

COUNTY WYANDOTTE

LOCATION 11-24E-27BAC

DATE 5-11-64

PERFORMED BY LAYNE-WESTERN FOR INLAND-UNDERGROUND FACILITIES

DISCHARGE VARIABLE 350, 503, 754 gpm

LENGTH OF TEST 240 min recovery for 5 min

OF OBSERVATION WELLS none

DISTANCE(S) TO PUMPING WELL (well # 4) .5'

WATER LEVEL = 40' 3"

AQUIFER TYPE ALLUVIAL (KANSAS River)

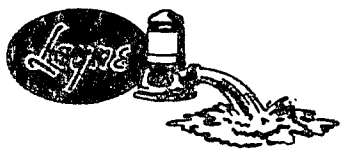
DEPTH OF TEST WELL 67.5'

SCREEN 20' at bottom of well

COMMENTS The storage value is very low; but the transmissivity value is okay.

COMPUTER ANALYSIS

METHOD	T (gpd/ft)	S	RMS error	r
TRANS. VQ	336,950	2.175×10^{-12}	.16	.5'



WELL INFORMATION

Layne-Western Company

1. CONTRACT INLAND
UNDERGROUND FACILITIES
2. City, State KANSAS CITY,
KANS.
3. Well No. 4 at Test Hole No. 1-64
4. Well Location (attach map) 200' N. OF
WELL #3 . APPROX. 1000'
N. & W. OF MAIN OFFICE
5. Driller R. L. SANDS BUR
6. DATE 5-11-64
7. Date Started 5-4-64
Completed 5-11-64
8. Drill Crew Man Hrs. 192
9. Working Days
Drilling 1
Other 5

10. MATERIAL IN WELL				WALL THICK- NESS IN.	MATERIAL	TYPE	NO.
	LENGTH FT. IN.	DIA. IN.	GAGE NO.				
Screen	<u>20 0</u>	<u>12</u>	<u>#7</u>	<u>—</u>	<u>STAINLESS STEEL</u>	<u>SHUTTER</u> Shutter Keystone	<u>5</u> Openings
Inner Casing	<u>47 6</u>	<u>12</u>	<u>—</u>	<u>3/8</u>	<u>STEEL</u>	<u>SCREWED</u> Welded Screwed	
Outer Casing	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>Welded</u> Screwed	

11. GRAVEL

Size 1/8 X 1/4 FINE

Tons 17.5

12. SEALING CASING

Puddled Clay (Yes) (No)

With Bags Bentonite Added
or

With Bags Cement

Seal Material Placed in
Well With

Bottom of Well Screen
Sealed With STEEL PLATE

13. WELL DIMENSIONS

A. Total Depth 67' 6"
(From Top of Inner Casing to Bottom of
Well)

B. Height of Inner Casing 2' 6"
(Above Ground Level)

C. Distance to Top of Gravel 10'
(From Ground Level)

D. Diameter of Drill Hole 34"

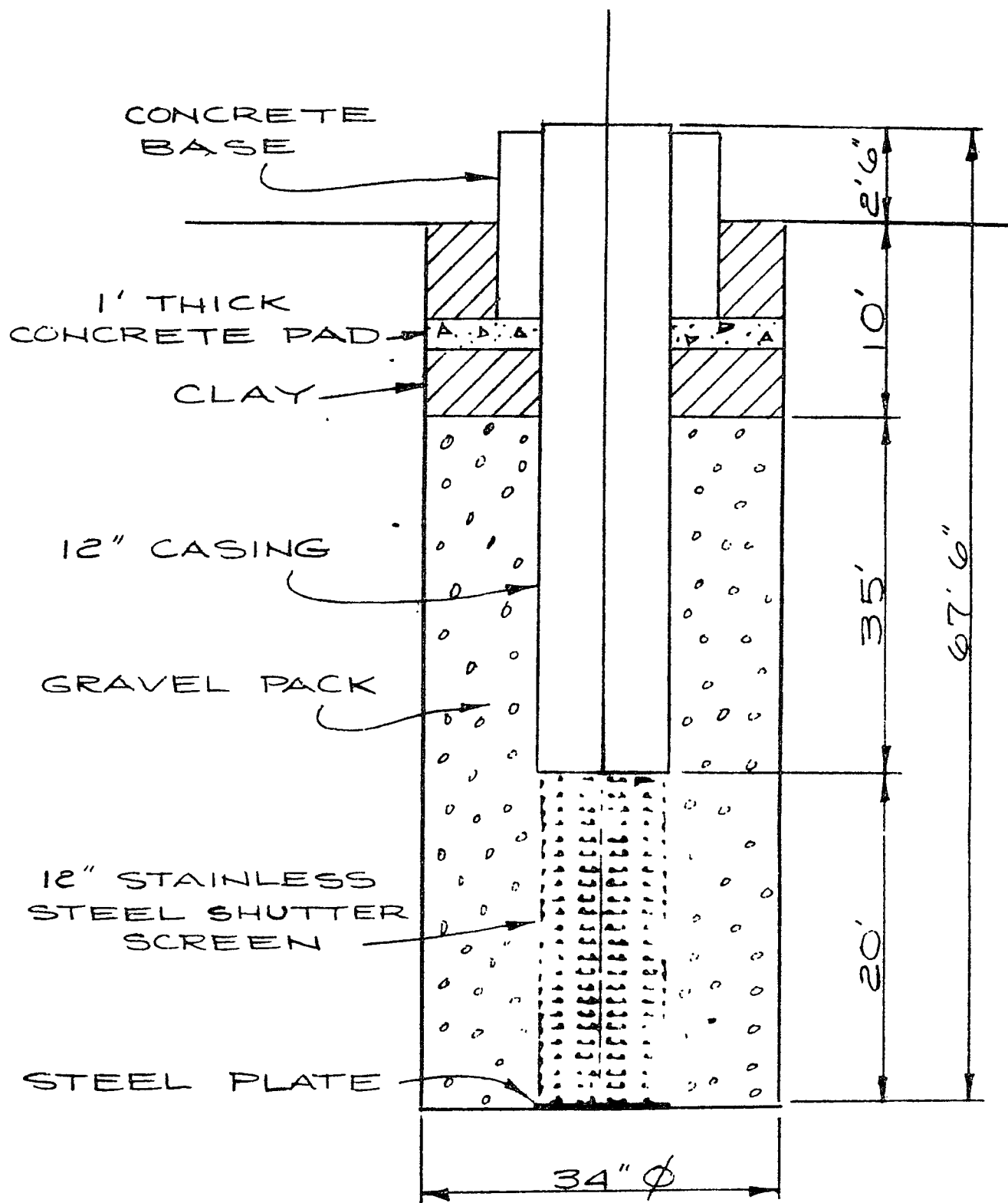
Comments

11-24E-27bac

44

Ft.		In.		to		Ft.		In.		Formation	
0	0			5	0	FILL, ROCK, SHALE, DIRT					
5	0			20	0	BROWN SANDY CLAY					
20	0			25	0	BROWN FINE SAND					
25	0			40	0	BROWN MED. TO FINE SAND					
40	0			45	0	GRAY MED. TO COARSE SAND					
45	0			50	0	GRAY MED. TO COARSE SAND, SOME VERY COARSE, FEW BOULDERS					
50	0			55	0	GRAY MED. TO COARSE SAND, BOULDERS					
55	0			65	0	GRAY MED. TO COARSE SAND & GRAVEL, BOULDERS					
				65	0	TOTAL DEPTH					

CONSTRUCTION OF WELL



PUMPING TEST

A. Test pump
Permanent pump
Length of column 40 Ft.
Length of Bowl 5 Ft.
Length of suction 10 Ft.

$r = .5$

B. Measured water level 40' 3" ft. from top of 12 In.

dia. casing which is 4 Ft. above ground.

ORIFICE

5 x 6

C. Length of airline Ft. from top of casing.

x

TIME	INCHES ORIFICE MANOMETER	GPM	ALT. GAGE READING	WATER LEVEL	DRAW DOWN
4:30		0		40' 3"	0
4:31	1	350	46.791	43' 4 1/2"	3' 1 1/2" 3.12
5:30	60	350		44' 1/2"	3' 9 1/2" 3.79
5:31	61	503	67.246	45' 1/2"	4' 9 1/2" 4.79
6:30	126	503		45' 7"	5' 4" 5.34
6:31	121	754	100.802	47' 6 1/2"	7' 3 1/2" 7.29
7:30	240	754		48' 0"	7' 9" 7.75
RECOVERY					
7:31		0		41' 4 1/2"	1' 1 1/2"
7:35		0		40' 11"	8"

15. Permanent Pump No. installed by

Leyas

Permanent air line length Ft. Date

Month

Day

Year

COUNTY

WYANDOTTE

LOCATION

11-24E-27BAC

DATE

January 20, 1965

PERFORMED BY LAYNE-WESTERN FOR INLAND UNDERGROUND STORAGE

DISCHARGE VARIABLE 200, 351, 500 gpm

LENGTH OF TEST 240 min, - Recovery for 15 min

OF OBSERVATION WELLS none

DISTANCE(S) TO PUMPING WELL (well #3) .5'

WATER LEVEL - 43'

AQUIFER TYPE ALLUVIAL - (KANSAS RIVER)

DEPTH OF TEST WELL .64'

SCREEN 20' of screen at bottom of well

COMMENTS: Note ^{the} low storage value. The transmissivity value is good for this aquifer.

COMPUTER ANALYSIS

METHOD	T (gpd/ft)	S	RMS error	r
Theis, VQ	361,819	259,710 ⁷⁰	.15	.5'



WELL INFORMATION

Layne-Western Company

#1 is west well.

