~~Webster~~ 1
Hamilton

May 8, 1946

Mr. X. P. Boyles, Public Health Engineer
State Department of Health
Fort Dodge, Iowa

Dear Mr. Boyles:

The information which we have available on ground-water conditions in the vicinity of Ellsworth, Hamilton County, has been examined. It appears probable that a satisfactory water supply can be obtained either from glacio-fluvial sands and gravels or from Mississippian limestones and dolomites.

The Skunk River Valley which extends along the western edge of Ellsworth is known to contain sand and gravel deposits in many parts of its course. Possibly there are now wells along the valley near the western edge of town which would indicate the presence of such deposits. If there is reason to believe that such deposits exist and are water-bearing, the town may wish to drill one or more test wells to determine whether enough water can be obtained from them to meet the needs of the town.

The second alternative would be to drill a rock well. It is my understanding that Ellsworth has had two drilled wells, one 362 and the other about 390 feet deep. We have no record of their logs, construction or production data, but it is probable that both were completed in Mississippian rocks. These rocks are generally rather productive in this region and should yield an adequate quantity of water for the needs of the town. Acidizing would probably increase the initial yield from such a well.

Mississippian rocks belonging to the Gilmore City limestone and Hampton dolomite formations are believed to be present beneath drift and Pennsylvanian shale. Both of these Mississippian formations are known to y ield considerable water within a few miles of Ellsworth. The town of Hubbard 15 miles to the east recently completed a well in the lower part of the Hampton dolomites and obtained quite a satisfactory well producing 112 g.p.m. with a drawdown of 38 feet. The water has a hardness of about 238 p.p.m., sulphates are very low and the iron content is 1 p.p.m. A somewhat similar well at Blairsburg yields 69 g.p.m. with 69 feet of drawdown, and the water is higher in hardness and iron.

It is difficult to give a forecast of the geologic section from the information available. Ellsworth is in the region adjacent to a prominent subsurface structure which is as yet only partially mapped. The drift at Ellsworth is known to be at least 90 feet thick and may extend to as much as 200 feet. Some Pennsylvanian shale and sandstone probably underlies the drift and overlies the Mississippian limestones. The base of these latter rocks is estimated at about 400 feet. However, they may extend considerably deeper.

Should the town decide to drill a well, samples of the cuttings should be saved. Examination of the samples after the limestone has been penetrated a short distance would undoubtedly make possible a reasonably accurate forecast of the section to follow.

Thus there appear to be two good possibilities for obtaining a satisfactory water supply at Ellsworth. Water-bearing sands and gravels, if present in the valley of Skunk River, might be developed or a deeper rock well might be drilled into the Mississippian limestones and dolomites.

I hope this information will be useful to you and the town. If you have any questions concerning it or if we can be of further assistance in this matter we shall expect to hear from you. Needless to say we shall be much interested in developments.

Very truly yours,

S. E. Harris, Jr.

SEH:BH

5

BROWN ENGINEERING COMPANY
Consulting Engineers

JUN 6 1947

REGISTERED
PROFESSIONAL ENGINEERS

K. R. BROWN
E. F. BEHRENS
L. B. ECKLES
E. S. BOUDINOT
G. P. PRICHETT
J. V. GEBUHR
G. W. VAN NESS
M. T. Mc DONALD
J. S. VETERSNECK
J. M. FAIRALL
G. C. HAVENS
D. H. LOVE
W. E. NICHOLS
R. A. SCHREIBER

K. P. BUILDING - SIXTH AVENUE AT LOCUST, DES MOINES 9, PHONE 4-9109

June 4, 1947

Dr. H.G. Hershey
Iowa Geological Survey
Geology Annex
Iowa City, Iowa

Subject: Test Wells
Ellsworth, Hamilton County, Iowa

Dear Sir:

The existing town wells are not adequate to supply the Town and the turkey processing plant. The Town wants to locate an additional source of supply. The existing wells are finished with approximately 3" holes in the rock at a depth of 368'. The static water level is 90' below curb and the pumping level is around 150' below curb at a pumping rate of 39 gpm. The water is of the following analysis:

Ca CO 3	10.4 gpg
Mg CO 3	8.79
Si O 2	.88
Fe2 O 3	.07
Na2CO 3	22.48
Na2SO 4	.62
Na CL	3.80
Total Solids	27.04
PH	7.1
CO2	0.4
MO Alkilinity	20.86
Total Hardness	22.25

These wells are located approximately in the N½ of the SW¼ SW¼ Sec. 30 R23W, T87N.

