Attachment 6.

Groundwater Condition

1) Items of Proposed Groundwater Study
in Jakarta Metropolis

2) Groundwater Demand
Case 1 & Case 2

3) Private Deepwell Production in DKI, Jakarta,
1978 - 1983

4) PDAM Deepwell Inventory, 1983
B-1 Deepwell Condition
B-2 Groundwater Quality

Proposed Groundwater Study in Jakarta Metropolis

I. General Review

1.1 Geographical Setting

1.2 Meteorological Setting

1.3 Geological Setting

1.4 Hydrogeological Setting

1.5 Groundwater Quality

1.6 Aquifer System

II. Hydrogeological Analysis

2.1 Jakarta Artesian Basin

2.2 Groundwater Potential Reserve

2.3 Groundwater Balance

2.4 Groundwater Recharge Mechanism

2.5 Groundwater Safe Yield

III. Problems on Groundwater Development

3.1 Piezometric Level Decline and Monitoring

3.2 Sea Water Intrusion and Monitoring

3.3 Land Subsidence and Monitoring

3.4 Mechanism of Groundwater Problems

3.5 Solution of Groundwater Problems

IV. Groundwater Management

4.1 Density of Groundwater Production and Deepwells

4.2 Water Well Condition and Design

Ground Water Demand Case 1

1. Total Area

Year	1980	1985	1990	1995	2000	2005
1. Domestic	136.6	216.0	271.2	286.9	327.6	332.0
2. Public	41.3	49.8	48.8	24.2	24.5	23.4
3. Industries	160.8	193.1	204.8	200.4	170.1	117.8
4. Trade & Service	123.0	141.3	154.7	162.7	152.6	130.0
Total (x 1000 m3/day)	461.7	600.2	679.5	674.2	674.8	603.2
Total (m3/sec)	5.4	7.0	7.9	7.8	7.8	7.0

2. Zone 1

Year	1980	1985	1990	1995	2000	2005
1. Domestic	2.2	4.0	6.1	6.9	10.0	13.3
2. Public Use	9.7	9.8	0.2	0.8	0.8	1.4
3. Industries	85.9	91.9	88.3	64.7	34.8	0.8
4. Trade & Service	36.5	38.8	39.4	37.7	32.5	24.0
Total (x 1000 m3/day)	134.3	144.5	142.0	110.1	78.1	39.5
Total (m3/sec)	1.6	1.7	1.6	1.3	0.9	0.5

3. Zone 2

Year	1980	1985	1990	1995	2000	2005
1. Domestic	37.2	53.0	57.1	65.0	71.8	66.4
2. Public Use	10.3	12.3	11.0	5.4	5.1	7.7
3. Industries	63.2	80.4	89.4	104.5	102.9	90.6
4. Trade & Service	36.4	42.2	46.8	50.8	48.8	52.2
Total (x 100 m3/day)	147.1	187.9	204.3	225.7	228.6	216.9
Total (m3/sec)	1.7	2.2	2.4	2.6	2.6	2.5

4. Zone 3

Year	1980	1985	1990	1995	2000	2005
1. Domestic	97.2	159.0	208.0	215.0	245.8	252.3
2. Public Use	21.3	27.7	29.6	18.0	18.6	14.3
3. Industries	11.7	20.8	27.1	31.2	32.4	26.4
4. Trade & Service	50.1	60.3	68.5	74.2	71.3	53.8
Total (x1,000 m^3/day)	108.3	267.8	333.2	338.4	368.1	346.8
Total (m^3/sec)	2.1	3.1	3.9	3.9	4.3	4.0

(Note)

Domestic : Per capita consumption of ground water is same to that of piped water.

(from Income Group I and II 20 lpcd)
(" III and IV 150 lpcd)
(" V 250 lpcd)

Physical Zone 1

$$\frac{1.7\ m^3/sec}{12{,}889\ ha} = 0.13\ l/sec/ha = 1{,}123\ m^3/s/km^2$$

Physical Zone 2

$$\frac{2.6}{19{,}334} = 0.13\ l/sec/ha = 1{,}123\ m^3/s/km^2$$

Physical Zone 3

$$\frac{4.3}{32{,}233} = 0.13\ l/sec/ha = 1{,}123\ m^3/s/km^2$$

Ground Water Demand Case 2

1. Total

Year	1980	1985	1990	1995	2000	2005
1. Domestic	89.8	135.0	165.4	172.3	192.7	191.5
2. Public Use	41.3	49.8	48.8	24.2	24.5	23.4
3. Industries	160.8	193.1	204.8	200.4	170.1	117.8
4. Trade & Service	61.5	70.6	77.4	81.4	76.3	65.0
Total (x1000 m3/day)	353.4	448.5	496.4	478.1	463.6	397.7
Total (m3/sec)	4.1	5.2	5.7	5.5	5.4	4.6

2. Zone 1

year	1980	1985	1990	1995	2000	2005
1. Domestic	1.4	2.6	3.6	4.1	5.8	7.7
2. Public Use	9.7	9.8	8.2	0.8	0.8	1.4
3. Industries	85.9	91.9	88.3	64.7	34.8	0.8
4. Trade & Service	18.2	19.3	19.7	18.9	16.2	12.0
Total (x1000 m3/day)	115.2	123.6	119.8	88.5	57.6	21.9
Total (m3/sec)	1.3	1.4	1.4	1.0	0.7	0.3

3. Zone 2

Year	1980	1985	1990	1995	2000	2005
1. Domestic	24.7	32.5	34.4	38.9	42.4	38.3
2. Public Use	10.3	12.3	11.0	5.4	5.1	7.7
3. Industries	63.2	80.4	89.4	104.5	102.9	90.6
4. Trade & Service	18.2	21.1	23.4	25.4	24.4	26.1
Total (x1000 m3/day)	116.4	146.3	150.2	174.2	174.8	162.7
Total (m3/sec)	1.4	1.7	1.8	2.0	2.0	1.9

4. Zone 3

Year	1980	1985	1990	1995	2000	2005
1. Domestic	63.7	99.9	127.4	129.1	144.5	145.5
2. Public Use	21.3	27.7	29.6	18.0	18.6	14.3
3. Industries	11.7	20.8	27.1	31.2	32.4	26.4
4. Trade & Service	25.1	30.2	34.3	37.1	35.7	26.9
Total (x1,000 m^3/day)	121.8	178.6	218.4	215.4	231.2	213.1
Total (m^3/sec)	1.4	2.1	2.5	2.5	2.7	2.4

(Note)

Domestic : Per capita consumption of ground water is set as belows.

(from Income Group I and II 20 lpcd)
(" III and IV 60 lpcd)
(" V 150 lpcd)

Trade and Service : Half by quantity compared with case 1

Physical Zone 1

$$\frac{1.4\ m^3/sec}{12,889\ ha} = 0.11\ l/sec/ha = 0.011\ m^3/s/km^2 = 950\ m^3/d/km^2$$

Physical Zone 2

$$\frac{2.0}{19,334} = 0.10\ l/sec/ha = 0.010\ m^3/s/km^2 = 864\ m^3/d/km^2$$

Physical Zone 3

$$\frac{2.7}{32,233} = 0.08\ l/sec/ha = 0.008\ m^3/s/km^2 = 691\ m^3/d/km^2$$

Table Private Deepwell Production in DKI, Jakarta, 1978

No.	Area	Items	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Central	Deepwells	127	128	128	130	132	133	133	135	135	137	139	141
		Production (m3)	288,140	317,844	285,641	328,278	272,102	295,244	325,830	339,709	296,467	296,233	290,188	282,660
2.	West	Deepwells	107	108	112	111	111	112	112	112	114	114	174	117
		Production (m3)	92,811	100,877	94,920	105,293	105,773	105,316	103,422	109,530	122,345	103,573	322,598	114,618
3.	South	Deepwells	167	169	169	169	169	169	171	172	173	172	117	174
		Production (m3)	318,599	290,004	277,913	256,386	286,656	294,267	292,903	277,799	321,492	257,255	127,018	308,250
4.	East	Deepwells	196	197	202	204	205	205	207	209	212	209	217	221
		Production (m3)	407,728	429,581	407,889	424,504	409,202	417,340	360,242	461,586	397,231	411,553	431,019	442,290
5.	North	Deepwells	152	149	151	152	152	156	156	158	160	165	167	167
		Production (m3)	194,717	168,063	162,385	180,532	170,004	190,958	175,984	191,167	180,816	186,161	196,945	128,040
	Total	Deepwells	749	751	762	766	769	775	779	786	794	797	814	820
		Production	1,301,995	1,306,369	1,227,748	1,294,993	1,243,737	1,303,125	1,269,701	1,379,791	1,318,351	1,254,775	1,367,768	1,275,85

Data From PDAM, Jakarta
August. 1983

Table Private Deepwell Production in DKI. Jakarta, 1979

No.	Area	Items	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Central	Deepwells	141	142	142	145	146	146	148	149	148	150	151	152
		Production (m3)	225,251	291,942	253,715	277,382	267,772	278,045	283,488	267,920	313,376	305,830	325,105	317,967
2.	West	Deepwells	118	118	118	120	121	123	123	123	124	126	128	127
		Production (m3)	114,741	118,304	106,650	136,329	129,865	129,874	128,993	127,101	106,520	133,341	146,751	138,690
3.	South	Deepwells	176	176	176	179	178	179	182	183	184	188	189	189
		Production (m3)	308,520	351,801	266,648	333,286	356,932	371,011	363,370	294,462	387,386	343,872	338,088	347,290
4.	East	Deepwells	221	224	227	228	227	228	234	238	239	239	242	243
		Production (m3)	401,704	479,621	421,212	496,115	452,394	439,256	480,135	418,831	516,384	482,220	482,290	530,336
5.	North	Deepwells	168	173	176	173	172	172	176	177	178	180	185	185
		Production (m3)	195,712	214,660	175,012	187,523	210,802	184,345	188,336	156,176	168,830	180,847	219,065	205,416
	Total	Deepwells	824	833	839	845	844	848	863	870	873	883	895	896
		Production	1,345,928	1,456,328	1,223,237	1,306,635	1,417,765	1,402,531	1,444,320	1,265,490	1,492,496	1,447,110	1,511,299	1,539,699

Table Private Deepwell Production in DKI, Jakarta, 1980

No.	Area	Items	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Central	Deepwells	153	157	154	154	157	158	159	160	161	161	161	161
		Production (m3)	325,390	321,035	287,937	312,487	263,671	292,125	287,004	281,262	242,215	274,833	252,925	253,879
2.	West	Deepwells	127	128	128	130	132	134	133	137	137	137	138	136
		Production (m3)	148,800	144,623	128,616	144,756	134,511	161,492	144,205	133,248	132,182	138,369	136,796	129,902
3.	South	Deepwells	191	193	195	197	199	201	204	203	203	205	205	204
		Production (m3)	346,417	348,930	383,913	357,638	311,958	343,223	320,143	334,922	243,303	332,287	320,445	301,731
4.	East	Deepwells	247	149	250	251	252	252	252	252	252	254	255	255
		Production (m3)	518,920	488,757	488,427	541,502	481,429	515,282	490,974	420,325	447,280	465,131	502,899	468,960
5.	North	Deepwells	188	188	188	191	191	193	193	194	195	195	198	200
		Production (m3)	209,827	201,907	182,835	232,414	326,798	210,364	176,463	189,010	166,301	191,504	219,567	163,509
	Total	Deepwells	906	915	915	923	931	938	941	946	948	952	957	956
		Production	1,544,354	1,505,252	1,471,728	1,589,307	1,418,364	1,522,486	1,398,789	1,358,767	1,201,281	1,402,124	1,432,632	1,317,981

Table Private Deepwell Production in DKI, Jakarta, 1981

No.	Area	Items	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Central	Deepwells	161	161	162	165	165	165	165	166	166	168	168	169
1.		Production (m3)	254,624	277,337	258,752	264,653	266,949	277,603	297,384	279,284	285,768	302,587	270,403	263,003
2.	West	Deepwells	137	137	138	140	140	142	142	144	144	144	144	146
		Production (m3)	123,075	134,660	133,257	141,634	161,676	187,470	179,713	178,636	169,593	169,981	157,003	164,262
3.	South	Deepwells	205	201	199	199	200	200	200	200	200	202	202	202
		Proudction (m3)	316,199	292,650	315,541	301,917	279,468	345,027	303,885	287,592	273,302	282,338	292,048	265,223
4.	East	Deepwells	255	256	258	259	260	262	262	264	264	267	267	272
		Production (m3)	485,363	547,028	495,817	508,450	473,676	554,004	524,860	424,183	532,272	515,210	588,037	490,431
5.	North	Deepwells	199	201	205	207	208	210	209	209	209	215	215	217
		Production (m3)	179,732	225,752	221,669	259,730	203,989	211,420	211,603	170,385	222,701	247,029	225,124	208,990
	Total	Deepwells	957	956	961	970	973	979	978	983	983	996	996	1.006
		Production	1,358,993	1,477,427	1,425,036	1,456,385	1,385,758	1,575,524	1,517,445	1,340,080	1,483,636	1,517,145	1,532,615	1,391,909

Table Private Deepwell Production in DKI, Jakarta, 1982

No.	Area	Items	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Central	Deepwells	247	247	253	258	256	254	256	261	265	268	275	273
		Production (m3)	367,143	361,928	340,646	379,108	319,406	312,618	318,813	334,282	354,703	357,975	376,885	341,61
2.	West	Deepwells	216	219	228	230	229	226	229	230	236	239	242	241
		Production (m3)	249,992	258,059	221,668	233,252	200,398	199,316	196,017	186,413	217,373	228,801	241,600	194,01
3.	South	Deepwells	580	789	855	885	884	881	881	888	940	946	975	976
		Production (m3)	703,848	839,002	873,980	946,911	906,273	845,288	649,890	632,071	588,767	660,926	724,259	694,39
4.	East	Deepwells	344	346	355	356	356	355	356	361	374	379	388	386
		Production (m3)	562,077	597,693	530,678	552,507	535,463	596,516	519,347	603,625	587,180	626,418	702,284	652,44
5.	North	Deepwells	250	251	274	279	278	277	282	279	282	288	296	295
		Production (m3)	259,512	259,121	280,667	295,601	262,038	269,703	250,515	271,113	251,878	323,279	267,846	270,09
	Total	Deepwells	1637	1861	1965	2008	2003	1993	2004	2019	2097	2120	2176	2171
		Production	2,142,573	2,351,803	2,247,639	2,407,379	2,223,576	2,223,441	1,934,582	2,027,504	1,999,901	2,197,399	2,312,874	2,152,551

Table Private Deepwell Production in DKI, Jakarta, 1983

No.	Area	Deepwells	Production	Deepwells	Production	Deepwells	Production
1.	Central (48.5 Km2)	273	341,614	273	364,246	282	386,253
2.	West (132,0 Km2)	241	194,011	242	190,719	247	184,324
3.	South (146,4 Km2)	976	694,390	975	601,393	977	636,923
4.	East (185,5 Km2)	387	652,446	390	649,490	396	633,484
5.	North (132,1 Km2)	294	270,090	297	259,279	306	301,151
	Total	2,171	2,152,551	2,177	2,065,127	2,208	2,142,135

* PDAM Jaya.