1. CONTRACT INLAND UNDERGROUND
STORAGE2. City, State. KANSAS CITY, KANSAS3. Well No. 3 at Test Hole No. 1-644. Well Location (attach map) 1000 FT APPROX
WEST OF OFFICE IN LINE
WITH REST OF THE WELLS5. Driller RL SANSBURY6. DATE JAN 20, 19657. Date Started JAN 12, 1965Completed JAN 19, 19658. Drill Crew Man Hrs. 159

9. Working Days

Drilling ONEOther FOUR

10. MATERIAL IN WELL

	LENGTH FT. IN.	DIA. IN.	GAGE NO.	WALL THICK- NESS IN.	MATERIAL	TYPE	NO.
Screen	<u>20'</u>	<u>12"</u>	<u>#7</u>	<u>---</u>	<u>STAINLESS STEEL</u>	<u>SHUTTER</u>	<u>5</u> Openings
						<u>Shutter Keyhole</u>	
Inner Casing	<u>47 6"</u>	<u>12"</u>	<u>---</u>	<u>3/8'</u>	<u>STEEL</u>	<u>SCREWED</u>	
						<u>Welded Screwed</u>	
Outer Casing	<u>NONE</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	
						<u>Welded Screwed</u>	

11. GRAVEL

Size 8 X 4 FINETons 23

12. SEALING CASING

Puddled Clay (Yes) (No)

With --- Bags Bentonite Added

or

With --- Bags CementSeal Material Placed in
Well With ---Bottom of Well Screen
Sealed With STEEL PLATE

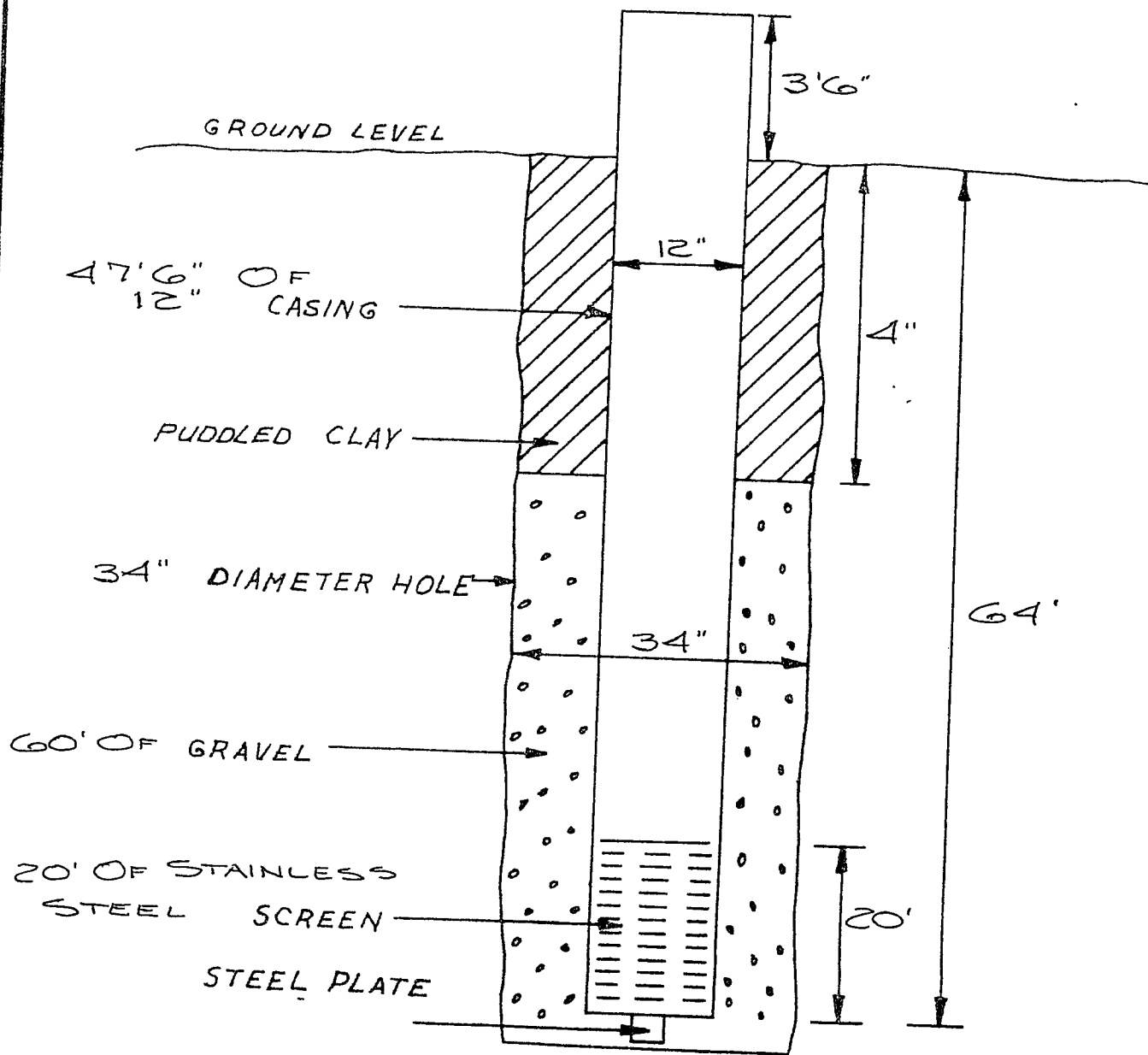
13. WELL DIMENSIONS

A. Total Depth 67' 6"
(From Top of Inner Casing to Bottom of
Well)B. Height of Inner Casing 3' 6"
(Above Ground Level)C. Distance to Top of Gravel 4'
(From Ground Level)D. Diameter of Drill Hole 34"Comments ---

LOG OF WELL

11-24E-276a c 3

[illegible]



JAN 1965

WELL NO. 3
INLAND UNDERGROUND
STORAGE

Layne-Western Company

1010 W. 39TH STREET

KANSAS CITY, MISSOURI

2. PUMPING TEST

A.

Test pump

TEST pump 6 in. 8 Bowl 5 Stages

Length of column 50 Ft.

Length of Bowl 5 Ft.

Length of suctionFt.

B. Measured water level 43' Ft. from top of 12" In.

dia. casing which ^{WAS} 4 Ft. above ground.

ORIFICE

4 x 6

C. Length of airlineFt. from top of casing.

.....x.....

TIME	INCHES ORIFICE MANOMETER	GPM	ALT. GAGE READING	WATER LEVEL	DRAW DOWN
4:00	0	0		43' 0"	0
4:01 1	9.5	200	= 26.738	45' 4 1/2"	2' 4 1/2"
5:00 60	9.5	200		45' 8 3/4"	2' 8 3/4"
5:01 61	31	351	= 45.925	47' 2"	4' 2"
6:00 120	31	351		47' 3 3/4"	4' 3 3/4"
6:01 121	63	500	= 66.845	48' 10 1/4"	5' 10 1/4"
7:00 240	63	500		49' 1/4"	6' 1/4"
7:01 241	RECOVERY			44' 6 1/2"	1' 6 1/2"
7:02				44' 4"	1' 4"
7:03				44' 2 3/4"	1' 2 3/4"
7:04				44' 2"	1' 2"
7:05				44' 1 1/2"	1' 1 1/2"
7:10				44' 0"	1' 0"
7:15				43' 11"	11"

15. Permanent Pump No. installed by

Layne

Permanent air line lengthFt. Date.....

Month

Day

Year

COUNTY

WYANDOTTE

LOCATION

11-24E-29 CDC

DATE

12/9/59 - 12/14/59

COUNTY

PERFORMED BY

LAYNE-WESTERN

FOR JOHNSON^{COUNTY} RWD #1

DISCHARGE 607 gpm

LENGTH OF TEST 72 hours

OF OBSERVATION WELLS 7

DISTANCE(S) TO PUMPING WELL 50', 150', 300', 445', 395',

WATER LEVEL = 20' ?, 300', 500'

AQUIFER TYPE ALLUVIAL (KANSAS RIVER)

DEPTH OF TEST WELL ~ 65' ?

SCREEN - ?, probably in about 10-20 feet of medium to coarse sand and gravel

COMMENTS: DATA points were taken from a hydrograph containing original data from 7 observation wells. Sample test hole logs are given for this area. A more detailed analysis was done by W.G. Keck. Note ^{the} difference in S values for the 50', 150', 300' observation wells. Storage values cannot be found from such flat curves.

COMPUTER ANALYSIS

METHOD	T (gpd/ft)	S	RMS error	r
Theim	142,503	.145	.61	70 lbs wells @ 20 times 3 - 4100 min
Theis	329,042	.00045	.21	50' 1-4220 min
Theis	192,735	.0737	.11	150' 1-4220 min
Theis	262,838	.0922	.09	300' 1-4220 min

A B S T R A C T

Aquifer Test No 2 at Site No 2 has been conducted for Johnson County Water District #1, Morris, Kansas. The test involved pumpage of 607 GPM uniformly, for 72 hours. Observation of changes in water level were made in 7 gauge holes distributed about the pumped well.

Analysis of the data so obtained gives the following aquifer coefficients:

Transmissibility	"T" = 139,000 G/da/hor ft
Storage Coef.	"S" = 0.20 cu ft/sq ft/ft

The geometry of the aquifer, as revealed by test drilling and from topographic maps of the area give:

Water-saturated thickness	"m" = 32 ft
Distance to impervious boundary	3000 ft
Probable distance to boundary of recharge	1500 ft.

Using the above data a computation for yield shows that for wells spaced 500 ft apart, parallel to the River, a yield of 420 GPM/well can theoretically be obtained by drawing the pumping level down to the top of 10 ft screens. If the wells are spaced 1000 ft apart, the yield could become 670 GPM/well.