Some wells located in the west part of town, E½ SE¼ Sec. 25 R24W, T87N, are known to be soft and the town would like to have a supply of water which is softer than the present.

What would be your suggestion for locating a better quality source of supply of adequate quantity? At what depths should we expect to find these aquifers? If you have analyses characteristic of these acquifers we would appreciate receiving them along with your suggestions.

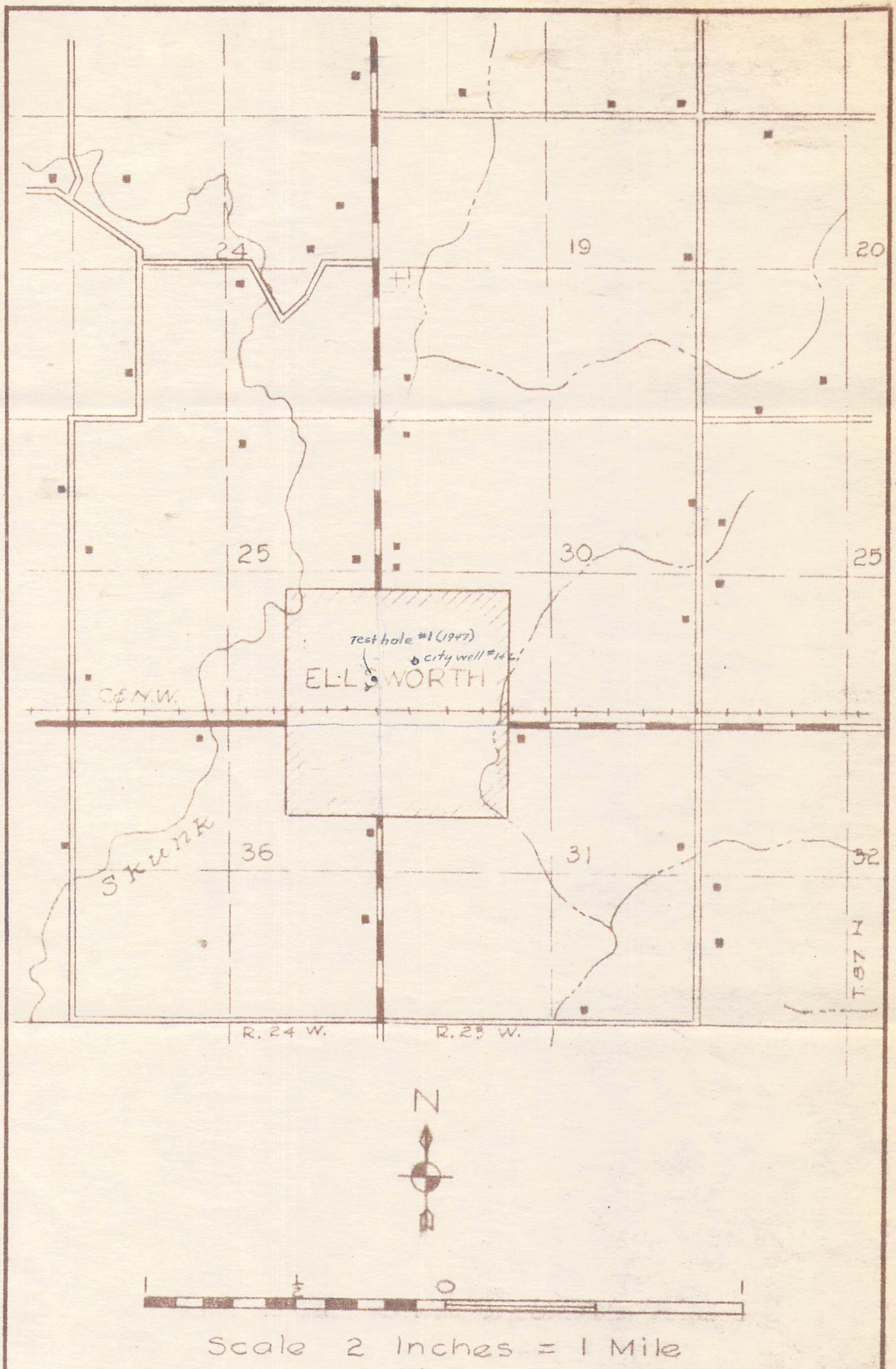
Very truly yours,

BROWN ENGINEERING COMPANY

J.M. Fairall

JMF:eam

Encl.



BROWN ENGINEERING COMPANY **Des Moines, Iowa** **Consulting Engineers**		ELLSWORTH, IOWA	
Dwn. by P. E. Freeman	6-3-47		
App. by		Scale As Shown	DWG.
Revised by		Sheet No of	NO.

