Table 3 LIST OF EXISTING SMALL SCALE PRODUCTION FACILITIES

NO.	NAME OF PRODUCTION FACILITY (WATERWORKS, INTAKE, WELL, SPRING AND PURCHASED WATER)	DESIGN PRODUCTION CAPACITY (M3/D)	1988's AVERAGE DAILY PRODUCTION (M3/D)	INSTALL FLOW METER	TREATMENT PROCESS Chl	KIND OF CHEMICAL USE	DISTRICT OF WASA
	=SURFACE WATER SOURCE=						
	TRINIDAD						
1	ST. ANN'S WATERWORKS	840	510	X	*	CL	P.O.S.
2	SANS SOUCI	-	501	X	*	CL	N.E.
3	ST. JOHN'S INTAKE	451	454	X	*	CL	N.C.
4	DAMIER INTAKE	143	355	X	*	CL	N.W.
5	TYRICO INTAKE	900	284	X	*	CL	N.W.
6	BICHE WATERWORKS	400	272	O	*	CL	S.E.
7	GUAICO TAMANA/LAS CUEVAS INTAKE	120	241	X	*	CL	N.W.
8	CASCADE INTAKE	-	193	X	*	CL	P.O.S.
9	ARIAPITA INTAKE	327	142	X	*	CL	P.O.S.
10	LA CANOA INTAKE	200	106	X	*	CL	N.W.
11	DIBE INTAKE	-	100	X	*	CL	P.O.S.
12	LA PASTORA RES. ROAD	-	94	X	*	CL	N.W.
13	Mt. D'OR INTAKE	-	88	X	*	CL	N.C.
14	PIPIOL INTAKE	90	88	X	*	CL	N.W.
15	LOS ARMADILLOS INTAKE	105	77	X	*	CL	N.E.
16	FOUR ROADS/TAMANA INTAKE	70	74	X	*	CL	N.E.
17	LA PASTORA/CAPRIATA INTAKE	-	63	O	*	CL	N.W.
18	LOANGO INTAKE	-	59	X	*	CL	N.C.
19	WATERFALL ROAD INTAKE	-	59	X	*	CL	N.C.
20	BLANCHISSEUSE INTAKE	61	44	X	*	CL	N.W.
21	MON REPOS INTAKE	90	44	X	*	CL	N.W.
22	GRAND RIVIERE INTAKE	45	35	X	*	CL	N.E.
23	LOPINOT INTAKE	145	35	X	*	CL	N.C.
24	MATELOT INTAKE	105	35	X	*	CL	N.E.
25	MATURA INTAKE	49	35	X	*	CL	N.E.
26	MONTEVIDEO INTAKE	45	35	X	*	CL	N.E.
27	SALIBEA INTAKE	45	35	X	*	CL	N.E.
28	ARIPO INTAKE	-	34	X	*	CL	N.E.
29	BRASSO SECO-PARIA INTAKE	-	27	X	*	CL	N.E.
30	MORNE LA CROIX INTAKE	-	27	X	*	CL	N.E.
31	CUMACA INTAKE	45	24	X	*	CL	N.E.
32	SURREY VILLAGE INTAKE	45	18	X	*	CL	N.C.
	SUB-TOTAL	4,321	4,188 (0.64 %)	(O-2, X-30)			
	TOBAGO						
33	CHARLOTTEVILLE INTAKE	600	418	O	*	CL	TOBAGO
34	SPEYSIDE INTAKE	86	321	X	*	CL	TOBAGO
35	CASTARA INTAKE	80	161	O	*	CL	TOBAGO
36	L'ANSE FOURMI INTAKE	34	27	X	*	CL	TOBAGO
37	PARATUVIER INTAKE	70	18	X	*	CL	TOBAGO
38	BLOODY BAY INTAKE	24	10	X	*	CL	TOBAGO
	SUB-TOTAL	894	955 (0.15 %)	(O-2, X-4)			
	TOTAL (M3/D)	5,215	5,143 (0.78 %)	(O-4, X-34)			

NO.	NAME OF PRODUCTION FACILITY (WATERWORKS, INTAKE, WELL, SPRING AND PURCHASED WATER)	DESIGN PRODUCTION CAPACITY (M3/D)	1988's AVERAGE DAILY PRODUCTION (M3/D)	INSTALL FLOW METER	TREATMENT PROCESS Are	Fil	Chl	KIND OF CHEMICAL USE	DISTRICT OF WASA	NUMBER OF WELLS
	=GROUNDWATER SOURCE= WELL									
	TRINIDAD									
1	CAP DE VILLE WATERWORKS	1,006	938	O	*	*	*	CL	S.W.	1
2	MAYARO WELLS	1,477	866	O	*		*	CL	S.E.	6
3	GUAYAGUAYARE #1 WELL	-	841	O	*	*	*	CL	S.E.	1
4	ARIMA #6 WELL	3,000	644	X			*	CL	N.E.	1
5	AROUCA WATERWORKS	1,863	577	X			*	CL	N.C.	2
6	CLARKE ROAD WELLS	623	482	O			*	CL	S.W.	1
7	POINT FORTIN WATERWORKS	980	393	O	*	*	*	LM, CL	S.W.	3
8	PARAMIN WATERWORKS	1,178	366	X			*	CL	P.O.S.	2
	SUB-TOTAL	10,127	5,107 (0.78 %)	(O-5, X-3)						17
	TOBAGO									
9	GOVERNMENT FARM #3 WELL	335	0	X					TOBAGO	1
	SUB-TOTAL	335	0 (0.00 %)	(X-1)						1
	SPRING									
1	GUARACARA SPRING	1,136	725	O			*	CL	S.E.	--
2	MAYO SPRING	630	613	O					S.E.	--
3	MORICAL SPRING	718	521	O			*	CL	S.E.	--
	SUB-TOTAL	2,484	1,859 (0.28 %)	(O-3)						--
	TOTAL (GOUNDWATER SOURCE)	12,946	6,966 (1.06 %)	(O-8, X-4)						18
	PURCHASED									
1	TRINTOC TO TECHIER	-	161	X						--
2	TEXACO TO POINT FORTIN	180	94	X						--
3	TRINTOC TO POINT FORTIN	-	51	O						--
	TOTAL (M3/D) (PURCHASED WATER)	180	306 (0.05 %)	(O-1, X-2)						--
	GRAND TOTAL (M3/D)	18,341	12,415 (1.9 %)	(O-13, X-40)						18

NOTE:
- P.O.S.; PORT OF SPAIN, N.W.; NORTH WEST, N.E.; NORTH EAST, N.C.; NORTH CENTRAL, S.E.; SOUTH EAST, S.F.& S.C.; SAN FERNANDO & SOUTH CENTRAL, S.W.; SOUTH WEST,
- EACH DESIGN PRODUCTION CAPACITIES ARE QUOTED FROM "THE WATER SYSTEM BALANCE IN TRINIDAD, AND "INFORMATION FROM WASA'S REGIONAL OFFICES IN TOBAGO.
- CL ; CHLORINE, LM ; HYDRATED LIME, Chl ; CHLORINATION, Are ; AERATION, Fil ; FILTRATION.
- " O " AND " X " MEAN INSTALLATION OF AND WITHOUT FLOW METER AT EACH PRODUCTION FACILITY RESPECTIVELY.
- FIGURES IN PARENTHESES ARE RATIO (%) TO TOTAL AVERAGE DAILY PRODUCTION CAPACITY IN 1988 (556,854 M3/D).

Table 4 RESULT OF PILOT LEAKAGE SURVEY

No.	Town	Area	[1] Number of House	[2] No. of Persons a House	[3] No. of Persons	[4] Isolated Block (Km2)	[5] Total Flow (m3/day)	[6] Minimum Flow (m3/h)	[7] Night Pressure (Kg/cm2)	[8] Leakage (m3/day)	[9] [5]-[8] Water Consumption (m3/day)	[10] [8]/[5] Leakage (%)	[11] [9]/[5] Water Consumption (%)	[12] [9]/[3] Per Capita Consumption (lpcd)
1	DIEGO MARTIN	DIAMOND VALE	69	4.4	304	0.57	91.554	2.51	3.40	50.268	40.749	54.91	45.09	135.99
2	DIEGO MARTIN	VICTORIA GARDEN	91	4.4	400	0.94	605.137	27.12	2.60	453.331	151.825	74.91	25.09	379.18
3	DIEGO MARTIN	VICTOTIA GARDEN	91	4.4	400	0.94	254.373	8.92	3.70	161.764	92.609	63.59	34.41	231.29
4	DIEGO MARTIN	DIAMOND VALE	58	4.4	255	0.54	144.450	3.81	2.40	79.438	65.012	54.99	45.01	254.75
5	St JOSEPH	TRINCITY	43	4.3	185	0.40	73.908	1.25	2.60	23.415	50.493	31.68	68.32	273.08
6	St JOSEPH	VALSAYN	80	4.3	344	2.20	333.125	11.70	0.40	280.346	52.779	84.16	15.84	153.43
7	TOBAGO	PLYMOUTH	280	4.7	1316	2.80	342.924	4.70	4.70	178.571	164.353	52.07	47.93	124.89
8	ARIMA	NETTOVILLE	91	4.4	400	1.58	140.192	3.49	2.80	80.028	57.163	59.22	40.78	142.77
9	ARIMA	TUMPUNA	102	4.4	449	0.87	130.967	3.73	4.20	260.256	149.289	50.34	57.36	332.64
10	PORT OF SPAIN	ST. JAMES	116	3.1	360	1.18	-	-	-	-	-	-	-	-

