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HYDROGEOLOGIC STUDY REPORT
FOR THE
ANN ARBOR SAND AND GRAVEL, INC.
PROPOSED TYPE III RECLAMATION LANDFILL
FACILITY

SECTION TWO OF LODI TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

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April 14, 1989

**HYDROGEOLOGIC STUDY REPORT
ANN ARBOR SAND AND GRAVEL, INC.
PROPOSED TYPE III RECLAMATION LANDFILL**

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Introduction.....	1
Location and Proposed Action.....	1
Scope of Work.....	1
Current Investigation.....	3
Subsurface Exploration.....	3
Laboratory Soil Testing.....	5
Water Quality Testing.....	5
Hydrogeologic Conditions.....	6
Regional Hydrogeology.....	6
Site Hydrogeology.....	8
Existing Ground-Water Quality.....	10
Analysis and Evaluation.....	13
Suitability of Site Soils.....	13
Synthetic Liner.....	14
Vertical Isolation.....	14
Leachate Collection System Design.....	14
Ground-Water Quality Performance Standard.....	16
Recharge Basin.....	19
Proposed Ground and Surface Water Monitoring Program.....	20
Conclusions and Recommendations.....	21

Appendix A

Appendix B

Appendix C

**HYDROGEOLOGIC STUDY REPORT
ANN ARBOR SAND AND GRAVEL, INC.
PROPOSED TYPE III RECLAMATION LANDFILL**

LIST OF TABLES

- 1- Summary of Test Data for Cohesive Soils
- 2- Summary of Available Regional Ground-Water Quality Data
- 3- Existing Ground-Water Quality at Ann Arbor Sand and Gravel, Inc.
- 4- Hydrologic Budget for the Proposed Type III Reclamation Landfill
- 5- Observed and Calculated Water Quality Concentrations

LIST OF FIGURES

- 1- Site Location Map
- 2- Regional Location Map
- 3- Regional Surficial Geology
- 4- Located Water Well Logs of Record of Lodi Township
- 5- Located Water Well Logs of Record of Scio Township
- 6- Site Water Table Contour Map

LIST OF PLATES

- 1- Site Plan
- 2- Generalized Regional Geologic Profiles
- 3- Generalized Water Table Contour Map
- 4- Generalized Site Geologic Profiles

**HYDROGEOLOGIC STUDY REPORT
ANN ARBOR SAND AND GRAVEL, INC.
PROPOSED TYPE III RECLAMATION LANDFILL**

INTRODUCTION

Location and Proposed Action

This report presents the results of a hydrogeologic investigation by G.R. Kunkle and Associates, Inc. (GRK&A) for the proposed Ann Arbor Sand and Gravel, Inc. (AAS&G) Type III Reclamation Landfill Project. The proposed site is located in Section 2 of Lodi Township (T3S, R5E), Washtenaw County, Michigan and consists of approximately 89 acres. The site is shown on Figure 1, Site Location Map.

The project site, which has operated as a sand and gravel pit since 1938, was purchased by the present owner and incorporated as AAS&G in 1988. Presently, sand and gravel is being extracted from the site and the excavated area occupies approximately 30 acres of the site.

Lodi Township officials have requested AAS&G to prepare a reclamation plan for the excavated area. In response, AAS&G proposes to construct a Type III landfill facility at the site in order to fill the excavated areas with demolition materials and to restore the property to its original grade.

Scope of Work

The purpose of this hydrogeologic investigation is to:

- (1) describe subsurface characteristics of the site and
- (2) establish the suitability of the site for development as a Type III disposal facility, in accordance with the requirements of the State of Michigan Solid Waste Management Act, Act 641 (P.A. 1978, as amended), rule R 299.4305(2).

Specifically, the scope of work for this report includes:

1. A description of soils exposed along the sides of the existing excavation.
2. The drilling of 8 test borings and the completion of 2 test pits.
3. The collection and testing of numerous soil samples.
4. The installation of three temporary observation wells and the collection and testing of water samples.
5. An analysis of hydrogeologic conditions.



Figure 1

6. The development of design recommendations for the construction of a Type III disposal facility.

The above work was completed in accordance with generally accepted hydrogeologic practices, as well as present guidelines established by the Michigan Department of Natural Resources (MDNR) for the collection and analysis of geologic data at proposed disposal sites. This report is prepared for the exclusive use of Ann Arbor Sand and Gravel, Inc.

CURRENT INVESTIGATION

Subsurface Exploration

The current study included a detailed field investigation of the project site with the mapping of soil types exposed in the existing excavation, the drilling of eight test borings (TB-1 through TB-8), the completion of two test pits (TP-1 and TP-2), and the installation of three temporary observation wells (OW-1 through OW-3). The field work for this report was completed in two parts and is described in the following paragraphs.

No information regarding previous investigations at the site was available and, therefore, the first portion of the field study was directed at a preliminary evaluation of the site geology. An initial visit to the site was completed on October 12, 1988 by personnel from GRK&A to inspect the existing excavation and to establish locations of proposed test borings. At several areas along the excavation perimeter, visible soil types were described from the ground surface down to the pit bottom. The stratigraphy at all locations was consistent and therefore a general log of the encountered soil types was prepared and is included as Figure A10, Log of Test Pit No. TP-A, in Appendix A.

Based on the general log prepared for the existing pit area, the upper portion of soil types present at the site was well documented. Exploratory test borings TB-1 through TB-3 were then drilled into the base of the existing excavated area to define soil types below the pit bottom and ground-water conditions at the site. These borings were performed during the period of October 17-25, 1988 by American Drilling Company under the full-time supervision of a geologist from GRK&A. Drilling was accomplished using a truck-mounted drilling rig and a combination of hollow stem augers and rotary-wash drilling methods. Borings TB-1 and TB-2 were extended approximately 10 feet into saturated soils and boring TB-3 was extended through site soils to the bedrock surface.

Soil samples were obtained from these boreholes with a 2-inch diameter split-spoon sampler generally at intervals of 5 feet. Samples were obtained using the Standard Penetration Test Method (ASTM D-1586) which involves driving the split-spoon sampler into the soil using a 140-pound weight falling a distance of 30 inches. The sampler is driven in three successive 6-inch increments and the number of blows for each increment is recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N) and is graphically presented on Figures A2 to A4, Log of Boring Nos. TB-1 to TB-3, included in Appendix A.

Temporary observation wells OW-1 through OW-3 were subsequently installed in the corresponding boreholes TB-1 to TB-3. These wells were installed at the completion of each boring and served to establish the direction of ground-water flow at the site and to obtain ground-water samples for standard water quality parameters. Wells were constructed using 2-inch diameter galvanized steel casing with stainless steel well screens.

A well assembly was lowered to a point near the bottom of boreholes TB-1 and TB-2, approximately 10 feet into saturated soils. In order to set the well screen for temporary well OW-3 at a similar depth, borehole TB-3 was backfilled with a cement grout from bedrock up to 78 feet from ground surface which was allowed to set up overnight. Bentonite pellets were then placed in the borehole on top of the cement grout up to 71.5 feet from ground surface. A well assembly was then lowered into the borehole to a point approximately 10 feet below the encountered ground-water level. After the well casing was in place, hollow stem augers were then removed from the borehole and native soils were allowed to collapse into the annular space around the well screen and casing. Any remaining borehole space was filled up to ground surface with a mixture of bentonite and native soils. Each well was then bailed so that a minimum three well volumes of water was removed. Water within the wells was then allowed to stabilize before water levels were measured. Details regarding the construction and installation of these temporary wells are presented on Figures A13 to A15, Log of Well Nos. OW-1 to OW-3, included in Appendix A.

To further describe surface soils in areas located away from the sand and gravel pit, test pits TP-1 and TP-2 were completed on October 26, 1988 by AAS&G under the supervision of a geologist from GRK&A. Bag samples of the excavated soils were collected from the test pits for laboratory testing. Soil descriptions for these pits are presented on Figures A11 to A12, Log of Test Pit Nos. TP-1 and TP-2, included in Appendix A.

All information collected during the first phase of the field work was evaluated and served as a basis for borings completed during the second phase of field work. Test boring TB-4 through TB-8 were drilled during the period of February 6-22, 1989 under the general supervision of a geologist from GRK&A. These five borings were drilled in unexcavated areas of the site to further describe soil conditions and to locate the approximate position of the water table. These borings were completed with a truck-mounted drilling rig using 8-inch hollow stem augers and a CME 3-1/2-inch diameter continuous sampler. Soils encountered in these boreholes are described on Figures A5 to A9, Log of Boring Nos. TB-4 to TB-8, included in Appendix A.

The stratification lines shown on all the logs represent the approximate boundary between soil types but the transition may be gradual. General Notes describing nomenclature and soil description terminology used on the logs are presented as Figure A1 in Appendix A. Plate 1, Site Plan, presents the locations all test borings, test pits and temporary wells, as well as the existing excavation boundaries.

Laboratory Soil Testing

After reviewing the condition of collected soil samples, GRK&A assigned various soil tests to be performed. Testing consisted of a determination of the natural moisture content (ASTM D 2216-80), dry density, grain size distribution (ASTM D 422-63), and Atterberg limits (ASTM D 4318-84) of selected samples. A modified Proctor test for maximum dry density and optimum moisture content was completed for each bag sample from test pits TP-1 and TP-2. Recompact samples of cohesive soils were then further tested to determine their Coefficient of Permeability. The results of all completed laboratory tests are included as Figures A16 to A42 in Appendix A.

Water Quality Testing

Ground-water samples were obtained from the project site to establish existing site ground-water quality. Temporary observation wells OW-1 to OW-3 were sampled on February 21, 1989 by personnel from Ann Arbor Technical Services (ATS) of Ann Arbor, Michigan. At each well, a static water level was measured prior to sampling. A submersible, stainless steel KeckTM pump was then lowered into the well and a minimum 5 well volumes of water was removed. Samples were then obtained for the following parameters: (pH, Total Alkalinity, Specific Conductance, Chloride, Sulfate, Total Organic Carbon, Chemical Oxygen Demand, Nitrate Nitrogen, Ammonia Nitrogen, Dissolved Metals: Iron, Calcium, Magnesium, Sodium, Cadmium, Chromium, Lead, Total Organic Halogens) The results of water quality testing at the site are included in this report as Figures A43 to A44 in Appendix A.

HYDROGEOLOGIC CONDITIONS

Regional Hydrogeology

The general geology and hydrogeology of Washtenaw County has been described by Kunkle (1960) and Fleck (1980). Specifically, the general geology of Lodi Township consists of deeply buried Paleozoic sedimentary bedrock overlain by variable thicknesses of unconsolidated glacial drift. Bedrock underlying the central portion of Washtenaw County is the Coldwater Shale, a gray sandy shale that contains minor lenses of sandstone and limestone.

Most of Lodi township is a well drained upland area with elevations from 900 to 1050 feet above mean sea level (feet msl). Lakes and wetlands occur infrequently in the vicinity. In the southeastern corner of the township, ground surface elevations decline and slopes flatten with elevations ranging from 800 to approximately 650 feet msl.

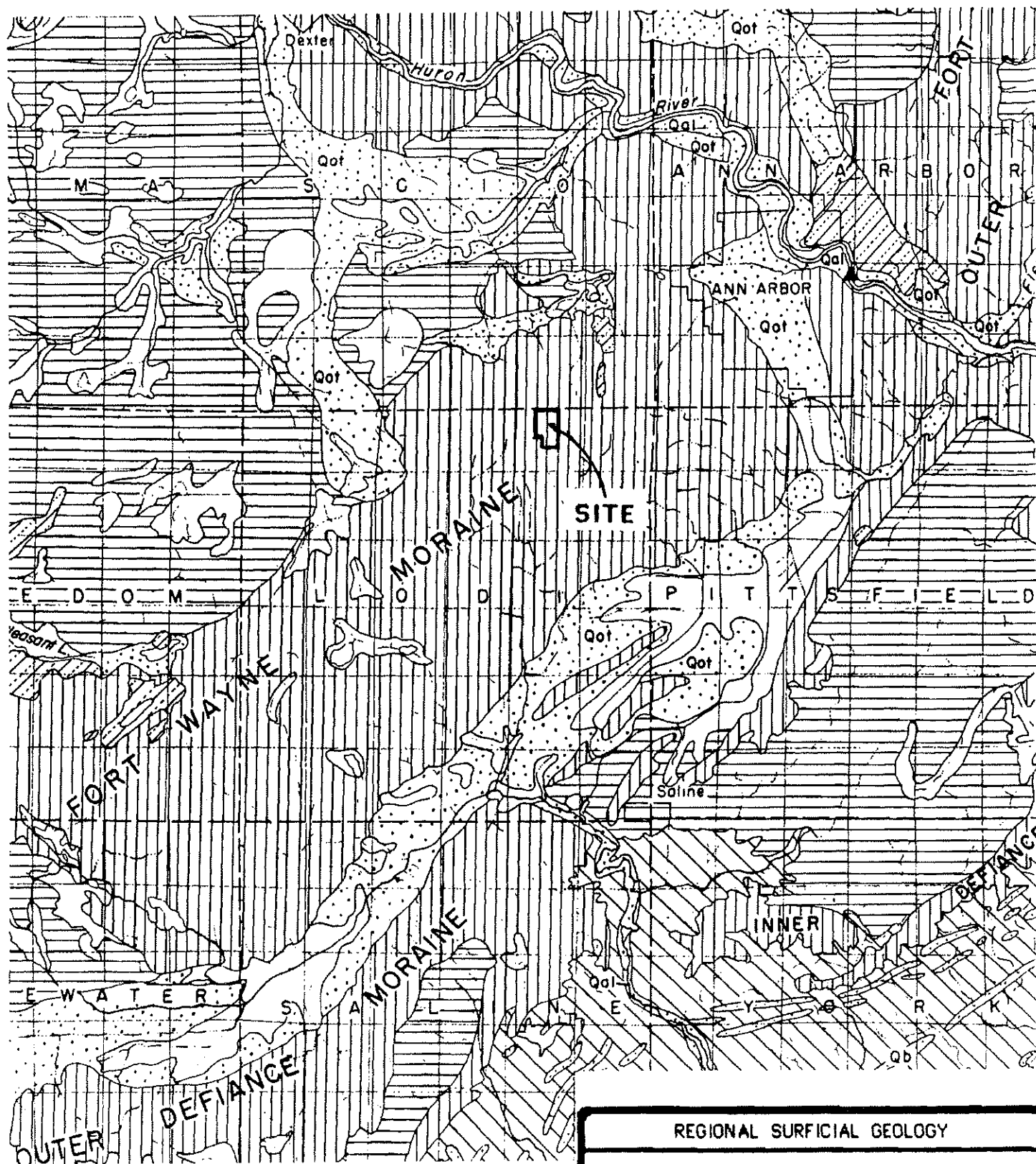
For the purposes of this report, a study area which encompasses a distance of 1 mile in all directions from the site, has been established. This area includes the northeastern portion of Lodi Township and the southeastern portion of Scio Township. A topographic map of the study area is presented in Figure 2, Regional Location Map.

The natural ground surface in the study area is rolling to steeply rolling with elevations ranging from 950 to 1050 feet msl. Glacial deposits in the area consist primarily of fine and coarse textured tills, and outwash deposits of sand and gravel. Interbedded within the till deposits are lenses of sand and gravel. Surface soils generally are clayey in nature as indicated by area water well log records. In Lodi Township, thicknesses of glacial deposits range from 50 to over 300 feet. Variations in drift thicknesses result from changes in ground surface elevations as well as variations in bedrock elevations.

The glacial geology of the study area is shown in Figure 3, Regional Surficial Geology. The most prominent glacial feature of Lodi Township is the Fort Wayne Moraine, an end moraine which trends across the township in a northeast-southwest direction. All of Section 2 is situated on this end moraine. In the southeastern corner of the township where the topography flattens out, sands and gravels comprise a glacial outwash plain.

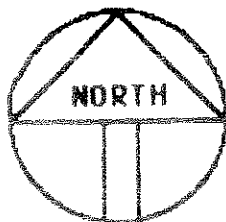


Figure 2



LEGEND

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REGIONAL SURFICIAL GEOLOGY

ANN ARBOR SAND AND GRAVEL, INC.
WASHTENAW COUNTY, MICHIGAN

G.R. KUNKLE AND ASSOCIATES, INC.
5744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116

SCALE: 1" = 2 MILES

DATE: 3-15-89

Figure 3

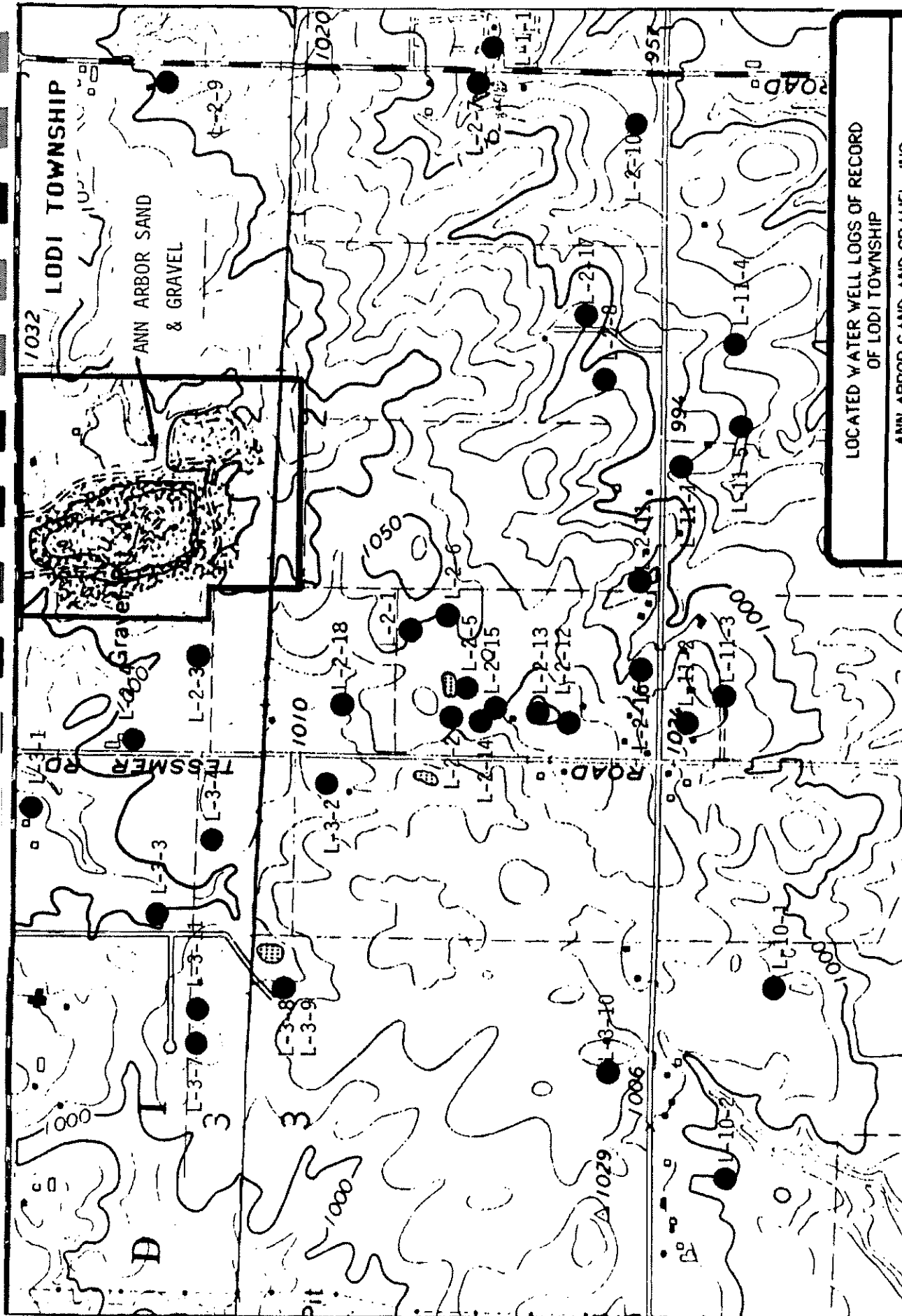
The bedrock surface in Section 2 of Lodi Township ranges in elevation from greater than 800 to approximately 650 feet msl. The general slope of the bedrock surface is to the southeast. A pre-glacial drainage channel that trends in a northwest-southeast direction is believed to exist in the vicinity of Lodi Township.

Water well records for Sections 1,2, and 3 of Lodi Township and Sections 34, 35 and 36 of Scio Township have been reviewed and selected wells from these sections have been located in the field based on well location addresses. The locations of these selected wells are presented in Figures 4 and 5 , Located Water Well Logs of Record. Copies of the located water well records are included in Appendix C.

To illustrate the subsurface geology of the study region, two generalized geologic profiles have been interpreted from soils described on water well logs. The locations of these profile lines are shown on Figure 2 and the geologic profiles are presented on Plate 2, Generalized Regional Geologic Profiles. In the study area the upper soils of the Fort Wayne Moraine consist of a brown to gray surface till varying in thickness from less than 10 to over 50 feet. The till is composed of silty clays and clayey silts with little to some sand and gravel. Underlying the surface till is a thick sequence of sands and gravelly sands. This granular deposit is generally 100 to 150 feet in thickness and is locally mined at several locations. Beneath the granular deposits is apparently a second glacial till consisting of a gray clayey sand. This lower till appears to have a fairly uniform thickness of approximately 25 feet. Beneath the lower till is either bedrock or a second occurrence of sand and gravel soils over bedrock.

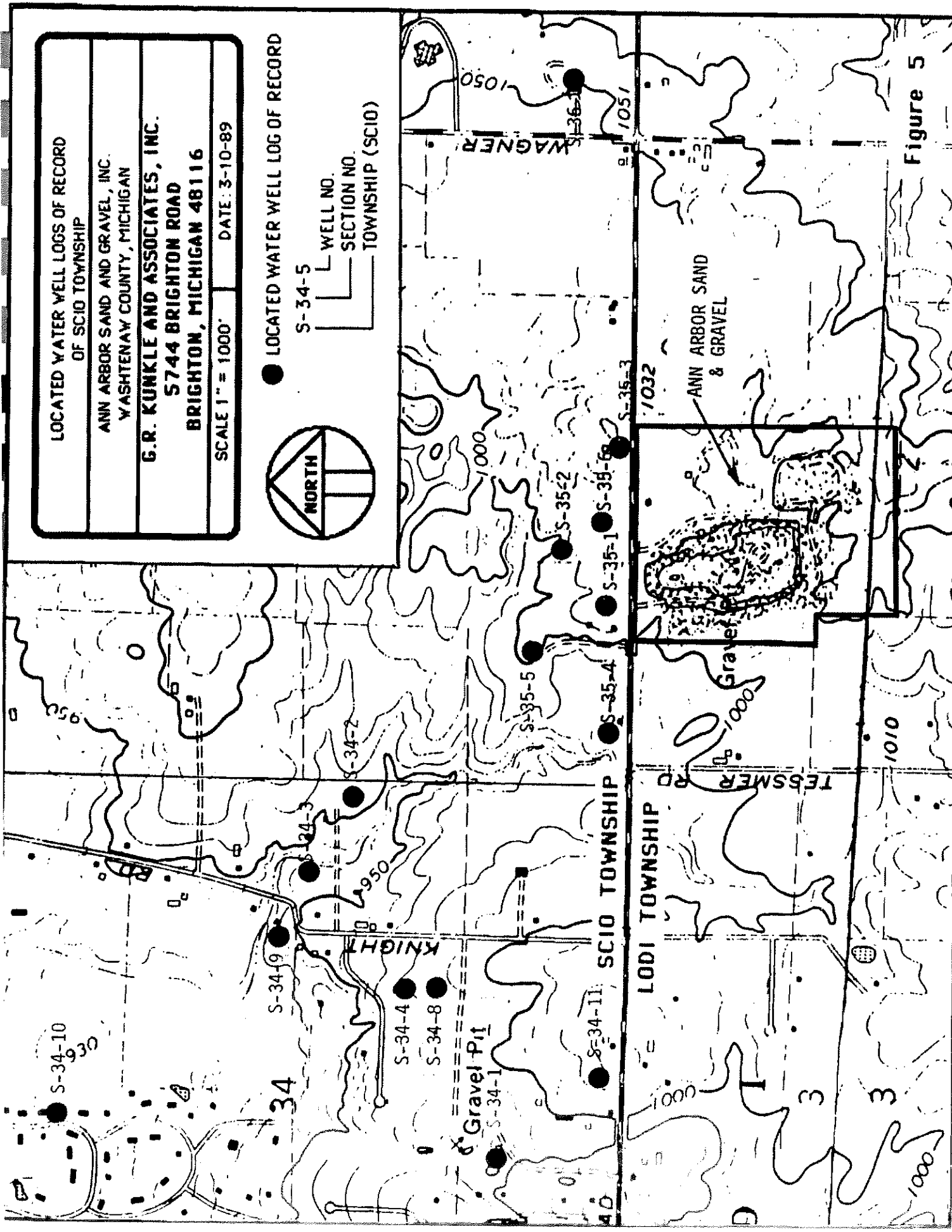
Water well records indicate that most domestic wells in Lodi Township are completed in sand and gravel layers within the glacial materials at depths ranging from 80 to over 300 feet. The potential yield of these aquifer materials can be estimated through the use of specific capacity data presented on the well logs. Specific capacity is expressed as the ratio of a well's pumping rate to the drawdown in a well as a result of that pumping rate. Specific capacity values for domestic wells located in the project site area range from less than 1 up to 16 gallons per minute per foot of drawdown. Aquifers which exhibit these yields can be considered adequate for domestic ground-water supplies. In the north-central and southeast portions of the township, sand and gravel aquifers are reported to be more favorable for the development of large ground-water supplies.

Ground water occurs under both confined and unconfined conditions within the glacial materials. Plate 3, Generalized Water Table Contour Map, has been interpreted for the study area using ground surface topography, visible expressions



LOCATED WATER WELL LOGS OF RECORD OF LODI TOWNSHIP	
ANN ARBOR SAND AND GRAVEL, INC. WASHTENAW COUNTY, MICHIGAN	
G.R. KUNKLE AND ASSOCIATES, INC. 57444 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116	
SCALE 1" = 1000'	DATE 3-10-89

Figure 4

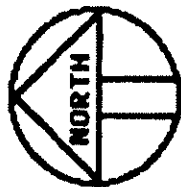


**LOCATED WATER WELL LOGS OF RECORD
OF SCIO TOWNSHIP**

ANN ARBOR SAND AND GRAVEL, INC.
WASHTENAW COUNTY, MICHIGAN

G.R. KUNKLE AND ASSOCIATES, INC.
5744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116

SCALE 1" = 1000' DATE 3-10-89



● LOCATED WATER WELL LOG OF RECORD

S-34-5



Figure 5

of the water table (ponds and streams), and water well records. This illustration indicates that a ground water divide exists in the area of the project site. Ground water north of the divide flows toward the Huron River, whereas ground water south of the divide flows to the south and east toward the Saline River. In the study area, ground water movement is generally to the southeast. Local flow directions are toward streams and wetlands where present.

Site Hydrogeology

Site Geology

The existing topography of the site represents a gently northwestward-sloping upland area with elevations ranging from 1090 to 1000 feet msl. Much of the original land surface of the site has been disturbed as a result of mining activities. At the project site, unconsolidated glacial deposits range in thickness from 200 to approximately 240 feet. Soil conditions encountered in test borings completed at the site have been interpreted in two subsurface profiles presented on Plate 4, Generalized Site Geologic Profiles.

The three major soil types encountered in the tests borings and test pits are described as, from the ground surface downward;

- (1) a cohesive deposit consisting of brown to gray clayey silts and silty clays,
- (2) a thick granular deposit encountered at elevations 1000 to 1010 feet msl consisting of fine to coarse sands with variable amounts of gravel and cobbles, and
- (3) a very compact clayey sand unit with variable amounts of silt. This unit was encountered at elevation 860 feet msl and overlies the bedrock surface at the site.

Each of these soil units is discussed in the following paragraphs.

The cohesive soil unit is generally described as a stiff to very stiff gray clayey silt to silty clay with little to some sand and trace of gravel. This soil unit ranges in thickness from 21 to 72 feet at the boring locations. Tested samples of this unit indicate silt and clay to comprise 59 to 86 percent of the samples. A tabulation of test results for the cohesive soil samples is presented in Table 1, Summary of Test Data for Cohesive Soils. The Unified Soil Classification System (USCS) designation for this material is CL and CL-ML.

TABLE 1

SUMMARY OF TEST DATA FOR COHESIVE SOILS
ANN ARBOR SAND AND GRAVEL, INC.

TEST BORING OR TEST PIT NUMBER	SOIL SAMPLE NUMBER	PERCENT CLAY AND SILT	ATTERBERG LIMITS			UNIFIED SOIL CLASSIFICATION
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
TP-1	BS-1	75	23	16	7	CL-ML
	BS-2	71	20	14	6	CL-ML
TP-2	BS-1	59	21	15	6	CL-ML
	BS-2	72	22	14	8	CL
TB-4	S-2	70	22	15	7	CL-ML
	S-3	65	20	13	7	CL-ML
	S-5	66	21	13	8	CL
	S-6	86	21	16	5	CL-ML
	S-8	74	24	13	11	CL
TB-5	S-2	68	23	14	9	CL
	S-5	70	23	14	9	CL
TB-6	S-4	72	23	14	9	CL
	S-7	75	24	14	10	CL
	S-9	63	26	15	11	CL
	S-10	62	26	15	11	CL
TB-7	S-1	70	37	17	20	CL
	S-4	68	23	13	10	CL
	S-7	69	23	14	9	CL
	S-9	74	23	14	9	CL
	S-11	74	23	14	9	CL
TB-8	S-2	62	23	15	8	CL
	S-4	82	26	15	11	CL

The granular soil unit is generally described as compact to very compact brown medium to coarse sand and gravel with trace to little silt and occasional cobble layers. The lower portions of this unit consist of fine to medium sands. Based on borings completed in the central portion of the project site, the thickness is approximately 150 feet. Tested samples of this soil unit indicate a wide range of sand- and gravel-sized particles, with silt fractions comprising only a minor percentage of the tested samples. The USCS designation for this material is SW, SP, SM, and GP.

The third soil unit was encountered in test boring TB-3 and overlies the bedrock surface. This unit is a very compact gray clayey sand with some silt and trace of gravel. The encountered thickness of this material was 25.5 feet. This soil unit is extremely dense as indicated by the high penetration resistance values (generally 140 blows for 6 inches) shown on boring log TB-3.

Site Ground-Water Conditions

At the project site, ground water occurs under both isolated or 'perched' conditions and under water table conditions. Evidence of perched water within the cohesive soils was found in the test pits and test borings. Perched ground water within the cohesive soil unit is present in silty sand seams which are of limited extent and yield very minor amounts of water. Examples of sand seams encountered in the test borings are shown on Plate 4. Also, as seen on Plate 4, a large thickness of unsaturated, or 'dry' sands is present beneath the cohesive soils containing perched water. Depending on the topography, the water table at the site is encountered at depths from 143 to 184 feet below ground surface, as shown on the deep test boring logs. These encountered water levels are consistent with static water levels observed in test borings drilled in the bottom of the existing pit.

Ground water occurs under water table conditions within the lower portion of the thick granular deposit. Saturated, or 'wet' soils within this granular unit consist of fine to medium sands and comprise the uppermost aquifer at the project site. Water levels measured in temporary wells screened in the upper portion of this water table aquifer have been interpreted in the form of a Site Water Table Contour Map, Figure 6. Ground-water elevations at the site vary from 895 to 890 and the direction of ground-water flow is to the southeast. The hydraulic gradient at the site ranges from 0.0025 to 0.003 foot per foot (ft/ft).

The grain-size distribution tests of samples obtained from the granular soils at the site indicate that the gradation of these sands is variable and therefore, the permeability of this soil unit is likely to vary from place to place. Permeability values for the coarse-grained portions of this deposit will be higher than those of

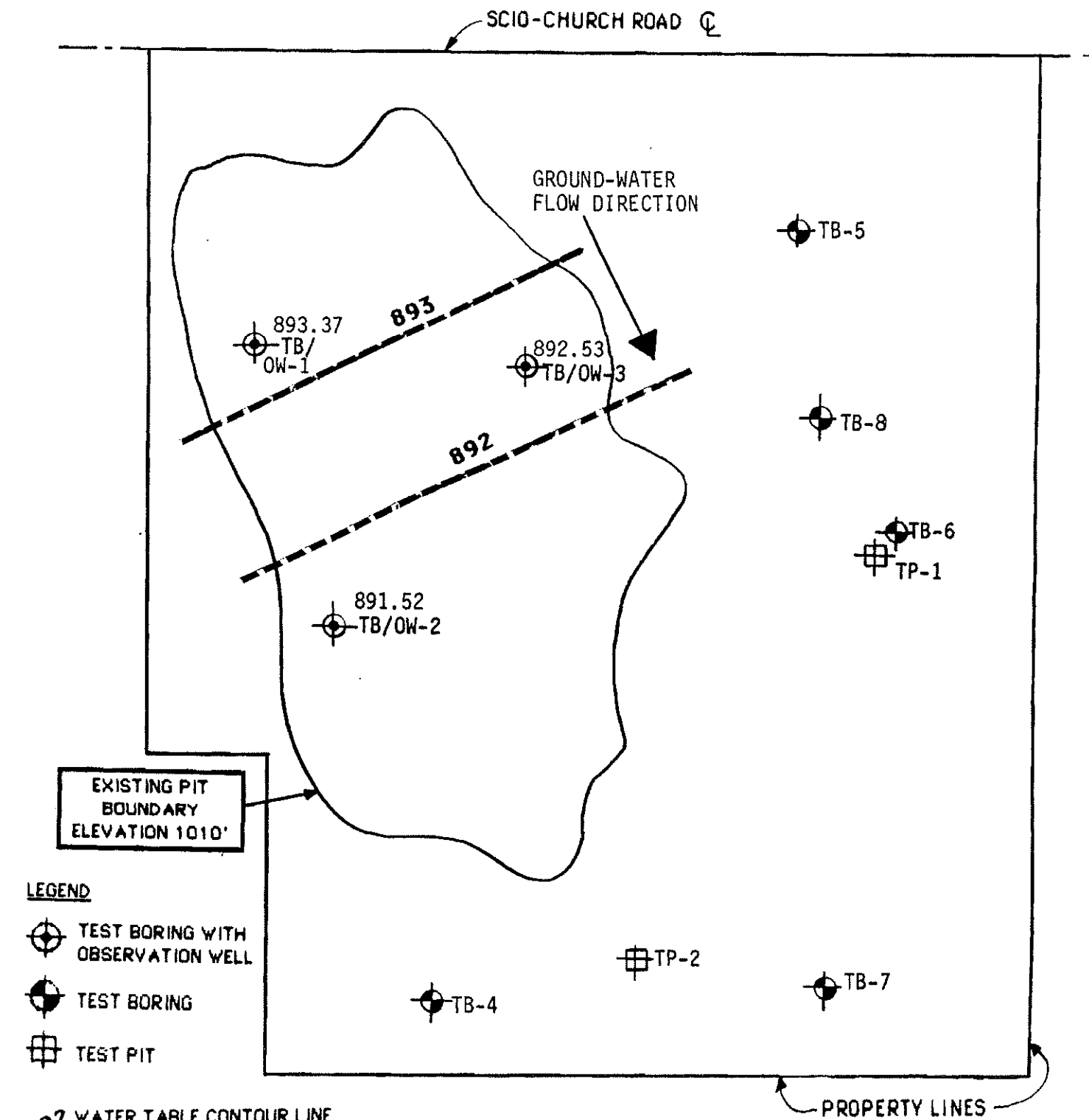


Figure 6

the fine sands. Based on grain-size distributions and the compact nature of the fine to medium sands at or below the water table, the calculated permeability of these water table sands ranges from 200 to 400 gallons per day per square foot (gpd/ft²) or from 9.4×10^{-3} to 1.9×10^{-2} centimeters per second (cm/sec).

Based on an average permeability value of 300 gpd/ft² and on the observed range in hydraulic gradient, the calculated seepage velocity within the water table aquifer at the site varies from 145 to 175 feet per year. At this velocity, it is estimated to require an average of approximately 16 years for ground water within this water table aquifer to migrate from northwest to southeast beneath the project site.

The water table aquifer at the site is approximately 25 to 30 feet thick and consists of silty fine to medium sands. Based on an average permeability value of 300 gpd/ft², the transmissivity for this water table aquifer is calculated to be 9000 gpd/ft. Larger transmissivity values (greater than 100,000 gpd/ft - Freeze and Cherry, 1979) are considered representative of good aquifers for water supply purposes. Due to the lack of available drawdown, as well as a relatively low transmissivity value, the aquifer at the site will not yield water supplies adequate for large-diameter, high-capacity wells such as municipal water wells.

Existing Ground-Water Quality

A discussion of ground-water quality for the project site is presented in two parts. First, records of ground-water quality data collected from tested domestic water wells within the project area are discussed. These data provide information regarding a limited number of chemical parameters and are presented in Table 2, Summary of Available Regional Ground-Water Quality Data. Second, data collected from onsite temporary wells is reviewed. These data represent a more comprehensive analysis of ground-water quality and are presented in Table 3, Existing Ground-water Quality Data at Ann Arbor Sand and Gravel, Inc.

As indicated in Table 2, ground water in the project area is generally of good quality with a few exceptions. The most notable exception to good quality is the consistently high iron content, which exceeds the National Secondary Drinking Water Standard of 0.3 milligrams per liter (mg/l). The average iron content is 1.0 mg/l which is sufficient to cause an iron taste and to stain clothes and porcelain fixtures.

Also in excess of good quality is the sodium concentration. Although no Drinking

TABLE 2

SUMMARY OF AVAILABLE REGIONAL GROUND-WATER QUALITY DATA
ANN ARBOR SAND AND GRAVEL, INC.

REPORTED PARAMETER CONCENTRATIONS

Address	Depth of Well in feet (if known)	Iron (mg/l)	Sodium (mg/l)	Nitrate (mg/l)	Hardness as CaCO ₃ (mg/l)	Conductivity (mmhos/cm)	Chloride (mg/l)	Fluoride (mg/l)
1700 Knight	200	(ND)	197	3.2	(ND)	698	26	0.2
1575 Knight	150	(ND)	170	(ND)	41	484	(ND)	0.1
5133 Waters		0.1	216	(ND)	32	750	(ND)	0.4
3151 Waters	110	1.4	(ND)	(ND)	284	559	(ND)	0.2
2566 Waters		0.1	168	(ND)	(ND)	631	(ND)	0.8
3600 S. Wagner	125	1.9	(ND)	(ND)	384	634	(ND)	0.2
2032 S. Wagner	200	3.3	(ND)	(ND)	(ND)	(ND)	(ND)	(ND)
3137 Shadberry		(ND)	176	(ND)	(ND)	681	(ND)	0.6
7411 Scio-Church	63	1.0	(ND)	(ND)	183	381	(ND)	0.4
5425 Scio-Church		0.3	(ND)	(ND)	437	746	110	0.1
4941 Scio-Church		0.2	47	(ND)	232	467	(ND)	0.3
4455 Scio-Church	220	1.4	(ND)	(ND)	385	604	(ND)	0.2
3415 Scio-Church	245	(ND)	211	(ND)	(ND)	781	(ND)	0.1
3415 Scio-Church	245	0.6	(ND)	(ND)	459	665	17	(ND)
2781 Scio-Church		(ND)	199	0.6	(ND)	730	(ND)	0.1
Average		1.0	173	1.9	271	629	51	0.3
High Value		3.3	216	3.2	459	781	110	0.8
Low Value		0.1	47	0.6	32	381	17	0.1

NOTES:

1. Water quality data obtained from Washtenaw County Health Department records.

(ND) indicates parameter was not detected

2. Volatile organic tests completed in December, 1987 on samples from this well. No volatiles detected.

Water Standard is presently established for sodium, most health agencies recommend that water in excess of 100 mg/l be restricted to those people who suffer from cardiovascular health problems. Based on Table 2, the average sodium content of ground waters in the area is 173 mg/l. This value is significantly greater than the concentrations normally encountered in ground waters in Michigan. For example, Kunkle (1960) reported that sodium concentrations in the ground waters of Washtenaw County were less than 33 mg/l, and in Lodi Township, waters from a single well had a sodium concentration equal to or less than 3.4 mg/l. These values reported by Kunkle are considered more normal for sodium concentrations in ground water. The high values reported in Table 2 may reflect water samples collected from artificially softened water taps. Water softeners add sodium ions to water while, at the same time, remove calcium and magnesium ions.

Both sodium and iron are naturally occurring inorganic elements and their presence within the ground waters is not believed to be related to any man-made source of contamination.

Additionally some of the ground water has a moderately high level of specific conductance, i.e., in excess of 600 micromhos per centimeter (mmhos/cm). In general, levels below 500 mmhos/cm are generally encountered in water table aquifers. Higher values are associated with deeper artesian aquifers.

In the same regard, hardness is also moderately high with most wells over 200 mg/l of CaCO_3 . Because of the high sodium content, it is believed that the waters are either naturally or artificially softened. Therefore, without the high sodium, it may be expected that hardness might well have been consistently above 350 mg/l.

Only three chloride determinations are available in Table 2 showing a range from 17 to 110 mg/l. These values are considerably below the National Secondary Drinking Water Standard of 250 mg/l. It is believed that higher values are most likely associated with deeper wells. This is based on the fact that saline waters are associated with the Coldwater Shale. The condition is most prevalent in the area of Saline, Michigan located approximately 5 to 6 miles southeast of the project area. Saline waters may also be a source of sodium in the useable aquifers.

Onsite ground-water quality data was collected, in February, 1989, from the three temporary observation wells OW-1 to OW-3. These wells were sampled and tested for general water quality parameters at the site. Based on the data presented in Table 3, ground waters at the site can be characterized as a calcium-magnesium

TABLE 3

EXISTING GROUND-WATER QUALITY

at

ANN ARBOR SAND AND GRAVEL, INC.

Parameter	Units	OW-1 2-20-89	OW-2 2-20-89	OW-2 Dup. 2-20-89	OW-3 2-20-89	Trip Blank 2-20-89
Total Organic Halogen	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Soluble Iron	mg/l	0.01	0.12	0.02	0.01	<0.01
Soluble Calcium	mg/l	160	160	160	130	<0.1
Soluble Magnesium	mg/l	63	55	60	48	<0.01
Soluble Sodium	mg/l	2.9	3.7	3.4	5.5	<0.01
Soluble Cadmium	mg/l	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Soluble Chromium	mg/l	0.004	0.004	0.002	0.003	<0.001
Soluble Lead	mg/l	<0.001	<0.001	<0.001	0.002	<0.001

Parameter	Units	OW-1 2-21-89	OW-2 2-21-89	OW-2 Dup. 2-21-89	OW-3 2-21-89	Trip Blank 2-20-89
pH	S.U.	7.40	7.79	7.90	7.63	4.10
Total Alkalinity	mg/l as CaCO ₃	360	340	330	300	<1
Specific Conductance	umhos cm @ 25°C	1200	1300	1300	1000	<10
Chloride	mg/l	3	32	32	9	<1
Sulfate	mg/l	360	360	360	260	<1
Total Organic Carbon	mg/l	5	5	7	6	<1
Chemical Oxygen Demand	mg/l	12	18	20	32	<5
Nitrate- Nitrogen	mg/l	0.2	1.3	1.2	0.6	<0.1
Ammonia Nitrogen	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02

NOTE: ANALYSES COMPLETED BY ANN ARBOR
TECHNICAL SERVICES, INC. OF ANN
ARBOR, MICHIGAN

bicarbonate water with moderate concentrations of sulfate and low concentrations of chloride. It is noted that sodium occurs in very low concentrations at the site, especially in comparison to concentrations noted above in residential wells.

At the site, specific conductance is generally higher than found in the residential wells. Values of 1,000 to 1,300 micromhos per centimeter indicate that the site ground waters are mineralized in a manner similar to deep artesian ground waters.

There are low concentrations of indicator parameters such as Total Organic Carbon, Total Organic Halogens, and Ammonia and Nitrate Nitrogen in ground water at the site. Total Oxygen Demand is slightly elevated and may be related to well installation procedures. All of the metal concentrations are below the National Primary and Secondary Drinking Water Standards. This includes iron which was consistently high in the residential wells. Taken together these parameters indicate that the ground-water quality at the site is generally good and does not indicate any degradation related to a source of contamination.

ANALYSIS AND EVALUATIONS

The project site has been hydrogeologically evaluated with respect to the proposed development of a Type III disposal facility in accordance with the administrative rules promulgated under Act 641 P.A. 1978. Due to the nature of the site, a part of the analysis establishes the suitability of cohesive soils at the site to serve as a recompacted clay soil liner.

Suitability of Site Soils

Although the materials to be placed at the disposal facility will consist of Type III wastes (principally demolition wastes), the clay soils are evaluated with respect to design standards applicable to lined Type II sanitary landfills. The requirements applicable to lined disposal sites are found in R 299.4307 (2) (a) which state that a compacted soil liner shall have a minimum thickness of 3 feet; that the soil shall be compacted to a maximum permeability of 1×10^{-7} cm/sec; and that the soil shall meet the criteria for a Unified Soil Classification of SC, ML, CL, or CH.

The cohesive soil deposits present at the site exhibit the basic characteristics for compacted soil liners. Soil classifications completed on numerous samples of this clay soil deposit indicate that these soils consistently classify as CL and CL-ML. Clay fractions within these cohesive soils are generally in the range of 20 to 40 percent by weight, indicating that the clay fraction will dominate the behavior of the soil. To quantify the recompacted properties of this cohesive soil unit, modified Proctor tests (ASTM D-1557) were completed on soil samples obtained from the test pits. The maximum dry density and optimum moisture content values of these tested samples were then used as guides for the recompaction of permeability test samples. Soil samples were recompacted at 90 and 93 percent of maximum dry density with moisture contents of 2 percent below optimum, optimum, and 5 percent above optimum moisture content, based on results of the modified Proctor tests. These compaction guidelines are in accordance with R 299.4307 (2)(a) of Act 641. Testing was then performed on these compacted samples under confining conditions of 1.0 ton and 1.5 tons per square foot.

The results of permeability testing for recompacted soil samples ranged from 8.5×10^{-9} cm/sec to 8.5×10^{-7} cm/sec. The higher values are associated with the lower laboratory test confining pressure. Permeability is a dynamic characteristic of clay soils and relates, in this case, to the confining pressures imposed by the landfill loads on the clay soil base. Considering the thickness of demolition materials to be placed, this clay base will be subject to loads in excess of 2.0 tons per square foot. The test data indicate that the average permeability of clay soils compacted to at

least 90 percent of the maximum dry density and tested under a 1.0 ton per square foot load will be 1.7×10^{-7} cm/sec. As the landfill is filled, and the load on the clay base increases to 1.5 tons per square foot, the permeability will decrease to an average of 8.7×10^{-8} cm/sec. Additional decreases in permeability will occur as landfill loads increase to 2.0 tons per square foot and above. Therefore, these cohesive soils are suitable for use in a recompacted clay soil liner.

In order to achieve the regulatory maximum permeability required for a clay soil liner, it is recommended that these soils be compacted to at least 95 percent of the maximum dry density based on the modified Proctor test.

Synthetic Liner

Recent discussions with MDNR personnel have indicated the department's desire to upgrade, whenever possible, design criteria for proposed Type II disposal sites. However, MDNR has not made such recommendations for Type III landfill design. Accordingly, AAS&G has proposed the installation of a synthetic liner upon the proposed 3-foot recompacted clay soil liner at the project site. Act 641 states that such a liner shall be a polyvinyl chloride sheeting or equivalent material not less than 20 mils in thickness. To protect this synthetic liner and to facilitate leachate collection, Act 641 states that the surface of this liner shall be covered by a minimum of 2 feet of permeable material.

Vertical Isolation

Act 641 rule R 299.4310 (2) requires that Type II lined sites shall have a minimum clearance of 12 feet from the top of the liner to the natural groundwater level. The lowest points of the proposed Type III landfill vary in elevation from 934 feet msl on the west side to 914 feet msl on the east side. The highest ground-water observed on the site is 893 feet msl. Therefore, vertical isolation from the water table varies from 21 to 41 feet.

