# Groundwater Monitoring and Remedial Action-Interim Report to DNR

STA-RITE Industries Water Equipment Division Delavan, Wisconsin

**April 1984** 

April 30, 1984

#### RECEIVED

SEP 13 1985

Sta-Rite Industries, Inc. 293 South Wright Street Delavan, WI 53115

BUR. OF SOLID WASTE MOT.

Attn: Mr. Dick LaChapell

Plant Manager

Re: Transmittal of Interim Report Concerning Groundwater Monitoring and Remedial Actions

Donohue Project No. 12894.007

Dear Mr. LaChappell:

Attached is our Interim Report addressing information discussed with the Wisconsin Department of Natural Resources on March 27, 1984. The report transmits boring logs, well logs and monitoring data and describes additional site investigations and remedial actions to be completed by Sta-Rite at the Delavan facilities.

If you have any questions concerning the contents of this report, please contact this office.

Very truly yours,

DONOHUE & ASSOCIATES, INC.

Michael L. Crosser

Michael L. Crosser Project Manager

MLC:mb

enc: Interim Report

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## GROUNDWATER MONITORING AND REMEDIAL ACTIONS INTERIM REPORT STA-RITE INDUSTRIES Delavan, Wisconsin

April 1984

DONOHUE & ASSOCIATES, INC. Engineers/Architects 4738 North 40th Street Sheboygan, WI 53081

Project No. 12894.007

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A Boring and Well Logs

#### INTRODUCTION AND BACKGROUND

Since late 1982, investigations of chlorinated solvent contamination detected in City Well 4 in Delavan, Wisconsin have been underway. The Wisconsin Department of Natural Resources (DNR) suspected that the Sta-Rite Industries Water Equipment Division facilities, located approximately 1,000 feet east of City Well 4, was the source of the solvent contamination. The City retained Warzyn Engineering, Inc., to investigate. With the cooperation of Sta-Rite Indistries, Warzyn Engineering obtained soil and groundwater samples on The samples were obtained in areas of potential con-Sta-Rite property. tamination as identified by Sta-Rite and in areas between the potentially contaminated areas and City Well 4. Warzyn issued a preliminary report of their findings on February 16, 1983, which indicated solvent-contamined water at the groundwater surface near the southeast wall of Plant 1 and soil and near surface water contamination near the holding tank outside the north wall Groundwater surface samples from wells between the identified contaminated areas and City Well 4 showed decreasing amounts of solvents as the distance from the identified contaminated area near Plants 1 and 2 Wells near the Sta-Rite property line showed little or no contamination.

In January 1983, Sta-Rite retained Donohue to conduct further investigations. Donohue placed additional groundwater monitoring and sampling wells to obtain data covering greater areal and vertical distances and conducted a pump test to determine aquifer characteristics. The goals of the work were to determine whether the identified areas of contamination near Plants 1 and 2 could contribute to contamination of City Well 4 and to provide data for selecting remedial action if required. No definitive data collected during the investigation indicated a direct path of migration from the contaminated areas on Sta-Rite property to City Well 4. However, there was strong indication that solvents in the groundwater in the vicinity of Plant 1 were moving off-site to the northwest, the direction of groundwater flow. The data and results were reported in May, 1983. Following evaluation of the results reported in May, 1983, Sta-Rite authorized additional investigations to determine groundwater and contaminant movement in the area and authorized the removal of the sump tank and contaminated soils near Plant 2. The remedial actions were completed in Decemeber, 1983. The report discussing the remedial actions was issued in January, 1984.

Concurrent with the implementation of the Plant 2 remedial actions and with the assistance of Thomas A. Prickett, Donohue modeled the groundwater flow system. The results of the groundwater modeling were discussed in a report issued in December, 1983. The results of the groundwater modeling program indicated that contamination in the vicinity of the sump at Plant 2 could impact the water quality of City Well 4, especially when City Well 4 is pumped at high rates. Furthermore, the modeling indicated that following the remedial actions at the Plant 2 sump, the water quality at City Well 4 should gradually improve as a contaminant plume moves off to the northwest. Based on the results of the modeling program, the City of Delavan elected to shut down City Well 4 for several years to allow validation of the model. If the model is accurate, the groundwater system will clear and City Well 4 can be used without water treatment.

On March 9, 1984, the DNR sent a letter to Sta-Rite requesting that additional remedial action be conducted at Plant 2 and that additional investigations be conducted on Sta-Rite property and in the area of the contaminant plume that appears to be moving to the northwest from the Sta-Rite property. At that meeting, Sta-Rite agreed to conduct further site investigations and report the results of the site investigations by June 30, 1984. Sta-Rite also agreed to submit a report by April 30, 1984, addressing the following items:

- 1. Transmittal of boring and well logs and data.
- 2. Additional information concerning the direction of flow of the contaminant plume.
- 3. A proposal for additional remedial action at the Plant 2 sump.
- 4. A discussion of the appropriateness of further investigations under Plant 1.

This report addresses those points and also discusses the additional site investigations to be completed by June 30, 1984.

#### BORING LOGS, WELL LOGS, AND DATA

Logs for the borings and wells installed by Donohue and Warzyn are presented in Appendix A. Table 1 presents a summary of the well depths from the ground surface and the elevations for the wells surveyed to date.

Table 2 presents a summary of the groundwater monitoring data taken from the monitoring wells. Table 3 presents a summary of soil analytical data for the borings. Discussions of the data had been presented in previous reports cited in the references and will not be repeated here.

The boring and well locations are shown on Figure 1. The boring and well labels have been changed from past reports for clarification. The legend is shown on Figure 1.

TABLE 1

BORING AND WELL INSTALLATION INFORMATION STA-RITE INDUSTRIES Delavan, Wisconsin

Well Boring	Installed By	Date Installed	Total Depth Feet	Screened Interval Feet	Ground Elevation	Top of Pipe Elevation	Elevation of Screened Interval
TB-1	Warzyn	12-14-82	10	-			
TB-2	Warzyn	12-14-82	15				
TB-3	Warzyn	12-14-82	10	X-2			
TB-4	Warzyn	12-14-82	10				
TB-5	Warzyn	12-14-82	10	2*			
TB-7	Warzyn	12-14-82	10	i <del>l d</del> i			
TB-8	Warzyn	12-14-82	10	ê <del>r t</del> e			
TB-9	Warzyn	12-14-82	10	-			Terrorina Substituti
TW-1	Warzyn	12-9-82	44	24-44	939.2	942.39	915.2-895.2
TW-1A	Warzyn	12-10-82	85	75-85	939.4	942.60	864.4-854.4
TW-2	Warzyn	12-2-82	51	31-51	942.5	944.38	911.5-891.5
TW-2A	Warzyn	12-3-82	90	80-90	942.5	945.50	862.5-852.5
TW-3	Warzyn	12-8-82	48	28-48	943.5	946.67	915.5-895.5
TW-4	Warzyn	12-6-82	49	29-49	948.0	951.06	919.0-900.0
D-1	Donohue - Wis. Testing Lab.	2-15-83	50	30-50	948.8	952.52	919.8-899.8
D-2	Donohue - Wis. Testing Lab.	2-9-83	110	100-110	948.71	950.10	848.7-838.7
D-3	Donohue - Wis. Testing Lab.	2-17-83	50	30-50	947.4	950.50	847.4-837.4
D-4	Donohue - Wis. Testing Lab.	2-17-83	80	70-80	947.2	949.75	917.4-867.2
D+S	Donohue - Wis. Testing Lab.	2-22-83	50	30-50	944.0	946.45	914.0-894.0
D-6	Donohue - Wis. Testing Lab.	2-21-83	110	100-110	944.1	946.39	844.1-834.1
D-9	Donohue - Wis. Testing Lab.	2-23-83	50	30-50	935.3	936.96	905.3-885.3
D-10	Donohue - Wis. Testing Lab.	3-2-83	110	100-110	935.4	938.33	835.4-825.4
B-11	Donohue - Wis. Testing Lab.	6-28-83	35	/ <del>-</del>			
D-12	Donohue - Wis. Testing Lab.	6-30-83	36	26-36	9		
B-13	Donohue - Wis. Testing Lab.	7-1-83	35.5				
D-14	Donohue - Wis. Testing Lab.	7-12-83	35	25-35			
D-15	Donohue - Wis. Testing Lab.	7-7-83	38	28-38			
B-16	Donohue - Wis. Testing Lab.	7-8-83	32.5				
B-17	Donohue - Wis.	7-11-83	27.5	181 na	¥		
· ·	Testing Lab.	A	on falls.			*	
D-18	Donohue - Wis. Testing Lab.	10-10-83	37	34.5-37			
D-19	Donohue - Wis. Testing Lab.	10-10-93	29.5	19.5-29.5			

TABLE 2
GROUNDWATER QUALITY DATA
STA-RITE INDUSTRIES
Delavan, Wisconsin

<u>'o.</u>	Date Sampled	Methylene chloride	1,1-Dichloro- ethylene	Trans 1,2- dichloroethylene	1,1,1-Trichloro- ethane	Trichloro- ethylene	Tetrachloro- ethylene	Toluene
-1	1-7-83				ND	7 -		
A	1-7-83	ND	ND	ND	ND	ND	ND	ND
922	1-7-83	ND	ND	ND	ND	ND	ND	ND
_A	1-7-83	ND	ND	ND	ND	ND	ND	ND
-3	1-7-83			7	8	81	7	
323	1-7-83		250	<500	13,750	2,035		
	4-8-83	<1	<1	<1	<1	<1	<1	<1
2	4-8-83	<1	<1	<1	<1	<1	<1	2
3	4-8-83	<1	<1	<1	<1	<1	<1	<1
	4-8-83	<1	<1	<1	<1	<1	. <1	<1
	4-8-83	<25	150 -	19	1,800	500	<1	<1
6	4-8-83	<1	<1	<1	<1	<1	<1	<1
.4	4-8-83	<1	<1	<1	10	2	<1	<1
	4-8-83	<1	<1	<1	<1	<1	<1	<1
	4-8-83	<1	<1	<1	3	3	<1	2
-1A	4-8-83	<1	<1	<1	<1	<1	<1	<1
1	4-8-83	<1	<1	<1	<1 .	<î	<i< td=""><td>&lt;1</td></i<>	<1
:A:	4-8-83	<1	<1	<1	<1	<1	<1	<1
1	4-8-83	<1	<1	<1	4	32	<1	<1
-4	4-8-83	<100	1,100	<100	12,500	3,400	<100	<100
37	7-13-83	140	4,080		16,200	3,870		85
	7-13-83	860				110,000	1,830	85
5500	10-18-83	· <1	<1	ব	6	7	1	<1
-1A	Not Sample							
÷	10-18-83	<1	<1	<1	<1	<1	<1	<1
A	10-18-83	<1	<1	<1	<1	<1	<1	<1
-3	10-18-83	2	4	4	17	199	12	2
-4	Not Sample		54					
	10-18-83	<1	<1	<1	<1	<1	<1	<1
	10-18-83	<1	<1	<1	<1	<1	<1	<1
	10-18-83	1	<1	<1	<1	<1	<1	<1
(4)	10-18-83	<1	<1	<1	<1	<1	<1	<1
	10-18-83	<1	250	23	2,120	588	10	<1
28	10-18-83	1	195	19	1,920	340	4	2
·	10-18-83	<1	<1	<1	11	4	<1	<1
9	10-18-83	<1	<1	<1	<1	<1	<1	<1
9	10-18-83	<1	<1	<1	<1	<1	<1	<1
- 2	10-18-83	9	1,010	55	9,820	1,190	<1	<1
14	10-18-83	2	773	<1	7,640	954	5	<1
14	10-18-83	1,180	8	10	26	17,400	2,950	11
	10-18-83	<1	<1	<1	<1	517	254	2
	10-18-83	<1	<1 .	2	· <1	518	67	<1
-1	1-25-84	1	<1	<1	<1	<1	<1	<1
.A	1-25-84	<1	<1	<1	<1	<1	<1	<1
1	1-25-84	<1	<1	2	<1	6	<1	<1
:A	1-25-84	<1	<1	2 <1	<1	20	<1	<1
-3	1-25-84	<1	5	5	38	500	27	<1
	1-25-84	5	2,330	57	20,400	5,360	₹1	i
	1-25-84	**	**	ù tr	N-M	**	**	**
	1-25-84	**	<del>**</del>	<b>*</b>	**	**	**	***
3	1-25-84	**	**	**	**	**	**	strake .

TABLE 2 (Continued)

Well No.	Date Sampled	Methylene chloride	1,1-Dichloro- ethylene	Trans 1,2- dichloroethylene	1,1,1-Trichloro- ethane	Trichloro- ethylene	Tetrachloro- ethylene	Toluene
D-4	1-25-84	***	**	**	**	**	strake .	strate
D-5	1-25-84	<1	91	14	1,150	404	<1	1
D-6	1-25-84	<1	<1	<1	6	3	<1	<1
D-9	1-25-84	<1	<1	<1	<1	<1	<1	<1
D-10	1-25-84	<1	<1	<1	<1	<1	<1	<1
D-12	1-25-84	<50	1,570	100	18,300	3,600	<50	<50
D-14	1-25-84	<1	140	6	1,720	363	<1	<1
D-15	1-25-84	<50	<50	<50	<50	29,200	1,100	<50
D-18	1-25-84	2	1	1	6	2,290	150	<1
D-19	1-25-84	Dry	1.50	100	- C-T-C		35 C	

Note: All analysis results are microgram/liter

\*Warzyn Analysis

2-5

į	Boring No.	Date	Sample Depth Feet	Methylene chloride+	1,1-Dichloro- ethylene+	Trans 1,2- dichloroethylene+	1,1,1-Trichloro- ethane+	Trichloro- ethylene	Tetrachloro- ethylene+	Toluene+
	TB-1	12-14-82	10				<500	600,000	13,800	
	TB-2	12-14-82	15		-		<5,000	820,000	17,300	
	TB-3			lyzed Because	No Solvent Odor					
	TB-4	12-14-82	7.5				150	410	10	
	TB-5	12-14-82	7.5				60	570	20	
	TB-7	12-14-82	7.5				250	940	10	
	TB-8	12-14-82	5.0				1,020	720	<10	
	TB-9	12-14-82	5.0				310	1,290	<10	
	B-11	6-27-83	12	12 2	4	42	29 -	1,000	3	4
	B-11	6-27-83	32	2	12	5	118	148	<1	4
	D-12	6-28-83	6.5	14	420	17	4,125	2,300	<1	9
	D-12	6-28-83	18.5	5	95	<1	610	400	<1	4
	D-12	6-28-83	32	<1	50 <1	<1	295	80	<1	4
- 88	B-13	6-30-83	5.5	5 5	<1	11	<1	44	<1	<1
5(0)	B-13	6-30-83	8.5	5	<1	<1	<1	S	2	2
	B-13	6-30-83	17.5	17	3	<1	<1	73	30	15
	B-13	6-30-83	34	<1 22	<1	<1	<1	<1	<1	<1
	D-14	7-11-83	22.5	22	L	52	7	3	6	12
	D-15	7-12-83	10					6	8	
	B-16	7-8-83	12	N .				29	S	•
	B-16	7-8-83	27				*	22	. 4	
	B-17	7-11-83	9					36	13	¥6
	Sump	11-12-83	18					980,000	280,000	
	Sump <sup>t</sup>	11-29-83	18				35	830	820	

<sup>+</sup>All values microgram per kilogram (ppb).

\*Values after excavation open for one week. See Remedial Action Report - Plant 2.

