GROUND WATER TUBEWELL PROJECT

Jaleswor, Mahottari

(DATA ON GROUND WATER RESOURCES INVESTIGATION IN MAHOTTARI DISTRICT)

By

J. Ghimire

P.B. Karki

DEPT. OF IRRIGATION
GROUND WATER RESOURCES DEVELOPMENT BOARD
GROUND WATER TUBEWELL PROJECT
Mahottari, Jaleswor (Nepal)
Tel. No.: 044-20047

2051/052

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SUMMARY

The aim of this project is to identify the potential areas for ground water development within the Mahottari district. Drilling activities started in fiscal year 2040/2041 and completed in F.Y. 2046/047. During this period, the project completed following item of works.

	Item of work	*No.*	*Size*
1.	Deep Tubewell	42	10"/6"
2.	Shallow Tubewell	15	4"
3.	Observation Well	3	1.5"
4.	Pump Installation	20	
5.	Pump House Construction	23	
6.	Canal Construction	1 Km	

Total cost of the project is about 40 million Rupees out of which 25 million was in the form of equipment grant received from Japanese government. These tubewells are providing irrigation facility in about nine hundred hectres land providing direct benefit to 500 families. Although these deep tubewells were installed only for investigation purpose, but according to farmers' request, later it is decided to use them as production well. Well monitoring in shallow and deep tubewells are carried out continuously. The no. of pump operators employed by the government has been reduced from 23 to 11 persons after conducting training of pump operator and maintenance to 20 farmers in the month of Paush 2050. By now, the project has already handed over 17 nos. of deep tubewells to the Water Users' Association and registration of these associations are in the process.

Water level fluctuation is slightly high (5m) in the north whereas it is low (2m) in the south. Ground water potential is high in the northern and south eastern parts whereas it is comparatively low in the south and south western part of the district. Transmissivities value ranges from:

4000 - 18000 m^2/day	in the north
1000 - 4000 m^2/day	in the central and
100 - 400 m^2/day	in the south

It clearly shows that there is high scope for ground water development specially in the northern part of the district where surface water resources is completely nil.

GROUND WATER PROJECT MAHOTTARI

DTW Performance Chart

S. No.	W. No.	Location	TDD M	TL M	Housing /Screen M	Q L/S	W.L. M	DD M	Cons. Yr.	Remarks
1.	1.	Jaleswor	183	134	x/15	12	0.5	6.3	040	6" only
2.	2.	Matihani	157	132	39/18		3.1		040	Failure
3.	3.	Ekrahiya	151	93	29/16		1.6		040	Failure
4.	4.	S.Kataiya	145	94	35/16		1.9		040	Abandoned
5.	6.	Raghunathpur	172	113	34/17	1	A	27.0	41/42	Artesian
6	5.	Pokhervinda	165	109	34/23		A	14.3	40/41	Damage
7.	7.	Aurhi	152	139	34/28	20	5.4	17.4	40/41	Q<20
8.	8.	Hathilet	83	80	34/23		33.5		41/42	Failure
9.	9.	Bangaha	138	93	36/21	28	7.2	20.6	41/42	
10.	10.	Matihani	138	128	36/16		3.6		41/42	Failure
11.	11.	Laxminiya	123	119	44/22	57	17.6	2.0	41/42	
12.	12.	Hathilet	111	108	52/22	26	31.4	3.4	41/42	
13.	13.	Sunderpur	150	115	29/11	8	A	24.1	40/41	Artesian
14.	14.	Sripur	152	110	30/19	29	A		41/42	,,
15.	15.	Bisamverpur	116	109	27/14	26	A	30.4	41/42	,,
16.	16.	Ratauli	159	101	30/20	11	1	27.8	40/41	
17.	17.	Mahottari	135	132	31/18	28	A	22.9	44/45	
18.	18.	Bhargavser	144	141	35/20	46	0.9	16.3	42/43	
19.	19.	Ramnagar	150	154	44/24	50	22.7	3.1	42/43	
20.	20.	Ramnagar	143	143	45/22	16	41.5	1.0	42/43	
21.	21.	Bijalpura	100	92	31/21	54	7.5	2.3	43/44	
22.	22.	Bijalpura	100	92	x /27				43/44	6" Obs.Well
23.	23.	Sahorwa		x	x	x	x	x	42/43	Abondoned
24.	24.	Dhamaura	181	182	38/17	22			42/43	Artesian
25.	25.	Paraul	182	182	39/17	20		24.8	43/44	,,

Note:
TDD - Total drilling depth
TL - Total lowering depth
Q - Discharge
WL - Water level
DD - Drawdown
A - Artesian
M - Meter
L/S - Litre per second

GROUNDWATER PROJECT MAHOTTARI

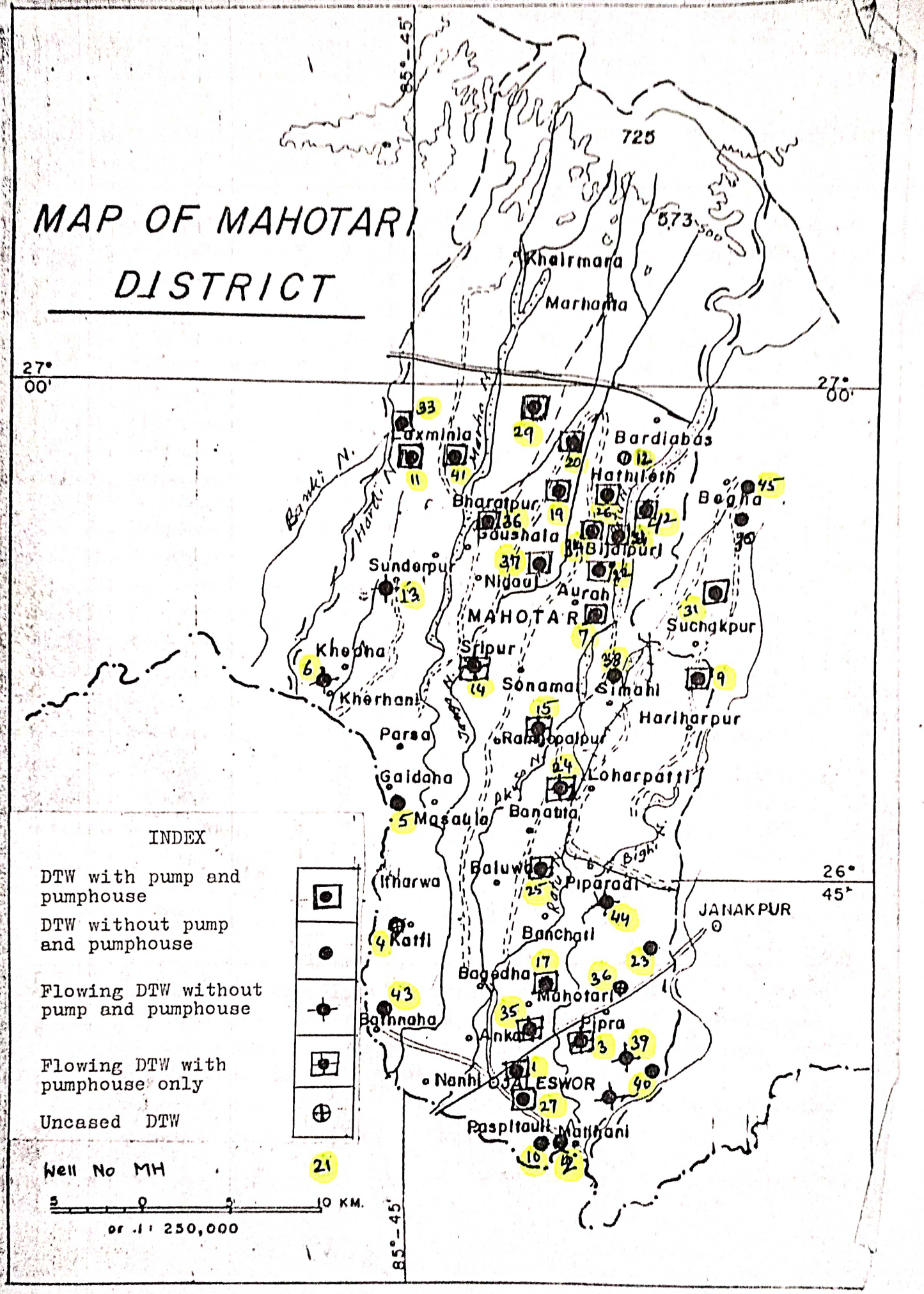
DTW Performance Chart

S. No.	W. No.	Location	TDD M	TL M	Housing /Screen	Q L/S	WL M	DD M	Cons. Yr.	Remarks
26.	26.	Hathilet	157	115	55/27	21	40.5	1.2	43/44	
27.	27.	Bhargavsar	144		x/20	-	-	-	43/44	2"Obs.well
28.	28.	,,	144		x/20	-	-	-	43/44	,,
29.	29.	Belgachhi	120	121	72/18	34	33.6	1.4	43/44	
30.	30.	Kisannagar	122	122	50/22	-	53.0	-	44/45	No P-test
31.	31.	P.Nagar	163	163	44/35	52	17.9	7.4	44/45	12"/8"size
32.	32.	Bharatpur	112	113	34/33	18	10.3	18.2	44/45	
33.	33.	Laxminiya	152	122	58/25	29	28.4	1.8	44/45	
34.	34.	Bijalpura	153	145	45/28	42	17.1	2.7	44/45	
35.	35.	Phulhatta	213	213	21/28	38	SA	7.5	44/45	1.2l/s
36.	36.	Pipara	222	222	34/27	25	A	-	45/46	
37.	37.	Gausala	187	183	38/33	40	4.8	6.5	45/46	
38.	38.	Hatisarwa	145	145	34/21	14	SA	32.4	45/46	
39.	39.	Ekrahiya	220	209	31/17	15	-	-	46/47	
40.	40.	Dhirapur	205	200	29/17	15	-	-	46/47	
41.	41.	Laxminiya	138	119	49/17	37	29.1	3.1	46/47	
42.	42.	Bijalpura	95	90	47/22	30	19.4	1.7	46/47	
43.	43.	Manrakatti	213	-	-	-	-	-	46/47	Abondoned
44.	44.	Khu.Piprari	187	184	32/16	14	A	-	46/47	
45.	45.	Kisannagar	138	118	52/17	-		-	46/47	

Note:
1. All wells are of 10"/6" size except mentioned.
2. Observation wells no. 22,27 & 28 are also included.
3. IN well no. 30 & 45 water level is too deep.

During Project period:

Incharge - Jitendra Ghimire
Geologist- Prem Bahadur karki
- Risi Ram Sharma
Driller - Ram Sundar Prajapati


MAP OF MAHOTARI DISTRICT
85°-45'
725
573
Khairmara
Marhama
27° 00'
Laxminia
Bardiabas
Hathiloth
Bharatpur
Baona
Gaushala
Bijalpuri
Sunderpur
Nigau
Aurah
MAHOTARI
Suchakpur
Khopha
Sripur
Sonama
Simahi
Kherhani
Hariharpur
Parsa
Ramgopalpur
Gaidaha
Loharpatti
Masaula
Banauta
Baluwa
Piparadi
26° 45'
JANAKPUR
Itharwa
Katti
Banchari
Bagedha
Mahotari
Bamnaha
Ankari
Pipra
Nanhi
JALESWOR
Pasupatti
Matihani
INDEX
DTW with pump and pumphouse
DTW without pump and pumphouse
Flowing DTW without pump and pumphouse
Flowing DTW with pumphouse only
Uncased DTW
Well No MH
5 0 5 10 KM.
or 1 : 250,000

Deep Tubewell condition in Mahottari district

S. No	W. No.	Location	p. y/n	PH y/n	BT y/n	Well type	FL y/n	WUA y/n	HO y/n	CA ha.	WL m.	Housing depth,m	Remarks
1.	1.	Jaleswor	Y	Y	N	NA				12	0.33	6" only	
2.	9.	Bhangaha	Y	Y	N	NA	Y	Y	Y	28	7.55	36.28	
3.	11.	Laxminiya	Y	Y	Y	NA	Y	Y		57	18.00	43.06	
4.	12.	Hathilet	Y	Y	N	NA	Y	Y		26	32.17	51.95	
5.	14.	Sripur	N	Y	Y	A	Y	Y		29	Art.	29.85	
6.	15.	Bisamverpur	N	Y	N	A				26	Art.	26.76	
7.	17.	Mahottari	Y	Y	N	NA	Y	Y		28	0.32	31.40	
8.	18.	Bhargavsar	Y	Y	N	NA				46	0.39	35.35	
9.	19.	Ramnagar	Y	Y	N	NA	Y	Y	Y	50	22.94	43.65	
10.	20.	Ramnagar	Y	Y	N	NA				16	42.10	44.63	Stopped
11.	21.	Bijalpura	Y	Y	Y	NA	Y	Y	Y	54	7.51	31.05	
12.	24.	Dhamaura	N	Y	N	A				22	Art.	38.45	
13.	26.	Hathilet	Y	Y	Y	NA	Y	Y	Y	21	40.51	55.50	
14.	29.	Belgachhi	Y	Y	N	NA	Y	Y	Y	34	33.65	62.25	
15.	31.	Pasupatinagar	Y	Y	Y	NA	Y	Y	Y	52	16.95	44.00	
16.	32.	Bharatpur	Y	Y	N	NA				18	10.35	34.00	
17.	33.	Laxminiya	Y	Y	N	NA	Y	Y		29	28.88	58.25	
18.	34.	Bijalpura	Y	Y	Y	NA	Y	Y	Y	42	17.09	45.40	
19.	35.	Phulhatta	Y	Y	N	SA				38	Art	20.67	
20.	36.	Pipara	N	Y	N	A	Y	Y		25	Art.	33.67	
21.	37.	Gausala	Y	Y	Y	NA				40	4.68	36.34	
22.	39.	Ekrahiya	N	N	N	A				15	Art.	31.26	
23.	40.	Dhirapur	N	Y	N	A				15	Art.	29.09	
24.	41.	Laxminiya	Y	Y	N	NA	Y	Y	Y	37	29.50	49.27	
25.	42.	Bijalpura	Y	Y	N	NA	Y	Y	Y	30	19.50	47.21	
26.	44.	Khuttapipradi	N	N	N	A				14	Art.	31.79	

Note: P-Pump installation PH - Pump house BT - Baffle tank
FL- Farmers list CA - Command area WL - Water level
WUA- Water users association SA- Seasonal Art.y/n-yes/no
HO- Handover to WUA (Started in F.Y.2049/2050)
W.No.-Well no. NA - Non-artesian A - Artesian Well

PUMP TEST DATA OF DTW OF MAHOTTARY DISTRICT

Well no. M1-M45

Well no.	Location	SWL M	Q l/s	S M	Test hours	Recovery hours	Housing depth M	Remarks
1.	Jaleshwar	0.5	12	6.3	5.0	3.0	6"only	SA
2.	Matihani	3.0	-	-	-	-	39.02	Damage
3.	Ekrahiya	1.6	48	22.0	24.0	47.0	29.02	
4.	Siswakataiya	1.9	3	9.0	3.0	4.2	35.36	
5.	Pokharvinda	A	14	14.3	2.0	5.0	35.33	
6.	Raghu N.Pur	A	1	1.4	26.6		34.14	
7.	Aurhi	5.4	20	17.4	30.0	63.5	34.14	
8.	Hathilet	33.5	-	-	-	-	33.53	Abondoned
9.	Bhangha	7.2	28	20.6	6.0	12.0	36.28	
10.	Matihani	3.1	-	-	-	-	36.48	Damage
11.	Laxminiya	17.6	57	2.0	18.0	11.0	43.86	
12.	Hathilet	31.4	26	3.4	14.0	55.0	51.95	
13.	Sunderpur	A	8	24.1	24.0	0.1	28.85	T = 506 M^2/d
14.	Sripur	A	29	-	-	-	29.85	
15.	Bisamverpur	A	26	30.4	12.3	0.1	26.76	T = 411 M^2/d
16.	Ratauli	1.1	11	27.8	10.3	61.3	30.14	
17.	Mahottary	0.2	28	22.9	12.0	19.0	31.4	T = 333 M^2/d
18.	Bhargavsar	0.2	46	16.8	16.3	34.2	35.35	T = 13222 M^2/d
19.	Ramnagar	22.7	50	3.2	18.0	1.2	43.65	T = 14000 M^2/d
20.	Ramnagar	37.8	16	0.9	-	-	44.63	No P.T.
21.	Bijalpura	7.5	54	2.3	21.3	15.5	31.05	
22.	Bijalpura	7.5	-	-	-	9.1	-	6" Obs.well
23.	Sahorwa	-	-	-	-	-	-	
24.	Belgachhi	33.4	34	1.4	12.0	76.0	62.25	
25.	Kisannager	53.0			6.3	15.3	49.75	
26.	P. Nager	16.4	52	7,4	18.0	48.0	44.00	
27.	Bharatpur	10.0	18	18.2	12.0	45.0	34.00	
28.	Laxminiya	28.3	29	122	24.0	39.0	58.25	
29.	Dhamaura	A	22				38.45	
30.	Paraul	A	20	24.8	30.0	26.0	39.25	
31.	Hathilet	40.5	21	1.2	6.0	22.0	55.50	
32.	Bhargavsar							6" Ovs.well
33.	Bhargavsar							6" Obs.well
34.	Bijalpura	17.1	42	2.7	18.0	35.0	45.40	
35.	Phulhatta	SA	38	7.5	23.0	50.5	26.67	

Highest

PUMP TEST DATA OF DTW OF MAHOTTARY DISTRICT

Well no.	Location	SWL M	Q l/s	S M	Test hrs.	Recovery hrs.	Housing depth M	Remarks
36.	Pipra	A	25	-			33.57	
37.	Gausala	4.2	40	6.5	16.1	49.3	36.34	
38.	Hatsarwa	SA	14	32.4	6.0	47.5	33.90	
39.	Ekraiya	A	26	6.5	36.0	0.1	31.26	T = 506 m^2/d
40.	Dhirapur	A	26	6.4	34.0	0.1	29.09	
41.	Laxminiya	29.2	37				49.27	
42.	Bijalpura	19.4	30	1.7			47.21	
43.	Manrakatti							Abondone
44.	K.Pipreadi	A	14				31.79	
45.	Kisan nager	41.6	20	1.8	36.0	21.3	51.81	

Note: SWL - Static water Leval
SA - Seasonal Artesian
L/s - Litre/second
P.T.- Pump Test
M - Meter
Q - Discharge
s - Drawdown
A - Artesian well

Damage indicates well is damaged but area is feasible.

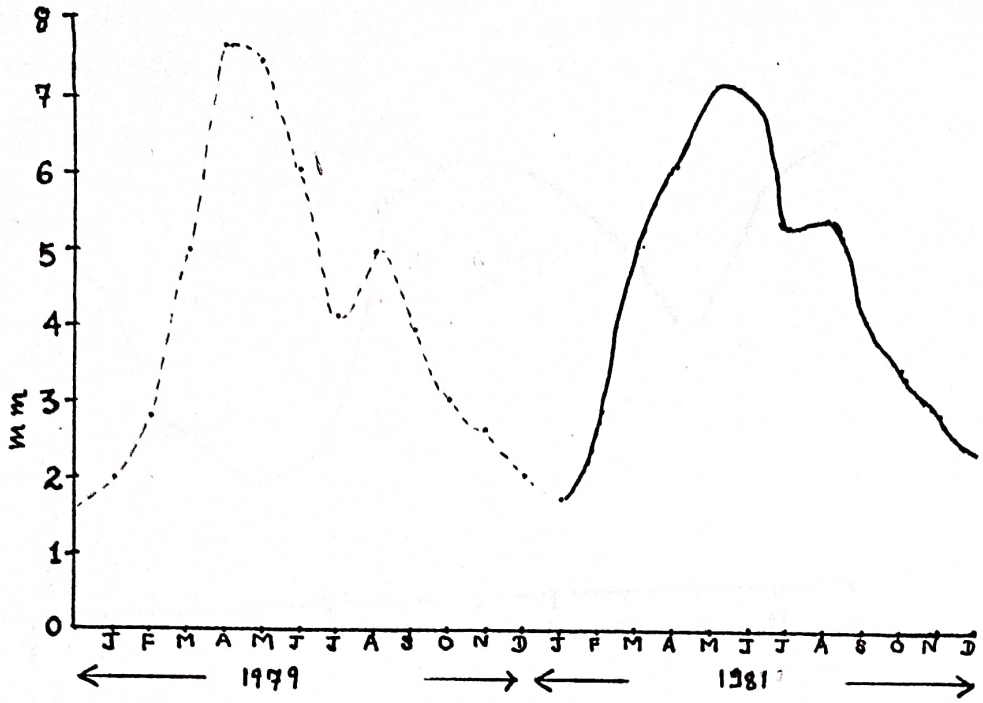
Abondoned indicates area is not feasible, so pipe is not lowered.

Pump test incharge - Khem K.C.
Gapal P. Shah

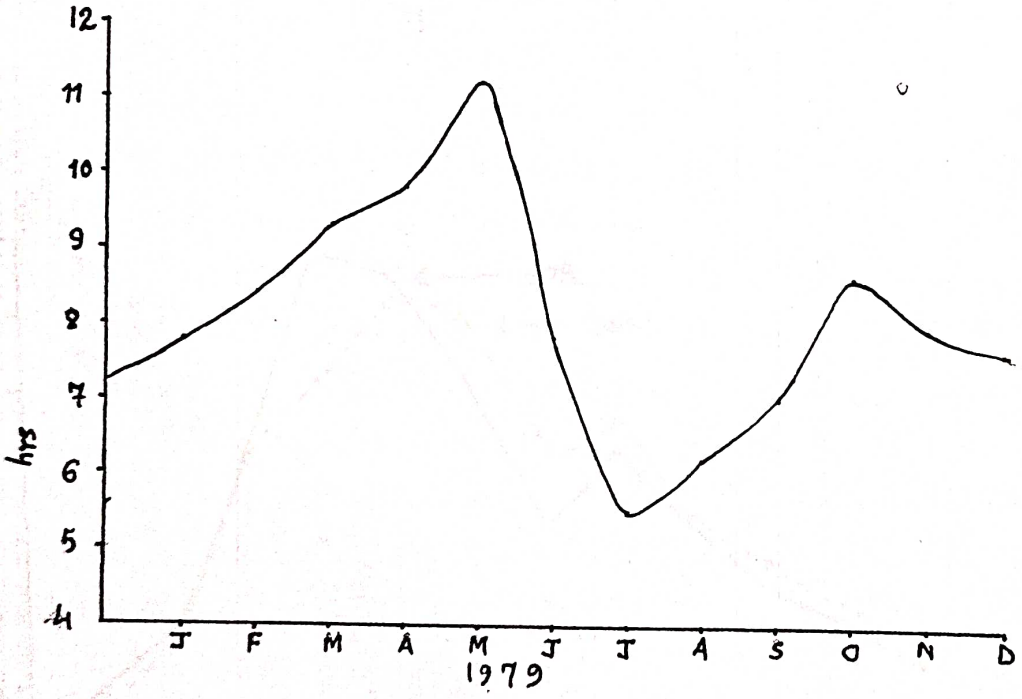
Pump running hours of DTW in Mahottari district

S. No.	Well No.	Location	Hours in 2045	Hours in 2046	Hours in 2047	Hrs.in 2048	Hrs.in 2049	Av: Hrs.
1.	1.	Jaleswor	-	-	-	82	106	94
2.	9.	Bhangaha	-	-	-	20	213	116
3.	11.	Laxminiya	439	300	418	441	598	439
4.	12.	Hathilet	111	216	154	120	376	195
5.	14.	Sripur	A R T E S I A N			W E L L		
6.	15.	Bisamverpur	,,			,,		
7.	17.	Mahottari	-	22	-	-	42	32
8.	18.	Bhargavsar	22	39	9	94	155	64
9.	19.	Ramnagar	546	310	495	917	883	630
10.	20.	Ramnagar	S T O P P E D					
11.	21.	Bijalpura	161	153	77	-	-	130
12.	24.	Dhamaura	A R T E S I A N			W E L L		
13.	26.	Hathilet	REPAIR IN 2049					
14.	29.	Belgachhi	-	68	138	18	117	85
15.	31.	Pasupatinagar	-	190	225	7	90	128
16.	32.	Bharatpur	-	130	159	249	261	200
17.	33.	Laxminiya	102	506	384	257	422	334.
18.	34.	Bijalpura	155	96	136	184	325	179
19.	35.	Phulhatta	S E A S O N A L	A R T E S I A N				
20.	36.	Pipara	A R T E S I A N			W E L L		
21.	37.	Gausala	-	-	-	56	-	56
22.	39.	Ekrahiya	A R T E S I A N			W E L L		
23.	40.	Dhirapur	,,			,,		
24.	41.	Laxminiya	-	-	311	384	305	333
25.	42.	Bijalpura	-	-	278	324	454	352
26.	44.	Khuttapipradi	A R T E S I A N			W E L L		

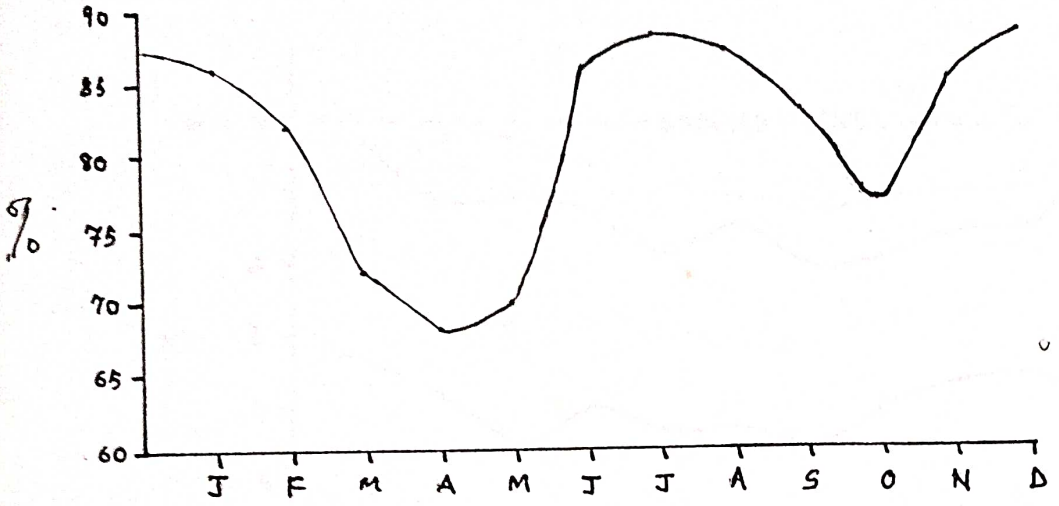
Note:
1. No maintenance work before 2049 year.
2. Drought year was 2049 i.e.April 1992-April 1993.
3. Well no. 20 can be used as well no 19 in normal condition.



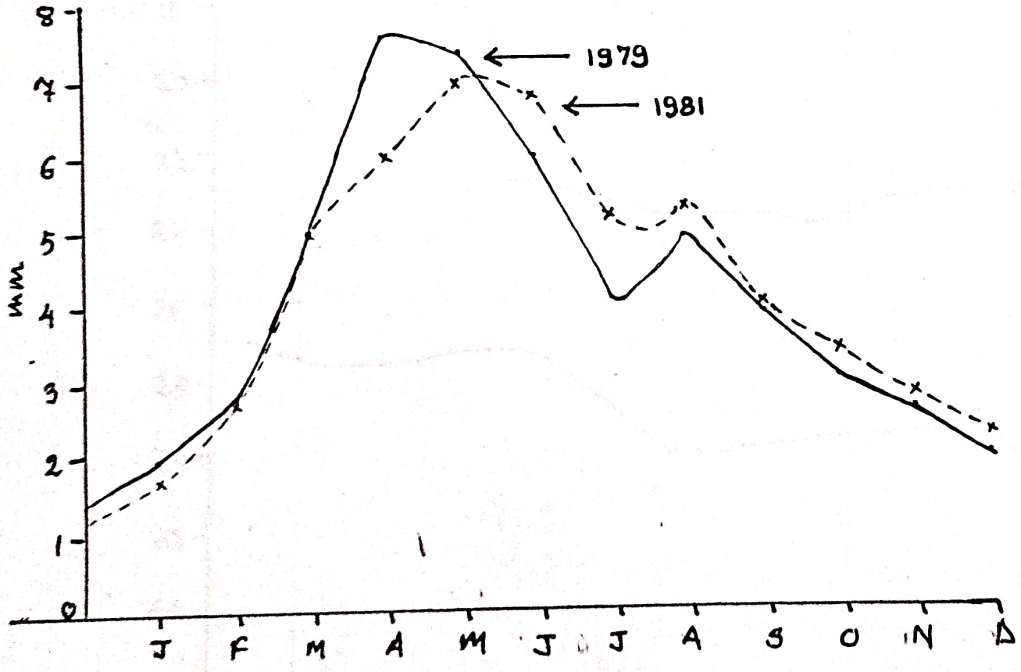
Mean monthly evaporation at Hardinath (Dhanusa) in 1979 and 1981



Mean monthly sunshine hours at Hardinath (Dhanusa) in 1979.

