	Net Work	Analysis	3	Distribut	ion Main	I	
Node	Elevation	Demand	Dynamic	Dynamic	Static		Leakage
No.	of Pipe (MSL)	(cum/d)	Pressure (MSL)	Pressure (m)	Pressure (m)		(cum/d)
1	1,881.7	189.1	1,919.6	37.9	109.3	0.0 0.0	0.0
2	•	108.5	1,924.3	39.2	105.9	0.0 0.0	0.0
4 5		117.8 62.0	1,922,1 1,921.8	40.3 40.5	109.2 109.7	0.0 0.0	0.0 0.0
6		117.8	1,921.5	37.8	107.3	0.0 0.0	0.0
9		206.2	1,916.0	34.8	109.8	0.0 0.0	0.0
10 11		38.8 133.3	1,926.2 1,943.9	22.8 41.8	87.6 88.9	0.0 0.0 0.0 0.0	0.0 0.0
12		102.3	1,912.3	31.8	110.5	0.0 0.0	0.0
13		79.0	1,912.4	38.2	116.8	0.0 0.0	0.0
14		102.3	1,912.7	47.1	125.4	0.0 0.0	0.0
15 16		94.5 131.8	1,918.8 1,918.1	58.3 57.6	130.5 130.5	0.0 0.0 0.0 0.0	0.0 0.0
18		165.8	1,915.8	30.7	105.9	0.0 0.0	0.0
19		131.8	1,915.7	29.9	105.2	0.0 0.0	0.0
22 23		122.5 127.1	1,916.2 1,915.4	26.8 28.1	101.6 103.7	0.0 0.0	0.0 0.0
24		181.3	1,915.4	27.7	103,3	0.0 0.0	0.0
25	1,887.0	79.0	1,915.4	28.4	104.0	0.0 0.0	0.0
27 28		116.3	1,921.3 1,918.3	39.0 39.1	108,7 111,8	0.0 0.0 0.0 0.0	0.0 0.0
29 29		20.1	1,910.6	18.2	98.6	0.0 0.0	0.0
30	1,882.6	124.0	1,917.6	35.0	108.4	0.0 0.0	0.0
31		144.2	1,923.0	41.0	109.0	0.0 0.0	0.0
36 37		$79.0 \\ 72.8$	1,921.7 1,921.6	$\frac{32.4}{30.2}$	101.7 99.6	0.0 0.0	0.0 0.0
38		65.1	1,921.6	27.7	97.1	0.0 0.0	0.0
39		77.5	1,929.9	15.0	76.1	The second second	0.0
41 42		68,2 58.9	1,919.3 1,919.2	20.1 23.1	91.8 94.9	0.0 0.0	0.0 0.0
43		62.0	1,919.1	24.3	96.2	0.0 0.0	0.0
44	1,893.4	83.7	1,919.1	25.7	97.6	0.0 0.0	0.0
45		103.8	1,920.9	36.0	106.1	0.0 0.0	0.0 0.0
46 47		196.8 55.8	1,921.3 1,921.1	43.1 40.4	112.8 110.3	0.0 0.0	0.0
48		156.6	1,919.1	38.9	110.8	0.0 0.0	0.0
49		248.0	1,919.1	38.0	109.9	0.0 0.0	0.0
50 51		223.2 72.8	1,935.8 1,916.1	49.5 20.7	104.7 95.6	0.0 0.0 0.0 0.0	$0.0 \\ 0.0$
52	2 1,889.1	150.3	1,915.4	26.3	101.9		0.0
59		137.9	1,915.5	29.3		0.0 0.0	0.0
56 57		76.0 144.2	1,946.0 1,915.6	43.3 31.5	88.3 106.9		0.0 0.0
58		184.4	1,915.3	24.4	100.1	0.0 0.0	0.0
60		155.0	1,915.4	25,5	101.1		. 0.0
6; 62		77.5 117.8	1,920.3 1,928.8	34.9 38.6	105,6 100,8		0.0 0.0
6:		58.9	1,923.0	44.3	112.3		0.0
64		68,2	1,923.0	46.5	114.5	0.0 0.0	0.0
61 6'		62,0 58,9	1,931.3 1,937.7	21.3 16.2	81.0 69.5	0.0 0.0	0.0
68		65.1	1,943.7	25.1	72,4	0.0 0.0	0.0
69		77.5	1,921.2	41.7	111.5		0.0
70 7		204.6 134.8	1,926.2 1,918.8	21.7 24.3	86.5 96.5	0.0 0.0	0.0 0.0
100		51.1	1,919.3	22.7	94.4	0.0 0.0	0.0
10		38.8	1,919.7	33.8	105.1	0.0 0.0	0.0
10: 10:		57.4 77.5	1,919.8 1,919.2	43.1 36.1	114.3 107.9	0.0 0.0	0.0
10		29.4	1,927.1	10.8	74.7	0.0 0.0	0.0
10	5 1,903.9	26.4	1,927.7	23.8	. 87.1	0.0 0.0	0.0
10 ⁴ 10 ⁴		66.7	1,918.6	37.3	109.7	0.0 0.0	0.0
10		49.6 46.5	1,918.3 1,918.2	38.1 34.1	110.9 106.9	0.0 0.0	0.0
10	9 1,884.6	31.0	1,918.1	33,5	106.4	0.0 0.0	0.0
11		0.0	1,910.7	10.0	90.3		0.0
11 11		45.0 88.3	1,918.0 1,918.0	39.5 20.6	112.5 93.7		0.0
11		91.5	1,917.9		83.5	0.0 0.0	0.0
11	8 1,889.0	57.4	1,914.7	25.7	102.0	0.0	0.0
11 12		99.2 175.2	1,912.3 1,911.3		101.9 119.8		$\begin{array}{c} 0.0 \\ 0.0 \end{array}$
12		168.9	1,917.0		128.4		0.0
12	2 1,950.0	137.9	1,943.5	-6.5	41.0	0.0 0.0	0.0
12 12		100.8 105.4	1,943.5 1,918.8		63.7 111.4	0.0 0.0	0.0 0.0
12		167.4	1,914.1		104.8		0.0
	•		,	-			

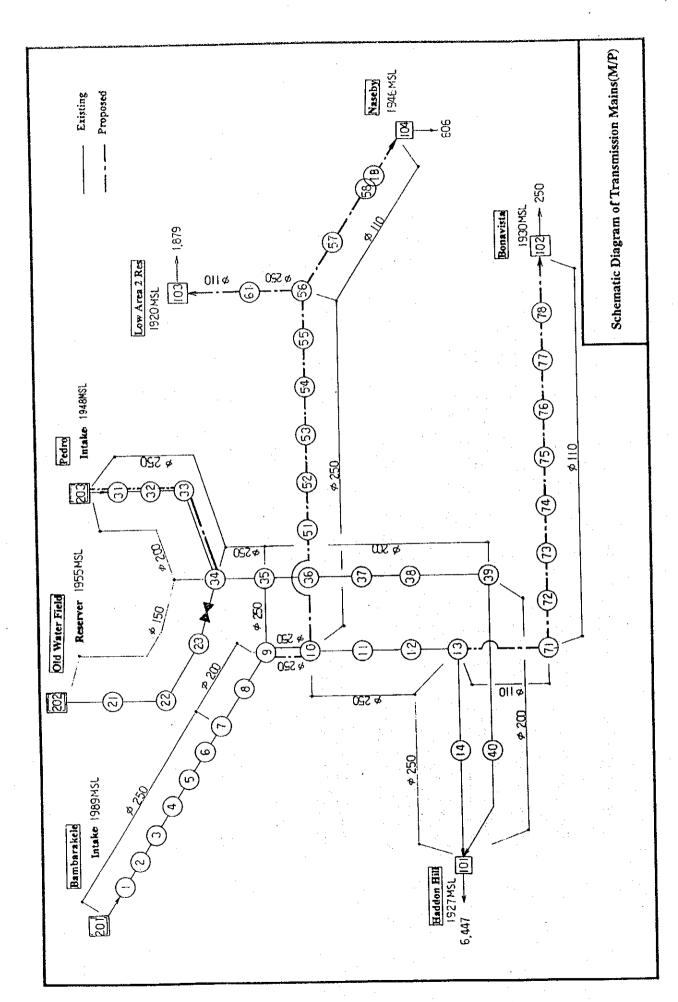
	Not Work	Analysis		Distribut	ion Wain	I		
Node	Elevation	=	Dynamic	Dynamic	Static	1		Leakage
No.	of Pipe	Demand	Pressure	Pressure	Pressure			•
126	(MSL) 1,894.1	(cum/d) 165,8	(MSL) 1,912.6	(m) 18.5	(m) 96.9	0.0	0.0	(cum/d) 0.0
127		83.7	1,910.4	35.5	116.1	0.0	0.0	0.0
128	1,896.4	58,9	1,911.1	14.7	94.6	0.0	0.0	0.0
129 130		12.4 10.9	1,911.0 1,911.0	15.0 24.6	$\begin{array}{c} 95.0 \\ 104.6 \end{array}$	$0.0 \\ 0.0$	$0.0 \\ 0.0$	0.0 0.0
131		6.2	1,911.0	35.1	115.2	0.0	0.0	0.0
132	1,886.8	79.0	1,927.0	40.2	104.2	0.0	0.0	0.0
133		27.9 83.7	1,926.4 1,931.6	$\frac{27.7}{7.1}$	92.3 66.5	0.0	$0.0 \\ 0.0$	0.0
134 135		89,9	1,931.1	15.4	75.3	0.0	0.0	0.0
136	1,944.8	110.1	1,942.9	-1.9	46.2	0.0	0.0	0.0
137 139		182.9 255.8	1,943.6 1,925.9	38.6 20.1	86.0 85.2	0.0	0.0 0.0	0.0 0.0
140		48.0	1,916.1	16.7	91.6	0.0	0.0	0.0
141	1,890.2	153.4	1,914.9	24.7	100.8	0.0	0.0	0.0
142 143		159.7 170.5	1,915.0 1,915.1	31.1 26.4	$107.1 \\ 102.3$	$\begin{array}{c} 0.0 \\ 0.0 \end{array}$	$0.0 \\ 0.0$	$0.0 \\ 0.0$
144		60.5	1,926.2	18.8	83.6	0.0	0.0	0.0
145	1,909.3	9.3	1,926.2	16.9	81.7	0.0	0.0	0.0
140 140		83.7 151.9	1,912.3 1,912.3	35.9 33.4	114.5 112.1	$0.0 \\ 0.0$	$0.0 \\ 0.0$	0.0 0.0
148		97.7	1,919.9	30.3	101.4	0.0	0.0	0.0
149	1,901.1	43.4	1,921.1	20.0	89.9	0.0	0.0	0.0
156 15		182.9 117.8	1,912.2 1,912.3	12.8 38.0	91.6 116.6	0.0 0.0	$0.0 \\ 0.0$	0.0 0.0
15		102.3	1,912.5	46,6	125.1	0.0	0.0	0.0
15	3 1,862.7	110.1	1,913.2	50.5	128.3	0.0	0.0	0.0
15 15		102.3 34.1	1,913.0 1,912.9	48.3 45.3	126.3 123.4	0.0	$0.0 \\ 0.0$	0.0
15		62,0	1,924.0	39.2	106.2	0.0	0.0	0.0
15	7 1,881.9	37.2	1,923.3	41,4	109.1	0.0	0.0	0.0
15		37.2 29.4	1,923.1 1,943.6	42.8 40.4	110.7 87.8	0.0 0.0	$0.0 \\ 0.0$	0.0 0.0
16 16		17.1	1,926.1	20.8	85.7	0.0	0,0	ŏ.ŏ
16	2 1,891.8	58.9	1,916.1	24.3	99.2	0.0	0.0	0.0
16		10.9 6.2	1,916.0 1,931.6	16.7 11.8	$\frac{91.7}{71.2}$	0.0 0.0	0.0 0.0	0.0 0.0
16 16		156.6	1,990.5	28.0	28,5	0.0	0.0	0.0
16	6 1,899.0	27.9	1,922.7	23.7	92.0	0.0	0.0	0.0
16 17		34.1 20.1	1,980.0 1,923.0	62.2 29.7	73.2 97.7	$0.0 \\ 0.0$	$0.0 \\ 0.0$	$0.0 \\ 0.0$
17		29.4	1,919.5	9.8	81.3	0.0	0.0	0.0
2		150.3	1,915.5		105.9	0.0	0.0	0.0 0.0
17	0 1,885.9 4 1,902.4	128.7 161.2	1,915.5 1,941.4	29.6 39.0	105.1 88.6	0.0 0.0	$0.0 \\ 0.0$	0.0
	3 1,895.7	150.3	1,915.3		95.3	0.0	0.0	0.0
17		35.6	1,919.0	24.0	96.0	0.0	0.0 0.0	0.0 0.0
17 17		35.6 85.3	1,919.0 1,929.6		93.7 78,2	0.0 0.0	0.0	0.0
17		38.8	1,929.9	12.4	73.5	0.0	0.0	0.0
18			1,919.9		110.0 99.1	0.0 0.0	$0.0 \\ 0.0$	0.0 0.0
18			1,918.0 1,918.0		91.8	0.0	0.0	0.0
18		102.3	1,926.5	23.7	88.2	0.0	0.0	0.0
18			1,912.7 1,943.6		105.6 87.8	0.0	0.0 0.0	0.0 0.0
18 18					59.3	0.0	0.0	0.0
18	39 1,921.8	45.0	1,929.6	7.8	69.2	0.0	0.0	0.0
	00 1,903.6 01 1.951.4		1,943.6 1,943.2		87.4 39.6	0.0 0.0	$0.0 \\ 0.0$	0.0 0.0
)1 1,951.4 59 1,900.0		1,945.5			0.0	0.0	0.0
50	00 1,892.8	38.8	1,912.9		98.2	0.0	0,0	0.0
	01 1,886.6 02 1,885.6		1,912.9			0.0 0.0	0.0	0.0 0.0
	03 1,884.2		1,916.1			0.0	0.0	0.0
• 5	1,914.5	79.0	1,925.9		76.5	0.0	0.0	0.0
	11 1,892.1 20 1,913.6		1,918.0 1,928.6			0.0	0.0	0.0 0.0
	20 1,913.0 04 1,900.4	·	1,917.6		90.6	0.0	0.0	0.0
i '	72 1,886.0	79.0	1,915.5	5 29.5		0.0	0.0	0.0
	73 1,916.(21 1,886.(1,925.9 1,910.0			0.0 0.0	0.0	0.0 0.0
	22 1,880.0		1,909.	3 29.3	111.0	0.0	0.0	0.0
. 5	23 1,903.0	79.0	1,944.0	41.0		0.0	0.0	0.0
	24 1,887.0 25 1,881.0		1,934.3 1,917.3			0.0	0.0 0.0	0.0
	26 1,882.0		1,917.			0.0	0.0	0.0
			*	•				

	Net Work	Analysis	3	Distribut		l		
Node	Elevation	Demand	Dynamic	Dynamic	Static			Leakage
No	of Pipe	Demand	Pressure	Pressure	Pressure			
	(MSL)	(cum/d)	(MSL)	(m)	(m)			(cum/d)
527	1,931.0	46,5	1,940.2	9.2	60.0	0.0	0.0	0.0
528	1,943.0	46.5	1,933.4	-9.6	48.0	0.0	0.0	0.0
33	1,867.0	79.0	1,912.3	45.3	124.0	0.0	0.0	0.0
35	1,870.0	94.5	1,912.3	42.3	121.0	0.0	0.0	0.0
40	1,920.0	62.0	1,929.6	9.6	71.0	0.0	0.0	0.0
54		79.0	1,915.6	29.6	105.0	0.0	0.0	0.0
91		0.0	1,926.1	26.7	91.6	0.0	0.0	0.0
92		0.0	1,926.3	30.9	95.6	0.0	0.0	0.0
93		0.0	1,926.6	44.5	109.0	0.0	0.0	0.0
540	,	644.8	1,935.0	5.0	61.0	0.0	0.0	0.0
541	•	863.4	1,985.0	5.0	11.0	0.0	0.0	0.0
542		0.0	1,942.0	52.9	101.9	0.0	0.0	0.0
610		0.0	1,930.0	30.0	91.0	0.0	0.0	0.0
61	•	0.0	1,929.9	45.3	106.4	0.0	0.0	0.0
612		0.0	1,929.3	48.0	109.7	0.0	0.0	0.0
205		-99.2	1,940.3	-19.7	31.0	0.0	0,0	0.0
206		-565.8	1,940,5	-14.5	36,0	0.0	0.0	0.0
213		-382.9	1,943,9	-35.1	12.0	0.0	0.0	0.0
201	,	-159.7	1,943.5	-16.5	31.0	0.0	0.0	0.0