Figure 1

## FLOW DIRECTION OF GROUNDWATER AND CONTAMINANT PLUME

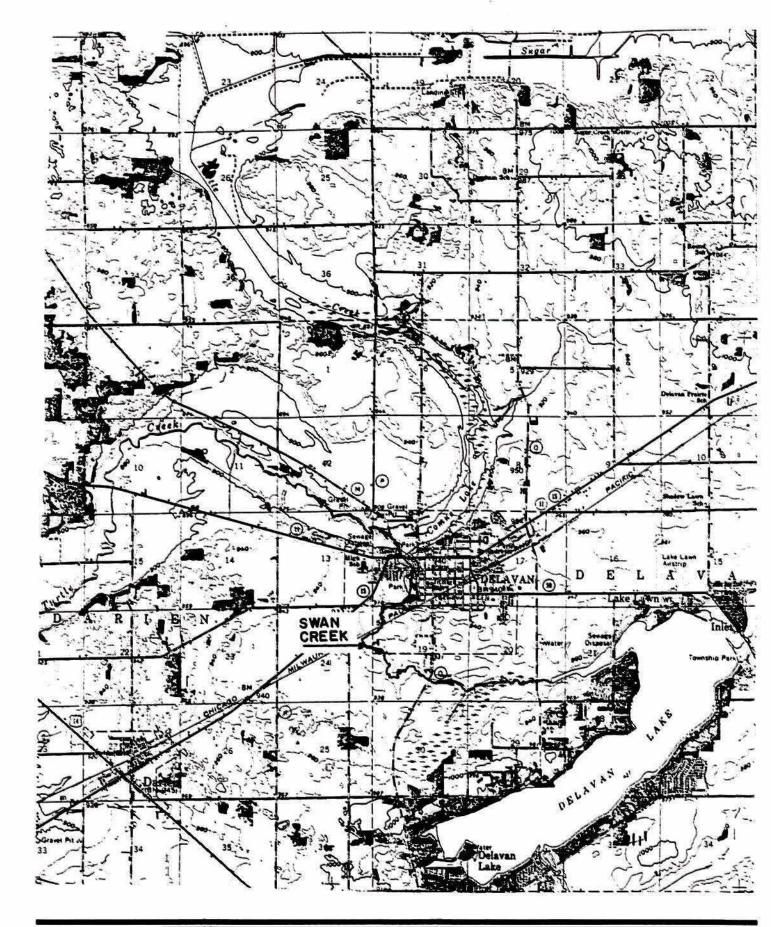
Previous analyses and modeling of contaminant movement from the Sta-Rite property indicates that the contaminant plume will have no effect on City Well 2. This is based on groundwater flow occurring to the west-northwest beneath the City of Delavan. The Department of Natural Resources (DNR) has raised questions that the plume will change direction from predominantly to the northwest to the southwest. The DNR suggested this could be caused by effects of pumping City Wells 2 and 3 and localized effects caused by southward flowing streams in the area. The DNR has also been concerned with verifying the plume downgradient of the contamination. This chapter discusses known groundwater flow conditions in the area and at site specific locations, including flow direction, recharge and discharge areas, seasonal variations in flow conditions, suspected vertical plume dispersion, and the effect of flow conditions on plume migration.

The general water table map of the area indicates flow to the northwest from Delavan Lake to Comus Lake (Borman, 1976). A groundwater divide exists to the southeast of the site between Delavan Lake and Lake Geneva; this results in Delavan Lake acting as a recharge area for flow to the northwest. The presence of this recharge area is substantiated in Borman, where it is noted that there was a 40-foot drop in water levels between the shallow and deep water table aquifer wells.

Groundwater flows away from Delavan Lake to the northwest and west and is discharged to Comus Lake and Turtle Creek. Comus Lake is known to be a discharge area for groundwater flow because of the upward gradients found within the aquifer in the lake area. These upward gradients result in numerous springs and artesian wells near the lake. Most of the shoreline of Comus Lake remains a groundwater discharge area throughout the entire year. Springs along the eastern shoreline remain flowing continuously (Smith, 1984; Thresher & Son, 1978). During high runoff periods, Comus Lake may become a flow-through lake resulting in discharge out of the lake along the southwest shore (Thresher & Son, 1978) near the dam and probably as a function of the dam.

Surface water flows from Delavan Lake northwestward through Swan Creek which discharges into Turtle Creek west of Comus Lake. Turtle Creek flows northwest out of Comus Lake and then westward out of Walworth County (Figure 2). Turtle Creek acts as a groundwater discharge area for water flowing from the north, east, and south. It is the main discharge area for the southwestern portion of the County. Since Comus Lake and Turtle Creek are the major discharge areas in this portion of the County, little or no groundwater underflow would be expected to occur beneath these areas. However, in the lower portions of the sand aquifer there will be some leakage of groundwater from the water table aquifer into the underlying bedrock aquifers because of head differences between the two systems.

Site specific groundwater levels measured in the vicinity of Sta-Rite and at the Mobil Oil bulk plant on Ann Street in the City of Delavan, substantiate



## Donohue

April 1984 12894. Topographic Map of Delavan Area Showing Stream Flow Directions and Major Surface Water Features



FIGURE 2

that groundwater flows to the northwest (Warzyn, 1984). Water table maps constructed from additional monitoring in 1983 and 1984 at Sta-Rite, are shown on Figures 3 through 6 and indicate flow to the northwest. Although there may be local "wobbles" in the groundwater contours, we would not expect large variations in the direction of flow since streams in the area flow to the north and northwest and groundwater flow would be to the discharge points of Lake Comus and Turtle Creek.

Groundwater flow beneath the suspected area of contamination occurs in the intermediate portion of the flow path system. This means that groundwater flow is predominantly horizontal. Nested wells on-site indicate small vertical upward and downward gradients which vary with time. Consistent vertical downward gradients only occur when City Well 4 is pumping. It is known that the contaminants tend to stay at the water table surface. This, coupled with the fact that flow is predominantly horizontal, indicates that dispersion would be the main cause of contaminants occurring in the deeper portion of the aquifer. Water quality testing at the deep nested wells substantiate that the majority of contamination occurs at the water table surface. Therefore, suspected contamination would be discharged to Comus Lake and Turtle Creek since it occurs at the water table and this groundwater is discharged at the springs. No discharge of contaminants to the bedrock system is expected to occur for this same reason.

These discussions indicate that contaminants would move off-site to the north-west, remain in the upper portion of the aquifer, and discharge to Comus Lake. Flow would not be expected to reverse itself and move southwestward towards City Well 2 nor travel as underflow to city wells to the west of Comus Lake. The modeling indicates that high pumping rates would be required at City Well 3 to pull contaminants into the well. Since City Well 2 is a small capacity well, pumping rates would not be high enough to draw contaminants in that direction.

The City discourages private wells for potable water in the city limits when a connection can be made to the city system. However, two wells were located between Sta-Rite and Comus Lake. A well used for swimming pool water is located on Estate Lane. This is directly downgradient from the suspected contamination. Water samples from this well were analyzed several times in 1983 for volatile organics. All results were below detection. In April 1984, a second well was located near the 3rd Street extension at Comus Lake. We are investigating well construction information for this well. We recommend semi-annual monitoring of these wells in lieu of installing additional monitoring wells.

Little underflow would occur beneath Comus Lake, and Comus Lake has been tested for the presence of contaminants with a negative result. Two samples were collected from Comus Lake on June 6, 1983, and analyzed for trichlor-ethylene and 1,1,1 trichloroethane. There was no solvent detected in either sample. The detection limit was 1 microgram per liter. One sample was collected 20 feet from shore on the east side of the lake near the northwest corner of the Ned Hollister Wetlands Conservancy. The second sample was collected at the lake outfall immediately upstream of the dam. Furthermore, Sta-Rite has implemented remedial action and additional investigations to further address the source of contamination. Therefore, Sta-Rite believes it is not necessary to implement an extensive groundwater monitoring program to define the exact plume boundaries.

Figure 3

Figure 4

Figure 5

## Figure 6

#### PLANT 2 REMEDIAL ACTION

#### ACTIONS COMPLETED

Remedial action at the sump near Plant 2, consisting of removal of the sump and contaminated soils to a depth of 20 feet was completed in December, 1984. The results of the remedial action program were reported in the report entitled, "Remedial Action at Plant 2 Sump, Sta-Rite Industries, Delavan Operations," January, 1984. The report indicates that a relatively small amount of solvent remains in the unsaturated soils between the depth of excavation (20 feet) and the top of the groundwater table (25 feet). In addition, the contamination already in the groundwater in the vicinity of the sump was not removed. At a review meeting with the DNR on March 27, 1984, Sta-Rite agreed to address further remedial action at the sump. The following discussion presents the approach to the additional remedial action.

#### ADDITIONAL REMEDIAL ACTION PROCEDURES

Additional excavation of contaminated soils in the vicinity of the Plant 2 Sump is not practical because the excavation will put the foundation for Plant 2 in jeopardy unless costly reinforcing measures are taken. Furthermore, additional excavation of the soils will do nothing to remove the contamination already in the groundwater. As an alternative to further excavation, we propose to install a flushing system in the vicinity of the sump and a groundwater extraction well to remove contaminated groundwater and provide water for the flushing system. To allow flushing of the contaminants from the unsaturated soils beneath the tank, a two-foot wide trench, two feet deep will be excavated around the perimeter of the new tank. The trench will be filled with stone. Water from the extraction well will be pumped to the flushing trench through a spray nozzle to provide aeration to remove a portion of the contaminants from the water.

Because it is possible that a groundwater mound will be created beneath the flushing trench and tank, precautions must be taken to ensure that the empty sump tank will not float; therefore, 2.5 feet of water will be pumped into the tank to provide sufficient weight. The remaining volume of the tank will be available to drain flammable solvents from the floor of Plant 2 in case of emergency.

The rate of flushing will be adjusted manually to ensure that the area does not flood. Flushing will continue until the water in Well D15 is adequately reduced in contamination. The extraction well will be drilled during the first week of May, 1984.

Installation of the pump, stone trench, and spray systm will be completed by June 30, 1984. Temporary piping will be installed initially because it is likely that the soil extraction will be complete by winter. At our anticipated flushing rate of 30 gpm, approximately 1,500 bed volumes of water can be eluted by winter. Because the solubility of chlorinated solvents in water exceeds 150 mg/l, and because the soils contain little organic matter, the partition coefficient favors the extraction. We expect that the extraction will be nearly

complete after fewer than 100 bed volumes. The final extractions will be completed using city water because water free of solvent will be required to provide adequate driving force (concentration differential) to remove final traces of solvent. We will determine the approximate total amount of water required to flush the soils by obtaining a sample of contaminated soil from another area on-site or by preparing a synthetially contaminated soil if we find no further on-site contamination. We will extract the contaminated soil to determine the amount of water required to remove the solvents.

The groundwater extraction well will be located approximatey 300 feet north-west of the sump near existing Donohue Wells D18 and D19. This placement of the extraction well will allow extraction of contamination downstream of the Plant 2 sump, as well as solvent in the immediate vicinity of the sump. The well will be 8 inches in diameter and will have a total depth of 50 feet. The screen will be 20 feet long and begin at the groundwater table surface.

A pump test will be run on the extraction well to allow calculation of parameters for designing additional extraction wells for the boundry extraction system discussed later in this report.

## REMEDIAL INVESTIGATION OF POTENTIAL CONTAMINANTS UNDER PLANT NO. 1

Based on information collected from site investigations and interviews of plant employees, we cannot exclude the possibility that there are pockets of contamination in the soils under Plant 1. Plant 1 was constructed in phases over a period of years with the last major expansion completed in 1974. There is a possibility that disposal of trichloroethylene occurred somewhere under the 1974 addition prior to its construction. We are confident that no 1,1,1-trichloroethane was disposed in this area because the plant did not use 1,1,1-trichloroethane as a degreasing solvent prior to the expansion.

Two general approaches are available for determining the importance of any contamination of soils under Plant 1. The first approach is direct and involves obtaining samples of soils beneath the building addition and analyzing the samples for the volatile solvents. This approach would required extensive concrete boring and soil sampling and would be disruptive to the production operations. If the extent of contamination could be found, remedial action efforts would be significant. They would include relocation of production equipment, saw cutting concrete, concrete demolition and removal, soil excavation of a portion of the contaminated soils, backfilling and installation of a system of drains for flushing the remainder of the contaminated soils, and replacement of the concrete floor. Direct investigation and remedial action beneath Plant 1 would be a significant economic burden to Sta-Rite. The area of interest contains the motor assembly room which has a controlled environment to eliminate dust contamination. This production operation cannot be moved elsewhere on-site or transferred to other production facilities without substantial facilities renovation and loss of product production. plant would have to stop production resulting in hundreds of thousands of dollars in lost sales and potential loss of market share. A temporary plant closing would affect not only company performance, but also employment in the community.

To minimize these adverse impacts, Sta-Rite will use an indirect method to evaluate the potential contamination beneath Plant 1.

Four borings have already been drilled inside the Plant 1 building. One of the borings has been converted to a groundwater monitoring well (D12). The well indicates that the groundwater is contaminated and that the ratio of 1,1,1-trichloroethane to trichloroethylene is approximately 4:1, approximately the same ratio found in the Warzyn monitoring well (TW4) located just south of the Plant 1 building and the Donohue monitoring well located just west of the Plant 1 building (D14).

Because 1,1,1-trichloroethane was not used prior to the 1974 building addition, we can estimate the importance of any past disposal practices under the addition without doing further explortory work beneath the existing building. As part of the field investigations, we propose to install two groundwater monitoring wells along the northwest wall of Plant 1. In addition, if soils analysis shows solvent contamination east of the chip storage area, we will install groundwater monitoring wells just northwest of the suspected outside

soil contamination east of the chip storage area. Based on the ratio of solvents found in the monitoring wells near the chip storage area, under Plant 1 and west and northwest of Plant 1 and based on the relative concentrations of the solvents with distance from the outside source, we will be able to estimate the importance of any contamination under Plant 1. Examples of hypothetical findings are discussed below to describe the approach.

- 1. The monitoring wells located near the area east of the chip storage area will show solvent contaminted groundwater and the solvents in the groundwater will be in the same ratio as the solvents in the groundwater monitoring wells located under and immediately south and west of Plant 1. The new monitoring wells located northwest of Plant 1 will be less contaminated but the solvent ratio will be the same. These results would suggest that the primary source of contamination is located outside of Plant 1 and we would recommend no further investigations directly under Plant 1 until the effect of site clean-up of the outside sources is complete and the effects of the clean-up evaluated. We would suggest installing perimeter extraction wells to intercept the contaminants.
- 2. The wells to be installed immediately north and west of north Plant 1 show contamination however, the contamination is primarily trichloro-ethylene with only small amounts of 1,1,1-trichloroethane. The wells east of the chip storage area show the same ratio of solvents as D12, D14, and TW4. This information would lead us to conclude that there is a source of contamination under Plant 1. The concentrations in the wells would indicate whether further work under Plant 1 is warranted and if it would be necessary for the company to develop a plan for addressing this contamination such as boundary interception wells is satisfactory.

Other possibilities exist. These will be discussed and evaluated after the data are collected. The monitoring wells will be installed during the first two weeks of May. Well development, sampling, analysis, and data evaluation will be completed by June 30, 1984.

## INVESTIGATION OF THE AREA EAST OF THE CHIP STORAGE AREA

There is a possibility that spent solvents were discharged in an area east of the existing chip storage facility. We propose to determine the significance of contamination, if any, in this area using a backhoe to excavate pits to obtain samples for analysis and, if solvent contamination is found, by installing groundwater monitoring wells to determine the impact on groundwater in the immediate vicinity.

#### BACKHOE TEST PITS

Test pits will be excavated with a backhoe throughout the area of suspected contamination. The test pits will be dug to a depth of approximately 12 feet and samples will be collected every three feet of depth. The samples will be analyzed by headspace analysis using VOA and HNU field organic analyzers. The field analysis will provide data concerning the number of solvent compounds present and the relative concentration of solvents in each sample. A limited number of samples will be further analyzed by laboratory gas chromatography to allow calculation of absolute concentrations. The pits will be excavated on a grid pattern to identify the limits of contamination.

During the excavation we will collect a sample of soil that is contaminated with solvents, compact the soil into a column and run laboratory extraction studies with water to determine the volume of water required to flush the soils.

#### GROUNDWATER MONITORING WELLS

If soil contamination is found, groundwater monitoring wells will be placed west and north of the potential site of contamination to determine the impact on groundwater quality. At one location a well nest will be installed to determine the depth of contamination in the aquifer. The groundwater monitoring wells will be drilled approximately 20 feet downgradient from the suspected source of contamination. The soils from one of the wells will be sampled every 2.5 feet and analyzed for the volatile solvents. These wells will be drilled through bituminous pavement.

Field analysis of the core sample from one well will confirm the presence or absence of contaminants under the pavement. We expect the soils beneath the pavement will not be contaminated.

As discussed earlier, two groundwater monitoring wells will be placed north and west of Plant 1 to estimate the significance of any contamination of soils beneath Plant 1.

We expect this investigation will be completed by June 30, 1984.

#### BOUNDARY EXTRACTION WELLS

Plant boundary extraction wells, in addition to the well proposed in Chapter 4, might be required to intercept contaminants flowing off-site to the northwest. To design the extraction program, the following information is required.

- 1. Aquifer characteristics at the plant downgradient boundary.
- 2. The depth of contamination in the aquifer.
- 3. The linear boundary limits of the aquifer contamination.

