

ATTACHMENT 2

Table4.4.1(a) Litho-logical Log of the Observation Well

Well No.JKPT-1, at Kaptanganj

Depth (m)	Thickness (m)	Description of Lithology
0-6	6	Yellowish fine to medium sand
6-12	6	Medium to coarse sand
12-18	6	Coarse sand with fine gravel
18-24	6	Fine sand with silt
24-32	8	Medium to coarse sand with fine gravel
32-39	7	Silty Clay
39-42	3	Fine to medium sand
42-44	2	Silty Clay
44-56	12	Medium to coarse sand with fine gravel
56-61	5	Sandy clay
61-64	3	Fine sand with silt
64-70	6	Medium to coarse sand
70-80	10	Gravel with medium to coarse sand
80-100	20	Gravel with coarse sand
100-106	6	Medium sand
106-124	18	Gravel with coarse sand

Table4.4.1(b) Litho-logical Log of the Test Well

Well No.JKPT-2, at Kaptanganj

Depth (m)	Thickness (m)	Description of Lithology
0-6	6	Fine to medium sand
6-10	4	Medium to coarse sand
10-22	12	Medium to coarse sand with fine gravel
22-26	4	Medium to coarse sand
26-32	6	Silt and fine to medium sand
32-54	22	Medium to coarse sand with fine gravel
54-66	12	Gravel with medium to coarse sand
66-68	2	Coarse sand with fine gravel
68-80	12	Fine to medium sand
80-84	4	Gravel with coarse sand
84-94	10	Coarse sand with fine gravel
94-112	18	Gravel with coarse sand
112-124	12	Coarse sand with fine gravel

ATTACHMENT-2

Table 4.4.2 (a): Electric Logging (Resistivity) of Observation Well

Well No. : JKPT1 (obs.Well)		Hole dia. : 8 1/2"					
Location : Kaptanganj		Logging Date : 31st August					
Well Depth : 120m		Logger Model : Minilog 300 M					
Logged By : P.N. Ghimire/M.Lamichane		(Integrated Geoinstrument and service Pvt. Ltd.)					
Owner : Sunsari River Irrigation Project		Contractor : SSC Drillwell Pvt. Ltd.					
Depth (m)	Spontaneous Potential (SP) (mV)	Resistance (ohms)			Resistivity (ohm-m)		Remarks
		Short Normal (SN)	Point Resistance (PR)	Long Normal (LN)	Short Normal (SN*5)	Long Normal (LN*20)	
1							
2							
3							
4							
5	-504	20.7	119	12.5	103.5	250	
6	-505	16.3	113	8.5	81.5	170	
7	-503	13.6	107	6.1	68	122	
8	-502	12.9	104	5.7	64.5	114	
9	-501	13.9	105	5.8	69.5	116	
10	-501	14.8	104	6.3	74	126	
11	-500	15.4	105	7.5	77	150	
12	-499	16.4	109	7.4	82	148	
13	-499	16.4	106	7.4	82	148	
14	-497	16	107	7.5	80	150	
15	-499	15.6	104	7.2	78	144	
16	-499	15.1	102	7.3	75.5	146	
17	-501	15.1	101	6.6	75.5	132	
18	-500	15	105	5.1	75	102	
19	-500	14.5	103	4.7	72.5	94	
20	-501	12.6	102	4.5	63	90	
21	-502	11.3	99	3.5	56.5	70	
22	-500	11.1	98	3.3	55.5	66	
23	-502	10.3	98	3.3	51.5	66	
24	-503	10.7	100	3.1	53.5	62	
25	-504	10.8	100	2.9	54	58	
26	-505	11	100	3	55	60	
27	-505	11.9	101	3	59.5	60	
28	-505	12	103	3.1	60	62	
29	-505	11.3	102	2.9	56.5	58	
30	-505	12	103	3.2	60	64	
31	-505	10.9	100	3	54.5	60	
32	-507	10.5	99	3.2	52.5	64	
33	-506	9.7	97	3	48.5	60	
34	-505	10.3	100	3.3	51.5	66	
35	-508	11.1	100	2.5	55.5	50	
36	-508	10.4	100	2.7	52	54	
37	-506	9.8	100	2.6	49	52	
38	-506	10.3	100	2.8	51.5	56	
39	-505	10	98	2.6	50	52	
40	-506	10.3	100	2.7	51.5	54	
41	-506	10.6	100	2.7	53	54	
42	-504	10.9	101	3	54.5	60	
43	-505	11.1	101	2.8	55.5	56	
44	-504	10.5	99	3	52.5	60	
45	-503	11.4	102	3	57	60	
46	-502	11.7	103	3.2	58.5	64	
47	-502	12.2	103	3.1	61	62	
48	-501	13	105	3.4	65	68	
49	-500	13.2	105	3.7	66	74	
50	-499	13	105	3.6	65	72	

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Depth (m)	Spontaneous Potential (SP) (mV)	Resistance (ohms)			Resistivity (ohm-m)		Remarks
		Short Normal (SN)	Point Resistance (PR)	Long Normal (LN)	Short Normal (SN*5)	Long Normal (LN*20)	
51	-499	14	108	3.6	70	72	
52	-497	14.1	106	3.4	70.5	68	
53	-499	12.4	104	3.6	62	72	
54	-498	12	104	3.5	60	70	
55	-497	14.4	110	3.2	72	64	
56	-497	12.4	105	2.9	62	58	
57	-496	11	101	3.2	55	64	
58	-497	10.9	102	3.1	54.5	62	
59	-495	11.3	100	2.9	56.5	58	
60	-495	12.9	101	3.1	64.5	62	
61	-495	13.1	103	3.5	65.5	70	
62	-498	13.6	106	3.8	68	76	
63	-497	14.9	106	3.9	74.5	78	
64	-496	17.2	111	4.1	86	82	
65	-496	16.2	106	4	81	80	
66	-494	14.6	105	4.4	73	88	
67	-496	14.5	105	4.1	72.5	82	
68	-496	15	106	3.9	75	78	
69	-495	14.8	106	3.9	74	78	
70	-495	13.9	104	4	69.5	80	
71	-493	13.7	103	3.8	68.5	76	
72	-495	13.6	103	4	68	80	
73	-494	14.4	105	4.1	72	82	
74	-495	14.3	103	4	71.5	80	
75	-496	15.1	106	4.5	75.5	90	
76	-495	15.9	107	4.2	79.5	84	
77	-496	15.2	107	4.2	76	84	
78	-496	16	107	4.7	80	94	
79	-496	15.7	106	4.8	78.5	96	
80	-495	15.4	107	4.6	77	92	
81	-491	16.1	107	4.8	80.5	96	
82	-492	17.9	111	5	89.5	100	
83	-491	19.8	113	5	99	100	
84	-488	18	110	5.1	90	102	
85	-488	18.2	111	5.6	91	112	
86	-486	18.1	110	5.3	90.5	106	
87	-483	18.4	111	5.5	92	110	
88	-485	18.1	110	5.3	90.5	106	
89	-480	17.5	108	5.5	87.5	110	
90	-476	18	110	5.5	90	110	
91	-475	18.1	111	5.6	90.5	112	
92	-476	19.9	112	5.5	99.5	110	
93	-477	18.9	110	6.1	94.5	122	
94	-480	20.8	118	6.5	104	130	
95	-483	23.2	120	6.1	116	122	
96	-478	21.4	114	6.5	107	130	
97	-475	19.8	112	6.5	99	130	
98	-478	20.9	117	6.3	104.5	126	
99	-478	20.6	114	5.6	103	112	
100	-478	18	110	5.7	90	114	
101	-479	17.4	109	5.7	87	114	
102	-476	17.5	110	5.3	87.5	106	
103	-473	16.7	109	5	83.5	100	
104	-474	17	109	5.3	85	106	
105	-472	17.5	110	5.3	87.5	106	
106	-466	19	112.2	5.7	95	114	
107	-462	21.9	120.5	6.2	109.5	124	
108	-456	23.8	119	5.9	119	118	
109	-455	21.3	116.9	6.3	106.5	126	
110	-457	21.1	117	6.4	105.5	128	

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Depth (m)	Spontaneous Potential (SP) (mV)	Resistance (ohms)			Resistivity (ohm-m)		Remarks
		Short Normal (SN)	Point Resi- stance (PR)	Long Normal (LN)	Short Normal (SN*5)	Long Normal (LN*20)	
111	-457	23.1	121	6.7	115.5	134	
112	-453	25.8	125	6.5	129	130	
113	-450	23.7	121.5	6.7	118.5	134	
114	-447	23.6	123	7	118	140	
115	-445	24.8	125	6.9	124	138	
116	-441	22.8	117.5	6.7	114	134	
117	-438	23.2	123	7.2	116	144	
118	-438	21.5	115	6.4	107.5	128	
119	-431	20.8	118	6.7	104	134	
120	-411	20.7	117	5.8	103.5	116	
121	-411	20.5	114	6.6	102.5	132	
122	-402	20.2	116	6.9	101	138	
123	-384	20.7	115	7	103.5	140	
123.5	-370	22	127	8.5	110	170	

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Table 4.4.2 (b): Electric Logging (Resistivity) of Test Well

Well No. : JKPT2 (test Well)		Hole dia. : 8 1/2"					
Location :Kaptanganj		Logging Date : 8 Sept 2002					
Well Depthth : 120m		Logger Model : Minilog 300 M					
Logged By : P.N. Ghimire/M.Lamichane		(Integrated Geoinstrument and service Pvt. Ltd.)					
Owner : Sunsari River Irrigation Project		Contractor : SSC Drillwell Pvt. Ltd.					
Depth (m)	Spontaneous Potential (SP) (mV)	Resistance (ohms)			Resistivity (ohm-m)		Remarks
		Short Normal (SN)	Point Resistance (PR)	Long Normal (LN)	Short Normal (SN*5)	Long Normal (LN*20)	
1							
2							
3	-304	35.2	129	16.1	176	322	
4	-312	23.5	113	15.9	117.5	318	
5	-317	20	111	12.4	100	248	
6	-324	20.6	113	11.4	103	228	
7	-332	20	115	10.8	100	216	
8	-338	20	115	11.2	100	224	
9	-342	22	119	10.6	110	212	
10	-300	22.2	126	10.7	111	214	
11	-243	22.3	111	11.1	111.5	222	
12	-241	20.2	108	11.2	101	224	
13	-215	19.1	106	11.3	95.5	226	
14	-215	18.3	106	10.5	91.5	210	
15	-206	18.5	106	10.6	92.5	212	
16	-194	19.3	107	9.6	96.5	192	
17	-192	19.2	109	9	96	180	
18	-188	17.7	110	7.9	88.5	158	
19	-190	15.7	106	7	78.5	140	
20	-192	14.4	104	6.6	72	132	
21	-195	14.6	103	6.4	73	128	
22	-192	13.8	102	6	69	120	
23	-199	13.7	102	5.8	68.5	116	
24	-203	13.7	102	5.8	68.5	116	
25	-204	14.1	105	6.1	70.5	122	
26	-205	14	105	5.7	70	114	
27	-209	14.2	104	5.8	71	116	
28	-207	15.6	106	5.8	78	116	
29	-199	15	104	6.1	75	122	
30	-193	16	106	6.2	80	124	
31	-188	15.2	105	6.1	76	122	
32	-192	16.5	107	6.6	82.5	132	
33	-201	18.1	110	6.6	90.5	132	
34	-204	20.6	118	7.4	103	148	
35	-107	21.6	116	7.4	108	148	
36	-196	18.3	110	7	91.5	140	
37	-195	15.8	106	6.6	79	132	
38	-196	15.1	107	6.2	75.5	124	
39	-202	15.3	108	6.1	76.5	122	
40	-203	15.7	106	6.2	78.5	124	
41	-208	15.8	107	5.8	79	116	
42	-208	15.5	106	6.1	77.5	122	
43	-207	14.5	105	5.8	72.5	116	
44	-176	14.7	105	5.9	73.5	118	
45	-170	14.1	103	6.1	70.5	122	
46	-169	15.2	105	6	76	120	
47	-172	16.1	106	6	80.5	120	
48	-164	16.2	106	6.4	81	128	
49	-159	16.2	105	6.5	81	130	
50	-136	16.1	106	6.7	80.5	134	

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Depth (m)	Spontaneous Potential (SP) (mV)	Resistance (ohms)			Resistivity (ohm-m)		Remarks
		Short Normal (SN)	Point Resistance (PR)	Long Normal (LN)	Short Normal (SN*5)	Long Normal (LN*20)	
51	-140	16.5	107	6.6	82.5	132	
52	-147	15.4	105	6.4	77	128	
53	-138	16	110	7	80	140	
54	-152	18.5	111	6.9	92.5	138	
55	-148	18.1	108	6.5	90.5	130	
56	-136	16.7	101	6.7	83.5	134	
57	-134	15.3	102	6.8	76.5	136	
58	-131	14.9	102	6.6	74.5	132	
59	-135	14.7	106	6.7	73.5	134	
60	-130	16.2	105	6.5	81	130	
61	-118	17.3	108	6.7	86.5	134	
62	-137	19.2	109	7	96	140	
63	-143	17.9	108	7.3	89.5	146	
64	-147	17.9	108	7.1	89.5	142	
65	-149	17.4	109	6.8	87	136	
66	-148	17.7	109	6.6	88.5	132	
67	-144	14.8	102	6	74	120	
68	-140	11.7	101	5.9	58.5	118	
69	-144	14.6	106	5.7	73	114	
70	-156	16.2	111	5.7	81	114	
71	-142	15.8	108	5.8	79	116	
72	-147	17	109	6.8	85	136	
73	-155	18.5	110	6.7	92.5	134	
74	-170	18.7	115	7.3	93.5	146	
75	-182	18.6	114	6.9	93	138	
76	-177	18	121	7.2	90	144	
77	-149	18.2	118	7	91	140	
78	-156	18.6	116	6.9	93	138	
79	-151	18.2	114	6.8	91	136	
80	-152	17.4	111	6.8	87	136	
81	-156	18.3	114	6.9	91.5	138	
82	-154	19.4	116	7.5	97	150	
83	-149	20.6	116	7.5	103	150	
84	-156	20	112	7.7	100	154	
85	-168	19	109	7.4	95	148	
86	-178	18.1	107	7.4	90.5	148	
87	-193	18.2	108	7.5	91	150	
88	-183	19.2	110	7.6	96	152	
89	-191	19.6	110	7.7	98	154	
90	-220	19.6	110	7.8	98	156	
91	-189	20.2	110	8.1	101	162	
92	-182	21	112	8.5	105	170	
93	-191	23.2	114	8.6	116	172	
94	-197	25.4	118	9.1	127	182	
95	-203	26.5	121	9.3	132.5	186	
96	-208	22.9	114	9.2	114.5	184	
97	-203	21.6	115	8.8	108	176	
98	-203	19.7	114	7.8	98.5	156	
99	-199	19.2	114	7.7	96	154	
100	-189	19.2	113	8	96	160	
101	-179	20.8	120	7.9	104	158	
102	-217	20.8	114	7.6	104	152	
103	-233	18.5	113	7.7	92.5	154	
104	-245	18.6	112	7.6	93	152	
105	-255	19.4	114	7.8	97	156	
106	-254	20.9	115	8	104.5	160	
107	-258	23.3	122	8.3	116.5	166	
108	-261	23.9	122	8.4	119.5	168	

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Depth (m)	Spontaneous Potential (SP) (mV)	Resistance (ohms)			Resistivity (ohm-m)		Remarks
		Short Normal (SN)	Point Resi- stance (PR)	Long Normal (LN)	Short Normal (SN*5)	Long Normal (LN*20)	
109	-276	22	116	8.5	110	170	
110	-281	22.6	120	9	113	180	
111	-290	25.1	125	9.1	125.5	182	
112	-289	28.4	129	9.4	142	188	
113	-292	25.9	122	9.2	129.5	184	
114	-297	22.6	118	9.1	113	182	
115	-297	22.3	120	8.6	111.5	172	
116	-299	21.4	116	8.2	107	164	
117	-296	21	118	8.3	105	166	
118	-305	21.9	118	8	109.5	160	
119	-307	22.7	119	7.9	113.5	158	
120	-310	21.6	116	7.5	108	150	
121	-321	20.3	112	7.6	101.5	152	
122							