	Net	t War	k Analy	vsis		Distribu	tion Main		Ì	
Pipe			Node B	Length	Diameter	С	Flow	Velocity	Pressure	Loss
No.	NO	10 H	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(m)	(mm)	u	(cum/d)	(m/s)	Gradient (o/oo)	(m)
	1	139	510	800,00	225.00	120.00	79.00	0.00	0.00	0.00
	2	139	304	374.00	44.00	130.00	108,00	0.80	22.30	8.30
	5	51 162	140 163	228.00 143.00	150.00 44.00	120.00 130.00	48.00 10.00	0.00 0.10	$0.00 \\ 0.30$	$0.00 \\ 0.00$
	6 7	102 51	162	20,00	150,00	120.00	69.00	0.10	0.00	0.00
	9	134	135	178.00	65.00	130.00	99,00	0.30	2.80	0.50
	12	134	164	84.00	44.00	130,00	$6.00 \\ 450.00$	0,10 0,30	$\substack{0.10\\0.90}$	$0.00 \\ 0.20$
	13 14	66 50	135 66	265.00 530.00	150.00 100.00	120.00 120.00	512.00	0.80	8.40	4,50
	15	50	67	583.00	100.00	120.00	-311.00	-0.50	-3.30	-1.90
	16	67	188	165.00	100.00	120.00	-370.00 -527.00	-0,60 -0,30	-4.60 -1.20	-0.80 -0.10
	20 21	21 21	54 23	59.00 88.00	150.00 100.00	120.00 120.00	187,00	0.30	1.30	0.10
	22	23	24	55.00	150.00	120.00	34.00	0.00	0.00	0.00
	23	20	24	90.00	100.00	120.00	174.00	$0.30 \\ -0.10$	1.10 -0.20	0.10 0.00
	24 26	20 25	21 52	66,00 110,00	150.00 100.00	120.00 120.00	-189.00 -26.00	0.00	0.00	0.00
	27	52	53	176.00	100.00	120,00	78.00	0.10	0.30	0.10
	28	53	60	100.00	100.00	120.00	~72.00	$-0.10 \\ 0.50$	-0.20 3.40	0.00 0.50
	29 30	18 18	60 19	134.00 54.00	100.00 150.00	120.00 120.00	313.00 594.00	0.40	1.50	0.10
	31	19	52	151.00	100.00	120,00	254.00	0.40	2.30	0.30
	32	19	55	133.00	100.00	120.00	208.00	0.30	1.60	$0.20 \\ 0.10$
	33 34	54 9	172 18	100,00 315.00	100,00 225,00	120.00 120.00	122.00 1,073.00	0.20 0.30	0.60	0.10
	35	9	48	47.00	100.00	120.00	-1,564.00	-2.30	-66.30	-3.10
	36	1	48	265.00	225.00	120,00	1,784.00	0.50	1.60	0.40
	37	48	49 49	201.00 672.00	100.00 150.00	120.00 120.00	63.00 -1,041.00	0.10 -0.70	$0.20 \\ -4.30$	0.00 -2.90
٠,	38 39	22 22	51	596.00	150.00	120.00	190.00	0.10	0.20	0.10
	40	49	148	536,00	100.00	120.00	-207.00	-0.30	-1.60	-0.80
	41	148	171 148	372.00 325.00	50.00 100.00	120.00 120.00	29.00 334.00	0.20 0.50	1.20 3.80	$0.50 \\ 1.20$
	42 43	69 46	69	90.00	150.00	120.00	455.00	0.30	0.90	0.10
	44	69	149	551.00	100.00	120.00	43.00	0.10	0.10	0.10
	45	1 1	49 46	264.00 401.00	100.00 225.00	120.00 120.00	221.00 -2,991.00	$0.30 \\ -0.90$	1.80 -4.30	$0.50 \\ -1.70$
	46 47	46	40 47	268.00	100.00	120.00	132.00	0.20	0.70	0.20
	48	47	64	268.00	100.00	120.00	~468.00	-0.70	-7.10	-1.90
	49 50	63 46	64 63	444.00 268.00	300.00 225.00	120,00 120,00	680.00 -3,776.00	0.10 -1.10	0,10 -6,50	0.00 -1.80
	50 51	63	158	47.00	300.00	120.00	-4,516.00	-0.70	-2,20	-0.10
	52	158	166	358.00	50.00	120.00	27.00	0.20	1.10	0.40
	53 54	157 157	158 170	77.00 264.00	300.00 44.00	120.00 130.00	4,581.00 20.00	0.80	2.30 1.00	$0.20 \\ 0.30$
	55	156	157	300.00	300.00	120.00	4,639.00	0.80	2.40	0.70
	56	2	156	100.00	300.00	120.00	5,564.00	0.90	3,30	0.30
	61 62	2 2	203	704.00 442.00	350.00 225.00	120.00 120.00	-8,982.00 3,309.00	-1.10 1.00	-3.80 5.10	-2.70 2.30
	63	. 4	5	65.00	225.00	120.00	3,114.00	0.90	4.60	0.30
	64	4	61	972.00	65.00	130.00	77.00	0.30	i.80 1.30	$1.70 \\ 0.30$
	65 66	5 5	6 27	221.00 150.00	150.00 150.00	120.00 120.00	548.00 524.00	0.40	1.20	0.20
	67	27	37	216.00	100.00	120.00	-184.00	-0.30	-1.30	-0.30
	68	36	37	400.00	150.00	120.00	250.00	0.20	0.30 0.20	0.10 0.10
	69 70	36 37	38 38	563.00 30.00	100.00 150.00	120.00 120.00	71.00 -6.00	0.10 0.00	0.00	0.00
	72	27	181	1,106.00	150.00	120.00	538.00	0.30	1.30	1.40
	74	39	173	320.00	44.00	130.00	79.00	0.60	12.40	$\frac{4.00}{-0.10}$
	76 8 0	102 39	18 i 179	92.00 125.00	150.00 150.00	120.00 120.00	-512.00 -348.00	-0.30 -0.20	-1.20 -0.60	-0.10
	82	179	208	104.00	65.00	130.00	-45.00	-0.20	-0.70	-0.10
	83	102	103	350.00	150.00		611.00	0.40	1.60	0.60 -0.10
	84 86	101 41	102 100	120.00 120.00	44.00 44.00	130.00 130.00	-19.00 -15.00	-0.10 -0.10	~0.90 ~0.60	-0.10
	. 60 87	100	101	312.00	37.00	130.00	-13.00	-0.10	-1.10	-0.30
	88	42	43	257.00	100.00		108.00	0.20	0.50 0.50	0.10
	89 90	42 43	43 44	257.00 268.00	100.00 150.00		108.00 155.00	0.20 0.10	0.10	0.00
	91	44		391.00	100.00	120.00	35.00	0.10	0.10	0:00
	92	44	176	391.00	100.00		35.00		0.10 0.00	0.00
	93 99	176 29		90.00 251.00	100.00 65.00		0.00 -20.00		-0.10	
	100	109		400.00	100.00	120.00	92,00	0.10	0.30	0.10
	101	108	109	120.00	100.00		96.00		0.40 0.80	$0.10 \\ 0.20$
	102 103	108 107		228.00 200.00			18.00 105.00		0.50	0.10
	100	101	100	200,00	20100				•	

	Net Wo	rk Anal	lysis		Distrib	ution Main		I	
Pipe No.	Node A	Node B	Length	Diameter	C	Flow	Velocity	Pressure Gradient	loss
			(m)	(mm)		(cum/d)	(m/s)	(0/00)	(m)
104 105		182 107	253.00 40.00	44,00 100.00	130.00 120.00	20.00 114,00	$0.10 \\ 0.20$	1.00 0.50	$0.30 \\ 0.00$
106		113	66.00	150.00	120,00	939.00	0.60	3.60	0.20
107	113	114	265.00	65.00	130.00	29.00	0.10	0.30	0.10
108 109		117 118	500.00	65.00	130.00	19.00	0.10	0.10	0.10
111		119	318.00 248.00	44.00 75.00	130.00 120.00	70,00 257.00	0.50 0.70	10.10 9.50	$\frac{3.20}{2.40}$
113	28	106	250.00	150.00	120.00	-566.00	-0.40	-1.40	-0.30
114		106	400.00	150.00	120.00	587.00	0.40	1.50	0.60
116 118		105 526	300.00 210.00	44.00 100.00	130,00 120,00	-29.00 158.00	-0.20	-2.00 0.90	-0,60 0,20
119	62	132	1,500.00	150,00	120,00	522.00	0.30	1.20	1.80
120		500	175.00	140.00	130.00	101.00	0,10	0.10	0.00
125 127		133 64	363.00 167.00	44.00 225.00	130,00 120,00	27.00 -144.00	0.20	1.80 0.00	0.70 0.00
129		144	284,00	100.00	120.00	69,00	0.10	0.00	0.10
130		145	121.00	44.00	130.00	9.00	0.10	0.20	0,00
132 133		47 45	162.00 761.00	150.00 100.00	120.00 120.00	-545,00 -441,00	-0.40 -0.70	-1.30 -6.40	$-0.20 \\ -4.90$
134		57	25.00	100.00	120.00	726.00	1.10	16.00	0.40
135	57	58	120.00	100,00	120.00	282.00	0.40	2.80	0.30
136		60	262.00	100,00	120.00	-86.00	~0.10	-0.30	-0.10
138 140		59 143	352.00 168.00	97.00 100.00	130.00 120.00	195.00 184.00	0.30 0.30	1.40 1.30	0.50 0.20
141	142	143	264.00	50.00	120.00		-0.10	-0.30	-0.10
142		142	202,00	100.00	120.00	299.00		3,10	0.60
143 146		142 150	99.00 360.00	100.00 150.00	120,00 120,00	-153.00 182.00	-0.20 0.10	-0.90 0.20	-0.10 0.10
147		151	163.00	150.00	120.00	-285.00	-0.20	-0.40	-0.10
148		151	35.00	150.00	120.00	64.00	0.00	0.00	0.00
149 151		186 155	450.00 132.00	140.00	130.00	-338,00	-0.30	-0.70	-0.30
160		154	165.00	100.00	120.00 120.00	135.00 202.00	$0.20 \\ 0.30$	0.70 1.50	0.10 0.30
161	14	153	236.00	150.00	120.00	-757.00	-0.50	-2.40	-0.60
162 163		14 146	475.00	150.00	120.00	-379.00	-0.30	-0.70	-0.30
163 164		140	$35.00 \\ 137.00$	150.00 150.00	120,00 120.00	235.00 151.00	0.10 0.10	$\begin{array}{c} 0.30 \\ 0.10 \end{array}$	$0.00 \\ 0.00$
167	11	137	663.00	150.00	120.00	305.00	0.20	0.50	0.30
168		152	66.00	100.00	120.00	275.00	0,40	2.70	0.20
170 175		152 68	150.00 165.00	100.00 100.00	120.00 120.00	-173.00 672.00	$-0.30 \\ 1.00$	-1.10 13.90	$-0.20 \\ 2.30$
176	68	136	726.00	44.00	130.00	21.00	0.20	1.10	0.80
177		137	512.00	44,00	130.00	-22.00	-0.20	-1.20	-0.60
178 182		187 124	277.00 400.00	140.00 225.00	130.00 120.00	100.00 -134.00	0.10 0.00	0.10 0.00	0.00
183		124	441.00	225.00	120.00	240.00	0.10	0.00	0.00
184		16	177.00	150.00	120.00	981.00	0.60	3.90	0.70
185 186		121 121	286.00 1,210.00	100.00 75.00	120.00 120.00	344.00 ~175.00	0.50 -0.50	4.00 -4.70	1.10 -5.70
187		125	850.00	100.00	120.00	374.00	0.60	4.70	4.00
191		209	120.00	225,00	120.00	-159.00	-0.10	0.00	0.00
193 194		126 128	396,00 668,00	100.00 65.00	120,00 130,00	337.00 88.00	$0.50 \\ 0.30$	3.90 2.30	1.50
195		127	1,047.00	65.00	130.00	83.00	0.30	2.30	$\frac{1.50}{2.20}$
196		129	90.00	65.00	130.00	29.00	0.10	0.30	0.00
197 198		130 131	60.00 88.00	44.00 37.00	130.00 130.00		0.10	0.70	0.00
199		520	569.00	100.00	120.00	6.00 97.00	0.10 0.10	0.30 0.40	$0.00 \\ 0.20$
200	41	42	237.00	100.00	120.00	58.00	0,10	0.10	0.00
201		113	250.00	150.00	120,00	-643.00	-0.40	-1.80	-0.40
203 179		36 300	105.00 500.00	150.00 150.00	120,00 120,00	401.00 ~17.00	0.30	0.70 0.00	0.10 0.00
250	136	301	215.00	65.00	130.00		-0.20	-1 30	-0.30
209		300	152.00	150.00	120.00	-108.00	-0.10	-0.10	0.00
213 214		524 503	334.00 334.00	97.00 100.00	130.00 120.00	-737.00 361.00	-1.20 0.50	-16.50 4.40	-5.50 1.50
215	112	511	132.00	75.00	120.00	-665.00	-1.70	-55.20	-7.30
216		501	100.00	140.00	130.00	62.00	0.10	0.00	0.00
217 218		501 501	104.00 221.00	65.00 140.00	130.00 130.00	58.00 -440.00	0.20 -0.30	1.10 -1.10	0.10 -0.20
110	118	503	167.00	75.00	120.00	-243.00	-0.30	-1.10 -8.60	-0.20 -1.40
300	215	301	554.00	100,00	120.00	183.00	0.30	1.30	0.70
208 17		300 527	250,00 250.00	100.00 100.00	120.00 120.00	199.00 99.00	0.30	1.50 0.40	$0.40 \\ 0.10$
172		153	577.00	150.00	120.00	1,601.00	1.10	9.60	0.10 5.50
302	10	70	480.00	150.00	120.00	-38.00	0,00	0.00	0.00
304	24	25	55.00	100.00	120,00	27.00	0.00	0.00	0.00

	Net Wo	rk Anal	lysis		Distrib	ution Main		I	
Pipe No.	Node A	Node B	Length	Diameter	C	Flow	Velocity	Pressure Gradient	loss
,,,,,			(m) ·	(mm)		(cum/d)	(m/s)	(0/00)	(m)
305	55	172	50.00	100.00	120.00	70.00	0.10	0.20	0.00
306		172	50.00	100.00	120.00	~113.00	-0.20	-0.50	0.00
307	23	25	75.00	100.00	120,00	25.00	0.00	0.00	0.00
308		178	150,00	150.00	120.00	85.00	0.10	0.00	0.00
77	39	40	180.00	100.00	120.00	192.00	0.30 0.10	1.40	0.30
78 79		189 101	60,00 450,00	100.00 44.00	120,00 130,00	44.00 -17.00	-0.10	0,10 -0,80	-0.30
309		42	150.00	150.00	120,00	217.00	0.10	0.20	0.00
310		521	350.00	65.00	130,00	158.00	0.60	6.70	2,30
311	521	522	350.00	65.00	130.00	79,00	0.30	1.90	0.70
313		35	150,00	100,00	120,00	94.00	0.10	0.40	0.10
301		523	120.00	150.00	120.00	-439.00	-0.30	-0.90	-0.10
314	59	523	180.00	100.00	120,00	518.00	0.80	8.60	1.50
315		524	150.00	75,00	120.00	-124.00	-0.30	-2.50	-0.40
317		600	450.00	97.00	130.00	-940.00	~1.50	-25.90	-11.70
319		526	210.00	75.00	120.00	-79.00	-0.20 0.80	-1.10 14.00	-0.20 6.70
321 322		528 528	480.00 200.00	65.00 65.00	130.00 130.00	236.00 -189.00	-0.70	-9.30	-1.90
322 11		601	75.00	65.00	130.00	-156.00	-0.60	-6.60	-0.50
324		527	50.00	65.00	130.00	-382.00	-1.30	-34.30	-1.70
325		123	160.00	140.00	130.00	100.00	0.10	0.10	0.00
327		59	352.00	140,00	130.00	512.00	0.40	1.40	0.50
328		49	264.00	158.00	130.00	797.00	0.50	1.80	0.50
329	206	527	215.00	150.00	120.00	565.00	0.40	1.40	0.30
330		541	931.00	100.00	120.00	863.00	1.30	22.10	20,50
331		540	434.00	97.00	130.00	644.00	1.00	12.90	5.60
601		139	162.00	150.00	120.00	443.00	0.30	0.90	0.10
602 603		161 93	225.00 662.00	65.00 150.00	130.00 120.00	17.00 -313.00	0.10 -0.20	0.10 -0.50	0.00 -0.30
605		132	616.00	150.00	120,00	-313.00 -415.00	-0.20	-0.80	-0.50
606		185	300.00	150.00	120.00	102.00	0.10	0.10	0.00
607			1,000.00	200.00	120.00	-1,455.00	-0.50	-2.00	-2,00
212	22	54	275,00	150.00	120.00	728.00	0.50	2,20	0.60
610			931.00	225.00	120.00	-79,00	0.00	0.00	0.00
611	91	92	228.00	150.00	120,00	-460.00	-0.30	-1.00	-0.20
612			690.00	100.00	120.00	-460.00	-0.70	-6.90	-4.80
613			200.00	97.00	130.00	55.00		0.10	0.00
614			250.00	44.00	130.00	-55.00	~0.40	-6.50	-1.60
616			569.00	97.00	130.00	-161.00 -2,917.00	-0.30 -0.70	-1.00 -2.40	-0.60 -1.20
701 702			500,00 50,00	250.00 55.00	120.00 130.00		-0.70	-0.90	0.00
705			850.00	65,00	130.00	130.00	0.50	4.70	4.00
713			350.00	198,00	130.00	1,374.00	0.50	1.60	0.60
714			400.00	198,00	130.00	1,320.00	0.50	1.50	
718			250.00	198.00	130.00	-1,274.00	-0.50	-1.40	-0.30
710	3 28	107	40.00	198.00	130.00	747.00	0.30	0.50	0.00
717			200.00	198.00	130.00		0.30	0.50	0.10
718			120.00	198,00	130.00	630.00	0.20	0.40	0.10
719			400.00	198.00	130.00	603.00	0.20	0.30	0.10
73			265.00	140.00	130.00	221.00	0.20	$0.30 \\ 0.10$	$0.10 \\ 0.10$
732 743			500.00 104.00	140.00 140.00	130.00 130.00	143.00 -342.00	0.10 -0.30	-0.70	-0.10
75.			630.00	97.00	130.00	55.00	0.10	0.10	0.10
752			610.00	65.00	130.00	55.00	0.20	1.00	0.60
76			1,044.00	97.00		-424.00	-0.70	-5,90	-6,20
76			165,00	97.00	130.00	585.00	0.90	10.80	1.80
77.	101	102	120.00	140.00	130.00	-414.00	-0.30	-0.90	-0.10
773		101	450.00	140.00		-364.00	-0.30	-0.80	-0.30
77			120.00	140.00	130.00	-328.00	-0.30	-0.60	-0.10
78			221.00	250.00	120.00	2,102.00	0.50	1.30	0.30
78			150.00	250.00	120.00	2,008.00	0.50	1.20	0.20
78: 78:			1,106.00 92.00	250.00 250.00	120.00 120.00	2,062.00 -1,964.00	0.50 -0.50	1.30 -1.20	1.40 -0.10
79:			104.00	140.00	130.00	437.00	0.30	1.10	0.10
79			165.00	140.00	130.00	531.00	0.40	1.50	0.30
, 0		101	250.00	110,00			****	2,00	