The required information will be obtained as part of the plan of study outlined in Chapters 3, 4, and 5. The aquifer characteristics will be determined by running a pump test on the extraction well to be used for the Plant 2 sump area remedial actions. The depth of contamination will be determined by sampling the well nest installed east of Wright Street between well D5 and D14.

The southern boundary of contamination can be defined with existing monitoring wells and the northeast boundary will be determined by the two additional wells to be installed along the northwest wall of Plant 1. Specific recommedations concerning alternative remedial actions will be included in the June 30, 1984, submittal to the DNR.

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## APPENDIX A BORING AND WELL LOGS

#### LUU UI UURIITU

#### WISCONSIN TESTING LABORATORIES

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PROJECT:	PROJECT:Test Borings and Well Installation												
CLIENT:						es, Inc.	*	BORING N		S-83 D-2		19/15	
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and wash boring with				5		LOOSE TO MED	IIIM DENSE BROV	YTII? N	caved	n a	<b>k</b>		
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DRIVEN 12" WITH 14								SPLIT TUBE	AUG	ER W	ASH_		

PROJECT: _	Te	st B	orin	gs and	We	ell Installation	JOB NO.: S-8315					
CLIENT:	Do	nohu	ie &	Associa	ate	es, Inc.	BORING NO.:					
LOCATION:	St	a-Ri	te l	ndustri	ies	s, Delavan, Wisconsin	GROUND ELEVATION:					
DRILLING DATA: BIT SIZE, TYPE,	SAMPLE NO.	BER	POCKET PENE. TSF	FT.	PEE	SOIL CLASSIFICATION			RESU	_	Y	ELEVATION
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PROJECT:						ell Installation	JOB NO.: S-8315 D-2							
CLIENT: _						es, Inc.	BORING NO.:							
LOCATION:	St	a-R	ite	Indust	rie	s, Delavan, Wisconsin	GROUND	ELEVATION:						
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PROJECT:	Test Borings and Well Inst	allation	JOB 1	NO.:	S-8315				
CLIENT: _	Donohue & Associates, Inc.		BORING NO.:D-2						
LOCATION:	Sta-Rite Industries, Delay	van, Wisconsin	Y	ELEVATION:					
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#### WISCONSIN TESTING LABORATORIES



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PROJECT:	Te	est	Borin	ngs and	d W	ell Installat	ion	JOB N	n .	12	s-83	15	
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WATER, CASING SIZE, ETC.	SAMP	Žã	og P	05	Ş.	SS:	<u>#</u>	P.S.F. Qu	Mc	P.C.F	5	E.E.
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	100	11-0-0-0 180/05 0		V21 (24)	100 B-04	90.125			320	thi payor		_
PROJECT:				11.18cm - 1 34900 1000 1000	Well Installa	tion	JOB 1	10.:_		s-83		
CLIENT:	FE 000-				ites, Inc.		BORING N	10.:_	I	-10		307 11
LOCATION:	St	a-R	ite	Industri	es, Delavan,	Wiscons in	GROUND	ELE	/AT	ION:		
BORING STARTED		2/2	24/83	3		GROUND WATER	. During	24	KOR	ILLIN	s_2	21
BORING COMPLETE	0_	3/2	2/83		220 F	At Completion	N ERBOR IN	FTER	DR	LLIN	s	
TOTAL DEPTH BOR	ING	110	) i		a valetari wante wa		HOURS A	FTER	DR	LLIN	G	
DRILLING DATA: BIT SIZE, TYPE, LOSS OR GAIN OF	LE NO.	1BER Ows	POCKET PENE. TSF	FT. DEPTH	sou	. CLASSIFICATION		LA	BOR	ATOR	Y	ELEVATION
WATER, CASING SIZE, ETC.	SAMPLE	Şã	S		<del>[</del> 9			P.S.F	% Mc	P.C.F.	S.	ELE,
8" Hollow stem augers to 55 ft., 41" tricone roller bit and wash boring with		3/1	/5	0- - - - 5-	moist. (OL)	BLACK CLAYEY  BROWN SILTY  fine to coar	CLAY					
bentonite for remainder of boring.	2	5/5	/6	- - 10-	SAND moist,	ILTY FINE TO little fine to e clay. (SM)						
	3	6/7	/7	- - 15-								
	4	7/8	/9	_ _ _ 20- _		Ę						
	5 S	10/	14/ 16	25-	COARSE SAND	Y DENSE BROWN saturated, sor avel, trace s	ne fine					
				DRILL	NG AND SAMPLIN	G INFORMATION	8					
BORING LOGGED BY	<u>.                                    </u>	н.	Stei	nruck	CHECKED BY_	Soils Engir	neer_CLAS	SIFICA	TIO	N SYS	TEM.	WTL
METHOD OF DRILLI					Drill	MACH	INE MODEL_			55, 1		
PENETRATION TEST DRIVEN 12" WITH 14 NUMBER OF BLOWS	rs: 2 0# P	" O.D	. × 1-3	/8" I.D. SP WEIGHT F	LIT SPOON SAMPL	ER	SPLIT TUBE SPOON SAMPL		A IGER IPLE	S 350	SH ?L€	

PROJECT: _						ell Installation	JOB N	10.:_	S	-831	5	
CLIENT: _					_	es, Inc.	BORING N	10.:_	D-	10	_	
LOCATION:	St	a-Ri	te l	ndustr	ie	s, Delavan, Wisconsin	GROUND	ELEV	/AT	ION:		
DRILLING DATA: BIT SIZE, TYPE, LOSS OR GAIN OF	SAMPLE NO.	NUMBER BLOWS	POCKET PENE. TSF	FT. DEPTH	MPLE	SOIL CLASSIFICATION			RESU	P.C.F	•	ELEVATION
WATER, CASING SIZE, ETC.	3	Z.	٥	25	5			Qu	Mc	Dd	S	E.
*				- - -		DENSE TO VERY DENSE BROWN COARSE SAND saturated, so to coarse gravel, trace s (SP-SW)	me fine					
	6	13/	15/	30- - -	Ŷ	HQ.						
	7	17/	19/	- 35- -								
	8	20/	26/ 29	- - 40- -	2.3							
	9	27/	35/ 40	- - 45-	1.40.00	VERY DENSE BROWN CLAYEY S TO COARSE SAND saturated, fine to coarse gravel. (S	some					
	10	23/	31/39	- - 50- -	- Table	*		of s	um sili	sean y lay	ıs	
,	11	30,	38/ 47	- - 55-	1	VERY DENSE BROWN FINE TO SAND saturated, trace coa sand, trace fine to mediu gravel. (SP)	rse ·		t.	the dept	h	
	12	34.	37/ 48		*****							

PROJECT: _	Test Borings	and Well Installation	JOB NO.: \$-8315
CLIENT: _	Donohue & Ass	sociates, Inc.	BORING NO.: D-10
LOCATION:	Sta-Rite Inde	ustries, Delavan, Wisconsin	GROUND ELEVATION:
DRILLING DATA: BIT SIZE, TYPE, LOSS OR GAIN OF WATER, CASING	m % 2 2 mm	PTH SOIL CLASSIFICATION	P.S.F. & P.C.F. & W
SIZE, ETC.	13 31/33/	VERY DENSE BROWN FINE TO PERSONAL SAND SATURATED, trace coal sand, trace fine to medium gravel. (SP)	MED I UM
	14 33/40/ 46 <b>7</b>	- 0- - -	
	15 26/31/ 34 <b>7</b>	VERY DENSE BROWN FINE TO C SAND saturated, trace sill little fine to coarse grave (SP-SW)	t,
	16 30/24/ 39 <b>8</b>		
	17 31/33/ 34 <b>8</b>	5- - - -	
	18 25/31/ 30 <b>9</b>	VERY DENSE BROWN FINE TO C SAND saturated, little fine coarse gravel. (SP-SW)	

PROJECT:	Te	st	sorı	ngs and	1 34	ell Installation	JOB	NO.:_		5-83	15	
CLIENT:	Do	nohu	ıe ε	Associ	at	es, Inc.	BORING	NO.:_	I	)-19		
LOCATION:	St	a-Ri	te	Industr	rie	s, Delavan, Wisconsin	GROUND					
DRILLING DATA: BIT SIZE, TYPE, LOSS OR GAIN OF	SAMPLE NO.	NUMBER	POCKET PENE. TSF	FT.	PLE	SOIL CLASSIFICATION		F	RESU	ATOR	_	ELEVATION
WATER, CASING SIZE, ETC.	SA P	Şã	PPE	DEPTH 95	Ş.		8.	P.S.F. Qu	Mc	P.C.F.	S	ELE
				)	Ш	VERY DENSE BROWN FINE TO SAND saturated, little fi						
				_	20	coarse gravel. (SP-SW)						
	20	28/	38/	_								
			41	100 -	M				13			
				_		<b>%</b> (99)						
195				9 <del>00-1</del> 8		8						
	21	23/	32/	105 -	1						1	
		ÿ		-								l R
				2 <del>1 -                                   </del>	$\ $							2
	22	30/	34/	. =	管察	360						
			39	110-		END OF BORING						
	6			_								
	8			-	Ш							
3/4%	100			_		3 <b>4</b> 3						
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596 5						•						
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#### LUG UF BURING

#### WISCONSIN TESTING LABORATORIES

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	5		Samp	ling				LOB	NO.:_	<b>S-</b>	8364	15	136.5	
PROJECT:		735			iat	es, Inc.	*	BORING				P.		
CLIENT:	-				THE REAL PROPERTY.	s, Delavan, N	,							
LOCATION:			/27/8		1,35			GROUND Durin		96534711	TEPADOCIC SOCI		201	
BORING STARTED_		61	/28/8				GROUND WATE	• • • • • • • • • • • • • • • • • • • •			ILLIN		30	
BORING COMPLETE		20		3				HOURS		e sometic				
TOTAL DEPTH BOR		·		V-100-10	17	2		HOURS				_	Z	
DRILLING DATA: BIT SIZE, TYPE,	E NO	SER SER	THE T	FT. DEPTH	120	SOIL	CLASSIFICATIO	Nu	LA	RES	ULTS	47	ELEVATION	
LOSS OR GAIN OF WATER, CASING	SAMPLE	NUMBER BLOWS	POCKE PENE. TSF	UE,	N. T.	-		M3	P.S. F		P.C.F		LEV	
SIZE, ETC.	S		_	0-	H	GRAY CONCRE	TF FLOOR.		+			H	w.	
9 In.	1		,	_	-		BROWN AND G	RAY SILTY		0.00	100	+		
hollow stem	2				1.33	FINE TO COAR	RSE SAND AND	GRAVEL	dia		by			
auger casing	3				₹.		le sandy cla of clayey t		cor		10 8			
used with				5-	1	(possible f								
carbide	4	*			21.7									
toothed	5				الام الحم		940		521		prov	1000000		
finger bit	6			_	-	RROWN SILTY	FINE TO COA	RSF SAND	- lar		grav	el		
for entire				_	100	AND GRAVEL	moist to ver	y moist,			6.			
depth of	7			AND GRAVEL moist to very moist, trace large gravel, few seams of silty sandy clay.										
boring.	8			_	7	DESCRIPTION SERVICES	C.G., .							
				_										
9	9	'			T.									
*	10			_	-									
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1	14			20-										
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726	至;	'		-	-		¥.							
4月11日	16				S. A. C.									
	AT .	1			1.4.									
	1/			25-	1									
	200	5100)				IG AND SAMPLIN								
BORING LOGGED B	/Y	- 200	100000	inruck		_ CHECKED BY_	Soils Eng		ASSIFIC	ATI	ON SY	STER	1 WTL	
METHOD OF DRILLI	ING			Stem A		ers, Truck Mo wer	ounted Drill			CME	55.	Uni	t 12	
PENETRATION TES	STS: 2	2" 0.0	D. × 1-	3/8" 1.0.	SPL	IT SPOON SAMPL	ER		8	0	E	9		
DRIVEN 12" WITH 14 NUMBER OF BLOWS	40a P	PIN GI	UIDED	WEIGHT	FR	EE FALLING 30".		SPLIT TU	8E A	UGE	R W.		*	

PROJECT: _	So	il S	amp 1	ing			JOB N	10.:_	s-8	364		
CLIENT: _	Dor	nohu	e &	Associ	ate	es, Inc.	BORING N	10.:B	41			
LOCATION:			7/2			s, Delavan, WI	GROUND			ION:		
DRILLING DATA: BIT SIZE, TYPE,		~			Ł.			LĄ	BOR	ATOR	Y	TION
LOSS OR GAIN OF WATER, CASING SIZE, ETC.	SAMPLE NO	NUMB	POCKET PENE. TSF	DEPTH	SAMP	SOIL CLASSIFICATION		P.S.F. Qu	Mc Mc	P.C.F Dd	5	ELEVATIÓN
	18			25 —	17/1/2	BROWN SILTY FINE TO COAR AND GRAVEL moist to very				lows		
	1,3			=		trace large gravel, few silty sandy clay.	seams of		2 i	n. 25 f		
	20				100	GRAY CEMENTED SAND moist,	some	to 3	0 f			
	21			30-	1.124.1	fine to coarse gravel.  GRAY FINE TO COARSE SAND	AND FINE	zone	•			
	22			_	. m	TO LARGE GRAVEL saturated						
				_	-	* *						
	23			_	18							
	24			35-	97	END OF BORING						
*				_		END OF BONTING						
				=								
*	201			_	Ш							
				40-								
				_	П							
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	S 25				1120	ONSIN TESTING LABORATORIES				٧		
PROJECT:	S	oil	Samp	ling a	nd	Well Installation	JOB N	10.:_	s-	8364		
CLIENT:	D	onoh	ue &	Assoc	iat	es, Inc.	BORING N	10.: <u></u>	-12	g.		
LOCATION:	S	ta-R	i te	Indust	rie	s, Delavan, WI	GROUND	ELE	VAT	ION:		
BORING STARTED.		6/	28/8	3		GROUND WATER	During	**	DR	ILLIN	c_3	11
BORING COMPLETE	EO_	6/	29/8	3			HOURS A	FTER	DRI	ILLIN	s	
TOTAL DEPTH BOR	RING	36	-1/2	•		*	HOURS A	FTER	ORI	LLIN	G	
ORILLING DATA: BIT SIZE, TYPE.	Š	E S	E. T	FT.	Ė,	- 1550 MAR - 150 MAR - 1500 MAR -		LA	BOR	ATOR	٧	Š
LOSS OR GAIN OF	SAMPLE	PE OF	POCKET PENE. TSF	DEPTH	YP	SOIL CLASSIFICATION		P. S. F	18	P.C.F.	*	ELEVATION
SIZE, ETC.	3	2	_	0-	_			Qu	Mc	DΦ	S	EL
0 1-	1			_	47.	GRAY CONCRETE FLOOR.		NOT	<b>.</b>	Flo	br	
9 In. hollow stem	2			_	-	DARK BROWN FINE TO COARSE GRAVEL FILL moist, trace		оре	ned	by		
auger casing				_	Ĭ.,	some concrete slabs.		dia	12			
used with	3			_		BROWN SILTY FINE TO COARS						
carbide	4			5-	15	AND GRAVEL moist, trace o topsoil in Samples 2 and		CON		Hit te a		
toothed			3	_	+	(possibly natural).		Carlotte Contractor	1458233	de mat	And the second	
finger bit	5			-	e je			4 to	6	in.	= 1 Y	
for entire	6			\$				thi	k.		1	
depth of	7	•		10		EX01			13			
boring.				10-	7.7	350						
****	8			_			8					
	9			_	-	\$						
				_								
	10		1000	15-	1000	BROWN FINE TO COARSE SAND						
	11				7-8	to very moist, trace silt fine to coarse gravel, fer		8				
				_	1	seams of clay.	ì					
	12			-	4				1			
	13			=								
	14	2		20-	19.							
	1.3			-	*							
1 2 1 1 2 1 E 2 1	15			-				i				
	16			_	3		1					
-				_			ı					Ĭ
	17	bs 558		25-	2							
22				DRIL	LIN	G AND SAMPLING INFORMATION:						
BORING LOGGED B	<b>-</b>		2015	nruck	01-31-900A	CHECKED BY Soils Engine	erCLAS	SIFIC	ATIO	N SYS	TEM	WTL
METHOD OF DRILLI	NG_	HOI	isco	Stem A nnect	uge Tow	rs,Truck Mounted Drill,	INE MODEL_	CME	55	, Un	it 1	2
PENETRATION TES	TS: 2					T SPOON SAMPLER			2	8		
DRIVEN 12" WITH 14 NUMBER OF BLOWS						TO SECULIAR	PLIT TUBE	en comô	JGER	14 - 24 THS	Her	- 1

