METHYLPHENOL	LESS THAN 27000
2-METHYLNAPHTHALENE	31000
HEXACHLOROCYCLOPENTADIENE	LESS THAN 27000
2,4,6-TRICHLOROPHENOL	LESS THAN 27000
2,4,5-TRICHLOROPHENOL	LESS THAN 130000
2-CHLORONAPHTHALENE	LESS THAN 27000

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SAMPLE NUMBER: 70101887

WASTE SOIL: WEI #13983; TP7-2, 01/09/87

BASE/NEUTRAL FRACTION (CONTINUED)

2-NITROANILINE	LESS THAN 130000
DIMETHYL PHTHALATE	LESS THAN 27000
ACENAPHTHYLENE	LESS THAN 27000
3-NITROANILINE	LESS THAN 130000
ACENAPHTHENE	LESS THAN 27000
2,4-DINITROPHENOL	LESS THAN 130000
4-NITROPHENOL	LESS THAN 130000
DIBENZOFURAN	LESS THAN 27000
2,4-DINITROTOLUENE	LESS THAN 27000
2,6-DINITROTOLUENE	LESS THAN 27000
DIETHYLPHTHALATE	LESS THAN 27000
4-CHLOROPHENYL-PHENYLETHER	LESS THAN 27000
FLUORENE	LESS THAN 27000
4-NITROANILINE	LESS THAN 130000
4,6-DINITRO-2-METHYLPHENOL	LESS THAN 130000
N-NITROSODIPHENYLAMINE*(1)	LESS THAN 27000
4-BROMOPHENYL-PHENYLETHER	LESS THAN 27000
HEXACHLOROBENZENE	LESS THAN 27000
PENTACHLOROPHENOL #1145	210000 cas # 87-86-5
PHENANTHRENE #1160	5000 J cas # 85-01-8
ANTHRACENE	LESS THAN 27000
DI-N-BUTYLPHTHALATE	LESS THAN 27000
FLUORANTHENE	LESS THAN 27000
PYRENE	LESS THAN 27000
BUTYLBENZYLPHTHALATE	LESS THAN 27000
3,3'-DICHLOROBENZIDINE	LESS THAN 53000
BENZO(A)ANTHRACENE	LESS THAN 27000
BIS(2-ETHYLHEXYL)PHTHALATE	LESS THAN 27000
CHRYSENE	LESS THAN 27000
DI-N-OCTYL PHTHALATE	LESS THAN 27000
BENZO(B)FLUORANTHENE	LESS THAN 27000
BENZO(K)FLUORANTHENE	LESS THAN 27000
BENZO(A)PYRENE	LESS THAN 27000
INDENO(1,2,3-CD)PYRENE	LESS THAN 27000
DIBENZO(A,H)ANTHRACENE	LESS THAN 27000
BENZO(G,H,I)PERYLENE	LESS THAN 27000

*(1) CANNOT BE SEPARATED FROM DIPHENYLAMINE.

J' INDICATES AN ESTIMATED VALUE. MASS SPECTRAL DATA INDICATED THE PRESENCE OF A COMPOUND THAT MEETS THE IDENTIFICATION CRITERIA BUT THE RESULT IS LESS THAN THE SPECIFIED DETECTION LIMIT BUT GREATER THAN ZERO.

TENTATIVELY IDENTIFIED COMPOUNDS

COMPOUND NAME	SCAN NUMBER	ESTIMATED CONCENTRATION MCG/KG
UNKNOWN ALKANE	1107	29000

SAMPLE NUMBER: 70101887 PAGE 3

WASTE SOIL: WEI #13983; TP7-2, 01/09/87

BASE/NEUTRAL FRACTION (CONTINUED)

UNKNOWN	1142	11000
UNKNOWN ALKANE	1283	13000
TRIDECANE	1346	54000
NAPHTHALENE, 1-METHYL-	1354	23000
UNKNOWN ALKANE	1520	12000
NAPHTHALENE, 1,8-DIMETHYL- OR ISOMER	1566	25000
TETRADECANE	1571	58000
NAPHTHALENE, 1,8-DIMETHYL- OR ISOMER	1598	27000
NAPHTHALENE, 1,5-DIMETHYL- OR ISOMER	1604	15000
DECANE, 2,3,6-TRIMETHYL- OR ISOMER	1704	18000
PENTADECANE	1783	59000
UNKNOWN ALKANE	1983	45000
HEPTADECANE	2174	45000
UNKNOWN	2185	13000
UNKNOWN ALKANE	2349	27000
NONADECANE	2453	16000
UNKNOWN ALKANE	2590	11000

METHOD REFERENCES

ACID FRACTION
METHODS FOR ORGANIC ANALYSIS OF MUNICIPAL AND INDUSTRIAL WASTEWATER, EPA PUBLICATION NO. 600/4-82-057, METHOD 625, U.S. EPA, CINCINNATI, OH (REVISED OCTOBER 1984)
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WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION West Bend, WI Elev.

Job No. 1207

Boring No. B-1

GROUND WATER				
While drilling		Time after drilling	¼ hr.	
Before casing removal		Depth to water	None	
After casing removal		Depth to cave-in	9.6'	

Start 3-16-88
Unit 45
Chief MK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight 140# Drop 30"	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
1	D	4	4			Light Grey-Brown SAND, Fine, W/Gravel						4¼" HSA
		5	4	1.0	9							
2	D	5	6			← No Recovery - Pounded rock						
		5	5	0	10							
3	D	3	4			5						
		3	4	0	7							
4	D	2	2			Dk Brn Silty SAND 6.0'						
		-	-		4	Lt.Brn Silty SAND 7.0'						
5	M	4	6			8.5'						
		7	6	1.5	13	10 Gray SAND, F-C						
6	M	2	2									
		3	6	1.0	9							
7	W	6	12			12.5'						
		16	16	2.0	32	Blk Silty SAND 13.5' Lt Brn Silty SAND						
						15 E.O.B. @ 14.0'						
						20 Engineer took all of sample 5 and 6						
						25						
						30						
						35						
						40						
						45						
						50						

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION West Bend, WI Elev.

Job No. 1207

Boring No. B-2

GROUND WATER	While drilling	Time after drilling	¼ hr.
	Before casing removal	Depth to water	10'
	After casing removal	Depth to cave-in	8.2'

Start 3-16-88
Unit 45
Chief MK

Casing/Probe
Weight 140#
Drop 30"

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
1	D	5	7			Brown SAND, Fine, With Trace Gravel					4½" HSA
		11	9	1.8	20						
2	D	4	8			3.0'					
		10	13	1.8	23	Lt. Brn SAND, Very Fine					
3	D	7	12			4.5'					
		13	12	1.8	25	Lt. Brn SAND & GRAVEL					
4	M	8	7			6.0'					
		4	4	1.0	8	Brn Silty SAND Very Fine					
5	W	6	6			7.0'					
		8	10	.6	18	Brn SAND & GRVL 7.5'					
6	W	4	4	1.0	8	Blk Sandy ORGANIC 8.0' Matter					
7	W	5	6	1.0	11	Black SAND 8.5'					
8	W	10	12	1.0	22	Brn SAND, W/Trc 10.0' Gravel					
						SAND, Fine 11.0'					
						SAND, Med, Trc 12.0' of Gravel					
						Lt Brn SAND, Medium					
						E.O.B. @ 14.0'					

Engineer took samples 4,6, & 8.

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION West Bend, WI Elev.

Job No. 1207

Boring No. B-3

GROUND WATER

While drilling —
Before casing removal —
After casing removal —

Time after drilling ¼ hr.
Depth to water 4'
Depth to cave-in None

Start 3-16-88
Unit 45
Chief MK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Casing/Probe — Weight 140# Drop 30"					
1	M	2	3			Brown Silty SAND, Fine					4¼"
		4	7	1.5	11	1.5'					HSA
2	W	1	3			Black Silty SAND, Coarse, W/Trc. Gravel					
		4	7	1.0	11	Organic lens					
3	W	6	12			5.0'					
		12	12	1.8	24	Med SAND & GRVL					
						E.O.B. @ 6.0'					

5 10 15 20 25 30 35 40 45 50

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION West Bend, WI Elev.

Job No. 1207

Boring No. B-4

GROUND WATER	While drilling		Time after drilling	¼ hr.	
	Before casing removal		Depth to water	None	
	After casing removal		Depth to cave-in	7.2'	

Start 3-16-88
Unit 45
Chief MK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight 140# Drop 30"	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
1	D	6	13									4¼"
		35	42	1.8	77	Light Brown SAND, Fine						HSA
2	M	5	5									
		5	5	1.8	10							
3	D	4	6			4.5'						
		11	13	1.8	23	Light Brown SAND, With Trace Gravel						
4	M	8	14									
		18	23	2.0	41	7.5'						
5	W	5	6			Dk. Brown SAND, Fine 8.5'						
		8	9	2.0	17	Brown SAND, Fine						
6	W	5	7									
		9	11	2.0	20							
						E.O.B. @ 12.0'						

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION West Bend, WI Elev.

Job No. 1207

Boring No. B-5

GROUND WATER	While drilling		Time after drilling	½ hr.	
	Before casing removal		Depth to water	None	
	After casing removal		Depth to cave-in	10.0'	

Start 3-16-88
Unit 45
Chief MK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight 140# Drop 30"	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
1	D	5	6									4½" HSA
		6	7	2.0	13	Light Brown SAND, Fine						
2	D	1	2									
		3	4	2.0	7							
3	D	1	3									
		6	9	1.8	15	5.5'						
4	M	1	3			Green Silty SAND, With Trace Gravel						
		7	8	1.0	15							
5	M	9	11									
		13	15	1.0	28	10.0'						
6	W	5	8			Green Silty SAND						
		9	12	1.8	21	E.O.B. @ 12.0'						
						Engineer took Samples 4 & 5.						

SOIL BORING LOG

BORING # 6

PROJECT: West Bend
LOCATION: as per Delta

Date completed: 5/25/88
ELEVATION none taken

depth	SOIL CLASSIFICATION	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS	MOISTURE REC	Q P
0	Fill--Brown silty clay mixed w/ silty F-M sand & gravel occassional cobbles	1	0.0-2.0	3,3,3,3	15	
	mostly F-M sand w/ some silt	2	2.0-4.0	2,1,2,4	20	
5		3	4.0-6.0	2,2,2,3	24	
		4	6.0-8.0	3,3,4,8	22	
10		5	8.0-10	3,5,3,4	24	
	10'-6"					
	Black peaty topsoil clayey w/ depth W.L. @ 12'-4" @ 10 min.	6	10-12	1,2,3,3	16	
	13'-2"					
	Gray F-M sand					
	14'-0"	7	12-14	1,3,4,6	16	
	End of Boring					
15						
20						
25						

ENVIRONMENTAL & FOUNDATION DRILLING INC.

SOIL BORING LOG

BORING # 7

PROJECT: West Bend
LOCATION: as per Delta

Date completed: 5/25/88
ELEVATION none taken

depth	SOIL CLASSIFICATION	SAMPLE NUMBER	DEPTH	BLOW COUNTS	MOISTURE REC	Q P
0	Fill--Brown F-M sand, trace silt	1	0.0-2.0	5,5,4,6	3	
		2	2.0-4.0	2,3,3,3	18	
5	w/ gray fine silty sand layers 6'-0" to 8'-9"	3	4.0-6.0	2,2,2,3	15	
	W.L. @ 7'-9" @ 10 min. w/ occ organic seams	4	6.0-8.0	5,6,9,9	18	
	8'-6"					
	Brown F-M sand w/ some silt					
10		5	8.0-10	7,6,7,9	18	
	12'-0"	6	10-12	6,6,6,7	18	
15						
20						
25						

ENVIRONMENTAL & FOUNDATION DRILLING INC.

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta — West Bend Monitoring Wells

LOCATION — West Bend, WI — Elev.

Job No. 1127

Boring No. MW-1

GROUND WATER: While drilling 9.5' — Time after drilling ¼ hr. — Depth to water 9.2' — Depth to cave-in

Start 9-15-87
Unit D-50
Chief PD

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Casing/Probe — Weight 140# — Drop 30"					
						ASPHALT 0.3'					6¼" HSA
1	M		7			Tan to Brown Silty SAND Very Fine					
		7	12	1.3	19						
2	M	10	10								
		12		1.5	22						
3	W		8								
		11	9	1.2	20						
4	W	15	8								
		11		.4	19						
5	W		15			Tan to Brown SAND M-F					
		17	22	1.1	39						
6	W	4	18								
		22		1.5	40						
7	W		15								
		10	11	1.5	21	Tan to Brn Silty SAND 18.0' Very Fine					
						E.O.B. @ 19.0'					
						Well Set @ 18.0'					

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta — West Bend Monitoring Wells

LOCATION West Bend, WI — Elev.

Job No. 1127

Boring No. MW-2

GROUND WATER: While drilling 13.5' — Time after drilling ½ hr.; Before casing removal -- — Depth to water 13.0'; After casing removal -- — Depth to cave-in --

Start 9-16-87; Unit D-50; Chief PD

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS (Casing/Probe Weight 140# Drop 30")	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Tan to Brown SAND M-F W/Silt W/Clay					6½" HSA
1	D		6								
		6	10	.5	16						
2	D	5	12			5	5				
		12		1.1	24	5.5' Tan to Brn. SAND 7.0' M-F, W/Organics					
3	D		2			Tan to Brn. SAND M-F					
		2	4	.3	6	Clay till layer.					
4	M	6	8			10	10				
		11		1.3	19						
5	W		8			13.0'					
		13	15	1.0	28	Tan to Brown Silty SAND					
6	W	8	15			15	15				
		16		.9	31						
7	W		6			18.0'					
		7	6	.9	13	Gray Silty CLAY					
8	W	7	8			20	20				
		27		.7	35	20.5' Alot of gravel Tan to Brn SAND M-F					
						E.O.B. @ 22.5'					
						Well Set @ 22.3'					
						25	25				
						30	30				
						35	35				
						40	40				
						45	45				

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta — West Bend Monitoring Wells

LOCATION West Bend, WI — Elev.

Job No. 1127

Boring No. MW-2

GROUND WATER	While drilling	13.4'	Time after drilling	½ hr.	
	Before casing removal	--	Depth to water	9.8'	
	After casing removal	9.8'	Depth to cave-in	--	

Start 9-15-87
Unit D-50
Chief PD

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS
						Tan to Brown SAND M-F W/Trc. Silt
1	D	3	4			
		6		1.1	10	
2	D	4	8			Layers of gray sand M-F
		9		1.0	17	Some Gravel
3	D		7			
		7	10	1.2	17	
4	D	4	6			
		8		.9	14	
5	W		8			
		10	10	.8	20	
6	W	6	7			
		12		0	19	
7	W		16			Silt Layer
		15	11	1.2	26	
8	W	4	5			
		5		1.2	10	
						E.O.B. @ 22.0'
						Well Set @ 19.1'

Casing/Probe
Weight 140#
Drop 30"

Unconfined Strength | Boulders | Blows on Casing Size | Blows on Probe Size | Drilling Method 6¼" HSA

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta — West Bend Monitoring Wells

LOCATION West Bend, WI — Elev.

Job No. 1127

Boring No. MW-4

GROUND WATER	While drilling	8.3'	Time after drilling	¼ hr.
	Before casing removal	--	Depth to water	4.9'
	After casing removal	--	Depth to cave-in	--

Start 9-16-87
Unit D-50
Chief PD

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight 140# Drop 30"	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						ASPHALT 0.3'						6¼" HSA
						Tan to Brown Silty SAND Medium to Fine						
1	D		6									
		7	9	1.1	16							
2	W	8	15									
		19		1.2	34	Gravel Layer						
3	W		9			Blk Sand layer 1' thick						
		6	7	.8	13							
4	W	8	6			Gravel layers						
		7		.9	13							
5	W		2									
		3	6	.7	9							
						E.O.B. @ 16.0'						
						Well Set @ 15.5'						

WISCONSIN TEST DRILLING, INC. — **FIELD BORING LOG** — Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta — West Bend Monitoring Wells

LOCATION — West Bend, WI — Elev.

Job No. 1127

Boring No. MW-5

GROUND WATER	While drilling	--	Time after drilling	½ hr.	
	Before casing removal	--	Depth to water	13.0'	
	After casing removal	--	Depth to cave-in	--	

Start 9-25-87
Unit B-45
Chief LF

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight Drop	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						(Fill)						HSA
						Silty SAND M-F Red to Brown						
						←Wood Railroad Tie						
						7.0'						
						Sandy SILT Red to Brown Uniform Fine						
						17.5'						
						SAND Red to Brown Uniform Fine						
						E.O.B. @ 21.0'						
						Well Set @ 20.6'						

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta — West Bend Monitoring Wells

LOCATION — West Bend, WI — Elev.

Job No. 1127

Boring No. MW-6A

GROUND WATER	While drilling	17.0'	Time after drilling	½ hr	
	Before casing removal	--	Depth to water	17.9'	
	After casing removal	--	Depth to cave-in	--	

Start 9-16-87
Unit D-50
Chief PD

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						ASPHALT 0.2'					6¼" HSA
1	D		5			Tan to Brown SAND Medium to Fine					
		12	17	1.1	29						
2	D	12	25								
		40		1.2	65						
3	D		7								
		6	10	.9	16						
4	D	7	9								
		20		1.0	29						
5	D		7								
		9	20	1.5	29						
6	D	10	14								
		19		1.5	33						
7	W		6								
		12	15	.8	27						
8	W	8	12								
		18		1.1	30						
9	W		5								
		20	47	1.5	67						
10	W	8	9								
		20		1.5	29						
						E.O.B. @ 27.0'					
						Well Set @ 26.6'					

Casing/Probe
Weight 140#
Drop 30"

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION West Bend, WI Elev.

Job No. 1207

Boring No. MW-6B

GROUND WATER
While drilling —— Time after drilling ¼hr.
Before casing removal —— Depth to water 16'
After casing removal —— Depth to cave-in Unknown

Start 3-18-88
Unit 45
Chief MK

Casing/Probe
Weight 140#
Drop 30"

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						See Log MW-6 (Old Well Log)					4¼" HSA
						30.0'					
1	W	12	14								
		23		1.5	37	Brown SAND, Medium, With Trace Silt					
2	W	20	30								
		23		1.5	53	36.5'					
3	M	15/.5		.5	15	Gray CLAY W/Trc. Grvl					
4	M	17	27								
		40				E.O.B. @ 38.5'					
						Well Set.@ 36.0'					

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION West Bend, WI Elev.

Job No. 1207

Boring No. MW-A

GROUND WATER				
While drilling		Time after drilling	¼ hr.	
Before casing removal		Depth to water	17'	
After casing removal		Depth to cave-in	18'	

Start 3-21-88
Unit 45
Chief MK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight 140# Drop 30"	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Light Brown SAND, Fine						4½" HSA
1	D	5	8									
		9		1.5	17							
2	D	2	4									
		5		1.5	9							
3	M	4	6									
		8		1.5	14							
						20.0'						
4	W	2	4									
		8		1.5	12	Medium Brown SAND						
5	W	4	5									
		7		1.5	12							
						E.O.B. @ 27.0'						
						Well Set @ 26.5'						

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION 514 Michigan, West Bend, WI Elev.

Job No. 1207

Boring No. MW-C

GROUND WATER
While drilling — Time after drilling
Before casing removal — Depth to water
After casing removal — Depth to cave-in

Start 3-17-88
Unit 45
Chief MK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight 140# Drop 30"	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						See Log MWC-2						4¼" HSA
1	M	8	7									
		7		1.5	14	Brn Silty CLAY — 10.5'						
						Green Silty SAND, Medium — 11.5'						
						E.O.B. @ 25.0'						
						Well Set @ 23.2'						

5 10 15 20 25 30 35 40 45 50

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

SCHOFIELD, WISCONSIN

Sheet 1 Of 1

FOR Delta

LOCATION 514 Michigan Westbend, WI Elev.

Job No. 1207

Boring No. ~~MW-2~~ B-C2

GROUND WATER: While drilling — Before casing removal — After casing removal

Time after drilling ¼ hr. — Depth to water 12.2' — Depth to cave-in

Start 3-17-88

Unit 45

Chief MK

Casing/Probe — Weight 140# — Drop 30"

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size —	Blows on Probe Size —	Drilling Method
						TOPSOIL 0.5'					4¼" HSA
						Light Brown SAND, Fine					
1	D	2	2								
		3		1.5	5	6.5'					
						Black Silty CLAY					
2	M	1	1			10.0'					
		2		.6	3	Fine SAND Lenses & Clay Lens					
3	W	6	5			15.0'					
		4		1.0	9	Brown SAND, Fine					
4	W	8	7			20.0'					
		9		1.5	16	Medium SAND & GRAVEL					
5	W	15	16			25.0'					
		17		1.0	33	SAND & GRAVEL, With Trace of Silt					
6	M	12	16			30.0'					
		23		1.5	39	Gray SILT, W/Clay — Hard Drilling ↓					
7	D	8	12								
		17		1.5	29						
8	D	23	40			40.0'					
		58		1.0	98	Gray SILT & GRVL (Hard Pan)					
						E.O.B. @ 42.0'					
						Grouted Hole 0-42'					

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

SCHOFIELD, WISCONSIN

Sheet 1 Of 1

Job No. 1207

Boring No. MW-~~D2~~ D1

FOR Delta

LOCATION West Bend, WI Elev.

GROUND WATER				
While drilling		Time after drilling		
Before casing removal		Depth to water		
After casing removal		Depth to cave-in		

Start 3-22-88
Unit 45
Chief MK

Casing/Probe
Weight 140#
Drop 30"

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing	Size	Probe	Size	Drilling Method
						0	See Log MW-D1 BLIND DRILLED							HSA 4¼"
						25	E.O.B..@ 25.0' Well Set @ 25.0'							

WISCONSIN TEST DRILLING, INC.

SCHOFIELD, WISCONSIN

FIELD BORING LOG

Sheet 1 Of 1

Job No. 1207

Boring No. MW-~~01~~ 02

FOR Delta

LOCATION West Bend, Wisconsin Elev.

GROUND WATER			
While drilling		Time after drilling	¼ hr.
Before casing removal		Depth to water	17'
After casing removal		Depth to cave-in	

Start 3-22-88
Unit 45
Chief MK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						0	Light Brown SAND, Fine					4¼" HSA
1	D	4	6			5						
		9		1.5	15							
2	D	4	7			10						
		9		1.5	16							
3	W	8	11			15						
		14		1.5	25							
						20	20.0'					
4	W	5	6									
		8		1.5	14		Brown Silty SAND, Fine					
5	W	3	3			25						
		3		1.5	6							
						30	30.0'					
6	W	9	9									
		10		1.0	19		Brown SILT, With Trace Sand					
	Shelby Tube						34.0'					
						35	Pushed Shelby tube 20" Gray CLAY w/T Grvl					
							E.O.B. @ 35.5'					
							Well Set @ 34.0'					
						40						
						45						
						50						

Casing/Probe ____ Weight ____ Drop ____

WISCONSIN TEST DRILLING, INC.

FIELD BORING LOG

Sheet 1 Of 1

SCHOFIELD, WISCONSIN

FOR Delta

LOCATION West Bend, WI Elev.