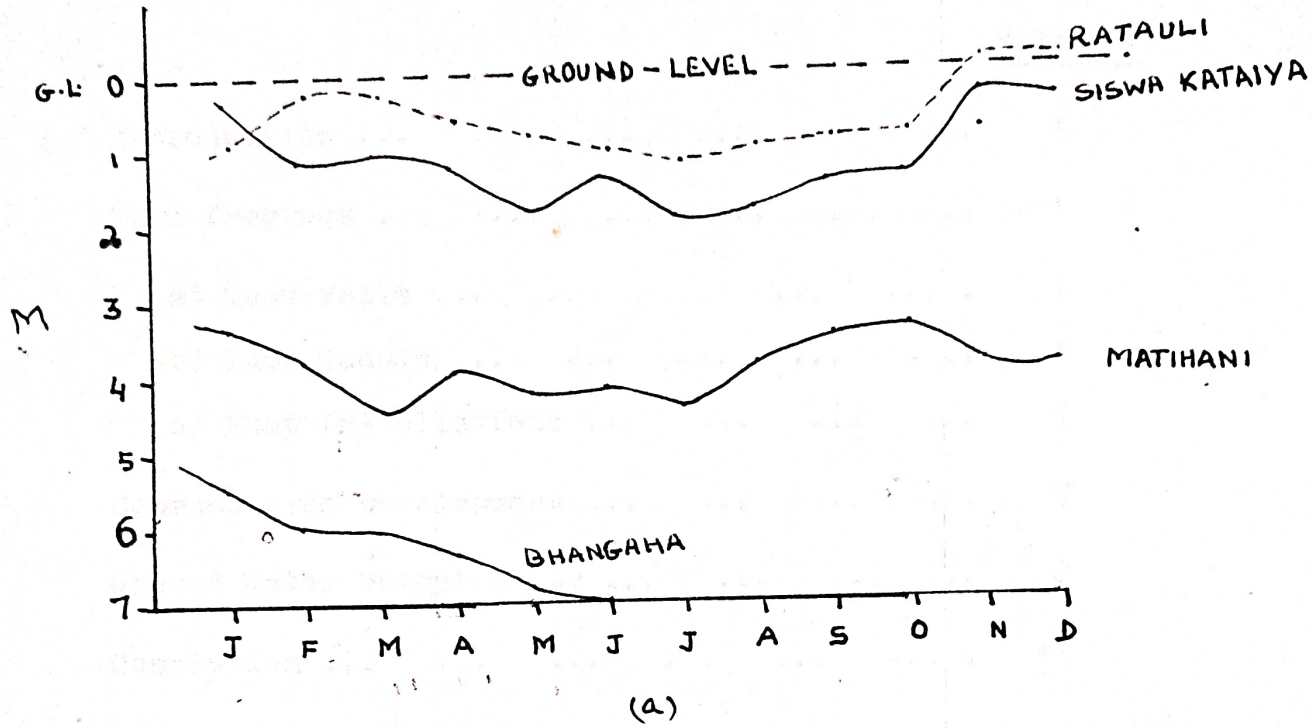


Mean daily Humidity in different months observed at 0840 at Janakpur Airport in 1982

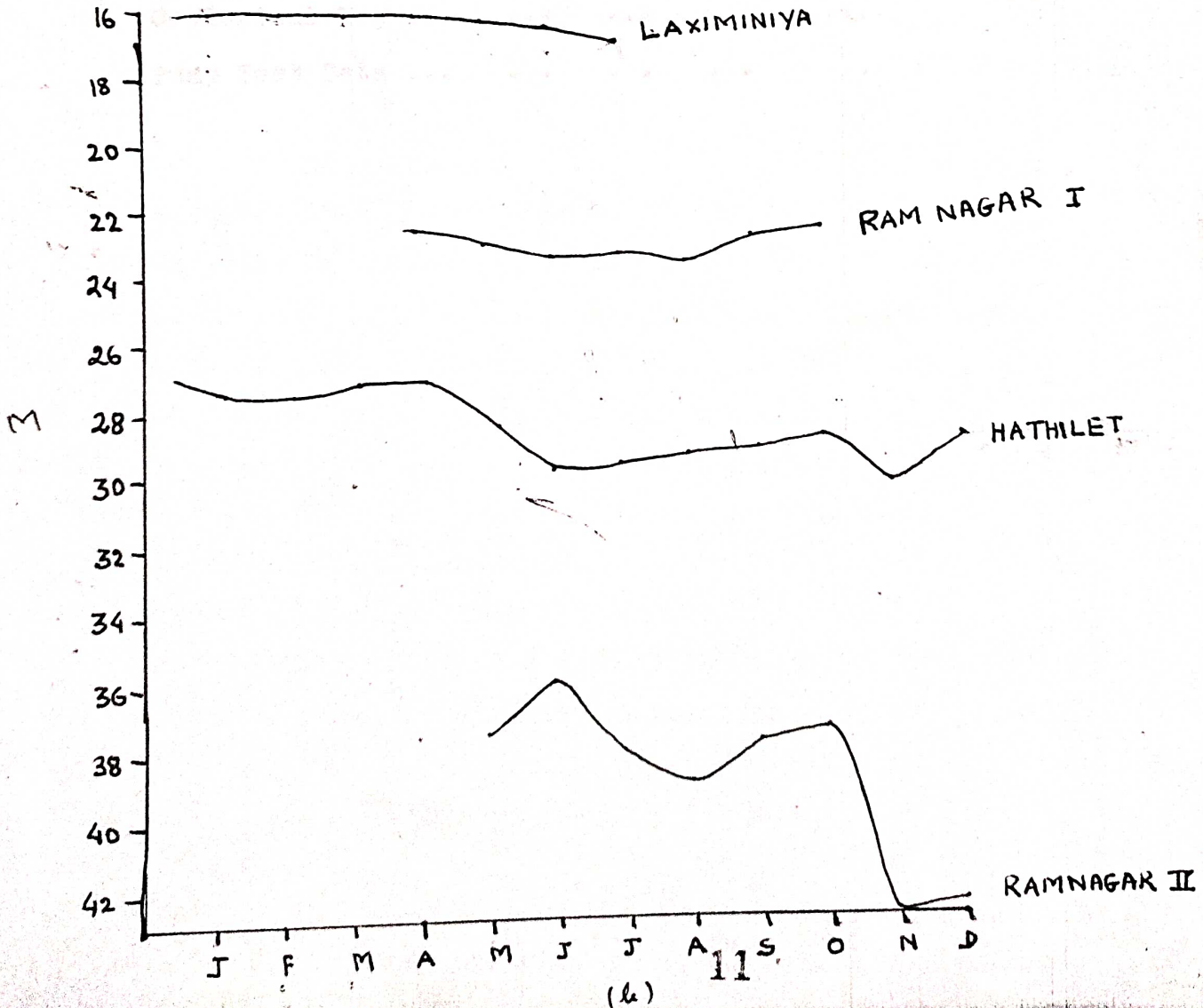


Mean monthly Evaporation at Hardinath (Mahottari) in 1979 and 1985

Well Hydrographs (a) Central and Southern Parts 1986
(b) Northern Parts 1986



(a)



(b)

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INTRODUCTION

The exploratory program for the ground water investigation was introduced in Mahottary district in the year 2040/41 with the following main objectives:-

(a) Construction of Tubewells (deep/shallow) for investigation

(b) The successful out of them to be utilized for irrigation so as to develop a command area of about 1200 hectres within 7th 5-year plan.

The program was Financed with a Grant in terms of materials only from the Government of Japan and the operational budget being born by the HMG. The Japanese Grant includes Drilling machines, Accessories, Water Tanker, Truck, Welding Generator, Vehicles, Spareparts and other materials etc.

WORK PROGRESS

(a) Tube Wells: For the drilling work in the Mahottary district one drilling machine namely TRD-300 is in the operation since last six years. 38 nos. of deep tube-wells have been constructed so far at the various locations within the Mahottary district. 40 nos. of shallow tube wells have also been drilled and completed so far including those constructed at Rautahat district in the year 2042/043. Location of deep tubewells is shown on Fig. 1. A year-wise program of the deep tube wells constructed is as follows.

Well Nos.	Location	Fiscal year
M_1	Jaleshwor	2040/041
M_2	Motihani	,,
M_3	Ekraiya	,,
M_4	Siswakataiya	,,
M_5	Pokharvinda	,,
M_6	Raghunathpur	,,
M_7	Aurhi	,,
M_8	Hathilet	,,
M_9	Bhangha	,,
M_{10}	Motihani	2041/042
M_{11}	Laxminiya	,,
M_{12}	Hathilet	,,
M_{13}	Sundarpur	,,
M_{14}	Sripur	,,
M_{15}	Bishamverpur	,,
M_{16}	Ratauli	,,
M_{17}	Mahottary	,,
M_{18}	Bhargavsar	2042/043
M_{19}	Ramnagar	,,
M_{20}	,,	,,
M_{21}	Bijalpura	,,
M_{22}	,,	,,
M_{23}	Saharwa	,,

Well Nos.	Location	Fiscal year
M24	Dhamaura	2043/044
M25	Paraul	,,
M26	Hathilet	,,
M27	Bhargavsar	,,
M28	,,	,,
M29	Belgachhy	,,
M30	Kishan Nagar	2044/045
M31	Pasupati Nagar	,,
M32	Bharatpur	,,
M33	Laxminiya	,,
M34	Bijalpura	,,
M35	Phulhatta	
M36	Pipara	2045/046
M37	Gaushala	,,
M38	Hattisharwa	,,

Five nos. of shallow wells were constructed within the Mahottary district in the year 2041/042, the successful out of them was only one at Saharwa which is being utilized for irrigation at present.

Twenty nos. of shallowwells were completed within the Rautahat district in the year 2042/043. Sixteen out of them were successful and are being utilized for irrigation.

Fifteen nos. of shallow wells (UNDP-Monitoring Wells) were constructed with the Mahottary district in the year 2045/046 and they are being utilized for Monitoring work only.

(b) **Pump Houses:** Twenty three nos. of pump houses have been constructed so far fig. 1. A year-wise progress of the construction is as follows:-

Well No.	Location	Year
M_3	Ekraiya	2041/042
M_9	Bhangaha	,,
M_{11}	Laxminiya	,,
M_{12}	Hathilet	2042/043
M_{14}	Sripur	,,
M_{18}	Bhargavsar	,,
M_{17}	Mahottary	2043/044
M_{19}	Ramnagar	,,
M_{21}	Bijalpura	,,
M_{29}	Belgachhy	2044/045
M_{26}	Hathilet	,,
M_{20}	Ramnagar	,,
M_1	Jaleshwor	,,
M_{25}	Paraul	,,
M_{24}	Dhamaura	
M_7	Aurhi	,,
M_{31}	Pashupati Nagar	,,

Well No.	Location	Year
M_{32}	Bharatpur	2045/046
M_{33}	Laxminiya	,,
M_{34}	Bijalpura	,,
M_{35}	Phulhatta	,,
M_{36}	Pipara	,,
M_{37}	Gaushala	,,

(c) **Pump Installation:** Fourteen nos. of vertical turbine pumps and one no. of centrifugal pump altogether fifteen nos. of pumps have been installed at different tube well locations within the Mahottary district so far fig. 1. A year-wise progress of pump installation is as follows:-

Well No.	Location	Installation year
M_3	Ekraiya	2042/043
M_9	Bhangaha	,,
M_{11}	Laxminiya	,,
M_{18}	Bhargavsar	2043/044
M_{19}	Ramnagar	,,
M_{21}	Bijalpura	,,
M_1	Jaleshwor	2044/045
M_{12}	Hathilet	,,
M_{17}	Mahottary	,,
M_{34}	Bijalpura	,,

Well No.	Location	Installation year
M_7	Aurhi	2045/046
M_{29}	Belgachhy	,,
M_{31}	Pashupati Nagar	,,
M_{32}	Bharatpur	,,
M_{33}	Laxminiya	,,
M_{37}	Gaushala	,,

On the artesian wells e.g. Pipara, Dhamaura, Sripur and Phulhatta pumps have not been installed so far for the economical reasons although the pump-houses have already been constructed and all the four locations mentioned above.

Pumps have not been yet installed on M_{26} Hathilet and M_{20} Ramnagar due to unavailability of suitable pumps. The water table is relatively deeper on both the wells mentioned above.

The wells have not been yet pump tested, because of deep water table. Arrangements are being made to test there wells in the year 2046/047. The tubewell M_{25} at Paraul has been pump tested already, the installation work, therefore would therefore be completed soon.

A lined channel was constructed at Ekraiya tube well in the year 2041/042. The installation of vertical turbine pump on this tube well was completed in the year 2042/043. The tube well could not be utilized for irrigation, any more, since then, because of the failure in the screen portion of the pipe assembly due to which (failure) the well started pumping sand in the heavy amount. During the remedial works at was observed that the damage occured along the screens at the bottom. 4" dia assembly was lowered inside the 6" dia pipe as according to the original design but positioning the 4" dia blind pipe opposite to the damaged portion. The water was free of sand but the discharge was not continuous because of the increase in drawdown resulted due to the reduced length of the screen. The problem was not solved even with a centrifugal pump because of the 'lift' ~~feeter~~.

A new tube well is under construction at present near by the previous well.

COMMAND AREA DEVELOPMENT

Twenty one nos. of deep tube wells including six nos. of artesian wells are being utilised for irrigation purposes at present covering about 654 hectres of land as the command area. The deep tube well which are being utilised at present are M_9, M_{13}, M_{14}, M_{15}, M_{18}, M_{19}, M_{24}, M_{12}, M_{34}, M_{17}, M_1, M_{35}, M_7, M_{29}, M_{31}, M_{33}, M_{32}, M_{37}, M_{36}, M_{11}, M_{21}.

Sixteen nos. of shallow wells being utilized since last five years for irrigation have developed about 116 hectres of command area with Rautahat and Mahottary districts. The actual area which is under command at present is therefore 770 hectres.

Command area could further increase by installing the pumps on the

(a) Previous drill wells, e.g. Hattisharwa, Phulhatta, Paraul (+60 hectres)

(b) Artesian wells e.g. Sripur, Pipara, Bishamvarpur (+ 32 hectres)

(c) Wells that have not been pumptested yet but having good discharges with the compresser e.g. Hathilet, Ramnagar (+ 8 hectres).

The project could therefore became capable to develop a command area of about 942 hectres to date. The figure could have increase by another 80 hectres, had there been no disturbence in the work due to shortage of fuel last year.

GROUND WATER POTENTIALITY

The areas having different potentiality of sub-surface water within the Mahottary district of the Janakpur zone can be observed in fig. 1. Depending upon the Transmissivities values. The area has been classified into Four Zones A,B,C and D to indicate the ground water potentiality of the area as high, medium, low and poor.

ZONE -A

The zone consists of the aquifers having high transmissivities ranging from 4000 to 18000 m^2/d, Properly constructed tubewells in this area will produce large yield with minimum effects of interference. Towards North of Gaushala, water table is deep and beyond the reach of centrifugal pump. The only way to irrigate this area therefor is by installing the high capacity deep production wells. The aquifer materials are coarse, well graded and highly permeable. Drilling is little difficult in the upper boulderly zone. Tube wells could be completed within 150 m.s. of depth.

ZONE-B

Aquifer with transmissivities ranging from 1000 to 4000 m^2/d are included in this zone. High capacity production wells could be constructed and drilling is not so difficult as that in zone A. Shallow tube wells are highly feasible in this zone. Local indigeneous method of drilling is not feasible because of the hand formation.

ZONE-C

The zone consists of the aquifers having transmissivities ranging from 500 to 1000 m^2/d. High productive aquifers are encountered generally at the deeper depths (more than 200 metres bgl) in this zone. The deepest well constructed so far is at Pipara which is 225 metres bgl. and falls an zone C. Deeper aquifers lowers south and south-west part of the district are artesian in nature yield ranging from 15 to 25 l/s.

ZONE-D

This zone represents relatively low value of transmissibility ranging from 100 to 500 m^2/d. Transmissibility decreases towards south and eastward within the zone. Towards the northern part, shallow tube well are observed feasible. Local indigeneous method can be utilised to drill shallow wells in this zone an also an zone C. Because of fines zone C lowers the southern tip of the district is not in general suitable for shallow tube well development on the other hand, the some in the middle part of the zone is quick feasible for shallow tube wells development.

ZONE-E

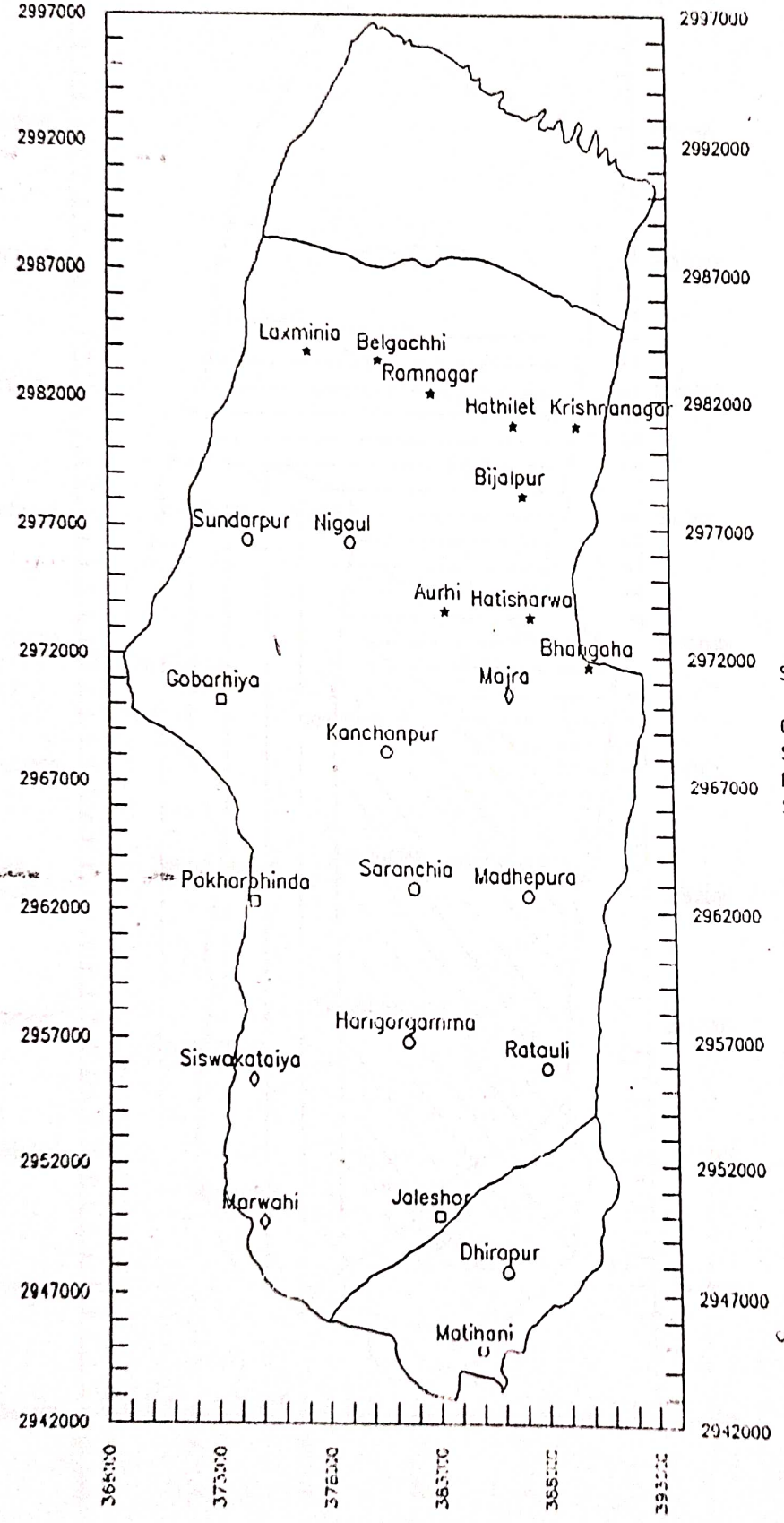
The area having vary poor potentiality of the sub-surface water is included in this zone.

In zone the potentialities of ground water approximate estimation based on the computed values is being made. So, modification or change in interpretation due further work or study is not uncommon. Zone A has been broadly classed, actually it could have classified into two e.g. 4000 - 9000 m^2/d and 9000 - 18000 m^2/d.

CONCLUSION

The area is general have good potentialist of ground water except zone E and some parts of zone D. Ground water blocks, by installing logs capacity deep production tubewells could be developed, throughout the area occupied by Zone A. Shallow tubewell development is not possible in this zone. B or C are best suited for shallow tubewell development. Because of fines predominance in the aquifer material shallow tube wells towards southern part (Zone C) are not observed feasible. Deep tube wells at greater depths are feasible in this zone C. Drilling in the Bhaber are the adjoining areas is defficult because of the upper boulder layer present through out. Common decrease lowers south. Deeper depths aquifers (200-2025 m.s. bgl.) even in the southern part are artisian in nature with yield ranging from 15 to 25 l/s.

MAHOTTARI – LOCATION OF WELLS



SYMBOLS:

Circle - UN STW pump tested
Square - UN STW not pump tested
Rhombus - UN STW abandoned
Star - GWRDB DTW

APPENDIX 1

GROUND WATER DEVELOPMENT FEASIBILITY

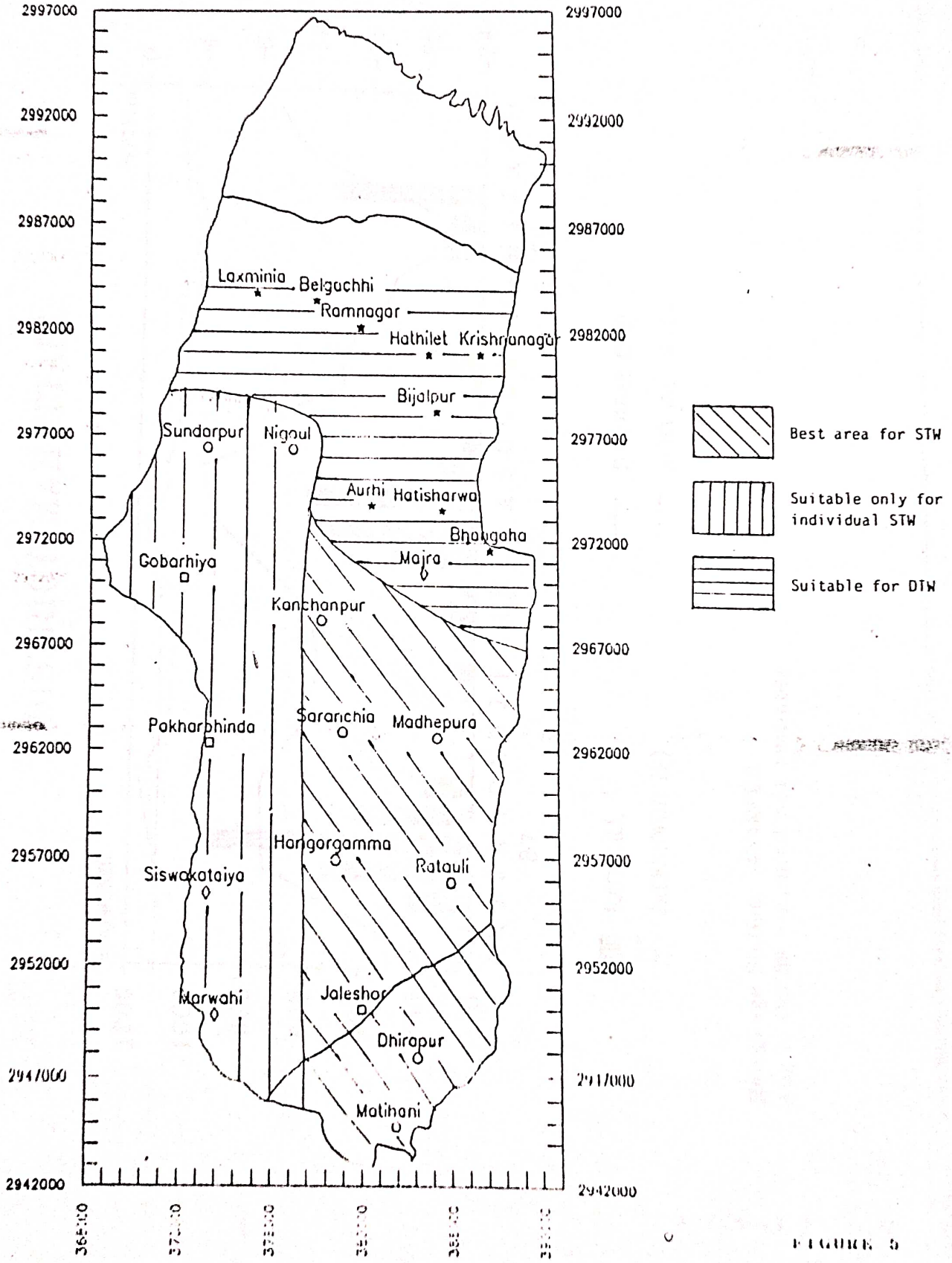
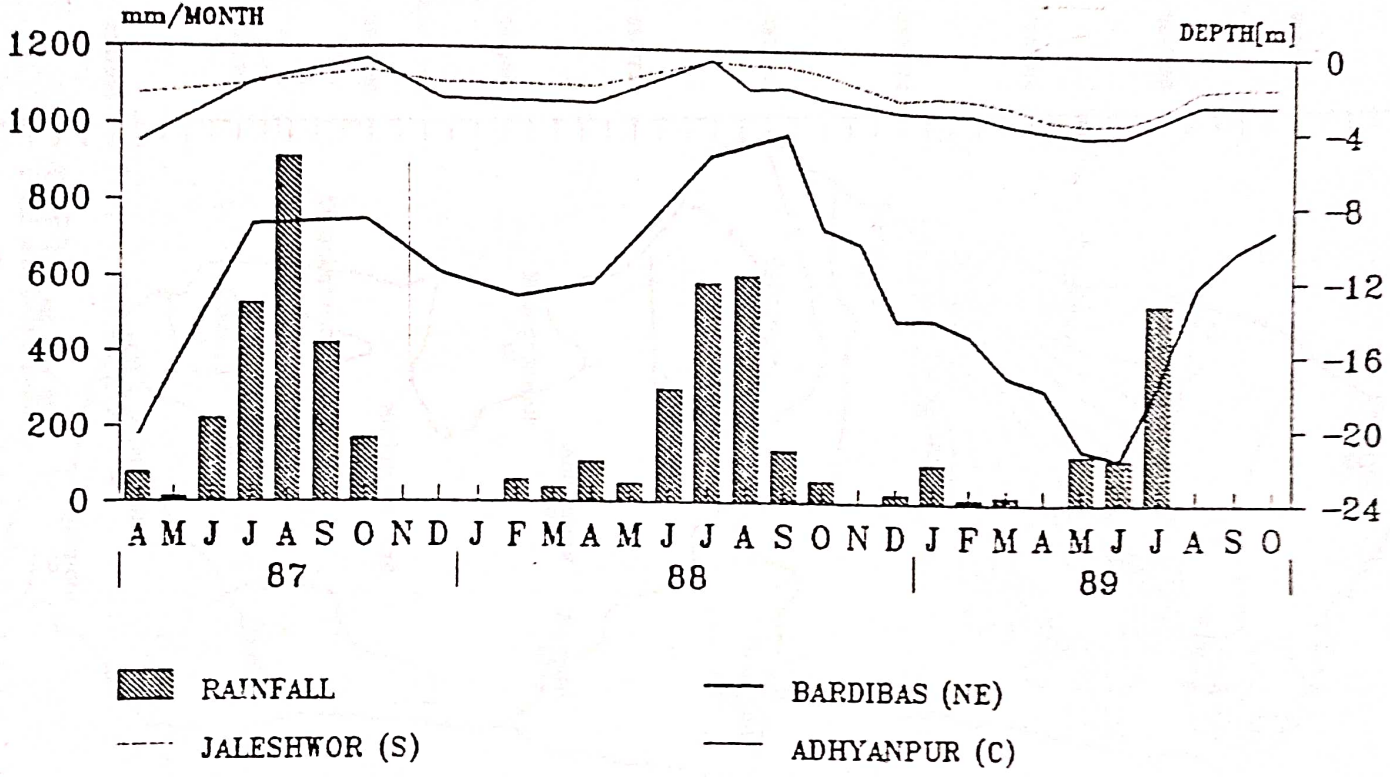


