SITE INVESTIGATION REPORT
-OFFSITE WELL INSTALLATION

12/31/98?

915168

SJB SERVICES, INC.

Contract Drilling
and Testing

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SITE INVESTIGATION REPORT
OFFSITE WELL INSTALLATION
210 FRENCH ROAD

PREPARED FOR:
KEN KLOEBER CONSULTING ENGINEERS
8397 BOSTON STATE ROAD
BOSTON, NEW YORK 14025

PREPARED BY:

SJB SERVICES, INC.
DECEMBER, 1998

SJB-D1338

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SITE INVESTIGATION REPORT
OFFSITE WELL INSTALLATION
210 FRENCH ROAD
CHEEKTOWAGA, NEW YORK

I. INTRODUCTION

SJB Services, Inc. drilling personnel were present at 210 French Road in Cheektowaga, New York on November 23 and 24, 1998 to perform a subsurface investigation for monitoring well installations. The work was requested and authorized by Mr. Chris Andrzejewski of Ken Kloeber Consulting Engineers Inc., 8397 Boston State Road, Boston, New York, 14025.

A total of two (2) test borings were advanced at the site, ranging in depth from 19.5 feet to 20.0 feet below existing ground surface. The location of each of these borings was provided to SJB Services, Inc. on a plan prepared by the client prior to commencing drilling operations. The actual "as drilled" locations are illustrated on the attached test boring plan.

II. METHOD OF INVESTIGATION

Standard drilling techniques were employed to advance 4 1/4" inside diameter hollow stem augers through the overburden soils. Representative soil samples were obtained on a continuous basis throughout the depth of the boring by driving a two-inch (2") outside diameter split spoon sampler into the undisturbed soils beneath the augers, using a 140 pound hammer free falling 30-inches. Data regarding the compaction and consistency of the overburden soils are related to the penetration of the split spoon, in accordance with the "Standard Penetration Test" (ASTM D1586).

Rotary diamond rock coring methods were utilized to obtain HQ size (nominal 3.78-Inch diameter) bedrock samples from both test borings.

The recovered samples were classified in the field by our drill foreman and transported to our Buffalo, New York office where visual classification was performed by a Geologist. Included in this report is a "General Information Key to Subsurface Logs" as a supplement to explain the terms, symbols and definitions which are utilized in our visual classifications.

III. GENERAL SITE CONDITIONS

In general, the subsurface conditions encountered at the site consisted of variable fills underlain by limestone and shale bedrock. Both test borings were advanced approximately 15-feet into the underlying bedrock. Two-inch (2") I.D. PVC monitoring wells with flush mount protective casings (curb boxes) were installed in the test borehole upon completion of casings.

Both wells were developed using a PVC bailer after installation. The drill foreman documented water levels and volumes removed during development. It should be noted that both wells went "dry" during development. This information is summarized in Attachment 'A' of this report.

Please consult the attached boring logs for more specific detail such as "N" values, soil classification, and water level conditions.

The stratification lines shown on the boring logs are approximate, where as in-situ the changes between strata may be more gradual. The subsurface information represented by the attached logs indicates the conditions present only at the location or depth of each sample taken at the borehole specified.

The following pages contain data recorded in the field by our drill foreman. The data, along with the recovered soil samples are their visual classification constitutes the subsurface investigation reports.

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be destroyed unless directed otherwise.

It has been a pleasure working with you on this project. If your have any questions or wish to discuss this report further, please contact our office at any time.

If we can be of further service to you, please let us know. SJB Services, Inc. offers a full range of construction testing services (concrete, asphalt, soil, steel), should you have a need for these items at a later date.

SJB SERVICES, INC.

Frank Minnolera

Frank Minnolera
Staff Geologist

tlf

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ATTACHMENT 'A'

WELL DEVELOPMENT SUMMARY
210 FRENCH ROAD

MONITORING WELL MW-1

Initial Water Level at 8.0' below grade in well

Bailed 4.0-gallons from well - well went dry

Well allowed to recover, bailed again - removed 2 gallons before well went dry

Well allowed to recover, bailed again - removed 2 gallons before well went dry

MONITORING WELL MW-2

Initial water level at 3.0' below grade in well

Bailed 5.0-gallons from well - well went dry

Well allowed to recover, bailed again - removed 1-gallon before well went dry

Well allowed to recover, bailed again - removed 2-gallons before well went dry

DATE:
STARTED 11/23/98
FINISHED 11/23/98

SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. MW-1
SURF. ELEV ---
G.W. DEPTH See Notes