ATTACHMENT-2

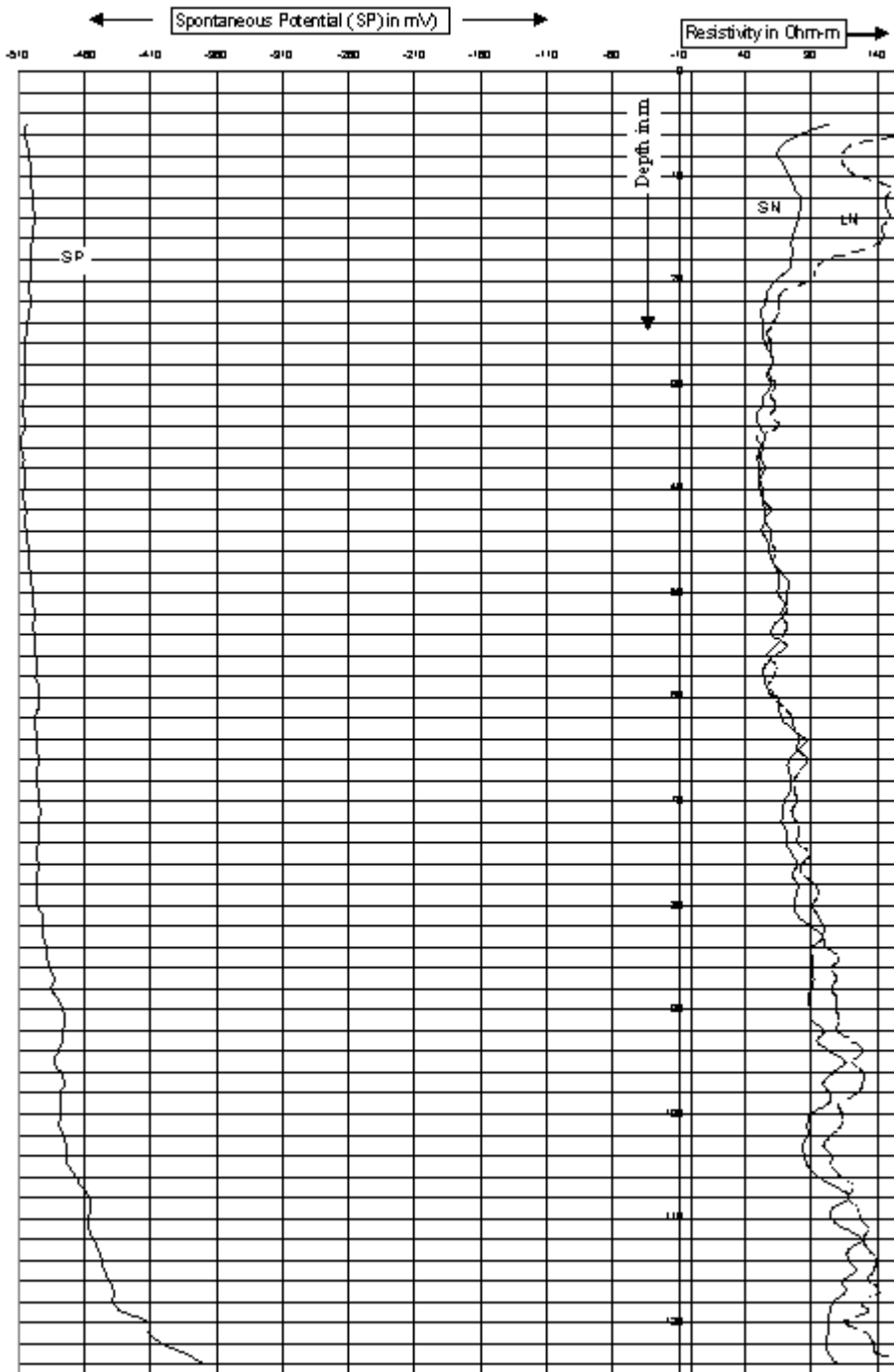


Figure 4.42 (a): Electrical Resistivity Curve of SN, LN and SP of Observation Well

Figure 4.4.2.(a) Electrical Resistivity Curve of LN, SN & SP Observation Well

ATTACHMENT-2

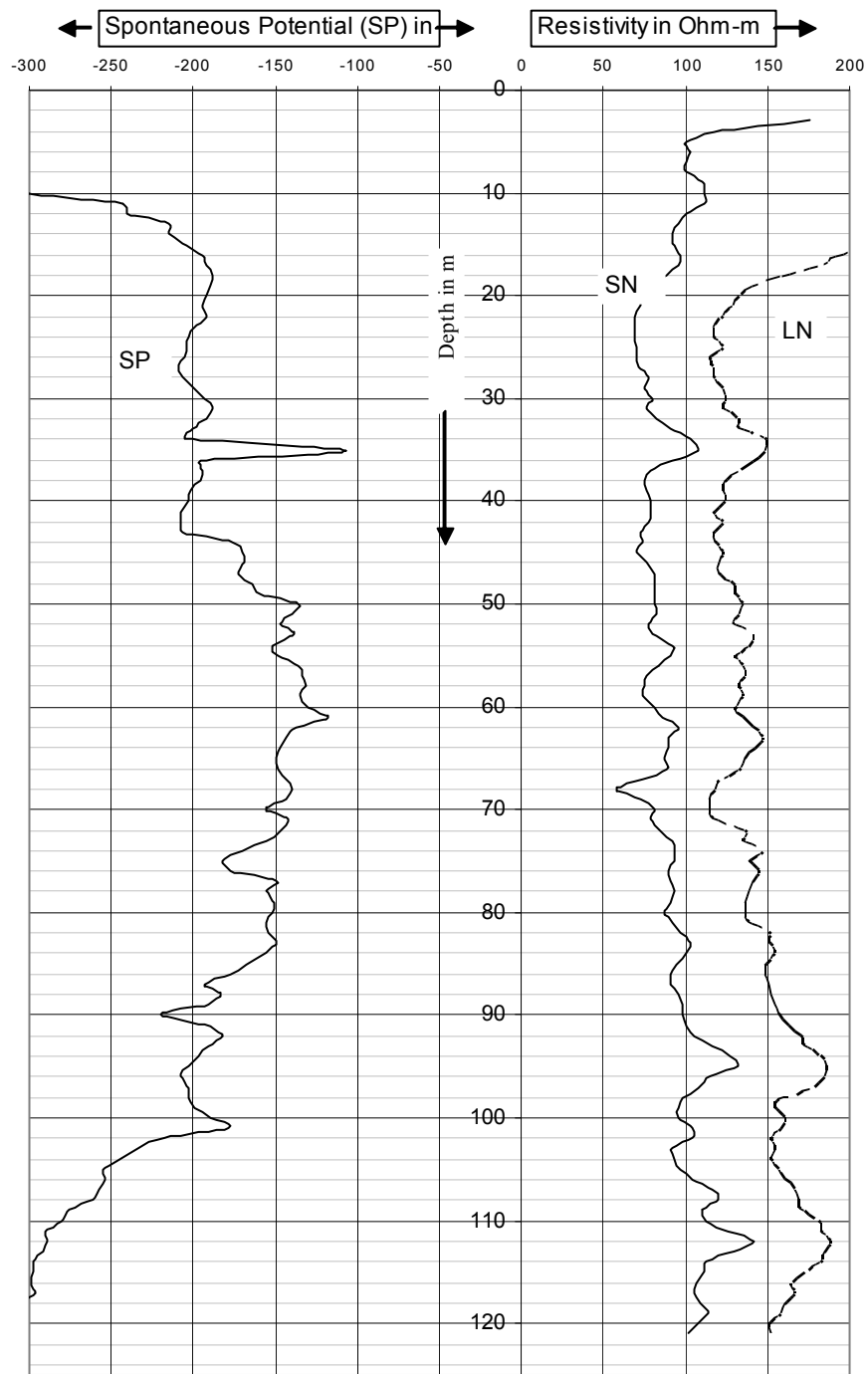


Figure 4.4.2.(b) Electrical Resistivity Curve of LN, SN & SP Test Well

ATTACHMENT-2

Drilling Well Log

Well No. : JKPT1 Coordinates:
 (Obs Well) : Well Dia. :
 Well Depth : 110m Well
 30m Drawdown
 Drilling Started: 28 August 2002 Drilling Completed: 1 Sept. 2002

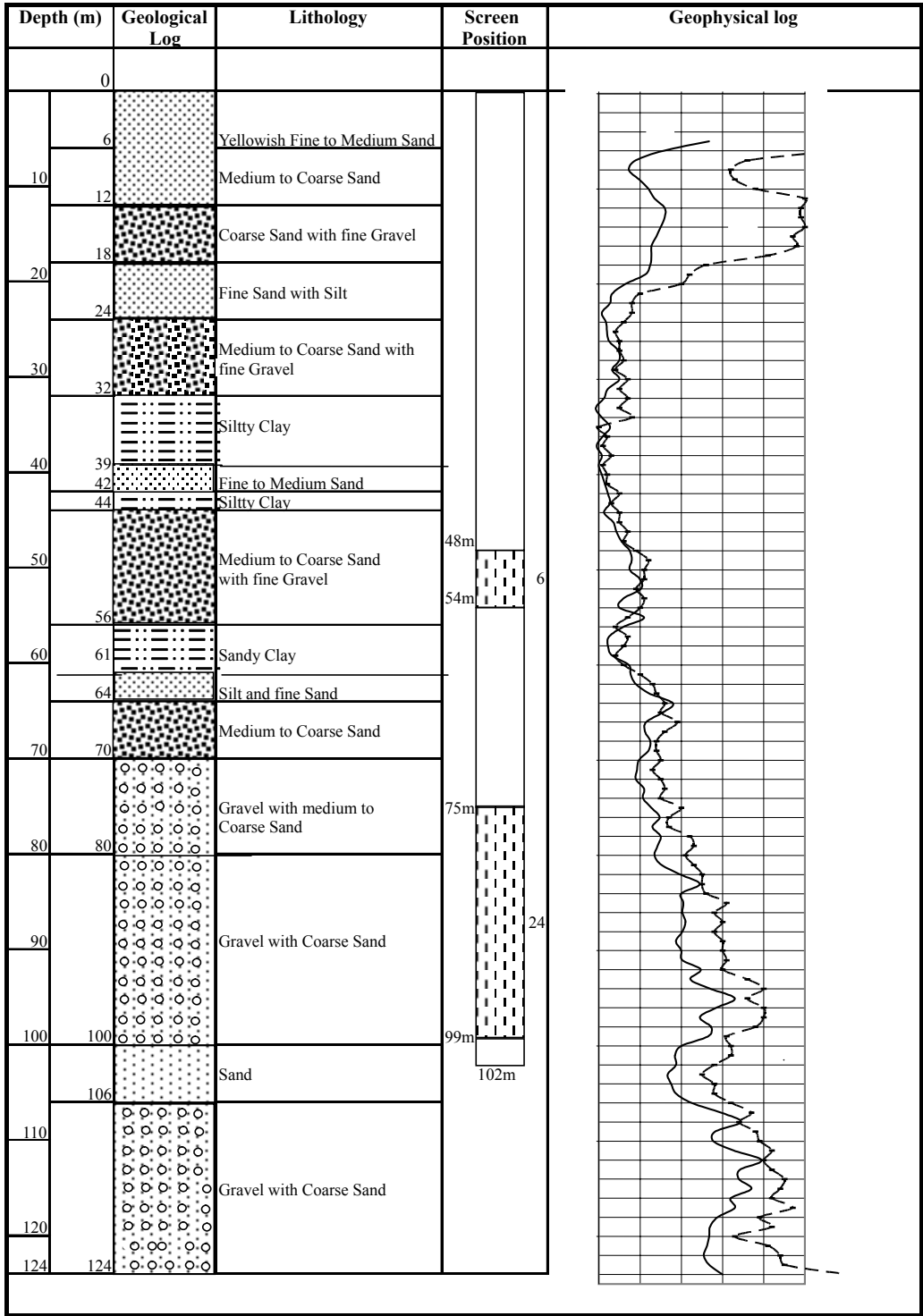


Figure 4.4.3(a) Well Design with Lithology and Resistivity Curve of Observation Curve

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Drilling Well Log

Well No. : JKPT2 (Test Well) Coordinates: Lat. 26deg.24'56"N,
 Location : 187deg.8'36"E
 Well Depth : 106.5m
 Drilling Started: 2nd Sept.2002 Drilling Completed: 16th Sept.2002
 (installation)

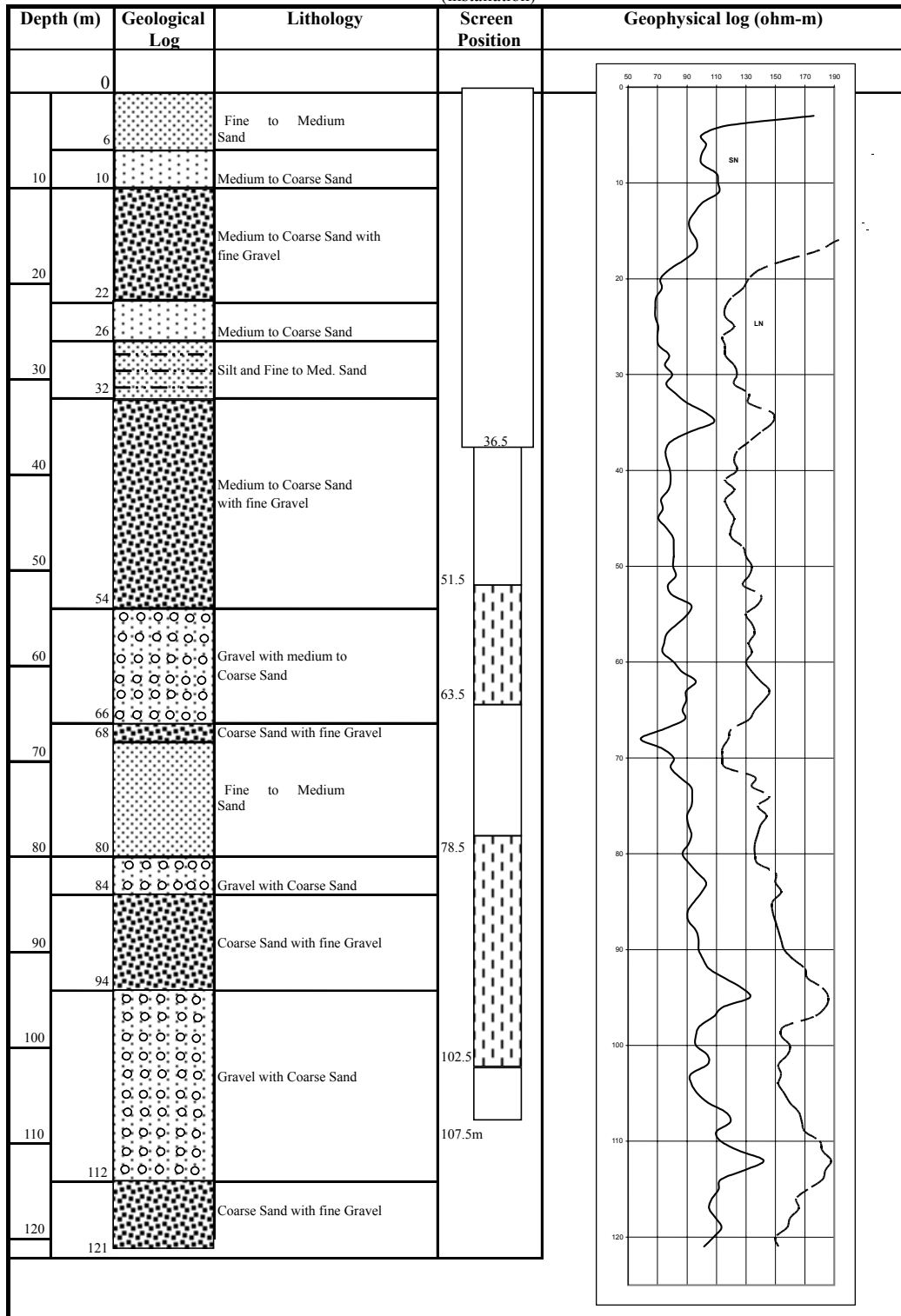


Figure 4.4.3(b) Well Design with Lithology and Resistivity Curve of Test Well

Table 4.4.4(a) Step-Drawdown Test (Test Well)