Leachate Collection System Design

One of the most critical design elements of a disposal facility is the leachate collection system. This system must allow for the rapid removal of leachate from the base of the landfill in order to minimize contact time between the leachate and the landfill base, and to prevent excessive head buildup on the liner.

The generation, seepage, and collection of leachate within a disposal facility can be calculated by the use of various water balance models. An analysis of proposed leachate collection system designs for AAS&G's facility was completed by computer simulation using the USEPA Hydrologic Evaluation of Landfill Performance (HELP) computer program (Schroeder et al., 1984). This model has been previously recommended by MDNR staff for analysis of landfill designs. The HELP computer program is a quasi-two-dimensional hydrologic model of water movement across, into, through, and out of landfills. The program was developed to aid in the rapid estimation of runoff, drainage, and leachate volumes that may result from the operation of various landfill designs. The model allows the user to select landfill soil and waste characteristics from default values supplied with the model. Numerical values for these soil properties were obtained mainly from agricultural soils which may be less dense than soils used to construct landfills. As a result, the amount of seepage calculated by the model may be more than actually occurs.

Authors of the computer program have indicated that all layers in the model below the evaporative zone are assumed to be at field capacity and that the model represents steady-state conditions for a landfill setting. Because of this, the model can only be used to simulate closed landfills which have had sufficient time for the refuse materials to accumulate moisture and reach field capacity. Depending on the nature and thickness of the waste, it may require tens of years for this condition to occur.

The User's Guide to the computer program explicitly states that credible results for the model should not be expected from input parameters that are unrepresentative of landfills. GRK&A has previously evaluated the HELP model data requirements and results for various landfill situations. Layers and parameters selected for the AAS&G model are illustrated in Figure B1, Typical Profile of Type III Landfill, in Appendix B. Landfill design parameters believed to reasonably represent the proposed design for the AAS&G Type III disposal facility were selected and a typical listing of these model parameters are presented in Figure B2 in Appendix B. These design parameters reflect the innovative cover design used by AAS&G and the nature of demolition refuse.

Summarized in Table 4, Hydrologic Budget for the Proposed Type III Reclamation Landfill, are the annual averages of a hydrologic budget performed for the proposed facility using the HELP model.

During the period modeled, 28.11 inches per year of water was diverted from the landfill either as evapotranspiration, lateral drainage, or runoff. Therefore, only 1.48 inches per year, representing 4.9 percent of the annual precipitation, actually

TABLE 4

HYDROLOGIC BUDGET FOR THE
PROPOSED TYPE III RECLAMATION LANDFILL
ANN ARBOR SAND AND GRAVEL, INC.

<u>Output Parameter</u>	<u>Amount</u> <u>(inches/year)</u>
1. Precipitation	30.00
2. Runoff	1.93
3. Evapotranspiration	23.42
4. Lateral Drainage from Cover	2.76
5. Percolation into Landfill	1.48
6. Drainage into Leachate Collection System	1.34
7. Percolation from Landfill Base	0.01

* Appendix B contains a complete listing of model results.

infiltrate into the fill materials. Of this amount, 1.34 inches per year will be collected and removed by the leachate collection system during post-closure operations. As little as 0.01 inches per year potentially may escape the landfill as percolation through the landfill base. Based on these values, it is determined that the leachate collection system, as designed, is over 90 percent efficient.

It may be noted that a tally of the average annual amounts within the hydrologic budget do not exactly balance. This results from the use of actual weather input data which in turn results in small changes in storage on a year to year basis. These changes in storage account for small discrepancies in a water balance.

A further consideration is the height of leachate accumulation on the landfill base. This is commonly referred to as leachate head. Act 641 regulates Type II landfills with regard to leachate head, restricting the head to a maximum of six inches. A determination of the peak daily head produced by AAS&G's proposed landfill was made by the HELP model. With final cover in place, and the leachate collection system operational, the peak daily leachate head is calculated to be no more than 4.1 inches. Accordingly, this design meets basic MDNR criteria established for Type II landfill.

Ground-Water Quality Performance Standard

Rule R 299.4306 (3) of Act 641 requires that the rationale for a landfill design be explained to demonstrate how the proposed design will meet ground-water quality performance standards as established by Act 245 and 40 CFR Part 257.3-4. The proposed design of the reclamation landfill meets this requirement in a number of ways. First, the facility design exceeds existing design standards for Type II facilities set forth by Act 641 and therefore, is constructable under state law. Second, the cover is designed to promote surface runoff at the expense of infiltration, thereby, limiting the generation of leachate which might impact ground water. Third, the leachate collection system design has been evaluated using computer simulation, and it has been determined that this system is over 90 percent efficient in collecting leachate from the base of the landfill. And, lastly, the amount of leachate which does escape has been determined to represent a very small quantity.

As previously determined, the amount of leachate that may escape from the base of the landfill is 0.01 inches per year. This potential rate of leakage is equivalent to 0.74 gallons per acre per day from the landfill base. Because the base of the landfill is approximately 31.5 acres in size, the total rate of potential leachate escape is calculated to be 23.3 gallons per day.

Leachate which may escape from the landfill will eventually reach the water table and enter into the aquifer. The impact associated with the assimilation of leachate within the ground water can be estimated by determination of the natural ground-water underflow and the use of dilution equations.

Underflow, or the amount of natural ground-water flow beneath the site, is determined based on Darcy's Law of ground-water flow, $Q = KIA$, where Q is the rate of underflow in gallons per day, K is the average permeability of the aquifer materials in gallons per day per square foot, I is the hydraulic gradient, and A is the cross-sectional area of the aquifer through which flow occurs.

The aquifer beneath the landfill site has a saturated thickness at test boring TB-3 location of 28 feet. The width of the aquifer beneath the landfill, normal to the direction of ground-water flow is approximately 1,500 feet. Therefore, the approximate cross-sectional area of the aquifer is 42,000 square feet.

Based on the texture of the aquifer materials, the average permeability of the aquifer is 300 gallons per day per square foot. The measured hydraulic gradient is approximately 0.0026. This information leads to a calculated underflow of 32,760 gallons per day beneath the landfill.

The impact associated with mixing a potential 23.3 gallons per day of leachate with 32,760 gallons per day of ground-water flow can be determined using the following dilution equations:

$$\begin{aligned}C_{gwu} \times Q_{gwu} + C_o \times Q_l &= C_{gwd} \times Q_{gwd} \\Q_{gwu} + Q_l &= Q_{gwd}\end{aligned}$$

Where: C_{gwu} is the concentration of a given conservative parameter in ground water upstream of the facility; C_o is the concentration of the same parameter within the leachate; C_{gwd} is the unknown concentration of the parameter in the ground water downstream of the facility; Q_{gwu} is the rate of underflow of ground water beneath the facility; Q_l is the escape rate of leachate from the landfill; and Q_{gwd} is the flow rate of ground water downstream of the facility.

To properly employ the above equations, it is necessary to know the type and concentration of chemical parameters which might occur within Type III landfill leachate. Unfortunately such information is not available, principally because existing regulations do not require Type III landfills to have leachate collection systems. While it is generally believed that Type III leachate is significantly weaker than Type II leachate, there is no real basis on which to quantify the belief.

In view of the absence of Type III leachate data, the analysis assumes that leachate from the proposed Type III Reclamation Landfill will be similar in quality to leachate from a Type II landfill. Table 5, Observed and Calculated Water Quality Concentrations, includes published information regarding typical Type II leachate quality. Representative values of Co have been selected for the parameters listed.

Also listed in Table 5 are average values of ground-water quality obtained from the three onsite observation wells. This existing water quality is equivalent to Cgwu. The dilution equations were then used to calculate downstream water quality, or Cgwd, after mixing the ground-water underflow with the presumed escape of 23.3 gallons per day of leachate.

Comparing the values of Cgwu with Cgwd clearly shows that the downgradient ground-water quality has changed little as a result of the addition of leachate. Many of the parameters show no or very insignificant changes in concentration. Other changes are too small to be measurable such as Specific Conductance from 1,200 to 1,206 micromhos per centimeter, Chloride from 15 to 15.6 mg/l, Magnesium from 55 to 55.3 mg/l, and Sodium from 4 to 4.3 mg/l. Others are measurable but insignificant compared to locational variations which already exist at the site, i.e., COD increased 3.5 mg/l, however, existing COD concentrations vary as much as 6 to 20 mg/l. The greatest calculated change occurs in Lead with downstream concentrations increasing 100 percent. Similar increases already occur onsite. Such changes are not sufficiently large to be distinguished from background locational variations, and hence, fail to classify as degradation of the water quality under definitions presented by the Water Resources Commission in their Part 22 Groundwater Quality Rules.

It is concluded from this quantitative analysis that, if the landfill has Type II leachate, the proposed design of AAS&G's Reclamation Landfill will not impact the ground-water quality at the site in any significant manner. Knowing that the proposed facility is a Type III landfill, there is a certain but unknown factor of safety in this conclusion.

It should be pointed out that other factors of safety also exist which have not been relied upon in making the above conclusion. One such factor is soil adsorption, which has the ability to renovate leachate before reaching the water table. The three feet of clay liner beneath the proposed landfill provides an active zone for soil adsorption, and the potential for adsorption in this zone can be derived using cation exchange capacity.

TABLE 5

OBSERVED AND CALCULATED WATER QUALITY CONCENTRATIONS
ANN ARBOR SAND AND GRAVEL, INC.
PROPOSED TYPE III RECLAMATION LANDFILL

Parameter	Units	Representative Type II Landfill Leachate (1)	Co	Cgwu	Calculated Cgwd	Existing Locational Variations
Specific Conductance	mmhos/cm	7,000-60,000	10,000	1,200	1,206	100-300
Chloride	mg/l	300-3,000	800	15	15.6	6-29
Sulfate	mg/l	10-1,000	500	325	325	0-100
TOC	mg/l	200-30,000	1,000	5	5.7	0-2
COD	mg/l	1,000-90,000	5,000	20	23.5	6-20
Nitrates	mg/l	0.10-10	5	0.7	0.7	0.4-1.1
Iron	mg/l	-----	4(est)	0.02	0.02	0-0.10
Calcium	mg/l	100-3,000	800	150	150	0-30
Magnesium	mg/l	100-1,500	500	55	55.3	5-15
Sodium	mg/l	200-1,200	400	4	4.3	0.3-2.6
Chromium	mg/l	-----	2(est)	0.004	0.005	0.001-0.002
Lead	mg/l	<5	3	0.001	0.003	0-0.002

(1) Values taken from Freeze and Cherry (1979, p. 435)

Within southeastern Michigan, glacial clay soils have cation exchange capacities of 3 to 6 milliequivalents per 100 grams of soil (meq/100 g). Noble (1976) provides a discussion of how this information can be used to determine the impact of soil adsorption on the renovation of leachate. Based on information presented by Noble, a Type II landfill leachate containing representative amounts of various cations would be expected to have a cation concentration of approximately 400 milliequivalents per liter. If the CEC of the soil is 3 meq/100 g., it is calculated that 13,300 grams of soil is required to renovate one liter of leachate. By conversion, this is equivalent to 110 pounds of soil per one gallon of leachate. Because 110 pounds of soil is essentially one cubic foot of soil, the ratio is approximately one cubic foot of soil for every gallon of leachate.

Beneath the base surface of AAS&G's proposed Type III Reclamation Landfill there will be approximately 4,116,000 cubic feet of clay soil. Based on the above information, this clay soil will have the capacity to renovate 4,116,000 gallons of leachate. If the rate of leachate escape reaches the potential established by the HELP model of 23.3 gallons per day, the renovative capacity of the clay will last for a duration in excess of 400 years.

On the basis of what has been presented, it is believed that the design proposed for the AAS&G Type III Reclamation Landfill is environmentally safe. The design goes far beyond the minimum design standards given in Act 641, limits the generation of leachate, provides for the efficient capture of leachate which is generated, effectively minimizes the escape of leachate through the cell base, and through a combination of dilution and soil adsorption nullifies ground-water quality impacts. Furthermore, the system will be monitored to ensure that no ground-water quality impact occurs.

Recharge Basin

The proposed Type III Reclamation Landfill plans include a design to recharge storm water using a recharge basin located in the northwest portion of the site. This basin was analyzed to determine if ground-water mounding will interfere with vertical isolation beneath the landfill. The base or floor of the landfill is at an approximate elevation of 945 feet in the northwest corner, and the existing water table is slightly below elevation 895 feet. This provides approximately 50 feet of vertical isolation, well above the minimum of ten feet required by Act 641 rules.

Ground-water mounding beneath the recharge basin has been analyzed using a computer version of the Hantush mound theory, as presented by Walton (1970).

In addition to aquifer characteristics, the mound analysis requires that the size and configuration of the recharge basin be known, as well as the recharge rate and the duration of the recharge period.

Based on the HELP model, stormwater runoff equal to 1.93 inches per year plus 2.76 inches per year of diversion from the lateral drainage layer within the landfill cover will be diverted into the recharge basin. The total, or 4.69 inches per year, is equal to the long-term average annual rate of recharge. This number, which equates to 1.10 gallons per day per square foot of recharge basin floor area, was used to predict long-term mounding effects. The results indicate that after 30 years of mounding, the maximum head within the mound will be less than 5.0 feet. Such a mound will have no impact on vertical isolation beneath the landfill.

Short-term transient mounding effects were also considered since the peak rate of recharge from an intense period of rainfall activity will be considerably more than the long-term annual average. For this purpose, the runoff from a 25-year storm was used. The runoff calculations were developed by Rowe Engineering, Inc. and are presented in the engineering documents. A 25-year storm results in 518,000 cubic feet of water being added to the recharge basin. This water will recharge over an approximate 2-day period resulting in a short-term recharge rate of 68 gallons per day per square foot of basin floor area. This rate of recharge will produce a ground-water mound with a maximum height of approximately 25 feet. The crest of the mound will be centered beneath the center of the recharge basin, a distance of 270 feet from the edge of the landfill base. At the edge of the landfill base, the mound will be less than 5.0 feet in height. Even if these short-term mound effects are superposed on top of long-term effects, the total mounding effect will not interfere with vertical isolation beneath the landfill.

Thus, given both long and short-term considerations, the recharge basin will not produce any adverse impacts on vertical isolation beneath the landfill.

Proposed Ground and Surface Water Monitoring Program

A proposed ground and surface water monitoring program is presented within a separate report titled: Water Quality Monitoring Program for the Ann Arbor Sand and Gravel, Inc. Proposed Type III Reclamation Landfill Facility, and dated April 6, 1989. The program includes two permanent upgradient monitoring wells, six permanent downgradient monitoring wells, four temporary downgradient monitoring wells, and three surface water monitoring stations. The reader is referred to the above referenced report for more complete details.

CONCLUSIONS AND RECOMMENDATIONS

1. The geology of the site is relatively simple. It consists of a cohesive glacial clay till overlying a thick sequence of granular materials. The glacial till varies in thickness from 0 to approximately 75 feet; the thickness of the granular materials is known at one location and is 150 feet. Bedrock is encountered at a depth of 113 below the bottom of the existing sand pit, or at an elevation of 837 feet. Similar geology is encountered throughout the general vicinity of the site.
2. Ground water is encountered at depths of 140 to 180 feet below natural ground surface and occurs under water-table conditions. Aquifer materials consist of 25 to 30 feet of silty fine to medium sands. The average permeability of these materials is estimated at 300 gallons per day per square foot. At the site, the aquifer has sufficient thickness and permeability to support residential water demands, but is limited in its ability to yield greater amounts.
3. At the site, the general direction of ground-water flow is toward the southeast. The water table gradient is approximately 0.0026 foot per foot and the apparent velocity of the flow is approximately 150 feet per year.
4. Ground water at the site contains moderate amounts of calcium and magnesium which imparts a high degree of hardness. Despite the hardness, the quality of ground waters meets or exceeds criteria established by the National Primary and Secondary Drinking Water Standards.
5. The cohesive glacial till at the site consists of silty clays and clayey silts and classifies as a CL or CL-ML soil material based on the Unified Soil Classification System. Extensive soil testing has established that the clays are remarkably uniform in texture and plasticity at the site. Soil permeability tests of recompacted clay demonstrate that with adequate compaction (95 percent of maximum dry density) and appropriate moisture content, the clay soils will have a permeability of less than 1×10^{-7} cm/sec. Therefore, the glacial till materials are suitable for construction as clay liners, sidewall dikes, and final cover at the proposed Type III Reclamation Landfill.

6. Economic deposits of sand and gravel occur at the site above the water table. These unsaturated materials consist mostly of medium to coarse sands with some gravel.
7. The proposed landfill design exceeds the minimum standards proposed for Type II Landfills with respect to the final cover system and the liner system. The liner system as proposed will consist of three feet of compacted clay soil overlain by a 40-mil HDPE synthetic membrane. The final cover system consists of 4.5 feet of soils materials consisting of various sand and clay layers. These improved systems will limit the amount of infiltration into the landfill and the amount of seepage out of the landfill.
8. The potential amount of leachate that may escape the landfill is limited to 0.74 gallons per day per acre of landfill base. When completely constructed, the maximum potential escape will be 23.3 gallons per day, a small amount.
9. If leachate is lost to the environment, the chemical constituents will be attenuated by soil adsorption and dilution by ground water. The attenuation capacity by these mechanisms is sufficiently large to preclude a significant change in downgradient water quality.
10. Surface water runoff from the facility is proposed to be recharged to the water table through a storm-water recharge basin. No appreciable impact to ground water is projected as a result. Storm water quality will be monitored to establish the suitability of recharge waters.
11. A ground and surface water monitoring program is proposed within a separate document. The program will include eight permanent ground-water monitoring wells, four temporary ground-water monitoring wells, and three surface water monitoring stations.
12. Construction of the proposed facility will provide reclamation of the sand and gravel mining pit, meet or exceed Act 641 design requirements for landfill sites, and is expected to comply with the Ground-Water Performance Standard, R 299.4306(1,2) of Act 641.

Respectfully submitted,

G.R. KUNKLE AND ASSOCIATES, INC.

Matthew E. Dodt

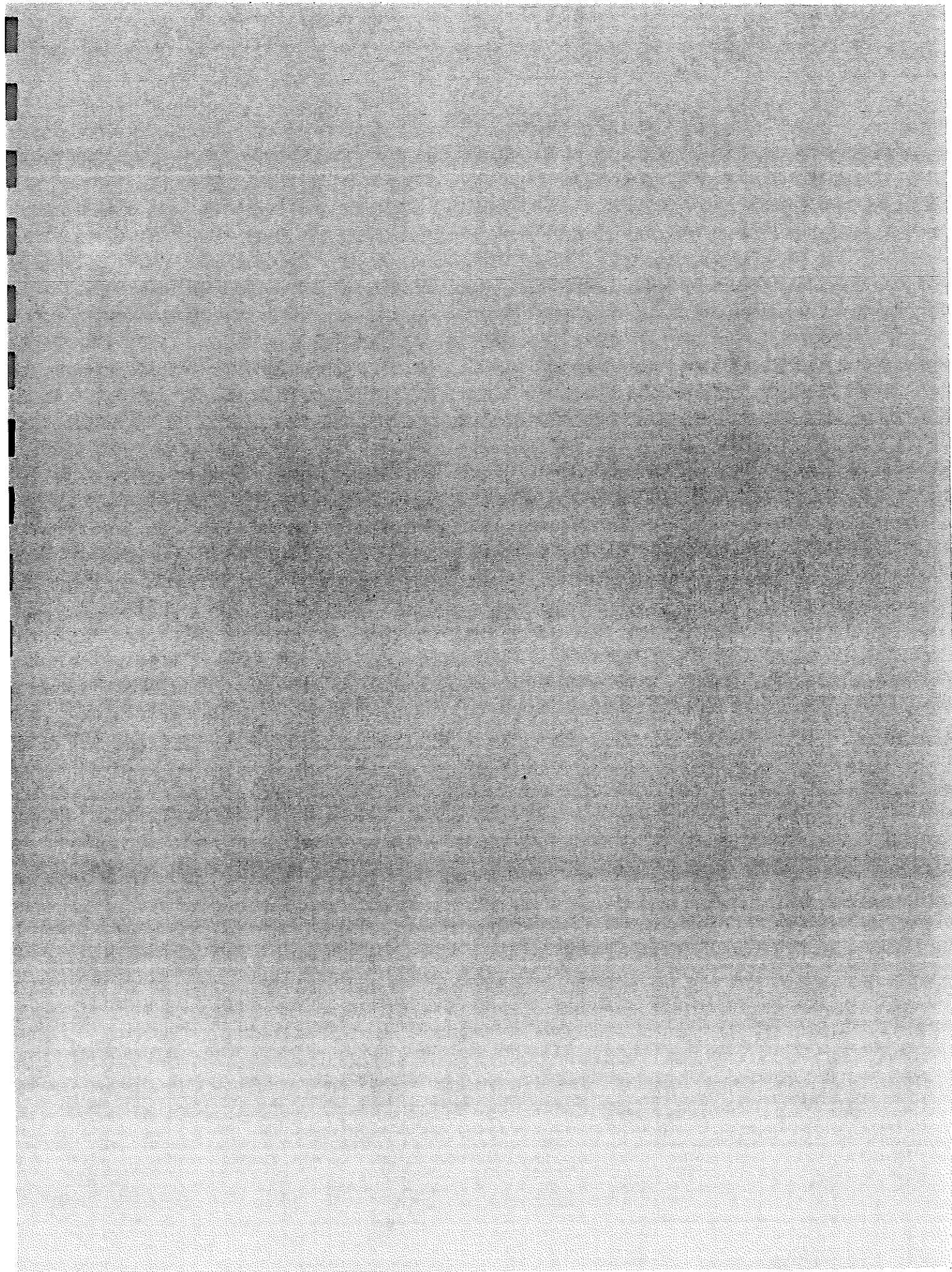
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George R. Kunkle, Ph.D.

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**HYDROGEOLOGIC STUDY REPORT
ANN ARBOR SAND AND GRAVEL, INC.
PROPOSED TYPE III RECLAMATION LANDFILL**

APPENDIX A

Contents

Plate Number

Site Plan	1
Generalized Regional Geologic Profiles	2
Generalized Water Table Contour Map	3
Generalized Site Geologic Profiles	4

Figure Numbers

General Notes	A1
Logs of Test Borings	A2 to A9
Logs of Test Pits	A10 to A12
Logs of Temporary Observation Wells	A13 to A15
Test Results for Cohesive Soils	A16 to A37
Test Results for Granular Soils	A38 to A42
Existing Ground Water Quality Data	A43 to A44

APPENDIX B

Typical Profile for Type III Landfill	B1
Computer Simulation of Proposed Type III Reclamation Landfill Design	B2

APPENDIX C

Domestic Water Well Logs of Record
Reported Water Quality Results from Domestic Water Wells

APPENDIX A

G.R. KUNKLE AND ASSOCIATES

CONSULTING HYDROGEOLOGISTS

GENERAL NOTES

TERMINOLOGY

Unless otherwise noted, all terms utilized herein refer to the Standard Definitions presented in ASTM D 653.

PARTICLE SIZES

Boulders	-	Greater than 12 inches (305mm)
Cobbles	-	3 inches (76.2mm) to 12 inches (305mm)
Gravel - Coarse	-	3/4 inches (19.05mm) to 3 inches (76.2mm)
Gravel - Fine	-	No. 4 - 3/16 inches (4.75mm) to 3/4 inches (19.05mm)
Sand - Coarse	-	No. 10 (2.00mm) to No. 4 (4.75mm)
Sand - Medium	-	No. 40 (0.425mm) to No. 10 (2.00mm)
Sand - Fine	-	No. 200 (0.074mm) to No. 40 (0.425mm)
Silt	-	0.005mm to 0.074mm
Clay	-	Less than 0.005mm

COHESIONLESS SOILS

Classification	Density Classification	Relative Density %	Approximate Range of (N)
The major soil constituent is the principal noun, i.e. sand, silt, gravel. The second major soil constituent and other minor constituents are reported as follows:	Very Loose	0-15	0-4
	Loose	16-35	5-10
	Medium Compact	36-65	11-30
	Compact	66-85	31-50
	Very Compact	86-100	Over 50
Second Major Constituent (percent by weight)	Minor Constituents (percent by weight)	Relative Density of Cohesionless Soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.	
Trace - 1 to 12%	Trace - 1 to 12%		
Adjective - 12 to 35% (clayey, silty, etc.)	Little - 12 to 23%		
And - Over 35%	Some - 23 to 33%		

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier; i.e., silty clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils; i.e., silty clay, trace of sand, little gravel.

Consistency	Unconfined Compressive Strength (psf)	Approximate Range of (N)
Very Soft	Below 500	0-2
Soft	500-1000	3-4
Medium	1000-2000	5-8
Stiff	2000-4000	9-15
Very Stiff	4000-8000	16-30
Hard	8000-16000	31-50
Very Hard	Over 16000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

SAMPLE DESIGNATIONS

- AS - Auger Sample - Directly from auger flight.
- BS - Miscellaneous Samples - Bottle or Bag.
- S - Split Spoon Sample with Liner Insert - ASTM D 1586
- LS - Liner Sample S with liner insert 3 inches in length.
- ST - Shelby Tube Sample - 3 inch diameter unless otherwise noted.
- PS - Piston Sample - 3 inch diameter unless otherwise noted.
- RC - Rock Core - NX core unless otherwise noted.

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0" outside-diameter, 1-3/8" inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

LOG OF BORING NUMBER: TB-1				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS								
Project Name: Ann Arbor Sand and Gravel, Inc.				5744 BRIGHTON ROAD								
Project Location: Washtenaw County, Michigan				BRIGHTON, MICHIGAN 48116								
Date of Drilling: October 17-18, 1988												
SUBSURFACE PROFILE			BOREHOLE SAMPLE DATA									
Scale (feet)	GROUND SURFACE ELEVATION: 955.0		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)					
							10	20	30	40	50	
950		FILL: Loose Brown SILTY SAND with trace of Gravel	6.0	S-1	--	--	9					
945		Loose to Medium Compact Brown MEDIUM TO COARSE SAND with trace to little Gravel and occasional coarse Gravel seams	S-2	--	--	6						
940			S-3	--	--				12			
935			S-4	--	--						60/3"	
930			Very Compact Brown SILTY FINE SAND with trace of Clay	S-5	--	--						145
925	S-6	--		--						104		
920	S-7	--		--						73		
915		CONTINUED ON SHEET 2	36.0									
INSPECTOR: M. Dodd DRILLER: L. Melvin CONTRACTOR: American Drilling Co. EQUIPMENT: Eagle No. 1 ATV DRILLING METHOD: 8-inch outside diameter hollow-stem augers				WATER LEVEL DATA: Encountered at 59.5 feet GENERAL NOTES: 1. Temporary observation well OW-1 installed in borehole at a depth of 70.0 feet.								

Figure No. A2a

LOG OF BORING NUMBER: TB-1				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS							
Project Name: Ann Arbor Sand and Gravel, Inc.				5744 BRIGHTON ROAD							
Project Location: Washtenaw County, Michigan				BRIGHTON, MICHIGAN 48116							
Date of Drilling: October 17-18, 1988											
SUBSURFACE PROFILE				BOREHOLE SAMPLE DATA							
Scale (feet)	GROUND SURFACE ELEVATION: 955.0 (sheet 2 - continued)		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N) 10 20 30 40 50				
			37.0								
915		Very Compact Brown FINE SAND with trace of Silt		S-8	--	--					60
910				S-9	--	--					71
905				S-10	--	--					55
900				S-11	--	--					71
895				S-12	--	--					67
890		Very Compact Brown FINE SANDY SILT with occasional fine Sand seams		S-13	--	--					72
885											
		Very Compact Brown FINE SAND with fine Sandy Silt seams	67.0								
			72.0	S-14	--	--					64
880		END OF BORING									

INSPECTOR: M. Dodd	WATER LEVEL DATA: Encountered at 59.5 feet GENERAL NOTES: 1. Temporary observation well OW-1 installed in borehole at a depth of 70.0 feet.
DRILLER: L. Melvin	
CONTRACTOR: American Drilling Co.	
EQUIPMENT: Eagle No. 1 ATV	
DRILLING METHOD: 8-inch outside diameter hollow-stem augers	

Figure No. A2b

LOG OF BORING NUMBER: TB-2

Project Name: Ann Arbor Sand and Gravel, Inc
Project Location: Washtenaw County, Michigan
Date of Drilling: October 20-21, 1988

**G.R. KUNKLE AND ASSOCIATES
CONSULTING HYDROGEOLOGISTS**

**5744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116**

SUBSURFACE PROFILE**BOREHOLE SAMPLE DATA**

Scale (feet)		GROUND SURFACE ELEVATION: 954.6		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
								10	20	30	40	50
950		RESIDUAL SPOIL MATERIALS: Very Loose to Loose Brown SILTY SAND with trace of Gravel and occasional Clayey Silt seams		S-1	--	--	3					
945		9.0		S-2	--	--	6					
940		RESIDUAL SPOIL MATERIALS: Soft to Medium Brown to Gray CLAYEY SILT with trace of Sand and Gravel and occasional Sand seams		S-3	--	--	6					
935		19.5		S-4	--	--	5					
930		Very Loose to Loose Brown MEDIUM TO COARSE SAND with trace of Silt and Gravel and occasional Gravel seams		S-5	--	--	4					
925				S-6	--	--	6					
920				S-7	--	--	9					
915		CONTINUED ON SHEET 2		36.0								

INSPECTOR: M. Dodd
DRILLER: L. Melvin
CONTRACTOR: American Drilling Co.
EQUIPMENT: Eagle No. 1 ATV
DRILLING METHOD: 8-inch outside
diameter hollow-stem augers

WATER LEVEL DATA: Encountered at 62.5 feet

GENERAL NOTES:

1. Temporary observation well OW-2 installed in borehole at a depth of 72.4 feet.

LOG OF BORING NUMBER: TB - 2				G.R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS							
Project Name: Ann Arbor Sand and Gravel, Inc.				5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116							
Project Location: Washtenaw County, Michigan											
Date of Drilling: October 20-21, 1988											
SUBSURFACE PROFILE				BOREHOLE SAMPLE DATA							
Scale (feet)	GROUND SURFACE ELEVATION: 954.6 (sheet 2 - continued)		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
							10	20	30	40	50
915	38.0			S-8	--	--					59
		Very Compact Brown MEDIUM TO COARSE SAND with trace of Gravel	41.0								
		Coarse GRAVEL and COBBLES	43.0								
910		Very Compact Brown MEDIUM TO COARSE SAND with trace to little Gravel	46.5	S-9	--	--					64
905				S-10	--	--					63
		Very Compact Brown FINE TO MEDIUM SAND with trace of Silt and trace to little Gravel									
900				S-11	--	--					95
895				S-12	--	--					50/3"
890				S-13	--	--					71
885				S-14	--	--					53
			72.5	S--	--	--					
880		END OF BORING									

INSPECTOR: M. Dodd DRILLER: L. Melvin CONTRACTOR: American Drilling Co. EQUIPMENT: Eagle No. 1 ATV DRILLING METHOD: 8-inch outside diameter hollow-stem augers	WATER LEVEL DATA: Encountered at 62.5 feet GENERAL NOTES: 1. Temporary observation well OW-2 installed in borehole at a depth of 72.4 feet.
---	--

LOG OF BORING NUMBER: TB-3

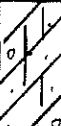
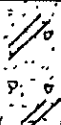
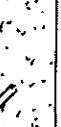
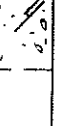
Project Name: Ann Arbor Sand and Gravel, Inc.
 Project Location: Washtenaw County, Michigan
 Date of Drilling: October 24-25, 1988

**G.R. KUNKLE AND ASSOCIATES
 CONSULTING HYDROGEOLOGISTS**

**5744 BRIGHTON ROAD
 BRIGHTON, MICHIGAN 48116**

SUBSURFACE PROFILE

BOREHOLE SAMPLE DATA

Scale (feet)		GROUND SURFACE ELEVATION: 950.0		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
								10	20	30	40	50
940		RESIDUAL SPOIL: Medium Brown CLAYEY SILT with little Sand, trace of Gravel, and Silty Sand seams		8.0	S-1	--	--	5				
		RESIDUAL SPOIL: Medium Brown CLAYEY SILT with trace of Sand		12.0	S-2	--	--	6				
930		Very Compact Brown MEDIUM TO COARSE SAND with trace of Silt and Gravel		18.0	S-3	--	--					92
		Very Compact Brown FINE SAND with trace of Silt		22.5	S-4	--	--					76
920					S-5	--	--					68
					S-6	--	--					77
910		Very Compact Brown MEDIUM TO COARSE SAND with trace of Silt and Gravel and occasional Gravel Seams			S-7	--	--					113
					S-8	--	--					89
900					S-9	--	--					67
				48.0								
		CONTINUED ON SHEET 2										

INSPECTOR: M. Dodd

DRILLER: J. Blank

CONTRACTOR: American Drilling Co.

EQUIPMENT: CME 75

DRILLING METHOD: 8-inch hollow-stem
 augers, 2-7/8-inch roller bit

WATER LEVEL DATA: Encountered at 58.5 feet

GENERAL NOTES:

1. Temporary observation well OW-3 installed in borehole at a depth of 70.7 feet.

LOG OF BORING NUMBER: TB-3

Project Name: Ann Arbor Sand and Gravel, Inc

Project Location: Washtenaw County, Michigan

Date of Drilling: October 24-25, 1988

**G.R. KUNKLE AND ASSOCIATES
CONSULTING HYDROGEOLOGISTS****5744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116****SUBSURFACE PROFILE****BOREHOLE SAMPLE DATA**

Scale (feet)	GROUND SURFACE ELEVATION: 950.0 (sheet 2 - continued)		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)						
							10	20	30	40	50		
900			49.4	S-10	--	--							70
		Very Compact Brown FINE SAND with trace of Silt		S-11	--	--							70
890			59.9	S-12	--	--							69
				S-13	--	--							70/5"
		Very Compact Brown MEDIUM TO COARSE SAND with trace of Silt and trace to little Gravel	66.0	S-14	--	--							46/3"
880													
		Very Compact Brown SAND with trace of Silt and Gravel	77.0	S-15	--	--							50/2"
870													
		Very Compact Brown SAND with trace of Silt and Gravel	88.0	S-16	--	--							150/6"
860													
				S-17	7.0	141							125/6"
			96.0										
850		CONTINUED ON SHEET 3											

INSPECTOR: M. Dodd

DRILLER: J. Blank

CONTRACTOR: American Drilling Co.

EQUIPMENT: CME 75

DRILLING METHOD: 8-inch hollow-stem
augers, 2-7/8-inch roller bit**WATER LEVEL DATA:** Encountered at 58.5 feet**GENERAL NOTES:**

1. Temporary observation well OW-3 installed in borehole at a depth of 70.7 feet.

LOG OF BORING NUMBER: TB-3				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS						
Project Name: Ann Arbor Sand and Gravel, Inc.				5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116						
Project Location: Washtenaw County, Michigan										
Date of Drilling: October 24-25, 1988										
SUBSURFACE PROFILE			BOREHOLE SAMPLE DATA							
Scale (feet)	GROUND SURFACE ELEVATION: (sheet 3 - continued)	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
						10	20	30	40	50
850	 Very Compact Dark Gray CLAYEY SAND with some Silt and trace of Gravel		S-18	--	--					140/6"
840										
	 BEDROCK: Black SHALE	113.5	S-19	--	--					150/2"
	END OF BORING	113.6								
830										
INSPECTOR: M. Dodd DRILLER: J. Blank CONTRACTOR: American Drilling Co. EQUIPMENT: CME 75 DRILLING METHOD: 8-inch hollow-stem augers, 2-1/8-inch roller bit			WATER LEVEL DATA: Encountered at 58.5 feet GENERAL NOTES: 1. Temporary observation well OW-3 installed in borehole at a depth of 70.7 feet.							

Figure No. A4c

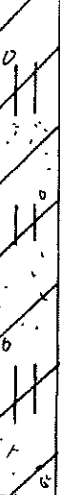
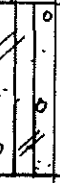
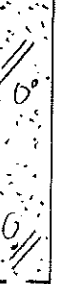
LOG OF BORING NUMBER: TB-4

Project Name: Ann Arbor Sand and Gravel, Inc.
Project Location: Washtenaw County, Michigan
Date of Drilling: February 6-13, 1989

**G. R. KUNKLE AND ASSOCIATES
CONSULTING HYDROGEOLOGISTS**

**5744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116**

SUBSURFACE PROFILE**BOREHOLE SAMPLE DATA**

BOREHOLE SAMPLE DATA												
Scale (feet)	GROUND SURFACE ELEVATION 1055.5		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)					
							10	20	30	40	50	
1050		Stiff Brown CLAYEY SILT with some Sand and trace of Gravel	10.0	S-1								
				S-2								
1040		Very Stiff Gray CLAYEY SILT with some Sand, trace of Gravel, and occasional Silty Clay seams	36.0	S-3								
				S-4								
1030				S-5								
				S-6								
1020				S-7								
				S-8								
1010		Very Stiff Gray SILTY CLAY with some Sand and trace of Gravel	45.0	S-9								
				S-10								
1000				S-11								
				S-12								
		Compact Brown FINE TO MEDIUM SAND with trace of Silt and trace to little Gravel		S-13								
				Continued on Sheet 2								
990												

INSPECTOR: M. Dodd / B. Panah
DRILLER: V. Bennett
CONTRACTOR: Mateco Drilling Co.
EQUIPMENT: CME High Torque 75
DRILLING METHOD: 8-inch augers with
CME 3-1/2-inch continuous sampler.

WATER LEVEL DATA: Encountered at 167.0 feet

GENERAL NOTES:

1. Borehole backfilled with native soils and bentonite slurry.
2. Clayey silt soils shown on this log reflect tested soil samples which classify as CL-ML.

LOG OF BORING NUMBER: TB-4				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS 5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116							
Project Name: Ann Arbor Sand and Gravel, Inc.											
Project Location: Washtenaw County, Michigan											
Date of Drilling: February 6-13, 1989											
SUBSURFACE PROFILE			BOREHOLE SAMPLE DATA								
Scale (feet)	GROUND SURFACE ELEVATION. 1055.5 Sheet 2 Continued		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N) 10 20 30 40 50				
990	Compact Brown FINE TO MEDIUM SAND with trace of Silt and trace to little Gravel		94.0	S-14							
				S-15							
				S-16							
				S-17							
980				S-18							
	Very Compact Brown MEDIUM TO COARSE SAND with some Gravel and trace of Silt		120.0	S-19							
970				S-20							
				S-21							
960				S-22							
				S-23							
950	Continued on Sheet 3			S-24							
				S-25							
940				S-26							
930											

INSPECTOR: M. Dodd / B. Panah	WATER LEVEL DATA: Encountered at 167.0 feet GENERAL NOTES: 1. Borehole backfilled with native soils and bentonite slurry.
DRILLER: V. Bennett	
CONTRACTOR: Mateco Drilling Co.	
EQUIPMENT: CME High Torque 75	
DRILLING METHOD 8-inch augers with CME 3-1/2-inch continuous sampler.	

Figure No A5b

LOG OF BORING NUMBER: TB-4

Project Name: Ann Arbor Sand and Gravel, Inc.
 Project Location: Washtenaw County, Michigan
 Date of Drilling: February 6-13, 1989

G. R. KUNKLE AND ASSOCIATES
 CONSULTING HYDROGEOLOGISTS

5744 BRIGHTON ROAD
 BRIGHTON, MICHIGAN 48116

SUBSURFACE PROFILE

BOREHOLE SAMPLE DATA

Scale (feet)	GROUND SURFACE ELEVATION. 1055.5 Sheet 3 Continued	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
						10	20	30	40	50
930	Very Compact Brown SAND AND GRAVEL with trace of Silt		S-27							
920			S-28							
			S-29							
910			S-30							
	Very Compact Brown FINE TO MEDIUM SAND with trace to little Silt and Gravel		S-31							
			S-32							
900			S-33							
		162.0	S-34							
890		168.5	S-35							
	END OF BORING									
880										

INSPECTOR: M. Dodd / B. Panah

DRILLER: V. Bennett

CONTRACTOR: Mateco Drilling Co.

EQUIPMENT: CME High Torque 75

 DRILLING METHOD: 8-inch augers with
 CME 3-1/2-inch continuous sampler.

WATER LEVEL DATA: Encountered at 167.0 feet

GENERAL NOTES:

1. Borehole backfilled with native soils and bentonite slurry.

LOG OF BORING NUMBER: TB-5				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS							
Project Name: Ann Arbor Sand and Gravel, Inc. Project Location: Washtenaw County, Michigan Date of Drilling: February 14-15, 1989				5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116							
SUBSURFACE PROFILE			BOREHOLE SAMPLE DATA								
Scale (feet)	GROUND SURFACE ELEVATION. 1036.3	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)					
						10	20	30	40	50	
1030	Medium Brown SILTY CLAY with some Sand and trace of Gravel	11.0	S-1								
			S-2								
1020	Compact Brown SILTY SAND	16.0	S-3								
	Very Stiff Gray SILTY CLAY with some Sand and trace of Gravel	35.0	S-4								
1010			S-5								
			S-6								
1000			S-7								
	Compact Brown MEDIUM TO COARSE SAND with trace of Silt and some Gravel	58.0	S-8								
990			S-9								
			S-10								
980			S-11								
	See Sheet 2		S-12								
970	Continued on Sheet 2										

INSPECTOR: M. Dodt / B. Panah DRILLER: V. Bennett CONTRACTOR: Mateco Drilling Co. EQUIPMENT: CME High Torque 75 DRILLING METHOD: 8-inch augers with CME 3-1/2-inch continuous sampler.	WATER LEVEL DATA: Encountered at 143.0 feet GENERAL NOTES: 1. Borehole backfilled with native soils and bentonite slurry.
---	---

Figure No. A6a

LOG OF BORING NUMBER: TB-5				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS								
Project Name:		Ann Arbor Sand and Gravel, Inc				5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116						
Project Location:												Washtenaw County, Michigan
Date of Drilling:		February 14-15, 1989										
SUBSURFACE PROFILE				BOREHOLE SAMPLE DATA								
Scale (feet)	GROUND SURFACE ELEVATION. 1036.3 Sheet 2 Continued			Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N) 10 20 30 40 50				
970	 Very Compact Brown MEDIUM TO COARSE SAND AND GRAVEL with trace of Silt				S-13							
					S-14							
960					S-15							
					S-16							
					S-17							
950					S-18							
		S-19										
940		96.0	S-20									
		 Very Compact Brown FINE TO MEDIUM SAND with trace of Silt and Gravel	S-21									
930			S-22									
			S-23									
			S-24									
920			S-25									
	Continued on Sheet 3											
910												

INSPECTOR: M. Dodd / B. Panah

DRILLER: V. Bennett

CONTRACTOR: Mateco Drilling Co.

EQUIPMENT: CME High Torque 75

DRILLING METHOD: 8-inch augers with
CME 3-1/2-inch continuous sampler.

WATER LEVEL DATA: Encountered at 143.0 feet

GENERAL NOTES:

- Borehole backfilled with native soils and bentonite slurry.

Figure No A6b

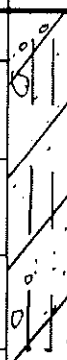
LOG OF BORING NUMBER: TB-6

Project Name: Ann Arbor Sand and Gravel, Inc.
Project Location: Washtenaw County, Michigan
Date of Drilling: February 16-17, 1989

**G. R. KUNKLE AND ASSOCIATES
CONSULTING HYDROGEOLOGISTS**

**5744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116**

SUBSURFACE PROFILE**BOREHOLE SAMPLE DATA**

Scale (feet)	GROUND SURFACE ELEVATION. 1052.8	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
						10	20	30	40	50
1050	 Stiff Brown to Gray CLAYEY SILT with little to some Sand and trace of Gravel	19.0	S-1							
			S-2							
1040			S-3							
			S-4							
1030	 Stiff to Very Stiff Gray SILTY CLAY with some Sand and trace of Gravel	44.0	S-5							
			S-6							
1020			S-7							
			S-8							
1010			S-9	13.3						
	 Very Stiff Gray SANDY CLAY with some Silt and trace of Gravel	52.0	S-10							
1000			S-11							
	 Compact Brown SAND with trace of Silt and trace to little Gravel		S-12							
990										

INSPECTOR: M. Dodd / B. Panah
DRILLER: V. Bennett
CONTRACTOR: Mateco Drilling Co.
EQUIPMENT: CME High Torque 75
DRILLING METHOD: 8-inch augers with
CME 3-1/2-inch continuous sampler.

WATER LEVEL DATA: Encountered at 162.0 feet

GENERAL NOTES: (revised 5-19-89)

1. Borehole backfilled with native soils and bentonite slurry.
2. Clayey silt soils shown on this log reflect tested soil samples which classify as CL-ML.

LOG OF BORING NUMBER: TB-6				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS						
Project Name: Ann Arbor Sand and Gravel, Inc. Project Location: Washtenaw County, Michigan Date of Drilling: February 16-17, 1989				5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116						
SUBSURFACE PROFILE				BOREHOLE SAMPLE DATA						
Scale (feet)	GROUND SURFACE ELEVATION. 1052.8 Sheet 2 Continued	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N) 10 20 30 40 50				
990	 Compact Brown SAND with trace of Silt and trace to little Gravel	67.0	S-13							
			S-14							
980			S-15							
			S-16							
970			S-17							
	 Very Compact Brown MEDIUM TO COARSE SAND AND GRAVEL with trace of Silt		S-18							
960			S-19							
			S-20							
950										
940				S-21						
			S-22							
930	Continued on Sheet 3									
INSPECTOR: M. Dodd / B. Panah DRILLER: V. Bennett CONTRACTOR: Mateco Drilling Co. EQUIPMENT: CME High Torque 75 DRILLING METHOD: 8-inch augers with CME 3-1/2-inch continuous sampler.			WATER LEVEL DATA: Encountered at 162.0 feet GENERAL NOTES: (revised 5-19-89) 1. Borehole backfilled with native soils and bentonite slurry.							

Figure No. A7b

LOG OF BORING NUMBER: TB-6

G. R. KUNKLE AND ASSOCIATES
CONSULTING HYDROGEOLOGISTS

Project Name: Ann Arbor Sand and Gravel, Inc.

Project Location: Washtenaw County, Michigan

Date of Drilling: February 16-17, 1989

5744 BRIGHTON ROAD

BRIGHTON, MICHIGAN 48116

SUBSURFACE PROFILE

BOREHOLE SAMPLE DATA

Scale (feet)	GROUND SURFACE ELEVATION. 1052.8 Sheet 3 Continued	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
						10	20	30	40	50
930	Very Compact Brown MEDIUM TO COARSE SAND AND GRAVEL with trace of Silt	142.0	S-23							
			S-24							
920			S-25							
			S-26							
910			S-27							
	Very Compact Brown FINE SAND with trace of Silt and Gravel	165.0	S-28							
900			S-29							
			S-30							
890			S-31							
	END OF BORING									
880										

INSPECTOR: M. Dodd / B. Panah

DRILLER: V. Bennett

CONTRACTOR: Mateco Drilling Co.

EQUIPMENT: CME High Torque 75

DRILLING METHOD: 8-inch augers with
CME 3-1/2-inch continuous sampler.

WATER LEVEL DATA: Encountered at 162.0 feet.

GENERAL NOTES:

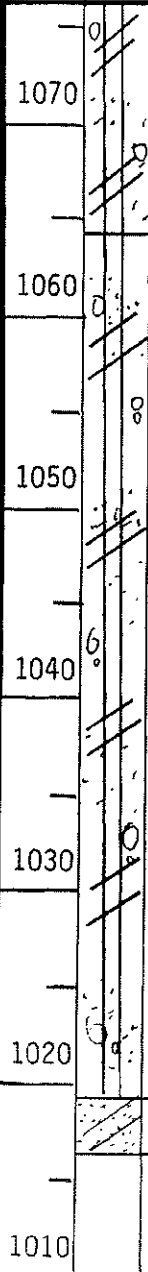
1. Borehole backfilled with native soils and bentonite slurry.