Note: [2] Source: Households Budgetary Survey 1989, CSO

Table 5 FINANCIAL OPERATIONS OF WASA (1985-1989)

(TT$ 1,000,000)

DESCRIPTION	1985	1986	1987	1988	1989
Operating Revenue	31.5	43.3	110.1	114.4	121.8
Operating Expenditure	255.8	247.7	244.8	219.3	197.8
Wages & Salaries	191.0	183.3	160.4	152.4	134.1
Contribution to NIB	3.4	3.8	3.3	3.3	2.1
Pensions & Gratuities (*)	--	--	--	--	4.9
Interest Payments	--	0.1	0.2	0.2	0.3
Goods & Services	61.4	60.5	80.9	63.4	56.4
Operating Balance	-224.3	-204.4	-134.7	-104.9	-76.0
Current Transfers from Central Administration	233.8	168.0	134.2	62.8	43.5
Current A/C Balance	9.5	-36.4	-0.5	-42.1	-32.5
Capital Transfers from Central Administration	28.1	2.5	5.0	--	22.8
Capital Contributions	4.0	--	0.9	1.8	1.5
Capital Expenditure	60.0	--	13.5	7.9	13.2
Capital A/C Balance	-27.9	2.5	-7.6	-6.1	11.1
Overall Balance	-18.4	-33.9	-8.1	-48.2	-21.4
Number of Employees (1989)	6,095	6,095	5,975	5,225	5,052

SOURCE: "TRINIDAD AND TOBAGO, RECENT ECONOMIC DEVELOPMENTS", IMF, APRIL 1990.

NOTE : (*) INCLUDES SEVERANCE AND PENSION PAYMENTS RESULTING FROM VOLUNTARY SEPARATION AND RETIREMENT PROGRAMS.

Table 6 POPULATION AND WATER DEMAND PROJECTION 1990-2005 (1)

YEAR / WATER AREA	1990										1995									
	POPULATION					WATER DEMAND (m3/d)					POPULATION					WATER DEMAND (m3/d)				
	Total	Service Area	Served	Served by Sources I	Served by Sources II	Area I	Area II	General	Special	Total	Total	Service Area	Served	Served by Sources I	Served by Sources II	Area I	Area II	General	Special	Total
1. DIEGO MARTIN	70,161	69,231	65,769	240	65,529	113	30,799	30,911		30,911	75,583	74,581	70,851	258	70,593	107	29,155	29,261		29,261
2. PORT OF SPAIN	82,530	81,691	77,607	39,610	37,996	29,707	19,378	39,579	9,505	49,085	82,928	82,025	77,923	38,612	39,311	26,860	17,572	34,832	9,601	44,432
3. E.M.R. COMMUNITIES	278,073	270,402	256,882	239,562	17,320	157,339	8,152	125,911	39,580	165,491	297,995	289,375	274,906	255,775	19,131	150,231	7,911	118,166	39,976	158,142
3.1 St. Barbs	6,342	6,342	6,025	5,803	223	2,959	113	3,073		3,073	6,438	6,438	6,116	5,890	226	2,633	101	2,734		2,734
3.2 Laventille	6,496	6,496	6,172	6,172		3,147		3,147		3,147	6,594	6,594	6,265	6,264		2,800		2,800		2,800
3.3 Morvant	19,658	19,658	18,676	18,613	62	9,493	32	9,525		9,525	19,955	19,955	18,957	18,894	64	8,445	28	8,474		8,474
3.4 Picton	27,058	27,058	25,705	25,705		13,109		13,109		13,109	27,466	27,466	26,093	26,093		11,663		11,663		11,663
3.5 Barataria	33,259	33,259	31,596	31,596		25,945		16,114	9,831	25,945	33,761	33,761	32,073	32,073		24,266		14,337	9,929	24,266
3.6 St. Joseph	34,868	31,563	29,985	23,477	6,508	31,946	3,059	14,093	20,912	35,005	38,658	34,922	33,176	25,810	7,366	31,780	3,042	13,702	21,121	34,823
3.7 Arouca	24,269	24,269	23,056	21,578	1,477	18,979	694	10,836	8,837	19,674	28,849	28,849	27,406	25,735	1,672	19,554	691	11,319	8,926	20,245
3.8 Tacarigua	20,447	19,196	18,236	18,236		9,300		9,300		9,300	23,134	21,718	20,632	20,632		9,223		9,223		9,223
3.9 Saddle Road	55,215	54,769	52,031	48,256	3,775	22,680	1,774	24,455		24,455	56,048	55,597	52,817	48,984	3,833	20,230	1,583	21,813		21,813
3.10 St. Augustine	23,601	23,573	22,394	17,120	5,275	8,046	2,479	10,525		10,525	26,703	26,674	25,340	19,371	5,970	8,000	2,466	10,466		10,466
3.11 Tunapuna	26,859	24,218	23,007	23,007		11,734		11,734		11,734	30,389	27,401	26,031	26,031		11,636		11,636		11,636
4. ARIMA	61,487	58,180	55,271	55,271		25,977		25,977		25,977	71,608	66,587	63,258	63,258		26,125		26,125		26,125
5. SANGRE GRANDE	55,755	49,614	47,133	43,037	4,096	16,010	1,524	17,533		17,533	63,611	56,664	53,831	49,091	4,740	15,611	1,507	17,118		17,118
6. WALLERFIELD	27,365	24,960	23,712	23,712		8,821		8,821		8,821	32,311	29,523	28,047	28,047		8,919		8,919		8,919
7. TOCO	8,761	7,821	7,430		7,430		2,764	2,764		2,764	10,157	9,068	8,614		8,615		2,739	2,739		2,739
8. CARONI	186,144	178,931	169,985	147,466	22,518	175,050	10,584	79,893	105,741	185,634	211,233	203,213	193,052	168,039	25,014	176,199	10,331	79,731	106,799	186,530
8.1 Caroni	8,461	8,461	8,038	8,038		3,778		3,778		3,778	9,707	9,707	9,221	9,222		3,809		3,808		3,808
8.2 Cunupia	55,597	53,426	50,754	49,724	1,030	23,370	484	23,855		23,855	64,294	61,840	58,748	57,610	1,137	23,793	470	24,263		24,263
8.3 Chaguanas	63,264	61,403	58,333	43,298	15,035	20,350	7,066	27,417		27,417	72,288	70,234	66,722	49,971	16,751	20,638	6,918	27,556		27,556
8.4 Couva	58,823	55,642	52,860	46,406	6,453	127,552	3,033	24,844	105,741	130,585	64,945	61,433	58,361	51,236	7,125	127,960	2,943	24,103	106,799	130,902
9. MAYARO	10,022	9,752	9,265		9,265		3,446	3,446		3,446	10,500	10,288	9,773		9,774		3,108	3,108		3,108
10. RIO CLARO	274,590	271,709	258,123	234,054	24,069	98,783	9,692	108,475		108,475	294,215	291,609	277,028	251,139	25,887	91,995	9,003	100,998		100,998
10.1 Arch Trace	47,531	44,649	42,416	38,413	4,003	14,290	1,489	15,779		15,779	48,829	46,223	43,912	39,641	4,271	12,606	1,358	13,964		13,964
10.2 Princes Town	50,765	50,765	48,227	48,227		17,940		17,940		17,940	55,310	55,310	52,545	52,545		16,709		16,709		16,709
10.3 Barrackpore	50,994	50,995	48,445	35,912	12,533	13,359	4,662	18,022		18,022	55,092	55,092	52,338	38,836	13,500	12,350	4,293	16,643		16,643
10.4 Fyzabad	59,523	59,523	56,547	49,924	6,623	23,464	3,113	26,577		26,577	64,123	64,123	60,917	53,782	7,134	22,212	2,946	25,159		25,159
10.5 Palmyra	45,050	45,050	42,798	41,887	911	19,687	428	20,115		20,115	48,532	48,532	46,106	45,124	981	18,636	405	19,042		19,042
10.6 Marabella	20,726	20,726	19,690	19,690		10,042		10,042		10,042	22,328	22,328	21,212	21,212		9,482		9,482		9,482
11. SAN FERNANDO	29,842	29,842	28,350	28,350		14,459		14,459		14,459	28,380	28,380	26,961	26,961		12,052		12,052		12,052
12. SIPARIA/ERIN	34,125	32,716	31,080		31,080		11,562	11,562		11,562	36,763	35,246	33,483		33,484		10,648	10,648		10,648
13. POINT FORTIN	51,368	50,018	47,517	13,727	33,790	5,106	12,570	17,676		17,676	55,636	54,171	51,463	14,788	36,675	4,702	11,663	16,365		16,365
14. NORTH COAST	2,360	1,842	1,749		1,749		651	651		651	2,736	2,135	2,028		2,028			645	645	645
TOTAL (TRINIDAD)	1,172,585	1,136,708	1,079,872	825,028	254,844	531,364	111,121	487,659	154,826	642,485	1,273,656	1,232,862	1,171,217	895,967	275,250	512,801	104,282	450,707	156,376	607,083
15. TOBAGO	56,195	55,784	52,994					23,781		23,781	66,707	66,253	62,941					24,773		24,773
15.1 Leeward Sect.	43,689	43,689	41,505					19,507		19,507	52,723	52,723	50,087					20,686		20,686
15.2 Windward Sect.	12,505	12,095	11,490					4,274		4,274	13,984	13,530	12,854					4,087		4,087
TOTAL	1,228,780	1,192,491	1,132,867	825,028	254,844	531,364	111,121	511,440	154,826	666,267	1,340,363	1,299,116	1,234,158	895,967	275,250	512,801	104,282	485,480	156,376	641,856