Table Water Quality of PDM Jaya Deepwells in Jakarta, 1983

No.	Well Name	Colour (Unit)	P. H	Organic Matter (ppm)	M. Alkali (ppm)	Total Hard Ness (°D)	Iron (ppm)	Ammonia (ppm)	Chloride (ppm)	Sampling Date
SSW 042	Manglekiu II	5	8,3	3,16	0,0	5,4°D	0,65	Neg	11,36	Feb.' 82
SSW 062	Panglima Polim II	5	6,6	2,212	125,0	6°D	0,33	Neg	27,694	Feb.' 82
SSW 051	Gandaria Tengah II	-	-	-	-	-	-	-	-	-
SSW 081	Brawijaya VII	-	-	-	-	-	-	-	-	-
SWW 071	Ragatnaca	-	-	-	-	-	-	-	-	-
SSW 031	Wijaya	-	-	-	-	-	-	-	-	-
SSW 052	Gandaria III	-	-	-	-	-	-	-	-	-
SSW 061	Cilosari	-	-	-	-	-	-	-	-	-
SSW 012	Laksana I	-	-	-	-	-	-	-	-	-
SSW 011	Suren II	-	-	-	-	-	-	-	-	-
SSW 041	Singgalang	-	-	-	-	-	-	-	-	-
SSW 021	Raji M. Noor	-	-	-	-	-	-	-	-	-
SST 071	Kagunan Kebon Binatang	45	6,9	1,58	100,0	3,6°D	1,5	Neg	11,36	Feb.' 82
SST 081	Lenteng Agung	25	7,5	10,112	450,0	0,8°D	Neg	Neg	22,01	Feb.' 82
SST 022	Pasar Minggu/ Komp.Polisi	95	7,3	3,476	110,0	3,6°D	0,65	Traces	6,39	Feb.' 82
SST 021	Rawa Bambu I	20	7,3	1,58	80,0	4,0°D	Neg	Neg.	10,65	Mar.' 82
SSR 071	H1.	100	7,5	4,424	200,0	2,8°D	1,32	Traces	22,72	Feb.' 82
		15	8,0	7,90	220,0	0,8°D	Traces	Ne.	15,62	Mei.' 82
SSR 072	H2.	65	7,5	4,424	220,0	1,4°D	0,81	Traces	17,75	Feb.' 82
		25	7,8	4,100	287,0	0,8°D	0,86	0,35	17,75	Jun.' 82
SSR 051	Kebon Obat	29	8,3	2,52	327,0	0,6°D	Neg	Neg	10,65	Dec.' 79
SSR 081	Kawi Ratna	35	8,0	8,85	290,0	0,4°D	Neg	Neg	16,39	Mei.' 82
SSR 061	C. 8/Gg. Mesjid	-	-	-	-	-	-	-	-	-
SSR 052	Menteng Sawah I	-	-	-	-	-	-	-	-	-
	WHO Standard	5-50	7.0-8.5			100-500	0.3-1.0		200-600	

Table) Water Quality of PDM Jaya Deepwells in Jakarta, 1983

No.	Well Name	Colour (Unit)	P. H	Organic Matter (ppm)	M. Alkali (ppm)	Total Hard Ness (°D)	Iron (ppm)	Ammonia (ppm)	Chloride (ppm)	Sampling date
SPD 061	Kramat Pulo bg. CC.XXI	15	7.8	4,42	365,0	3,8	Neg	Neg	107,92	Jan' 81
SPE 031	Percetakan Negara II	0-5	7,3	7,58	320,0	1,2	Neg	Neg	19,17	Mei' 82
SPE 021	Percetakan Negara IX A	-	-	-	-	-	-	-	-	-
SPE 022	Cempaka Putih Timur II Rt. 03/07	0-5	7.6	3,47	285,0	2,2	Neg	Neg	144 [illegible]	Mei ' 82
SBM 031	Tanjung Duren Timur	-	-	-	-	-	-	-	-	-
SBM 021	Empang Bahagia Rt.004/016	-	-	-	-	-	-	-	-	-
SBM 022	Satria II Rt. 002/04	-	-	-	-	-	-	-	-	-
S.B. 0.6	Lontar II Rt.006/010	-	-	-	-	-	-	-	-	-
S.B. 0.8	Tubagus Angke Rt.001/009	-	-	-	-	-	-	-	-	-
S.B.0.3	Krendang Barat Rt.014/006	-	-	-	-	-	-	-	-	-
S.B.0.31	Krendang Barat Rt.005/005	-	-	-	-	-	-	-	-	-
S.B.0.61	Jembatan Balok Rt.010/03	-	-	-	-	-	-	-	-	-
	Badar									
	Mizah									
	F Rt.004/09									
	Mutiara									
	Alexander									
	Sumbawa Rt.06/07	65	7,6	17,68	457,50	1,2	Traces	0.35	66,75	August'80
	Nurul Huda	5-0	8,0	2,84	248,0	0,8	Neg	Neg	9,94	July' 77
	Nurul Amal									
	Kenanga									
	Nirwana									
	Fajar Baru									
	Kincir									
SBM 088	Kemanggisan I Rt.005/08	0-5	7,5	5,37	255,0	2,2	Traces	Neg	40,47	Juni'82
SBM 082	Kemanggisan Rt.008/010	5-10	8,3	4,74	365,0	6,6	Neg	Neg	13,49	Juni'82
SBM 051	Seroja 18 Rt.004/01	-	-	-	-	-	-	-	-	-
SBM 042	Pulo Macan X Rt.0015/05	-	-	-	-	-	-	-	-	-
SBM 041	Rawa Kedo Utama Rt.002/013	-	-	-	-	-	-	-	-	-
SBM 032	Tanjung Duren Barat Rt.0014/013	-	-	-	-	-	-	-	-	-

Table Water Quality of PDM Jaya Daerah in Jakarta, 1983

No.	Well Name	Colour (Unit)	P. H	Organic Matter (ppm)	M. Alkali (ppm)	Total Hand Ness (°D)	Iron (ppm)	Ammonia (ppm)	Chloride (ppm)	Sampling Date
T.T.2.10	Duren Sawit Timur	-	-	-	-	-	-	-	-	-
T.T.2.10	Duren Sawit	-	-	-	-	-	-	-	-	-
T.T. 2.3	Barlian/Tanjung Lengkong	25	7,1	2,212	145,0	4,4	Treces	Neg	1988	Feb'82
T.T.2.8	Bambu Kuning	5-10	8,0	2,53	150,0	4,6	Treces	Neg	9,94	Mart' 82
T.T.2.6	Cipinang Jaya I	0-5	7,5	2,844	215,0	3,0	0,26	0,25	7,10	Mart' 82
T.T.2.6	Perumpung Sawah	10	7,3	1,58	236,0	1,4	Neg	Neg	8,52	April' 80
T.T.2.3	Kbu.Sayur I kp. Legok	0-5	7,3	1,89	230,0	5,2	Neg	Neg	32,66	Juni' 80
T.T.2.10	Purbaya I	75	6,7	1,58	170,0	11,2	2,0	Treces	37,63	Marec' 82
T.T.2.9	Pertanian Kam.Kapitan	0-5	7,6	3,16	245,0	2,4	Treces	Neg	9,23	April' 82
		10	7,8	1,89	215,0	7,8	0,23	Neg	13,49	April' 82
TTT.2	Harapan II	5-10	7,5	1,58	175,0	0,5	Neg	Neg	10,65	Juli' 81
TTX.4	Sukarman/Salemba Utan	5	8,0	2,21	140,0	7,0	Treces	Treces	12,78	April' 82
STY02.4	Kincir VI Rt.014/10	-	--	-	-	-	-	-	-	-
STY02.2	Rawamangun Muka Barat III C 27.	-	-	-	-	-	-	-	-	-
STY02.3	Loan IV	-	-	-	-	-	-	-	-	-
STY02.4	Kayu Jati V	-	-	-	-	-	-	-	-	-
STY02.5	Cumi-Cumi No.2	-	-	-	-	-	-	-	-	-
STY02.6	Juwet No.17	-	-	-	-	-	-	-	-	-
STY02.7	Pulo Asem Utara	-	-	-	-	-	-	-	-	-
STY01.1	Kayu Putih Timur (Blok. C. III)	5-10	8,0	8,8	510	2,2	Neg	Treces	32,0	Mart' 81
STY01.2	Pulo Mas II C/I	25	7,5	6,9	395	1,2	Neg	0,08	11,4	Jan' 81
STY01.3	Pulo Mas V Blok F/C II	25	7,3	5,7	365	1,2	Neg	0,10	29,1	Jan' 81
STY01.4	Kayu Putih III.	35	83	12,0	400	0,8	Neg	Treces	14,2	Mart' 81

Table Water Quality of PDM Jaya Deepwells in Jakarta, 1983

No. of Well	Name	Colour (Unit)	P. H	Organic Matter (ppm)	M. Alkali (ppm)	Total Hand Ness (°D)	Iron (ppm)	Ammonia (ppm)	Chloride (ppm)	Sampling Date
SU.J.4	Lagoa Kanal	0-5	7,8	3,16	190,0	1,6	Neg	Neg	21,07	Feb' 82
SU.J.2	Warakas (Sungai Bambu)	-	-	-	-	-	-	-	-	-
SU.J.2	Warakas III gang IV	-	-	-	-	-	-	-	-	-
SU.J.4.1	Merapi Barat	-	-	-	-	-	-	-	-	-
SU.J.5	Dasawarsa Rt007/05	100	8,3	18,64	569,0	1,6	Neg	0,25	19,17	Mei' 81
SU.J.4.2	Swasembada 06.18	-	-	-	-	-	-	-	-	-
SU.K.05.4	Rawabinangun	150	8,3	29,07	730,0	2,4	Neg	0,60	28,36	July' 82
SU.K.03.5	Lagoa terusan	-	-	-	-	-	-	-	-	-
SU.K.05.5	S.L. Rewabadak Rt04/09	-	-	-	-	-	-	-	-	-
SU.K03.04	Jeruk	-	-	-	-	-	-	-	-	-
SU.K04.3	Kramat Jaya Rt011/08	150	8,5	42,98	710,0	3,0	Neg	0,35	136,32	Juni' 82
SU.K04.4	Kramat Jaya Rt017/01	-	-	-	-	-	-	-	-	-
SU.K06.2	Sumarekon I	5	8,3	5,06	265,0	5,0	Neg	Neg	144,13	July' 82
SU.K063	Sumarekon III	5	8,3	5,06	265,0	5,0	Neg	Neg	144,13	July' 82
SU.K03.2	Cilincing	-	-	-	-	-	-	-	-	-
SU.K.05.2	Rawabadak Barat GangJ	-	-	-	-	-	-	-	-	-
SU.K05.3	Walang	-	-	-	-	-	-	-	-	-
SU.K04.1	Mahoni Ujung	76	8,3	28,75	710,0	1,2	Neg	0,35	41,89	Oct'o82
SU.K04.2	Mawar A.	35	8,4	14,22	340,0	2,0	Neg	Traces	284,71	Oct' 82
SU.K03.1	Mengkudu	-	-	-	-	-	-	-	-	-
SU.K05.1	Rawa Badak.Jl.1	35	8,5	14,59	500,0	1,6	Neg	Neg	29,11	July' 82
SU.K06.1	Sumarekon I	65	8,3	12,95	390,0	3,0	Neg	Neg	58,93	July' 82
SU.L.1	Pepaya Blok S Rt010/03	45	8,3	18,01	350,0	0,8	Neg	Traces	257,02	Juni' 82
S.U.L.1	J.II Rt.005/014	-	-	-	-	-	-	-	-	-
S.U.L.1	X. Rt.009/014	100	8,3	30,97	815,0	2,8	Neg	0,35	151,23	Juni' 82
S.U.L.1	Bantenan dalam Rt006/02	45	8,4	16,12	430,0	1,4	Neg	0,6	392,63	Juni' 82
S.U.L.1	Sungai Musi Rt006/013	35	7,6	22,78	450,0	2,0	Neg	Neg	317,37	Juni' 82
S.U.L 07.1	Pademangan KK GG.17-Rt 004/04	-	-	-	-	-	-	-	-	-
SUI 02.1	Teluk Gong I Jl.18 Rt 004/12	-	-	-	-	-	-	-	-	-