A computation has been made to show that well losses in the pumped well amounted to about 0.2 ft at the rate of 607 GPM. In recognition of the fact that not all wells may be so well developed and that well losses will increase with use of the wells, it is recommended that a figure of 350 GPM/well be used in estimating total yield from this portion of the proposed well strip.

It is further recommended that a special test, involving extended pumpage of one or more of the existing wells on the south side of the River, be made. This would not be a detailed aquifer test but would call for daily or twice daily measurement of water levels on the north side of the River. The objective is to see whether the cone of depression can cross underneath the River.

	r=50'	r=150'	r=445'	r=300'	r=395'	r=300'	r=500'
	GH#1	GH#2	GH#3	GH#4	GH#5	GH#6	GH#
1	1.3	.2	.0	.01	.01	.12	.0
3	1.35	.25	.0	.03	.03	.15	.0
10	1.4	.27	.0	.05	.05	.15	.01
20	1.4	.3	.0	.07	.05	.16	.03
60	1.47	.37	.0	.09	.05	.16	.05
120	1.55	.45	.02	.1	.06	.2	.05
360	1.8	.75	.07	.21	.14	.25	.1
480	1.9	.85	.1	.26	.18	.3	.12
600	1.96	.9	.14	.33	.24	.35	.13
720	2.05	.95	.15	.36	.26	.37	.14
960	2.16	1.07	.2	.44	.3	.44	.17
1200	2.24	1.15	.24	.51	.33	.51	.19
1440	2.3	1.25	.28	.56	.42	.57	.23
1800	2.45	1.32	.33	.65	.49	.62	.27
2040	2.52	1.4	.42	.71	.51	.67	.34
2280	2.57	1.45	.44	.75	.56	.7	.36
2880	2.7	1.55	.51	.84	.66	.82	.46
3500	2.82	1.7	.58	1.0	.77	.95	.55
3980	2.9	1.77	.65	1.0	.82	1.02	.59
4100	2.9	1.77	.68	1.03	.84	1.04	.6