FIGURE 5

DEPTH TO WATER TABLE & RAINFALL 1987–89

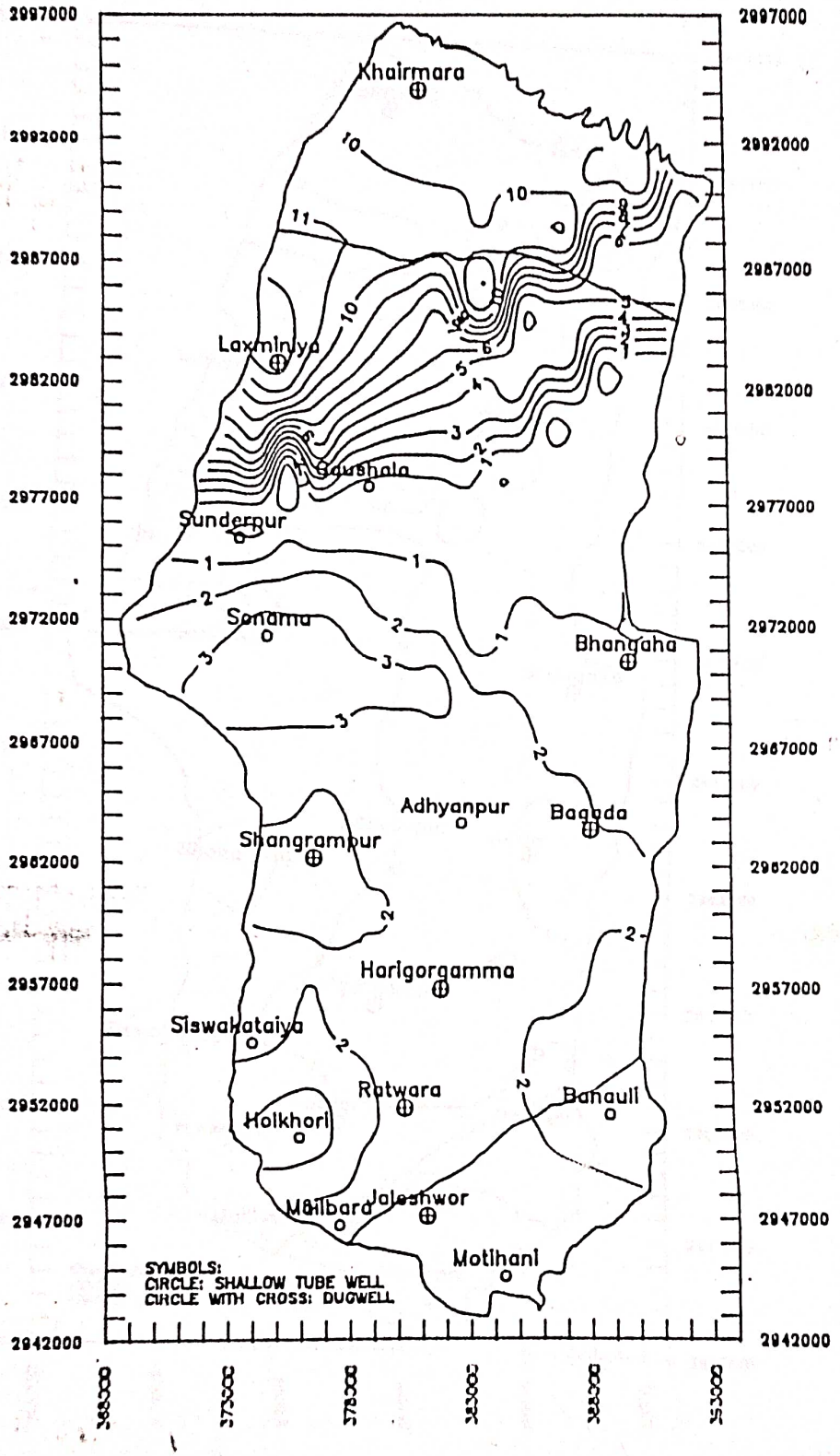
DISTRICT MAHOTTARI



Raingauge Station: JANAKPUR
Aug to Oct'89 – rainfall not available

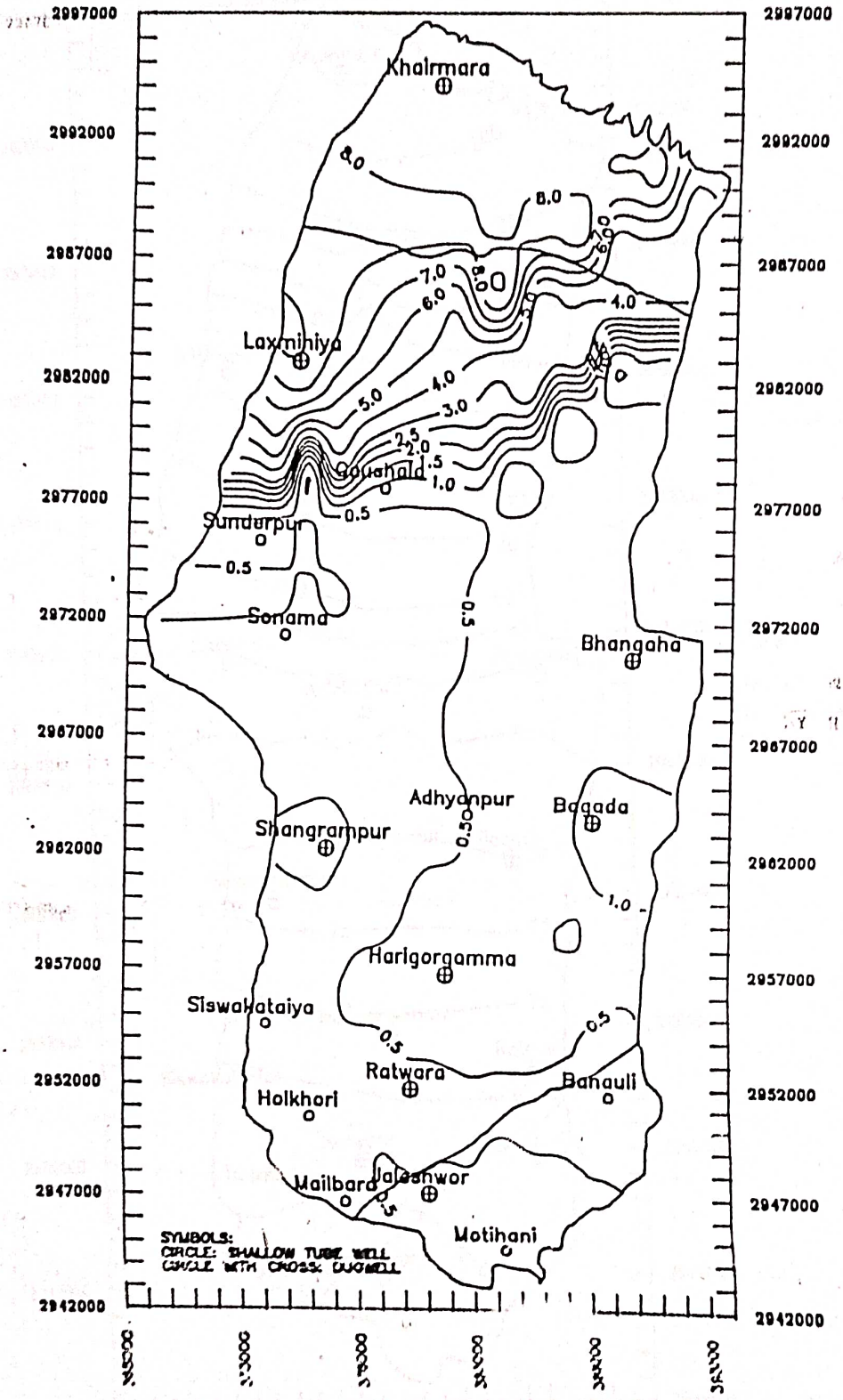
APPENDIX 7

MAHOTTARI DEPTH TO WATER TABLE APRIL 1988



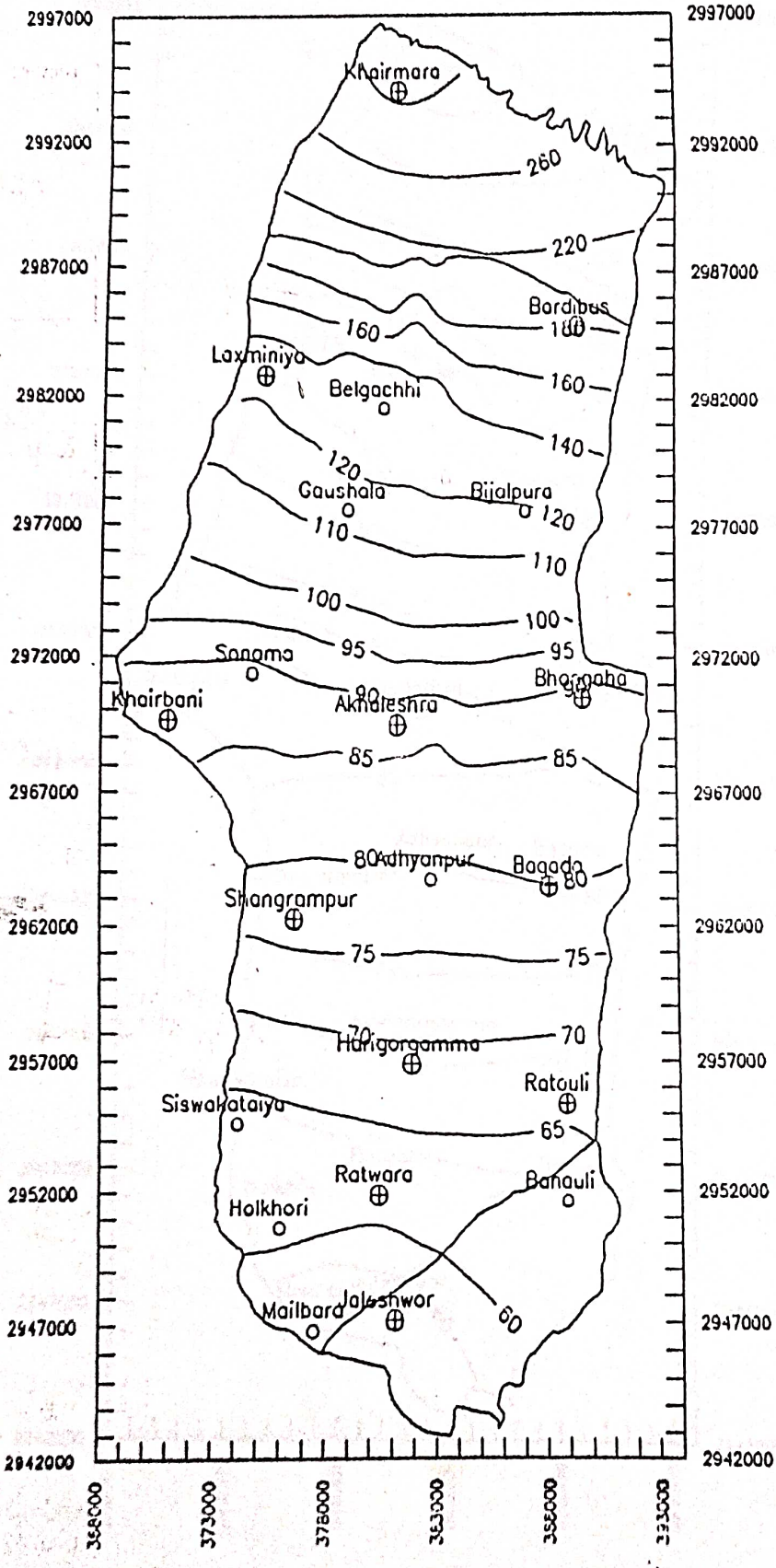
APPENDIX 8/2

MAHOTTARI DEPTH TO WATER TABLE JULY 1988



APPENDIX 8/3

WATER LEVEL CONTOURS MAY 1989



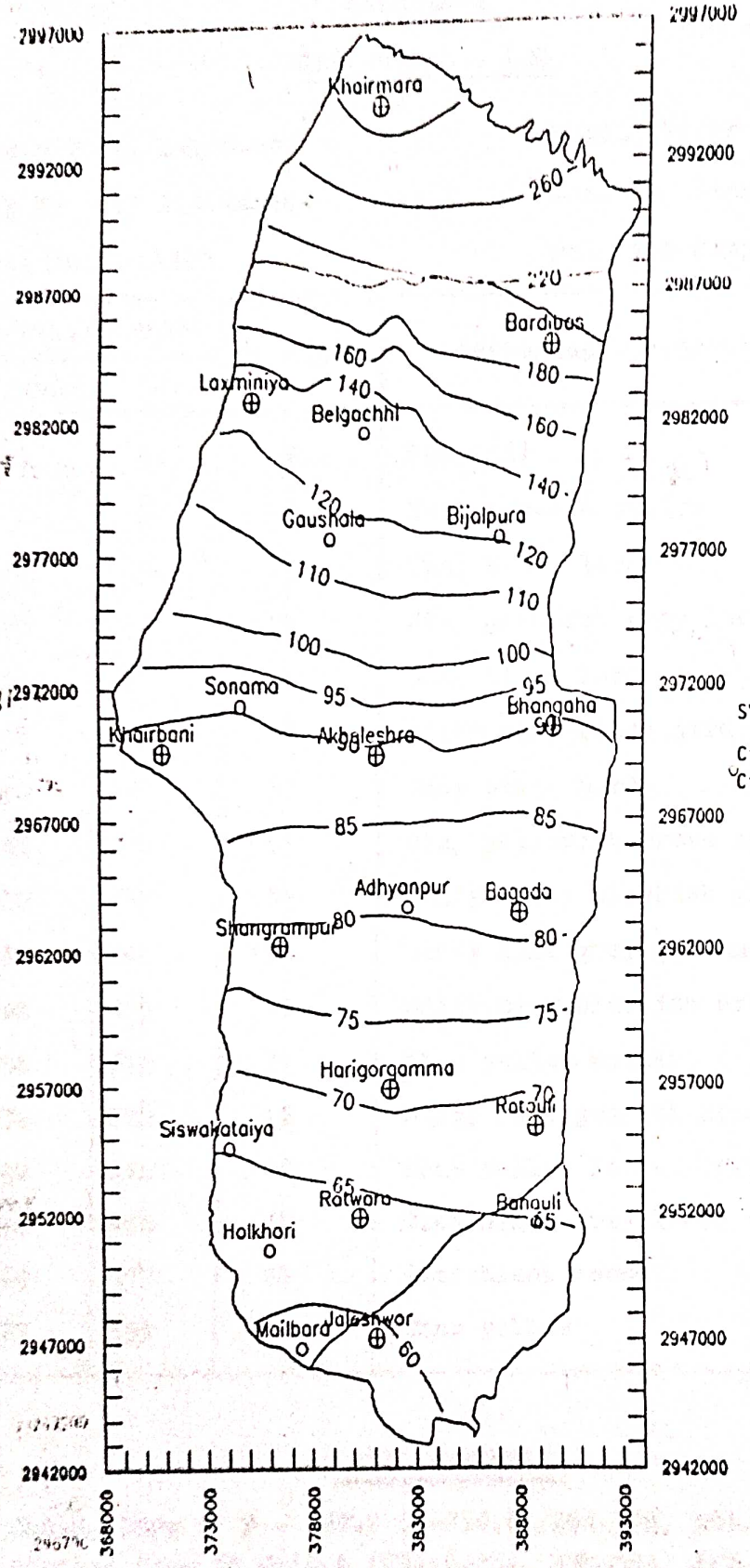
SYMBOLS:

Circle - Shallow Tubewell

Circle with Cross - Dug Well

APPENDIX 8/8

WATER LEVEL CONTOURS OCT 1989



SYMBOLS:

Circle - Shallow Tubewell

Circle with Cross - Dug Well

APPENDIX 8/9

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Jaleswar

Log By :- A.N.Mandal

Well No. :- MH/1

Static Water Level :- 0.30 m.

Drilling Started :- 2040/9/3

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	4	4	Top soil	
4	8	4	Sand brown & yellow	
8	15	7	Clay brown loose	
15	30	15	Clay greenish grey loose	
30	85	55	Clay black hard	
85	90	5	Silty clay black hard	
90	145	55	Clay black hard	
145	200	55	Clay yellowish brown loose	
200	238	38	Sandy silty blackish grey	
238	342	104	Sandy silt grey medium to fine	
342	355	13	Silty clay blackish brown	
355	376	21	Clay yellow sticky	
376	392	16	Silty sand greyish black	
392	410	18	Clay yellow loose	
410	450	40	Clay black grey loose to medium	
459	477	27	Clay black loose	
477	559	122	Clay yellow	

WELL ASSEMBLY

1. Casing Pipe 6" Ø - 387.2 (0-234.6, 254-378, 388-417 G.L.)
2. Slotted Pipe 6" Ø 49.6 (234.6-254, 378-388, 417-437)
3. Bail Plug 20 (437-457)
4. Total lowering 459.0

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Matihani

Log By :- A.N.Mandal

Well No. :- MH/2

Static Water Level :- 3.65 m.

Drilling Started :-

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	18	18	Top soil	
18	33	15	Clay and silt brown loose	
33	76	43	Sand with silt blackish grey medium to poor.	
76	113	42	Clay with silt blackish grey to yellowish green sticky	
118	275	157	Clay with silt, yellowish green, sticky	
275	288	13	Sand with silt	No sample
332	352	20	Silt and gravels with sand medium to poor	
352	377	25	Clay brownish, yellow sticky plastic	
377	407	30	Silt and gravels with sand, grey poor graned.	
407	516	109	Clay with silt, brownish yellow loose.	

WELL ASSEMBLY

1. Casing Pipe 10" Ø - 127 (0 - 127)
2. Casing Pipe 6" Ø - 223+2.10 (128.4-250.4, 265.4-310.4, 320.4 - 345.4, 365.4-390.4 + G.L.)
3. Reducer 10/6" Ø - 1.4
4. Bail Plug 20
5. Total lowering - 432-10
6. Slotted Pipe - 60 (255.4 - 265.4, 310.4 - 320.4, 345.4-365.4, 390.4 - 410.4)

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Ekraiya

Log By :- A.N.Mandal

Well No. :- MH/3

Static Water Level :- 1.82 m

Drilling Started :- 040/10/2

Drilling Completed :- 040/10/15

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	10	10	Top soil	
10	26	16	Clay blackish to grey sticky	
26	140	114	Clay sandy, light grey	
140	270	130	Clay silty light yellow, black loose.	
270	291	21	Sand fine with silt poor to medium graned	
291	331	60	Clay grey sticky plastic	
331	420	89	Clay black loose	
420	445	25	Sand with silt	No sample
445	495	50	Clay black to grey sticky	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 95 (0-95-2)
2. ,, - 6" Ø - 75.1 (106.4-129.6, 137.6-155.6, 163.6 - 240, 250 - 268)
3. Slotted Pipe - 6" Ø - 54 - (96.4-106.4, 129.6-137.6, 155.6-163.6 240.0 - 250, 268-286)
4. Reducer - 10/6" - 1.4
5. Bail Plug - 18 - 286 - 304
6. Total lowering - 306

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Sisba Kataiya

Log By :- A.N.Mandal

Well No. :- MH/4

Static Water Level :-

Drilling Started :- 040/11/7

Drilling Completed :- 040/11/24

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	20	20	Top soil	
20	30	10	Clay brownish yellow, loose	
30	231	201	Sand silty poor graned	
231	252	21	Clay light brown sticky to medium loose	
252	272	20	Clay brownish yellow loose to sticky	
272	293	21	Clay sandy medium to hard	
293	313	20	Silt stone mostly sub-angular to pebbles & cobbles	
313	352	39	Sandy silt, poor to well graned mostly silt stone are cuttings	
352	372	20	Silt stone and gravels,mostly silt stone, gravels angular to sub-angular	
372	393	21	Silt with sand	
393	475	82	Silt with sand	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 114.5 + G.L. (0-114.5 - 2)
2. ,, - 6" Ø - 127.0 (116.0 - 243.0)
3. Slotted Pipe- 6" Ø - 54.0 (243.0 - 297.0)
4. Reducer - 10/6" Ø - 1.7
5. Bail Plug - 9.5 - (297.0 - 306.5)
6. Total lowering - 308.5

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Pokharbhinda

Log By :- A.N.Mandal

Well No. :- MH/5

Static Water Level :- Weak Artision

Drilling Started :- 040/11/15

Drilling Completed :- 040/12/1

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	12	12	Top soil	
12	45	33	Clay yellowish grey	
45	66	27	Clay grey sandy medium	
66	76	10	Sand medium gravel	
76	106	30	Clay silty dark grey, medium to hard silt mostly poor grained.	
106	150	44	Sandy clay with silt light yellow	
150	170	20	Clay silty yellow	
170	180	10	Sand fine well graned light grey	
180	225	45	Clay dark grey sticky medium to hard	
225	263	38	Sand and gravels with clay coarse to medium gravels mostly quartzite subangular	
263	275	12	Clay light grey sticky	
275	288	13	Sand	No sample
288	307	19	Clay grey sticky	
307	325	16	Sand with silt	No sample according to sound
325	328	5	Clay light yellow silty	
328	344	15	Gravels medium with sand mostly quartzite and poor to fine graned.	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
344	394	50	Clay with silty grey	
394	399	5	Sand with gravels	
399	438	39	Clay brown grey sticky	
438	511	28	Gravels medium to fine sub-angular to pebble and pebble quartz & quartzite	
511	540	29	Clay yellow	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 109 + G.L. (0-109+7.6)
2. ,, - 6" Ø - 153 (110.7 - 205, 259-307, 317-328)
3. Slotted Pipe - 6" Ø 76 (205-259, 307-377, 328-340)
4. Reducer - 10/6" Ø - 1.7
5. Bail Plug - 19.0

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Raghunathpur

Log By :- A.N.Mandal

Well No. :- MH/6

Static Water Level :- Weak Artision

Drilling Started :-

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	14	14	Top soil	
14	22	8	Clay black loose	
22	33	11	Sand fine well graned	
33	40	7	Clay black	
40	80	40	Sand fine	
80	104	24	Clay grey	
104	150	46	Sand silty(with clay mix) sand poor	
166	207	41	Clay light yellow	
207	250	43	Clay grey sticky	
250	267	17	Sand with silt	
267	290	23	Sand & silt stone modules, mostly silt stone nodules sub angular sand	
290	305	15	Sand and gravel with silt & clay	
305	310	5	Gravel with silt and clay	
310	316	6	Clay dark grey	
316	330	14	Silt stone with gravel mostly rusted	
330	342	12	Clay grey sticky	
342	351	9	Sand fine with gravels fine coarses	
351	372	21	Gravel with medium coarse grained quartz	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
372	392	20	Gravel medium to coarse sub-angular to sub rounded	
392	408	16	Clay grey sticky	
408	422	14	Sand with gravels, medium to coarse	
422	434	12	Clay black	
434	445	11	Sand with gravels	
445	560	15	Clay grey sticky	
560	564	4	Gravels	

WELL ASSEMBLY

1. Casing Pipe 10" - 111-1.6 (0-110, - G.L.)
2. ,, 6" - 183.3 (112.7 - 227.7, 234.7 - 263.0, 281.2 - 327.0)
3. Slotted Pipe 6" - 57.2 (221.7 - 234.7, 263.0 - 281.0, 327'0-353.0)
4. Reducer - 10/6 - 1.7
5. Bail Plug - 18.2
6. Total lowering - 370.6

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Aurhi

Log By :- A.N.Mandal

Well No. :- MH/7

Static Water Level :- 3.96 m

Drilling Started :- 041/1/9

Drilling Completed :- 041/2/2

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	10	10	Top sandy clay	
10	17	7	Sandy clay yellow	
17	25	8	Clay sandy grey	
25	45	20	Gravels fine to medium	
45	66	21	Gravels fine to medium	
66	86	20	Gravels fine with clay light grey	
86	102	16	Gravels fine grey	
102	127	25	Clay with gravels fine	
127	148	21	Gravels fine to medium	
148	168	20	,, ,,	
168	189	21	Gravels with clay 50% each	
189	209	20	Gravels medium with clay	
209	230	21	Gravels coarse sub-angular	
230	245	15	Clay light yellow sticky	
245	271	26	Gravels coarse sub-angular with cuttings	
271	291	20	Gravels fine dot medium sub-angular	
291	338	47	Gravels fine to medium with sand	
338	350	12	Gravels medium to coarse angular to sub-rounded	

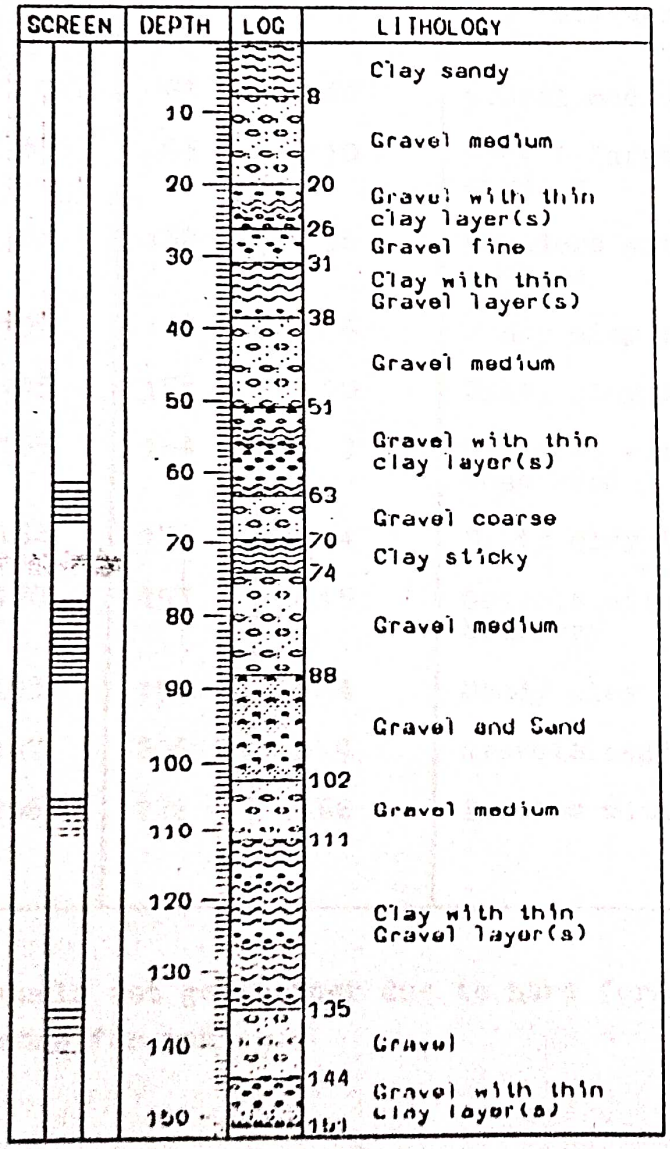
Depth in Metre		Thickness	Geological Description	Remarks
From	To			
350	368	18	Gravels fine to medium angular	
368	380	12	Clay dark grey	
380	385	5	Clay grey with gravels	
385	390	5	Gravels medium to coarse angular to sub-rounded brown	
390	437	47	Clay yellowish light	
437	447	10	Clay light yellow	
447	500	23	Gravels with clay	

WELL ASSEMBLY

1. Casing Pipe 10" Ø - 110.8 + G.L. (0.110.8, 1.6)
2. ,, 6" Ø - 261.2(111.3-203.0, 221.0-257.6, 293.10 - 346.4, 364.0 - 446.0)
3. Slotted Pipe 6" Ø - 90.6(203.0-221.0, 257.6-293.10, 364.6 , 446.0, 464.0)
4. Reducer - 10/6" (0-7)
5. Bail Plug - 12.0
6. Total lowering - 457.6

Well No. DTW 7	Location: Aurhi
Elevation: 100	X = 383550 Y = 2973750
Method of Drilling: RIG	
Drilling Dates : 21.4.84	
Total Depth : 151.50	
Comments : Well Size: 10"/6" Screen Position:61.5- 67.0, 78.0- 89.0 m 105.0-110.5,135.2-140.6 m Drilled Under: GWRDB/Mahottari Project	

W E L L L O G



APPENDIX 3/16

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Hathilet

Log By :-

Well No. :- MH/8

Static Water Level :- 33.53 m

Drilling Started :-

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	3	3	Top soil sandy clay yellowish brown	
3	63	60	Gravel medium with coarse sand	
63	83	10	Gravel large with cobbles cutting	
83	139	56	Boulders with pebbles and cobbles	
139	145	6	Sandy clay yellow	
145	155	10	Silty clay sticky & plastic	
155	164	9	Boulders with pebbles with some sand	
164	178	14	Silty clay loam yellow	
178	193	15	Gravels with cutting of boulders	
193	197	4	Sandy clay loam sticky yellow	
197	206	9	Gravels medium to large	
206	272	66	Pebbles with boulders cuttings	

Could not go further due to hard formation. No satisfactory zone for taking.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Bhangaha

Log By :- A.N.Mandal

Well No. :- MH/9

Static Water Level :- 9.45 m.