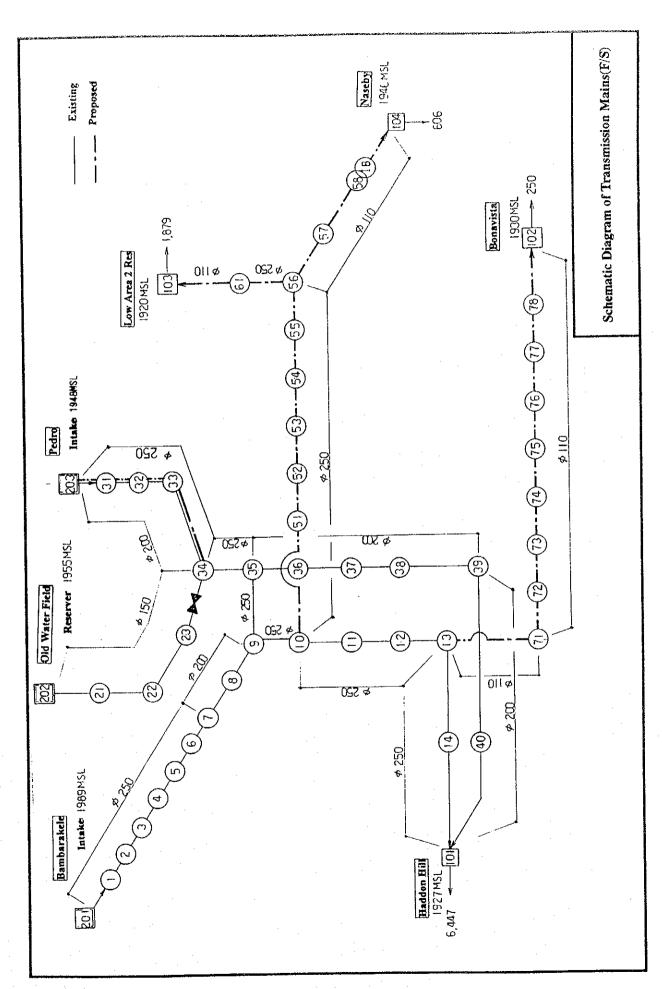


Net	Work Analysi	8	Transmission
File Name Season Network Type	NTMO1 J Wet Proposed		
Demand	Year 2015		
Reserver	Day Max Water Level Fix Discharge Fix	K	All None
Magnificatio	n of Demand	1.000	
Reservoir Da Node	ta HWL	LWL	Reservoir
201	(MSL)	(MSL)	Powhorskala Intoka
	1 1,989.00 1 1,948.00	1,989.00 1,948.00	Bamberekele Intake Pedro Intake
Node Data			
Node	Ground Elev	Demand	
4	(MSL)	(cu∎/d)	
1 2	1 1,985.0 1 1,987.0	0.0 0.0	0 0
	1 1,978.0	0.0	0 0
4	1 1,924.0	0.0	0 0
5	1 1,917.0	0.0	0 0
	1 1,946.0	0.0	0 0
. 7	1 1,895.0	0.0	0 0
8	1 1,896.0	0.0	0 0
9	1 1,881.0	0.0	0 0
	1 1,877.0	0.0	0 0
11	1 1,882.0	0.0	0 0
	1 1,885.0	0.0	0 0
13 14	1 1,887.0 1 1,891.0	0.0	0 0
31	1 1,891.0 1 1,945.0	0.0	0 0 0 0
	1 1,906.0	0.0	0 0
	1 1,900.0	0.0	o o
34	1 1,881.0	0.0	0 0
35	1 1,880.0	0.0	0 0
36	1 1,877.0	0.0	0 0
	1 1,882.0	0.0	0 0
. 38	1 1,885.0	0.0	0 0
39	1 1,887.0	0.0	0 0
40 51	1 1,891.0 1 1,880.7	0.0 0.0	0 0
52	1 1,876.5	0.0	0 0
53	1 1,882.0	0.0	0 0
54	1 1,899.4	0.0	0 0
55	1 1,902.8	0.0	0 0
56	1 1,920.0	0.0	0 0
57 50	1 1,890.2	0.0	0 0
58	1 1,887.0	0.0	0 0
61 71	1 1,935.0 1 1.881.8	0.0	0 0
72	1 1,881.8 1 1,881.3	0.0 0.0	0 0
73	1 1,883.7	0.0	o o
74	1 1,882.3	0.0	0 0
75	1 1,891.4	0.0	0 0
76	1 1,893.9	0.0	0 0
77	1 1,914.9	0.0	0 0
78	1 1,917.5	0.0	0 0
101	1 1,930.0	6,447.0	0 0.
102 103	1 1,930.0 1 1,920.0	250.0 1,879.0	0 0
103	1,946.0	606.0	0 0
	. 1,070.0	00010	υ υ
Booster Pump	Data		•
No. Type		Node B	Pipe No. Pressure
t n		101	(a)
1 B	58	104	333 25.0

Pipe	Data					
Pipe		٨	Node B	Diameter	Length	C Value
				(mm)	(m)	
	2	1	2	250.0	56.0	120.0
	3	2	3	250.0	201.0	120.0
	4	3	4	250.0	123.0	120.0
	5	4	5	250.0	207.0	120.0
	6	5	6	250.0	621.0	120.0
	7	6	7	250.0	884.0	120.0
	8	7	8	200.0	641.0	120.0
	g	8	9	200.0	1036.0	120.0
	10	9	10	250.0	488.0	120.0
	11	10	11	250.0	366.0	120.0
	12	11	12	250.0	31.0	120.0
	13	12	13	250.0	183.0	120.0
	14	13	14	250.0	61.0	120.0
	15	14	101	250.0	518.0	120.0
	32	31	32	200.0	284.0	120.0
	33	32	33	200.0	229.0	120.0
	34	33	34	200.0	215.0	120.0
	35	34	35	250.0	242.0	120.0
	36	35	36	200.0	488.0	120.0
	37	36	37	200.0	366.0	120.0
	38	37	38	200.0	31.0	120.0
	39	38	39	200.0	183.0	120.0
	40	39	40		61.0	120.0
	41	40	101	200.0	518.0	120.0
	51	9	35	250.0	31.0	120.0
	201	1	201	250.0	52.0	120.0
	203	31	203	200.0	234.0	120.0
	301	9	- 10	250.0	488.0	120.0
	311	13	71		442.0	130.0
	312	71	72	97.0	65.0	130.0
	313	72	73	97.0	221.0	130.0
	314	73	74	97.0	150.0	130.0
	315	74	75	97.0	216.0	130.0
	316	75	7€		30.0	130.0
	317	76	77		300.0	130.0
	318	77	78		125.0	130.0
	319	78	102		104.0	130.0
	321	10	51		268.0	120.0
	322	51	52		268.0	120.0
	323	52			167.0	120.0
	324	53			300.0	120.0
	325	54			300.0	120.0
	326	55			800.0	120.0
	327	56			480.0	120.0
	328	61			80.0	130.0
	331	56			350.0	130.0
	332	57			334.0	130.0
	333	58	10-	4 97.0	450.0	130.0

	Net Work	Analysis	3	Transmiss	ion	.J		
Nade	Elevation	Demand	Dynamic	Dynamic	Static			Leakage
No.	of Pipe	Demand	Pressure	Pressure	Pressure			•
	(MSL)	(cum/d)	(MSL)	(m)	(m)			(cum/d)
1		0.0	1,988.7	3.7	4.0	0.0	0.0	0.0
2	1,987.0	0.0	1,988.3	1.3	2,0	0.0	0.0	0.0
3	1,978.0	0.0	1,987.0	9.0	11.0	0.0	0.0	0.0
4	1,924.0	0.0	1,986.2	62.2	65.0	0.0	0.0	0.0
5		0.0	1,984.9	67.9	72.0	0.0	0.0	0.0
6	1,946.0	0.0	1,980.9	34.9	43.0	0.0	0.0	0.0
7		0.0	1,975.2	80.2	94.0	0.0	0.0	0.0
8	1,896.0	0.0	1,962.9	66,9	93.0	0.0	0.0	0.0
9	1,881.0	0.0	1,943.0	62.0	108.0	0.0	0.0	0.0
10	1,877.0	0.0	1,941.4	64.4	112.0	0.0	0.0	0.0
11	1,882.0	0,0	1,939.5	57.5	107.0	0.0	0.0	0.0
12	1,885.0	0.0	1,939.3	54.3	104.0	0.0	0.0	0.0
13	1,887.0	0.0	1,938.4	51.4	102.0	0.0	0.0	0.0
14	1,891.0	0.0	1,938.1	47.1	98.0	0.0	0.0	0.0
31	1,945.0	0.0	1,954.7	9.7	44.0	.0.0	0.0	0.0
32	1,906.0	0.0	1,950.6	44.6	83.0	. 0.0	0.0	0.0
33	1,900.0	0.0	1,947.3	47.3	89.0	0.0	0.0	0.0
34	1,881.0	0.0	1,944.2	63.2	108.0		0.0	0.0
35		0.0	1,943.1	63.1	109.0	0.0	0.0	0.0
36		0.0	1,940.9	63.9	112.0	0.0	0.0	0.0
37	1,882.0	0.0	1,939.2	57.2	107.0	0.0	0.0	0.0
38		0.0	1,939.1	54.1	104.0	0.0	0.0	0.0
39		0.0	1,938.2	51.2	102.0	0.0	0.0	0.0
40		0.0	1,938.0	47.0	98.0	0.0	0.0	0.0
51		0.0	1,940.9	60.2	108.3	0.0	0.0	0.0
52		0.0	1,940.4	63.9	112.5	0.0	0.0	0.0
53		0.0	1,940.1	58.1	107.0	0.0	0.0	0.0
54		0.0		40.2	89,6	0.0	0.0	0.0
55		0.0	1,939.1	36.3	86.2	0.0	0.0	0.0
56		0.0	1,937.6	17.6	69.0	0.0	0.0	0.0
57		0.0	1,933.6	43.4	98.8	0.0	0.0	0.0
58		0.0	1,929.8	42.8	102.0	0.0	0.0	0.0
61		0.0	1,937.1	2.1	54.0	0.0	0.0	0.0
71		0.0	1,937.4	55.6	107.2		0.0	0.0
72		0.0	1,937.2	55.9	107.7	0.0	0.0	0.0
73		0.0	1,936.7	53.0	105.3	***	0.0	0.0
74		0.0	1,936,4	54.1	106.7	0.0	0.0	0.0
73		0.0	1,935.9	44.5	97.6	0.0	0.0	0.0
70	,	0.0	1,935.9	42.0	95.1	0.0	0.0	0.0
7		0.0	1,935.2	20.3	74.1	0.0	0.0	0.0
78		0.0		17.4	71.5	0.0	0.0	0.0
10		6,447.0	1,935.6	5.6	59.0	6,286.8	6,286.8	0.0
107		250.0	1,934.7	4.7	59.0	219.2	219.2	0.0
10:		1,879.0	1,929.6	9.6	69.0	1,879.0	1,879.0 0,0	0.0
10	4 1,946.0	606.0	1,949.6	3,6	43.0	0.0	0,0	0.0

	Net	Wor	k Anal;	ysis		Transmis	sion		_	
Pipe No.	Node		łode B	Length	Diameter	C	Flow	Velocity	Pressure Gradient	Loss
				(m)	(mm)		(cum/d)	(n/s)	(0/00)	(m)
2	2	j	2	56.00	250.00	120.00	4,951.00	1.20	6.50	0.40
	}	2	3	201.00	250.00	120.00	4,951.00	1.20	6.50	1.30
4		3	4	123.00	250.00	120.00	4,951.00	1.20	6.50	0.80
	5	4	5	207.00	250.00	120.00	4,951.00	1.20	6.50	1.30
(3	5	6	621.00	250,00	120,00	4,951.00	1.20	6.50	4.00
		6	7	884.00	250.00	120,00	4,951.00	1.20	6.50	5.70
8		7	8	641,00	200.00	120.00	4,951.00	1,80	19,20	12.30
•	9	8	9	1,036.00	200.00	120,00	4,951.00	1.80	19.20	19.90
11		9	10	488.00	250.00	120.00	3,456.00	0.80	3.30	1.60
ī		10	11	366,00	250.00	120,00	4,428.00	1.00	5.30	1.90
1		11	12	31.00	250.00	120,00	4,428.00	1.00	5.30	0.20
1		12	13	183.00	250.00	120,00	4,428.00	1.00	5.30	1.00
1		13	14	61.00	250.00	120,00	4,178.00	1.00	4.70	0.30
1		14	101	518,00	250.00	120.00	4,178.00	1.00	4.70	2.40
3		31	32	284.00	200.00	120,00	4,230.00	1.60	14.30	4.10
3		32	33	229.00	200.00	120.00	4,230.00	1.60	14.30	3.30
	4	33	34	215.00	200.00	120.00	4,230.00	1.60	14.30	3,10
3		34	35	242.00	250.00	120,00	4,230.00	1,00	4.80	1.20
	6	35	36	488,00	200.00	120.00	2,268.00	0.80	4.50	2.20
3	7	36	37	366.00	200.00	120.00	2,268.00	0.80	4.50	1.60
	8	37	38	31.00	200.00	120.00	2,268.00	0.80	4.50	0.10
	9	38	39	183.00	200.00	120.00	2,268.00	0.80	4,50	0.80
	0	39	40	61.00	200.00	120.00	2,268.00	0.80	4.50	0.30
	1	40	101	518.00	200.00	120.00	2,268.00	0.80	4.50	2.30
	51	9	35	31.00	250.00	120.00	-1,962.00	-0.50	-1.20	0.00
20		1	201	52.00	250.00	120.00	-4,951.00	-1.20	-6.50	-0.30
20		31	203	234.00	200.00	120.00	-4,230.00	-1.60	-14.30	-3.40
30		9	10	488.00	250.00	120.00	3,456.00	0.80	3.30	1.60
31	11	13	71	442.00	97.00	130.00	250.00	0.40	2.20	1.00
	12	71	. 72	65.00	97.00	130.00	250.00	0.40	2.20	0.10
3	13	72	73	221.00	97.00	130.00	250.00	0,40	2.20	0.50
	14	73	74	150.00	97.00	130.00	250.00	0.40	2,20	0.30
	15	74	75	216.00	97.00	130.00	250.00	0.40	2.20	0.50
3	16	75	76	30.00	97.00	130.00	250.00	0.40	2.20	0.10
3	i 7	76	77	300.00	97.00	130,00	250.00	0.40	2.20	0.70
	18	77	78	125.00	97.00	130.00	250.00	0.40	2.20	0.30
	19	78	102	104.00	97.00	130.00	250.00	0.40	2.20	0.20
	21	10	51	268.00	250.00	120.00	2,485.00	0.60	1.80	0.50
	22	51	52	268.00	250.00	120.00	2,485.00	0.60	1.80	0.50
	23	52	53	167.00	250.00	120.00	2,485.00	0.60	1.80	0.30
	24	53	54	300.00	250,00	120.00	2,485.00	0.60	1.80	0.50
3	25	54	55	300.00	250.00	120.00	2,485.00	0,60	1.80	0.50
	26	55	56	800.00	250.00	120.00	2,485.00	0.60	1.80	1.40
	27	56	61	480,00	250.00		1,879.00	0.40	1.10	0,50 7,50
	28	61	103	80,00	97.00		1,879.00	2.90	93.20	4.00
	31	56	57	350.00	97.00		606.00	0.90	11.50 11.50	4.00 3.80
	32	57	58	334.00	97.00		606.00	0.90		
3	33	58	104	450.00	97.00	130.00	606.00	0.90	11.50	5.20



A-5.4.131

Net	Work Analys	is	Transmission
File Name Season Network Type	NTMO2 K Wet Proposed	(
Demand	Year 2005		
Reserver	Day Max Water Level Fi Discharge Fix	x	All None
Magnificatio	n of Demand	1.000	
Reservoir Da Node	HWL	LWL	Reservoir
201	(MSL) 1 1,989.00	(MSL) 1,989.00	Bamberekele Intake
	1,948.00	1,948.00	Pedro Intake
Node Data			
Node	Ground Elev	Demand	
	(MSL)	(cum/d)	_
	l 1,985.0 l 1,987.0	0.0	0 0
	1,987.0 1,978.0	0.0 0.0	0 0
	1,924.0	0.0	0 0
	1,917.0	0.0	0 0
6	1,946.0	0.0	0 0
	1,895.0	0.0	0 0
	1,896.0	0.0	0 0
	1,881.0	0.0	0 0
	1,877.0 1.882.0	0.0	0 0
	1,882.0 1,885.0	0.0 0.0	0 0
	1,887.0	0.0	0 0
14		0.0	0 0
31		0.0	0 0
32		0.0	0 0
33		0.0	0 0
34		0.0	0 0
35 36		0.0	0 0
37	-,	0.0	0 0
38	-,	0.0	0 0
39		0.0	0 0
40		0.0	0 0
51 1	•	0.0	0 ; 0
52	-	0.0	0 0
53 1 54 1		0.0	0 0
55 1		0.0	0 0
56		0.0	0 0
57 1		0.0	Ŏ Ŏ
58 1	-,	0.0	0 0
61 1	-,	0.0	0 0
71 1 72 1	-,	0.0	0 0
73	,	0.0 0.0	0 0
74		0.0	0 0
75 1	,	0.0	0 0
76 1	1,893.9	0.0	0 0
77 1	•	0.0	. 0 0
78 1		0.0	0 0
101 1 102 1		5,978.0	. 0 0
102	.,	232.0 1,742.0	0 0
104	,	562.0	0 0
Booster Pump	Data		· · · · · · · · · · · · · · · · · · ·
No. Type	Node A	Node B	Pipe No. Pressure
1 B	58	104	333 25.0

Pipe	Data								
Pipe	No.	Node	A	Node B		Diameter	Leng	gth	C Value
						(an)	(≝)	
	2		1		2	250.0		6.0	120.0
	3		2	;	3	250.0	20	0.10	120.0
	4		3		1	250.0	12	23.0	120.0
	5		4	(ŏ	250.0	20	0.70	120.0
	6		5		5	250.0	62	0.15	120.0
	7		6	•	7	250.0		34.0	120.0
	8		7	1	3	200.0	64	11.0	120.0
	9		8		9	200.0		36.0	120.0
	10		9	10		250.0	48	88.0	120.0
	11		10	10	ĺ	250.0	36	6.0	120.0
	12		11	12		250.0		31.0	120.0
	13		12	13		250.0		33.0	120.0
	14		13	14		250.0		1.0	120.0
	15		14	10		250.0		8.0	120.0
	32		31	3:		200.0		34.0	120.0
	33		32	3		200.0		29.0	120.0
	34		33	34		200.0		15.0	120.0
	35		34	3!		250.0	24	12.0	120.0
	36		35	36		200.0	48	38.0	120.0
	37		36	3'		200.0		6.0	120.0
	38		37	3		200.0		31.0	120.0
	39		38	3:		200.0		33.0	120.0
	40		39	4		200.0	- 1	61.0	120.0
	41		10	10		200.0		18.0	120.0
	51		9	3!		250.0		31.0	120.0
	201		1	20		250.0		52.0	120.0
	203		31	20		200.0	9	34.0	120.0
	311		13	7		97.0	4	12.0	130.0
	312		71	7		97.0		55.0	130.0
	313		72	7:		97.0		21.0	130.0
	314		73	7		97.0		50.0	130.0
	315		74	7	-	97.0		16.0	130.0
	316		75	71		97.0		30.0	130.0
	317		76	7		97.0		0.00	130.0
	318		77	7		97.0		25.0	130.0
	319		78	10		97.0)4.0	130.0
	321		10	5		250.0		34.0 38.0	120.0
	322		51	5 5		250.0		58.0	120.0
	323		52	5		250.0			120.0
	324		53	5,				57.0	
								0.00	120.0
	325		54 55	5: 5:		250.0		0.00	120.0
	326		55 5e	5		250.0		0.00	120.0
	327		56	6		250.0		80.0	120.0
	328		61 ce	10		97.0		80.0	130.0
	331		56	5'		97.0		50.0	130.0
	332		57	5		97.0		34.0	130.0
	333	;	58	10	4	97.0	43	50.0	130.0