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PROJECT:		1 Sampl		at	es, Inc.			JOB N					
CLIENT:	AND THE PROPERTY.		Sales Documents	7,61	es, Delavan, W	J1		BORING N					
BORING STARTED_ BORING COMPLETE	(	6/30/8	3			GROUND WA	TER:		XX.	DRI	ILLIN	G_2	29 <u>‡</u> '
TOTAL DEPTH BOR					HS 15144 124 2 No. 144		6	HOURS A					
ORILLING DATA: BIT SIZE, TYPE. LOSS OR GAIN OF WATER, CASING	o	rs.	FT. DEPTH	SAMPLE	SOIL	CLASSIFICAT	TION		P. S. F	RESI	P.C.F		ELEVATION
9 In. hollow stem auger casing used with carbide	1 2 3		0- - - - - 5-	一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一	GRAY CONCRE BROWN FINE T moist, some grayel.  DARK BROWN T CLAY moist, BROWN FINE T	TO COARSE S e fine to TO BROWN SA , trace ha	SAND larg  ANDY ir_r	e SILTY oots.	NOTI oper diar cor	: red	loo by		8.
toothed finger bit for entire depth of boring.	5 6 7 8		- - - 10-	4 1 min 1 2 - 2   1 min 1   2 min 1	BLACK TO DAR moist. BROWN FINE T	RK BROWN CL	LAYE	Y TOPSOIL		37.53			
P. 17.5	9 10 11 12		- - 15- - - - 20-	大小   上京   大丁   上京		2							S.
	14:15		- - - - 25-	一年 中間 一年の	BROWN TO GRA AND FINE TO some cobbles	LARGE GRAV		CONTRACTOR	den dif dri	ie ic Ili	ilt		
DRILLING AND SAMPLING INFORMATION:  BORING LOGGED BY H. Steinruck CHECKED BY Soils Engineer CLASSIFICATION SYSTEM WTL  HOllow Stem Augers, Truck Mounted Drill,  METHOD OF DRILLING Disconnect Tower MACHINE MODEL CME 55, Unit 12  PENETRATION TESTS: 2" O.D. × 1-3/8" I.D. SPLIT SPOON SAMPLER  DRIVEN 12" WITH 140# PIN GUIDED WEIGHT FREE FALLING 30".  NUMBER OF BLOWS REQUIRED SHOWN ON REPORT.  SPOON SAMPLE SAMPLE													

PROJECT:	Soil Samp	ing and	Well Installation	JOB I	ON	s-8	364		
CLIENT:	Donohue &	Associat	es, Inc.	BORING	10.:D-	12			
LOCATION:	Sta-Rite	Industrie	s, Delavan, WI	GROUND	ELEV	AT	ION:		
	N RY H.	FT.		2	LA	BOR	ATOR LTS	٧	NO.
LOSS OR GAIN OF WATER, CASING	NUMBER BLOWS POCKET	DEPTH XX	SOIL CLASSIFICATION		P.S.F. Qu	% Mc	P.C.F Dd	. 5	ELEVATION
	18 19 20 21 22 23 24	25   30   35   40   45   50   50   55   55   55   5	BROWN FINE TO COARSE SAND to very moist, trace silt fine to coarse gravel, fer seams of clay.  GRAY FINE TO COARSE SAND TO LARGE GRAVEL saturated  END OF BORING	moist , some w thin	P.S.F. Qu	Mc	P.C.F Dd	***	פרפּי

			•	_		375 N		c 0	261		
PROJECT: _				> FLAC	1/24 21 SCHOOL DAY	JOB			304	-	
CLIENT:				72.44	e, Inc.	BORING					
LOCATION:	Sta-R	ite I	ndustr	ie	s, Delavan, WI	GROUND	ELE	/AT	ION:		
ORILLING DATA: BIT SIZE, TYPE, LOSS OR GAIN OF WATER, CASING	NUMBER	POCKET PENE. TSF	FT. OEPTH	498E	SOIL CLASSIFICATION		P.S.F.	RESU	P.C.F		ELEVATION
SIZE, ETC.	7/14/2015	_	25		BROWN TO GRAY FINE TO COA	RSE SAND	40		-		ш
	17		=	136 .	AND FINE TO LARGE GRAVEL I						
	19		_								
	20		30-	3 T 124	BROWN FINE TO COARSE SAND	AND FINE		100			
	21		_	1.60	TO LARGE GRAVEL saturated						
	22	4	_	是一世							
	23		_		)	:4					
			35	18.50	END OF BORING						
			-	П	CHO OF BOXING						
						540					2:
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<b>€</b> 6			: <del></del>								
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			-	1880				0			
			50-								
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			55-		37						
			J J-								29
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WISCONSIN TESTING LABORATORIES 5-8364 Soil Sampling and Well Installation JOB NO .:\_ PROJECT: \_ BORING NO.: D- 14 Donohue & Associates, Inc. CLIENT: Sta-Rite Industries, Delavan, WI GROUND ELEVATION: LOCATION: During & DRILLING. 7/11/83 30' GROUND WATER: BORING STARTED. 30' 7/12/83 12 HOURS AFTER DRILLING. BORING COMPLETED. 36' HOURS AFTER DRILLING TOTAL DEPTH BORING LABORATORY RESULTS ELEVATION ORILLING DATA: NUMBER BLOWS POCKE PENE. TSF BIT SIZE, TYPE. SAMPLE DEPTH SOIL CLASSIFICATION LOSS OR GAIN OF P.S.F & P.C.F. WATER, CASING SIZE, ETC. 0-BLACK TO DARK BROWN CLAYEY 1 TOPSOIL moist, some fine gravel 9 In. (possible fill). 2 hollow stem auger casing 3 DARK BROWN TO DARK GRAY SILTY CLAY moist, little fine to medium used with 4 carbide BROWN CLAYEY TO SILTY FINE TO 5 COARSE SAND moist, some fine to toothed large gravel. finger bit 6 for entire 7 depth of boring. 8 9 10 11 12 13 20-BROWN FINE TO COARSE SAND AND FINE TO LARGE GRAVEL moist. DRILLING AND SAMPLING INFORMATION: \_CLASSIFICATION SYSTEM WTL H. Steinruck . CHECKED BY Soils Engineer BORING LOGGED BY. Hollow Stem Augers, Truck Mounted Drill MACHINE MODEL CME 55, Unit 12 METHOD OF DRILLING 8 PENETRATION TESTS: 2" O.O. × 1-3/8" I.O. SPLIT SPOON SAMPLER DRIVEN 12" WITH 140# PIN GUIDED WEIGHT FREE FALLING 30". SPLIT TUBE AUGER WASH NUMBER OF BLOWS REQUIRED SHOWN ON REPORT.

PROJECT:	Dor	nohu	e &	Assoc	at	well Installation es, Inc. s, Delavan, WI	JOB N BORING N GROUND	10.:_	14			
LOCATION:		_			L		GROOND	LA	BOR	ATOR	Y	ğ
BIT SIZE, TYPE, LOSS OR GAIN OF WATER, CASING SIZE, ETC.	SAMPLE NO	NUMBE BLOWS	POCKET PENE. TSF	DEPTH	SAMPL	SOIL CLASSIFICATION		P.S.F.		P.C.F Dd	S	ELEVATION
	18			25 - -	h someter	BROWN FINE TO COARSE SAND TO LARGE GRAVEL moist.	AND FINE					
	19			-	4.00							
	20			30-	_							
	21			_		BROWN FINE TO COARSE SAND saturated, some fine to c gravel.	oarse					
	23			_	<u>.</u>	gravei.						
	24	1		35								
e e			(*)	-		END OF BORING						
				40- - -								
				45-								
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*				50- -								*
<i>i</i> .				-			2					
				5 5 - - - -		35.			*			
				40								

#### LUG UF BURING

#### WISCONSIN TESTING LABORATORIES

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						ONSIA TESTING CADONATONICS				0-41		
PROJECT:		-715 D	(Seriotise)	- NOTE - 1000	3	Well Installation	JOB N				×	100 H
CLIENT:	-	-	0	ar os	Pillar	es, Inc.	BORING N	10.: <u>_</u>	15	-3.0-2-		
LOCATION:	S	ta-R	ite	Industr	· i e	s, Delavan, WI	GROUND I	ELE	AT	ION:		603 500
BORING STARTED.		7/	7/73	SY: SY:		GROUND WATER	Durin	9 <b>*</b> *	DRI	LLIN	3_3	211
BORING COMPLETE	EO_	7/	7/83			At Completic	n example	FTER	DRI	LLIN	<u>_2</u>	7'
TOTAL DEPTH BO		- 0					HOURS A	FTER	DRI	LLIN	G	¥
DRILLING DATA:	Š	S.S.	E T	FT.	ב כנ	8		LA	BOR	ATOR	۲	Š
LOSS OR GAIN OF	SAMPLE	JA B	POCKE PENE. TSF	DEPTH	d M	SOIL CLASSIFICATION		P. S. F	-	P.C.F.	1	ELEVATION
WATER, CASING SIZE, ETC.	Š	ž	<u> </u>	0-	2,			Qu	Mc		S	น
			0	_	1	BLACK ASPHALT SURFACE.  BROWN FINE TO COARSE SAND		1				
9 In.	1			_		GRAVEL moist, few seams of						
hollow stem	2		Ì	=		clay.	73 C:					
auger casing	3			_								
used with	4			5-		9		1900				
carbide	1579			-	1							
toothed	5			-	3							
finger bit	6			-	if							
for entire				-	14				130		10000	
depth of	7		-	10-	1	9						
boring.	8			-	•	BROWN CLAYEY TO SILTY FIN	F TO				i	
	1551			-	13	COARSE SAND moist, little						
	9			_	7.3	coarse gravel.						
	10		, 3		6.03	0				à		
				15-	***	<b>%</b>						
•	11				111	34	*					
	12				10							
	13			_	.1							
	13			20-								
	14			_	1.	*						
4A	Lik.				1. 3.	et						
TE TO	<b>Z</b> .					BROWN VERY SANDY CLAY TO			-			
7	当6			_		FINE TO COARSE SAND very some fine to coarse grave		b			- 1	
- E-C	17			25-	7.						- 1	
			300		1							3
		н	Stei	nruck	LIN	G AND SAMPLING INFORMATION Soils Engine	a <i>r</i>					WTL
BORING LOGGED E		1502500				_ CHECKED BY		SIFIC				
METHOD OF DRILL						ers,Truck Mounted Drill	A A Property of the Control of the C		_	, Un	)	
DRIVEN 12" WITH I	40# F	IN GI	JIDED	WEIGHT	FR	IT SPOON SAMPLER EE FALLING 10°.	SPLIT TURE		W UGE F	ָ <u>"</u>	J SH	
NUMBER OF BLOWS	REC	JUIRE	D SHO	OWN ON R	EP	ORT.	SPLIT TUBE	LE SA	MPL	E SA	PLE	ji

PROJECT: _	Soi	1 5	amp 1	ing an	d	Well Installation	JOB	NO.:_	<b>S-</b> 8	3364		
CLIENT: _	Don	ohu	еε	Associ	at	es, Inc.	BORING	NO.:D	15			
LOCATION:	Sta	-Ri	te l	ndustr	ie	s, Delavan, Wl	GROUND					
ORILLING DATA: BIT SIZE, TYPE, LOSS OR GAIN OF WATER, CASING	SAMPLE NO.	UMBER	POCKET PENE. TSF	FT. DEPTH	3786	SOIL CLASSIFICATION			ESU	ATOR	٦.	ELEVATION
SIZE, ETC.	3	z	œ	25	S			Qu	Mc	Dd	S	13
	18			=	A 1999	BROWN VERY SANDY CLAY TO C FINE TO COARSE SAND very r some fine to coarse grave	noist,					
	19			_	100							
	20			30-	1 14.00	BROWN FINE TO COARSE SAND GRAVEL moist, trace silt,	AND trace	-				
	21			-		clay.						
	23			_	1 1	RUST-BROWN TO BROWN FINE COARSE SAND saturated, som						
	24			35-	3.0	to large gravel.  BROWN FINE TO COARSE SAND						
	25			_	Ki turks	saturated, little fine to gravel.						
				-		END OF BORING						
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## WISCONSIN TESTING LABORATORIES



PROJECT:	S	oil	Samp	ling	3	130		JOB N	ın .	ς.	8364	W	
CLIENT:	4.0%	5,000		20%	iat	es, Inc.		BORING N					
LOCATION:	1000				_	s, Delavan, V	//	GROUND					
	-	/	7/83		-		F = 1		_	_		-	101
BORING STARTED			8/83			<del>-//</del>	GROUND WATER:					0.00	
BORING COMPLETE		92.70	-1/2			****	At Completion						<u> </u>
DRILLING DATA:	7	1	G72	FT.			*Caved to 25-	HOURS A				-	Z
BIT SIZE, TYPE, LOSS OR GAIN OF	LE NO	NUMBER BLOWS	POCKET PENE. TSF	DEPTH	130	SOIL	CLASSIFICATION	.,_	^	RES	ULTS	T.	CLEVATION
WATER, CASING	SAMPLE	ŽĄ	Poc		5 4 5				P.S.F Qu	Mc	P.C.F.	% S	רני
3,22, 210.	~			0-	H	BLACK ASPHA	LT SURFACE.		- 2		-		
9 In.	1			_	7	BROWN CLAYEY	TO SILTY FIN	E TO					
hollow stem	2			, <u>s</u>			moist, some f	ine to			Ì		
auger casing						large gravel	•						
used with	3		,	5-	2	15							
carbide	4			J	1								
toothed	5			_	10			*	ĵ				
finger bit			į	_									
for entire	6			5 <del></del>	5 . 4							- 1	
depth of	7		8	10-	3			10			*	1	
boring.	l i				Q.					Ì			
	8			_	33								
				-	- NE					ı		-	
	9			-	18.6					î			
	10			15-	2.5 11.0						l		
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	13			_	11			*					
				20-									
Contractives	14			-	) k		LAYEY SAND TO	100					
7				-	7	to coarse gra	ery moist, som avel.	e fine					
	£				-	Satelly idealwayayeth north-c		i		1	- 1		
N. A.	716												
				25-		See Next Page							8
		SSALL.		DRIL	LIN	G AND SAMPLING	INFORMATION:	7					
BORING LOGGED BY	·	н.	Stei	nruck		CHECKED BY	Soils Engine	erCLASS	SIFICA	TIO	N SYS	TEM	WTL
METHOD OF DRILLI	4G_	Hol	low	Stem A	uge	rs,Truck Moun	ted Drill	NE MODEL_	CME	55	, Un	it 1	2
PENETRATION TEST DRIVEN 12" WITH 140 NUMBER OF BLOWS	34 PI	N GU	OBO	WEIGHT	FRE	E FALLING JO.		PLIT TUBE	و پين	GE A	<u> </u>	SH OI E	