Drilling Started :- 041/2/5

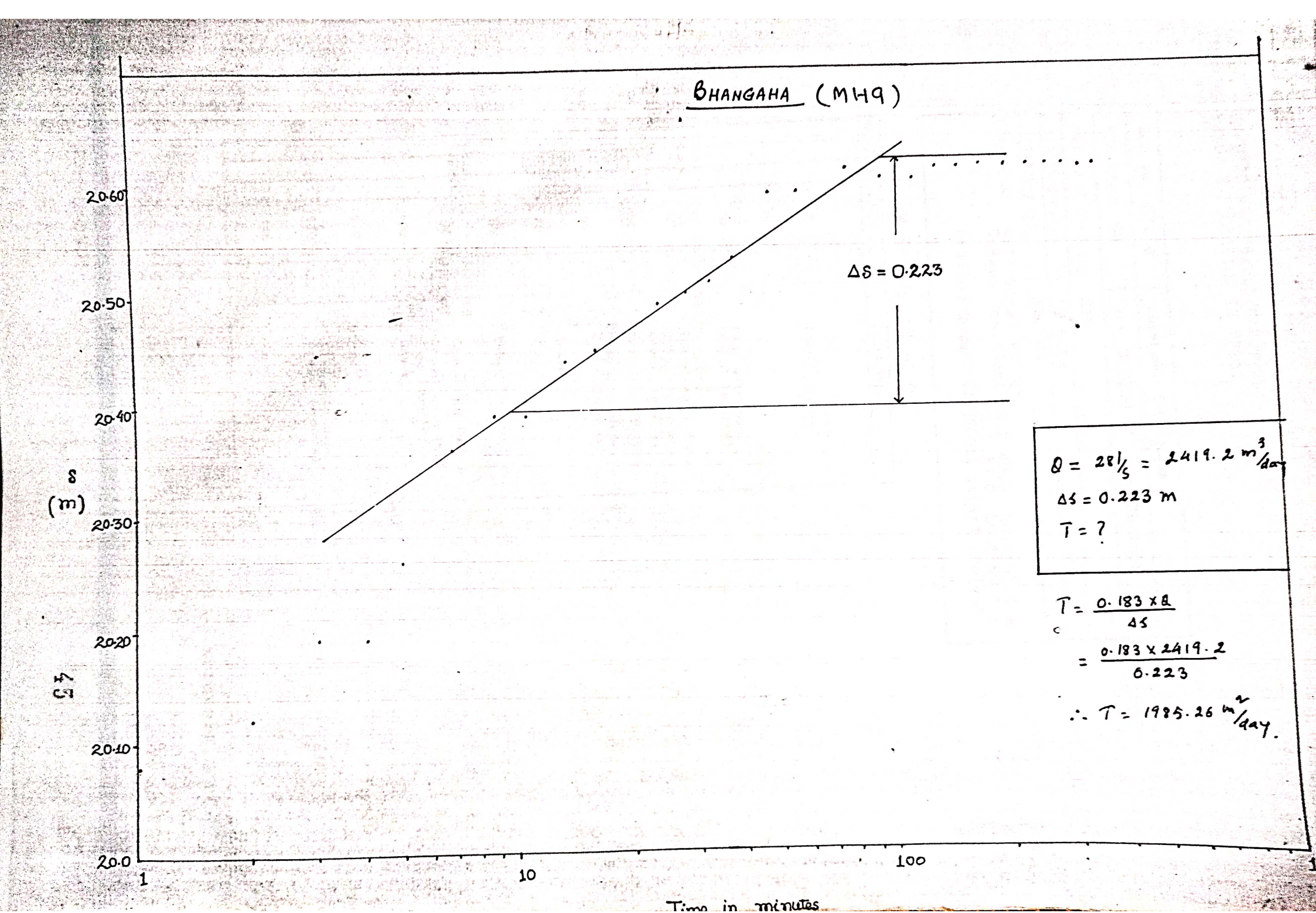
Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	5	5	Top soil	
5	10	5	Gravel medium to coarse sub-angular	
10	22	12	Gravels coarse, mostly sub-round with cuttings quartz	
22	33	11	Gravels mostly cutting with sub-angular, quartz & quartzite	
33	50	17	Gravels coarse angular pebbles & pebbles with cuttings quartzite & quartz.	
50	60	10	Gravels mostly cuttings, sub-round gravels quartz.	
60	76	16	Pebble 1-2 c.m. angular to sub-angular well graned quartz	
76	119	43	Clay with gravel light yellow	
119	139	29	Gravels with pebbles sub-angular to angular quartz.	
139	154	15	Clay with gravels yellow	
154	180	26	Gravels mostly pebbles sub-rounded to angular quartz.	
180	196	16	Clay with gravels yellow	
196	243	47	Gravels with cuttings sub-rounded quartz.	
243	267	24	Clay with gravels clay yellow gravels small cuttings	
267	283	6	Gravels with small cuttings pebbles mostly poor graned	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
283	285	2	Clay grey yellow	
285	300	15	Pebble sub-rounded to angular & with cuttings mostly quartzite	
300	327	27	Gravels with clay yellow 60% gravels 40% clay cuttings.	
327	337	10	Gravels mostly angular with cuttings	
337	346	9	Clay dark grey sticky	
346	352	6	Gravels sub-round to angular quartz	
352	375	23	No sample	
375	382	7	,,	
382	452	70	Clay dark grey with brown patenes.	

WELL ASSEMBLY

1. Casing Pipe 10" Ø - 119.0 + G.L. (0-119.0)
2. ,, 6" Ø - 106.0 (135.0-166.0,173.0,205.0,205.0-241.0, 284-294)
3. Slotted Pipe 6" Ø - 69.0 (119.7-135.0,166.0-173.0,205.0-241.0, 284-294.0)
4. Reducer 10/6" - 0.7
5. Bail Plug - 10.0
6. Total lowering - 304.0



$Q = 28 l/s = 2419.2 \ m^3/day$

$\Delta s = 0.223 \ m$

$T = ?$

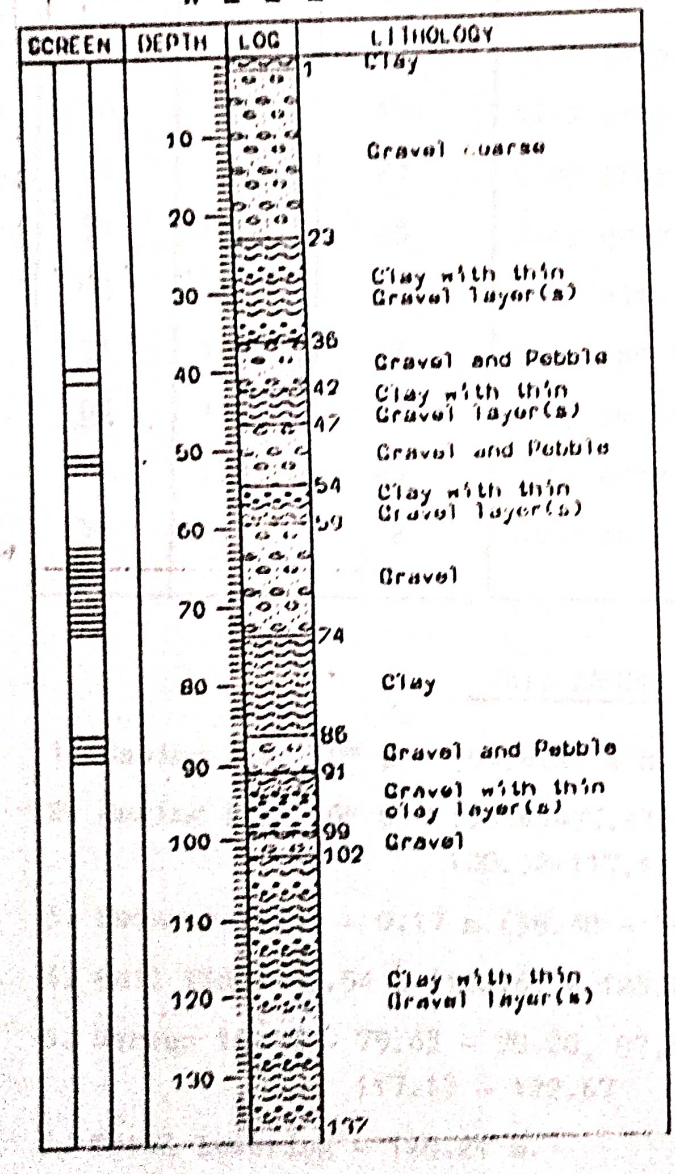
$$T = \frac{0.183 \times Q}{\Delta s}$$

$$= \frac{0.183 \times 2419.2}{0.223}$$

$$\therefore T = 1985.26 \ m^2/day.$$

Well No. DTW 9	Location: Dhangaha
Elevation: 98	x = 390200 y = 2971600
Method of Drilling: RIG	
Drilling Dates : 18.5.84	
Total Depth : 137.00	
Comments : Well Size: 10"/6" Screen Position: 30.2-40.9, 50.2-52.4 m 62.1-73.0, 86.1-89.1 m Drilled Under: GWRDB/Mahottari Project	

W E L L L O G



APPENDIX 3/17

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Matihani

Log By :- R.S.Prajapati

Well No. :- MH/10

Static Water Level :- 3.65 m

Drilling Started :- 041/9/20

Drilling Completed :- 041/10/23

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	1	1	Top soil brown	
1	18	17	Clay grey sticky	
18	28	10	Clay grey to yellow	
28	55	27	Clay grey to sticky	
55	80	25	Clay grey to sticky	
80	91	11	Clay with silt, yellow	
91	105	14	Sand and silt	
105	111	6	Clay yellowish	
111	136	25	Clay grey sticky	
136	138	2	Clay dark grey sticky	

WELL ASSEMBLY

1. Casing Pipe 10" Ø - (0-36.48 + G.L.)
2. Casing Pipe 6" Ø - (36.65-75.43, 78.20-92.20, 94.97-103.28, 108.32-117.13)
3. Reducer 10/6" - 0.17 m (36.48 - 36.65)
4. Bail Plug - 5.54 m (122.67 - 128.21)
5. Screen 16.14 - 75.43 - 78.20, 92,20 - 94.97, 103.26-108.32, 117.13 - 122.67
6. Total lowering - 128.21 m.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Laxminiya

Log By :- R.S.Prajapati

Well No. :- MH/11

Static Water Level :- 19.20 m.

Drilling Started :-

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	3	3	Sand fine	
3	5	2	Clay yellowish to grey sticky hard	
5	20	15	Gravel with sand, sst. and fine pebbles	
20	24	4	Clay & gravel mixed sticky	
24	29	5	Gravel cobble medium grey	
29	33	4	Clay yellowish sticky hard gravels	
33	38	5	Gravel fine pebble medium grey	
38	45	7	Clay yellowish sticky hard	
45	48	3	Gravel fine pebble sst.	
80	70	22	Clay sticky yellowish to grey	
70	76	6	Gravel with sand, sst.pebble	
76	87	11	Clay sandy yellowish	
87	93	6	Gravel with sand & sst.	
93	99	6	Clay yellowish to grey sticky	
99	122	23	Gravel & sst. cobble grey	
122	123	1	Clay sandy, yellow	

WELL ASSEMBLY

1. Casing Pipe - 10" - 43.86 m - (0-43.47 + G.L.)
2. ,, 6" - 52.91 m - (43.64-71.34,75.76-86.84,89.92-101.0)
3. Slotted Pipe - 6" - 22.21 m - (71.34-75.76,86.84-89.92,101.0-115.71)
4. Reducer -10/6" - 0.17 m - (43.47 - 43.64)
5. Bail Plug - 6" - 3.05 m. (115.71 - 118.76)
6. Total lowering - 118.76 m.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Hathilet

Log By :- R.S.Prajapati

Well No. :- MH/12

Static Water Level :- 30.48 m.

Drilling Started :- 041/10/28

Drilling Completed :- 041/11/28

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	5	5	Top soil	
5	9	4	Gravels with cuttings pebbles cobbles with boulders	
9	20	11	Gravels with cuttings pebbles cobbles with boulders	
20	24.32	4.32	,, ,,	
24.32	26.82	2.50	Clay yellow	
26.82	31.07	4.25	Gravels with cuttings pebbles and cobbles	
31.07	37.32	6.25	Clay yellow sticky	
37.32	40.57	3.25	Gravel with cuttings boulders	
40.57	40.67	0.10	Clay yellow sticky	
40.67	57.87	17.20	Gravels with cuttings pebbles and cobbles	
57.87	64.12	6.25	Clay yellow with gravels	
64.12	70.12	6.00	Gravels with cuttings pebbles and cobbles	
70.12	75.62	5.50	Clay yelow	
75.62	76.37	0.75	Gravel with cutting boulders	
76.37	80.87	4.50	Clay yellow sticky	
80.87	107.87	24.00	Gravels with cuttings pebbles and cobbles	

WELL ASSEMBLY

1. Casing Pipe - 10" ø - 51.95 m. (0-51.95) + G.L.
2. ,, - 6" ø - 34.74 m. (49.13 - 83.87)
3. Slotted Pipe 6" ø - 22.58 m. (83.87 - 106.45)
4. Bail Plug - 6" ø - 1.59 m. (106.45-108.83 m.)

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Sundarpur

Log By :- R.S.Prajapati

Well No. :- MH/13\

Static Water Level :- Weak Artision

Drilling Started :- 040/9/3

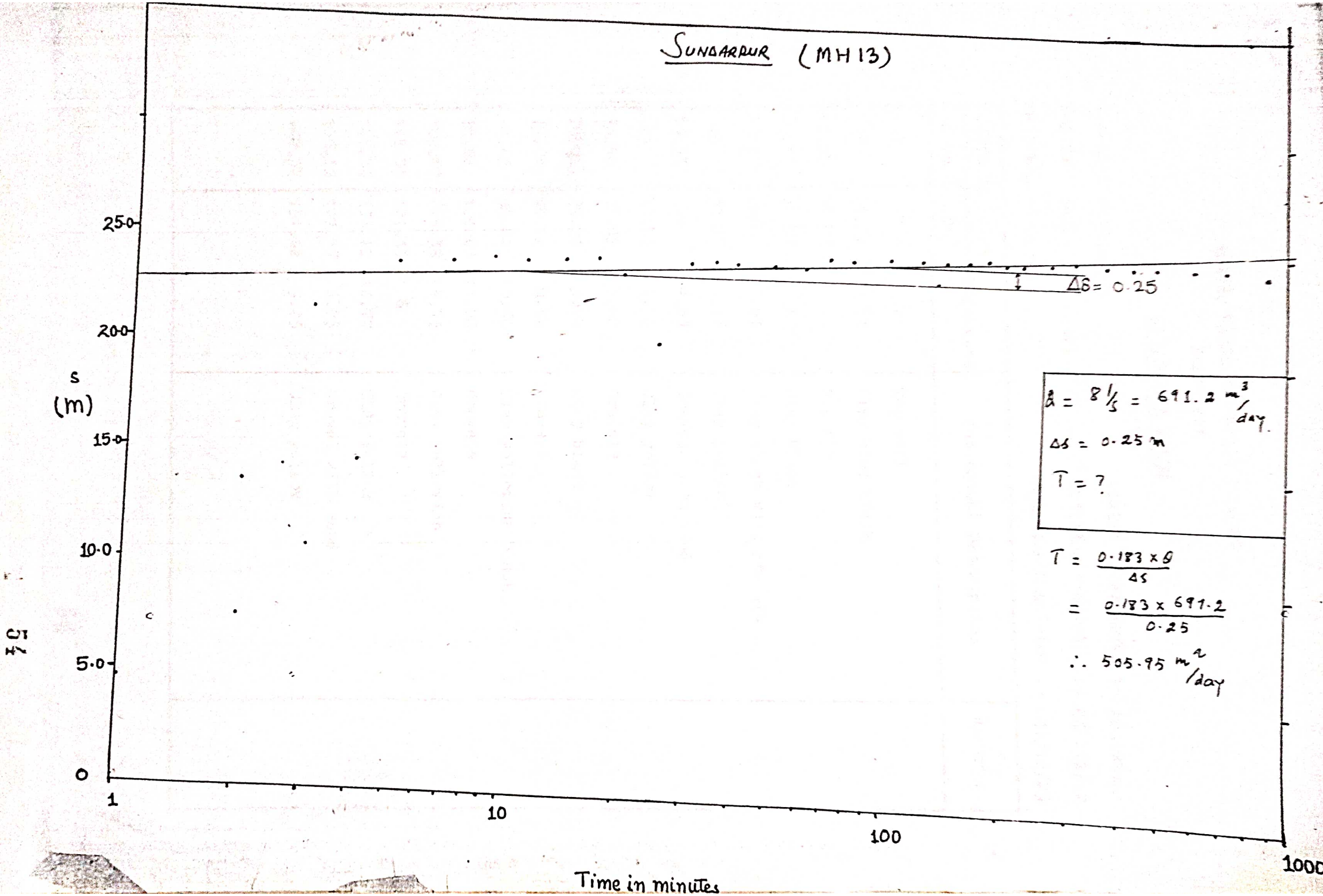
Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	1	1	Top soil	
1	3	2	Sand fine to coarse	
3	8	5	Clay blackish to grey sticky hard	
8	31	23	Clay yellowish sticky	
31	40	9	Gravel and sand fine, grey pebble	
40	53	13	Clay yellowish sticky	
53	55	2	Gravel grey medium	
55	67	12	Clay yellowish to grey hard	
67	76	9	Gravels grey to white sand fine to medium	
76	93	17	Clay yellowish to grey hard	
93	95	2	Gravels grey, sst.medium to fine	
95	102	7	Clay yellowish hard sticky	
102	110	8	Gravels grey medium fine sand	
110	114	4	Clay	No sample
114	118	4	Gravel fine grey with fine sand	
118	121	3	Clay blackish to grey hard	
121	123	2	Gravels	"

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
123	128	5	Clay	No sample
128	129	1	Gravels	,,
129	150	21	Clay blackish sticky hard	,,

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 28.85 m (0 - 28.85 m.) + G. L.
2. Casing Pipe - 6" Ø - 72.00 m (29.02-67.8,69.50-73.0,75.0-102.70)
3. Slotted Pipe - 6" Ø - 11.50 m (67.8-69.50,73.0-75.0,102.70-110.5)
4. Reducer - 10/6" - 0.17 m. (28.85-29.62)
5. Bail Plug - 6" Ø - 2.49 m (110.5 - 112.54)


SUNDARPUR (MH 13)
25·0
20·0
15·0
10·0
5·0
0
s (m)
Δs = 0.25
Q = s/t = 691.2 m³/day
Δs = 0.25 m
T = ?
T = 0.183 × Q / Δs
= 0.183 × 691.2 / 0.25
∴ 505.95 m²/day
1
10
100
1000
Time in minutes

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Shreepur

Log By :- R.S.Prajapati

Well No. :- MH/14

Static Water Level :- Artision

Drilling Started :- 041/12/12

Drilling Completed :- 041/12/29

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	7	7	Top soil	
7	14.37	7.37	Clay blue black	
14.37	21.37	7	Gravels	
21.37	22.37	1	Clay black	
22.37	26	3.63	Clay black with gravels	
26	54.37	28.37	Clay yellow	
54.37	59	4.63	Gravels with sand	
59	73.50	14.50	Clay yellow	
73.50	76.02	2.52	Gravels	
76.02	79.74	3.72	Clay black	
79.74	88.12	8.38	Gravels	
8.12	98.62	10.50	Clay yellowish black	
98.62	109.62	11.00	Gravels	
109.62	115.35	5.73	Clay yellowish	
115.35	121.35	6	Gravels	
121.35	136.12	14.77	Clay yellow	
136.12	142.37	6.25	Gravel with sand	
142.37	151.62	9.25	Clay yellow	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 29.85 m (0-29.85 m) + G.L.
2. ,, - 6" Ø - 59.00 m (30-65, 68-74, 77-85, 88-98 m.)
3. Slotted Pipe - 6" Ø - 18.00 m (65-68, 74-77, 85-88, 98-107 m.)
4. Reducer - 10/6" Ø - 0.15 m. (29.85 - 30 m.)
5. Bail Plug - 6" Ø - 3 m. (107 - 110 m.)
6. Total lowering - 110 m.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Vishambhar Pur

Log By :- R.S.Prajapati

Well No. :- MH/15

Static Water Level :- Artision

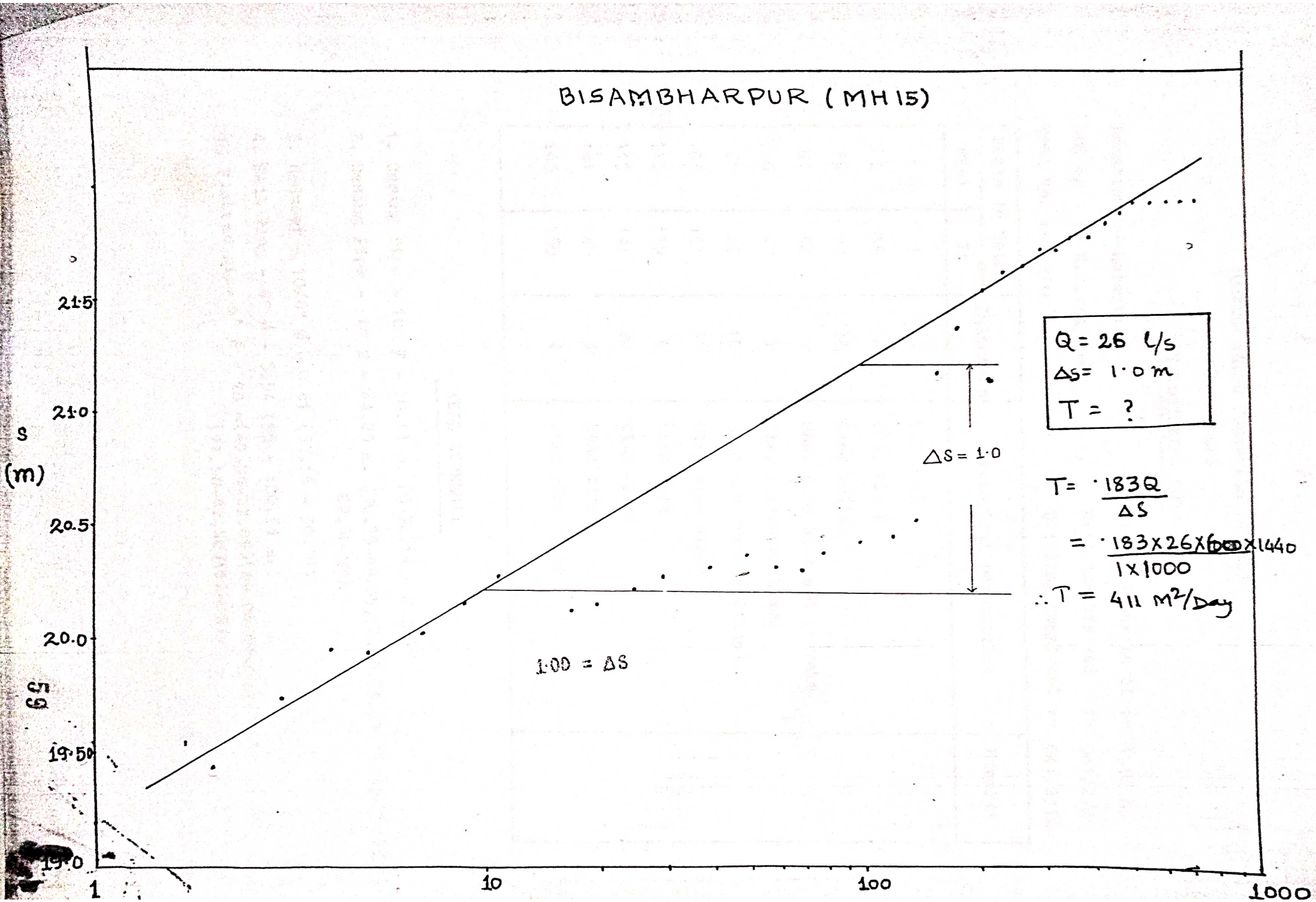
Drilling Started :- 041/1/5

Drilling Completed :- 041/1/26

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	5	5	Top soil	
5	10	5	Sand fine	
10	15	5	Clay black	
15	20	5	Gravels with coarse sand	
20	23	3	Gravels	
23	32	9	Clay black	
32	42	10	Clay black with gravels	
42	43	1	Gravels with sand	
43	47.62	4.62	Clay black	
47.62	50	2.36	Gravels with sand	
50	57.87	7.87	Clay black	
57.87	60.12	2.25	,,	
60.12	63	2.88	Gravels with sand	
63	70.75	7.75	Clay yellow	
70.75	72.75	2	Gravels	
72.75	93.50	20.75	Clay black with gravels	
93.50	98.25	4.75	Gravel with sand	
98.25	100	1.75	Clay black	
100	109.75	9.75	Gravel with sand	
109.75	115.85	6.10	Clay black	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 26.76 m. (0-26.76 m + G.L.)
2. ,, - 6" Ø - 62.59 m. (26.91-60, 65-69, 73-94, 97-101 m.)
3. Slotted Pipe- 6" Ø - 14.50 m. (60-65, 69-73, 94-97, 101-104 m.)
4. Reducer - 10/6" Ø - 0.15 m. - (26.76 - 26.91 m.)


BISAMBHARPUR (MH15)
21.5
21.0
S
(m)
20.5
20.0
19.50
19.0
1
10
100
1000
Q = 26 L/s
Δs = 1.0 m
T = ?
ΔS = 1.0
T = .183Q / ΔS
= .183 x 26 x 1000 x 1440 / 1 x 1000
∴ T = 411 M²/Day
1.00 = ΔS

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Ratauli

Log By :- R.S.Prajapati

Well No. :- MH/16

Static Water Level :- 1.52 m.

Drilling Started :- 041/2/2

Drilling Completed :- 041/2/16

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	3	3	Top soil	
3	35	32	Clay black	
35	57	22	Clay yellow	
57	60	3	Sand with silt and gravels	
60	67	7	Clay yellowish black	
67	83	16	Sand and gravels (fine)	
83	113	30	Clay blue black	
113	119	6	Sand fine	
119	141	22	Clay black	
141	145	4	Sand fine	
145	159	4	Sand clay black	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 30.14 m. (0-30.14 + G.L.)
2. Casing Pipe - 6" Ø - 44.25 m. (30.75-49.05,52.05-59,05,62.05-71.50 82.50-92)
3. Reducer - 10/6" Ø - 0.61 (30.14 - 30.75)
4. Bail Plug - 6" Ø - 5.54 (95 - 100.54 m.)
5. Slotted pipe 6" Ø = 20 m(49.05-52.05)(59.05-62.05) (71.50-82.50)(92-95)

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Mahottari

Log By :- R.S. Prajapati

Well No. :- MH/17

Static Water Level :- 0.60 m.

Drilling Started :-

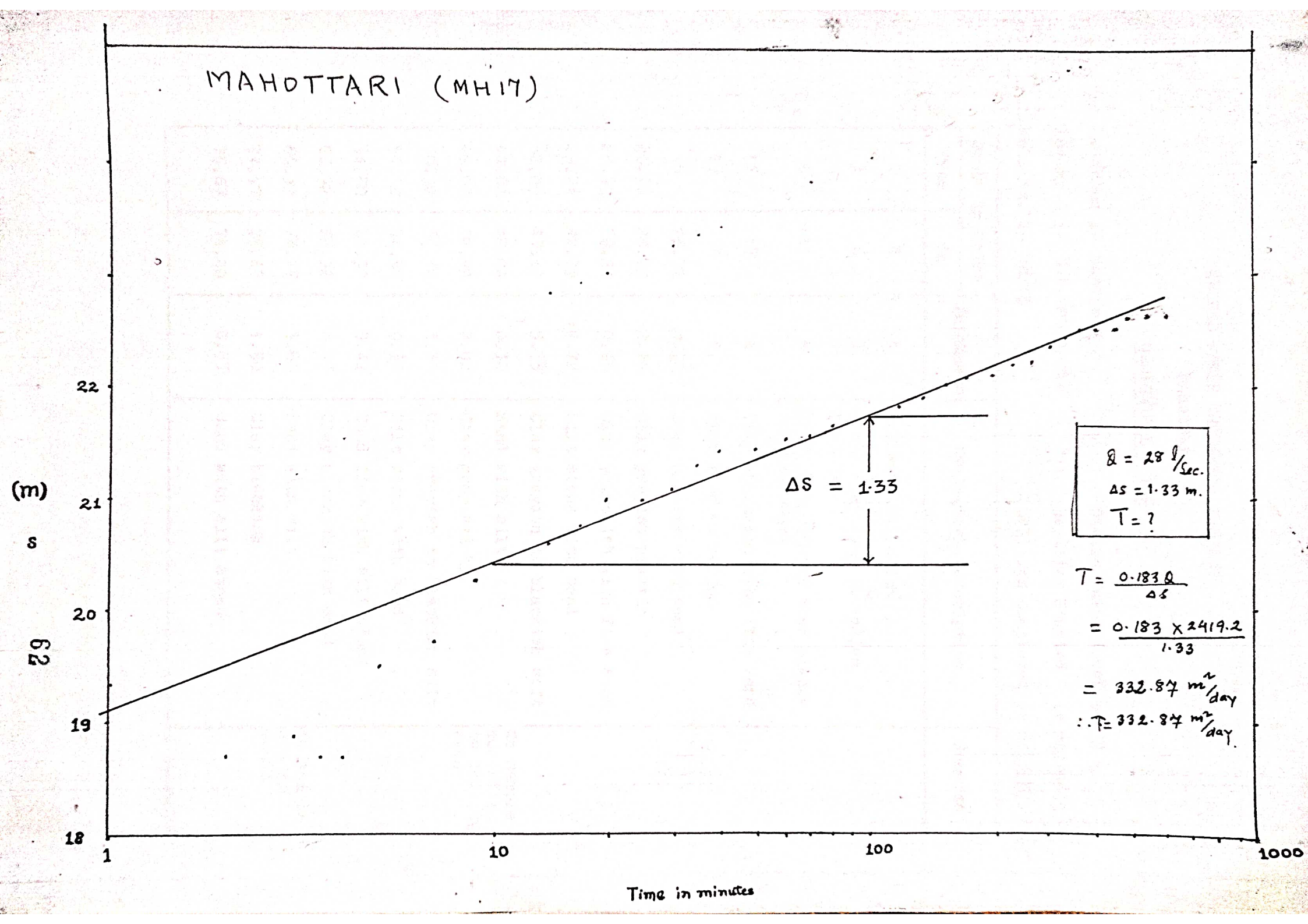
Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	7	7	Top soil yellow	
7	13	6	Silt stone with sand	
13	32	19	Clay blue black	
32	41	9	Silt stone and sand	
41	44	3	Clay yellow	
44	47	3	Sand with silt	
47	48	1	Clay yellow	
48	60	12	Silt stone with sand	
60	75	15	Clay yellow	
75	76	1	Sand with silt stone	
76	86	10	Clay blue black	
86	107	21	Sand with silt	
107	121	14	Clay blue black	
121	128	7	Sand with gravel & silt	
128	135	7	Clay blue black	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 31.40 m - (0-31.40 m + G.L.)
2. ,, - 6" Ø - 75.10 m - (38-84.5 m, 90.5-120 m.)
3. Slotted Pipe- 6" Ø - 18 m. - (32-38 m, 84.5-90.5)(120-126 m.)
4. Reducer 10/6" Ø - 0.60 m. (31.40 - 32 m.)
5. Bail Plug - 6" Ø - 5.54 m (126 - 131.64 m.)
6. Total lowering - 131 m.