LOG OF BORING NUMBER: TB-7

G. R. KUNKLE AND ASSOCIATES
CONSULTING HYDROGEOLOGISTSProject Name: Ann Arbor Sand and Gravel, Inc.
Project Location: Washtenaw County, Michigan
Date of Drilling: February 20-22, 19895744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116

SUBSURFACE PROFILE

BOREHOLE SAMPLE DATA

Scale (feet)		GROUND SURFACE ELEVATION: 1076.4	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
							10	20	30	40	50
1070		Stiff Brown SILTY CLAY with some Sand and trace of Gravel	12.0	S-1							
		S-2									
1060		S-3									
	Stiff Gray SILTY CLAY with some Sand and trace of Gravel	S-4									
1050		S-5									
		S-6									
1040		S-7									
		S-8									
1030		S-9									
		S-10									
1020		S-11									
		S-12									
1010	See Sheet 2 Continued on Sheet 2										

INSPECTOR: M. Dodt / B. Panah
DRILLER: V. Bennett
CONTRACTOR: Mateco Drilling Co.
EQUIPMENT: CME High Torque 75
DRILLING METHOD: 8-inch augers with
CME 3-1/2-inch continuous sampler.

WATER LEVEL DATA: Encountered at 184.0 feet

GENERAL NOTES:

1. Borehole backfilled with native soils and bentonite slurry.

LOG OF BORING NUMBER: TB-7				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS							
Project Name: Ann Arbor Sand and Gravel, Inc. Project Location: Washtenaw County, Michigan Date of Drilling: February 20-22, 1989				5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116							
SUBSURFACE PROFILE				BOREHOLE SAMPLE DATA							
Scale (feet)	GROUND SURFACE ELEVATION: 1076.4 Sheet 2 Continued			Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N) 10 20 30 40 50			
1010	Compact Gray SILTY SAND			67.0	S-13						
1000	Stiff Gray SILTY CLAY with some Sand and trace of Gravel			72.0	S-14						
990	Compact to Very Compact Brown MEDIUM TO COARSE SAND AND GRAVEL with trace of Silt				S-15						
980					S-16						
970					S-17						
960					S-18						
950					S-19						
	Continued on Sheet 3				S-20						
					S-21						
					S-22						
INSPECTOR: M. Dodt / B. Panah DRILLER: V. Bennett CONTRACTOR: Mateco Drilling Co. EQUIPMENT: CME High Torque 75 DRILLING METHOD: 8-inch augers with CME 3-1/2-inch continuous sampler.					WATER LEVEL DATA: Encountered at 184.0 feet GENERAL NOTES: 1. Borehole backfilled with native soils and bentonite slurry.						

Figure No A8b

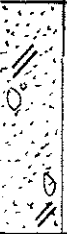
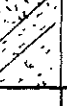
LOG OF BORING NUMBER: TB-7				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS						
Project Name: Ann Arbor Sand and Gravel, Inc. Project Location: Washtenaw County, Michigan Date of Drilling: February 20-22, 1989				5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116						
SUBSURFACE PROFILE			BOREHOLE SAMPLE DATA							
Scale (feet)	GROUND SURFACE ELEVATION: 1076.4 Sheet 3 Continued	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
						10	20	30	40	50
950			S-23							
			S-24							
940			S-25							
			S-26							
930			S-27							
920			S-28							
910			S-29							
		168.0	S-30							
900			S-31							
			S-32							
		180.0	S-33							
890			S-34							
			S-35							
		185.0								
	END OF BORING									
INSPECTOR: M. Dodd / B. Panah DRILLER: V. Bennett CONTRACTOR: Mateco Drilling Co. EQUIPMENT: CME High Torque 75 DRILLING METHOD: 8-inch augers with CME 3-1/2-inch continuous sampler.			WATER LEVEL DATA: Encountered at 184.0 feet GENERAL NOTES: 1. Borehole backfilled with native soils and bentonite slurry.							

Figure No A8c

LOG OF BORING NUMBER: TB-8				G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS							
Project Name: Ann Arbor Sand and Gravel, Inc Project Location: Washtenaw County, Michigan Date of Drilling: February 22, 1989				5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116							
SUBSURFACE PROFILE				BOREHOLE SAMPLE DATA							
Scale (feet)	GROUND SURFACE ELEVATION: 1028.2		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	PENETRATION RESISTANCE (N)				
							10	20	30	40	50
1020	 Very Stiff Gray SILTY CLAY with little to some Sand and trace of Gravel		21.0	S-1							
			S-2								
			S-3								
			S-4								
1010	 Very Compact Brown MEDIUM TO COARSE SAND AND GRAVEL with trace of Silt			S-5							
			S-6								
			S-7								
			S-8								
			S-9								
			S-10								
1000	END OF BORING		50.0								
990											
980											
970											

INSPECTOR: M. Dodd / B. Panah DRILLER: V. Bennett CONTRACTOR: Mateco Drilling Co. EQUIPMENT: CME High Torque 75 DRILLING METHOD: 8-inch augers with CME 3-1/2-inch continuous sampler.	WATER LEVEL DATA: None encountered GENERAL NOTES: 1. Borehole backfilled with native soils and bentonite slurry.
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Figure No A9

LOG OF TEST PIT NUMBER: TP-A				G.R. KUNKLE and ASSOCIATES, INC.			
Project Name: Ann Arbor Sand and Gravel, Inc. Project Location: Washtenaw County, Michigan Date: October 12, 1988 Inspector: M. Dodd Contractor: ----- Equipment: -----				CONSULTING HYDROGEOLOGISTS 5744 Brighton Road Brighton, Michigan 48116			
SUBSURFACE PROFILE			SOIL SAMPLE DATA				
Scale feet msl	GROUND SURFACE ELEVATION: 1040.0	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	COMMENTS	
1030		38.0				Descriptions based on visual field observations	
1020							
1010							
1000							
990		90.0					
980							
970							
960							
950							
940	BOTTOM OF EXISTING PIT						

GENERAL NOTES:

- This log represents encountered soil types exposed along the side walls of the existing excavated area.

LOG OF TEST PIT NUMBER: TP-1

Project Name: Ann Arbor Sand and Gravel, Inc.
Project Location: Washtenaw County, Michigan
Date: October 26, 1988
Inspector: M. Dodt
Contractor: Ann Arbor Sand and Gravel, Inc.
Equipment: Caterpillar 5502 Backhoe

G.R. KUNKLE and ASSOCIATES, INC.**CONSULTING HYDROGEOLOGISTS**

**5744 Brighton Road
Brighton, Michigan 48116**

SUBSURFACE PROFILE**SOIL SAMPLE DATA**

Scale feet msl	GROUND SURFACE ELEVATION: 1052.7	Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	COMMENTS
1050	TOPSOIL: Dark Brown CLAYEY SILT with trace of Sand and Gravel	0.8				
1045	Brown CLAYEY SILT with little Sand and trace of Gravel	9.5	BS-1	14.7	--	USCS: CL-ML
1040	Gray CLAYEY SILT with some Sand and trace of Gravel					
1035		18.0	BS-2	12.5	--	USCS: CL-ML
	END OF TEST PIT					

GENERAL NOTES:

1. Ground surface elevations supplied by Atwell-Hicks, Inc.
2. Test pit backfilled with excavated soils.

Figure A11

LOG OF TEST PIT NUMBER: TP-2				G.R. KUNKLE and ASSOCIATES, INC. CONSULTING HYDROGEOLOGISTS 5744 Brighton Road Brighton, Michigan 48116			
Project Name: Ann Arbor Sand and Gravel, Inc. Project Location: Washtenaw County, Michigan Date: October 26, 1988 Inspector: M. Dodt Contractor: Ann Arbor Sand and Gravel, Inc. Equipment: Caterpillar 5502 Backhoe							
SUBSURFACE PROFILE				SOIL SAMPLE DATA			
Scale feet msl	GROUND SURFACE ELEVATION: 1067.7		Depth (feet)	SAMPLE TYPE & NUMBER	MOISTURE CONTENT (percent)	DRY DENSITY (pcf)	COMMENTS
1065	TOPSOIL: Dark Brown CLAYEY SILT with trace of Sand and Gravel		0.8				
1060	Brown CLAYEY SILT with some Sand and little Gravel			BS-1	11.4	--	USCS: CL-ML
1055	Gray SILTY CLAY with some Sand and trace of Gravel		10.0				
1050	Gray SILTY CLAY with some Sand and trace of Gravel		18.0	BS-2	12.2	--	USCS: CL
	END OF TEST PIT						
GENERAL NOTES: 1. Ground surface elevations supplied by Atwell-Hicks, Inc. 2. Test pit backfilled with excavated soils.							

Figure A12

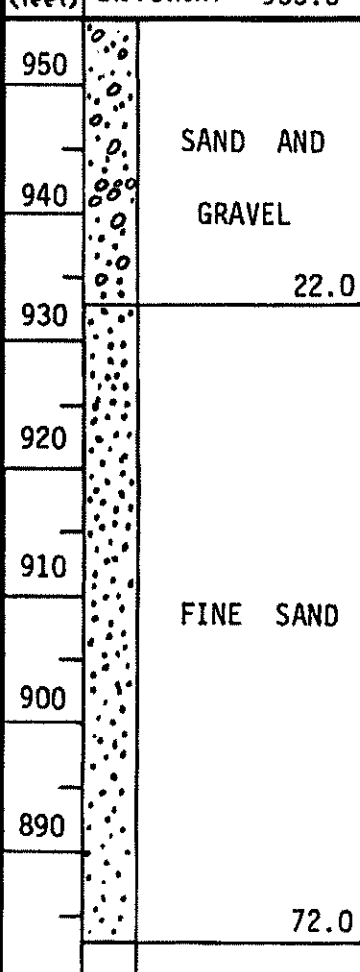
LOG OF WELL NUMBER: OW-1		G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS	
Project Name: Ann Arbor Sand and Gravel, Inc.		5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116	
Project Location: Washtenaw County, Michigan Date of Installation: October 19, 1988			
GENERALIZED GEOLOGIC PROFILE		LOG OF WELL CONSTRUCTION	
Scale (feet)	Ground Surface Elevation: 955.0	 Well Casing Top Elevation: 958.46 DEPTH TO TOP OF GROUT: 0.0 GROUT SEAL DEPTH TO TOP OF BENTONITE SEAL: 0.0 BENTONITE SEAL DEPTH TO TOP OF SAND: 60.0 SAND WELL SCREEN TIP ELEVATION: 885.0	
		WATER LEVEL DATA	
		DATE	GROUND- WATER ELEVATION (feet m.s.l.)
		10-19-88	892.46
		10-27-88	893.26
		2-1 -89	893.37
		WELL CONSTRUCTION DETAILS	
		CASING DIAMETER: 2-inch CASING LENGTH: 70 feet CASING TYPE: Galvanized Steel SCREEN DIAMETER: 2-inch SCREEN LENGTH: 3 feet SCREEN MESH: .010-inch SCREEN TYPE: Stainless Steel PROTECTIVE CASING LENGTH: none PROTECTIVE CASING TYPE: none GROUT TYPE: Bentonite Slurry	
END OF BORING			
WELL TYPE: Temporary observation INSPECTOR: M. Dodd DRILLER: L. Melvin CONTRACTOR: American Drilling Co. EQUIPMENT: Eagle No. 1 ATV		GENERAL NOTES: 1. See Log of Boring TB-1 for detailed soil descriptions.	

Figure No. A13

LOG OF WELL NUMBER: OW-2**G. R. KUNKLE AND ASSOCIATES
CONSULTING HYDROGEOLOGISTS**

Project Name: Ann Arbor
Sand and Gravel, Inc.
Project Location: Washtenaw County, Michigan
Date of Installation: October 20, 1988

**5744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116**

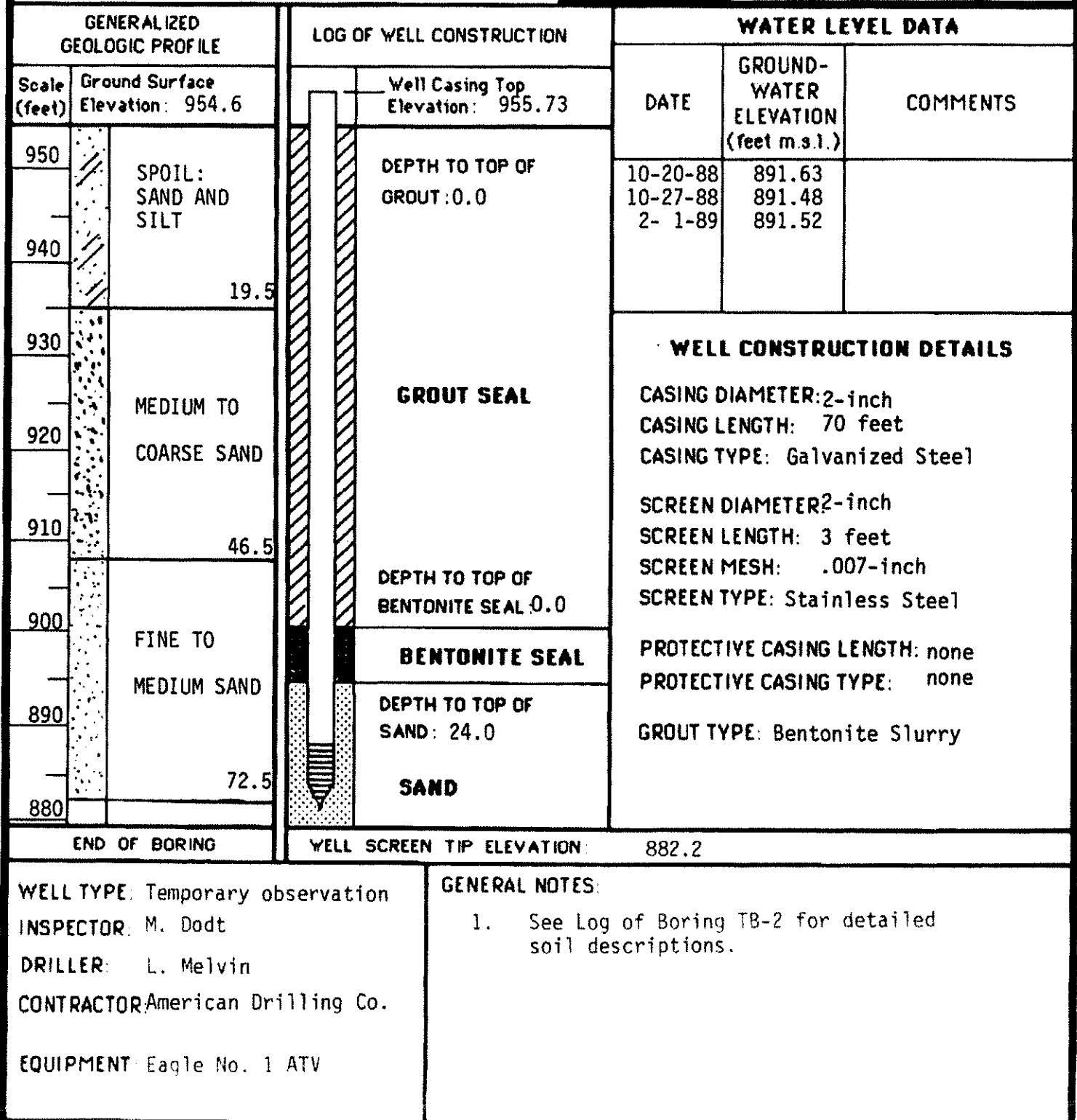


Figure No. A14

LOG OF WELL NUMBER: OW-3		G. R. KUNKLE AND ASSOCIATES CONSULTING HYDROGEOLOGISTS	
Project Name: Ann Arbor Sand and Gravel, Inc. Project Location: Washtenaw County, Michigan Date of Installation: October 25, 1988		5744 BRIGHTON ROAD BRIGHTON, MICHIGAN 48116	
GENERALIZED GEOLOGIC PROFILE		LOG OF WELL CONSTRUCTION	
Scale (feet)	Ground Surface Elevation: 950.0	Well Casing Top Elevation: 952.86	
940	SPOIL: SILT 12.0	DEPTH TO TOP OF GROUT: 0.0	
930	FINE TO COARSE SAND 72.0	GROUT SEAL	10-27-88 2-1 -89
920			GROUND- WATER ELEVATION (feet m.s.l.)
910			COMMENTS
900			
890		WELL CONSTRUCTION DETAILS	
880		CASING DIAMETER: 2-inch CASING LENGTH: 70 feet CASING TYPE: Galvanized Steel SCREEN DIAMETER: 2-inch SCREEN LENGTH: 3 feet SCREEN MESH: .007-inch SCREEN TYPE: Stainless Steel PROTECTIVE CASING LENGTH: none PROTECTIVE CASING TYPE: none GROUT TYPE: Bentonite Slurry	
END OF BORING		DEPTH TO TOP OF BENTONITE SEAL: 0.0	
		BENTONITE SEAL	
		DEPTH TO TOP OF SAND: 48.0	
		SAND	
		WELL SCREEN TIP ELEVATION: 879.3	
WELL TYPE: Temporary observation INSPECTOR: M. Dodt DRILLER: J. Blank CONTRACTOR: American Drilling Co. EQUIPMENT: CME 75		GENERAL NOTES: 1. See Log of Boring TB-3 for detailed soil descriptions.	

Figure No. A15

PROJECT NO. 88694 OW			NEYER, TISEO & HINDO, LTD.										SHEET 1 OF 1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Test Boring or Test Pit Number	Sample Number	Depth of Sample Tip	Elevation of Sample Tip	Unconfined Compressive Strength (PSF)	Failure Strain (Percent)	Natural Water Content (Percent of Dry Weight)	In-Place Dry Density (Pounds per Cubic Foot)	Permeability (Centimeters per Second)	Particle Size Distribution								Atterberg Limits			Apparent Specific Gravity	Unified Soil Classification																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
									Colloids (Percent)	Clay (Percent)	Silt (Percent)	Fine Sand (Percent)	Medium Sand (Percent)	Coarse Sand (Percent)	Gravel (Percent)	Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
TB-1	S-3	15.5	939.5	-	-	-	-	-	↓	8	↑	15	26	15	36																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

Figure A16

PROJECT NO. 88694 OW		NEYER, TISEO & HINDO, LTD.										SHEET 1 OF 2									
Ann Arbor Sand and Gravel, Inc.												TABULATION OF TEST DATA									
Test Boring or Test Pit Number	Sample Number	Depth of Sample Tip	Elevation of Sample Tip	Unconfined Compressive Strength (PSF)	Failure Strain (Percent)	Natural Water Content (Percent of Dry Weight)	In-Place Dry Density (Pounds per Cubic Foot)	Permeability (Centimeters per Second)	Particle Size Distribution								Atterberg Limits			Apparent Specific Gravity	Unified Soil Classification
									Colloids (Percent)	Clay (Percent)	Silt (Percent)	Fine Sand (Percent)	Medium Sand (Percent)	Coarse Sand (Percent)	Gravel (Percent)	Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)			
TB-4	S-2	8.5	1047.0	-	-	-	-	-	↓	24	46	19	7	2	2	22	15	7	-	CL-ML	
	S-3	13.5	1042.0	-	-	-	-	-	↓	25	40	21	8	4	2	20	13	7	-	CL-ML	
	S-5	23.5	1032.0	-	-	12.5	-	-	↓	25	41	20	7	4	3	21	13	8	-	CL	
	S-6	28.5	1027.0	-	-	-	-	-	↓	21	65	10	3	1	0	21	16	5	-	CL-ML	
	S-8	38.5	1017.0	-	-	12.8	-	-	↓	32	42	16	6	2	2	24	13	11	-	CL	
TB-5	S-2	10.0	1026.3	-	-	-	-	-	↓	28	40	20	7	3	2	23	14	9	-	CL	
	S-5	25.0	1011.3	-	-	-	-	-	↓	30	40	17	8	3	2	23	14	9	-	CL	
TB-6	S-4	20.0	1032.8	-	-	-	-	-	↓	29	43	17	7	2	2	23	14	9	-	CL	
	S-7	35.0	1017.8	-	-	-	-	-	↓	30	45	16	6	2	1	24	14	10	-	CL	
	S-9	45.0	1007.8	-	-	13.3	-	-	↓	32	31	19	9	4	5	26	15	11	-	CL	
	S-10	50.0	1002.8	-	-	-	-	-	↓	31	31	21	9	4	4	26	15	11	-	CL	
TB-7	S-1	5.0	1071.4	-	-	-	-	-	↓	38	32	22	6	2	0	37	17	20	-	CL	
	S-4	20.0	1056.4	-	-	-	-	-	↓	28	40	19	8	3	2	23	13	10	-	CL	
	S-7	35.0	1041.4	-	-	-	-	-	↓	29	40	17	7	3	4	23	14	9	-	CL	
	S-9	45.0	1031.4	-	-	12.6	-	-	↓	30	44	15	5	3	3	23	14	9	-	CL	
	S-11	55.0	1021.4	-	-	-	-	-	↓	30	44	17	6	2	1	23	14	9	-	CL	

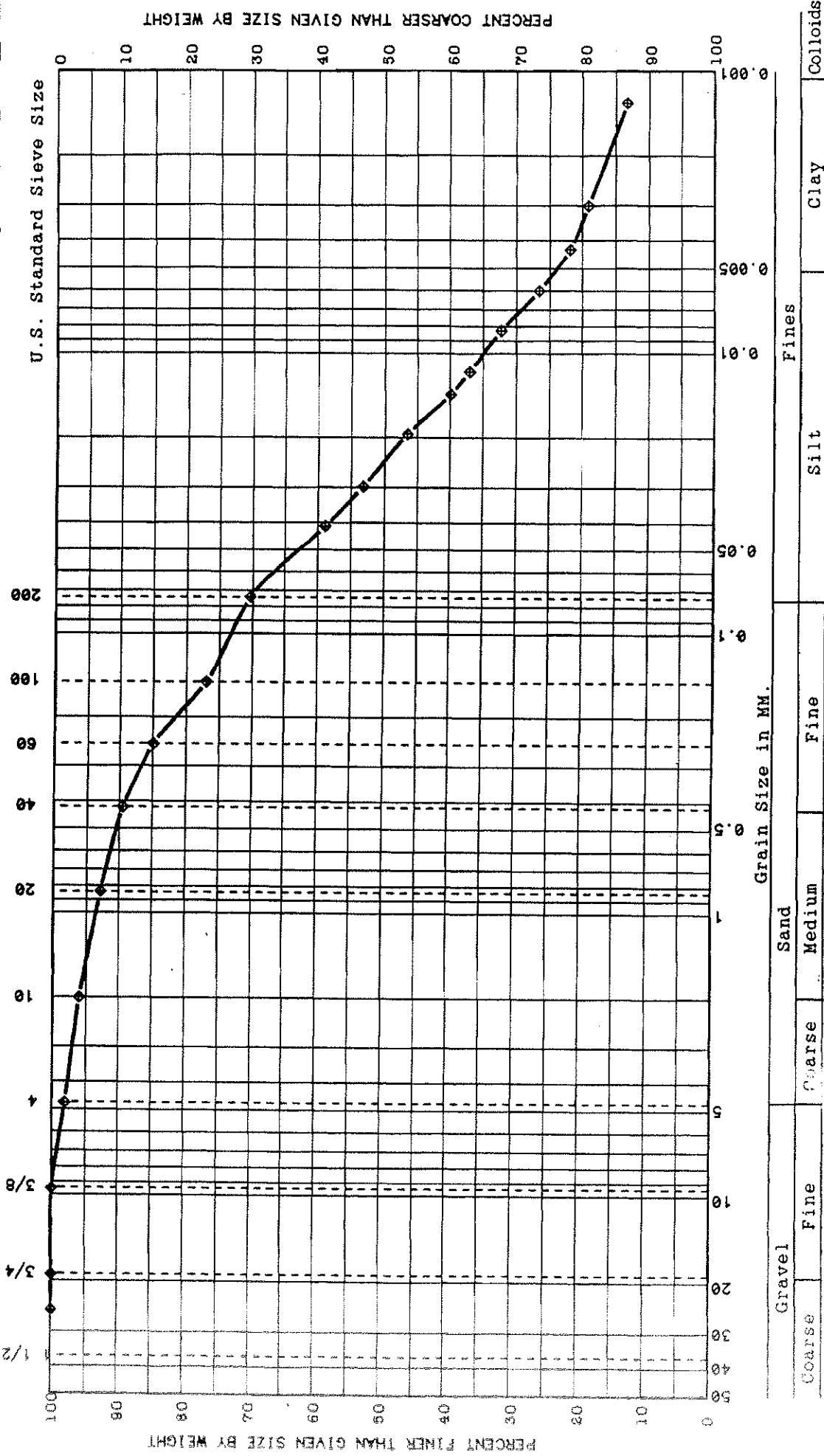
Figure A18

PROJECT NO. 88694 OW		NEYER, TISEO & HINDO, LTD.				SHEET 2 OF 2																	
Ann Arbor Sand and Gravel, Inc.												TABULATION OF TEST DATA											
Test Boring or Test Pit Number	Sample Number	Depth of Sample Tip	Elevation of Sample Tip	Unconfined Compressive Strength (PSF)	Failure Strain (Percent)	Natural Water Content (Percent of Dry Weight)	In-Place Dry Density (Pounds per Cubic Foot)	Permeability (Centimeters per Second)	Particle Size Distribution								Atterberg Limits			Apparent Specific Gravity	Unified Soil Classification		
									Clays (Percent)	Silt (Percent)	Fine Sand (Percent)	Medium Sand (Percent)	Coarse Sand (Percent)	Gravel (Percent)	Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)						
TB-8	S-2	10.0	1018.2	1	1	1	1	1	↓	26	36	21	6	2	9	23	15	8	1	1	CL		
	S-4	20.0	1008.2	1	1	1	1	1	↓	36	46	11	4	2	1	26	15	11	1	1	CL		

Figure A19

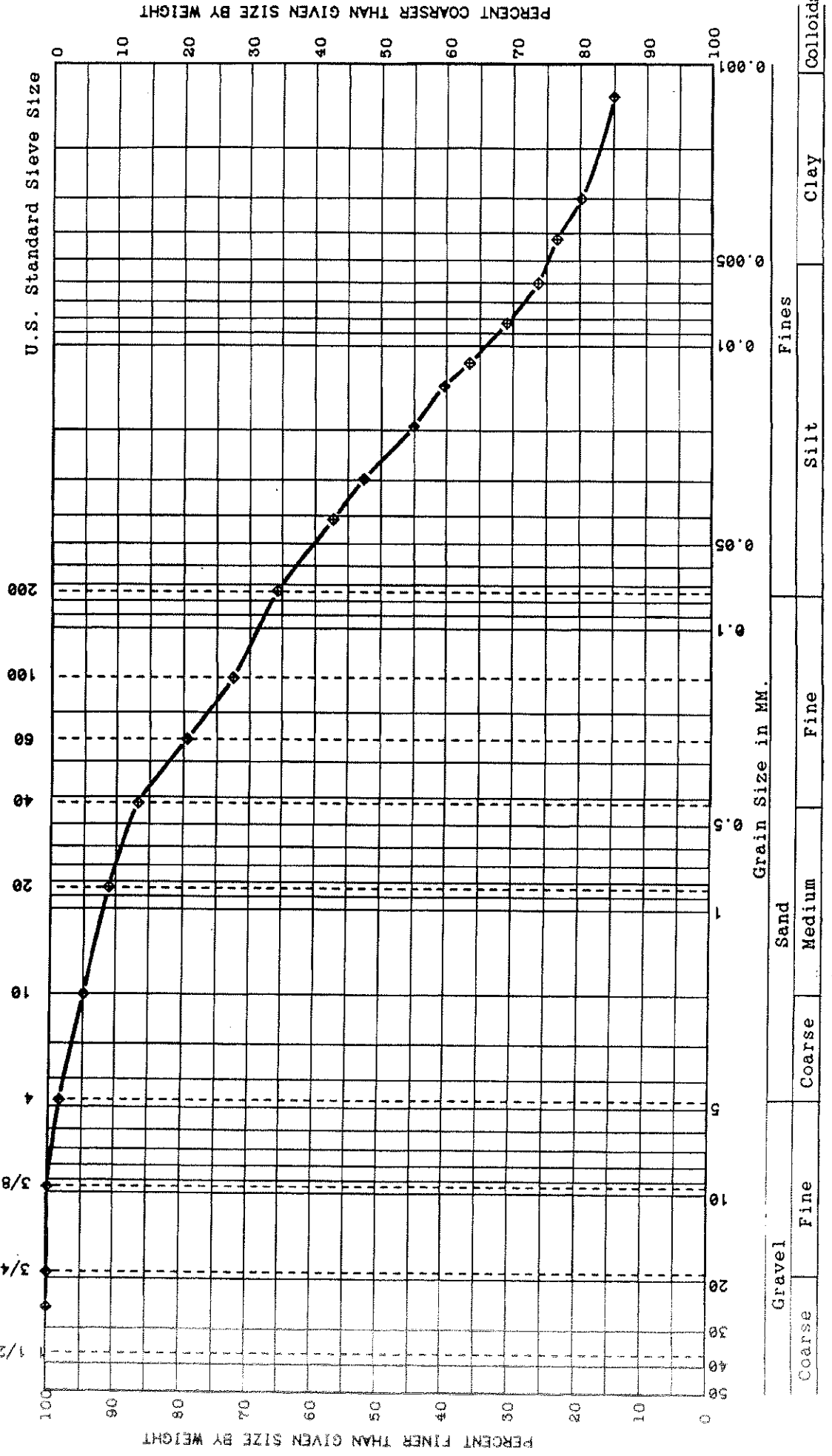
NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. _____ Source _____
 Project Location Ann Arbor, Michigan For _____
 Boring No. 4 Field Sample No. S-2 Sample Depth 8.5' Sample Elev. (Tip) 1047.0'
 Sample Description Very Stiff Brown SILTY CLAY with Some Sand and Trace of Gravel (CL-ML)
 Sampled By GRK Date --- Tested By SY Date 4/6/89 Check By SG



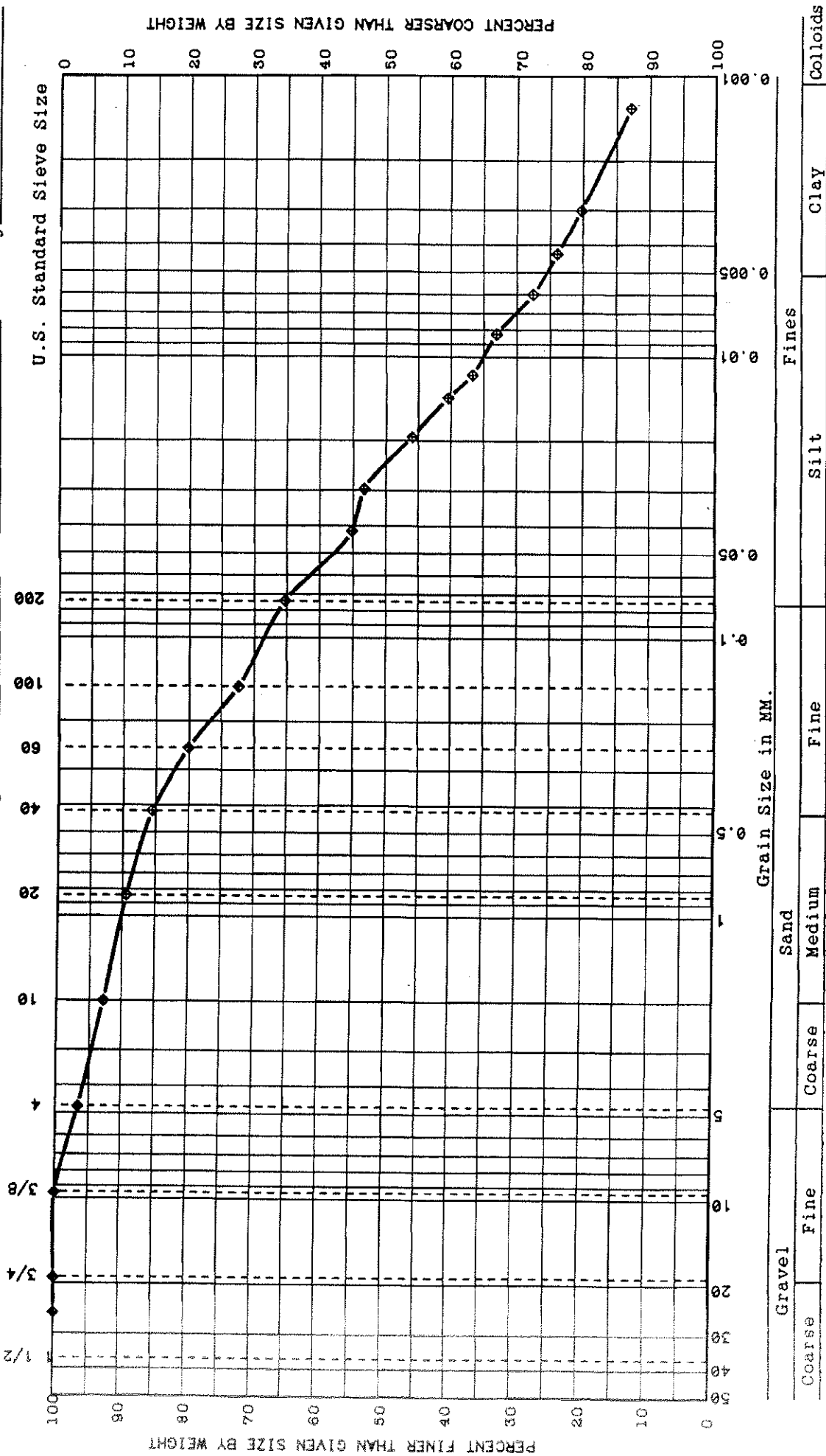
NEVER, TISEO & HINDO, LTD.
GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. _____ Source _____
 Project Location Ann Arbor, Michigan For _____
 Boring No. 4 Field Sample No. S-3 Sample Depth 13.5' Sample Elev. (Tip) 1042.0'
 Sample Description Very Stiff Gray **SILTY CLAY** with Some Sand and Trace of Gravel (CL-ML)
 Sampled By GRK Date _____ Tested By DV Date 4/5/89 Check By SG



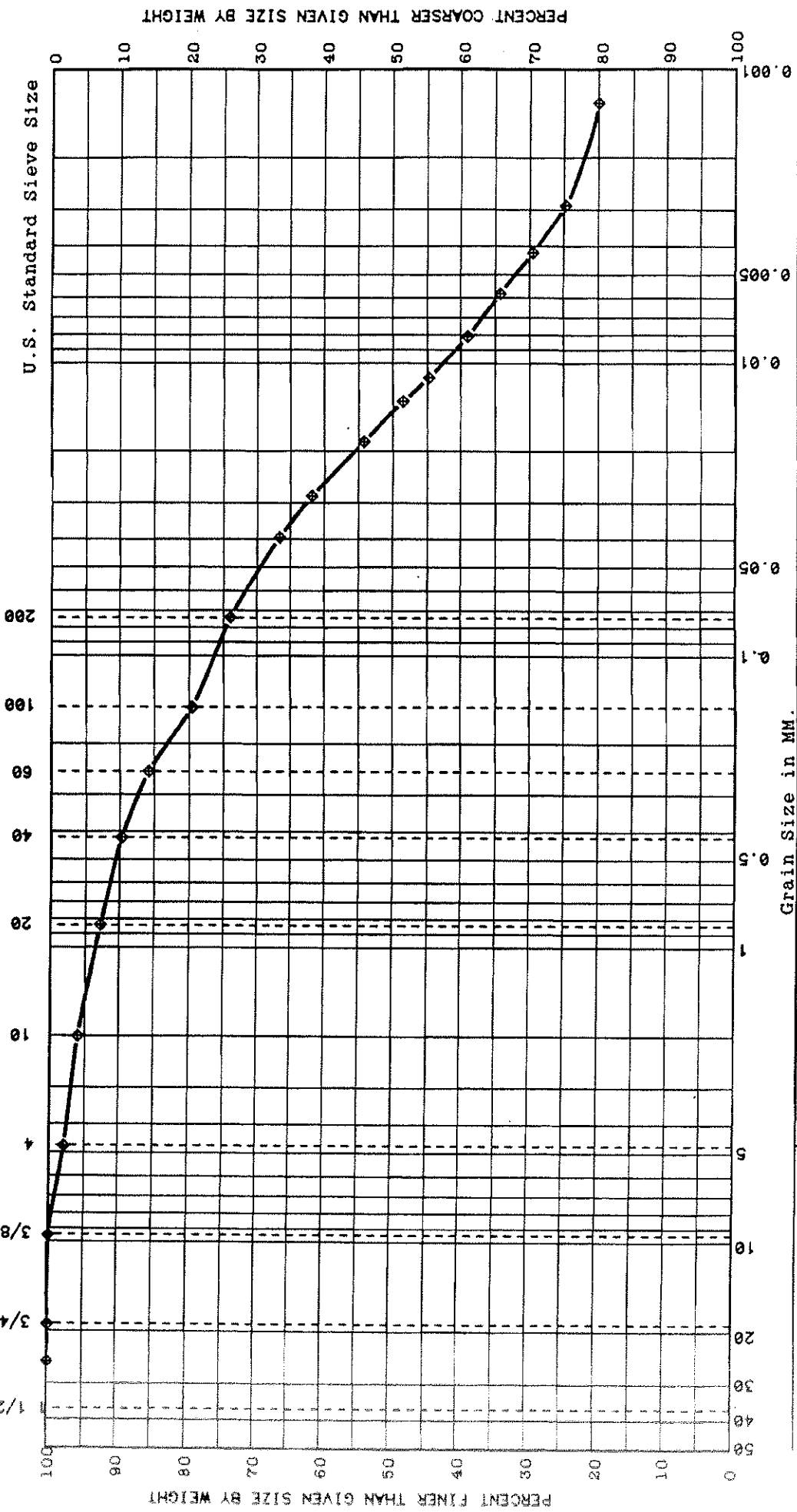
NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. _____ Source _____
 Project Location Ann Arbor, Michigan For _____
 Boring No. 4 Field Sample No. S-5 Sample Depth 23.5' Sample Elev. (Tip) 1032.0'
 Sample Description Very Stiff Gray SILTY CLAY with Little Sand, Trace of Gravel and Seams of Sand (CL)
 Sampled By GRK Date _____ Tested By SY Date 4/6/89 Check By SG



NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

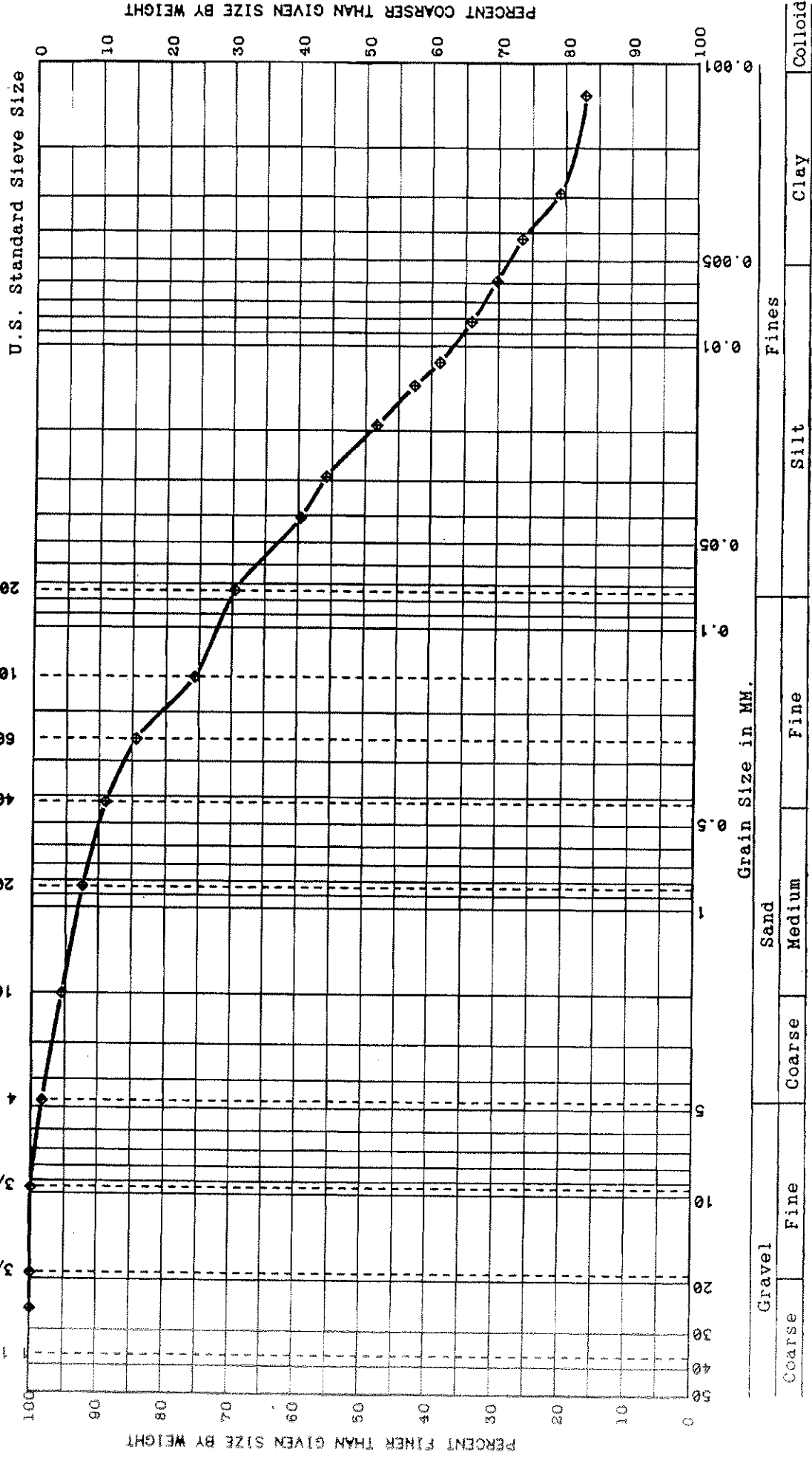
Project No. 88694 OW Lab Sample No. _____ Source _____
 Project Location Ann Arbor, Michigan For _____
 Boring No. 4 Field Sample No. S-8 Sample Depth 38.5' Sample Elev. (Tip) 1017.0'
 Sample Description Very Stiff Gray SILTY CLAY with Some Sand, Trace of Gravel and Pieces of Shale (CL)
 Sampled By GRK Date --- Tested By DV Date 4/5/89 Check By SG



Gravel			Sand			Fines		
Coarse	Fine		Coarse	Medium	Fine	Silt	Clay	Colloids

NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. _____ Source _____
 Project Location Ann Arbor, Michigan For _____
 Boring No. 5 Field Sample No. S-2 Sample Depth 10.0' Sample Elev. (Tip) 1026.3'
 Sample Description Very Stiff Brown SILTY CLAY with Some Sand and Trace of Gravel (CL)
 Sampled By GRK Date --- Tested By DV Date 4/5/89 Check By SG



NEYER, TISEO & HINDO, LTD. **GRAIN SIZE DISTRIBUTION CURVE**

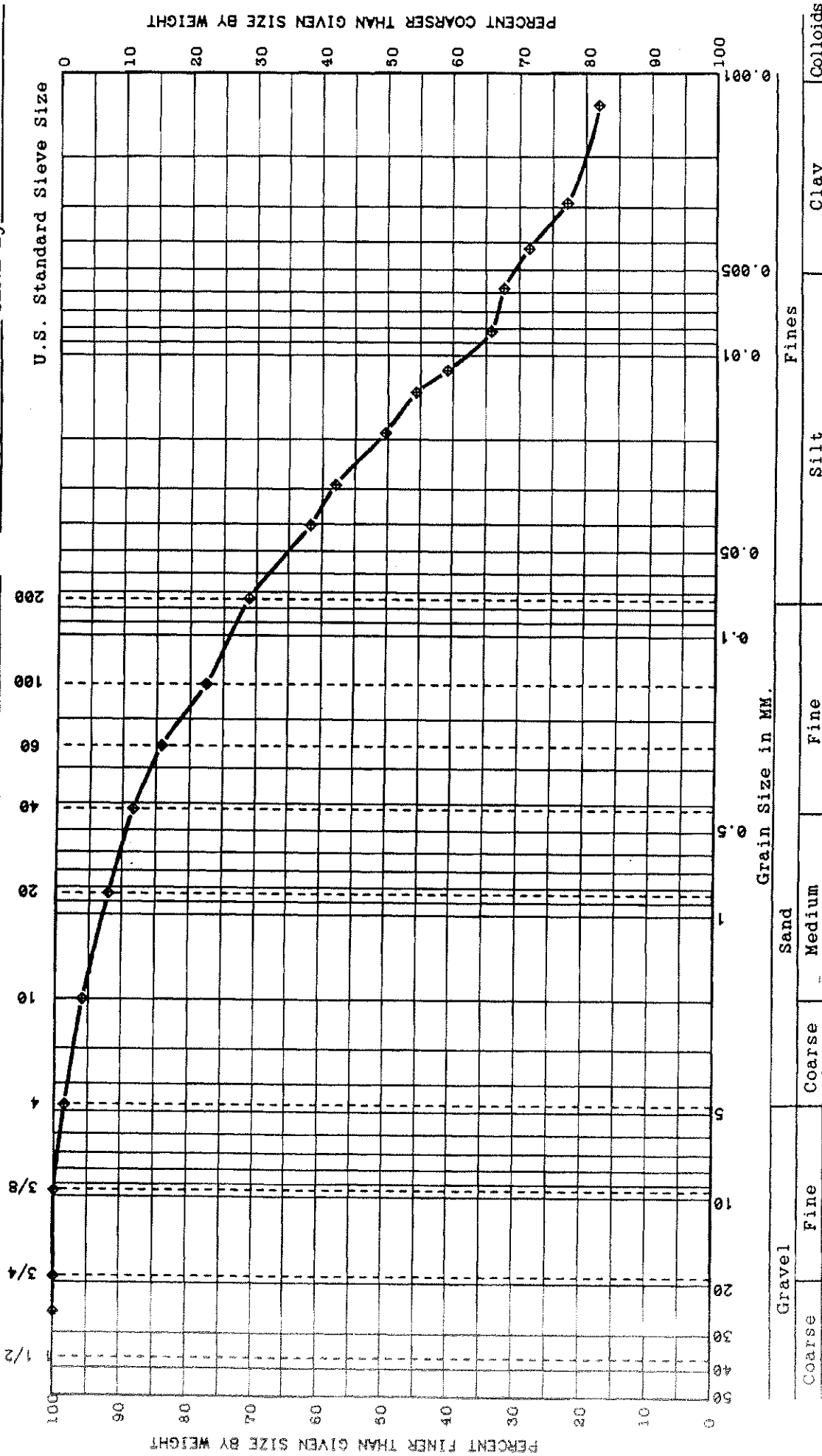
Project No. 88694 OW Lab Sample No. Source

Project Location Ann Arbor, Michigan For

Boring No. 5 Field Sample No. S-5 Sample Depth 25.0' Sample Elev. (Tip) 1011.3'