20

$$Q = 81.15 \text{ ft}^3/\text{min}$$

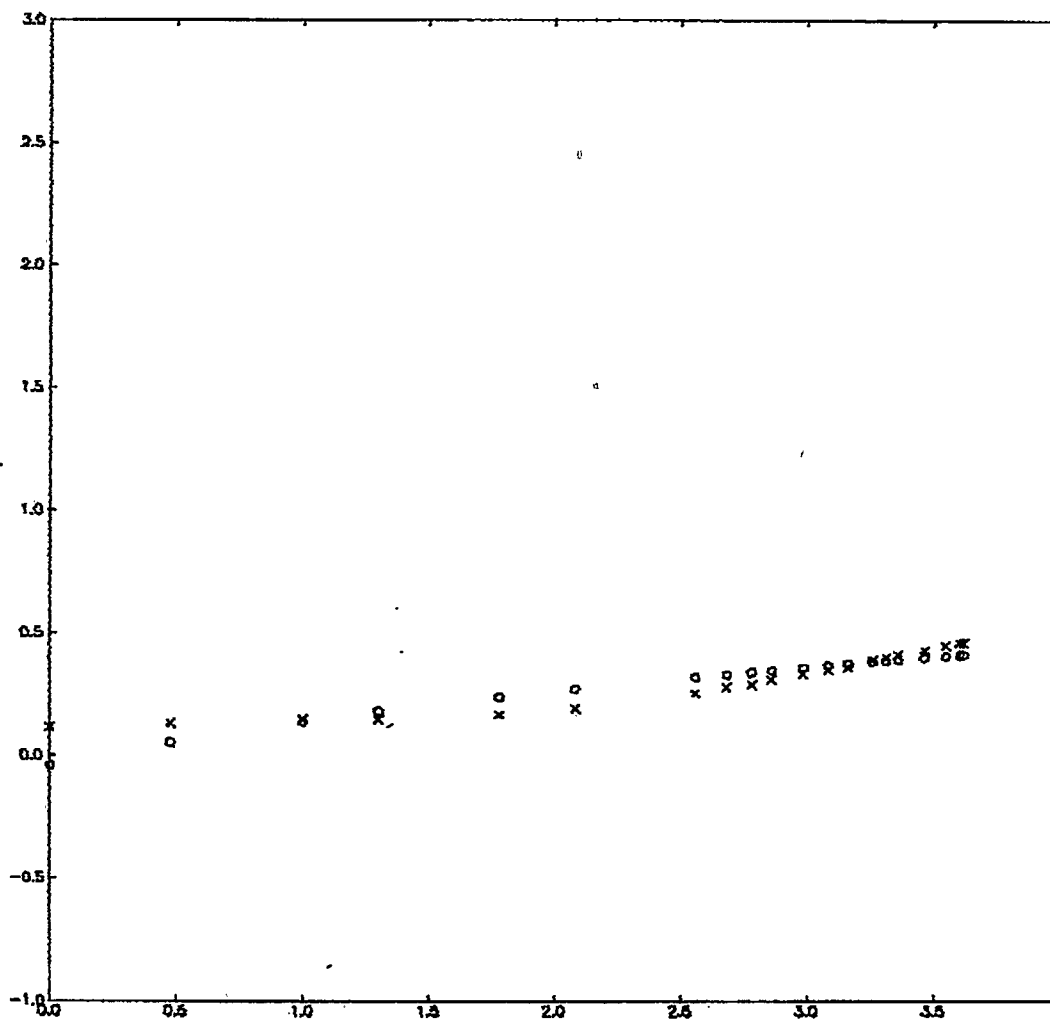
distance - drawdown

11-24E - 29CDC

DATE 05/21/85 TIME 13:12:21 PLOT# 1 PATH= :SI1:PLOT:UK:LOGPLOT.KAW.PLOT

LOGPLOT.KAW
PLOT NO. 1

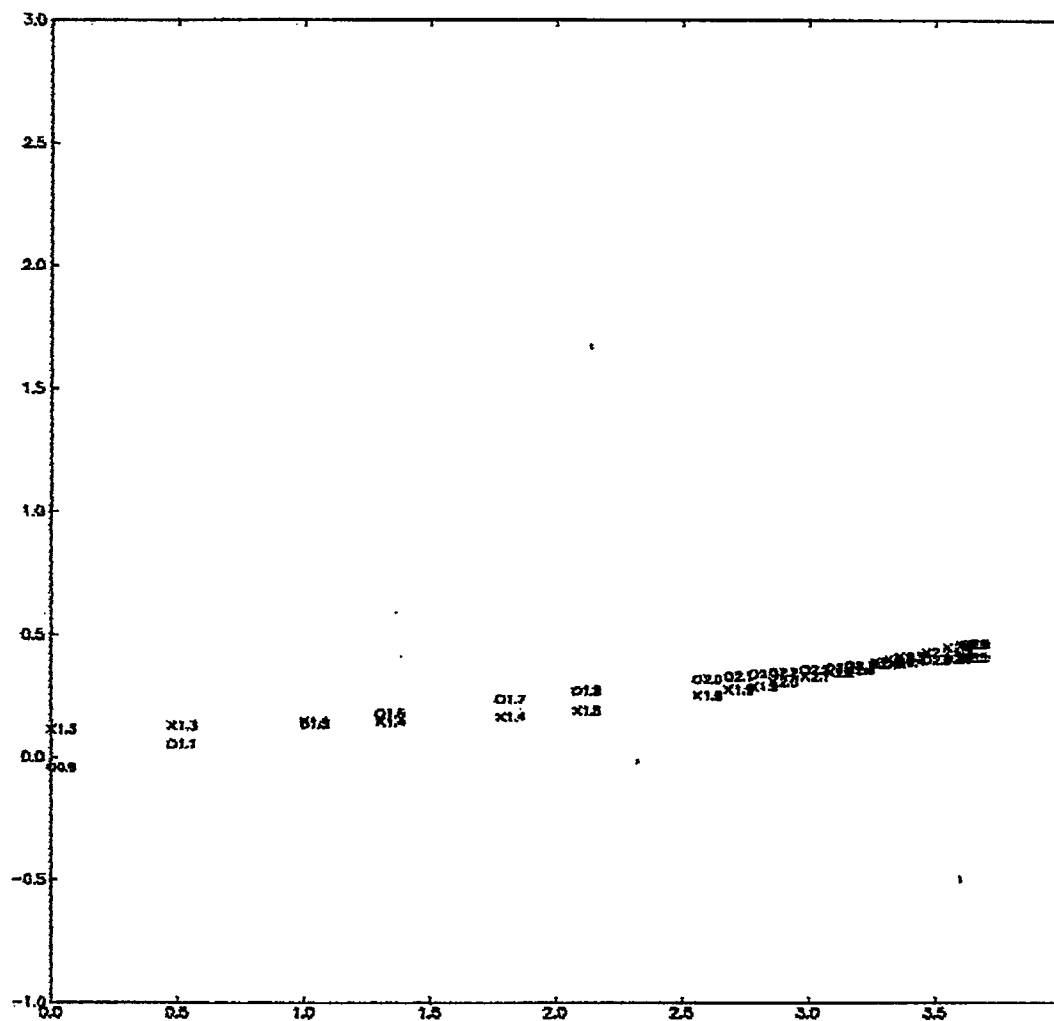
DATE 05/21/85 TIME 11:11:54



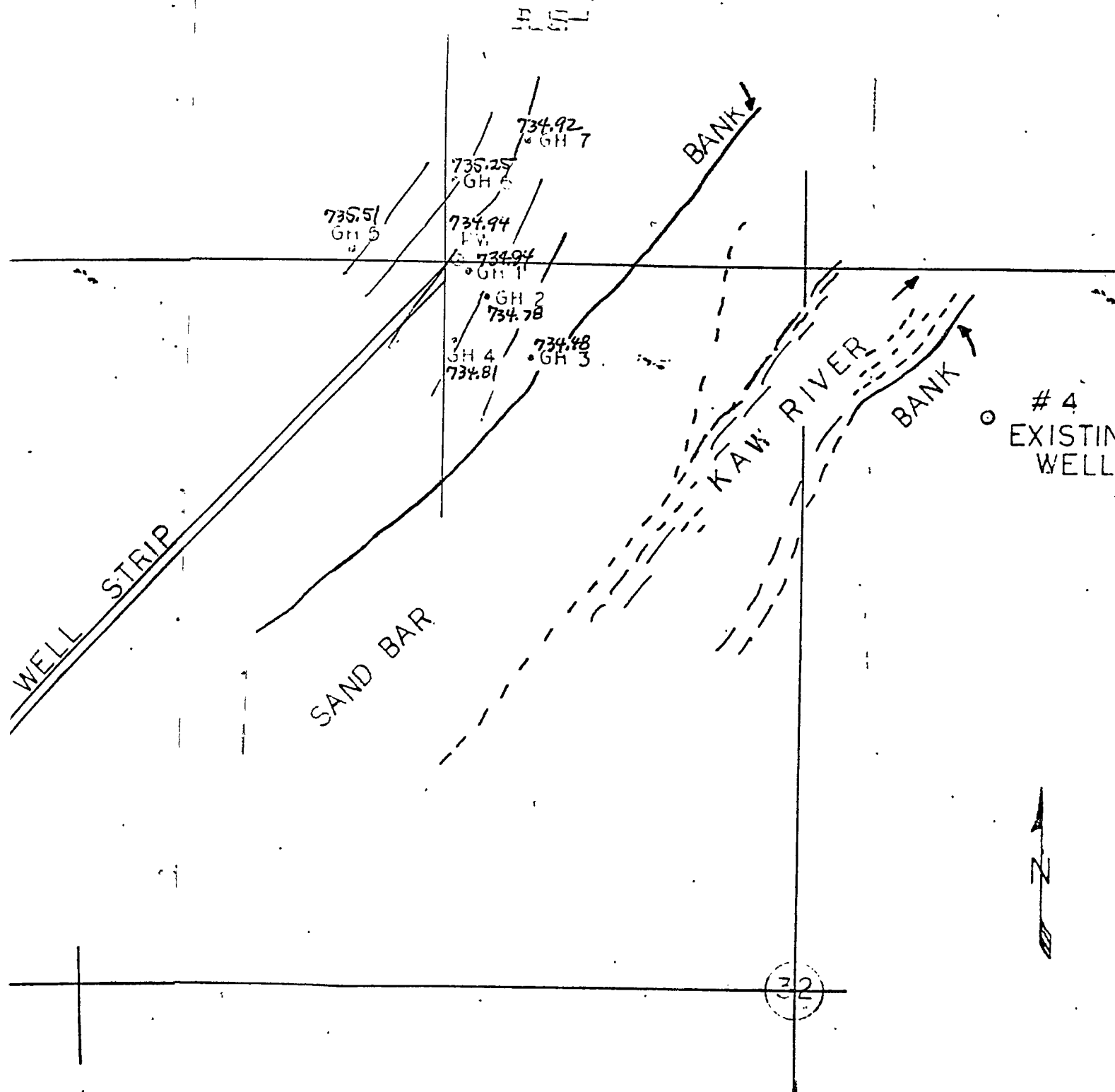
KAW, CL1
(50°)

DATE 05/21/85 TIME 13:13:13 PLOT# 1 PATH= 1511:PLOT:WK:LABEL.KAW.PLOT

* LABEL KAW
 PLOT NO. 1
 DATE 05/21/85
 TIME 11:11:12



KAW. CL1
(50')



11-24E-28b db

HOLE NO. 5

S.W.L. 27'6"

ELEV. 764.0

0'	-	5'	Clayey Fine Sand
5'	-	10'	Clay and Fine Sand
10'	-	13'	Sandy Brown Clay
13'	-	20'	Fine Sand
20'	-	30'	Medium Fine Brown Sand, some Coarse
30'	-	33'	Medium Blue Sand
35'	-	46'	Medium Blue Coarse Sand and Gravel
46'	-	50'	Medium Blue Coarse Sand and Gravel (few boulders)
50'	-	66'	Medium Brown Coarse Sand, Gravel, Boulders
66'	-	66'6"	Limestone and Brown Shale

11-24E-28adc

HOLE NO. 6

S.W.L. 20

ELEV. 759.3

0'	-	2'	Black Top Soil
2'	-	7'	Sandy Brown Clay
7'	-	15'	Silt
15'	-	18'	Fine Sand (clay streaks)
18'	-	23'	Medium Fine Sand (some coarse)
23'	-	28'	Fine Sand (some medium)
28'	-	35'	Medium Fine Sand
35'	-	43'	Medium Fine & Coarse Sand
43'	-	51'	Medium Coarse Sand and Gravel
51'	-	66'	Medium Coarse Sand and Gravel (boulders)
66'	-	68'	Blue Shale

11-24E-28acg

HOLE NO. 7

S.W.L. 24'3"

ELEV. 762.7

0'	-	18'	Silt and Clay
18'	-	25'	Fine Sand (clay streaks)
25'	-	28'	Medium Fine Sand (clean)
28'	-	35'	Medium Coarse Sand (clean)
35'	-	40'	Medium Coarse Sand and Gravel (clean)
40'	-	43'	Medium Coarse Sand and Gravel (some clay)
43'	-	46'	Medium Coarse Sand and Gravel (clean)
46'	-	55'	Medium Coarse Sand and Gravel (boulders)
55'	-	56'	Blue Clay
56'	-	59'6"	Medium Coarse Sand and Gravel (boulders)
59'6"	-	59'10"	Limestone

Well

GH#1

 $r=50'$ $q = 607 \text{ gpm} =$ $81.15 \text{ ft}^3/\text{min}$ $r=150'$ $r=300'$

Time

DD

GH#2

GH#6

1 1.3

Time

DD

Time

DD

2 1.35 -

1

.2

1

.12

10 1.4 -

3

.25

3

.15

20 1.4 -

10

.27

20

.16

60 1.47 -

20

.3

60

.16

120 1.55 -

40

.35

120

.2

240 1.7 -

60

.37

240

.22

360 1.8 -

120

.45

360

.25

480 1.9 -

240

.65

480

.3

600 1.96 -

360

.75

600

.35

720 2.05 -

480

.85

720

.37

840 2.1 -

600

.9

840

.42

1080 2.22 -

720

.95

1140

.5

1320 2.3 -

840

1.05

1320

.55

1440 2.3 -

960

1.07

1440

.57

1560 2.35 -

1140

1.1

1560

.6

1680 2.4 -

1200

1.15

1800

.62

1800 2.45 -

1320

1.25

2040

.67

1920 2.5 -

1440

1.25

2160

.67

2040 2.52 -

1680

1.3

2280

.7

2160 2.55 -

1800

1.32

2640

.77

2280 2.57 -

1920

1.35

2880

.82

2400 2.65 -

2040

1.4

3120

.85

2880 2.7 -

2160

1.4

3240

.9

3120 2.75 -

2280

1.45

3360

.95

3360 2.8 -

2640

1.50

3500

.95

3500 2.82 -

2760

1.55

3740

1.0

3740 2.85 -

2880

1.55

3980

1.02

3980 2.9 -

3120

1.57

4220

1.05

4220 2.9 -

3360

1.65

(30)

3500

1.7

3920

1.75

3980

1.77

4220

1.77

(33)

28

11-24E-29CDC

COUNTY

WYANDOTTE

LOCATION

11-24E-29D

DATE

2/10/59 to 2/13/59

PERFORMED BY

Layne-Western FOR JOHNSON RWD#1

DISCHARGE

740 gpm

LENGTH OF TEST

72 hours

OF OBSERVATION WELLS

9

DISTANCE(S) TO PUMPING WELL

50', 100', 125', 276', 300', 300', 487'

WATER LEVEL = ?

550'

AQUIFER TYPE

ALLUVIAL (KANSAS RIVER)

DEPTH OF TEST WELL

~ 50'

SCREEN - ?

probably in 10 to 20 feet of medium to coarse sand and gravel

COMMENTS

DATA POINTS were taken from a hydrograph containing original data from 8 observation wells. - Sample Test hole logs are given for this area. A more detailed analysis was done by W.G. Keck (March 28, 1959). ~~Some~~ Some of these logs indicate unconfined conditions. The 'RIM' analysis gives a reasonable error when recharge conditions are considered.

COMPUTER ANALYSIS

METHOD	T (gpd/ft)	S	RMS error	τ
Twim	328,004	.11	.18	using 8 obs. wells @ 720 min
Twim	588,353	.0057	.60	8 obs. wells @ 9 times 10-600 min
RIM	496,400	.00043	.12	50' 2000' to River Recharge

ABSTRACT

A 72-hour aquifer test has been conducted on a group of wells located in the SE $\frac{1}{4}$ of Sec. 29, belonging to Johnson County Water District # 1. Well No 4 of this group served as the pumped well, being pumped at the uniform rate of 740 GPM.

From an analysis of the data it was determined that the transmissibility "T" = 290,000 G/da/hor ft and the storage coefficient "S" = 0.012 cu ft/sq ft/ft. It was further determined that there are effects of river recharge with the line of recharge out under the river at a distance of from 375 to 500 ft from Well # 4. The line was still receding however, evidenced by a slight, continued decline of water levels throughout the entire test.

From geological information we know that an impervious boundary (the valley wall) exists to the south at a distance of 2000 ft. The average water-saturated thickness of the aquifer between the River and this southern boundary is about 39 ft.