MP=0.4 m				SWL=2.8 m(bgl)			
Step I				Discharge= 20l/s			
Time since pumping started (min.)	Water Level in m (from MP)	Water Level in m BGL	Drawdown in m	Time since pumping started (min.)	Water Level in m (from mp)	Water Level in m BGL	Drawdown in m
0.0	3.22	2.82	0.00	0.0	11.27	10.87	0.00
0.5	10.80	10.40	7.58	0.5	14.40	14.00	3.13
1.0	10.82	10.42	7.60	1.0	14.45	14.05	3.18
1.5	10.83	10.43	7.61	1.5	14.48	14.08	3.21
2.0	10.83	10.43	7.61	2.0	14.52	14.12	3.25
2.5	10.85	10.45	7.63	2.5	14.55	14.15	3.28
3.0	10.83	10.43	7.61	3.0	14.56	14.16	3.29
3.5	10.85	10.45	7.63	3.5	14.58	14.18	3.31
4.0	10.85	10.45	7.63	4.0	14.61	14.21	3.34
4.5	10.87	10.47	7.65	4.5	14.62	14.22	3.35
5.0	10.90	10.50	7.68	5.0	14.64	14.24	3.37
6.0	10.92	10.52	7.70	6.0	14.66	14.26	3.39
7.0	10.93	10.53	7.71	7.0	14.68	14.28	3.41
8.0	10.95	10.55	7.73	8.0	14.70	14.30	3.43
9.0	10.96	10.56	7.74	9.0	14.70	14.30	3.43
10	10.98	10.58	7.76	10	14.71	14.31	3.44
11	10.98	10.58	7.76	11	14.72	14.32	3.45
12	11.01	10.61	7.79	12	14.72	14.32	3.45
13	11.02	10.62	7.80	13	14.74	14.34	3.47
14	11.04	10.64	7.82	14	14.74	14.34	3.47
15	11.05	10.65	7.83	15	14.74	14.34	3.47
20	11.06	10.66	7.84	20	14.76	14.36	3.49
25	11.08	10.68	7.86	25	14.77	14.37	3.50
30	11.11	10.71	7.89	30	14.78	14.38	3.51
40	11.13	10.73	7.91	40	14.80	14.40	3.53
50	11.14	10.74	7.92	50	14.82	14.42	3.55
60	11.15	10.75	7.93	60	14.82	14.42	3.55
70	11.18	10.78	7.96	70	14.83	14.43	3.56
80	11.20	10.80	7.98	80	14.84	14.44	3.57
90	11.20	10.80	7.98	90	14.84	14.44	3.57
100	11.22	10.82	8.00	100	14.85	14.45	3.58
110	11.23	10.83	8.01	110	14.85	14.45	3.58
120	11.24	10.84	8.02	120	14.85	14.45	3.58
130	11.24	10.84	8.02	130	14.85	14.45	3.58
140	11.26	10.86	8.04	140	14.85	14.45	3.58
150	11.26	10.86	8.04	150	14.85	14.45	3.58
160	11.27	10.87	8.05	160	14.85	14.45	3.58
170	11.27	10.87	8.05	170	14.85	14.45	3.58
180	11.27	10.87	8.05	180	14.85	14.45	3.58

Step III (test well)			
Time since pumping started (min.)	Water Level in m (from mp)	Discharge= 30l/s	
		Water Level in m BGL	Drawdown in m
0.0	14.85	14.45	0.00
0.5	15.45	15.05	0.60
1.0	15.95	15.55	1.10
1.5	16.05	15.65	1.20
2.0	16.28	15.88	1.43
2.5	16.42	16.02	1.57
3.0	16.54	16.14	1.69
3.5	16.65	16.25	1.80
4.0	16.82	16.42	1.97
4.5	16.95	16.55	2.10
5.0	16.99	16.59	2.14
6.0	17.02	16.62	2.17
7.0	17.05	16.65	2.20
8.0	17.10	16.70	2.25
9.0	17.13	16.73	2.28
10	17.15	16.75	2.30
11	17.18	16.78	2.33
12	17.19	16.79	2.34
13	17.20	16.80	2.35
14	17.21	16.81	2.36
15	17.22	16.82	2.37
20	17.22	16.82	2.37
25	17.24	16.84	2.39
30	17.25	16.85	2.40
40	17.27	16.87	2.42
50	17.29	16.89	2.44
60	17.30	16.90	2.45
70	17.32	16.92	2.47
80	17.34	16.94	2.49
90	17.36	16.96	2.51
100	17.36	16.96	2.51
110	17.38	16.98	2.53
120	17.38	16.98	2.53
130	17.38	16.98	2.53
140	17.38	16.98	2.53
150	17.38	16.98	2.53
160	17.38	16.98	2.53
170	17.38	16.98	2.53
180	17.38	16.98	2.53

Step IV (test well)			
Time since pumping started (min.)	Water Level in m (from mp)	Discharge= 22l/s	
		Water Level in m BGL	Drawdown in m
0.0	17.40	17.00	0.00
0.5	11.20	10.80	6.20
1.0	11.25	10.85	6.15
1.5	11.30	10.90	6.10
2.0	11.60	11.20	5.80
2.5	11.75	11.35	5.65
3.0	11.68	11.28	5.72
3.5	11.72	11.32	5.68
4.0	11.79	11.39	5.61
4.5	11.84	11.44	5.56
5.0	11.88	11.48	5.52
6.0	11.94	11.54	5.46
7.0	11.98	11.58	5.42
8.0	12.00	11.60	5.40
9.0	12.02	11.62	5.38
10	12.09	11.69	5.31
11	12.11	11.71	5.29
12	12.13	11.73	5.27
13	12.13	11.73	5.27
14	12.16	11.76	5.24
15	12.18	11.78	5.22
20	12.21	11.81	5.19
25	12.23	11.83	5.17
30	12.25	11.85	5.15
40	12.27	11.87	5.13
50	12.29	11.89	5.11
60	12.30	11.90	5.10
70	12.30	11.90	5.10
80	12.32	11.92	5.08
90	12.32	11.92	5.08
100	12.34	11.94	5.06
110	12.36	11.96	5.04
120	12.37	11.97	5.03
130	12.37	11.97	5.03
140	12.38	11.98	5.02
150	12.38	11.98	5.02
160	12.38	11.98	5.02
170	12.38	11.98	5.02
180	12.38	11.98	5.02

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Step V (test well)		Dischar ge= 16l/s	
Time since pumping started (min.)	Water Level in m (from mp)	Water Level in m BGL	Drawdo wn in m
0.0	12.38	11.98	0.00
0.5	9.03	8.63	3.35
1.0	9.15	8.75	3.23
1.5	9.25	8.85	3.13
2.0	9.31	8.91	3.07
2.5	9.40	9.00	2.98
3.0	9.43	9.03	2.95
3.5	9.48	9.08	2.90
4.0	9.52	9.12	2.86
4.5	9.53	9.13	2.85
5.0	9.54	9.14	2.84
6.0	9.56	9.16	2.82
7.0	9.56	9.16	2.82
8.0	9.57	9.17	2.81
9.0	9.59	9.19	2.79
10	9.61	9.21	2.77
11	9.62	9.22	2.76
12	9.63	9.23	2.75
13	9.65	9.25	2.73
14	9.66	9.26	2.72
15	9.68	9.28	2.70
20	9.70	9.30	2.68
25	9.73	9.33	2.65
30	9.75	9.35	2.63
40	9.79	9.39	2.59
50	9.80	9.40	2.58
60	9.81	9.41	2.57
70	9.83	9.43	2.55
80	9.85	9.45	2.53
90	9.86	9.46	2.52
100	9.87	9.47	2.51
110	9.87	9.47	2.51
120	9.88	9.48	2.50
130	9.88	9.48	2.50
140	9.89	9.49	2.49
150	9.89	9.49	2.49
160	9.89	9.49	2.49
170	9.90	9.50	2.48
180	9.90	9.50	2.48

**Table 4.4.4(b) Step-Drawdown Test
(Observation Well)**

MP=0.6 m				SWL=2.8m(bgl) Discharge= 20l/s				Step II (obs. we II)				Discharg e= 25l/s			
Step I															
Time since pumpin g started (min.)	Water Level in m (from MP)	Water Level in m BGL	Drawdown in m	Time since pumpi ng started (min.)	Water Level in m (from mp)	Water Level in m BGL	Drawdow n in m	Time since pumpi ng started (min.)	Water Level in m (from mp)	Water Level in m BGL	Drawdow n in m	Time since pumpi ng started (min.)	Water Level in m (from mp)	Water Level in m BGL	Drawdow n in m
0.0	3.400	2.800	0.000	0.0	3.426	2.826	0.000	0.0	3.426	2.826	0.000	0.0	3.426	2.826	0.000
0.5	3.402	2.802	0.002	0.5	3.428	2.828	0.002	0.5	3.428	2.828	0.002	0.5	3.428	2.828	0.002
1.0	3.403	2.803	0.003	1.0	3.430	2.830	0.004	1.0	3.430	2.830	0.004	1.0	3.430	2.830	0.004
1.5	3.405	2.805	0.005	1.5	3.433	2.833	0.007	1.5	3.433	2.833	0.007	1.5	3.433	2.833	0.007
2.0	3.406	2.806	0.006	2.0	3.435	2.835	0.009	2.0	3.435	2.835	0.009	2.0	3.435	2.835	0.009
2.5	3.408	2.808	0.008	2.5	3.437	2.837	0.011	2.5	3.437	2.837	0.011	2.5	3.437	2.837	0.011
3.0	3.409	2.809	0.009	3.0	3.438	2.838	0.012	3.0	3.438	2.838	0.012	3.0	3.438	2.838	0.012
3.5	3.410	2.810	0.010	3.5	3.438	2.838	0.012	3.5	3.438	2.838	0.012	3.5	3.438	2.838	0.012
4.0	3.410	2.810	0.010	4.0	3.438	2.838	0.012	4.0	3.438	2.838	0.012	4.0	3.438	2.838	0.012
4.5	3.412	2.812	0.012	4.5	3.439	2.839	0.013	4.5	3.439	2.839	0.013	4.5	3.439	2.839	0.013
5.0	3.412	2.812	0.012	5.0	3.439	2.839	0.013	5.0	3.439	2.839	0.013	5.0	3.439	2.839	0.013
6.0	3.413	2.813	0.013	6.0	3.439	2.839	0.013	6.0	3.439	2.839	0.013	6.0	3.439	2.839	0.013
7.0	3.413	2.813	0.013	7.0	3.439	2.839	0.013	7.0	3.439	2.839	0.013	7.0	3.439	2.839	0.013
8.0	3.413	2.813	0.013	8.0	3.439	2.839	0.013	8.0	3.439	2.839	0.013	8.0	3.439	2.839	0.013
9.0	3.414	2.814	0.014	9.0	3.440	2.840	0.014	9.0	3.440	2.840	0.014	9.0	3.440	2.840	0.014
10	3.414	2.814	0.014	10	3.440	2.840	0.014	10	3.440	2.840	0.014	10	3.440	2.840	0.014
11	3.414	2.814	0.014	11	3.440	2.840	0.014	11	3.440	2.840	0.014	11	3.440	2.840	0.014
12	3.415	2.815	0.015	12	3.440	2.840	0.014	12	3.440	2.840	0.014	12	3.440	2.840	0.014
13	3.415	2.815	0.015	13	3.440	2.840	0.014	13	3.440	2.840	0.014	13	3.440	2.840	0.014
14	3.415	2.815	0.015	14	3.441	2.841	0.015	14	3.441	2.841	0.015	14	3.441	2.841	0.015
15	3.416	2.816	0.016	15	3.441	2.841	0.015	15	3.441	2.841	0.015	15	3.441	2.841	0.015
20	3.417	2.817	0.017	20	3.441	2.841	0.015	20	3.441	2.841	0.015	20	3.441	2.841	0.015
25	3.417	2.817	0.017	25	3.441	2.841	0.015	25	3.441	2.841	0.015	25	3.441	2.841	0.015
30	3.418	2.818	0.018	30	3.441	2.841	0.015	30	3.441	2.841	0.015	30	3.441	2.841	0.015
40	3.420	2.820	0.020	40	3.442	2.842	0.016	40	3.442	2.842	0.016	40	3.442	2.842	0.016
50	3.421	2.821	0.021	50	3.442	2.842	0.016	50	3.442	2.842	0.016	50	3.442	2.842	0.016
60	3.421	2.821	0.021	60	3.442	2.842	0.016	60	3.442	2.842	0.016	60	3.442	2.842	0.016
70	3.422	2.822	0.022	70	3.442	2.842	0.016	70	3.442	2.842	0.016	70	3.442	2.842	0.016
80	3.423	2.823	0.023	80	3.442	2.842	0.016	80	3.442	2.842	0.016	80	3.442	2.842	0.016
90	3.424	2.824	0.024	90	3.443	2.843	0.017	90	3.443	2.843	0.017	90	3.443	2.843	0.017
100	3.425	2.825	0.025	100	3.443	2.843	0.017	100	3.443	2.843	0.017	100	3.443	2.843	0.017
110	3.426	2.826	0.026	110	3.443	2.843	0.017	110	3.443	2.843	0.017	110	3.443	2.843	0.017
120	3.426	2.826	0.026	120	3.443	2.843	0.017	120	3.443	2.843	0.017	120	3.443	2.843	0.017
130	3.426	2.826	0.026	130	3.443	2.843	0.017	130	3.443	2.843	0.017	130	3.443	2.843	0.017
140	3.426	2.826	0.026	140	3.443	2.843	0.017	140	3.443	2.843	0.017	140	3.443	2.843	0.017
150	3.426	2.826	0.026	150	3.444	2.844	0.018	150	3.444	2.844	0.018	150	3.444	2.844	0.018
160	3.426	2.826	0.026	160	3.444	2.844	0.018	160	3.444	2.844	0.018	160	3.444	2.844	0.018
170	3.426	2.826	0.026	170	3.444	2.844	0.018	170	3.444	2.844	0.018	170	3.444	2.844	0.018
180	3.426	2.826	0.026	180	3.444	2.844	0.018	180	3.444	2.844	0.018	180	3.444	2.844	0.018

Step III (obs.w ell)