Table Water Quality of PDM Jaya Deepwells in Jakarta, 1983

No. of	Well Name	Colour (Unit)	P. H	Organic Matter (ppm)	M. Alkali (ppm)	Total Hard Ness (°D)	Iron (ppm)	Ammonia (ppm)	Chloride (ppm)	Sampling Date
SUI.02.2	Teluk Gong II Rt008/09	-	-	-	-	-	-	-	-	-
SUI.04.2	Jl. E. Rt.006/06	-	-	-	-	-	-	-	-	-
SUI.04.3	Kp. Budi Mulyo Rt.07/010	-	-	-	-	-	-	-	-	-
SUI.07.2	Pademangan IV GG.26 Rt 005/01	-	-	-	-	-	-	-	-	-
SUI.08.1	Sinar Budi Bidura Raya GG.6 Rt.05/01	-	-	-	-	-	-	-	-	-
SUI.02.3	Geraja Rt009/08	-	-	-	-	-	-	-	-	-

Table Preserc Condition of PDM Jaya Deepwell in Jakarta 1983

No.	Deepwell Name	Production (m3/day)	Depth (m)	Well Size (Ø mm)	Aquifer Depth	Consturction year	Operation (hour)	Pumping capacity (m3/day)	Statistic water level (M)	Pumping water level (M)	Well type (DW/MW)	Pump Installation depth (M)
SPD 061	Kramat Pulo bg. CC XXI Rt 07/08	-	176 m	6"/3"	- 105 - 115m - 90 - 100m	1980	-	-	- 7,00 m		DW	- 60 m
SPE 031	Percetakan Negara II	-	-	6"/3"	-	1980	-	-	-	-	DW	-
SPE 021	Percetakan Negara IX A	-	-	10"/6"	-	-	-	-	-	-	DW	-
SPE 022	Cempaka Putih Timur RT 03/07	-	-	8"/4"	-	1972	-	-	-	-	WM	-
SEM 031	Tanjung Duren Timur Rt. 0013/04	-	-	-	-	1969	-	-	-	-	DW	-
SEM 021	Empang Bahagia Rt.004/016	-	-	8"/4"	-	1974	-	-	-	-	WM	-
SEM	Satria III Rt.002/04	-	-	8"/4"	-	1979	-	-	-	-	-	-
S.B.0.6	Lontar II Rt 006.010	-	-	-	-	-	-	-	-	-	-	-
S.B.0.8	Tubagus Angke Rt.001/009.	-	-	-	-	-	-	-	-	-	-	-
S.B.0.3	Krendang Barat Rt. 014/006	-	-	-	-	-	-	-	-	-	-	-
S.B.0.31	Krendeng Barat Rt. 005/005	-	-	-	-	-	-	-	-	-	-	-
S.B.0.61	Jembatan Balok Rt. 010/03.	-	-	-	-	-	-	-	-	-	-	-
	Badar			6"/3"								
	Mirah											
	F Rt. 004/09			6"/3"								
	Mutiara											
	Alexander											
	Sumbawa Rt. 06/07											
	Kampung Sukatani Rt.06/07		170	6"/3"		1980					DW	- 45
	Nurul huda		200	6"/3"	- 125 - 130 m - 150 - 160 m	1980			- 7M.	- 22 M	DW	- 60
	Nurur Amal										DW	

Table Present Condition of PDM Jaya Deepwell in Jakarta 1983

No.	Deepwell Name	Production (m3/day)	Depth (m)	Wel. Size (Ø mm)	Aquifer Depth	Consturction year	Operation (hour)	Pumping capacity (m3/day)	Statistic water level (M)	Pumping water level (M)	Well type (DW/MW)	Pump Installation Depth (M)
	Kenanga	-	-	-	-	-	-	-	-	-	DW	-
	Nirwana	-	-	-	-	-	-	-	-	-	DW	-
	Fajar Baru	-	-	-	-	-	-	-	-	-	WM	-
	Kincir	-	-	-	-	-	-	-	-	-	WM	-
SBM 088	Kemanggisan I Rt.005/08	-	-	10"/6"/3"	-	1975	-	-	-	-	WM	-
SBM 082	Kemanggisan Rt.008/010	-	-	8"/4"	-	1977	-	-	-	-	DW	-
SBM 05.1	Seroja 18 Rt.004/01	-	-	8"/4"	-	1975	-	-	-	-	DW	-
SBM 04.2	Pulo Macan X Rt.0015/05	-	-	10"/6"/3"	-	1975	-	-	- 8,00 M	-	DW	-
SBM 04.1	Rawa Kepa Utama Rt.002/013	-	-	-	-	1975	-	-	-	-	DW	-
SBM 03.2	Tanjung Duren Barat Rt. 0014/013	-	-	-	-	-	-	-	-	-	-	-

Table Present Condition of PDM Jaya Deepwell in Jakarta, 1983

No.	Deepwell Name	Production (m3/day)	Depth (m)	Well Size (Ø mm)	Aquifer Depth	Construction Year	Operation (hour)	Pumping capacity (M3/day)	Statiatic water level (M)	Pumping water level (M)	Well type (DW/WM)	Pump Installation depth (M)
SSW 042	Manglekiu II	300 M3/day	100	10"/6"/12	-	1972	24	300M3/day	-	-	D.W	- 45
SSW 062	Panglima Polim II	300 M3/day	110	8"/4"	-	1972	24	300M3/day	- 14,27	- 18,40	D.W	- 45
SSW 051	Gandaria Tengah II	-	-	10"/6"/4"	-	1972	-	-	-	-	D.W	-
SSW 081	Brawijaya VII	-	-	10"/6"/4"	-	1975	-	-	-	-	D.W	-
SSW 071	Ragatnata	-	-	8"/4"	-	1972	-	-	-	-	D.W	-
SSW 031	Wijaya	-	-	10"/6"/4"	-	1980	-	-	-	-	D.W	-
SSW 052	Gandaria III	-	-	8"/4"	-	1968	-	-	-	-	D.W	-
SSW 061	Cilosari	-	-	10"/6"/4"	-	1972	-	300M3/day	-	-	D.W	-
SSW 012	Laksana I	-	-	8"/4"	-	1972	-	-	-	-	D.W	-
SSW 011	Surem II	-	-	12"/6"/4"	-	1972	-	300M3/day	-	-	D.W	-
SSW 041	Singgalang	-	-	8"/4"	-	1972	-	-	-	-	D.W	-
SSW 021	Haji M. Noor	-	100	8"/4"	-	1975	-	-	- 12.00	-18,00	D.W	- 40
SST 071	Ragunan Kebon Binatang	-	-	10"/6"/4"	-	1969	-	-	-	-	W.M	-
SST 081	Lenteng Agung	-	-	6"/3"	-	1977	-	-	-	-	D.W	- 40
SST 022	Pasar Minggu/Komp Polisi	-	-	10"/6"/4"	-	1971	-	-	-	-	W.M	-
SST 021	Rawa Bumbu I	-	-	6"/3"	-	1977	8	150M3/day	-	-	D.W	- 40
SSR 071	H1.	400 M3/day	205	6"/3"	- 188 - 205 - 163 - 172 - 129 - 132	1979	12	300M3/day	- 9	- 13	D.W	- 48
SSR 072	H2.	-	200	6"/3"	- 166 - 173 - 131 - 137 - 117 - 120	1978	12	240M3/day	- 12	- 14,5	D.W	- 40
SSR 051	Kebon Obat	-	200	6"/3"	- 168 - 171 - 100 - 106	1978	8	220M3/day	- 12	- 20	D.W	- 50
SSR 081	Kawi Ratna	-	225	6"/3"	- 217 - 220 - 214 - 217 - 204 - 207 - 200 - 203	1980	-	-	-	-	D.W	- 50
SSR 061	C.8 / Cg. Mesjid	-	-	6"/3"	-	1979	-	-	- 4	-	D.W	-
SSR 052	Menteng Sawah I	-	-	10"/8"/4"	-	1971	-	-	-	-	W.M	-

Table Present Condition of PDM Jaya Deepwell in Jakarta 1983

No.	Deepwell Name	Production (m3/day)	Depth (m)	Well Size (Ø mm)	Aquifer Depth	Consturction year	Operation (hour)	Pumping capacity (m3/day)	Stactastic water level (M)	Pumping wacer level (M)	Well type (DW/HW)	Pump Installation depth (M)
STY02.5	Cumi-Cumi No.2	-	-	10"/6"/3"	-	1975	-	-	-	-	DW	-
STY02.6	Juwet No. 17	-	-	8"/6"/3"	-	1975	-	-	- 7 M		DW	-
STY02.7	Pulo Asem Utara	-	-	8"/6"/3"	-	1977	-	-	- 6 M	-	DW	-
STY01.1	Kayu Putih Timur (Blok. C.III)	-	-	6"/3"	-	1979	-	-	-	- 46 M	DW	-
STY01.2	Pulo Mas II C/I	-	-	6"/3"	-	1979	-	-	-	-	DW	-
STY01.3	Pulo Mas V Blok F/CII.	-	-	6"/3"	-	1979	-	-	-	-	DW	-
STY01.1	Kayu Putih III	-	-	6"/3"	-	1979	-	-	-	- 32 M	DW	-
T.T.2.10	Duren Sawit Timur	-	-	-	-	1974	-	-	-	-	-	-
T.T.2.10	Duren Sawit	-	-	-	-	1974	-	-	- 9,00M	-	-	-
T.T.2.3	Barlian/Tanjung Lengkong	-	-	6"/3"	-	1978	-	-	-	-	DW	-
T.T.2.8	Bambu Kuning	-	-	8"/6"/3"	-	1976	-	-	-	-	DW	-
T.T.2.6	Cipinang Jaya I	-	-	8"/6"/3"	-	1974	-	-	-	- 8,00 M	DW	-
T.T.2.6	Perumpung Sawah	-	200	-	-	1980	-	-	- 12,00M	-17,00 M	DW	-
T.T.2.3	Kbu. Sayur I Kp. Legok	-	195	6"/3"	- 145 - 148 - 104 - 110	1980	-	-	- 12,00M	-19,00 M	DW	60 M
T.T.2.10	Purbaya I.	-	-	6"/3"	-	1977	-	-	-	-	DW	-
T.T.2.9	Pertanian Kam.kapitan.	-	-	8"/6"/3"	-	1976	-	-	-	-	DW	-
TTT.2.	Harapan II	-	200 M	6"/3"	-	1981	-	-	-	-	DW	-
TTT.4.	Sukarman/Salemba Utan	-	-	6"/3"	-	1971	-	-	- 6 M	-	DW	-
STY02.4	Kincir VI Rt.014/10	-	-	8"/4"	-	1972	-	-	-	-	WM	-
STY02.2	Rawamangun Muka Barat II C 27.A	-	-	8"/4"	-	1977	-	-	- 5,00 M	-	DW	-
STY02.3	Lodan IV	-	-	6"/3"	-	1977	-	-	-11,6 M	-	DW	-
STY02.4	Kayu Jati V	-	-	8"/4"	-	1980	-	-	-	-	DW	-

Table Present Condition of PDM Jaya Deepwell in Jakarta 1983

No.	Deepwell Name	Production (m3/day)	Depth (m)	Well Size (Ø mm)	Aquifer Depth	Consturction year	Operation (hour)	Pumping capacity (m3/day)	Statistic water level (M)	Pumping water level (M)	Well type (DW/MW)	Pump Installation Depth (M)
SUJ.4	Lagoa Kanal	-	315	6"/3"	-222 - 230 M -261 - 286 M	1980	-	-	- 1150 M	-	DW	- 40 M
SUJ.2	Warakas (Sungai Bambu)	-	-	6"/3"	-	1980	-	-	-	-	DW	-
SUJ.2	Warakas III Gang IV	-	-	6"/3"	-	1980	-	-	-	-	DW	-
SUJ.4.1	Merapi Barat	-	-	-	-	-	-	-	-	-	-	-
SUJ.5	Dasawarsa Rt007/05	-	200	6"/3"	-112 - 118 M -132 - 134	1980	-	-	-	-	DW	- 60 M
SUJ.4.2	Swasembada 06.18	-	-	-	-	-	-	-	-	-	-	-
SUK.05.4	Rawabinangun	-	-	6"/3"	-	1976	5	-	-	-	DW	-
SUK.03.3	Lagoa Terusan	-	-	8"/4"	-	1977	-	-	-	-	DW	-
SUK.05.5	E.L. Rewabadak Rt04/09	-	-	-	-	-	-	-	-	-	MW	-
SUK.03.4	Jeruk	-	-	10"/6"/4"	-	1975	-	-	-	-	DW	-
SUK.04.3	Kramat Jaya Rt011/08	-	-	6"/3"	-	1977	-	-	-	-	DW	-
SUK04.4	Kramat Jaya Rt07/01	-	-	8"/4:	-	-	-	-	-	-	WM	-
SUK.06.2	Sumarekon I	-	-	6"/3"	-	1980	-	-	-	-	DW	-
SUK.063	Sumarekon III	-	-	6"/3"	-	1980	-	-	-	-	DW	-
SUK.03.3	Cilincing	-	-	8"/4"	-	1972	-	-	-	-	WM	-
SUK.05.2	Rawabadak Barat Bang J	-	-	8"/4"	-	1976	-	-	- 8,5 M	-	DW	-
SUK.05.1	Walang	-	-	8"/4"	-	1972	-	-	-	-	WM	-
SUK04.1	Mahoni Ujung	-	-	6"/3"	-	1976	-	-	- 15.00M	-	DW	-
SUK04.2	Mawar A.	-	-	6"/3"	-	1980	-	-	- 2.00 M	-	DW	-
SUK03.1	Mengkudu	-	-	8"/4"	-	1977	-	-	- 24.0 M	-	DW	-
SUK05.1	Rawa Badak Jl.1	-	-	6"/3"	-	1976	2	-	-	-	DW	-
SUK06.1	Sumarekon I	-	-	6"/3"	-	1980	-	-	-	-	DW	-
SUL.1	Pepaya Blok S Rt010/05	-	-	6"/3"	-	1977	-	-	- 15.5 M	-	DW	-
SUL.1	J. II Rt005/014	-	-	8"/4"	-	1977	-	-	-	-	DW	-
SUL.1	X. Rt009/014	-	-	6"/3"	-	1975	-	-	+ 0.15 M	-	DW	-
SUL.1	Bantenan dalam Rt006/02	-	-	6"/3"	-	1978	-	-	+ 0.15 M	-	DW	-