Hamilton
3

June 10, 1947

Brown Engineering Company
K. P. Building
Sixth Avenue at Locust
Des Moines 9, Iowa

Attention: Mr. J. M. Fairall

Gentlemen:

Re: Test wells, Ellsworth, Hamilton County, Iowa.

The information which we have available in the open files of the Geological Survey on ground-water conditions in the vicinity of Ellsworth, Hamilton County has been examined. It appears probable that a satisfactory water supply can be obtained either from the glacio-fluvial sands and gravels or from the Mississippian limestones and dolomites.

The Skunk River Valley which extends along the western edge of Ellsworth is known to contain sand and gravel deposits in many parts of its course. Possibly those wells located in the western part of town which you mentioned in your letter are producing from such deposits. The town may wish to drill one or more test wells in this vicinity to determine whether enough water can be obtained from them to meet the needs of the town. Water obtained from the glacio-fluvial deposits is usually of fair mineralogical quality and not as hard as water obtained from deeper horizons, but the iron content will probably be higher.

The second alternative would be to drill a rock well. The two existing town wells probably were completed in Mississippian rocks. These rocks are generally rather productive in this region. A well with a larger diameter hole should yield an adequate quantity of water for the needs of the town. Acidizing would probably increase the initial yield from such a well.

Mississippian rocks belonging to the Gilmore City limestone and Hampton dolomite formations are believed to be present beneath the drift and Pennsylvanian shale. Both of these Mississippian formations are known to yield considerable water within a few miles of Ellsworth. The town of Hubbard 15 miles east of Ellsworth completed a well in the lower part of the Hampton dolomites and obtained quite a satisfactory well producing 112 g.p.m. with a drawdown of 38 feet. The water has a hardness of about 238 p.p.m., sulphates are very low and the iron content 1 p.p.m. A similiar well at Blairsburg yields 69 g.p.m. with 69 feet of drawdown. The water is higher in hardness and iron.

It is difficult to make a forecast of the geologic section from the information available. Ellsworth is in the region adjacent to a prominent subsurface structure which is as yet only partially mapped. The drift at Ellsworth is known to be at least 90 feet thick and may extend to as much as 200 feet. Some Pennsylvanian shale and sandstone probably underlies the drift and overlies the Mississippian limestones. The base of these latter rocks is estimated at about 400 feet. However, they may extend considerably deeper.

If Ellsworth is interested primarily in obtaining a supply of softer water perhaps the sand and gravel deposits in the valley of the Skunk River could be developed. If any of the present wells in the western part of town are strong, the first test hole might be drilled in that vicinity. Additional sites would be located according to the record of the first. Accurate and complete records of each test should be obtained in regards to the type of material drilled, the water level and depth at which changes in water level occur. Drilling and pumping tests will yield data necessary to determine the extent of the sand and gravel deposit and its water-bearing qualities. It might be well to drill all tests to bedrock in order to test the possibilities of the entire drift section.

I hope this information will be useful to you. If you have any questions concerning it or if we can be of further assistance in this matter we shall expect to hear from you. Needless to say we shall be much interested in any developments at Ellsworth.

Very truly yours,

S. E. Harris, Jr.
Geologist

SEH:MCP:AEH

June 10, 1947

Brown Engineering Company
K. P. Building
Sixth Avenue at Locust
Des Moines 9, Iowa

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Mr. J. M. Fairall -2- June 10, 1947

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Very truly yours,

S. E. Harris, Jr.
Geologist

SEH:MCP:AEH

AUG 21 1947

2

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Consulting Engineers

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K. P. BUILDING - SIXTH AVENUE AT LOCUST, DES MOINES 9, PHONE 4-9109

August 20, 1947

Dr. H.G. Hershey
Iowa Geological Survey
Geology Annex
Iowa City, Iowa

Subject: Ellsworth, Iowa
Test Well No. 1

Dear Doctor:

The ground elevation at this well is 1081.6'. Art Bruinekool wrote the log on the top of the sample cartons. Any levels given in this letter are less correct than the log.

No satisfactory sand or gravel was found above bedrock at the 110' level. When we got into the rock at a depth of 112' the water rose to a static level of 17.5'. This was test bailed at 35 gpm with a pumping level of 50'. The water sample which we are expressing to you was collected at this point. Note the gassy odor. The aquifer was a creviced rock with a hard black clay in the crevices. We came to the conclusion that the water from this aquifer would remain muddy.