Discharge = 30l/s

Time since pumping started (min.)	Water Level in m (from mp)	Water Level in m BGL	Drawdown in m
0.0	3.444	2.844	0.000
0.5	3.448	2.848	0.004
1.0	3.449	2.849	0.005
1.5	3.450	2.850	0.006
2.0	3.450	2.850	0.006
2.5	3.451	2.851	0.007
3.0	3.451	2.851	0.007
3.5	3.452	2.852	0.008
4.0	3.452	2.852	0.008
4.5	3.452	2.852	0.008
5.0	3.453	2.853	0.009
6.0	3.453	2.853	0.009
7.0	3.453	2.853	0.009
8.0	3.453	2.853	0.009
9.0	3.453	2.853	0.009
10	3.454	2.854	0.010
11	3.454	2.854	0.010
12	3.454	2.854	0.010
13	3.454	2.854	0.010
14	3.454	2.854	0.010
15	3.456	2.856	0.012
20	3.456	2.856	0.012
25	3.457	2.857	0.013
30	3.457	2.857	0.013
40	3.459	2.859	0.015
50	3.459	2.859	0.015
60	3.460	2.860	0.016
70	3.460	2.860	0.016
80	3.461	2.861	0.017
90	3.461	2.861	0.017
100	3.461	2.861	0.017
110	3.462	2.862	0.018
120	3.462	2.862	0.018
130	3.463	2.863	0.019
140	3.463	2.863	0.019
150	3.463	2.863	0.019
160	3.464	2.864	0.020
170	3.464	2.864	0.020
180	3.464	2.864	0.020

Step IV (obs.well)			
Time since pumping started (min.)	Water Level in m (from mp)	Water Level in m BGL	Discharg
			e= 22l/s
			Drawdown in m
0.0	3.464	2.864	0.000
0.5	3.450	2.850	0.014
1.0	3.426	2.826	0.038
1.5	3.426	2.826	0.038
2.0	3.425	2.825	0.039
2.5	3.424	2.824	0.040
3.0	3.424	2.824	0.040
3.5	3.423	2.823	0.041
4.0	3.421	2.821	0.043
4.5	3.421	2.821	0.043
5.0	3.420	2.820	0.044
6.0	3.420	2.820	0.044
7.0	3.420	2.820	0.044
8.0	3.420	2.820	0.044
9.0	3.419	2.819	0.045
10	3.417	2.817	0.047
11	3.416	2.816	0.048
12	3.416	2.816	0.048
13	3.415	2.815	0.049
14	3.413	2.813	0.051
15	3.413	2.813	0.051
20	3.412	2.812	0.052
25	3.412	2.812	0.052
30	3.412	2.812	0.052
40	3.411	2.811	0.053
50	3.411	2.811	0.053
60	3.411	2.811	0.053
70	3.411	2.811	0.053
80	3.411	2.811	0.053
90	3.412	2.812	0.052
100	3.412	2.812	0.052
110	3.412	2.812	0.052
120	3.412	2.812	0.052
130	3.413	2.813	0.051
140	3.413	2.813	0.051
150	3.413	2.813	0.051
160	3.413	2.813	0.051
170	3.413	2.813	0.051
180	3.413	2.813	0.051

Step V (obs.well)			
Time since pumping started (min.)	Water Level in m (from mp)	Water Level in m BGL	Discharg
			e= 16l/s
			Drawdown in m
0.0	3.413	2.813	0.000
0.5	3.411	2.811	0.002
1.0	3.410	2.810	0.003
1.5	3.408	2.808	0.005
2.0	3.408	2.808	0.005
2.5	3.408	2.808	0.005
3.0	3.408	2.808	0.005
3.5	3.407	2.807	0.006
4.0	3.407	2.807	0.006
4.5	3.407	2.807	0.006
5.0	3.407	2.807	0.006
6.0	3.407	2.807	0.006
7.0	3.407	2.807	0.006
8.0	3.406	2.806	0.007
9.0	3.406	2.806	0.007
10	3.406	2.806	0.007
11	3.406	2.806	0.007
12	3.406	2.806	0.007
13	3.406	2.806	0.007
14	3.406	2.806	0.007
15	3.406	2.806	0.007
20	3.406	2.806	0.007
25	3.406	2.806	0.007
30	3.406	2.806	0.007
40	3.406	2.806	0.007
50	3.406	2.806	0.007
60	3.405	2.805	0.008
70	3.405	2.805	0.008
80	3.405	2.805	0.008
90	3.405	2.805	0.008
100	3.405	2.805	0.008
110	3.405	2.805	0.008
120	3.405	2.805	0.008
130	3.405	2.805	0.008
140	3.405	2.805	0.008
150	3.405	2.805	0.008
160	3.405	2.805	0.008
170	3.405	2.805	0.008
180	3.405	2.805	0.008

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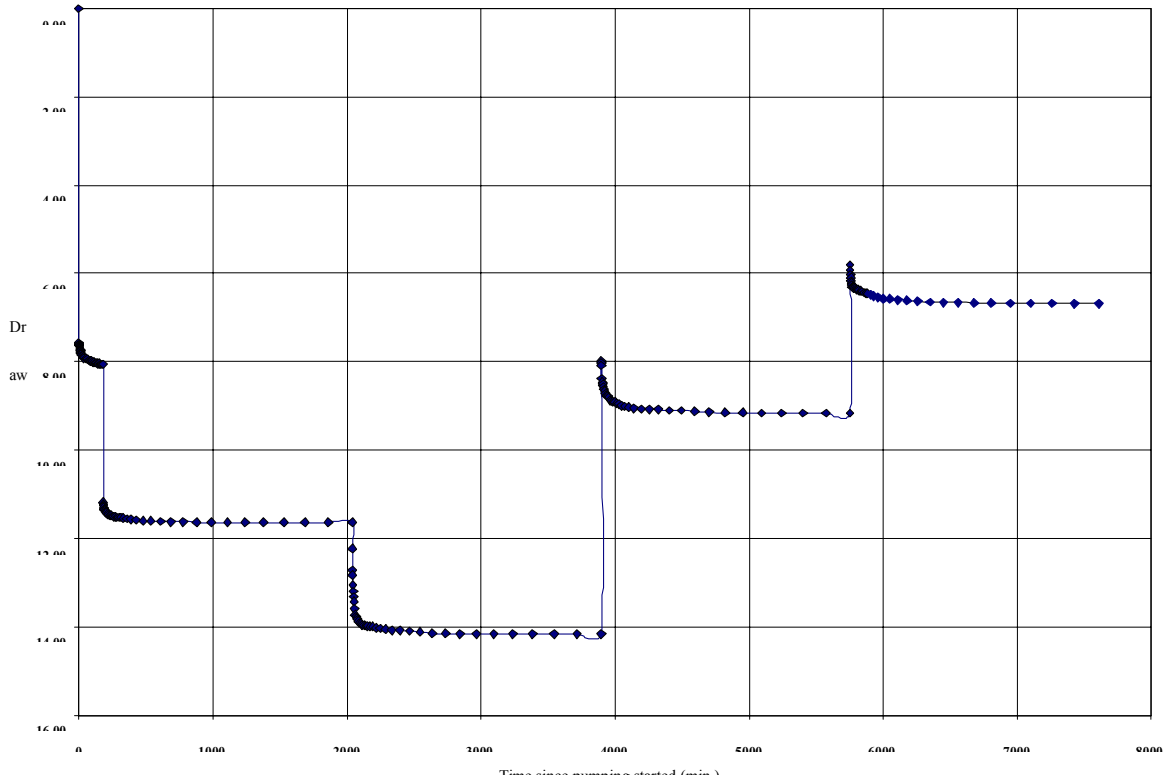


Figure 4.4.4.(a) Step-Draw down Test Curve (Test Well)

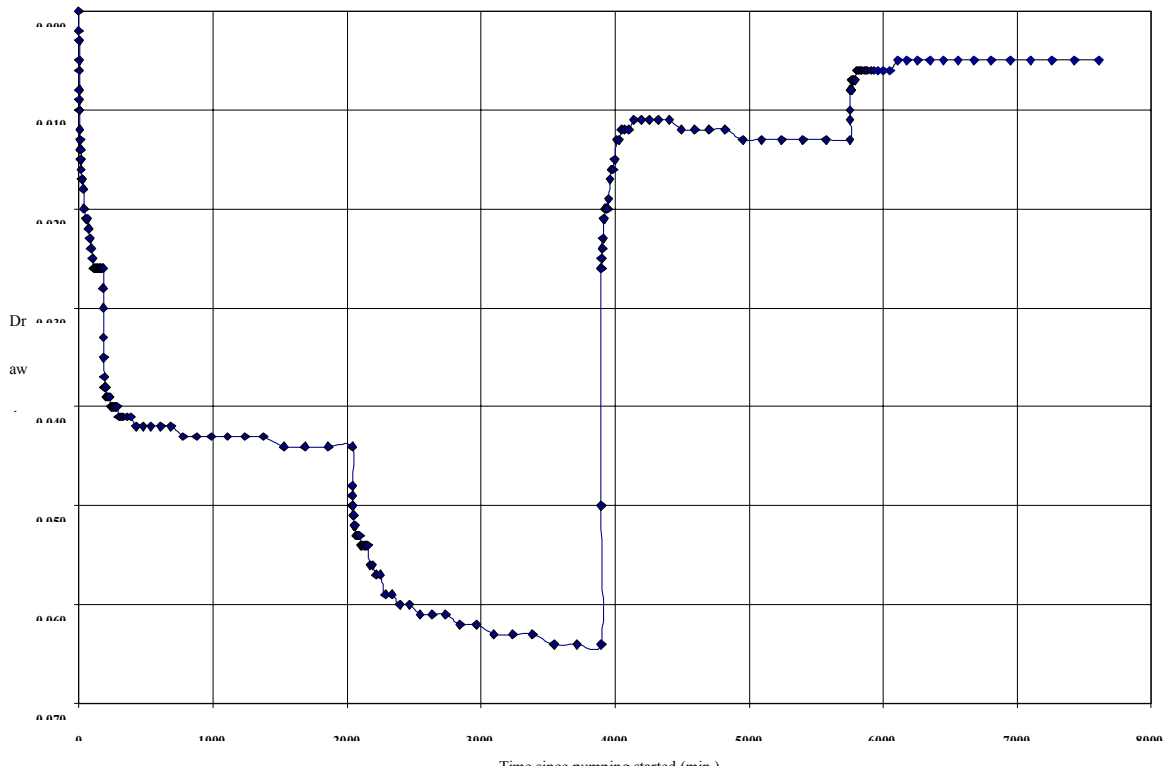


Figure 4.4.4.(b) Step-Draw down Test Curve (Observation Well)

Table 4.4.5 (a): Continuous Time-Drawdown Test (Test Well)

P=0.4m
SWL=3m(bgl) Discharge = 30l/s

Time since pumping started (min.)	Water Level in m (from MP)	Water Level in m BGL	Drawdown in m
0.00	3.40	3.00	0
0.50	17.53	17.13	14.13
1.00	17.82	17.42	14.42
1.50	17.88	17.48	14.48
2.00	17.88	17.48	14.48
2.50	17.90	17.50	14.50
3.00	17.90	17.50	14.50
3.50	17.91	17.51	14.51
4.00	17.91	17.51	14.51
4.50	17.92	17.52	14.52
5.00	17.92	17.52	14.52
6.00	17.90	17.50	14.50
7.00	17.90	17.50	14.50
8.00	17.91	17.51	14.51
9.00	17.91	17.51	14.51
10.00	17.91	17.51	14.51
11.00	17.92	17.52	14.52
12.00	17.92	17.52	14.52
13.00	17.93	17.53	14.53
14.00	17.93	17.53	14.53
15.00	17.94	17.54	14.54
20.00	17.96	17.56	14.56
25.00	17.97	17.57	14.57
30.00	17.98	17.58	14.58
45.00	17.99	17.59	14.59
60.00	18.00	17.60	14.60
75.00	18.01	17.61	14.61
90.00	18.01	17.61	14.61
105.00	18.02	17.62	14.62
120.00	18.02	17.62	14.62
135.00	18.03	17.63	14.63
150.00	18.03	17.63	14.63
165.00	18.04	17.64	14.64
180.00	18.05	17.65	14.65
210.00	18.06	17.66	14.66
240.00	18.06	17.66	14.66
270.00	18.07	17.67	14.67
300.00	18.07	17.67	14.67
330.00	18.07	17.67	14.67
360.00	18.08	17.68	14.68
420.00	18.08	17.68	14.68
480.00	18.08	17.68	14.68
540.00	18.08	17.68	14.68
600.00	18.08	17.68	14.68
660.00	18.09	17.69	14.69
720.00	18.10	17.70	14.70
780.00	18.10	17.70	14.70
840.00	18.11	17.71	14.71
900.00	18.11	17.71	14.71
960.00	18.11	17.71	14.71
1020.00	18.11	17.71	14.71
1080.00	18.11	17.71	14.71
1140.00	18.10	17.70	14.70
1200.00	18.11	17.71	14.71
1260.00	18.11	17.71	14.71
1320.00	18.11	17.71	14.71
1400.00	18.11	17.71	14.71

Table4.4.5 (b): Continuous Time-Drawdown Test (Observation Well)

MP=0.6m
SWL=2.8m(bgl) Discharge= 30l/s

Time since pumping started (min.)	Water Level in m (from mp)	Water Level in m BGL	Drawdown in m
0.00	3.400	2.800	0.000
0.50	3.420	2.820	0.020
1.00	3.420	2.820	0.020
1.50	3.425	2.825	0.025
2.00	3.425	2.825	0.025
2.50	3.428	2.828	0.028
3.00	3.430	2.830	0.030
3.50	3.432	2.832	0.032
4.00	3.435	2.835	0.035
4.50	3.438	2.838	0.038
5.00	3.440	2.840	0.040
6.00	3.440	2.840	0.040
7.00	3.440	2.840	0.040
8.00	3.440	2.840	0.040
9.00	3.440	2.840	0.040
10.00	3.440	2.840	0.040
11.00	3.440	2.840	0.040
12.00	3.440	2.840	0.040
13.00	3.440	2.840	0.040
14.00	3.440	2.840	0.040
15.00	3.440	2.840	0.040
20.00	3.440	2.840	0.040
25.00	3.440	2.840	0.040
30.00	3.441	2.841	0.041
45.00	3.442	2.842	0.042
60.00	3.442	2.842	0.042
75.00	3.443	2.843	0.043
90.00	3.443	2.843	0.043
105.00	3.443	2.843	0.043
120.00	3.443	2.843	0.043
135.00	3.444	2.844	0.044
150.00	3.443	2.843	0.043
165.00	3.443	2.843	0.043
180.00	3.443	2.843	0.043
210.00	3.443	2.843	0.043
240.00	3.443	2.843	0.043
270.00	3.443	2.843	0.043
300.00	3.443	2.843	0.043
330.00	3.443	2.843	0.043
360.00	3.443	2.843	0.043
420.00	3.443	2.843	0.043
480.00	3.443	2.843	0.043
540.00	3.443	2.843	0.043
600.00	3.443	2.843	0.043
660.00	3.443	2.843	0.043
720.00	3.443	2.843	0.043
780.00	3.443	2.843	0.043
840.00	3.443	2.843	0.043
900.00	3.443	2.843	0.043
960.00	3.444	2.844	0.044
1020.00	3.444	2.844	0.044
1080.00	3.444	2.844	0.044
1140.00	3.444	2.844	0.044
1200.00	3.444	2.844	0.044
1260.00	3.445	2.845	0.045
1320.00	3.445	2.845	0.045