			Analysis		Transmiss		K		
Node		ation	Demand	Dynamic	Dynamic	Static			Leakage
No.		Pipe		Pressure	Pressure	Pressure			(cum/d)
		(SL)	(cum/d)	(MSL)	(m)	(16)	0.0	0.0	
1		985.0	0.0	1,988.7	3.7	4.0	0.0	0.0	0.0
2	1,	,987.0	0.0	1,988.3	1.4	2.0	0.0	0.0	0.0
3		,978.0	0.0	1,987.1	9.1	11.0	0.0	0.0	0.0
4		,924.0	0.0	1,986.4	62.4	65.0	0.0	0.0	0.0
5		,917.0	0.0	1,985.1	68.1	72.0	0.0	0.0	0.0
6		,946.0	0.0	1,981.4	35.4	43.0	0.0	0.0	0.0
7		,895.0	0.0	1,976.1	81.1	94.0	0.0	0.0	0.0
8		,896.0	0.0	1,964.6	68.6	93.0	0.0	0.0	0.0
9		,881.0	0.0	1,946.1	65.1	108.0	0.0	0.0	. 0.0
10		,877.0	0.0	1,944.7	67.7	112.0	0.0	0.0	0.0
11		,882.0	0.0	1,943.0	61.0	107.0	0.0	0.0	0.0
12		,885.0	0.0	1,942.8	57.8	104.0	0.0	0.0	0.0
13		,887.0	0.0	1,942.0	55.0	102.0	0.0	0.0	0.0
14		,891.0	0.0	1,941.8	50.8	98.0	0.0	0.0	0.0
31		,945.0	0.0	1,955.3	10.3	44.0	0.0	0.0	0.0
32		,906.0	0.0	1,952.1	46.1	83.0	0.0	0.0	0.0
33	3 1	,900.0	0.0	1,949.5	49.5	89.0	0.0	0.0	0.0
34		,881.0	0.0	1,947.0	66.0	108.0	0.0	0.0	0.0
38		,880.0	0.0	1,946.1	66.1	109.0	0.0	0.0	0.0
36		,877.0	0.0	1,944.2	67.2	112.0	0.0	0.0	0.0
37		,882.0	0.0	1,942.7	60.7	107.0	0.0	0.0	0.0
38		,885.0	0.0	1,942.6	57.6	104.0	0.0	0.0	0.0
39		,887.0	0.0	1,941.9	54.9	102.0	0.0	0.0	0.0
40		,891.0	0.0	1,941.7	50.7	98.0	. 0.0	0.0	0.0
5:		,880.7	0.0	1,944.2	63.5	108.3	0.0	0.0	0.0
52		,876.5	0.0	1,943.8	67.3	112.5	0.0	0.0	0.0
5		,882,0	0.0	1,943.6	61.6	107.0	0.0	0.0	0.0
5-		,899.4	0.0	1,943.1	43.7	89.6	0.0	0.0	0.0
5		,902.8	0.0	1,942.6	39.8	86.2	0.0	0.0	0.0
5		1,920.0	0.0	1,941.4	21.4	69.0	0.0	0.0	0.0
5		,890.2	0.0	1,937.9	47.7	98.8	0.0	0.0	0.0
. 5		,887.0	0.0	1,934.6	47.5	102.0	0.0	0.0	0.0
6		1,935.0	0.0	1,940.9	5.9	54.0	0.0	0.0	0.0
7		8.188,1	0.0	1,941.2	59.4	107.2	0.0	0.0	0.0
		1,881.3	0.0	1,941.0	59.7	107.7	0.0	0.0	0.0
		,883.7	0.0	1,940.6	56.9	105.3	0.0	0.0	0.0
		1,882.3	0.0	1,940.3	58.0	106.7	0.0	0.0	0.0
		1,891.4	0.0	1,939.9	48.5	97.6	0.0	0.0	0.0
		1,893.9	0.0	1,939.8	45,9	95.1	0.0	0.0	0.0
		1,914.9	0.0	1,939.3	24.4	74.1	0.0	0.0	0.0
		1,917.5	0.0	1,939.0		71.5	0.0	0.0	0.0
10		1,930.0		1,939.6		59.0	6,286.8	6,286.8	0.0
10		1,930.0		1,938.8		59.0	219.2	219.2	0.0
10		1,920.0		1,934.4		69.0	1,879.0	1,879.0	0.0
10	14	1,946.0	562.0	1,955,1	9.1	43.0	0.0	0.0	0.0

	Net Wo	rk Anal	ysis		Transmis	sion			
Pipe	Node A	Node B	Length	Diameter	C	Flow	Velocity	Pressure Gradient	Loss
Ňο,			(m)	(mm)		(cum/d)	(m/s)	(0/00)	(10)
2	1	2	56.00	250.00	120,00	4,771.00	1.10	6.00	0.30
3	2	3	201.00	250.00	120,00	4,771.00	1.10	6.00	1,20
4	3	4	123.00	250.00	120,00	4,771.00	1.10	6.00	0.70
5	4	5	207.00	250.00	120,00	4,771.00	1.10	6.00	1.30
6	5	6	621.00	250.00	120,00	4,771.00	1.10	6.00	3,80
7	6	ž	884.00	250.00	120,00	4,771.00	1.10	6.00	5.30
8		8	641.00	200.00	120.00	4,771.00	1.80	17.90	11.50
9	8	9	1,036.00	200.00	120.00	4,771.00	1.80	17.90	18.50
10		10	488.00	250.00	120,00	3,205.00	0.80	2.90	1.40
11	10	11	366.00	250,00	120.00	4,106.00	1.00	4.60	1,70
12		12	31.00	250.00	120.00	4,106.00	1.00	4.60	0.10
13		13	183.00	250.00	120,00	4,106.00	1.00	4.60	0.80
14		14	61.00	250.00	120.00	3,874.00	0.90	4.10	0.30
15			518.00	250.00	120,00	3,871.00	0.90	4.10	2.10
32		32	284.00	200.00	120.00	3,742.00	1.40	11.40	3,20
33	32		229,00	200.00	120.00	3,742.00	1.40	11.40	2.60
34			215.00	200.00	120,00	3,742.00	1.40	11,40	2.50
35			242,00	250.00	120.00	3,742.00	0.90	3.90	0.90
36			488.00	200.00	120.00	2,103.00	0.80	3.90	1.90
37			366.00	200.00	120.00	2,103.00	0.80	3.90	1.40
38			31.00	200.00	120.00	2,103.00	0.80	3.90	0.10
39			183.00	200.00	120.00	2,103.00	0.80	3.90	0.70
40		40	61.00	200.00	120.00	2,103.00	0.80	3.90	0.20
41	40	101	518,00	200.00	120.00	2,103.00	0.80	3,90	2.00
51	9	35	31.00	250.00	120.00	-1,639.00	-0.40	-0.80	0.00
201		201	52.00	250,00	120.00	-4,771.00	-1.10	-6.00	-0.30
203		203	234.00	200.00	120.00	-3,742.00	-1.40	-11.40	-2.70
311		71	442.00	97.00	130.00	232.00	0.40	1.90	0.90
312	2 71		65.00	97.00	130.00	232.00	0.40	1.90	0.10
313	3 72	73	221.00	97.00	130.00	232.00	0.40	1,90	0.40
314	1 73	3 74	150.00	97.00	130.00	232.00	0.40	1,90	0,30
315		75	216.00	97.00	130.00	232,00	0.40	1.90	0.40
318			30.00	97.00	130.00	232.00	0.40	1.90	0.10
31			300.00	97.00	130.00	232.00	0.40	1.90	0.60
318			125.00	97.00	130.00	232.00	0.40	1.90	0.20
31			104.00	97.00	130.00	232.00	0.40	1.90	0.20
32			268.00	250.00	120.00	2,304.00	0.50	1.60	0.40 0.40
32.	2 51		268.00	250.00	120.00	2,304.00	0,50	1.60	
32			167.00	250.00	120.00	2,304.00	0.50	1.60	0.30 0.50
32			300.00	250.00	120.00	2,304.00	0.50	1,60 1,60	0.50
32	5 54		300.00	250,00	120.00	2,304.00	0.50		1.30
32				250.00	120.00	2,304.00	0.50	0.90	0.50
32			480.00	250.00	120.00	1,742.00	0.40 2.70	81.00	6.50
32				97.00	130.00	1,742.00	0.90	10.00	3.50
33				97.00	130.00	562.00		10.00	3.30
33			the state of the s	97.00	130.00	562.00		10,00	4.50
33	3 5	8 104	450.00	97.00	130.00	562.00	0.90	10,00	4.00

Node Demand List for Network Analysis(Year 2015) Appendix 5.4.2

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Node Demand List for Network Analysis(Year 2015)

	.* .*		Node Demand List for Network Analysis(Tear 2013)	ist for Netwo	rk Analysis(I	ear 2013)	:			(Unit:cum/d)	
	Demand	Piyatissapura	High Area 1	Low Area 1	LOW Area 2	High Area 2	Bonavista	Опідце Vіем	Vijithapura		
Node	Day Max		Pedro, W/F, G/B, Lov	Banbarakele	New Bore Hole	Upper Lake Road	Race Course	Low Area 1	LOW Area I	Remark	
-2	p/∎no	Piyatissapura	Pedro, W/F, 6/B, Low ers I	Haddon Hill	Hew Reserver	Maseby	Bonabista	Unique View	Vijithapura		
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Water Source Gamunu/Brewerry Remark From Unique View (Unit:cum/d) LOW Area 1 23 Unique View Unique View Low Area 1 53 02222 댨 Bace Course Bonavista Bonabista Upper Lake Road High Area 2 Naseby Node Demand List for Network Analysis(Year 2015) 99 New Bore Hole New Reserver Low Area 2 51 13 ន្ល 822 38 Banberakele Haddon Hill Low Area High Area 1
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ers L 104 101 Piyetissapure Piyati ssapura Piyatissapura 22 13 10 10 10 10 10 99 9 8 62 2222 Day Hax 852 Demand cmm/d 402

Node Demand List for Network Analysis(Year 2015)

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Node Demand List for Network Analysis (Year 2005)

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Node Demand List for Network Analysis(Year 2005)

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Node Demand List for Network Analysis(Year 2005)

TO CHO C										
	Piyatissapura	High Area 1	Low Area 1	Low Area 2	High Area 2	Bonavista	unique view	Vijithapura	•	
Node Day Max	r Piyatissapura	Pedro, W/F, G/B, Lov ers L	Bambarakele	New Bore Hole	Upper Lake Road	Race Course	Low Area 1	Low Area 1	Rea	Remark
cu n /d	Piyatissapura	Pedro, W/F, G/B, Lovers I.	Haddon Hill	New Reserver	Naseby	Bonabista	Unique View	Vi ji thapura		
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Node Demand List for Network Analysis(Year 2005)

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	Demand	Piyatissapura	High Area 1	Low Area 1	Low Area 2	High Area 2	Bonavista	Unique View	Viji thapura	
Node No.	Day Hax	Piyatissapura	Pedro, W/F, G/B, Lov ers L	Banbarakele	New Bore Hole	Upper Lake Road	Race Course	Low Area 1	LOW Area 1	Remark
1	com/d	Piyatissapura	Pedro, W/F, G/B, Lov ers L	Haddon Hill	New Reserver	Naseby	Bonahista	Unique View	Vi ji thapura	
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Appendix 5.4.4 Magnification of Node Demand for Netwok Analysis

, A	Vear			1,995		2,005		2,015	Remark
Day Mean Demand		cum/d	8,133		8,506		8,919	4.00	Including NRW
	cation		0.739	0.739 =8,133/11,000	0.773	0.773 =8,506/11,000	0.811	0.811 =8,919/11,000	
	Load Factor		1.2		1.2		1.2		
Day Max	Demand	cum/d	9,760	9,760 =8,133*1.2	10,200	10,200 =8,506*1.2	11,000	11,000 =8,919*1.2	
:	Magnification		0.887	0.887 =9,760/11,000	0.928	0.928 =10,200/11,000 1.000 =11,000/11,000	1.000	=11,000/11,000	
	Peak Factor		2.0		2.0		2.0		
Hourly Max Demand	Demand	cum/d	16,266	'd 16,266 =8,133*2.0	17,012	17,012 =8,506*2.0	17,838	17,838 =8,919*2.0	
•	Magnification		1.479	=9,760/11,000	1.547	1.479 = 9,760/11,000 1.547 = 17,012/11,000 1.622 = 17,838/11,000	1.622	=17,838/11,000	

Withdrawal flow in nodes are based on daily maximum flow(2,015) and modified by node No.

Appendix 5.4.5

Calculation of Node Demand for Vijithapura and Unique View Hill Reservoir

שנת יוסף כסיים יוסף		Remark		=Basic node flow Refer	to node Demand List(2,15)								
	View Hill	(Node No.541)	Remark			=905*0.739	=669/0.739	=905*0.887	543 =803/1.479	=905*0.811		=905*1.000	=905/1.622
	Unique	(Nod	Demand		902	699	902	803	543	734	906	305	558
	thapura	(Node No.540)	Remark			=658*0.739	=486/0.739	=658*0.887	=584/1.479	=658*0.811	=534/0.811	=658*1.000	=658/1.622
	ICIV	(Node	Demand		658	486	658	584	395	534	658 =	658	406
			<u></u>			Actual Demand	Input Demand	0.887 Actual Demand	Input Demand	0.811 Actual Demand	Input Demand	Actual Demand	Input Demand
		Magnification	Demand Magnification			0.739	0.739	0.887	1.479	0.811	0.811	1.000	
		Magnif	Domand	7		Day Mean	Day Mean	Dav Max	Hour Iv Max	Day Mean	Day Mean	Day Max	Hourly Max
		A CA	Domand	TO THOM TO		1 QQK Daw Mean	Day mount	1 005 Harry Vay Dav Max	The state of	9 015 Day Mean		2 015 Hourly Max Day Max	
		₹	Voon	1001		- 1		1 005	1,000	9 015	27.6	2 015	27.62
	Moture	Time	24.61			Tvicioting	Simpereren						

Dry and Wet Season

													-	-	-		~
DIT CHANGE COMPANY		Remark		=Basic node flow Refer	to node Demand List(2,15)												
	Unique View Hill	(Node No.541)	Remark			=928*0.739	=686/0.739	=928*0.887	557 =823/1.479	=928*0.773	928 =717/0.773	861 =928*0.928	557 =861/1.547	=928*0.811	=753/0.811	=928*1.000	572 =928/1.622
	Unique	(Node	Demand		928	989	928	823	557	717	928	861	557	753	828	928	572
	Vijithapura	(Node No.540)	Remark			=694*0.739	694 =513/0.739	616 =694*0.887	=616/1.479	=694*0.773	694 =536/0.773	=694*0.928	416 =644/1.547	=694*0.811	694 =563/0.811	694 =694*1.000	428 =694/1.622
	Viji	(Node	Demand		694	513	169	616	416	536	694	644	416	563	694	694	428
						0.739 Actual Demand	0.739 Input Demand	0.887 Actual Demand	1.479 Input Demand	Actual Demand	Input Demand	Actual Demand	Input Demand	Actual Demand	Input Demand	Actual Demand	Input Demand
		Magnification	Magnification	TIMBUTT TO CO TO		0.739	0.739	0.887	1.479	0.773 A	0.773	T-	1	0.811	0.811	1.000 A	1.622
		Magnif	選出	(#/\frac{1}{2})		Day Mean	Day Mean	Dav Max	Hourly Max	Day Wean	Day Mean	Day Max	Hourly Max	Day Mean	Day Mean	Day Max	Hourly Max
		CASE	Domond	nomen a		995 Day Mean	-	1 995 Hour v Max Day Max		2 005 Day Mean		2 005 Hourly Max Day Max	.	2.015 Day Mean		2.015 Hourly Max Day Max	
		<u>ට</u>	Voor	1001		1 995	2	1 995	200 51	2 005	2	2 005) 	2.015) 1	2.015	î
	Notwork	Tone	24.71			Pronosed	nacodo I I										···

Withdrawal flow in nodes at Vijithapura, Unique View Hill Reservoir in Low Area 1 is based on Daily maximum Flow

Node Demand for High Area 1 Reservoir Dry Season		Remark						815 Treated as Reservoir	
emand for	2,005	Supply	(cnm/d)	63	364	247	103	815	1.592
Node I	1,995	Supply	(cum/d)	20	290	197	82	650	1.269
fo		Ratio	<u>%</u>	3.96%	22.89%	15.49%	6.46%	51.19%	100.00%
Calculation of	2,015	Supply	(com/d)	89	393	266	111	879	1.717
		Node No.		205	206	215	209		
Appendix 5.4.6		Reservoir		New Water Field	01d Water Field	Gamunu/Brewery	Lovers Leap	(Pedro)	To+2]

1,995 Demand High Area 1/All Area=1,717/11,000=0.156 0.156*8,133=1,269cum/d

Upon demand calculation, above mentioned values shall be adopted. Reservoirs excluding Pedro Reservoir are assumed as withdrawal nodes.