Job No. 1207

Boring No. MW-E

GROUND WATER
While drilling
Before casing removal
After casing removal
Time after drilling ¼ hr.
Depth to water 9'
Depth to cave-in

Start 3-22-88
Unit 45
Chief MK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight 140# Drop 30"	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Brown SAND, Fine, With Trace Silt						4¼" HSA
1	M	3	6									
		7		1.5	13							
2	W	4	6			10.0'						
		8		1.5	14	Brown SAND, Fine to Medium						
3	W	4	6									
		7		1.5	13	←Silt Lens						
						E.O.B. @ 18.0'						
						Well Set @ 17.5'						

SOIL BORING LOG

BORING # MW "F"

PROJECT: West Bend
LOCATION: across from 233 Kilbourne

Date completed: 5/25/88
ELEVATION none taken

depth	SOIL CLASSIFICATION	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS	MOISTURE REC	Q P
0	Fill--Brown fine sand mixed w/ layers of Dark Brown clayey F-M sand					
	4'-8"					
5	Dark Brown Clayey F-M sand	1	3.5-5.0	2, 1, 1	18	
	5'-6"					
	Brown layers of fine, F-M & F-C sand					
	predominantly Brown F-M sand					
10		2	8.5-10	3, 5, 4	18	
15		3	13.5-15	2, 2, 3	18	
20	20'-0"	4	18.5-20	1, 1, 1	18	
	End of Boring					
25						

ENVIRONMENTAL & FOUNDATION DRILLING INC.

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

June 24, 1988

Mr. Kenneth Shimko
Delta Environmental Consultants, Inc.
1801 Old Highway 8
Suite 123
New Brighton, MN 55112

RE: Delta Project No. 10-87-285
PACE Project No. 880321.501

Dear Mr. Shimko:

Enclosed is the report of laboratory analyses for samples received March 21, 1988.

The organic analyses were performed March 23 - June 13, 1988.

A copy of the chain of custody record for the samples and an invoice for services provided are also enclosed.

Please contact us if you have any questions regarding the enclosures.

Sincerely,

Peggy F. Gaskill

Peggy F. Gaskill
Coordinator of Services

Roger C. Splinter, Ph.D.
Director, Laboratory Services

Enclosures

pace laboratories, inc.

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

REPORT OF LABORATORY ANALYSIS

Delta Environmental Consultants, Inc.
1801 Old Highway 8
Suite 123
New Brighton, MN 55112

June 24, 1988
PACE Project Number: 880321501

Attn: Mr. Kenneth Shimko

10-87-285

Date Sample(s) Collected: 03/16/88
Date Sample(s) Received: 03/21/88

PACE Sample Number:			062760	062770
Parameter	Units	MDL	Drilling Fluid	Trip Blank
Chloromethane	ug/L	1.0	ND	ND
Bromomethane	ug/L	1.5	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND
Chloroethane	ug/L	1.0	ND	ND
Methylene chloride	ug/L	1.0	ND	ND
Trichlorofluoromethane	ug/L	0.4	ND	0.6
1,1-Dichloroethylene	ug/L	0.3	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND
Chloroform	ug/L	0.5	0.8	ND
1,2-Dichloroethane	ug/L	0.2	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	0.8	ND
Carbon tetrachloride	ug/L	0.3	ND	ND
Bromodichloromethane	ug/L	0.2	1.1	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	ND	ND
Benzene	ug/L	1.0	ND	ND
Dibromochloromethane	ug/L	1.0	1.0 (1)	ND
1,1,2-Trichloroethane	ug/L	1.0	1.0 (1)	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND
Bromoform	ug/L	1.0	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number:			062760	062770
Parameter	Units	MDL	Drilling Fluid	Trip Blank
Toluene	ug/L	1.0	3.5	ND
Chlorobenzene	ug/L	1.0	ND	ND
Ethyl benzene	ug/L	1.0	2.1	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

pace laboratories, inc.

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 3

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number: Parameter	Units	MDL	062690 B1	062710 B2	062720 B3 (4)
Phenol	mg/kg	0.33	ND (2)	ND	ND (2)
2-Chlorophenol	mg/kg	0.93	ND (2)	ND	ND (2)
2-Nitrophenol	mg/kg	0.90	ND (2)	ND	ND (2)
2,4-Dimethylphenol	mg/kg	0.60	ND (2)	ND	ND (2)
2,4-Dichlorophenol	mg/kg	0.80	ND (2)	ND	ND (2)
4-Chloro-3-methylphenol	mg/kg	3.3	ND (2)	ND	ND (2)
2,4,6-Trichlorophenol	mg/kg	2.4	ND (2)	ND	ND (2)
2,4-Dinitrophenol	mg/kg	3.3	ND (2)	ND	ND (2)
4-Nitrophenol	mg/kg	3.3	ND (2)	ND	ND (2)
2-Methyl-4,6-dinitrophenol	mg/kg	4.3	ND (2)	ND	ND (2)
Pentachlorophenol	mg/kg	50	ND (2)	ND	ND (2)
Chloromethane	ug/kg	120	ND	ND	ND
Bromomethane	ug/kg	190	ND	ND	ND
Dichlorodifluoromethane	ug/kg	190	ND	ND	ND
Vinyl Chloride	ug/kg	190	ND	ND	ND
Chloroethane	ug/kg	120	ND	ND	ND
Methylene Chloride	ug/kg	120	ND	ND	ND
Trichlorofluoromethane	ug/kg	50	ND	ND	ND
1,1-Dichloroethylene	ug/kg	38	ND	ND	ND
1,1-Dichloroethane	ug/kg	25	ND	ND	ND
Trans-1,2-Dichloroethylene	ug/kg	38	ND	ND	ND
Chloroform	ug/kg	62	ND	ND	ND
1,2-Dichloroethane	ug/kg	25	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	62	ND	ND	ND
Carbon Tetrachloride	ug/kg	38	ND	ND	ND
Bromodichloromethane	ug/kg	25	ND	ND	ND
1,2-Dichloropropane	ug/kg	25	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/kg	62	ND	ND	ND
1,1,2-Trichloroethylene	ug/kg	62	ND	ND	ND
Benzene	ug/kg	120	ND	ND	ND
Dibromochloromethane	ug/kg	120	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	120	ND	ND	ND
Trans-1,3-Dichloro-1-propene	ug/kg	38	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

Mr. Kenneth Shimko
Page 4

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number: / Parameter	Units	MDL	062690 B1	062710 B2 (5)	062720 B3 (4)(6)
2-Chloroethylvinyl Ether	ug/kg	620	ND	ND	ND
Bromoform	ug/kg	120	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	120	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/kg	120	ND	ND	ND
Toluene	ug/kg	120	280	ND	ND
Chlorobenzene	ug/kg	120	ND	ND	ND
Ethylbenzene	ug/kg	120	ND	ND	650
1,3-Dichlorobenzene	ug/kg	500	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	500	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	500	ND	ND	ND
4-chloro-3-methylphenol	mg/kg	8.2	-	ND	ND
2-chlorophenol	mg/kg	2.6	-	ND	ND
2,4-Dichlorophenol	mg/kg	7.8	-	ND	ND
2,4-Dimethylphenol	mg/kg	12	-	ND	ND
2,4-Dinitrophenol	mg/kg	20	-	ND	ND
2-Methyl-4,6-Dinitrophenol	mg/kg	9.2	-	ND	ND
2-Nitrophenol	mg/kg	5.4	-	ND	ND
4-Nitrophenol	mg/kg	32	-	ND	ND
Pentachlorophenol	mg/kg	11	-	ND	2400
Phenol	mg/kg	3.6	-	ND	ND
2,4,6-Trichlorophenol	mg/kg	4.0	-	ND	ND
Acenaphthene	mg/kg	7.6	-	ND	ND
Acenaphthylene	mg/kg	9.8	-	ND	ND
Anthracene	mg/kg	9.6	-	ND	ND
Benzo(a)anthracene	mg/kg	6.0	-	ND	ND
Benzo(a)pyrene	mg/kg	13	-	ND	ND
Benzo(b)fluoranthene	mg/kg	2.0	-	ND	ND
Benzo(k)fluoranthene	mg/kg	7.6	-	ND	ND
Benzo(g,h,i)perylene	mg/kg	4.0	-	ND	ND
Bis(2-chloroethoxy)methane	mg/kg	12	-	ND	ND
Bis(2-chloroethyl)ether	mg/kg	34	-	ND	ND
Bis(2-chloroisopropyl)ether	mg/kg	13	-	ND	ND
Bis(2-ethyl hexyl)phthalate	mg/kg	5.2	-	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

Mr. Kenneth Shimko
Page 5

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number: / Parameter	Units	MDL	062710 B2 (5)	062720 B3 (4)(5)(6)
4-Bromophenyl phenyl ether	mg/kg	7.8	ND	ND
Butyl benzyl phthalate	mg/kg	6.0	2.5	ND
2-chloronaphthalene	mg/kg	8.4	ND	ND
4-chlorophenyl phenyl ether	mg/kg	2.0	ND	ND
Chrysene	mg/kg	6.0	ND	ND
Dibenzo(a,h)anthracene	mg/kg	7.7	ND	ND
1,2-Dichlorobenzene	mg/kg	5.2	ND	ND
1,3-Dichlorobenzene	mg/kg	7.8	ND	ND
1,4-Dichlorobenzene	mg/kg	4.4	ND	ND
3,3-Dichlorobenzidine	mg/kg	28	ND	ND
Diethyl phthalate	mg/kg	9.6	ND	ND
Dimethyl phthalate	mg/kg	6.4	ND	ND
Di-n-butyl phthalate	mg/kg	4.0	ND	ND
2,4-Dinitrotoluene	mg/kg	6.5	ND	ND
2,6-Dinitrotoluene	mg/kg	5.4	ND	ND
Di-n-octyl phthalate	mg/kg	6.0	ND	ND
Fluoranthene	mg/kg	6.8	ND	ND
Fluorene	mg/kg	9.0	ND	ND
Hexachlorobenzene	mg/kg	7.4	ND	ND
Hexachlorobutadiene	mg/kg	4.8	ND	ND
Hexachloroethane	mg/kg	8.6	ND	ND
Indeno(1,2,3-c,d)pyrene	mg/kg	7.7	ND	ND
Isophorone	mg/kg	14	ND	ND
Naphthalene	mg/kg	5.2	ND	50
Nitrobenzene	mg/kg	5.4	ND	ND
N-Nitrosodimethylamine	mg/kg	4.4	ND	ND
N-Nitrosodi-n-propylamine	mg/kg	8.0	ND	ND
N-Nitrosodiphenylamine	mg/kg	12	ND	ND
Phenanthrene	mg/kg	7.4	ND	87
Pyrene	mg/kg	7.4	ND	ND
1,2,4-Trichlorobenzene	mg/kg	5.4	ND	ND
Hexachlorocyclopentadiene	mg/kg	19	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number: / Parameter	Units	MDL	062730 B4 (4)(5)	062740 B5 (4)(5)	062750 B5-2 (5)
2,3,7,8-Tetrachlorodibenzo-P-Dioxin	ug/kg	0.300	-	-	ND
Phenol	mg/kg	3.3	ND	ND (3)	ND (2)
2-Chlorophenol	mg/kg	9.3	ND	ND (3)	ND (2)
2-Nitrophenol	mg/kg	9.0	ND	ND (3)	ND (2)
2,4-Dimethylphenol	mg/kg	6.0	ND	ND (3)	ND (2)
2,4-Dichlorophenol	mg/kg	8.0	ND	ND (3)	ND (2)
4-Chloro-3-methylphenol	mg/kg	33	ND	ND (3)	ND (2)
2,4,6-Trichlorophenol	mg/kg	24	ND	ND (3)	ND (2)
2,4-Dinitrophenol	mg/kg	33	ND	ND (3)	ND (2)
4-Nitrophenol	mg/kg	33	ND	ND (3)	ND (2)
2-Methyl-4,6-dinitrophenol	mg/kg	43	ND	ND (3)	ND (2)
Pentachlorophenol ~ppm	mg/kg	500	ND	ND (3)	ND (2)
Chloromethane ~ppb	ug/kg	120	ND	ND	ND
Bromomethane	ug/kg	190	ND	ND	ND
Dichlorodifluoromethane	ug/kg	190	ND	ND	ND
Vinyl Chloride	ug/kg	190	ND	ND	ND
Chloroethane	ug/kg	120	ND	ND	ND
Methylene Chloride	ug/kg	120	ND	ND	ND
Trichlorofluoromethane	ug/kg	50	ND	ND	ND
1,1-Dichloroethylene	ug/kg	38	ND	ND	ND
1,1-Dichloroethane	ug/kg	25	ND	ND	ND
Trans-1,2-Dichloroethylene	ug/kg	38	ND	ND	ND
Chloroform	ug/kg	62	ND	ND	ND
1,2-Dichloroethane	ug/kg	25	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	62	ND	ND	ND
Carbon Tetrachloride	ug/kg	38	ND	ND	ND
Bromodichloromethane	ug/kg	25	ND	ND	ND
1,2-Dichloropropane	ug/kg	25	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/kg	62	ND	ND	ND
1,1,2-Trichloroethylene	ug/kg	62	ND	ND	ND
Benzene	ug/kg	120	ND	ND	ND
Dibromochloromethane	ug/kg	120	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	120	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number: Parameter	Units	MDL	062730 B4 (4)(5)	062740 B5 (4)(5)	062750 B5-2 (5)
Trans-1,3-Dichloro-1-propene	ug/kg	38	ND	ND	ND
2-Chloroethylvinyl Ether	ug/kg	620	ND	ND	ND
Bromoform	ug/kg	120	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	120	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/kg	120	ND	ND	ND
Toluene	ug/kg	120	ND	750	1200
Chlorobenzene	ug/kg	120	ND	ND	ND
Ethylbenzene	ug/kg	120	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	500	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	500	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	500	ND	ND	ND
4-chloro-3-methylphenol	mg/kg	8.2	ND	ND	ND
2-chlorophenol	mg/kg	2.6	ND	ND	ND
2,4-Dichlorophenol	mg/kg	7.8	ND	ND	ND
2,4-Dimethylphenol	mg/kg	12	ND	ND	ND
2,4-Dinitrophenol	mg/kg	20	ND	ND	ND
2-Methyl-4,6-Dinitrophenol	mg/kg	9.2	ND	ND	ND
2-Nitrophenol	mg/kg	5.4	ND	ND	ND
4-Nitrophenol	mg/kg	32	ND	ND	ND
Pentachlorophenol	mg/kg	11	240	250	20
Phenol	mg/kg	3.6	ND	ND	ND
2,4,6-Trichlorophenol	mg/kg	4.0	ND	ND	ND
Acenaphthene	mg/kg	7.6	ND	ND	ND
Acenaphthylene	mg/kg	9.8	ND	ND	ND
Anthracene	mg/kg	9.6	ND	ND	ND
Benzo(a)anthracene	mg/kg	6.0	ND	ND	ND
Benzo(a)pyrene	mg/kg	13	ND	ND	ND
Benzo(b)fluoranthene	mg/kg	2.0	ND	ND	ND
Benzo(k)fluoranthene	mg/kg	7.6	ND	ND	ND
Benzo(g,h,i)perylene	mg/kg	4.0	ND	ND	ND
Bis(2-chloroethoxy)methane	mg/kg	12	ND	ND	ND
Bis(2-chloroethyl)ether	mg/kg	34	ND	ND	ND
Bis(2-chloroisopropyl)ether	mg/kg	13	ND	ND	ND

≈ PPB
≈ PPM

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

Mr. Kenneth Shimko
Page 8

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number: Parameter	Units	MDL	062730 B4 (4)(5)	062740 B5 (4)(5)	062750 B5-2 (5)
Bis(2-ethyl hexyl)phthalate	mg/kg	5.2	ND	ND	ND
4-Bromophenyl phenyl ether	mg/kg	7.8	ND	ND	ND
Butyl benzyl phthalate	mg/kg	6.0	ND	ND	ND
2-chloronaphthalene	mg/kg	8.4	ND	ND	ND
4-chlorophenyl phenyl ether	mg/kg	2.0	ND	ND	ND
Chrysene	mg/kg	6.0	ND	ND	ND
Dibenzo(a,h)anthracene	mg/kg	7.7	ND	ND	ND
1,2-Dichlorobenzene	mg/kg	5.2	ND	ND	ND
1,3-Dichlorobenzene	mg/kg	7.8	ND	ND	ND
1,4-Dichlorobenzene	mg/kg	4.4	ND	ND	ND
3,3-Dichlorobenzidine	mg/kg	28	ND	ND	ND
Diethyl phthalate	mg/kg	9.6	ND	ND	ND
Dimethyl phthalate	mg/kg	6.4	ND	ND	ND
Di-n-butyl phthalate	mg/kg	4.0	ND	ND	ND
2,4-Dinitrotoluene	mg/kg	6.5	ND	ND	ND
2,6-Dinitrotoluene	mg/kg	5.4	ND	ND	ND
Di-n-octyl phthalate	mg/kg	6.0	ND	ND	ND
Fluoranthene cas 206-44-0 #754	mg/kg	6.8	ND	27	ND
Fluorene cas 86-73-7 #755	mg/kg	9.0	ND	ND	8.3
Hexachlorobenzene	mg/kg	7.4	ND	ND	ND
Hexachlorobutadiene	mg/kg	4.8	ND	ND	ND
Hexachloroethane	mg/kg	8.6	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	mg/kg	7.7	ND	ND	ND
Isophorone	mg/kg	14	ND	ND	ND
Naphthalene	mg/kg	5.2	200	560	43
Nitrobenzene	mg/kg	5.4	ND	ND	ND
N-Nitrosodimethylamine	mg/kg	4.4	ND	ND	ND
N-Nitrosodi-n-propylamine	mg/kg	8.0	ND	ND	ND
N-Nitrosodiphenylamine	mg/kg	12	ND	ND	ND
Phenanthrene	mg/kg	7.4	170	360	23
Pyrene	mg/kg	7.4	ND	ND	ND
1,2,4-Trichlorobenzene	mg/kg	5.4	ND	ND	ND
Hexachlorocyclopentadiene	mg/kg	19	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number: / Parameter	Units	MDL	062730 B4 (4)(5)	062740 B5 (4)(5)	062750 B5-2 (5)
Gasoline	mg/kg	5.0	-	-	ND
Fuel Oil #1	mg/kg	5.0	-	-	ND
Fuel Oil #2	mg/kg	5.0	-	-	3400

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
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Coralville, Iowa

June 24, 1988
PACE Project Number: 880321501

PACE Sample Number:			062780
Parameter	Units	MDL	B3-A (4)
Chloromethane	ug/kg	120	ND
Bromomethane	ug/kg	190	ND
Dichlorodifluoromethane	ug/kg	190	ND
Vinyl Chloride	ug/kg	190	ND
Chloroethane	ug/kg	120	ND
Methylene Chloride	ug/kg	120	ND
Trichlorofluoromethane	ug/kg	50	ND
1,1-Dichloroethylene	ug/kg	38	ND
1,1-Dichloroethane	ug/kg	25	ND
Trans-1,2-Dichloroethylene	ug/kg	38	ND
Chloroform	ug/kg	62	ND
1,2-Dichloroethane	ug/kg	25	ND
1,1,1-Trichloroethane	ug/kg	62	ND
Carbon Tetrachloride	ug/kg	38	ND
Bromodichloromethane	ug/kg	25	ND
1,2-Dichloropropane	ug/kg	25	ND
cis-1,3-Dichloro-1-propene	ug/kg	62	ND
1,1,2-Trichloroethylene	ug/kg	62	ND
Benzene	ug/kg	120	ND
Dibromochloromethane	ug/kg	120	ND
1,1,2-Trichloroethane	ug/kg	120	ND
Trans-1,3-Dichloro-1-propene	ug/kg	38	ND
2-Chloroethylvinyl Ether	ug/kg	620	ND
Bromoform	ug/kg	120	ND
1,1,2,2-Tetrachloroethane	ug/kg	120	ND
1,1,2,2-Tetrachloroethylene	ug/kg	120	ND
Toluene	ug/kg	120	ND
Chlorobenzene	ug/kg	120	ND
Ethylbenzene	ug/kg	120	ND
1,3-Dichlorobenzene	ug/kg	500	ND
1,2-Dichlorobenzene	ug/kg	500	ND
1,4-Dichlorobenzene	ug/kg	500	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

June 24, 1988
PACE Project Number: 880321501

(1) These compounds co-elute; compound calculated as dibromochloromethane.
(2) The sample was diluted 1 to 100 for the phenol analysis; all phenolic compound MDLs must be multiplied by the dilution factor.
(3) The sample was diluted 1 to 10 for the phenol analysis; all phenolic compound MDLs must be multiplied by the dilution factor.
(4) The sample was diluted 1 to 2 for the volatile analysis; all volatile compound MDLs must be multiplied by the dilution factor.
(5) The sample was concentrated 1 to 6 for the base/neutral acid analysis; all base/neutral/acid compound MDLs must be divided by the concentration factor.
(6) The sample was diluted 1 to 17 for the base/neutral acid analysis; all base/neutral/acid compound MDLs must be multiplied by the dilution factor.