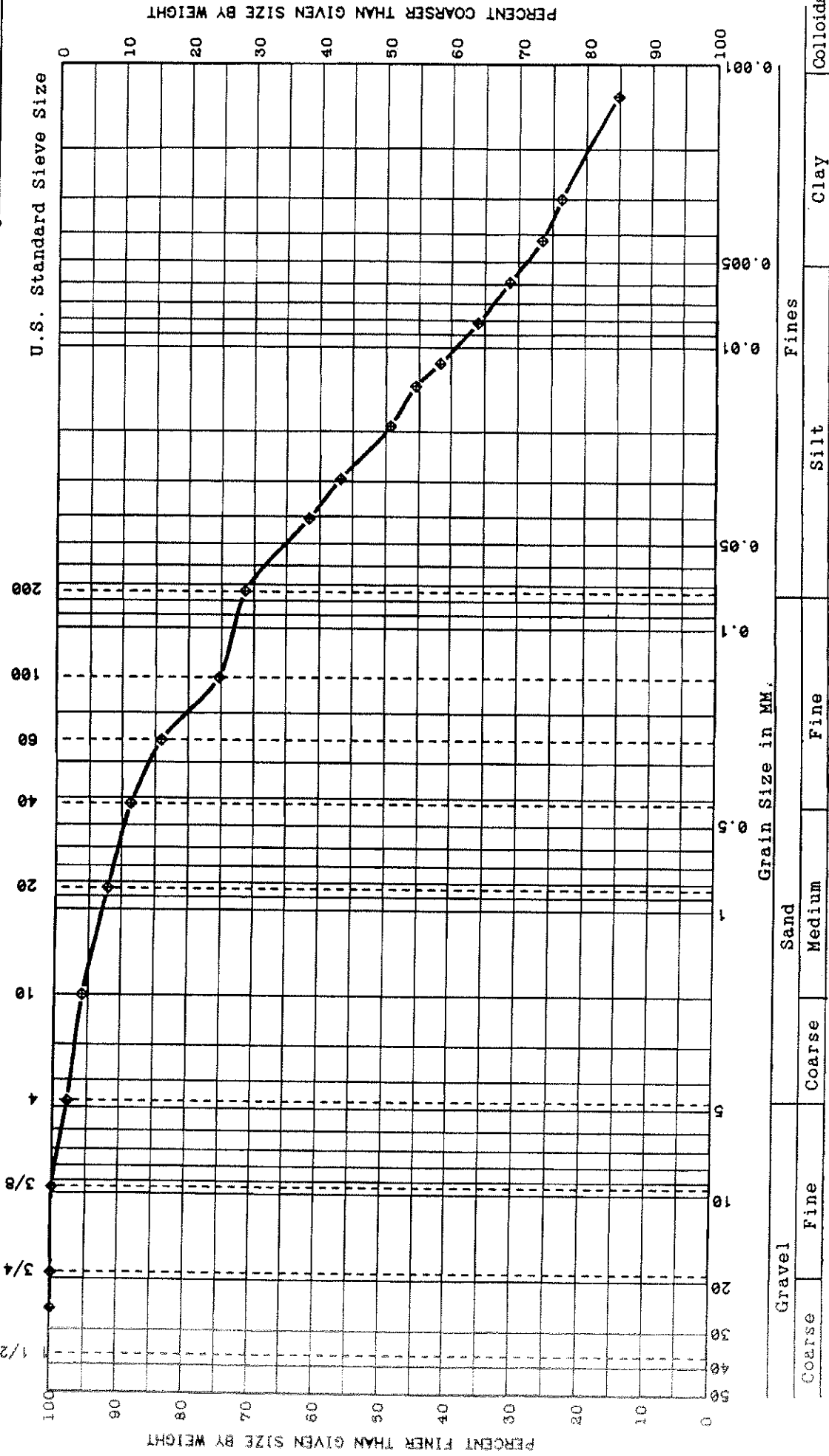
Sample Description Very Stiff Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)

Sampled By GRK Date Tested By DV Date 4/5/89 Check By SG



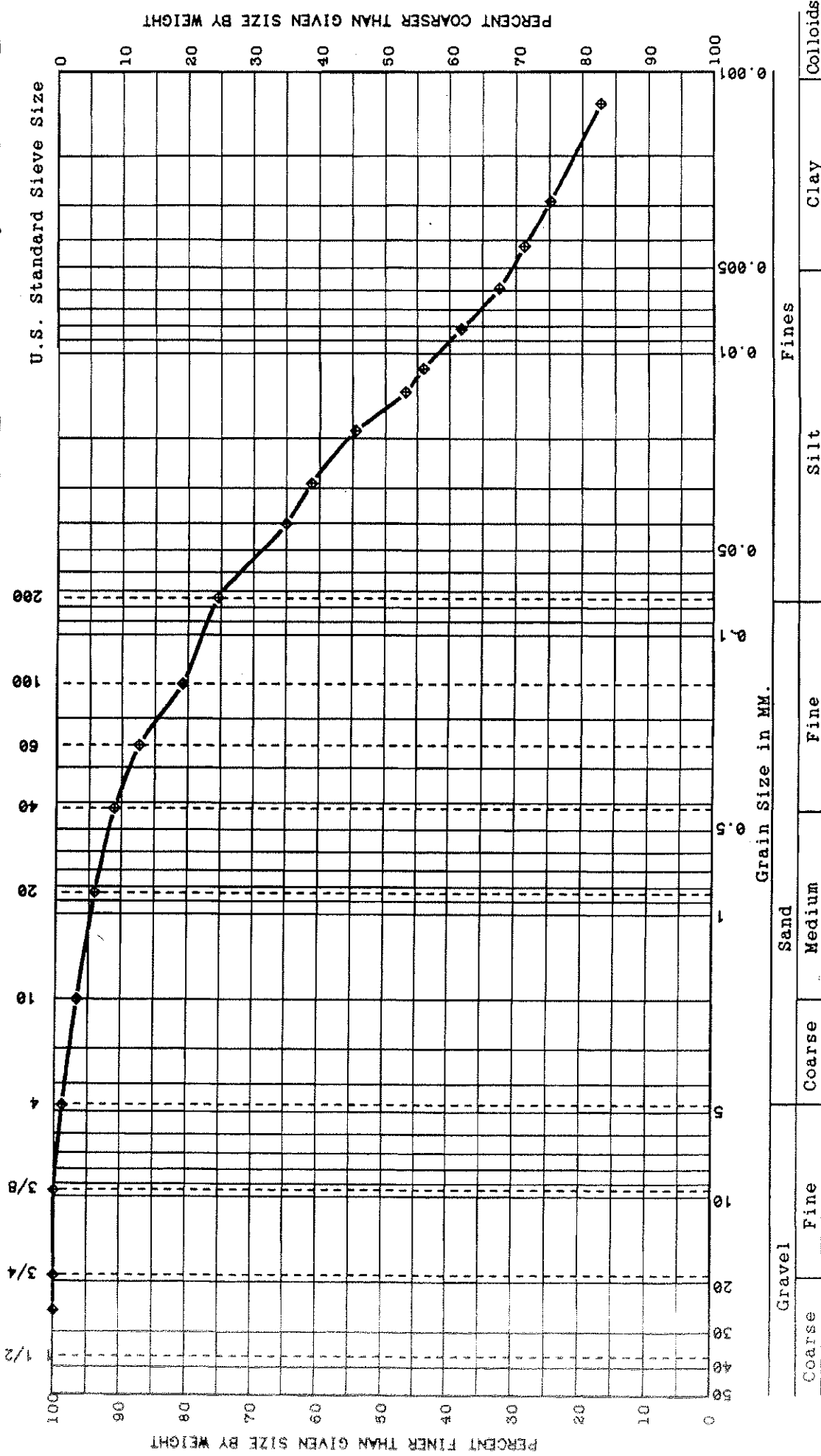
NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. Source For
 Project Location Ann Arbor, Michigan
 Boring No. 6 Field Sample No. S-4 Sample Depth 20.0' Sample Elev. (Tip) 1032.8'
 Sample Description Stiff Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)
 Sampled By GRK Date --- Tested By SY Date 4/6/89 Check By SG



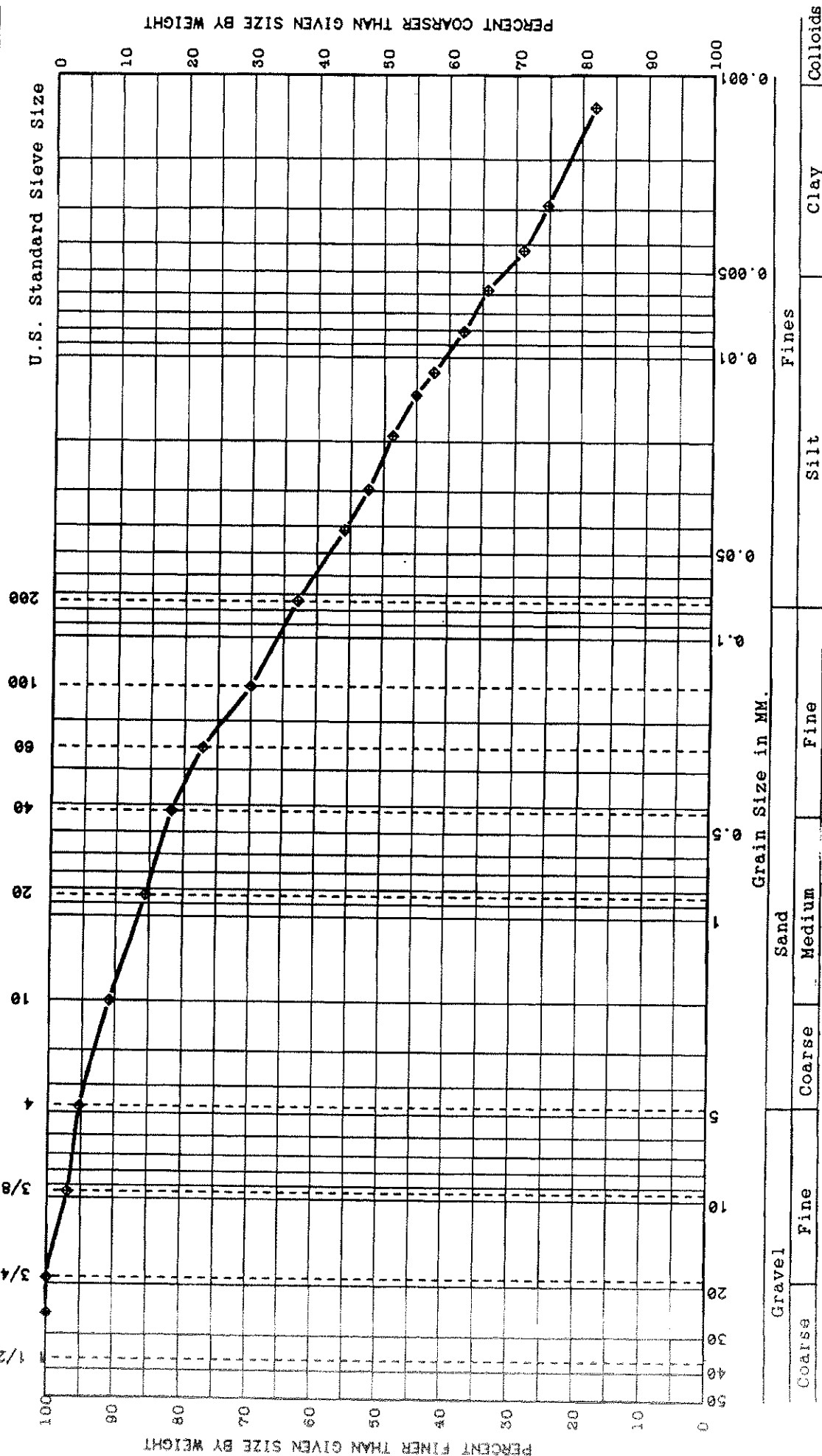
NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. Source
Project Location Ann Arbor, Michigan For
Boring No. 6 Field Sample No. S-7 Sample Depth 35.0' Sample Elev. (Tip) 1017.8'
Sample Description Stiff Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)
Sampled By GRK Date --- Tested By SY Date 4/6/89 Check By SG



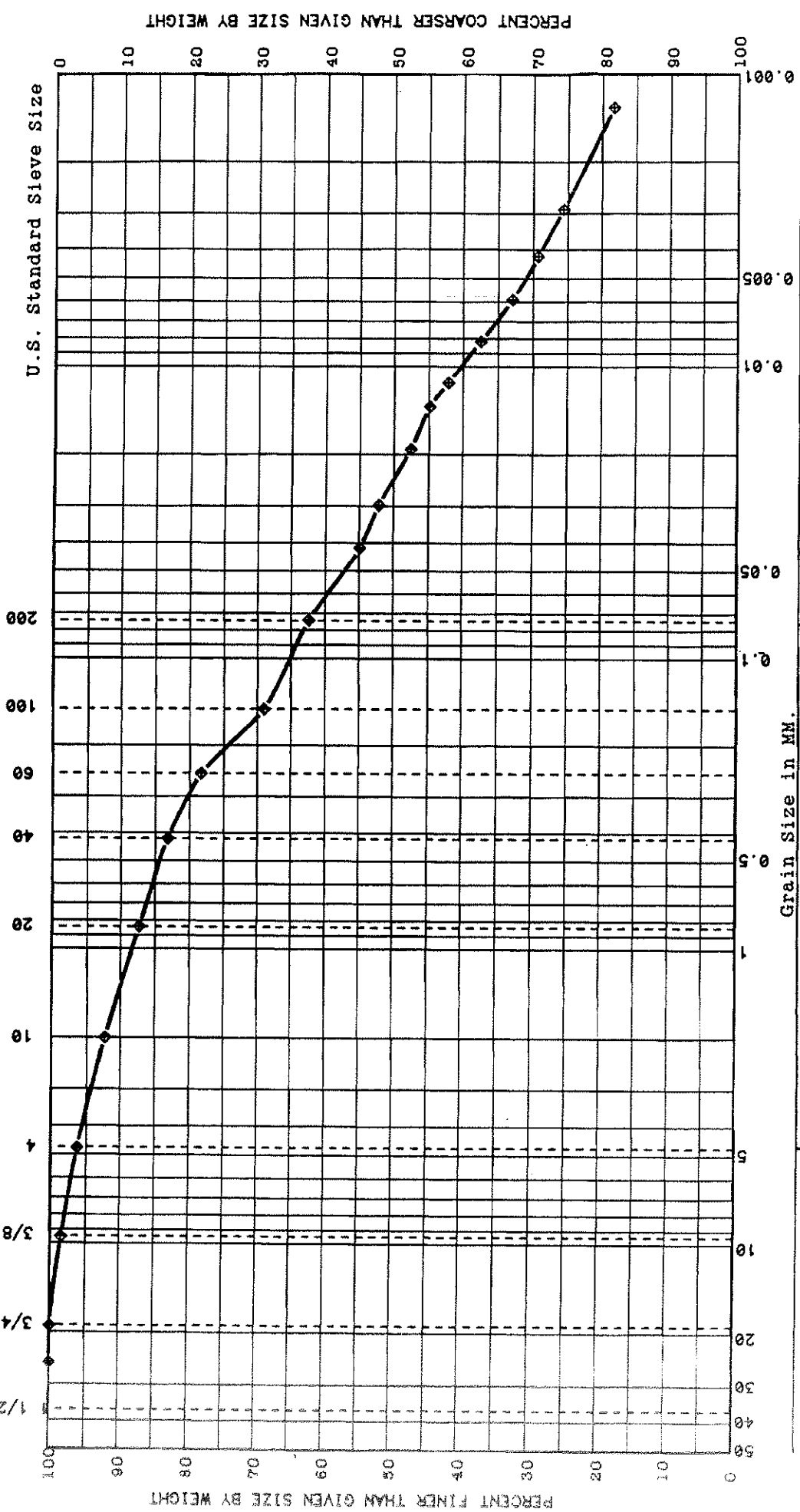
NEVER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OM Lab Sample No. Source
Project Location Ann Arbor, Michigan For
Boring No. 6 Field Sample No. S-9 Sample Depth 45.0' Sample Elev. (Tip) 1007.8'
Sample Description Stiff Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)
Sampled By GRK Date Tested By SY Date 4/6/89 Check By SG



NEVER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

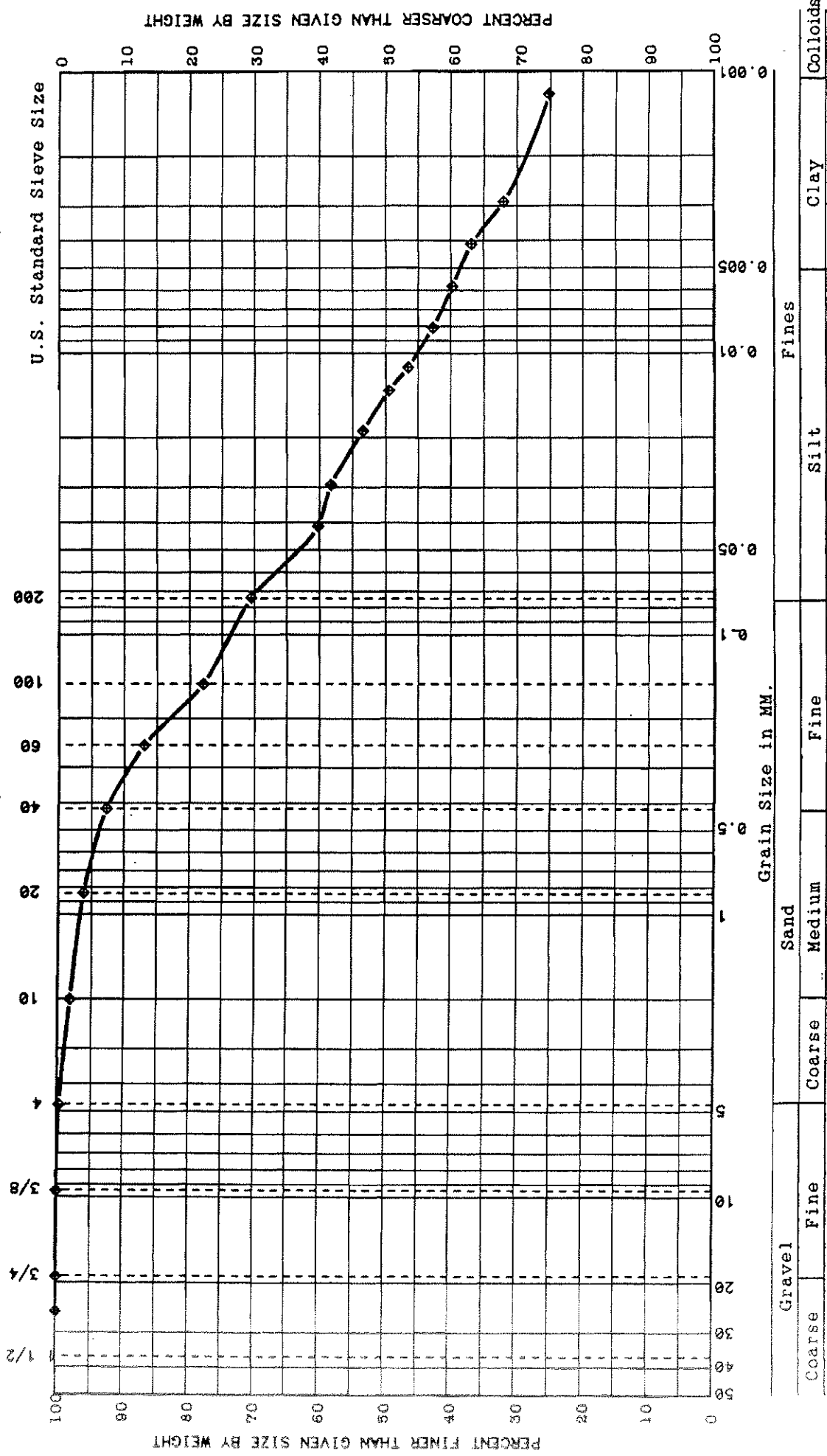
Project No. 88694 OW Lab Sample No. _____ Source _____
 Project Location Ann Arbor, Michigan For _____
 Boring No. 6 Field Sample No. S-10 Sample Depth 50.0' Sample Elev. (Tip) 1002.8'
 Sample Description Very Stiff Mottled Brown and Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)
 Sampled By GRK Date --- Tested By SY Date 4/6/89 Check By SG



Gravel			Sand			Fines		
Coarse	Fine		Coarse	Medium	Fine	Silt	Clay	Colloids

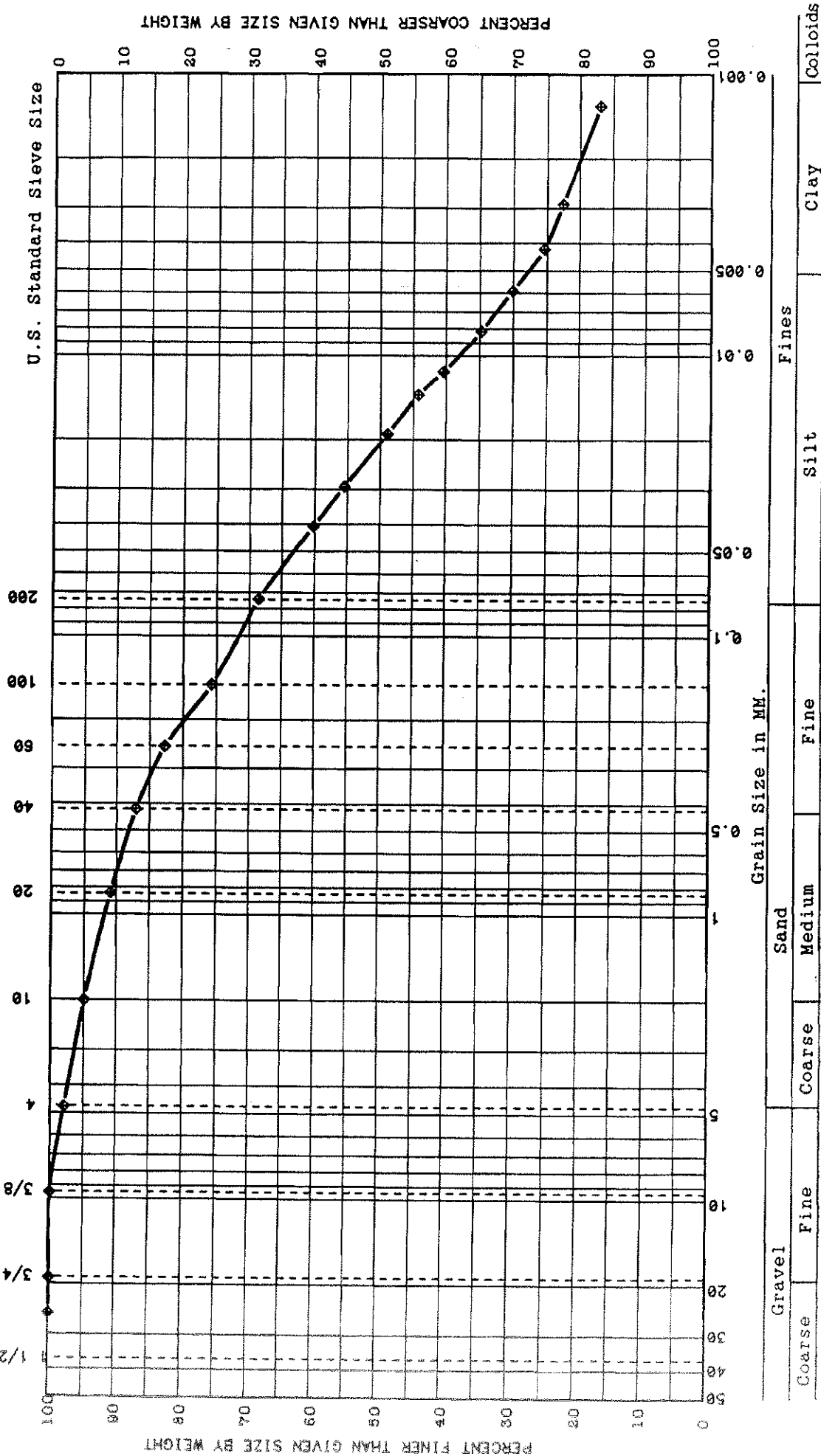
NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. Source
 Project Location Ann Arbor, Michigan
 Boring No. 7 Field Sample No. S-1 Sample Depth 5.0' For Sample Elev. (Tip) 1071.4'
 Sample Description Very Stiff Mottled Brown and Gray SILTY CLAY with Some Sand (CL)
 Sampled By GRK Date --- Tested By SY Date 4/6/89 Check By SG



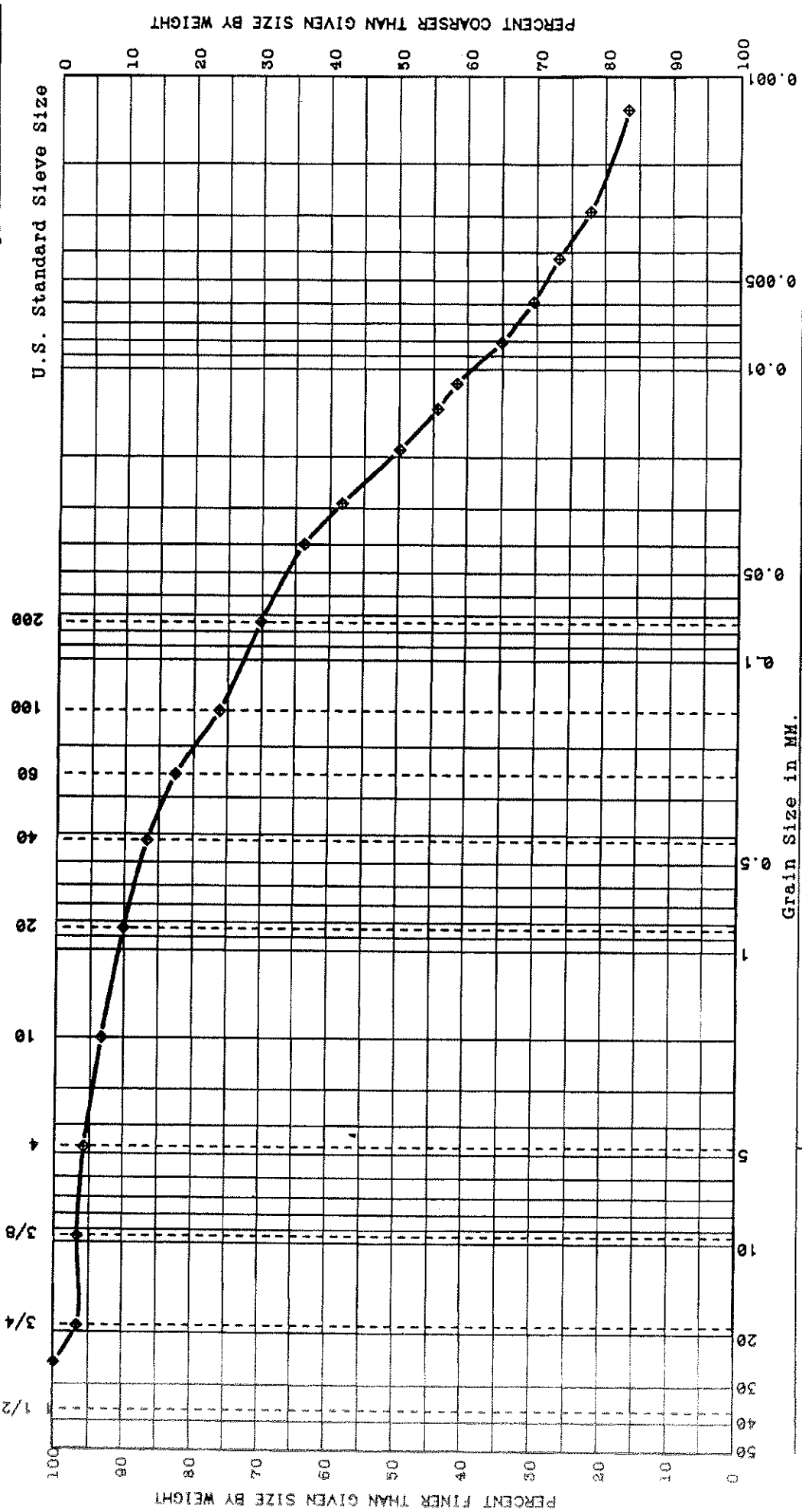
NEVER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. Source
 Project Location Ann Arbor, Michigan For
 Boring No. 7 Field Sample No. S-4 Sample Depth 20.0' Sample Elev. (Tip) 1056.4'
 Sample Description Very Stiff Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)
 Sampled By GRK Date --- Tested By DV Date 4/5/89 Check By SG



NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

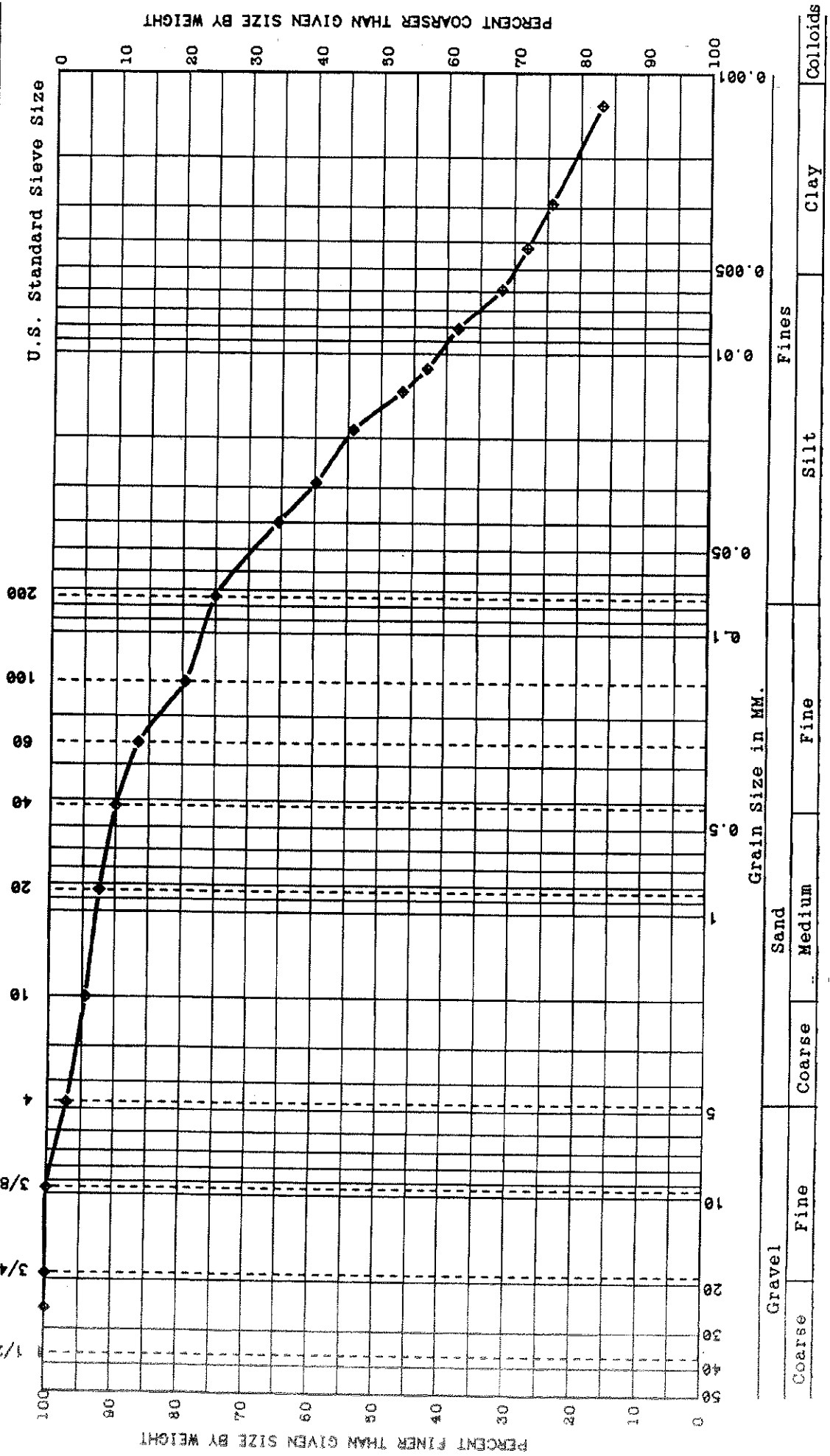
Project No. 88694 OW Lab Sample No. Source
 Project Location Ann Arbor, Michigan For
 Boring No. 7 Field Sample No. S-7 Sample Depth 35.0' Sample Elev. (Tip) 1041.4'
 Sample Description Very Stiff Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)
 Sampled By GRK Date --- Tested By DV Date 4/5/89 Check By SG



Gravel			Sand			Fines		
Coarse	Fine		Coarse	Medium	Fine	Silt	Clay	Colloids

NEVER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. _____ Source _____
 Project Location Ann Arbor, Michigan For _____
 Boring No. 7 Field Sample No. S-9 Sample Depth 45.0' Sample Elev. (Tip) 1031.4'
 Sample Description Very Stiff Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)
 Sampled By GRK Date --- Tested By SY Date 4/6/89 Check By SG



NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

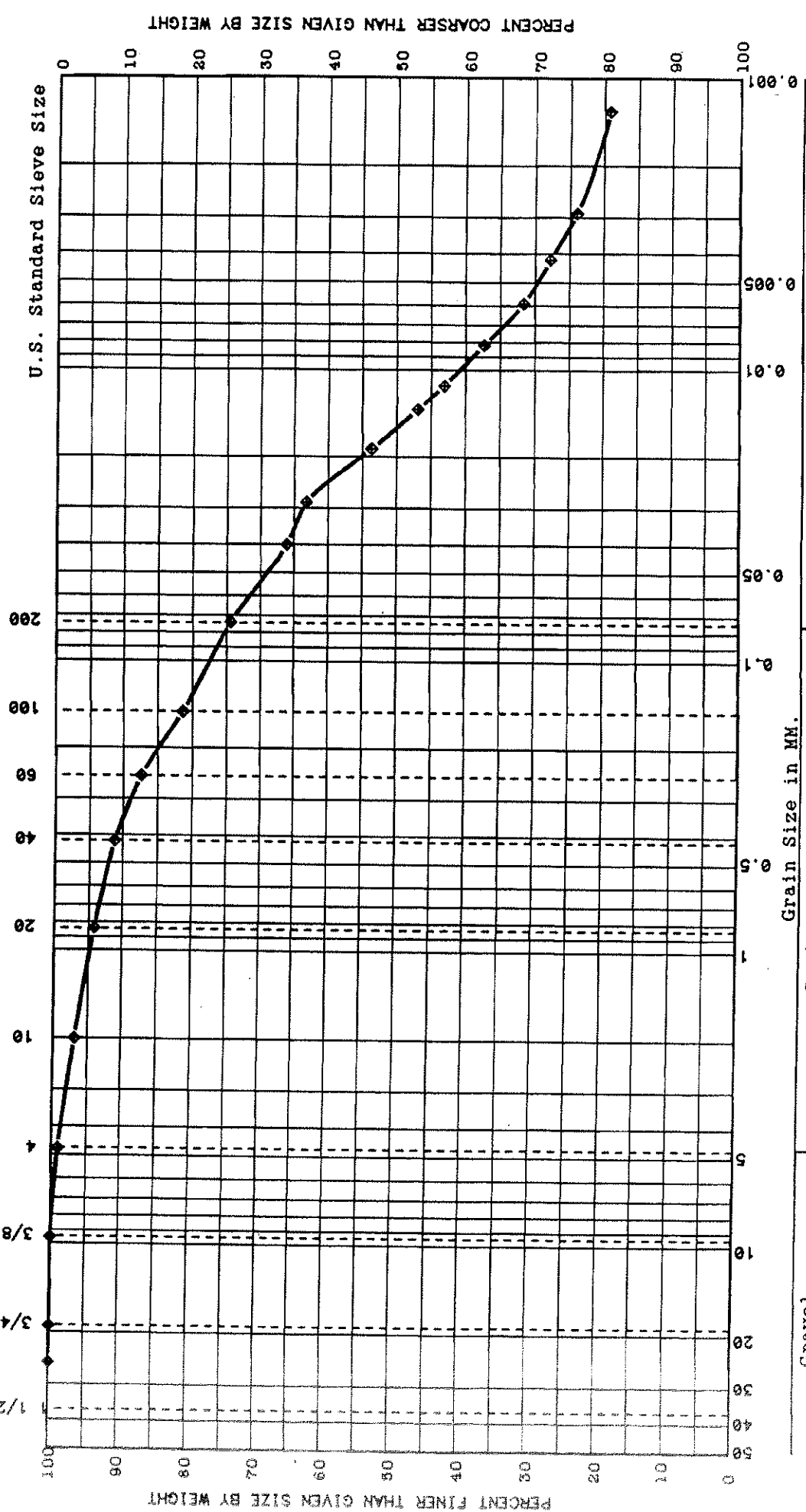
Project No. 88694 OW Lab Sample No. _____ Source _____

Project Location Ann Arbor, Michigan For _____

Boring No. 7 Field Sample No. S-11 Sample Depth 55.0' Sample Elev. (Tip) 1021.4'

Sample Description Very Stiff Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)

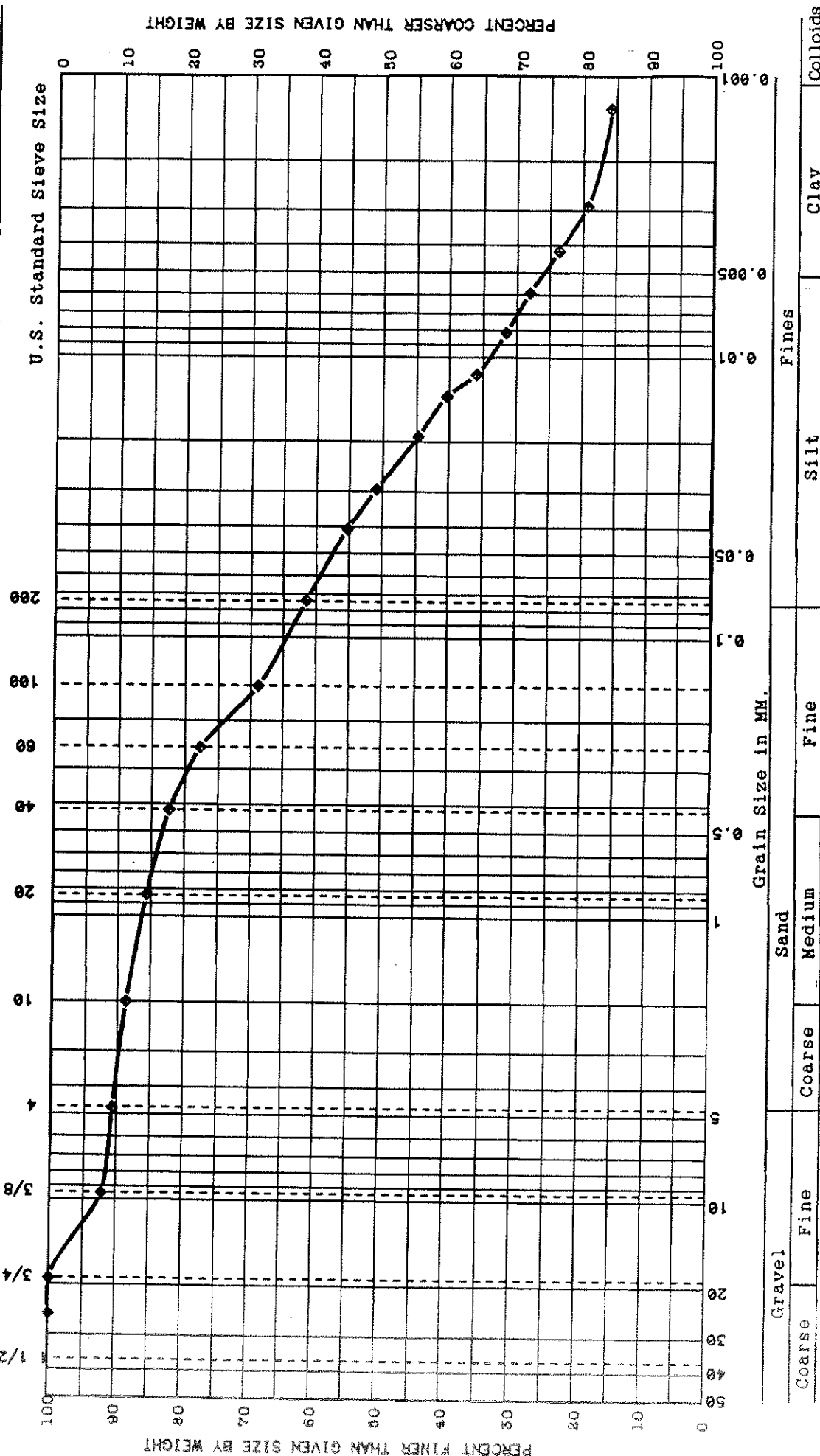
Sampled By GRK Date --- Tested By DV Date 4/5/89 Check By SF



Gravel			Sand			Fines		
Coarse	Fine		Coarse	Medium	Fine	Silt	Clay	Colloids

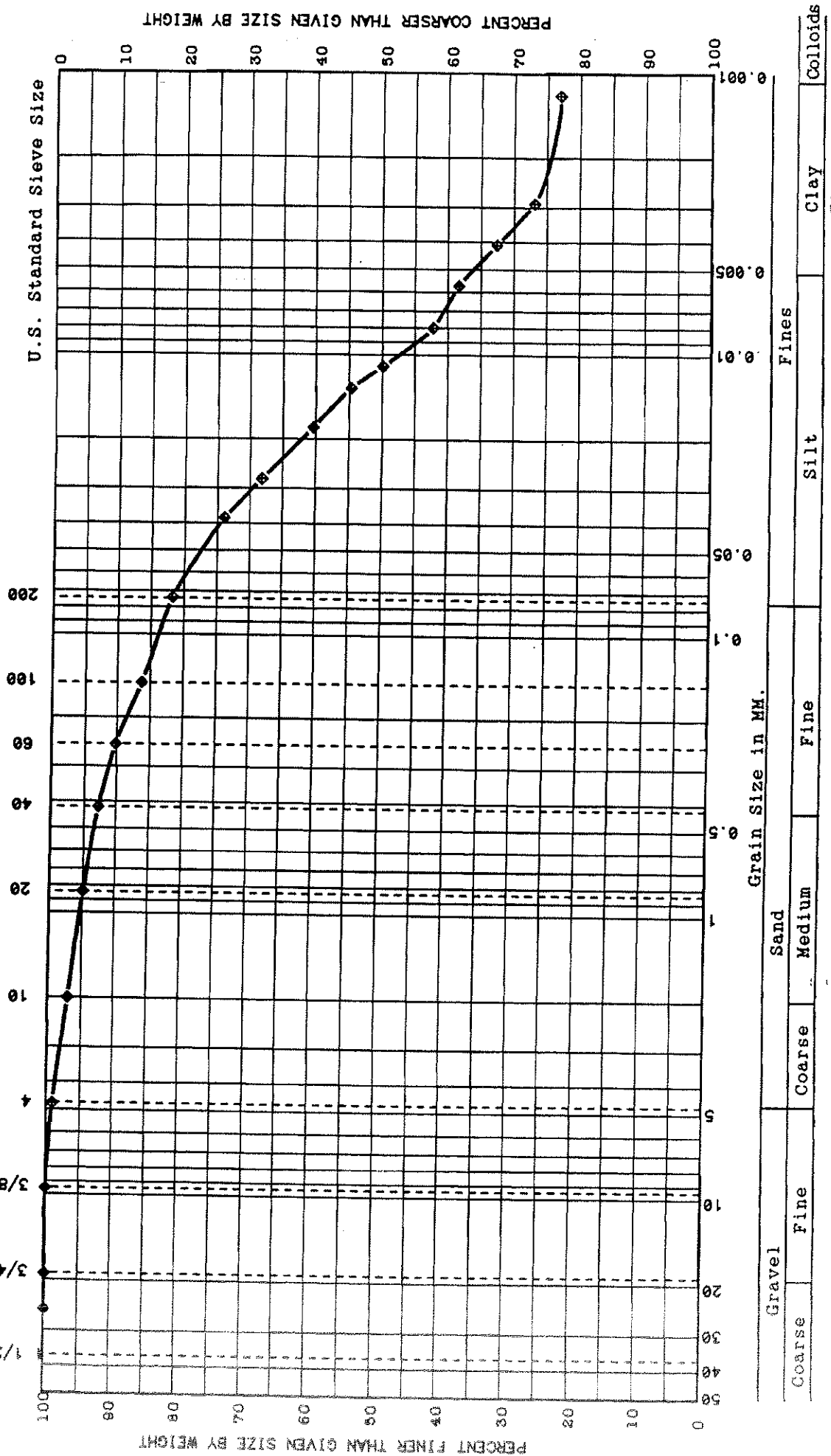
NEVER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 88694 OW Lab Sample No. Source
 Project Location Ann Arbor, Michigan For
 Boring No. 8 Field Sample No. S-2 Sample Depth 10.0' Sample Elev. (Tip) 1018.2'
 Sample Description Very Stiff Mottled Brown and Gray SILTY CLAY with Some Sand and Trace of Gravel (CL)
 Sampled By GRK Date --- Tested By DV Date 4/5/89 Check By SG



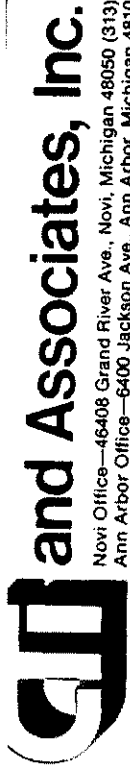
NEYER, TISEO & HINDO, LTD. GRAIN SIZE DISTRIBUTION CURVE

Project No. 38694 OW Lab Sample No. _____ Source _____
 Project Location Ann Arbor, Michigan For _____
 Boring No. 8 Field Sample No. S-4 Sample Depth 20.0' Sample Elev. (Tip) 1008.2'
 Sample Description Very Stiff Gray SILTY CLAY with Little Sand and Trace of Gravel (CL)
 Sampled By GRK Date _____ Tested By DV Date 4/5/89 Check By SG



SUMMARY OF LABORATORY TEST RESULTS
GRANULAR SOILS

PROJECT: Ann Arbor Sand and Gravel, Inc. - Bag Samples										PROJECT NO: D-14539		SHEET 1 OF 3				
Test Boring or Test Pit Number	Field Sample Designation	Depth of Sample in Feet	Natural Water Content (Percent of Dry Weight)	Natural Density (Pounds per Cubic Foot)	Unconfined Compression		Atterberg Limits			Particle Size Distribution					Unified Soil Classification	
					Strength (PSF)	Failure Strain (Percent)	Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)	Clay (Percent)	Silt (Percent)	Fine Sand (Percent)	Medium Sand (Percent)	Coarse Sand (Percent)		Gravel (Percent)
TB-4	99	68.5- 78.5	-	-	-	-	-	-	-	↓	0	30	40	25	5	SW
TB-4	97	78.5- 98.5	-	-	-	-	-	-	-	↓	2	28	34	20	16	SW
TB-4	98	98.5- 118.5	-	-	-	-	-	-	-	↓	2	21	24	25	28	SW
TB-4	102	118.5- 133.5	-	-	-	-	-	-	-	↓	2	4	6	24	64	GP
TB-4	100	143.5- 148.5	-	-	-	-	-	-	-	↓	5	17	26	25	27	SW-SM
TB-4	101	148.5- 163.5	-	-	-	-	-	-	-	↓	3	17	8	28	44	SW
TB-4	108	165.5- 168.5	-	-	-	-	-	-	-	↓	0	28	50	14	8	SP
TB-5	104	35.0- 50.0	-	-	-	-	-	-	-	↓	5	13	27	28	27	SW-SM
TB-5	103	55.0- 75.0	-	-	-	-	-	-	-	↓	6	5	16	22	51	GP-GM
TB-5	106	80.0- 100.0	-	-	-	-	-	-	-	↓	7	21	24	18	30	SW-SM
TB-5	105	100.0- 125.5	-	-	-	-	-	-	-	↓	8	27	35	20	10	SW-SM



GJ and Associates, Inc.

Novi Office—46408 Grand River Ave., Novi, Michigan 48050 (313) 349-3744
Ann Arbor Office—6400 Jackson Ave., Ann Arbor, Michigan 48103 (313) 995-3777

SUMMARY OF LABORATORY TEST RESULTS

(revised 5-19-89)

GRANULAR SOILS

PROJECT: Ann Arbor Sand and Gravel, Inc. - Bag Samples										PROJECT NO: D14539		SHEET 2 OF 3				
Test Boring or Test Pit Number	Field Sample Designation	Depth of Sample in Feet	Natural Water Content (Percent of Dry Weight)	Natural Density (Pounds per Cubic Foot)	Unconfined Compression		Atterberg Limits			Particle Size Distribution					Unified Soil Classification	
					Strength (PSF)	Failure Strain (Percent)	Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)	Clay (Percent)	Silt (Percent)	Fine Sand (Percent)	Medium Sand (Percent)	Coarse Sand (Percent)		Gravel (Percent)
TB-5	107	125.0- 145.0	-	-	-	-	-	-	-	↓	15	45	14	18	8	SM
TB-6	111	50.0- 65.0	-	-	-	-	-	-	-	↓	2	31	31	14	22	SP
TB-6	109	65.0- 75.0	-	-	-	-	-	-	-	↓	1	10	20	24	45	SW
TB-6	110	75.0- 95.0	-	-	-	-	-	-	-	↓	3	5	22	18	52	GP
TB-6	118	95.0- 115.0	-	-	-	-	-	-	-	↓	2	6	17	23	52	GP
TB-6	115	115.0- 140.0	-	-	-	-	-	-	-	↓	2	13	20	17	48	SW
TB-6	116	140.0- 160.0	-	-	-	-	-	-	-	↓	0	90	8	2	0	SP
TB-7	123	75.0- 95.0	-	-	-	-	-	-	-	↓	2	6	22	18	52	GP
TB-7	120	95.0- 120.0	-	-	-	-	-	-	-	↓	4	12	33	27	24	SW
TB-7	121	120.0- 140.0	-	-	-	-	-	-	-	↓	0	6	27	20	47	SP
TB-7	122	150.0- 165.0	-	-	-	-	-	-	-	↓	1	5	24	26	44	SP



SUMMARY OF LABORATORY TEST RESULTS GRANULAR SOILS

[illegible]



GJ and Associates, Inc.