		ppendix 5.5 S									
	F.	scilities		Description	Unit	Unit Price	2,065	Cast	2,015 Quantity	Cost	Fotal Cost
	l						Quantity	Cost	Quality.		
Int	ake P	aclitics U	/ell	150 m/piece	pes	7,944,000.0	7	\$5,608,000	0	o C	55,608,000
	<u>'''</u>			Jeum/min*50m*15kw	set	2,778,000.0	8	22,224,000	0	0	22,224,000
-			lectrical Facilities	15 kw	Set	0.000,830,1	7	7,476,090	0.	0	7,476,000
·~			ower Supply Cost	15 kw	sat	75,000.0	7	525,000		0	525,000
			ump House	10 m2/set	set	200,000.0		1,400,000		0	1,400,000
-		7	ransmission l'ipe	PVC \$160	m	3,502.0	1,240	4,312,480		0	4,342,400
İ	T	ransmission Pacifitise 1	o Haddon Hill Res								
Ĺ				21cum		0.500.0	24	228,720		0	228,720
			Concrete		m3	9,530.0	159	168,540		0	168,54
L	1.	.,	orm Work		512	72,970.0	3	218,910	0	0	218,91
L			deinforcement	0.12	ton set	0.0	— <u> </u>	616,170	- 0	0	616,17
ļ.,			Aiscellaneous		m2	20,000.0	25	500,000	0	0	500,00
4	\perp		ump House	25 m2 3.47cum/m*68m*75kw	set	3,168,000.0	2	6,336,000	0	0	6,336,00
ļ.	4		ump Equipment	75 kw	≗ot	3,998,000.0	i	3,998,000	0	0	3,998,00
╀	-		Electrical Pacifities	75 kw	set	1,404,000.0	1	1,404,000	0	0	1,404,00
ļ	-+		Power Supply Cost To Low Area 2 Res	13 88							
†-	-		(Pump Pit)	21cum							
┝	— <u>├</u> -		Concrete		513	9,530.0	24	228,720	0		228,72
H	+		Porm Work		m2	1,060.0	159	168,540	0	0	168,5
╁╌	-		Reinforcement	0.12	ton	72,970.0	3	218,910	0	0	218,9
t	-+		Miscellaneous	100%	set	0.0	1	616,170	0	0	616,17
H			Pump House	25 m2	m2	20,000.0	25	500,000	0	0	500,0
ţ-			Pump Equipment	1.30cum/m+63m+30kw	set	1,945,000.0	2	3,890,000	0		3,890,0
ŀ			Electrical Pacifitles	30 kw	şet	1,756,000.0		1,756,000	0	0	1,756,0
t			Fower Supply Cost	30 kw	set	75,000.0		75,000	. 0	0	75,0
+					i				lanawa l		
t	. 1	Sub Total			🚟			112,499,160	5.838833	0	112,499,1
1	rans	mission Pipe Line								-	
1		Transmiss	ion Main of Undergro	und Water			-				44,020,8
ť	†		DI	φ300	III.	10,190.0	4,320	44,020,800	0	0	3,150,7
†			PVC	Ф225	cs.	4,501.0	700	3,150,700	0	0	ارلادارد
1	t	Transmiss	ion Main of Surface \			<u>.</u>	- 	AA 47	498	4,172,400	34,482,1
Ť			DI	φ250	m	8,550.0	3,545	30,309,750	100	9,172,400	8,268,4
†	***		PVC	φ110	w	2,884.0	2,867	8,268,428			0,400,1
1		To Naseby	Res				L	- 463.000	0	0	1,303,0
†	~		Pump Equipment	0.42cum/m+25m+3.7kw	set	1,303,000.0	 :	1,303,000	- 0	. 0	80,0
Ť			Pump House	4.0 m2	m2	20,000.0	4	80,000 578,000	0	0	578,0
ī			Electrical Pacifities	3.7 kw	set	578,000.0	;	75,000	0	0	75,0
I			Power Supply Cost	3.7 kw	set	75,000.0	 	75,000	<u>-</u>	h	
Ι		To Vijith			+	1,317,000.0	1	1,317,000	0	0	1,317,0
1			Pump Equipment	0.48cum/m*25m*3.7kw	set	20,000.0	1	80,000	0	0	80,
┙			Pump House	4.0 m2	m2	605,000.0	1	605,000	0	0	605/
_			Electrical Pacilities	3.7 kw	set	75,000.0	1	75,000	0	. 0	75,0
. 1			Power Supply Cost	3.7 kw	set	75,000.0	 				
4		To Uniqu	e View Hill	0.64	set	1,700,000.0	1 1	1,700,000	0	0	1,700,
_			Pump Equipment	0.64cum/m+85m+18kw	m2	20,000.0	4	80,000		0	80,
-			Pump House	4.0 m2 18 kw	set	1,306,000.0	 	1,306,000		0	1,306,
-			Electrical Facilities		set	75,000.0	1	75,000		0	75,
-1											
			Power Supply Cost)8 kw	-	1	1	73,000			
	40000		Power Supply Cost	18 kw	2 833			91,023,678		4,172,409	97,196
_		Sub Total	Power Supply Cost	18 kw							
3	Trea	Sub Total tment Facilities)8 kw		600,000.0			0	0	1,860,
3	Trea		Chlorinator		sel	0.000,000	3	93,023,678	0	0	1,860,
3	Trea			18 kw		0.000,000	3	93,023,678 1,800,000 1,350,000	0 0	0	1,800, 1,350,
3	Trea	ment Facilities	Chlorinator		sel	0.000,000	3	93,023,678	0 0	0	1,800, 1,350,
3		ment Facilities Sub Total	Chlorinator		sel	0.000,000	3	93,023,678 1,800,000 1,350,000 3,150,000	0 0	0 0	1,800, 1,350, 3,150
3		ment Facilities Sub Total	Chlorinator Chlorination House		sel	600,000.0 450,000.0	3 3	93,023,678 1,800,000 1,350,000 3,150,000	0 0	0 0	1,800, 1,350, 3,150
3		sub Total Sub Total Sub Total Sub Total Sub Total Sub Total Cold Water Pield Reservois	Chlorinator Chlorination House		set set	9,530.0 1,000.0	3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	91,023,678 1,800,000 1,350,000 3,150,000 1,524,800 424,000	3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0	1,800, 1,350, 3,150 1,524 424
3		ment Facilities Sub Total	Chlorinator Chlorination House		set	9,530.0 1,060.0	3 3 3 160 160 400 19	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 424,000 1,386,436	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1,800 1,350 3,150 1,524 424 1,386
4		sub Total Sub Total Sub Total Sub Total Sub Total Sub Total Cold Water Pield Reservois	Chlorinator Chlorination House Concrete Form Work	10 m2	set set mil	9,530.0 1,060.0	3 3 3 160 160 400 19	91,023,678 1,800,000 1,350,000 5,150,000 1,524,500 424,000 1,386,430 3,335,231	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1,800, 1,350, 3,150 1,524 424 1,386 3,335
3		sub Total Sub Total Sub Total Sub Total Sub Total Sub Total Cold Water Pield Reservois	Chlorinator Chlorination House Concrete Form Work Reinforcement	10 m2	set	9,530.0 1,060.0 12,970.0	160 3 400 19 11	93,023,678 1,800,000 1,350,000 3,150,000 1,524,500 424,000 1,383,523 6,670,46	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1,800, 1,350, 3,150 1,524 424 1,386 3,335 6,670
4		sub Total Sub Total Sub Total Sub Total Sub Total Sub Total Cold Water Pield Reservois	Chlorinator Chlorination House Concrete Porm Work Reinforcement Miscellaneous	10 m2	set	9,530.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0	3 3 3 160 400 19 10 10 10 10 10 10 10 10 10 10 10 10 10	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 424,000 1,386,430 3,386,430 4,955,600 4,955,600	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0	1,800, 1,350, 3,150 1,524 424 1,386 3,335 6,670 4,955
3		Inent Facilities Sub-Total Facilities Old Water Field Reservoir 100 m3	Chlorinator Chlorination House Chlorination House Concrete Form Work Reinforcement Miscellaneous Sub Total	10 m2	set	9,530.0 1,060.0 12,970.0 1 9,530.0	3 3 3 160 400 19 1 19 3 1	93,023,678 1,800,000 1,350,000 3,150,000 1,524,500 424,000 1,386,43 3,335,23 6,670,46 4,955,600 1,336,300 1,356,800 1,35	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0	1,800, 1,250, 3,150 1,524 424 1,386 6,670 4,935
3 4		Sub-Total	Chlorinator Chlorination House Concrete Porm Work Reinforcement Miscellaneous Sub-Total Concrete	10 m2 0.1 1000	sel	9,530.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0	3 3 160 400 19 1 1 0 520 0 1,280 0 62	93,023,678 1,800,000 1,350,000 3,150,000 4,524,804 424,000 1,384,323 6,670,464 4,955,600 1,356,800 4,524,141	b 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,800, 1,250, 3,150 3,150 1,524 424 1,366 3,335 6,670 1,955 1,356 4,524
4		Sub-Total	Chlorinator Chlorination House Concreto Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous	10 m2	sel	9,530.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0 1,060.0	3 3 160 400 19 1 1 0 520 0 1,280 0 62	93,023,678 1,800,000 1,350,000 3,150,000 1,524,500 424,000 1,353,333,32 6,670,461 4,955,600 1,356,800	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,800 1,350 3,150 1,524 1,366 3,335 6,670 4,955 1,356 4,524 10,836
4		Sub-Total	Chlorisator Chlorisator Chlorisation House Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total	10 m2 0.1 1000	set sct sct sct sct sct sct sct sct sct sc	600,000.0 450,000.0 9,530.0 1,660.0 72,970.0 0,1 1,660.0 1,660.0 1,660.0 1,660.0 1,660.0 1,660.0	3 3 160 4 490 1 19 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 424,000 1,386,431 3,335,232 6670,400 4,955,600 4,955,600 4,524,141 1,036,643 1,216,73,080	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,800 1,350 3,150 1,524 424 1,286 3,235 6,670 1,256 1,256 1,050 1,
4		Sub-Total	Chlorisator Chlorisation House Concrete Porm Work Reinforcement Miscellareous Sub Total Concrete Form Work Reinforcement Miscellareous Sub Total Concrete Concrete Concrete Concrete Concrete Concrete Concrete	10 m2 0.1 1000	set sct sct sct sct sct sct sct sct sct sc	9,530.0 1,060.0 1,0	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 5,150,000 1,524,500 1,386,434 3,335,231 6,670,461 4,955,600 1,356,800 4,524,141 10,835,541 21,673,089 2,287,200 2,287,200	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,800 1,350 3,150 1,524 421 1,386 3,235 6,670 1,955 4,522 10,882 21,673 2,287
4		Sub-Total	Chlorinator Chlorination House Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work	10 m2 0.1 1000	set	9,530,000.00 9,530,000.00 1,06	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 3,150,000 424,000 1,284,804 425,000 4,955,60 4,955,60 4,955,60 4,955,60 4,224,141 10,836,544 21,673,08 2,287,20 646,60	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,380 3,150 1,524 424 1,386 6,670 4,955 1,356 1,356 2,1673 2,1673 2,1673 2,1673
3 4		Sub-Total	Chlorinator Chlorination House Concreto Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Form Work Reinforcement Reinforcement Reinforcement Reinforcement Reinforcement	10 m2 0.1 10.00 0.1 100 0.1 100	set	9,530.6 1,060.0 1,060.	3 3 3 1600 19 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1,800,000 1,350,000 1,350,000 1,350,000 1,524,500 424,000 424,000 4,955,600 4,955,600 4,955,600 4,956,640	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,350, 3,150, 1,524, 424, 1,386, 6,670, 1,955, 1,356, 1,356, 1,356, 1,072, 2,287, 2,28
4		Sub-Total	Chlorientor Chlorientor House Concreto Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Miscellaneous	10 m2 0.1 1000	set	9,530.6 1,060.0 1,060.	3 3 3 1600 19 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	93,023,678 1,800,000 1,350,000 3,150,000 1,524,500 1,386,43 3,335,231 6,670,461 1,955,600 1,356,800 4,2524,141 10,836,544 21,673,089 2,287,200 646,600 2,116,13 5,049,93	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,350 3,150 1,524 424 1,386 5,235 1,356 1,356 1,356 21,673 2,287 2,287 2,101 6,640 2,101 6,640 6
3 4		Sub-Total	Chlorisator Chlorisator Chlorisation House Concreto Porm Work Reinforcement Miscellameous Sub-Total Concreta Form Work Reinforcement Miscellameous Sub-Total Concrete Porm Work Reinforcement Miscellameous Sub-Total Sub-Total Sub-Total	10 m2 0.1 10.00 0.1 100 0.1 100	mil set	9,530.0 1,060.0 1,0	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 424,000 1,386,434 3,335,233 6,670,464 4,955,600 1,356,800 4,524,141 10,836,544 21,673,800 2,287,20 646,600 2,116,13 5,049,93 10,099,866		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,800 1,350 3,150 1,524 424 1,386 3,355 1,356 4,524 1,955 2,167 2,287 646 2,116 2,110 10,000
4		Sub-Total Sub-Total Dution Pacilities Old Water Field Reservoir 100 end Pedro Reservoir 220 end Unique View Reservoir 200 end Vijitapura Reservoir	Chlorinator Chlorination House Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete	10 m2 0.1 10.00 0.1 100 0.1 100	set	9,530,000.00 9,530,000.00 1,060.00	3 3 160 4400 191 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	93,023,678 1,800,000 1,350,000 3,150,000 424,000 1,324,804 4,955,000 4,955,000 4,955,000 4,955,000 4,955,000 2,1073,020 646,600 2,116,13 5,049,93 1,099,86 1,810,709,88	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,350 3,150 1,524 424 1,386 6,670 4,955 1,356 21,673 2,287 2,287 2,116 5,049 1,093 1,093 1,093
4		Sub-Total	Chlorisator Chlorisator Chlorisation House Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Concrete Form Work Form Work Concrete Form Work	10 m2 0.1 10.00 0.1 100 0.1 100	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 424,000 1,386,431 3,335,231 6,670,46 4,955,600 4,524,141 1,036,56 21,673,08 2,287,20 646,60 2,116,13 5,049,93 10,099,86 1,810,70 5,08,00 5,08,00		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,800 1,350 3,150 1,524 424 1,386 3,335 1,355 1,356 4,524 10,938 2,287 2,287 1,673 2,111 10,099 1,010
4		Sub-Total Sub-Total Dution Pacilities Old Water Field Reservoir 100 end Pedro Reservoir 220 end Unique View Reservoir 200 end Vijitapura Reservoir	Chlorientor Chlorientor House Concrete Porm Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Reinforcement Reinforcement Reinforcement Reinforcement	10 m2 0.1 100 0.1 100 0.1 100 0.1 100	set	9,530.00 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 3,150,000 1,524,500 1,386,43 3,335,231 6,670,461 1,0836,54 4,524,141 10,836,54 21,673,081 2,287,20 646,600 2,116,13 5,049,93 10,099,86 1,810,700 508,801	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,350 1,524 424 1,366 1,524 1,366 1,525 1,356 1,955 1,356 1,356 1,356 1,258 1,258 1,673 1,258 1,673 1,156 1,673 1,156 1,673 1,167 1,167 1,167 1,171 1,293
4		Sub-Total Sub-Total Dution Pacilities Old Water Field Reservoir 100 end Pedro Reservoir 220 end Unique View Reservoir 200 end Vijitapura Reservoir	Chlorinator Chlorination House Concreto Porm Work Reinforcement Miscellaneous Sub-Total Concreta Form Work Reinforcement Miscellaneous Sib-Total Concrete Porm Work Reinforcement Miscellaneous Sub-Total Concrete Form Work Reinforcement Miscellaneous Sub-Total Concrete Form Work Reinforcement Miscellaneous Miscellaneous Miscellaneous	10 m2 0.1 10.00 0.1 100 0.1 100	set	9,530.00 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 3,150,000 1,524,500 1,386,430 1,386,430 4,524,141 10,836,540 4,524,141 10,836,540 2,161,33 2,287,20 646,600 2,1161,33 5,049,93 10,099,86 1,810,70 508,80 1,678,811		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,380, 1,524, 424, 1,386, 1,524, 424, 1,386, 6,670, 1,955, 1,356, 1,356, 21,673, 2,887, 2,116, 5,049, 1,910, 5,049, 1,910, 5,049, 1,910, 5,049, 1,910, 5,049, 1,910, 5,049, 1,910, 5,049, 1,910, 5,049, 1,910, 5,049, 1,910
4		Sub-Total Sub-Total Fourities Old Water Field Reservoir 220 ss3 Unique View Reservoir 200 m3 Vijitapura Reservoir 140 m3	Chlorisator Chlorisator Chlorisator Chlorisation House Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Sub Total	10 m2 0.1 100 0.1 100 0.1 100 0.1 100	set	9,530,000.00 450,000.00 450,000.00 9,530,000.00 1,060.00	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 424,000 1,386,433 3,335,231 6,670,400 1,356,800 4,524,14 1,0836,500 2,167,308 2,287,200 2,116,13 5,049,93 1,093,80 1,678,31 5,049,93 1,678,31 3,997,81 7,993,62	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,800, 1,350, 1,350, 1,524, 424, 1,386, 4,955, 1,356, 4,955, 1,356, 21,673, 2,287, 2,116, 5,049, 10,093, 1,911, 5,064, 1,977, 1,977, 1,991, 1,
4		Sub-Total Sub-Total Poultines Old Water Field Reservoir 220 m3 Unique View Reservoir 204 m3 Vijitapura Reservoir 140 m3	Chloriestor Chloriestor House Concrete Porm Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete	10 m2 0.1 100 0.1 100 0.1 100 0.1 100	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 1,386,434 3,335,231 6,670,461 1,955,600 4,254,141 10,836,54 2,1673,08 2,187,20 646,600 1,810,700 508,800 1,678,311 3,997,811 3,997,814		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,350 1,524 424 1,366 4,955 6,670 1,955 1,256 21,672 21,673 4,925 1,110 1,002 1,111 1,002 1,111 1,002 1,111 1,002 1,111 1,002 1,111 1,002 1,111 1,002 1,111 1,002 1,111 1,002 1,111 1,002
3 3 4 4		Sub-Total Sub-Total Fourities Old Water Field Reservoir 220 ss3 Unique View Reservoir 200 m3 Vijitapura Reservoir 140 m3	Chlorisator Chlorisator Chlorisator Chlorisation House Form Work Reinforcement Miscellareous Sub Total Concrete Form Work	10 m2 0.1 100 0.1 100 0.1 100 0.1 100	set	600,000.0 450,000.0 450,000.0 1,060.0 1,060.0 1,050.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 5,150,000 1,524,500 1,386,434 3,335,231 6,670,461 4,955,600 4,955,600 4,524,141 10,836,541 2,673,089 2,216,13 5,049,93 10,099,86 1,810,70 5,08,80 1,678,31 3,997,81 7,955,62 4,197,90 1,1144,80		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,380, 1,380, 1,524, 424, 1,386, 1,524, 1,386, 1,396, 1,395, 1,396, 2,1673, 2,287, 1,10, 1,91
3 4		Sub-Total Sub-Total Poultines Old Water Field Reservoir 220 m3 Unique View Reservoir 204 m3 Vijitapura Reservoir 140 m3	Chlorinator Chlorination House Concrete Porm Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Reinforcement Reinforcement Reinforcement Reinforcement Reinforcement Reinforcement	0.1 1000 0.1	## set ##	600,000.0 450,000.0 9,530.0 1,060.0	3 3 3 160 160 190 190 190 190 190 190 190 190 190 19	93,023,678 1,800,000 1,350,000 3,150,000 4,24,000 424,000 43,335,233 6,670,464 4,955,600 4,524,141 10,836,544 2,287,20 646,600 2,116,13 5,049,93 1,070,938 1,671,811 3,997,81 7,995,62 4,007,90 1,144,86 3,794,44		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,350, 1,524, 424, 1,366, 1,524, 1,326, 1,32
4		Sub-Total Sub-Total Poultines Old Water Field Reservoir 220 m3 Unique View Reservoir 204 m3 Vijitapura Reservoir 140 m3	Chloriestor Chloriestor Chloriestor House Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Reinforcement Miscellaneous	0.1 10 m2 0.1 100 0.1	## set ##	600,000.0 450,000.0 9,530.0 1,060.0	3 3 3 160 160 190 190 190 190 190 190 190 190 190 19	93,023,678 1,800,000 1,350,000 3,150,000 4,24,000 424,000 43,335,233 6,670,464 4,955,600 4,524,141 10,836,544 2,287,20 646,600 2,116,13 5,049,93 1,070,938 1,671,811 3,997,81 7,995,62 4,007,90 1,144,86 3,794,44		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,350, 1,524, 424, 1,366, 1,524, 1,326, 1,32
4		Sub-Total Sub-To	Chlorinator Chlorination House Concrete Porm Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Reinforcement Reinforcement Reinforcement Reinforcement Reinforcement Reinforcement	0.1 10 m2 0.1 100 0.1	## set ##	600,000.0 450,000.0 9,530.0 1,060.0	3 3 3 160 160 190 190 190 190 190 190 190 190 190 19	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 1,224,800 1,386,431 3,335,231 6,670,400 1,356,809 4,524,411 1,356,809 4,524,411 1,356,809 4,524,411 1,356,809 1,16,13 5,049,93 10,099,86 1,678,31 3,997,81 7,995,62 4,097,90 1,144,80		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,350 1,524 424 1,366 1,524 1,366 1,524 1,366 1,955 1,356 1,955 1,356 2,1,673 2,2888 646 2,116 560 1,910 1,9
4		Sub-Total Sub-Total Poultines Old Water Field Reservoir 220 m3 Unique View Reservoir 204 m3 Vijitapura Reservoir 140 m3	Chlorisator Chlorisator Chlorisator Chlorisator Chlorisator Porm Work Reinforcement Miscellareous Sub Total Concrete Porm Work Reinforcement Miscellaneous	0.1 10 m2 0.1 100 0.1	## set ##	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 3,150,000 1,524,800 424,000 1,386,433 3,335,231 6,670,4,524,141 1,386,433 2,287,200 4,254,141 1,367,200 1,161,35,000 1,678,31 5,049,93 1,078,31 5,049,93 1,078,31 1,079,00 1,1144,80 1,144,80 1,144,80 1,144,80 1,144,80 1,144,80 1,144,80 1,14		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,350 1,524 424 1,386 1,524 425 1,386 1,525 1,356 1,35
4		Sub-Total Sub-To	Chlorisator Chlorisator Chlorisator Chlorisation House Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Miscellaneous Sub Total	0.1 10 m2 0.1 100 0.1	set	600,000.0 450,000.0 9,530.0 1,060.0 72,970.0 1,060.0	3 3 3 3 3 3 3 3 3 3	93,022,678 1,800,000 1,350,000 1,524,800 1,524,800 1,386,434 3,335,223 6,670,461 1,955,600 1,356,800 4,524,141 10,836,54 21,673,081 2,287,200 646,600 1,810,700 508,800 1,678,311 3,997,811 1,414,80 3,794,44 13,074,24 13,074,24	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,350 1,524 424 1,386 4,955 1,956 1,956 21,673 2,287 1,673 1,000 1,677 1,919 1,911 1
4		Sub-Total Sub-To	Chlorisator Chlorisator Chlorisator Chlorisator Chlorisation House Concrete Form Work Reinforcement Miscellaneous Sub Total	0.1 10 m2 0.1 100 0.1	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 1,524,500 1,524,500 1,386,434 3,335,231 6,670,461 4,955,600 4,524,141 10,836,541 21,673,089 2,216,73 5,049,93 10,099,86 1,810,70 508,80 1,678,31 3,997,81 7,995,62 4,027,90 1,144,86 3,794,44 9,037,41 13,074,22 123,22 5,378,12 1,729,55	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,350 1,524 424 1,366 4,955 6,670 1,356 21,673 2,287 646 2,116 1,003 1,110 1,003 1,110 1,003 1,110 1,003 1,110 1,003 1,
4		Sub-Total Sub-To	Chlorientor Chlorientor House Concrete Porm Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Porm Work Reinforcement Miscellameous Sub Total PVC 663 PVC 675 PVC 675	0.1 10 m2 0.1 100 0.1	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 160 160 190 190 190 190 190 190 190 190 190 19	93,023,678 1,800,000 1,350,000 1,524,500 424,000 1,386,434 3,335,231 6,670,464 4,955,600 1,365,804 2,167,31 2,167,31 3,997,81 7,995,62 4,097,90 1,144,86 3,794,44 9,037,14 13,074,22 123,20 1,23,26	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,380 1,380 1,524 424 1,386 4,955 6,670 1,955 1,356 2,1,673 2,116 5,049 10,099 1,910 5,009 1,910 5,009 1,910 1,91
4		Sub-Total Sub-To	Chlorisator Chlorisator Chlorisator Chlorisator Chlorisator Porm Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Miscellaneous Sub Total PVC 063 PVC 075 PVC 0110 PVC 0 160	0.1 10 m2 0.1 100 0.1	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,022,678 1,800,000 1,350,000 1,524,800 1,524,800 1,386,431 3,335,221 6,670,461 1,356,800 4,752,141 1,0,836,54 21,673,08 2,287,20 646,600 1,678,31 5,049,93 1,099,86 1,678,31 3,997,81 1,448,6 3,794,44 3,794,44 1,379,46 1,144,86 3,794,46 1,144,86 3,794,46 1,130,74,22 1,123,22 1,123,22 1,123,22 1,124,23 1,124,23 1,124,24 1,124,26 1	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,350 1,524 424 1,386 4,525 1,325 1,325 1,325 1,325 1,325 1,325 1,325 1,673 2,187 2,116 5,049 1,039 1,101 5,049 1,57 1,91 1,01 1,01 1,01 1,01 1,01 1,01 1,01
4		Sub-Total Sub-To	Chloriestor Chloriestor Chloriestor House Concrete Form Work Reinforcement Miscellaneous Sub Total PVC 463 PVC 475 PVC 4110 PVC 4160 PVC 4225	0.1 10 m2 0.1 100 0.1	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 1,524,500 1,524,500 1,386,433 3,335,231 6,670,461 10,836,54 10,836,54 21,673,08 2,287,20 64,620 416,13 5,049,93 10,099,86 1,678,31 3,997,81 1,414,70 508,80 1,678,31 3,997,81 1,414,80 3,794,44 9,037,41 110,74,22 110,74,22 110,729,5	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,350 1,524 424 1,366 1,524 1,366 6,670 1,955 1,955 1,955 1,956 1
4		Sub-Total Sub-To	Chloriestor Chloriestor House Concreto Porm Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Form Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Miscellaneous Sub Total Concrete Porm Work Reinforcement Miscellaneous Sub Total PVC 463 PVC 475 PVC 4110 PVC 4160 PVC 4225 DIP 4250	0.1 10 m2 0.1 100 0.1	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 1,524,500 424,000 1,386,434 3,335,231 6,670,461 4,955,600 4,955,600 2,16,13 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,939,861 1,810,70 1,1144,80 3,734,44 9,037,141 13,074,22 1,372,52 1,372,52 1,373,44 9,037,141 13,074,22 1,372,52 1,373,44 9,037,141 1,374,24 1,373,24	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860 1,380 1,380 1,524 424 1,386 6,670 4,955 1,356 2,1,673 2,288 646 2,116 5,649 1,093 1,144 1,973 1,993 1,144 1,973 1,993 1,144 1,973 1,993 1,144 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,147 1,973 1,772 1,
3 4 4		Sub-Total Sub-Total Dutton Pacifities Old Water Field Reservoir 100 m3 Pedro Reservoir 220 m3 Unique View Reservoir 200 m3 Vijitapura Reservoir 140 m3 Low Area 2 Reservoir 470 m3	Chlorientor Chlorientor House Concrete Porm Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Porm Work Reinforcement Miscellameous Sub Total PVC \$63 PVC \$63 PVC \$75 PVC \$110 PVC \$150 PVC \$225 DIP \$250 Sub Total	0.1 10 m2 0.1 100 0.1	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 1,524,500 1,524,500 1,386,433 3,335,231 6,670,461 10,836,54 10,836,54 21,673,08 2,287,20 64,620 416,13 5,049,93 10,099,86 1,678,31 3,997,81 1,414,70 508,80 1,678,31 3,997,81 1,414,80 3,794,44 9,037,41 110,74,22 110,74,22 110,729,5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,800, 1,380, 1,380, 1,524, 424, 1,366, 6,670, 4,955, 1,356, 4,522, 10,836, 21,672, 2,878, 646, 2,116, 5,049, 10,099, 1,144, 1,677, 9,931, 1,444, 1,931, 1,147, 1,167, 1,1
4		Sub-Total Sub-Total Sub-Total Doublon Pacilities Old Water Field Reservoir 100 m3 Pedro Reservoir 220 m3 Unique View Reservoir 200 m3 Vijitapura Reservoir 140 m3 Low Area 2 Reservoir 470 m3	Chlorientor Chlorientor House Concrete Porm Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Porm Work Reinforcement Miscellameous Sub Total PVC \$63 PVC \$63 PVC \$75 PVC \$110 PVC \$150 PVC \$225 DIP \$250 Sub Total	0.1 10 m2 0.1 100 0.1	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 1,350,000 1,524,500 1,386,434 3,335,231 6,670,461 10,836,54 4,524,141 10,836,54 2,161,33 2,287,20 646,600 2,1161,33 3,997,81 2,180,73 1,478,31 3,997,81 1,478,31 3,795,62 1,144,85 3,794,14 9,037,14 1,374,24 1,374,24 1,374,24 1,374,24 1,3729,5 3,729,5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,860, 1,350, 1,350, 1,524, 424, 1,366, 6,670 4,955, 1,356, 4,522, 1,073, 1,099, 1,100
4		Sub-Total Sub-Total Dutton Pacifities Old Water Field Reservoir 100 m3 Pedro Reservoir 220 m3 Unique View Reservoir 200 m3 Vijitapura Reservoir 140 m3 Low Area 2 Reservoir 470 m3	Chlorientor Chlorientor House Concrete Porm Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Form Work Reinforcement Miscellameous Sub Total Concrete Porm Work Reinforcement Miscellameous Sub Total PVC \$63 PVC \$63 PVC \$75 PVC \$110 PVC \$150 PVC \$225 DIP \$250 Sub Total	0.1 100 m2	set	600,000.0 450,000.0 450,000.0 1,060.	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93,023,678 1,800,000 1,350,000 1,524,500 424,000 1,386,434 3,335,231 6,670,461 4,955,600 4,955,600 2,16,13 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,836,541 10,939,861 1,810,70 1,1144,80 3,734,44 9,037,141 13,074,22 1,372,52 1,372,52 1,373,44 9,037,141 13,074,22 1,372,52 1,373,44 9,037,141 1,374,24 1,373,24	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2,287 \$46 \$10,099 1,010 1,009 1,010 1,679 2,997 1,144 3,799 1,144 3,799 10,077 10,077 12,21 13,379 14,979 14,979 15,377 16,279 16,