PROJECT: Monitoring Well Installation
LOCATION: 210 French Road
PROJ. NO.: D-1338

DEPTH FT	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	3	4			Black SILT, f-c Sand, little f-c Gravel (moist, FILL)	
		6	6		10		
	2	6	6			Becomes Orange-Black and Brown	
		9	50/0.2		15		HQ Size Rock Core
5						Grey LIMESTONE Rock, medium hard, sound bedded, Contains occasional fractured zones and Shale seams	RUN #1 4.0' - 8.0' REC= 83% RQD= 64%
							RUN #2 8.0' - 13.0' REC= 95% RQD= 55%
10						Transition at Approx. 13.0'	
						Black SHALE Rock, medium hard, sound thinly bedded to bedded, Contains occasional Weathered zones	RUN #3 13.0' - 18.0' REC= 92% (Approx.) RQD= 33%
15							
							RUN #4 18.0' - 19.5' REC= 83%
20						Boring Complete at 19.5'	2" PVC Groundwater Monitoring Well Installed at Boring Completion.
25							
30							
35							
40							

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW

CLASSIFICATION: VISUAL BY GEOLOGIST

DRILLER: C. Ackley
DRILL RIG TYPE : CME 85
METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

MONITORING WELL COMPLETION RECORD

SJB SERVICES, INC. Contract Drilling and Testing

Well Number: MW-1

Project: 210 French Road

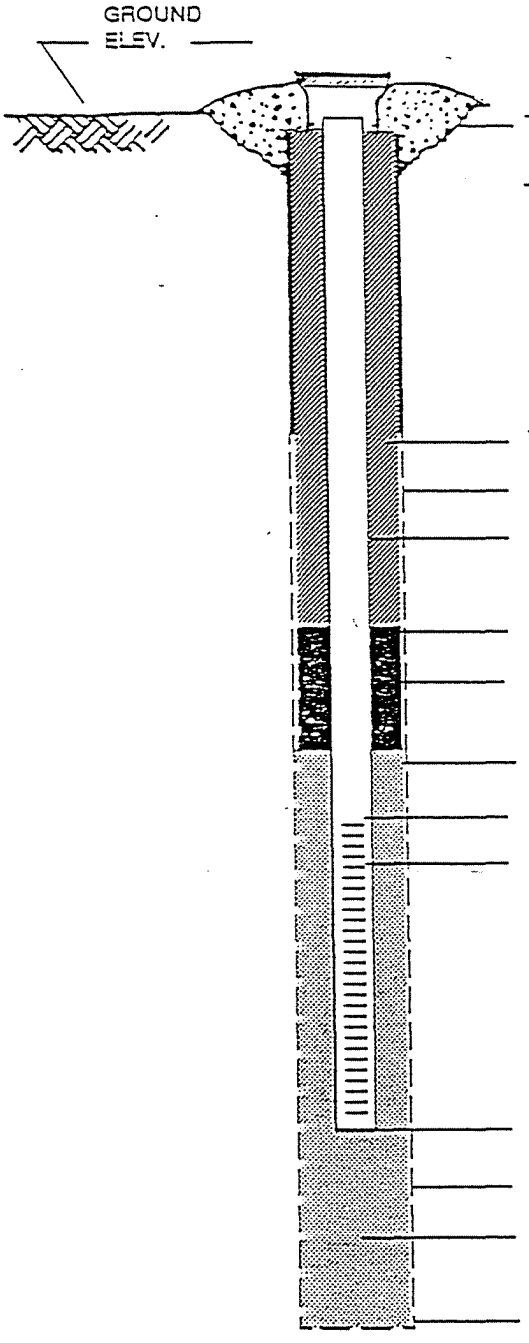
Project Number: D-1338

Driller: C. Ackley

Drilling Method: ASTM D-1586 Using Hollow Stem Augers

Geologist: ---

Installation Date(s): 11/23/98



Type of Surface Seal: Sakrete Pad	
Type of Backfill: Sakrete	
Borehole Diameter: HQ Rock Core (Approx. 3.8")	
I.D. of Riser Pipe: 2.0"	
Type of Riser Pipe: PVC	
Depth of Seal:	1.0'
Type of Seal: Bentonite Chips	
Depth of Sand Pack:	4.0'
Depth Top of Screen:	4.5'
Type of Screen: PVC	
Slot Size x Length: .010 x 15.0'	
I.D. of Screen: 2.0"	
Type of Sand Pack: Morie '0' Filter Sand	
Depth Bottom of Screen:	19.5'
Depth Bottom of Sand Pack:	19.5'
Type of Backfill Below Observation Well:	
Elevation/Depth of Hole:	19.5'

GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the observations and mechanical data collected by the driller at the site, supplemented by classification of the material removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a fraction of the total volume of the deposits at the site and may not necessarily be representative of the subsurface conditions between adjacent borings or between the sampled intervals. The data presented on the Subsurface Logs together with the recovered samples will provide a basis for evaluating the character of the subsurface conditions relative to the project. The evaluation must consider all the recorded details and their significance relative to each other. Often analyses of standard boring data indicate the need for additional testing or sampling procedures to more accurately evaluate the subsurface conditions. Any evaluation of the contents of this report and recovered samples must be performed by Professionals. The information presented in the following defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered.

1. The figures in the Depth column defines the scale of the Subsurface Log.

2. The sample column shows, graphically, the depth range from which a sample was recovered See Table 1 for a description of the symbols used to signify the various types of samples.

3. The Sample No. is used for identification on sample containers and/or Laboratory Test Reports.

4. Blows on Sampler—shows the results of the "Penetration Test", recording the number of blows required to drive a split spoon sampler into the soil. The number of blows required for each six inches of penetration is recorded. The first 6 inches of penetration is considered to be a seating drive. The number of blows required for the second and third 6 inches of penetration is termed the penetration resistance, N. The outside diameter of the sampler, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log.

5. Blows on Casing — shows the number of blows required to advance the casing a distance of 12 inches. The casing size, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log. If the casing is advanced by means other than driving, the method of advancement will be indicated in the Notes column or under the Method of Investigation at the bottom of the Subsurface Log.

6. All recovered soil samples are reviewed in the laboratory by an engineering technician, geologist or geotechnical engineer, unless noted otherwise. The visual descriptions are made on the basis of a combination of the driller's field descriptions and observations and the sample as received in the laboratory. The method of visual classification is based primarily on the Unified Soil Classification (ASTM D 2487-83) with regard to the particle size and plasticity (See Table No. 2) Additionally, the relative portion, by weight, of two or more soil types is described for granular soils in accordance with "Suggested Methods of Test for Identification of Soils" by D M. Burmister, ASTM Special Technical Publication 479, June 1970. (See Table No. 3) The description of the relative soil density or consistency is based upon the penetration records as defined on Table No. 4. The description of the soil moisture is based upon the relative wetness of the soil as recovered and is described as dry, moist, wet and saturated. Water introduced in the boring either naturally or during drilling may have affected the moisture condition of the recovered sample. Special terms are used as required to describe materials in greater detail several such terms are listed in Table 5. When sampling gravelly soils with a standard two inch diameter split spoon,the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the casing and samplers blows or through the "action" of the drill rig as reported by the driller.

7. The description of the rock shown is based on the recovered rock core and the driller's observations. The terms frequently used in the description are included in Table 6.

8. The stratification lines represent the approximate boundary between soil types end the transition may be gradual. Solid stratification lines are based on the driller's field observations.

9. Miscellaneous observations and procedures noted by the driller are shown in this column, including water level observations. It is important to realize the reliability of the water level observations depends upon the soil type (water does not readily stabilize in a hole through fine grained soils), and that drill water used to advance the boring may have influenced the observations. The ground water level typically will fluctuate seasonally. One or more perched or trapped water levels may exist in the ground seasonally. All the available readings should be evaluated. If definite conclusions cannot be made, it is often prudent to examine the conditions more thoroughly through test pit excavations or water observation wells.

10. The length of core run is defined as the length of penetration of the core barrel. Core recovery is the length of core recovered divided by the core run. The RQD (Rock Quality Designation) is the total pieces of NX core exceeding 4 inches in length divided by the core run. The size core barrel used is also noted.