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

William H. Scruton
Organic Chemistry Manager

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REPORT OF LABORATORY ANALYSIS

Table 1

Delta Environmental Consultants, Inc.
PACE Project Number: 880321.501

Other Semi-Volatile Compounds Tentatively Identified by GC/MS

Sample Number	Parameter	Retention Time (Min.)	Estimated Concentration mg/kg
62710	2-Hydroxy-propanoic acid	5.33	4.3
	4-Hydroxy-4-methyl-2-pentanone	8.32	47
	4-Methyl octane	9.00	1.4
	Dibutyl Phthalate	29.05	7.7
	Unknown Phthalate	35.87	9.7
	Unknown	10.13	2.6
	Unknown	34.73	2.9
62720	Undecane	16.63	890
	Unknown hydrocarbon	18.60	1600
	Unknown hydrocarbon	19.98	660
	Unknown hydrocarbon	20.43	1500
	Unknown hydrocarbon	21.48	830
	Unknown hydrocarbon	22.13	1400
	Unknown hydrocarbon	23.75	1300
	Unknown hydrocarbon	25.27	1200
	Unknown hydrocarbon	25.35	730
	Unknown hydrocarbon	28.10	660
62730	2-Methylnaphthalene	18.88	5000
	Undecane	16.45	2600
	Unknown hydrocarbon	18.38	3000
	Unknown hydrocarbon	20.20	3300
	Unknown dimethylnaphthalene	20.63	1200
	Unknown dimethylnaphthalene	20.90	1300
	Unknown hydrocarbon	21.88	3300
	Unknown hydrocarbon	23.48	3300
	Unknown hydrocarbon	25.00	3000
	Unknown hydrocarbon	26.45	1800
62740	2-Methylnaphthalene	18.92	4200
	Unknown hydrocarbon	18.32	4000
	1-Methyl naphthalene	18.53	2800
	Unknown hydrocarbon	20.13	4300
	2,6-Dimethylnaphthalene	20.55	2000
	Unknown hydrocarbon	21.83	4200
	4,2,6-Trimethyloctane	23.42	4100
	Unknown hydrocarbon	24.93	3800
	Unknown hydrocarbon	26.38	2400
	Heptadecane	27.73	1800
62750	2-Methylnaphthalene	18.90	210

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 13

July 07, 1988
PACE Project Number: 880527502

PACE Sample Number:			136560	136570	136580
Parameter	Units	MDL	B6	B 7	Excavated Soil
Phenol	mg/kg	0.33	ND	-	-
Phenol	mg/kg	3.3	-	ND	-
2-Chlorophenol	mg/kg	0.93	ND	-	-
2-Chlorophenol	mg/kg	9.3	-	ND	-
2-Nitrophenol	mg/kg	0.90	ND	-	-
2-Nitrophenol	mg/kg	9.0	-	ND	-
2,4-Dimethylphenol	mg/kg	0.60	ND	-	-
2,4-Dimethylphenol	mg/kg	6.0	-	ND	-
2,4-Dichlorophenol	mg/kg	0.80	ND	-	-
2,4-Dichlorophenol	mg/kg	8.0	-	ND	-
4-Chloro-3-methylphenol	mg/kg	3.3	ND	-	-
4-Chloro-3-methylphenol	mg/kg	33	-	ND	-
2,4,6-Trichlorophenol	mg/kg	2.4	ND	-	-
2,4,6-Trichlorophenol	mg/kg	24	-	ND	-
2,4-Dinitrophenol	mg/kg	3.3	ND	-	-
2,4-Dinitrophenol	mg/kg	33	-	ND	-
4-Nitrophenol	mg/kg	3.3	ND	-	-
4-Nitrophenol	mg/kg	33	-	ND	-
2-Methyl-4,6-dinitrophenol	mg/kg	4.3	ND	-	-
2-Methyl-4,6-dinitrophenol	mg/kg	43	-	ND	-
Pentachlorophenol	mg/kg	4.7	ND	-	-
Pentachlorophenol	mg/kg	47	-	ND	-
Benzene	mg/kg	0.12	-	-	ND
Toluene	mg/kg	0.12	-	-	ND
Xylene	mg/kg	0.12	-	-	ND
Total Hydrocarbons	mg/kg	1.2	-	-	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Offices:
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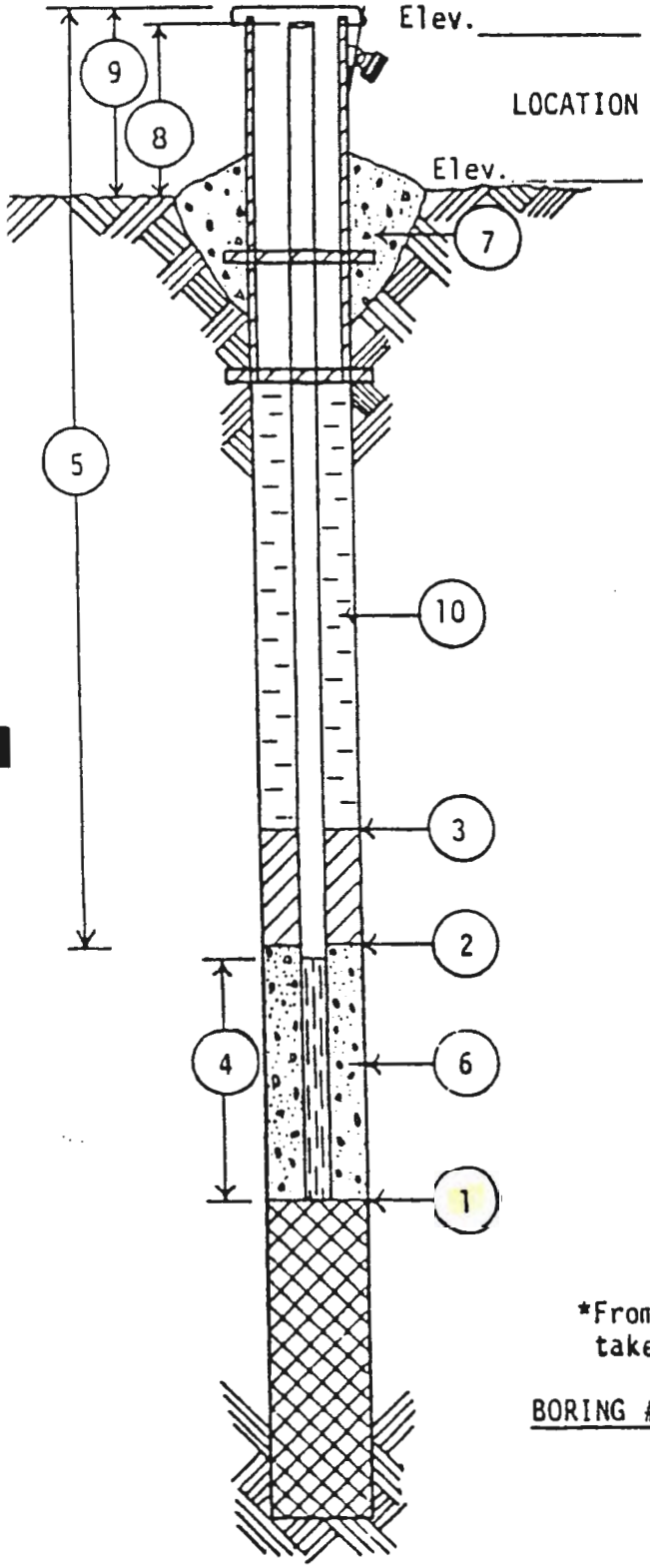
July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136590 B 6
Chloromethane	ug/kg	120	ND
Bromomethane	ug/kg	190	ND
Dichlorodifluoromethane	ug/kg	190	ND
Vinyl Chloride	ug/kg	190	ND
Chloroethane	ug/kg	120	ND
Methylene Chloride	ug/kg	120	ND
Trichlorofluoromethane	ug/kg	50	ND
1,1-Dichloroethylene	ug/kg	38	ND
1,1-Dichloroethane	ug/kg	25	ND
Trans-1,2-Dichloroethylene	ug/kg	38	ND
Chloroform	ug/kg	62	ND
1,2-Dichloroethane	ug/kg	25	ND
1,1,1-Trichloroethane	ug/kg	62	ND
Carbon Tetrachloride	ug/kg	38	ND
Bromodichloromethane	ug/kg	25	ND
1,2-Dichloropropane	ug/kg	25	ND
cis-1,3-Dichloro-1-propene	ug/kg	62	ND
1,1,2-Trichloroethylene	ug/kg	62	ND
Benzene	ug/kg	120	ND
Dibromochloromethane	ug/kg	120	ND
1,1,2-Trichloroethane	ug/kg	120	ND
Trans-1,3-Dichloro-1-propene	ug/kg	38	ND
2-Chloroethylvinyl Ether	ug/kg	620	ND
Bromoform	ug/kg	120	ND
1,1,2,2-Tetrachloroethane	ug/kg	120	ND
1,1,2,2-Tetrachloroethylene	ug/kg	120	ND
Toluene	ug/kg	120	ND
Chlorobenzene	ug/kg	120	ND
Ethylbenzene	ug/kg	120	ND
1,3-Dichlorobenzene	ug/kg	500	ND
1,2-Dichlorobenzene	ug/kg	500	ND
1,4-Dichlorobenzene	ug/kg	500	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

WELL DETAIL INFORMATION SHEET



JOB NO. 1127

BORING NO. MW-1

DATE 9-15-87

CHIEF P.D.

LOCATION West Bend Monitoring Wells

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 18.0 FEET.
2. DEPTH OF BOTTOM OF SEAL (if installed) 7.5 FEET.
3. DEPTH TO TOP OF SEAL (if installed) 5.2 FEET.
4. LENGTH OF WELL POINT, (PVC WELL SCREEN), OR SLOTTED PIPE 10.0 FEET. (Circle One)
5. TOTAL LENGTH OF PIPE 10.0 FEET @ 2 IN. DIAMETER.
6. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.
7. CONCRETE CAP, (YES) NO (Circle One)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.0 FEET.
9. PROTECTIVE CASING? (YES) NO (Circle One)
   HEIGHT ABOVE GROUND 2.1'.
   LOCKING CAP? (YES) NO (Circle One)
10. TYPE OF BACKFILL: Bentonite Grout

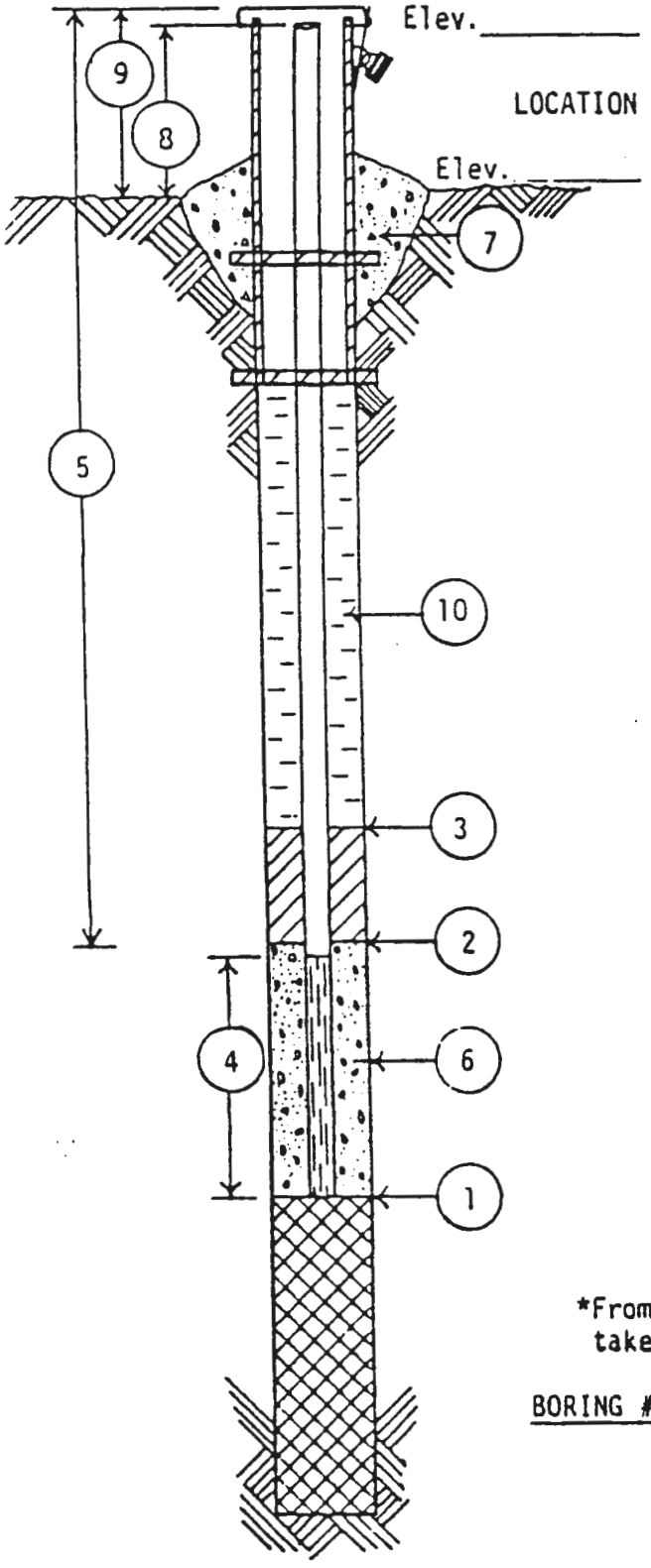
WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET



JOB NO. 1127

BORING NO. MW-3 2

DATE 9-16-87

CHIEF PD

LOCATION West Bend Monitoring Wells

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 22.3 FEET.
2. DEPTH OF BOTTOM OF SEAL (if installed) 11.0 FEET.
3. DEPTH TO TOP OF SEAL (if installed) 9.8 FEET.
4. LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10.0 FEET. (Circle One)
5. TOTAL LENGTH OF PIPE 14.3 FEET @ 2 IN. DIAMETER.
6. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.
7. CONCRETE CAP, (YES) NO (Circle One)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.0 FEET.
9. PROTECTIVE CASING? (YES) NO (Circle One)
   HEIGHT ABOVE GROUND 2.1'.
   LOCKING CAP? (YES) NO (Circle One)
10. TYPE OF BACKFILL: Bentonite Grout

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET

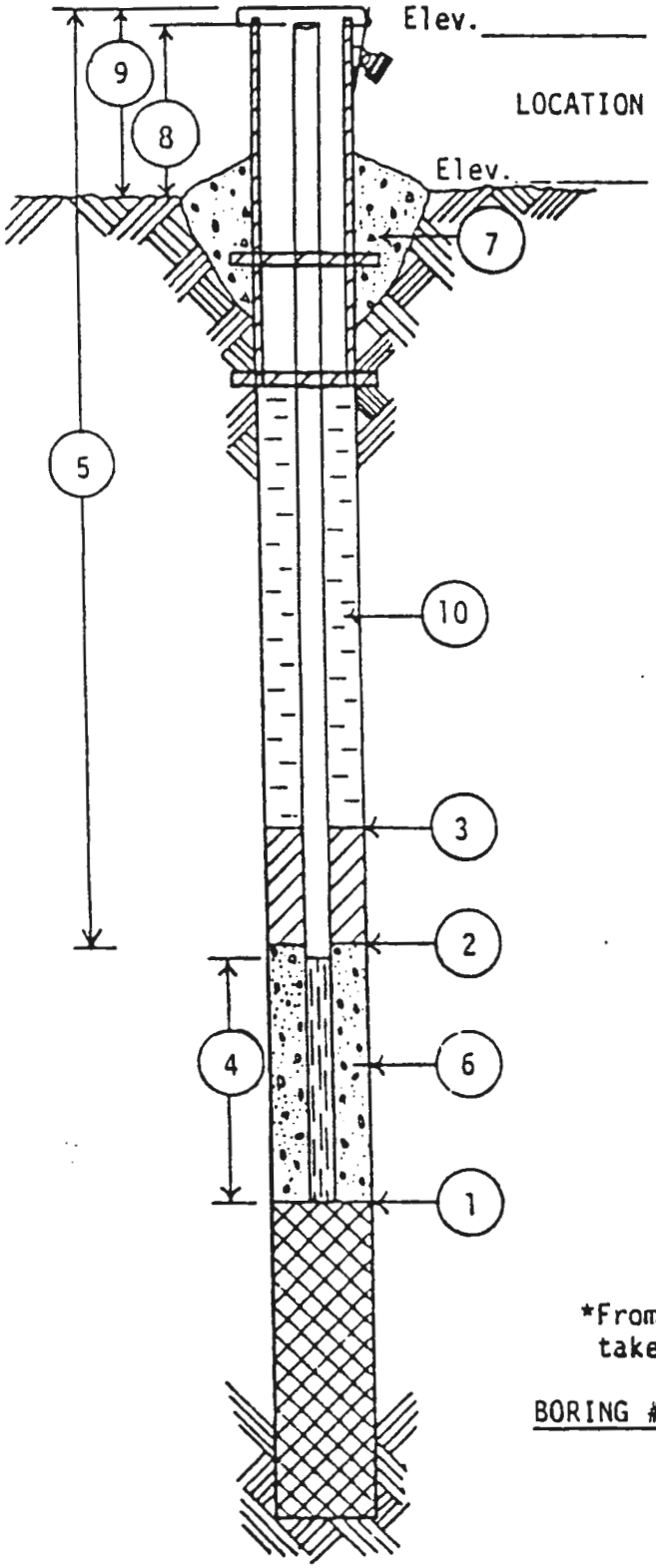
JOB NO. 1127

BORING NO. MW-@ 3

DATE 9-15-87

CHIEF P.D.

LOCATION West Bend Monitoring Wells



All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 19.1 FEET.

(2) DEPTH OF BOTTOM OF SEAL (if installed) 8.3 FEET.

(3) DEPTH TO TOP OF SEAL (if installed) 6.9 FEET.

(4) LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10.0 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 11.1 FEET @ 2 IN. DIAMETER.

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.

(7) CONCRETE CAP, (YES) NO (Circle One)

(8) HEIGHT OF WELL CASING ABOVE GROUND 2.0 FEET.

(9) PROTECTIVE CASING? (YES) NO (Circle One)
HEIGHT ABOVE GROUND 2.1'.
LOCKING CAP? (YES) NO (Circle One)

(10) TYPE OF BACKFILL: Bentonite Grout

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

MONITORING WELL DEVELOPMENT

WELL NUMBER MW-03

WELL DIAMETER 2"

TOTAL DEPTH 18.8' 18.5'

DEPTH TO WATER Before Dev. 9.9'
After Dev. 10.1'

PROJECT West Bend MW's

PROJECT NO. 1127

DATE 9-16-87

DEVELOPED BY M.M

DESCRIPTION OF DEVELOPMENT METHOD

VOLUME OF WATER REMOVED FROM WELL 40 Gal.

CLARITY OF WATER IN WELL BEFORE DEVELOPMENT Black, very cloudy

CLARITY OF WATER IN WELL AFTER DEVELOPMENT Lt. Blk, Cloudy

VOLUME OF WATER ADDED TO WELL

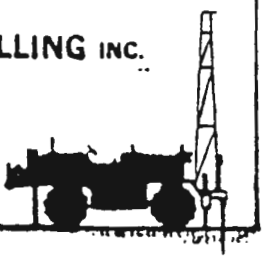
SOURCE OF WATER ADDED TO WELL

TIME SPENT FOR DEVELOPMENT: 45 Min.

COMMENTS:

WISCONSIN TEST DRILLING INC.
SOIL AND FONDATION EXPLORATION

101 ALDERSON
P. O. BOX 89
SCHOFIELD, WISCONSIN 54476
(715) 359-7090



WELL DETAIL INFORMATION SHEET

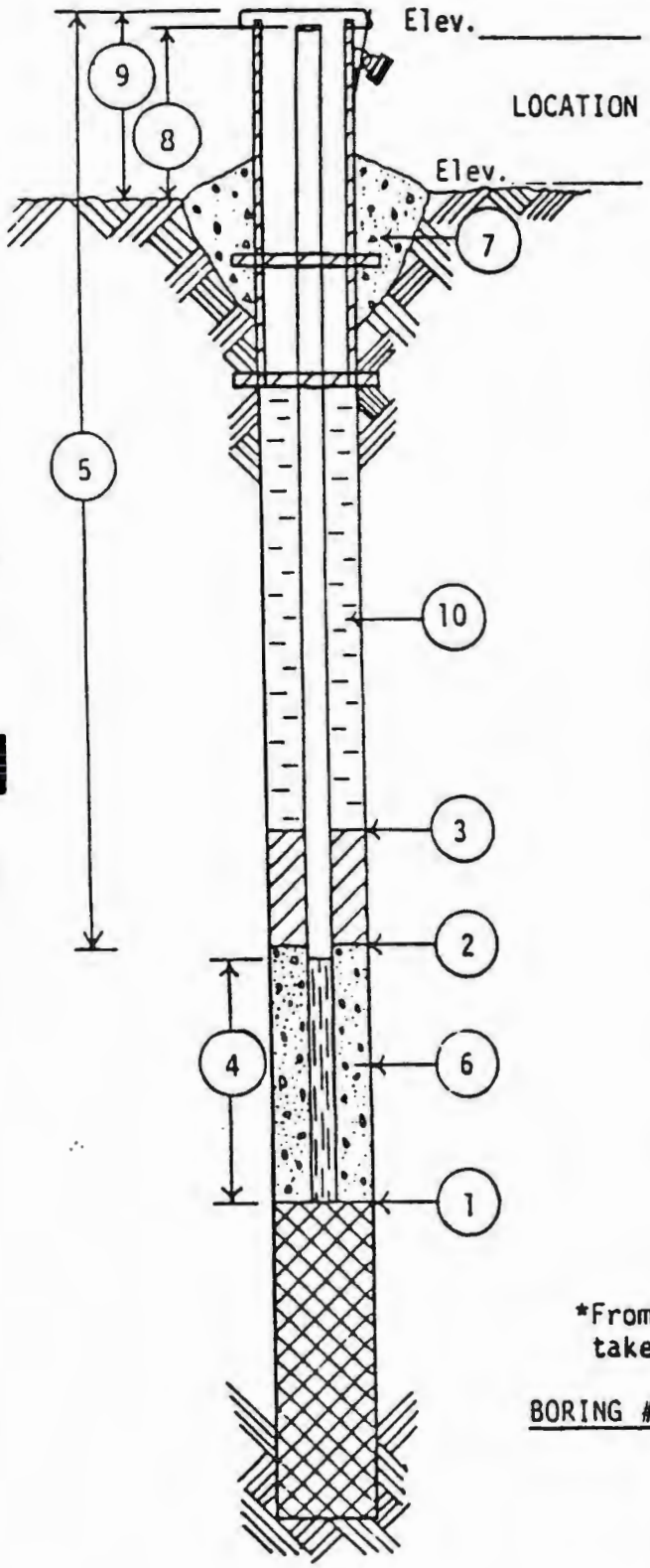
JOB NO. 1127

BORING NO. MW-4

DATE 9-16-87

CHIEF P.D.

LOCATION West Bend Monitoring Wells



All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 15.5 FEET.

(2) DEPTH OF BOTTOM OF SEAL (if installed) 4.3 FEET.

(3) DEPTH TO TOP OF SEAL (if installed) 3.1 FEET.

(4) LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10.0 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 50.0 FEET @ 2 IN. DIAMETER

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.

(7) CONCRETE CAP, (YES) NO (Circle One)

(8) HEIGHT OF WELL CASING ABOVE GROUND 0.6 FEET.