MAHOTTARI (MH17)



Q = 28 l/Sec.
ΔS = 1.33 m.
T = ?

$$T = \frac{0.183\,Q}{\Delta S}$$

$$= \frac{0.183 \times 2419.2}{1.33}$$

$$= 332.87 \text{ m}^2/\text{day}$$

$$\therefore T = 332.87 \text{ m}^2/\text{day}.$$

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Bhargavsar

Log By :- R.S.Prajapati

Well No. :- MH/18

Static Water Level :- 2 m.

Drilling Started :- 042/9/19

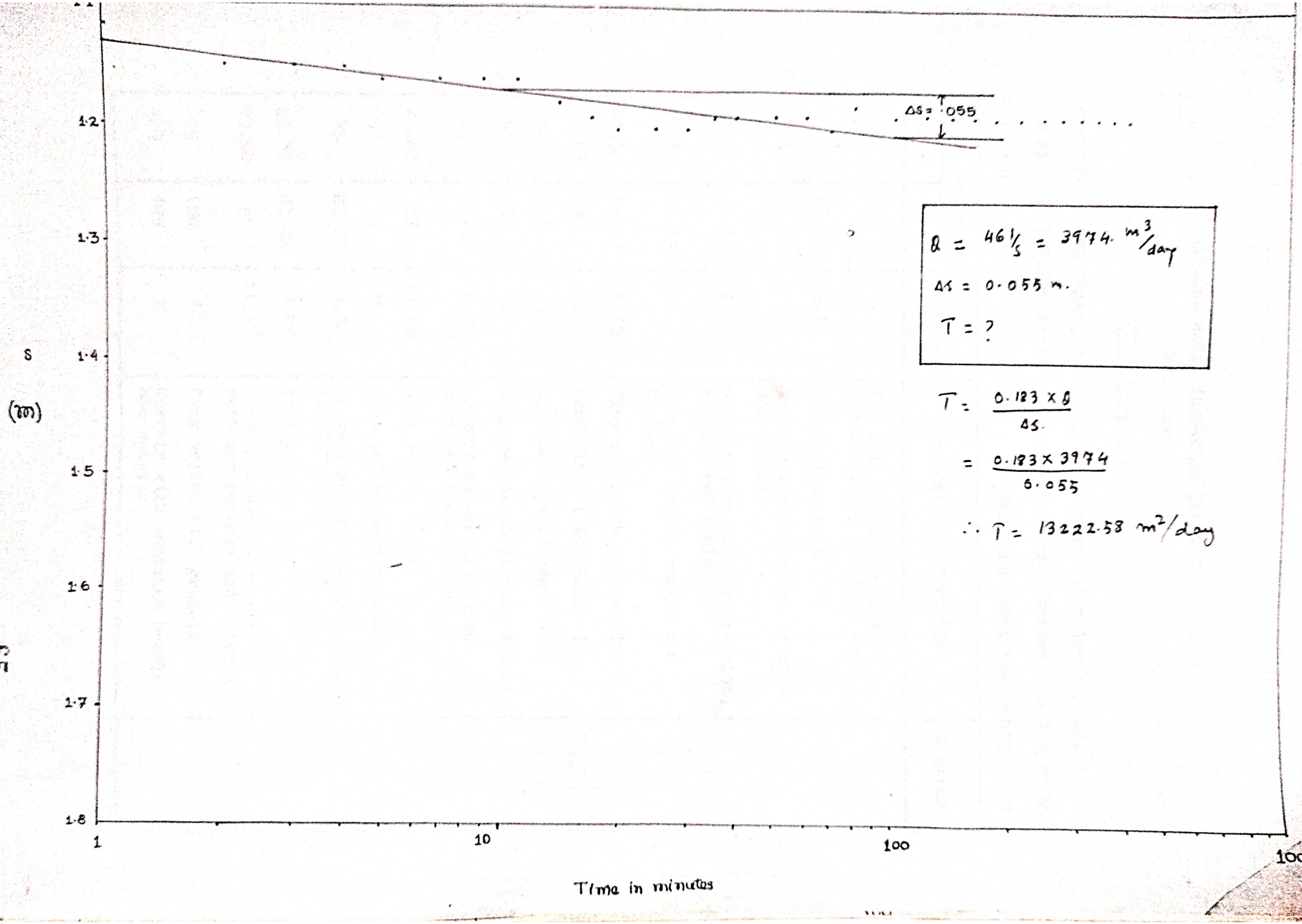
Drilling Completed :- 042/10/20

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	3	3	Top soil yellowish	
3	6	3	Sandy clay fine to medium grained	
6	11	5	Clay yellowish at some places contains sand	
11	17	6	Clay yellowish with fine sand	
17	18	1	Sand find to medium	
18	26.72	8.72	Clay blueish with sand	
26.72	28.99	2.29	Clay greyish plastic	
28.99	29.24	0.25	Clay yellowish with fine sand	
29.24	42.29	12.72	Silt stone with sand	
42.29	47.62	5.33	Clay greyish to blackish soft	
47.62	48.00	0.38	Sand with silt	No sample according to drilling rate
48.00	50.92	2.92	Clay grey sticky	
50.92	54.12	3.30	Clay greyish to blackish silt	
54.12	54.50	0.38	Silt stone with sand	
54.50	63.92	9.42	Sand fine with silt stone	
63.92	68.32	4.45	Clay blackish with sand	
68.32	74.17	5.80	Sand with silt	No sample due to sound
74.17	75.67	1.50	Clay blackish	
75.67	76.20	0.53	Sand with silt stone	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
76.20	80.27	4.07	Clay hard blackish to yellow	
80.27	81.17	0.90	Sand and silt	No sample due to sound
81.17	82.42	1.25	Clay yellow	
82.42	91.19	8.77	Clay sticky greyish to blackish	
91.19	100.17	8.98	Clay greyish	
100.17	115.67	15.50	Silt stone with fine sand	
115.67	117.92	2.25	Clay with silt	
117.92	120.40	2.48	Silt fine sand	
120.40	122.42	2.02	Clay blackish to greyish	
122.42	138.17	15.75	Silt stone with fine sand	
138.17	143.67	5.50	Clay greyish	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 35.35 m.
2. ,, - 6" Ø - 79.75 m.
3. Reducer -10/6"Ø - 0.25 m.
4. Bail Plug - 6" Ø - 5.55 m.
5. Slotted Pipe 6" Ø - 20 m.(57-61, 104-114, 129-135 m.)



$Q = 46 l/s = 3974.4\ m^3/day$

$\Delta s = 0.055\ m.$

$T = ?$

$$T = \frac{0.183 \times Q}{\Delta s}$$

$$= \frac{0.183 \times 3974}{0.055}$$

$$\therefore T = 13222.58\ m^2/day$$

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Ram Nagar, Ward No.2 Static Water Level :- 22.92 m.

Log By :- R.S.Prajapati Drilling Started :- 042/10/20

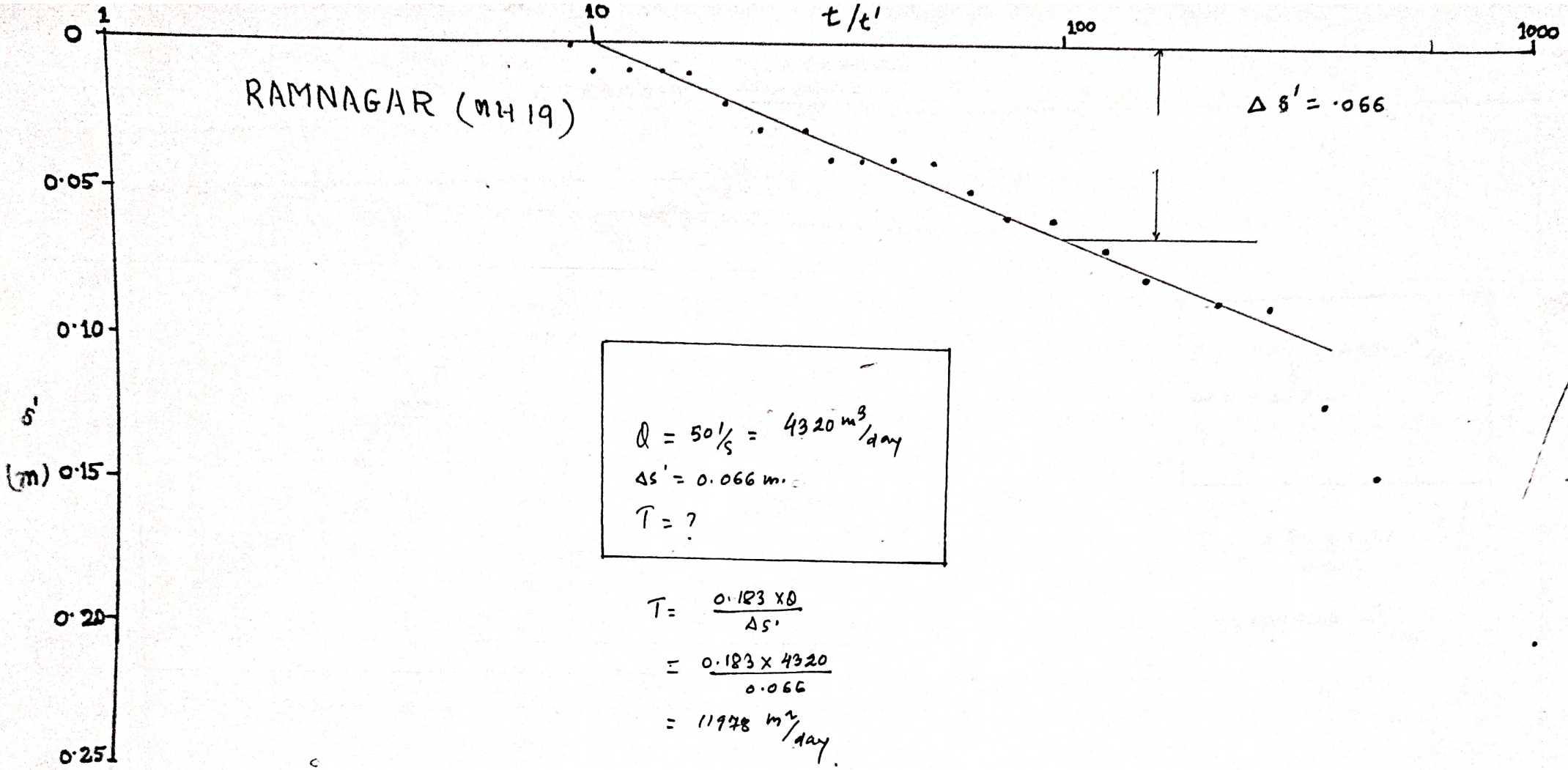
Well No. :- MH/ 19 Drilling Completed :- 042/11/11

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	7	7	Top soil yellowish at some places clayey and fine sand	
7	12.42	5.42	Clay yellow soft	
12.42	18.42	6	Gravels with cuttings pebbles and cobbles	
18.42	21.32	2.90	Gravels with cuttings pebbles, cobbles and boulders	
21.32	22.32	1	Cuttings pebble cobble and boulders	
22.32	28.07	5.75	Clay yellowish to blackish	
28.07	30	1.93	Sand fine (No sample)	Drilling rate soun
30	33	3	Clay soft yellowish	
33	39	6	Clay yellowish plastic sticky	
39	41.82	2.82	Gravels sub-angular with cuttings pebble cobbles	
41.82	57	15.18	Clay yellow sticky	
57	75	18	Clay yellow soft plastic	
75	83.32	8.32	Gravels and sand with cuttings pebbles and cobbles	
83.32	83.82	0.52	Clay yellow	
83.82	95	11.17	Gravels sub-angular with cuttings pebbles and cobbles	
95	100	5	Clay yellow with gravels	
100	108	8	Gravels with cuttings pebble and cobbles	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
108	114	6	Gravels with sand	
114	116	2	Clay yellow	
116	120	4	Sand with gravels	
120	129.17	9.17	Clay yellow sticky	
129.17	131.17	2	Gravels with sand	No sample due to sound
131.17	138.00	2	Clay yellow	
138.00	145.00	7	Gravels with sand	
145.00	150.00	5	Clay yellow	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 43.65 m.
2. ,, - 6" Ø - 81.04 m.
3. Slotted Pipe - 6" Ø - 24.00 m. (85-95, 102-113, 139-143) m.
4. Bail Plug - 6" Ø - 5.54 m.
5. Overlap - 5.45 m.



Q = 50 l/s = 4320 m³/day

Δs' = 0.066 m.

T = ?

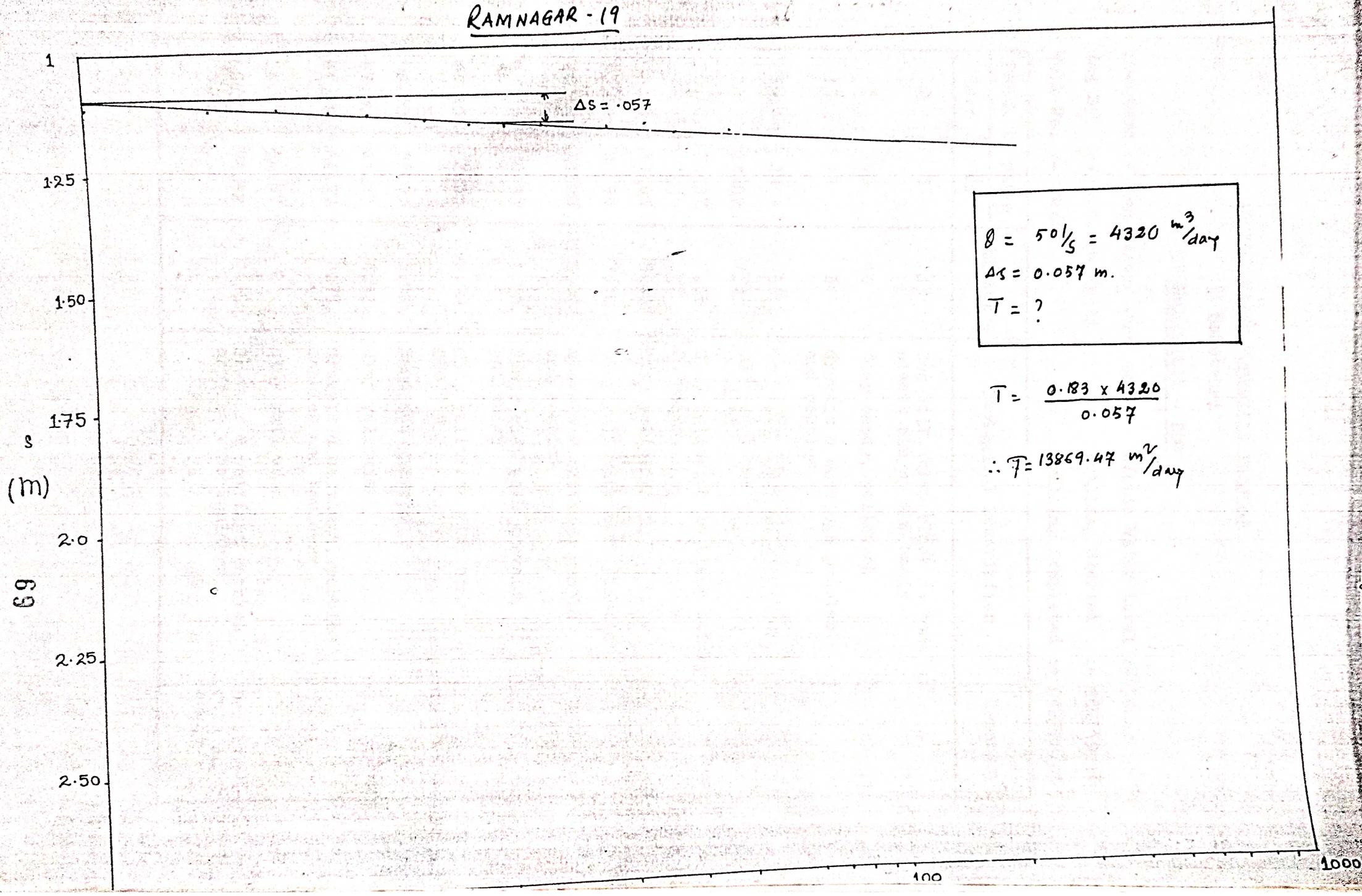
$$T = \frac{0.183 \times Q}{\Delta s'}$$

$$= \frac{0.183 \times 4320}{0.066}$$

$$= 11978 \text{ m}^2/\text{day}.$$

Time in minutes

RAMNAGAR - 19



$Q = 50\ l/s = 4320\ m^3/day$

$\Delta s = 0.057\ m.$

$T = ?$

$$T = \frac{0.183 \times 4320}{0.057}$$

$$\therefore T = 13869.47\ m^2/day$$

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Ram Nagar, Ward No.7 Static Water Level :- 38 m.

Log By :- R.S.Prajapati Drilling Started :- 042/12/16

Well No. :- MH/20 Drilling Completed :- 042/12/26

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	3	3	Top soil, blue black at some places clayey and sandy	
3	13	10	Clay sandy, yellowish	
13	15	2	Gravels & cuttings pebbles and cobbles	
15	20	5	,, ,,	
20	24.82	4.82	,, ,,	
24.82	32.07	7.25	Clay yellowish to black sticky plastic	
32.07	37.50	5.43	Clay yellowish	
37.50	40.50	3.00	Clay yellowish soft plastic	
40.50	43.00	3.00	Gravels & cuttings pebble and cobbles	
43.00	44.50	1.50	Sandy clay with gravels, yellowish	
44.50	54.00	9.50	Clay yellowish with some gravels	
54.00	57.00	3.00	Sand and gravels	
57.00	61.82	4.82	Clay yellowish	
61.82	64.57	2.75	Gravels & cuttings, pebbles cobbles and boulders	
64.57	66.57	2	Clay yellowish	
66.57	75.82	9.25	Gravels & cuttings pebbles cobbles with boulders	Drilling rate and sound

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
75.82	77.57	1.75	Clay yellow	No sample
77.57	78.90	1.33	Gravels with cuttings pebbles and cobbles	
78.90	80	1.10	Clay yellowish with gravels	
80	83.30	3.30	Gravels & cuttings, pebbles and cobbles	
83.30	85.30	2.00	Clay yellowish	
85.30	91.57	6.57	Gravels & cuttings pebbles and cobbles	
91.57	97.82	6.25	Clay yellowish	
97.82	100.82	3.00	Gravels and sand	
100.82	104.00	3.18	Clay yellowish	
104	108	4	Gravels & cuttings pebble and cobble	
108	118	10	Gravels & cuttings pebbles, cobbles and boulders	
118	125	7	Clay yellowish	
125	142.57	17.57	Clay yellowish gravels pebbles and cobbles	

WELL ASSEMBLY

1. Casing Pipe - 10" ø (Housing) - 44.63 m.
2. ,, - 6" ø (Blind) - 46.37 m.
3. Bail Plug - 6" ø - 29.57 m.
4. Overlap - 6" ø - 5 m.
5. Slotted Pipe - 6" ø - 22 m (68-74,81-84,84-87,87-91,104-113m.)
6. Total lowering - 142.57 m.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Bijalpura

Log By :- R.S.Prajapati

Well No. :- MH/21

Static Water Level :- 6.7 m.

Drilling Started :- 043/11/8

Drilling Completed :- 043/11/22

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	2	2	Top soil yellowish to black	
2	4	2	Gravels with sand	
4	5	1	Clay yellowish	
5	8	3	Gravels with sand	
8	13	5	Gravels & cuttings pebbles and cobbles	
13	19	6	Clay yellowish soft plastic	
19	24	5	Gravels and cutting pebbles and cobbles	
24	29	5	Clay black	
29	35	6	Gravels with sand	
35	42.17	7.17	Gravels and cutting pebbles and cobbles	
42.17	45	2.83	Clay yellow	
45	55.87	10.87	Gravels with sand cuttings pebbles and cobbles	
55.87	62.42	6.13	Clay yellow	
62.42	71.92	9.50	Gravel with sand	
71.92	79.17	7.25	Clay yellow	
79.17	88	8.63	Gravel with sand	
88	97	9	Gravel with sand some clay mix	
97	99	2	Gravel with sand	
99	100	1	Clay yellow	

LOCATION- BIJAL PURA

WELL ASSAMBLY DATA

1. CASHING PIPE 10" =31.05 m
2. CASHING PIPE 6" =29.00 m
3. BAIL PLUG 6" = 4.64 m
4. SLOTTED PIPE 6" =27.00 m (31-42.46-52.64-68,81-87m)
5. REDUCAR 10/6" = 0.30 m

TOTAL LOWERING- 91.64 m

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Sahorwa

Log By :- R.S.Prajapati

Well No. :- MH/23

Static Water Level :-

Drilling Started :- 043/2/4

Drilling Completed :- 043/2/10

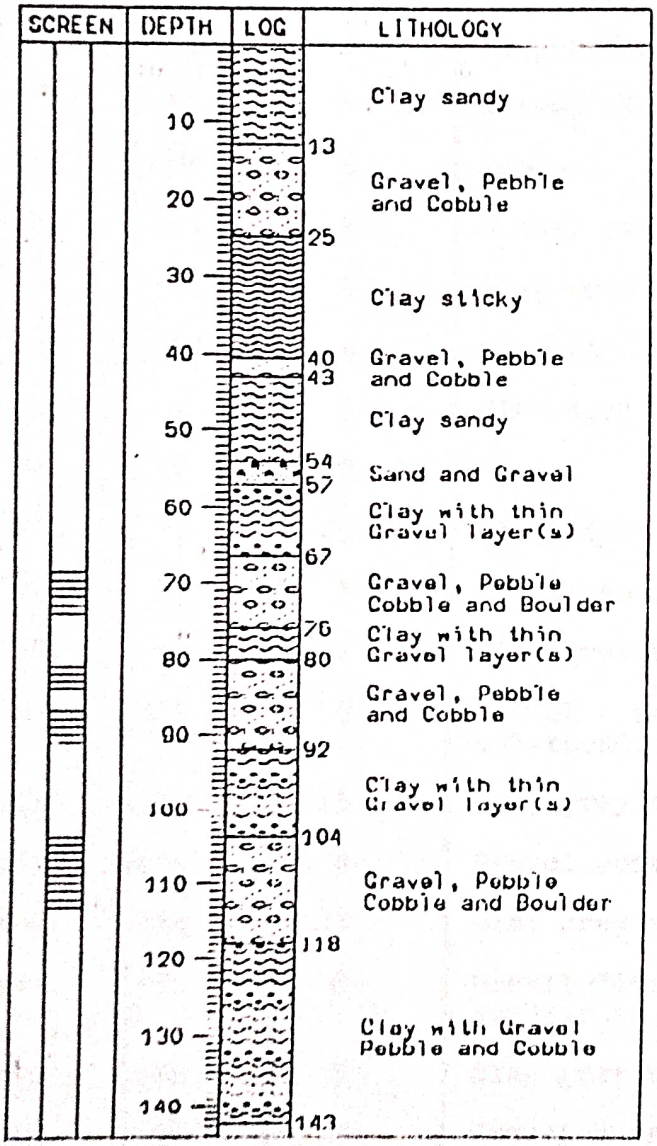
Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	0.61	061	Top soil yellowish	
0.61	2.13	1.52	Clay yellow sticky plastic	
2.13	4.8	0.67	Silty clay greyish to yellow small cutting	
4.8	7.9	3.1	Sand silt with clay grey to black	
7.9	28.3	20.4	Clay with silt blackish grey	
28.3	45.0	16.7	Clay yellow plastic	
45.0	50.0	5.0	Sand fine well grained	
50.0	51.5	1.5	Clay, greyish to black sticky plastic	
51.5	59.0	7.5	Silty clay	
59.0	61.5	2.5	Sand small grained	
61.5	67.9	6.4	Silt and clay	
67.9	74.6	6.7	Clay loose grey	
74.6	78.0	4.0	Sand and gravel with cutting pebble and cobbles	
78.0	101.2	23.0	Clay sticky plastic grey	
101.2	105.4	4.2	Silty sand	
105.4	106.4	1.0	Clay greyish	
106.4	113.4	7.0	Sand poor grained yellow	
113.4	119.2	5.8	Clay greyish	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
119.2	151.8	32.6	Clay yellowish	
151.8	157.0	4.8	Blackish to yellowish clay sandy	
157.0	159.1	2.1	,, ,,	
159.1	163.7	6.6	Sand medium	
163.7	167.7	4.6		

GWRDB - UN/DTCD NEP/86/025/MAHOTTARI
"GROUND WATER EXPLORATION IN TERAI"

Well No. DTW 23	Location: Ramnagar
Elevation: 150	X = 383000 Y = 2982250
Method of Drilling: RIG	
Drilling Dates : 29.3.86 - 8.4.86	
Total Depth : 142.60	
Comments : Well Size: 10"/6" Screen Position: 68.7 - 74, 81 - 84 m 87.0 - 91, 104 - 113 m Drilled Under: GWRDB/Mahottari Project	

W E L L L O G



APPENDIX 3/18

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Dhamoura

Log By :- R.S.Prajapati

Well No. :- MH/ 24

Static Water Level :- Artision

Drilling Started :- 043/10/14

Drilling Completed :- 043/11/18

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	3	3	Sand fine light brown	
3	4	1	Clay green	
4	12	8	Gravel coarse sub-rounded	
12	18	6	Sand	
18	23	5	Gravel medium sub-rounded	
23	28	5	Clay grey sticky	
28	32	4	Clay light brown sticky	
32	40	8	Clay dark grey sticky	
40	62	12	,, ,,	
62	82	20	Clay light grey sticky	
82	85	3	Gravel coarse to medium	
85	96	11	Clay grey sticky	
96	102	6	Gravel coarse to medium sub-rounded	
102	117	15	Clay grey silty	
117	121	4	Gravel coarse with pebbles	
121	144	23	Clay grey with gravel coarse	
144	152	8	Gravel fine to medium sub-angular to anguler	
152	155	3	Clay grey silty	
155	159	4	Gravel coarse with pebbles coarse sub-rounded	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
159	163	4	Clay grey	
163	174	11	Pebbles medium to coarse sub-rounded (quazite)	

WELL ASSEMBLY

1. Casing Pipe (Housing) 10" Ø - 38.45 m.
2. ,, (Blind) 6" Ø - 125.93 m.
3. Slotted Pipe 6" Ø - 11.64 m. (97-102.54,146-152.01)
4. Screen Pipe - 6" Ø - 5.54 m. (175.57-181.11)
5. Bail Plug - 1 m.
6. Overlap - 7.6 m.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Paroul

Log By :- R.S.Prajapati

Well No. :- MH/ 25

Static Water Level :- Artision

Drilling Started :- 043/10/14

Drilling Completed :- 043/11/18

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	4	4	Clay brown silty	
4	13	9	Clay light brown sticky	
13	16	3	Gravel coarse with pebbles	
16	25	9	Clay grey sticky	
25	38	13	Clay light brown silty	
38	76	41	Clay light brown silty	
76	83	7	Gravel medium to coarse with pebbles	
83	85	12	Clay dark grey sticky	
95	104	9	Gravel medium to coarse sub-rounded	
104	112	8	Clay light grey silty	
112	113	1	Gravel medium to coarse gravel with sand	
113	134	21	Clay light brown silty	
134	137	3	Gravel medium sub-angular to sub-rounded	
137	143.5	6.5	Clay light brown sticky	
143.5	148.5	5.5	Gravel coarse sub-angular to sub-rounded	
148.5	182	33.5	Clay grey sticky	

WELL ASSEMBLY

1. Casing Pipe (Housing) 10" Ø - 39.25 m.
2. ,, (Blind) 6" Ø - 92.35 m.
3. Slotted Pipe - 16.85 m. (83.55-78)(105.15-96.55)(148.20-145.50)
4. Bail Plug - 33. 8
5. Overlap - 5.8 m.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Hathilet

Log By :- R.S. Prajapati

Well No. :- MH/26

Static Water Level :- 42 m.