Novi Office—46408 Grand River Ave., Novi, Michigan 48050 (313) 349-3744
Ann Arbor Office—6400 Jackson Ave., Ann Arbor, Michigan 48103 (313) 996-3777

SUMMARY OF LABORATORY TEST RESULTS GRANULAR SOILS

PROJECT: Ann Arbor Sand and Gravel, Inc. - Jar Samples										PROJECT NO: D-14539		SHEET 1		OF 2		
Test Boring or Test Pit Number	Field Sample Designation	Depth of Sample in Feet	Natural Water Content (Percent of Dry Weight)	Natural Density (Pounds per Cubic Foot)	Unconfined Compression		Atterberg Limits			Particle Size Distribution					Unified Soil Classification	
					Strength (PSF)	Failure Strain (Percent)	Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)	Clay (Percent)	Silt (Percent)	Fine Sand (Percent)	Medium Sand (Percent)	Coarse Sand (Percent)		Gravel (Percent)
TB-4	S-16	71.0	-	-	-	-	-	-	-	↓ 5	21	47	16	11		SW-SM
TB-4	S-20	88.5	-	-	-	-	-	-	-	↓ 4	13	57	13	13		SW
TB-4	S-23	103.5	-	-	-	-	-	-	-	↓ 8	12	29	17	34		SW-SM
TB-4	S-26	118.5	-	-	-	-	-	-	-	↓ 6	36	19	8	31		SW-SM
TB-4	S-28	133.5	-	-	-	-	-	-	-	↓ 4	11	28	14	43		SW
TB-4	S-31	148.5	-	-	-	-	-	-	-	↓ 6	18	20	17	39		SW-SM
TB-4	S-34	163.5	-	-	-	-	-	-	-	↓ 11	30	20	10	29		SW-SM
TB-4	S-35	168.5	-	-	-	-	-	-	-	↓ 18	61	16	2	3		SM
TB-5	S-20	95.0	-	-	-	-	-	-	-	↓ 3	10	32	16	39		SW
TB-5	S-30	145.0	-	-	-	-	-	-	-	↓ 67	33	0	0	0		ML
TB-6	S-13	65.0	-	-	-	-	-	-	-	↓ 3	47	37	9	4		SP



SUMMARY OF LABORATORY TEST RESULTS

GRANULAR SOILS

[illegible]



Ann Arbor
Technical Services, Inc.

6540 Jackson Road • Ann Arbor, Michigan 48103 • 313-995-0995

34002

Data Summary Sheet

Date March 21, 1989

G.R. Kunkle and Associates -
Project Ann Arbor Sand and Gravel

Sample I.D./Sample Date								
Parameter	Units		OW-1 2-21-89	OW-2 2-21-89	OW-2 Dup. 2-21-89	OW-3 2-21-89	Trip Blank 2-20-89	
pH	S.U.		7.40	7.79	7.90	7.63	4.10	
Total Alkalinity	mg/l as CaCO ₃		360	340	330	300	<1	
Specific Conductance	$\frac{\text{umhos}}{\text{cm}}$ @ 25°C		1200	1300	1300	1000	<10	
Chloride	mg/l		3	32	32	9	<1	
Sulfate	mg/l		360	360	360	260	<1	
Total Organic Carbon	mg/l		5	5	7	6	<1	
Chemical Oxygen Demand	mg/l		12	18	20	32	<5	
Nitrate-Nitrogen	mg/l		0.2	1.3	1.2	0.6	<0.1	
Ammonia Nitrogen	mg/l		<0.02	<0.02	<0.02	<0.02	<0.02	

Figure A43

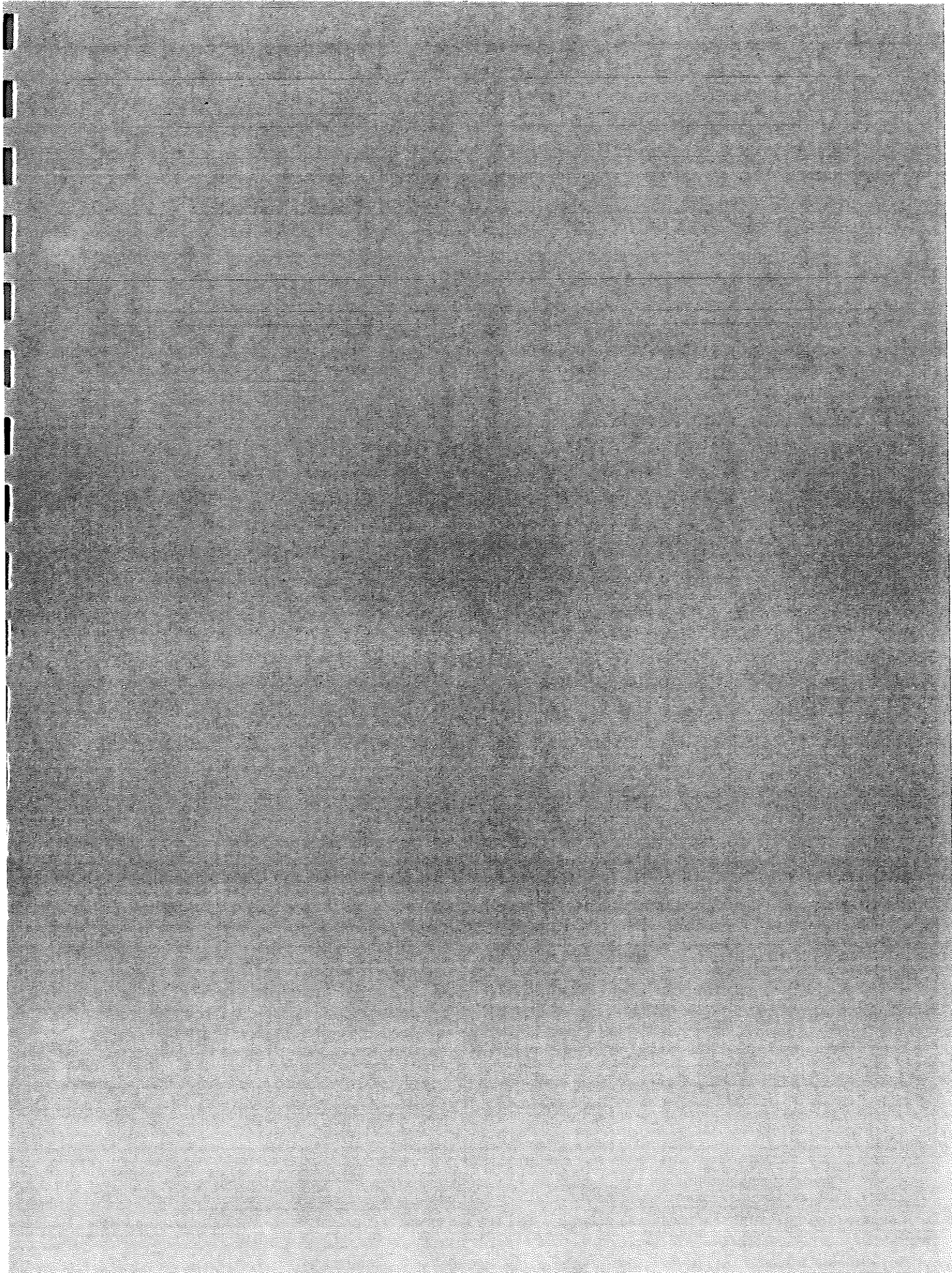
Data Summary Sheet

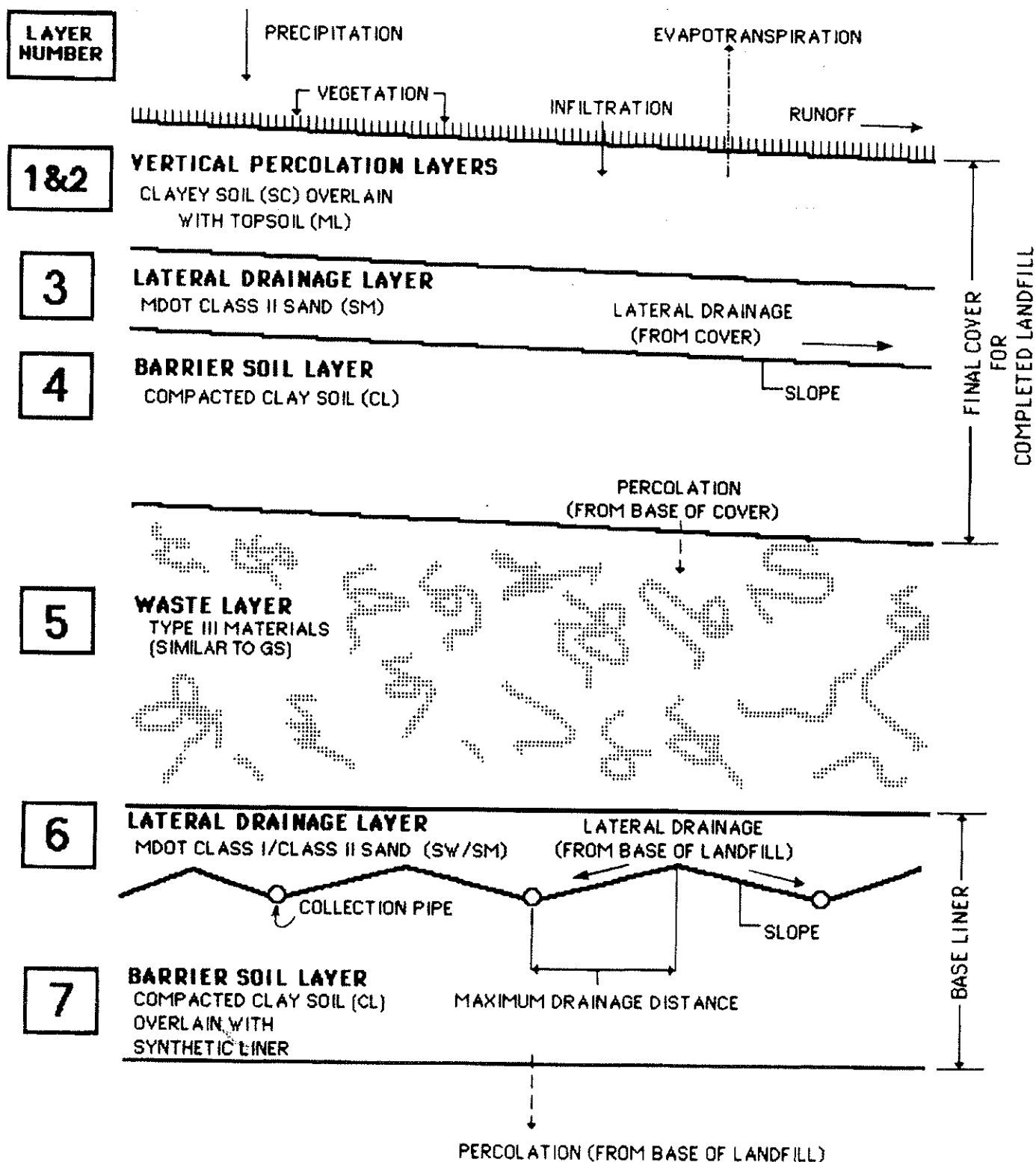
Date March 21, 1989

G.R. Kunkle and Associates -
Project Ann Arbor Sand and Gravel

Sample I.D./Sample Date

Sample I.D./Sample Date									
Parameter	Units			OW-1 2-20-89	OW-2 2-20-89	OW-2 Dup. 2-20-89	OW-3 2-20-89	Trip Blank 2-20-89	
Total Organic Halogen	mg/l			<0.01	<0.01	<0.01	<0.01	<0.01	
Soluble Iron	mg/l			0.01	0.12	0.02	0.01	<0.01	
Soluble Calcium	mg/l			160	160	160	130	<0.1	
Soluble Magnesium	mg/l			63	55	60	48	<0.01	
Soluble Sodium	mg/l			2.9	3.7	3.4	5.5	<0.01	
Soluble Cadmium	mg/l			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Soluble Chromium	mg/l			0.004	0.004	0.002	0.003	<0.001	
Soluble Lead	mg/l			<0.001	<0.001	<0.001	0.002	<0.001	





NOTE: DRAWING IS NOT TO SCALE
SOME FEATURES ARE ENLARGED TO
SHOW DETAIL

TYPICAL PROFILE OF TYPE III LANDFILL
USED IN HELP MODEL ANALYSIS
G.R. KUNKLE AND ASSOCIATES, INC.
5744 BRIGHTON ROAD
BRIGHTON, MICHIGAN 48116

Figure 81

LAYER 4

BARRIER SOIL LAYER		
THICKNESS	=	24.00 INCHES
EVAPORATION COEFFICIENT	=	3.100 MM/DAY**0.5
POROSITY	=	0.5200 VOL/VOL
FIELD CAPACITY	=	0.4500 VOL/VOL
WILTING POINT	=	0.3600 VOL/VOL
EFFECTIVE HYDRAULIC CONDUCTIVITY	=	0.00014200 INCHES/HR

LAYER 5

WASTE LAYER		
THICKNESS	=	1200.00 INCHES
EVAPORATION COEFFICIENT	=	3.300 MM/DAY**0.5
POROSITY	=	0.3510 VOL/VOL
FIELD CAPACITY	=	0.1740 VOL/VOL
WILTING POINT	=	0.1070 VOL/VOL
EFFECTIVE HYDRAULIC CONDUCTIVITY	=	11.94999981 INCHES/HR

LAYER 6

LATERAL DRAINAGE LAYER		
SLOPE	=	1.40 PERCENT
DRAINAGE LENGTH	=	200.0 FEET
THICKNESS	=	36.00 INCHES
EVAPORATION COEFFICIENT	=	3.300 MM/DAY**0.5
POROSITY	=	0.3710 VOL/VOL
FIELD CAPACITY	=	0.1720 VOL/VOL
WILTING POINT	=	0.0500 VOL/VOL
EFFECTIVE HYDRAULIC CONDUCTIVITY	=	7.08659983 INCHES/HR

LAYER 7

BARRIER SOIL LAYER WITH LINER		
THICKNESS	=	36.00 INCHES
EVAPORATION COEFFICIENT	=	3.100 MM/DAY**0.5
POROSITY	=	0.5200 VOL/VOL
FIELD CAPACITY	=	0.4500 VOL/VOL
WILTING POINT	=	0.3600 VOL/VOL
EFFECTIVE HYDRAULIC CONDUCTIVITY	=	0.00014200 INCHES/HR

GENERAL SIMULATION DATA

SCS RUNOFF CURVE NUMBER	=	79.45
TOTAL AREA OF COVER	=	2731212. SQUARE FEET
EVAPORATIVE ZONE DEPTH	=	10.00 INCHES
LINER LEAKAGE FRACTION	=	0.010000
EFFECTIVE EVAPORATION COEFFICIENT	=	4.588 MM/DAY**0.5
UPPER LIMIT VEG. STORAGE	=	4.6660 INCHES
INITIAL VEG. STORAGE	=	2.6740 INCHES

CLIMATOLOGIC DATA FOR EAST LANSING, MICHIGAN

MONTHLY MEAN TEMPERATURES, DEGREES FAHRENHEIT

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
23.10	24.95	32.83	44.62	57.15	67.09
71.75	69.90	62.02	50.23	37.70	27.76

MONTHLY MEANS SOLAR RADIATION, LANGLEYS PER DAY

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
121.19	185.29	286.98	399.01	491.38	539.31
529.98	465.88	364.19	252.15	159.79	111.85

LEAF AREA INDEX TABLE

DATE	LAI
1	0.00
126	0.00
142	0.61
158	0.99
173	0.99
189	0.99
205	0.99
221	0.99
237	0.89
252	0.65
268	0.32
284	0.17
366	0.00

FAIR GRASS

WINTER COVER FACTOR = 0.60

CALCULATIONS AND WATER BALANCE RESULTS

AVERAGE MONTHLY TOTALS USING CLIMATIC DATA FROM 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
	-----	-----	-----	-----	-----	-----
PRECIPITATION (INCHES)	2.19 2.03	1.67 3.66	2.99 2.81	2.95 1.61	2.34 2.30	3.26 2.20
RUNOFF (INCHES)	0.000 0.022	0.000 0.331	0.042 0.003	1.355 0.005	0.094 0.001	0.080 0.000
EVAPOTRANSPIRATION (INCHES)	0.812 2.293	1.108 2.482	2.297 2.270	2.706 1.705	2.765 1.209	2.964 0.806
PERCOLATION FROM BASE OF COVER (INCHES)	0.0964 0.1353	0.0797 0.1101	0.0846 0.1192	0.1642 0.1281	0.1593 0.1247	0.1448 0.1311
PERCOLATION FROM BASE OF LANDFILL (INCHES)	0.0009 0.0012	0.0009 0.0012	0.0015 0.0011	0.0012 0.0012	0.0012 0.0011	0.0011 0.0012
DRAINAGE FROM BASE OF COVER (INCHES)	0.140 0.264	0.094 0.242	0.121 0.230	0.332 0.253	0.327 0.214	0.293 0.254
DRAINAGE FROM BASE OF LANDFILL (INCHES)	0.101 0.123	0.090 0.123	0.095 0.117	0.099 0.123	0.113 0.119	0.116 0.125

Figure B2d

AVERAGE ANNUAL TOTALS USING CLIMATIC DATA FROM 1974 THROUGH 1978

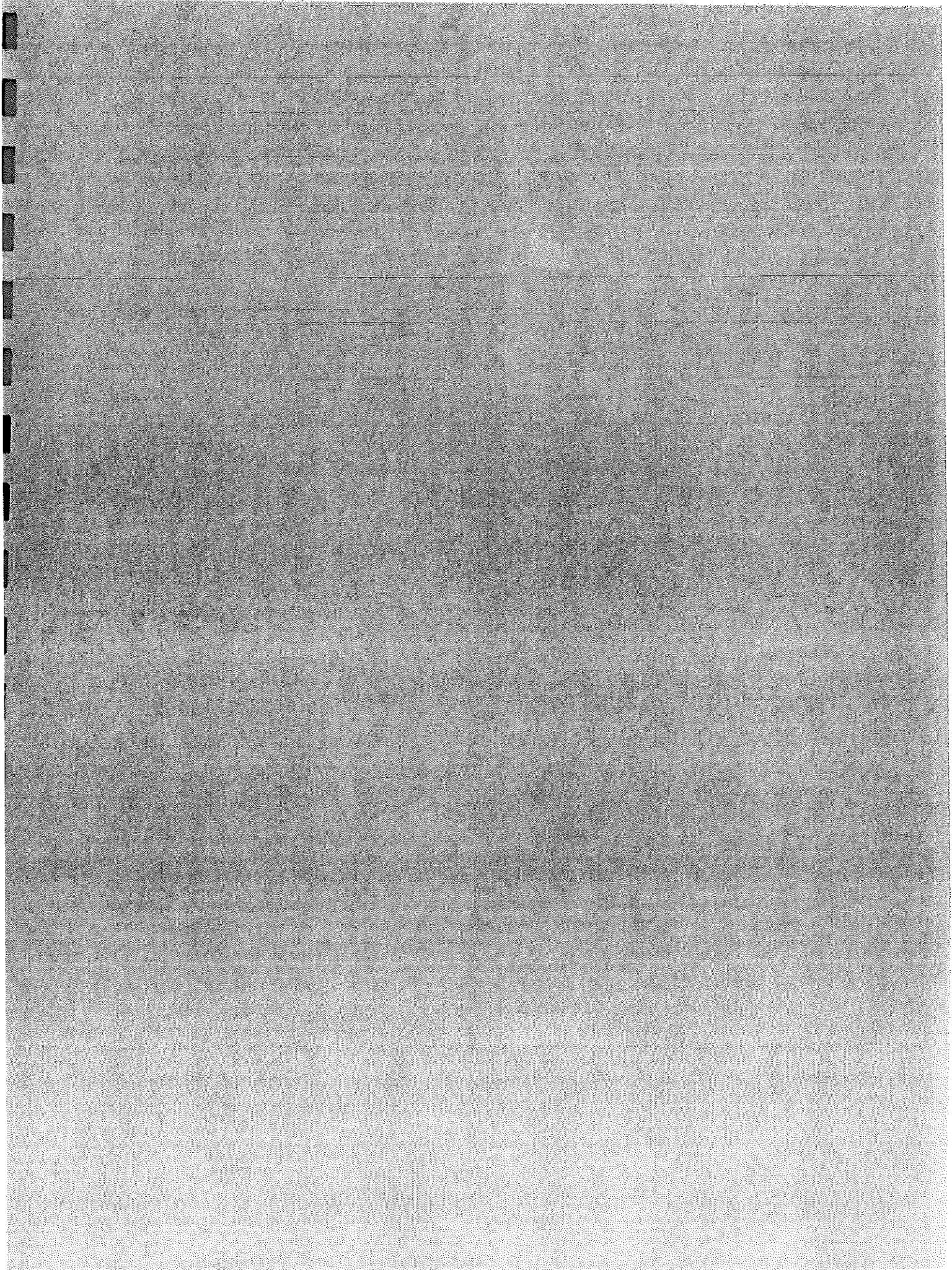
	(INCHES)	(CU. FT.)	PERCENT
PRECIPITATION	30.00	6828487.	100.00
RUNOFF	1.934	440198.	6.45
EVAPOTRANSPIRATION	23.417	5329810.	78.05
PERCOLATION FROM BASE OF COVER	1.4775	336284.	4.92
PERCOLATION FROM BASE OF LANDFILL	0.0138	3139.	0.05
DRAINAGE FROM BASE OF COVER	2.763	628927.	9.21
DRAINAGE FROM BASE OF LANDFILL	1.344	305906.	4.48

PEAK DAILY VALUES USING CLIMATIC DATA FROM 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	3.08	701011.1
RUNOFF	1.126	256277.1
PERCOLATION FROM BASE OF COVER	0.0126	2856.5
PERCOLATION FROM BASE OF LANDFILL	0.0006	140.1
DRAINAGE FROM BASE OF COVER	0.028	6287.6
DRAINAGE FROM BASE OF LANDFILL	0.007	1531.0
HEAD ON BASE OF COVER	24.0	
HEAD ON BASE OF LANDFILL	4.1	
SNOW WATER	6.53	1486514.7

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4666
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.2042

Figure B2e



APPENDIX C

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

WATER WELL AND PUMP RECORD

PERMIT NUMBER

1 LOCATION OF WELL		Fraction		Section Number	Town Number	Range Number
County <u>Washtenaw</u>	Township Name <u>Free</u>	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$ 1	3 MS	5 EDW
Distance And Direction From Road Intersection <u>1/4 OF A MILE N. OF WATERS RD AT</u> <u>2735 E WATERS RD</u>		3 OWNER OF WELL: <u>Don & Mary T. R. A.</u> Address <u>2755 S. WATERS RD</u> <u>Ann Arbor, MI 48103</u> Address Same As Well Location? ☒ Yes ☐ No				
Street Address & City of Well Location <u>2735 E WATERS RD</u>		4 WELL DEPTH: (completed) <u>174</u> ft. Date of Completion <u>11-30-84</u>				
Locate with "X" in Section Below		5 ☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐				
Sketch Map: 		6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐				
2 FORMATION DESCRIPTION		7 CASING: ☐ Steel ☐ Threaded ☐ Welded ☒ Plastic ☐ Diameter <u>5</u> in. to <u>4</u> ft. depth <u>5</u> in. to <u>4</u> ft. depth Grouted Drill Hole Diameter <u>5</u> in. to <u>4</u> ft. depth <u>5</u> in. to <u>4</u> ft. depth				
THICKNESS OF STRATUM		Height: Above/Below Surface <u>1</u> ft. Weight <u>5</u> lbs./ft. Drive Shoe ☒ Yes ☐ No				
DEPTH TO BOTTOM OF STRATUM		8 SCREEN: ☐ Not installed Type <u>JOHNSON'S</u> Diameter <u>4</u> Slot/Screen <u>4-354 40</u> Length <u>8</u> Set between <u>1166</u> ft. and <u>174</u> ft. FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☐ Blank above screen <u> </u> ft. Other <u> </u>				
SAND		9 STATIC WATER LEVEL: <u>97</u> ft. below land surface ☐ Flow				
CLAY		10 PUMPING LEVEL: below land surface <u>98</u> ft. after <u>8</u> hrs. pumping at <u>90</u> G.P.M. <u>100</u> ft. after <u>8</u> hrs. pumping at <u>90</u> G.P.M.				
SAND		11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit				
Gravel Sand		12 WELL GROUTED? ☐ No ☒ Yes From <u>all</u> to <u>all</u> ft. ☐ Neat cement ☐ Bentonite ☒ Other <u>neat</u> No. of bags of cement <u> </u> Additives <u> </u>				
SAND		13 Nearest source of possible contamination Type <u>Sybil Lake</u> Distance <u>100</u> ft. Direction <u>W</u> Well disinfected upon completion? ☒ Yes ☐ No				
WATER SAND		14 PUMP ☐ Not installed ☐ Pump Installation Only Manufacturer's name <u>Red Jacket</u> Model number <u>10EC</u> HP <u>5</u> Volts <u>30</u> Length of Drop Pipe <u>150</u> ft. capacity <u>300</u> G.P.M. TYPE: ☒ Submersible ☐ Jet PRESSURE TANK: Manufacturer's name <u> </u> Model number <u> </u> Capacity <u> </u> Gallons				

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

30' BY 4' X 10' ON RE

DPO

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Ann Arbor Water Well Drilling, Inc. 12710
REGISTERED BUSINESS NAME REGISTRATION NO. 103Address 2135 W. WATERS RDSigned Don & Mary T. R. A. Date 12-28-84

AUTHORIZED REPRESENTATIVE

Authority: Act 368 PA 1978
Completion: Required

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

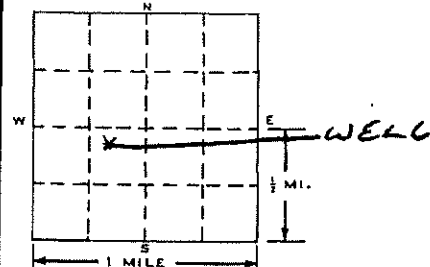
County WASH Township Name Lapeer Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ Section Number 2 Town Number 3 N/S. Range Number 5 E/W.

Distance And Direction from Road Intersections

Street address & City of Well Location same

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address

J. H. SEITZ JR INC
4433 TESSMER ROAD
ANN ARBOR

4 WELL DEPTH: (completed) Date of Completion

175 ft. 11-25-77

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above/Below

4 in. to 122 ft. Depth Surface 1 ft.
Weight 11 lbs./ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type WINSTAIN Dia.: 3 3/4
Slot/Groove 40 Length 8
Set between 122 ft. and 130 ft.
Fittings: PACKER + 6' ANCHOR

9 STATIC WATER LEVEL

136 ft. below land surface

10 PUMPING LEVEL below land surface

136 ft. after 2 hrs. pumping 12 g.p.m.
ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____
Hardness _____ Other _____

12 WELL HEAD COMPLETION: ☐ In Approved Pit

☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No

☐ Neat Cement ☒ Bentonite ☐

Depth: From _____ ft. to _____ ft.

14 Nearest Source of possible contamination

100 feet Direction DRAINFIELD Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installed

Manufacturer's Name REDA

Model Number 17090101 HP 1 Volts 220

Length of Drop Pipe 147 ft. capacity _____ G.P.M.

Type: ☒ Submersible

☐ Jet

☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

LI 49-77

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

GRIGLEY DRILLING INC 1576
REGISTERED BUSINESS NAME REGISTRATION NO.

Address Dexter Mich

Signed Charles Grigley Date 11-25-77
AUTHORIZED REPRESENTATIVE

4-1-87-WN

Authority: Act 388 PA 1978
Completion: Required

WATER WELL AND PUMP RECORD

L 1 1 0 7 7 7 W N
PERMIT NUMBER

L-2-3

1 LOCATION OF WELL					
County <u>Washtenaw</u>	Township Name <u>Lodi</u>	Fraction <u>NE 1/4 SW 1/4</u>	Section Number <u>2</u>	Town Number <u>3</u>	Range Number <u>6</u>
Distance And Direction From Road Intersection <u>1/2 mi. S. of ... Rd</u>					
Street Address & City of Well Location <u>4 ... Rd ... MI. 4800</u>					
Locate with "X" in Section Below					
Sketch Map					
2 FORMATION DESCRIPTION		THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM		
<u>Brown Clay</u>		<u>26</u>	<u>26</u>		
<u>Gray Clay</u>		<u>14</u>	<u>40</u>		
<u>Dark Gray Clay</u>		<u>86</u>	<u>126</u>		
<u>Gravel & White Clay</u>		<u>24</u>	<u>150</u>		
<u>Gravel</u>		<u>17</u>	<u>167</u>		
<u>Gray Clay</u>		<u>3</u>	<u>170</u>		
<u>~1005</u> <u>127</u> <u>878</u>					
3 OWNER OF WELL: <u>Pat Brusher</u>					
Address <u>2315 TESSMER RD.</u> <u>ANN ARBOR MI. 48106</u>					
Address Same As Well Location? ☐ Yes ☒ No					
4 WELL DEPTH: <u>170</u> FT. Date Completed <u>11/30/77</u> ☒ New Well ☐ Replacement Well					
5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐					
6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐					
7 CASING: ☐ Steel ☐ Threaded ☐ Welded ☒ Plastic ☐ Diameter <u>5</u> in. to <u>1 1/2</u> ft. depth ☐ Grouted Drill Hole Diameter <u>2</u> in. to <u>4 1/2</u> ft. depth ☐ in. to <u> </u> ft. depth					
Height: Above/Below Surface <u>1</u> ft. Weight <u>SDR 34</u> lbs./ft. Drive Shoe ☐ Yes ☒ No					
8 SCREEN: ☐ Not installed Type <u>Stainless Steel</u> Diameter <u>5</u> in. Length <u>4</u> ft. Set between <u>162</u> ft. and <u>166</u> ft. FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Brammer Check ☒ Blank above screen <u>1</u> ft. Other <u> </u>					
9 STATIC WATER LEVEL: <u>127</u> ft. below land surface ☐ Flow					
10 PUMPING LEVEL: below land surface <u>127</u> ft. after <u>2</u> hrs. pumping at <u>12</u> G.P.M. <u> </u> ft. after <u> </u> hrs. pumping at <u> </u> G.P.M.					
11 WELL HEAD COMPLETION: ☒ Pitless adapter ☒ 12" above grade ☐ Basement offset ☐ Approved pit					
12 WELL GROUTED? ☐ No ☒ Yes From <u>0</u> to <u>130</u> ft. ☐ Neat cement ☒ Bentonite ☒ Other <u>Cuttings</u> No. of bags of cement <u> </u> Additives <u> </u>					
13 Nearest source of possible contamination Type <u>Septic</u> Distance <u>140</u> ft. Direction <u>E</u> Well disinfected upon completion? ☒ Yes ☐ No Was old well plugged? ☐ Yes ☐ No					
14 PUMP: ☐ Not installed ☐ Pump installation Only Manufacturer's name <u>Red Jacket</u> Model number <u>UN106C</u> HP <u>1 1/2</u> Volts <u>230</u> Length of Drop Pipe <u>157</u> ft. capacity <u>10</u> G.P.M. TYPE: ☒ Submersible ☐ Jet PRESSURE TANK: Manufacturer's name <u>Amstar</u> Model number <u>W-502</u> Capacity <u>26.7</u> Gallons					
15. Remarks, elevation, source of data, etc. <u>4" Tail pipe no bottom of screen</u> <u>Li 107-875/W</u>					
16. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. <u>Criley Drilling Co., Inc.</u> REGISTERED BUSINESS NAME REGISTRATION NO. <u>21-0521</u> Address <u>330 ... Rd ... MI. 48106</u> Signed <u>Jack ...</u> Date <u>11-20-77</u> AUTHORIZED REPRESENTATIVE					
17. Rig Operator's Name: <u>Larry Clark</u>					

RECEIVED

DEC 13 1988

ENVIRONMENTAL HEALTH

USE A 2ND SHEET IF NEEDED

WATER WELL RECORD
ACT 294 PA 1965MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

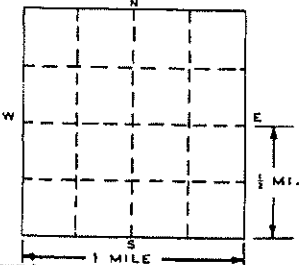
1 LOCATION OF WELL

County Washtenaw	Township Name Lodi	Fraction SW 1/4 NW 1/4	Section Number 2	Town Number 3 S.	Range Number 5 E
----------------------------	------------------------------	----------------------------------	----------------------------	----------------------------	----------------------------

Distance And Direction from Road Intersections
**Apex 1/2 mile South int Tessmer & Scio Church
rds and 250' East CL Scio Ch, Rd.**Street address & City of Well Location **2181 Tessmer Rd. ANN ARBOR**

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

**Charles Wolff Farm C/O
Mrs E. Minock
4074 Gotfredson Rd. Plymouth**4 WELL DEPTH: (completed) Date of Completion
232 ft. **5-1-81**5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐7 CASING: Threaded ☒ Welded ☐ Height: Above ~~land~~
Diam. Surface **1** ft.
4 in. to **227** ft. Depth Weight **11** lbs./ft.
in. to ft. Depth Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: **Johnson 353** Dia.: **3.75 OD**
Slot: **15** Length **4**
Set between **227** ft. and **232** ft.
Fittings: **TBE Neoprene packer on 3x36
blk nipple & CI Plug**

9 STATIC WATER LEVEL

113 ft. below land surface

10 PUMPING LEVEL below land surface

114 ft. after **2** hrs. pumping **16** g.p.m.
ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl)

Hardness Other

12 WELL HEAD COMPLETION: ☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☒ BentoniteDepth: From **5** ft. to **225** ft.

14 Nearest Source of possible contamination

58 feet **S** Direction **Septic Tank** TypeWell disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installedManufacturer's Name **Red Jacket**Model Number **75R1-12BC** HP **3/4** Volts **230**Length of Drop Pipe **189** ft. capacity **12** G.P.M.Type: ☒ Submersible☐ Jet☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

This is a replacement well

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true
to the best of my knowledge and belief.**J. P. Schmitt & Co.** **81-0019**

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address **4540 Saline Rd. Ann Arbor**Signed **J. P. Schmitt** Date **5-11-81**

AUTHORIZED REPRESENTATIVE

WATER WELL AND PUMP RECORD

PERMIT NUMBER

L-2-5

1 LOCATION OF WELL		County <u>Alcona</u>		Township Name <u>10.11</u>		Fraction <u>N 1/4 Sec 24 T 34 N R 15 W</u>		Section Number <u>2</u>		Town Number <u>3 MS</u>		Range Number <u>5 E/A</u>	
Distance And Direction From Road Intersection <u>2.643 Twp. Rd. R1</u> <u>Green Oak, MI 49703</u>													
Street Address & City of Well Location <u>Green Oak, MI 49703</u>													
Locate with "X" in Section Below													
Sketch Map: 													
2 FORMATION DESCRIPTION				THICKNESS OF STRATUM		DEPTH TO BOTTOM OF STRATUM		3 OWNER OF WELL					
<u>CLAY</u>				<u>14</u>		<u>14</u>		Address <u>3421 Beaumont</u> <u>A 2 MI 49705</u> Address Same As Well Location? ☐ Yes ☒ No					
<u>CLAY</u>				<u>130</u>		<u>147</u>		4 WELL DEPTH: <u>183</u> ft. Date Completed <u>1/4/88</u> ☒ New Well ☐ Replacement Well					
<u>GRAVEL</u>				<u>12</u>		<u>160</u>		5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐					
<u>CLAY</u>				<u>10</u>		<u>170</u>		6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐					
<u>GRAVEL</u>				<u>9</u>		<u>179</u>		7 CASING: ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded <u>5</u> in. to <u>179</u> ft. depth <u>3</u> in. to <u>183</u> ft. depth Ground Drill Hole Diameter <u>3</u> in. to <u>183</u> ft. depth Drive Shoe ☐ Yes ☒ No					
<u>CLAY + GRAVEL MIX</u>				<u>4</u>		<u>183</u>		8 SCREEN: ☒ Installed ☐ Not Installed Type <u>WV</u> Diameter <u>5" Non</u> Slow Gauge <u>25</u> Length <u>9'</u> Set between <u>179</u> ft. and <u>183</u> ft. FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☐ Blank above screen <u> </u> ft. Other <u> </u>					
								9 STATIC WATER LEVEL: <u>145</u> ft. below land surface ☐ Flow					
								10 PUMPING LEVEL: below land surface <u>153</u> ft. after <u>1</u> hrs. pumping at <u>6</u> G.P.M. <u>163</u> ft. after <u>2</u> hrs. pumping at <u>10</u> G.P.M.					
								11 WELL HEAD COMPLETION: ☒ Pitless adapter ☒ 12" above grade ☐ Basement offset ☐ Approved pit					
								12 WELL GROUTED? ☐ No ☒ Yes From <u>2</u> to <u>183</u> ft. ☐ Neat cement ☒ Bentonite ☒ Other <u>Grout</u> No. of bags of cement <u> </u> Additives <u> </u>					
								13 Nearest source of possible contamination Type <u>SEWAGE</u> Distance <u>1.5</u> ft. Direction <u>NW</u> Well disinfected upon completion? ☒ Yes ☐ No Was old well plugged? ☐ Yes ☐ No					
								14 PUMP: ☐ Not Installed ☐ Pump Installation Only Manufacturer's name <u>Grundfos</u> Model number <u>15005422112</u> HP <u>1/2</u> Volts <u>240</u> Length of Drop Pipe <u>170</u> ft. capacity <u>10</u> G.P.M. TYPE: ☒ Submersible ☐ Jet PRESSURE TANK: Manufacturer's name <u>Air-Tek</u> Model number <u>302</u> Capacity <u>26.7</u> Gallons					

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

Water from bottom of screen
at screen

17. Rig Operator's Name:

Ray Clark
Li 33-879/WN

7d 12/85

16. WATER WELL CONTRACTOR'S CERTIFICATION:

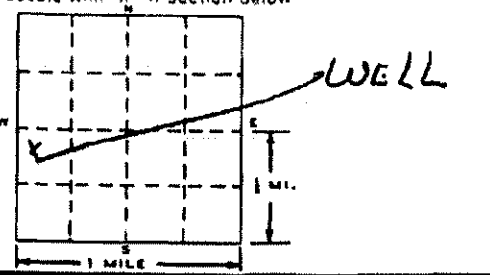
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Ray Clark
REGISTERED BUSINESS NAME Ray Clark REGISTRATION NO. 31-0524
Address 800 East 1st St. S. L.
Signed Ray Clark Date 1-6-88
AUTHORIZED REPRESENTATIVE

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PART 127 ACT 368, P.A. 1978

PERMIT NUMBER

1 LOCATION OF WELL		TOWNSHIP NAME		Fraction	Section Number	Town Number	Range Number
County <u>Washtenaw</u>		<u>Lodi</u>		<u>1/4</u>	<u>2</u>	<u>3</u> N <u>5</u> W	<u>5</u> E <u>1/2</u>
Distance And Direction From Road Intersection <u>2617 TESSMER RD.</u> <u>ANN ARBOR MI 48103</u>				3 OWNER OF WELL: <u>THOMAS A. STANTON</u> Address <u>2707 TESSMER RD</u> <u>ANN ARBOR MI 48103</u> Address Same As Well Location? ☐ Yes ☒ No			
Street Address & City of Well Location				4 WELL DEPTH (completed) <u>206</u> ft. Date of Completion <u>2-15-83</u>			
Locate with 'X' in Section Below				5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐			
Sketch Map				6 USE ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐			
				7 CASING Diameter ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded Height: Above/Below Surface <u>1</u> ft Weight <u>500</u> lbs/ft Drive Shoe ☐ Yes ☒ No			
2 FORMATION DESCRIPTION		THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	8 GROUTED DRILL HOLE DIAMETER <u>8</u> in to <u>200</u> ft depth			
<u>YELLOW CLAY</u>		<u>20</u>	<u>20</u>	9 SCREEN ☐ Not installed Type <u>WLD STAIN</u> Diameter <u>4" NOM</u> Slot/Grate <u>1/4" x 1/8"</u> Length <u>8</u> ft Set between <u>196</u> ft and <u>205</u> ft FITTINGS ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☐ Blank above screen <u>1</u> ft Other			
<u>GRAY & YELLOW CLAY MIX</u>		<u>20</u>	<u>40</u>	10 STATIC WATER LEVEL <u>159</u> ft below land surface ☐ Flow			
<u>GRAVEL</u>		<u>1</u>	<u>41</u>	11 PUMPING LEVEL below land surface <u>159</u> ft after <u>2</u> hrs pumping at <u>12</u> GPM			
<u>GRAY CLAY</u>		<u>10</u>	<u>51</u>	<u>159</u> ft after _____ hrs. pumping at _____ GPM			
<u>GRAVEL</u>		<u>16</u>	<u>67</u>	12 WELL HEAD COMPLETION ☒ Jetless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit			
<u>SAND</u>		<u>23</u>	<u>90</u>	13 WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft			
<u>GRAY CLAY w/ SAND</u>		<u>55</u>	<u>145</u>	☐ Neat cement ☒ Bentonite ☐ Other _____			
<u>GRAY CLAY</u>		<u>23</u>	<u>168</u>	No. of bags of cement _____ Admixtures _____			
<u>SAND</u>		<u>33</u>	<u>201</u>	14 Nearest source of possible contamination Type <u>SEPTIC</u> Distance <u>120</u> ft Direction <u>NW</u>			
<u>GRAVEL</u>		<u>2</u>	<u>203</u>	Well disinfected upon completion? ☒ Yes ☐ No			
<u>GRAY CLAY</u>		<u>3</u>	<u>206</u>	15 PUMP ☐ Not installed ☐ Pump installation Only			
				Manufacturer's name <u>KEDA</u>			
				Model number <u>1209 P071</u> HP <u>3/4</u> Volts <u>220</u>			
				Length of Drop Pipe <u>168</u> ft capacity <u>9</u> G.P.M.			
				TYPE ☒ Submersible ☐ Jet			
				PRESSURE TANK <u>W X TROL</u>			
				Manufacturer's name <u>W X 251</u> Capacity <u>19</u> Gallons			

15. Remarks, elevation, source of data, etc.
2' TAIL PIPE SET TO BOTTOM OF
SCHEMATIC
Dept. Environmental Affairs

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Cribble Drilling Co. 81-0524
REGISTERED BUSINESS NAME REGISTRATION NO.
Address DEXTER MI 48130
Signed Jack C. Clark Date 2-28-83
AUTHORIZED REPRESENTATIVE

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P.A. 1978

PERMIT NUMBER

1 LOCATION OF WELL																				
County WASHTENAW	Township Name L001	Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ Section Number 2 Town Number 3 S Range Number 5 E																		
Distance And Direction From Road Intersection																				
Street Address & City of Well Location SOKE																				
Locate with "X" in Section Below		Sketch Map																		
		3 OWNER OF WELL: ~~JOHN WILSON~~ Address JOHN WILSON 2700 S. WAGNER RD. Address Same As Well Location? ☒ Yes ☐ No																		
2 FORMATION DESCRIPTION <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">FORMATION DESCRIPTION</th> <th style="width: 10%;">THICKNESS OF STRATUM</th> <th style="width: 10%;">DEPTH TO BOTTOM OF STRATUM</th> </tr> </thead> <tbody> <tr> <td>BROWN CLAY</td> <td>4</td> <td>4</td> </tr> <tr> <td>GRAY CLAY</td> <td>43</td> <td>47</td> </tr> <tr> <td>COARSE GRAVEL</td> <td>45</td> <td>92</td> </tr> <tr> <td>WHITE CLAY & GRAVEL</td> <td>39</td> <td>131</td> </tr> <tr> <td>SAND</td> <td>20</td> <td>151</td> </tr> </tbody> </table>		FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	BROWN CLAY	4	4	GRAY CLAY	43	47	COARSE GRAVEL	45	92	WHITE CLAY & GRAVEL	39	131	SAND	20	151	4 WELL DEPTH: (completed) 151 ft. Date of Completion 12-15-81 5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐ 6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐ 7 CASING: ☐ Steel ☐ Threaded ☐ Welded ☒ Plastic ☐ 5 in. to 151 ft depth Grouted Drill Hole Diameter _____ in. to _____ ft. depth _____ in. to _____ ft. depth _____ in. to _____ ft. depth Height Above Ground Surface 1 ft. Weight _____ lbs./ft. Drive Shoe ☐ Yes ☒ No
		FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM																
		BROWN CLAY	4	4																
		GRAY CLAY	43	47																
		COARSE GRAVEL	45	92																
WHITE CLAY & GRAVEL	39	131																		
SAND	20	151																		
8 SCREEN ☐ Not Installed Type 316 STAINLESS Diameter 5" NOM Slot/Screen 12 Length 4 Set between 147 ft. and 151 ft. FITTINGS ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☐ Blank above screen _____ ft. Other _____																				
9 STATIC WATER LEVEL 97 ft. below land surface ☐ Flow																				
10 PUMPING LEVEL below land surface 100 ft. after 2 hrs. pumping at 209 G.P.M. _____ ft. after _____ hrs. pumping at _____ G.P.M.																				
11 WELL HEAD COMPLETION ☐ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit																				
12 WELL GROUTED? ☐ No ☒ Yes From 0 to 140 ft. ☐ Near cement ☒ Bentonite ☐ Other _____ No. of bags of cement _____ Additives _____		13 Nearest source of possible contamination Type _____ Distance _____ ft. Direction _____ Well disinfected upon completion? ☐ Yes ☐ No																		
14 PUMP ☒ Not installed ☐ Pump installation Only Manufacturer's name _____ Model number _____ HP _____ Volts _____ Length of Drop Pipe _____ ft. capacity _____ G.P.M. TYPE ☒ Submersible ☐ Jet PRESSURE TANK Manufacturer's name _____ Model number _____ Capacity _____ Gallons																				

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

CRIELED DRILLING **11-1586**

REGISTERED BUSINESS NAME REGISTRATION NO.

Address **DETER M.**

Signed **Charles Greer** Date **12-17-81**

AUTHORIZED REPRESENTATIVE

L-2-8

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH (14)

1 LOCATION OF WELL

County WASH	Township Name L001	Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$	Section Number 2	Town Number 3 N.S.	Range Number 5 E.W.
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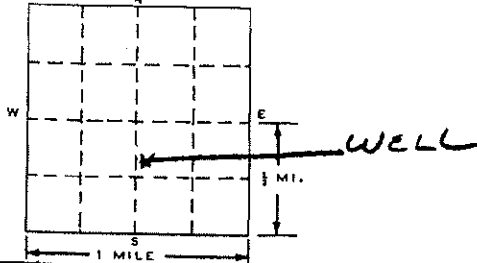
Distance And Direction from Road Intersections

3794 WATERS RD
ANN ARBOR

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

ERHARD ENDERS
Address **13101 JERUSALEM**
CHELSEA

4 WELL DEPTH: (completed) Date of Completion

301 ft. **11-2-79**5 ☒ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐6 USE: ☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐7 CASING: Threaded ☒ Welded ☐ Height: Above/Below
Diam. Surface **1** ft.**4** in. to **301** ft. Depth Weight **11** lbs./ft.
in. to ft. Depth Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: Dia.: Length:

Slot/Gauze Length:

Set between ft. and ft.