SUBSURFACE LOG KEY

Project_____ Date Started_____

Project#_____ Date Finished_____

Location_____ Surf. Elv._____

Driller:_____ G.W. Depth_____

SJB SERVICES, INC. **Contract Drilling and Testing**

Hole # _____

Sheet____of____

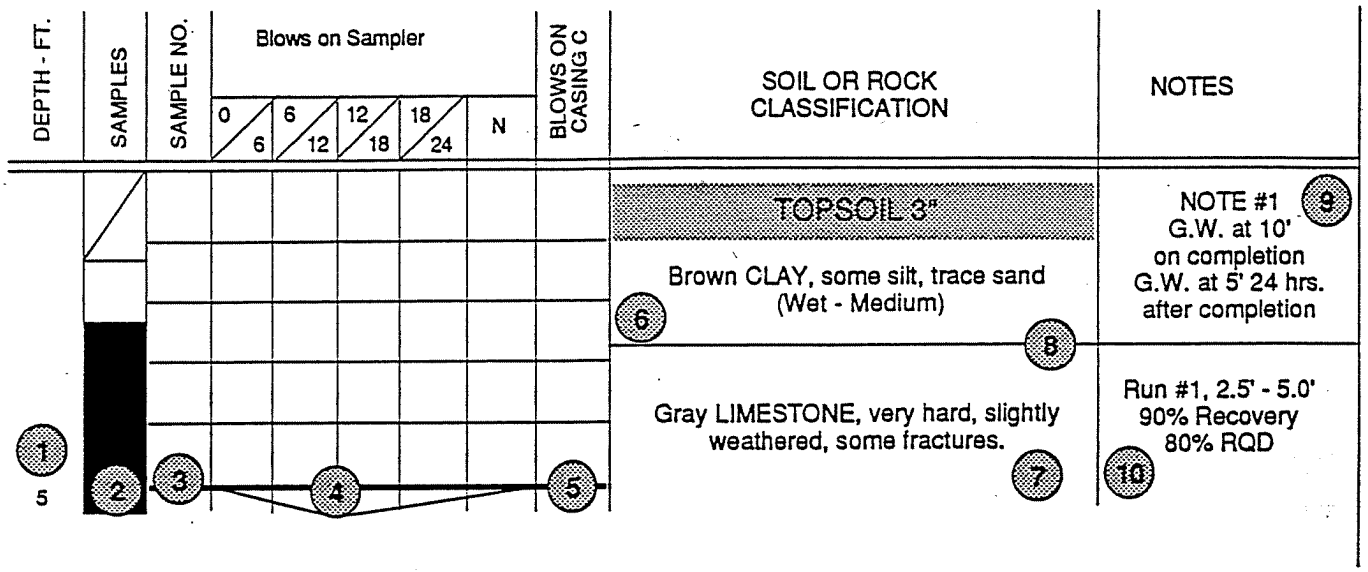


TABLE 1

- Split Spoon Sample
- Shelby Tube Sample
- Auger or Test Pit Sample
- Rock Core

TABLE 2

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on the basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	>12"	
Cobble	3" - 12"	
Gravel - Course	3" - 3/4"	Coarse Grained (Granular)
- Fine	3/4" - #4	
Sand - Coarse	#4 - #10	
- Medium	#10 - #40	
- Fine	#40 - #200	
Silt - Non Plastic (Granular)		
Clay-Plastic (Cohesive)	<#200	Fine Grained

TABLE 3

The following terms are used in classifying soils consisting of mixtures of 2 or more soil types. The estimate is based on weight of total sample.

Term	% of Total Sample
"and"	35-50
"some"	20-35
"little"	10-20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE 4

The relative compactness or consistency is described in accord with the following terms:

Granular Soils		Cohesive Soils	
Term	Blows per Foot, N	Term	Blows per Foot, N
Loose	<11	Very Soft	<3
Firm	11-30	Soft	3-15
Compact	31-50	Stiff	16-25
Very Compact	>51	Hard	>26

(Large particles in the soils will often significantly influence the blows per foot recorded during the Penetration Test)