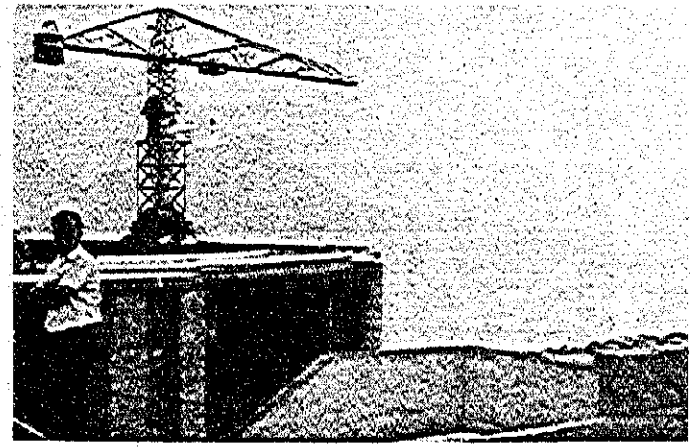
Table Present Condition of PDM Jaya Deepwell in Jakarta 1983

No.	Deepwell Name	Production (m3/day)	Depth (m)	Well Size (Ø mm)	Aquifer Depth	Consturction year	Operation (hour)	Pumping capacity (m3/day)	Statistic water level (M)	Pumping water level (M)	Well type (DW/MW)	Pump Installation depth (M)
SUL.1	Sungai Musi Rt.006/013	-	-	6"/3"	-	1978	-	-	+ 0.25 M	-	DW	-
SUI.07.1	Pademgangan II GG.17 Rt004/04	-	-	8"/4"	-	1975	-	-	-	-	DW	-
SUI.02.1	Teluk Geng I Jl.18 Rt Rt004/012	-	-	6"/3"	-	1977	-	-	-	-	DW	-
SUI.02.2	Teluk Gong II Rt008/09	-	-	6"/3"	-	1977	-	-	-	-	DW	-
SUI.04.1	Martadinata Rt.013/012	-	-	-	-	-	-	-	-	-	WM	-
SUI.04.2	Jl.E. Rt006/06	-	-	-	-	-	-	-	-	-	WM	-
SUI.04.3	Kp. Budi Mulyo Rt07/010	-	-	-	-	-	-	-	-	-	WM	-
SUI.07.2	Pademangan IV GG.26 Rt 005/01	-	-	-	-	-	-	-	-	-	WM	-
SUI.08.1	Sitor Budi Bidara Raya GG.6 Rt05/01	-	-	-	-	-	-	-	-	-	WM	-
SUI.02.3	Gereja Rt009/08	-	-	-	-	-	-	-	-	-	WM	-

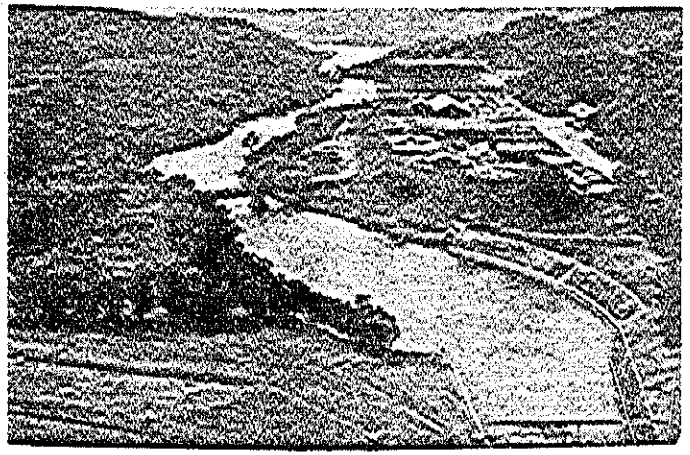
Attachment

(Photograghs)

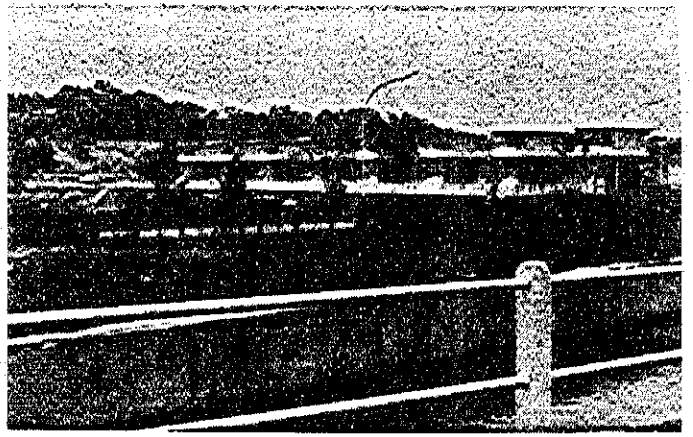
1. Jatiluhur Dam



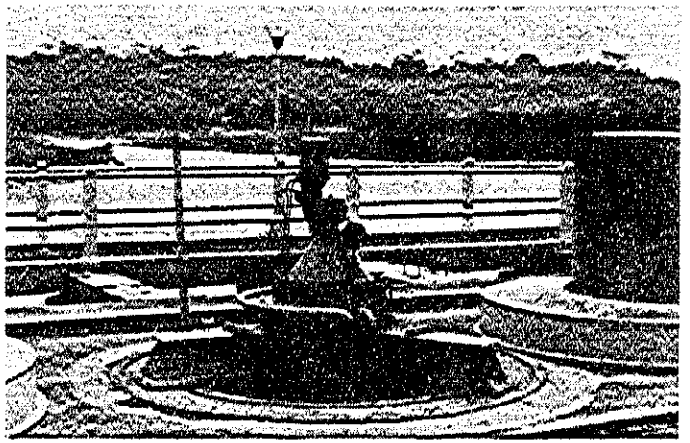
2. Jatiluhur Dam



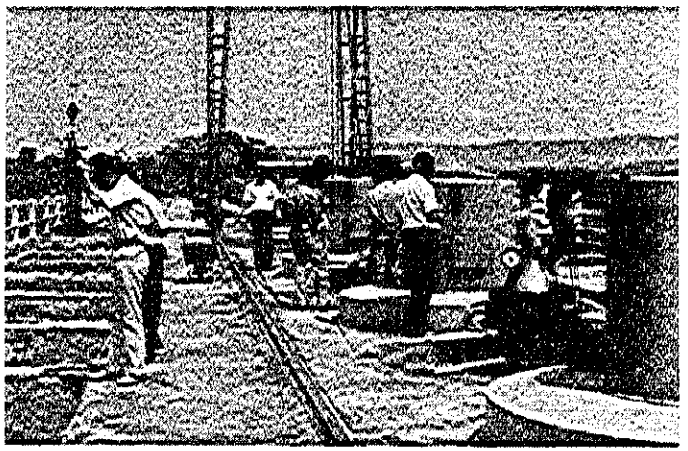
3. Jatiluhur Damsite and the Citarum River



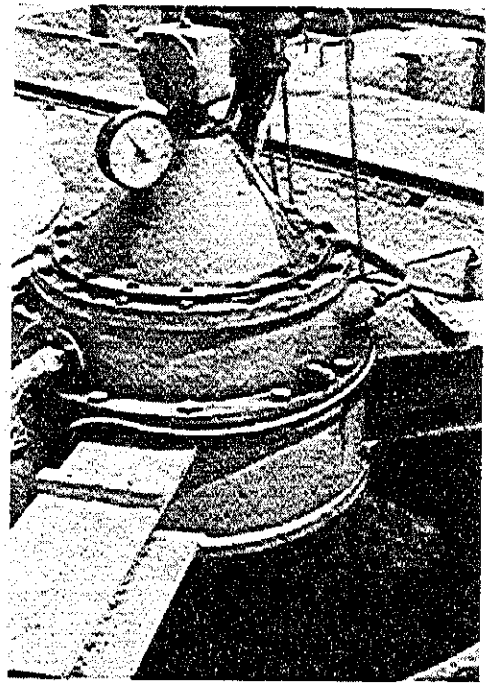
4. Curug Weir



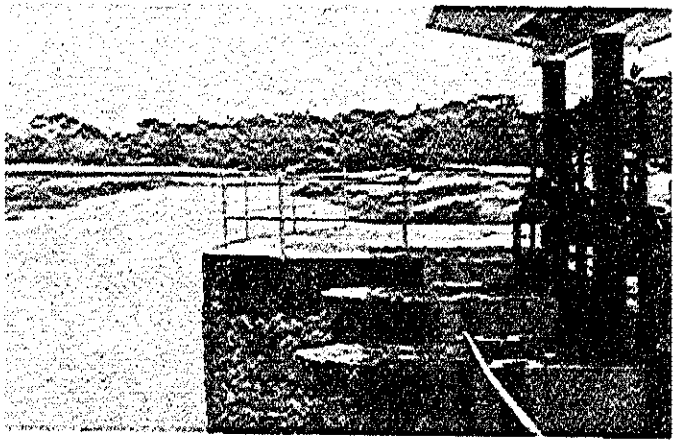
5. Hydrolic Pump at Curug Weir to the West Tarum Canal (34 m3/sec, Aug. 1983)



6. Hydrolic Pump at Curug Weir



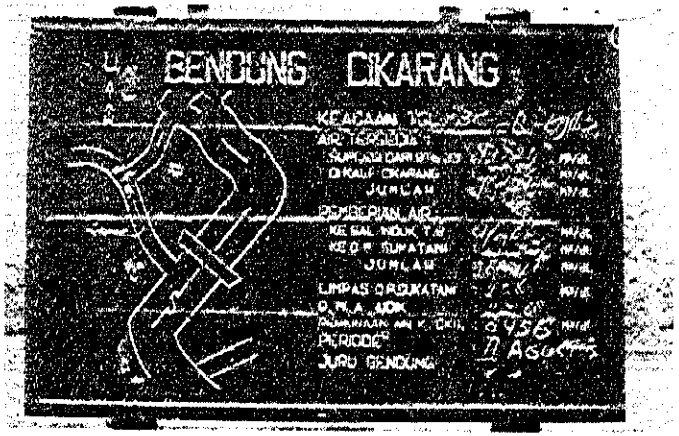
7. Hydrolic Pump at Curug



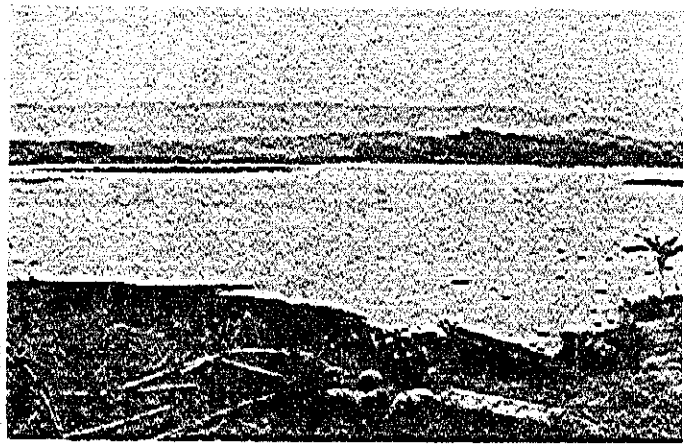
9. Cikarang Weir

Inflow 19.221 (m3/s)
Local 0.456
19.677

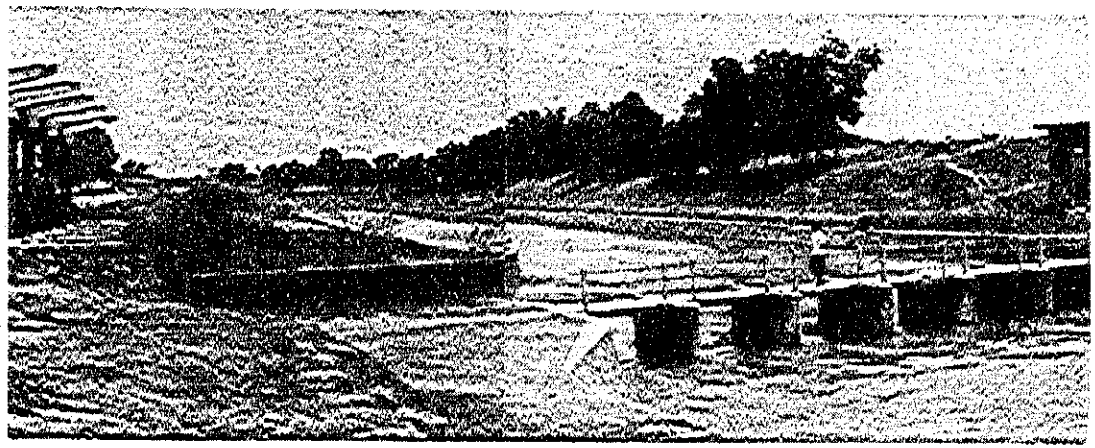
(Aug. 30, 1983)