Table 6 POPULATION AND WATER DEMAND PROJECTION 1990-2005 (2)

YEAR	2000										2005									
WATER AREA	POPULATION					WATER DEMAND (m3/d)					POPULATION					WATER DEMAND (m3/d)				
	Total	Service Area	Served	Served by Sources I	Served by Sources II	Area I	Area II	General	Special	Total	Total	Service Area	Served	Served by Sources I	Served by Sources II	Area I	Area II	General	Special	Total
1. DIEGO MARTIN	81,425	80,345	76,328	278	76,049	104	28,366	28,470		28,470	85,578	84,443	80,221	293	79,929	100	27,416	27,516		27,516
2. PORT OF SPAIN	83,622	82,648	78,515	37,713	40,803	25,041	16,362	31,485	9,918	41,402	83,733	82,710	78,575	36,832	41,743	23,941	15,361	28,915	10,387	39,303
3. E.M.R. COMMUNITIES	320,646	310,946	295,399	274,235	21,165	147,600	7,903	114,206	41,297	155,503	342,306	331,631	315,049	292,012	23,038	147,190	7,903	111,848	43,252	155,100
3.1 St. Barbs	6,535	6,535	6,208	5,979	229	2,398	92	2,490		2,490	6,700	6,700	6,365	6,130	235	2,256	86	2,342		2,342
3.2 Laventille	6,694	6,694	6,359	6,359		2,550		2,550		2,550	6,863	6,863	6,520	6,520		2,399		2,399		2,399
3.3 Morvant	20,256	20,256	19,243	19,180	65	7,691	26	7,717		7,717	20,768	20,768	19,730	19,663	66	7,236	24	7,260		7,260
3.4 Picton	27,880	27,880	26,486	26,486		10,621		10,621		10,621	28,584	28,584	27,155	27,155		9,993		9,993		9,993
3.5 Barataria	34,270	34,270	32,557	32,557		23,312		13,055	10,257	23,313	35,136	35,136	33,379	33,379		23,026		12,284	10,743	23,026
3.6 St. Joseph	42,934	38,707	36,772	28,437	8,334	32,426	3,109	13,716	21,819	35,535	46,850	42,183	40,074	30,872	9,202	33,441	3,156	13,745	22,852	36,597
3.7 Arouca	34,414	34,414	32,694	30,803	1,891	20,710	706	12,195	9,221	21,415	38,859	38,859	36,916	34,828	2,089	21,603	717	12,662	9,657	22,319
3.8 Tacarigua	26,174	24,572	23,343	23,343		9,361		9,361		9,361	28,898	27,129	25,773	25,773		9,484		9,484		9,484
3.9 Saddle Road	56,894	56,436	53,614	49,723	3,891	18,547	1,451	19,998		19,998	58,331	57,861	54,968	50,979	3,989	17,486	1,368	18,854		18,854
3.10 St. Augustine	30,212	30,179	28,670	21,916	6,755	8,175	2,519	10,694		10,694	33,356	33,320	31,654	24,197	7,458	8,299	2,558	10,857		10,857
3.11 Tunapuna	34,382	31,002	29,452	29,452		11,810		11,810		11,810	37,961	34,228	32,517	32,517		11,966		11,966		11,966
4. ARIMA	84,175	76,926	73,080	73,080		27,259		27,259		27,259	93,937	85,108	80,853	80,853		27,732		27,732		27,732
5. SANGRE GRANDE	72,647	64,786	61,547	56,052	5,495	15,695	1,539	17,233		17,233	80,536	71,858	68,265	62,134	6,130	15,596	1,539	17,135		17,135
6. WALLERFIELD	38,243	35,011	33,260	33,260		9,313		9,313		9,313	43,285	39,628	37,647	37,647		9,449		9,449		9,449
7. TOCO	11,775	10,512	9,986		9,986		2,796	2,796		2,796	13,322	11,893	11,298		11,298		2,836	2,836		2,836
8. CARONI	239,840	230,921	219,375	191,581	27,794	181,787	10,367	81,827	110,327	192,154	269,840	259,892	246,897	215,896	31,001	189,603	10,933	84,686	115,550	200,236
8.1 Caroni	11,138	11,138	10,581	10,581		3,947		3,947		3,947	12,474	12,474	11,850	11,850		4,065		4,065		4,065
8.2 Cunupia	74,358	71,584	68,005	66,749	1,256	24,897	468	25,366		25,366	84,034	80,933	76,886	75,499	1,387	25,896	476	26,372		26,372
8.3 Chaguanas	82,639	80,372	76,353	57,682	18,671	21,515	6,964	28,480		28,480	93,230	90,664	86,131	65,226	20,905	22,373	7,170	29,543		29,543
8.4 Couva	71,704	67,827	64,436	56,569	7,867	131,427	2,934	24,034	110,327	134,362	80,102	75,821	72,030	63,320	8,710	137,269	2,987	24,706	115,550	140,257
9. MAYARO	11,054	10,889	10,345		10,345		2,896	2,896		2,896	11,752	11,602	11,022		11,022		2,766	2,766		2,766
10. RIO CLARO	315,688	313,332	297,665	269,796	27,869	88,217	8,616	96,834		96,834	339,696	337,455	320,582	290,527	30,052	86,363	8,410	94,773		94,773
10.1 Arch Trace	50,464	48,108	45,703	41,121	4,582	11,514	1,283	12,797		12,797	52,992	50,751	48,213	43,247	4,967	10,855	1,247	12,102		12,102
10.2 Princes Town	60,282	60,282	57,268	57,268		16,035		16,035		16,035	65,722	65,722	62,436	62,436		15,671		15,671		15,671
10.3 Barrackpore	59,527	59,527	56,550	42,005	14,545	11,761	4,072	15,834		15,834	64,327	64,327	61,111	45,441	15,668	11,406	3,933	15,339		15,339
10.4 Fyzabad	69,079	69,079	65,625	57,940	7,686	21,611	2,867	24,478		24,478	74,418	74,418	70,697	62,417	8,279	21,409	2,840	24,249		24,249
10.5 Palmyra	52,283	52,283	49,669	48,612	1,057	18,132	394	18,526		18,526	56,324	56,324	53,508	52,369	1,138	17,962	390	18,353		18,353
10.6 Marabella	24,054	24,054	22,851	22,851		9,163		9,163		9,163	25,913	25,913	24,617	24,617		9,059		9,059		9,059
11. SAN FERNANDO	26,989	26,989	25,640	25,640		10,281		10,281		10,281	26,321	26,321	25,005	25,005		9,202		9,202		9,202
12. SIPARIA/ERIN	39,604	37,969	36,071		36,071		10,100	10,100		10,100	42,665	40,904	38,859		38,859		9,754	9,754		9,754
13. POINT FORTIN	60,265	58,681	55,747	15,931	39,816	4,461	11,149	15,609		15,609	65,285	63,573	60,394	17,162	43,233	4,308	10,851	15,159		15,159
14. NORTH COAST	3,172	2,475	2,351		2,351		658	658		658	3,502	2,732	2,595		2,595		651	651		651
TOTAL (TRINIDAD)	1,389,143	1,342,430	1,275,308	977,565	297,744	509,757	100,753	448,967	161,541	610,509	1,501,756	1,449,750	1,377,263	1,058,359	318,901	513,484	98,127	442,423	169,190	611,612
15. TOBAGO	79,415	78,914	74,969					26,625		26,625	90,616	90,077	85,573					27,905		27,905
15.1 Leeward Sect.	63,771	63,771	60,583					22,597		22,597	73,530	73,530	69,854					23,960		23,960
15.2 Windward Sect.	15,644	15,143	14,386					4,028		4,028	17,086	16,547	15,720					3,945		3,945
TOTAL	1,468,558	1,421,344	1,350,277	977,565	297,744	509,757	100,753	475,593	161,541	637,134	1,592,372	1,539,827	1,462,836	1,058,359	318,901	513,484	98,127	470,328	169,190	639,517