(9) PROTECTIVE CASING? (YES) NO (Circle One)
HEIGHT ABOVE GROUND 0 (Flush Mount Top)
LOCKING CAP? (YES) NO (Circle One)

(10) TYPE OF BACKFILL: Bentonite Grout

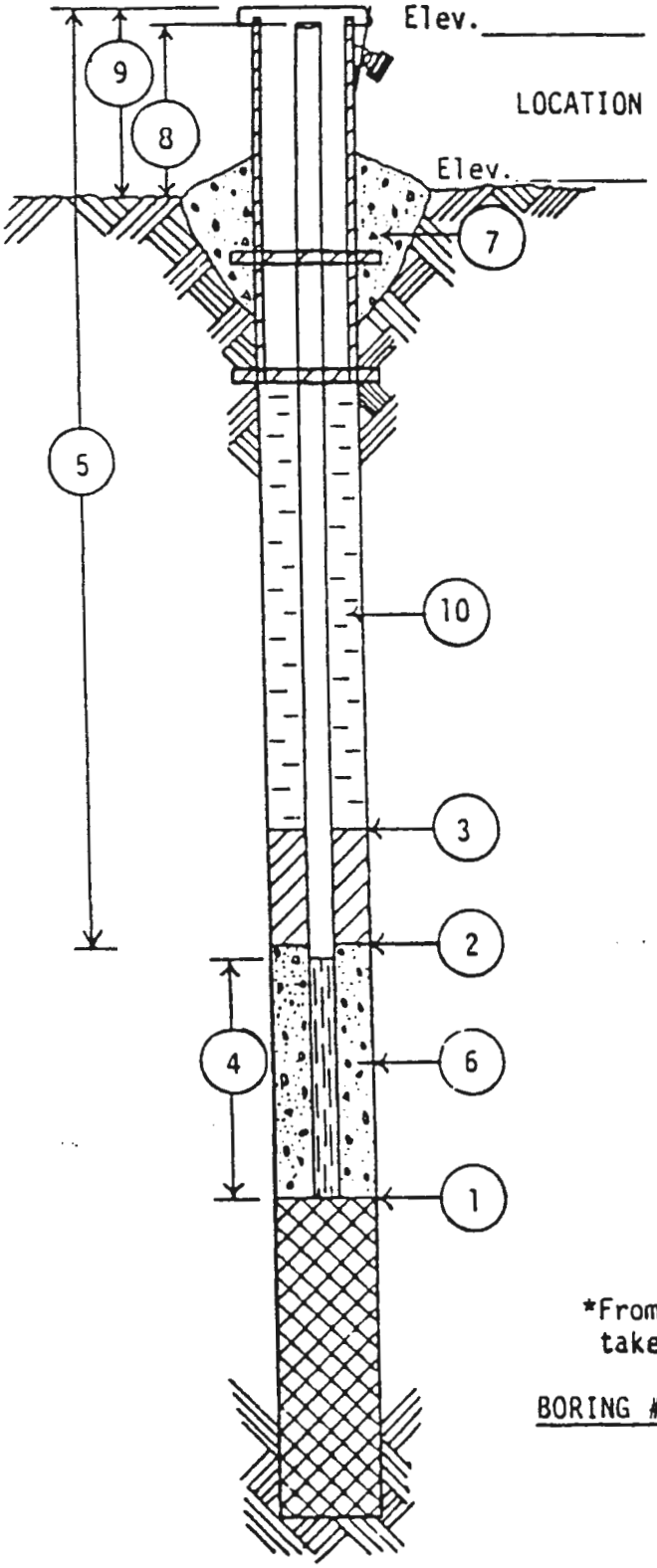
WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET



JOB NO. 1127

BORING NO. MW-5

DATE 9-25-87

CHIEF L.E.

LOCATION West Bend Monitoring Wells

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 20.6 FEET.

(2) DEPTH OF BOTTOM OF SEAL (if installed) 10.0 FEET.

(3) DEPTH TO TOP OF SEAL (if installed) 7.8 FEET.

(4) LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10.0 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 12.0 FEET @ 2 IN. DIAMETER.

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.

(7) CONCRETE CAP, (YES) NO (Circle One)

(8) HEIGHT OF WELL CASING ABOVE GROUND 2.0 FEET.

(9) PROTECTIVE CASING? (YES) NO (Circle One)
HEIGHT ABOVE GROUND 2.2'.
LOCKING CAP? (YES) NO (Circle One)

(10) TYPE OF BACKFILL: Bentonite Grout

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET

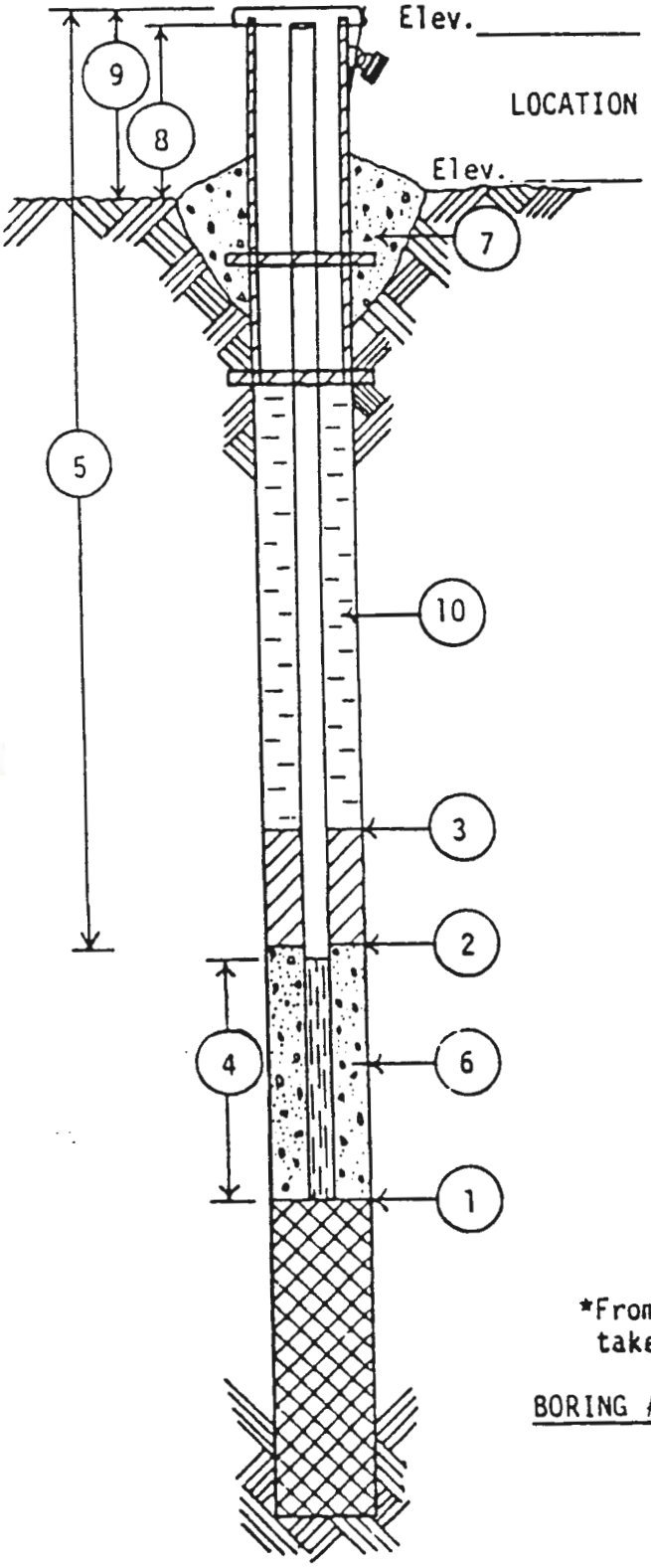
JOB NO. 1127

BORING NO. MW-6A

DATE 9-16-87

CHIEF P.D.

LOCATION West Bend Monitoring Wells



All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 26.6 FEET.

(2) DEPTH OF BOTTOM OF SEAL (if installed) 15.4 FEET.

(3) DEPTH TO TOP OF SEAL (if installed) 14.2 FEET.

(4) LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10.0 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 16.0 FEET @ 2 IN. DIAMETER.

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.

(7) CONCRETE CAP, (YES) NO (Circle One)

(8) HEIGHT OF WELL CASING ~~ABOVE GROUND~~ below grade 0.46 ~~0.5~~ FEET.

(9) PROTECTIVE CASING? (YES) NO (Circle One)
HEIGHT ABOVE GROUND 0 (Flush Mount. Well Top
LOCKING CAP? (YES) NO (Circle One)

(10) TYPE OF BACKFILL: Bentonite Grout

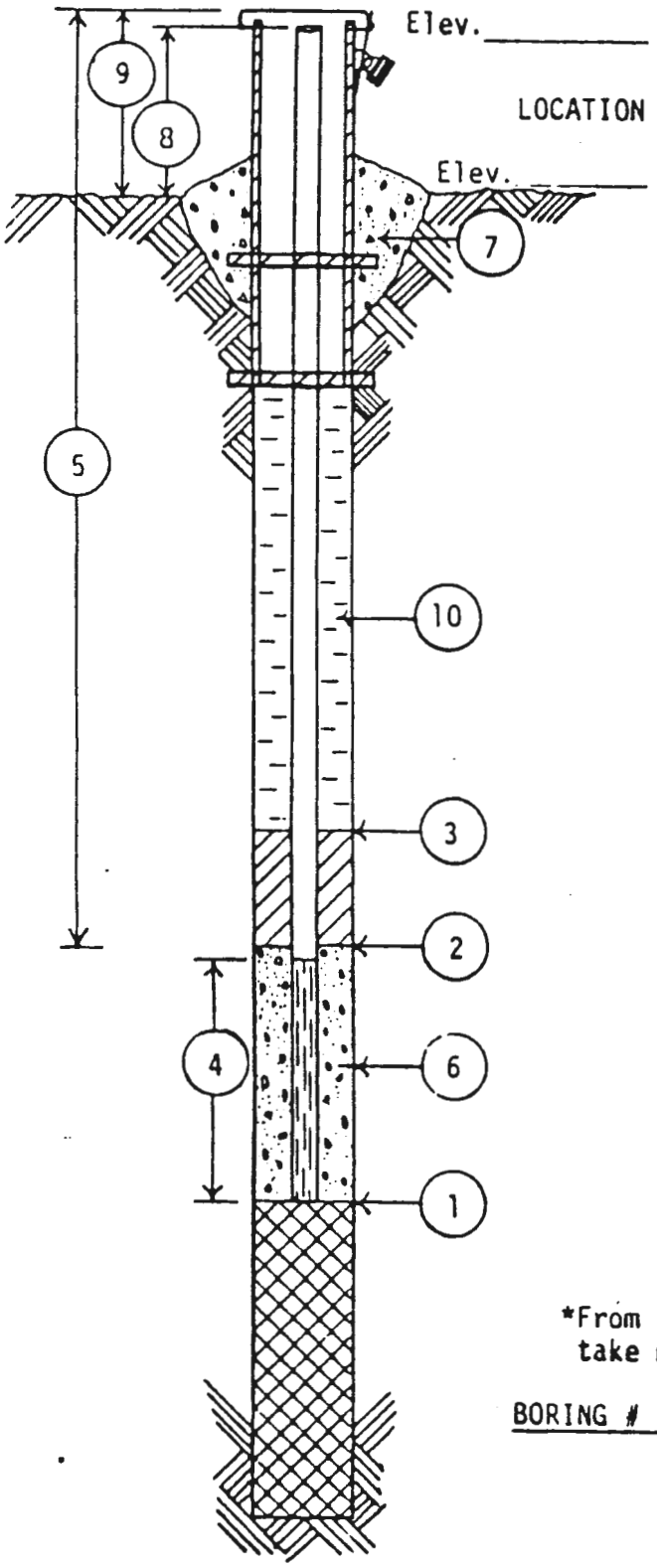
WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET



JOB NO. 1207

BORING NO. MW-6B

DATE 3-21-88

CHIEF MK

LOCATION West Bend, WI

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 36 FEET.
2. DEPTH OF BOTTOM OF SEAL (if installed) 28 FEET.
3. DEPTH TO TOP OF SEAL (if installed) 22 FEET.
4. LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 5 FEET. (Circle One)
5. TOTAL LENGTH OF PIPE 31 FEET @ 2 IN. DIAMETER.
6. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.
7. CONCRETE CAP, (YES) NO (Circle One)
8. HEIGHT OF WELL CASING ~~ABOVE GROUND~~ below grade = 0.5 feet Flush Mount FEET.
9. PROTECTIVE CASING? (YES) NO (Circle One)
   HEIGHT ABOVE GROUND Flush Mount.
   LOCKING CAP? YES (NO) (Circle One)
10. TYPE OF BACKFILL: Bentonite Slurry

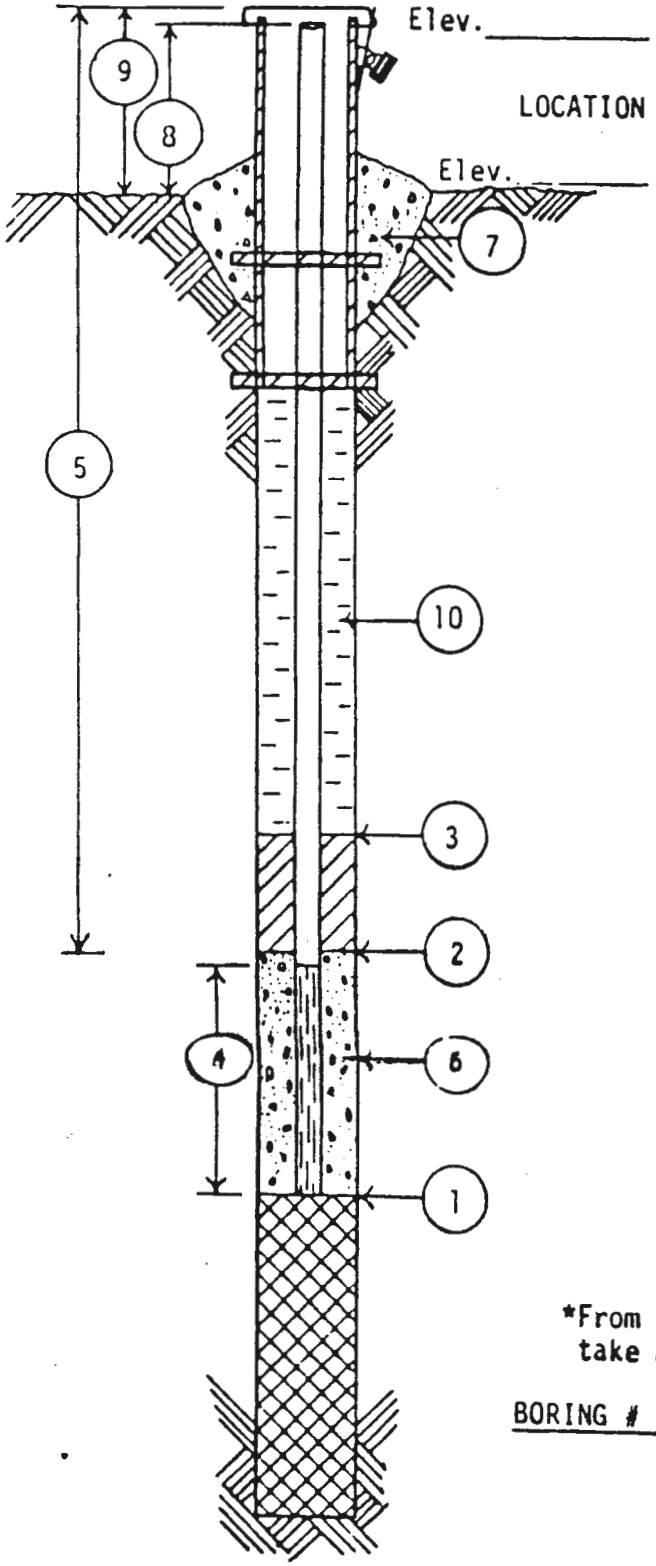
WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET



JOB NO. 1207

BORING NO. MW-A

DATE 3-22-88

CHIEF M.K.

LOCATION West Bend, WI

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 26.5 FEET.
2. DEPTH OF BOTTOM OF SEAL (if installed) 4.5 FEET.
3. DEPTH TO TOP OF SEAL (if installed) 2.5 FEET.
4. LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10 FEET. (Circle One)
5. TOTAL LENGTH OF PIPE 19.5 FEET @ 2 IN. DIAMETER.
6. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.
7. CONCRETE CAP, (YES) NO (Circle One)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.5 FEET.
9. PROTECTIVE CASING? (YES) NO (Circle One)
   HEIGHT ABOVE GROUND 3.0'.
   LOCKING CAP? (YES) NO (Circle One)
10. TYPE OF BACKFILL: Bentonite Slurry

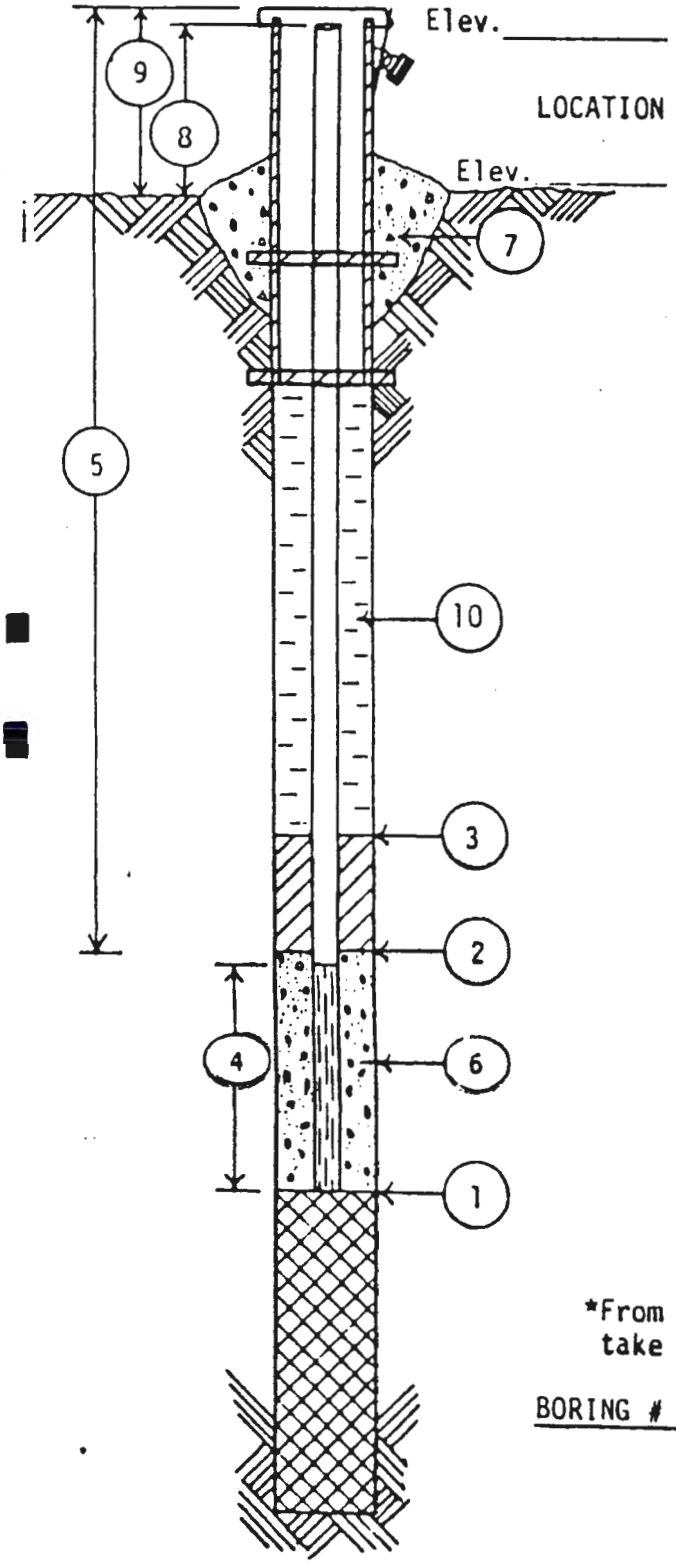
WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET



JOB NO. 1207

BORING NO. MW-C

DATE 3-17-88

CHIEF M.K.

LOCATION 514 Michigan, West Bend, WI

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 23.2 FEET.
2. DEPTH OF BOTTOM OF SEAL (if installed) 11.4 FEET.
3. DEPTH TO TOP OF SEAL (if installed) 9.3 FEET.
4. LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10 FEET. (Circle One)
5. TOTAL LENGTH OF PIPE 15.7 FEET @ 2 IN. DIAMETER.
6. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.
7. CONCRETE CAP, (YES) NO (Circle One)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.5 FEET.
9. PROTECTIVE CASING? (YES) NO (Circle One)
   HEIGHT ABOVE GROUND 2.6'.
   LOCKING CAP? (YES) NO (Circle One)
10. TYPE OF BACKFILL: Bentonite Grout

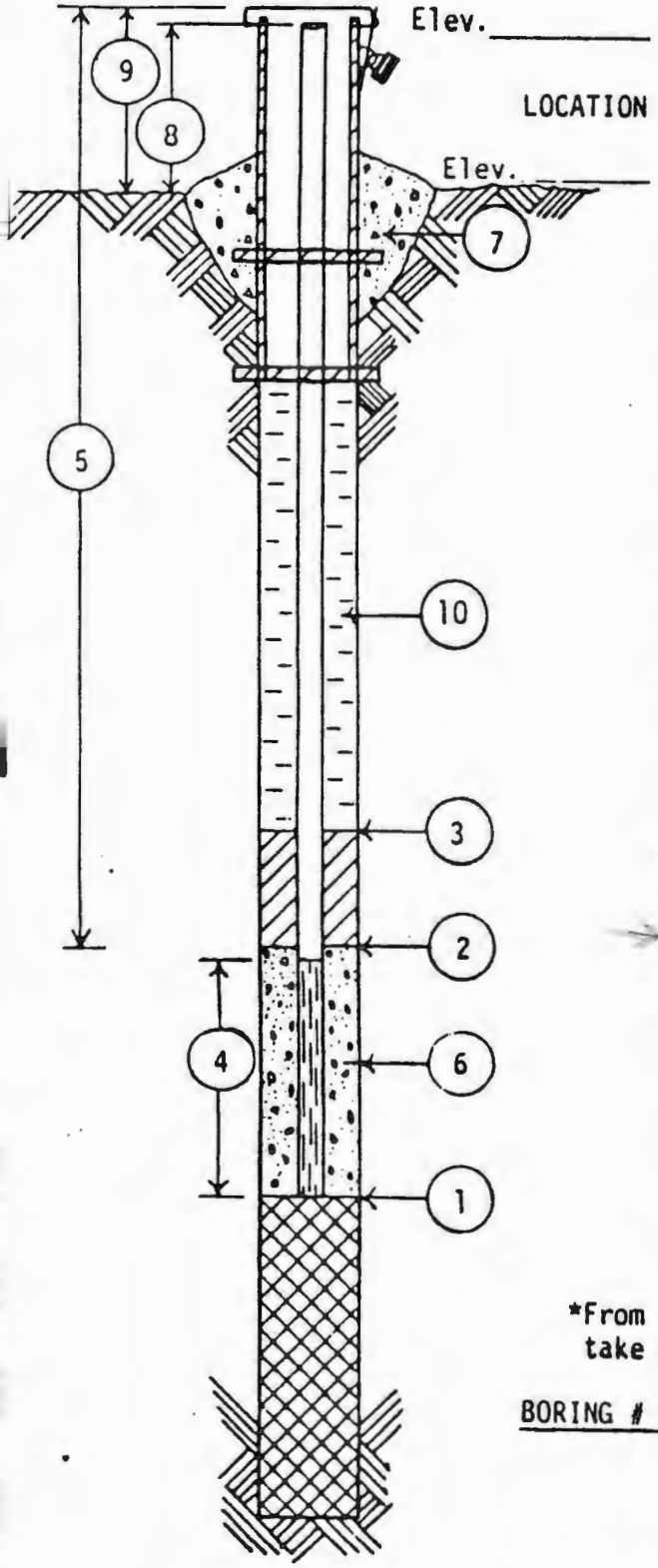
WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET



JOB NO. 1207

BORING NO. MW-~~02~~ D1

DATE 3-22-88

CHIEF M.K.