For purposes of computing yield, the following geometry of aquifer was assumed:

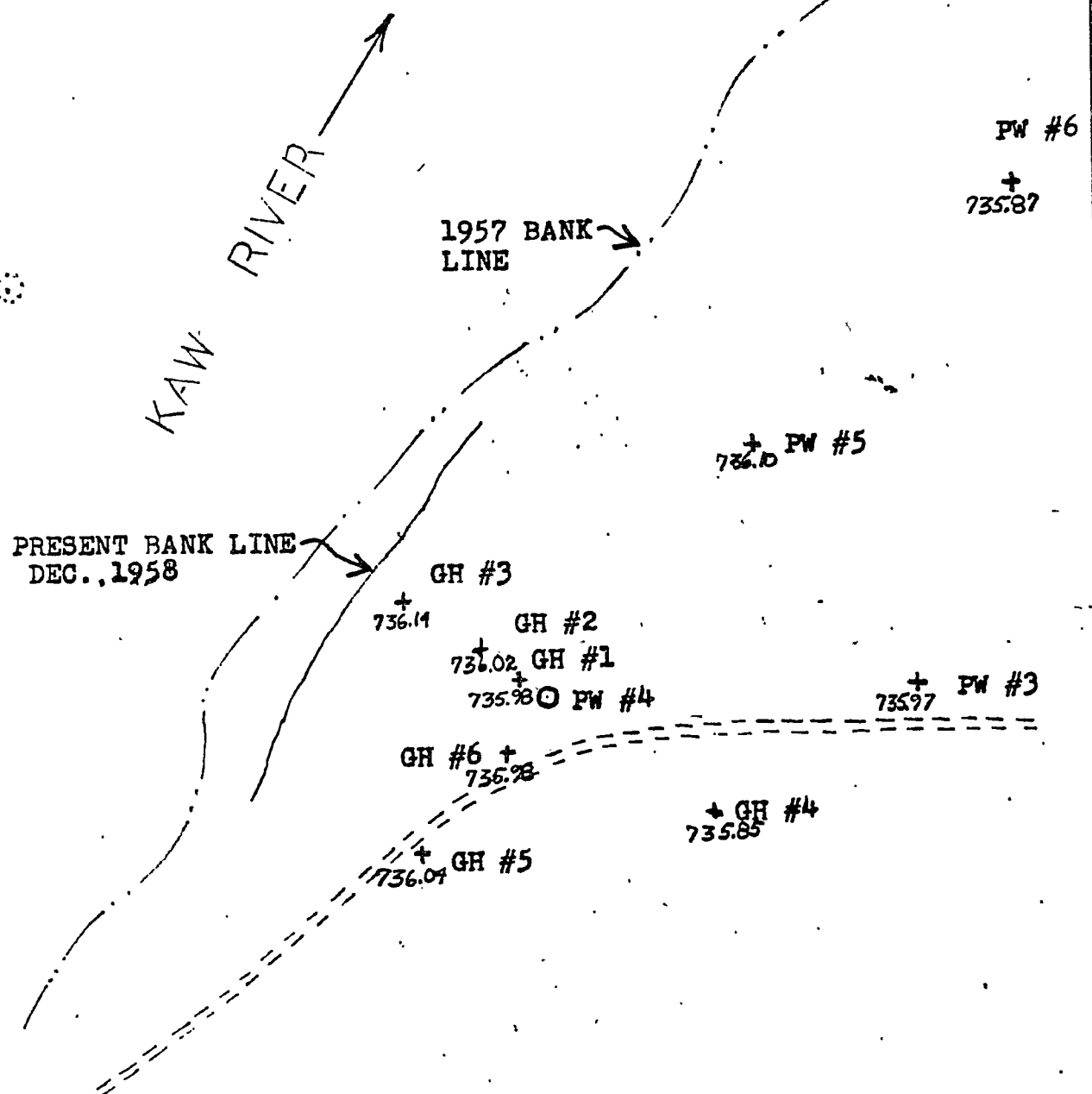
Aquifer thickness	39 ft
Distance to southern impervious boundary	2000 ft
Distance to effective line of recharge	2000 ft

(This line roughly parallels the River and the southern boundary. It has been taken on the far side of the River to insure that our hypothetical cone has spread completely under the River's bed)

The present well field extends for a distance of 3000 ft, roughly parallel with the River. The yield from a line of wells utilizing this frontage was computed to be about 11 million gallons per day. It is believed that this estimate is properly conservative since the distance to the line of recharge has been taken to be several times larger than that indicated during the test. Further support of this conservatism is the fact that this yield requires an infiltration rate through the River bed of only 0.2 MG/da whereas average stream bed infiltration rates are about 1.5 MG/da.

SKETCH MAP OF WELL FIELD
SHOWING LOCATION OF GAGE HOLES,
(GH) AND PERMANENT WELLS (PW).

JOHNSON COUNTY WATER DISTRICT #1
MORRIS, KANSAS



NORTH

SCALE: 1" = 250'

LAYNE WESTERN COMPANY, INC.
KANSAS CITY, MISSOURI
MARCH 13, 1959

BY: W.G. KECK, Ph.D.

11-24E-28966
HOLE NO. 8

S.W.L. 29'7"

ELEV. 764.6

0'	-	5'	Fine Sand and Silt
5'	-	0'	Clayey Fine Sand
0'	-	13'	Sandy Brown Clay
13'	-	20'	Clay and Fine Sand
20'	-	25'	Fine Sand
25'	-	35'	Medium Fine Sand, some Coarse
35'	-	55'	Medium Coarse Sand
55'	-	43'	Medium Coarse Sand and Gravel
43'	-	53'	Medium Coarse Sand and Gravel (few clay balls)
53'	-	56'	Medium Coarse Sand and Gravel
56'	-	66'	Medium Coarse Sand and Gravel (boulders)
66'	-	66'4"	Limestone
66'4"	-	68'6"	Soft Yellow Shale
68'6"	-	71'	Hard Blue Shale

11-24E-28663
HOLE NO. 9

S.W.L. 23'3"

ELEV. 762.5

0'	-	15'	Sandy Brown Clay
15'	-	18'	Fine Sand (clay streaks)
18'	-	23'	Medium Fine
23'	-	28'	Fine Sand (some medium)
28'	-	33'	Fine Sand
33'	-	38'	Fine Sand (some medium)
38'	-	40'	Medium Fine Sand (clay streaks)
40'	-	43'	Medium Coarse Sand
43'	-	51'	Medium Coarse Sand and Gravel
51'	-	53'	Medium Coarse Sand and Gravel (boulders)
53'	-	64'	Medium Coarse Sand and Gravel (few boulders)
64'	-	66'	Yellow Brown Sandstone

11-24E-3366C
HOLE NO. 10

S.W.L. 29'

ELEV. 768.73

0'	-	5'	Silt and Clay
5'	-	25'	Brown Clay
25'	-	30'	Clay and Fine Sand
30'	-	33'	Medium Fine Sand
33'	-	37'	Medium Fine Sand
37'	-	40'	Medium Brown Coarse Sand
40'	-	43'	Medium Fine Blue Sand and Clay
43'	-	47'	Medium Fine Sand and Clay (blue)
47'	-	53'	Medium Coarse Brown Sand and Gravel
53'	-	65'	Medium Coarse Brown Sand and Gravel
65'	-	67'8"	Medium Coarse Brown Sand and Gravel (boulders) (broken limestone)

Well	Time	r=50		r=100		r=125		r=276		r=300		r=300		r=487		r=550	
		GH#1	GH#2	GH#1	GH#2	GH#1	GH#2	GH#1	GH#2	GH#1	GH#2	GH#1	GH#2	PW#5	PW#3	PW#5	PW#3
GH#1	1	1.12	.05	.45	.2	.2	.2	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
	10	1.15	.05	.55	.24	.41	.29	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
	20	1.20	.05	.59	.25	.45	.3	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
	40	1.22	.01	.6	.27	.52	.3	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12
	60	1.25	.03	.61	.29	.52	.3	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14
	120	1.28	.05	.65	.3	.52	.32	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16
	240	1.28	.08	.67	.33	.52	.34	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	360	1.32	.05	.76	.42	.57	.39	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
	600	1.32	.02	.78	.4	.64	.36	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3
	720	1.4	.07	.79	.42	.56	.39	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26
	840	1.47	-														
	960	1.45	-														
	1080	1.42	-														
	1200	1.4	-														
	1440	1.4	-														
	1560	1.32	-														
	1680	1.7	-														
	1800	1.5	-														
	1920	1.55	-														
	2040	1.5	-														
	2280	1.55	-														
	2520	1.55	-														
	2640	1.6	-														
	2760	1.62	-														
	2880	1.57	-														
	3360	1.65	-														
	3600	1.62	-														
	3720	1.5	-														
	3960	1.55	-														
	4080	1.5	-														
	4200	1.57	-														
	4260	1.6	-														
	4320	1.6	-														

Johnson Co. RWD #1

11-24E-29 D

WYANDOTTE CO.

for Jo. Co. RWD #1

@ 740 gpm

x = 50

y = 0

(24)

(2)

COUNTY WYAN DOTTE

LOCATION 11-24E-21DD

DATE 2/9/60 - 2/13/60

PERFORMED BY LAYNE-WESTERN FOR JOHNSON COUNTY RWD#1

DISCHARGE 525 gpm

LENGTH OF TEST 72 hours

OF OBSERVATION WELLS 6

DISTANCE(S) TO PUMPING WELL 50', 150', 300', 400', 400' —

WATER LEVEL = ?

AQUIFER TYPE ALLUVIAL (KANSAS River)

DEPTH OF TEST WELL ~65' ?

SCREEN ? , probably in 10 to 20 feet of medium to coarse sand and gravel

COMMENTS DATA points were taken from a hydrograph containing original data from 6 observation wells. Sample test hole logs are given for this area. A more detailed analysis was done by W. G. Keck. The evaluation of data from 5 observation wells is probably the reason for the high storage and low transmissivity values.