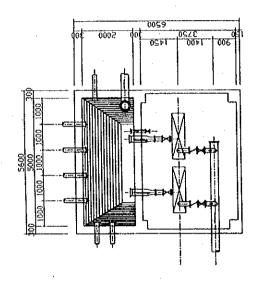
Chapter 6

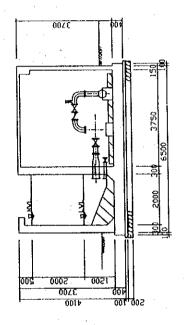
Appendix 6.1 Drawings

Appendix 6.1 Drawing

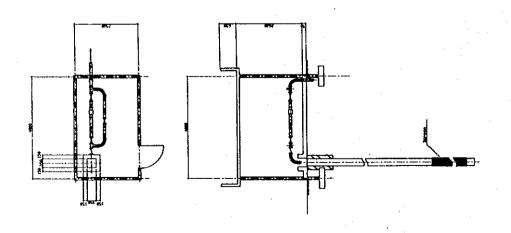
Drawing List

No.	Drawing Name	
W.1- 1	Intake Facilities	
W.2- 1	Typical Drawing of Service Reservoir	
W.2- 2	Layout of Old Water Field Service Reservoir	
W.2- 3	Layout of Pedro Service Reservoir	
W.2- 4	Layout of Unique View Hill Service Reservoir	
W.2- 5	Layout of Vijitapura Service Reservoir	



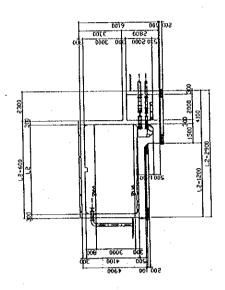


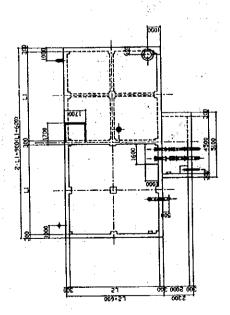


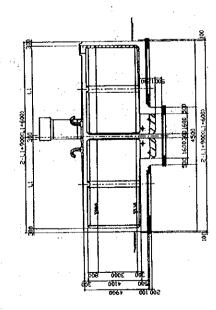


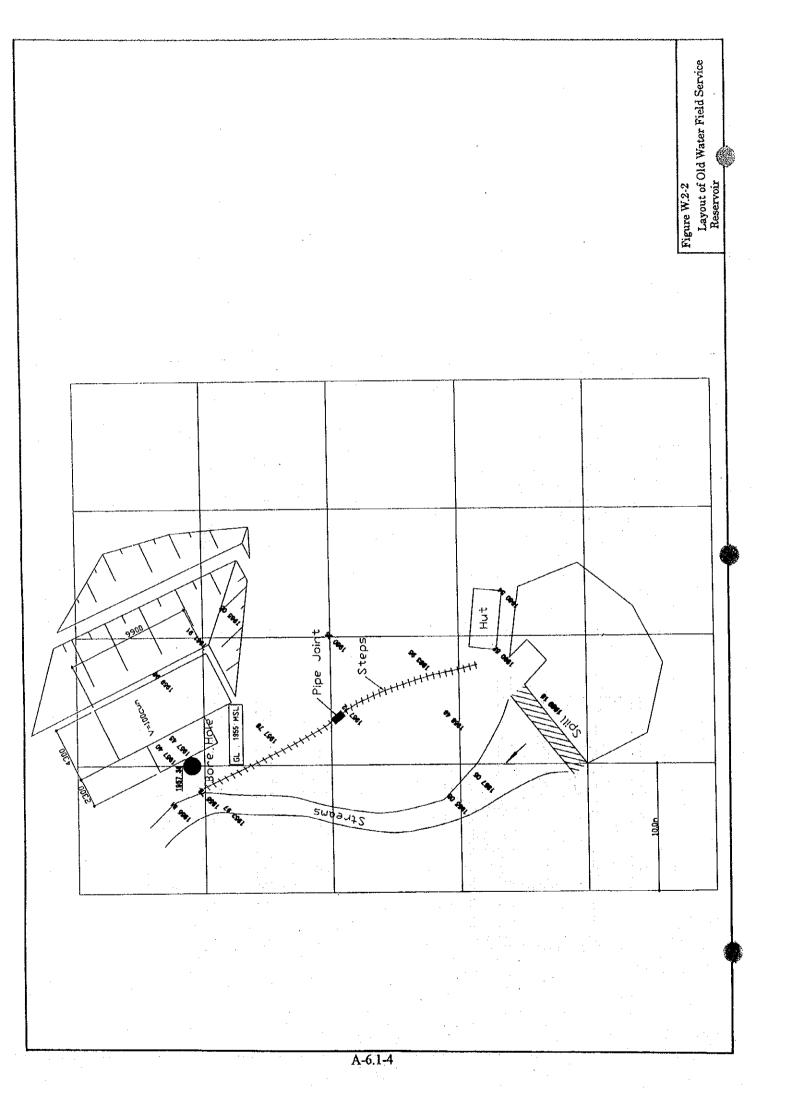
Well and Well Pump

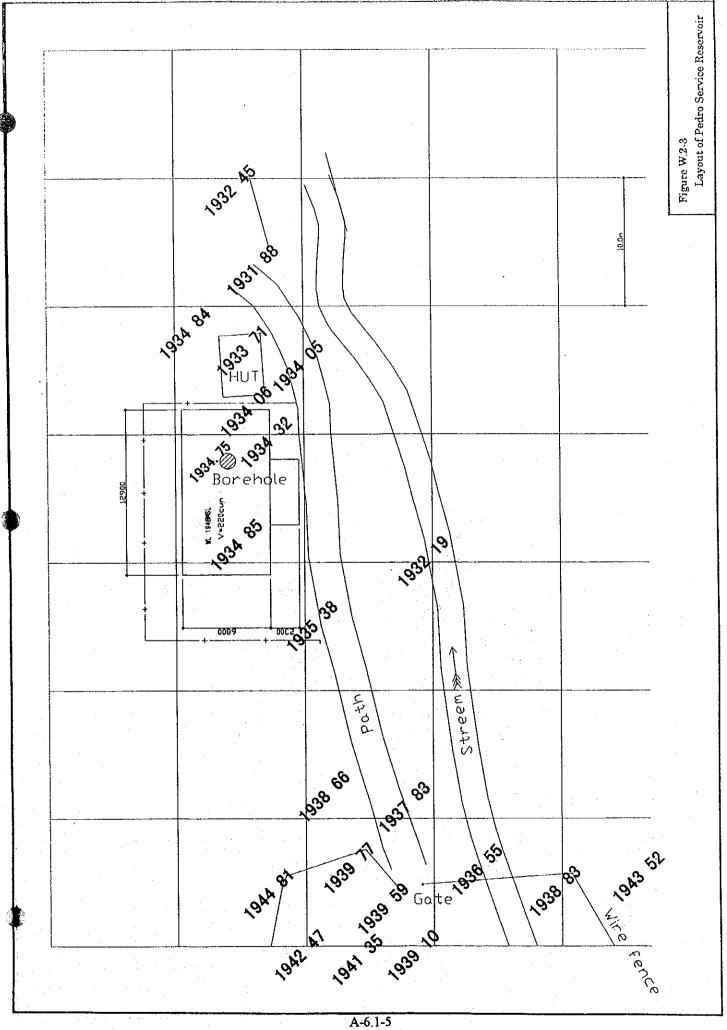
Reservoir	3	21	Depth	М.	V(cus)	1.1
Old Water Field	4,500	3,700	3,000	2	001	1,355
Pedro	6,000	6,200	3,000	2	220	1,948
Onique View Hill	8,600	8,500	3,008	1	002	1,980
Yi ji thapura	8,500	5,500	3,000		140	1,925
Low area 2	10,066	2,900	3,000	27	470	1,920