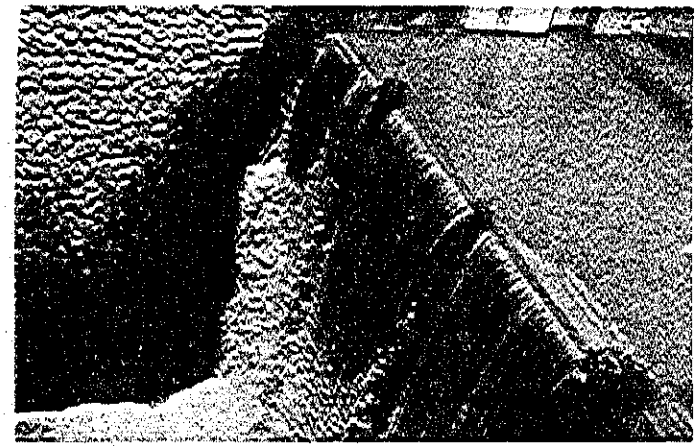


10. Cikarang Weir



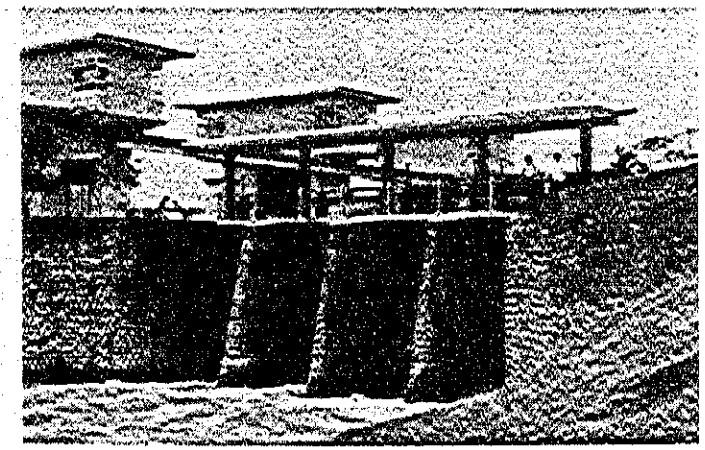
8. Curug Reservoir (weir)



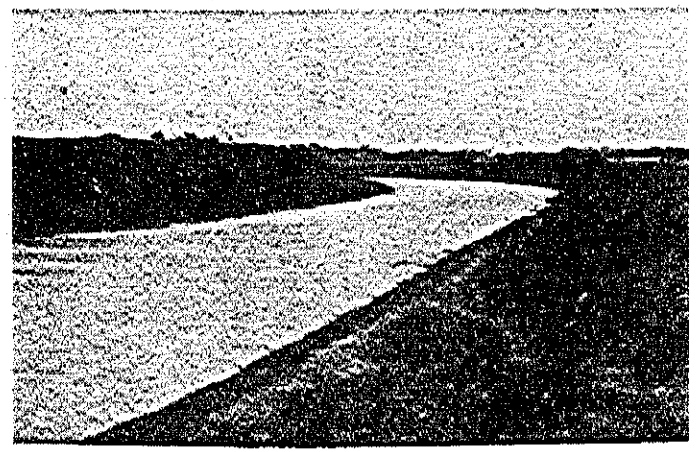


12. Cikarang Weir

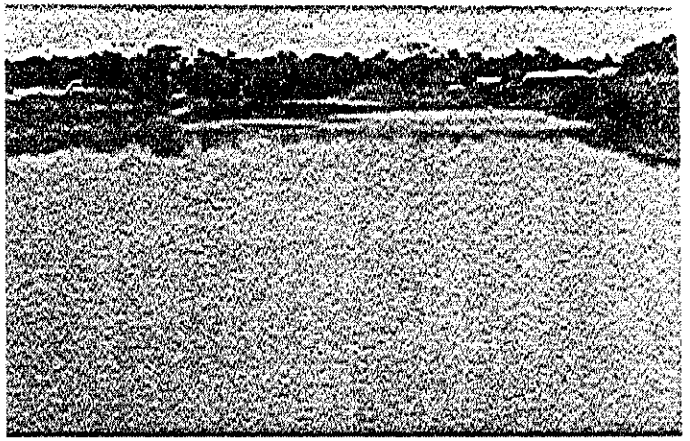
Outflow to
Cikarang River
(0.456 m3/s,
Aug. 30, 1983)



13. Cikarang
Intake Gates,
Inflow to
West Tarum Canal

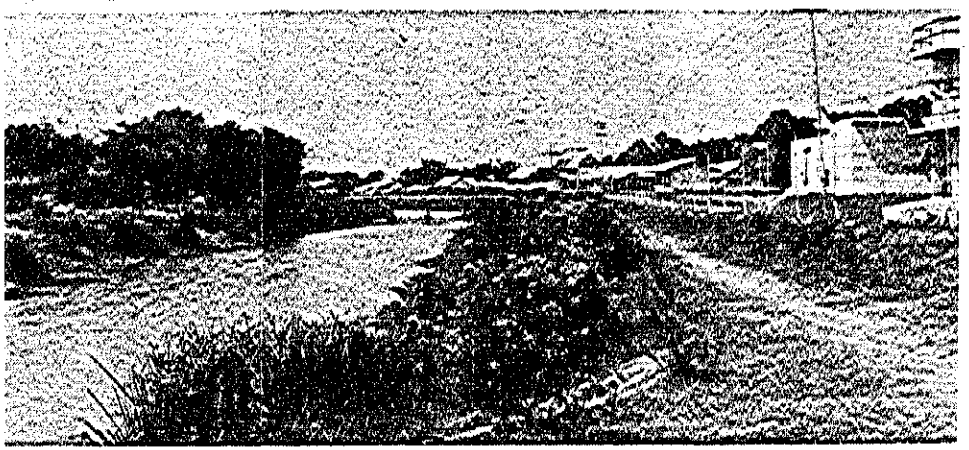


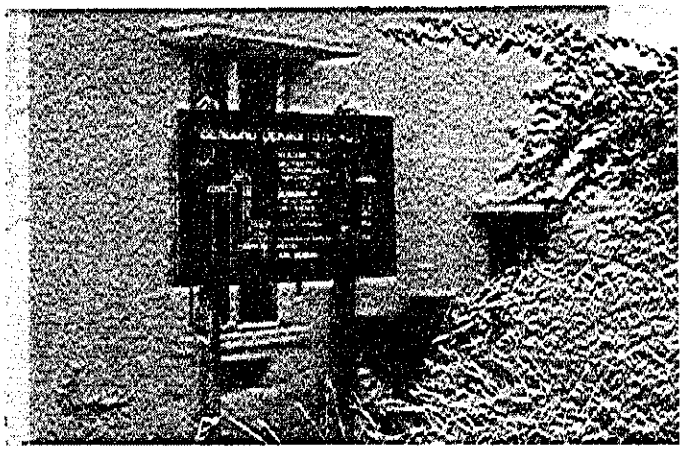
14. The West Tarum
Canal, after
Cikarang Weir



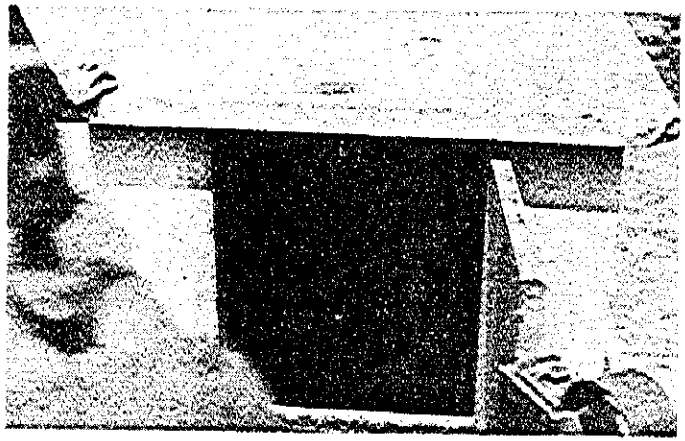
15. Bekasi Weir
(Reservoir)

16. Bekasi Plants
and West Tarum
Canal

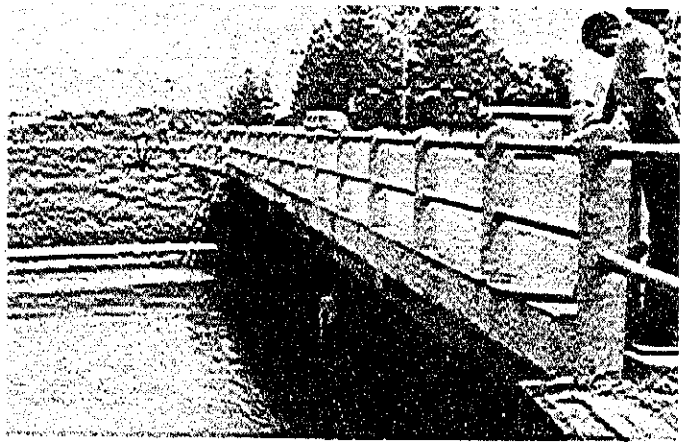




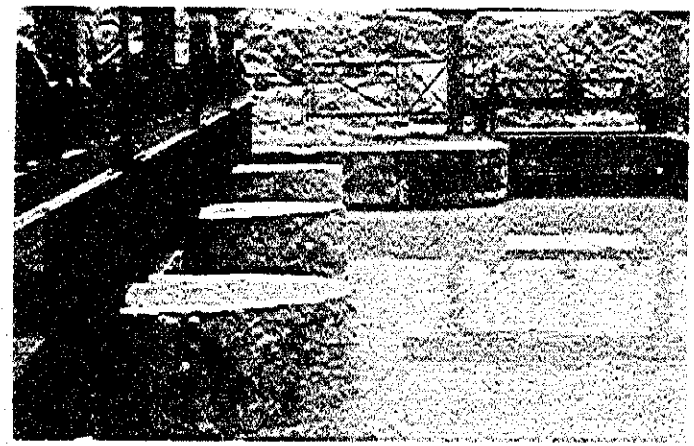
17. Bekasi Weir



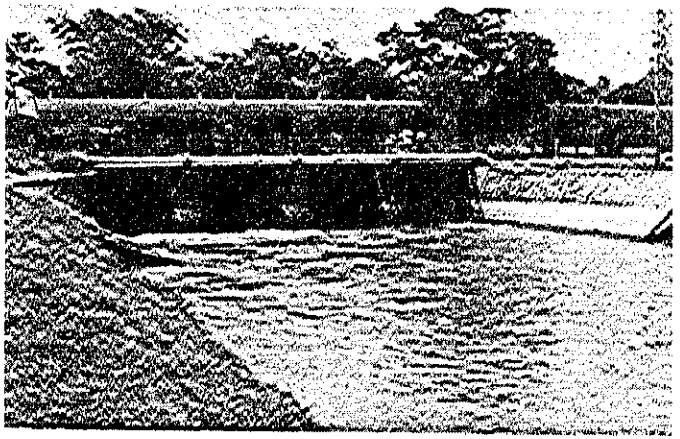
18. Bekasi Weir Water Level Gauge



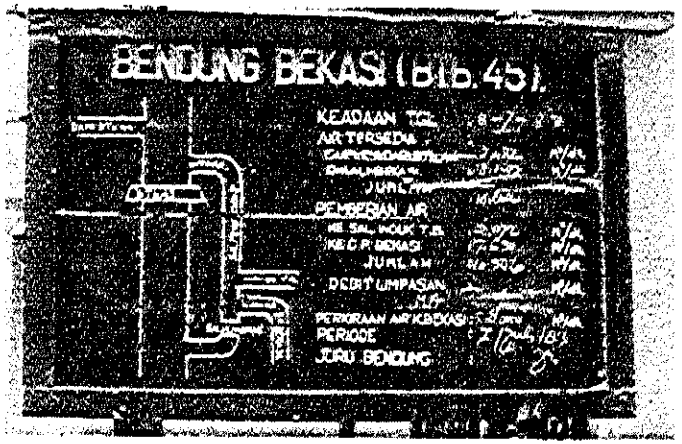
19. Water Level Gauge at Intake Gate, Bekasi Weir



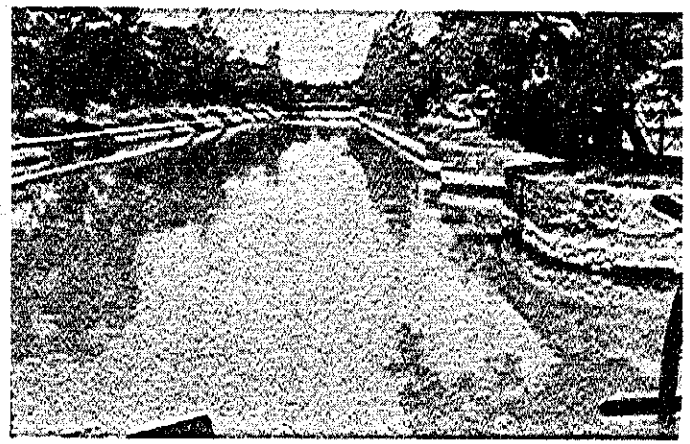
20. Water Level Gauge at Flow Gate, Bekasi



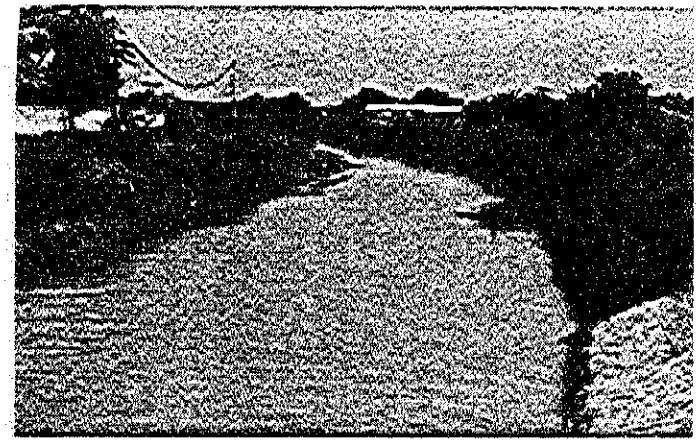
21. Bekasi Weir Intake Gate to Jakarta West Tarum Canal