LOCATION West Bend, WI

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 25 FEET.
2. DEPTH OF BOTTOM OF SEAL (if installed) 13 FEET.
3. DEPTH TO TOP OF SEAL (if installed) 11 FEET.
4. LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10 FEET. (Circle One)
5. TOTAL LENGTH OF PIPE 17 FEET @ 2 IN. DIAMETER.
6. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.
7. CONCRETE CAP, (YES) NO (Circle One)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.5 FEET.
9. PROTECTIVE CASING? (YES) NO (Circle One)
   HEIGHT ABOVE GROUND 2.5'.
   LOCKING CAP? (YES) NO (Circle One)
10. TYPE OF BACKFILL: Bentonite Slurry

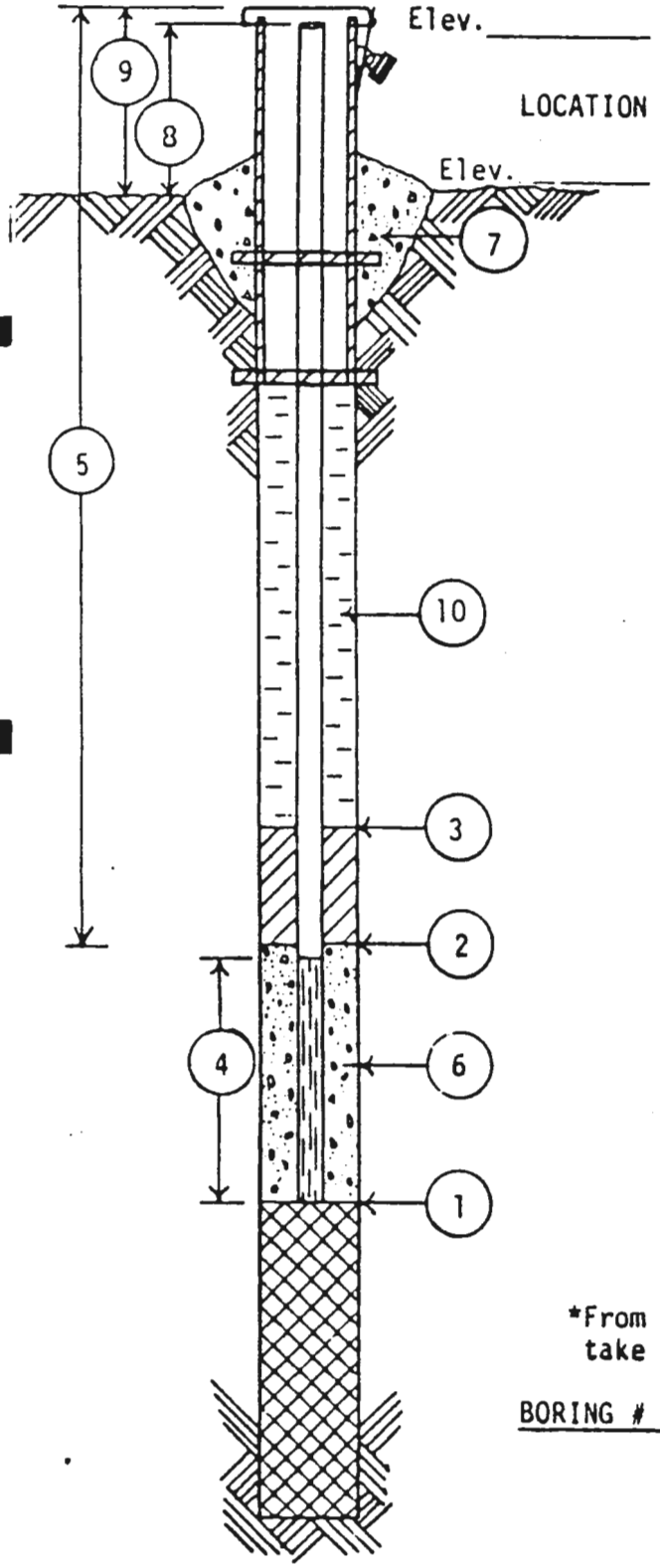
WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET



JOB NO. 1207

BORING NO. MW-D2 D2

DATE 3-22-88

CHIEF M.K.

LOCATION West Bend, WI

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 34 FEET.

(2) DEPTH OF BOTTOM OF SEAL (if installed) 22 FEET.

(3) DEPTH TO TOP OF SEAL (if installed) 21 FEET.

(4) LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 5.0 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 26 FEET @ 2 IN. DIAMETER.

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand .

(7) CONCRETE CAP, (YES) NO (Circle One)

(8) HEIGHT OF WELL CASING ABOVE GROUND 2.5 FEET.

(9) PROTECTIVE CASING? (YES) NO (Circle One)
HEIGHT ABOVE GROUND 2.5' .
LOCKING CAP? (YES) NO (Circle One)

(10) TYPE OF BACKFILL: Bentonite Slurry

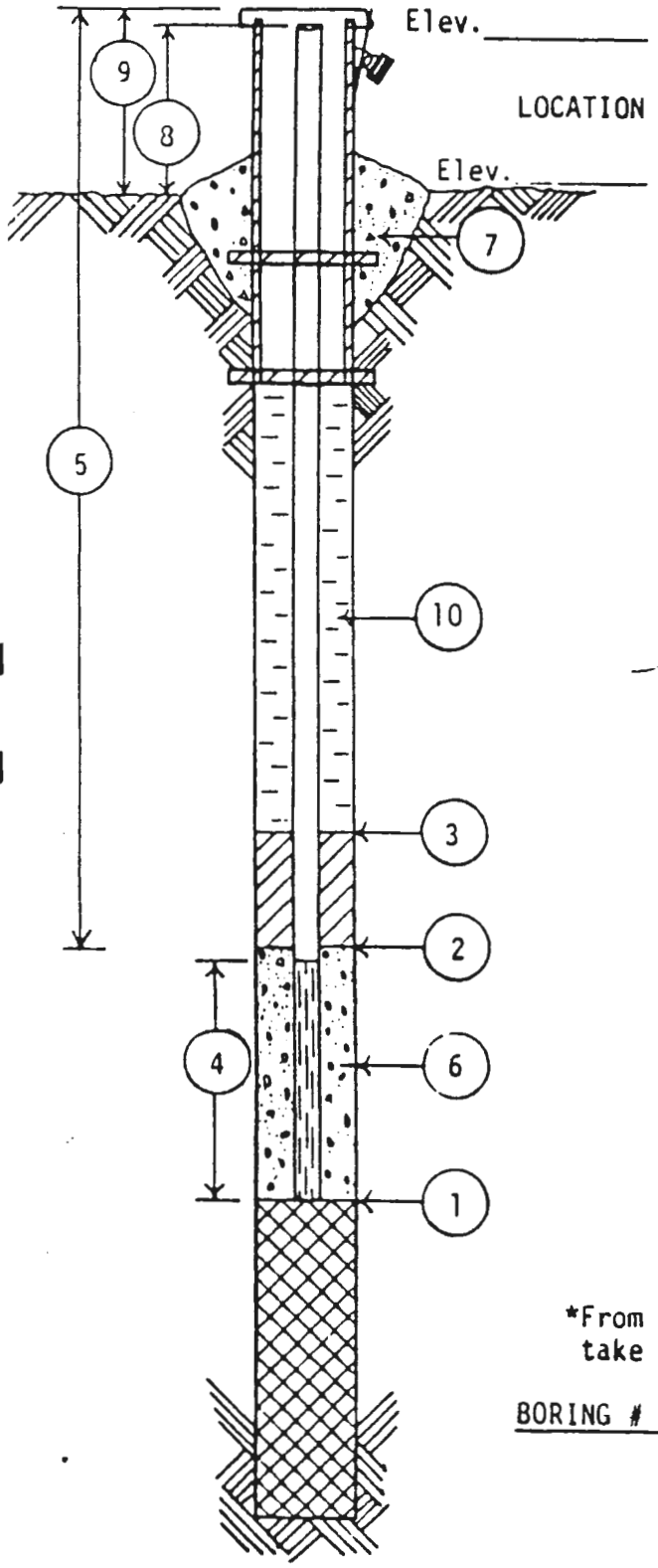
WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WISCONSIN TEST DRILLING

WELL DETAIL INFORMATION SHEET



JOB NO. 1207

BORING NO. MW-E

DATE 3-22-88

CHIEF M.K.

LOCATION West Bend, WI

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 17.5 FEET.
2. DEPTH OF BOTTOM OF SEAL (if installed) 5.5 FEET.
3. DEPTH TO TOP OF SEAL (if installed) 3.5 FEET.
4. LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10 FEET. (Circle One)
5. TOTAL LENGTH OF PIPE 7.5 FEET @ 2 IN. DIAMETER.
6. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 Flint Sand.
7. CONCRETE CAP, (YES) NO (Circle One)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.5 FEET.
9. PROTECTIVE CASING? (YES) NO (Circle One)
   HEIGHT ABOVE GROUND 3.0+.
   LOCKING CAP? (YES) NO (Circle One)
10. TYPE OF BACKFILL: Bentonite Slurry

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

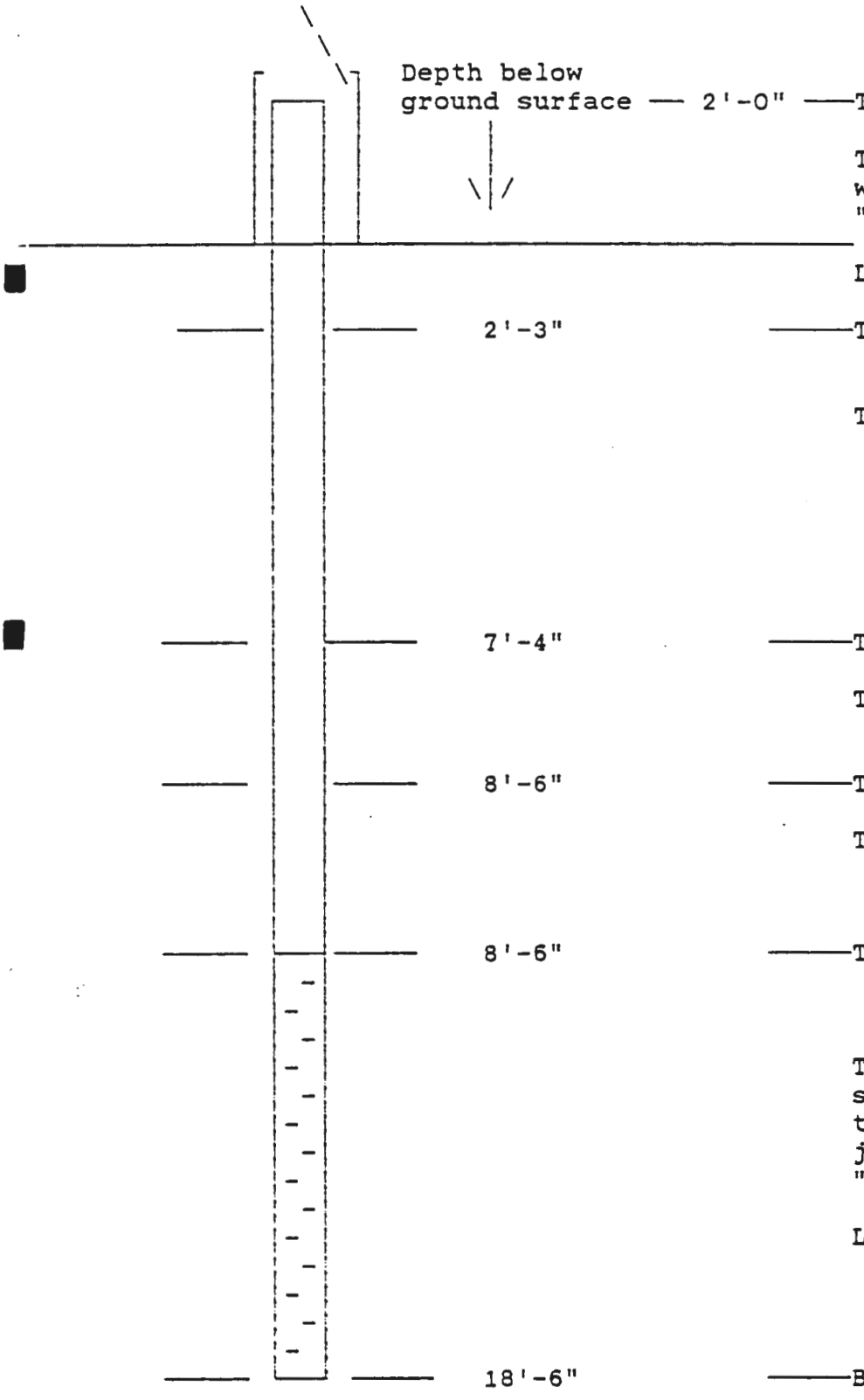
WISCONSIN TEST DRILLING

MONITORING WELL LOG

Date completed: 5/25/88

PROJECT: West Bend
LOCATION: across from 233 Kilbourne
WELL # "F"
ELEVATION: None taken

BORING METHOD: 6.25 ID augers
BORE HOLE DIAMETER: 9.5 in.
PROTECTOR PIPE: 6" diameter, concreted, locking



-X--X--X--X--X--X--X- Depth drilled (below G.S.)= 18'-6"

(not-to-scale)

ENVIRONMENTAL & FOUNDATION DRILLING INC.

Delta Environmental Consultants, Inc.

Slug Test Data

Project:	EIS Brake Parts	Tested by:	AWV
Project No.:	1987285	Data analyzed by:	KAS
Well No.: MW	MW-2	Date of Test:	50488

Slug Data

Outside radius of slug:	0.0542
Slug bottom:	24.3
Slug length:	4

Well data

Measuring point:	Top of pvc riser
Well depth:	24.3
Inside radius of riser:	0.083
Effective intake radius:	0.083
Screened interval length:	10
Static water level:	11.87

Initial drawdown at beginning of test (So): 1.70569894 Independent Regression Values

Time	Depth below M.P.	Height above static	Hx=Sx/So	log(Hx)	Col. 1	Col. 2	Col. 3
0	11.87	0	0	ERR	-0.3611326	0	0
28	11.21	0.66	0.38693815	-0.4123584	-0.4680375		
60	11.43	0.44	0.25795877	-0.5884497	-0.5902146		
73	11.49	0.38	0.22278257	-0.6521188	-0.639849		
92	11.58	0.29	0.17001828	-0.7695044	-0.7123916		
120	11.61	0.26	0.15243018	-0.816929	-0.8192966		
150	11.68	0.19	0.11139129	-0.9531488	-0.9338375		
165	11.71	0.16	0.09380319	-1.0277824	-0.991108		
180	11.71	0.16	0.09380319	-1.0277824	-1.0483785		
210	11.74	0.13	0.07621509	-1.117959	-1.1629195		
240	11.74	0.13	0.07621509	-1.117959	-1.2774605		
270	11.74	0.13	0.07621509	-1.117959	-1.3920015		
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
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		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			
		11.87	6.95902408	0.84254834			

Column 1 Regression Output:

Constant			-0.3611
Std Err of Y Est			0.0390
R Squared			0.97590
No. of Observations			
Degrees of Freedom			
X Coefficient(s)			-0.003818
Std Err of Coef.			0.00022677
T1 =	0	S1 =	0.74262
T2 =	270	S2 =	0.06916
K2 =	1.45E-05	K3 =	3.26E
K4 =	1.45E-05	K5 =	1.60E

Column 2

T1 =		S1 =	1.70569
T2 =		S2 =	1.70569
K2 =	ERR	K3 =	0.00E
K4 =	ERR	K5 =	

Column 3

T1 =		S1 =	1.70569
T2 =		S2 =	1.70569
K2 =	ERR	K3 =	0.00E

K2-K5 and the theory behind this spreadsheet are explained in

Thompson, D. B. 1987. A microcomputer program for interpreting time-lag permeability tests. Ground Water.

Delta Environmental Consultants, Inc.

Slug Test Data

Project: EIS Brake Parts
Project No.: 1097283
Well No.: MW MW-5
Tested by: MWV
Data analyzed by: KAS
Date of Test: 50488

Slug Data

Outside radius of slug: 0.0542
Slug bottom: 22.6
Slug length: 4

Well data

Measuring point: Top of pvc riser
Well depth: 22.6
Inside radius of riser: 0.083
Effective intake radius: 0.083
Screened interval length: 7.72
Static water level: 14.88

Initial drawdown at beginning of test (So): 1.70569894 Independant Regression Values

Time	Depth below M.P.	Height above static	Hx=Sx/So	log(Hx)	Col. 1	Col. 2	Col. 3
0	14.88	0	0	ERR	0.08515923	-1.0283992	0
30	14.75	0.13	0.07621509	-1.117959	0.07624166	-1.1031774	
60	14.75	0.13	0.07621509	-1.117959	0.06732409	-1.1779557	
75	14.77	0.11	0.06448969	-1.1905097	0.0629853	-1.2153448	
95	14.79	0.09	0.05276429	-1.2778599	0.05692025	-1.2651967	
120	14.8	0.08	0.04690159	-1.3288124	0.04948894	-1.3275121	
135	14.82	0.06	0.0351762	-1.4537511	0.04303015	-1.3849012	
150	14.82	0.06	0.0351762	-1.4537511	0.04057137	-1.4022903	
180	14.82	0.06	0.0351762	-1.4537511	0.03165379	-1.4770683	
195	14.82	0.06	0.0351762	-1.4537511	0.02719501	-1.5144576	
		14.88	8.72369657	0.94070055	0.08515923	-1.0283992	
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			
		14.88	8.72369657	0.94070055			

Column 1
Regression Output:

Constant			0.08515923
Std Err of Y Est			0.00663293
R Squared			0.87355379
No. of Observations			9
Degrees of Freedom			7
X Coefficient(s)	-0.0002973		
Std Err of Coef.	4.2357E-05		
T1 =	30	S1 =	2.03303116
T2 =	195	S2 =	1.81592283
K2 =	1.35E-06	K3 =	1.90E-05
K4 =	1.38E-06	K5 =	1.62E-06

Column 2
Regression Output:

Constant			-1.0283992
Std Err of Y Est			0.05259467
R Squared			0.98714
No. of Observations			9
Degrees of Freedom			7
X Coefficient(s)	-0.0024426		
Std Err of Coef.	0.00033526		
T1 =	30	S1 =	0.13450082
T2 =	195	S2 =	0.05217287
K2 =	1.16E-05	K3 =	1.37E-04
K4 =	1.16E-05	K5 =	1.38E-05

Column 3

K2-K5 and the theory behind this spreadsheet are explained in Thompson, G. B. 1987. A microcomputer program for interpreting time-lag permeability tests. Ground Water.

T1 =		S1 =	1.70569894
T2 =		S2 =	1.70569894
K2 =	ERR	K3 =	0.00E+00

Delta Environmental Consultants, Inc.
Slug Test Data

Project:	EIS Brake Parts	Tested by:	awv
Project No.:	[illegible]	Data analyzed by:	kas
Well No.: MW	MW-3	Date of Test:	[illegible]

Slug Data

Wall data
Measuring point: Top of pvc riser
Wall depth: 35.5

Outside radius of slug:	0.0541	Inside radius of riser:	0.083
Slug bottom:	33.5	Effective intake radius:	0.333
Slug length:	3	Screened interval length:	5
		Static water level:	18.16

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Initial drawdown at beginning of test (H0): [illegible] Independent Regression Values Column 1

Time	W.L.	H above static					
0	18.16	0	0	ERR	-0.296413	0	0
45	17.27	0.89	0.52176024	-0.2825124	-0.4016917		
60	17.39	0.77	0.45140725	-0.3454117	-0.4355946		
75	17.49	0.67	0.39280095	-0.4058276	-0.4708775		
90	17.57	0.59	0.34589926	-0.4610504	-0.5057704		
105	17.62	0.54	0.31658576	-0.4995086	-0.5406633		
120	17.68	0.48	0.28140957	-0.5506611	-0.5755562		
135	17.74	0.42	0.24623337	-0.6086531	-0.6104491		
165	17.79	0.37	0.21691987	-0.6637007	-0.6802349		
180	17.83	0.33	0.19346908	-0.7133884	-0.7151279		
195	17.87	0.29	0.17001828	-0.7695044	-0.7500208		
210	17.88	0.28	0.16415558	-0.7847443	-0.7849137		
240	17.93	0.23	0.13484208	-0.8701745	-0.8546995		
270	17.98	0.18	0.10552857	-0.9766299	-0.9244853		
300	18	0.16	0.09380319	-1.0277824	-0.9942711		
330	18.03	0.13	0.07621509	-1.117959	-1.0640569		
360	18.07	0.09	0.05276429	-1.2776599	-1.1338427		
390	18.07	0.09	0.05276429	-1.2776599	-1.2036286		
420	18.1	0.06	0.0351762	-1.4537511	-1.2734144		
450	18.1	0.06	0.0351762	-1.4537511	-1.3432002		
480	18.12	0.04	0.0234508	-1.6298424	-1.412986		
510	18.14	0.02	0.0117254	-1.9308724	-1.4827718		
540	18.15	0.01	0.0058627	-2.2319024	-1.5525576		
570	18.16	0	0	ERR	-1.6223435		
		18.16	10.6466619	1.02721346			
		18.16	10.6466619	1.02721346			
		18.16	10.6466619	1.02721346			

Regression Output:

Constant	-0.296413
Std Err of Y Est	0.40573202
R Squared	0.48341025
No. of Observations	23
Degrees of Freedom	21
X Coefficient(s)	-0.0023262
Std Err of Coef.	0.00051952

T1 =	45	S1 =	0.6773462
T2 =	570	S2 =	0.04069667
K2 =	1.51E-05	K3 =	6.63E-04
K4 =	1.51E-05	K5 =	1.96E-05

Column 2

T1 =		S1 =	1.70569894
T2 =		S2 =	1.70569894
K2 =	ERR	K3 =	0.00E+00
K4 =	ERR	K5 =	ERR

Column 3

K2-K5 and the theory behind this
spreadsheet are explained in
Thompson, D. B. 1987. A microcomputer program
for interpreting time-lag
permeability tests. Ground Water.
v. 25, no. 2.

T1 =		S1 =	1.70569894
T2 =		S2 =	1.70569894
K2 =	ERR	K3 =	0.00E+00
K4 =	ERR	K5 =	ERR

Delta Environmental Consultants, Inc.
Slug Test Data

Project:	EIS Brake Parts	Tested by:	awv
Project No.:	1097233	Data analyzed by:	kas
Well No.: MW	MW-C	Date of Test:	50493

Slug Data

Outside radius of slug:	0.0541
Slug bottom:	25.7
Slug length:	4

Well data

Measuring point:	Top of pvc riser
Well depth:	25.7
Inside radius of riser:	0.083
Effective intake radius:	0.083
Screened interval length:	10
Static water level:	13.16

Initial drawdown at beginning of test (So): 1.70569894

Time	Depth below M.P.	Height above static	Hx=Sx/So	log(Hx)	Col. 1	Col. 2	Col. 3
0	13.16	0	0	ERR	-0.5095422	0	0
30	12.8	0.36	0.21103713	-0.6765999	-0.6357892		
45	12.84	0.32	0.18760633	-0.7267524	-0.6929127		
60	12.88	0.28	0.16416553	-0.7847443	-0.7620362		
75	12.91	0.25	0.14656746	-0.8339624	-0.8251597		
90	12.95	0.21	0.12311669	-0.9096831	-0.8882832		
105	12.99	0.18	0.10551859	-0.9766299	-0.9514067		
120	12.99	0.17	0.09966589	-1.0014638	-1.0145302		
135	13	0.16	0.09380319	-1.0277824	-1.0776538		
150	13.02	0.14	0.08207779	-1.0857743	-1.1407773		
165	13.04	0.12	0.07035239	-1.1527211	-1.2039008		
180	13.07	0.09	0.05276429	-1.2776699	-1.2670243		
210	13.08	0.08	0.04690159	-1.3288134	-1.3932713		
240	13.1	0.06	0.0351762	-1.4537511	-1.5195183		
270	13.12	0.04	0.0234508	-1.6298424	-1.6457653		
300	13.14	0.02	0.0117254	-1.9306724	-1.7720124		
330	13.16	0	0	ERR			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			
		13.16	7.71531229	0.88708331			

Column 1
Regression Output:

Constant	-0.5095422
Std Err of Y Est	0.05776461
R Squared	0.97320996
No. of Observations	15
Degrees of Freedom	13
X Coefficient(s)	-0.0042092
Std Err of Coef.	0.00019363

T1 =	30	S1 =	0.29456012
T2 =	300	S2 =	0.02383301
K2 =	1.60E-05	K3 =	3.59E-04
K4 =	1.60E-05	K5 =	1.77E-05

Column 2

T1 =		S1 =	1.70569894
T2 =		S2	1.70569894
K2 =	ERR	K3 =	0.00E+00
K4 =	ERR	K5 =	ERR

Column 3

KC-MT and the theory behind this
spreadsheet are explained in
Thompson, D. B. 1987. A microcomputer program
for interpreting time-lag
permeability tests. Ground Water.