TABLE 5

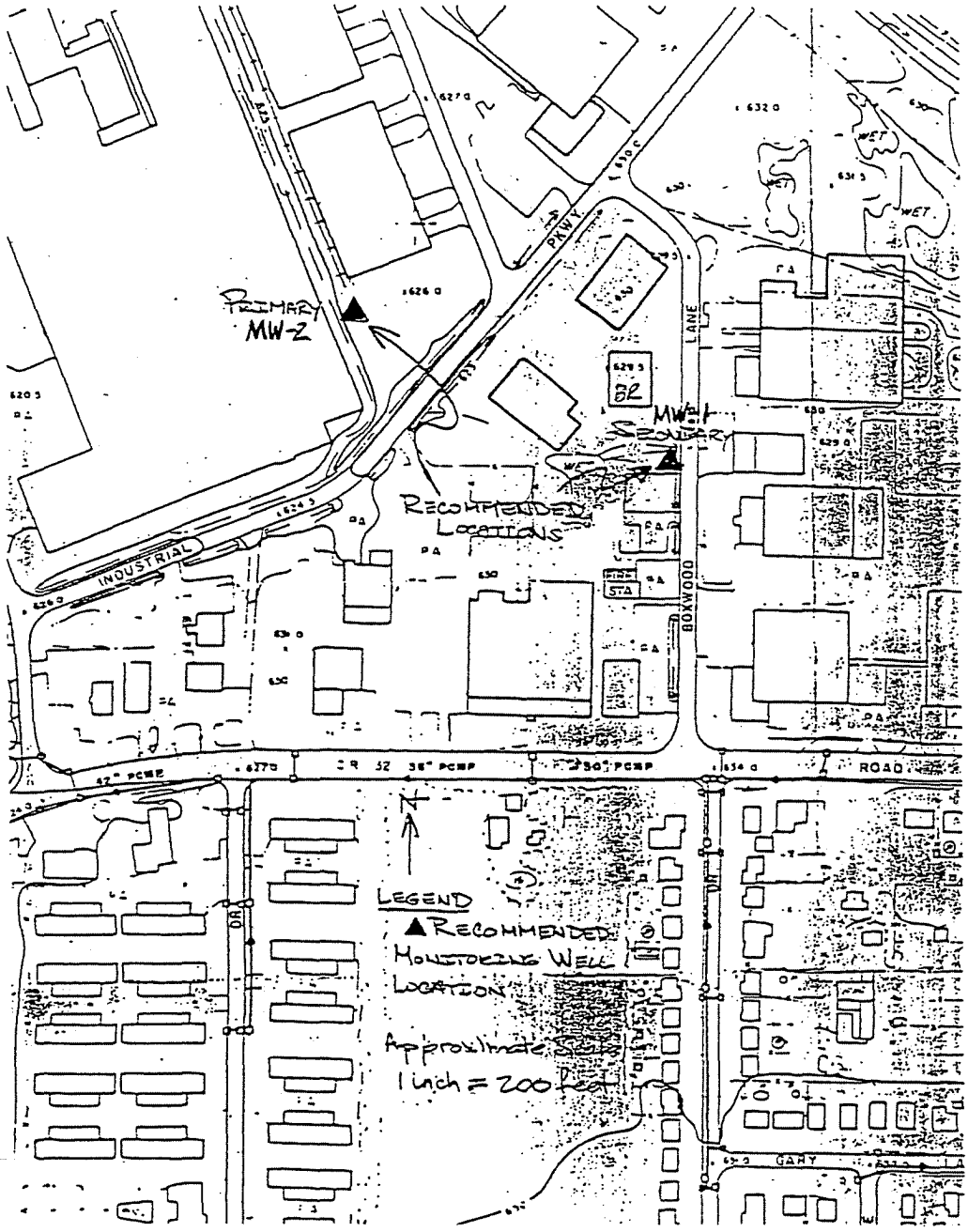
Varved - Horizontal uniform layers or seams of soil(s).
Layer - Soil deposit more than 6" thick.
Seam - Soil deposit more than 6" thick.
Parting - Soil deposit less than 1/8" thick.
Laminated - Irregular, horizontal and angled seams and partings of soil(s).

TABLE 6

Rock Classification Terms		Meaning
Hardness	Soft	Scratched by fingernail
	Medium Hard	Scratched easily by penknife
	Hard	Scratched very difficultly with penknife
	Very Hard	Cannot be scratched by penknife
Weathering	Very Weathered	Judged from relative amounts
	Weathered, Sound	of disintegration, iron staining, core recovery, clay seams, etc.

Rock Classification Terms			
Bedding	Laminated	(<1")	Natural breaks in Rock Layers
	Thin Bedded	(1"-4")	
	Bedded	(4"-12")	
	Thick Bedded	(12" - 36")	
	Massive	(>36")	

Fracturing- natural breaks in the rock oriented at an angle to the rock layers



SJB Services, Inc.