Table 7 ESTIMATED DEPENDABLE YIELDS (1)

* Estimated

DISTRICT OF WASA		NAME OF PRODUCTION FACILITIES WATERWORKS/TREATMENT PLANTS INTAKES, WELLS AND SPRINGS	KIND OF SCALE	SURFACE WATER		GROUNDWATER		TOTAL	
				RAINY (m3/d)	DRY (m3/d)	RAINY (m3/d)	DRY (m3/d)	RAINY (m3/d)	DRY (m3/d)
NORTH CENTRAL	1	CARONI/ARENA TREATMENT PLANT	LARGE-S	272,760	272,760	----	----	272,760	272,760
	2	* VALSAYN WATERWORKS	MEDIUM-G	----	----	27,280	27,280	27,280	27,280
	3	* TACARIGUA WATERWORKS	MEDIUM-G	----	----	14,550	14,550	14,550	14,550
	4	LAS LOMAS WATERWORKS	MEDIUM-G	----	----	11,360	11,360	11,360	11,360
	5	CAURA WATERWORKS	MEDIUM-S	11,360	9,094	----	----	11,360	9,094
	6	LOANGO/NARANJO WATERWORKS	MEDIUM-S	3,180	2,214	----	----	3,180	2,214
	7	* AROUCA WATERWORKS	SMALL-G	----	----	653	653	653	653
	8	* ST. JOHN'S INTAKE	SMALL-S	454	454	----	----	454	454
	9	* Mt. D'OR INTAKE	SMALL-S	88	88	----	----	88	88
	10	* WATERFALL ROAD INTAKE	SMALL-S	59	59	----	----	59	59
	11	* LOANGO INTAKE	SMALL-S	59	59	----	----	59	59
	12	* LOPINOT INTAKE	SMALL-S	35	35	----	----	35	35
	13	* SURREY INTAKE	SMALL-S	18	18	----	----	18	18
		LARGE-S		272,760	272,760	0	0	272,760	272,760
		MEDIUM-G		0	0	53,190	53,190	53,190	53,190
		MEDIUM-S		14,540	11,308	0	0	14,540	11,308
		SMALL-G		0	0	653	653	653	653
		SMALL-S		713	713	0	0	713	713
		SUB-TOTAL		288,013	284,781	53,843	53,843	341,856	338,624
NORTH EAST	14	NORTH OROPOUCHE WATERWORKS	LARGE-S	90,125	44,825	----	----	90,125	44,825
	15	* HOLLIS WATERWORKS	LARGE-S	31,826	25,000	----	----	31,826	25,000
	16	GUANAPO WATERWORKS	MEDIUM-S	11,360	11,360	----	----	11,360	11,360
	17	ARIPO NEW WATERWORKS	MEDIUM-S	10,530	8,059	----	----	10,530	8,059
	18	* ARIPO INTAKE	MEDIUM-S	4,535	4,535	----	----	4,535	4,535
	19	* QUARE INTAKE (VALENCIA)	MEDIUM-S	2,935	2,935	----	----	2,935	2,935
	20	* TOCO WATERWORKS	MEDIUM-S	2,162	1,525	----	----	2,162	1,525
	21	* ARIMA WELL #6	SMALL-G	----	----	644	644	644	644
	22	* SANS SOUCI INTAKE	SMALL-S	493	493	----	----	493	493
	23	* LOS ARMADILLOS INTAKE	SMALL-S	105	105	----	----	105	105
	24	* FOUR ROAD/TAMANA INTAKE	SMALL-S	70	70	----	----	70	70
	25	* CUMACA INTAKE	SMALL-S	45	45	----	----	45	45
	26	* MATURA INTAKE	SMALL-S	35	35	----	----	35	35
	27	* MATELOT INTAKE	SMALL-S	35	35	----	----	35	35
	28	* GRAND RIVIERE INTAKE	SMALL-S	35	35	----	----	35	35
	29	* SALIBEA INTAKE	SMALL-S	35	35	----	----	35	35
	30	* MONTEVIDEO INTAKE	SMALL-S	35	35	----	----	35	35
	31	* MORNE LA CROIX INTAKE	SMALL-S	27	27	----	----	27	27
	32	* BRASSO SECO-PARIA INTAKE	SMALL-S	27	27	----	----	27	27
		LARGE-S		121,951	69,825	0	0	121,951	69,825
		MEDIUM-S		31,522	28,414	0	0	31,522	28,414
		SMALL-G		0	0	644	644	644	644
		SMALL-S		942	942	0	0	942	942
		SUB-TOTAL		154,415	99,181	644	644	155,059	99,825
NORTH WEST	33	* FOUR ROADS WATERWORKS	MEDIUM-G	----	----	28,900	28,900	28,900	28,900
	34	* EL SOCORRO WATERWORKS	MEDIUM-G	----	----	24,126	24,126	24,126	24,126
	35	* TUCKER VALLEY WELLS	MEDIUM-G	----	----	7,971	7,971	7,971	7,971
	36	* RIVER ESTATE WATERWORKS	MEDIUM-G	----	----	6,820	6,820	6,820	6,820
	37	* CHAGUARAMAS WELLS	MEDIUM-G	----	----	5,669	5,669	5,669	5,669
	38	* DORRINGTON GARDEN WATERWORKS	MEDIUM-G	----	----	5,400	5,400	5,400	5,400
	39	* LA PASTORA WELLS	MEDIUM-G	----	----	2,900	2,900	2,900	2,900
	40	ACONO WATERWORKS	MEDIUM-S	2,100	1,543	----	----	2,100	1,543
	41	* DAMIER INTAKE	SMALL-S	358	358	----	----	358	358
	42	* TYRICO INTAKE	SMALL-S	305	305	----	----	305	305
	43	* GUAICO TAMANA/LAS CUEVAS INTAKE	SMALL-S	266	266	----	----	266	266
	44	* LA CANOA INTAKE	SMALL-S	200	200	----	----	200	200
	45	* LA PASTORA RES. ROAD	SMALL-S	94	94	----	----	94	94
	46	* PIPIOL INTAKE	SMALL-S	90	90	----	----	90	90
	47	LA PASTORA/CAPRIATA INTAKE	SMALL-S	88	88	----	----	88	88
	48	* MON REPOS INTAKE	SMALL-S	45	45	----	----	45	45
	49	* BLANCHISSEUSE INTAKE	SMALL-S	44	44	----	----	44	44
		MEDIUM-G		0	0	81,786	81,786	81,786	81,786
		MEDIUM-S		2,100	1,543	0	0	2,100	1,543
		SMALL-S		1,490	1,490	0	0	1,490	1,490
		SUB-TOTAL		3,590	3,033	81,786	81,786	85,376	84,819
PORT OF SPAIN	50	* SAVANNAH WELLS	MEDIUM-G	----	----	12,270	12,270	12,270	12,270
	51	* KING GEORGE V PARK WELLS	MEDIUM-G	----	----	10,340	10,340	10,340	10,340
	52	* ST. CLAIR WELL	MEDIUM-G	----	----	1,820	1,820	1,820	1,820
	53	* MOKA WELLS	MEDIUM-G	----	----	1,590	1,590	1,590	1,590
	54	* MARAVAL WATERWORKS	MEDIUM-S	5,910	4,770	----	----	5,910	4,770
	55	* PARAMIN WATERWORKS	SMALL-G	----	----	390	390	390	390
	56	* ST ANN'S WATRWORKS	SMALL-S	840	840	----	----	840	840
	57	* CASCADE INTAKE	SMALL-S	207	207	----	----	207	207
	58	* DIBE INTAKE	SMALL-S	145	145	----	----	145	145

Table 7 ESTIMATED DEPENDABLE YIELDS (2)