COMPUTER ANALYSIS

METHOD	T (gpd/ft)	S	RMS error	τ
THEIM	166,794	.185	.10	5 obs. wells @ 1440 min

A B S T R A C T

Aquifer Test No 4 on Santa Fe Railroad property has been conducted for Johnson County Water District No 1, Morris, Kansas. The test involved a uniform pumpage of 525 GPM for a period of 72 hours. Observation of water levels was maintained throughout a span of time beginning 21 hours ahead of the pumpage and continuing for 24 hours after the termination of the pumpage.

Analyses of the data submitted gives the following aquifer coefficients:

Transmissibility	"T"	=	168,000	G/da/hor ft
Storage Coef.	"S"	=	0.20	cu ft/sq ft/ft

The geometry of the aquifer, as revealed by test drilling and from topographic maps of the area give:

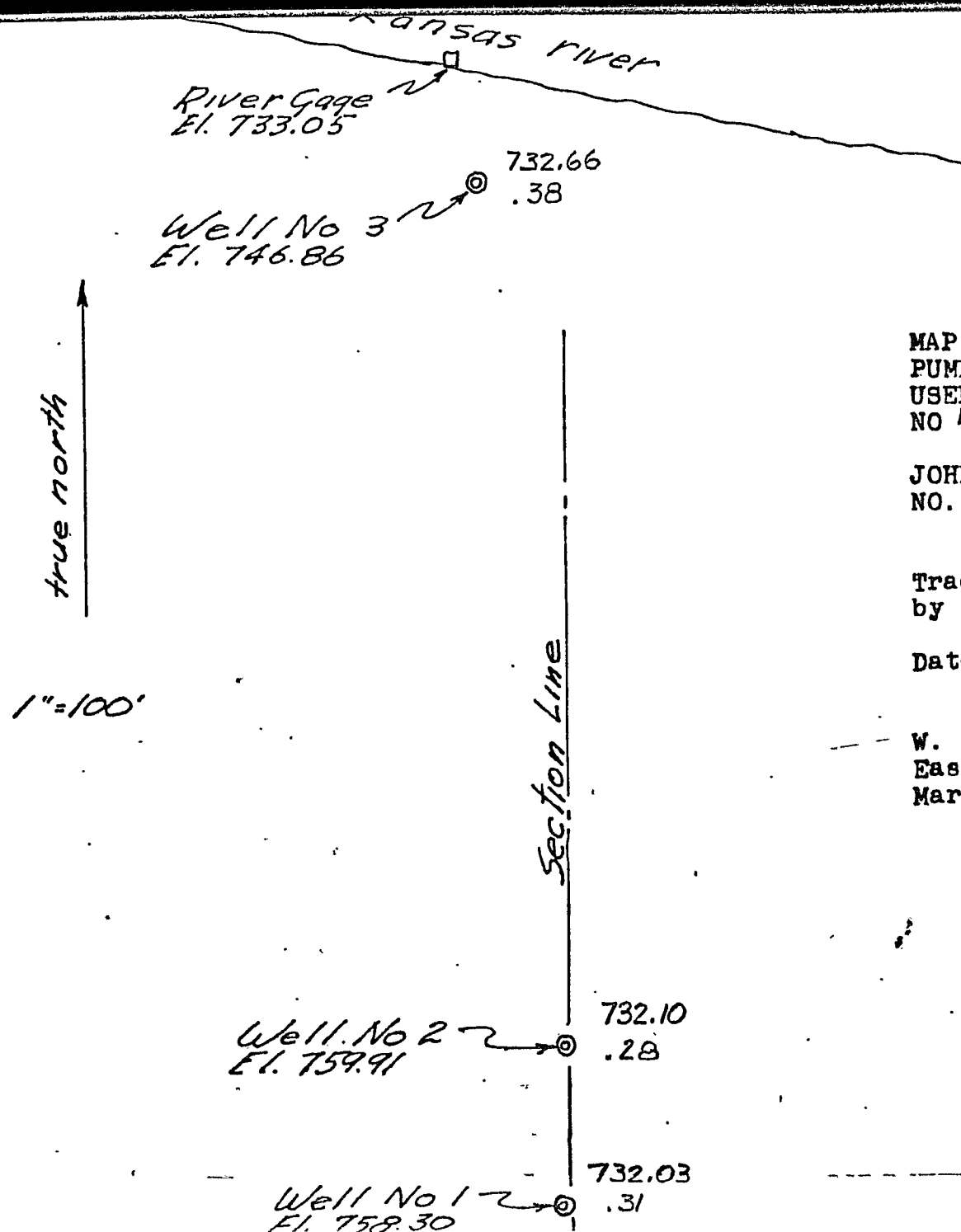
Water-saturated thickness	"m"	=	30 ft
Distance to impervious boundary			3500 ft
Distance to recharge boundary			1500 ft

Using the above data it was shown that wells with a 500 ft spacing, placed in a line parallel with the River and approximately 700 ft back from the water's edge would have a theoretical yield of 370 GPM/well if equipped with 15 foot screens and 440 GPM/well if equipped with 10 ft screens.

A computation was made which showed that the well losses in the pumped well of this test amounted to 2.3 ft at the rate of 525 GPM.

A figure of 350 GPM/well, using a 500 ft well spacing is recommended to be used for preliminary design purposes. Both figures may be changed when the comprehensive report is prepared, though the yield/foot front will not change greatly.

A request has been made for authorization for a trip to Kansas City to confer with engineers of Haskins, Riddle and Sharpe and with Layne Western Company prior to preparation of the comprehensive report.



MAP SHOWING LOCATIONS OF
PUMPING WELL AND GAUGE HOLES
USED DURING THE AQUIFER TEST
NO 4, SANTA FE AREA.

JOHNSON COUNTY WATER DISTRICT
NO. 1, MORRIS, KANSAS.

Traced from a map furnished
by HASKINS, RIDDLE & SHARPE
CONSULTING ENGINEERS
Dated February - 1960

W. G. Keck & Associates, Inc.
East Lansing, Michigan
March 14, 1960

Well No 1
El. 758.30

732.03

.31

731.93
.30



Well Site - top 18" Well
Casing - 759.05

Well No. 6
El. 758.92

732.11
.23

All elevations to
top of casings

599.68'

731.59
.24



Well No 5
El. 758.13

S.E. Corner
Sec 21-11-24

S.W. Corner
Sec. 22-11-24

Northeast Cor. Sec 28

TEST HOLES

KANSAS CITY SUBURBAN WATER COMPANY

MORRIS, KANSAS

BLACK & VEATCH, ENGINEERS

LAKNE-WESTERN COMPANY, KANSAS CITY, MISSOURI-----DRILLER-F. BRYAN

HOLE NO. 1 *11-24E-28d66* S.W.L. 25'8" ELEV. 765.3

0'	-	1'	Sandy Brown Clay
1'	-	3'	Black Soil
3'	-	5'	Silt and Clay
5'	-	13'	Clayey Fine Sand
13'	-	17'	Fine Sand (Clay streaks)
17'	-	24'	Medium Fine Sand
24'	-	26'	Medium Fine & Coarse Sand
26'	-	33'	Medium Coarse Sand (clean)
33'	-	36'	Medium Coarse Sand (clay streaks)
36'	-	43'	Medium Coarse Sand, some Gravel (clean)
43'	-	58'	Medium Coarse Sand and Gravel (clean)
58'	-	65'	Coarse Sand and Gravel (boulders)
65'	-	66'6"	Limestone (soft)

11-24E-28cd
HOLE NO. 2 S.W.L. 19'8" (?) ELEV. 762.6

0'	-	13'	Silt and Clay
13'	-	18'	Clayey fine Sand
18'	-	23'	Medium Fine Sand
23'	-	30'	Medium Fine Sand, some Coarse
30'	-	35'	Medium Fine Sand (clay streaks)
35'	-	40'	Medium Fine & Coarse Sand (clean)
40'	-	43'	Fine & Medium Sand
43'	-	45'	Medium Fine Sand
45'	-	53'	Medium Coarse Sand, Some Gravel (clean)
53'	-	57'	Medium Fine & Coarse Sand (boulder at 53')
57'	-	62'	Medium Coarse Sand and Gravel
62'	-	62'6"	Limestone

Pump Test

Johnson Co Water Dist #1

Q = 525 gpm = 70.19 ft³/min

Feb 9 - Feb 13

r=50'

r=150'

r=300'

r=400'

r=400'

±

GH#1

GH#2

GH#5

GH#4

GH#6

GH#3

1440

1.72

~~1.72~~

.84

.49

.28

.35

—

11-1-7-75260

COUNTY

WYANDOTTE

LOCATION

11-24E-31 DAB

DATE

12/15/59 - 12/19/59

PERFORMED BY

LAYNE WESTERN FOR JOHNSON CO. RWD #1

DISCHARGE

560 gpm

LENGTH OF TEST

72 hours

OF OBSERVATION WELLS

7

DISTANCE(S) TO PUMPING WELL 45', 144', 422', 198', 382',

WATER LEVEL = 27' ?

300', 500'

AQUIFER TYPE ALLUVIAL (KANSAS RIVER)

DEPTH OF TEST WELL

~65' ?

SCREEN ?

, probably in 10 to 20 feet of medium to coarse sand and gravel

COMMENTS DATA points were taken from a hydrograph containing original data from 7 observation wells. - Sample test hole logs are given for this area. A more detailed analysis was done by W.B. Keck. Note the high errors for this analysis.