SUBSURFACE INVESTIGATION PLAN

Offsite Monitoring Wells
210 French Road
Cheektowaga, New York

DR. BY: ---	SCALE: reduced	PROJ. NO.: D-1338
CK'D BY: FRM	DATE: 12/98	DRWG NO.: 1

DATE:
STARTED 11/24/98
FINISHED 11/24/98

SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. MW-2
SURF. ELEV. ---
G.W. DEPTH See Notes

PROJECT: Monitoring Well Installation
LOCATION: 210 French Road
PROJ. NO.: D-1338

DEPTH FT	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	2	3			Brn.-Black and Grey f-m SAND, some Silt (moist, FILL)	
		4	7		7		
	2	10	50/0.0		REF		NQ Size Rock Core
						Grey LIMESTONE Rock, medium hard, sound, bedded, Contains occasional Shale partings and seams	RUN #1 2.5' - 7.5' REC= 84% RQD= 72%
5							
						Transition at Approx. 8.5'	RUN #2 7.5' - 12.5'
10						Black SHALE Rock, medium hard, fractured, thinly bedded to bedded	REC= 84% (Approx.) RQD= 72%
							RUN #3 12.5' - 17.5' REC= 92% (Approx.) RQD= 30% (Approx.)
15							
							RUN #4 17.5' - 20.0' REC= 67% (Approx.)
20							
						Boring Complete at 20.0'	2" PVC Groundwater Monitoring Well Installed at Boring Completion.
25							
30							
35							
40							

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW

CLASSIFICATION: VISUAL BY GEOLOGIST

DRILLER: C. Ackley

DRILL RIG TYPE : CME 85

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

MONITORING WELL COMPLETION RECORD

SB SERVICES, INC. Contract Drilling and Testing

Well Number: MW-2

Project: 210 French Road

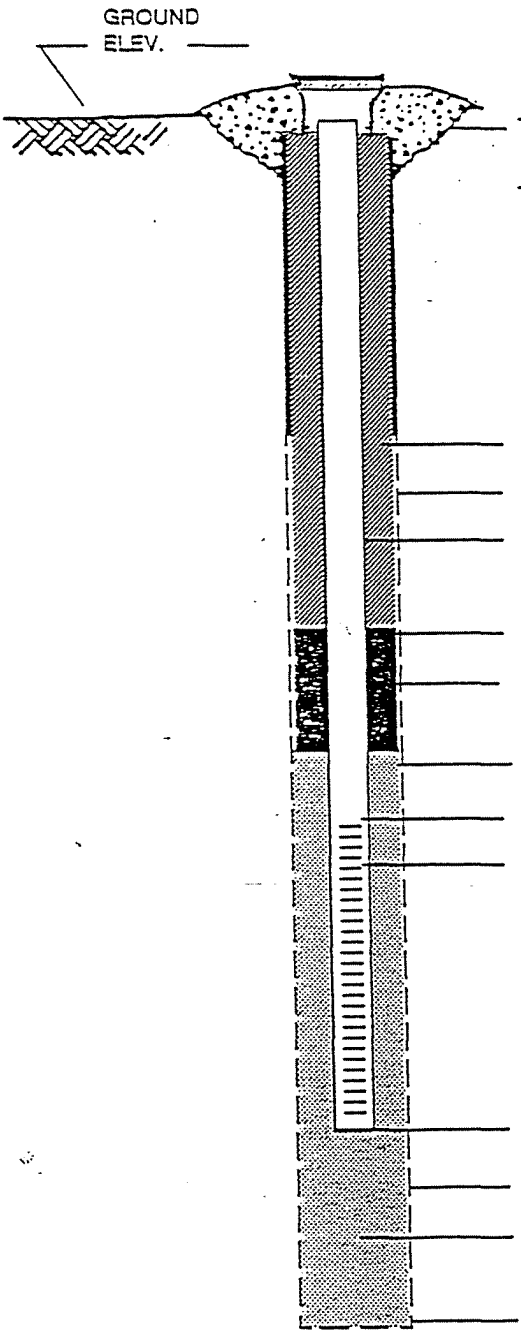
Project Number: D-1338

Driller: C. Ackley

Drilling Method: ASTM D-1586 Using Hollow Stem Augers

Geologist: ---

Installation Date(s): _____



Type of Surface Seal: Sakrete Pad

Type of Backfill: Sakrete

Borehole Diameter: HQ Core (Approx. 3.8")

I.D. of Riser Pipe: 2.0"

Type of Riser Pipe: PVC

Depth of Seal: 1.0'

Type of Seal: Bentonite Chips

Depth of Sand Pack: 4.0'

Depth Top of Screen: 5.0'

Type of Screen: PVC

Slot Size x Length: .010 x 15.0'

I.D. of Screen: 2.0"

Type of Sand Pack: Morie '0' Filter Sand

Depth Bottom of Screen: 20.0'

Depth Bottom of Sand Pack: 20.0'

Type of Backfill Below Observation Well: _____

Elevation/Depth of Hole: 20.0'