* Estimated

DISTRICT OF WASA		NAME OF PRODUCTION FACILITIES WATERWORKS/TREATMENT PLANTS INTAKES, WELLS AND SPRINGS	KIND OF SCALE	SURFACE WATER RAINY (m3/d)	SURFACE WATER DRY (m3/d)	GROUNDWATER RAINY (m3/d)	GROUNDWATER DRY (m3/d)	TOTAL RAINY (m3/d)	TOTAL DRY (m3/d)
	59	* ARIAPITA INTAKE	SMALL-S	138	138	----	----	138	138
		MEDIUM-G		0	0	26,020	26,020	26,020	26,020
		MEDIUM-S		5,910	4,770	0	0	5,910	4,770
		SMALL-G		0	0	390	390	390	390
		SMALL-S		1,330	1,330	0	0	1,330	1,330
		SUB-TOTAL		7,240	6,100	26,410	26,410	33,650	32,510
SAN FERNANDO /SOUTH CENTRAL	60	CARLSEN FIELD WATERWORKS	MEDIUM-G	----	----	11,175	11,175	11,175	11,175
	61	FREEPORT WATERWORKS	MEDIUM-G	----	----	6,165	6,165	6,165	6,165
		MEDIUM-G		0	0	17,340	17,340	17,340	17,340
		SUB-TOTAL		0	0	17,340	17,340	17,340	17,340
SOUTH EAST	62	NAVET WATERWORKS	LARGE-S	77,280	77,280	----	----	77,280	77,280
	63	MALONEY WELLS	MEDIUM-G	----	----	1,358	1,358	1,358	1,358
	64	AMOCO TOURNEBRIDGE WELLS	MEDIUM-G	----	----	1,194	1,194	1,194	1,194
	65	GUARACARA SPRING	SMALL-G	----	----	1,136	1,136	1,136	1,136
	66	GUAYAGUAYARE WELL #1	SMALL-G	----	----	897	897	897	897
	67	MAYARO WELLS	SMALL-G	----	----	792	792	792	792
	68	MORICHAL SPRING	SMALL-G	----	----	718	718	718	718
	69	MAYO SPRINGS	SMALL-G	----	----	630	630	630	630
	70	BICHE WATERWORKS	SMALL-S	259	259	----	----	259	259
		LARGE-S		77,280	77,280	0	0	77,280	77,280
		MEDIUM-G		0	0	2,552	2,552	2,552	2,552
		SMALL-G		0	0	4,173	4,173	4,173	4,173
		SMALL-S		259	259	0	0	259	259
		SUB-TOTAL		77,539	77,539	6,725	6,725	84,264	84,264
SOUTH WEST	71	CHATHAM WATERWORKS	MEDIUM-G	----	----	6,750	6,750	6,750	6,750
	72	PENAL WATERWORKS	MEDIUM-G	----	----	3,500	3,500	3,500	3,500
	73	SIPARIA (COORA) WATERWORKS	MEDIUM-G	----	----	3,033	3,033	3,033	3,033
	74	GRANVILLE WATERWORKS	MEDIUM-G	----	----	2,800	2,800	2,800	2,800
	75	FYZABAD WATERWORKS	MEDIUM-G	----	----	1,500	1,500	1,500	1,500
	76	CARAPAL WATERWORKS	MEDIUM-G	----	----	1,400	1,400	1,400	1,400
	77	CAP DE VILLE WATERWORKS	SMALL-G	----	----	1,006	1,006	1,006	1,006
	78	POINT FORTIN WATERWORKS	SMALL-G	----	----	980	980	980	980
	79	CLARKE ROAD WELLS	SMALL-G	----	----	623	623	623	623
	80	* TEXACO TO GUAYAGUARE	SMALL-G	----	----	180	180	180	180
	81	* TRINTOC TO TECHIER	SMALL-G	----	----	155	155	155	155
	82	TRINTOC TO PT. FORTIN	SMALL-G	----	----	69	69	69	69
		MEDIUM-G		0	0	18,983	18,983	18,983	18,983
		SMALL-G		0	0	3,013	3,013	3,013	3,013
		SUB-TOTAL		0	0	21,996	21,996	21,996	21,996
TRINIDAD		LARGE-S		471,991	419,865	0	0	471,991	419,865
		MEDIUM-G		0	0	199,871	199,871	199,871	199,871
		MEDIUM-S		54,072	46,035	0	0	54,072	46,035
		SMALL-G		0	0	8,873	8,873	8,873	8,873
		SMALL-S		4,734	4,734	0	0	4,734	4,734
		TOTAL		530,797	470,634	208,744	208,744	739,541	679,378
TOBAGO	83	HILLSBOROUGH WATERWORKS	MEDIUM-S	8,582	8,582	----	----	8,582	8,582
	84	COURLAND WATERWORKS	MEDIUM-S	7,368	7,368	----	----	7,368	7,368
	85	HILLSBOROUGH WEST RIVER	MEDIUM-S	3,500	3,500	----	----	3,500	3,500
	86	GREEN HILL INTAKE	MEDIUM-S	3,360	3,360	----	----	3,360	3,360
	87	KINGS BAY WATERWORKS	MEDIUM-S	2,994	2,994	----	----	2,994	2,994
	88	RICHMOND WATERWORKS	MEDIUM-S	2,467	2,467	----	----	2,467	2,467
	89	CRAIG HALL INTAKE	MEDIUM-S	2,461	2,461	----	----	2,461	2,461
	90	GOV'T FARM WELL #3	SMALL-G	----	----	335	335	335	335
	91	CHARLOTTEVILLE	SMALL-S	388	388	----	----	388	388
	92	* SPEYSIDE	SMALL-S	86	86	----	----	86	86
	93	CASTARA	SMALL-S	80	80	----	----	80	80
	94	* PARLATUVIER	SMALL-S	70	70	----	----	70	70
	95	* L'ANSE FOURMI	SMALL-S	34	34	----	----	34	34
	96	* BLOODY BAY	SMALL-S	24	24	----	----	24	24
		MEDIUM-S		30,732	30,732	0	0	30,732	30,732
		SMALL-G		0	0	335	335	335	335
		SMALL-S		682	682	0	0	682	682
		TOTAL		31,414	31,414	335	335	31,749	31,749
TRINIDAD AND TOBAGO		LARGE-S		471,991	419,865	0	0	471,991	419,865
		MEDIUM-G		0	0	199,871	199,871	199,871	199,871
		MEDIUM-S		84,804	76,767	0	0	84,804	76,767
		SMALL-G		0	0	9,208	9,208	9,208	9,208
		SMALL-S		5,416	5,416	0	0	5,416	5,416
		GRAND-TOTAL		562,211	502,048	209,079	209,079	771,290	711,127

NOTE: - " * " MEANS NO INSTALLATION OF FLOW METER AT THE EXISTING PRODUCTION FACILITIES.
- " -S " MEANS OBTAINING RAW WATER FROM SURFACE WATER.
- " -G " MEANS OBTAINING RAW WATER FROM GROUNDWATER.

Table 8 LIST OF MONITORING AND CONTROL EQUIPMENT TO BE INSTALLED FOR CENTRAL SUPERVISORY SYSTEM (1)

NOTE: AN; ANNUBAR, B ; BOURDON TUBE, F ; FLOAT TYPE, PF; PARSHALL FLUME, BPS; BOOSTER PUMPING STATION, HW ; HIGH WAY, "¥"; EXISTINGS (REPLACEMENT PERIPHERALS).
AP; AIR PURGE TYPE, BU; BUTTERFLY VALVE, O ; ORIFICE PLATE, V ; VENTURI TUBE, WTP; WATER TREATMENT PLANT, (300); PIPE DIAMETER(MM), "#"; INSTALLATION OF CONTROL EQUIPMENT.
AV; ALTITUDE VALVE, CV; CONE VALVE, P ; PROPELLAR TYPE, WW; WATERWORKS, D ; DIFFERENTIAL PRESSURE TYPE, "*" ; EXISTINGS TO BE USED.