ATTACHMENT-2

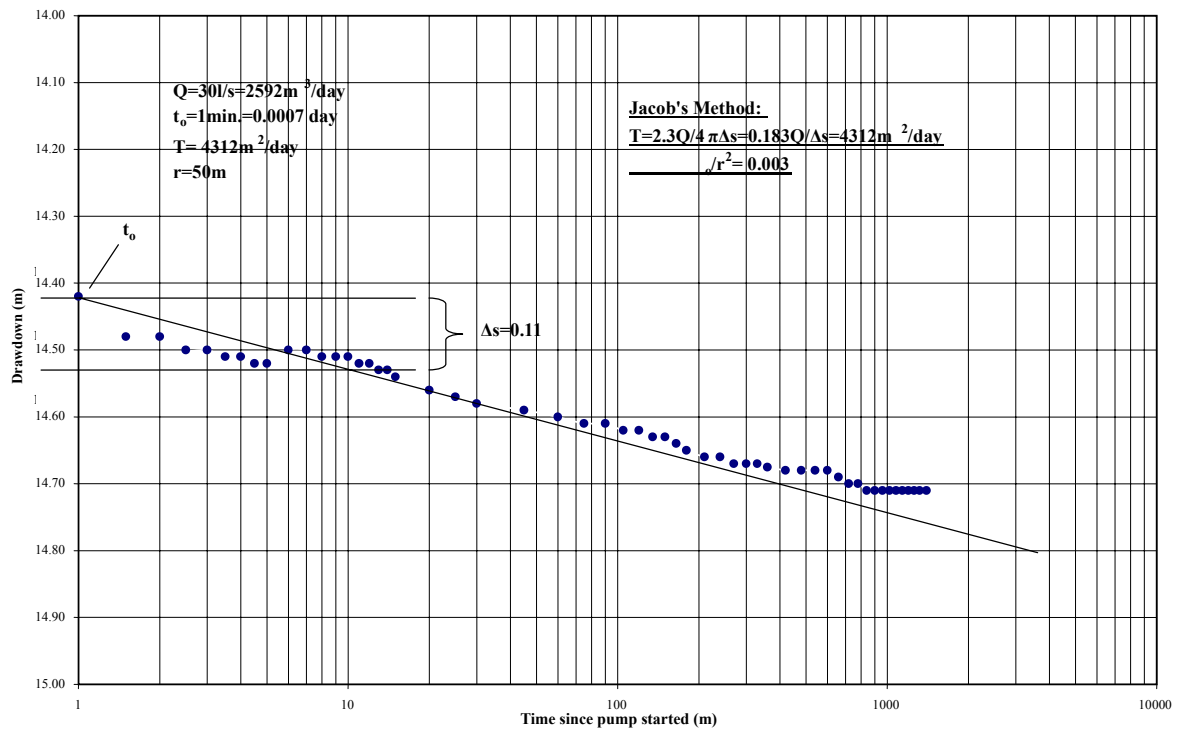


Figure 4.4.5: Time-Drawdown Curve

Figure 4.4.5 Time-Drawdown Curve

Table 4.4.7 (a): Recovery Test (Test Well)

MP=0.4m

Time since Recovery started (min)	Water Level in m	Water Level in m BGL	Recovery in m
0.00	18.11	17.71	
0.50		8.10	9.61
1.00	4.59	4.19	13.52
1.50			17.71
2.00	3.25	2.85	14.86
2.50			17.71
3.00	3.22	2.82	14.89
3.50			17.71
4.00	3.22	2.82	14.89
4.50	3.22	2.82	14.89
5.00	3.22	2.82	14.89
6.00	3.22	2.82	14.89
7.00	3.22	2.82	14.89
8.00	3.22	2.82	14.89
9.00	3.22	2.82	14.89
10.00	3.22	2.82	14.89
11.00	3.22	2.82	14.89
12.00	3.22	2.82	14.89
13.00	3.22	2.82	14.89
14.00	3.22	2.82	14.89
15.00	3.22	2.82	14.89
20.00	3.22	2.82	14.89
25.00	3.22	2.82	14.89
30.00	3.22	2.82	14.89
45.00	3.22	2.82	14.89
60.00	3.22	2.82	14.89
75.00	3.22	2.82	14.89
90.00	3.22	2.82	14.89
105.00	3.22	2.82	14.89
120.00	3.22	2.82	14.89
135.00	3.22	2.82	14.89
150.00			

Table 4.4.7 (b): Recovery Test (Observation Well)

MP=0.6m

Time since Recovery started (min)	Water Level in m (from mp)	Water Level in m BGL	Recovery in m
0.00	3.445	2.845	
0.50	3.432	2.832	0.013
1.00	3.432	2.832	0.013
1.50	3.432	2.832	0.013
2.00	3.428	2.828	0.017
2.50	3.428	2.828	0.017
3.00	3.425	2.825	0.020
3.50	3.423	2.823	0.022
4.00	3.423	2.823	0.022
4.50	3.420	2.820	0.025
5.00	3.420	2.820	0.025
6.00	3.418	2.818	0.027
7.00	3.418	2.818	0.027
8.00	3.417	2.817	0.028
9.00	3.417	2.817	0.028
10.00	3.417	2.817	0.028
11.00	3.417	2.817	0.028
12.00	3.417	2.817	0.028
13.00	3.417	2.817	0.028
14.00	3.416	2.816	0.029
15.00	3.416	2.816	0.029
20.00	3.415	2.815	0.030
25.00	3.415	2.815	0.030
30.00	3.413	2.813	0.032
45.00	3.411	2.811	0.034
60.00	3.409	2.809	0.036
75.00	3.409	2.809	0.036
90.00	3.406	2.806	0.039
105.00	3.406	2.806	0.039
120.00	3.405	2.805	0.040
135.00	3.405	2.805	0.040
150.00	3.403	2.803	0.042
165.00	3.400	2.800	0.045
180.00			

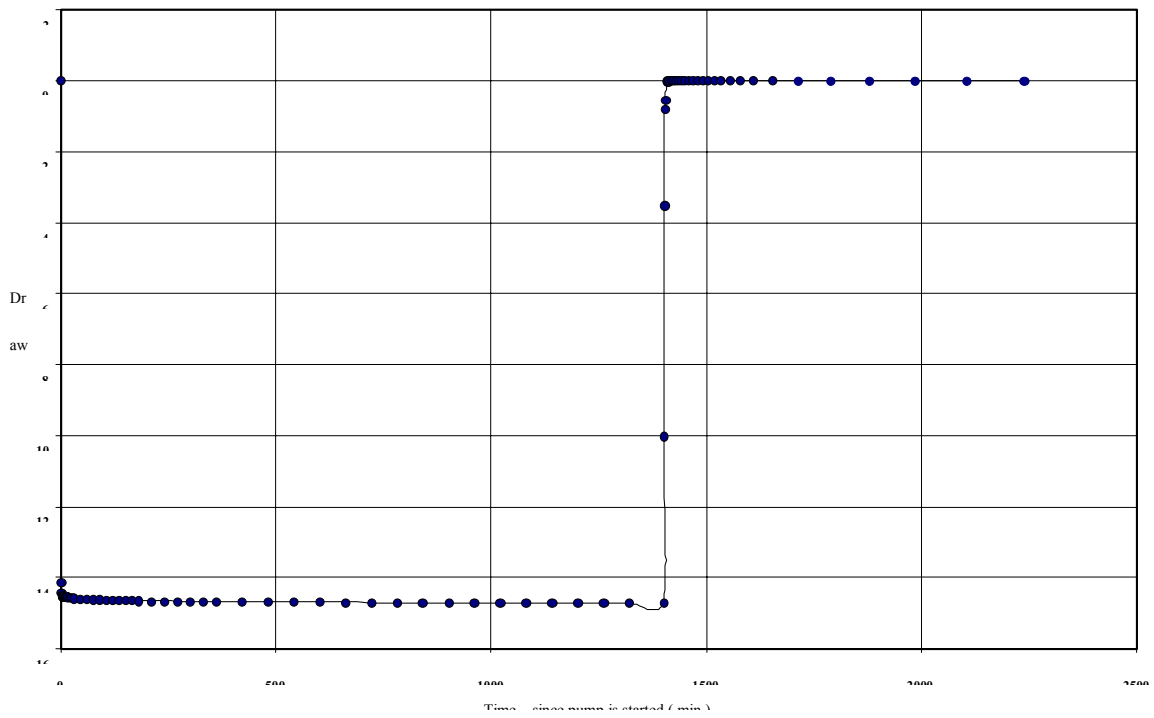


Figure 4.4.6 Recovery Test Curve (Test Well)