COMPUTER ANALYSIS

METHOD

T (gpd/ft)

S

RMS
error

r

Theim

138,568

.178

.52

6 OBS wells at 3480 min

Theim

159,402

.108

.71

6 OBS wells at 21 times
3-3480 min

A B S T R A C T

Aquifer Test No 3 at Site No 1 has been completed for Johnson County Water District No 1. The test involved a pumpage of 560 GPM from a central well, uniformly, for a period of 72 hours. Observation of changes in water level were made in 7 gauge holes, suitably located around the pumped well.

Analysis of the data gives the following aquifer coefficients:

Transmissibility	"T" = 136,000 G/da/hor ft
Storage Coef.	"S" = 0.18 cu ft/sq ft/ft

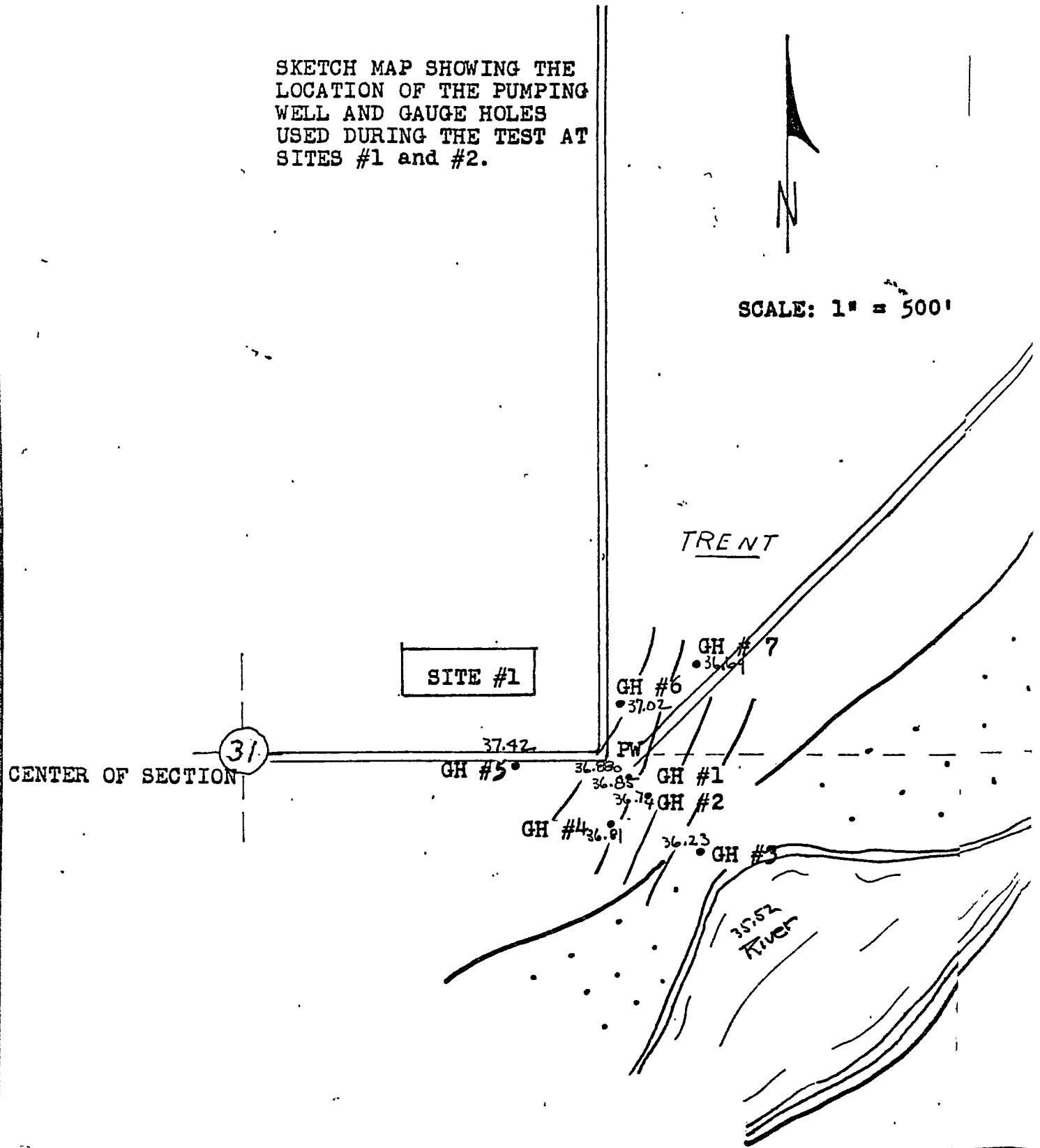
The geometry of the aquifer, as revealed by test drilling and from topographic maps give:

Water-saturated thickness	"m" = 32 ft
Distance to impervious boundary	4000 ft
Probable distance to boundary of recharge	1500 ft

Comparison of these data with those obtained from Aquifer Test No 2 at Site No 2 indicates that this portion of the proposed well strip should also be rated for design purposes, as being able to support wells of 350 GPM capacity on a 500 ft spacing between wells.

AQUIFER PERFORMANCE TEST
for
JOHNSON COUNTY WATER DISTRICT #1
MORRIS, KANSAS

SKETCH MAP SHOWING THE
LOCATION OF THE PUMPING
WELL AND GAUGE HOLES
USED DURING THE TEST AT
SITES #1 and #2.



11-24E-33 bba
HOLE NO. 3

S.W.L. 25'6"

ELEV. 766.6

0'	-	1'	Sandy Brown Clay
1'	-	20'	Silt and Clay
20'	-	23'	Medium Fine, some Coarse Sand
23'	-	29'	Medium Fine Sand
29'	-	33'	Fine Sand, some Medium
33'	-	39'	Fine Sand
39'	-	42'	Sandy Blue Clay
42'	-	50'	Medium Coarse Sand
50'	-	61'	Coarse Sand and Gravel
61'	-	67'	Gravel, some Coarse Sand
67'	-	70'	Gravel and boulders
70'	-	73'	Blue Shale

From 61' - 70' gravel would measure from 1/2" - 1"

11-24E-28 bcc
HOLE NO. 4

S.W.L. 27'0"

ELEV. 766.0

0'	-	1'	Fine Sand
1'	-	2'	Brown Sandy Clay
2'	-	5'	Clayey Fine Sand
5'	-	14'	Sandy Brown Clay
14'	-	18'	Fine Sand (clay streaks)
18'	-	27'	Medium Fine Sand (some coarse)
27'	-	30'	Medium Brown Coarse Sand (some fine)
30'	-	33'	Medium Blue Coarse Sand
33'	-	42'	Medium Coarse Sand and Gravel
42'	-	43'	Clay Streak
43'	-	50'	Medium Coarse Sand and Gravel (few clay balls)
50'	-	55'	Medium Coarse Sand and Gravel
55'	-	62'4"	Medium Coarse Sand and Gravel (boulders)
62'4"	-	63'3"	Limestone

11-24E-28 bdb
HOLE NO. 5

S.W.L. 27'6"

ELEV. 764.0

0'	-	5'	Clayey Fine Sand
5'	-	10'	Clay and Fine Sand
10'	-	13'	Sandy Brown Clay
13'	-	20'	Fine Sand
20'	-	30'	Medium Fine Brown Sand, some coarse
30'	-	33'	Medium Blue Sand
33'	-	46'	Medium Blue Coarse Sand and Gravel
46'	-	50'	Medium Blue Coarse Sand and Gravel (few boulders)
50'	-	66'	Medium Brown Coarse Sand, Gravel, Boulders
66'	-	66'6"	Limestone and Brown Shale

	r=45'	r=144'	r=422'	r=198'	r=382'	r=300'	r=500'
	GH-1	GH-2	GH-3	GH-4	GH-5	GH-6	GH-7
1	.8	.1	0	.03	.0	.1	.07
3	1.0	.15	0	.05	.0	.13	.09
10	1.5	.25	0	.14	.03	.39	.14
20	1.6	.26	0	.16	.04	.4	.15
60	1.65	.33	0	.2	.04	.44	.15
120	1.74	.37	.01	.24	.05	.45	.17
240	1.86	.49	.05	.33	.12	.51	.2
360	1.89	.57	.06	.4	.17	.61	.24
600	2.06	.71	.1	.5	.17	.65	.27
720	2.16	.8	.14	.59	.19	.72	.31
1080	2.32	.92	.23	.66	.23	.8	.38
1320	2.37	1.0	.25	.68	.17	.83	.4
1560	2.38	1.03	.25	.66	.13	.86	.42
1800	2.42	1.07	.3	.62	.03	.91	.52
2040	2.45	1.11	.34	.67	.11	.95	.54
2280	2.48	1.14	.36	.72	.17	.97	.56
2520	2.54	1.15	.4	.82	.27	1.04	.61
2760	2.6	1.22	.43	.87	.29	1.1	.67
3000	2.63	1.26	.43	.9	.34	1.1	.67
3240	2.67	1.3	.44	.99	.4	1.15	.7
3480	2.74	1.35	.44	1.01	.44	1.16	.72

(2)

don't use

$$Q = 560 \text{ gpm} = 74.87 \text{ ft}^3/\text{min}$$

$$\begin{array}{r} .15 \\ .56 \\ \hline .71 \end{array}$$

$$\begin{array}{r} .15 \\ .15 \\ \hline .30 \end{array}$$

$$\begin{array}{r} .18 \\ .15 \\ \hline .33 \end{array}$$

$$\begin{array}{r} .127 \\ .25 \\ \hline .377 \end{array}$$

$$\begin{array}{r} .25 \\ .42 \\ \hline .67 \end{array}$$

$$\begin{array}{r} .35 \\ .35 \\ \hline .70 \end{array}$$

$$\begin{array}{r} .35 \\ .35 \\ \hline .70 \end{array}$$

COUNTY WYANDOTTE

LOCATION 11-23E-31 DABB

DATE 3-20-71

PERFORMED BY LAYNE WESTERN FOR SUPERIOR SAND

DISCHARGE 703 gpm

LENGTH OF TEST 240 min 20 min recovery

OF OBSERVATION WELLS NONE

DISTANCE(S) TO PUMPING WELL .67'

WATER LEVEL = 30'

AQUIFER TYPE ALLUVIAL (KANSAS RIVER)

DEPTH OF TEST WELL 59'

SCREEN 20' of screen at bottom of well in medium to coarse sand and gravel

COMMENTS: A high RMS error was calculated when data from drawdown and recovery^(D-R) were analyzed together. There is a large initial well loss.