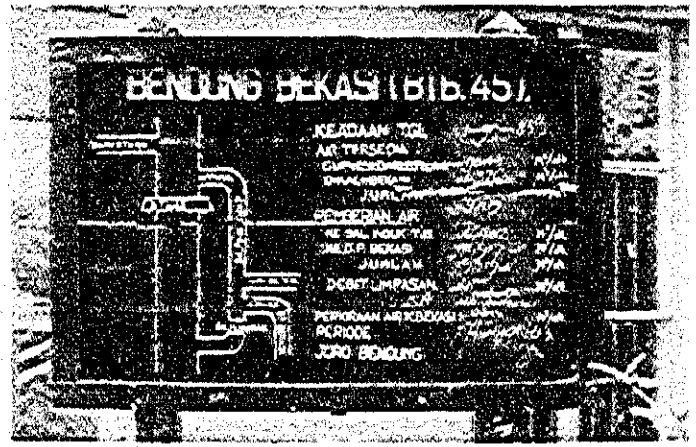
22. Bekasi Weir



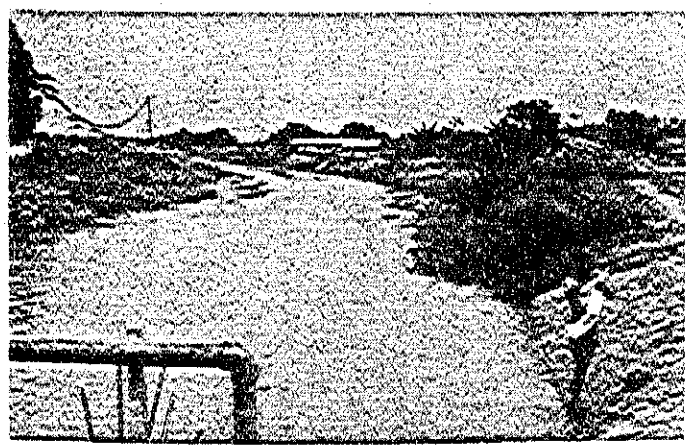
23. Bekasi Weir Silt Trap



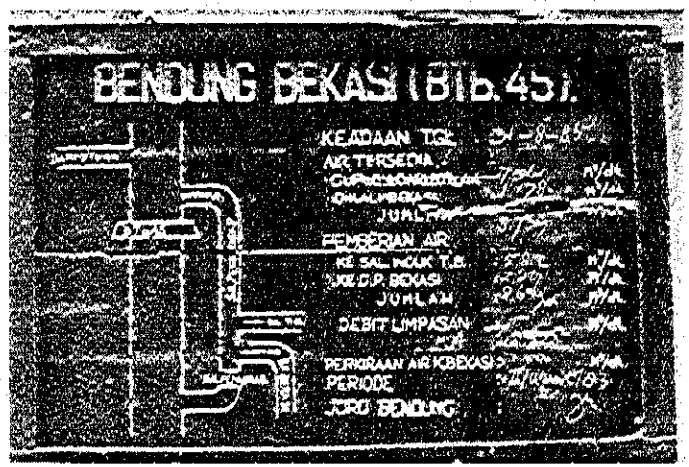
24. West Tarum Canal after Bekasi Weir
Q = 2.872 m3/s
July 8, 1983



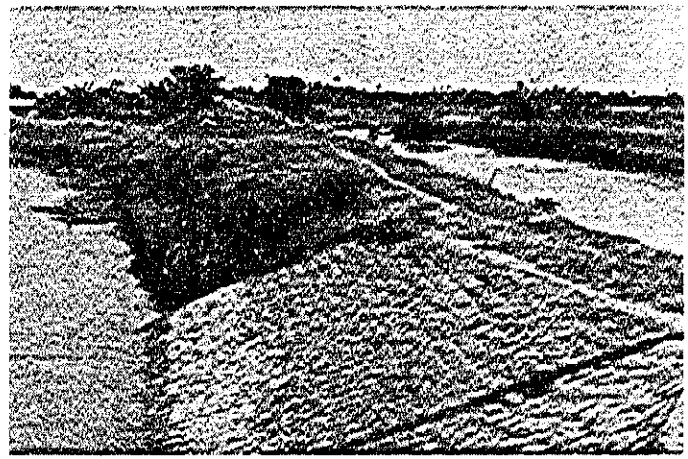
25. Bekasi Weir
Sept. 1, 1983



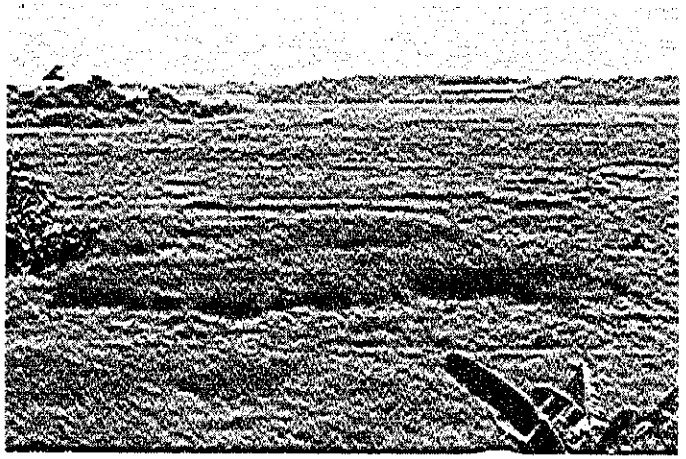
26. West Tarum Canal after Bekasi Weir
Q = 6.402 m3/s
Sept. 1, 1983



27. Bekasi Weir
Flow of Jakarta
Q = 5.812 m3/s
Aug.31, 1983



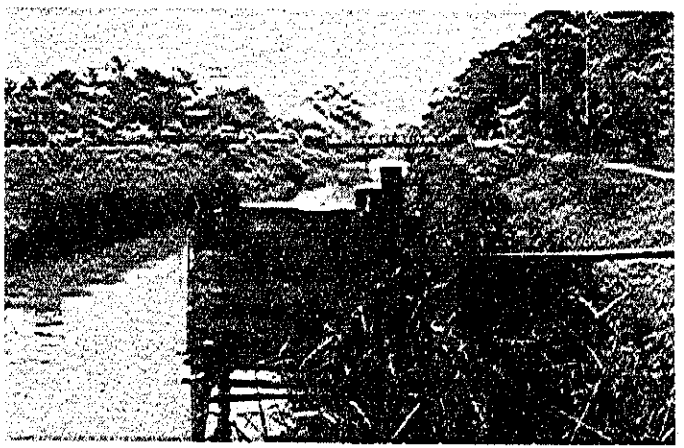
28. West Tarum Canal and Bekasi Irrigation Canal



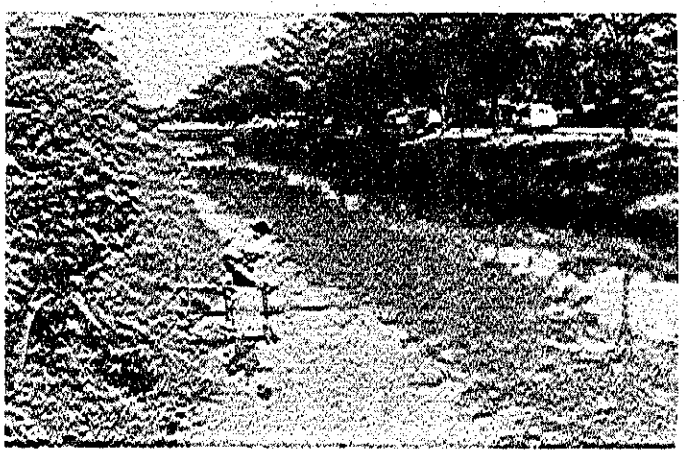
29. Available Land for Immediate Programm, near Sunter River

30. Buaran River

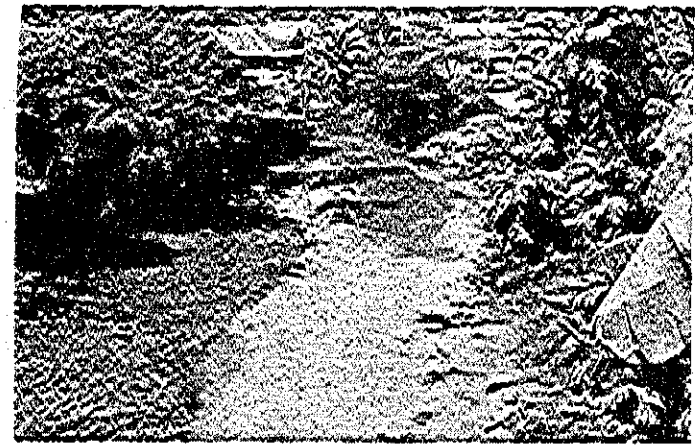
31. West Tarum Canal between Bekasi and Sunter



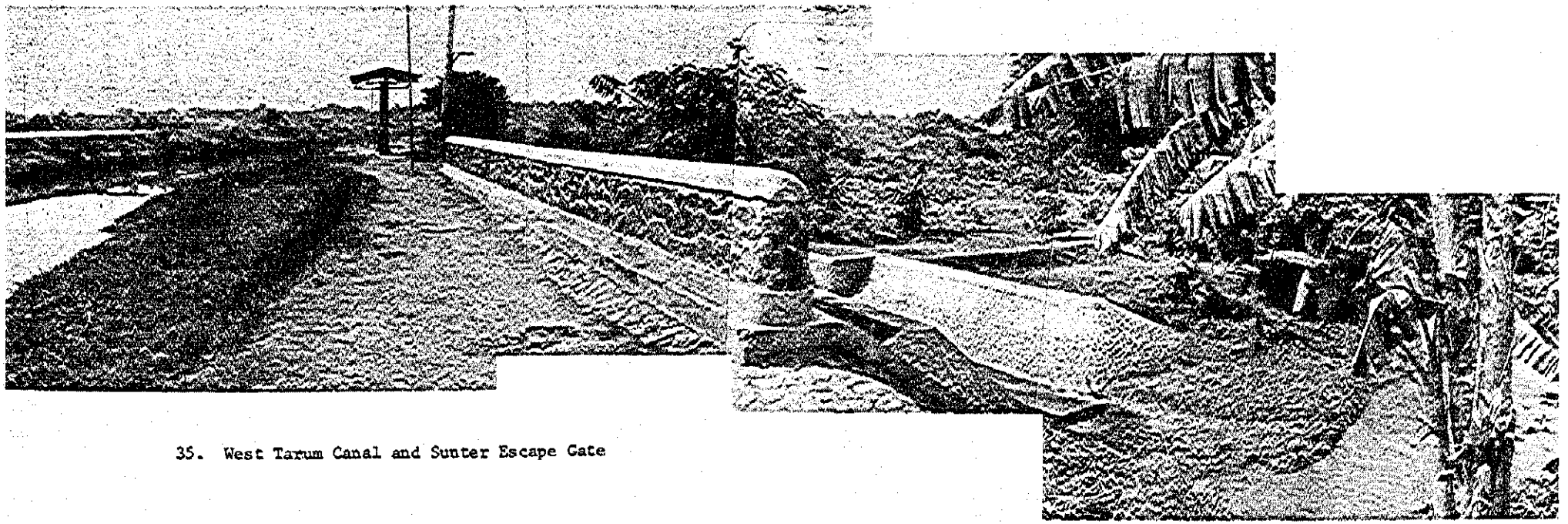
32. West Tarum Canal between Bekasi and Sunter



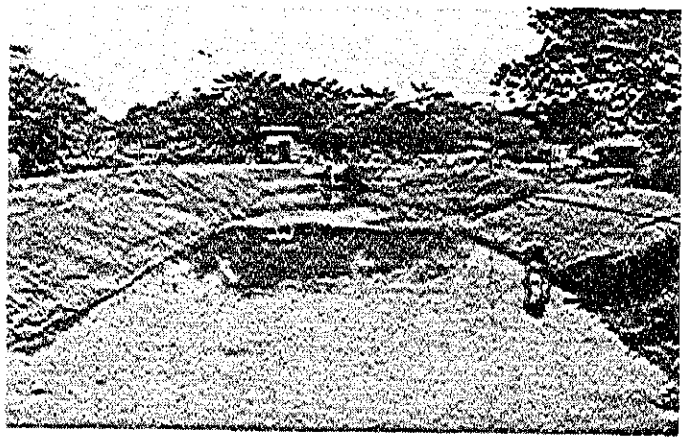
33. West Tarum Canal between Sunter and Cipinang