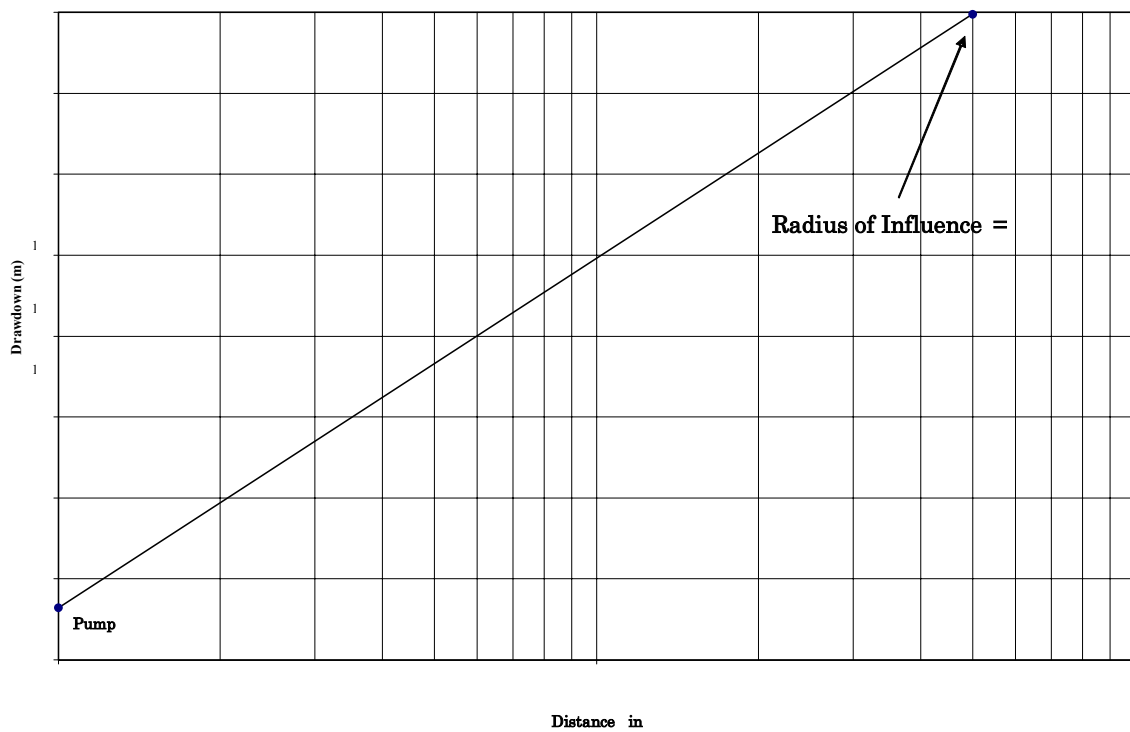


Figure 4.4.7 Radius of Influence by Distance-Drawdown Relationship

ATTACHMENT-3

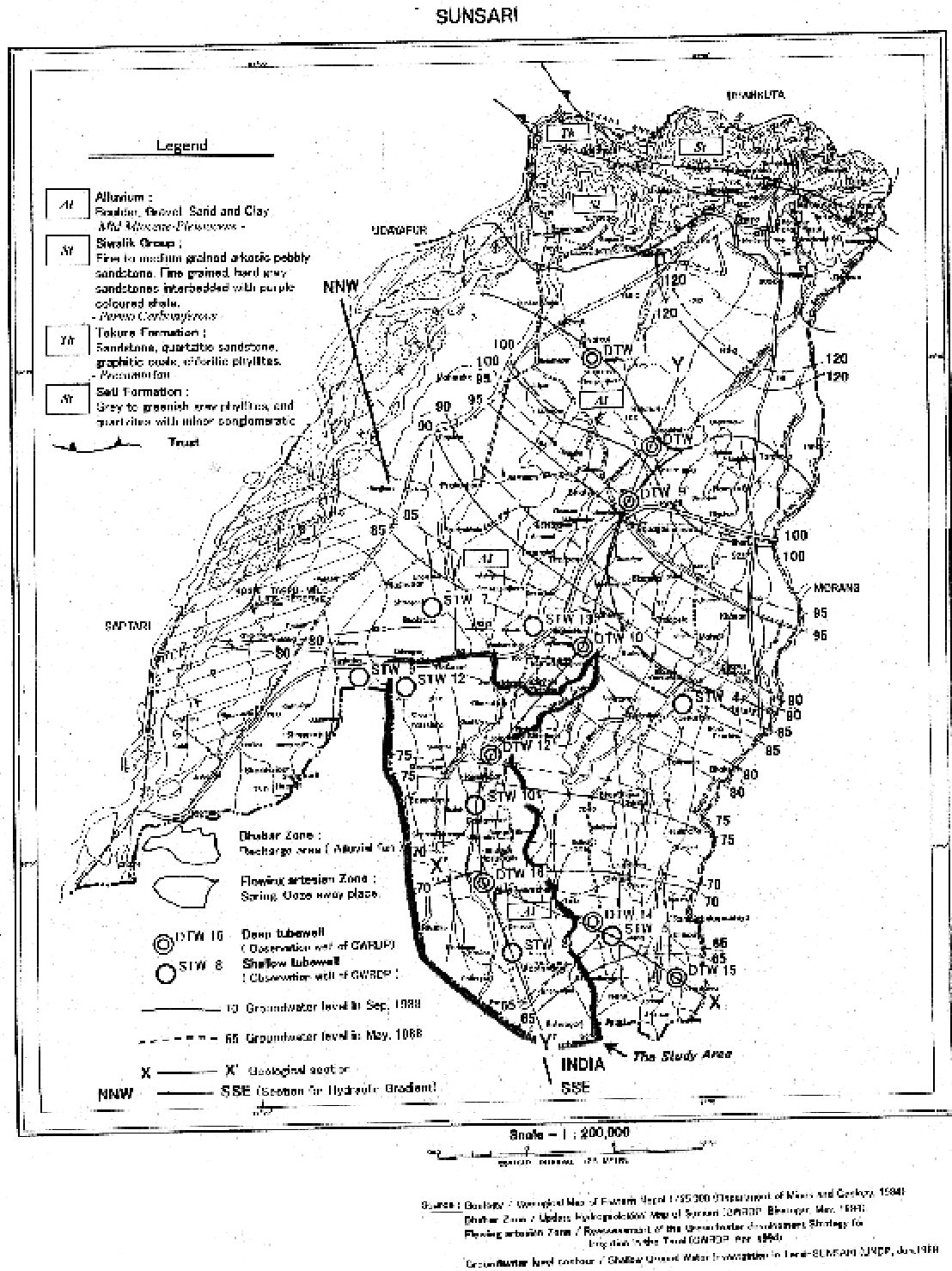


Figure 5.1.1 Hydro-geological Map of the Study Area

ATTACHMENT-3

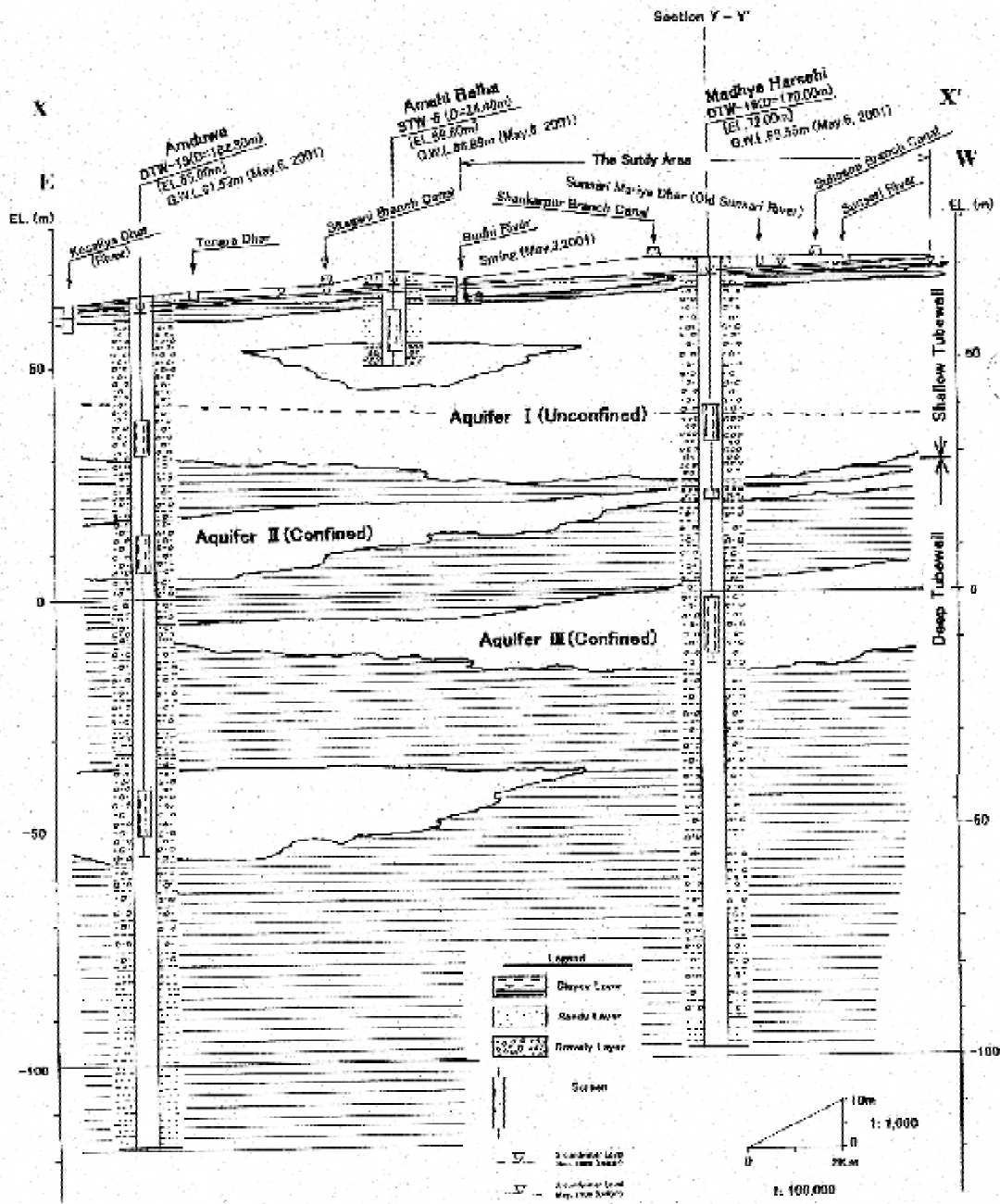


Figure 5.1.2 Hydro-geological Cross Section (X-X')

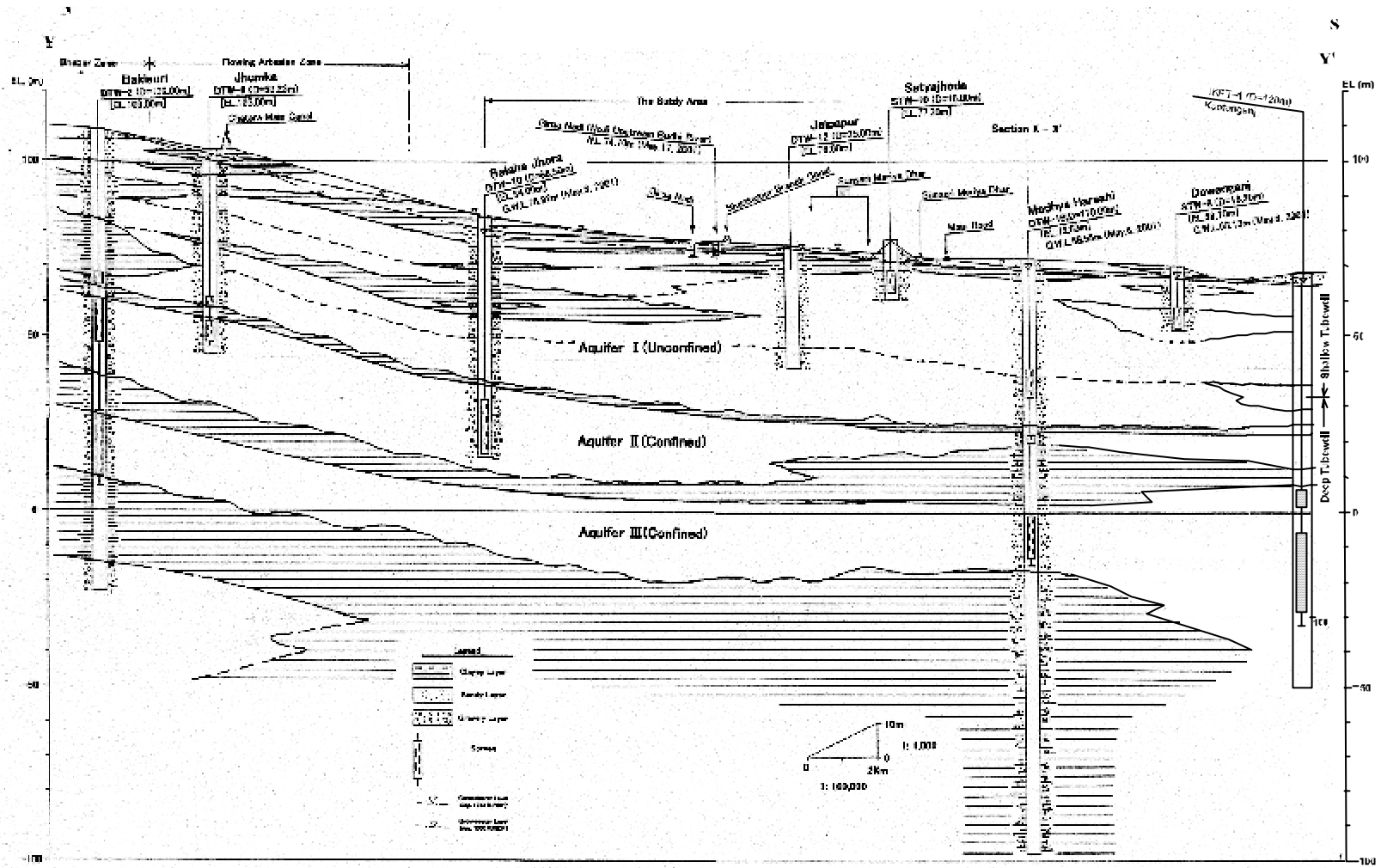
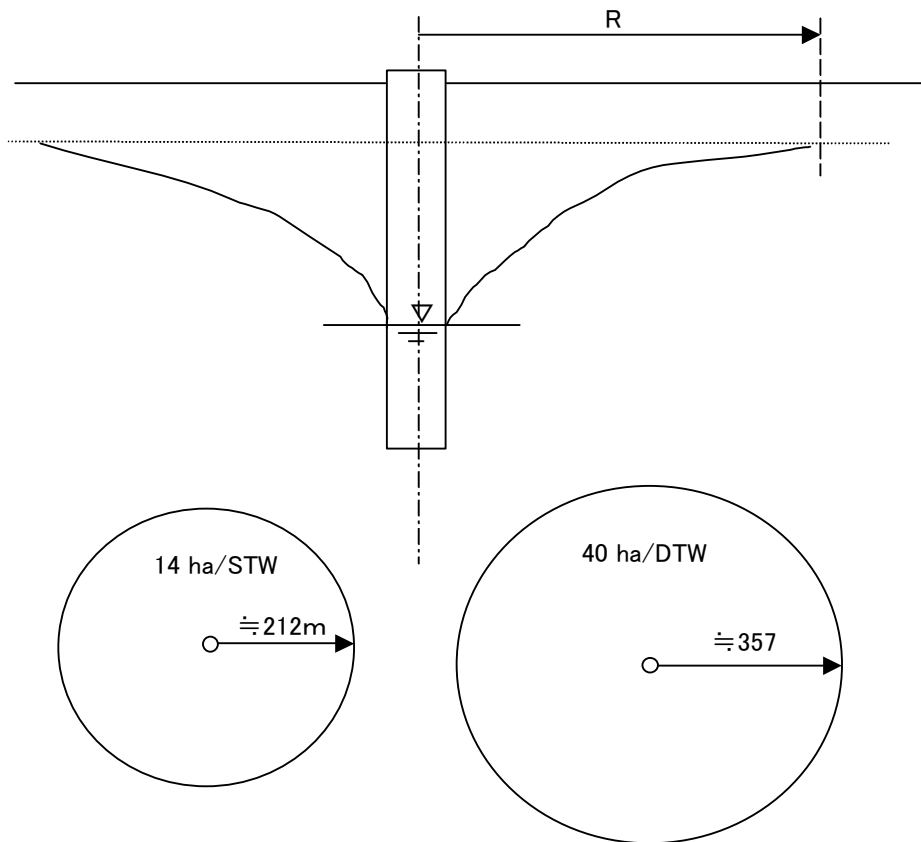


Figure 5.1.3 Hydro-geological Cross Section (Y-Y)

ATTACHMENT-3

Table 5.1.1 Standard Design and Capacity of the Irrigation Tubewell

	STW	DTW
Well depth	30 m	100 m
Diameter of well (r ²)	10 cm (4")	25 cm (10")
Screen Length (≅ thickness of aquifer (b))	9 m	25 m
Transmissivity (T)	1200 m ² /d	1800 m ² /d
Discharge (Q)	14 l/s/14ha (1210 m ³ /d)	40 l/s/40ha (3450 m ³ /d)
Storage Coefficient (S)	0.05 - 0.3 [0.175]	0.0005 - 0.005 [0.003]
Drawdown (s)	1.5 m	3.0 m
Operation Time (t)	0.5 day	0.5 day
Radius of Influence (R)	40 m - [100 m]	60 m - [600 m]



ATTACHMENT-3

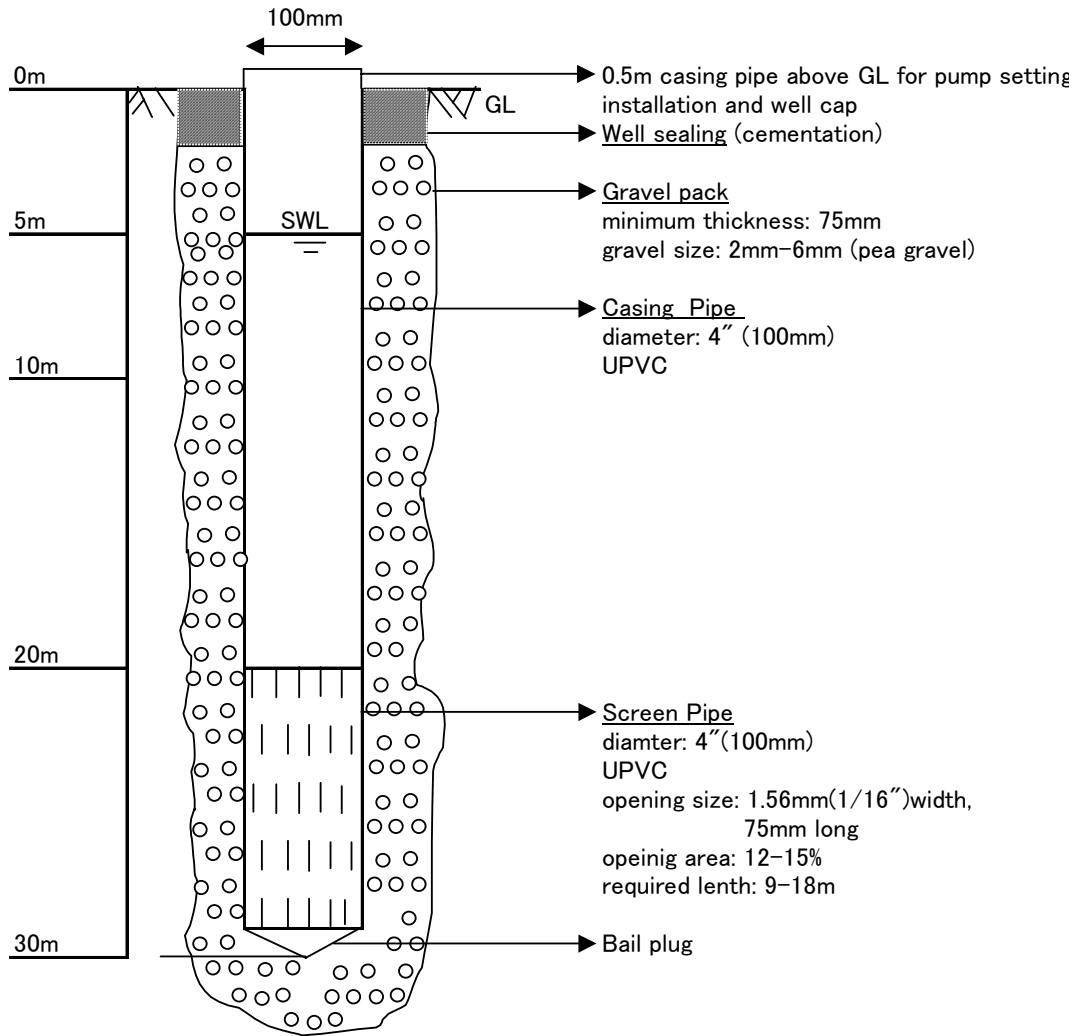


Figure 5.2.1 Standard Design of STW

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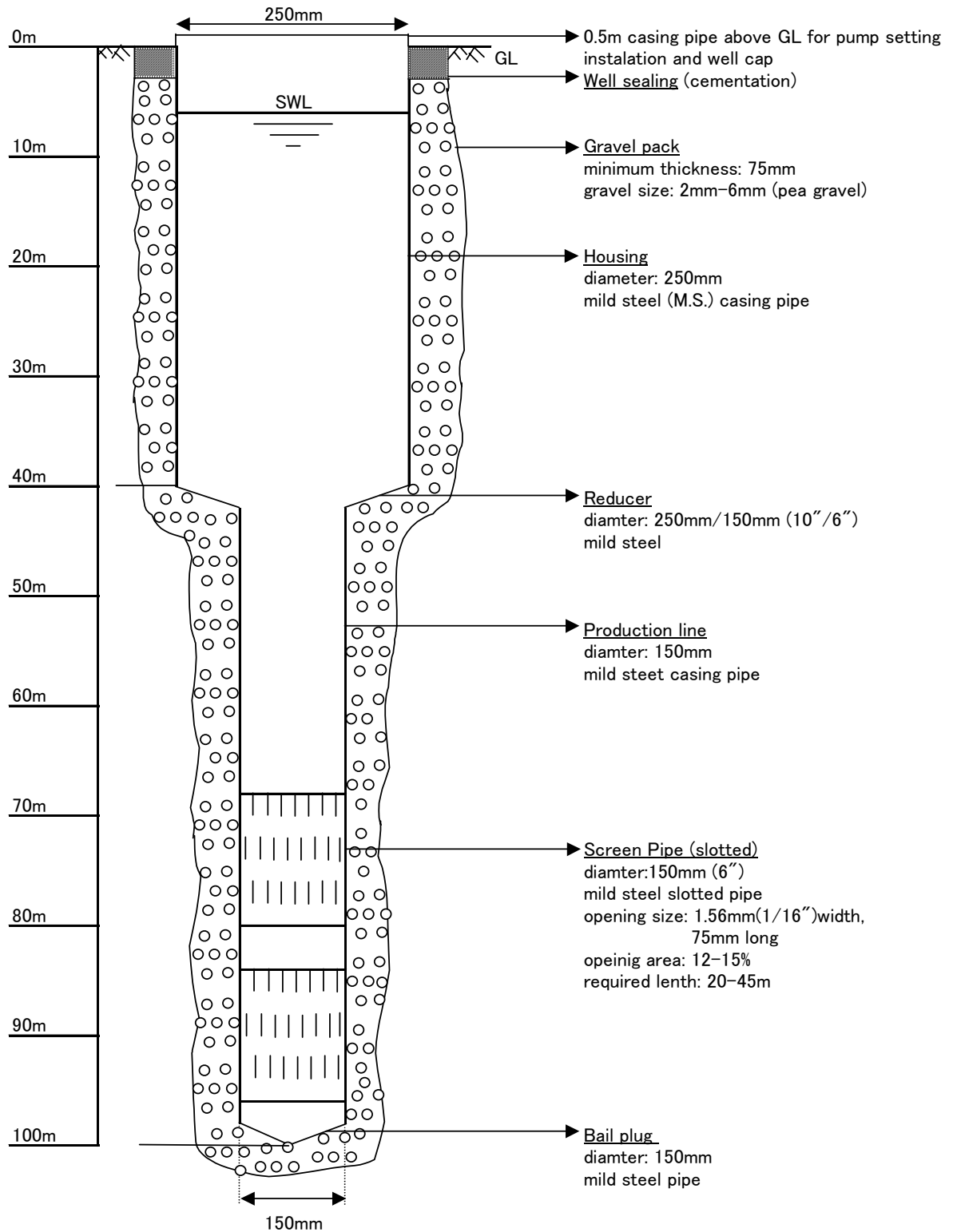