Fittings:

9 STATIC WATER LEVEL

131 ft. below land surface

10 PUMPING LEVEL below land surface

137 ft. after **2** hrs. pumping **9** g.p.m.

ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl)

Hardness Other

12 WELL HEAD COMPLETION: ☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☒ Bentonite ☐

Depth: From ft. to ft.

14 Nearest Source of possible contamination

feet Direction **Nor in** TypeWell disinfected upon completion ☐ Yes ☐ No15 PUMP: ☐ Not installedManufacturer's Name **RED JACKET**Model Number **75RW1-CP12BC** HP **3/4** Volts **230V**Length of Drop Pipe **168** ft. capacity **9** G.P.M.Type: ☒ Submersible☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

BOTTOMED OUT ON CLAY
LI 13-79

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

CRIBLEY DRILLING INC 81-1576
REGISTERED BUSINESS NAME REGISTRATION NO.Address **Dexter Mich**Signed **Charles Criley** Date **11-2-79**
AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County WASHTENAW Township Name L00 Fraction 1/4 Section Number 2 Town Number 3 Range Number 5

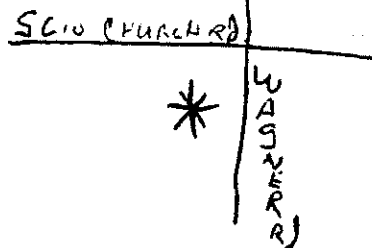
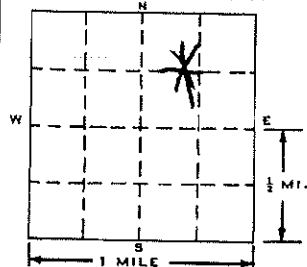
Distance And Direction from Road Intersections

1/3 OF A.M. L.S. OF SCIO CHURCH RD.
ON WAGNER RD. AT 2100

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address

GEORGE SCHNEERLE2050 S WAGNER RD

4 WELL DEPTH: (completed) Date of Completion

217 ft.9-11-79

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well

7 CASING: Threaded ☒ Welded ☐ Height: Above/Below

Diam.

4 in. to ALL ft. Depth4 in. to ALL ft. DepthWeight 11 lbs./ft.Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: 50 MESH SS Dia.: 4"Slot/Gauze 10 Length 8'Set between 209 ft. and 217 ft.Fittings: K PACKER & 3" PLUG

9 STATIC WATER LEVEL

187 ft. below land surface

10 PUMPING LEVEL below land surface

187 ft. after 2 hrs. pumping 20 g.p.m.189 ft. after 2 hrs. pumping 20 g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl) Hardness Other 12 WELL HEAD COMPLETION: ☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted: ☒ Yes ☐ No☐ Neat Cement ☐ Bentonite ☒ MUDDepth: From ALL ft. to ALL ft.

14 Nearest Source of possible contamination

85 feet WATER Direction SEPTIC TANK Type Well disinfected upon completion ☒ Yes ☐ No15 PUMP: ☒ Not installedManufacturer's Name RELI-JACKETModel Number 250 Volts 230Length of Drop Pipe 22' capacity 30 G.P.M.Type: ☒ Submersible☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

LI-28-79

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Ann Arbor Well Drilling 1290

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address 7015 70th Rd NaptunSigned George A. White Date 3-25-79

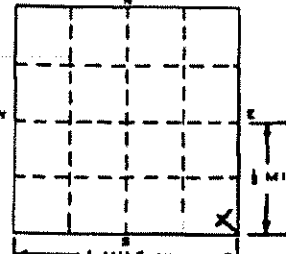
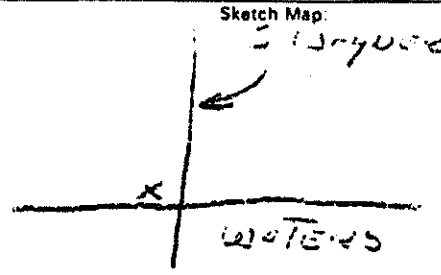
AUTHORIZED REPRESENTATIVE

WATER WELL AND PUMP RECORD

L-2-10

2118840

PERMIT NUMBER

1 LOCATION OF WELL		Township Name		Fraction	Section Number	Town Number	Range Number
County <u>Alcona</u>		<u>Leelanau</u>		<u>2E 1/4 Sec 14 T35N R10E</u>	<u>2</u>	<u>3</u> N/S	<u>5</u> E/W
Distance And Direction From Road Intersection <u>2700 S Wing Lake Rd</u> <u>Alcona, M. 48113</u>							
Street Address & City of Well Location Locate with "X" in Section Below							
		Sketch Map: 					
		3 OWNER OF WELL: <u>Charles Riddle</u> Address <u>2700 S Wing Lake Rd</u> <u>Alcona, M. 48113</u> Address Same As Well Location? ☐ Yes ☒ No					
2 FORMATION DESCRIPTION		THICKNESS OF STRATUM		DEPTH TO BOTTOM OF STRATUM		4 WELL DEPTH: <u>153</u> ft.	
		<u>25</u>		<u>25</u>		Date Completed: <u>6/3/88</u> ☒ New Well ☐ Replacement Well	
<u>Lower Clay</u>		<u>23</u>		<u>48</u>		6 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug	
<u>Low, Clay</u>		<u>41</u>		<u>89</u>		☐ Hollow rod ☐ Auger ☐ Jetted ☐	
<u>15 sand</u>		<u>27</u>		<u>116</u>		6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public	
<u>Lower sandy clay</u>		<u>37</u>		<u>153</u>		☐ Irrigation ☐ Type IIa Public ☐ Heat pump	
<u>Sand</u>		<u>37</u>		<u>153</u>		☐ Test Well ☐ Type IIb Public ☐	
7 CASING: Diameter <u>5</u> in. to <u>14 1/2</u> ft. depth		Steel ☐ Threaded ☐ Welded ☐		Height: Above/Below Surface <u>1</u> ft.		Weight <u>50</u> lb./ft.	
		☒ Plastic ☐		Drive Shoe ☐ Yes ☒ No			
8 SCREEN: Type <u>Stainless wire</u> Diameter <u>4" Nom</u>		Slot/Groove <u>12</u> Length <u>8</u>		Set between <u>14 1/2</u> ft. and <u>153</u> ft.		Fittings: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check	
		☒ Blank above screen <u> </u> ft. Other <u> </u>					
9 STATIC WATER LEVEL: <u>107</u> ft. below land surface ☐ Flow		10 PUMPING LEVEL: below land surface		<u>107</u> ft. after <u>2</u> hrs. pumping at <u>16</u> G.P.M.		<u> </u> ft. after <u> </u> hrs. pumping at <u> </u> G.P.M.	
		11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit		12 WELL GROUTED? ☐ No ☒ Yes From <u>2</u> to <u>116</u> ft.		☐ Neat cement ☒ Bentonite ☐ Other <u> </u>	
13 Nearest source of possible contamination Type <u>Septic</u> Distance <u>100</u> ft. Direction <u>W</u>		14 PUMP: ☐ Not Installed ☐ Pump Installation Only		Manufacturer's name <u>ENIGGC</u> <u>1 1/2</u> HP <u>112</u> Volts		Length of Drop Pipe <u>105</u> ft. capacity <u>20</u> G.P.M.	
		Model number <u> </u>		TYPE: ☒ Submersible ☐ Jet		PRESSURE TANK: Manufacturer's name <u>Airtank</u> Model number <u>10X302</u> Capacity <u>20</u> Gallons	

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

17. Rig Operator's Name:

Kurt Wing

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Charles Riddle Co Inc 81052

REGISTERED BUSINESS NAME

REGISTRATION NO. 114 48130

Address

Signed

AUTHORIZED REPRESENTATIVE

Date

Authority: Completion:

Act 388 PA 1978 Required

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County Washtenaw Twp. Sadie Fraction W 1/2 SW 1/4 SW 1/4 Section No. 2 Town N/S. Range E/W.

Distance And Direction from Road Intersections

500' East of Assen

OWNER No. _____

Street address & City of Well Location

4380 W. Waters Rd. Ann Arbor3 OWNER OF WELL John StephensonAddress 4380 W WatersAnn Arbor

2 FORMATION

THICKNESS
OF
STRATUMDEPTH TO
BOTTOM OF
STRATUM

4 WELL DEPTH: (completed) Date of Completion

171 ft. 2-14-685 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐7 CASING: Threaded ☒ Welded ☐
Diam. 4 in. to 165 ft. Depth Height: Above/Below
surface 1 ft.
Weight 1 lbs./ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: W L Co. Co. Dia.: 3 3/4Slot/Gauze 20 Length 4'Set between 165 ft. and 169 ft.Fittings: flange + 2 ft anchor

9 STATIC WATER LEVEL

144 ft. below land surface

10 PUMPING LEVEL below land surface

144 ft. after 2 hrs. pumping 12 g.p.m.

ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____

Hardness _____

12 WELL HEAD COMPLETION: ☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:

Well Grouted? ☒ Yes ☐ NoMaterial: ☐ Neat Cement ☒ Self

Depth: From _____ ft. to _____ ft.

14 SANITARY:

Nearest Source of possible contamination

100 feet N Direction Septic TypeWell disinfected upon completion ☒ Yes ☐ No

15 PUMP:

Manufacturer's Name EdaModel Number 12 D4 P071 HP 3/4Length of Drop Pipe 152 ft. capacity 12 G.P.M.Type: ☒ Submersible ☐☐ Jet☐ Reciprocating

6 Remarks, elevation, source of data, etc.

LI 312

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address

Signed

Date

AUTHORIZED REPRESENTATIVE

WATER WELL AND PUMP RECORD

L-2-12

PERMIT NUMBER

1 LOCATION OF WELL

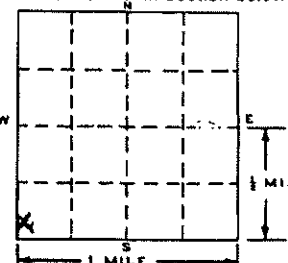
County Washtenaw Township Name Locli Fraction SW 1/4 SW 1/4 SW 1/4 Section Number 2 Town Number 3 N/S W Range Number 5 E/W

Distance And Direction From Road Intersection

2917 Tassmer
Ann Arbor, MI 48103

Street Address & City of Well Location

Locate with "X" in Section Below



Sketch Map

510 Church Rd
TESSMER Rd
WATERS Rd

2 FORMATION DESCRIPTION

THICKNESS
OF
STRATUMDEPTH TO
BOTTOM OF
STRATUM

<u>Brown Clay</u>	<u>8</u>	<u>8</u>
<u>Shale</u>	<u>23</u>	<u>31</u>
<u>Gravel</u>	<u>131</u>	<u>162</u>
<u>Sand</u>	<u>13</u>	<u>175</u>
<u>Shale</u>	<u>2</u>	<u>177</u>

3 OWNER OF WELL:

Address

Address Same As Well Location? ☒ Yes ☐ No

4 WELL DEPTH:

177 Ft.

Date Completed

2 10 87☐ New Well☒ Replacement Well

5

☐ Cable tool☐ Hollow rod☒ Rotary☐ Auger☐ Driven☐ Jetted

6 USE:

☒ Domestic☐ Irrigation☐ Test Well☐ Type I Public☐ Type IIa Public☐ Type IIb Public☐ Type III Public☐ Heat pump

7 CASING:

Diameter

5 1/2 in.☐ Steel☒ Plastic☐ Threaded☐ Welded

Height: Above/Below

Surface _____ ft.

Weight _____ lbs./ft.

Drive Shoe ☐ Yes ☐ No

Grouted Drill Hole Diameter

1 1/2 in.177 ft. depth

11 WELL HEAD

COMPLETION:

☒ Pitless adapter☐ Basement offset☒ 12" above grade☐ Approved pit☐ Neat cement☒ Bentonite☐ Other

No. of bags of cement

Additives

13 Nearest source of possible contamination

Type

Distance

ft. Direction

Well disinfected upon completion? ☒ Yes ☐ NoWas old well plugged? ☐ Yes ☒ No

SEE NOTE 16

14 PUMP:

☐ Not installed☐ Pump Installation Only

Manufacturer's name

Model number

Length of Drop Pipe

TYPE: ☒ Submersible ☐ Jet

PRESSURE TANK:

Manufacturer's name

Model number

Capacity

Gallons

Gallons

Gallons

Gallons

Gallons

Gallons

Gallons

Gallons

Gallons

Gallons

Gallons

15. Remarks, elevation, source of data, etc.

ABANDONMENT OF old well
By OWNER.

17. Rig Operator's Name:

Harry Clark

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address

Signed

AUTHORIZED REPRESENTATIVE

Date

Authority:

Completion:

Penalty:

Act 388 PA 1978

Required

Conviction of a violation

of any provision is a

L-2-13

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County Washtenaw Township Name Loch Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ Section Number 2 Town Number N/S. Range Number E/W.

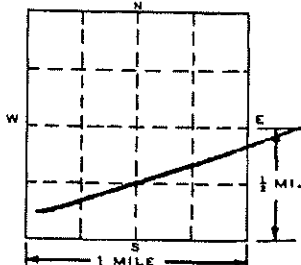
Distance And Direction from Road Intersections

2681 Tessmer Rd.
Ann Arbor

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address **Dr. William Howah**

Same

4 WELL DEPTH: (completed) Date of Completion

196 ft. **8-24-73**

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above ~~Surface~~ **1** ft.

4 in. to **196** ft. Depth Weight **11** lbs./ft.
in. to ft. Depth Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: **Smith** Dia.: **3 3/4**
Slot/Screen **18** Length **4**
Set between **192** ft. and **196** ft.
Fittings: **Packer & Plug**

9 STATIC WATER LEVEL

168 ft. below land surface

10 PUMPING LEVEL below land surface

183 ft. after **2** hrs. pumping **10** g.p.m.
ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl)
Hardness Other

12 WELL HEAD COMPLETION: ☐ In Approved Pit

☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No

☐ Neat Cement ☒ Bentonite
Depth: From ft. to ft.

14 Nearest Source of possible contamination

100 feet Direction **Septic** Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installed

Manufacturer's Name **Reda**
Model Number **1709P001** HP **1** Volts **220**
Length of Drop Pipe **183** ft. capacity **10** G.P.M.
Type: ☒ Submersible ☐ Reciprocating
☐ Jet ☐

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

LI 8-73

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Cribbley Drilling Co. Inc. **324**
REGISTERED BUSINESS NAME REGISTRATION NO.

Address **Dexter Mich. 48130**

Signed **Jack Cribbley** Date **9-14-73**
AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County <u>Washtenaw</u>	Twp. <u>Lodi</u>	Fraction <u>SW 1/4 NW 1/4 SW 1/4</u>	Section No. <u>2</u>	Town <u>3 N 5 E</u>	Range <u>5 E W</u>
Distance And Direction from Road Intersection <u>1/2 mile north of Waters</u>			OWNER No. 		
Street address & City of Well Location <u>707 Leasmer Rd. Ann Arbor, Mich.</u>			3 OWNER OF WELL <u>Tom Stanton</u> Address <u>2707 Leasmer Rd. Ann Arbor, Mich.</u>		

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
<u>Blue Clay</u>	<u>44</u>	<u>44</u>
<u>Dry Gravel</u>	<u>113</u>	<u>157</u>
<u>Water Gravel</u>	<u>24</u>	<u>181</u>

4 WELL DEPTH: (completed) <u>181</u> ft.	Date of Completion <u>2-15-68</u>
5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug	☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry	☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐	

7 CASING: Threaded ☒ Welded ☐ Diam. <u>4</u> in. to <u> </u> ft. Depth <u> </u> ft.	Height: Above/Below surface <u>1</u> ft. Weight <u>11</u> lbs/ft. Drive Shoe? Yes ☒ No ☐
---	---

8 SCREEN:	
Type: <u>WW Cork</u>	Dia.: <u>3 3/4</u>
Slot/Gauge: <u>50</u>	Length: <u>4'</u>
Set between <u>177</u> ft. and <u>181</u> ft.	
Fittings: <u>Packer & plug</u>	

9 STATIC WATER LEVEL
<u>172</u> ft. below land surface

10 PUMPING LEVEL below land surface
<u>172</u> ft. after <u>2</u> hrs. pumping <u>10</u> g.p.m.
<u> </u> ft. after <u> </u> hrs. pumping <u> </u> g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) <u> </u> Chlorides (Cl) <u> </u>
Hardness <u> </u>

12 WELL HEAD COMPLETION: ☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:
Well Grouted? ☒ Yes ☐ No
Material: ☐ Neat Cement ☒ <u>Self</u>
Depth: From <u> </u> ft. to <u> </u> ft.

14 SANITARY:
Nearest Source of possible contamination <u>200 feet W</u> Direction <u>Water</u> Type <u> </u>
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:
Manufacturer's Name <u>Pedra</u>
Model Number <u>DDYPO 51</u> HP <u>3/4</u>
Length of Drop Pipe <u>168</u> ft. capacity <u>10</u> G.P.M.
Type: ☒ Submersible ☐ Jet ☐ Reciprocating

6 Remarks, elevation, source of data, etc.

LI 2-68

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Cristy Drilling Co. 524
REGISTERED BUSINESS NAME REGISTRATION NO.Address Ann Arbor, Mich.Signed J. H. Clark Date 5-7-68
AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL		Fraction		Section No.	Town	Range
County <u>Washtenaw</u>	Twp. <u>Todds</u>	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	<u>2</u>	<u>3</u> S. <u>5</u> E.
Distance And Direction from Road Intersections <u>600' north of Waters Rd.</u>		OWNER No. 		3 OWNER OF WELL: <u>J. H. Seitz Jr</u>		
Street address & City of Well Location <u>2775 Leasmer Rd.</u> <u>Ann Arbor Mich</u>				Address <u>1235 Glen Haven</u> <u>Ann Arbor Mich</u>		
2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	4 WELL DEPTH: (completed) <u>181</u> ft. Date of Completion <u>12-14-67</u>			
<u>Blue Clay</u>	<u>40</u>	<u>40</u>	5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug			
<u>dry sand</u>	<u>124</u>	<u>164</u>	☐ Hollow rod ☐ Jetted ☐ Bored ☐			
<u>water sand</u>	<u>17</u>	<u>181</u>	6 USE: ☒ Domestic ☐ Public Supply ☐ Industry			
			☐ Irrigation ☐ Air Conditioning ☐ Commercial			
			☐ Test Well ☐			
			7 CASING: Threaded ☒ Welded ☐ Height: Above/Below surface <u>1</u> ft.			
			Diam. <u>4</u> in. to <u>127</u> ft. Depth <u>11</u> lbs./ft.			
			<u> </u> in. to <u> </u> ft. Depth Drive Shoe? Yes ☐ No ☐			
			8 SCREEN: Type: <u>6 W. Cook</u> Dia.: <u>3 3/4</u>			
			Slot/Gauge <u>50</u> Length <u>4'</u>			
			Set between <u>172</u> ft. and <u>181</u> ft.			
			Fittings: <u>pusher, 9 plug.</u>			
			9 STATIC WATER LEVEL <u>164</u> ft. below land surface			
			10 PUMPING LEVEL below land surface <u>164</u> ft. after <u>3</u> hrs. pumping <u>10</u> g.p.m.			
			<u> </u> ft. after <u> </u> hrs. pumping <u> </u> g.p.m.			
			11 WATER QUALITY in Parts Per Million: Iron (Fe) <u> </u> Chlorides (Cl) <u> </u>			
			Hardness <u> </u>			
			12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade			
			13 GROUTING: Well Grouted? ☒ Yes ☐ No			
			Material: ☐ Neat Cement ☐ <u>Grout</u>			
			Depth: From <u> </u> ft. to <u> </u> ft.			
			14 SANITARY: Nearest Source of possible contamination <u>100</u> feet <u>N</u> Direction <u>Septic</u> Type			
			Well disinfected upon completion ☒ Yes ☐ No			
			15 PUMP: Manufacturer's Name <u>Reda</u>			
			Model Number <u>1207P071</u> HP <u>3/4</u>			
			Length of Drop Pipe <u>170</u> ft. capacity <u>10</u> G.P.M.			
			Type: ☒ Submersible ☐ Jet ☐ Reciprocating			

Remarks, elevation, source of data, etc.

Washtenaw Permit
LI 285

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Gibley Drilling Co
REGISTERED BUSINESS NAME0574
REGISTRATION NO.Address Dexter MichSigned A. ClarkDate 1-4-68

AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL			Fraction		Section No.	Town	Range
County	Twp.		1/4	1/4	1/4	N/S.	E/W.
Distance And Direction from Road Intersections 1000' East of Cassmer			OWNER No. 		3 OWNER OF WELL: Carl Sayley		
4460 Waters Rd. Street address & City of Well Location Ann Arbor Mich.					Address 2807 Cranbrook Ann Arbor, Mich.		
2	FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	4 WELL DEPTH: (completed) 162 ft. Date of Completion 4-2-68			
	Yellow Clay	30	30	5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug			
	Sand	132	162	☐ Hollow rod ☐ Jetted ☐ Bored ☐			
	Bottomed on clay			6 USE: ☒ Domestic ☐ Public Supply ☐ Industry			
				☐ Irrigation ☐ Air Conditioning ☐ Commercial			
				☐ Test Well ☐			
				7 CASING: Threaded ☒ Welded ☐ Height: Above/Below surface 1 ft.			
				Diam. 4 in. to 152 ft. Depth Weight 11 lbs/ft.			
				In. to ft. Depth Drive Shoe? Yes ☒ No ☐			
				8 SCREEN: Type: WW Coak Dia.: 3 3/4			
				Slot/Gauge 14 Length 5'			
				Set between 157 ft. and 162 ft.			
				Fittings: packer & plug			
				9 STATIC WATER LEVEL 140 ft. below land surface			
				10 PUMPING LEVEL below land surface			
				143 ft. after 2 hrs. pumping 9 g.p.m.			
				ft. after hrs. pumping g.p.m.			
				11 WATER QUALITY in Parts Per Million:			
				Iron (Fe) Chlorides (Cl)			
				Hardness			
				12 WELL HEAD COMPLETION: ☐ In Approved Pit			
				☒ Pitless Adapter ☐ 12" Above Grade			
				13 GROUTING:			
				Well Grouted? ☒ Yes ☐ No			
				Material: ☐ Neat Cement ☒ Hel			
				Depth: From ft. to ft.			
				14 SANITARY:			
				Nearest Source of possible contamination 100 feet E Direction Septic Type			
				Well disinfected upon completion ☒ Yes ☐ No			
				15 PUMP:			
				Manufacturer's Name Reda			
				Model Number 1209 P071 HP 3/4			
				Length of Drop Pipe 150 ft. capacity 9 G.P.M.			
				Type: ☒ Submersible ☐ Jet ☐ Reciprocating			
16 Remarks, elevation, source of data, etc.				17 WATER WELL CONTRACTOR'S CERTIFICATION:			
Washtenaw Cty Permit LI 239				This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.			
				C. W. D. King 524 REGISTERED BUSINESS NAME REGISTRATION NO.			
				Address Water Mich. Signed G. Clark Date 8-6-68 AUTHORIZED REPRESENTATIVE			

WATER WELL AND PUMP RECORD

L-2-17

PERMIT NUMBER

1 LOCATION OF WELL			3 OWNER OF WELL:		
County <u>WASHTENAW</u>	Township Name <u>L.L.D.</u>	Fraction <u>SE 1/4 SE 1/4</u>	Section Number <u>2</u>	Town Number <u>3</u>	Range Number <u>5</u>
Distance And Direction From Road Intersection <u>2700 WATER'S RD</u> <u>AWAY N. 1/2 M. 4103</u>			Address <u>2606 VALLEY DR</u> <u>AWAY N. 1/2 M. 4103</u>		
Street Address & City of Well Location			Address Same As Well Location? ☐ Yes ☒ No		
Locate with "X" in Section Below			4 WELL DEPTH: Date Completed <u>7-10-87</u> ☒ New Well ☐ Replacement Well		
Sketch Map			5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug		
			☐ Hollow rod ☐ Auger ☐ Jetted ☐		
			6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public		
			☐ Irrigation ☐ Type IIa Public ☐ Heat pump		
			☐ Test Well ☐ Type IIb Public ☐		
			7 CASING: ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded		
			Height: Above/Below Surface <u>1</u> ft.		
			Weight <u>SDR 26</u> lbs./ft.		
			Drive Shoe ☐ Yes ☒ No		
2 FORMATION DESCRIPTION			8 SCREEN: ☐ Not Installed		
	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	Type <u>STAINLESS</u> <u>110</u> Diameter <u>5" NUM.</u>		
<u>BROWN CLAY</u>	<u>17</u>	<u>17</u>	Slot/Gauge <u>12</u> Length <u>4'</u>		
<u>GRAVELLY CLAY</u>	<u>93</u>	<u>110</u>	Set between <u>116</u> ft. and <u>120</u> ft.		
<u>SAND</u>	<u>10</u>	<u>120</u>	FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check		
			☒ Blank above screen <u>1</u> ft. Other _____		
			9 STATIC WATER LEVEL: <u>102</u> ft. below land surface ☐ Flow		
			10 PUMPING LEVEL: below land surface		
			<u>102</u> ft. after <u>2</u> hrs. pumping at <u>12</u> G.P.M.		
			_____ ft. after _____ hrs. pumping at _____ G.P.M.		
			11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade		
			☐ Basement offset ☐ Approved pit		
			12 WELL GROUTED? ☐ No ☒ Yes From <u>0</u> to <u>110</u> ft.		
			☐ Neat cement ☒ Bentonite ☒ Other <u>CUTTINGS</u>		
			No. of bags of cement _____ Additives _____		
			13 Nearest source of possible contamination		
			Type <u>S.T.</u> Distance <u>100</u> ft. Direction <u>EAST</u>		
			Well disinfected upon completion? ☒ Yes ☐ No		
			Was old well plugged? ☐ Yes ☐ No		
			14 PUMP: ☐ Not Installed ☐ Pump Installation Only		
			Manufacturer's name <u>RED JACKET</u>		
			Model number <u>EN123C</u> HP <u>3/4</u> Volts <u>220</u>		
			Length of Drop Pipe <u>107</u> ft. capacity <u>12</u> G.P.M.		
			TYPE: ☒ Submersible ☐ Jet		
			PRESSURE TANK: <u>AMTREL</u>		
			Manufacturer's name _____		
			Model number <u>WX203</u> Capacity <u>7.9</u> Gallons		

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Cribbley Drilling Co Inc 81-0524

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address

1211 E. M. 4103

Signed

AUTHORIZED REPRESENTATIVE

Date

7-15-87

17. Rig Operator's Name:

LI 2-87 WN

L-2-18

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County <u>Washtenaw</u>	Township Name <u>South</u>	Fraction $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$	Section Number <u>2</u>	Town Number N/S.	Range Number E/W.
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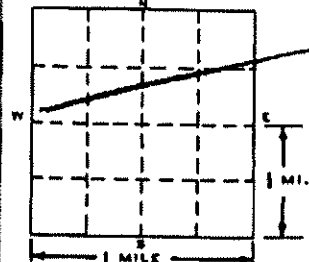
Distance And Direction from Road Intersections

2395 Lincoln Rd

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address

Phil Drucker
5586 Elizabeth St
Ann Arbor

4 WELL DEPTH: (completed) Date of Completion

177 ft. 10-21-71

☒ Cable tool	☐ Rotary	☐ Driven	☐ Dug
☐ Hollow rod	☐ Jetted	☐ Bored	☐

6 USE: ☒ Domestic	☐ Public Supply	☐ Industry
☐ Irrigation	☐ Air Conditioning	☐ Commercial
☐ Test Well	☐	☐

7 CASING: Threaded ☒ Welded ☐ Height: Above/BelowDiam. 4 in. to 173 ft. DepthSurface 1 ft.Weight 11 lbs./ft.Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: WW Coor Dia.: 3 3/4Slot/Gauge 25 Length 1Set between 173 ft. and 177 ft.Fittings: packer & plug

9 STATIC WATER LEVEL

137 ft. below land surface

10 PUMPING LEVEL below land surface

142 ft. after 2 hrs. pumping 12 g.p.m. ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl) Hardness Other 12 WELL HEAD COMPLETION: ☐ In Approved Pit☐ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☐ Bentonite ☐Depth: From ft. to ft.

14 Nearest Source of possible contamination

100 feet SW Direction Septic field Type Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installedManufacturer's Name DeltaModel Number DD9P101 HP 1 Volts 240Length of Drop Pipe 16 ft. capacity 1 G.P.M.Type: ☒ Submersible☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

LI 12-71

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address

Signed

AUTHORIZED REPRESENTATIVE

Date

L-3-1

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

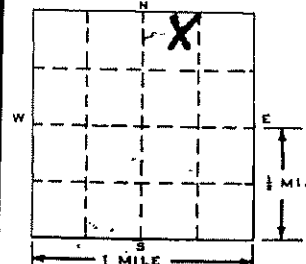
County Wash	Township Name Lodi	Fraction NE 1/4 NW 1/4 NE 1/4	Section Number 3	Town Number 3 S.	Range Number 5 E.
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Distance And Direction from Road Intersections

4 mi. E. of Tesser Rd at
4581 Scio Church Rd
Street address & City of Well Location **ANN ARBOR**

Locate with "X" in section below

Sketch Map:



Scio Church Rd
80' ↓ X
4 mi. E
Tesser CR

3 OWNER OF WELL:

MARY KULSACKAddress **300 DAVENPORT RD**
CHELSEA, MICH.

4 WELL DEPTH: (Completed) Date of Completion

148' ft. **4-22-69**5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well7 CASING: Threaded ☒ Welded ☐ Height: Above ☐ BelowDiam. **4** in. to **11** ft. Depth **11** lbs./ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: **Wire Wound** Dia.: **4**
Slot/Gauze **18** Length **4**
Set between **144** ft. and **148** ft.
Fittings: **3" X 16" BLANK + 3" Plug**

9 STATIC WATER LEVEL

105 ft. below land surface

10 PUMPING LEVEL below land surface

109 ft. after **1** hrs. pumping **10** g.p.m.
ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl)
UNKNOWN
Hardness Other

12 WELL HEAD COMPLETION:

☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☐ Bentonite ☒ Mud
Depth: From **All** ft. to **Open** ft.

14 Nearest Source of possible contamination

60 feet **SE** Direction **Septic** Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installed
Manufacturer's Name **Red A**
Model Number **43131** HP **3/4** Volts **230**
Length of Drop Pipe **132** ft. capacity **12** G.P.M.
Type: ☒ Submersible
☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

Replacement
Well

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Ann Arbor Well Drilling 36

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address **1393 Knight Rd**

Signed

Russell Crife
AUTHORIZED REPRESENTATIVEDate **5-15-69**

L-3-2

WATER WELL RECORD
ACT 294 PA 1965MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

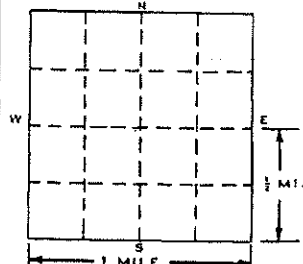
County Washtenaw	Township Name Lodi	Fraction 7 1/4 7 1/4 7 1/4	Section Number 3	Town Number 3 N/S.	Range Number 5 E/W.
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Distance And Direction from Road Intersections

**Abt 1/2 mile North int Waters & Tessmer Rd
and apx 200' West CL Tessmer Rd.**Street address & City of Well Location **2500 Tessmer Rd.**

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Walter Godek

Address

2500 Tessmer Rd. Ann Arbor

4 WELL DEPTH: (completed) Date of Completion

230 ft. **12-7-77**

☐ Cable tool	☒ Rotary	☐ Driven	☐ Dug
☐ Hollow rod	☐ Jetted	☐ Bored	

6 USE: ☒ Domestic	☐ Public Supply	☐ Industry
☐ Irrigation	☐ Air Conditioning	☐ Commercial
☐ Test Well		

7 CASING: Threaded ☒ Welded ☐

Diam.

Height: Above

Surface **1** ft.**4** in. to **225** ft. DepthWeight **11** lbs./ft.

in. to ft. Depth

Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: **Slotted SS** Dia.: **3.75 OD**Slot **15** Length **4'**Set between **225** ft. and **230** ft.Fittings: **Neoprene packer on 3x36 nipple & GI Plug**

9 STATIC WATER LEVEL

126 ft. below land surface

10 PUMPING LEVEL below land surface

153'? ft. after **2** hrs. pumping **13** g.p.m.

ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl)

Hardness Other

12 WELL HEAD COMPLETION:

☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☒ BentoniteDepth: From **220** ft. to **5** ft.

14 Nearest Source of possible contamination

60 feet **N** Direction **Septic Tank** TypeWell disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installedManufacturer's Name **Red Jacket**Model Number **100R1-14BC** HP **1** Volts **230**Length of Drop Pipe **195** ft. capacity **13** G.P.M.☒ Submersible☐ Jet☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

**Drilled under health permit
LI-3-77**

WELL CONTRACTOR'S CERTIFICATION:

This well was installed under my jurisdiction and this report is true to the best of my knowledge and belief.

J. P. Schmitt & Co.**2019**

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address **4540 Saline Rd. Ann Arbor**

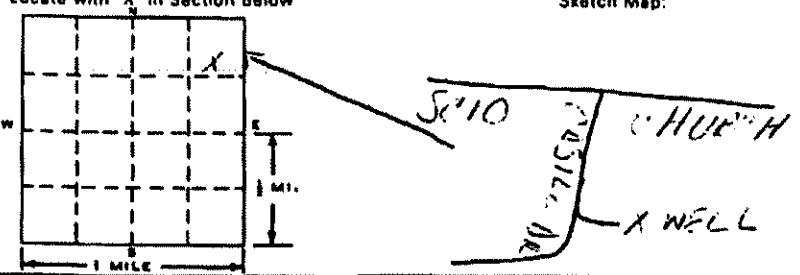
Signed

J. P. Schmitt
AUTHORIZED REPRESENTATIVEDate **12-7-77**

WATER WELL AND PUMP RECORD

L-3-3

PERMIT NUMBER

1 LOCATION OF WELL			3 OWNER OF WELL:		
County <u>WASHTENAW</u>	Township Name <u>LOD1</u>	Fraction <u>NE 1/4 NE 1/4 SW 1/4</u>	Section Number <u>3</u>	Town Number <u>3-55S</u>	Range Number <u>E 1/4</u>
Distance And Direction From Road Intersection <u>JAMES L. NIOFFS</u> <u>2355 CASTLE DR, ANN ARBOR</u>			Address <u>FERET & ASSOC</u> <u>185 JUDD RD, MILAN</u>		
Street Address & City of Well Location			Address Same As Well Location? ☐ Yes ☒ No		
Locate with "X" in Section Below			4 WELL DEPTH: (completed) ft. <u>140</u> Date of Completion <u>1-30-1987</u>		
Sketch Map: 			5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐		
2 FORMATION DESCRIPTION			6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐		
			7 CASING: Diameter ☐ Steel ☐ Threaded ☐ Height: Above/Below ☒ Plastic ☐ Welded Surface <u>1</u> ft. <u>5" PVC</u> to <u>132</u> ft. depth Weight <u>50</u> lbs./ft. Grouted Drill Hole Diameter in. to <u>132</u> ft. depth Drive Shoe ☐ Yes ☒ No <u>7 1/2</u> in. to <u>132</u> ft. depth		
BROWN CLAY			8 SCREEN: ☐ Not installed Type <u>STAINLESS</u> Diameter <u>4" NOM</u> Slot/Groove <u>20</u> Length <u>4'</u> Set between <u>132</u> ft. and <u>136</u> ft. FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☐ Blank above screen <u>1</u> ft. Other <u>4' ANCHOR</u>		
GRAVEL & SAND			9 STATIC WATER LEVEL: <u>103'</u> ft. below land surface ☐ Flow		
GRAY CLAY			10 PUMPING LEVEL: below land surface <u>103</u> ft. after <u>1</u> hrs. pumping at <u>12</u> G.P.M. <u>103</u> ft. after <u>2</u> hrs. pumping at <u>12</u> G.P.M.		
GRAVEL & SAND			11 WELL HEAD COMPLETION: ☒ Pitless adapter ☒ 12" above grade ☐ Basement offset ☐ Approved pit		
GRAY CLAY			12 WELL GROUTED? ☐ No ☒ Yes From <u>0</u> to <u>132</u> ft. ☐ Neat cement ☒ Bentonite ☒ Other <u>CUTTING</u> No. of bags of cement _____ Additives _____		
15. Remarks, elevation, source of data, etc. <u>L-59-86 S/WN AREA</u>			13 Nearest source of possible contamination Type <u>DRAINFIELD</u> Distance <u>110</u> ft. Direction <u>NE</u> Well disinfected upon completion? ☒ Yes ☐ No		
			14 PUMP: ☐ Not Installed ☐ Pump Installation Only Manufacturer's name <u>RED JACKET</u> Model number <u>750W1-CHPDC-34</u> Volts <u>230</u> Length of Drop Pipe <u>125</u> ft. capacity <u>12</u> G.P.M. TYPE: ☒ Submersible ☐ Jet PRESSURE TANK: Manufacturer's name <u>WELL-X-TROL</u> Model number <u>203</u> Capacity <u>1.4</u> Gallons		
16. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. <u>[Signature]</u> REGISTERED BUSINESS NAME _____ REGISTRATION NO. _____ Address _____ Signed _____ Date <u>1-30-87</u> AUTHORIZED REPRESENTATIVE			Authority: Act 388 PA 1978 Completion: Required Penalty: Conviction of a violation		



WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County Wash Township Name Joda Fraction 1/4 1/4 1/4 Section Number 3 Town Number N/S. Range Number E/W.

Distance And Direction from Road Intersections

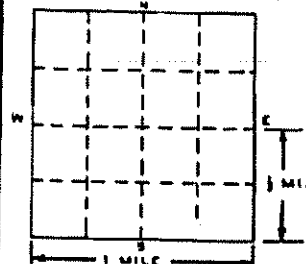
2292 Jessmer Rd

Street address & City of Well Location

Ann Arbor Mich

Locate with "X" in section below

Sketch Map:



3 OWNER-OF WELL:

Mr. Michael Nohrwald
Address Ann Arbor Mich

4 WELL DEPTH: (completed) Date of Completion

176 ft. 10-12-78

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above/Below

Diam. 4 in. to 176 ft. Depth Surface 1 ft.
Weight 11 lbs./ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: WW Stain Dia.: 3 3/4
Slot/Gauge 10 Length 5
Set between 171 ft. and 176 ft.
Fittings: Backer & plug

9 STATIC WATER LEVEL

123 ft. below land surface

10 PUMPING LEVEL below land surface

135 ft. after 2 hrs. pumping 12 g.p.m.

_____ ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____
Hardness _____ Other _____

12 WELL HEAD COMPLETION: ☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No

☐ Neat Cement ☒ Bentonite ☐
Depth: From _____ ft. to _____ ft.

14 Nearest Source of possible contamination

100 feet _____ Direction Syptic System
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installed
Manufacturer's Name Keda
Model Number DD4P101 HP 1 Volts 220
Length of Drop Pipe 147 ft. capacity 12 G.P.M.
Type: ☒ Submersible
☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

LT 21-78

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Cubley Drilling Co. 524
REGISTERED BUSINESS NAME REGISTRATION NO.

Address Deerfield, Mich

Signed Jack Clark Date 10-20-78
AUTHORIZED REPRESENTATIVE

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P.A. 1978

PERMIT NUMBER

1 LOCATION OF WELL		PART 127 ACT 368, P.A. 1978						PENNY NUMBER _____																						
County WASHINGTON	Township Name Loomis	Fraction 1/4 1/4 1/4			Section Number 3	Town Number 3 N/S	Range Number 5 E/W																							
Distance And Direction From Road Intersection 2296 ESTATE DR SUNNYSIDE Street Address & City of Well Location Locate with "X" in Section Below		3 OWNER OF WELL: CROWN DEVELOPMENT CO Address 3446 CASTLE DR SUNNYSIDE Address Same As Well Location? ☒ Yes ☐ No 4 WELL DEPTH: (completed) 156 ft. Date of Completion 9-3-81 5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐ 6 USE: ☐ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☒ Heat pump ☐ Test Well ☐ Type IIb Public ☒ RETURN VALVE 7 CASING Diameter ☐ Steel ☐ Threaded Height Above/Below Surface 1 ft. ☒ Plastic ☐ Welded Weight _____ lbs./ft. 5 in. to 136 ft. depth Drive Shoe ☐ Yes ☒ No Grouded Drill Hole Diameter 7 1/8 in. to 136 ft. depth _____ in. to _____ ft. depth																												
		8 SCREEN ☐ Not Installed Type WELDED STEEL Diameter 5" NOM Slot/Groove 4-35 Length 8 Set between 4-20/148 ft. and 156 ft. FITTINGS ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☐ Blank above screen _____ ft Other _____ 9 STATIC WATER LEVEL 122 ft below land surface ☐ Flow 10 PUMPING LEVEL below land surface 122 ft after 2 hrs. pumping at 9 G.P.M. _____ ft after _____ hrs. pumping at _____ G.P.M. 11 WELL HEAD COMPLETION ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit 12 WELL GROUTED? ☐ No ☒ Yes From 0 to 156 ft ☐ Neat cement ☒ Bentonite ☐ Other _____ No. of bags of cement _____ Additives _____ 13 Nearest source of possible contamination Type ADJACENT FIELD Distance 100 ft Direction S Well disinfected upon completion? ☒ Yes ☐ No 14 PUMP ☒ Not installed ☐ Pump Installation Only Manufacturer's name _____ Model number _____ HP _____ Volts _____ Length of Drop Pipe 136 ft. capacity _____ G.P.M. TYPE ☐ Submersible ☐ Jet _____ PRESSURE TANK Manufacturer's name _____ Model number _____ Capacity _____ Gallons _____																												
2 FORMATION DESCRIPTION <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">FORMATION DESCRIPTION</th> <th style="width: 20%;">THICKNESS OF STRATUM</th> <th style="width: 20%;">DEPTH TO BOTTOM OF STRATUM</th> </tr> </thead> <tbody> <tr><td>YELLOW CLAY</td><td>41</td><td>41</td></tr> <tr><td>SAND</td><td>16</td><td>57</td></tr> <tr><td>GRAY CLAY + GRAVEL</td><td>32</td><td>79</td></tr> <tr><td>GRAVELLY YELLOW CLAY</td><td>32</td><td>111</td></tr> <tr><td>GRAVEL + YELLOW & WHITE CLAY MIX</td><td>44</td><td>155</td></tr> <tr><td>GRAY CLAY</td><td>1</td><td>156</td></tr> </tbody> </table>		FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	YELLOW CLAY	41	41	SAND	16	57	GRAY CLAY + GRAVEL	32	79	GRAVELLY YELLOW CLAY	32	111	GRAVEL + YELLOW & WHITE CLAY MIX	44	155	GRAY CLAY	1	156	~1015 122 893							
FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM																												
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GRAY CLAY	1	156																												

USE A 2ND SHEET IF NEEDED

15 Remarks, elevation, source of data, etc.

LI-16-8U

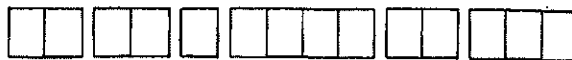
16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME, CORBIN SELLING Co Inc REGISTRATION NO. 81-1586

Address LEITEC M 48130

Signed Charles L. Green Date 9-10-81
 AUTHORIZED REPRESENTATIVE



WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT

OF
PUBLIC HEALTH

1 LOCATION OF WELL

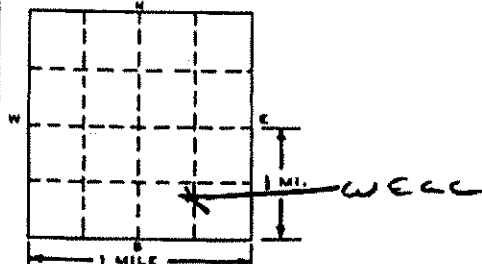
County WASH	Township Name Lodi	Fraction 1/4 1/2 3/4	Section Number (3)	Town Number 30S.	Range Number 5 E.
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Distance And Direction from Road Intersections

Street address & City of Well Location
2446 STONE GATE DR ANN ARBOR

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address

**JOHN COOCH
4941 SCIO CHURCH RD
ANN ARBOR**

4 WELL DEPTH: (completed) Date of Completion

151 ft. 12-12-805 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐7 CASING: Threaded ☒ Welded ☐

Height: Above/Below

Diam.

Surface **1** ft.**4** in. to **141** ft. DepthWeight **11** lbs./ft.

in. to ft. Depth

Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: **UNSTAINLESS** Dia.: **3/4**Slot/Gauge **25** Length **4**Set between **141** ft. and **145** ft.

Fittings:

PACKER & 6' BLACK

9 STATIC WATER LEVEL

117 ft. below land surface

10 PUMPING LEVEL below land surface

117 ft. after **2** hrs. pumping **9** g.p.m.

ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl)

Hardness Other

12 WELL HEAD COMPLETION: ☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☒ Bentonite ☐

Depth: From ft. to ft.

14 Nearest Source of possible contamination

feet Direction **160° IN** TypeWell disinfected upon completion ☐ Yes ☐ No

15 PUMP:

☐ Not installedManufacturer's Name **RED JACKET**Model Number **100W CHAMP** 1 Volts **220**Length of Drop Pipe **137** ft. capacity **18** G.P.M.Type: ☒ Submersible☐ Jet☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

LI-20-80

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

CRIBLEY DRILLING 81-1586

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address

Dexter M.

Signed

Charles Brown

Date

12-12-80

WATER WELL RECORD
ACT 294 PA 1965MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County <u>Washtenaw</u>	Township Name <u>Lodi</u>	Fraction <u>1/4</u> <u>1/4</u> <u>1/4</u>	Section Number <u>3</u>	Town Number <u>38</u> S.	Range Number <u>5</u> E.
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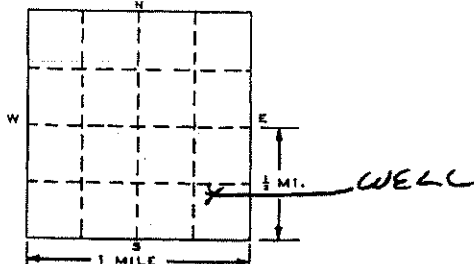
Distance And Direction from Road Intersections

2446 Stonegate Dr
Ann Arbor

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address John Cooch
4941 Scio Church Rd
Ann Arbor

4 WELL DEPTH: (completed) Date of Completion

304 ft. 12-12-80

☐ Cable tool	☒ Rotary	☐ Driven	☐ Dug
☐ Hollow rod	☐ Jetted	☐ Bored	☐

☒ Domestic	☐ Public Supply	☐ Industry
☐ Irrigation	☐ Air Conditioning	☐ Commercial
☐ Test Well	☐	☐

7 CASING: Threaded ☐ Welded ☐ Height: Above/Below4 in. to 304 ft. Depth
Surface ft.
Weight lbs./ft.
Drive Shoe? Yes ☐ No ☐

8 SCREEN:

Type: Dia.:
Slot/Gauze Length
Set between ft. and ft.
Fittings:

9 STATIC WATER LEVEL

 ft. below land surface

10 PUMPING LEVEL below land surface

 ft. after hrs. pumping g.p.m. ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl) Hardness Other

12 WELL HEAD COMPLETION:

☐ In Approved Pit
☐ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☐ Bentonite ☐
Depth: From ft. to ft.