34. Sunter River

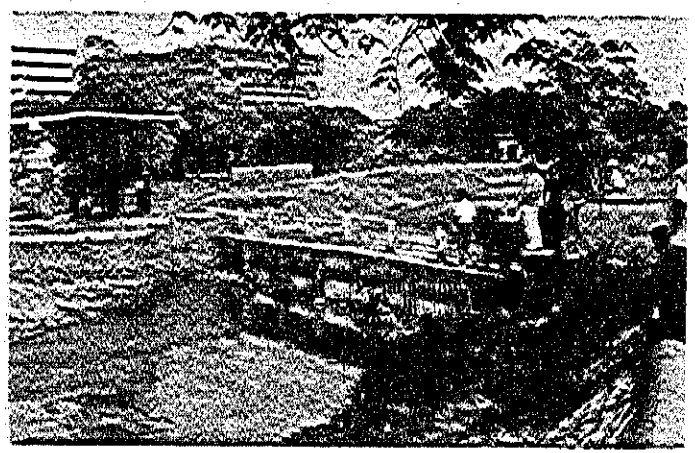


35. West Tarum Canal and Sunter Escape Gate

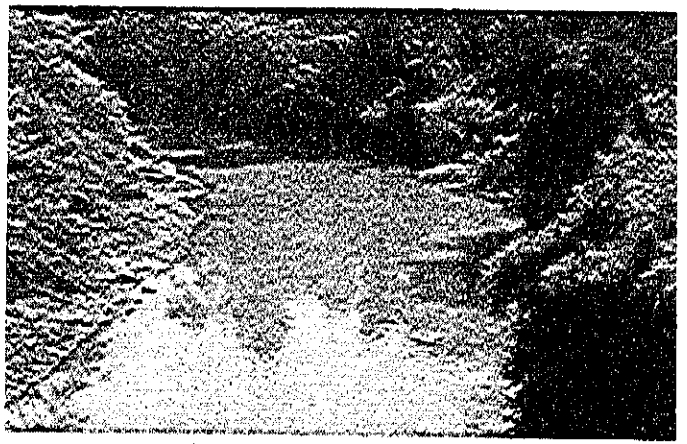


36. The end of West Tarum Canal at Cipinang

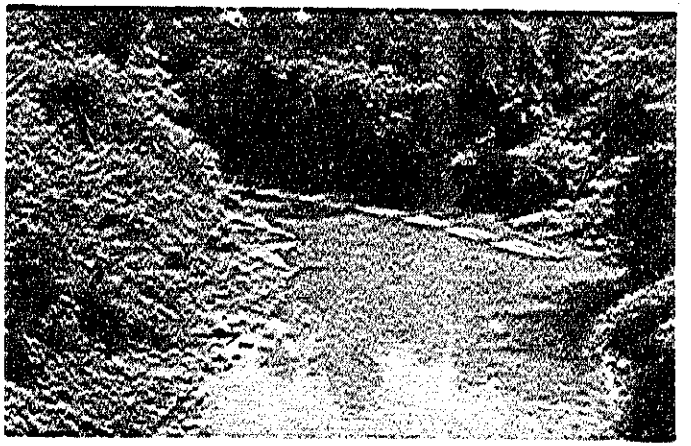
37. The end of West Tarum Canal at Cipinang



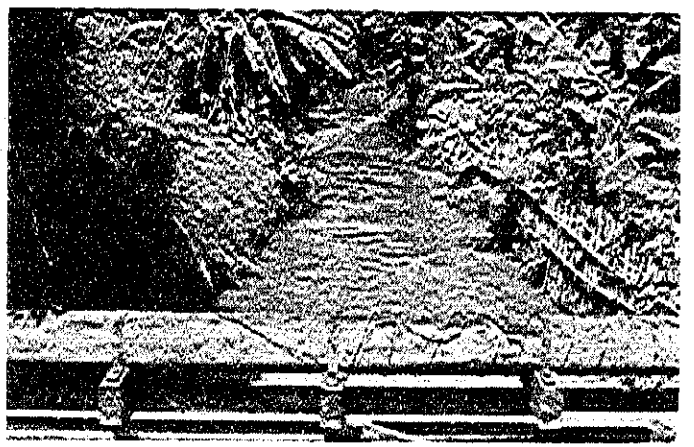
38. Weat Tarum Canal at Cipinang Escape Gate