Figure 5.2.2 Standard Design of DTW

ATTACHMENT-3

Table 5.3.3 Cost Estimation of Tubewell

S. No.	Shallow Tubewell			Deep Tubewell		
	Descriptions	Machine Drilled Cost for 30m (Rs.)	Manually Drilled Cost for 30m (Rs.)	Machine Drilled Cost for 100m (Rs.)	Descriptions Case: Q=80l/s	Machine Drilled Cost for 130m (Rs.)
A.	Construction Cost			Construction Cost	Construction Cost	
	1 Drilling, Installation, Development aquifer test (Diameter: 4")	68,000	10,400	Drilling, Installation and Development & aquifer test, well sealing (250mm/150mm dia.)	692,000	Drilling, Installation and Development & aquifer test, well sealing (350mm/250mm dia.) or (400mm/250mm dia.)
2	Material Cost (4" PVC casing pipe, 4" PVC screen pipe M.S. top casing pipe and sockes)	33,000	25,900	Material Cost (250mm M.S. casing pipe for housing, 150mm M.S. casing pipe for production 150mm M.S. slotted pipe for production)	183,000	Material Cost (M.S. casing pipe for housing, M.S. casing pipe for production M.S. slotted pipe for production)
	SubTotal (Rs.)	101,000	36,300	SubTotal (Rs.)	875,000	SubTotal (Rs.)
B.				Electricity System (50%for 11KV main line, 45% for 50KVA transformer, 5% for service line)	500000	Electricity System (45% for 11KV main line/km +steel pole 55% 100KVA transformer + etc.)
C.	Pump (Diesel) Cost	27,000	27,000	Submercible Pump (Electric) Cost	450,000	Submercible Pump (Electric) Cost
	7HP, 14l/s discharge			40-45l/s discharge, 30-40m head		(60Hp, 45kwh)
D.	Pump House			Pump House	140,000	Pump House
						200,000
	Total capital cost(Rs.)	128,000	63,300	Total capital cost (Rs.)	1,965,000	Total capital cost (Rs.)
E.	Operating cost (Rs. 27l/hr *250hrs/yr)	6750	6750	operating cost (25HP or 18kwh) (1000hrs/year)	63,000	operating cost (60HP or 45kwh) (1000hrs/year * 3.50Rs.)
F.	Maintenance Cost (4% of capital cost)	5120	2532	Maintenance Cost (4% of capital cost)	78,600	Maintenance Cost (5% of capital cost)
G.	Annual O and M cost(E + F)	11870	9282	Annual O and M cost(E + F)	141,600	Annual O and M cost(E + F)
H.	Present Value of O and M (6.14* annual cost for Machine considering 10yr in 10%, 3.79*annual cost for Manual considering 5yr in 10%)	72881	35178	PV of O and M (8.51* annual O and M considering 20yr for tubewell + 0.39* cost of pump, since pump life is 10yrs)	1,380,516	PV of O and M (8.51* annual O and M considering 20yr for tubewell + 0.39* cost of pump, since pump life is 10yrs)
	Total present value cost(Rs.)	200,881	98,478		3,345,516	
I.	Water Cost (14l/s*3.6*250hrs*6.14 for Machine 14l/s*3.6*250hrs*3.79 for Manual)	2.59/m3	2.06/m3	water Cost (water quantity= 40l/s*3.6*1000*8.51)	2.73/m3	water Cost (water quantity= 40l/s*3.6*1000*8.51)

Source: *GWRDP, Field Office, Biratnagar for STW Machine drilled cost (inflation rate considered upto 2001/02)

*CGISP, Vol.2 Oct.1997 for STW manually drilled cost (inflation rate considered upto 2001/02), and B-I

*Ground Water Irrigation Project,Chitwan/GWRDP, Biratnagar for DTW Machine drilled cost (inflation rate considering upto 2001/02)

ATTACHMENT-3

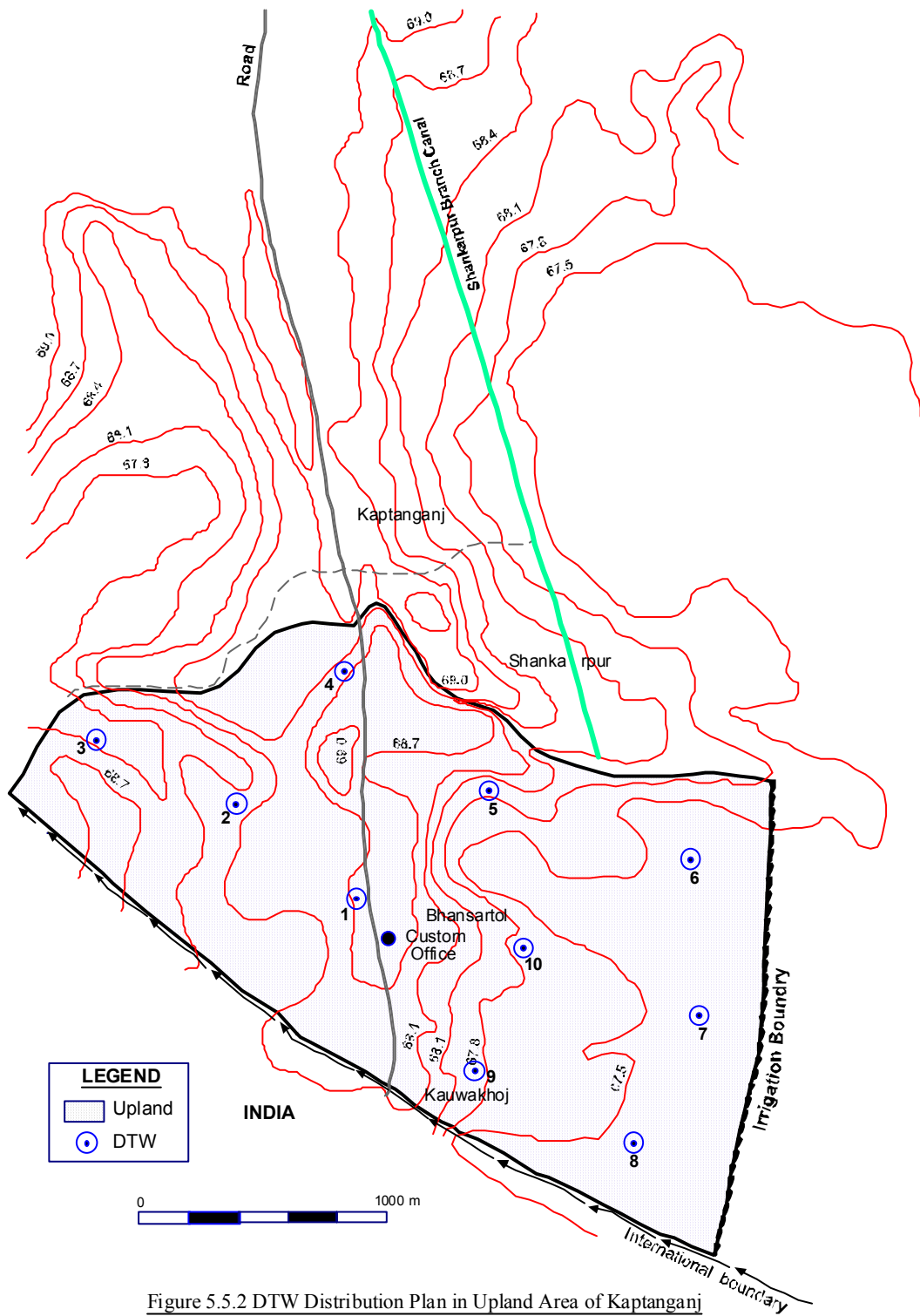


Figure 5.5.2 DTW Distribution Plan in Upland Area of Kaptanganj

ATTACHMENT-3

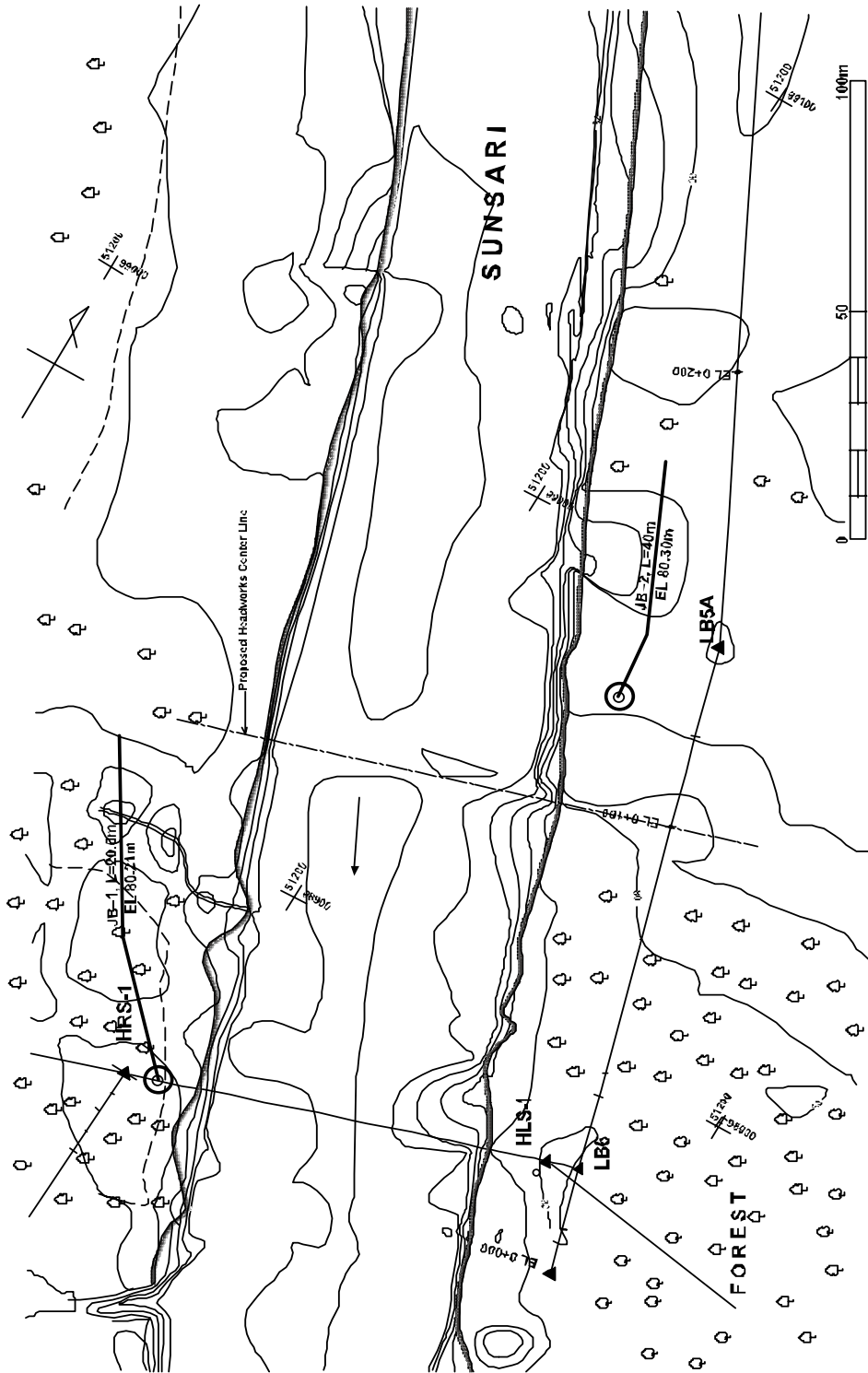


Figure 6.1.1 Location Map of Core Boring Site

Figure 6.1.1 Location Map of the Core Boring Site

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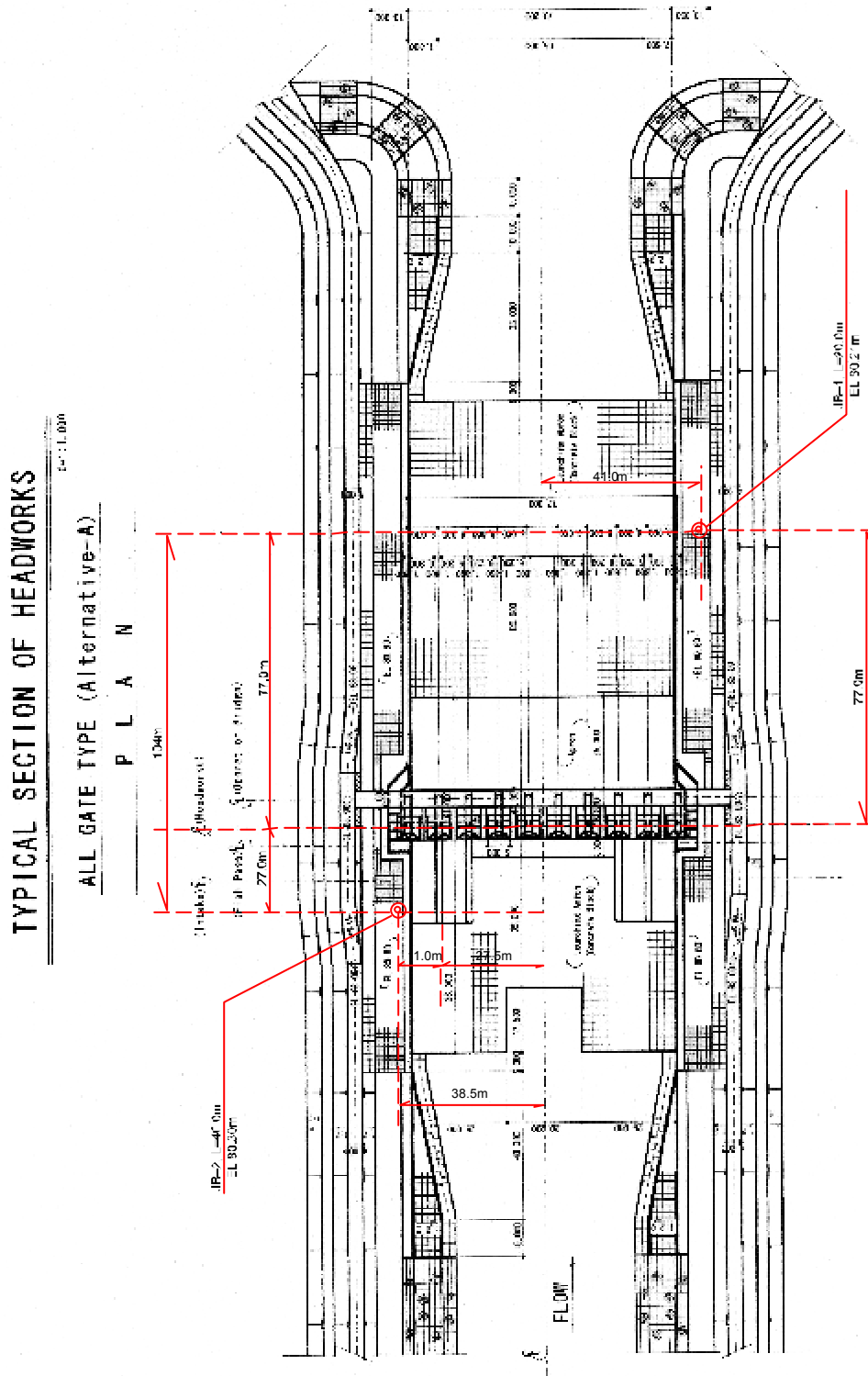