Drilling Started :- 043/12/23

Drilling Completed :- 044/1/13

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	1	1	Top soil blackish	
1	3	2	Gravel with coarse sand	
3	11	8	Gravel with cutting pebbles and cobbles	
11	12	1	Clay yellow	
12	21	9	Cutting pebbles cobbles and boulders	
21	24	3	Sandy clay yellow	
24	30	6	Cuttings pebbles cobbles with gravels	
30	39	9	Sandy clay yellow with cuttings pebbles, cobbles and gravels	
39	44	5	Cuttings pebbles cobbles with sandy clay	
44	50	6	Cutting pebbles cobbles and gravels	
50	58	8	Clay yellow plastic	
58	71	13	Cutting pebbles cobbles and gravel mostly quazite.	
71	73	2	Sandy clay yellow	
73	75	2	Gravel with cuttings pebbles cobbles, sub-angular	
75	78	3	Clay yellow sticky	
78	86	8	Gravel with cutting pebbles cobbles sub-rounded to angular	

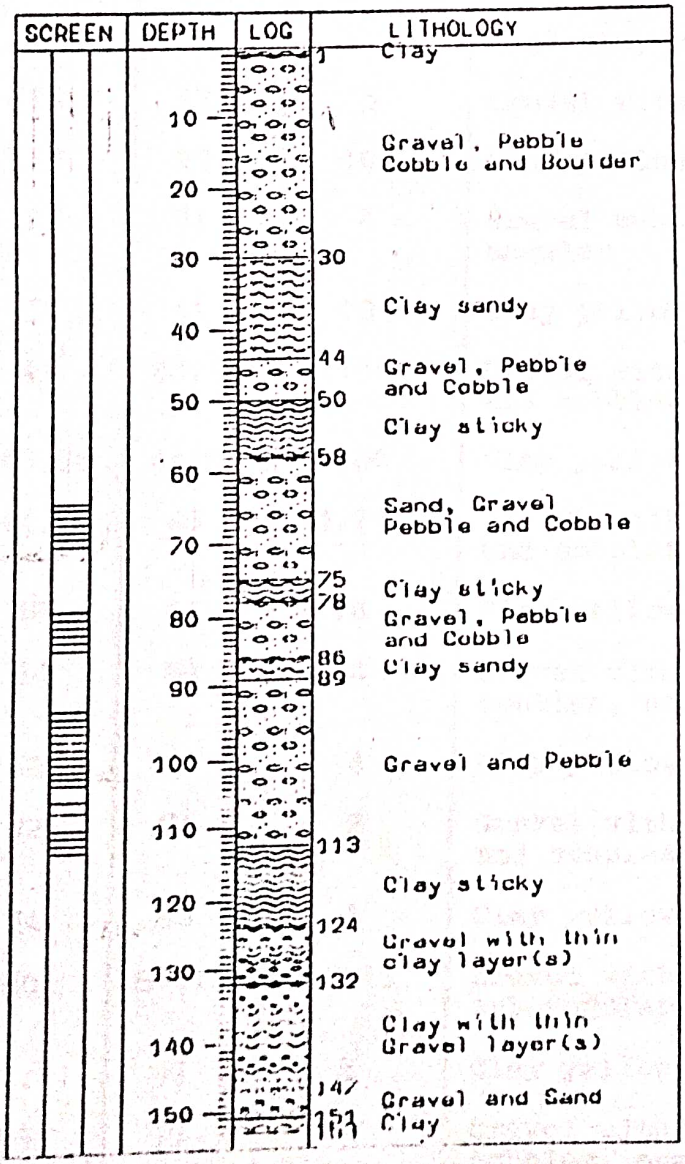
Depth in Metre		Thickness	Geological Description	Remarks
From	To			
86	89	3	Sandy clay yellow	
89	103	14	Gravel sub-rounded to sub-angular to quazite	
103	104	1	Sandy clay yellow	
104	106	2	Gravel with cuttings pebbles	
106	108	2	Sandy clay yellow	
108	112.7	4.7	Gravel sub-rounded angular quazite	
112.7	123.7	11.6	Clay yellow sticky	
123.6	132	9.4	Gravel with sandy clay yellow	
132	138.8	6.8	Clay yellow sticky	
138.8	139.3		Gravel with sand	
139.3	146.6	7.1	Clay yellow	
146.6	151	4.4	Gravel with sand	
151	153	2	Clay yellow	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø (Housing) - 55.50 m.
2. ,, 6" Ø (Blind) - 30.56 m.
3. Reducer - 10/6" - 1 Nos.
4. Slotted Pipe - 6" 27.22 m. (63.88-70.00)(78.01-84.15) (92.87-103)(105.5-107.15) (109.9-113.08)
5. Bail Plug - 6" - 2 m.

Well No. DTW 28	Location: Hathilet
Elevation: 152	X = 386850 Y = 2981000
Method of Drilling: RIG	
Drilling Dates : 6.4.87 - 26.4.87	
Total Depth : 153.00	
Comments : Well Size: 10"/6" Screen Position:63.9- 70.0, 78.8- 84.2 m 92.9-103.0,105.5-107.2 m 109.8-113.1 m Drilled Under: GWRDB/Mahottari Project	

W E L L L O G



APPENDIX 3/19

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Belgachhi

Log By :- R.S.Prajapati

Well No. :- MH/29

Static Water Level :- 34 m.

Drilling Started :- 044/1/24

Drilling Completed :- 044/2/14

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	3	3	Clay blackish top soil	
3	14	11	Sand clay yellowish	
14	17	3	Gravel with coarse sand	
17	27	10	Clay yellowish sticky	
27	31	4	Gravel sub-rounded to sub-angular	
31	41	10	Clay yellowish	
41	43.86	2.86	Gravel with cuttings pebbles and cobbles	
43.86	44.86	1.00	Clay yellow	
44.86	48	3.24	Gravel with cuttings pebbles and cobbles	
48	64	16	Clay yellow sticky	
64	68	4	Gravel with cutting pebbles, cobbles, boulders (Quartz)	
68	72	4	Clay yellow	
72	74	2	Gravel with cuttings pebbles and cobbles	
74	80	6	Clay yellow plastic	
80	87.11	7.11	Gravel with pebbles cobbles sub-angular to angular	
87.11	95	8	Clay yellow	
95	99	4	Gravel with cuttings pebbles cobbles, quartz and quartzite	

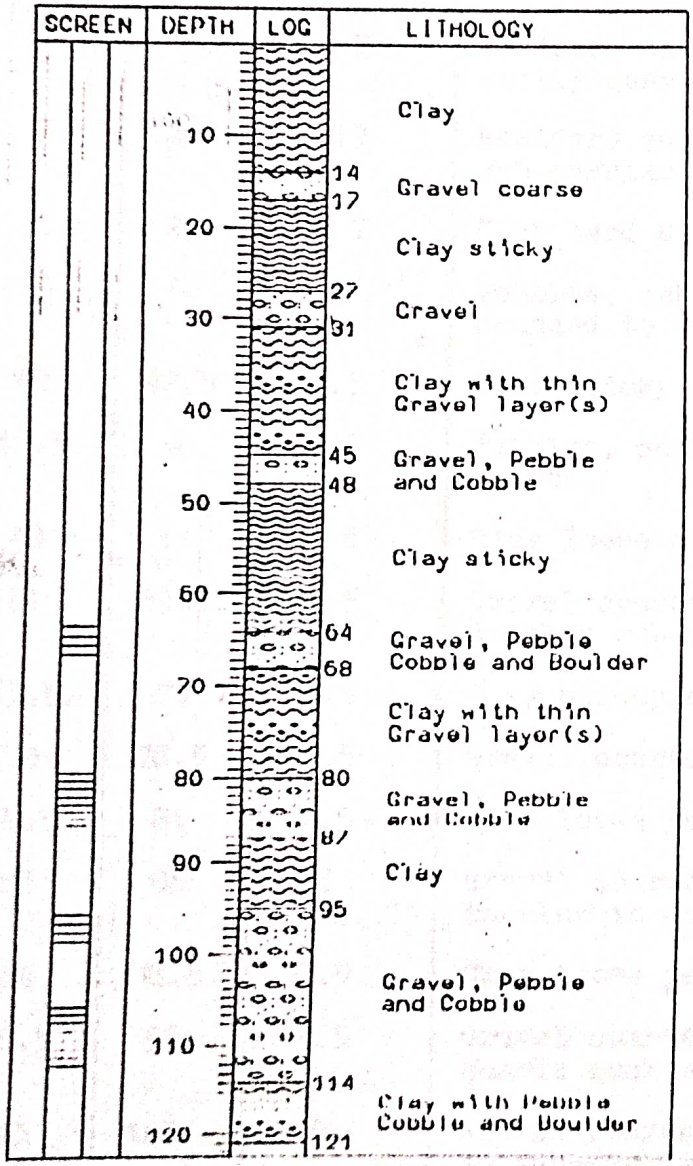
Depth in Metre		Thickness	Geological Description	Remarks
From	To			
99	100.9	1.9	Sandy clay yellow	
100.9	104	3.1	Gravel with cuttings pebbles cobbles, sub-angular quartz	
104	106	2	Sandy clay yellow	
106	114	8	Gravel with cutting pebble, cobble, angular to angular sub-rounded(Quartz to Quzite)	
114	120	6	Clay yellow	
120	121	1	Boulder with pebbles, cobbles (No sample)	

WELL ASSEMBLY

1. Casing Pipe 10" Ø (Housing) - 62.25 m.
2. ,, 6" Ø (Blaind) - 37.2 m.
3. Slotted Pipe 6" Ø 18 m. (63.5-66.5)(79.5-85.5)(95.5-98.5) (106-112)
4. Bail Plug 6" Ø - 9.19 m.
5. Overlap 6" - 5.0 m.

Well No. DTW 29	Location: Belgachhi
Elevation: 150	X = 380550 Y = 2983500
Method of Drilling: RIG	
Drilling Dates : 7.5.87 - 28.5.87	
Total Depth : 121.00	
Comments : Well Size: 10"/6" Screen Position: 63.5-66.5, 79.5- 85.5 m 95.5-98.5,106.0-112.0 m Drilled Under: GWRDB/Mohottari Project	

W E L L L O G



APPENDIX 3/20

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- ~~Krishna Nagar~~ Kishan Nagar

Static Water Level :- 53 m.

Log By :- R.S.Prajapati

Drilling Started :-

Well No. :- MH/30

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	1	1	Top soil	
1	3	2	Boulders small cutting, mostly quartz	
3	22	19	Boulders cutting angular to sub-angular quartz	
22	29	7	Clay hard sticky blackish grey	
29	40	11	Pebbles, cobbles, cuttings rounded to sub-rounded quartz	
40	42.5	2.5	Clay sticky yellow	
42.5	48	5.5	Pebbles, cobbles cuttings quartz	
48	51	3	Clay loose compart yellow	
51	63.50	12.5	Gravel coarse to medium sub-angular sub-rounded quartzite	
63.50	70	6.5	Clay sticky blackish to grey	
70	78.5	8.5	Gravel coarse to medium	
78.5	81	2.5	Clay loose yellow	
81	86	5	Gravel coarse to medium angular to sub-angular quartz	
86	88.5	2.5	Clay loose yellow	
88.5	93	4.5	Gravel coarse to medium quartz quartzite	
93	102	9	Gravel coarse to medium round to sub-rounded quartz	

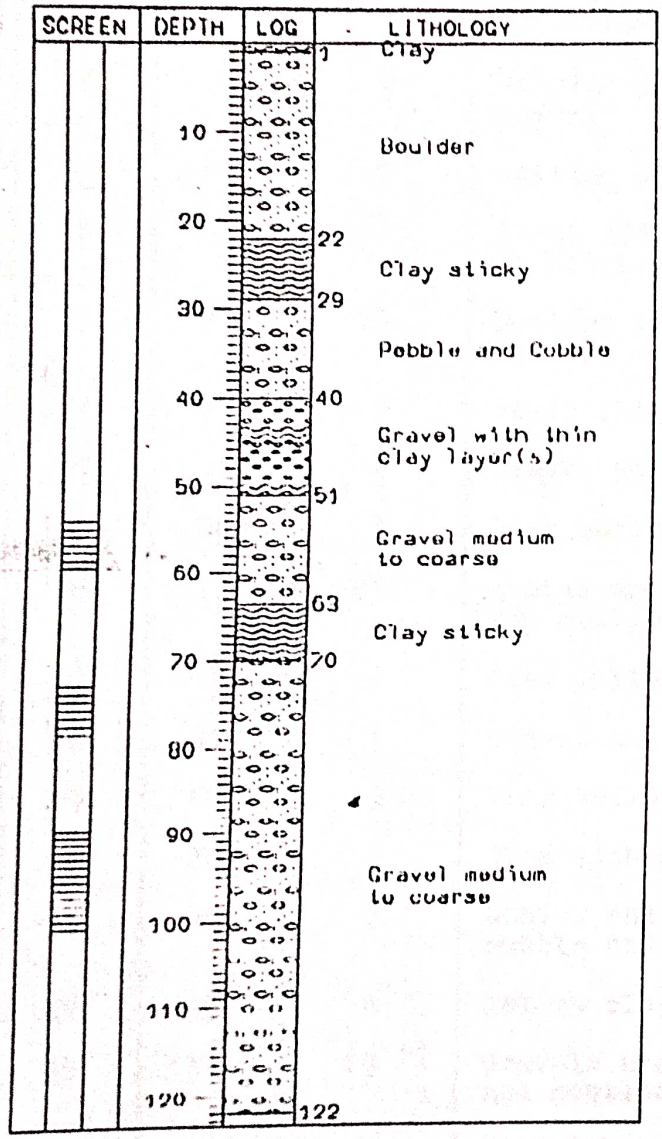
Depth in Metre		Thickness	Geological Description	Remarks
From	To			
102	104	2	Clay sandy	
104	116.5	12.5	Gravel with sand coarse to medium gravel rounded of gravel more.	
116.5	117.5	1.00	Clay yellowish brown	
117.5	122.0	4.5	Gravel coarse to medium	

WELL ASSEMBLY

1. Casing Pipe - 10" Ø - 49.75 m.
2. ,, - 6" Ø - 32.8 m.
3. Slotted Pipe- 6" Ø - 22.2 m.(100.6-89.5)(78.55-73) (59.55-54)
4. Screen Pipe - 6" Ø - 11.1 m (105.6-116.1)
5. Bail Plug - 6" Ø - 6.2 m.

Well No. DTW 30	Location: Kishnanagar
Elevation: 164	X = 389750 Y = 2981000
Method of Drilling: RIG	
Drilling Dates :	
Total Depth : 122.00	
Comments : Well Size: 10"/6" Screen Position: 54 - 59.5 m 73 - 78.5 m 89.5 - 100.6 m Drilled Under: GWRDB/Mahottari Project.	

W E L L L O G



APPENDIX 3/21

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Pasupati Nagar Static Water Level :-

Log By :- R.S. Prajapati Drilling Started :-

Well No. :- MB/31 Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	5	5	Top soil sandy clay blackish to yellowish	
5	10	5	Cutting pebble, cobble and gravels	
10	18	8	Cutting boulders and gravels	
18	31	13	Loose clay sandy yellowish to blackish	
31	44	13	Cutting pebble, cobble and gravels	
47	47	3	Sandy clay yellow	
47	51	4	Gravel and sand	
51	54	3	Clay yellow plastic	
54	77	23	Gravel and cutting pebbles, and cobbles	
77	78	1	Clay yellow	
78	79	1	Gravel and sand	
79	82	3	Clay yellow (No sample)	
82	84	2	Clay with gravels (No sample)	
84	91	7	Gravel and sand with cutting pebble and cobbles	
91	95	4	Yellow clay sticky	
95	114	19	Gravels and cutting pebbles and cobbles	
114	115	1	Sand (No sample)	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
115	132	17	Clay yellowish to blackish same gravel mixed	
132	138	6	Gravel and cutting pebbles, and cobbles	
138	142	4	Clay yellowish	
142	144.5	2	Gravels with sand	
155.5	146	1.5	Clay yellowish	
146	158	12	Gravels and cutting pebbles and cobbles	
158	163	5	Clay sandy yellowish	

WELL ASSEMBLY

1. Housing Pipe 14" Ø - 44 m.
2. Blind Pipe 6" Ø - 70.95 m.
3. Slotted Pipe 6" Ø - 33.15 m (55-60.55)(63.5-69)(83.5-89)(95.5-112.15)
4. Screen Pipe 6" Ø - 11 m. (132-137.5)(148-153.5)
5. Bail Plug 6" Ø - 9.5
6. Overlap 6" Ø - 5.65

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Bharatpur

Log By :- R.S.Prajapati

Well No. :- MH/32

Static Water Level :-

Drilling Started :-

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	6	6	Top yellow clay	
6	21	15	Cutting boulder,pebble, cobble and gravels	
21	40	19	Clay yellowish plastic sticky	
40	42	2	Gravel with sand	
42	50	8	Yellow clay sticky	
50	60	10	Gravel with sand	
66	66	6	Silt clay yellowish	
66	73.5	7.5	Gravel with sand	
73.5	80.5	7	Clay yellowish, plastic sticky	
80.5	83	2.5	Sand with gravels(No sample)	
83	85	2	Clay soft (No sample)	
85	102.5	17.5	Gravel and sand sub-angular	
102.5	104.5	2	Clay yellowish, plastic	
104.5	113	8.5	Gravel and cutting pebble, cobble and boulders	

WELL ASSEMBLY

1. Casing Pipe (Housing) 14" Ø :- 34.m.
2. ,, (Blind) 8" Ø :- 47.0 m.
3. Slotted Pipe 8" Ø :- 33 m. (52-57)(70-73)(86-103)(106-113)
4. Overlap 8" Ø :- 4.2 m.

GROUND WATER WELLS PROJECT

Mahi[illegible]

GEOLOGICAL LOG

Location :- Laxminia

Log By :- R.S.Prajapati

Well No. :- MH/33

Static Water Level :-

Drilling Started :-

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	4	4	Top soil sandy clay blackish	
4	11	7	Cutting boulder and sands	
11	12	1	Sandy clay (No sample)	
12	16	4	Cutting pebble, cobble and gravels	
16	19	3	Medium sand	
19	20	1	Cutting pebble, cobble with sand	
20	37	17	Yellowish clay plastic	
37	44	7	Gravel with cutting pebble, and cobbles.	
44	47	3	Coarse sand with fine gravels	
47	59.5	12.5	Cutting pebble, cobble and gravels	
59.5	66	6.5	Yellow clay sticky	
66	67	1	Cutting pebble, cobble and sand gravels	
67	82	15	Yellowish at same places clayey and sandy	
82	96.5	14.5	Gravel with cutting pebble and cobbles	
96.5	98	1.5	Yellowish clay with same silt	

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
98	118	20	Gravel with cutting pebble and cobbles	
118	149	31	Yellowish clay	
149	152.4	3.4	Gravel with sand	

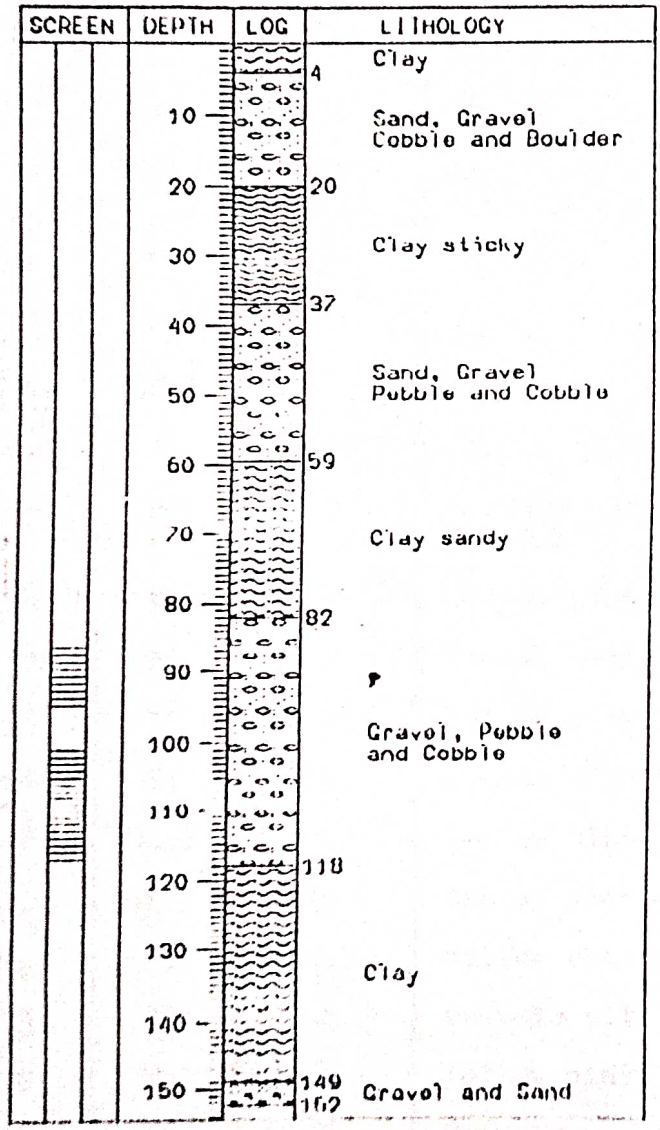
WELL ASSEMBLY

1. Casing Pipe 10" Ø (Housing) :- 58.25 m.
2. ,, 6" Ø (Blaind) :- 33.03 m.
3. Slotted Pipe 6" - 25.2 m (100.85-117)(86.25-94.8)
4. Reducer 10/6" - 1 Nos.
5. Bail Plug 6" - 5.55 m.

GWRDB - UN/DTCD NEP/86/025/MAHOTTARI
"GROUND WATER EXPLORATION IN TERAI"

Well No. DTW 33	Location: Laxminia
Elevation: 147	X = 377250 Y = 2983850
Method of Drilling: RIG	
Drilling Dates :	
Total Depth : 152.40	
Comments : Well Size: 10"/6" Screen Position: 86.3 - 94.8 m 100.8 - 117.0 m Drilled Under: GWRDB/Mahottari Project.	

W E L L L O G



APPENDIX 3/22

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Bijalpura

Log By :- R.S.Prajapati

Well No. :- MH/34

Static Water Level :-

Drilling Started :-

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	4	4	Top soil	
4	15	11	Cuttings pebbles, cobbles and sand	
15	16	1	Yellow clay with silt	
16	22	6	Cuttings pebbles, cobbles with gravels	
22	29	7	Yellowish clay plastic sticky	
29	40	11	Cutting boulder and gravels	
40	42.5	2.5	Sand with gravels	
42.5	44	1.5	Yellow clay	
44	50	6	Cutting pebble, cobble with gravels	
50	52	2	Yellow clay	
52	54	2	Gravel with sand	
54	56	2	Yellow clay (No sample)	
56	57	1	Gravel with sand (No sample)	
57	62.5	5.5	Yellow clay	
62.5	72.5	10	Gravel with sand (Sand angular)	
72.5	73	0.5	Yellow clay (No sample)	
73	75	2	Gravels with sand (No sample)	
75	79	4	Yellow clay	
79	85	6	Gravels	

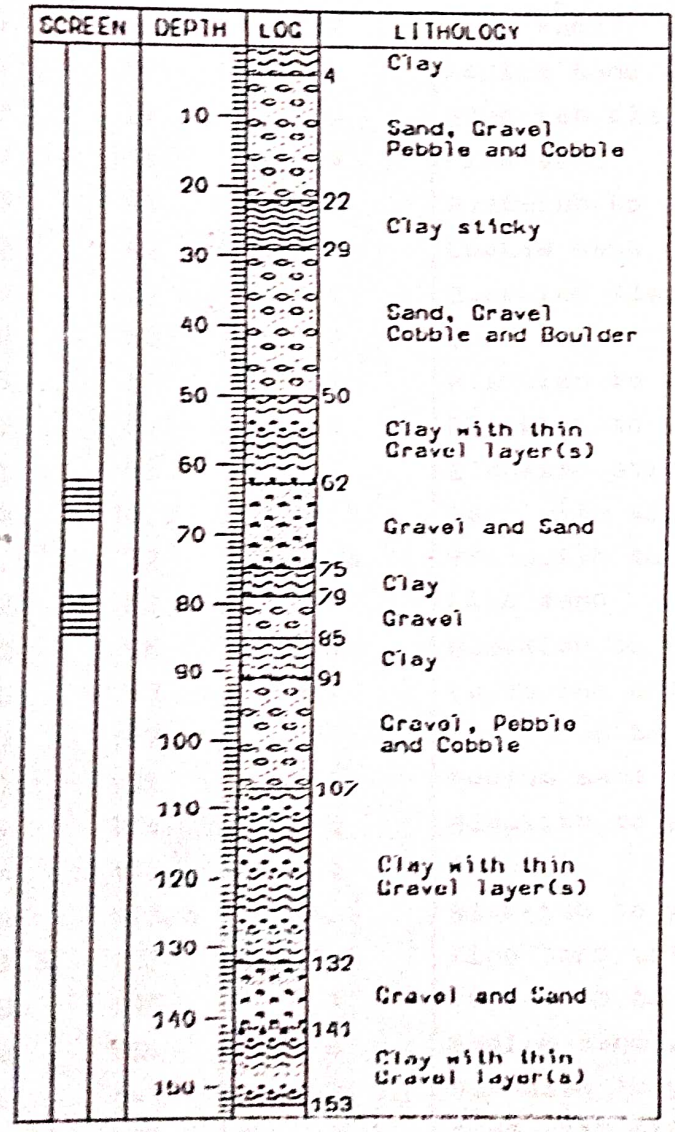
Depth in Metre		Thickness	Geological Description	Remarks
From	To			
85	91	6	Yellow clay	
91	107	16	Gravel with cutting pebble, cobble	
107	114	7	Yellow clay	
114	116	2	Sand with gravels	
116	119	3	Yellow clay	
119	121	2	Gravel with sand	
121	132.5	11.5	Yellowish clay plastic	
132.5	141.5	9	Gravels with sand	
141.5	147	5.5	Yellow clay with silt	
147	150	3	Gravel with sand	
150	153	3	Yellow clay	

WELL ASSEMBLY

1. Casing Pipe 10" Ø (Housing) :- 45.4 m.
2. ,, 6" Ø (Blind) :- 66.6 m.
3. Slotted Pipe 6" Ø :- 27.75m. (62.3-67.35)(78.95-84.5) (95.6-106.7)(134.45-140)
4. Reducer 10/6" :- 1 Nos.
5. Bail Plug 6" Ø :- 5.55 m.