PROJECT:	So	il S	amp l	ing			JOB	NO.:_	s-8	3364		
CLIENT:	Do	nohu	e &	Associ	ate	e, Inc.	BORING	NO.B_	16			
LOCATION:	St	a-Ri	te l	ndusțr	ie	s, Delavan, Wl	GROUND	ELE	VAT	ION:		
DRILLING DATA: BIT SIZE, TYPE, LOSS OR GAIN OF	E NO.	BE R Ows	POCKET PENE. TSF	FT.	3.33	SOIL CLASSIFICATION		LA	RESU	ATOR		ELEVATION
WATER, CASING SIZE, ETC.	SAMPLE	P.S.	POC	DEPTH	Ã₽S	3	80	P, S, F.	Mc	P.C.F	Š	ELEV
	17			25	H	BROWN VERY SANDY CLAY TO					Τ	
	18				-   3 so	fine to coarse gravel.	some					
	19			_	1.44 as							
	20			30-	=							
32	21			_	- 1 S. Or. 20							
				_		END OF BORING						
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		522				(2)						
				40-	(325)							
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PROJECT: Soil Sampling Donohue & Associates, Inc.  CLIENT: Donohue & Associates, Inc.  Sta-Rite Industries, Delavan, WI GROUND ELEVATION:  BORING STARTED 7/8/83  POR OND ELEVATION:  BORING COMPLETED 7/11/83  TOTAL DEPTH BORING 27-1/2' HOURS AFTER DRILLING  ORILLING DATA- BIT SIZE TYPE. LOSS OR GAIN OF WATER, CASING 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2												
BORING STARTED 7/8/83 GROUND WATER: During %* DRILLING 22'  BORING COMPLETED 7/11/83 HOURS AFTER DRILLING HOURS AF												
BORING STARTED 7/8/83  BORING COMPLETED 7/11/83  TOTAL DEPTH BORING 27-1/2¹  ORILLING DATA: BIT SIZE, TYPE. LOSS OR GAIN OF MATER. CASING SIZE, ETC.  9 In. 11 hollow stem 2 auger casing used with carbide toothed 5 finger bit for entire 6 depth of 5 boring.  8 BROWN FINE TO COARSE SAND Very moist to moist, little clay, 10 little fine to coarse gravel.												
BORING COMPLETED 7/11/83  BORING COMPLETED 7/11/83  TOTAL DEPTH BORING 7-1/2¹  BORING COMPLETED 7/11/83  TOTAL DEPTH BORING 7-1/2¹  BORING COMPLETED 7/11/83  HOURS AFTER DRILLING  HOURS AFTER DRILLING  MOURS AFTER DRILLING  LABORATORY RESULTS  P.S.F. R. P.C.F. S. A												
TOTAL DEPTH BORING  27-1/2'  DRILLING DATA: BIT SIZE, TYPE LOSS OR GAIN OF WATER, CASING SIZE, ETC.  9 In. hollow stem auger casing used with carbide toothed finger bit for entire depth of Doring.  8 BROWN FINE TO COARSE SAND Very moist to moist, little clay, 10 BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
DRILLING DATA: BIT SIZE. TYPE LOSS OR GAIN OF WATER CASING SIZE ETC.  9 In. hollow stem auger casing used with carbide toothed finger bit for entire depth of boring.  8 BROWN FINE TO COARSE SAND Very moist to moist, little clay, little fine to coarse gravel.												
BLACK ASPHALT SURFACE.  BROWN FINE TO COARSE SAND AND GRAVEL moist.  BROWN CLAYEY FINE TO COARSE SAND  BROWN CLAYEY FINE TO COARSE SAND  AND GRAVEL moist.  BROWN CLAYEY FINE TO COARSE SAND  AND GRAVEL moist.  BROWN FINE TO COARSE SAND  AND GRAVEL moist.  BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
BLACK ASPHALT SURFACE.  BROWN FINE TO COARSE SAND AND GRAVEL moist.  BROWN CLAYEY FINE TO COARSE SAND  BROWN CLAYEY FINE TO COARSE SAND  AND GRAVEL moist.  BROWN CLAYEY FINE TO COARSE SAND  AND GRAVEL moist.  BROWN FINE TO COARSE SAND  AND GRAVEL moist.  BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
BLACK ASPHALT SURFACE.  BROWN FINE TO COARSE SAND AND GRAVEL moist.  BROWN CLAYEY FINE TO COARSE SAND  BROWN CLAYEY FINE TO COARSE SAND  AND GRAVEL moist.  BROWN CLAYEY FINE TO COARSE SAND  AND GRAVEL moist.  BROWN FINE TO COARSE SAND  AND GRAVEL moist.  BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
9 In. hollow stem auger casing used with carbide toothed finger bit for entire depth of boring.  8 BROWN FINE TO COARSE SAND AND GRAVEL moist.  BROWN CLAYEY FINE TO COARSE SAND AND GRAVEL moist.  BROWN FINE TO COARSE SAND  BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
hollow stem auger casing used with carbide toothed for entire depth of boring.  8  GRAVEL moist.  BROWN CLAYEY FINE TO COARSE SAND AND GRAVEL moist.  10  BROWN FINE TO COARSE SAND BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
auger casing used with carbide toothed 5 finger bit for entire 6 depth of boring.  8  9  BROWN CLAYEY FINE TO COARSE SAND AND GRAVEL moist.  BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
used with carbide toothed for entire depth of boring.  8 9 10 15-  BROWN CLAYEY FINE TO COARSE SAND AND GRAVEL moist.  10  BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
used with carbide toothed 5 finger bit for entire 6 depth of 7 boring.  8 BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
toothed finger bit for entire depth of boring.  8  9  BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
finger bit for entire depth of boring.  8 9 BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
for entire 6 depth of 7 boring.  8 9												
depth of poring.  8  9  BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
boring.  8 9												
boring.  8 9												
BROWN FINE TO COARSE SAND very moist to moist, little clay, little fine to coarse gravel.												
moist to moist, little clay, little fine to coarse gravel.												
moist to moist, little clay, little fine to coarse gravel.												
BROWN FINE TO COARSE SAND very												
20- moist to wet, little fine to												
medium gravel.												
27.0年至19 — — — — — — — — — — — — — — — — — — —												
- Care -												
25-												
DRILLING AND SAMPLING INFORMATION:												
BORING LOGGED BY H. Steinruck CHECKED BY Soils Engineer CLASSIFICATION SYSTEM WTL												
Hollow Stem Augers Truck Mounted Drill CME 55. Unit 12												

PROJECT: _	So	il S	amp 1	ing			JOB	NO.:_	s-8	364		
CLIENT:	Do	nohu	e 8	Associ	iat	es, Inc.	BORING	NO B-	17			
LOCATION:	St	a-Ri	te I	ndusti	rie	s, Delavan, WI	GROUND					
DRILLING DATA:	ğ	a's	F	FT.	Ŀ			LA	BOR	ATOR	Y	Š
BIT SIZE, TYPE. LOSS OR GAIN OF	SAMPLE NO	LOBE	POCKET PENE. TSF	DEPTH	d S	SOIL CLASSIFICATION		P.S.F.		P.C.F	••	ELEVATION
WATER, CASING SIZE, ETC.	3	ž	ă d	25	5			Qu	Mc	Da	,	<u> </u>
						BROWN FINE TO COARSE SAND moist to wet, little fine	to					
	18			-		medium gravel.						
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PROJECT:					- T	Piezometer	nstallations	JOB N					
CLIENT:				T- 1/2	25	ites, Inc.		BORING N					
LOCATION:	Sta	i-Ri	te ir	ndustri	es	, Delavan, Wi	sconsin	GROUND	ELE	/AT	ION:		
BORING STARTED			10-8	(A)			GROUND WATER:				ILLIN		241
BORING COMPLETE				3		· · · · · · · · · · · · · · · · · · ·	At completion	<u> </u>	FTER	DR	ILLIN	G	27'
TOTAL DEPTH BOR	IING	37	ft.		_			HOURS A	FTER	DR	ILLIN	G	,
DRILLING DATA: BIT SIZE, TYPE,	2	R S X	⊢	FT.	إرا	NAME OF STREET			LA	BOR	LATOR	l <b>Y</b>	Š
LOSS OR GAIN OF	SAMPLE NO	NUMBE	POCKE PENE. TSF	DEPTH	AMA	SOIL	CLASSIFICATION		P. S. F	5	P.C.F.	5	ELEVATION
SIZE, ETC.	3	z -	-	0-	_				Qu	Mc	Dd	S	7
8 3/4" Hollow				-			EY_IOPSOIL_mo						
stem auger				_			Y CLAY moist, dium gravel.	trace of				2	
casing with				-		BROWN CLAY	EY FINE TO CO	ARSE SAND					
carbide				5-			moist, some						
toothed finger				1, 2		*							
bit for				-									
entire depth				-			*	ě					
of boring.				10-				*					
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F. C	i i			25-		ACCOUNTS TO SECURE	TO COARSE SAN le fine to med	Thinks - Annual Control of the Contr	١.				
				DRIL	LIN	IG AND SAMPLIN	IG INFORMATION	:					
BORING LOGGED B	Y	н. 5	itein			ALCHEOLOGICAL CONTRACTOR CONTRACT			SIFIC	ATI	ON SY	STER	WTL
METHOD OF DRILLI						ck mounted dr	ill ria	IINE MODEL -			, Un		
PENETRATION TES	OR P	IN GL	UIDED	WEIGHT	FR	REE FALLING 30".		SPLIT TUBE	: A	WGE.	R W		
NUMBER OF BLOWS	REC	JUIRE	: D 2HC	JAN ON I	KEP	OKT.		SPLIT TUBE	LE SA	MPL	E SAM	IPLE	

#### LUG UF BUKING

PROJECT: CLIENT: LOCATION:	0	ono	hue a	and As	soc	nd Piezometer Installation iates,Inc. es, Delavan, Wisconsin	S JOB BORING GROUND	но.:_	-	)-18		
ORILLING DATA: BIT SIZE, TYPE, LOSS OR GAIN OF WATER, CASING SIZE, ETC.	SAMPLE NO.	NUMBER	POCKET PENE. TSF	FT. DEPTH	SAMPLE	SOIL CLASSIFICATION		P.S.F. Qu	RESU	P.C.F	Y S	ELEVATION
8 3/4" Hollow stem auger				- - -		BROWN FINE TO COARSE SA saturated, little fine medium gravel.						
casing with				_								
carbide toothed finger				30-	П							
bit for				_		*						
entire depth of boring.				35-		3	*					
or borning.				=	H	END OF BORIN	G					
			*	_ 40-								
	AND THE PERSON NAMED IN			-		3						
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TANKS THE STATE OF	TAX TAX		200000000	************	1,1111111111111111111111111111111111111		ABORATORIES	1	er 1,540 i	1040 TO		_	
PROJECT:	92.91					Piezometer	Installations	JOB N	0.:_	S -			
CLIENT:						ites, Inc.		BORING N	0.:_	-	D-1	9	**************************************
LOCATION:				386-17	ies	, Delavan, W	sconsin	GROUND	ELE	AT	ION:		
BORING STARTED		_	10-8			<del></del>	GROUND WATER	During	KK	DRI	LLIN	G_24	41
BORING COMPLETE	0_	10-	10-8	3			At completion	u marka v	FTER	DRI	LLIN	<u> </u>	ţ'
TOTAL DEPTH BOR	RING	29₺	ft.					HOURS A	FTER	DRI	LLIN	G	
DRILLING DATA:	Š	K S	±,,,,	FT.	F.				LA	BOR	ATOR	4	Ş
LOSS OR GAIN OF	SAMPLE	NUMBE BLOWS	POCKE PENE. TSF	DEPTH	TYP T	SOIL	CLASSIFICATION		P. S. F	1	P.C.F	•	ELEVATION
SIZE, ETC.	3	z	۵	0-	\$		:•3 — <u></u>		Qu	Mc	Dd	S	<u> </u>
8 3/4" Hollow	Į.			_	ļ		Y CLAY moist,						
stem auger				_			dium gravel.	trace or					
casing with `				_		BROWN CLAY	EY FINE TO CO	ĀRSĒ SĀND					
carbide				5-		AND GRAVEL cobbles.	. moist, some	small					
toothed finger	1			-									
bit for				=									
entire depth				_				12					
of boring.		3		10-		<b>S</b> 01							
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4.6 mg - 1	<u>:</u> :			**				W I					
7-61 3	2			_	П			*					
	A.												
a Good	<b>.</b> 			25-		BROWN FINE ated, litt	TO COARSE SAI le fine to med	ND, satur lium grave	١.				
	W-25			DRIL	LIN	G AND SAMPLIN	G INFORMATION	•	X - 8 - 411 E				
BORING LOGGED B	٧	н, 9	tein	ruck		_ CHECKED BY_	Soils Enginee	CLAS	SIFIC	ATIO	YZ NC	STEM	WTL
METHOD OF DRILL	ING.	Flic	ht a	uger t	ru	ck mounted dr	ill rig MACH	INE MODEL	CME	_55	. Un	عن	11
PENETRATION TES DRIVEN 12" WITH 14 NUMBER OF BLOWS	ON F	IN G	UIDED	WEIGHT	FR	LEE FALLING 30".	ER	SPLIT TUBE SPOON SAMP	. A	A UCE UCE	R W	ASH C	

#### LUG UF BURING

JOB NO .: 5-83112 Additional Well and Piezometer Installations PROJECT: \_ Donohue and Associates, Inc. BORING NO .:\_ CLIENT: Sta-Rite Industries, Delavan, Wisconsin GROUND ELEVATION: LOCATION: LABORATORY RESULTS DRILLING DATA: FT. NUMBER BLOWS POCKET PENE. BIT SIZE, TYPE, LOSS OR GAIN OF SOIL CLASSIFICATION DEPTH 12 % P.C.F Mc Dd P. S. F. WATER, CASING Qu SIZE, ETC. 25 8 3/4" Hollow BROWN FINE TO COARSE SAND, saturated, little fine to medium stem auger gravel. casing with carbide END OF BORING 30toothed finger bit for entire depth 35of boring. 40-45-50-55-60

#### WELL DIAGRAM

R€J	· H	1	- 2 Ft.	Boring No: (Well)	D-1	
Protecto Pipe	$\exists \mathbb{N}$				2/15/83	
Seal 1			NO Ft.	Seal Material		
	<b>⊠!</b>	$\boxtimes$	<u>3</u> Ft.	Seal 1 Concrete mix	ked with Bentonite	_
Backfi <u>ll</u>			8	Seal 2 Bentonite Pe	llets	
1 7						
		::		Backfill Material Grout	- 2 to 1 Cement/	
4		1	261	Backfill   Bentoni	te Powder	-
		155		Backfill. 2 Washed	Torpedo Sand	-
	;;	**	28 Ft.	Auger Hole Diameter _	8	– In.
Seal 2→		**	29 Ft.	Well Material	PVC, Sch. 40, FJT	
Well.			<u>30</u> Ft.	Total Length of Well	52	- _ Ft.
Screen				Well I.D	2	_ In.
Backfill			50 Ft.	Well Point Slot Size	0.006	_ In.
-			\$ 5 m		* %	
			Ft.			

Comments Started this boring on 2/9/83. Used hollow stem augers to 25' depth, then used 42" roller bit to 40' depth, but could not keep hole open even with a very thick Bentonite slurry. Pulled off until we had more hollow stem augers (2/15/83).

Finished hole and set well.

Protector Pipe Seal 1	2 Ft. 0 Ft. 3 Ft.	Boring No. (Well)  Date Installed  Seal Material  Seal 1  Seal 2	Concrete	
			composed of 2 parts ce part bentonite powder Washed Sand	
Seal 2→	97 Ft. 98 Ft. 100 Ft.	Ammer Hole Diameter		. In.
Well Screen		Total Length of Well Well I.D.		Ft.
Backfill	110 Ft.	Well Point Slot Size		
	Ft.		* *	
Comments		×	•	
		6		

	I						D-3		
naze se sel	P	<del>}</del>	3 F	t.	Boring. No. (V	dell)	<u> </u>		× =
Protecto Pipe			.2. 2		Date Install	ed	2/17/83	- Hell	_
Seal 1	Øi.		WASAS E	t.	Seal Materia	l			
	<b>         </b>		2 F	t.	Seal 1				<del>-0</del> ,
Backfi <u>ll</u>					Seal 2		Bentonite	Pellets	-20
					Backfill Mate				2
					Backfill 1	2 to 1	Grout - Cem	ent/Benton	ite
íš.					Backfill 2		Sand		
	Si		*	8					<u>.</u>
Seal 2	27	333	<u>28_</u> F		Auger Hole D	iameter _	8		. In
			29 F 30 F	T 2000	Well Materia	1	PVC, Sch.	40, FJT	28
Well _				. •	Total Length	of Well	53		Ft.
Screen				24	Well I.D		2		In.
Backfill 2			50_F	t.	Well Point Si	lot Size	0.006		In.
			45						
			Ft	•					¥:
0 <b></b> - 25 = 257 mio = 10.	*								
Comments	<del> </del>						- (	*	
					Tem server			· · · · · · · · · · · · · · · · · · ·	

Boring No. (Well)	
Protector	
Pipe Date Installed 2/17/8	
Seal 1-1 Seal Material	
2 Ft. Seal 1 Concre	;e
Backfill Seal 2 Benton	te Pellets
313	
Backfill Material 2 to 1 Grout - (	Cement/Bentonite
Backfill 1 Powder	
Backfill 2 Washed Sand	
[2] [12]	
	3
68 Ft. AVXXX Hole Diameter 44 to	3 In.
58a1 2 69 Ft.	- The second sec
Well Total Length of Well83	Ft.
Screen	In.
1::4:1::V	
Backfill 80 Ft. Well Point Slot Size 0.006	In.
	(5
Ft.	×
FE.	
Comments	******
	8% 