T1 =		S1 =	1.70569894
T2 =		S2 =	1.70569894
K2 =	ERR	K3 =	0.00E+00

Delta Environmental Consultants, Inc.
Slug Test Data

Project: EIS Brake Parts
Project No.: 1087295
Well No.: MW D1

Tested by: awv
Data analyzed by: kas
Date of Test: 50488

Slug Data

Outside radius of slug: 0.0542
Slug bottom: 27
Slug length: 4

Well data

Measuring point: Top of pvc riser
Well depth: 27
Inside radius of riser: 0.083
Effective intake radius: 0.083
Screened interval length: 4.39
Static water level: 20.61

Initial drawdown at beginning of test (So): 1.70569894

Time	Depth below M.P.	Height above static	Hw=Sw/So	log(Hw)	Col. 1	Col. 2	Col. 3
0	20.61	0	0	ERR	-0.6933942	0	0
30	20.26	0.35	0.20519448	-0.6878343	-0.7299554		
45	20.28	0.33	0.19346908	-0.7133884	-0.746706		
60	20.29	0.32	0.18760638	-0.7267524	-0.7645164		
75	20.32	0.29	0.17001823	-0.7695044	-0.7822972		
90	20.34	0.27	0.15829288	-0.8005396	-0.8000778		
105	20.35	0.26	0.15243018	-0.816929	-0.8178585		
120	20.36	0.25	0.14656748	-0.8339624	-0.8356391		
135	20.38	0.23	0.13484209	-0.8701745	-0.8534197		
150	20.4	0.21	0.12311669	-0.9096831	-0.8712003		
180	20.42	0.19	0.11139129	-0.9531485	-0.9067615		
210	20.43	0.18	0.10552859	-0.9766299	-0.9423227		
240	20.45	0.16	0.09380319	-1.0277824	-0.9778839		
270	20.45	0.16	0.09380319	-1.0277824	-1.0134451		
300	20.46	0.15	0.08794049	-1.0552111	-1.0490064		
330	20.48	0.13	0.07621509	-1.117959	-1.0845676		
360	20.48	0.13	0.07621509	-1.117959	-1.1201288		
390	20.48	0.13	0.07621509	-1.117959	-1.15569		
420	20.48	0.13	0.07621509	-1.117959	-1.1912512		
		20.61	12.0830233	1.08217561			
		20.61	12.0830233	1.08217561			
		20.61	12.0830233	1.08217561			
		20.61	12.0830233	1.08217561			
		20.61	12.0830233	1.08217561			
		20.61	12.0830233	1.08217561			
		20.61	12.0830233	1.08217561			

Independent Regression Values

Column 1
Regression Output:

Constant	-0.6933942
Std Err of Y Est	0.035648229
R Squared	0.946885173
No. of Observations	18
Degrees of Freedom	16
X Coefficient(s)	-0.0011854
Std Err of Coef.	6.8904E-05

T1 =	30	S1 =	0.31838087
T2 =	420	S2 =	0.10981234
K2 =	6.39E-06	K3 =	2.08E-04
K4 =	6.39E-06	K5 =	7.80E-06

Column 2

T1 =		S1 =	1.70569894
T2 =		S2 =	1.70569894
K2 =	ERR	K3 =	0.00E+00
K4 =	ERR	K5 =	ERR

Column 3

T1 =		S1 =	1.70569894
T2 =		S2 =	1.70569894
K2 =	ERR	K3 =	0.00E+00
K4 =	ERR	K5 =	ERR

K2-K5 and the theory behind this spreadsheet are explained in Thompson, J. S. 1987. A microcomputer program for interpreting slug-log permeability tests. Ground Water, v. 25, no. 2.

Delta Environmental Consultants, Inc.
Slug Test Data

Project:	EIS Brake Parts	Tested by:	smv
Project No.:	[illegible]	Data analyzed by:	kas
Well No.: MW	[illegible]	Date of Test:	[illegible]

		Measuring point:	Top of pvc riser
		Well depth:	36
Outside radius of slug:	[illegible]	Inside radius of riser:	0.083
Slug bottom:	36	Effective intake radius:	0.083
Slug length:	4	Screened interval length:	5
		Static water level:	19.94

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Initial drawdown at beginning of test (So): 1.70569394 Independent Regression Values

Time	Depth below M.P.	Height above static	Hx=Sx/So	log(Hx)	Col. 1	Col. 2	Col. 3
0	19.94	0	0	ERR	-0.1818895	0	0
30	18.85	1.09	0.63903422	-0.1944759	-0.2441536		
45	18.95	0.99	0.58040723	-0.2362672	-0.2753007		
60	19.03	0.91	0.53350564	-0.272861	-0.3064378		
75	19.14	0.8	0.46901594	-0.3288124	-0.3375749		
90	19.22	0.72	0.42211435	-0.3745699	-0.368712		
120	19.29	0.65	0.38107546	-0.418989	-0.4309862		
135	19.35	0.59	0.34589926	-0.4610504	-0.4621233		
150	19.4	0.54	0.31658576	-0.4995086	-0.4932603		
165	19.47	0.47	0.27554687	-0.5598045	-0.5243974		
180	19.48	0.46	0.26968417	-0.5691445	-0.5555345		
215	19.54	0.4	0.23450797	-0.6298424	-0.6281877		
225	19.58	0.36	0.21105718	-0.6755999	-0.6489458		
240	19.6	0.34	0.19933178	-0.7004235	-0.6800829		
255	19.63	0.31	0.18174368	-0.7405407	-0.7112199		
270	19.66	0.28	0.16415558	-0.7847443	-0.742357		
300	19.68	0.26	0.15243018	-0.816929	-0.8046312		
330	19.71	0.23	0.13484208	-0.8701745	-0.8669054		
360	19.75	0.19	0.11139129	-0.9531488	-0.9291796		
390	19.78	0.16	0.09380319	-1.0277824	-0.9914537		
420	19.8	0.14	0.08207779	-1.0857743	-1.0537279		
450	19.8	0.14	0.08207779	-1.0857743	-1.1160021		
480	19.82	0.12	0.07035239	-1.1527211	-1.1782763		
510	19.84	0.1	0.05862699	-1.2319024	-1.2405504		
540	19.84	0.1	0.05862699	-1.2319024	-1.3028246		
570	19.86	0.08	0.04690159	-1.3288124	-1.3650988		
600	19.88	0.06	0.0351762	-1.4537511	-1.427373		
630	19.91						
660	19.92						
690	19.93						
720	19.94						

Column 1
Regression Output:

Constant	-0.1818895
Std Err of Y Est	0.03055361
R Squared	0.99318057
No. of Observations	26
Degrees of Freedom	24

X Coefficient(s)	-0.0020758		
Std Err of Coef.	3.5111E-05		
T1 =	30	S1 =	0.77216222
T2 =	600	S2 =	0.06378723
K2 =	1.33E-05	K3 =	6.42E-04
K4 =	1.33E-05	K5 =	1.74E-05

Column 2

T1 =	30	S1 =	1.70569394
T2 =	720	S2 =	1.70569394
K2 =	0.00E+00	K3 =	0.00E+00
K4 =	0.00E+00	K5 =	0.00E+00

Column 3

K2-K5 and the theory behind this spreadsheet are explained in
Thompson, D. B. 1987. A microcomputer program for interpreting time-lag permeability tests. Ground Water. v. 25, no. 2.

T1 =		S1 =	1.70569394
T2 =		S2 =	1.70569394
K2 =	ERR	K3 =	0.00E+00
K4 =	ERR	K5 =	ERR

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

OCT 19 '87

October 16, 1987

Mr. Kenneth Shimko
Delta Environmental Consultants, Inc.
1801 Old Highway 8
Suite 123
New Brighton, MN 55112

RE: Delta Project No. 10-87-285
PACE Project No. 870928.501

Dear Mr. Shimko:

Enclosed is a report for the laboratory analysis of samples received September 28, 1987. A copy of the chain of custody record for the samples and an invoice for services provided are also enclosed.

Please contact us if you have any questions regarding the enclosures.

Sincerely,

Daniel A. Comeau
Environmental Scientist

Roger C. Splinter, Ph.D.
Director, Laboratory Services

DAC:RCS/lg

Enclosures

pace laboratories, inc.

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

REPORT OF LABORATORY ANALYSIS

Delta Environmental Consultants, Inc.
1801 Old Highway 8
Suite 123
New Brighton, MN 55112

October 16, 1987
PACE Project Number: 870928501

Attn: Mr. Kenneth Shimko

Project #10-87-285

Date Sample(s) Collected: 09/25/87
Date Sample(s) Received: 09/28/87

PACE Sample Number:			166680	166690	166700
Parameter	Units	MDL	MW-1	MW-2	MW-3
Cadmium	mg/L	0.01	ND	ND	ND
Cyanide, Total	mg/L	0.02	ND	ND	ND
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane(1)	ug/L	1.5	ND	ND	ND
Vinyl chloride(1)	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	1.2
Methylene chloride	ug/L	1.0	2.0	1.3	2.5
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	5.7
1,1-Dichloroethane	ug/L	0.2	ND	ND	66(3)
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	0.6	ND	30
1,2-Dichloroethane	ug/L	0.2	ND	ND	0.3
1,1,1-Trichloroethane	ug/L	0.5	ND	0.6	180(3)
Carbon tetrachloride	ug/L	0.3	ND	ND	33
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	ND	ND	2.8
Benzene	ug/L	1.0	ND	ND	ND
Dibromochloromethane(2)	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane(2)	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND

ND Not detected at or above the MDL.

MDL Method Detection Limit

pace laboratories, inc.

Offices:
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REPORT OF LABORATORY ANALYSIS

October 16, 1987
PACE Project Number: 87092850I

PACE Sample Number:			166680	166690	166700
Parameter	Units	MDL	MW-1	MW-2	MW-3
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	4.9
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND	2.4
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND
Phenol	ug/L	1.0	ND	ND	ND
2-Chlorophenol	ug/L	2.8	ND	ND	ND
2-Nitrophenol	ug/L	2.7	ND	ND	ND
2,4-Dimethylphenol	ug/L	1.8	ND	ND	ND
2,4-Dichlorophenol	ug/L	2.4	ND	ND	13
4-Chloro-3-methylphenol	ug/L	10	ND	ND	ND
2,4,6-Trichlorophenol	ug/L	7.3	ND	ND	ND
2,4-Dinitrophenol	ug/L	10	ND	ND	ND
4-Nitrophenol	ug/L	10	ND	ND	ND
2-Methyl-4,6-dinitrophenol	ug/L	13	ND	ND	ND
Pentachlorophenol	ug/L	9.3	ND	ND	590
Di-n-butyl phthalate	ug/L	1.0	ND	ND	1.7
Bis(2-ethyl hexyl)phthalate	ug/L	5.0	6.1	ND	ND
Di-n-octyl phthalate	ug/L	5.0	ND	ND	ND
Butyl benzyl phthalate	ug/L	1.0	ND	ND	ND
Diethyl phthalate	ug/L	1.0	ND	ND	ND
Dimethyl phthalate	ug/L	1.0	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 3

October 16, 1987
PACE Project Number: 870928501

PACE Sample Number:			166710	166720	166730
Parameter	Units	MDL	MW-4	MW-5	MW-6
Cadmium	mg/L	0.01	ND	ND	ND
Cyanide, Total	mg/L	0.02	ND	ND	ND
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane(1)	ug/L	1.5	ND	ND	ND
Vinyl chloride(1)	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	1.0	1.3	ND	1.1
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	2.7
1,1-Dichloroethane	ug/L	0.2	ND	ND	1.1
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	0.6	ND	1.2
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND MDL
1,1,1-Trichloroethane	ug/L	0.5	ND	ND	180(4) #5
Carbon tetrachloride	ug/L	0.3	ND	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	ND	ND	230(4) MDL #5
Benzene	ug/L	1.0	ND	ND	ND
Dibromochloromethane(2)	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane(2)	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

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October 16, 1987
PACE Project Number: 870928501

(1) These compounds co-elute.
(2) These compounds co-elute.
(3) MDL is 2 times higher due to sample dilution.
(4) MDL is 5 times higher due to sample dilution.

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Thomas L. Halverson
Inorganic Chemistry Manager

William H. Scruton
Organic Chemistry Manager

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

Offices:
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April 27, 1988

Mr. Kenneth Shimko
Delta Environmental Consultants, Inc.
1801 Old Highway 8
Suite 123
New Brighton, MN 55112

RE: Delta Project No. 10-87-285
PACE Project No. 880324.515

Dear Mr. Shimko:

Enclosed is the report of laboratory analyses for samples received March 24, 1988.

The organic analyses were performed March 26 - April 25, 1988.

A copy of the chain of custody record for the samples and an invoice for services provided are also enclosed.

Please contact us if you have any questions regarding the enclosures.

Sincerely,

Daniel A. Comeau
Environmental Scientist

Roger C. Splinter, Ph.D.
Director, Laboratory Services

Enclosures

pace laboratories, inc.

Offices:
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Tampa, Florida
Coralville, Iowa

REPORT OF LABORATORY ANALYSIS

Delta Environmental Consultants, Inc.
1801 Old Highway 8
Suite 123
New Brighton, MN 55112

April 27, 1988
PACE Project Number: 880324515

Attn: Mr. Kenneth Shimko

10-87-285

Date Sample(s) Collected: 03/23/88
Date Sample(s) Received: 03/24/88

PACE Sample Number: / Parameter	Units	MDL	066130 MW-A(1)	066140 MW-C	066150 MW-D1
Phenol	ug/L	1.0	ND	ND	ND
2-Chlorophenol	ug/L	2.8	ND	ND	ND
2-Nitrophenol	ug/L	2.7	ND	ND	ND
2,4-Dimethylphenol	ug/L	1.8	ND	ND	ND
2,4-Dichlorophenol	ug/L	2.4	ND	ND	ND
4-Chloro-3-methylphenol	ug/L	10	ND	ND	ND
2,4,6-Trichlorophenol	ug/L	7.3	ND	ND	ND
2,4-Dinitrophenol	ug/L	10	ND	ND	ND
4-Nitrophenol	ug/L	10	ND	ND	ND
2-Methyl-4,6-dinitrophenol	ug/L	13	ND	ND	ND
Pentachlorophenol	ug/L	14	ND	ND	ND
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	3.0	ND	ND	ND
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	ND	ND	ND
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	24	ND	ND
Carbon tetrachloride	ug/L	0.3	ND	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Offices:
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April 27, 1988
PACE Project Number: 880324515

PACE Sample Number: Parameter	Units	MDL	066130 MW-A(1)	066140 MW-C	066150 MW-D1
1,1,2-Trichloroethylene	ug/L	0.5	300	ND	1.7
Benzene	ug/L	1.0	ND	ND	ND
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 3

April 27, 1988
PACE Project Number: 880324515

PACE Sample Number: / Parameter	Units	MDL	066160 MW-D2	066170 MW-E	066180 MW-I
Phenol	ug/L	1.0	ND	ND	ND
2-Chlorophenol	ug/L	2.8	ND	ND	ND
2-Nitrophenol	ug/L	2.7	ND	ND	ND
2,4-Dimethylphenol	ug/L	1.8	ND	ND	ND
2,4-Dichlorophenol	ug/L	2.4	ND	ND	ND
4-Chloro-3-methylphenol	ug/L	10	ND	ND	ND
2,4,6-Trichlorophenol	ug/L	7.3	ND	ND	ND
2,4-Dinitrophenol	ug/L	10	ND	ND	ND
4-Nitrophenol	ug/L	10	ND	ND	ND
2-Methyl-4,6-dinitrophenol	ug/L	13	ND	ND	ND
Pentachlorophenol	ug/L	14	ND	ND	ND
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	3.0	ND	ND	ND
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	0.5	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	ND	ND	ND
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	24	2.4	ND
Carbon tetrachloride	ug/L	0.3	ND	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	0.3	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	1.8	0.5	ND
Benzene	ug/L	1.0	ND	4.2	ND
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

Offices:
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Mr. Kenneth Shimko
Page 4

April 27, 1988
PACE Project Number: 880324515

PACE Sample Number: / Parameter	Units	MDL	066160 MW-D2	066170 MW-E	066180 MW-1
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 5

April 27, 1988
PACE Project Number: 880324515

PACE Sample Number: / Parameter	Units	MDL	066190 MW-2	066200 MW-3(2)	066210 MW-3D(2)
Phenol	ug/L	1.0	ND	-	-
Phenol	ug/L	10	-	-	ND
Phenol	ug/L	100	-	ND	-
2-Chlorophenol	ug/L	2.8	ND	-	-
2-Chlorophenol	ug/L	28	-	-	ND
2-Chlorophenol	ug/L	280	-	ND	-
2-Nitrophenol	ug/L	2.7	ND	-	-
2-Nitrophenol	ug/L	27	-	-	ND
2-Nitrophenol	ug/L	270	-	ND	-
2,4-Dimethylphenol	ug/L	1.8	ND	-	-
2,4-Dimethylphenol	ug/L	18	-	-	ND
2,4-Dimethylphenol	ug/L	180	-	ND	-
2,4-Dichlorophenol	ug/L	2.4	ND	-	-
2,4-Dichlorophenol	ug/L	24	-	-	ND
2,4-Dichlorophenol	ug/L	240	-	ND	-
4-Chloro-3-methylphenol	ug/L	10	ND	-	-
4-Chloro-3-methylphenol	ug/L	100	-	-	ND
4-Chloro-3-methylphenol	ug/L	1000	-	ND	-
2,4,6-Trichlorophenol	ug/L	7.3	ND	-	-
2,4,6-Trichlorophenol	ug/L	73	-	-	ND
2,4,6-Trichlorophenol	ug/L	730	-	ND	-
2,4-Dinitrophenol	ug/L	10	ND	-	-
2,4-Dinitrophenol	ug/L	100	-	-	ND
2,4-Dinitrophenol	ug/L	1000	-	ND	-
4-Nitrophenol	ug/L	10	ND	-	-
4-Nitrophenol	ug/L	100	-	-	ND
4-Nitrophenol	ug/L	1000	-	ND	-
2-Methyl-4,6-dinitrophenol	ug/L	13	ND	-	-
2-Methyl-4,6-dinitrophenol	ug/L	130	-	-	ND
2-Methyl-4,6-dinitrophenol	ug/L	1300	-	ND	-
Pentachlorophenol	ug/L	14	ND	-	-
Pentachlorophenol	ug/L	140	-	-	12,000
Pentachlorophenol	ug/L	1400	-	16,000	-
Chloromethane	ug/L	1.0	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 6

April 27, 1988
PACE Project Number: 880324515

PACE Sample Number: / Parameter	Units	MDL	066190 MW-2	066200 MW-3(2)	066210 MW-3D(2)
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	3.0	ND	17	19
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	43	43
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	ND	24	22
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	ND	65	61
Carbon tetrachloride	ug/L	0.3	ND	35	33
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	ND	2.4	2.1
Benzene	ug/L	1.0	1.4	ND	ND
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	4.7	6.4
Chlorobenzene	ug/L	1.0	ND	6.0	ND
Ethyl benzene	ug/L	1.0	ND	ND	11
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 7

April 27, 1988
PACE Project Number: 880324515

PACE Sample Number: / Parameter	Units	MDL	066220 MW-4	066230 MW-5	066240 MW-6A(3)
Phenol	ug/L	1.0	ND	ND	ND
2-Chlorophenol	ug/L	2.8	ND	ND	ND
2-Nitrophenol	ug/L	2.7	ND	ND	ND
2,4-Dimethylphenol	ug/L	1.8	ND	ND	ND
2,4-Dichlorophenol	ug/L	2.4	ND	ND	ND
4-Chloro-3-methylphenol	ug/L	10	ND	ND	ND
2,4,6-Trichlorophenol	ug/L	7.3	ND	ND	ND
2,4-Dinitrophenol	ug/L	10	ND	ND	ND
4-Nitrophenol	ug/L	10	ND	ND	ND
2-Methyl-4,6-dinitrophenol	ug/L	13	ND	ND	ND
Pentachlorophenol	ug/L	14	ND	ND	ND
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	3.0	ND	3.3	18
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	ND	ND	ND
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	ND	ND	140
Carbon tetrachloride	ug/L	0.3	ND	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	ND	ND	78
Benzene	ug/L	1.0	ND	ND	3.7
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

Offices:
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April 27, 1988
PACE Project Number: 880324515

PACE Sample Number: / Parameter	Units	MDL	066220 MW-4	066230 MW-5	066240 MW-6A(3)
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

pace laboratories, inc.

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 9

April 27, 1988
PACE Project Number: 880324515

PACE Sample Number:			066250	066260
Parameter	Units	MDL	MW-6B	Bailer Blank
Phenol	ug/L	1.0	ND	ND
2-Chlorophenol	ug/L	2.8	ND	ND
2-Nitrophenol	ug/L	2.7	ND	ND
2,4-Dimethylphenol	ug/L	1.8	ND	ND
2,4-Dichlorophenol	ug/L	2.4	ND	ND
4-Chloro-3-methylphenol	ug/L	10	ND	ND
2,4,6-Trichlorophenol	ug/L	7.3	ND	ND
2,4-Dinitrophenol	ug/L	10	ND	ND
4-Nitrophenol	ug/L	10	ND	ND
2-Methyl-4,6-dinitrophenol	ug/L	13	ND	ND
Pentachlorophenol	ug/L	14	ND	ND
Chloromethane	ug/L	1.0	ND	ND
Bromomethane	ug/L	1.5	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND
Chloroethane	ug/L	1.0	ND	ND
Methylene chloride	ug/L	3.0	ND	3.3
Trichlorofluoromethane	ug/L	0.4	ND	1.1
1,1-Dichloroethylene	ug/L	0.3	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND
Chloroform	ug/L	0.5	ND	ND
1,2-Dichloroethane	ug/L	0.2	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	9.2	1.3
Carbon tetrachloride	ug/L	0.3	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	4.5	ND
Benzene	ug/L	1.0	1.4	ND
Dibromochloromethane	ug/L	1.0	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

April 27, 1988
PACE Project Number: 880324515

PACE Sample Number:			066250	066260
Parameter	Units	MDL	MW-6B	Bailer Blank
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND
Bromoform	ug/L	1.0	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND
Toluene	ug/L	1.0	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND

ND Not detected at or above the MDL.
MDL Method Detection Limit
(1) The sample was diluted 1 to 10 for volatile compounds; all volatile compound MDLs must be multiplied by the dilution factor.
(2) The sample was diluted 1 to 2 for volatile compounds; all volatile compound MDLs must be multiplied by the dilution factor.
(3) The sample was diluted 1 to 2.5 for volatile compounds; all volatile compound MDLs must be multiplied by the dilution factor.

