NEW PROVIDENCE

Sections 3, 4, 9, and 10; T. 86 N.; R. 20 W.; Providence Twp.; Hardin Co.

New Providence is situated on the upland at an approximate elevation of 1130 feet above sea level. Earlier reports indicate that Wisconsin and Kansan glacial drift are present at that location. Immediately below the drift occur consolidated rocks of the Pennsylvanian system composed here of shales and sandstones which should be thin because the locality is near the eastern extension of the Pennsylvanian. Limestones and sandstones of the Mississippian system occur below the Pennsylvanian.

In certain sections of Hardin County, Wisconsin and Kansan sands and gravels produce water but it is questionable that the production is sufficient for a town supply at New Providence since several farm wells in the vicinity were necessarily drilled to a depth of 300 or 400 feet and into solid rock. It may be feasible to sink a test well to bedrock to determine the character of the drift formations at this particular locality.

It is extremely doubtful that the Pennsylvanian will produce water of sufficient quantity or suitable quality for a town supply.

Probably the most satisfactory results will be obtained from a well into the Mississippian at a depth of 300 to 400 feet. Such a well should be cased through the drift and Pennsylvanian and into the solid portion of the Mississippian.

GW New Providence
Geol Data Hardin Co

September 18, 1972

Mr. Dave Fox, P.E.
Clapsaddle and Garber Associates
23 South First Avenue
Marshalltown, Iowa 50158

Dear Mr. Fox,

On September 14 you called us concerning information on the existing water well at New Providence, Iowa and possibilities for augmenting their supply by drilling another well.

Enclosed is a xerox copy of the town well drilled in 1946 which apparently is their only source. As far as I know, this well has always yielded enough water for the community without trouble and the water seems to be of acceptable quality. Excess iron might be present but the water is treated with phosphate compounds for stabilization. However, in 1963 a letter from the town indicated they were experiencing some trouble with their well. Although they weren't specific about the trouble, I believe they were pumping a little sand at that time. I wonder if this condition has turned up again? The most likely place for sand to be entering the well is from the base of the glacial drift around the outside of the casing which extends only a few feet into rock. This condition might be corrected by adding a length of 6-inch liner pipe and sealing the annular space with neat cement and perhaps using a packer between the 8-inch and 6-inch casing. A thin siltstone with embedded coarse sand grains (Prospect Hill Formation) at the base of the Mississippian rocks is another possible cause of sand-pumping trouble in this well.

If the town decides to drill a new well in the same general vicinity, the Mississippian-age limestones and dolomites between about 340 and 460 feet would seem to be the most promising source. I would advise setting casing from the surface to about 35 feet into the upper part of the bedrock and grouting the pipe in place for its full length. This will provide a good seal and protect the pipe from corrosion. I would further advise that the well extend no deeper than the base of the Maynes Creek Dolomite (lower Hampton Formation) to avoid the basal siltstone unit.

A thick sequence of Devonian-age shale representing the Maple Mill, Sheffield and Lime Creek Formations containing thin interbedded limestone is next below. For all practical purposes the shale will be dry. This interval is underlain by the Cedar Valley-Wapsipinicon limestone and dolomite. These deeper beds contain gypsum deposits that greatly increase the mineralization of the water. The top of the Cedar Valley is expected at a depth of about 775 feet at New Providence. I wouldn't recommend drilling below the Mississippian unless the yield from this aquifer is much less than needed. Acidizing the carbonate rocks may appreciably increase the original production.

On the whole, the prospects appear good that sufficient water for the New Providence municipal supply can be obtained from the Mississippian aquifer at about 460 feet. Developing the well with muriatic acid may help to increase the initial yield. A good construction would have casing set and grouted to about 35 feet into the top of the limestones.

I hope this is the information you wanted. If any questions remain or if I can be of additional assistance in this matter, please let me know.

Very truly yours,

Paul J. Horick
Chief of Groundwater Geology

PJH:cs

New Providence City Well
Hardin Co.
July 19, 1946

Loc: SW SE SW 3-8S-2O
Elev: 1121

Well completed & machine moved away.

Reported:
SWL: 175'
Prod: 50 g.p.m. w. 25' dd

100,000+ gal in 24 hrs. reported

SEJ

July 5, 1946

Mr. Charles D. Nolan
1003 - 20th Street SE
Cedar Rapids, Iowa

Dear Mr. Nolan:

We have received and examined the well cuttings to a depth of 485' from the well that you are drilling at New Providence. Mr. Turner was anxious to obtain some information on the well, and I am taking this means of getting it to you in the hope that you can forward it to him.

At a depth of 485' it is believed that the top of the Maple Mill shale has been reached. The section above that is fairly normal and is composed largely of dolomite with a lesser amount of limestone and some chert in the interval from 425' to 465'. The most porous zones appear at 310'-325', 330'-340', 375'-385', 400'-415', and 455'-460'.

Information that we have on the rock formations below the present depth of the hole is not too accurate for that area. The Maple Mill shale and possibly some other shale containing thin bands of limestone will continue for some distance and be underlain by the Cedar Valley limestone. It is possible that the Cedar Valley limestone will not be reached above a depth of 765', although I am hopeful that it will be above that depth.

The reason for the highly questionable character of the rocks is that New Providence is in an area where the rocks have been tilted and formed into at least one large arch and one depression. We have not yet completely defined the area involved.