Figure 6.1.2 Location Map of the Core Boring Site for All Gate Type

Figure 6.1.2 Location Map of the Core Boring Site for All Gate Type

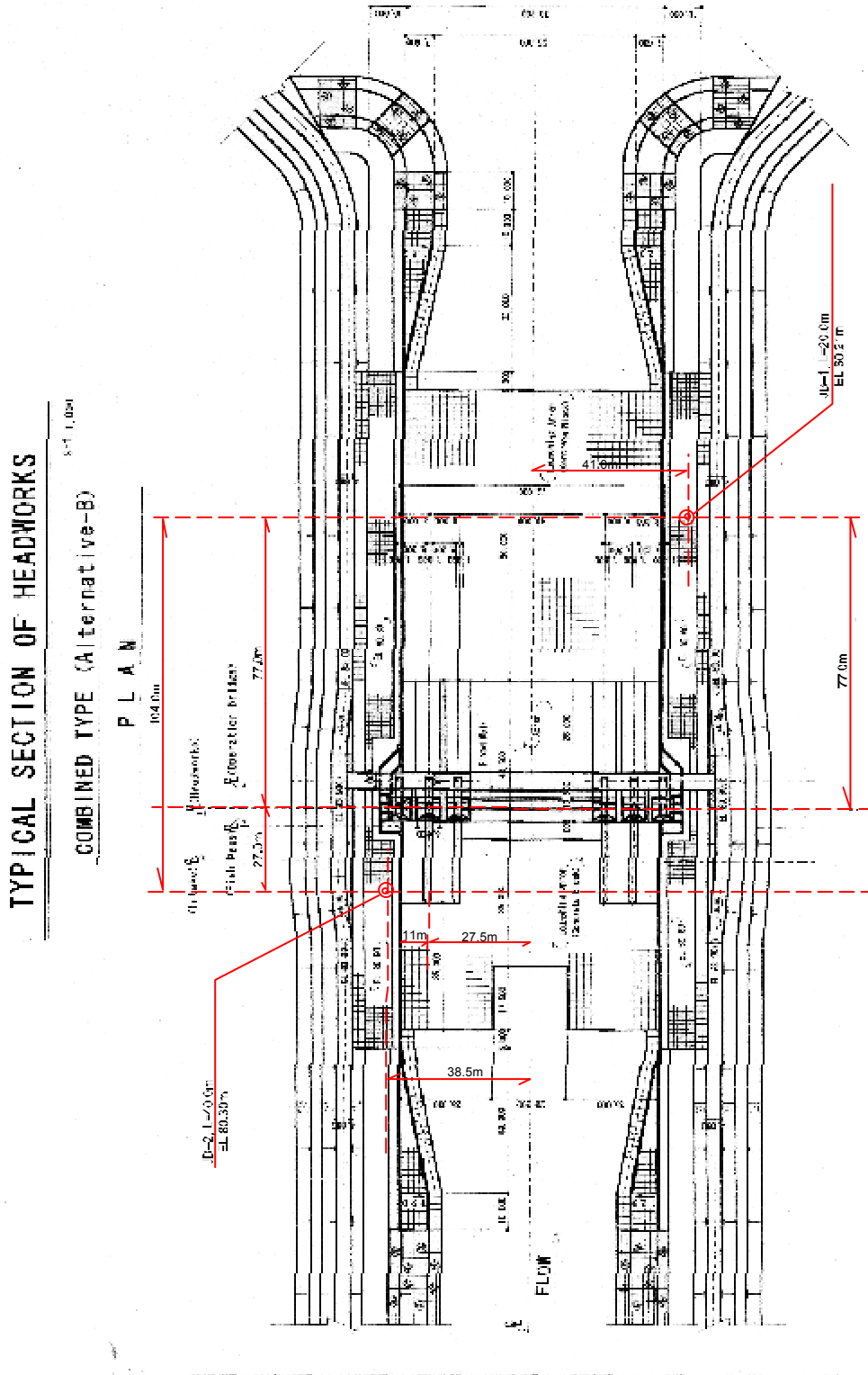


Figure 6.1.3 Location Map of the Core Boring Site for Combined Type

Figure 6.1.3 Location Map of the Core Boring Site for Combined Type

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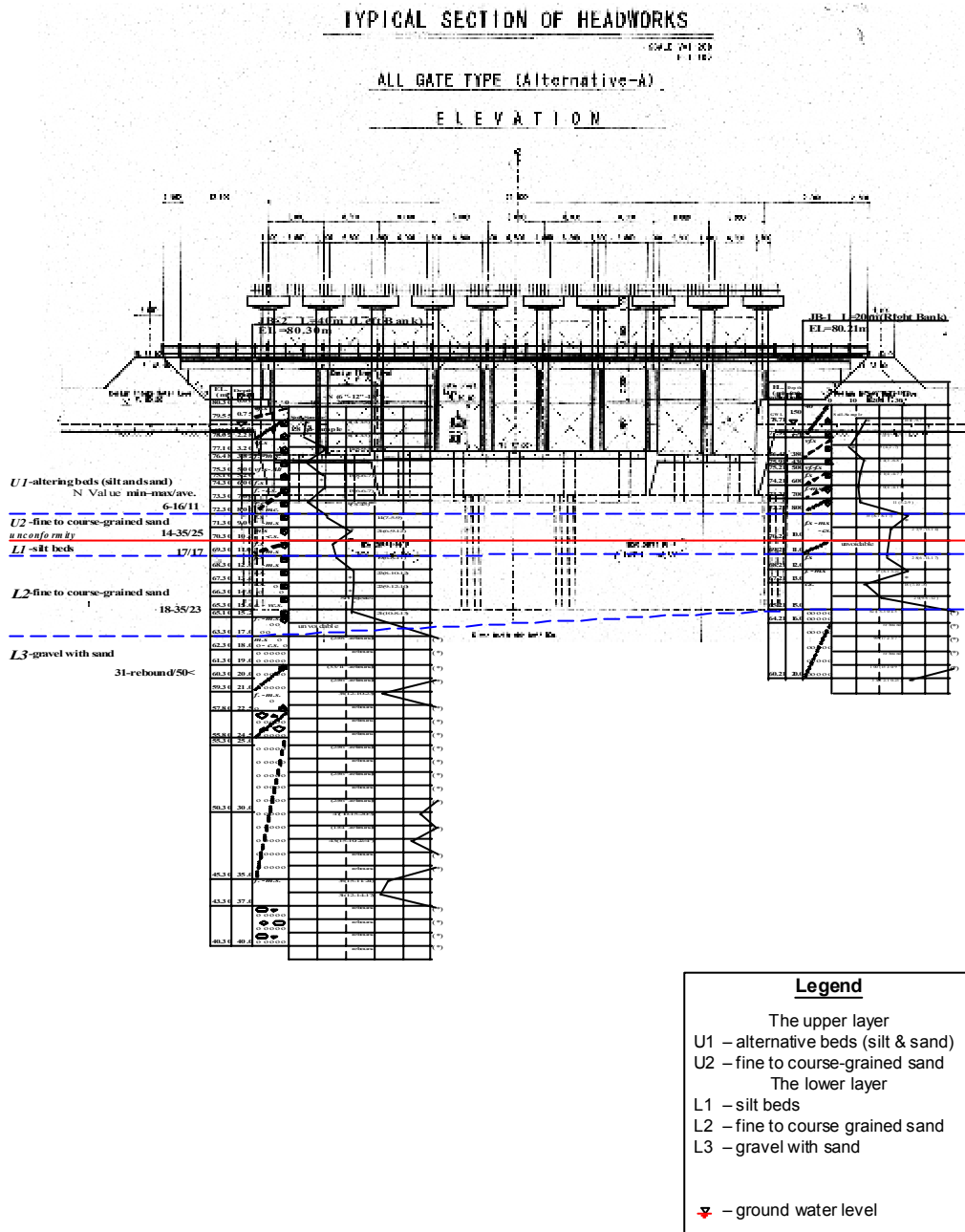


Figure 6.3.1 The foundation Structure at the Proposed HWS for All Gate Type

Figure 6.3.1 The Foundation Structure at the Proposed HWs for All Gate Type

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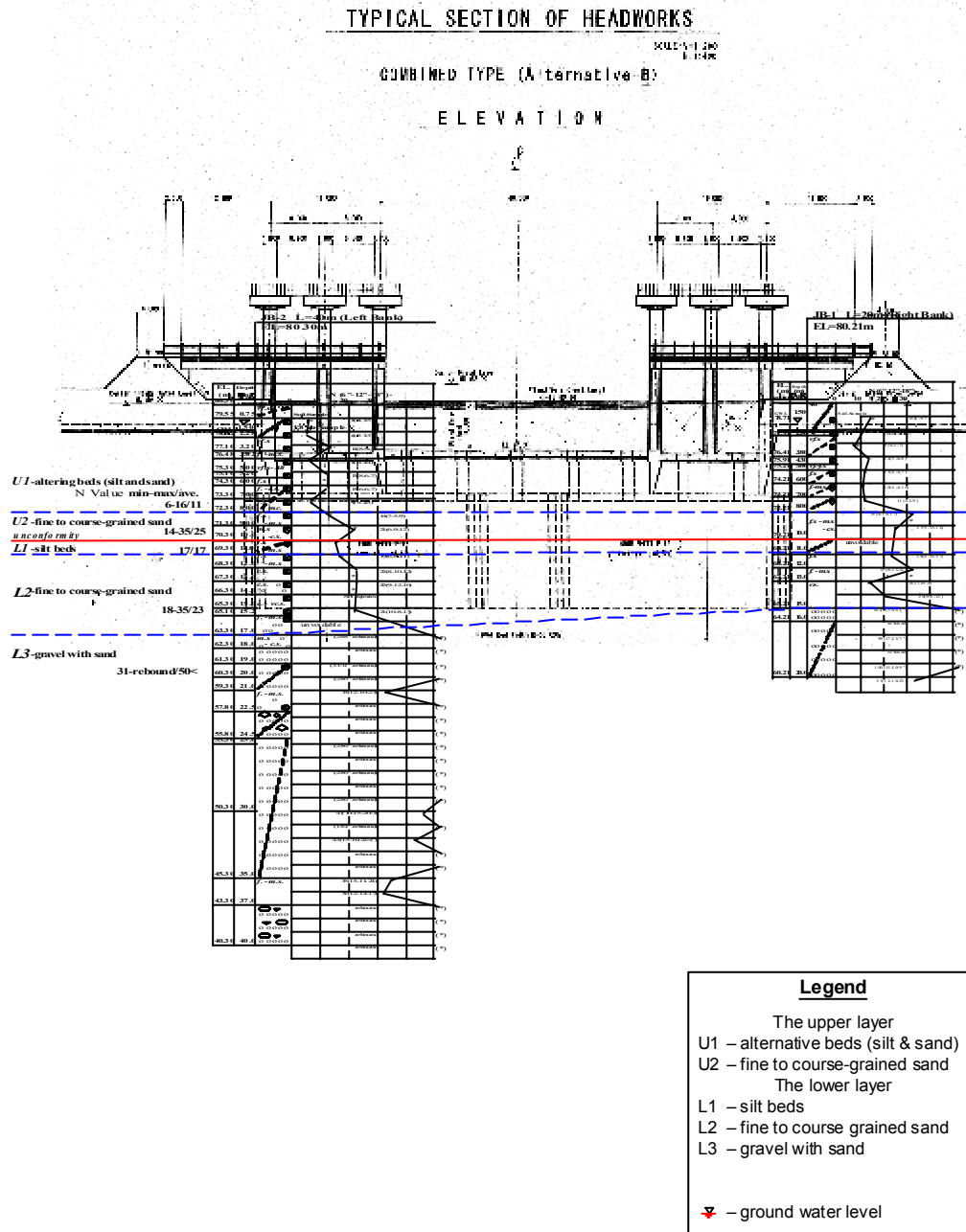


Figure 6.3.2 The foundation Structure at the Proposed HWS for Combined Type

Figure 6.3.2 The Foundation Structure at the Proposed HWs for Combined Type

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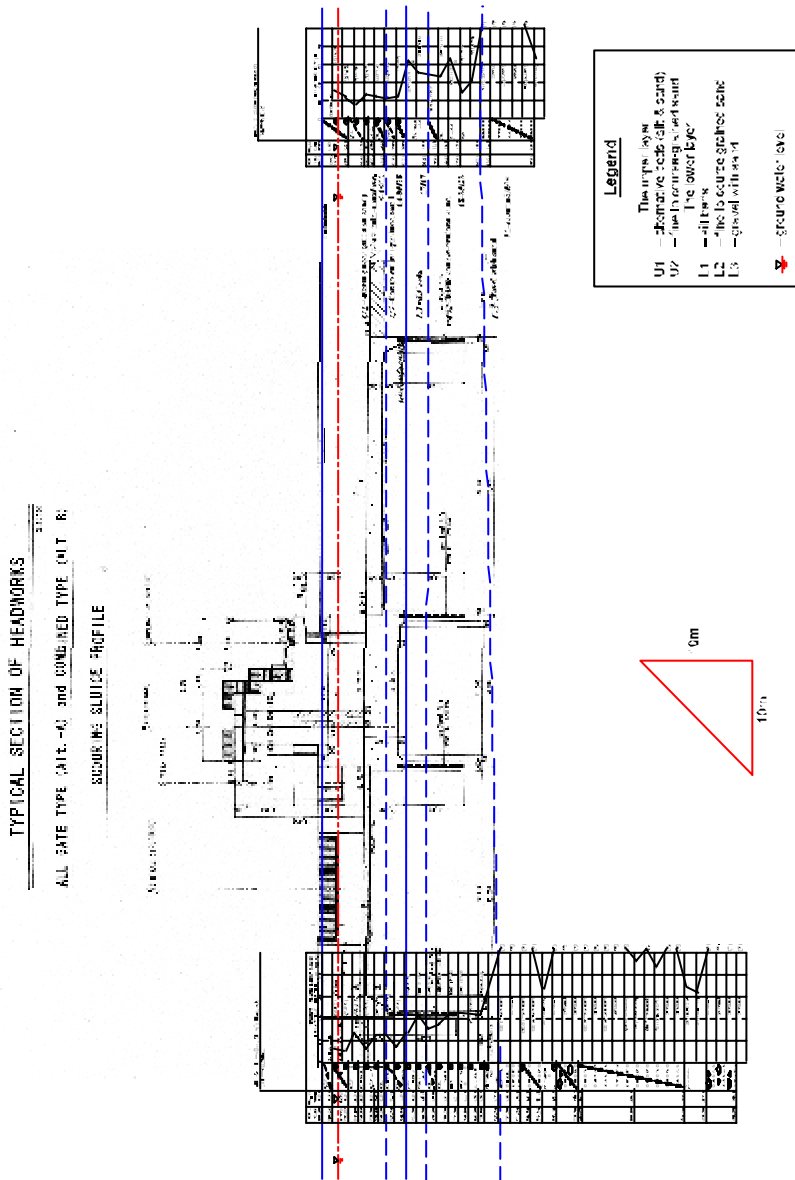


Figure 6.3.3 Foundation Structure at the HWs along the Sunsari River

Figure 6.3.3 The Foundation Structure at the Proposed HWs for Combined Type