The data contained in this report were obtained using EPA or other approved methodologies. All analysis were performed by me or under my direct supervision.

William H. Scruton
Organic Chemistry Manager

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

July 07, 1988

Mr. Kenneth Shimko
Delta Environmental Consultants, Inc.
1801 Old Highway 8
Suite 123
New Brighton, MN 55112

RE: Delta Project No. 10-87-285
PACE Project No. 880527.502

Dear Mr. Shimko:

Enclosed is the report of laboratory analyses for samples received May 27, 1988.

The organic analyses were performed June 03 - July 01, 1988.

A copy of the chain of custody record for the samples and an invoice for services provided are also enclosed.

Please contact us if you have any questions regarding the enclosures.

Sincerely,

Peggy F. Gaskill

Peggy F. Gaskill
Coordinator of Services

Roger C. Splinter, Ph.D.
Director, Laboratory Services

Enclosures

pace laboratories, inc.

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Coralville, Iowa

REPORT OF LABORATORY ANALYSIS

Delta Environmental Consultants, Inc.
1801 Old Highway 8
Suite 123
New Brighton, MN 55112

July 07, 1988
PACE Project Number: 880527502

Attn: Mr. Kenneth Shimko

10-87-285

Date Sample(s) Collected: 05/25/88
Date Sample(s) Received: 05/27/88

PACE Sample Number: / Parameter	Units	MDL	136600 B 7	136610 Blank 3	136620 Blank 2
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	1.0	ND	6.3	ND
Trichlorofluoromethane	ug/L	0.4	ND	0.5	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	ND	ND	ND
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	ND	ND	ND
Carbon tetrachloride	ug/L	0.3	ND	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	ND	ND	ND
Benzene	ug/L	1.0	ND	ND	ND
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	3.9

MDL Method Detection Limit
ND Not detected at or above the MDL.

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July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136600 B 7	136610 Blank 3	136620 Blank 2
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 3

July 07, 1988
PACE Project Number: 880527502

Duplicate MW-A

PACE Sample Number: Parameter	Units	MDL	136630 Blank 1	136640 MW-1	136650 MW-2
Phenol	ug/L	1.0	ND	ND	ND
2-Chlorophenol	ug/L	2.8	ND	ND	ND
2-Nitrophenol	ug/L	2.7	ND	ND	ND
2,4-Dimethylphenol	ug/L	1.8	ND	ND	ND
2,4-Dichlorophenol	ug/L	2.4	ND	ND	ND
4-Chloro-3-methylphenol	ug/L	10	ND	ND	ND
2,4,6-Trichlorophenol	ug/L	7.3	ND	ND	ND
2,4-Dinitrophenol	ug/L	10	ND	ND	ND
4-Nitrophenol	ug/L	10	ND	ND	ND
2-Methyl-4,6-dinitrophenol	ug/L	20	ND	ND	ND
Pentachlorophenol	ug/L	14	ND	ND	ND
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	1.0	ND	ND	ND
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	ND	ND	ND
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	12	ND	ND
Carbon tetrachloride	ug/L	0.3	~~ND~~	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
~~1,1,2-Trichloroethylene~~	~~ug/L~~	0.5	-	ND	ND
1,1,2-Trichloroethylene	ug/L	5.0	170	-	-
Benzene	ug/L	1.0	ND	ND	ND
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Offices:
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July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: Parameter	Units	MDL	136630 Blank 1	136640 MW-1	136650 MW-2
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 5

July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136660 MW-3(1)	136670 MW-4	136680 MW-5
Phenol	ug/L	1.0	8.1	-	ND
Phenol	ug/L	50	-	ND	-
2-Chlorophenol	ug/L	140	-	ND	-
2-Chlorophenol	ug/L	2.8	ND	-	ND
2-Nitrophenol	ug/L	140	-	ND	-
2-Nitrophenol	ug/L	2.7	ND	-	ND
2,4-Dimethylphenol	ug/L	1.8	7.4	-	ND
2,4-Dimethylphenol	ug/L	90	-	ND	-
2,4-Dichlorophenol	ug/L	120	-	ND	-
2,4-Dichlorophenol	ug/L	2.4	ND	-	ND
4-Chloro-3-methylphenol	ug/L	10	ND	-	ND
4-Chloro-3-methylphenol	ug/L	500	-	ND	-
2,4,6-Trichlorophenol	ug/L	370	-	ND	-
2,4,6-Trichlorophenol	ug/L	7.3	ND	-	ND
2,4-Dinitrophenol	ug/L	10	ND	-	ND
2,4-Dinitrophenol	ug/L	500	-	ND	-
4-Nitrophenol	ug/L	10	ND	-	ND
4-Nitrophenol	ug/L	500	-	ND	-
2-Methyl-4,6-dinitrophenol	ug/L	1000	-	ND	-
2-Methyl-4,6-dinitrophenol	ug/L	20	ND	-	ND
Pentachlorophenol	ug/L	14	2600	-	ND
Pentachlorophenol	ug/L	700	-	ND	-
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	1.0	9.2	ND	ND
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	ND
1,1-Dichloroethane	ug/L	0.2	43	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	11	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko

July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136660 MW-3(1)	136670 MW-4	136680 MW-5
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	50	ND	ND
Carbon tetrachloride	ug/L	0.3	14	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	ND	ND	ND
Benzene	ug/L	1.0	ND	ND	ND
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	7.4	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136690 MW-6A(1) (MDL x 5)	136700 MW-6B	136710 MW-C
Phenol	ug/L	1.0	-	ND	ND
Phenol	ug/L	50	ND	-	-
2-Chlorophenol	ug/L	140	ND	-	-
2-Chlorophenol	ug/L	2.8	-	ND	ND
2-Nitrophenol	ug/L	140	ND	-	-
2-Nitrophenol	ug/L	2.7	-	ND	ND
2,4-Dimethylphenol	ug/L	1.8	-	ND	ND
2,4-Dimethylphenol	ug/L	90	ND	-	-
2,4-Dichlorophenol	ug/L	120	ND	-	-
2,4-Dichlorophenol	ug/L	2.4	-	ND	ND
4-Chloro-3-methylphenol	ug/L	10	-	ND	ND
4-Chloro-3-methylphenol	ug/L	500	ND	-	-
2,4,6-Trichlorophenol	ug/L	370	ND	-	-
2,4,6-Trichlorophenol	ug/L	7.3	-	ND	ND
2,4-Dinitrophenol	ug/L	10	-	ND	ND
2,4-Dinitrophenol	ug/L	500	ND	-	-
4-Nitrophenol	ug/L	10	-	ND	ND
4-Nitrophenol	ug/L	500	ND	-	-
2-Methyl-4,6-dinitrophenol	ug/L	1000	ND	-	-
2-Methyl-4,6-dinitrophenol	ug/L	20	-	ND	ND
Pentachlorophenol	ug/L	14	-	ND	ND
Pentachlorophenol	ug/L	700	ND	-	-
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	1.0	ND	ND	ND
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	11	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

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Mr. Kenneth Shimko
Page 8

July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136690 MW-6A(1) (MDL x5)	136700 MW-6B	136710 MW-C
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	210	6.5	ND
Carbon tetrachloride	ug/L	0.3	ND	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	180	2.0	ND
Benzene	ug/L	1.0	ND	ND	ND
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko
Page 9

July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136720 MW-F(2)	136730 MW-D1	136740 MW-D2
Phenol	ug/L	1.0	ND	ND	ND
2-Chlorophenol	ug/L	2.8	ND	ND	ND
2-Nitrophenol	ug/L	2.7	ND	ND	ND
2,4-Dimethylphenol	ug/L	1.8	ND	ND	ND
2,4-Dichlorophenol	ug/L	2.4	ND	ND	ND
4-Chloro-3-methylphenol	ug/L	10	ND	ND	ND
2,4,6-Trichlorophenol	ug/L	7.3	ND	ND	ND
2,4-Dinitrophenol	ug/L	10	ND	ND	ND
4-Nitrophenol	ug/L	10	ND	ND	ND
2-Methyl-4,6-dinitrophenol	ug/L	20	ND	ND	ND
Pentachlorophenol	ug/L	14	ND	ND	ND
Chloromethane	ug/L	1.0	ND	ND	ND
Bromomethane	ug/L	1.5	ND	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND	ND
Chloroethane	ug/L	1.0	ND	ND	ND
Methylene chloride	ug/L	1.0	ND	1.4	ND
Trichlorofluoromethane	ug/L	0.4	ND	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND	0.5
1,1-Dichloroethane	ug/L	0.2	ND	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND	ND
Chloroform	ug/L	0.5	ND	ND	0.5
1,2-Dichloroethane	ug/L	0.2	ND	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	2.8	ND	24
Carbon tetrachloride	ug/L	0.3	ND	0.3	ND
Bromodichloromethane	ug/L	0.2	ND	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	16	0.5	0.6
Benzene	ug/L	1.0	ND	ND	ND
Dibromochloromethane	ug/L	1.0	ND	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Offices:
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July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136720 MW-F(2)	136730 MW-D1	136740 MW-D2
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND	ND
Bromoform	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND	ND
Toluene	ug/L	1.0	ND	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. Kenneth Shimko

July 07, 1988
PACE Project Number: 880527502

PACE Sample Number: / Parameter	Units	MDL	136750 MW-A(3) (MDL x10)	136760 MW-E
Phenol	ug/L	1.0	ND	ND
2-Chlorophenol	ug/L	2.8	ND	ND
2-Nitrophenol	ug/L	2.7	ND	ND
2,4-Dimethylphenol	ug/L	1.8	ND	ND
2,4-Dichlorophenol	ug/L	2.4	ND	ND
4-Chloro-3-methylphenol	ug/L	10	ND	ND
2,4,6-Trichlorophenol	ug/L	7.3	ND	ND
2,4-Dinitrophenol	ug/L	10	ND	ND
4-Nitrophenol	ug/L	10	ND	ND
2-Methyl-4,6-dinitrophenol	ug/L	20	ND	ND
Pentachlorophenol	ug/L	14	ND	ND
Chloromethane	ug/L	1.0	ND	ND
Bromomethane	ug/L	1.5	ND	ND
Dichlorodifluoromethane	ug/L	1.5	ND	ND
Vinyl chloride	ug/L	1.5	ND	ND
Chloroethane	ug/L	1.0	ND	ND
Methylene chloride	ug/L	1.0	ND	1.4
Trichlorofluoromethane	ug/L	0.4	ND	ND
1,1-Dichloroethylene	ug/L	0.3	ND	ND
1,1-Dichloroethane	ug/L	0.2	ND	ND
trans-1,2-Dichloroethylene	ug/L	0.3	ND	ND
Chloroform	ug/L	0.5	ND	ND
1,2-Dichloroethane	ug/L	0.2	ND	ND
1,1,1-Trichloroethane	ug/L	0.5	7.8	3.8
Carbon tetrachloride	ug/L	0.3	ND	ND
Bromodichloromethane	ug/L	0.2	ND	ND
1,2-Dichloropropane	ug/L	0.2	ND	ND
cis-1,3-Dichloro-1-propene	ug/L	0.5	ND	ND
1,1,2-Trichloroethylene	ug/L	0.5	180	ND
Benzene	ug/L	1.0	ND	2.9
Dibromochloromethane	ug/L	1.0	ND	ND
1,1,2-Trichloroethane	ug/L	1.0	ND	ND
trans-1,3-Dichloro-1-propene	ug/L	0.3	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

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Page 12

July 07, 1988
PACE Project Number: 880527502

MDL x10

PACE Sample Number: / Parameter	Units	MDL	136750 MW-A(3)	136760 MW-E
2-Chloroethylvinyl ether	ug/L	5.0	ND	ND
Bromoform	ug/L	1.0	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	1.0	ND	ND
1,1,2,2-Tetrachloroethylene	ug/L	1.0	ND	ND
Toluene	ug/L	1.0	ND	ND
Chlorobenzene	ug/L	1.0	ND	ND
Ethyl benzene	ug/L	1.0	ND	ND
1,3-Dichlorobenzene	ug/L	4.0	ND	ND
1,2-Dichlorobenzene	ug/L	4.0	ND	ND
1,4-Dichlorobenzene	ug/L	4.0	ND	ND

MDL Method Detection Limit
ND Not detected at or above the MDL.

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa

July 07, 1988
PACE Project Number: 880527502

(1) The sample was diluted 1 to 5 for the volatile analysis; all volatile compound MDLs must be multiplied by the dilution factor.
(2) The sample was diluted 1 to 2 for the volatile analysis; all volatile compound MDLs must be multiplied by the dilution factor.
(3) The sample was diluted 1 to 10 for the volatile analysis; all volatile compound MDLs must be multiplied by the dilution factor.

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

William H. Scruton
Organic Chemistry Manager

May 2, 1988

twin city testing
corporation

662 CROMWELL AVENUE
ST. PAUL, MN 55114
PHONE 612/645-3601

Delta Environmental Consultants, Inc.
1801 Highway 8
Suite 123
St. Paul, MN 55112

Attn: Mr. Kenneth Shimko

SUBJ: Permeability and Particle Size Analysis
West Bend, Delta Job #1087285
TCT #4220 88-475

Gentlemen:

This report includes the results of a permeability and sieve and hydrometer analysis performed on a thin-walled tube sample you delivered to our office on April 19, 1988. This work was verbally authorized by you. We are sending you five copies of our report.

The sieve and hydrometer analyses were performed in general accordance with procedures given under ASTM: D422. Results are given on the attached summary and grain size distribution curve sheets. The permeability test was performed in a triaxial-like chamber by the "flexible wall" method. The specimen was encased in a heavy latex membrane and confined to the estimated overburden pressure of 20 psi. After allowing the specimen to saturate and adjust under the effective confining pressure, a falling head of 5' was established. Readings were then taken at appropriate time intervals for 11 days. The given hydraulic conductivity (coefficient of permeability) is based on an average of the latter four trials (recordings). Deaired, St. Paul City tapwater was used. Results are given on the attached data summary sheet.

The remaining portion of the sample will be held at this office for one month unless other arrangements are made. If you have any questions regarding the test results, or if we can be of any further assistance, please call me at 641-9390. We sincerely appreciate this opportunity to serve you.

Very truly yours,

Gordon R. Eischens
Manager/Laboratory Services

GRE/djs

Encs.

LABORATORY TEST DATA

PROJECT: West Bend, Delta Job No. 1087285 DATE: April 29, 1988

REPORTED TO: Delta Environmental Consultants, Inc. JOB NO.: 4220 88-475

Boring No.	D-2			
Sample No. / Sample Designation				
Depth (ft)	@35			
Type of Sample	3T			
Soil Classification (ASTM:D2487)	Lean Clay (CL)			
In-Place Moisture Content (%)				
Moisture-Density Relation of Soil (ASTM:D698)				
Max. Dry Density (PCF)				
Optimum Moisture Content (%)				
Permeability Test				
Trial No.	7-10			
Type of Test	Falling Head			
Type of Specimen	Undisturbed			
Specimen Height (inches)	2.86			
Specimen Diameter (inches)	2.86			
Dry Density (PCF)	120.0			
Percent of Max. Density	--			
Moisture Content (%)	15.4			
Max. Head Differential (ft)	5.0			
Confining Pressure (effective - PSF)	20.0			
Water Temperature (°C)	20			
Coefficient of Permeability - K @ 20°C (cm/sec)	1×10^{-8}			
K @ 20°C (ft/min)	2×10^{-8}			
Atterberg Limits				
Liquid Limit (%)				
Plastic Limit (%)				
Plasticity Index				

SIEVE ANALYSIS TESTS

PROJECT West Bend, Delta Job. No. 1087285 DATE April 29, 1988

REPORTED TO Delta Environmental Consultants, Inc. JOB NO. 4220 88-475

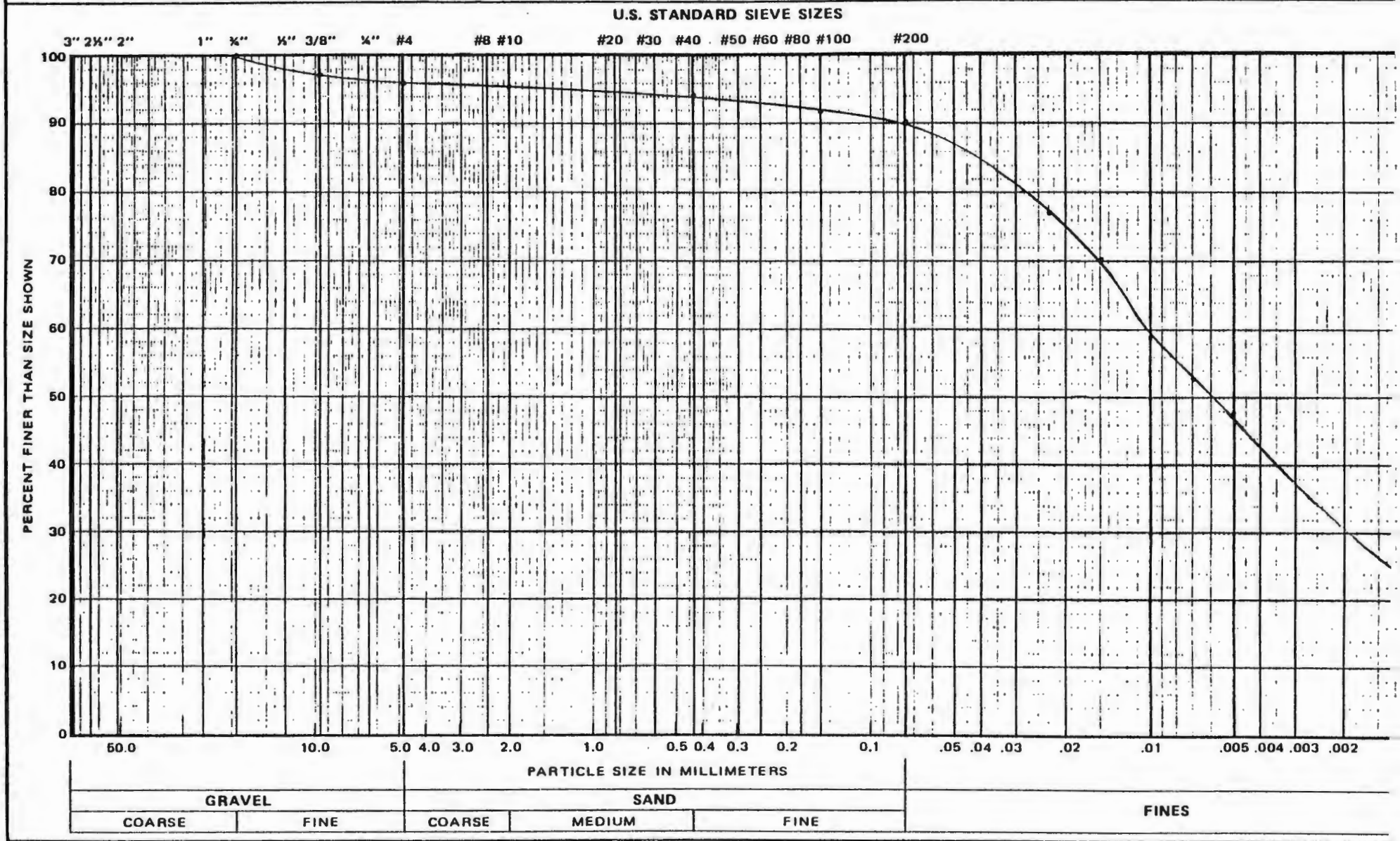
BORING NO.	D-2			
SAMPLE NO.				
DEPTH (ft)	@35			
TYPE OF SAMPLE	3T			
CLASSIFICATION (ASTM: D 2487)				
Symbol	(CL)			
Description	Lean Clay			
MECHANICAL ANALYSIS:				
Dry Weight of Total Sample (grams)	443			
Based on Total Sample				
% Finer Than 3"				
2"				
1"				
3/4"	100			
3/8"	97.2			
# 4	96.1			
# 10	95.6			
# 40	94.2			
# 100	91.9			
# 200	90.2			

GRAIN SIZE DISTRIBUTION CURVE

PROJECT West Bend, Delta Job. No. 1087285 DATE April 29, 1988

REPORTED TO Delta Environmental Consultants, Inc. JOB NO. 4220 88-475

BORING NO. D-2 SAMPLE NO. _____ DEPTH (FT) @35 SOIL TYPE Lean Clay (CL)



662 CROMWELL AVENUE twin city testing corporation ST. PAUL, MN. 55114

ASTM Designation:

(Based on Unified Soil Classification System)

SOIL ENGINEERING

			Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]	Soil Classification: Group Symbol	Soil Classification: Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OL	Organic clay[K,L,M,N] Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OH	Organic clay[K,L,M,P]
					Organic silt[K,L,M,Q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor		PT	Peat
Fibric Peat > 67% Fibers		Hemic Peat 33%-67% Fibers			Sapric Peat < 33% Fibers

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded gravel with silt
- GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with silt
- GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
- SW-SM well-graded sand with silt
- SW-SC well-graded sand with clay
- SP-SM poorly graded sand with silt
- SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains $\geq 15\%$ sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains $\geq 30\%$ plus no. 200, predominantly sand, add "sandy" to to group name.