Protector Pipe	3 Ft.	Boring No. (Well)  Date Installed	2/22/83	<b>-</b> 3
	0 Ft.			•
Seal 1	NAVANAN S	Seal Material		
	2 Ft.	Seal 1	Concrete	20
Backfill	1123			
' 「新	![5]	14.		
	113	Backfill Material	***	•
	113	2/1 Gro	out - Cement/Bentonite	ž
[;;]	[][3]	Backfill 1		-
13	[[3]	Backfill 2 Washed	Sand	
133	13	*		
[3]	28 Ft.		0	
Seal 2→	29 Ft.	Auger Hole Diameter _		. In
	30 Ft.	Well Material	PVC, Sch. 40, FJT	
		Tabal Laurah of Mall	53	Ft
Well	<b>≢</b>  :::	local Length of Well		
Screen Itil		Well I.D.		In
Well Screen Backfill	######################################	Well I.D	· <u>2</u>	. In In
Screen Backfill	50 Ft.		· <u>2</u>	2
Screen	50 Ft.	Well I.D	· <u>2</u>	2
Screen Tool	50 Ft.	Well I.D	· <u>2</u>	2

Comments		While	retracting		augers	to a	bove	screen,		believe	some	large	gravels
may	have	fallen	in	against	screen	port	ion c	F PVC.				*	
<u> </u>	4	s a X									-		

- E	D-6 L. Boring No. (Well)
Protector Pipe	Date Installed 2/21/83
Seal 1-18	Seal Material
2 F	
Backfill	Seal 2 Bentonite Pellets
	Backfill Material Grout 2/1, Cement/Bentonite Backfill 1 Powder
	Backfill 2 Washed Sand
Seal 2—388   97 F	mager have branecer 14 to 5
Seal 2————————————————————————————————————	Wall Wassaill BVC Sch 40 FIT
Well	. Total Length of Well 113 Ft
Screen #	Well I.D In
Backfill 110 F	
F	
Comments	

	+	1	3	Ft.	Borin	g No. (Wel	1)	D=9	
Protecto Pipe	<u>`</u>				2		ere-se il	2/23/83	<del></del>
Seal 1	Øi		vaivas	, Ft.	Seal	Material			
	<b>23</b> !	$\boxtimes$	, 2	.Ft.	Sea	11		Concrete	
Backfi <u>ll</u> 1			•		Sea	1 2	30 <sub>3</sub>	Bentonite Pellets	(96).
		***				ill Mater			
	SI				Вас	kfill 1 Gr	out - (	Cement/Bentonite (2 t	0 1)
1060	33				Вас	kfill 2 Wa	ished Sa	and	-
	23 i					9	5.		_
Seal 2-	30.4	3,0,0		Ft.	Auger	Hole Diam	neter _	8	_ In
			10.52	Ft.	Well	Material _	Was a super	PVC, Sch. 40, FJT	-
Well _			848	(8)	Total	Length of	f Well	53	_ Ft
Screen	l∷ ≢				Well	1.0.		2	In
Backfill 2			50	Ft.		Clark -		0.006	- 10 I
			3	Ft.	s				
		•••1							
Comments	74.74		8						-
		264.0	ne way to the same	1317		55 H	.61	**	
	X==-X****			•				8	<b>.</b>
								*	*11

	H	7	3	_ Ft.		Bori	na No	(Va	111		D-10		
Protecto Pipe	-					1901	8		Mar. 3		3/2/83		
Seal 1					'	Seal	Mate	rial					
		$\otimes$	2	_Ft.							Concrete		ş
Backfi <u>ll</u> 1						Se	al 2				Bentonite Pe	llets	•
						Back	- fill !	Mater	ial				
	(	1::				Ba	ckfil	1 1 _0	Grout	2	to 1 - Cement	/Bentoni	te
*						Ba	ckfil	1 2 <u>V</u>	Vashed	1 5	and		en Ma
Seal 2—		3,7		8 Ft.		XXXX	¥ Hole	– Dia	meter	-	44 to 8		In
Seal 2-		***	100	9 Ft.							PVC, Sch. 40	, FJT	
Well _				<u> Ft.</u>		Tota	I Leng	th o	f Wel	1_	113		Ft
Screen	:: 重					Well	1.0.				2		In
Backfi <u>ll</u> 2			110	<u>)</u> Ft.					•		0.006		In
			84										
3				<b>C</b> *	8	8							
	<u>-[-[-]-[-]</u>			- <sup>Ft.</sup>		9			55		16		
Comments		34.2%	- <u>2.35 - 38</u> - 5					7. <del>- 7 1</del>			···		
												•	
				3									

# WISCONSIN TESTING LABORATORIES WELL DIAGRAM

Plumbers	Well		2 <u>5</u> =		
Cap	Сар		Boring No. (We		-
/	` /		Date Installed	6/30/83	<u> </u>
Seal 2			Seal Material Ing Seal 1 Quic Seal 2 1 to Seal 3 Bent Seal 4 Bent Backfill Mater	k-Set Concrete  1 Paste - Cement/Bentonite  conite Pellets  conite Pellets	Powder
'a		22 Ft.	· · · · ·	Saturated Sand and Gravel From Hole	-
Seal 4—,		24 Ft. 26 Ft.	Auger Hole Dia	PVC Sch. 40, FJT	_ In. _
Well Screen		5	Total Length o	of Well 36	- Ft. - In.
Backfi <u>ll</u> 2		36 Ft.		t Size 0.010	_ In.
		<u>36}</u> Ft.	8		
Comments	200 822430		*		-9
			,	\$ 100 Section 100	<b>=</b> 841
					<b>3</b>
			**************************************		•

	+	1		Ft. Ft.	U 000 000 000 000 000 000 000 000 000 0	Boring No	(Vall)		D-14	
Protector Pipe	1					Date Inst			7/12/83	_
Seal 1-			× × × × × × × × × × × × × × × × × × ×			Seal Mate				
Ě	<b>8</b>	$\boxtimes$	3	Ft.					Cement-Bentonite Pa	ste
Backfill			•			Seal 2			Bentonite Pellets	
		***				Backfill !	Material	-(1/1/1	8	===
		1				Backfil	1 1		Cuttings	
,		13							Washed Sand	
		155		24			WEDGE 02	96		
		**	221	Ft.		Auger Hole	e Diamete	er.	9	In
Seal 2->				Ft.	9 *	Well Mater			PVC Sch. 40, FJT	A THOUSE
	IJ <u>ŧ</u>		25	Ft.					37	– Ft
Well Screen	#			(196		Total Leng		-	2	
98 AGNOSAL AS	訓章					Well I.D.			19.80%	_ In
Backfill 2			35	Ft.		Well Point	Slot Si	ze .	0.010	_ In
			550							
			\$5W							
1:			36	Ft.				5.40		
								88.5		
Comments _									<del></del>	-
	- V									4
				2		SSSE III			**************************************	-
=40										

#### WISCONSIN TESTING LABORATORIES

#### WELL DIAGRAM

87		T	2 Ft. 2 1 Ft. 9½		Boring No. (Well)	,D=15	
Protecto Pipe	<u> </u>				Date Installed	7/7/87	
Seal 1			NAVANA 0	Ft.	Seal Material		22
	<b>23</b> !	$\boxtimes$	3	Ft.	Seal 1	Concrete .	
Backfi <u>ll</u> 1	<u>                                      </u>				Seal 2	Bentonite Pelle	ts
					Backfill Material		
		133			Backfill 1		
*		**		1		Washed Sand	
		**		o.		3	
Seal 2-	133	300		Ft.	Auger Hole Diamet	er <u>9</u>	In
Jea1 2-			27	Ft.	Well Material	PVC Sch. 40, FJ	<u> </u>
Well _				*	Total Length of W	ell <u>39.8</u>	Ft.
Screen	謎種				Well 1.0.	2	In.
Backfill 2	, I		38	Ft.	Well Point Slot S		In.
						a <sub>_</sub>	f. 8
			39	Ft.			
	8		Ě		/2.		2
Comments	**						
						1	
					141		
		(%)		8		586 986	

#### WISCONSIN TESTING LABORATORIES

#### WELL DIAGRAM

	4	-	3 1 25	*5		2	D-18	
20 N N	P	<del>\</del>	2 1/2	_ Ft.	Boring No.	(Well)	D-18	-
Protecto Pipe	<del>-</del>				Date Insta	lled _	10-10-83	-
Seal 1			NAVAN SI	Ft.	Seal Mater	ial		
			2	_ Ft.	Seal 1 _		Concrete	-
Backfill		**	2		Seal 2 _		Bentonite Pellets	<b>→</b>
59 10 10 10 10 10 10 10 10 10 10 10 10 10							a 3	
					Backfill M	laterial	3	
		33		580	8ackfill	1	Cement-Bentonite Grout	<u>(</u> 10:1)
		3			Backfill	2	Sand	
	::  i	; ;						<b>2</b>
Seal 2→	300	333	31 1/2	200 W/SG	Auger Hole	Diamet	er <u>9 3/4</u>	_ In.
JCG, 1 ,		***	33 1/2 34 1/2		Well Mater	ial	PVC Sch. 40, ETT	-
Well _					Total Leng	th of W	ell <u>39 1/2</u>	_ Ft.
Screen	:::  <b>≢</b>				Well 1.D.		2	ln.
Backfill 2			37	Ft.	80.	•	ize <u>0.01</u>	- _ In.
					¥		2	
				_Ft.	i.			
							X	
Comments	Wate	r at	27 ft.	depth	in well after :	surging	with nitrogen for	•
	15 m	in.	at 160 1	×si.	( <del>*</del> /			<b>-</b> 50
	Note	: No	locks t	vere in	stalled on well	ls by cl	ient as of 6:30 P.M., 10-	-10-83
			145, 411 (ST - 112)					

### WISCONSIN TESTING LABORATORIES WELL DIAGRAM

			24 50		*
2	Ft.	Boring No.	(Well)	D-19	
rotector				<del>-</del> -	
ipe       ·	a Sar	Date Insta	lled	10-10-83	<b>.</b>
	O Ft.				
al 1 → 🛇		Seal Mater	ial		
2	Ft.	Seal 1		Concrete	¥7
al 2 - 12 2	Ft.	12			
		Seal 2 _		Bentonite P	ellets
		20	× -		
		-	*		
		Backfill M	aterial		
	¥*)		3 <b>2</b> 9		30
		Backfill	1	Sand	
		Maria Maria			
			24/2001		
	1864		120		
	š.	<b>2</b> 12000000		2	
		Auger Hole	Diameter	8 3/4	***
粉日粉		Well Mater	ial F	VC Sch. 40,	FJT
1:::1 = 1:::1	1/2 Ft.	marr mater		THE THE PROPERTY OF THE PARTY	STATE OF
		Total Leng	th of Well	31 1/2	
reen 🗒				•	
		Well I.D.		2	
kfi山計画 29	1/2 Ft.	Well Point	Slot Size	0.01	
1:12:1	Ft.				
	2	2			-
	*				
	96		96		
	Ft.		,•		
•	1	\$ .			
				3 8	, ,
ments <u>Water in wel</u>	1 at 24 1/2	tt. depth	•	3.0	
Well was sur	ged with nit	rogen		* 6	
					7
			œ		
		**************************************		<u> </u>	

B

#### LOG OF TEST BORING

Project ..... Ilydrogeologic Investigation

Location .... Delayan, Wisconsin.....

	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PF	ROP	ERT	TES
	Reco	very	Mois	ture		and Remarks	Q.	w	u	PL	0
łe.	Type	+	+	N	Depth					-	
					E						
-			-	_	E		_				
				17	E10-						
					E	See TW-1A for Soil Classification					
_,		_	_		-20-	See TH-IN TOP SOTT Classification					
					E						
-				_	E	IX					
-		-		•	30-	*					
					Ē.	*					
		_			E40-						
		•			E						
-		-	-	—	E	End Boring at 45'		-			
			_	-	E50-						
					ĒΙ	e e					
					Εļ	140		244			
					Ē	¥ *		iš.			
-		-	-								
1				-	Ē 🕇						
					Ē ŀ		.   _				
					E	*			-		
į			W	AT	ER LE	VEL OBSERVATIONS	GE	NER	AL I	TOP	ES
pc	le Dri in Coi e Aft	mple	tion	of C	rilling		Crew	2/8/82 Chieff G Metr Bento	IG/.S'#	.55 gi	i1

#### LOG OF TEST BORING

Project .... Hydrogeologic Investigation

Location ... Relayan. Wisconsin.....

		AM				VISUAL CLASSIFICATION	SO	SOIL PROPERTI			
	1	very	Mais	ture	10	and Remarks	9.	W	u	PL	٥
No.	Type	1	•	H	Depth	Brown Clayey SILT					_
					E	Brown Silty CLAY, Trace to		****			
					FI	Some Fine to Coarse Sand,					
1	SS	1.0	M	4	Es-	Trace Fine Gravel (ML-CL)					
	1				FH		+		-		
				_	Εl						
2	SS	.75	М	21	E10-	Brown Silty Fine to Medium					
					F"	SAND, Some Fine Gravel (SM)					
					E						
3	SS	1.5	м	27	F						
_				-	E,3-	9					
					ĒΙ						
4	SS_	1 0	м	60	FH		1-1				w
7	22-	-1.0	н	00	E 20 -	*					
					E	*					
_					E						
5	SS	1.0	W	77	25-	Gray, Fine to Coarse SAND					-
					Εl	and Fine to Coarse GRAVEL, Trace to Little Silt (SW-SM)					
_			_		El	EX. ORGANIZATE   SERVE SERVE SERVENCE   LET IN COST   MATERIAL OFFICE					
6_	SS_	1.0	N_	83	30-		$\vdash$			-	
					E		ě				
	-				E						
7_	S.S	1_5	W	53_	35-						
					Εl						
-					-	· .	-			_	
8.	ss	1-0	W	58_	40-				_	_	
					E						
	_		_		-45-	Brown SAND and SILT, Little			*		
					-	Fine Gravel, Little Clay (SII)					
						(Continued)					



Hydrogeologic Investigation

Location .... Delavan .. Wisconsin

Boring No. ..... IW-1A..... Surface Elevation .....939.50 Job No. ... C 10771 Sheet ..... 2 .... of ..... 2 .....

	S	AM	PL	E		VISUAL CLASSIFICATION	so	IL PE	ROP	ERT	ES
	Rec	overy	Mois	ture		and Remarks					
No.	Type	1	+	N	Depth		Q0	•	u	PL	
						Brown SAND and SILT, Little Fine Gravel, Little Clay (SM)					
9	SS	1.5	M	56	50-	rine draver, Little Clay (SM)					
	_				ĒΙ						
					E 55-		_				_
10	SS	1.0	W	71.	E <sub>60</sub>	Brown to Gray Fine to Coarse					
						SAND, Little Fine Gravel, Little Silt (SW-SM)					
					E <sub>65</sub> -						
11		. 75		06						_	_
	33	.73		90	E 70-					1	
					75-	**				#	
		_									
12	SS	1.0	W	71	80 -				+	$\dashv$	
13		.0	W	65	 						
		-	W	AT		VEL OBSERVATIONS	GE	NERA	ALI	OTE	ES
Up	nile Dr on Co ne Af	mple ter D	tion rilling		Prilling		_ Crew _ Drillin	2/9/82 Chiell o Meth c/Bent	G/.5\\\.	o .55 <del>.</del>	



Project ... Hydrogeologic Investigation

Delavan, Wisconsin

Surface Elevation .....942.60 

	S	AM	PL	E		VISUAL CLASSIFICATION	SO	L P	ROP	ERT	IES
	Reco	very	Mois	ture		and Remarks		w	u	PL	0
Ho.	Type	+	+	N	Depth					r	
1	SS	1.0	М	8		Brown Clayey SILT (ML)					
2	SS	1.5	n	9	5-						
3	SS	1.5	М	32	10-	×					
4	SS	x	м 6	98"		Brown Silty Fine to Medium SAND, Some Fine Gravel (SM)					
	33	٨	13	•	E 15-			,			
5	<u>ss</u>	1.5	W	52		•					
<u>6</u>	SS	.5	W 6	96"							
7 -	SS_	.5	w 7	96"		Brown Fine GRAVEL, Little to Some Coarse Sand (GP).	-				
				20		Brown Fine to Coarse SAND					
_	ss .	1.5	W '	7/8"	35-	and Fine to Coarse Gravel, Trace to Little Silt (SW-SM)					
	SS	1_0	M	912	- 40-	Gray, Fine to Coarse SAND and Fine to Coarse GRAVEL, Trace to Little Silt (SW-SM)					
	2,	_					4-1		4	_	
					_45-	Brown to Gray Fine to Coarse SAND, Little Fine Gravel, Little Silt (SW-SM) (Continued)					

## WARZYN

ENGINEERING INC

#### LOG OF TEST BORING

Hydrogeologic Investigation Project .... Location Delavan, Wisconsin Boring No. .... TW-2 Surface Elevation ... 942.60. Job No. ...C. 107.7.1..... Sheet .....2..... of ......2.....

