Punched FCH

WRD Exp. (GW)
Aug. 1964

Verified PMJ

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by P.J. Horick Source of data Files Date 5/26/65 Map H. & T.

State Iowa 16 County (or town) Emmet 37

Latitude: 43 24 N Longitude: 094 50 20 Sequential number: 2

Lat-long accuracy: 7 T 99 N S, R 34 E W, Sec 10, SW ¼, NE ¼, SE ¼ 5 PM B & M

Local well number: 099/34W/10d C Other number: W-2930

Local use: 029 47 CITY Owner or name: ESTHERVILLE

Owner or name: STHERVILL Address: Estherville, Iowa

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist M

Use of water: (A) Air cond, (C) Comm, (D) Dewatering, (F) Fire, (H) Dom, (I) Irr, (N) Ind, (P) P S, (S) Stock, (T) Instit, (U) Unused U

Use of well: (A) Anode, (D) Drain, (G) Seismic, (O) Obs, (P) Oil-gas, (R) Recharge, (S) Spring, (T) Test, (U) Unused, (W) Withdraw, (Z) Waste, Destroyed Z

DATA AVAILABLE: Well data: 1 Freq. W/L meas.: INVENTORY Field aquifer char.

Hyd. lab. data:

Qual. water data; type: COMPLETE C

Freq. sampling: ORIGINAL Pumpage inventory: yes no, period:

Aperture cards: yes

Log data: GEOLOGIST L.L.

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 410 ft 410 Meas. repl 6

Depth cased; (first perf.) 350 ft 350 Casing type: STEEL; Diam. 20 in accuracy 20

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., screen, sd. pt., (S) shored, (T) open hole, (W) other, (Z) other G

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other

Date Drilled: JULY 1947 9 47 Pump intake setting: ft

Driller: Thorpe Well Co. (name), Des Moines, Iowa (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple, (cent.) (M) multiple, (turb.) (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other Deep Shallow

Power (type): diesel, elec, gas, gasoline, hand, gas, wind; nat H.P. LPG Trans. or meter no.

Descrip. MP LSD ft above below lsd, Alt. MP 1282

Alt. LSD: 1282 1282 Accuracy: (source) ALTIMETER 7

Water Level 100 ft above below MP; Ft above below lsd 1010 Accuracy: DRILLER'S LOG 3

Date meas: JULY 1947 7 47 Yield: 1115 gpm 5 Method determined

Drawdown: 60 ft 10 Accuracy: 6 Pumping period hrs

QUALITY OF WATER DATA: Iron 1.5 ppm 5 Sulfate 496 ppm 7 Chloride 1.0 ppm 0 Hard. 709 ppm 8

Sp. Conduct 1430 K x 10⁶ 5 Temp. °F Date sampled 3 4 15

Taste, color, etc.

099-34W-10dac

Well Number 43.24.16 (N) 094.50.20.2
d m s (S) d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (1-19) Physiographic Province: CENTRAL LOWLAND [12] (20-21) Section: WESTERN

LAKE [B] (22) Drainage Basin: DES MOINES [258] (23-25) Subbasin: [ ] (26)

Topo of well site: (D) (F) (H) (S) (T) (V) [ ] (27)

MAJOR AQUIFER: Cretaceous, system; LOWER, series; [K1] (28-29); Dakota Sandstone, aquifer, formation, group; [D1] (30-31)

Lithology: COARSE SANDSTONE [4V] (32-33) Origin: MARINE [C] (34) Aquifer Thickness: 127 ft

[27] (35-37) Length of well open to: 57 ft [57] (38-40) Depth to top of: 280 ft [280] (41-43)

MINOR AQUIFER: [ ] (44-45) system, series; [ ] (46-47) aquifer, formation, group

Lithology: [ ] (48-49) Origin: [ ] (50) Aquifer Thickness: ft

[ ] (51-53) Length of well open to: ft [ ] (54-56) Depth to top of: ft [ ] (57-59)

Intervals Screened: 350-395

Depth to consolidated rock: 165 ft [165] (60-63) Source of data: WELL-CUTTINGS [C] (64)

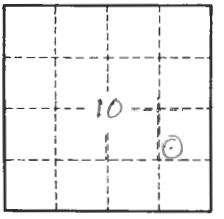
Depth to basement: ft [ ] (65-68) Source of data: [ ] (69)

Surficial material: SANDY TIL [81] (70-71) Infiltration characteristics: POOR [4] (72)

Coefficient Trans: gpd/ft [ ] (73-75) Coefficient Storage: [ ] (76-78)

Coefficient Perm: gpd/ft²; Spec cap: 18.5 gpm/ft; Number of geologic cards: [ ] (79)

Casing: 310' 2" of 20" pipe from +2' to 308' and 45' of 12" Everdur screen attached to 350' of 12" pipe and set at 395'. Pea gravel around screen.