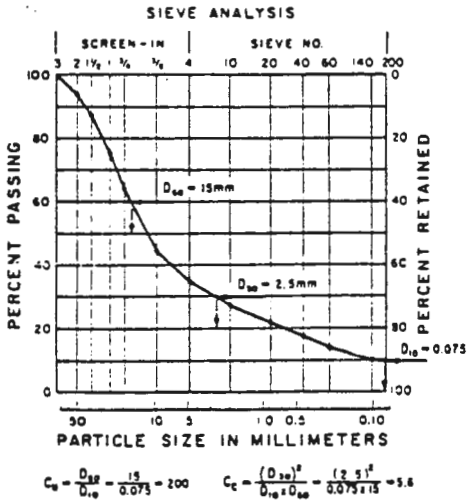
[M] If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

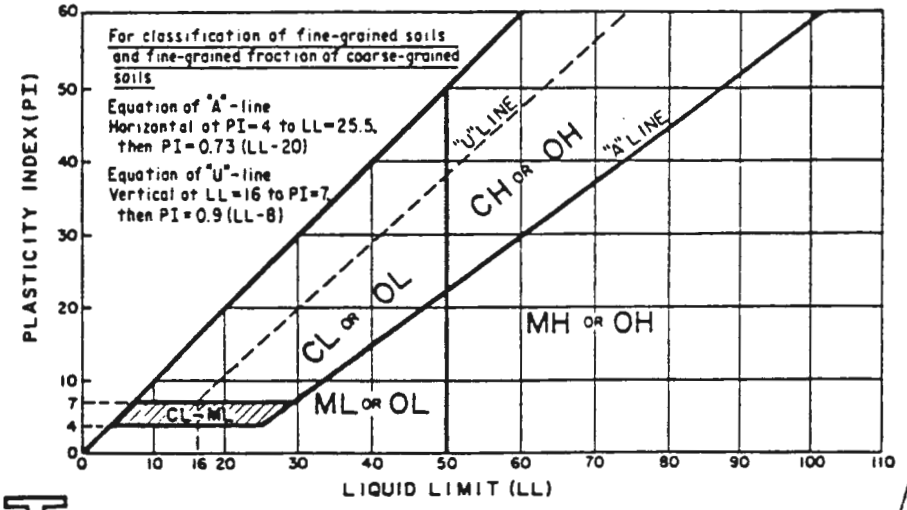
[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



$C_u = \frac{D_{60}}{D_{10}} = \frac{15}{0.075} = 200$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = \frac{(2.5)^2}{0.075 \times 15} = 5.6$



twin city testing corporation

SAND ANALYSIS REPORT

DRILLER DELTA ENVIRONMENTAL
ST. PAUL, MN

ENGINEER

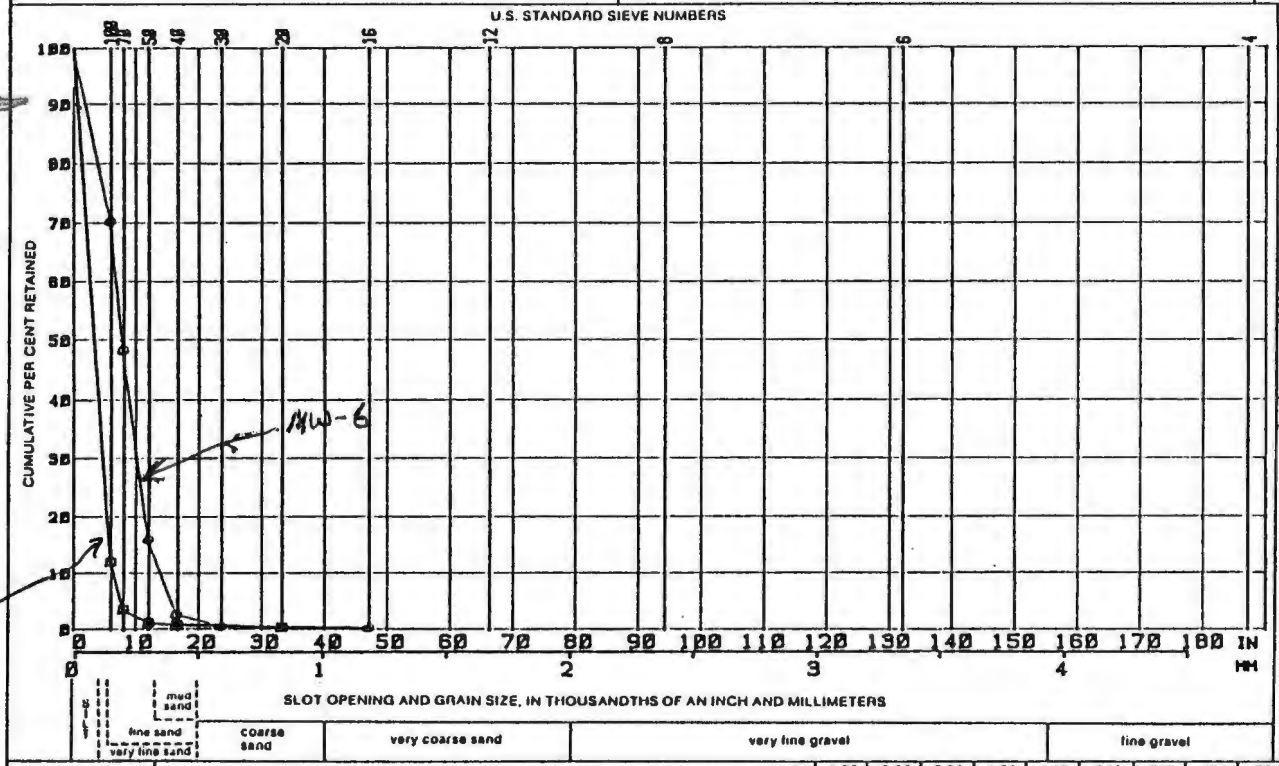
ANALYSIS BY JOE RENIER
DATE JUNE 28, 1988

JOB NAME # 1127

LOCATION # 1087285

JOHNSON I.D. NUMBER 881000
SAMPLE SENT IN BY

Johnson Filtration Systems Inc.
P. O. Box 64118, St. Paul, MN 55164-0118, (612) 636-3900
1950 Old Hwy 8, St. Paul, MN 55112, Fax (612) 636-3132



TEST HOLE DATA

DIAMETER

DEPTH

DRILLING METHOD

DRILLING FLUID

GEOPHYSICAL LOGS

STATIC WATER LEVEL

COMMENTS

MW-6
SWL = 10 ft.

MW-1
SWL = 15-18 ft.

WELL DATA

CASING DIAMETER

DESIRED YIELD

WELL APPLICATION RECOVERY WELLS

DESIGN RECOMMENDATIONS

MW-6

Utilize a #.45-.55 pack from American Materials Corp., Eau Claire, Wisc., in conjunction with a #15 slot screen.

MW-1

Utilize a #.35-.45 pack from American Materials Corp. with a #10 slot screen.

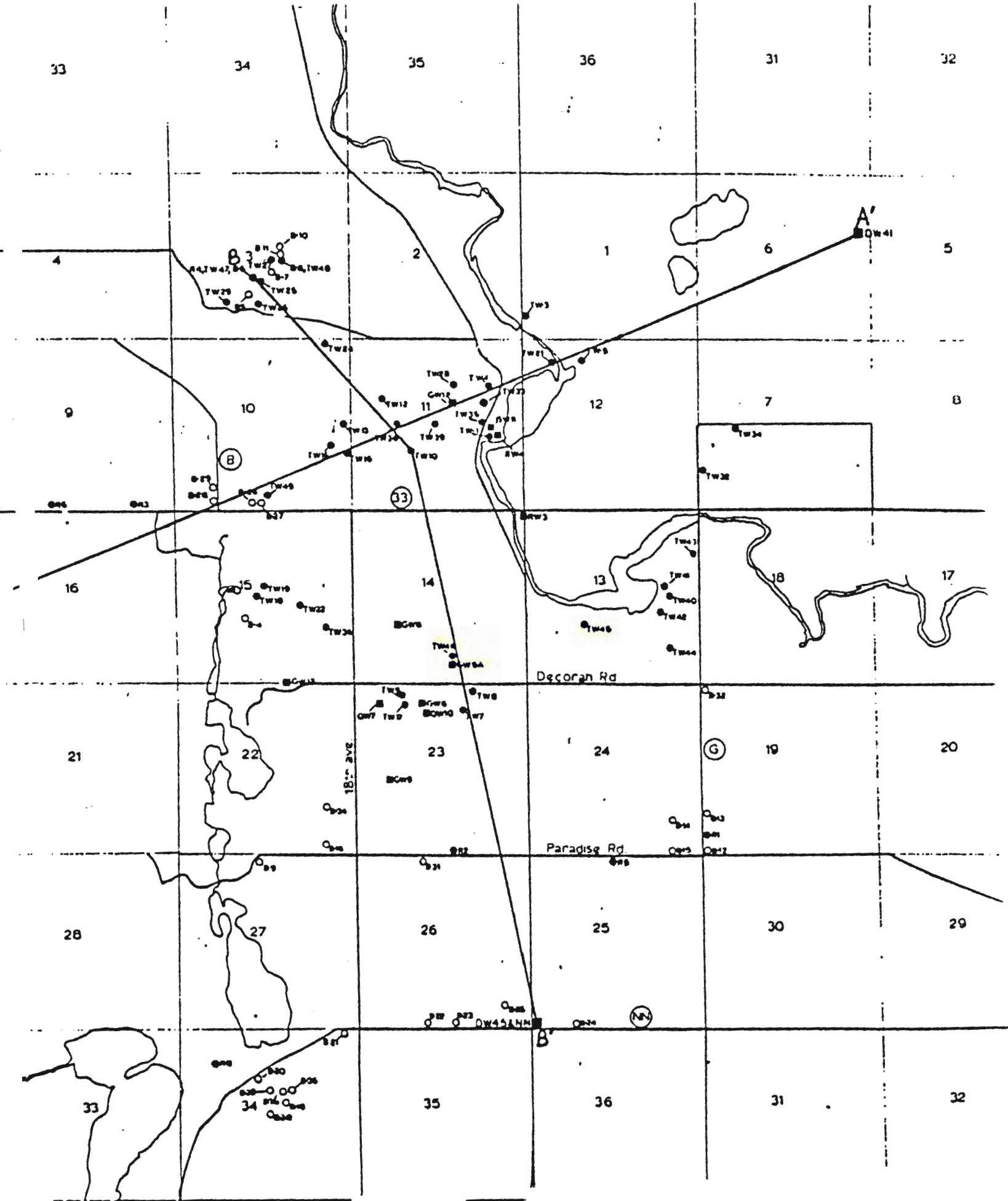
SCREEN RECOMMENDATIONS

DIAMETER

SLOT	LENGTH	SETTING

COMBINED SAMPLE DEPTHS	PHYSICAL SAMPLE DESCRIPTION	CUMULATIVE % RETAINED	mm	4.76	3.36	2.38	1.68	1.19	.840	.590	.420	.297	.210	.149	.074	.053	TOTAL WT.
			Inches	.187	.123	.094	.066	.047	.033	.023	.016	.012	.008	.006	.003	.002	
			U.S. Sieve #	4	6	8	12	16	20	30	40	50	70	100	200	270	
15.0	OFINE SAND # 6 MW - 6							0.9		8.7	2.7	18.1	48.9	70.5			298.0
7.5	□VERY FINE SAND # 3 MW - 1								8.5		8.9	1.4	3.8	12.2			222.0

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF JOHNSON WELL SCREENS


A
A'
B
B'
Decoran Rd
Paradise Rd
18th ave.
33
34
35
36
31
32
4
3
2
1
6
5
9
10
11
12
7
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16
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32

TEST HOLES DRILLED FOR
CITY OF WEST BEND IN
1972—1973

Test Hole #40: 600' North of Kilbourn Street; 350' East of River; 36' North of fence line at woods. 150' East from lone tree.

0 - 4'	Gray clay
4 - 14'	Very muddy sand and fine gravel
14 - 16'	Medium sand and gravel, silty
16 - 23'	Medium sand and gravel, small boulders, silty
23 - 30'	Fine to medium sand and gravel, some silt.
30 - 44'	Tan fine sand, some silt.
44 - 50'	Tan fine to coarse sand, fine gravel, clay on bottom
50 - 77'	Gray heavy clay. Static Water Level = 24.82'

Test Hole #41: 320' North of Test Hole #40, 50' East of lone tree.

0 - 10'	Muddy fine sand
10 - 16'	Muddy sand and gravel, some drilling
16 - 20'	Medium-fine sand, some medium to coarse gravel (slightly silty)
20 - 25'	Medium to fine sand
25 - 30'	Medium to fine sand
30 - 39'	Fine to medium-coarse sand, some fine gravel
39 - 43'	Fine to medium sand and gravel more silt
43 - 53'	Fine to medium sand, silty. Static 26.31', Clay on bottom
53 - 59'	Gray clay

Test Hole #42: 200' North and 90' East from centerline of Kilbourn and Idlewood Avenue. 140' East of light pole #69T1363.

0 - 4'	Red clay
4 - 10'	Sandy clay (Hard to drill)
10 - 18'	Fine to medium coarse sand, rocks, and fine gravel
18 - 20'	Very coarse to fine sand, fine gravel. Large boulders at 20'.
20 - 29'	Fine to medium sand, boulders, gravel, very silty and tight (drilled)
29 - 37'	Fine to very silty sand
37 - 40'	Fine to very fine sand, silty

TEST HOLES DRILLED FOR CITY OF WEST BEND IN 1972—1973

Test Hole #42 (cont'd.)

40 - 51'	Fine to very fine sand, silty
51 - 53'	Sandy tan clay
53 - 74'	Gray clay, streaks of sand
74 - 80'	Hardpan and gray clay.
	Static Water Level = 31.8'

Test Hole #43: 175' West of centerline of "G", 30' North of property line; 195' West of Hiline pole #55-10199.

0 - 4'	Red clay
4 - 6'	Sandy tan clay
6 - 8'	Hardpan
8 - 25'	Very fine silty tan sand
25 - 28'	Very fine silty sand
28 - 30'	Very fine silty sand, some tan clay and black boulders (Had to drill)
30 - 63'	Very fine silty sand
63 - 68'	Very fine silty sand and tan clay
68 - 70'	Gray heavy clay
	Static Water Level - 26.29'

Test Hole #44: 75' East from centerline of Juniper, 445' South from centerline of Hillcrest and Juniper Street intersection minus eight feet to Decorah and "G".

0 - 2'	Red clay
2 - 8'	Hardpan and rocks
8 - 12'	Medium to coarse gravel and sand
12 - 25'	Tan clay and gravel, semi-hardpan and boulders
25 - 41'	Dirty fine sand and gravel
41 - 45'	Muddy fine sand, some clay
45 - 58'	Muddy fine sand
	Static 31.70'.

Test Hole #45: 150' North from centerline of Kilbourn Avenue, and 75' East from centerline of Indiana Avenue.

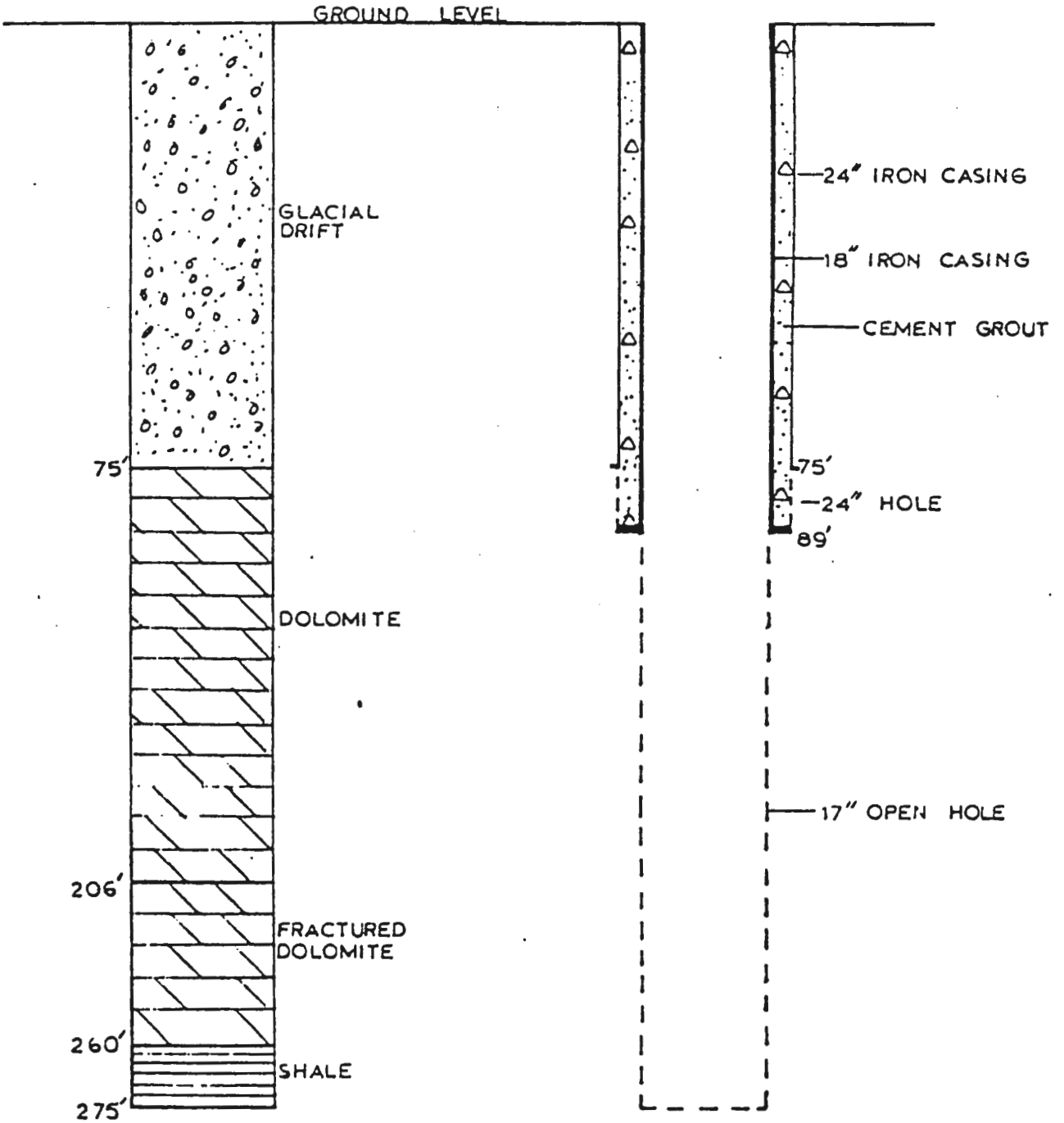
0 - 10'	Gray clay, gravel and boulders semi-hardpan
10 - 15'	Muddy coarse gravel, had to drill
15 - 17'	Dirty fine sand drilled
17 - 33'	Fine silty sand
33 - 37'	Gray clay and gravel
37 - 50'	Gray heavy clay
	Static Water Level = 15'

CITY WELL, WEST BEND, WIS.

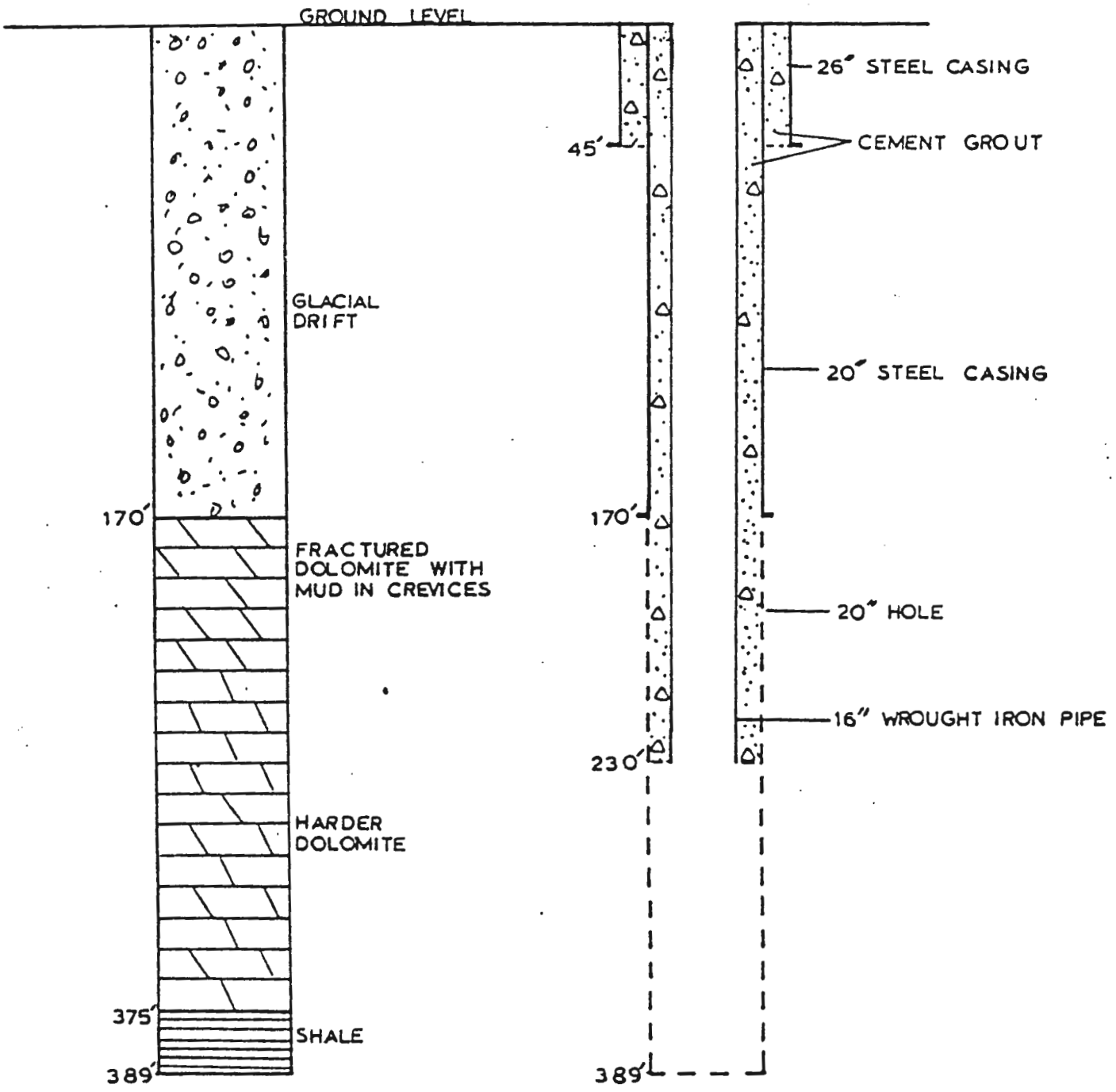
SE. ¼, Sec. 14, T. 11, R. 19 E.
F. M. Gray, Jr., Contractor
Arthur West, Driller
Completed, Jan. 1919
Samples examined by F. T. Thwaites, U. W. Nos. 51765-51858
Elevation 920

DRIFT		0-40		Glacial till, stony clay, buff and gray, very limy
		40-70		Clay, gray, limy
		70-100		Gravel, sandy
		100-110		Glacial till, buff, stony
		110-120		Sand and gravel
		120-170		Clay, gray, limy
	190	170-180		Sand and gravel
		180-190		Clay, gray, limy
NIAGARA Silurian	80	190-250		Limestone, magnesian, gray
		250-270		Limestone, magnesian, blush gray, shaley
CINCINNATI (RICHMOND)	265	270-290		Shale, blue, limy
		290-320		Limestone, magnesian, gray with layers of blue, limy shale
		320-390		Shale, blue, limy (sample missing 380-390)
		390-430		Shale, blue, shaley, little lime
		430-535		Shale, blue, limy
GALENA - TRENTON (PLATTEVILLE)	235	535-700		Limestone, magnesian, gray
		700-770		Limestone, magnesian, buff-gray, sandy
PETER		770-850		Sandstone, fine to coarse, gray

CONSTRUCTION of CITY WELL NO. 4 WEST BEND, WISCONSIN



CONSTRUCTION of CITY WELL NO. 5-A WEST BEND, WISCONSIN



LAYNE NORTHWEST GJD 2-19-79