We went on down to 140' trying to find a pourous aquifer without the clay. The casing slipped down and partially cased off the creviced rock. Later pumping tests did not indicate any water coming from lower aquifers. When the hole was bailed out, water could be heard running into the hole from the aquifer at the top of the rock. The static level on standing over night was 15'.

The Town wells produce a gassy water. Is there any promise of a yield of 100 gpm of better quality water from an aquifer below the present Town aquifer of 365'?

Very truly yours,
BROWN ENGINEERING COMPANY
John M. Fairall
John M. Fairall

JMF:eam

P.S. The location of this well is the NE corner SE¼ SE¼ SE¼ Section 25 R 24W T87N.

Hamilton Co.

1

August 21, 1947

Mr. John M. Fairall
Brown Engineering Company
K. P. Building
Des Moines, Iowa

Dear Mr. Fairall:

We have your letter of August 2 in regard to the test well drilled at Ellsworth. The water sample has arrived and we are proceeding with the analysis.

With regard to the possibilities of obtaining better water at a greater depth than the present city well, I believe we can give you better information after we examine the samples from the present test hole. We would appreciate it if you can arrange to send the samples to us.

Very truly yours,

H. G. Hershey

HGH:WEH:aeh

September 13, 1947

Mr. E. S. Boudinot
Brown Engineering Company
K. P. Building
Sixth Avenue at Locust
Des Moines 9, Iowa

Dear Mr. Boudinot:

Mr. Bruinekool brought in the samples from the Ellsworth test, and they have now been examined. A copy of our log is enclosed for your files.

You will note that the limestone belongs to the Gilmore City formation. This is known to yield large quantities of water where it is creviced; however, the driller reported no crevices here below the upper few feet of rock. Therefore, if a rock well is to be drilled it may be necessary to penetrate some distance into the underlying Hampton dolomite to obtain enough water to satisfy the needs of the town.

Let us hear from you if we can be of further assistance on this project.

Very truly yours,

S. E. Harris, Jr.
Geologist

SEH:BH

BROWN ENGINEERING COMPANY
Consulting Engineers

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K. P. BUILDING - SIXTH AVENUE AT LOCUST, DES MOINES 9, PHONE 4-9109

September 15, 1947

SEP 16 1947

Iowa Geological Survey
Geology Annex
Iowa City, Iowa

Subject: Ellsworth, Iowa

Attention: Mr. S.E. Harris, Jr.

Gentlemen:

Thank you very much for the log of the test well and your comments of the 13th.

In our letter of August 20th we asked if there was any promise of a yield of 100 gpm of better quality water from an aquifer below the present Town well of 365'. Is there any prospect of better water at greater depth?

What would be the minimum diameter hole you would recommend at the bottom of the well either in the Hampton dolomite or in a deepter rock for a yield of 100 gpm?

Very truly yours,

BROWN ENGINEERING COMPANY

John M. Fairall

John M. Fairall

JMF:eam

3

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Consulting Engineers

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K. P. BUILDING - SIXTH AVENUE AT LOCUST, DES MOINES 9, PHONE 4-9109

November 15, 1947

Iowa Geological Survey
Geology Annex
Iowa City, Iowa

Subject: Ellsworth, Iowa

Attention: Dr. H. G. Hershey

Gentlemen:

Thank you for the analysis of the Test Well No. 1. This water is of good quality but due to the rock formation we do not know of any way of pumping a clear water from this aquifer.

The water in the present Town wells is apparently increasing in iron and does not taste good when warm. A sample collected from the north well showed 6 ppm unfiltered iron in August this year.

Is there any possibility of getting a better quality water than the present Town supply by going to a greater depth; say not to exceed 600' T.D.?

Very truly yours,

BROWN ENGINEERING COMPANY

John M. Fairall

John M. Fairall

JMF:em

Hamilton

December 2, 1947

Brown Engineering Company
K. P. Building
Sixth Avenue at Locust
Des Moines 9, Iowa

Attention: Mr. J. M. Fairall

Gentlemen:

Re: Possibility of obtaining better quality water by deeper drilling at Ellsworth.

In response to your recent inquiry regarding a supply of better quality water by drilling to a depth of not greater than 600 feet, we have assembled the following information from the open files of the Geological Survey.

A former forecast of June 10, 1947, discussed the possibilities of developing a good water supply down through the Hampton formation. Since your test well has evidently just reached the Hampton or possibly penetrated a little into it, there is still a good chance that a satisfactory water supply will be encountered at a lower horizon.