2	S	AM	PL	E		VISUAL CLASSIFICATION	SO	IL P	ROP	ERT	IES
	Reco	very	Mois	ture	_	and Remarks			**************************************		
Ho.	Type	1	ţ	H	Depth	and Remarks	Q1	W	u	PL	D
						Brown to Gray Fine to Coarse SAND, Little Fine Gravel, Little Silt (SW-SM)		(4)			
10	SS	1.5	W	56	E <sub>50</sub>	Little Silt (SM-SM)					
*					E T	End Boring at 50'					
-					55-						_
					ĒΙ						
		X.			E 60-	w w					
					65-	1.46		н	4		
*(6)				+C00	E			8			
					E70-		*			s	
					Ē	**************************************					
	ļ. <b></b>			-	E75-						
	<u> </u>				£	*					
					E-80-						
÷ ++					El	×	-				<u> </u>
			~	/ A T	<del>_</del> 85-	EVEL OBSERVATIONS	GF	NER	AL	NOT	ES
Up	nile D on C	ampl	etion	of (	Orilling		_ Start	11/29/ Chief ng Met /Bento	82 Com JNG/F	plete.	/29, 59



Project Hydrogeologic Investigation

Location	Delayan,	. Wisconsin
Location	ve layall,	. WI2CDUZIU"

Boring No	TW-2A
Surface Ele	vation 942.50
	J0771
Sheet 1	of I

	S	AM	IPL	E		VISUAL CLASSIFICATION	so	IL. PF	ROP	ERT	IES
	Reco	very	Moi	ture		and Remarks					
No.	Type	+	ţ	N	Depth	·	d.	W	u	PL	0
					55	See Boring TW-2 for Soil Classification to 50'					
L	SS	.3	W	60 <sub>8</sub> .	E -60-						
				:7		si .					
		-			65-	Brown to Gray Fine to Coarse SAND, Little Fine Gravel, Little Silt (SW-SM)	-				
_	_			 	70 -						
	<u>\$\$</u>	. 25	Н	59 <u>7"</u>		¥.					
	SS	.3	W	5 <del>99</del> "	-75- -		-				
					80-	*	-				
		_				•					
								80			
	SS .	2	W	9 <sub>8"</sub>	_ _90-	End Paris at CO.					
	-		W	AT	ER LE	VEL OBSERVATIONS	GE	NER	AL I	TOP	ES
im	e Aft	mple	tion rilling		rilling		Crew Drillin	12/1/8 Chiełłł o Meti w/Bent	G/SIA	io55	5 <del></del> l.



	S	AM	PL	E		VISUAL CLASSIFICATION	SO	IL PF	ROP	ERT	IES
	Rec	overy	Mois	ture		and Remarks	9-	w	u	PL	0
No.	Type	+	ł	N	Depth			•		,,,	_
	-	-		-	₽ ┣	TOPSOIL  Brown Silty Fine to Medium SAND,			-	-	-
	SS	1.0	M	-	ΕL	Some Fine Gravel (SM)			-		
2	cc	.5		4	<b>F</b> [	Brown Silty CLAY, Trace to Some					
	SS		_ PI	4	E5-	Fine to Coarse Sand, Trace Fine Gravel (ML-CL)					
	<del> </del>				£						
3	ss	1.5	М	30	E10-	3					
					F						
					Εl	Brown Silty Fine to Medium					
4	SS	1.0	М	30	F I	SAND, Some Fine Gravel (SM)					
				•	E15-						
					Εl						
5	SS	1.5	M	32	F.						
				-	E 20-						
					F						
6	SS	1.5	М	31	F.I					-	
	25	1.5		31	25						
			3.		ĒΙ	*					
7	SS	1.5	M	37	E30-			81			
					F**]	*					
					F						
8_	SS	.5	W	26"	35-	Brown Fine GRAVEL, Little to Some Coarse Sand (GP)				_	
					F	Some Course Sund (ur)	+				
					Εl	Gray Fine to Coarse SAND					
9	SS	1.0	W	78	F.,	and Fine to Coarse GRAVEL, Trace to Little Silt (SW-SM)					
	20-		-"-		E**	Trace to Little STIE (SW-SM)					******
					E						
			-	-	_						
					-45-				-		
						(Continued)					

## WARZYN

ENGINEERING INC

#### LOG OF TEST BORING

Project ......Hydrogeologic Investigation

********		750
Location	Delavan.Wisconsil.	

TW-3	
Doring No	¥ 18
Surface Elevation	
Job NoC. 10/.7.1	
Sheet2 of 2	

	S	AM	PL	E	5	VISUAL CLASSIFICATION	SO	L PF	ROP	ERT	IES
e 112	Reco	very	Mais	ture		and Remarks	Qu	W	u	PL	٥
ło.	Type	ł	<b>†</b>	N	Oepth	######################################		***			
10	65			-		Gray, Fine to Coarse SAND and Fine to Coarse GRAVEL, Trace to Little Silt (SW-SM)					
0	SS	1.0	W	61	-50	End Boring at 50'					
						9					-
					- 55-	<b>2</b>			10		
_						÷					
-				•	-60-		2				
,						*					
_					_ -65-						
-					70-		*				
						*.					
_					- -75-	1364	18				
_					-80-						-
				E	- 85 -						
WATER LEVEL OBSERVATIONS  While Drilling  Upon Completion of Drilling					_ Start	NER 12/7/8 Chief	3€om	piete2 No 5	/7/8 5-1.		
Fir	ne Af	ter C	Drillin		*		— Drillin	w/Ben	hod toni	te DM	

C

#### LOG OF TEST BORING

Hydrogeologic Investigation Location Delayan, Wisconsin

Boring No. TW-4 Surface Elevation ... 948.00 Job No. . C. 10771 Sheet ..... of ... 2

	S	AM				VISUAL CLASSIFICATION	so	IL P	ROP	ERT	IES
	_	ASIA	Mois	ture		and Remarks		w	u	PL	0
No.	Type	+	+	N	Depth				-		
1	ss	1.0	М	4		TOPSOIL (FILL)					
2	ss	1.5	M	4	Es-	Brown Silty CLAY					
_3_	SS	1.5	W	-	<b>₽</b>						
_4	S <u>S</u>	1.5	M	24	10-	Brown Silty Fine to Medium SAND, Some Fine Gravel (SM)	-				
_5_	SS	1.5	М	47	15-	More Gravel at 14.5'					
6	 SS_	1.0	M	28	20-					_	
7	SS	1.0	м	57	25						
8	ss_	.1	W	<sup>5</sup> 97"	30	Gray, Fine to Coarse SAND and Fine to Coarse GRAVEL, . Trace to Little Silt (SW-SM)					_
	-					Brown Fine GRAVEL, Little to					
.9	22	-1	_W_	59 <sub>8"</sub>	35-	Some Coarse Sand (GP)	-			+	
_10	S\$	1.0	W	37_	40-	Gray, Fine to Coarse SAND and Fine to Coarse GRAVEL, Trace to Little Silt (SW-SM)	-				- 50
11	SS				-45						•
						(Continued)					

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V	W
ENGINEE	BING INC

Project ... Hydrogeologic Investigation Location Delaván, Wisconsin 

	S	MA	PLE	Ξ	540	VISUAL CLASSIFICATION	SOI	L P	ROP	ERT	IES
12.000	Reco	ery	Moist	are		and Remarks			Ι	21	۵
No.	Type	+	+ [	H	Depth		Qu	v	u	PL	υ
						Gray, Fine to Coarse SAND and Fine to Coarse GRAVEL, Trace to Little Silt (SW-SM)					
1	SS	X	W	30	50	End Boring at 50'	$\dashv$				
		•									
		-			Ė						<del></del>
_				£	85-						
:46			W	AT	ER LE	VEL OBSERVATIONS	1/02/02/02			NOT	
While Drilling						_ Crew	Chief	G/SWA	plete io 55	-1	



Location Delavan, Wisconsin

Haring No. .... Surface Elevation 944.1 

	S	AM	PL	E		VISUAL CLASSIFICATION	SO	IL PI	ROP	ERT	TES
	Reco	very	Mois	ture		and Remarks			T		
No.	Type	+	+	N	Depth	TOPSOIL	de.	W	u	PL	D
1 SS 1.0 2 SS 1.0 3 SS 1.0 4 SS -	_	14	E, J	Brown Silty Fine to Medium SAND, Some Fine Gravel (SM)  Saturated @ 5.0' (Odor) Strong Layer of Silty Clay Water after 7.5 Sample Water at 5.8' Odor Strong  End Boring at 10'							
				•	15-						
					30-	*					
	-				- 35 - - - - - - - - - - - - - - - - - - -						1
WATER LEVEL OBSERVATIONS  hile Drilling  Upon Completion of Drilling  Time After Drilling  Depth to Water  Depth to Cave In					GENERAL NOTES  12/14/82 12/14/8 Start Complete Crew Chiel/G/CTRig 55-1 Drilling Method FA 0-10'						

#### LOG OF TEST BORING

Project .	Hydrogeologic Investigation
Location	Delavan, Wisconsin

Boring N	lo	B-2
Surface	Elevation	944.43
		1

	S	AM	PL	E		VISUAL CLASSIFICATION	SO	L PF	ROP	ERT	IES
	Reco	very	Mois	ture		and Remarks					
No.	Type	+	+	N	Depth		q.	, W	u	PL	0
1_	SS	1.0	М	8	Ē	Brown Silty Fine to Medium SAND, Some Fine Gravel (SM)					
2	SS	1.5	M	5	<u>-</u> s-	High Moisture, Also High Odor at 2.0'					
3	SS	1.0	M	21		Strong Odor					
4	SS	1.0	11	18	- 10- -	0dor	H				
5_	SS	1.5	М	33	E <sub>15</sub>	0dor					_
					<u> </u>	End Boring at 15'					
					E <sub>20</sub>						
		-		-						İ	
						*					
					- 30 -						
					-35-						
							-				
-	-				- 40 -				-		_
			W	AT	ER LE	VEL OBSERVATIONS	GE	VERA	LI	NOTE	S
While Drilling								/14/8 ChiełW Meth			

#### LOG OF TEST BORING

Location Delavan, Wisconsin

	B-3	
Boring N	ło	
Surface	Elevation 944.	1
Job No.	C107.71	
Sheet	of	

	Ş	AM	PL	E	Į.	VISUAL CLASSIFICATION	SO	IL P	ROP	ERT	TES
	Rec	very	Mois	ture		and Remarks	9.	w	l		
No.	Type	+	ŧ	N	Depth	O N S N ORS	4.	W	u	PL	0
].		1.0	<u> </u>	4		Brown Silty SAND, with Occasional Gravel & Stone Chips (Fill)					
2	SS	1.5	М	8	E <sub>5</sub>	6" Layer Brown Clayey Silt, Trace of Sand					
3	SS	1.0	М	52		Brown Silty Fine to Medium SAND, Some Fine Gravel (SM)					
4_	SS	1.0	M	30	E10						
						End Boring at 10'					
					15-	· ·					
. 1223						*					
		Per Victory									
		3.0				e e e e e e e e e e e e e e e e e e e		55#4		ş	
						(40)					
		+			30-			3			p.
10) - 10)									_		
					35 						
					_ _ 	365 CL					
	ž		W	AT	- 17	VEL OBSERVATIONS	GE	NER	Δ1 N	VOT	FS
Upo Tim	e Aft	mple	tion rilling	of D	rilling s hour		Start Crew Drillin	/14/82 Chiedk g Metr	Comp G/CA	plete io55 FA . 0-	14/8 -1 10!



Project	llydrogeo	logic	Investigation
5) 2555058 \$555055			
Location	Delayan.	Wisco	onsin

l	U-4	
Boring N	o	909
Surface	Elevation 947.4	
	C 10771	
Ch4	1 _ 1	

	SAMPLE			VISUAL CLASSIFICATION	SOIL PROPERTIES							
Recovery Moisture			and Remarks				D.	D				
lo.	Type	ł	+	N	Depth		q.	W	ш	PL		
	SS	1.0	М	4	Ē				<b>-</b>		* **	
					Εl	Brown Silty CLAY						
	SS	1.5	M	_7_	E-s-	,					_	
	_ <u>ss</u>	1.5	М	9		Brown Silty Fine to Medium						
	SS	 1.5	М	15	E,L	SAND, Some Fine Gravel (SM)						
					E"	End Boring at 10'	V *100					
					Εl							
					E <sub>15</sub> -	Di .	-					
		34		٠	Εl	8e						
					Ē		-				3	
					E 20 -	W)				$\neg$		
		•			Ē							
					E <sub>25</sub> _	8 ,						
					Ē	×			(g)			
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-				ENI	E 30-					1		
					ĒΙ							
					<u></u>							
4		_				98						
1		100			-40-	\$				-		
			W	AT	ER LE	VEL OBSERVATIONS		NER				
pc	le Dr on Co e Aft	mple		The House	rilling		_ Crew	2/13/8 Chiefd g Meth	WG/ GT	9 .55.	:l	

#### LOG OF TEST BORING

Hydrogeologic Investigation

Location Delavan, Wisconsin

Parina Na	B-5	
Boring No	*******	****
Surface Elevati	ion 946	. 3.
Job NoC	10771	
Sheet	of	

		AM	40 32 32	021		VISUAL CLASSIFICATION	SOIL PROPERT		ERT	IES	
	Reco	very	Mois			and Remarks	Q.	W	u	PL	0
No.	Type	+	+	H	Depth						_
		-	-		-	1' GRAVEL, PEBBLES, SILT					
.l	<u>ss</u>	1.0	M	_ 9	E	Brown Clayey SILT	-		-		· <del></del>
2	SS	1.0	М	7	上,上	•					N. 696. / 1961
3	SS	1.0	W	7	Ē	Brown Silty Fine to Medium SAND, Some Fine Gravel (SM)					
4	SS	1.5	И	14	E <sub>10</sub>	Wet Not Saturated	•				
						End Boring at 10'					
_		-		•	15-	* Brown Sandy Silty CLAY, Occasional Gravel					
	_										
_		•	1		20-						
	-		-			sil.					
					= 7		3				
		7	4		30-	*					
-		+	+		35-						
	1		1								
	1	1	1	_	40-					1	
WATER LEVEL OBSERVATIONS  While Drilling  Upon Completion of Drilling				GENERAL NOTES  Start 2/13/82 complete / 13/82  Crew Child G/CTRig 55-1.  Drilling Method FA 0-10'							
Dep	e Aft	Wate	er	-	10.0'M		_ Drillin	g Meth	bor	A 0-1	0'



Location Delavan, Wisconsin

Surface	Elevation	945.3
Job No.	C 1077	1
	2022	

Boring No. ....