14 Nearest Source of possible contamination

 feet Direction Type Well disinfected upon completion ☐ Yes ☐ No

15 PUMP:

☒ Not installedManufacturer's Name Model Number HP Volts Length of Drop Pipe ft. capacity G.P.M.Type: ☐ Submersible
☐ Jet ☒ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

DON'T GO INTO THE
ROCK - DRY HOLE.
11-20-80

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true
to the best of my knowledge and belief.CRIBLEY DRILLING 81-1586
REGISTERED BUSINESS NAME REGISTRATION NO.Address Dexter St.Signed Charles Crivley Date 12-12-80
AUTHORIZED REPRESENTATIVE

WATER WELL AND PUMP RECORD

 HLI 79 869N
 PERMIT NUMBER

L-3-10

1 LOCATION OF WELL		L-3-10		C	
County	Township Name	Fraction	Section Number	Town Number	Range Number
WASH-ENAW	Lodi	5/45/45 S/E	3	3 W/S	5 E/W
Distance And Direction From Road Intersection		3 OWNER OF WELL: Jack Pillsbury			
of Zeeb Rd $\frac{1}{2}$ mile west		Address 4970 Waters Rd			
of 7 essmer on North side of		Ann Arbor			
Waters Rd.		Address Same As Well Location? ☒ Yes ☐ No			
Street Address & City of Well Location		4 WELL DEPTH: (completed) 210 ft. Date of Completion Nov 6-86			
Locate with 'X' in Section Below		5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug			
Sketch Map:		☐ Hollow rod ☐ Auger ☐ Jetted ☐			
		6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public			
		☐ Irrigation ☐ Type IIa Public ☐ Heat pump			
		☐ Test Well ☐ Type IIb Public ☐			
		7 CASING: Diameter ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded			
		Height: Above/Below Surface 1 ft.			
		Weight PVC lbs./ft.			
		Drive Shoe ☐ Yes ☒ No			
2 FORMATION DESCRIPTION		8 SCREEN: ☐ Not Installed			
CLAY	THICKNESS OF STRATUM 50	Type JOHNSON Diameter 4"			
CLAY & GRAVEL	20	Slot/Gauze 20 Length 6'			
CLAY	50	Set between 204 ft. and 210 ft.			
Quick SAND & CLAY	30	FITTINGS: ☐ K-Packer ☐ Lead Packer ☐ Bramer Check			
CLAY	53	☐ Blank above screen ft. Other TAPER 6N			
GRAVEL	203	9 STATIC WATER LEVEL: 120 ft. below land surface ☐ Flow			
		10 PUMPING LEVEL: below land surface			
		150 ft. after 2 hrs. pumping at 20 G.P.M.			
		ft. after hrs. pumping at G.P.M.			
		11 WELL HEAD COMPLETION: ☒ Flareless adapter ☐ 12" above grade			
		☐ Basement offset ☐ Approved pit			
		12 WELL GROUTED? ☐ No ☒ Yes From 204 to 0 ft.			
		☐ Neat cement ☒ Bentonite ☐ Other CLAY			
		No. of bags of cement Two Additives BEN-SEAL			
		13 Nearest source of possible contamination			
		Type SEPTIC Distance 100 ft. Direction W			
		Well disinfected upon completion? ☒ Yes ☐ No			
		14 PUMP: ☐ Not Installed ☐ Pump Installation Only			
		Manufacturer's name HERMITIC			
		Model number HP 3 Volts 220			
		Length of Drop Pipe 150 ft. capacity G.P.M.			
		TYPE: ☒ Submersible ☐ Jet			
		PRESSURE TANK: WEIX 120			
		Manufacturer's name Model number WX-202 Capacity Gallons			

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

 Gordon & Sons Inc. 58-0551
 REGISTERED BUSINESS NAME REGISTRATION NO.

Address Tipton MI

Signed Ray Gordon AUTHORIZED REPRESENTATIVE

Date Nov 5-86

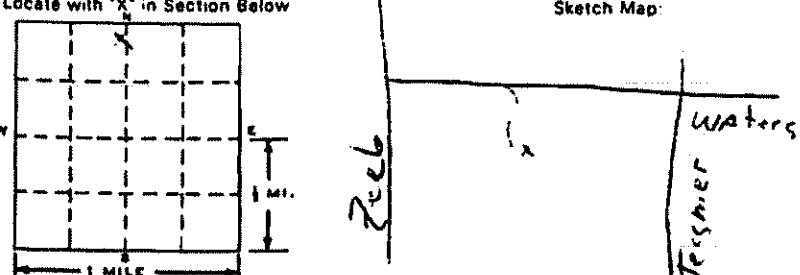
 Authority: Act 368 PA 1978
 Completion: Required
 Penalty: Conviction of a violation

87d 12/85

WATER WELL AND PUMP RECORD

 47875W
 PERMIT NUMBER

L-10-1

1 LOCATION OF WELL		Fraction		Section Number		Town Number		Range Number	
County <u>Washtenaw</u>		Township Name <u>Lodi</u>		<u>NE 1/4 NW 1/4</u>		<u>10</u>		<u>3 MS 5 ENE</u>	
Distance And Direction From Road Intersection					3 OWNER OF WELL: <u>Ronald Grams</u>				
<u>4749 Waters Rd</u>					Address <u>280 Hampshire</u>				
<u>ANN ARBOR 48103</u>					Address Same As Well Location? ☐ Yes ☒ No				
Street Address & City of Well Location					4 WELL DEPTH: <u>162</u> FT.				
Locate with "X" in Section Below					Date Completed <u>8-31-88</u> ☒ New Well ☐ Replacement Well				
Sketch Map:					5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug				
					☐ Hollow rod ☐ Auger ☐ Jetted ☐				
					6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public				
					☐ Irrigation ☐ Type IIa Public ☐ Heat pump				
					☐ Test Well ☐ Type IIb Public ☐				
					7 CASING: ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded				
					Height: Above/Below <u>1</u> ft.				
					Surface <u>1</u> ft.				
					Weight <u>SNR-26</u> lbs./ft.				
					Drive Shoe ☐ Yes ☐ No				
2 FORMATION DESCRIPTION					8 SCREEN: ☐ Not installed				
THICKNESS OF STRATUM					Type <u>Stainless W.W.</u> Diameter <u>5" Nom</u>				
DEPTH TO BOTTOM OF STRATUM					Slot/Gauge <u>12</u> Length <u>4'</u>				
<u>Brown Clay</u>					Set between <u>158</u> ft. and <u>160</u> ft.				
<u>Gray Clay</u>					FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Brainer Check				
<u>Gravel & Sand</u>					☐ Blank above screen <u>1</u> ft. Other <u>2' Anchor</u>				
<u>Sand & Gray Clay streaks</u>					9 STATIC WATER LEVEL: <u>113</u> ft. below land surface ☐ Flow				
<u>Sand</u>					10 PUMPING LEVEL: below land surface				
<u>Gray Clay</u>					<u>120</u> ft. after <u>2</u> hrs. pumping at <u>12</u> G.P.M.				
					<u> </u> ft. after <u> </u> hrs. pumping at <u> </u> G.P.M.				
					11 WELL HEAD COMPLETION: ☐ Pitless adapter ☒ 12" above grade				
					☐ Basement offset ☐ Approved pit				
					12 WELL GROUTED? ☐ No ☒ Yes- From <u>0</u> to <u>130</u> ft.				
					☐ Neat cement ☒ Bentonite ☐ Other <u>Cuttings</u>				
					No. of bags of cement <u> </u> Additives <u> </u>				
					13 Nearest source of possible contamination				
					Type <u>Septic</u> Distance <u>105</u> ft. Direction <u>SW</u>				
					Well disinfected upon completion? ☒ Yes ☐ No				
					Was old well plugged? ☐ Yes ☐ No				
					14 PUMP: ☒ Not installed ☐ Pump installation only				
					Manufacturer's name <u> </u>				
					Model number <u> </u> HP <u> </u> Volts <u> </u>				
					Length of Drop Pipe <u> </u> ft. capacity <u> </u> G.P.M.				
					TYPE: ☐ Submersible ☐ Jet				
					PRESSURE TANK: <u> </u>				
					Manufacturer's name <u> </u>				
					Model number <u> </u> Capacity <u> </u> Gallons				

RECEIVED

SEP 30 1988

ENVIRONMENTAL HEALTH

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

Li 47-875/WN

17. Rig Operator's Name:

Larry Clark

17d 12/85

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

CRIBLEY Drilling Co Inc 810524

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address

Dexter

Signed

Jack O. Clark

Date

8-31-88

AUTHORIZED REPRESENTATIVE

Authority:

Completion:

Penalty:

Act 368 PA 1978

Required

Conviction of a violation

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P.A. 1978

PERMIT NUMBER

1 LOCATION OF WELL		3 OWNER OF WELL:																															
County <u>Wash</u>	Township Name <u>Lodi</u>	Fraction <u>1/4</u> <u>1/4</u> <u>1/4</u>	Section Number <u>10</u> Town Number <u>3</u> Range Number <u>5</u> <u>N</u> <u>S</u> <u>E</u> <u>W</u>																														
Distance And Direction From Road Intersection <u>5061 WATERS Rd.</u> <u>ANN ARBOR, MI. 48103</u>		Address <u>5171 WATERS Rd.</u> <u>ANN ARBOR MI. 48103</u>																															
Street Address & City of Well Location		Address Same As Well Location? ☐ Yes ☒ No																															
Locate with "X" in Section Below		4 WELL DEPTH: (completed) <u>274</u> ft. Date of Completion <u>11-23-83</u>																															
		5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐																															
		6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐																															
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:40%;">2 FORMATION DESCRIPTION</th> <th style="width:10%;">THICKNESS OF STRATUM</th> <th style="width:10%;">DEPTH TO BOTTOM OF STRATUM</th> </tr> <tr><td><u>YELLOW CLAY</u></td><td><u>17</u></td><td><u>17</u></td></tr> <tr><td><u>GRAY CLAY</u></td><td><u>95</u></td><td><u>112</u></td></tr> <tr><td><u>GRAVEL</u></td><td><u>12</u></td><td><u>124</u></td></tr> <tr><td><u>GRAY CLAY</u></td><td><u>100</u></td><td><u>224</u></td></tr> <tr><td><u>GRAVEL + SAND w/CLAY</u></td><td><u>8</u></td><td><u>232</u></td></tr> <tr><td><u>GRAVEL + CLAY MIX</u></td><td><u>9</u></td><td><u>241</u></td></tr> <tr><td><u>GRAY CLAY</u></td><td><u>21</u></td><td><u>262</u></td></tr> <tr><td><u>GRAVEL</u></td><td><u>12</u></td><td><u>274</u></td></tr> <tr><td colspan="3" style="text-align: center;"> <u>N1000</u> <u>121</u> <u>879</u> </td></tr> </table>		2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	<u>YELLOW CLAY</u>	<u>17</u>	<u>17</u>	<u>GRAY CLAY</u>	<u>95</u>	<u>112</u>	<u>GRAVEL</u>	<u>12</u>	<u>124</u>	<u>GRAY CLAY</u>	<u>100</u>	<u>224</u>	<u>GRAVEL + SAND w/CLAY</u>	<u>8</u>	<u>232</u>	<u>GRAVEL + CLAY MIX</u>	<u>9</u>	<u>241</u>	<u>GRAY CLAY</u>	<u>21</u>	<u>262</u>	<u>GRAVEL</u>	<u>12</u>	<u>274</u>	<u>N1000</u> <u>121</u> <u>879</u>			7 CASING: Diameter ☒ Steel ☐ Threaded ☐ Plastic ☐ Welded <u>4</u> in. to <u>274</u> ft. depth <u>8</u> in. to <u>200</u> ft. depth Height: Above/Below Surface <u>1</u> ft. Weight <u>11</u> lbs./ft. Drive Shoe ☒ Yes ☐ No	
		2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM																													
<u>YELLOW CLAY</u>	<u>17</u>	<u>17</u>																															
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<u>N1000</u> <u>121</u> <u>879</u>																																	
CITY OF ANN ARBOR DIVISION OF WATER 12/22/83		8 SCREEN: ☐ Not Installed Type <u>LOW STAIN</u> Diameter <u>4" Nom.</u> Slot/Gauge <u>20-25</u> Length <u>8</u> Set between <u>266</u> ft. and <u>274</u> ft. FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☒ Blank above screen <u>1</u> ft. Other _____																															
		9 STATIC WATER LEVEL <u>121</u> ft. below land surface ☐ Flow																															
		10 PUMPING LEVEL: below land surface <u>121</u> ft. after <u>2</u> hrs. pumping at <u>12</u> G.P.M. _____ ft. after _____ hrs. pumping at _____ G.P.M.																															
		11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit																															
		12 WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft. ☐ Neat cement ☒ Bentonite ☐ Other _____ No. of bags of cement _____ Additives _____																															
		13 Nearest source of possible contamination Type <u>SEPTIC</u> Distance <u>125</u> ft. Direction <u>SE</u> Well disinfected upon completion? ☒ Yes ☐ No																															
		14 PUMP: ☐ Not Installed ☐ Pump Installation Only Manufacturer's name <u>RED JACKET</u> Model number <u>756NW</u> HP <u>3/4</u> Volts <u>220</u> Length of Drop Pipe <u>147</u> ft. capacity <u>12</u> G.P.M. TYPE: ☒ Submersible ☐ Jet PRESSURE TANK: Manufacturer's name <u>AMTRAK</u> Model number <u>WY 202</u> Capacity <u>6.2</u> Gallons																															

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Cribbley Drilling Co Inc 81-0524
REGISTERED BUSINESS NAME REGISTRATION NO.
Address DEXTER MI 48130
Signed Paul C. Clark Date 12-22-83
AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County WASHTENAW Twp. Lodi Fraction NE 1/4 NE 1/4 NW 1/4 Section No. 11 Town 3 S. Range 5 E.

Distance And Direction from Road Intersections

OWNER No. _____

200 FT SOUTH OF WATERS RD
4065 WATERS RD, ANN ARBOR
3/4 MILE SOUTHWEST OF WATERS

3 OWNER OF WELL:

Address

Cole
6035 WATERS RD ANN ARBOR

2 FORMATION

THICKNESS
OF
STRATUMDEPTH TO
BOTTOM OF
STRATUM

CLAY - BROWN	12	12
GRAVEL & SAND	16	28
BROWN SAND, WITH SILTY CLAY	48	76
DRY SAND & FINE GRAVEL	69	145
CLAY - GRAY, FINE	29	174
CLAY w/pebbles	45	219
GRAVEL		
SAND & GRAVEL - FINE TO MEDIUM	8	227

4 WELL DEPTH: (completed) Date of Completion

227 ft. 11-1-66

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐
Diam. 4 in. to 12 3/4 ft. Depth
Height: Above/Below surface 1 ft.
Weight 11 lbs./ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN STAINLESS STEEL
Type: Slotted Dia.: 3"
Slot/Gauge 20 Length 4'
Set between 223 ft. and 227 ft.
Fittings: Closed Bottom - 1' X 3"
Blank Nipple + Hump Tee

9 STATIC WATER LEVEL
140 ft. below land surface

10 PUMPING LEVEL below land surface
160 ft. after 2 1/2 hrs. pumping 20 g.p.m.
_____ ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____

Hardness _____

12 WELL HEAD COMPLETION: ☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:
Well Grouted? ☐ Yes ☐ No
Material: ☐ Neat Cement ☐
Depth: From _____ ft. to _____ ft.

14 SANITARY:
Nearest Source of possible contamination
25 feet North Direction Septic Tank
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP:

Manufacturer's Name _____

Model Number _____ HP _____

Length of Drop Pipe _____ ft. capacity _____ G.P.M.

Type: ☐ Submersible ☐
☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

Washtenaw County Permit W 286

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true
to the best of my knowledge and belief.

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address

Signed

Date

AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT

OF

PUBLIC HEALTH

1 LOCATION OF WELL

County Wash Twp. Lodi Fraction NW 1/4 NW 1/4 Section No. 11 Town 3 Range 5 E

Distance And Direction from Road Intersections

200' E. of Tassmer Rd AT
4473 Waters Rd.

OWNER No. _____

3 OWNER OF WELL: BEN ROSSAddress 4495 WATERS RdANN ARBORStreet address & City of Well Location ANN ARBOR, MICH

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
<u>clay - hard - Red</u>	<u>25</u>	<u>25</u>
<u>SAND AND GRAVEL</u>	<u>141</u>	<u>166</u>
<u>SAND - water bearing</u>	<u>2</u>	<u>168</u>
<u>GRAVEL - clayey</u>	<u>12</u>	<u>180</u>
<u>clay - hard</u>	<u>64</u>	<u>244</u>
<u>SAND, muddy</u>	<u>4</u>	<u>248</u>
<u>GRAVEL, water bearing</u>	<u>3</u>	<u>251</u>

4 WELL DEPTH: (completed) 251' ft. Date of Completion 1-14-69

5 ☒ Cable tool 4" AUGER ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above/Below surface 1 ft.
Diam. 5 in. All ft. Depth Weight 15 lbs./ft.
in. to ft. Depth Drive Shoe? Yes ☒ No ☐

8 SCREEN:
Type: NONE Dia.: _____
Slot/Gauze _____ Length _____
Set between _____ ft. and _____ ft.
Fittings: _____

9 STATIC WATER LEVEL
145 ft. below land surface

10 PUMPING LEVEL below land surface
152 ft. after 1 hrs. pumping 15 g.p.m.
_____ ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____

Hardness UNKNOWN

12 WELL HEAD COMPLETION: ☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:
Well Grouted? ☒ Yes ☐ No
Material: ☐ Neat Cement ☒ MUD
Depth: From _____ ft. to _____ ft. ALL UPON

14 SANITARY:
Nearest Source of possible contamination
80 feet W Direction Septic Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:
Manufacturer's Name Reda
Model Number 17092101 HP 1
Length of Drop Pipe 185 ft. capacity 12 G.P.M.
Type: ☒ Submersible ☐ Jet ☐ Reciprocating

5 Remarks, elevation, source of data, etc.

LI 13-68

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Ann Arbor Well Drilling 36
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 1393 Knight Rd

Signed Russell Grife Date MAR 24, 69
AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County Washtenaw Twp. Lodi Fraction NW 1/4 NW 1/4 NE 1/4 Section No. 11 Town 1 Range N/S. E/W.

Distance And Direction from Road Intersections

500' S. of Waters Rd3077 Jessmer Rd

Street address & City of Well Location

OWNER No. _____

3 OWNER OF WELL: D. HAKALA

Address

2502 Jessmer Rd
Ann Arbor, Mich

2

FORMATION

THICKNESS
OF
STRATUMDEPTH TO
BOTTOM OF
STRATUM

4 WELL DEPTH: (completed)

Date of Completion

171

ft.

2-9-685 ☒ Cable tool☐ Rotary☐ Driven☐ Dug☐ Hollow rod☐ Jetted☐ Bored6 USE: ☒ Domestic☐ Public Supply☐ Industry☐ Irrigation☐ Air Conditioning☐ Commercial☐ Test Well

7 CASING:

Diam. 4 in. to 167 ft. Depth☒ Threaded☐ Welded

Height: Above/Below

surface 1 ft.Weight 4 lbs/ft.Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type 6W CorkDia.: 3 3/4Slot/Gauge 3.5Length 4'Set between 167 ft. and 171 ft.Fittings: packer & plug

9 STATIC WATER LEVEL

146 ft. below land surface

10 PUMPING LEVEL below land surface

146 ft. after _____ hrs. pumping 10 g.p.m.

_____ ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____

Hardness _____

12 WELL HEAD COMPLETION: ☐ In Approved Pit☐ Pitless Adapter☐ 12" Above Grade

13 GROUTING:

Well Grouted? ☒ Yes ☐ NoMaterial: ☐ Neat Cement ☒ HL

Depth: From _____ ft. to _____ ft.

14 SANITARY:

Nearest Source of possible contamination

100 feet E Direction Seeps TypeWell disinfected upon completion ☒ Yes ☐ No

15 PUMP:

Manufacturer's Name PedaModel Number 1204 P071 HP 3/4Length of Drop Pipe 158 ft. capacity 10 G.P.M.Type: ☒ Submersible☐☐ Jet☐ Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Willey W. King

REGISTERED BUSINESS NAME

524

REGISTRATION NO.

Address 15 Dexter, MichSigned W. A. King Date 6-1-68

AUTHORIZED REPRESENTATIVE

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME

REGISTRATION NO

Address

Signed

AUTHORIZED REPRESENTATIVE

Date _____

WATER WELL AND PUMP RECORD

PERMIT NUMBER

L-11-5

1 LOCATION OF WELL		County		Township Name		Fraction		Section Number		Town Number		Range Number	
Washtenaw		Lodi		1/4		1/4		11		3 N/S		5 E/W	
Distance And Direction From Road Intersection				3 OWNER OF WELL:									
1/2 MILE E. OF TESSMER RD RT 3999 WATER				Greg Hubbard Address 2400 Lima Center Rd. P.O. BOX 115 DEXTER, MI 48130									
Street Address & City of Well Location				Address Same As Well Location? ☐ Yes ☒ No									
Locate with "X" in Section Below				4 WELL DEPTH: (completed) 147 ft. Date of Completion 1-10-86									
Sketch Map:				5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jatted ☐									
6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐				7 CASING: ☐ Steel ☐ Threaded ☐ Welded ☒ Plastic ☐ Grouted Drill Hole Diameter _____ in. to _____ ft. depth _____ in. to _____ ft. depth _____ in. to _____ ft. depth									
8 SCREEN: ☐ Not Installed Type Stainless Diameter 4" Slot/_____ 10# Length 5" Set between 142 ft. and 147 ft. FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☒ Blank above screen 1 ft. Other _____				9 STATIC WATER LEVEL: 90 ft. below land surface ☐ Flow									
10 PUMPING LEVEL: below land surface 93 ft. after 2 hrs. pumping at 10 G.P.M. 44 ft. after 2 hrs. pumping at 12 G.P.M.				11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit									
12 WELL GROUTED? ☐ No ☒ Yes From ALL to _____ ft. ☐ Neat cement ☒ Bentonite ☐ Other Mud No. of bags of cement _____ Additives _____				13 Nearest source of possible contamination Type SEPTIC TANK Distance 90 ft. Direction W Well disinfected upon completion? ☒ Yes ☐ No									
14 PUMP: ☐ Not Installed ☐ Pump Installation Only Manufacturer's name RED JACKET Model number 12 BC HP 3/4 Volts 220 Length of Drop Pipe 120 ft. capacity 18 G.P.M. TYPE: ☒ Submersible ☐ Jet PRESSURE TANK: ☒ WELL X TROL Manufacturer's name Model number 202 Capacity 5 Gallons													

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

L1 2-85 9/4WN

67d 2/84

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

ANN ARBOR WELL DRILLING, INC. 1290

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address 7015 Joy Rd., Dexter, MI 48130

Signed Gerald F. Wheeler 1-10-86

Gerald F. Wheeler

Authority:

Completion:

Act 368 PA 1978

Required

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County Washtenaw Township Name Ann Arbor Fraction 1/4 1/4 1/4 Section Number 34 Town Number 2 N.W. Range Number 5 E.W.

Distance And Direction from Road Intersections

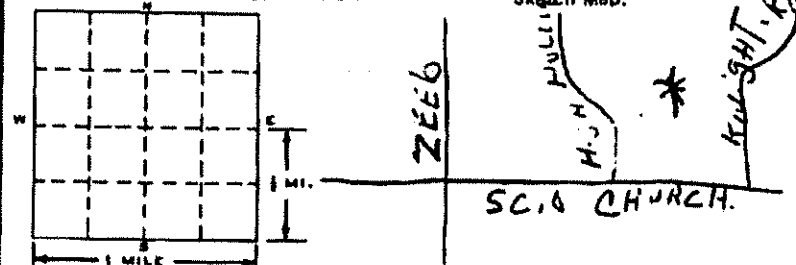
20 ft. AM. LC N. OF SC. O. CHURCH RD.

Street address & City of Well Location

ON H. H. HOLLOW AT 1869

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address

12310 D. L. L. Rd.
Ann Arbor 48106

4 WELL DEPTH: (completed) Date of Completion

138 ft. 11/10/80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above/BelowDiam. 4 in. to all ft. Depthin. to all ft. DepthWeight 11 lbs./ft.Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: Jackson SS Dis.: 4Slot: 10 Length 5Set between 133 ft. and 138 ft.Fittings: 3" plug & R. Packer

9 STATIC WATER LEVEL

65 ft. below land surface

10 PUMPING LEVEL below land surface

106 ft. after 2 hrs. pumping 12 g.p.m.108 ft. after 2 hrs. pumping 12 g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl) Hardness Other 12 WELL HEAD COMPLETION: ☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☐ Bentonite ☒ Depth: From all ft. to all ft.

14 Nearest Source of possible contamination

 feet Direction Type Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installedManufacturer's Name Model Number 7502 HP 3/4 Volts 230Length of Drop Pipe 24 ft. capacity G.P.M.Type: ☒ Submersible☐ Jet☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

50-61-80

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME AA719101 Drilling Inc REGISTRATION NO. 1290Address 7015 E. Michigan St.Signed Date 11/10/80

AUTHORIZED REPRESENTATIVE

S-34-2

WATER WELL RECORD
ACT 294 PA 1965MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

R0

1 LOCATION OF WELL

County Washtenaw	Township Name Scio	Fraction SW 1/4 NE 1/4 SE 1/4	Section Number 34	Town Number 2 N.S.	Range Number 5 E.W.
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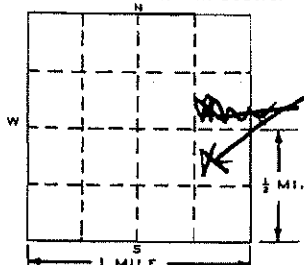
Distance And Direction from Road Intersections

1639 Knight

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Tom Clark
1909 Crestland
Ann Arbor, MI.

Address

4 WELL DEPTH: (completed) Date of Completion

172 ft. **7/30/75**

☐ Cable tool	☒ Rotary	☐ Driven	☐ Dug
☐ Hollow rod	☐ Jetted	☐ Bored	

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above/Below

4 in. to 168 ft. Depth	Surface _____ ft.
_____ in. to _____ ft. Depth	Weight 11 lbs./ft.
	Drive Shoe? Yes ☒ No ☐

2 FORMATION

THICKNESS
OF
STRATUMDEPTH TO
BOTTOM OF
STRATUM

8 SCREEN:

Type: **stainless** Dia.: **4"**
Slot/Screen **18** Length **4'**
Set between **168** ft. and **172** ft.
Fittings: **hemp packer plug 1' blank**

9 STATIC WATER LEVEL

70 ft. below land surface

10 PUMPING LEVEL below land surface

100 ft. after **4** hrs. pumping **25** g.p.m.
_____ ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____
Hardness _____ Other _____

12 WELL HEAD COMPLETION: ☐ In Approved Pit
☐ Pitless Adapter ☒ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No

☐ Neat Cement ☒ Bentonite ☐
Depth: From _____ ft. to _____ ft.

14 Nearest Source of possible contamination

125 feet **SW** Direction **drainfield** Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installed

Manufacturer's Name _____
Model Number _____ HP _____ Volts _____
Length of Drop Pipe _____ ft. capacity _____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

So 14-72

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true
to the best of my knowledge and belief.

Slusser Drilling Co., Inc. **0388**
REGISTERED BUSINESS NAME REGISTRATION NO.

Address **1707 W. Michigan, Ypsilanti**

Signed *[Signature]* Date **8/1/75**
AUTHORIZED REPRESENTATIVE

S-34-3
WATER WELL RECORD
ACT 294 PA 1965MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH**1 LOCATION OF WELL**

County Washtenaw	Township Name SCIO	Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$	Section Number 34	Town Number 2 N/S.	Range Number 5 E/W.
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Distance And Direction from Road Intersections

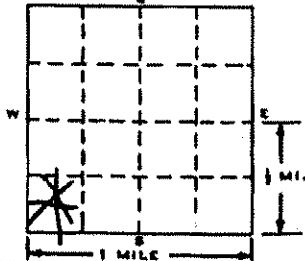
1/2 mile S. of LIBERTY RD

Street address & City of Well Location

1575 Knight Rd.

Locate with "X" in section below

Sketch Map:

**2 FORMATION**THICKNESS
OF
STRATUMDEPTH TO
BOTTOM OF
STRATUM

clay

8

8

sand

7

15

clay

30

45

muddy sand

54

99

water sand

24

123

940
60
380

3 OWNER OF WELL:**Dick Wagner**
2900 Gale Rd.
Ann Arbor, Mich.

Address

4 WELL DEPTH: (completed) Date of Completion**123 ft. 9/15/80**

☐ Cable tool	☒ Rotary	☐ Driven	☐ Dug
☐ Hollow rod	☐ Jetted	☐ Bored	

6 USE: ☒ Domestic	☐ Public Supply	☐ Industry
☐ Irrigation	☐ Air Conditioning	☐ Commercial
☐ Test Well		

7 CASING: Threaded ☒ Welded ☐Height: Above **2800**Diam. **4 in. to 4 1/2 in.**Surface **1 ft.**Weight **11 lbs./ft.**Drive Shoe? Yes ☒ No ☐**8 SCREEN:**Type: **Johnson S.S.** Dia.: **4**Slot **1/8 in.** Length **8**Set between **115 ft.** and **123 ft.**Fittings: **3=plug and K-Packer****9 STATIC WATER LEVEL****60 ft. below land surface****10 PUMPING LEVEL below land surface****61 ft. after 2 hrs. pumping 12 g.p.m.****63 ft. after 2 hrs. pumping 12 g.p.m.****11 WATER QUALITY in Parts Per Million:**

Iron (Fe) _____ Chlorides (Cl) _____

NOT KNOWN

Hardness _____ Other _____

12 WELL HEAD COMPLETION:☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade**13 Well Grouted? ☒ Yes ☐ No**☐ Neat Cement ☐ Bentonite ☒ **MUD**Depth: From **all** ft. to **all** ft.**14 Nearest Source of possible contamination****85 feet W Direction septic tank Type**Well disinfected upon completion ☒ Yes ☐ No**15 PUMP:**☒ Not installedManufacturer's Name **Reinhardt**Model Number **75 BL** HP **1/4** Volts **220**Length of Drop Pipe **100** ft. capacity **20** G.P.M.Type: ☒ Submersible☐ Jet☐ Reciprocating**16 Remarks, elevation, source of data, etc.**

18013-111
SU-53-80
ENVIRONMENTAL HEALTH

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Ann Arbor Well Drilling Inc. 1290

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address **7015 Joy Rd. Dexter 48130**Signed **Harold J. H. H.** Date **6/13/81**

AUTHORIZED REPRESENTATIVE

WATER WELL AND PUMP RECORD

PART 127 ACT 388, P.A. 1978

PERMIT NUMBER

1 LOCATION OF WELL			3 OWNER OF WELL:		
County <u>WASH</u>	Township Name <u>SC10</u>	Fraction <u>1/4</u>	Section Number <u>34</u>	Town Number <u>2</u>	Range Number <u>5</u>
Distance And Direction From Road Intersection <u>1700 Knight Rd</u> <u>Ann Arbor, MI 48103</u>			Address <u>MELTON Campbell</u>		
Street Address & City of Well Location			Address Same As Well Location? ☒ Yes ☐ No		
Locate with "X" in Section Below			4 WELL DEPTH: (completed) <u>203</u> ft. Date of Completion <u>9-14-84</u>		
			5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐		
			6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐		
			7 CASING: ☐ Steel ☐ Threaded ☐ Plastic ☒ Welded Diameter <u>5</u> in. to <u>203</u> ft. depth Height: Above/Below Surface <u>1</u> ft. Weight <u>SDR 21</u> lbs./ft. 8 in. to <u>8</u> ft. depth Drive Shoe ☐ Yes ☒ No Grouped Drill Hole Diameter <u>8</u> in. to <u>8</u> ft. depth		
2 FORMATION DESCRIPTION			8 SCREEN: ☐ Not Installed Type <u>STAIN W/L</u> Diameter <u>4" NOM</u> Slot/Gauze <u>20-18</u> Length <u>8</u> Set between <u>195</u> ft. and <u>203</u> ft. FITTINGS ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☒ Blank above screen <u>1</u> ft. Other _____		
YELLOW CLAY			9 STATIC WATER LEVEL: <u>91</u> ft. below land surface ☐ Flow		
GRAVEL			10 PUMPING LEVEL below land surface <u>91</u> ft. after <u>2</u> hrs. pumping at <u>12</u> G.P.M.		
SAND			<u>91</u> ft. after _____ hrs. pumping at _____ G.P.M.		
GRAY CLAY			11 WELL HEAD COMPLETION: ☐ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit		
SAND & GRAVEL			12 WELL GROUTED? ☐ No ☒ Yes From <u>0</u> to <u>195</u> ft. ☐ Neat cement ☒ Bentonite ☒ Other <u>CUTTINGS</u>		
GRAY CLAY			No. of bags of cement _____ Additives _____		
YELLOW CLAY			13 Nearest source of possible contamination Type <u>SEPTIC</u> Distance <u>100</u> ft. Direction <u>W</u>		
GRAVEL (MED)			Well disinfected upon completion? ☒ Yes ☐ No		
GRAVEL (FINE)			14 PUMP: ☐ Not Installed ☐ Pump Installation Only Manufacturer's name <u>RED JACKET</u> Model number <u>CN128C</u> HP <u>3/4</u> Volts <u>220</u> Length of Drop Pipe <u>105</u> ft. capacity <u>12</u> G.P.M. TYPE: ☒ Submersible ☐ Jet PRESSURE TANK: <u>AMTROL</u> Manufacturer's name <u>AMTROL</u> Model number <u>WX 203</u> Capacity <u>9.9</u> Gallons		
<u>2980</u> <u>41</u> <u>389</u>					

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

Sm
1/25/85

SO 48-84 SWN

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Cribley Drilling Co Inc 81-0524
REGISTERED BUSINESS NAME REGISTRATION NO.

Address DEXTER MI 48130

Signed Jack G. Clark Date 1-25-85
AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL		TOWNSHIP NAME		FRACTION		SECTION NUMBER		TOWN NUMBER		RANGE NUMBER	
COUNTY <u>WASH</u>		<u>SC10</u>		<u>1/4</u> <u>1/4</u> <u>1/4</u>		<u>34</u>		<u>2</u> <u>2</u> <u>2</u>		<u>5</u> <u>5</u> <u>5</u>	
Distance And Direction from Road Intersections											
Street address & City of Well Location <u>SAHE</u>											
Locate with "X" in section below Sketch Map:											
2 FORMATION				THICKNESS OF STRATUM		DEPTH TO BOTTOM OF STRATUM		3 OWNER OF WELL:			
<u>YELLOW CLAY</u>				<u>37</u>		<u>37</u>		Address <u>HOWARD ROUSH</u> <u>1736 KNIGHT RD</u> <u>ANN ARBOR</u>			
<u>GRAY CLAY</u>				<u>18</u>		<u>55</u>		4 WELL DEPTH: (completed) Date of Completion <u>203</u> ft. <u>1-11-80</u>			
<u>GRAVELLY CLAY</u>				<u>30</u>		<u>85</u>		5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐			
<u>GRAVEL</u>				<u>40</u>		<u>107</u>		6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐			
<u>GRAY CLAY</u>				<u>66</u>		<u>193</u>		7 CASING: Threaded ☒ Welded ☐ Height: Above/Below Diam. <u>4</u> in. to <u>199</u> ft. Depth <u>1</u> ft. Weight <u>11</u> lbs./ft.			
<u>SAND</u>				<u>10</u>		<u>203</u>		Drive Shoe? Yes ☒ No ☐			
<u>~905</u> <u>103</u> <u>882</u>								8 SCREEN:			
								Type: <u>UNSTAINLESS</u> Dia.: <u>3 3/4</u> Slot/Groove <u>25</u> Length <u>4</u> Set between <u>199</u> ft. and <u>203</u> ft. Fittings: <u>PACKER PLUG</u>			
								9 STATIC WATER LEVEL <u>103</u> ft. below land surface			
								10 PUMPING LEVEL below land surface <u>107</u> ft. after <u>2</u> hrs. pumping <u>9</u> g.p.m. _____ ft. after _____ hrs. pumping _____ g.p.m.			
								11 WATER QUALITY in Parts Per Million: Iron (Fe) _____ Chlorides (Cl) _____ Hardness _____ Other _____			
								12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade			
								13 Well Grouted? ☒ Yes ☐ No ☐ Neat Cement ☒ Bentonite ☐ Depth: From _____ ft. to _____ ft.			
								14 Nearest Source of possible contamination _____ feet _____ Direction <u>DOWN</u> Type _____ Well disinfected upon completion ☒ Yes ☐ No			
								15 PUMP: ☐ Not installed Manufacturer's Name <u>RED JACKET</u> Model Number <u>TRW1-CP200314</u> Volts <u>230</u> Length of Drop Pipe <u>126</u> ft. capacity <u>12</u> G.P.M. Type: ☒ Submersible ☐ Jet ☐ Reciprocating			
16 Remarks, elevation, source of data, etc.						17 WATER WELL CONTRACTOR'S CERTIFICATION:					
<u>80-72-79</u>						This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief <u>CRIBLEY DRILLING INC</u> <u>81-1586</u> REGISTERED BUSINESS NAME REGISTRATION NO. Address <u>Dexter Mich</u> Signed <u>Charles Brown</u> Date <u>1-11-80</u> AUTHORIZED REPRESENTATIVE					

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

B2

1 LOCATION OF WELL

County WASHTENAW Twp. SALO Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ Section No. 34 Town 2 N/S. Range 5 E/W.

Distance And Direction from Road Intersections

1/4 MI N OF INTERSECTION
OF SALO & KNIGHT RD.
AT 1600 KNIGHT RD.

Street address & City of Well Location

OWNER No. _____

3 OWNER OF WELL:

STEVE L & COE

Address 1600 KNIGHT RD.
ANN ARBOR, MICH.

FORMATION

THICKNESS
OF
STRATUMDEPTH TO
BOTTOM OF
STRATUM

YELLOW CLAY

9'

9'

SAND

6'

15'

DIRTY CLAY

22'

37'

SAND

9'

46'

DIRTY CLAY

37'

13'

SAND

19'

102'

DIRTY SAND

10'

112'

WATER SAND

112'

122'

4 WELL DEPTH: (completed) Date of Completion

122' ft. 5-30-67

5 ☒ Cable tool - ☒ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐
Diam. 4 in. to ALL ft. Depth Height: Above/Below
surface 1 ft.
Weight 11 lbs/ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: SLOTTED Dia.: 3 1/2"Slot/Gauge 12 Length 4'Set between 11 1/2 ft. and 122' ft.Fittings: 3 NIPPLE + SOLID PLUG

9 STATIC WATER LEVEL

61 ft. below land surface

10 PUMPING LEVEL below land surface

65 ft. after 1 hrs. pumping 10 g.p.m.

ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____

Hardness NOT KNOWN12 WELL HEAD COMPLETION: ☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:

Well Grouted? ☒ Yes ☐ NoMaterial: ☒ Neat Cement ☐Depth: From ALL to 122'

14 SANITARY:

Nearest Source of possible contamination

65 feet N Direction SEPTIC TANKWell disinfected upon completion ☒ Yes ☐ No

15 PUMP:

Manufacturer's Name REDAModel Number 43131 HP 3/4Length of Drop Pipe 105 ft. capacity 18 G.P.M.Type: ☒ Submersible ☐☐ Jet☐ Reciprocating

Remarks, elevation, source of data, etc.

WASHTENAW COUNTY Permit
50-2004.

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true
to the best of my knowledge and belief.

ANN ARBOR WELL DRILLING 36
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 1393 KNIGHT RD, ANN ARBORSigned Russell C. [Signature] Date 11-30-67

AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County Washtenaw Twp. SC10 Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ Section No. 34 Town 2 N/S. Range 5 E/W.

Distance And Direction from Road Intersections
3 MI. E. OF INTERSECTION OF LIBERTY AND ZEEB RDS. AT
1150 BANDERA IN LIBERTY TOWNSHIP SUB.
Street address & City of Well Location ANN ARBOR

3 OWNER OF WELL: A & R BUILDERS
Address P.O. BOX 1754
ANN ARBOR

2 FORMATION THICKNESS OF STRATUM DEPTH TO BOTTOM OF STRATUM

SANDY CLAY	4'	4'
SAND & GRAVEL	11'	15'
SANDY CLAY	23'	38'
MUDY SAND	38'	76'
CLAY	6'	82'
WATER SAND	8'	90'

4 WELL DEPTH: (completed) 90 ft. Date of Completion 7-4-67

5 ☒ Cable tool 4000 ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Diam. 4 in. to 4 ft. Depth 4 ft. to 4 ft. Depth
Threaded ☒ Welded ☐ Height: Above/Below surface 1 ft.
Weight 11 lbs./ft. Drive Shoe? Yes ☒ No ☐

8 SCREEN:
Type: SLOTTED Dia.: 3 1/2"
Slot/Gauge 15 Length 4'
Set between 86 ft. and 90 ft.
Fittings: 3 NIPPLE & SOLID PLUG

9 STATIC WATER LEVEL 41 ft. below land surface

10 PUMPING LEVEL below land surface
44 ft. after 1 hrs. pumping 10 g.p.m.
_____ ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) _____ Chlorides (Cl) _____
Hardness NOT KNOWN

12 WELL HEAD COMPLETION: ☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:
Well Grouted? ☒ Yes ☐ No
Material: ☐ Neat Cement ☒ MUD
Depth: From 4 ft. to 90 ft.

14 SANITARY:
Nearest Source of possible contamination 60 feet W Direction SEPTIC TANK
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:
Manufacturer's Name IRIDA
Model Number 41101 HP 1/2
Length of Drop Pipe 68 ft. capacity 15 G.P.M.
Type: ☒ Submersible ☐ _____
☐ Jet ☐ Reciprocating

6 Remarks, elevation, source of data, etc.

Washtenaw County
Permit 502021

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

ANN ARBOR WELL DRILLING 36
REGISTERED BUSINESS NAME REGISTRATION NO.
Address 1393 KNIGHT RD, ANN ARBOR
Signed Daniel Crisp Date 1-6-68
AUTHORIZED REPRESENTATIVE



WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

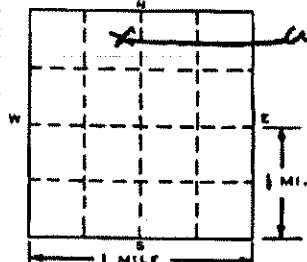
County WASH	Township Name LOO	Fraction $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$	Section Number 3	Town Number 3 N/S.	Range Number 5 E
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Distance And Direction from Road Intersections

4941 SCIO CHURCH RDStreet address & City of Well Location **ANN ARBOR**

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address

**JOHN COUCH
3350 CHELSEA CIRCLE
ANN ARBOR**

4 WELL DEPTH: (completed) Date of Completion

191 ft. 10-20-795 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well7 CASING: Threaded ☒ Welded ☐ Height: Above/Below
Diam. Surface **1****4** in. to **187** ft. Depth Weight **11** lbs./ft.
in. to ft. Depth Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: **WU/STAINLESS** Dia.: **3 3/4**
Slot/Gauge **30** Length **4**
Set between **187** ft. and **191** ft.
Fittings: **BACKER PLUG**

9 STATIC WATER LEVEL

140 ft. below land surface

10 PUMPING LEVEL below land surface

0 ft. after **2** hrs. pumping **9** g.p.m.
ft. after hrs. pumping g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) Chlorides (Cl)
Hardness Other12 WELL HEAD COMPLETION: ☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☒ Bentonite
Depth: From ft. to ft.

14 Nearest Source of possible contamination

feet Direction **Nor in** Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installed
Manufacturer's Name **RED JACKET**
Model Number **100LW1-CR14861** Volts **230**
Length of Drop Pipe **168** ft. capacity **9** G.P.M.
Type: ☒ Submersible ☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true
to the best of my knowledge and belief.**CRIBLEY DRILLING INC** **81-1576**
REGISTERED BUSINESS NAME REGISTRATION NO.

Address

DEXTER HIGH

Signed

Charles Cruse

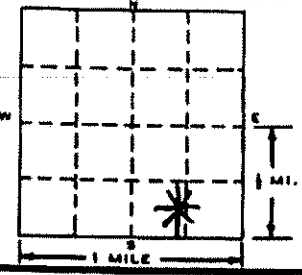
Date

11-9-79

WATER WELL AND PUMP RECORD

S-35-1

PERMIT NUMBER

1 LOCATION OF WELL					
County Washtenaw	Township Name Scio	Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$	Section Number 35	Town Number 2 NYS	Range Number 5 E/W
Distance And Direction From Road Intersection $\frac{1}{2}$ M - WEST OF WAGNER AT 4228 SCIO CHURCH RD.			3 OWNER OF WELL: David Ernst Address 4228 Scio Church Rd. Ann Arbor, MI 48103 Address Same As Well Location? ☒ Yes ☐ No		
Street Address & City of Well Location Locate with "X" in Section Below			4 WELL DEPTH: (completed) 170 ft. Date of Completion 4-14-86		
 Sketch Map: SCIO CHURCH RD * WAGNER			5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐		
			6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐		
2 FORMATION DESCRIPTION			7 CASING: Diameter ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded _____ in. to _____ ft. depth _____ in. to _____ ft. depth Grouted Drill Hole Diameter _____ in. to _____ ft. depth _____ in. to _____ ft. depth		
			Height: Above/Below XXX Surface 1 ft. Weight 5 lbs./ft. Drive Shoe ☒ Yes ☐ No		
THICKNESS OF STRATUM			8 SCREEN: ☐ Not Installed Type Stainless Diameter 4" Slot/Grit 35 Length 4' Set between 166 ft. and 170 ft. FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☒ Blank above screen 1 ft. Other _____		
DEPTH TO BOTTOM OF STRATUM			9 STATIC WATER LEVEL: 140 ft. below land surface ☐ Flow		
Sand 150 150			10 PUMPING LEVEL: below land surface 143 ft. after 2 hrs. pumping at 12 G.P.M. 144 ft. after 2 hrs. pumping at 12 G.P.M.		
			11 WELL HEAD COMPLETION: ☒ Floss adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit		
Gray Clay 15 165			12 WELL GROUTED? ☐ No ☒ Yes From ALL ft. ☐ Neat cement ☒ Bentonite ☐ Other Mud No. of bags of cement _____ Additives _____		
Sand 5 170			13 Nearest source of possible contamination Type SEPTIC TANK Distance 90' Direction N.E. Well disinfected upon completion? ☒ Yes ☐ No		
			14 PUMP: ☐ Not Installed ☐ Pump Installation Only Manufacturer's name REDJACKET Model number 8cc 14 stage 1 HP Volts 230 Length of Drop Pipe 155 ft. capacity 13 G.P.M. TYPE: ☒ Submersible ☐ Jet _____		
			PRESSURE TANK: Perma D-96 Manufacturer's name D-96 Capacity 28 Gallons		

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

50 57-85 9/10

3281 S

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

ANN ARBOR WELL DRILLING, INC. 1290

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address **7015 Joy Rd., Dexter, MI 48130**Signed **Gerald F. Wheeler** 4-29-86

AUTHORIZED REPRESENTATIVE

Authority:

Completion:

Penalty:

Act 388 PA 197B

Required

Conviction of a violation

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

62

1 LOCATION OF WELL

County Washtenaw Township Name Scio Fraction 1/4 1/4 1/4 Section Number 35 Town Number 7 Range Number 5 E/W

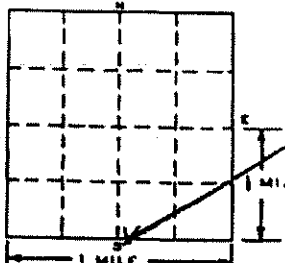
Distance And Direction from Road Intersections

4150 Scio Church Rd.

Street address & City of Well Location

Ann Arbor Mi

Sketch Map:



3 OWNER OF WELL:

Address

Kenneth Smith
Scio

4 WELL DEPTH: (completed) Date of Completion

149 ft. 7-18-79

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well

7 CASING: Threaded ☒ Welded ☐ Height: Above/BelowDiam. 4 in. to 145 ft. Depth4 in. to 149 ft. DepthWeight 4 lbs./ft.Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: WW Starn Dia.: 4Slot/Gauze 16 Length 4 ftSet between 145 ft. and 149 ft.Fittings: Packet 4 plug

9 STATIC WATER LEVEL

123 ft. below land surface

10 PUMPING LEVEL below land surface

129 ft. after 2 hrs. pumping 12 g.p.m.129 ft. after 2 hrs. pumping 12 g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) 100 Chlorides (Cl) 123Hardness 332 Other 100512 WELL HEAD COMPLETION: ☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☒ BentoniteDepth: From 145 ft. to 149 ft.