Below the Hampton formation of Mississippian age to the top of the Maquoketa of Ordovician age, we have little data in our files concerning ground-water possibilities at Ellsworth. In a well at White Institute at New Providence in Harden County, the lower Cedar Valley and upper Wapsipinicon formations of Devonian age produce water at the rate of 56 gallons per minute from a well 832 feet deep. The static water level is 158 feet and the pumping level is 193 feet below land surface. The water is of good quality containing only 1.5 parts per million iron, and relatively low hardness of 14.2 grains per U. S. gallon. This horizon at Ellsworth would be encountered at approximately 600 feet.

Another Devonian well at the Story County Home near Nevada is reported to produce 55 gallons per minute with a drawdown of 40 feet from a static water level of 97 feet below the surface. This well is 765 feet deep, and gets its water from the Lime Creek of Upper Devonian age. The water contains 2 parts per million unfiltered iron and has a calculated hardness of 31.2 grains per U. S. gallon. The Lime Creek should be encountered at Ellsworth from approximately 325 to 475 feet.

It is difficult to know what to expect in the interval between the Devonian and the top of the Maquoketa, which should be reached at roughly 900 feet below the surface. This seems, however, to be much deeper than you care to go at Ellsworth.

It seems highly possible that further drilling for several hundred feet may reach a water supply in the Hampton or Cedar Valley which will give you better quality water.

If we can be of further service to you, please call on us.

Very truly yours,

S. E. Harris, Jr.
Geologist

SEH:DAM:AEH

W-2979

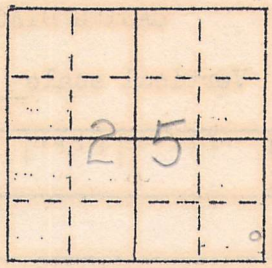
The correct W# is W-2979 8-23-78 Donna Runkle

This number is wrong. It is the number for a well in Worth Co. (Near the town of Manly). Drilled for a guy named Cobeen.

W-1927

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

RECORD OF WELL



Location:

Town: Ellsworth (N E / S W): County Hamilton E.

NE/c SE SE SE sec. 25 T 87 N., R. 24 W. Twp.

Well name and number Ellsworth Town Test Well #1 (1947)

Owner Town of Ellsworth Address

Tenant Address

Brown Engineering Company, Des Moines - Consulting Engineers

Contractor ~~Mr~~ Pella Tank & Pipe Company Address Pella, Iowa

Drillers Art Bruinekool

Drilling dates August 1947

Well data:

Elevations: Drilling curb feet; Land surface 1081.6 feet

Spirit Level from railroad station at Ellsworth - top rail El.

Determined by Brown Engineering Company

Topographic position

Total depth: Reported 140 feet, Measured feet

Drilling method Cable tool

Hole and casing data Cased to bedrock with 5 3/16" casing.

7" pipe set at 110'; at 117' pipe settled 2" + most of water was shut out. settled 2" more at 138'

Original depth to water 15 to 17.5 ft. ~~above~~ below Land surface Date

Original elevation of water level ft.; Source of data

Sources of water: Principal 112 - to 112 +; Others

Production data: Date _____

Static depth to water 17.5± Measuring point _____
Pumping level 50 ± at 35 g.p.m. bailer test water sample

Specific capacity _____ g.p.m. per ft. drawdown; Temperature _____ °F.

Pump data: Type pump _____ Column Dia. _____ Length _____
Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____

Power _____ Airline _____

Estimated rate of production: _____ g.p.m. for _____ hrs. a day
Use of water _____

WATER ANALYSES (in parts per million)

Date samples				
Sampled by				
Total solids				
Insoluble matter				
Alkalinity (Meo)				
Alkalinity (Phn)				
pH				
Fe_2O_3+ Mn_2O_3 +Al_2O_3				
Alkali as sodium				
Calcium				
Magnesium				
Iron (unfiltered)				
Manganese				
Nitrate				
Fluoride				
Chloride				
Sulfate				
Bicarbonate				
Hardness (ppm)				
Hardness (gpg)				

Remarks Water sample collected when well at depth of 112'

Laboratory data: Sample storage location _____

Sample range 0-141 No. spls. 37 No. dupls. & cond. 37 Good
Spls. prepared by P.J.H Washed range. 108-141 by P.J.H.
Driller's log and cond. no
Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
Microscopic study ✓ strip log ✓
Gen. log _____ Correl. by S.E.H.

WATER LEVEL DATA

Measuring point _____

Date	Depth to water	Altitude	Remarks

REMARKS

From Brown Engineering Co - Letter of Aug. 20, 1947

1. No satisfactory sand or gravel deposits reported above bedrock
2. Mud in crevices of rock at 112' - water did not clear. - SWL 17.5' pwl 50' at 35 gpm
3. Rock from 112± to 140' did not yield any water.