REMOTE TERMINAL UNIT (RTU)		PHASE I																		PHASE II											
		EQUIPMENT AND NUMBER TO BE INSTALLED						NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED				EQUIPMENT AND NUMBER TO BE INSTALLED				NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
NO.	LOCATION	LEVEL METER	PRESS GAUGE	FLOW METER	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE	LEVEL METER	PRESS GAUGE	FLOW METER	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
1	NORTH OROPOUCHE WW	F 1 *D 2		¥PF 1 AN 1		3		2				5					¥F 1 D 2		¥PF 1 ¥AN 1		3		2				5				
2	HOLLIS WW	F 1		AN 2		1		2				3					¥F 1		¥AN 2		1		2				3				
3	GILL TRACE	D 1	B 4 ¥B 1	AN 4 ¥V 1	BU 4	1	5	5	4			15			4	SITE	¥D 1	B 1 ¥B 4	¥AN 4 ¥V 1	#BU 4	1	5	5	4			15			4	CSS
4	ARIPO BPS	D 2	B 3	AN 5 ¥O 1 ¥V 1	BU 3	2	3	7	3			15			3	SITE	¥D 2	¥B 3	¥AN 5 ¥O 1 ¥V 1	#BU 3	2	3	7	3			15			3	CSS
5	GUANAPO JUNCTION	D 1	B 3	AN 4	BU 3	1	3	4	3			11			3	SITE	¥D 1	¥B 3	¥AN 4	#BU 3	1	3	4	3			11			1 2	WW CSS
6	DEMERARA JUNCTION		B 2	AN 2	BU 2		2	2	2			6			2	SITE		¥B 2	¥AN 2	#BU 2		2	2	2			6			2	CSS
7	ARIMA OLD RESERVOIR	F 1 D 1	B 4	AN 7	BU 4	2	4	7	4			17			4	SITE	¥F 1 ¥D 1	¥B 4	¥AN 7	#BU 4	2	4	7	4	4	17	38	2	CSS	4	CSS
8	MAUSICA JUNCTION		B 6	AN 6	BU 6		6	6	6			18			6	SITE		¥B 6	¥AN 6	#BU 6		6	6	6			18			6	CSS
9	AROUCA WW	D 1	B 2	AN 3	BU 3	1	2	3	3			9			3	SITE	¥D 1	¥B 2	¥AN 3	#BU 3	1	2	3	3			9			1 2	WW CSS
10	CAURA WW	D 1	B 1	AN 2	BU 1	1	1	2	1			5			1	SITE	¥D 1	¥B 1	¥AN 2	#BU 1	1	1	2	1			5			1	WW
11	TACARIGUA WW	¥D 1	B 4	AN 4	BU 3	1	4	4	3			12			3	SITE	D 1	¥B 4	¥AN 4	BU 1 #BU 3	1	4	4	4			13			2 2	WW CSS
12	FLOW CONTROL STATION		B 4	AN 2 ¥V 1	BU 2 #CV 2		4	3	4			11			4	SITE		¥B 4	¥AN 2 ¥V 1	#BU 2 #CV 2		4	3	4			11			4	CSS
13	ST AUGUSTINE RESERVOIR	F 1	B 4	AN 5	AV 1	1	4	5				10					¥F 1	¥B 4	¥AN 5	¥AV 1 BU 4	1	4	5	4			14			4	CSS
14	TUNAPUNA BPS		B 6	AN 6	BU 5		6	6	5	6	25	48	3	CSS	2 3	CSS SITE		¥B 6	¥AN 6	#BU 5		6	6	5	6	25	48	3	CSS	5	CSS
15	ST JOSEPH RESERVOIR	F 1	B 4	AN 6	BU 4	1	4	6	4			15			4	SITE	¥F 1	¥B 4	¥AN 6	#BU 4	1	4	6	4			15			4	CSS
16	VALSAYN WW	¥D 1	¥B 3	AN 1 ¥AN 1 ¥V 2	BU 2	1	3	4	2	6	25	41	3	CSS	1 1	CSS SITE	D 1	B 3	¥AN 2 ¥V 2	#BU 2	1	3	4	2	6	25	41	3	CSS	1 1	WW CSS
17	URIAH BUTLER HW JUNCTION		B 1	AN 1	BU 1		1	1	1			3			1	SITE		¥B 1	¥AN 1	#BU 1		1	1	1			3			1	CSS
18	MT. HOPE RESERVOIR	D 1	B 7	AN 8	AV 1 BU 7	1	7	8	7			23			7	SITE	¥D 1	B 1 ¥B 7	AN 1 ¥AN 8	¥AV 1 BU 1 #BU 7	1	8	9	8			26			8	CSS
19	MALICK RESERVOIR	D 1	B 3	AN 4	AV 1 BU 3	1	3	4	3			11			3	SITE	¥D 1	¥B 3	¥AN 4	¥AV 1 #BU 3	1	3	4	3			11			3	CSS
20	EL SOCORRO WW	¥AP 1	B 3 ¥B 3	AN 3 ¥AN 2 ¥V 1	BU 5	1	6	6	5	6	25	49	3	CSS	1 4	CSS SITE	F 1	B 3 ¥B 3	¥AN 5 ¥V 1	#BU 5	1	6	6	5	6	25	49	3	CSS	1 4	WW CSS
21	LAVENTILLE		B 1	AN 1	BU 1		1	1	1			3			1	SITE		¥B 1	¥AN 1	#BU 1		1	1	1			3			1	CSS
22	BLACK RIVER		B 4	AN 4	BU 4		4	4	4			12			4	SITE		¥B 4	¥AN 4	#BU 4		4	4	4			12			4	CSS
23	PICTON NO. 3 RESERVOIR	*D 4	B 3	AN 6	AV 4 BU 3	4	3	6	3			16			3	SITE	D 4	¥B 3	¥AN 6	¥AV 4 #BU 3	4	3	6	3			16			3	CSS
24	SERVOL LIFE CENTER		B 3	AN 3	BU 3		3	3	3			9			3	SITE		¥B 3	¥AN 3	#BU 3		3	3	3			9			3	CSS

Table 8 LIST OF MONITORING AND CONTROL EQUIPMENT TO BE INSTALLED FOR CENTRAL SUPERVISORY SYSTEM (2)

NOTE: AN; ANNUBAR, B ; BOURDON TUBE, F ; FLOAT TYPE, PF; PARSHALL FLUME, BPS; BOOSTER PUMPING STATION, HW ; HIGH WAY, "¥"; EXISTINGS (REPLACEMENT PERIPHERALS),
AP; AIR PURGE TYPE, BU; BUTTERFLY VALVE, O ; ORIFICE PLATE, V ; VENTURI TUBE, WTP; WATER TREATMENT PLANT, (300); PIPE DIAMETER(MM), "#"; INSTALLATION OF CONTROL EQUIPMENT.
AV; ALTITUDE VALVE, CV; CONE VALVE, P ; PROPELLAR TYPE, WW; WATERWORKS, D ; DIFFERENTIAL PRESSURE TYPE, "*" ; EXISTINGS TO BE USED.

REMOTE TERMINAL UNIT (RTU)		PHASE I																PHASE II											
		EQUIPMENT AND NUMBER TO BE INSTALLED								NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED				EQUIPMENT AND NUMBER TO BE INSTALLED								NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
NO.	LOCATION	LEVEL METER		PRESS GAUGE		FLOW METER		CONTROL VALVE		WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM STATUS	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE	LEVEL METER		PRESS GAUGE		FLOW METER		CONTROL VALVE		WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM STATUS	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
25	KNAGGS HILL	*D	2	B	6	AN	7	*AV	2	2	6	7	4			19			4	SITE	D	2	¥B	6	¥AN	7	¥AV	2	2	6	7	4			19			4	CSS
								BU	4																	#BU	4											
26	NATIONAL FLOUR MILL			B	1	AN	1	BU	1		1	1	1			3			1	SITE			B	3	¥AN	1	#BU	4		4	4	4			12			4	CSS
																							¥B	1	¥P	3													
27	TUMPUNA STORAGE LIFT PS	¥AP	1			¥V	2	¥BU	2	2		2	2	12	59	77	6	CARONI	2	CARONI	F	1			¥V	2	#BU	2	2		2	2	12	59	77	6	CARONI	2	CARONI
		F	1																		¥F	1																
28	CARONI WTP	¥AP	2	*B	2	¥AN	2	¥BU	2	2	2	3	2			9			2	CARONI	¥AP	2	B	2	¥AN	2	#BU	2	2	2	3	2			9			2	CARONI
						¥PF	1																			¥PF	1												
29	KELLY VILLAGE			B	1	AN	1	BU	1		1	1	1			3			1	SITE			¥B	1	¥AN	1	#BU	1		1	1	1			3			1	CSS
30	SCALE YARD			B	2	AN	2	BU	2		2	2	2			6			2	SITE			¥B	2	¥AN	2	#BU	2		2	2	2			6			2	CSS
31	LAS LOMAS WW	D	1	¥B	1	¥O	1	BU	1	1	1	2	1			5			1	SITE	¥D	1	B	1	¥O	1	#BU	1	1	1	2	1			5			1	WW
						¥V	1																			¥V	1												
32	JERNINGHAM JUNCTION			B	2	AN	2	BU	1		2	2	1			5			1	SITE			¥B	2	¥AN	2	BU	1		2	2	2			6			2	CSS
																												#BU	1										
33	CHAGUANAS			B	2	AN	2	BU	2		2	2	2			6			2	SITE			¥B	2	¥AN	2	#BU	2		2	2	2			6			2	CSS
34	CARLSEN FIELD WW	F	1	B	2	AN	2	BU	2	1	2	2	2			7			2	SITE	¥F	1	¥B	2	¥AN	2	#BU	2	1	2	2	2			7			2	WW
35	CARAPICHAIMA			B	3	AN	3	BU	1		3	3	1			7			1	SITE			¥B	3	¥AN	3	BU	2		3	3	3			9			3	CSS
																												#BU	1										
36	WARDEN OFFICE			B	3	AN	3	BU	3		3	3	3			9			3	SITE			¥B	3	¥AN	3	#BU	3		3	3	3			9			3	CSS
37	TRINGEN II			B	1	AN	1	BU	1		1	1	1			3			1	SITE			¥B	1	¥AN	1	#BU	1		1	1	1			3			1	CSS
38	CALIFORNIA RESERVOIR	D	1			AN	1	AV	1	1		1				2					¥D	1			¥AN	1	¥AV	1	1		1				2				
39	TCL			B	1	AN	1	BU	1		1	1	1			3			1	SITE			¥B	1	¥AN	1	#BU	1		1	1	1			3			1	CSS
40	MARAVELLA			B	1	AN	1	BU	1		1	1	1			3			1	SITE			¥B	1	¥AN	1	#BU	1		1	1	1			3			1	CSS
41	SAN FERNANDO BPS	¥D	3	B	3	AN	5	AV	1	3	5	6	4	6	25	49	3	CSS	1	CSS	D	3	B	2	¥AN	6	¥AV	1	3	5	6	4	6	25	49	3	CSS	4	CSS
				¥B	2	¥AN	1	BU	3										3	SITE			¥B	3			#BU	4												
								*BU	1																															
42	MOSQUITO CREEK			B	1	AN	1	BU	1		1	1	1			3			1	SITE			¥B	1	¥AN	1	#BU	1		1	1	1			3			1	CSS
43	ST CLEMENT			B	2	AN	2	BU	2		2	2	2			6			2	SITE			¥B	2	¥AN	2	#BU	2		2	2	2			6			2	CSS
44	DAISY			B	1	AN	1	BU	1		1	1	1			3			1	SITE			¥B	1	¥AN	1	#BU	1		1	1	1			3			1	CSS
45	MALGRETOUTE BPS			B	3	AN	3	BU	4		5	4	4	10	41	64	5	CSS	1	CSS			B	2	¥AN	3	#BU	4		5	4	4	10	41	64	5	CSS	4	CSS
				¥B	2	¥V	1												3	SITE			¥B	3	¥V	1													
46	BROTHER ROAD			B	3	AN	3	BU	3		3	3	3			9			3	SITE			¥B	3	¥AN	3	#BU	3		3	3	3			9			3	CSS
47	TCO BPS			B	1	AN	1	BU	2		3	2	2	12	49	68	6	CSS	1	CSS			B	2	¥AN	1	#BU	2		3	2	2	12	49	68	6	CSS	2	CSS
				¥B	2	¥V	1			3		6				9			1	SITE			¥B	1	¥V	1													
48	NAVET WW	F	3			AN	6														¥F	3			¥AN	6			3		6				9				
	TOTAL		38		127		160		124	38	127	160	113	58	249	745	29		113			38		131		164		136	38	131	164	125	62	256	786	31		125	
	= LIST OF EQUIPMENT =	¥AP	4	¥B	14	¥AN	6	AV	9								6	CARONI	102	SITE	¥AP	2	B	20	AN	1	BU	9								6	CARONI	4	CARONI
		D	11	B	111	AN	139	*AV	2								23	CSS	7	CSS	D	13	¥B	111	¥AN	145	¥AV	11								25	CSS	111	CSS
		*D	8	*B	2	¥O	2	BU	106										4	CARONI	¥D	11			¥O	2	#BU	114										10	WW
		¥D	5			¥PF	2	*BU	1												F	2			¥P	3	#CV	2											
		F	10			¥V	11	¥BU	4												¥F	10			¥PF	2													
								#CV	2																¥V	11													