B-7

SAMPLE		SAMPLE VISUAL CLASSIFICATION					so	IL PE	ROP	ERT	IES
120015	Reco	very	Mois	ture	58,50	and Remarks	Qu W 11 P1			0.2	
No.	Type	+	100	N	Depth	6" Crushed ROCK	9.	W	ш	PL	0
1	_SS	1.5	_M_			Brown Clayey SILT					
2	SS	1.5	М	12	E5-						
3	_S <u>S</u>	1.5	W	13	E	Brown Silty Fine to Medium SAND, Some Fine Gravel (SM)					(6)
1	SS	1.5	М	13	E10_	*			- X- 76		
						End Boring at 10'		٠			
					-15-						
				٠			3				
	. 11 (1111										
		•		8							
		4				is a second of the second of t					
-		+		×	_30-						
		-	-	_						-	0
-					_35- _ _	*					
					40 -						
			W	ATI	ER L	EVEL OBSERVATIONS	GEI	VERA	AL N	OTE	ES
po	le Dri n Cor e Aft	mple	tion	of Dr	illing_ hour		Starl?	13/8 ChieWG	Comp /CTRig	12/ ete 55-	13/8
	th to	Wate		53255	0.0'M	pist	-				

### WARZYN

ENGINEERING INC

#### LOG OF TEST BORING

Location Delavan, Wisconsin

Boring No	B-8
BANTOS EL MONTO DE	945.5
Surface Elevat	ion
Job No	10771
Sheet	of

SAMPLE			VISUAL CLASSIFICATION	SOIL PROPERTIES							
	Rec	very	Mais	ture		and Remarks	Q.	w			
No.	Type	1	. ∳∷	H	Depth	2" BLACKTOP		W	II	PL	0
				_		**					
1_	22	1.5	М	9	E	Brown Silty CLAY		-			
2	22	1.5	М	5		High Moisture at 4'				25-5	
			3,000		5-						
3	SS	1.5	М	12	Ξ	Trace Sand, Occasional Gravel					
			2			Brown Silty Fine to Medium					
4	SS	1.5	М	17	E10-	SAND, Some Fine Gravel (SM)			20 (8)		
					E''T	End Boring at 10'					
					-		į.			*	
			- 1		E						Vin.
					15-						
			- 1				1 1				
						*3"± GRAVEL					* ***
					20	Dark Brown Clayey Silt					
	1	٠			-			.			
				-	I I	395		W.6		-	34
	_	_	•	-	25	€			-		
							100				
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					_30-						
	1	- 1	- 1	ł	-		1 1				
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		_			_35_						
					3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3				ı		
				Ė				İ			
_					-	<b>8</b>					<u> </u>
					-40-				_i		-
WATER LEVEL OBSERVATIONS							GEI	NERA	YL N	OTE	ES
While Drilling							Start	2/13/8	Eomp	le[2/]	3/82
				HAN THE PARTY	illing		Crew	CniedW	G/CRig	5.5	i <del>.</del> .l
	Aft			4	hour	<del></del>	_ Drilling	g Meth	od	FA .0-	10'
Dept	th to	Wate	er	8.00	.0'Mois			*******		*******	

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ENGINEER	RING INC

Project	Hydrogeologic Investigation
	Nelavan Wisconsin

Boring No	9
Surface Elevation	945.8
Job No. C 10771	
Sheet 1 of	1

SAMPLE						VISUAL CLASSIFICATION	so	SOIL PROPERTIES			
Recovery		Moisture			and Remarks	Qu	w	u	PL		
No.	Type	· •	ŧ	N	Depth					307.000	D
1	SS	1.0	_N_	15		2" BLACKTOP 6"± GRAVEL Brown Clayey Silt					
2	SS	1.5	M	13	Es+						
3	SS	1.0	W	7	Ē	Brown Silty Fine to Medium SAND, Some Fine Gravel (SM)		i i			
4	SS	1.5	W	14	Ē,,L						
					15-	End Boring at 10'					
			•								
	2418				F						
	•				E 20-						
					25-						
	3348					18					
					-30-						
***					35-						
											S155-84
			90		<u>-</u> 40−	2.52			_i		
WATER LEVEL OBSERVATIONS						NER		2542	77		
While Drilling					Start2/13/8 Complet2/13/8 Crew Chief G/Chig 55-1 Drilling Method FA 0-10'						

APPENDIX D

WELL DETAILS WARZYN WELLS



All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.  1 DEPTH TO BOTTOM OF BOREHOLE  44 FEET  2 LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 19 2 FEET  3 TOTAL LENGTH OF SOLID PIPE 27.9 FEET @ 2 IN. DIAMETER  4 HEIGHT OF WELL CASING ABOVE GROUND  3.09 FEET  5 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint  6 DEPTH OF LOWER OR BOTTOM SEAL  3.0 FEET  7 DEPTH OF UPPER OR TOP SEAL  0.0 FEET		JOB NO. C 10771
Elev. 942.39  LOCATION  LOCATION  LOCATION  Elev. 939.30  DEPTH TO BOTTOM OF BOREHOLE  44 FEET  2 LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 19.2 FEET  3 TOTAL LENGTH OF SOLID PIPE 27.9 FEET 8 2 IN. DIAMETER  4 HEIGHT OF WELL CASING ABOVE GROUND  3.09 FEET  4 DEPTH OF LOWER OR BOTTOM SEAL  3.0 FEET  7 DEPTH OF LOWER OR BOTTOM SEAL  3.0 FEET  6 B TYPE OF BACKFILL Flint  9 PROTECTIVE CASING YES NO  HEIGHT ABOVE GROUND 3.10  LOCKING CAP YES NO  MATER LEVEL CHECKS  * From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE TIME DEPTH TO MATER REMARKS		RORING NO. 1W-1
Hydrogeologic Investigation Delavan, Misconsi All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.  10 DEPTH TO BOTTOM OF BOREHOLE  44 FEET  2 LENGTH OF WELL POINT, MELL SCREEN, OR SLOTTED PIPE 19 2 FEET  3 TOTAL LENGTH OF SOLID PIPE 27.9 FEET 9 IN. DIAMETER  4 HEIGHT OF WELL CASING ABOVE GROUND  3.09 FEET  5 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint  6 DEPTH OF LOWER OR BOTTOM SEAL  3.0 FEET  7 DEPTH OF UPPER OR TOP SEAL  0.0 FEET  9 PROTECTIVE CASING FES NO  HEIGHT ABOVE GROUND 3.10  LOCKING CAP FES NO  10 CONCRETE CAP YES NO  MATER LEVEL CHECKS  * From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE TIME DEPTH TO MATER REMARKS		DATE12/9/82
All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.  10 DEPTH TO BOTTOM OF BOREHOLE  44 FEET  2 LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 19,2 FEET  4 HEIGHT OF WELL CASING ABOVE GROUND  3,09 FEET  7 DEPTH OF LOWER OR BOTTOM SEAL  3,0 FEET  7 DEPTH OF UPPER OR TOP SEAL  0,0 FEET  10 CONCRETE CASING TES NO  HEIGHT ABOVE GROUND 3,10  LOCKING CAP TES NO  MATER LEVEL CHECKS  * From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE TIME DEPTH TO WATER REMARKS	T. T. T. Elev. 942.	39 CHIEF JWG/SW
DEPTH TO BOTTON OF BOREHOLE	LOCA	ATION Hydrogeologic Investigation Delavan, Wisconsin All depth measurements of well detail assumed to be from ground surface unless otherwise
OR SLOTTED PIPE 19.2 FEET  TOTAL LENGTH OF SOLID PIPE 27.9 FEET 8 2 IN. DIAMETER  HEIGHT OF WELL CASING ABOVE GROUND  3.09 FEET  TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint  DEPTH OF LOWER OR BOTTOM SEAL  3.0 FEET  TYPE OF BACKFILL Flint  PROTECTIVE CASING TES NO  HEIGHT ABOVE GROUND 3.10  LOCKING CAP TES NO  MATER LEVEL CHECKS  From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE TIME DEPTH TO MATER REMARKS		DEPTH TO BOTTOM OF BOREHOLE  44 FEET
FEET 0 2 IN. DIAMETER  4 HEIGHT OF WELL CASING ABOVE GROUND  3.09 FEET  5 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint  6 DEPTH OF LOWER OR BOTTOM SEAL 3.0 FEET  7 DEPTH OF UPPER OR TOP SEAL 0.0 FEET  8 TYPE OF BACKFILL Flint 9 PROTECTIVE CASING YES NO HEIGHT ABOVE GROUND 3.10 LOCKING CAP YES NO  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		2 LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 19 2 FEET
3.09 FEET  TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint  6 DEPTH OF LOWER OR BOTTOM SEAL 3.0 FEET  7 DEPTH OF UPPER OR TOP SEAL 0.0 FEET  8 TYPE OF BACKFILL Flint 9 PROTECTIVE CASING YES NO HEIGHT ABOVE GROUND 3.10 LOCKING CAP YES NO  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	3 <b>1</b>	TOTAL LENGTH OF SOLID PIPE 27.9 FEET @ 2 IN. DIAMETER
TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint  6 DEPTH OF LOWER OR BOTTOM SEAL 3.0 FEET  7 DEPTH OF UPPER OR TOP SEAL O.0 FEET  8 TYPE OF BACKFILL Flint 9 PROTECTIVE CASING TES NO HEIGHT ABOVE GROUND 3.10 LOCKING CAP TES NO MATER LEVEL CHECKS  * From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE TIME DEPTH TO WATER REMARKS		HEIGHT OF WELL CASING ABOVE GROUND  3.09 FEET
3.0 FEET  7 DEPTH OF UPPER OR TOP SEAL  O.0 FEET  8 TYPE OF BACKFILL Flint  9 PROTECTIVE CASING YES NO  HEIGHT ABOVE GROUND 3.10  LOCKING CAP YES NO  MATER LEVEL CHECKS  * From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE TIME DEPTH TO WATER REMARKS		TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint
O.O FEET  TYPE OF BACKFILL Flint  PROTECTIVE CASING YES NO  HEIGHT ABOVE GROUND 3.10  LOCKING CAP YES NO  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		6 DEPTH OF LOWER OR BOTTOM SEAL 3.0 FEET
PROTECTIVE CASING YES NO  HEIGHT ABOVE GROUND 3.10  LOCKING CAP YES NO  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		
HEIGHT ABOVE GROUND 3.10  LOCKING CAP YES NO  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	6	8 TYPE OF BACKFILL Flint
LOCKING CAP YES NO  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		
* From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE TIME DEPTH TO WATER REMARKS	(2), (1) (5)	
* From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE   TIME   DEPTH TO WATER   REMARKS		LOCKING CAP YES NO
* From top of casing, if protective casing higher take measurement from top of protective casing.  BORING # DATE   TIME   DEPTH TO WATER   REMARKS	* T	(10) CONCRETE CAP YES NO
BORING # DATE   TIME   DEPTH TO WATER   REMARKS		WATER LEVEL CHECKS
	• F.	rom top of casing, if protective casing higher ake measurement from top of <u>protective</u> casing.
	BORING	#   DATE   TIME   DEPTH TO WATER   REMARKS
	<u> </u>	WARZ

	JOB NO. C 10771
	BORING NO. TW-IA
	DATE12/10/82
Elev. 943.22	CHIEF JWG/SW
Elev. 939.50	Hydrogeologic Investigation Delavan, Wisconsin (1) depth measurements of well detail assumed to be from ground surface unless otherwise indicated.
	DEPTH TO BOTTOM OF BOREHOLE85FEET
2	OR SLOTTED PIPE 9.6 FEET
	TOTAL LENGTH OF SOLID PIPE 78.5 FEET @ 2 IN. DIAMETER
	HEIGHT OF WELL CASING ABOVE GROUND  3.1 FEET
[-]-	TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint
	DEPTH OF LOWER OR BOTTOM SEAL  73 FEET
	DEPTH OF UPPER OR TOP SEAL
6 8	TYPE OF BACKFILL Flint Pellets
	PROTECTIVE CASING YES NO
2 5	HEIGHT ABOVE GROUND 3.72
	LOCKING CAP YES NO
1 10	CONCRETE CAP YES NO
	WATER LEVEL CHECKS
* From top	of casing, if protective casing higher
take mea	surement from top of <u>protective</u> casing.
BORING #   C	DATE   TIME   DEPTH TO WATER   REMARKS

-			JOB NO. C	10771	PATENTAL VINCEN
			BORING NO. TW		
**:			DATE12	/2/82	<del> </del>
Ž.	TITTE E	lev. 945.62	CHIEFJW	G	
		lev. 942.6 t	n depth measur	ic Investigation De ements of well det nd surface unless o	ail assumed
1775		(10)""	DEPTH TO BO	OTTOM OF BOREHOLE	9)
12		(2)	51 LENGTH OF 1	_ FEET WELL POINT, WELL SC	REEN.
20	<u> </u>			PIPE 19.0 FE	
	3	(3)	TOTAL LENG' FEET @	TH OF SOLID PIPE :	83.8 R
		4	HEIGHT OF 1	HELL CASING ABOVE G	ROUND
STATE !		5		TER MATERIAL AROUN	
6		6	DEPTH OF LO	OWER OR BOTTOM SEAL FEET	8
		$\mathcal{O}$	DEPTH OF U	PPER OR TOP SEAL FEET	
B		6) (8)	TYPE OF BA	CKFILL Flint	•
		9	PROTECTIVE	CASING YES	NO
	(2),	5)	HEIGHT	ABOVE GROUND3	.02
S			LOCKIN	G CAP (YES) N	0
	¥ <b>***</b> (	1) (10)	) CONCRETE C	AP YES (10	>
			WATER LEVE	L CHECKS	
		* From top	of casing, if surement from	protective casing top of protective c	higher asing.
4	· <b>\\</b>	voceniceterints 2 m		. DODEN TO MATER	I REMARKS
		BORING # C	DATE   TIME	DEPTH TO WATER	-
P		TW-2 12/	10/82 AM	29.3'	From Top
L		12).			WARZYN ENGINEFRING IN

	n.	B NO.	C. 10771	
	BC	RING NO	TW-24	
	O	TE	12/3/82	
TT TILL EI	ev. 945.50 CH	ILEF	JWG	
	ev. 942.50 to l	depth measur	vestigation; Delay ements of well det id surface unless o	ail assumed
	10)	DEPTH TO BO 90.0	TTOM OF BOREHOLE	
	2	LENGTH OF V	PIPE 9.6 FE	REEN,
3	(3)	TOTAL LENGT FEET 0 2	TH OF SOLID PIPE IN. DIAMETE	80.4 R
	4	HEIGHT OF W	FEET ABOVE OF	GROUND
	(5)		TER MATERIAL AROUN	
	6	DEPTH OF LO 78.0	WER OR BOTTOM SEAL FEET	1961
		DEPTH OF US	PPER OR TOP SEAL FEET	
J 6	8	TYPE OF BAC	KFILL Flint/Ben	tonite
	9	PROTECTIVE	CASING YES	NO
2), 11 - 5	)	HEIGHT	ABOVE GROUND3	.05
	522	LOCKING	CAP YES 1	10
<b>→</b>	) 10	CONCRETE CA	AP YES NO	$\supset$
		WATER LEVEL	CHECKS	
	* From top o take measu	f casing, if rement from t	protective casing top of <u>protective</u> (	higher casing.
	BORING #   DAT	E I TIME	DEPTH TO WATER	REMARKS
	TW-2A 12/10		28.9'	From Top
y				
8				WARZ

	supposed to Marketine	JOB N	0.	C 10771	
	8	BORIN	G NO		
(8)			S <b>W</b> .5	1 - 10 100	
于下于了门门。EI	ev. <u>946.67</u>	8 - 942			
(9) (4) (7) (7) (7)	LOCATION 943.70	Hydrog	eologic I th measure rom groun	ements of well detailed a surface unless of	ail assumed
	10)		PTH TO BO 48.2	TTOM OF BOREHOLE FEET	<b>1</b> 50
		LE	NGTH OF W	ELL POINT, WELL SCI PIPE 19.2 FE	REEN,
3		3) TO	TAL LENGT ET @ 2	H OF SOLID PIPE IN. DIAMETE	32.0
			IGHT OF W	ELL CASING ABOVE G	ROUND
8	) (	5) TY	PE OF FIL	TER MATERIAL AROUN	D WELL
		6) DE	PTH OF LO 3.0	WER OR BOTTOM SEAL FEET	
	) (	7) DE	PTH OF UP	PER OR TOP SEAL FEET	
6	)	B) TY	PE OF BAC	KFILL Flint	
	<i>'</i>	9) PR	OTECTIVE	CASING YES	NO
2 5	)		HEIGHT	ABOVE GROUND	7
	**	W	LOCKING	CAP YES N	0
<u> </u>	) (	0) (0	NCRETE CA	P YES AD	2
		W/	TER LEVEL	CHECKS	
	* From take m	cop of ca neasureme	ising, if ent from t	protective casing op of protective c	higher asing.
	BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
	TW-3 1	2/10/82	AM	28.0	From Top
					WAR

	JOB NO C 10771
39).	BORING NO. TW-4
	DATE 12/6/82
Elev. 951.06	CHIEF JWG/SW
Elev. 948.0	ydrogeologic Investigation; Delavan, Wisconsin Il depth measurements of well detail assumed o be from ground surface unless otherwise ndicated.
	DEPTH TO BOTTOM OF BOREHOLE 49.5 FEET
2	DENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 19.2 FEET
(3) (3)	TOTAL LENGTH OF SOLID PIPE 33.4 FEET @ 2 IN. DIAMETER
	HEIGHT OF WELL CASING ABOVE GROUND  3.1 FEET
5	TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint
	DEPTH OF LOWER OR BOTTOM SEAL  3.0 FEET
1.	DEPTH OF UPPER OR TOP SEAL O.O FEET
(8)	TYPE OF BACKFILL Flint
	PROTECTIVE CASING (YES) NO
2 5	HEIGHT ABOVE GROUND 3.09
	LOCKING CAP CYES NO
1 10	CONCRETE CAP YES NO
	WATER LEVEL CHECKS
* From top take mea:	of casing, if protective casing higher surement from top of <u>protective</u> casing.
BORING # D	ATE   TIME   DEPTH TO WATER   REMARKS
i	l wor