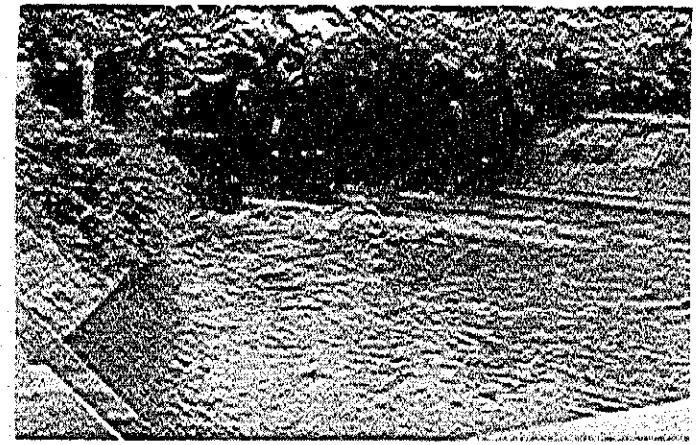
39. Ciliwung River



40. Ciliwung River

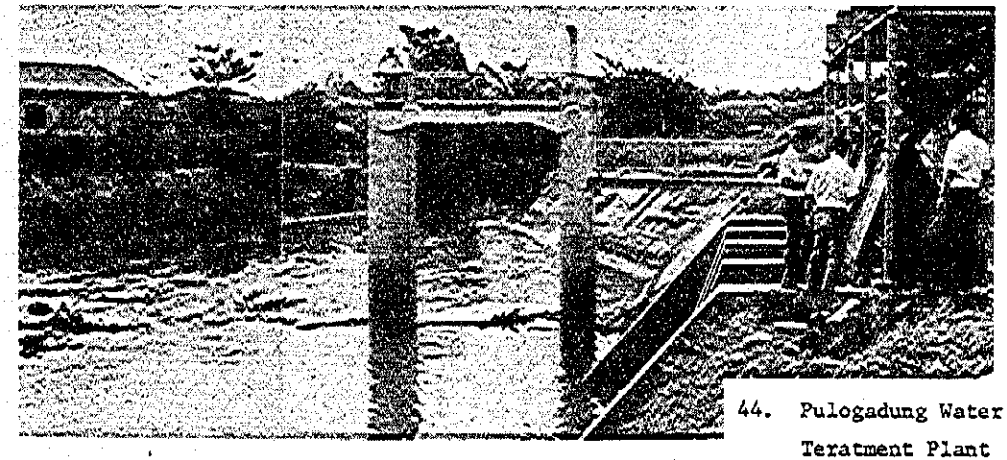


41. Crogol River

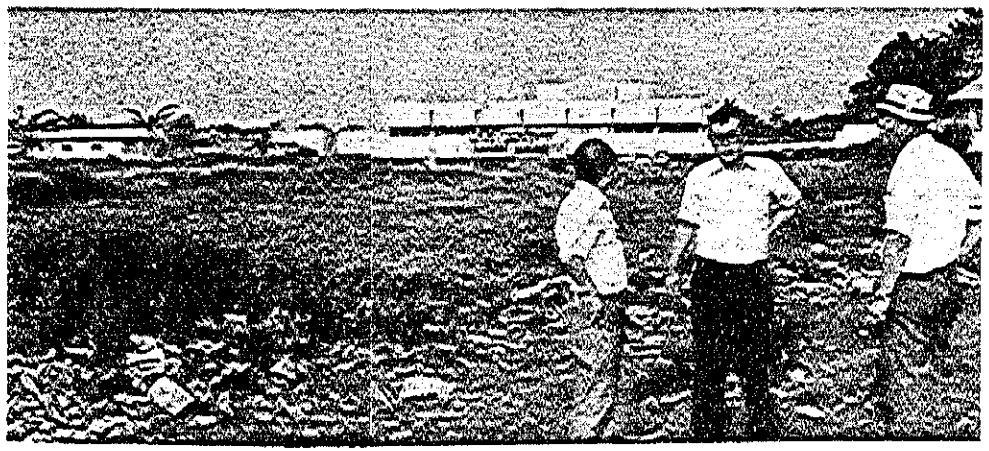


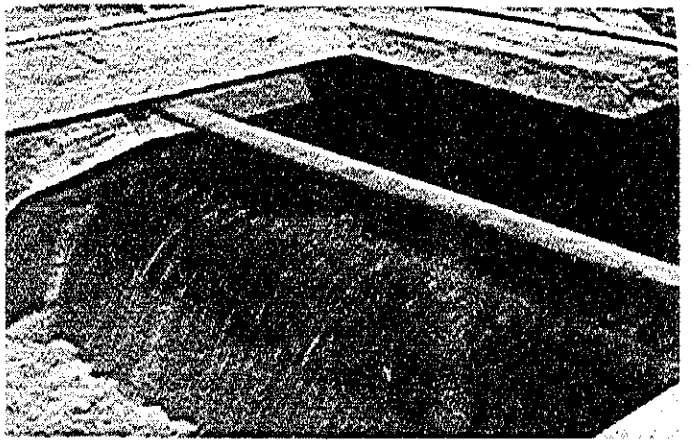
42. Sumter River at Pulogadung

43. Pulogadung Intake Gate

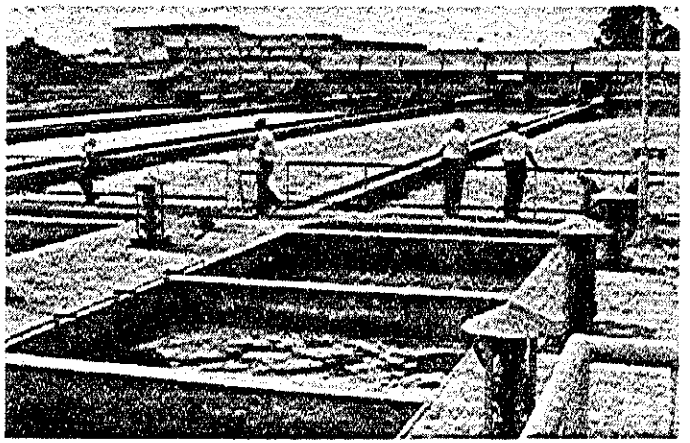


44. Pulogadung Water Teratment Plant

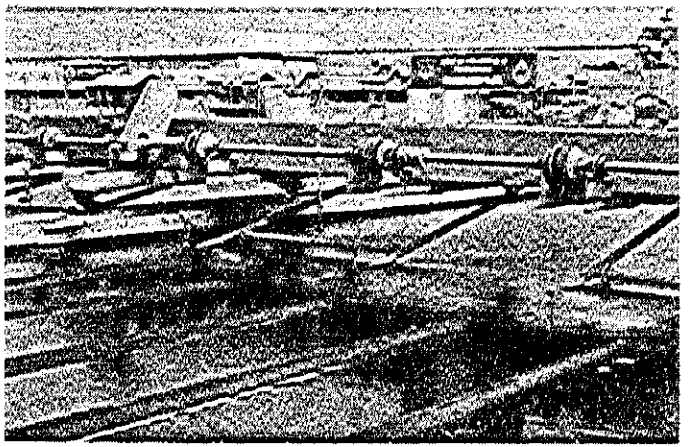




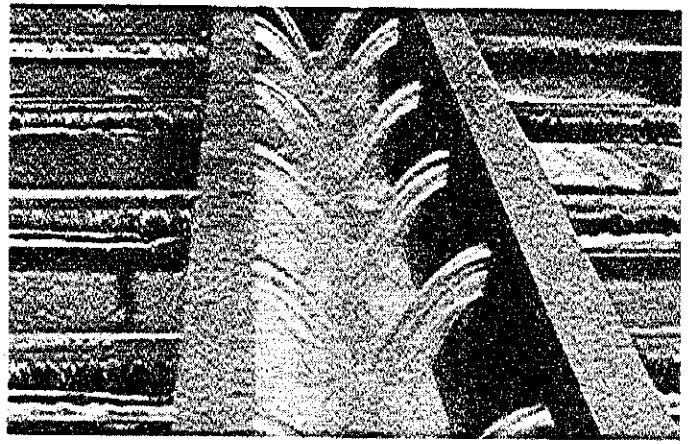
45. Pulogadung Water Treatment Plants



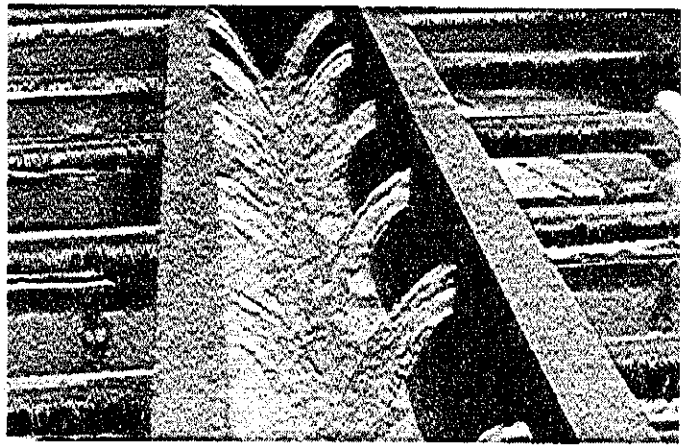
46. Pulogadung Water Treatment Plants



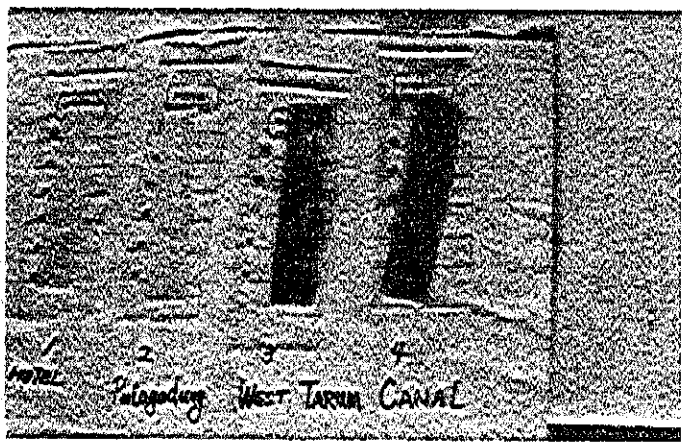
47. Pulogadung Water Treatment Plants



48. Pulogadung Water Treatment Plants

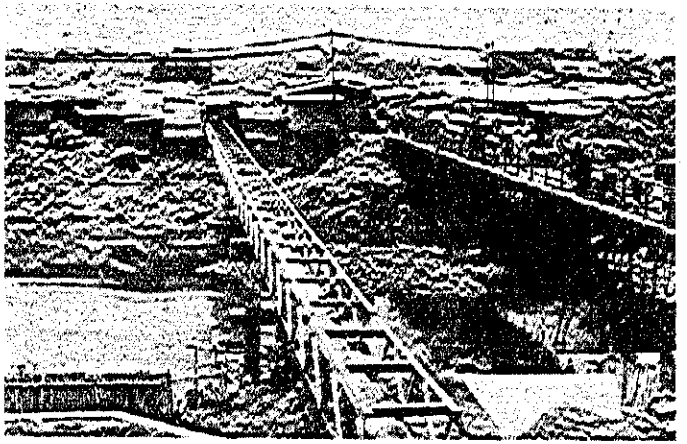


49. Pulogadung Water Treatment Plants

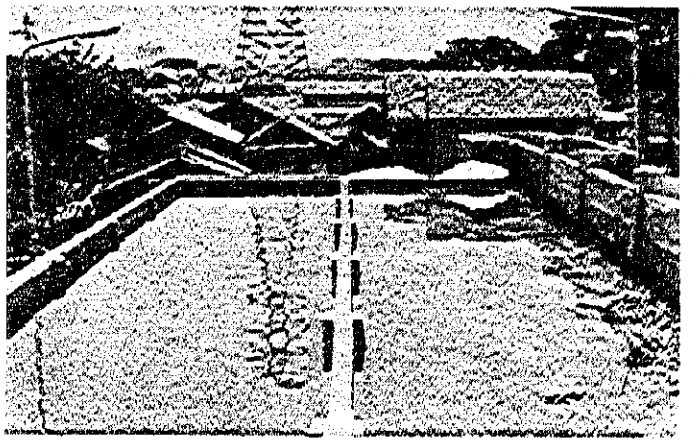


50. Water Quality Bacteril Test

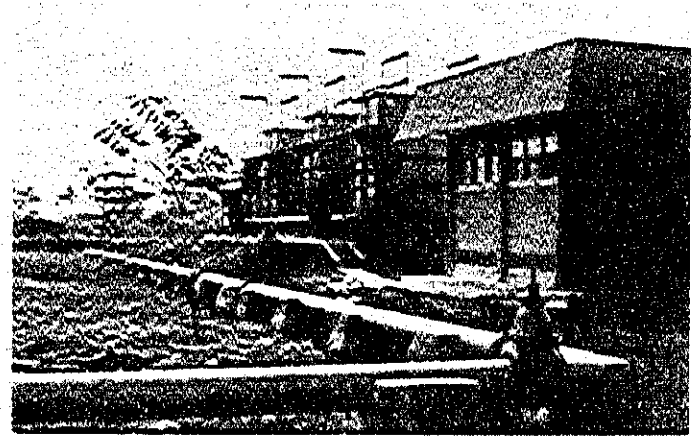
51. Mini Plant Mura Karang Intake Point



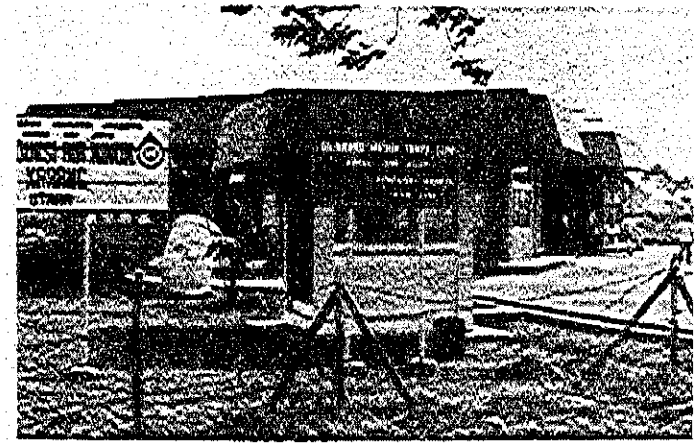
52. Banjil Canal Intake Gate



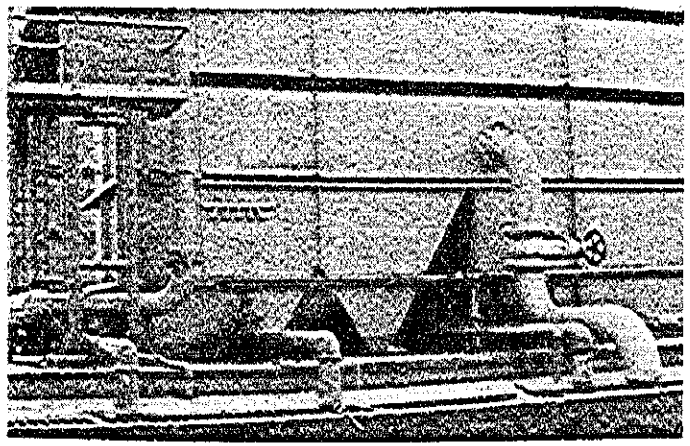
53. Mini Plant Mura Karang Raw Water Pond



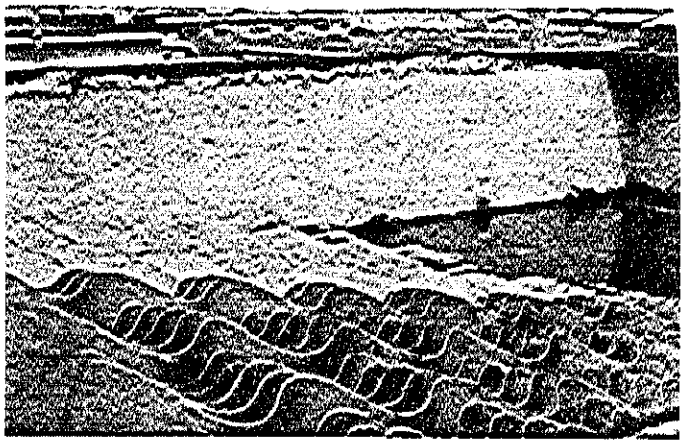
54. Mura Karang
Mini Teratment
Plants



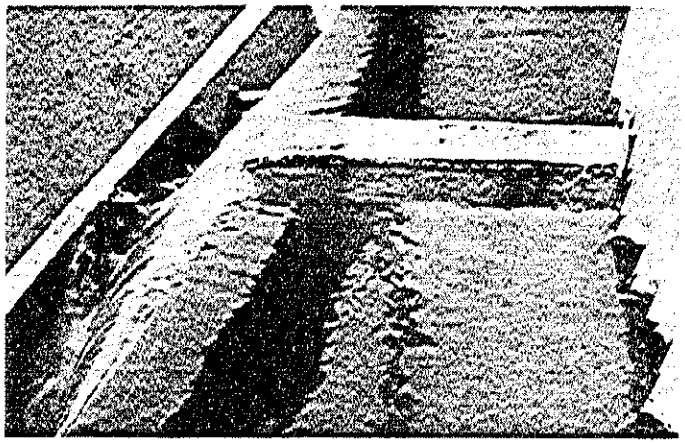
55. Mura Karang



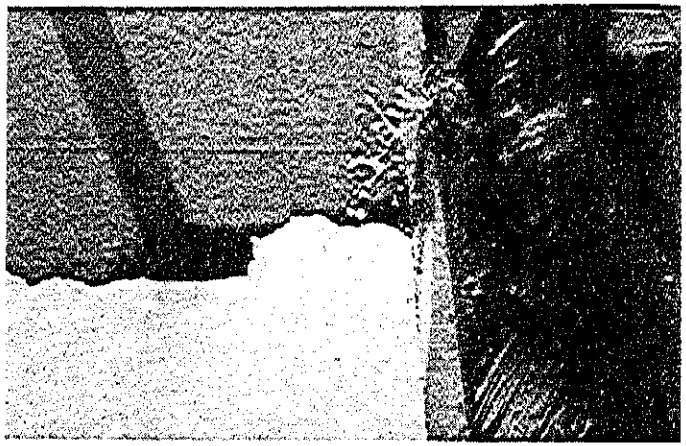
56. Mura Karang
Mini Plant
(100 l/sec)



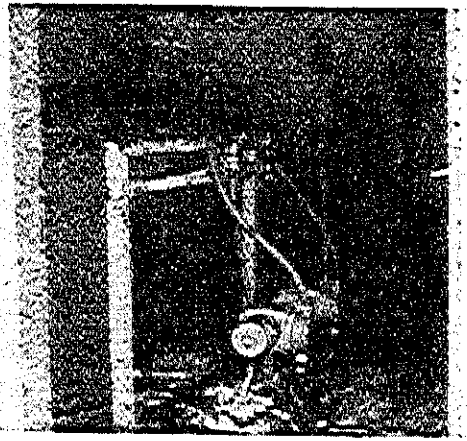
57. Mura Karang
Unit Plant



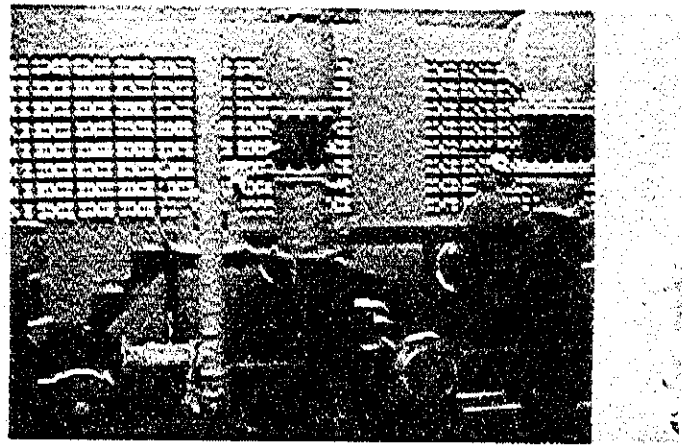
58. Mini Unit Plant
(30 l/sec)



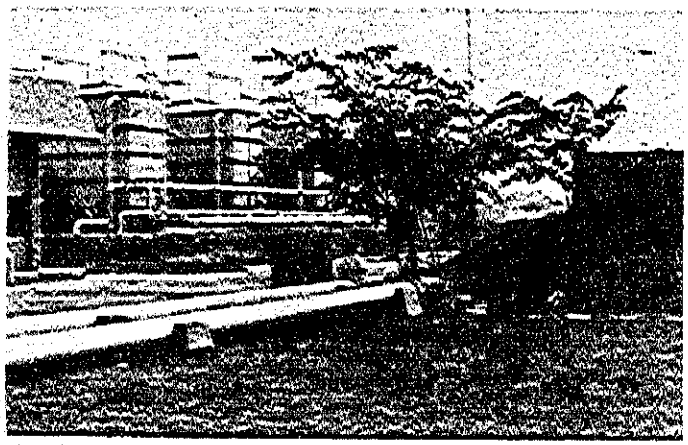
59. Mini Unit Plant



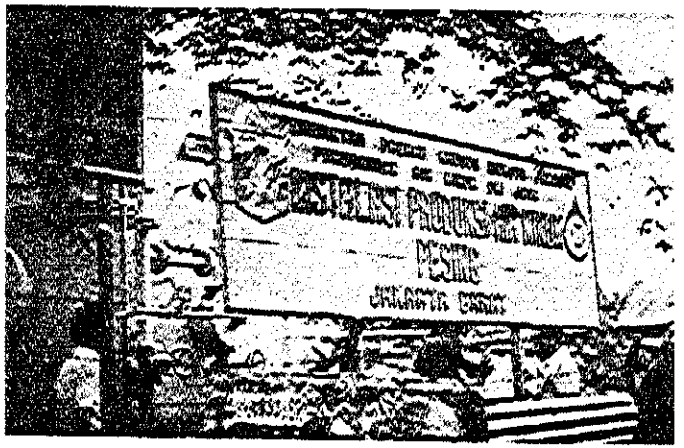
60. Chemical Treatment Plants



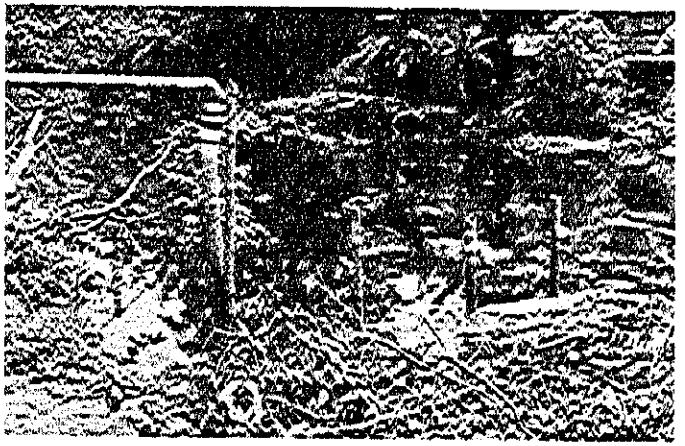
61. Distribution Pump



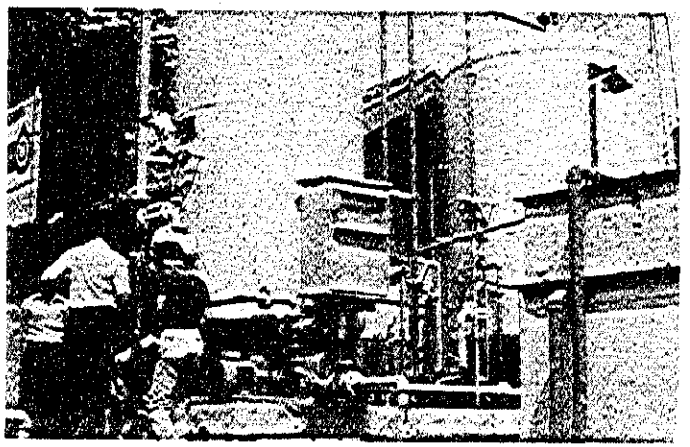
62. Mini Plant (100 l/sec) and Distribution Pipe



63. Pesing Mini Plant



64. Mini Plant Intake Point



65. Mini Plant (5 l/sec)