Table 9 LIST OF MONITORING EQUIPMENT AND DATA UNDER LOCAL SUPERVISORY SYSTEM

NO.	FACILITY	PHASE I: NUMBER OF MONITORING FLOW DATA IN M'LY REPORT	PHASE II: FLOW DATA MONITORED IN W'LY REPORT: IN'ED METER	PHASE II: FLOW DATA MONITORED IN W'LY REPORT: NUMBER OF DATA
(NORTH CENTRAL)				
1	LOANGO/NARANJO WW (300)	1	¥ 1	1
2	LOANGO INTAKE (100)	* 1	1	1
3	LOPINOT INTAKE (100)	* 1	1	1
4	MT. D'OR INTAKE (100)	* 1	1	1
5	ST. JOHN'S INTAKE (150)	* 1	1	1
6	SURRY INTAKE (100)	* 1	1	1
7	WATERFALL RD. INTAKE (100)	* 1	1	1
	SUB-TOTAL	[6] 7	[1] 7	7
(NORTH EAST)				
8	BRASO SECO-PARIA INTAKE(100)	* 1	1	1
9	CUMACA INTAKE (100)	* 1	1	1
10	FOUR RD/TAMANA INTAKE (100)	* 1	1	1
11	GRAND RIVIERE INTAKE (100)	* 1	1	1
12	MATELOT INTAKE (100)	* 1	1	1
13	MATURA INTAKE (100)	* 1	1	1
14	MONTEVIDEO INTAKE (100)	* 1	1	1
15	MORNE LA CROIX INTAKE (100)	* 1	1	1
16	SARIBEA INTAKE (100)	* 1	1	1
17	SANS SOUCI WATERWORKS (100)	* 1	1	1
18	TOCO WATERWORKS (250)	* 1	1	1
19	LOS ARMADILLOS INTAKE (100)	* 1	1	1
	SUB-TOTAL	[12] 12	[0] 12	12
(NORTH WEST)				
20	BLANCHISSEUSE INTAKE (100)	* 1	1	1
21	CHAGUARAMAS WELLS (300)	* 2	2	2
22	DAMIER INTAKE (100)	* 1	1	1
23	DORRINGTON GARDEN WW (200)	* 1	1	1
24	FOUR RD. WATERWORKS (200)	* 12	12	12
25	LA CANOA INTAKE (100)	* 1	1	1
26	LA PASTORA RES. RD. (125)	* 1	1	1
27	LA PASTORA WELLS (200)	* 2	2	2
28	GUAICO TAMANA/L.C. IT(100)	* 1	1	1
29	MON REPOS INTAKE (100)	* 1	1	1
30	PIPIOL INTAKE (100)	* 1	1	1
31	RIVER ESTATE WW (200)	* 5	5	5
32	TUCKER VALLEY WELLS (200)	* 8	8	8
33	TYRICO INTAKE (100)	* 1	1	1
34	ACONO WATERWORKS (300)	1	¥ 1	1
35	LA PASTORA/CAPRIATA IT (125)	1	¥ 1	1
	SUB-TOTAL	[14] 40	[2] 40	40
(PORT OF SPAIN)				
36	ARIPITA INTAKE (100)	* 1	1	1
37	CASCADE INTAKE (125)	* 1	1	1
38	DIBE INTAKE (100)	* 1	1	1
39	KING GEORGE V PK.WELLS (300)	* 3	3	3
40	MARAVAL WATERWORKS (675)	* 1	1	1
41	MOKA WELLS (200)	* 2	2	2
42	PARAMIN WATERWORKS (200)	* 2	2	2
43	SAVANNAH WELLS (300)	* 6	6	6
44	ST ANN'S WATERWORKS (200)	* 1	1	1
45	ST CLAIR WELL (300)	* 1	1	1
	SUB-TOTAL	[18] 19	[0] 19	19
(SAN FERNANDO/SOUTH CENTRAL)				
46	FREEPORT WATERWORKS (300)	3	¥ 3	3
	SUB-TOTAL	[0] 3	[3] 3	3

NO.	FACILITY	PHASE I: NUMBER OF MONITORING FLOW DATA IN M'LY REPORT	PHASE II: FLOW DATA MONITORED IN W'LY REPORT: IN'ED METER	PHASE II: FLOW DATA MONITORED IN W'LY REPORT: NUMBER OF DATA
(SOUTH EAST)				
47	MALONEY WELLS (150)	2	¥ 2	2
48	AMOCO TOURNEBRIDGE WELL(100)	3	¥ 3	3
49	GUARACARA SPRING (100)	1	¥ 1	1
50	GUAYAGUAYARE WELL #1 (100)	1	¥ 1	1
51	MAYARO WELLS (100)	6	¥ 6	6
52	MORICHAL SPRING (100)	1	¥ 1	1
53	MAYO SPRINGS (100)	1	¥ 1	1
54	BICHE WATERWORKS (150)	1	¥ 1	1
	SUB-TOTAL	[0] 16	[16] 16	16
(SOUTH WEST)				
55	CHATAM WATERWORKS (400)	5	¥ 5	5
56	PENAL WATERWORKS (250)	8	¥ 8	8
57	SIPARIA (COORA) WW (300)	8	¥ 8	8
58	GRANVILLE WATERWORKS (200)	7	¥ 7	7
59	FYZABAD WWTERWORKS (150)	5	¥ 5	5
60	CARAPAL WATERWORKS (250)	2	¥ 2	2
61	CAP DE VILLE WW (300)	1	¥ 1	1
62	POINT FORTIN WW (200)	3	¥ 3	3
63	CLARK ROAD WELLS (150)	1	¥ 1	1
64	TEXACO TO GUAYAGUARE (100)	* 1	1	1
65	TRINTOC TO TECHIER (100)	* 1	1	1
66	TRINTOC TO P'T FORTIN (100)	1	¥ 1	1
	SUB-TOTAL	[2] 43	[41] 43	43
(TOBAGO)				
67	HILLSBOROUGH WW (400)	1	¥ 1	1
68	COURLAND WATERWORKS (400)	1	¥ 1	1
69	HILLSBOROUGH WEST RV (300)	1	¥ 1	1
70	GREEN HILL INTAKE (300)	1	¥ 1	1
71	KINGS BAY WATERWORKS (200)	1	¥ 1	1
72	RICHMOND WATERWORKS (200)	1	¥ 1	1
73	CRAIG HALL INTAKE (150)	1	¥ 1	1
74	GOV'T FARM WELL #3 (150)	1	¥ 1	1
75	CHARLOTEVILLE INTAKE (100)	1	¥ 1	1
76	SPEYSIDE INTAKE (250)	* 1	1	1
77	CASTARA INTAKE (50)	1	¥ 1	1
78	PARLATUVIER INTAKE (50)	* 1	1	1
79	L'ANSE FOURMI INTAKE (50)	* 1	1	1
80	BLOODY BAY INTAKE (50)	* 1	1	1
	SUB-TOTAL	[4] 14	[10] 14	14
	TOTAL	[48] 154	[73]154	154