Note: In 1953 in attempting to pull the screen for cleaning, the sand caved and the screen tilted and the well was abandoned. A new well put down nearby was also called well No. 5 by the city, but the Iowa Geol. Survey called the new well No. 6. Thereafter, the city wells are one number behind the Iowa Geol. Survey numbers for these wells. Their No. 6 is our No. 7, etc.

GSO-84-0205

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM 416905

MOORE'S MODERN METHODS

Estherville, Iowa July 22, 1947

Estherville City Well No. 3
DW - 111.65' below T.C. at 2:00 P.M. July 22, 1947
T.C. is .65' above floor - well has been down 4 days.

Use about 2,000,000 gallons per day

Estherville City Well No. 5 well.
Thorpe Well Co. - Gravel Packed type
July 1946 - July 1947
310' 2" feet of 20 from +2' to 308'6"
45' of 12" Everdur screen 395' - 345' attached to 350'
of 12" pipe
[4 side holes 10" in diameter
290'-290'-290'-317' 3/8 x 1 1/4 gr.]

Drillers log

2	topsoil	0-2
10	sand + gravel	2-12
8	Blue clay	12-20
45	Gray clay	20-65
5	yel clay	65-70
10	gray clay	70-80
5	yel clay	80-85
5	gray clay	85-90
5	blue clay	90-95
5	Blue gray shy	95-100
20	Gray clay	100-120
10	sand	120-130
4	blk shale	130-134
6	Sand	134-140
10	Gray clay	140-150
15	Sand	150-165
10	blk shale	165-175
10	Brn shale	175-185
5	Blk shale	185-190
12	Gray shale	190-202
2	limestone	202-204
41	gy. shale	204-245

SWL 100'
PWL 160' at 1115 gpm
" 150' " 950 gpm

5	gr. sh sandy	245-250
20	gr sh	250-270
5	lm	270-275
5	gr shale	275-280
45	Sandstone	280-325
5	ss (shale streaks)	325-330
70	ss	330-400
7	ss (shale streaks)	400-407
3	Green shale	407-410

Samples obtained

Estherville EMMET Co.

July 25, 1947

W.E. Hoke

Well No. 5 Estherville

7½' below BM at C R I & P sta. - Land surface at Well 1289.5 − 7.5 = 1282.0'

By hand level

Well No. 3

W L 8:30 am July 25 - 111.56'

T D 394.5'

We have samples on this well.

099-34W-10DAC
KDD

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Estherville city No. 5
W-2930

Water Quality
(ppm)

Card Q

State: Iowa (1 2: 16) County: Emmet (3 4: 32) Town: Estherville

Well No. (5–11: 43246N) Latitude Longitude (12–18: 0945020) Seq. No. (19: 2) Date M D Y (20–25: 081948)

Sampling Depth (26–29: 410) Type (30: 1) Kx10^6 (31–35: 1430) pH (36–38: 7.3) Temp. °F (39–41:)

SiO_2 (42–44:) Ca (45–49: 180.) Mg (50–53: 62.) Na (54–58: 81.) K (59–61: .C)

HCO_3 (62–65: 449) CO_3 (66 67: 0) SO_4 (68–72: 496.) Cl (73–78: 10.) Source No. (79–80: 3 Q)

Card R

Duplicate Columns 1-25 from Card Q

F (26–28: .2) NO_3 (29–32: .0) PO_4 (33–35:) B (36–38:) Al (39–41:) Fe (42–45: 1.5)

Mn (46–49: .30) Cu (50–52:) Pb (53 54:) Zn (55–57:)

Solids Determined (58–63: 1200) Calc. (64–69:) Ca,Mg Hardness (70–73: 709) Non-Carb. (74–77: 341)

Color (78 79:) No. (80: R)

Card S

Duplicate Columns 1-25 from Card Q

Br (26–28:) I (29–31:) Alk. as $CaCO_3$ (32–35: 368) Free CO_2 (36–38:) SAR (39–41:)

RSC (42–44:) ABS (45–47:) (48–50:) (51–54:)

Alpha (pc/l) (55–57:) Beta (pc/l) (58–60:) Ra (pc/l) (61–63:) U (ug/l) (64–66:)

Verified PMJ

No. (80: S)

Recorded by: R.J. Horick

Punched by: Punched FCH Date:

Published:

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa

Well Log Record — well 5

Well name and number Estherville City Town Estherville County Emmett

Owner of well _____ Address _____

Tenant _____ Address _____

Location _____ sec. ____, T. ____ N., R. ____ E. W. _____ Twp.