14 Nearest Source of possible contamination

100 feet Direction Scio SystemWell disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installedManufacturer's Name Red JacketModel Number 75RWC12BC HP 3/4 Volts 220Length of Drop Pipe 138 ft. capacity 12 G.P.M.Type: ☒ Submersible☐ Jet☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

Bottomed on Clay
30 99-78

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Contractor's Name Wiley Drilling Co. Inc 524Address Wiley Drilling Co. IncSigned Jack G. Clark Date 2-2-79

AUTHORIZED REPRESENTATIVE

WATER WELL AND PUMP RECORD

PERMIT NUMBER

S-35-3

(46)

1 LOCATION OF WELL		3 OWNER OF WELL:	
County <u>Washtenaw</u>	Township Name <u>SCIO</u>	Fraction <u>S/E 1/4 S/E 1/4 S/W 1/4</u>	Section Number <u>35</u>
Distance And Direction From Road Intersection <u>3478 SCIO Church Rd</u> <u>Ann Arbor, MI</u> Street Address & City of Well Location		Town Number <u>2-5</u> N/S	Range Number <u>5-E</u> E/W
Locate with "X" in Section Below		Date of Completion <u>11-18-85</u>	
Sketch Map: 		4 WELL DEPTH: (completed) ft. <u>201</u>	
2 FORMATION DESCRIPTION		5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐	
THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐	
<u>Brown Clay</u>	<u>12</u>	7 CASING: ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded Diameter <u>5 1/2</u> in. to <u>192</u> ft. depth Grouted Drill Hole Diameter <u>7 7/8</u> in. to <u>197</u> ft. depth <u>7 7/8</u> in. to <u>197</u> ft. depth	
<u>Gray Clay</u>	<u>12</u>	Height: Above/Below Surface <u>1</u> ft. Weight <u>500</u> lbs./ft. Drive Shoe ☐ Yes ☒ No	
<u>Brown Clay</u>	<u>7</u>	8 SCREEN: ☐ Not Installed Type <u>Stainless w/1/4"</u> Diameter <u>4"</u> Nominal Slot/Gauge <u>14</u> Length <u>4</u> Set between <u>197</u> ft. and <u>201</u> ft.	
<u>Gray Clay</u>	<u>29</u>	FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☒ Blank above screen <u>1</u> ft. Other	
<u>Gravel</u>	<u>42</u>	9 STATIC WATER LEVEL: <u>155'</u> ft. below land surface ☐ Flow	
<u>Gray sandy Clay</u>	<u>78</u>	10 PUMPING LEVEL: below land surface <u>155'</u> ft. after <u>1</u> hrs. pumping at <u>12</u> G.P.M. <u>155'</u> ft. after <u>2</u> hrs. pumping at <u>12</u> G.P.M.	
<u>Sand</u>	<u>21</u>	11 WELL HEAD COMPLETION: ☐ Pitless adapter ☒ 12" above grade ☐ Basement offset ☐ Approved pit	
<u>N1030</u> <u>155</u> <u>875</u>		12 WELL GROUTED? ☐ No ☒ Yes From <u>0</u> to <u>192</u> ft. ☐ Neat cement ☒ Bentonite ☒ Other <u>Cuttings</u> No. of bags of cement Additives	
		13 Nearest source of possible contamination Type <u>Drianfield</u> Distance <u>110'</u> Direction <u>North</u> Well disinfected upon completion? ☒ Yes ☐ No	
		14 PUMP: ☐ Not Installed ☐ Pump Installation Only Manufacturer <u>Lead Jacket</u> Model number <u>25RN1000</u> Volts <u>2</u> Length of Drop Pipe <u>180'</u> ft. capacity <u>12</u> G.P.M. TYPE: ☒ Submersible ☐ Jet PRESSURE TANK: <u>Used Old Tank</u> Manufacturer's name Model number Capacity Gallons	

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

5078-85 WR

RAW
12-19-85

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Cribley Drilling Co Inc 1872
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 8300 Dexter Chelsea RdSigned Severance D Clark Date 11-18-85

AUTHORIZED REPRESENTATIVE

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation

WATER WELL AND PUMP RECORD

PART 127 ACT 388, P.A. 1978

PERMIT NUMBER

1 LOCATION OF WELL

County Washtenaw Township Name Scio Fraction 1/4 1/4 1/4 Section Number 35 Town Number 2 Range Number 5 E/W

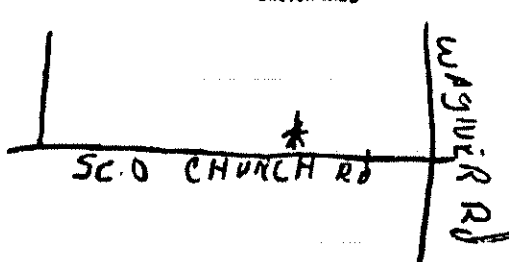
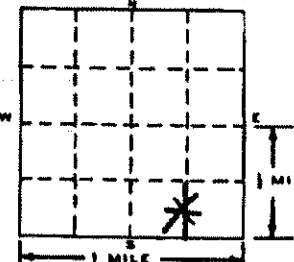
Distance And Direction From Road Intersection

1/2 m. W. of Wasiver Rd
on Scio Church Rd at 4400

Street Address & City of Well Location

Locate with "X" in Section Below

Sketch Map



2 FORMATION DESCRIPTION

THICKNESS
OF
STRATUMDEPTH TO
BOTTOM OF
STRATUM

clay
sand

35

35

clay

153

189

water sand

2

200

~990
80
910

3 OWNER OF WELL:

CHARLES BROWN

Address 4400 SCIO CHURCH RD.
AND AUSTIN, MICH

Address Same As Well Location? ☒ Yes ☐ No

4 WELL DEPTH: (completed)

200 ft.

Date of Completion

7-1-83

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Auger ☐ Jetted ☐

6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public
☐ Irrigation ☐ Type IIa Public ☐ Heat pump
☐ Test Well ☐ Type IIb Public ☐

7 CASING:

Diameter ☐ Steel ☐ Threaded☒ Plastic ☐ Welded

3 in. to ALL ft. depth

Grouted Drill Hole Diameter

m. to ft. depth

m. to ft. depth

in. to ft. depth

Height: Above/Below

Surface 1 ft

Weight 5 lbs./ft.

Drive Shoe ☒ Yes ☐ No

8 SCREEN:

☐ Not installedType JOHNSON SS Diameter 5Slot/Gauge 12 Length 4Set between 146 ft. and 200 ft.FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check☐ Blank above screen 1 ft Other

9 STATIC WATER LEVEL

80 ft below land surface

☐ Flow

10 PUMPING LEVEL below land surface

82 ft after 2 hrs. pumping at 12 G.P.M.

83 ft after 2 hrs. pumping at 12 G.P.M.

11 WELL HEAD COMPLETION

☒ Pitless adapter☐ 12" above grade☐ Basement offset☐ Approved pit

12 WELL GROUTED?

☐ No☒ Yes From ALL to ALL ft.☐ Neat cement☐ Bentonite☒ Other MUD

No. of bags of cement Additives

13 Nearest source of possible contamination

Type Septic Tank Distance 65 ft. Direction N.W.

Well disinfected upon completion?

☒ Yes☐ No

14 PUMP

☐ Not installed☐ Pump Installation OnlyManufacturer's name C. L. PackerModel number 3/4 1200 Volts 230Length of Drop Pipe 120 ft. capacity 40 G.P.M.TYPE: ☒ Submersible ☐ Jet

PRESSURE TANK

Manufacturer's name

Model number

Capacity

Gallons

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

RECEIVED

80-28881-100
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Andy Allen Well Drilling, Inc. 1290
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 7015 Joy Rd PO Box 1143-Dexter

Signed Jeffrey Allen Date 7-5-80

AUTHORIZED REPRESENTATIVE

PIT

S-35-5

WATER WELL RECORD
ACT 294 PA 1965MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

49

1 LOCATION OF WELL

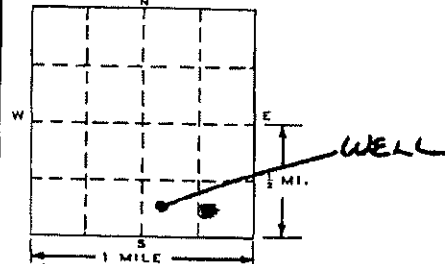
County WASH	Township Name SCIO	Fraction NW 1/4 SW 1/4 SE 1/4	Section Number 35	Town Number 2 N/S.	Range Number 5 E/W.
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Distance And Direction from Road Intersections

4300 SCIO CHURCH RDStreet address & City of Well Location **ANN ARBOR**

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

CHARLES H. BEUNERAddress **614 S. ANN ARBOR ST
SALINE**4 WELL DEPTH: (completed) Date of Completion
152 ft. **6-18-75**5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐7 CASING: Threaded ☒ Welded ☐ Height: Above/Below
Diam. _____4" in. to **152** ft. Depth Surface **1** ft.
_____ in. to _____ ft. Depth Weight **11** lbs./ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: **WEL STAINLESS** Dia.: **3 3/4**Slot/Gauge **60** Length **4'**Set between **147** ft. and **152** ft.Fittings: **PACKER & PLUG**

9 STATIC WATER LEVEL

112 ft. below land surface

10 PUMPING LEVEL below land surface

112 ft. after **2** hrs. pumping **12** g.p.m.

_____ ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____

Hardness _____ Other _____

12 WELL HEAD COMPLETION: ☐ In Approved Pit☒ Pitless Adapter ☐ 12" Above Grade13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☒ Bentonite ☐

Depth: From _____ ft. to _____ ft.

14 Nearest Source of possible contamination

120 feet _____ Direction **SEPTIC** TypeWell disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installedManufacturer's Name **REDA**Model Number **1209P071** HP **3/4** Volts **230**Length of Drop Pipe **126** ft. capacity **12** G.P.M.Type: ☒ Submersible☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED.

16 Remarks, elevation, source of data, etc.

S017-75

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

GRIBLEY DRILLING CO

REGISTERED BUSINESS NAME

REGISTRATION NO. **524**Address **8300 DEXTER-CHelsea RD.**Signed **Charles H. Beuner** Date **9-19-75**
AUTHORIZED REPRESENTATIVE

S-35-6

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

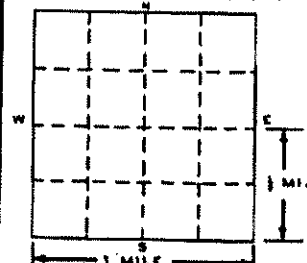
County WASHTENAW Township Name SEIO Fraction $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ Section Number 35 Town Number 2 Range Number 5 E.W.

Distance And Direction from Road Intersections

Street address & City of Well Location 4100 SEIO CHURCH

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:

Address

LEE HIRTH
2598 SEIO CHURCH
ANN ARBOR

4 WELL DEPTH: (completed) Date of Completion

334 ft. 11-16-76

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above/Below

Diam. 4 in. to 330 ft. Depth 11 lbs./ft.
in. to _____ ft. Depth Drive Shoe? Yes ☐ No ☒

8 SCREEN:

Type: STAINLESS Dia.: 4"Slot/Gauze 10 Length 4 FT.Set between 330 ft. and 334 ft.

Fittings:

HEMP PACKER PLUG 1 FT. BLANK

9 STATIC WATER LEVEL

140 ft. below land surface

10 PUMPING LEVEL below land surface

200 ft. after 4 hrs. pumping 10 g.p.m.

_____ ft. after _____ hrs. pumping _____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) _____ Chlorides (Cl) _____

Hardness _____ Other _____

12 WELL HEAD COMPLETION:

☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No☐ Neat Cement ☒ Bentonite ☐

Depth: From _____ ft. to _____ ft.

14 Nearest Source of possible contamination

120 feet N Direction DRAINFIELD TypeWell disinfected upon completion ☒ Yes ☐ No

15 PUMP:

☐ Not installedManufacturer's Name AERMOTORModel Number SD-12 HP 1 Volts 230Length of Drop Pipe 189 ft. capacity _____ G.P.M.Type: ☒ Submersible☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

SO 43-76

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

SLUSSER DRILLING CO., INC. 0388

REGISTERED BUSINESS NAME

REGISTRATION NO.

Address 1701 W. MICHIGAN, UPILHANTSigned T. L. A. A. A. Date 11-18-76

AUTHORIZED REPRESENTATIVE

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT
OF
PUBLIC HEALTH

1 LOCATION OF WELL

County: Washtenaw Fraction: SW 1/4 SW 1/4 Section No.: 36 Town: 2 S. Range: 5 E.

Distance And Direction from Road Intersections

About 300' N. of Sals-Cross Road
and 300' E. of Wagner

Street address & City of Well Location

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Yellow Caly	12'	12'
Blue Clay	9'	21'
Stony Clay	5'	26'
Sandy Hardpan	16'	42'
Stony Clay	9'	51'
Gray Clay Film	12'	63'
Sandy Hardpan	3'	66'
Gravelly Hardpan	40'	106'
Sandy Hardpan	29'	135'
Sandy Clay	5'	140'
Sandy Hardpan	28'	168'
Hardpan Gravel (Dry)	20'	188'
Sticky Sand (Dry)	13'	201'
Sand	9'	210'
Fine Water Sand	13'	223'
Med. Fine Sand	6'	229'

16 Remarks, elevation, source of data, etc.

Washtenaw Permit
502096

3. OWNER OF WELL:

Address: **Detroit Edison Co.**
2008 Second Ave.
Detroit, Michigan 48226

4 WELL DEPTH: (completed) Date of Completion

229 ft. 8-1-67

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Jetted ☐ Bored ☐

6 USE: ☐ Domestic ☐ Public Supply ☒ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above/Below surface 5'
Diam. 6 in. to 208 ft. Depth 19.45 lbs./ft.
in. to ft. Depth Drive Shoe? Yes ☒ No ☐

8 SCREEN: Johnson Stainless

Type: Slot Dia.: 6"
Top 5' Bottom 12' Length: 10'
Set between 218 ft. and 229 ft.

Fittings: 3" x 18" nipple

9 STATIONARY WATER LEVEL

10' below land surface

10 PUMPING LEVEL below land surface
ft. after 3 hrs. pumping 120 g.p.m.
ft. after 18 hrs. pumping 120 g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) 1.3 Chlorides (Cl) 18
Hardness 393

12 WELL HEAD COMPLETION: ☐ In Approved Pit
☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:

Well Grouted? ☐ Yes ☒ No
Material: ☐ Neat Cement ☐
Depth: From 229 ft. to 229 ft.

14 SANITARY: UNKNOWN

Nearest Source of possible contamination
feet Direction Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP:

Manufacturer's Name Jacuzzi
Model Number 1536J1112 HP 15
Length of Drop Pipe 198 ft. capacity 120 G.P.M.
Type: ☒ Submersible ☐
☐ Jet ☐ Reciprocating

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

G. O. Corcoran Inc. 0025
REGISTERED BUSINESS NAME REGISTRATION NO.

Address: 15101 W. 11 Mile Road, Oak Park, 48237

Signed G. O. Corcoran Date Sept. 27, 1967
AUTHORIZED REPRESENTATIVE

Received:

Location Code (1-3)

LANSING

880 APR 27 AM 10:33

1242

Give all known information Type or Print with soft lead or black ink.

LAB NO.

1. Report Results to: DARRELL K. CAMPBELL

Phone No:

Street Address: 1700 KNIGHT RD.

Post Office

State Zip Code: ANN ARBOR, MI 48103

665-7789

2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)

Supply Owner:

3. MERTON K. CAMPBELL

Phone No.

665-7789

Sample Collected at: Street Address:

4. 1700 KNIGHT RD.

Township:

SCIO

Section No.:

Sample Collected at: Post Office (MI), Zip Code

5. ANN ARBOR, MI 48103

County:

WASHTENAW

Sample Collected by (name):

6. DARRELL K. CAMPBELL

Time—24 hr. Format: (4-7) HR MIN MD DAY YR

Sampling Point (circle):

Source (circle):

Well, surface water

Well No.

Age (yrs.)—Depth (ft.)—Diam. (in.)

7. ☒ Faucet, pump, corp tap, other

3 yrs. 200 ft.

8. ☐ Check and complete following line only if sampling a public water supply.

Name of Supply:

WSSN (14-20)

Sample Type (21)

7

LAB ID (22-26) 00001

DO NOT WRITE BELOW LABORATORY RESULTS

Code (27-30)

Parameter

*Result (31-34)

LAB NO. 8804-04242 (1)

PROGRAM: 00

IRON (AUTOMATED) Not Detected
 SODIUM (AUTOMATED) 197mg/L
 NITRATE AS N (AUTOMATED) 3.2mg/L
 HARDNESS AS CaCO₃ (AUTOMATED) Not Detected
 CONDUCTIVITY (AUTOMATED) 698umhos
 CHLORIDE (AUTOMATED) 26mg/L
 FLUORIDE (AUTOMATED) 0.2mg/L

JRK

Examiner

[*Unless otherwise indicated results given as mg/L]

Date Reported (35-40) MAY 3 1988

Laboratory

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

PB-32 88

By Authority of Act 399, P.A. 19

LANSING

REV.

1983 AUG -3 PM 1:55

Location Code (1)

SANITARY BACTERIOLOGY
& CHEMISTRY SECTION

388

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

1. Report Results to: <u>JOHN R. ADAMS</u>		Phone No: <u>(313) 662-096</u>	
Street Address: <u>1575 KNIGHT RD</u>			
Post Office— <u>ANN ARBOR MICH 48103</u>			
State—Zip Code:			
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)			
3. Supply Owner: <u>JOHN R. ADAMS</u>		Phone No. <u>SAME</u>	
Sample Collected at—Street Address: <u>1575 KNIGHT RD.</u>		Township: <u>SCIO</u>	Section: <u>10</u>
Sample Collected at—Post Office (MI), Zip Code: <u>ANN ARBOR MICH 48103</u>		County: <u>WASHINGTON</u>	
Sample Collected by (name): <u>JOHN ADAMS</u>		Time—24 hr. Format (4-7) <u>11:18:00</u>	Date: (8-13) <u>MO 07 DAY 26 YR 83</u>
Sampling Point (circle): <u>cube</u> pump, corp tap, other	Source (circle): <u>Well</u> surface water	Well No. <u>1</u>	Age (yrs.)—Depth (ft.)—Diam. (in) <u>2 150 4</u>
E. ☐ Check and complete following line only if sampling a public water supply.			
Name of Supply:		WSSN (14-20): <u>111111</u>	Sample Type (21):
LAB ID: 22-26: 00001 DO NOT WRITE BELOW—LABORATORY RESULTS			
Code (27-30)	Parameter	*Result (31-34)	

LAB NO. 8308-00388 (1)

PROGRAM: 00

IRON (AUTOMATED)	Not Detected
SODIUM (AUTOMATED)	170mg/l
NITRATE AS N (AUTOMATED)	Not Detected
HARDNESS AS CaCO ₃ (AUTOMATED)	41mg/l
CHLORIDE (AUTOMATED)	Not Detected
FLUORIDE (AUTOMATED)	0.2mg/l
CONDUCTIVITY (AUTOMATED)	484µmhos

Examiner

*Unless otherwise indicated results given as mg/l

Reported (35-40)

AUG 5 1983 2

John R. Robinson
Laboratory DirectorBureau of Disease Control and Laboratory Services
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

Date Received:

PARTIAL CHEMICAL ANALYSIS OF WATER

Location Code ()

291

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

1. Report Results to: <u>LAURIE MACTAVISH</u>		Phone No:	
Street Address: <u>5133 ~~WATER~~ WATERS RD. W.</u>		761-526	
Post Office --			
State—Zip Code: <u>ANN ARBOR, MI 48103</u>			
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)			
3. Supply Owner: <u>MILTON POOL</u>		Phone No.	
Sample Collected at—Street Address: <u>5133 WATERS RD. W.</u>		Township: <u>hodi</u>	
Sample Collected at—Post Office (MI), Zip Code: <u>ANN ARBOR, MI 48103</u>		County: <u>WASHTENAW</u>	
Sample Collected by (name): <u>LAURIE MACTAVISH</u>		Time—24 hr. Format (4-7) <u>HR</u> <u>MIN</u> <u>MO</u> <u>DAY</u> <u>YR</u>	
Sampling Point (circle): <u>7. Kitchen</u>		Source (circle): <u>Well surface water</u>	
(Faucet) pump, corp tap, other		Well No. Age (yrs.)—Depth (ft.)—Diam.	
8. ☐ Check and complete following line only if sampling a public water supply.			
Name of Supply:		WSSN (14-20)	
9.		Sample Type (21)	

LAB ID (22-26) 00001

DO NOT WRITE BELOW—LABORATORY RESULTS

Code (27-30)

Parameter

*Result (31-34)

LAB NO. 8710-00291 (13)

PROGRAM: 00

IRON (AUTOMATED)	0.1mg/l
SODIUM (AUTOMATED)	216mg/l
NITRATE AS N (AUTOMATED)	Not Detected
HARDNESS AS CaCO ₃ (AUTOMATED)	32mg/l
CONDUCTIVITY (AUTOMATED)	750µmhos
CHLORIDE (AUTOMATED)	Not Detected
FLUORIDE (AUTOMATED)	0.4mg/l

Examiner

(*Unless otherwise indicated results given as mg/l)

Date Reported (35-40)

01 7 87 2

Laboratory

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FB-32

LANSING

1995 NOV 21 PM 12:30

SANITARY BACTERIOLOGY
& CHEMISTRY SECTION

Location Co
1

2740

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

1. Report Results for	PAUL S HOOPER	Phone N
Street Address:	3151 WATERS RD W	6650
Post Office—	ANN ARBOR MI 48103	
State—Zip Code:		

2. Reason for Analysis (check): ☐ Routine ☐ Other (Describe on separate sheet)

Supply Owner:	ROBERT F HOOPER	Phone I
Sample Collected at—Street Address:	3151 WATERS RD W	6650
Township:	LOPI	Section:

Sample Collected at—Post Office (MI), Zip Code	ANN ARBOR MI 48103	County:
		WASHTENA

Sample Collected by (name):	PAUL S HOOPER	Time—24 hr. Format (4-7)	Date: (8-13)
		HR MIN MO DAY	11 01 11 21 C

Sampling Point (circle):	Source (circle):	Well No.	Age (yrs.)—Depth (ft.)—Dic
Faucet, pump, corp tap, other	Well, surface water		40 110 4

8. ☐ Check and complete following line only if sampling a public water supply.

Name of Supply:	WSSN (14-20)	Sample Type

LAB ID (22-26) 00001 DO NOT WRITE BELOW—LABORATORY RESULTS

Code (27-30) Parameter *Result (31-34)

LAB NO. 8511-02740 (1) PROGRAM: 00

IRON (AUTOMATED)	1.4mg/l
SODIUM (AUTOMATED)	Not Detected
NITRATE AS N. (AUTOMATED)	Not Detected
HARDNESS AS CaCO3 (AUTOMATED)	284mg/l
CONDUCTIVITY (AUTOMATED)	559µmhos
CHLORIDE (AUTOMATED)	Not Detected
FLUORIDE (AUTOMATED)	0.2mg/l

*Unless otherwise indicated results given as mg/l)

Reported (35-40)

25 35 2

Examiner

Greg R. Anderson Exam
Laboratory Director
Bureau of Disease Control and Laboratory Se
MICHIGAN DEPARTMENT OF PUBLIC HEAL

Date
Received:

PARTIAL CHEMICAL ANALYSIS OF WATER

Location Code (1)

LANSING

1963 DEC -7 AM 11:51

864

SANITARY BACTERIOLOGY
& CHEMISTRY SECTION

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

1. Report Results to: JULIA JACKLING		Phone No:	
Street Address: 2966 WATERS RD.		663-455	
Post Office— State—Zip Code: ANN ARBOR, MI 48103			
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)			
3. Supply Owner: same as above		Phone No.	
4. Sample Collected at—Street Address:		Township: LODI	Section:
Sample Collected at—Post Office (MI), Zip Code		County: WASHTENAW	
5. Sample Collected by (name):		Time—24 hr. Format (4-7) HR MIN MO DAY YR	
6. Sampling Point (circle): FAUCET		Source (circle): Well, surface water	Well No. ?
Faucet, pump, corp tap, other		Age (yrs.)—Depth (ft.)—Diam. (in)	? ? ?
8. ☐ Check and complete following line only if sampling a public water supply.			
Name of Supply:		WSSN (14-20)	Sample Type (21)
9. LAB ID (22-26) 00001		DO NOT WRITE BELOW—LABORATORY RESULTS	
Code (27-30)	Parameter	*Result (31-34)	

LAB NO. 8812-00864 (1)

PROGRAM: 00

IRON (AUTOMATED) 0.1mg/L
SODIUM (AUTOMATED) 168mg/L
NITRATE AS N (AUTOMATED) Not Detected
HARDNESS AS CaCO₃ (AUTOMATED) Not Detected
CONDUCTIVITY (AUTOMATED) 631umhos
CHLORIDE (AUTOMATED) Not Detected
FLUORIDE (AUTOMATED) 0.8mg/L

Examiner

(*Unless otherwise indicated results given as mg/l)

Date Reported (35-40)

Laboratory

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FB-32 B/84

By Authority of Act 399, P.A. 1976

DEC 12 '66 2

Received:

LANSING

1986 SEP 12 PM 12:11

SANITARY BACTERIOLOGY
& CHEMISTRY SECTION

Location Code (1)

2177

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

1. Report Results to: CHRIS DALEY		Phone No:	
Street Address: 3600 S. WAGNER		769 494	
Post Office -- State—Zip Code: ANN ARBOR MI 48103			
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)			
3. Supply Owner:		Phone No.	
Sample Collected at—Street Address:		Township:	Section No.
4. 3600 S. WAGNER		LODI	
Sample Collected at—Post Office (MI), Zip Code:		County:	
5. ANN ARBOR MI 48103		WASHTENAW	
6. Sample Collected by (name): CHRIS DALEY		Time—24 hr. Format Date: (3-13)	
		(4-7) HR MIN MO DAY YR	
Sampling Point (circle):	Source (circle):	Well No.	Age (yrs.)—Depth (ft.)—Diam. (in)
Faucet, pump, corp tap, other	Well, surface water		OVER 15 125 4
8. ☐ Check and complete following line only if sampling a public water supply.			
Name of Supply:		WSSN (14-20)	Sample Type (21)
9.			
LAB ID (22-26) 00001		DO NOT WRITE BELOW—LABORATORY RESULTS	
Code (27-30)	Parameter	* Result (31-34)	

LAB NO. 8609-02177 (1)

PROGRAM: 00

IRON (AUTOMATED)	1.9mg/l
SODIUM (AUTOMATED)	Not Detected
NITRATE AS N (AUTOMATED)	Not Detected
HARDNESS AS CaCO ₃ (AUTOMATED)	384mg/l
CONDUCTIVITY (AUTOMATED)	634umhos
CHLORIDE (AUTOMATED)	Not Detected
FLUORIDE (AUTOMATED)	0.2mg/l

Examiner

(*Unless otherwise indicated results given as mg/l)

Date Reported (35-40)

SEP 17 1986 2

Laboratory
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FB-32 8/1

By Authority of Act 399, P.A. 15

CHEMICAL ANALYSIS OF WATER

Please return sample any time between Monday A.M. and Friday noon to:

Washtenaw County Health Department
Rm. 101; 2355 W. Stadium Blvd.
Ann Arbor, Michigan 48107

Received: _____

Date Collected: 4/15/80

Health Permit No.: _____

Sampling Point: Kitchen faucet
Faucet, hand pump, pool, etc.

Collected by: Dennis Vessels

At: 2032 S. Wagner
No./Street

Ann Arbor

City

Lodi

Township of Washtenaw County

Private or Other Water System: _____

Well Data: Age _____ Diam. 4" Depth 200' approx

Well Owner: George Schriener

Reason For Analysis: Citric Acid causes sink to turn blue.

Check or write in determinations desired.

CK	DETERMINATION	RESULT
	Chloride	
	Nitrate-N	
	Fluoride	
✓	IRON	3.3
✓	CU	<0.05
✓	COBALT	<0.05

All chemical results are in parts per million.

Analyst MR

Report results to: Dennis Vessels

2032 S. WAGNER 663-1799
Address

Date
Received

PARTIAL CHEMICAL ANALYSIS OF WATER

Location Code (1-)

518

Give all known information Type or Print with soft lead or black ink.

LAB NO.

1. Report Results to: **D. B. Johnson, D.D.S., P.C.**

Phone No:

Street Address:

104 MINDS SQ.

313

Post Office

Saline, Mich. 48176

State Zip Code:

479-252

2. Reason for Analysis (check): ☐ Routine ☐ Other (Describe on separate sheet)

Supply Owner:

3. **TANYA KELLER**

Phone No.

Sample Collected at Street Address:

Township:

Section No.:

4. **3137 SHAD BERRY CT**

Sample Collected at Post Office (MI), Zip Code

County:

5. **SALINE 48176**

Sample Collected by (name):

Time-- 24 hr. Format Date: (8-13)

6.

(4-7) HR MIN MO DAY YR

Sampling Point (circle):

Source (circle):

Well No.

Age (yrs.)—Depth (ft.)—Diam. (in.)

7. ☒ faucet, pump, corp tap, other

☒ Well, surface water

8. ☐ Check and complete following line only if sampling a public water supply.

Name of Supply:

WSSN (14-20)

Sample Type (21)

9.

LAB ID (22-26) 00001

DO NOT WRITE BELOW—LABORATORY RESULTS

Code (27-30)

Parameter

*Result (31-34)

LAB NO. 8807-00518 (1)

PROGRAM: 00

IRON (AUTOMATED) Not Detected
SODIUM (AUTOMATED) 176mg/L
NITRATE AS N (AUTOMATED) Not Detected
HARDNESS AS CaCO₃ (AUTOMATED) Not Detected
CONDUCTIVITY (AUTOMATED) 681umhos
CHLORIDE (AUTOMATED) Not Detected
FLUORIDE (AUTOMATED) 0.6mg/L

SLK

Examiner

(*Unless otherwise indicated results given as mg/l)

Date Reported (35-40)

JUL 11 1982

Laboratory

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FB-32 R/R4

By Authority of Act 399, P.A. 1976

Received

PARTIAL CHEMICAL ANALYSIS OF WATER

F-29
RE

LANSING

Location Code

1985 MAY 14 PM 2:42

SANITARY BACTERIOLOGY
& CHEMISTRY SECTION

1850

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

Rev. L. Hallauer

Phone No.

Street Address: 7411 Scio Church Rd.

663-094

Post Office—

Ann Arbor, MI 48103

2. Reason for Analysis (check): ☐ Routine ☐ Other (Describe in Laboratory Section below)

Supply Owner:

Phone No.

3. Salem Ev. Lutheran Church

663-094

Sample Collected at—Street Address:

Township:

Section No.

4. 7411 Scio Church Rd.

Lodi

5

Sample Collected at—Post Office (MI), Zip Code

County:

5. Ann Arbor, MI 48103

Washtenaw

Sample Collected by (name):

Time—24 hr. Format
(4-7) HR MIN

Date: (8-13)

6. Rev. L. HALLAUER

MO DAY YR
4 25 8

Sampling Point (circle):

Source (circle):

Well No.

Age (yrs.)—Depth (ft.)—Diam. (in.)

7. Well, surface water

63 4

Faucet, pump, corp tap, other

8. ☐ Check and complete following line only if sampling a public water supply.

Name of Supply:

WSSN (14-22)

9.

LAB ID (22-26) 00001

LABORATORY SECTION

Code (27-30)

Parameter

*Result (31-34)

LAB NO. 8505-01850 (1)

PROGRAM: 13

IRON (AUTOMATED) 1.0mg/l
 SODIUM (AUTOMATED) Not Detected
 NITRATE AS N (AUTOMATED) Not Detected
 HARDNESS AS CaCO₃ (AUTOMATED) 183mg/l
 CONDUCTIVITY (AUTOMATED) 381µmhos
 CHLORIDE (AUTOMATED) Not Detected
 FLUORIDE (AUTOMATED) 0.4mg/l

Examiner

* (Unless otherwise indicated results given as mg/l)

Reported (35-40) MAY 17 1985 3

Laboratory Director

Bureau of Disease Control and Laboratory Services

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

Date
Received:

PARTIAL CHEMICAL ANALYSIS OF WATER

LANSING

1987 DEC -3 AM 10:34

Location Code (1-4)

778

SANITARY BACTERIOLOGY
& CHEMISTRY SECTION

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

1. Report Results for: <u>Mike Horgan</u>		Phone No.	
Street Address: <u>P O Box 8645</u>			
Post Office -- State - Zip Code: <u>Ann Arbor, Mi. 48107-8645</u>			
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)			
3. Supply Owner: <u>Emerson School</u>		Phone No.	
Sample Collected at - Street Address: <u>5425 Scio Church</u>		Township: <u>Scio</u>	Section No.:
Sample Collected at - Post Office (MI), Zip Code <u>Ann Arbor, Mi. 48103</u>		County: <u>Washtenaw</u>	
6. Sample Collected by (name): <u>Ron Holben / Mike Horgan</u>		Time—24 hr. Format (4-7) Date: (8-13) HR MIN MO DAY YR <u>11 30 12 01 87</u>	
Sampling Point (circle): 7. <u>Raw water</u> Faucet, pump, corp tap, other	Source (circle): <u>Well, surface water</u>	Well No.	Age (yrs.)—Depth (ft.)—Diam. (in.)
8. ☒ Check and complete following line only if sampling a public water supply.			
Name of Supply: <u>Emerson School</u>		WSSN (14-20) <u>20119991</u>	Sample Type (21)
LAB ID (22-26) 00001 DO NOT WRITE BELOW—LABORATORY RESULTS			
Code (27-30)	Parameter	*Result (31)	

LAB NO. 8712-00778 (1)

PROGRAM: 13

IRON (AUTOMATED)	0.3mg/L
SODIUM (AUTOMATED)	Not Detected
NITRATE AS N (AUTOMATED)	Not Detected
HARDNESS AS CaCO ₃ (AUTOMATED)	437mg/L
CONDUCTIVITY (AUTOMATED)	746umhos
CHLORIDE (AUTOMATED)	110mg/L
FLUORIDE (AUTOMATED)	0.1mg/L

Examiner

(*Unless otherwise indicated results given as mg/l)

Date Reported (35-40)

DEC 7 1987

Laboratory
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FB-32 8/84

By Authority of Act 399, P.A. 1976

CHEMICAL ANALYSIS OF WATER

Bureau of Laboratory and Epidemiological Services
Michigan Department of Public Health
3500 North Logan, P.O. Box 30035
Lansing, MI 48909
Telephone (517) 335-8184

SCHOOL FILE
AND/OR PREMISES

SM

Abbreviations: GT = Greater than given value
MCL = State regulated maximum contaminant limit

LAB NO.: 8712-00837 Page: 1
PROGRAM CODE: 14

REPORT TO:

Washtenaw County Health Dept.
2355 W. Stadium Blvd.
Ann Arbor, MI 48107

Date received: 12/03/87
Date reported: 12/08/87

Examiners in Charge:
T.J. Williams, Sect Chief
F.M. Saad, Assist Sect Chief

F.M. Saad

SAMPLE SOURCE INFORMATION:

System Owner: EMERSON SCHOOL
Street Address: 5425 SCIO CHURCH RD.
City or Twp: ANN ARBOR
County: WASHT

WSSN: 2017981
Location/Source:
Collected by: HOLBEN
Date Collected: 12/01/87

Test Name	Test Result	Standard Health MCL	Detection Test Limit
BROMOFORM	Not Detected	0.10mg/l	0.001mg/l
BROMOMETHANE	Not Detected		0.020mg/l
CARBON TETRACHLORIDE	Not Detected		0.001mg/l
CHLOROBENZENE	Not Detected		0.001mg/l
CHLORODIBROMOMETHANE	Not Detected	0.10mg/l	0.001mg/l
CHLOROETHANE	Not Detected		0.020mg/l
CHLOROFORM	Not Detected	0.10mg/l	0.001mg/l
CHLOROMETHANE	Not Detected		0.050mg/l
DICHLOROBROMOMETHANE	Not Detected	0.10mg/l	0.001mg/l
DICHLOROETHANE, 1,2-	Not Detected		0.001mg/l
DICHLOROETHANE, 1,1-	Not Detected		0.001mg/l
DICHLOROETHYLENE, TRANS-1,2,	Not Detected		0.001mg/l
DICHLOROETHYLENE, CIS-1,2,	Not Detected		0.001mg/l
DICHLOROPROPANE, 1,2-	Not Detected		0.001mg/l
DICHLOROPROPYLENE, TRANS-1,3,	Not Detected		0.001mg/l
DICHLOROPROPYLENE, CIS-1,3,	Not Detected		0.001mg/l
ETHYLENE DIBROMIDE	Not Detected		0.001mg/l
FLUOROTRICHLOROMETHANE	Not Detected		0.010mg/l
HEXACHLOROETHANE	Not Detected		0.001mg/l
METHYLENE CHLORIDE	Not Detected		0.001mg/l
TETRACHLOROETHANE, 1,1,2,2-	Not Detected		0.001mg/l
TETRACHLOROETHYLENE	Not Detected		0.001mg/l
TOTAL TRIHALOMETHANES	Not Detected	0.10mg/l	0.001mg/l
TRICHLOROETHANE, 1,1,2-	Not Detected		0.001mg/l
TRICHLOROETHANE, 1,1,1-	Not Detected		0.001mg/l
TRICHLOROETHYLENE	Not Detected		0.001mg/l
VINYL CHLORIDE	Not Detected		0.005mg/l
VINYLDENE CHLORIDE	Not Detected		0.001mg/l
BENZENE	Not Detected		0.001mg/l
DICHLOROBENZENE, 1,4-	Not Detected		0.001mg/l
DICHLOROBENZENE, 1,3-	Not Detected		0.001mg/l

(CONTINUED)

CHEMICAL ANALYSIS OF WATER

Bureau of Laboratory and Epidemiological Services
Michigan Department of Public Health
3500 North Logan, P.O. Box 30035
Lansing, MI 48909
Telephone (517) 335-8184

Abbreviations: GT = Greater than given value
MCL = State regulated maximum contaminant limit

LAB NO.: 8712-00837 Page: 2
PROGRAM CODE: 14

REPORT TO:

Washtenaw County Health Dept.
2355 W. Stadium Blvd.
Ann Arbor, MI 48107

Date received: 12/03/87
Date reported: 12/08/87

Examiners in Charge:
T.J. Williams, Sect Chief
F.M. Saad, Assist Sect Chief

F.M. Saad

SAMPLE SOURCE INFORMATION:

System Owner: EMERSON SCHOOL
Street Address: 5425 SCIO CHURCH RD.
City or Twp: ANN ARBOR
County: WASHT

ISSN: 2017981
Location/Source:
Collected by: HOLBEN
Date Collected: 12/01/87

Test Name	Test Result	Standard Health MCL	Detection Test Limit
DICHLOROBENZENE, 1,2-	Not Detected		0.001mg/l
ETHYLBENZENE	Not Detected		0.001mg/l
METHYL ETHYL KETONE	Not Detected		0.020mg/l
METHYL ISOBUTYL KETONE	Not Detected		0.020mg/l
STYRENE	Not Detected		0.001mg/l
TOLUENE	Not Detected		0.001mg/l
XYLENE	Not Detected		0.001mg/l

Date
Received:

PARTIAL CHEMICAL ANALYSIS OF WATER

LANSING

1983 JAN 19 AM 10:22

SANITARY BACTERIOLOGY
& CHEMISTRY SECTION

Location Code (1-3)

1794

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

1. Report Results to: GAIL BANFIELD Phone No.
Street Address: 4941 SCIO CHURCH RD (313)
Post Office—Ann Arbor MI 48103 663-
State—Zip Code: 3415

2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)

3. Supply Owner: ABOVE Phone No.

4. Sample Collected at—Street Address: ABOVE Township: LOD Section No.

5. Sample Collected at—Post Office (MI), Zip Code: ABOVE County: WASHTENAW

6. Sample Collected by (name): Time—24 hr. Format Date: (8-13)
(4-7) HR MIN MD DAY YR

Sampling Point (circle): Well (circle): Surface water Well No. Age (yrs.)—Depth (ft.)—Diam. (in.)
Faucet, pump, corp tap, other 9485-7-2

8. ☐ Check and complete following line only if sampling a public water supply.

9. Name of Supply: WSSN (14-20) Sample Type (21)

LAB ID (22-26) 00001 DO NOT WRITE BELOW—LABORATORY RESULTS

Code (27-30)

Parameter

Result (31-34)

LAB NO. 8881-01794 (1)

PROGRAM: 00

IRON (AUTOMATED) 0.2mg/L
SODIUM (AUTOMATED) 47mg/L
NITRATE AS N (AUTOMATED) Not Detected
HARDNESS AS CaCO₃ (AUTOMATED) 232mg/L
CONDUCTIVITY (AUTOMATED) 467µmhos
CHLORIDE (AUTOMATED) Not Detected
FLUORIDE (AUTOMATED) 0.3mg/L

Examiner

(*Unless otherwise indicated results given as mg/l)

Date Reported (35-40)

Laboratory

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FL

21 78?

Date
Received:

PARTIAL CHEMICAL ANALYSIS OF WATER
LANSING

007 001 - 1 11 10 00

SANITARY BACTERIOLOGY
& CHEMISTRY SECTION

Location Code

223

Give all known information—Type or Print with soft lead or black ink.

LAB NO.

1. Report Results to: Mr + Mrs Wm Lehmann		Phone No.
Street Address: 4455 Scio church		663-0
Post Office: Ann Arbor MI 48103		(313)
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)		
3. Supply Owner: Bill Lehmann		Phone 1
Sample Collected at—Street Address: 4455 Scio Church		663-
Township: Lodi		Section
Sample Collected at—Post Office (MI), Zip Code: Stadium Dr 48103		County: Washtenaw
Sample Collected by (name): Holly Lehmann		Time—24 hr. Formal Date: (8-13)
Sampling Point (circle): ☒ (Faucet) pump, corp tap, other		(4-7) HR MIN MO DAY 09 51 09 12 9
Source (circle): ☒ Well surface water		Well No. Age (yrs.)—Depth (ft.)—Dia
3		220'
8. ☐ Check and complete following line only if sampling a public water supply.		
Name of Supply:		WSSN (14-20)
9.		Sample Type

LAB ID (22-26) 00001

DO NOT WRITE BELOW—LABORATORY RESULTS

Code (27-30)

Parameter

*Result (31-34)

LAB NO. 8710-00223

(1)

PROGRAM: 00

IRON (AUTOMATED)	1.4mg/l
SODIUM (AUTOMATED)	Not Detected
NITRATE AS N (AUTOMATED)	Not Detected
HARDNESS AS CaCO3 (AUTOMATED)	385mg/l
CONDUCTIVITY (AUTOMATED)	604mhos
CHLORIDE (AUTOMATED)	Not Detected
FLUORIDE (AUTOMATED)	0.2mg/l

(*Unless otherwise indicated results given as mg/l)

Examiner

Date Reported (35-40)

01 6 27 2

Laboratory

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FE

By Authority of Act 399, I

LANSING

1987 MAR -2 AM 9:02

Location Code (1-3)

45

LABORATORY & CHEMISTRY SECTION

Give all known information—Type or Print with soft lead or black ink.

1. Report Results to: Barbara B. Poag		Phone No:
Street Address:	3415 Scio Church Rd.	313-668-
Post Office		7519
State—Zip Code:	Ann Arbor, MI 48103	
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)		
Supply Owner:		Phone No.
3. as above		
Sample Collected at—Street Address:		Section No.
4. Same		
Sample Collected at—Post Office (MI), Zip Code		
5. Same		
Sample Collected by (name):	Washtenaw	
6. as above		
Sampling Point (circle):	Time—24 hr. Format Date: (8-13)	
50 ft H ₂ O	(4-7) 11 12 00 02 27 87	
Faucet, pump, corp tap, other	Well No.	Age (yrs.)—Depth (ft.)—Diam. (in.)
	151 YK	245 ft, 6 in
7. ☐ Check and complete following line only if sampling a public water supply.		
Name of Supply:	WSSN (14-20)	Sample Type (21)
LAB ID (22-26) 00001 DO NOT WRITE BELOW—LABORATORY RESULTS		
Code (27-30) Parameter *Result (31-34)		

LAB NO. 8703-00045 (1) PROGRAM: 00

IRON (AUTOMATED)	Not Detected
SODIUM (AUTOMATED)	21 mg/l
NITRATE AS N (AUTOMATED)	Not Detected
HARDNESS AS CaCO ₃ (AUTOMATED)	Not Detected
CONDUCTIVITY (AUTOMATED)	781 μmhos
CHLORIDE (AUTOMATED)	Not Detected
FLUORIDE (AUTOMATED)	0.1 mg/l

*Unless otherwise indicated results given as mg/l

Date Reported (35-40)

MAR 12 87 2

Examiner

Laboratory

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FB-32 884

By Authority of Act 399, P.A. 1976

LANSING

1987 MAR -2 AM 9:03

Location Code (1-3)

66

LABORATORY & CHEMISTRY SECTION

Give all known information—Type or Print with soft lead or black ink.

1. Report Results to: Barbara B. Poag		Phone No:
Street Address:	3415 Scio Church Rd.	313-
Post Office		668-
State—Zip Code:	Ann Arbor, MI 48103	7519
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)		
Supply Owner:		Phone No.
3. as above		
Sample Collected at—Street Address:		Section No.
4. Same		
Sample Collected at—Post Office (MI), Zip Code		
5. Same		
Sample Collected by (name):	Washtenaw	
6. as above		
Sampling Point (circle):	Time—24 hr. Format Date: (8-13)	
50 ft H ₂ O	(4-7) 11 13 00 02 27 87	
Faucet, pump, corp tap, other	Well No.	Age (yrs.)—Depth (ft.)—Diam. (in.)
	151 YK	245 ft, 6 in
7. ☐ Check and complete following line only if sampling a public water supply.		
Name of Supply:	WSSN (14-20)	Sample Type (21)
LAB ID (22-26) 00001 DO NOT WRITE BELOW—LABORATORY RESULTS		
Code (27-30) Parameter *Result (31-34)		

LAB NO. 8703-00066 (1) PROGRAM: 00

IRON (AUTOMATED)	0.6 mg/l
SODIUM (AUTOMATED)	Not Detected
NITRATE AS N (AUTOMATED)	Not Detected
HARDNESS AS CaCO ₃ (AUTOMATED)	459 mg/l
CONDUCTIVITY (AUTOMATED)	665 μmhos
CHLORIDE (AUTOMATED)	17 mg/l
FLUORIDE (AUTOMATED)	Not Detected

*Unless otherwise indicated results given as mg/l

Date Reported (35-40)

MAR 12 87 2

Examiner

Laboratory

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FB-32 884

By Authority of Act 399, P.A. 1976

LANSING

1986 SEP -9 PH 12: 37

SANITARY & CHEMISTRY SECTION

1267

Give all known information Type or Print with soft lead or black ink. LAB NO.

1. Report Results to: Sue Abbott		Phone No:
Street Address: 2781 Scio Church Rd.		662-02
Post Office— State—Zip Code: Ann Arbor, MI 48103		
2. Reason for Analysis (check): ☒ Routine ☐ Other (Describe on separate sheet)		
Supply Owner:		Phone No.
3. Sue Abbott		662-02
Sample Collected at—Street Address:		Township: Section No
4. 2781 Scio Church		Loati
Sample Collected at—Post Office MI, Zip Code		County:
5. Ann Arbor, MI 48103		Washtena
Sample Collected by (name):		Time 24 hr. Format Date
6. Sue Abbott		11 10 4 09 10 17 5
Sampling Point (circle):	Source (circle):	Well No. Age (yrs.) Depth (ft.) Diam. (i)
7. Faucet	Well, surface water	
Faucet, pump, corp tap, other		
8. ☐ Check and complete following line only if sampling a public water supply.		
Name of Supply:		Sample Type (21)
9.		
LAB ID (22-26) 00001 DO NOT WRITE BELOW LABORATORY RESULTS		
Code (27-30)	Parameter	Result (31-34)

LAB NO. 8609-01267 (1) PROGRAM: 00

IRON (AUTOMATED)	Not Detected
SODIUM (AUTOMATED)	199mg/l
NITRATE AS N (AUTOMATED)	0.6mg/l
HARDNESS AS CaCO ₃ (AUTOMATED)	Not Detected
CONDUCTIVITY (AUTOMATED)	730mmhos
CHLORIDE (AUTOMATED)	Not Detected
FLUORIDE (AUTOMATED)	0.1mg/l

BS

(*Unless otherwise indicated results given as mg/l)

Date Reported (35-40)

SEP 12 1986 2

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

FB-32 8/8

By Authority of Act 399, P.A. 197