Well No. DTW 34	Location: Bijalpur (Mane)
Elevation: 145	X = 387250 Y = 2978250
Method of Drilling: RIG	
Drilling Dates :	
Total Depth : 153.00	
Comments : Well Size: 10"/6" Screen Position: 62.3 - 67.8 m 78.9 - 84.5 m Drilled Under: GWRDB/Mahottari Project	

W E L L L O G



GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Fulhatta

Static Water Level :-

Well N. :- MH/35

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	6	6	Top sandy bleckish to yellowish clay	
6	9	3	Yellowish clay	
9	16	7	Find sand	
16	19	3	Medium sand with silt and gravels	
19	29	10	Blackish clay loose	
29	39	10	Fine sand	
39	42	3	Blackish to yellowish clay sticky	
42	49	7	Coarse sans	
49	50	1	Blackish clay plastic	
50	53	3	Sand	
53	57	4	Blackish to yellowish clay	
57	61	4	Blackish to yellowish with silt	
61	65	4	Blackish sticky clay	
65	70.5	5.5	Sand with silt and gravels	
70.5	72	1.5	Yellowish to blackish clay	
72	82	10	Fine sand	
82	90	8	Blackish to yellowish clay plastic	
90	97	7	Yellowish and with silt	
97	107	10	Yellowish to blackish clay sticky	
107	109	2	Medium sand	
109	114	5	Blackish to yellowish clay	
114	119	5	Sand	
119	123.5	4.5	Blackish to yellowish clay with silt	
123.5	129	5.5	Fine sand with silt and gravels	
129	130	1	Yellowish to blackish clay	
130	136	6	Medium sand with gravels	
136	141	5	Blackish to yellowish clay sticky	
141	143	2	Sand with silt	
143	147.5	4.5	Blackish to yellowish clay	
147.5	150	2.5	Sans	

Depth in Meter		Thickness	Geological Description	Remarks
From	To			
150	154	4	Blackish to yellowish clay with silt	
154	157	3	Sanky clay	
157	161	4	Blue blackish clay	
161	180	19	Gravels with sand	
180	190	10	Blackish clay sticky	
190	213	23	GRavels with sand	

WELL ASSEMBLY

1. Casing Pipe 10" (Housing) - 26.67 m.
2. Casing Pipe 6" (Blaind) - 155.04 m.
3. Slotted Pipe 6" - 27.75 m. (165.6.176.7) (193.35-210)
4. Reducer 10¼6" - 1 No.
5. Bail Plug 6" - 3 M.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Pipara

Log By :- R.S.Prajapati

Well No. :- MH/36

Static Water Level :-Artision

Drilling Started :-045/8/28

Drilling Completed :-045/9/29

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	9	9	Top soil clay yellow	
9	21	12	Fine sand	
21	29	8	Clay yellow sticky	
29	36	7	Sand coarse	
36	46	10	Clay yellow sticky	
46	49	4	Sand medium to poor yellow	
49	61	12	Clay yellowish to grey	
61	73	12	Sand with silty sand stone	
73	75	2	Clay yellow	
75	80	5	Sand fine with gravels	
80	90	10	Clay black	
90	99	9	Sand medium	
99	121	22	Clay yellow	
121	128	7	Sand coarse with gravels	
128	147	19	Clay blackish to yellowish	
147	150	3	Sand medium with gravel	
150	171	21	Clay black	
171	179	8	Sand coarse with fine gravels	
179	185	6	Clay black with gravels	
185	188	3	Gravel with sand	

Depth in metre		Thickness	Geological Description	Remarks
From	To			
188	205	17	Gravel cutting quarty angular	Sub rounded
205	209	4	Clay black	
209	217	8	Gravel cutting quarty	
217	222	3	Sandy clay	

WELL ASSEMBLY

1. Casing Pipe 10" ø (Housing) :- 33.57 m.
2. ,, 6" ø (Blaind) :- 154.54 m.
3. Reducer 10/6" ø :- 1 Nos.
4. Slotted Pipe 6" ø :- (171.82-177.34)(188-204.94)(210.47-216) = 27.61 m.
5. Bail Pluge 6" ø :- 6 m.
6. A.G.L. Casing Pipe 10" ø :- 0.95 m.
7. Discharge Pipe 6" ø :- 3.7 m.

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :- Goushala

Log By :- R.S. Prajapati

Well No. :- MH/37

Static Water Level :- 3.7 m.

Drilling Started :- 045/10/28

Drilling Completed :- 045/11/20

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	5	5	Top soil clay yellow	
5	9	4	Fine sand	
9	22	13	Cuttings pebble, cobble with gravels	
22	28	6	Clay yellowish to grey	
28	34	6	Cuttings pebble, cobbles, gravels with clay mix	
34	47	13	Clay yellowish	
47	65	18	Cuttings pebble, cobbles and gravels	
65	74	9	Clay yellow	
74	82	8	Cuttings pebble, cobble with gravels	
82	84	2	Clay yellowish to blackish	
84	88	4	Cutting pebble, cobble with gravels	
88	93	5	Clay yellowish	
93	95	2	Sand with gravels	
95	97	2	Clay yellowish	
97	112	15	Cutting pebble, cobble and gravels	
112	117	5	Yellow clay	
117	122	5	Sand with same gravels	
122	128	6	Yellow clay	

Depth in metre		Thickness	Geological Description	Remarks
From	To			
128	132	4	Sand with gravels	
132	141	9	Gravels	
141	146	5	Clay yellow	
146	154	8	Gravels	
154	163	9	Sandy clay	
163	181	18	Gravels	
181	186.4		Clay yellow sticky	

WELL ASSEMBLY

1. Casing Pipe 10" Ø (Housing) :- 36.34 m.
2. ,, 6" Ø (Blaind) :- 110.48 m.
3. Reducer 10/6" Ø :- 1 Nos.
4. Slotted Pipe 6" Ø :- (180-163.6)(152.58-147.07)(141.56-136.05) (102.99-97.48) = 32.93 m.
5. Bail Pluge 6" Ø 3.5 m.
6. A.G.L. Casing Pipe 10" Ø :- 0.5 m.

GROUND WATER TUBEWELLS PROJECT

MAHOTTARI

GEOLOGICAL - LOG

Location :- Hatisharwa

Log By :- R.S.Prajapati

Well No. :- MH/38

Static Water Level :-

Drilling Started :- 045/12/4

Drilling Completed :- 045/12/29

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	4	4	Blackish top soil	
4	6	2	Madium sand yellow	
6	18	12	Gravels and cutting pebble,cobble	
18	20	2	Blackish clay	
20	22	2	Gravels	
22	26.5	4.5	Yellow clay	
26.5	36	9.5	Cuttings pebble,cobble with gravels	
36	40	4	Yellow clay plastic	
40	47	7	Cutting pebble,cobble and gravels	
47	52	5	Yellowish clay plastic	
52	54	2	Gravels cuttings pebble,cobble	
54	59	5	Yellow clay	
59	65	6	Gravels	
65	67	2	Yellowish clay	
67	71.5	4.5	Cutting pebble,cobble and gravels	
71.5	78	6.5	Yellowish clay	
78	81	3	Gravels cutting pebble,cobble	

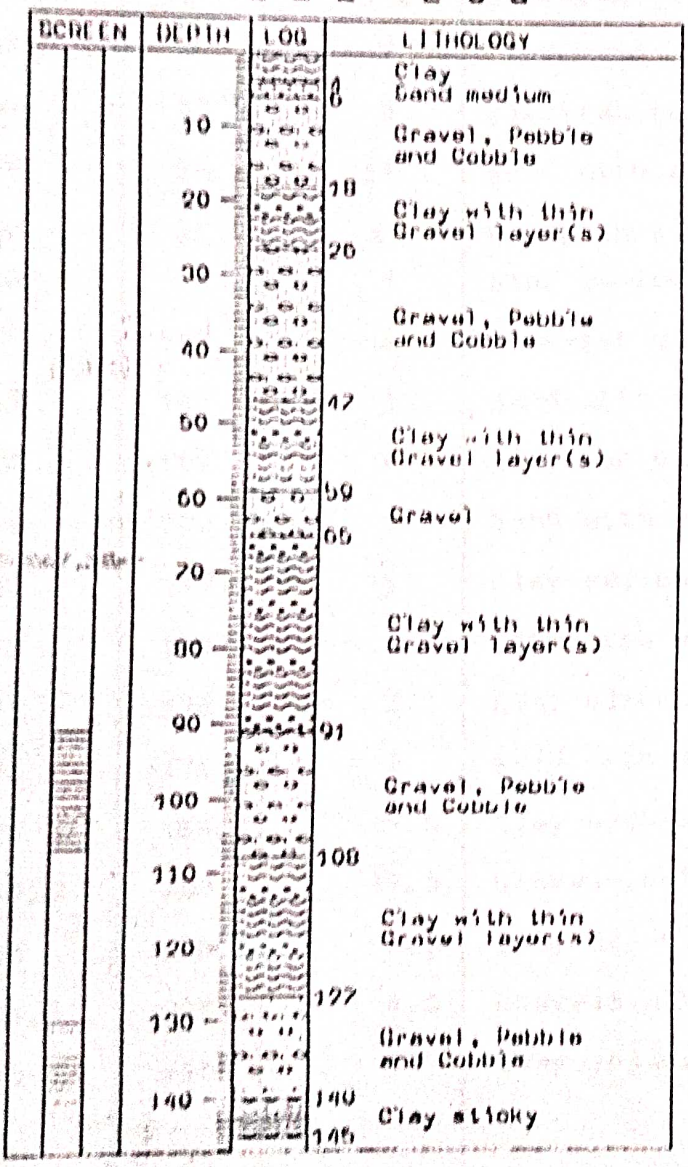
Depth in Metre		Thickness	Geological Description	Remarks
From	To			
81	91	10	Yellowish clay sticky	
91	108	17	Gravels with same cuttings pebble, cobble	
108	114	6	Yellowish clay	
114	120	6	Gravels and cutting pebble,cobble	
120	127	7	Yellowish clay plastic sticky	
127	140	13	Gravels with cutting pebble,cobble	
140	145.5	5.5	Yellowish clay sticky	

WELL ASSEMBLY

1. Casing pipe 10" (Housing) :- 33.93 m.
2. Casing pipe 6" Ø (Blaind):- 83.32 m.
3. Reducer 10/6" Ø :- 1Nos.
4. Slotted Pipe 6" Ø (140-180) (106.8-101) (99.5-97.5) (90-91) -21.5 m.
5. Bail Pluge 6" Ø :- 5.5 m.
6. A.G.L. Casing Pipe 10" Ø :- 0.5 m.

Well No. DTW 30	Location: Hattaharwa
Elevation: 100	X = 382550 Y = 2973500
Method of Drilling: RIG	
Drilling Dates : 17.4.89 - 11.5.89	
Total Depth : 145.50	
Comments : Well Size: 10"/6" Screen Position: 91- 96.0, 97.5- 99.5 m 101-106.0,130.0-140.0 m Drilled Under: GWRDB/Mahottari Project	

W E L L L O G



APPENDIX 3/24

GROUND WATER TUBES WELS PROJECT

MAHOTTARY

LOCATION :- EKRAIYA
LOG BY :- R.S. PRAJAPATI
WELL NO. :-MH 39

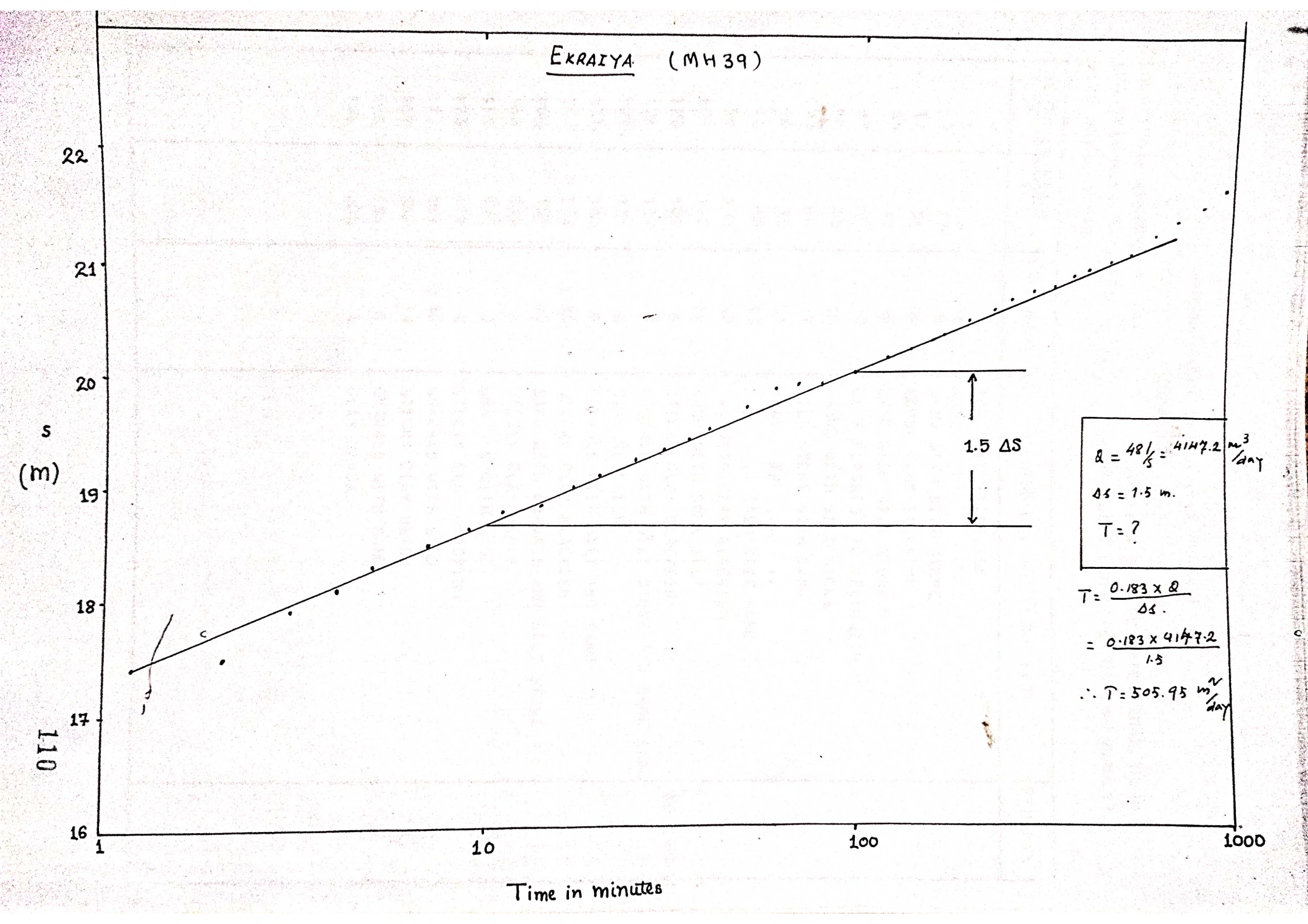
DRILLING STARTED DATA :- 2046.9.7
DRILLING COMPLETED DATE :-2046.10.10

DEPTH IN METRE		THICKNESS	LITHOLOGY OF FOR MATION	REMARKS
RROM	TO			
0M	7M	7	Top soil clay loose yellowish	
7	12	5	Fine sand	
12	29	17	Blackish clay	
29	36	7	Fine sand	
36	39	3	Vlackish to bluish clay	
39	50	11	Sand with silt stone	
50	88	38	Blackish clay	
88	89	1	Sand medium with silt	
89	147	58	Blackish clay	
147	148	1	Sand with silt stone	
148	152	4	Blackish clay	
152	153	1	Sand with silt	
153	169	16	Clay yellowish to grey	
169	171	2	Sand with silt	
171	174	3	Clay blackish to grey xticky	
174	176	2	Sand with silt	
176	184.5	8.5	Clay blackish to grey stbcky	
184.5	203	18.5	Gravals,cuttings quarzy	
203	208.5	5.5	Clay blackish to grey sticky	
208.5	213	4.5	Gravals with sand	
213	220	7	Clay yellowish to blackish	

LOCATION- IKRAIYA

WELL ASSEMEBLY

1.	CASING PIPE 10" Ø A.G.L.	= 1.00 m
2.	CASING PIPE 10" Ø (HOUSING)	= 31.26 m
3.	REDUCER 10/6" Ø 1NOS	= 1 NOS
4.	CASING PIPE 6" Ø (BLIND)	=155.12 m
5.	SOOTTED PIPE 6" Ø	= 16.62 m (203-186.38)
6.	BAIL PLUGE 6" Ø	= 5.54 m
7.	DISCHARGE PIPE 6" Ø	= 3.00 m
8.	SLUGE VALVE 6" Ø	= 1 SET.


EKRAIYA (MH 39)
22
21
20
19
18
17
16
s (m)
1
10
100
1000
Time in minutes
1.5 ΔS
Q = 48 l/s = 4147.2 m³/day
Δs = 1.5 m.
T = ?
T = 0.183 x Q / Δs.
= 0.183 x 4147.2 / 1.5
∴ T = 505.95 m²/day
110

GROUND WATER TUBELS WELL PROJECT

MAHOTTARY

LOCATION :- DHEERAPUR

LOG BY :- R.S. PRAJAPTI

WELL NO. :- MH/40

DRILLING STARTED DATE :- 2046.10.16

DRILLING COMPLETED DATE :- 2046.11.3

DEPTH IN METRE FROM	TO	THICKNESS	LITHOLOGY OF FORMATION	REMARKS
0	1	1	Top SOIL YELLOWISH	
1	5	4	SAND	
5	13	8	SAND WITH SILT STONE	
13	31	18	LOOSE CLAY BLACKISH	
31	37	6	SAND WITH SILT STONE	
37	40	3	CLAY BLACKISH TO YELLOWISH	
40	55	15	SAND WITH SILT STONE	
55	64	9	SILT STONE WITH SAND	
64	75	11	SILT ?? ,, ,,	
75	88	13	,, ,, AND SAME SAND	
88	101	13	,, WITH CLAY BLACKISH	
101	120	19	SAND WITH SOME SILT	
120	126	6	STICKY CLAY BLACKISH	NO SAMPLE
126	127	1	GRAVALS WITH SILT STONE AND SAME SAND	
127	135	8	CLAY BLACKISH	
135	143	8	GRAVALS WITH SILT AND SAND	
143	153	10	STICKY CLAY BLACKISH	
153	166	13	SAND WITH GRAVALS AND SILT STONE	
165	172	6	STICKY CLAY BLACK	
172	175	3	GRAVALS WITH SAND	
175	177	2	STICKY CLAY BLACKISH	
177	187	10	GRAVALS WITH SAND	
187	188	1	STICKY CLAY BLACK	
188	196	8	GRAVALS WITH SAND	
196	205	5	CLAY BLACK	

LOCATION- DHEERAPURA

WELL ASSEMBLY

1.	CASSING PIPE 10" Ø A.G.L.	=	0.91 m
2.	CASING PIPE 10" Ø (HOUSING)	=	29.09 m
3.	REDUCER 10/6" Ø 1 NOS	=	0.25 m
4.	CASING PIPE 6" Ø (BLIND)	=	149.58 m
5.	SLOTTED PIPE 6" Ø	=	17.08 m (196-178.92)
6.	BAIL PLUG 6" Ø	=	3.54 m
7.	DISCHARG PIPE 6" Ø	=	2.00 m
8.	SLUGE VALVE 6" O/	=	1 SET.

GROUND WATER TUBESWELL PROJECT

MAHOTTARY

LOCATION :- LAXMINIA
LOG BY :- R.S. PRAJAPATI
WELL NO. :- MH/ 41

DRILLING STARTED DATE- 2046.11.17
DRILLING COMPLETED DATE-2046.12.10

DEPTH IN METRE		THICKNESS	LITHOLOGY OF FARMATION	REMARK
FROM	TO			
0	3	3	Top soil yellowish	
3	55	2	Gravals with sand	
5	8	3	Yellow clay	
8	13	5	Cuttings gravals with sand	
13	22	9	Yellow clay plastic sticky	
22	23.5	1.5	Cuttings pebbles,cobbles with gravals	
23.5	26.5	3	Yellow clay	
26.5	28.5	2	Cutting boulders and gravals	
28.5	35	6.5	Yellow clay sticky	
35	37	2	Cuttings boulders and gravals	
37	45	8	Yellow clay sticky	
45	46.5	1.5	Gravals with sand	
46.5	49	3.5	Yellowish sticky clay	
49	55.5	6.5	Cotting boulders,pebbles,cobbles and gravels	
55.5	62	6.5	Corse sand	
62	66	4	Cutting pebbles,cobbles and gravals	
66	67	1	Yellow clay	
67	77	10	Cuttings pebbles,cobbles and gravals	
77	79	2	Yellow clay	
79	92	13	Cutting,pebbles and gravals	
92	95.5	3.5	Yellow stick clay	
95.5	118	22.5	Cutting boulders,pebbles,cobbles and gravels	
118	119	1	Corse sand	
119	123	4	Yellowish clay	
123	127	4	Cutting boulders and gravals	
127	138.6	11.6	Yellowish clay sticky	

LOCATION- LAXIMINIYA

WELL ASSEMBLY

1.	10" ø	CASING PIPE A.G.L.	= 0.68 m	
2.	10" ø	CASING PIPE (HOUSING)	= 49.27 m	
3.	10/6" ø	REDUCER (1 NOS)	= 0.25 m	
4.	6" ø	CASING PIPE (BLIND)	= 49.86 m	
5.	6" ø	SLOTTED PIPE	= 17.08 m	(99.38-116.46)
6.	6" ø	BAIL PLUG	= 8.00 m	

GROUND WATER TUBEWELLS PROJECT

Mahottari

GEOLOGICAL - LOG

Location :-Vijalpura

Log By :-R.S.Prajapati

Well No. :-MH/42

Static Water Level :- 6.7 m.

Drilling Started :-

Drilling Completed :-

Depth in Metre		Thickness	Geological Description	Remarks
From	To			
0	2	2	Top soil yellowish to blackish	
2	4	2	Gravels with sand	
4	5	1	Yellowish clay	
5	8	3	Gravel with sand	
8	13	5	Gravel and cutting pebbles and cobbles	
13	19	6	Yellowish clay soft plastic	
19	24	5	Gravel and cutting pebbles and cobbles	
24	29	5	Blackish clay	
29	35	6	Gravel with sand	
35	42.17	7.17	Gravel and cutting pebbles and cobbles	
42.17	45	3	Yellow clay	
45	55.87	10.87	Gravel with sand and cutting pebbles and cobbles	
55.87	62.42	6.55	Yellow clay	
62.42	71.92	9.50	Gravel with sand	
71.92	79.17	7.25	Yellow clay	
79.17	88.0	8.83	Gravel with sand	
88	97	9	Gravel with sand and same claynix	
97	99	2	Gravel with sand	
99	100	1	Yellow clay	

WELL ASSEMBLY

1. Casing Pipe 6" Ø - 60.0 m.
2. Bail Plug 6" Ø - 4.60 m.
3. Slotted Pipe 6" Ø - 27.0 m. (31-42)-(46-52)(64-68)-(81-97)

GROUND WATER TUBES WELL PROJECT

MAHOTTARY

LOCATION- MANARA KATTI

LOG BY- R.S. PRAJAPATI

WELL NO.- MH/43

DRILLING STARTED DATE:- 2047.1.12

DRILLING COMPLETED DATE:-2047.2.9

DEPTH IN METRE		THICKNESS	LITHOLOGY OF FORMATION	REMARKS
FROM	TO			
0	15	15	Top soil,clay yellowish	
15	17	2	Fine sand	
17	49	32	Clay yellowish sticky	
49	52	3	Silt with sand	
52	56	4	Clay blackish	
56	62	6	Sand with silt	
62	90	28	Clay blackish	
90	103	13	Gravals with sand	
103	135	32	Clay blackish sticky	
135	144	9	Sand with same fine gravals	
144	148	4	Clay blackish to yellowish	
148	183	35	Silt with fine sand and same gravals	
183	213	30	Clay yellow	

NO PIPES WERE LOWERD BECAUSE OF THE INSUFFICIENT

THICKNESS OF THE QUIFER WITHIN THE DRILLED DEPTH

GROUND WATER TUBE WELLS PROJECT

MAHOTTARY

LOCATION - KHUTTA PIPARADI

WELL NB. - MH/44

START DATE :- 2047.1.17

DRILLING COMPLTED D.2047.2.31

DEPTH IN METRE FROM	TO	THICKNESS	LITHOLOGY OF FARNATION	REMARKS
0	4	4	Top soil yellow	
4	14.5	10.5	Fine sand	
14.5	29	14.5	Clay blackish	
29	32	3	Silt with sand and Grayals	
32	40	8	Clay yellowish sticky	
40	42	2	Sand with gravals	
44	49	5	Gravals	
49	57.5	8.5	Clay yellowish to blackish	
57.5	62	4.5	Sand with Gravals	
62	65	3	Clay yellowish	
65	68	3	Gravals	
68	72.5	4.5	Clay yellow	
72.5	77	4.5	Gravals	
77	85	8	Clay yellowish	
85	91	6	Gravals	
91	101.5	10.5	Clay yellow sticky	
101.5	105	3.5	Gravals	
105	134	29	Clay yellow sticky	
134	141	7	Fine sand	
141	162	21	Clay yellowish sticky	
162	170	8	Gravals	
170	171	1	Clay yellow	
171	183	12	Sand with gravals	
183	187	4	Clay blackish	

WELLS ASSEMBLY

1. 10" Ø Casing pipe A.G.L = 1.00 m.
2. 10" Ø ,, ,, (Housing) =31.79 m.
3. 10/6" Reducer = 1 No.
4. 6" Bail plug = 3.00 m.
5. 6" Slotted Pipe =16.08 m.
6. 6" Discharge Pipe = 1.00 m.
7. Sluge valve = 1 ses.

GROUND WATER TUBES WELL PROJECT

MAHOTTARY

LOCATION - KISHANNAGAR
LOG BY - R.S. PRAJAPATI
WELL NO.-MH/45

DRILLING STARTED DATE :- 2047.3.1
DRILLING COMPLETED DATE :-2047.4.16

DEPTH IN METRE		THICKNESS	LITHOLOGY OF FARMATION	REMARKS
FROM	TO			
0	1	1	Top soil yellowish	
1	20	19	Cuttings bovlder and pebble,cobble	
20	23	3	Yellow clay	
23	31	8	Cutting bovlder and pebble,cobble with gravals	
31	36	5	Sandy clay yellow	
36	48.5	12.5	Cuttings bovlder and pebble,cobble	
48.5	50	1.5	Yellow clay with gravals	
50	56	6	Cuttings Pebble, Cobble with gravals	
56	59	3	Yellow clay with gravals	
59	78	19	Cutting pebble,cobble and gravals	
78	81	3	Yellowish clay with gravals	
81	90	10	Cutting pebble,cobble, with gravals	
90	96	6	Sandy clay yellow	
96	98	2	Clay yellowish	
98	114	26	Gravals	
114	123	9	Yellow clay	
123	130	7	Gravals	
130	138	8	Yellowish clay	

WELL ASSEMBLY

*1.	CASING PIPE 10" Ø A.G.L.	= 0.40 m
2.	,, ,, 10" Ø (HOUSING)	= 51.81 m
3.	Reducer 10/6" Ø 1NOS	= 0.25 m
4.	CASING PIPE (BLIND) 6" Ø	= 44.32m
5.	BAIL PLUG 6" Ø	= 5.54 m
6.	SLOTTED PIPE 6" Ø	= 16.62 m(85.3-90.84) (101.92-113

WATER LEVAL DATA OTV

Well No.	Location	W.L. 1985 Max. m.	W.L. 1985 Min. m.	W.L. 1986 Max. m.	W.L. 1986 Min. m.	W.L. 1987 Max. m.	W.L. 1987 Min. m.	W.L. 1988 Max. m.	W.L. 1988 Min. m.	Remarks
1.	Jaleshwar	Flowing		Flowing		Flowing		Flowing		
2.	Matihani	3.12	2.34	4.40	1.32	4.26	2.92	4.23	1.83	
3.	Ekaraiya	A		1.34	0.11			2.00	0.15	
4.	Siswakataiya	0.40	0.18	1.98	0.31	1.79	0.35	1.85	0.31	
5.	Pokharvinda	Flowing		+0.35	Flow	0.14	Flow	Flowing		
7.	Aurhi	0.71	0.25	+0.93	0.15	1.95	Flow	4.20	0.95	
9.	Bhangaha	6.29	6.06	7.06	5.84			6.65	4.95	
10.	Matihani	0.49	0.58	4.13	0.29	1.16	0.10	4.13	0.32	
11.	Laxminiya	19.39	17.12	17.17	16.19			18.00	11.45	
12.	Hathilate							38.35	26.80	
16.	Ratauli	0.23	0.01	1.17	0.09	0.04	0.21	0.75	0.50	
17.	Mahottary	Flowing		+0.56	Flow	Flowing		0.80	Flow	
18.	Bhargavshar			0.60	0.28	2.38	1.95	2.62	1.05	
19.	Ramnagar			23.78	22.82	26.20	23.84	24.75	21.72	
20.	,,			42.97	35.46	41.52	36.02	40.27	36.25	
21.	Bijalpura			7.42	6.55	7.25	4.71			
22.	,,			7.28	6.54	7.07	4.50	7.10	4.55	
26.	Hathilet	29.58	27.78	30.27	27.45	31.75	21.24	30.07	27.20	
29.	Belgachhi					32.11	31.98	30.70	27.00	
31.	Pashupatinagar							16.90	13.00	
32.	Bharatpur							12.75	9.30	
33.	Saxminiya							29.78	27.00	
34.	Bijalpura							19.40	14.90	
37.	Gaushala									
38.	Hathisharwa									
41.	Laxminiya							30.40	29.20	
42.	Bijalpura							20.45	18.00	