Curb elevation _____ ft. Present depth _____ ft. final depth 410 ft.

Static level: (Depth to water above below curb) 100' ft. Pumping level 154 ft. at 1115 g.m.

Contractor Thorpe Date drilled compld June 47

Description*	FEET Thick	From	To	Description*	FEET Thick	From	To
Top soil	2	0	2	Gray clay	20	100	120
Gravel	10	2	12	sand	10	120	130
Blue clay	8	12	20	Blue clay	4	130	134
Gray clay	45	20	65	sand	6	134	140
yellow clay	5	65	70	Gray clay	10	140	150
Gray clay	10	70	80	sand	15	150	165
yellow clay	5	80	85	Black shale	10	165	175
Gray clay	5	85	90	Brown shale	10	175	185
Blue clay	5	90	95	Black shale	5	185	190
Blue clay, sandy	5	95	100	Gray shale	12	190	202

*Abbreviate descriptions: use one line for each formation

Remarks on water zones and casings 45' of 12" Screen with 5' of 10" pipe on top. 1/8 slot Bottom of screen 395' 310'2" of 20" pipe. 350' of 12" pipe. 317'2" of 10" pipe (west side hole) 290'2" of 10" pipe (North side hole) 290'2" of 10" pipe (East Side hole) 290'8" of 10" Pipe (South side hole)

Temperature: Air _____ °F., Water _____ °F. at A.M. P.M. _____ 19__

Record obtained from Larry madden City Engr Recorded by _____

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa

Well Log Record

Well name and number _____ Town _____ County _____

Owner of well _____ Address _____

Tenant _____ Address _____

Location _____ sec. ____, T. ____ N., R. ____ E. W. _____ Twp.

Curb elevation _____ ft. Present depth _____ ft. final depth _____ ft.

Static level: (Depth to water above below curb) _____ ft. Pumping level ____ ft. at ____ g.m.

Contractor _____ Date drilled _____

Description*	FEET			Description*	FEET		
	Thick	From	To		Thick	From	To
Limestone	2	202	204	Green shale	3	407	410
grey shale	41	204	245				
grey shale, sandy	5	245	250				
Gray shale	20	250	270				
Limestone	5	270	275				
grey shale	5	275	280				
Sandstone, hard	10	280	290				
Sandstone, lime streks	15	290	305				
Sand stone	95	305	400				
Sand stone shale streaks	7	400	407				

*Abbreviate descriptions: use one line for each formation

Remarks on water zones and casings _____

Temperature: Air _____ °F., Water _____ °F. at A.M. P.M. _____ 19__

Record obtained from Lanny Madden City Engr Recorded by _____

W-2930

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

RECORD OF WELL

Location:

Town: Estherville (N E / S W): County Emmet

SW/c NE¼SE¼ sec. 10 T 99 N., R. 34 W. Estherville Twp.

Well name and number Estherville City well #5

Owner City of Estherville Address

Tenant Address

Contractor Thorpe Well Co. Address Des Moines, Iowa

Drillers

Drilling dates July 1946 - July 1947

Well data:

Elevations: Drilling curb 1282.0 feet; Land surface 1282.0 feet

1282.371' City Engr. 1954.

Hand level from BM near R.R. station of CRI&P at Estherville El. 1289.5'

Determined by W.E.H.

Topographic position Valley slope

Total depth: Reported Well 395' Pilot hole 410' feet, Measured feet

Drilling method Cable tool

Hole and casing data 310' 2" of 20" pipe from +2' to 208'6", 45' of 12" Everdur screen attached to 350 feet of 12" pipe and set at 395'. 4 side holes for gravel packing cased to 290, 290, 290, 217 feet. 3/8 to 1/4 inch gravel used in packing around well screen.

Original depth to water 100' ft. ~~above~~ below Date

Original elevation of water level ft.; Source of data

Sources of water: Principal ; Others

Production data: Date July 1947

Static depth to water 100 Measuring point

Pumping level 150 at 250 g.p.m. pumping sand sand

160 1115 pumping " "

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 0-410 No. spls. 77 No. dupls. & cond. 77 Faint to good

Spls. prepared by PEH Washed range 120-410 by PEH

Driller's log and cond.

Insoluble residues: Prepared by Studied by Strip log

Microscopic study strip log

Gen. log Correl. by WE/H