I hope that this information will be helpful to you and that you will be able to get it to Mr. Turner.

If additional drilling is done I suggest that samples be sent to us at 50-foot intervals. I feel sure that after some additional drilling we will be able to give a much better forecast of what to expect in depth.

Very truly yours,

H. G. Hershey

HGH:BH

New Providence - July 2 1946 AGM

Mr. J.N. Warten.

Hit Rock at 312'

Bottom 485' - Put 2 ft shot
Going to test. - hope for 50 gpm
but well will probably yield 30.

W L 175' below top of
casing which is 2' above ground

Elev about same as at City Hall

March 5, 1946

Mr. Art Bruinekool
Pella,
Iowa

Dear Mr. Bruinekool:

A brief forecast of the geology and ground-water conditions at New Providence has now been prepared. The elevation at the town is roughly 1130 feet above sea level, and the depth figures given below are based on that figure.

The thickness of the drift in the vicinity of New Providence ranges from 200 to 250 feet. Some sands and gravels are known to be present, but it is questionable whether they will yield sufficient water for a town supply. The water supply from the shallower sands and gravels has been depleted and is likely to be affected during periods of drought.

Beneath the drift the Pennsylvanian shale varies considerably in thickness. In this area the top of the Mississippian limestones is low so that the shale is relatively thick. Some sandstone may overlie the Mississippian rocks, although none has been reported here. No water can be anticipated from the Pennsylvanian rocks unless the sandstone is present.

The Hampton dolomite should be encountered at a depth of about 350 feet. The rock is generally porous and a good water-producer as, for example, at Hubbard. In the New Providence area the Hampton is only about 60 feet thick. However, it seems probable that an adequate quantity of water can be produced to supply a town of this size. The quality of water should be similar to that at Hubbard.

We have record of a well at the White Institute two miles north of New Providence which did not yield an adequate supply of water from the thin dolomite above the Maple Mill shale. Should this condition exist at New Providence also, the next aquifer would be the Devonian limestones beneath the 300-foot thick Maple Mill formation. The Devonian limestones should yield water after they have been penetrated to a depth of 150 feet, or possibly even less. The quality of water from this horizon is also quite good and rather similar to that from the Hampton dolomite.

A generalized log of the anticipated geologic section follows:

	Thickness	From	To
Pleistocene system - glacial drift	200-250	0	200-250
Pennsylvanian system - shales	100-150	200-250	350
Mississippian system			
Hampton formation - cherty dolomite	60	350	410
Mississippian - Devonian systems			
"Maple Hill" formation - shale with limestone and dolomite breaks	300	410	710
Devonian system - limestone and dolomite		710	

If you have any questions concerning the above information or if we can be of further assistance we shall expect to hear from you.

Very truly yours,

H. G. Hershey

HGH:SEH:BH

2364

Name: New Providence town well (1946) pop 220 (1962)

Loc. SW SE SW 3-86N-20W, Hardin Co.

T.D. 485'

Drilled: C.D. Nolan July 1946 (NEW PUMP INSTALLED IN '60 + PUMPS 100 GAL IN 45 SEC. 1334 gpm)

Log: W-2364 Parker

Casing: CASED INTO ROCK (8" TO 314')

Prod. data: 100% POP ON CITY SYS

SWL 175' 6-21-62 76815600 READING FOR ENTIRE PERIOD 1946 on

PWL 200 25|50.0 (2.0) 68368900 -1-6-61

Yield 50 gpm 74131300 1-3-62 piezometric 946

pop = 206 (1960)

74131300
68368900
365 | 5762400 gpy | 15787 gpd

206 | 15787 | 76.6 gpd/per
1442
1367
1236
1310

OK OK

Need: Casing, analysis

Analysis: No. 2491 (3683) 4/21/62

Elevation 1121'

Formations	Depth	Top	Base	Thick
Burlington	310	811	786	25
Hampton	335	786	696	90
Maquoketa Ark.	425	696	656	40
Pros. Hill	465	656	641	15
Maple Mill	480	641		5

480
310
170

7½' New Providence Quad
421658N-0931007-01
86-20W-03 CDDB
Elev. 1121' CI=10'
1975 field located

W-2364

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

RECORD OF WELL

Location:

Town: New Providence (NE / SW): County Hardin

SW¼SE¼SW¼ sec. 3 T. 86 N., R. 20 W. Providence Twp.

Well name and number New Providence Town Well (1946)

Owner Town of New Providence Address

Tenant Address

Contractor C. D. Nolan Address

Drillers Turner

Drilling dates Started

Well data:

Elevations: Drilling curb ~~1027~~ tent. site feet; Land surface feet

1121 - SEH.

Determined by

Topographic position

Total depth: Reported feet, Measured feet

Drilling method

Hole and casing data

Original depth to water ft. above/below Date

Original elevation of water level ft.; Source of data

Sources of water: Principal ; Others

Production data: Date _____

Static depth to water 175 Measuring point _____
Pumping level 200 at 50 g.p.m.

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 _____

Laboratory data: Sample storage location _____

Sample range 0-485 No. spls. 97 No. dupls. & cond. 97 Poor
Spls. prepared by S.P. Washed range 310- by S.P.
Driller's log and cond. _____
Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
Microscopic study _____ strip log _____
Gen. log _____ Correl. by MCP