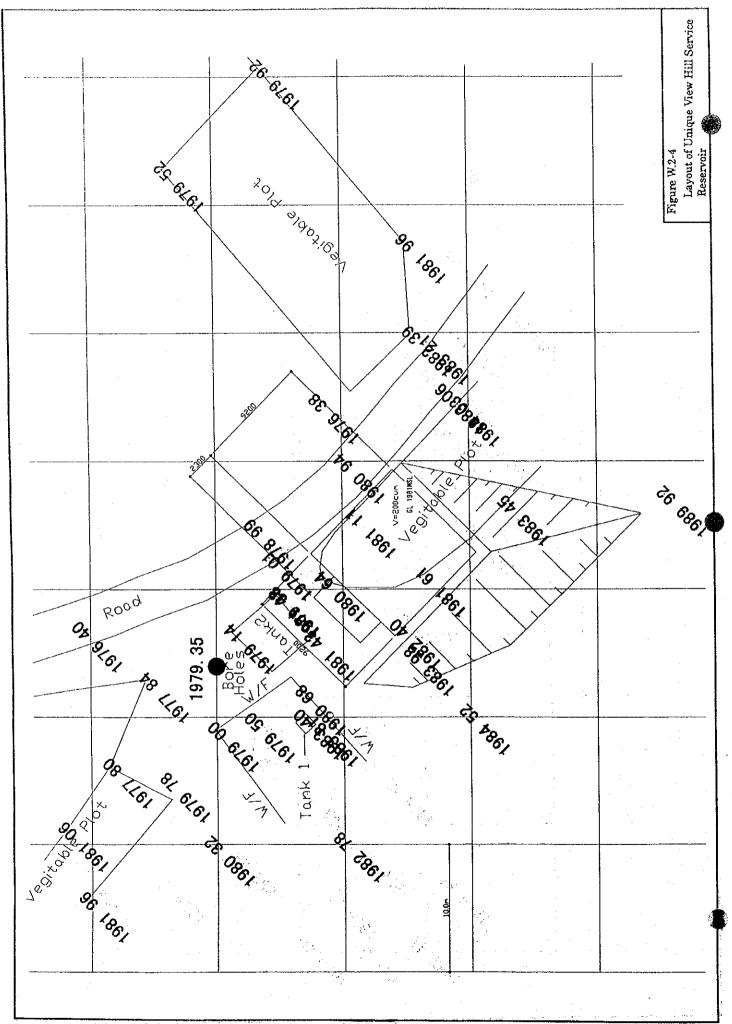


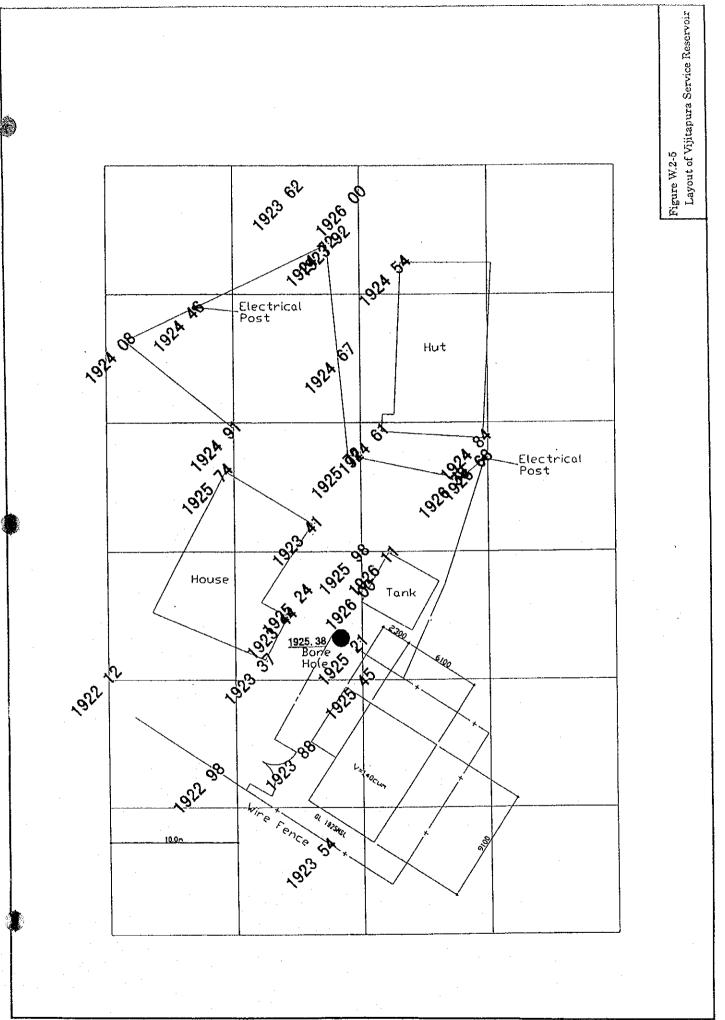












A-6.1-7

Chapter 7

Appendix 7.1 Annual Operation and Maintenance Cost

Appendix 7.1 Annual Operation and Maintenance Cost

Nuwara Eliya Master Plan

									-			-	,		E	1.7
1								Chemical		Z	Man-Power	_	Spare Parts	æ	101	21
UI MIT	17/11/1	/M-1	LAW.		De/month			b/ss/d	Rs/month	Rs/1	nonth F	Rs/month Rs/month	Cost	Rs/month	Rs/month	Rs/year
	n/em	44	7		The state of the s						-					
1 Intake										+	+				+	
T-4-1-December	4	2320	1 160	2.420	160.080	162,500							42,902,000	429,020		
maxe rumb		2			1	L					-	-				
2 T.P.	_										+	+		000	†	
4.0							Chlorine	0.89	817				1,800,000	18,000		
			†								_					
3. Transmission										+	+		, , , ,	10 010	†-	
Rooster Pump	15	3.7	56	220	7,728	7,948					-		1,881,000	OTO'OT		
4.Distribution						╧				-	-		4 0.08 0.00	40.280		
Roester Pump	19	21.7	412	4	26,856	57,296				1	1		4,7 40,000	20006/1	\dagger	
F 1 - F -										5 20,000	8,	100,000				
DOOR C										1 30	30,000	30,000				
o. Maintenance			1							1,	50 000	20 000				
7. Manager/Engineer										1	+	000	C1 511 000	515 110	073 671	023 671 11 084 047
Total						227,744			81/1	-	1	100,001	21,000	242,442	1	26, 22,
Intake Pump			24hr*3M	onth/12Mo	24hr*3Month/12Month*0.81=5hrs/d	p/s	Chlorine	11set*0.1k	11set*0.1kg/d*0.81=0.89kg/d	89kg/d						

Intake Pump 24hr*3Month/12Month*0.81=5hrs/d
Transmission Booster Pump 24hr*0.80=19hrs/d
Distribution Booster Pump 24hr*0.81=19hrs/d

Nuwara Eliya Feasibility Study

3								Chemical		Man-Power	wer	Spare Parts	arts	Total	[E]
Item		Г						1,00/4	D. /month	IR s/mont	Be/month Re/month	Cost	Rs/month	Rs/month	Rs/vear
	hrs/d	κw	kWb/d		Ks/month			NS/II	NS/IIIOIIVI	TO THOU	- Care (care				
1 Intake			_												
Intote Pumo	4	232.0	1.160	2.420	160,080	162,500						42,902,000	429,020		
Auto T Committee	1													-	
2. I.F.	1											1 800 000	18.000		
T.P.							Chlorine	0.85	0//			1,900,000	10,000		
3 Transmission															
D 11 D	=	00	c	220	С	220						1,881,000	18,810		
Doostel t mily										_					
3.Distribution			_									000 000	0000		
Booster Duma	Ĭ,	18.0	324	440	44,712	45,152					7	4,928,000	49,280		
drim v raisoner	1									5 20.000	100,000				_
4 Labor			+							00000	20.000				
5. Maintenance										70000					
6 Managar/Engineer			·		_					1 50,000	50,000		-	1	
Total Series	1					207.872			776	_	180,000	51,511,000	515,110		903,758 10,845,099
Icial						- 1			2000 0000	.,					
Intake Pump			24hr*3Mc	onth/12Mon	24hr*3Month/12Month*0.77=5hrs/d	,/d	Chlorine	11set*0.1k	11set*U.1kg/d*U.//=0.85kg/d	Kg/d					
Transmission Booster Pump	r Pump		24hr*9Mo	mth/12Mon	24hr*9Month/12Month*0.77=14hrs/d	ts/d									

24hr*0.77=18hrs/d

Transmission Booster Pump Distribution Booster Pump

Chapter 11

Appendix 11.1 Population in Sewerage Service Area

Appendix 11.2 Peak Factor

(Hourly Maximum / Maximum Daily)

Appendix 11.3 Sewage Flow Calculation

Appendix 11.1 Population in Sewerage Service Area

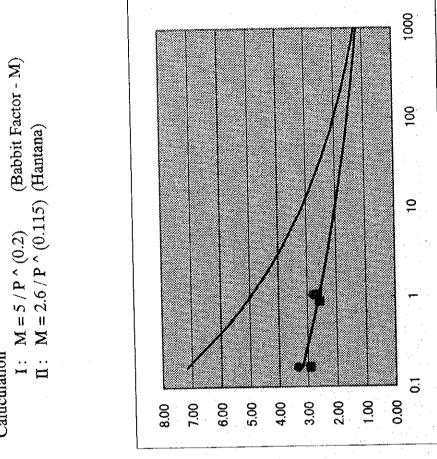
1000

							VI Victoria	Corner (P.	PA	D Service	Area (1	W 1200	P Service	Area (20	15) M/P	Service	Area (20	Š	With the Country M. B. Souries Area (1007) M/P Service Area (2015) M/P Service Area (2005) F/S Service Area (2005)	Tea (200	<u> </u>
			₹	All Area			WILLIOUS	LOTES/I	/I.		7			5	\ -	-	D)	Popular Ar	Area	Popula	112
	<u>+</u>		Camilia Domilat	Annilat	٢	Density P	Percen Area Density	Vrea Dea		Area	P.	Popula Area	rea	rop.	ropulati A	-Mc4	5'				
. " .		\(\frac{1}{2}\)	T amiliar		Size		tage (ha) (nc/ha)	ha) (oc	/ha)	(ha) De	Density ti	tion (1	(ha) Density		ou (C	(ha) Density		tion (h	(ha) Density	Ĭ	g
No. ID GN Name		Area(na)	2	rio.	71	4			1	100	I	╬	20 7	11	445	38.7	10 3	375 1	15.3	10 1	148
1 No 535 Nuwara Eliva	Eliva	250.2	196	196 1,066 5.44	5.44	4	45.3% 136.9	96.9	×	78.	*	210		1	\downarrow		1	┸			Γ
2 No 535 Al Mahagastota	tota	162.9	396	396 1,895	4.79	12		-	_		+	4		4		16.4	ľ	803	20	10	56
3 No 535H Kalukele		110.2	258	258 1,279	4.96	12 2	28.7%	78.6	16	46.1	120	738	40.1	3	200:1	1	1				T
A No Sast Kellegala		147.3	406	406 2,049	5.05	14		_				4		4	1		23 2 563	5		33	200
A No Cast Nation Central	1 6 6	3776	655	655 3.962 6.05	6.05	11 (61.1% 145.3	45.3	27	78.4	27 2,	2,117	78.4	39.	3,041	40.4	5	3	+	1	T
J Ne SSSEIN Empa		300	130	700 0 020	69.4	8		_	_		<u>·</u>			_			-	4		4	Ţ
6 No. 535E Sadamenna	E I	2005		+	1 2	+-	33 60%	86.1	20	64	20	086	49	29 1,	1,408	49	24 1,1	1,186	44.3	7,1	2,0,7
7 No. 535F Hewa Eliya West	Iya West	129.6	470	4.78 1,721	77.7	_	· 1.		+	+	1	-	-	_							
8 No 535G Hewa Eliva North	iva North	177.2	379	379 2,076	5.48	12					+	+	1	+	+	1	-	+	-		Γ
O N. 4247111 Elius Bast	imo Foet	1505	417	417 1.641	3.94	10					-			4	4		4	1			7,7
y No. 333FI DEWALL	174 1.001	200	905	100	2,60	ď	20 30% C	08.5	20	31.1	20	622	31.1	23	893	31.1	24	53		<u> </u>	2
10 No. 535I (Buluela		248.0	238	238 1,781	8	-	丄		3		4-	Ļ	-	-	-						-
11 No. 535J Toppass		1,317.0	466	466 2,285	4.90	2	-	+	+	+	+	$\frac{1}{1}$	+	+	-	-	\mid	-		_	
12 No 535K Babarakele	93	943.7	480	480 2,108	4.39	2	-	_		-	- 19	Ц.	0	\downarrow	1 022	20.0	1,	1 545	12.6	22	275
13 No. 535L N'Eliya West	West	259.2	424	424 1,946	4.59	80	59.1% 106.0	0.0	78	70.9	18 1,	1,2/0	5)	3	3	}	-	_		_	
14 No. 535M Santhipura	II.	801.3	310	310 1,588	5.12	7			+	-	+	+	1	+	+		-	-	-	-	Γ
15 No. 535N Kalapura	-	1,371.0	572	572 2,770	4.84	2			╢		-	╬	-	╬	+	-	╀	-	-		T
					8	ave						- 3				7 7 7	22 7315		840	22 1.8	1.827
Total		6,757.20	6,355 30,774		4.84	11				314.2	18 6,	18 6,043 314.2	14.2	8	0,000	7.4	}	4	2	4	

Annual population Increase Ratio (1997-2000) 1.0270 (2001-2005) 1.0225 (2006-2010) 1.0185 (2011-2015) 1.0160

Appendix 11.2 Peaking Factor (Hourly Maxmum/Daily Maxmum)

Caluculation	∵ }	: 11					000	200.0	7.00.7	9009		2.00	4.00		• 	2.00	1.80		0000	- - -			
Factor						2.00									1 80)					1.50		
Actual 2	2.91			2.57	2.65	·																	
Actual Actual 1 2	3.34			2.59	2.79							-											
Ħ	3.20	2.82	2.60	2.63	2.58	2.40	2.29	2.22	2.16	2.00	1.84	1.76	1.70	1.66	1.62	1.60	1.57	1.55	1.53	1.46	1.41	1.38	1.35
I	7.17	5.74	5.00	5.10	4.93	4.35	4.01	3.79	3.62	3.15	2.75	2.53	2.39	2.29	2.20	2.14	2.08	2.03	1.99	1.84	1.73	1.66	1.60
Sewage	46	139	277	250	296	554	831	1,108	1,385	2,770	5,540	8,310	11,080	13,850	16,620	19,390	22,160	24,930	27,700	41,550	55,400	250 69,250	83,100
Popilation	5	0.5		0.904	1.069	2	3	4	5	10	20	30	40	50	09	70	08	06	100	150	200	250	300



Appendix 11.3 Sewage Flow Calculation

Sri Lanka - Nuwara Eliya

1. Population by Year

		Area			Population			
ID GN	Name	(ha)	1997	1998	2000	2005	2010	2015
No. 535 Ni	uwara Eliya	38.7	310	318	336	376	412	446
No. 535B Ka	alukele	46.1	738	758	799	893	979	1,060
No. 535D N'	Eliya Central	78.4	2,117	2,174	2,293	2,563	2,809	3,041
No. 535F He	ewa Eliya West	49	980	1,006	1,062	1,187	1,301	1,408
No. 5351 He	ewa Eliya East	31.1	622	639	674	753	825	893
No. 535L N	'Eliya East	70.9	1,276	1,310	1,382	1,545	1,693	1,833
Total		314.2	6,043	6,205	6,546	7,317	8,019	8,681

Annual population Increase Ratio

(1997-2000)1.0270

(2001-2005)

1.0225 1.0185

(2006-2010) (2011-2015)

1.0160

2. Per Capita Domestic Supply Water

(Design Average Daily Flow)

Unit: Lpcd

	1998	2000	2005	2010	2015
Domestic Water Supply	93	93	93	93	93

Gardening water is excluded. (107 - 14 = 93 Lpcd)

3. Non-Domestic Water Consumption (Design Average Daily Flow)

Unit: m3/d

1995	2000	2005	2010	2015
315	360	402	441	477
145	166	186	204	221
460	526	588	645	698
595	680	760	833	902
33	38	42	46	50
628	718	802	879	952
190	217	243	266	288
1,278	1,461	1,633	1,790	1,938
	315 145 460 595 33 628 190	315 360 145 166 460 526 595 680 33 38 628 718 190 217	315 360 402 145 166 186 460 526 588 595 680 760 33 38 42 628 718 802 190 217 243	315 360 402 441 145 166 186 204 460 526 588 645 595 680 760 833 33 38 42 46 628 718 802 879 190 217 243 266

4. Water Supply to Sewage Service Area

(Design Average Daily Flow)

Unit: m3/d

Item	1995	2000	2005	2010	2015
Commercial Water	276	316	353	387	558
Hotel/Hospital Water	377	431	481	527	762
Industrial Water	190	217	243	266	288
Total	843	747	834	914	1,320

by 2005 60% Ratio of Commercial/Hotel Water Use 80% by 2015 in Sewage Service Area 100%

Ratio of Industrial Water Use in Sewage Service Area

5. Per Capita Sewage Flow by Year

Unit: Lpcd

Item		1998	2000	2005	2010	2015
Domestic Wastewater	Q1	74	74	74	74	74
	Q2	89	89	89	89	89
	Q3	148	148	148	148	148
Commercial Wastewater	Q1	36	39	39	39	51
	Q2	43	47	47	47	61
	Q3	72	78	78	78	102
Infiltration	Q1 Q2 Q3	20	20	20	20	23

Discharging Ratio of Domestic and Commercial Water Suppry to Sewerage

80%

Infiltration for Domestic and Commertial Water.