WATER OLEVAL DATA DTW

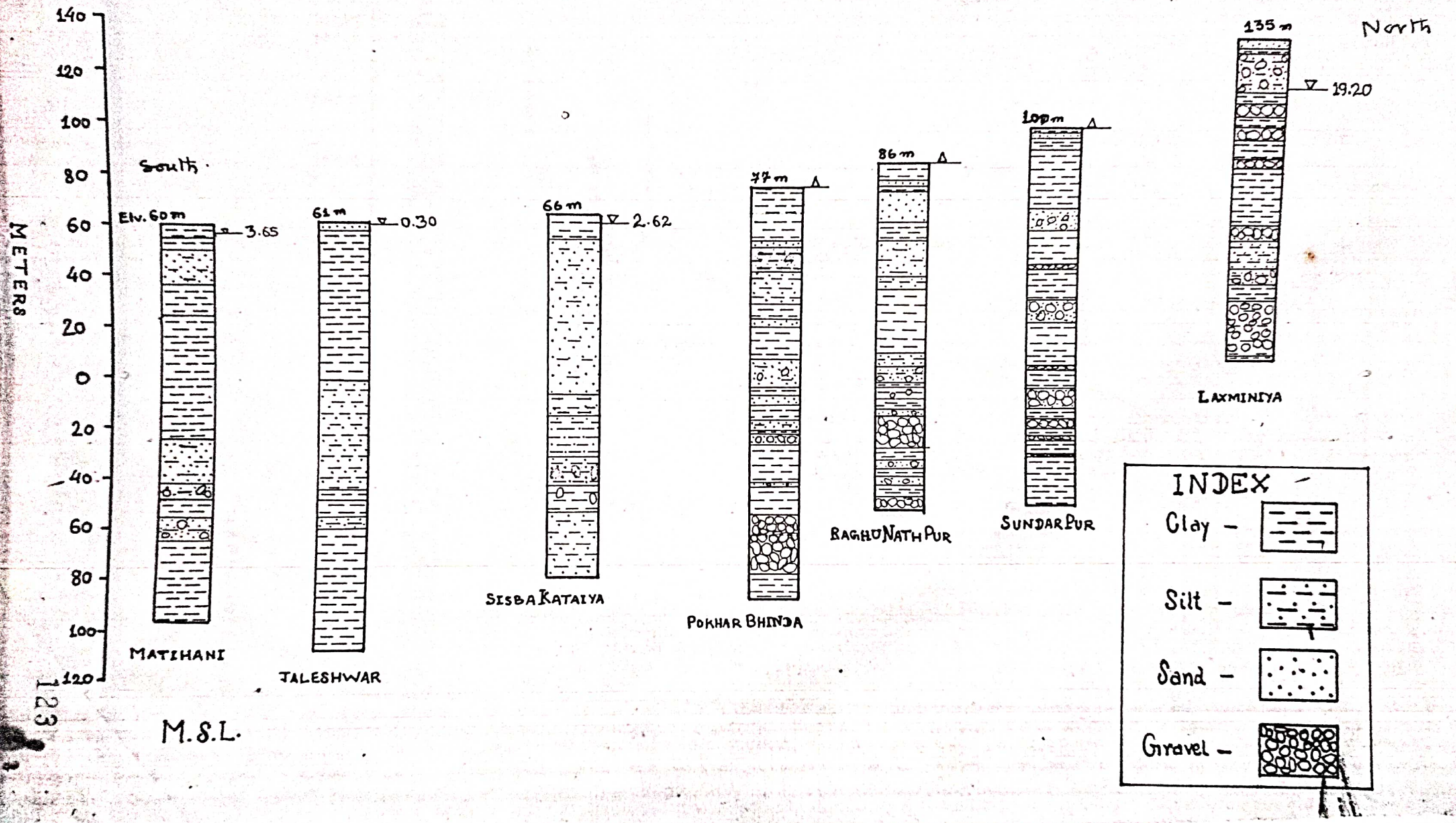
Well No.	Location	W.L. 1989 Max. m.	W.L. 1989 Min. m.	W.L. 1990 Max. m.	W.L. 1990 Min. m.	W.L., 1991 Max. m.	W.L. 1991 Min. m.	W.L. 1992 Max. m.	W.L. 1992 Min. m.	Remarks
1.	Jaleshwar	+0.35	0.09	+0.30	Flow	+0.60	Flow	+0.70	+0.10	
2.	Mathihani	4.08	1.43	2.93	1.28	2.03	0.83	2.03	1.03	
3.	Ekariya	2.35	0.50	1.95	0.65	2.20	0.65	1.90	1.45	
4.	Sishwakati	2.11	0.38	1.56	0.76	2.11	0.76	2.36	0.85	
5.	Pokharvinda	0.40	Flow	Flowing		+0.22	Flow	+0.72	0.03	
6.	Aurhi	5.00	3.70	3.55	1.00	2.35	0.95	3.53	1.70	
79.	Bhangaha	7.20	5.25	7.40	5.80	7.70	6.35	9.20	7.70	
10.	Matihani	4.19	1.94	4.44	2.95	5.56	3.69	4.89	4.26	
11.	Laxminiya	18.05	14.25	20.65	17.15	20.65	17.75	21.70	19.65	
12.	Hathilet	40.75	34.15	40.45	40.30					
16.	Ratauli	2.22	0.05	1.05	0.08	1.47	0.23	1.31	0.43	
17.	Mahottary	0.85	Flow	0.31	Flow	0.55	Flow	1.05	0.05	
18.	Bhargavshar	2.60	0.87	2.08	0.95	2.15	1.00	2.70	1.55	
19.	Ramnager	24.75	22.58	24.75	22.75	24.77	23.90	26.10	23.95	
20.	,,	37.52	36.52	39.27	37.22	38.23	36.23	40.92	37.02	
21.	Bijalpura	8.00	6.00	8.25	7.00	9.15	7.20	11.00	7.95	
22.	,,	7.70	5.20	8.40	5.90	9.60	6.40	9.05	7.00	
26.	Hathilut	31.37	28.12	30.67	28.47	31.07	33.07	33.07	30.20	
29.	Belgahhi	30.95	28.56	32.30	29.00	32.70	31.20	34.20	31.60	
31.	Pashupatinagar	17.25	14.65	18.00	15.90	18.30	16.40	19.55	17.60	
32.	Bharatpur	13.15	8.15	12.25	10.45	10.45	11.25	14.95	13.33	
33.	Laxminiya	29.93	27.43	30.10	28.53	30.18	29.48	31.48	30.11	
34.	Bijalpura	17.52	14.90	18.65	16.34	18.84	17.60	21.10	18.20	
37.	Gaushala	4.90	3.90	5.68	4.46	6.48	6.48	5.25	14.68	
38.	Hathishrwa	1.60	0.79	2.55	0.80	2.05	1.65	0.70	0.25	
41.	Laxminiya	42.00		30.40	29.20	31.00	29.40	32.75	30.78	
42.	Bijalpura			20.45	18.00	20.10	18.00	23.95	19.20	

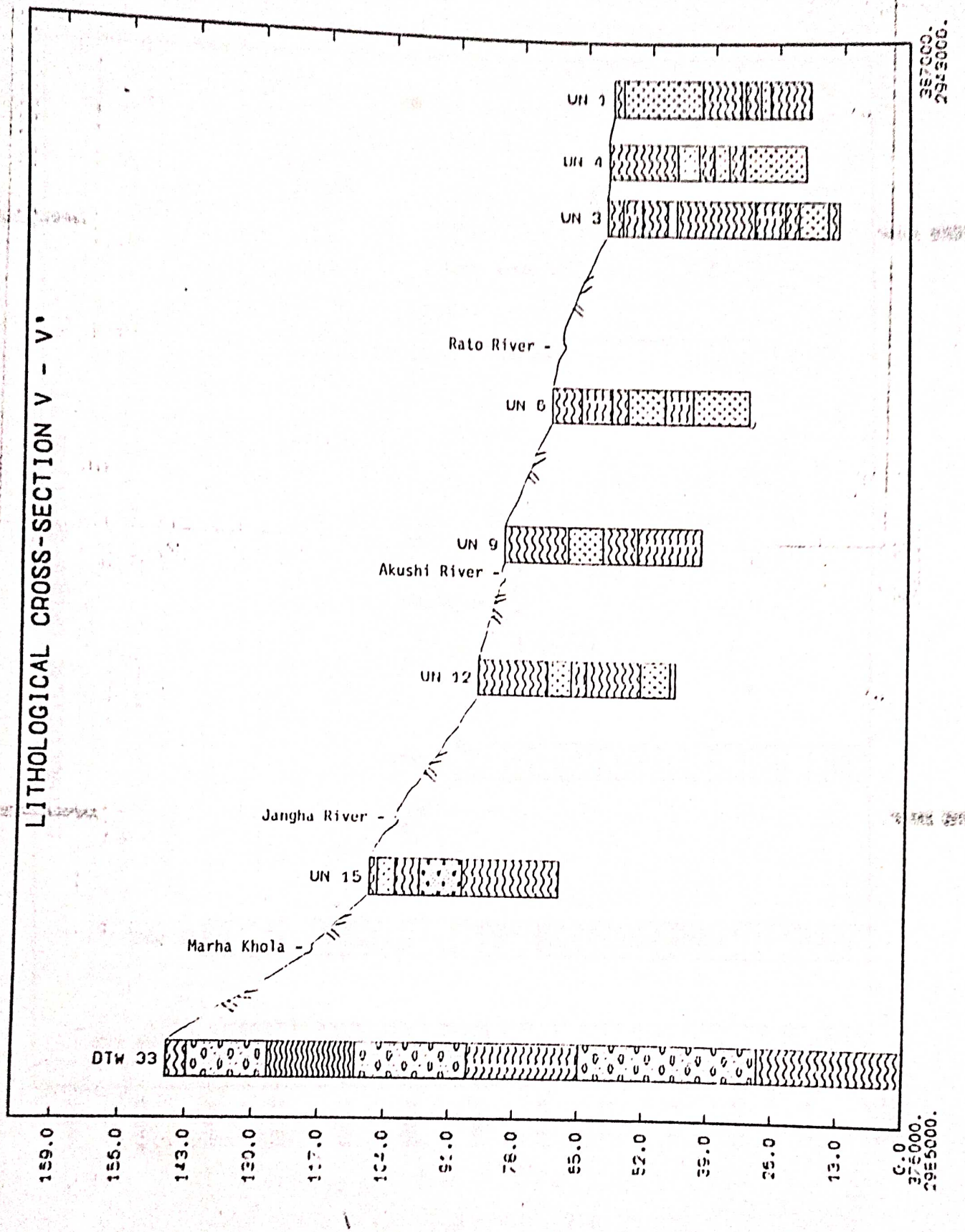
Well No.	Location	Aq/T.D.D (M)	Aq thickness %	Type of aquifer
1	Jaleshwar	32.02/183	17.05 %	Sand silty
2	Matihani	31.40/157	20.00 %	Sand silty with fine gravel
3	Ektahiya	31.55/151	20.09 %	Sand with silt
4	S. Kataiya	44.37/145	30.06 %	Sand silty
5	Pokarvinda	53.08/165	32.18 %	,, fine with gravels
6	Raghunathpur	43.00/172	25.00 %	,, silty ,, fine gravel
7	Aurhi	43.32/152	28.05 %	Gravel fine to course
8	Hathilet	29.88/083	36.00 %	,, withcutting of boulder
9	Bhangha	60.00/138	44.00 %	,, couse with pebble
10	Matihani	14.00/138	10.14 %	Sand with silt
11	Laxminiya	62.97/123	51.02 %	Gravel fine with sand
12	Hathilet	80.03/111	72.01 %	,, ,, ,, ,,
13	Sunderpur	39.00/150	26.00 %	,, and sand
14	Sripur	45.60/152	30.00 %	,, ,, ,,
15	Bishamvepur	35.82/116	30.88 %	,, ,, ,,
16	Ratauli	28.93/159	18.02 %	Sand fine with gravel
17	Mahottayi	31.05/135	23.00 %	,, silty and ,,
18	Bhargaveser	64.80/144	45.00 %	,, fine ,, silty
19	Ramnager	61.15/150	40.77 %	Gravel sand and pebble
20	Ramnager	52.91/143	37.00 %	,, ,, ,, ,,
21	Bijalpura	59.00/100	59.00 %	,, with sand
22	Bijalpura	59.00/100	59.00 %	,, ,, ,,
23	Sahorba			Abondoned
24	Dhamoura	63.35/181	35.00 %	Gravel couse to medium
25	Parauli	28.39/182	15.06 %	,, medium to coupse
26	Hathilet	42.73/157	27.22 %	,, and pebble
27	Bhargavesar	64.80/144	45.00 %	Sand fine and silt
28	Bhargavesar	64.80/144	45.00 %	,, ,, ,, ,,
29	Belgachhi	42.91/122	35.75%	Gravel with cuttingpebbl
30	Kishannager	92.00/122	75.04 %	,, course and ,, ,,
31	pashupatinagar	95.00/163	58.85 %	,, ,, ,, ,, ,,
32	Bharatpur	48.00/112	42.85 %	,, ,, ,, ,, ,,
33	Laxminiya	62.00/152	40.78 %	,, ,, ,, ,, ,,
34	Bijalpura	78.00/153	50.98 %	,, ,, ,, ,, ,,
35	phulhatta	79.00/213	37.08 %	,, ,, ,, ,, ,,
36	Pipara	83.00/222	37.38 %	,, ,, ,, ,, ,,

well No.	Location	Aq/T.D.D.(M)	Aq. Thickness	Type of Aquifer
37	Gaushala	110/197	58.82 %	Gravel with cutting of pebble
38	Hathisharua	70/145	48.27 %	,, ,, ,, ,,
39	Ekrahiya	48/220	21.81 %	,, ,, ,, ,,
40	Dhirapur	116/205	56.58 %	,, ,, ,, ,,
41	Laxminiya	74/138	53.39 %	,, ,, ,, ,,
42	Bijalpura	49/95	51.57 %	,, ,, ,, ,,
43	Manarakati	56/213	26.29 %	Silt with fine sand and gravel
44	Khuttapiprari	48/187	25.66 %	,, ,, ,, ,,
45	Kisannager	80/138	57.37 %	Cutting of pobble cobble and gravel

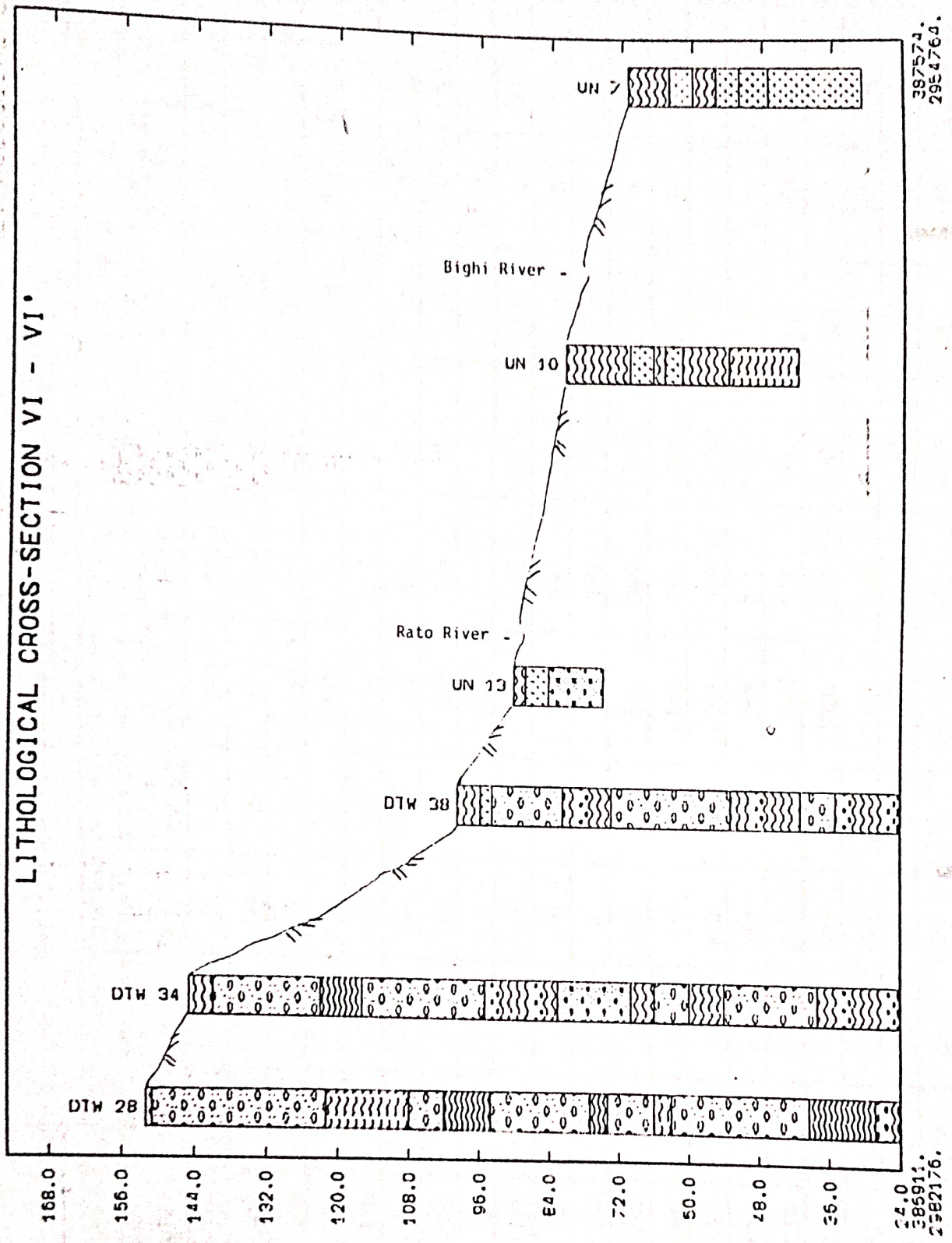
Variation of Lithology

From South ⟶ North




LITHOLOGICAL CROSS-SECTION V - V'
UN 1
UN 4
UN 3
Rato River
UN 6
UN 9
Akushi River
UN 12
Jangha River
UN 15
Marha Khola
DTW 33
159.0
155.0
143.0
130.0
117.0
104.0
91.0
78.0
65.0
52.0
39.0
26.0
13.0
0.0
367000.
293000.
376000.
295000.

APPENDIX 4/6


LITHOLOGICAL CROSS-SECTION VI - VI'
UN 9
Bighi River
UN 10
Rato River
UN 13
DTW 38
DTW 34
DTW 28
387574.
2954764.
168.0
156.0
144.0
132.0
120.0
108.0
96.0
84.0
72.0
60.0
48.0
36.0
24.0
385911.
2982176.

APPENDIX 4/7

Maximum Shallow Tubewell Potential

District	Terai area 1/	Forest, game reserve 2/	Tubewell projects 3/	Bhabhar Zone 4/	Percent area of failed STW's 5/	Net area suitable for STW's 6/	12 l/s well, percolation recharge 7/		16 l/s well, perennial recharge 8/		Total STW's
							area	wells	area	wells	
Kanchanpur	1450	300		160	15	842	716	3365	126	907	4272
Kailali	1970			475	15	1271	1106	5198	165	1188	6386
Bardiya	1350			130	15	1037	830	3959	207	1490	5449
Banke	800			120	20	544	446	2096	98	706	2802
Kapilvastu	1500			200	20	1040	1040	4888	0	0	4888
Rupandehi	1140		140	100	10	810	810	3807	0	0	3807
Nawal Parasi	520			80	5	418	389	1828	29	209	2037
Parsa	1120		30	600	5	466	466	2190	0	0	2190
Bara	1100		85	360	10	590	590	2773	0	0	2773
Rautahat	1020			10	5	960	960	4512	0	0	4512
Sarlahi	1240		200	100	10	846	846	3976	0	0	3976
Mahotari	1090		325	100	5	632	632	2970	0	0	2970
Danusha	940		100	270	5	542	542	2547	0	0	2547
Sirha	930			180	5	713	713	3351	0	0	3351
Saptari	1030			200	10	747	583	2740	164	1181	3921
Sunsari	1240			100	10	1026	123	578	903	6502	7080
Morong	1450			200	15	1063	925	4348	138	994	5342
Jhapa	1400	120		100	5	1121	1121	5269	0	0	5269
Totnl	21290	630	880	3845	average 10.3	14668	12838	60335	1830	13177	73,572

Area in square kilometers

Explanation notes on following page

भूमिगत जलभण्डार खतरामुक्त छैन

मानिस तात्कालिक आवश्यकताको पूर्तिमा नै बढी मात्रामा केन्द्रित रहने तथ्य भविष्यमा पर्न-सक्ने असरप्रति गम्भीर नभएर चाल्दै आएका विभिन्न अदूरदर्शी कदमहरूले पुष्टि गर्दै आएको छ । काठमाडौवासीहरूका लागि खानेपानीको समस्या एउटा दीर्घकालीन सत्यको रूपमा स्थापित भइसकेको छ । सतही जलस्रोतबाट समाधान हुन नसकेको यो समस्याले भूमिगत जलस्रोतलाई पनि अतिक्रमण गर्न थालिसकेको छ, यो पनि सत्य हो । यसैसँग जोडिएको अर्को भयावह सत्य यो छ कि भूमिगत जल सञ्चयमाथि गर्न थालिएको शोषणले काठमाडौं-को धरातलीय स्वरूप भासिने सम्भावनालाई जन्माईदिएको छ ।

समुद्री सतहबाट करीब १३४० मि. को उचाइमा अवस्थित काठमाडौं उपत्यकाको जमिनबाट करीब ६०० फिट तलसम्म कालोमाटोको बाक्लो पत्र पाइन्छ र कडा चट्टानलाई भेट्नाउन करीब १४०० फिट तल जानुपर्छ । यस कडा चट्टानलाई करीब तीनसयदेखि चारसय पचास फिट माथिसम्म बाक्लो लेसिलो माटोले छोपेको छ । यस लेसिलो माटो र कालोमाटोको बीचमा नै भूमिगत जलभण्डार अवस्थित रहेको छ ।

खानेपानी संस्थानलाई पनि खानेपानी सङ्कलन-का लागि भूमिगत जलभण्डारको उपयोग गर्न परिरहेको छ । उक्त संस्थानले विश्व बैंकको ऋण सहयोगबाट ३८ वटा गहिरा ट्युबवेलहरूको निर्माण गरेको थियो । हाल सञ्चालित भइरहेका बीसवटा ट्युबवेलबाट नेपाल खानेपानी संस्थानले प्रतिदिन करीब साढे दुईकरोड लि. पानी निकाल्ने गरेको छ । यति मात्र नभई उक्त संस्थानले सुख्खा चार महिनाका लागि भूमिगत स्रोतको पानी नै बढी मात्रामा प्रयोगमा ल्याउने योजना नै बनाएको पनि थाहा भएको छ । यसप्रकार काठमाडौं उपत्यकाको सीमित भूमिगत जलस्रोत सरकारी तथा निजी दुबै क्षेत्रको दोहनको मारमा परिरहेको छ ।

जाइकाले काठमाडौं उपत्यकाको विस्तृत अध्ययनपछि प्रस्तुत गरेको एक प्रतिवेदनमा यहाँको भूमिगत जलभण्डारबाट दैनिक एकलाख पचासहजार लिटरभन्दा बढी पानी निकाल्न नहुने तथ्य उल्लेख गरिएको थियो । काठमाडौं उपत्यकाको भूमिगत जलभण्डारलाई ध्यानमा राखी तोकिएको उक्त सीमाभन्दा निकै बढी पानी दैनिकरूपमा निकालिदै आएको छ । फलस्वरूप भूमिगत जलको आवश्यक मात्रा सञ्चय नभई काठमाडौं उपत्यकाको जमिन भासिने सम्भावना उत्पन्न भइसकेको कुरा भू-गर्भविद्हरू व्यक्त गर्दछन् ।

काठमाडौं उपत्यकामा वृद्धि भइरहेको जनसंख्याको चाप, अत्यधिक पानी उपभोग गर्ने कलकारखानाहरूको उपस्थिति, सतही मुहानको घट्दै गएको क्षमता जस्ता विविध कारणले सिर्जना भएको जल सङ्कटलाई तार्ने एकमात्र सजिलो विकल्पका रूपमा भूमिगत जलस्रोतको उपयोगलाई नै लिइन थालिएको छ । विगत करीब पन्ध्र वर्ष यता काठमाडौंमा देखा परेको गहिरा ट्युबवेल खन्ने परम्परा आज आएर निस्कै भयावह बनिसकेको छ । उपत्यकामा सरकारी र निजी गरी करीब एकसय पचासवटा गहिरा ट्युबवेलले दिनहुँ भूमिगत जलस्रोतको शोषण गरिरहेको अनुमान गरिन्छ ।

एक अध्ययन अनुसार गलैंचा कारखाना-हरूलाई करीब एककरोड दशलाख लि., कपडा कारखानालाई करीब सैंतीसलाख लि. र ठण्डा पेय, मदिरा कारखाना जस्ता अन्य उद्योगहरूका लागि करीब ५० लाख लि. पानी दैनिक रूपमा आवश्यकता पर्दछ । यसको करीब पन्ध्र प्रतिशत आपूर्ति मात्र नेपाल खानेपानी संस्थानबाट वितरित पानीबाट गरिन्छ र बाँकी पानी भूमिगत जलभण्डारबाट लिइएको हुन्छ ।

निजी क्षेत्र मात्र होइन, खानेपानीको व्यवस्थापनको जिम्मा लिएर बसेको नेपाल

भासिने सम्भावना उत्पन्न भइसकेको कुरा भू-गर्भविद्हरू व्यक्त गर्दछन् ।

नेपाल राजकीय विज्ञान तथा प्रविधि प्रतिष्ठानका भू-गर्भविद् डा. चन्द्रकान्त शर्माका अनुसार हाल प्रत्येक वर्ष जमिनमुनिको पानीको सतह एक । एक मिटर तल झरिंदै गएको छ । यसैगरी जियोटेक्निकल इन्जिनियर के.बी. रानामगर 'जल निष्काशनको मात्रा नाघेको नतिजास्वरूप जमिन भासिने प्राकृतिक क्रम शुरू भइसकेको' उल्लेख गर्नुहुन्छ ।

गहिरा ट्युबवेलको प्रयोग अत्यधिक मात्रामा हुँदै आएको परिणामस्वरूप भूमिगत जलस्रोत सुक्दै गएको तथ्य ठाउँ ठाउँमा ट्युबवेल गाढ्दा पनि पानी नआएको यथार्थताले प्रमाणित गरिरहेको छ । यस किसिमको अनुभव दरबारमार्ग क्षेत्रमा गरिएको थियो । यसैगरी प्राकृतिक कुवा, इनार, धुङ्गेधाराको पानी सुक्दै जानु जस्ता घट्नाले पनि यसै वास्तविकताको पुष्टि गर्दछ ।

भूमिगत जलस्रोतलाई पुनः भर्ने प्रक्रियाको अभावमा यो स्रोतको दिगोपना वर्षाको पानीमै निर्भर भइरहेको छ । यस स्थितिमा वर्षा तुलनात्मक रूपमा कम हुनु र पानीको प्रयोग अधिकतम मात्रामा भइरहेको कारणले भूमिगत जलभण्डार भयावहरूपमा असन्तुलित भइसकेको छ र कालान्तरमा यसले काठमाडौं उपत्यकाको सांस्कृतिक सम्पदालाई समेत खतरामा पार्ने सम्भावना जन्मिसकेको छ ।

भूमिगत जलसम्पदा सुक्दै जानु मात्र समस्या नभई क्रमिकरूपमा यो प्रदूषित हुँदै जानु पनि अर्को समस्या हो । काठमाडौं उपत्यकामा कोच्चिएर बसेका विभिन्न उद्योगहरूले प्रयोग गरेका रासायनिक पदार्थ मिश्रित पानी बिना कुनै प्रशोधन त्यसै फालिन्छ । सोही प्रदूषित पानी भूमिगत जलभण्डारमा मिसिन पुग्दछ । यसप्रकार गलैंचा धुने, गलैंचाका लागि प्रयोग गरिने ऊनमा रङ्ग हाल्ने, कपडालाई रङ्गिन पार्ने, साबुन उत्पादन गर्ने कारखानाका अप्रशोधित पानी एवं प्रदूषित नदीका पानीले भूमिगत पानीलाई पनि क्रमशः प्रदूषित गर्दै लगेको पाइन्छ ।

जमिनभित्र प्राकृतिकरूपमा जम्मा भएर बसेको पानीमाथि छाएको सङ्कट समाधानको दिशामा स्पष्ट कानुनी व्यवस्थाको अभाव पहिलो व्यवधानको रूपमा खडा भएको छ । गहिरो ट्युबवेल जडान गर्नका लागि अनुमतिको आवश्यकता नपर्ने तथा पानी निकाल्ने कुनै हदबन्दीको व्यवस्था नभएको कारणले भूमिगत जलमाथि अतिक्रमण गर्नेहरू छाडा साँढे जस्तै भएका छन् । तसर्थ भूमिगत जलमा आएको असन्तुलनबाट वातावरणमा दीर्घकालिन असर पर्नबाट जोगिन स्पष्ट नीति नियमको व्यवस्था हुनु अत्यन्त जरूरी देखिन्छ ।

यसैगरी भूमिगत जलभण्डारलाई दिगो बनाइराख्न यसको एकोहोरो उपभोग मात्र नगरी पुनः भण्डार गर्ने बानीलाई प्रोत्साहन दिने, नदी, पोखरीको जलसतहलाई कायम गराउने, साना साना सतही जलस्रोतको खोजी गर्ने एवं जनसंख्याको चापलाई घटाउने, उद्योगहरूलाई विकेन्द्रित गर्ने जस्ता कदमहरू चाल्नु पनि अपरिहार्य भइसकेको देखिन्छ ।

पुष्कर न्यौपाने