COMPUTER ANALYSIS

METHOD	T (gpd/ft)	S	RMS error	r
Thois	403,812	—	.068	.67' (to 180 min 6 points)
D-R	—	—	1.28	.67' (all data)



WELL INFORMATION

Layne Western Co. Inc. ~~Layne~~

Wyandotte, Mo. #11

1. CONTRACT Superior Sand
80th St. & Kaw River
2. City, State Kansas City, Kansas
3. Well No. 1 at Test Hole No. 2-71
4. Well Location (attach map) 130' East & 30' South
11-23 E - 31 adce
5. Driller R. L. Sansbury
6. DATE 3-20-71
7. Date Started —
Completed —
8. Drill Crew Man Hrs. —
9. Working Days
Drilling —
Other —

1966

10. MATERIAL IN WELL			GAGE NO.	WALL THICK-NESS IN.	MATERIAL	TYPE	NO.
	LENGTH FT. IN.	DIA. IN.					
Screen	<u>20' 0"</u>	<u>16"</u>	<u>.250"</u>	<u>—</u>	<u>Carbon Steel</u>	<u>Bridged Louvre</u> Strutted Kevlarone	<u>1/8"</u> Openings
Inner Casing	<u>44' 6"</u>	<u>16"</u>	<u>.375"</u>	<u>—</u>	<u>Carbon Steel</u>	<u>welded</u> Welded Screwed	
Outer Casing	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u> Welded Screwed	

11. GRAVEL
Size 1/2" x 5/32" With Disposal
Tons 20 Sand.

12. SEALING CASING
Puddled Clay (Yes) ☒
- With — Bags Bentonite Added
or
With — Bags Cement
- Seal Material Placed in
Well With Shovel
- Bottom of Well Screen
Sealed With Steel Plate

13. WELL DIMENSIONS
- A. Total Depth 64'-6"
(From Top of Inner Casing to Bottom of Well)
- B. Height of Inner Casing 5'-6"
(Above Ground Level)
- C. Distance to Top of Gravel 20'
(From Ground Level)
- D. Diameter of Drill Hole 36"
- Comments None



TEST HOLE REPORT

Layne-Western Company

Contract Name Superior Sand

Job No. KC 157-B

Date 2-24-71

City Edwardsville

State Kansas

Driller O.J. Harper

TEST HOLE

No. 1-71

Test Hole Location 24' S. & 10' W. of N.W. Corner of Gravel & Sand Washer

Distance and Direction from Permanent Landmark or Previous Test Hole

TEST LOG

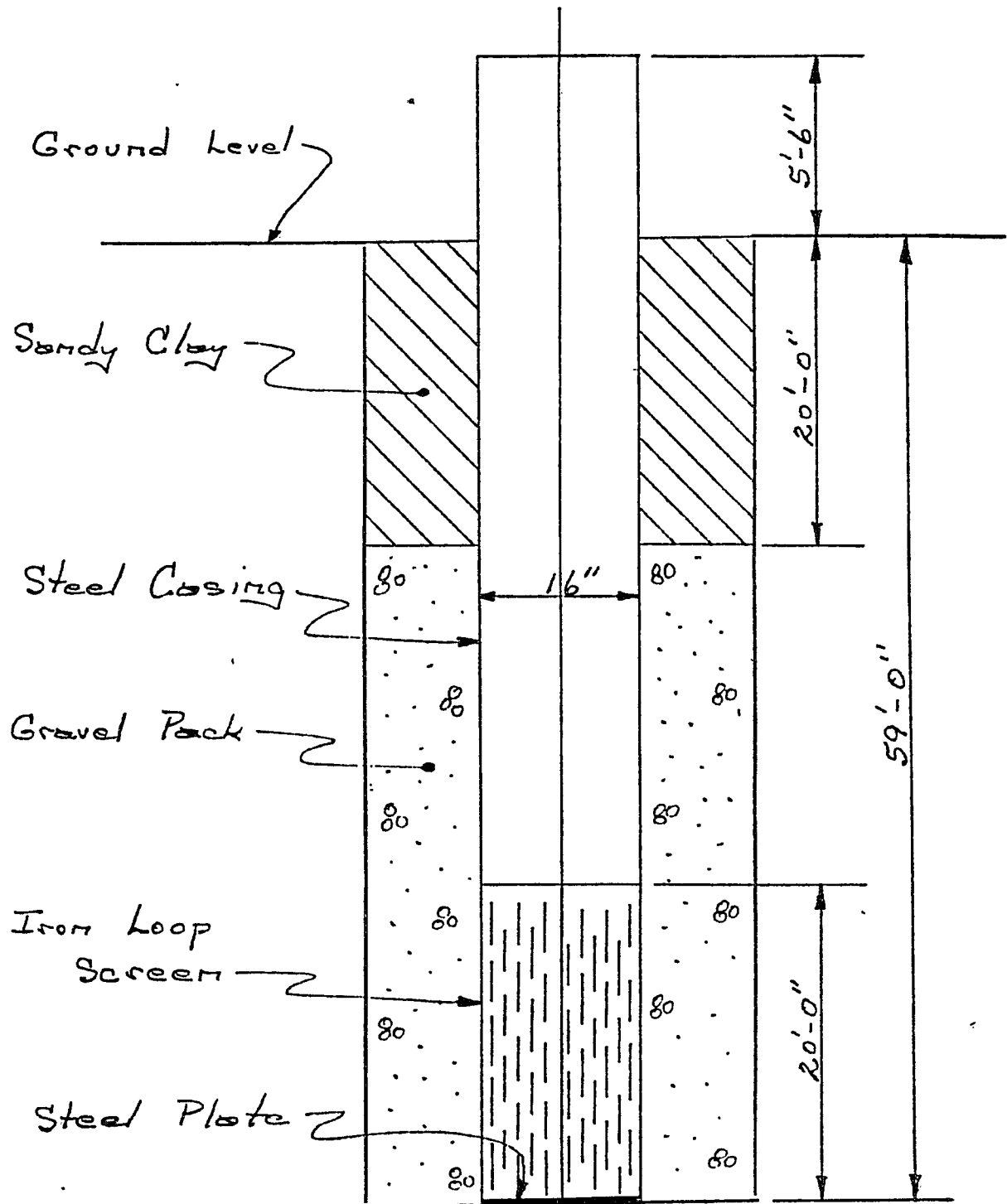
FROM	TO	MARSH FUNNEL VISCOSITY SECONDS	MUD PIT LOSS INCHES	Static Water Level _____ Measured _____ Hours After Completion
				FORMATION
0'0"	1'0"			Brown, sandy silt
1'0"	6'6"			Brown, fine to very fine, tr. med. sand
6'6"	12'6"			Brown, silty clay
12'6"	26'0"			Brown, fine to med., tr. very fine sand
26'0"	28'0"			Brown, med. to coarse, tr. f. sand & gravel
28'0"	30'0"			Gray-brown, med. to coarse, tr. fine sand & gravel
30'0"	35'0"			Same
35'0"	40'0"	40	1"	Gray, med. to coarse, tr. fine sand & gravel, tr. clay
40'0"	41'0"	spoon		Gray, fine to v. fine, tr. med. sand
41'0"	45'0"	40	1/4"	Same
45'0"	46'0"	40		Same
46'0"	50'0"	40	1"	Gray, med. to coarse, tr. fine sand & gravel
50'0"	51'0"	spoon		Gray, med. to fine, tr. coarse sand
51'0"	53'0"	40	2"	Same
53'0"	55'0"	40		Gray, coarse to med., tr. fine sand, tr. gravel boulders

Continued-----

NOTES: Size of Pit _____ X portable _____ X

DEEP

CONSTRUCTION OF WELL



PUMPING TEST

A.

Test pump

..... in Bowl Stages

Permanent pump

Length of column Ft.

Length of Bowl Ft.

Length of suction Ft.

10.67'

B. Measured water level 30 Ft. from top of 16 In.

ORIFICE

dia. casing which is 1 Ft. above ground.

..... X

C. Length of airline Ft. from top of casing.

..... X

TIME	INCHES ORIFICE MANOMETER	GPM	ALT. GAGE READING	WATER LEVEL	DRAW DOWN
12:00	—	0	—	30'	0
12:01	1	703	93.98 $\pm \frac{3}{m}$	38'-8"	8'-8" 8.67
12:30	30	703	—	39'-6"	9'-6" 9.5
1:00	60	703	—	39'-7"	9'-7" 9.58
2:00	120	703	—	39'-7 $\frac{3}{4}$ "	9'-7 $\frac{3}{4}$ " 9.64
3:00	180	703	—	39'-8"	9'-8" 9.67
4:00	240	703	—	39'-8"	9'-8"
Pump off (Recovery)					
4:01	1			30'-6 $\frac{1}{2}$ "	6 $\frac{1}{2}$ " 6.04
4:05	20			30'-1 $\frac{3}{4}$ "	1 $\frac{3}{4}$ " 1.06
4:20	265			30'-0 $\frac{1}{2}$ "	1 $\frac{1}{2}$ " .04

15. Permanent Pump No. installed by

Layne

Permanent air line length Ft. Date

Month

Day

Year