15%

Daily Maximum / Daily Average Hourly Maximum / Daily Average 1.2

Q1: Design Average Daily Flow

Q2: Design Maximum Daily Flow

Q3: Design Maximum Hourly Flow

6. Amount of Sewage Flow

Master Plan

Ye	ar	2005	(M/P Are	a)	2	015 (M/P)	
Area(ha)			314.2	I		314.2	
Population		<u> </u>	7,317			8,681	
Ite	m	Q1	Q2	Q3	Q1	Q2	Q3
Domestic Waste		541	651	1,083	642	773	1,285
Commercial Wa		285	344	571	446	530	885
Infiltration		124	124	124	200	200	200
Sub-to	tal	950	1,119	1,778	1,288	1,503	2,370
Hotel/Hospital		481	577	962	762	914	1,524
Industrial Use e	tc.	243	243	486	288	288	576
Sewage Flow	Total	1,674	1,939	3,226	2,338	2,705	4,470
(m3/day)	Round	1,700	1,900	3,200	2,300	2,700	4,500

Feasibility Study

reasibility bear	*3			
Ye	ar	2	005 (F/S)	
Area(ha)			84.0	
Population			1,827	
Ite	m	Q1	Q2	Q3
Domestic Waste	ewater	135	163	270
Commercial Wa	stewater	285	344	571
Infiltration		76	76	76
Sub-to	tál	496	583	917
Hotel/Hospital		481	577	962
Industrial Use e	tc.	243	243	486
Sewage Flow	Total	1,220	1,403	2,365
(m3/day)	Round	1,200	1,400	2,400

Q1: Design Average Daily Flow

Q2: Design Maximum Daily Flow

Q3: Design Maximum Hourly Flow

Chapter 12

Appendix 12.1	Design Calculation for Sewage
• •	Treatment Plant
Appendix 12.2	Sewer Network Hydraulic Analysis
Appendix 12.3	Pumping Station
	- Capacity Calculation
Appendix 12.4	Sewage Treatment Plant
• •	- Capacity Calculation
Appendix 12.5	Summary of Construction Cost
Appendix 12.6	
Appendix 12.7	



Appendix 12.1 Design Calculation for Sewage Treatment Plant

	Prof 0-10-10	Acrated Lagoon (Lower)					
Treatment Method	SHOT REPORTED	News		Water Quality - Influent			
Design Criteria		Design Flore		8008	240 mg/l		
		Daily Average	2,300 m3/day	SS	250 mg/l		
		Daily Maximum	2,800 m3/day	Removal Rate			
		Thursday Mandon 1889	4.600 m3/day	190106	# 28		
		TOTAL OF TAXABLE PARTY		SS			
		Load		3			
		Influent - BODS Load Influent - SS Load	552 kg-BOD5/day 575 kg-BOD6/day	SS SS	30 mg/l 50 mg/l		
	4-1-4	(Injet)		(Inlet)		(Inlet)	
2 Flow Diagram	(mrer)						
	Screen & Grit Chamber	Screen & Grit Chamber		Screen & Grit Chamber		Screen & Grit Common	TO Q
	Annerobic Pond	Complete Moong Laguon	-	Oxidation Ditch	-	Oxidation Disch	
	Dambheire Pand	Parint Mixing Lagoon		Primary Sedimentation Tank	Tank	Sedimentation Tank	*
	Mentalion Pond	Disaffection Twak		First Trickling Fifter		Disinfection Tank	
	(Outlet)	(Outlet)		Second Trickling Filter		(Onter)	Studge Thickening Tank Studge Drying Bed
				Find Sedimentation Tank	. الد		
£	im.			Disinfection Tank			
				(Outet)	Studge Thickening Tank Studge Drying Bed		
			g	Grit Chamber		1) Grit Chamber	
3 Outline of	'n	L) Chi Chamber			Plug Flow, Rectangular		Plug Flow, Rectangular
Major Facilities	Type fing riow, recungular	sion L=		sion La	2.2 th	Dimension L=	8 6 7 9 8 6
	*	H A	0.6 m	# I	8 E	Ι Β	B 18
	11	lj	0.3 H	Number (1-standby)	3 units	Number (1-standby)	3 points
	andby)	Number (Comment)	z m²	Surface Area	걸	Surface Area	4 m2
	Surface Area 4 20.2 Surface Load 1,742 103/102/day		1,742 m3/m2/day	Surface Load	1,742 m3/m2/day	Surface Load	1,742 m3/m2/day
		7 1 20000	- C	2) Primary Sedimentation Tank	¥.	Ð	
	obje Pond	Z) Complete Mading Actived Lagoust		Ž.	Creater Tank		Greater Chansel
	Type Rectangular	T.E.	23.0 m	ision L=	6.0 m dia.		110.0 m
	HOD-Volumetric Load (at 25.5 of the 20.5	. II	30.0 m		3.0 m	**	B :
	the Court is a second of the court of the co		3.0 m	Number	2 units		EI .
	12	Number	2 units	Surface Area A=	72 m2		Z upits
		Area A=	1,380 ш2	Surface Load	48.5 m3/m2/day	5	780 088
		11	4,140 m3		85 m3		2,640 m3
		Time	1.50 days	Retention Time T=	1.5 hours	Retention Time T	23.0 hours
			25.0 kW			Agreed Supply	#3 S
	Surface Area A = 2.500 m2	Kladn	21.8 £W			Sludge April	14.5 day
	× × ×	- Agitation 24	24.8 ŁW			a the control of	
						_	

		Account of the second of the s	Trickling Filter	Oxidation Ditch
Treatment Method	Stabilization Pond	Darrie Mexico	3) Trickling Eller	Sedimentation Tu
3 Outline of	abve rond	- 52	Type Crealer	Greeler '
Mayor Facilities	See to Surface Area 60.3"	ision Lx	7.7	Dimension Let 1000 m one.
	= 11	W= 30.0 m	m 2.1 ±0.) H
		D= 4.0 m		
	, in	Number-Busin 2 units		я К
	i	-Cell/Basin 3 units	Volume V ≈ S07 m3	proof
		-Cell (stand-by) 1 units	BOD Load 1.16 kg/m3/day	۵. ۲
	1	23	Secondary L= 13 m	Retention Time T = 6.9 hours
	311	ıı >		
	- /k	⊒ ⊥	Number 2 units	
			Surface Area A. 338 m2	
	Retention Table 1 = /3 0498			
			. 9	
	4) Maturation Pond	ection Tank	3) Final Sedimentation Tenk	
	Rectangula	Rectange		
	ion Time	ision L=	Dimension L= 10.0 m day.	
		W= 1.0 m	Market 2	
		II	1 4	
	D= 15 B		! C	
	Number-Series 3 units	Ves A=		
	-Basin 4		!! > {	
	Surface Area A = 7,800 m2	Retention Time T= 15.7 min.	Retention Time T = 4.1 hours	
	V= 11			
	Time T=			
			5) Disinfection Tank	ection Tank
			Rectangs	Rectangui
			Dimension L= 30.0 m	Limension CH 110 m
			8 # OF 100	
			Number 1 spin	
			A = A =	Area A=
			1 2	
			Time T= 1	Time T= 1

			6) Sludge Thickening Tank	6) Studge Thickening Tank
3 Outline of	1.		Type Crouler T	Creuter 1
major receiptor			Dimension L= 3.0 m dia.	Dimension Lin 5.0 month
			E C. HO	
			Aca A=	Surface Area A= 9 m2
			29 pao	Dad Dad
			Volume V= 28 m3	Volume V= 28 m3
			7. Studes Daine Red	7) Sludge Drying Bed
		-	d Sludge	dic
			¥ ,-1	Dimension Le 26.0 m
			8 11 00	DH 038
			tres A= 9	Surface Acea A= 936 m2
-			">	"
			a Time T≃	Retention Time Ta 30.5 days

Tour transfer	Sabilization Pond	Aerated Lagoon (Dout Power)	Trickling Fifter	Oxidation Diteh	Ī
4 Acea Requirement	4 m2 4 m2 250 m	4 m2	Grit Chamber	Grit Chamber Oxidation Dich Sedimennsion Tank Disinfection Tank Shage Thielening Tank Shade Dring Bed Toni	4 m2 440 m2 768 m2 0 m2 9 m2 936 m2 2.157 m2
S Power Consumption excluding: - office - lighting	Approx. 0 kW	Action Complete Mixing Partial Moving Disinfection 3.7 kW Total Total 35 kW	Recirclation Pump Trickling Eller Sludge Collector Prinary Sedimentation Tank Secondary Sedimentation Tank Sludge Thickener Sludge Pump Surplus Surplus Surplus Total 99 kW	Acriaor Ociciacion Diach Slucke-Collector Sedimentation Tank Slucke-Pamp Slucke-Pamp Rehum Surplus Disinfection Total	30 kW 12 kW 0.4 kW 15 kW 3.7 kW 55 kW

Appendix 12.2 Sewer Network Hydraulic Analysis (Master Plan)

Appendix 12.2.1 Alternative 1 (Applied)

Sewage Flow Calculation Table (Nuwara Eliya)

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Sewage Flow Calculation Table (Nuwara Eliya)

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Sewage Flow Calculation Table (Nuwara Eliya)

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Appendix 12.2.2

Alternative 2

Sewage Flow Calculation Table (Nuwara Eliya)

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Sewage Flow Calculation Table (Nuwara Eliya)

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Sewage Flow Calculation Table (Nuwara Eliya)

Sewage Flow Calculation Table (Nuwara Eliya)

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Appendix 12.3 Pumping Station - Capacity Calculation

1. Pumping Facility

1. Fumping Facility								
Alternative	Alternative 1		Alternative 2					
Area	Nuwar	a Eliya	Nuwara Eliya					
Pump Station		P/S 1	P/S 2	P/S 1	P/S 2			
	m3/sec	0.01480	0.04700	0.01480	0.03210			
P/S Flow	m3/min	0.888	2.820	0.888	1.926			
P/S Type		Circular	Circular	Circular	Circular			
Number (+1)-standby		1(+1)	1(+1)	1(+1)	1(+1)			
Capacity	m3/min	0.89	2.82	0.89	1.93			
Head	m	39	23	10	19			
h1 =	m	29.40	13.50	8.00	13.50			
h2 =	m	7.78	7.19	0.28	3.55			
D =		150	200	150	200			
L=		1,400	620	50	620			
V =	<u> </u>	0.838	1.496	0.838	1.022			
h3 =	m	1.50	1.50	1.50	1.50			
Diameter	mm	- 87	155	- 87	128			
Diameter	mm	100	150	100	125			
Motor Output	kW	10.8	20.3	2.8	11.5			
Motor Output	kW	11	22	3.7	15			

2. Pump Pit (Circular)

			Alternative 2		
<u>Alternative</u>	Alterna		Alternative 2		
Area	Nuwara Eliya		Nuwara Eliya		
Pump Station	P/S 1	P/S 2	P/S 1	P/S 2	
D/O FI	m3/sec	0.01480	0.04810	0.01480	0.03210
P/S Flow	m3/min	0.888	2.886	0.888	1.926
P/S Type		Circular	Circular	Circular	Circular
Number (+1)-standby		1(+1)	1(+1)	1(+1)	1(+1)
Capacity	m3/min	0.89	2.89	0.89	1.93
Pump Minimum Starting Period	min	8	15	8	15
Pump Pit Capacity	cu.m	1.78	10.84	1.78	7.24
Therefore	cu.m	2.00	11.60	2.00	8.00
Ground Level	m	0.00	0.00	0.00	0.00
Inlet Pipe Level	m	-4.00	-4.00	-4.00	-4.00
Effective Depth	m	1.00	1.00	1.00	1.00
Тор	m	0.50	0.50	0.50	0.50
Bottom	m	0.50	0.50	0.50	0.50
Required Area	sq.m	2.00	11.00	2.00	8.00
Diameter	m	1.60	3.74	1.60	3.19
Therefore	m	2.00	3.80	2.00	3.20
Dimension (DIA)	m	2.00	3.80	2.00	3.20
(D)	m	6.00	6.00	6.00	6.00
Retention Time	min	3.54	3.93	3.54	4.18

Appendix 12.4

Sewage Treatment Plant – Capacity Calculation

Appendix 12.4.1 Alternative 1 – Nuwara Eliya (Aerated Lagoon)

Appendix 12.4.2 Alternative 2 – Nuwara Eliya (Aerated Lagoon)

Appendix 12.4.3 Alternative 2 – Hospital/Brewery (Aerated Lagoon)

Appendix 12.4.1 Sewage Treatment Plant - Capacity Calculation CAPACITY CALCULATION OF FACILITIES Alternative 1 - Nuwara Eliya (Aerated Lagoon)

1 BASIC CONDITIONS

1-1 BASIC ITEMS

(1) Name

Nuwara Eliya Sewage Treatment Plant

(2) Land Area

Approximately

2.20 ha

(3) Elevation

1855.000

1954

1854.850

(5) Pipe Diameter :

(4) Inlet Pipe Level:

400

m

m

m

(6) Land Use

Tea Plantation

(7) Collection System:

Seperate Type

(8) Treatment Method:

Sewage Treatment: Aerated Lagoon Method

Sludge Treatment: Pond Accumulation

(9) Effluent Point:

Nanu Oya

(10) Effluent Point Water Level:

1852.000 m

(11) Target Year

Year 2000 (Phase 1)

(12) Lowest Monthly Average Temperature

15 °C (January)

1-2 Design Population

Design Population:

8,680 Persons (Total)

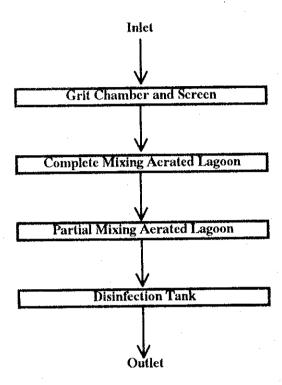
1-3 Design Sewage Flow

ITEM	m3/day	m3/hr	m3/min	m3/sec
Daily Average	2,340	97.5	1.63	0.027
Daily Maximum	2,700	112.5	1.88	0.031
Hourly Maximum	4,500	187.5	3.13	0.052

1-4 Design Sewage Quality

ITEM	INFLUENT	EFFLUENT	REMOVAL	REMARKS
	(mg/L)	(mg/L)	RATIO (%)	
BOD	240	30	88	
SS		50	80	

1-5 Flow Chart (Dual Power Acrated Lagoon)



1-6 Design Criteria for Dual Power Aerated Lagoon

ITEMS	UNIT	Formula or Value	Application
1-6-1 Grit Chamber			
		. 1800	1 200
(1) Water Surface Load	m3/m2/day	> 1800	1,800 0.3
(2) Average Velocity	m/sec	> 0.3	0.3
1-6-2 Complete Mixing Aerated Lagoon			
(1) Retention Time	day	1.5 - 2.5	1.50
(2) Water Depth	m l	3.0 - 4.0	3.0
(3) Power Requirement for Mixing	W/m3	> 6.0	6.0
(3) Tower Requirement for Mixing	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
1-6-3 Partial Mixing Aerated Lagoon	·		
44	day	2.0	2.0
(1) Retention Time	day	2.0 - 4.0	3.0
(2) Water Depth	m W/m3	> 1.0	1.0
(3) Power Requirement for Mixing	Cell/Basin	1-3	3
(4) Number of Cell	Celly Dasin	1-5	
1-6-4 Storm Water Settling Tank			
(1) Water Depth	m	1.5 - 3.0	1.5
	hour	> 0.5	0.5
	m3/m2/day	75 - 150	150.0
(3) Water Surface Load (Hourly Max Rain)	112/112/01/		
1-6-5 Disinfection Tank			
(1) Retention Time	min.	> 15	15.0
(2) Dosage	mg/l	2.0 - 4.0	3.0

2 CAPACITY CALCULATION

2-1 Grit Chamber and Screen (Hourly Maximum)

ITEM	SIGN	UNIT	CALCULATION	RESULT
Туре	-	_	Parallel Flow Type	
Design Flow	Q1	m3/day	~	4,500
	Q2	m3/sec	•	0.052
Water Surface Load	WSL	m3/m2/day	-	1,800
Required Surface Area	RSA	m2	Q1/WSL	2.500
Basin Number (Total)	BN	basin		3
Basin Number (Stand-By)	BNS	basin		
Average Velocity	V	m/sec	-	0.30
Depth	Н	m	-	0,30
Width	W1	m	Q2/(V*H)	0.579
Therefore	W2	m		0.50
Length	Li	m	RSA/W2/(BN-BNS)	2.500
Therefore	L2	m	-	2.70
Dimension (W) W	m	W2	0.50
`(L) L	m	L2	2.70
(Basin		basin	BN	2
(Stand-By		stand-by	BNS	1
Screen Type	1	1 -	Fine Bar Screen	
Screen Set Number	SSN	set	BN	3
Check		UNIT	APPLICATION	RESULT
Water Surface Load	1	m3/m2/day	> 1800	1,667
Average Velocity	1	m/sec	> 0.3	0.17

2-2 Complete Mixing Aerated Lagoon (Daily Maximum)

ITEM	SIGN	UNIT	CALCULATION	RESULT
Туре		-	Rectangular Type	
Design Flow	Q1	m3/day	-	2,700
	Q2	m3/hr	~	112.50
Retention Time	TI	day		1.50
Inlet BOD Quality	So	mg/L		240
Required Volume	V1	m3/basin	Q1*T	4,050
Basin Number	BN	basin	<u>-</u>	4
Required Volume per Basin	VBN	m3/basin	Q1*T/BN	1,013
Water Depth	Н	m	-	3.00
Required Surface Area	A	m2	V/H	338
Width	W	m	-	14.00
Length	L1	m	A/W	24.107
Therefore	L2	m	-	25.00
Oxygen Demand Rate	PR1	kg/h	(4.16*10^-5)*r*Q1*So	40
-max. oxygen uptake	r	W/m3		1.5
Aeration Unit Power Rate	PRO	kg/h	1000*PR1/(N*Q1*T1)	5.25
Therefore	PRO	W/m3	-	5.3
-aeration performance	N	W/m3	-	1.9
Power Requirement	P1	kW	-	13,0
1) Oxygen Requirement	P10	kW	PR1/N	21.3
2) Mixing Power	P1M	kW	V1*P0*10^-3	24.3
Dimension (Width)	W	m	W	14.00
(Length)	L	m	I.2	25.00
(Depth)		. m	H	3.00
(Basin)	-	basin	BN	4
Aerator Type	-	+ -	Slanting Shaft Screw Aerator	
Check		UNIT	APPLICATION	RESULT
Retention Time		day	1.5 - 2.5	1.56

2-3 Partial Mixing Aerated Lagoon (Daily Maximum)

ITEM	SIGN	UNIT	CALCULATION	RESULT
Гуре	-	-	Rectangular Type	
Design Flow	Q1	m3/day	_	2,700
	Q2	m3/hr	_	112.50
Retention Time	T2	day	-	2.00
Required Volume	V2	m3/basin	Q2*T	5,400
Basin Number	BN	basin	-	4
Cells Number	CN	cell/basin	-	3
Stand-by Cell Number	CNS	basin	-	2
Sludge Accumulation	SA	m3/year	365*Q1*Xi/(x*10^6)	1,355
-inert solid concentration	Xi	mg/l	<u>-</u>	55
-weight fraction of solids	х	-	<u>-</u>	0.04
No. of Cells Cleaned per Year	CNC	basin	-	2
Total Sludge Accumulation	TSA	m3	•	2,033
Required Volume	V	m3/cell	(Q1*T+TSA)/(BN*CN-CNS)	743
Water Depth	D	m	<u>-</u>	4:00
Required Surface Area	A	m2/cell	V/H	186
Width	W	m	- · · · · · · · · · · · · · · · · · · ·	12.00
Length	L1	m	A/W	15.485
Therefore	L1	m	<u>-</u>	16.00
Power Requirement	P2	kW	<u>-</u>	3.0
1) Mixing Power	P2M	kW	Q1*T2*CN*10^-3	5.4
Dimension (Width)	W	m	W	12.00
(Length)	L	m	L1	16.00
(Depth)	H	m	H	4.00
(Basin))	basin	BN	
(Cell	-	cell/basin	CN	
(Stand-by Cell) -	celi	-	
Aerator Type -		-	Slanting Shaft Screw Aerator	
Check		UNIT	APPLICATION	RESULT
Surface Area		m2	<u> </u>	2,30
Retention Time	T	day	2.0	2.09

2-6 Disinfection Tank (Daily Maximum)

ITEM		SIGN	UNIT	CALCULATION	RESULT
Chemical Type		**	ter	Chlorination Type	
Design Flow		Q1	m3/day		2,700
		Q2	m3/min	4.	1.88
Retention Time		T	min.	-	15.0
Basin Number		BN	basin	_	
Required Volume		V	m3	Q2*T	28
Width		W	m		1.00
Water Depth		Н	m	-	1.00
Length		L1	m	V/(W*H)	28.125
_	therefore	L2	m	-	30.00
Dosage		D	mg/L		3.0
Required Chemical		RC1	kg/day	Q1*D*10^-3/C	8.10
	Therefore	RC2	· kg/hr	RC1/24	0.34
Dimension	(Width)	W	m	W	1.00
	(Length)	L	m	1.2	30.00
	(Depth)	Н	m	H	1.00
	(Depth)	BN	basin		1
Chlorine Feeder		-	unit	including 1 for stand-by	2
Check			UNIT	APPLICATION	RESULT
Retention Time		· · · · · · · · · · · · · · · · · · ·	min.	> 15	16.0