NOTE:

WW; WATERWORKS, (200); PIPE DIAMETER (MM),
IT; INTAKE, "*"; NO INSTALLATION OF FLOW METER IN EXISTING FACILITY,
RD.; ROAD, "¥"; EXSISTINGS (REPLACEMENT OF PERIPHERALS),
RES.; RESERVOIR, IN'ED; INSTALLED,
L.C.; LAS CUEVAS,
PK.; PARK,
P'T; POINT,
RV.; RIVER,
GOV'T; GOVERNMENT,
M'LY; MONTHLY,
W'LY; WEEKLY,

Table 10 LIST OF WSSS HARDWARE

HARDWARE COMPONENTS	QUANTITY	ROLE OF COMPONENTS
[A] CENTRAL DATA PROCESSING SYSTEM (CDPS)		
(1) CENTRAL PROCESSING UNIT (CPU)	2	DATA PROCESSING, STORAGE AND RETRIEVAL
(2) FIXED DISK DRIVE	2	STORAGE OF OPERATING SYSTEM
(3) FLEXIBLE DISK DRIVE	2	DATA STORAGE
(4) CARTRIDGE TAPE DRIVE	2	DATA STORAGE
(5) COMMUNICATION INTERFACE	2	CONTROL OF CPU AND DATA COMMUNICATION
(6) SERIAL INTERFACE	2	PERIPHERAL CONTROL
(7) SERIAL INPUT/OUTPUT INTERFACE	2	CONTROL OF GRAPHIC PANEL, PUMP REMOTE OPERATION & VALVE REMOTE PANELS
(8) CRT DISPLAY	2	DISPLAY OF GRAPHIC AND ALPHANUMERIC SYMBOLS
(9) HARD COPIER	1	CRT PICTURE COPY
(10) LINE PRINTER	1	DATA PRINTOUT
(11) SERIAL PRINTER	1	OPERATION REPORT PRONTOUT
(12) SYSTEM CONSOLE	1	CONTROL OF COMPUTER SYSTEM
(13) GRAPHIC PANEL	1	DISPLAY OF WATER SUPPLY SYSTEM AND MONITORING DATA
(14) MODEM	2	MODULATION AND DEMODULATION OF SIGNAL
(15) UNINTERRUPTIBLE POWER SUPPLY	1	BACK-UP POWER SUPPLY FOR EQUIPMENT OF CSS BUILDING
[B] REMOTE TERMINAL UNIT (RTU)		
(1) INTERNAL CONTROLLER	48	INTERPRETATION BETWEEN CPU AND FIELD INSTRUMENTS
(2) SERIAL INPUT/OUTPUT INTERFACE	48	INPUT/OUTPUT CONTROL FOR MICROPROCESSOR
(3) PROCESS INPUT/OUTPUT INTERFACE	48	ANALOG AND DISCRETE DATA CONTROL
[C] DATA RADIO COMMUNICATION SYSTEM		
(CSS BUILDING)		
(1) UHF TRANCEIVER	2	DATA COMMUNICATION BETWEEN CSS BUILDING AND REPEATER STATION
(2) COMMUNICATION INTERFACE	2	CONTROL OF DATA COLLECTION
(REPEATER STATION)		
(1) UHF REPEATER	2	COMMUNICATION RELAY FROM/TO VHF
(2) VHF REPEATER	2	COMMUNICATION RELAY FROM/TO UHF
(3) UNINTERRUPTIBLE POWER SUPPLY	1	BACK-UP POWER SUPPLY FOR EQUIPMENT OF REPEATER STATION
(RTU STATION)		
(1) VHF TRANSCEIVER	48	DATA COMMUNICATION BETWEEN RTU AND REPEATER STATION
(2) COMMUNICATION INTERFACE	48	CONTROL OF DATA TRANSMISSION
(3) UNINTERRUPTIBLE POWER SUPPLY	48	BACK-UP POWER SUPPLY FOR EQUIPMENT OF RTU STATION
[D] REGIONAL OFFICE		
(1) WORK STATION (CRT AND COMPUTER)	3	DATA INPUT, DISPLAY AND ANALYSES
(2) OPTICAL CHARACTER READER (OCR)	3	DATA ELECTRONICALLY INPUT INTO THE INDIVIDUAL COMPUTER
(3) HARD COPIER	3	CRT PICTURE COPY

Table 11 SUMMARY OF COST ESTIMATE FOR WATER SUPPLY SUPERVISORY SYSTEM

UNIT: IN x 1,000

ITEM	NAME OF FACILITIES AND EQUIPMENT	PHASE I										PHASE II									
		FOREIGN CURRENCY (US$)			LOCAL CURRENCY (TT$)						TOTAL (US$)	FOREIGN CURRENCY (US$)			LOCAL CURRENCY (TT$)						TOTAL (US$)
		SUPPLY			CIVIL WORKS				SUPPLY			SUPPLY			CIVIL WORKS				SUPPLY		
		PRIMARY EQUIPMENT	INSTRUMENT -ATION	TOTAL (US$)	F-M/C-V CHAMBER	BUILDING WORKS	INSTAL-LATION	SUB-TOTAL (CIVIL)	TRANS-PORTATION	TOTAL (TT$)		PRIMARY EQUIPMENT	INSTRUMENT -ATION	TOTAL (US$)	F-M/C-V CHAMBER	BUILDING WORKS	INSTAL-LATION	SUB-TOTAL (CIVIL)	TRANS-PORTATION	TOTAL (TT$)	
[1] CONSTRUCTION WORKS																					
	[CSS]																				
	FLOW METER	494.2	1,329.8	1,824.0	1,438.4	---	775.2	2,213.6	155.0	2,368.7	2,381.3	4.4	1,363.0	1,367.4	10.1	---	581.1	591.2	116.2	707.4	1,533.8
	CONTROL VALVE	2,156.4	3,779.8	5,936.2	1,396.5	---	2,522.9	3,919.4	504.6	4,424.0	6,977.1	296.2	1,620.7	1,916.9	115.0	---	814.7	929.7	162.9	1,092.6	2,174.0
	LEVEL METER	32.5	279.6	312.0	---	---	132.6	132.6	26.5	159.1	349.5	6.5	312.8	319.3	---	---	135.7	135.7	27.1	162.8	357.6
	PRESSURE GAUGE	---	566.7	566.7	---	---	240.8	240.8	48.2	289.0	634.7	---	593.9	593.9	---	---	252.4	252.4	50.5	302.9	665.1
	CSS's CENTRAL EQUIP	---	5,861.9	5,861.9	---	385.3	1,902.6	2,287.9	380.5	2,668.4	6,489.7	---	3,486.9	3,486.9	---	---	1,481.9	1,481.9	296.4	1,778.3	3,905.3
	REGIONAL OFFICE	---	211.6	211.6	---	---	89.9	89.9	18.0	107.9	236.9	---	317.3	317.3	---	---	134.9	134.9	27.0	161.8	355.4
	REPEATER STATION	---	219.1	219.1	---	---	93.1	93.1	18.6	111.7	245.4	---	219.1	219.1	---	---	93.1	93.1	18.6	111.7	245.4
	RTU STATION	---	11,832.0	11,832.0	---	2,219.5	5,028.6	7,248.1	1,005.7	8,253.8	13,774.1	---	9,973.3	9,973.3	---	---	4,238.7	4,238.7	847.7	5,086.4	11,170.1
	BOOSTER P/S	---	226.7	226.7	---	---	96.3	96.3	19.3	115.6	253.9	---	---	---	---	---	0.0	0.0	0.0	0.0	0.0
	SPARE PARTS	---	249.3	249.3	---	---	---	---	21.2	21.2	254.3	---	249.3	249.3	---	---	0.0	0.0	21.2	21.2	254.3
	SUB-TOTAL	2,683.1	24,556.3	27,239.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	18,519.5	31,596.9	307.1	18,136.4	18,443.4	125.1	---	7,732.5	7,857.6	1,567.7	9,425.3	20,661.1
	[LSS]																				
	FLOW METER	---	---	---	---	---	---	---	---	---	---	328.4	1,279.9	1,608.3	1,444.6	---	683.5	2,128.1	136.7	2,264.8	2,141.2
	SUB-TOTAL	---	---	---	---	---	---	---	---	---	---	328.4	1,279.9	1,608.3	1,444.6	---	683.5	2,128.1	136.7	2,264.8	2,141.2
	TOTAL	2,683.1	24,556.3	27,239.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	18,519.5	31,596.9	635.4	19,416.3	20,051.7	1,569.7	---	8,416.0	9,985.7	1,704.4	11,690.1	22,802.3
[2] ENGINEERING SERVICES		---	---	3,437.0	---	---	---	---	---	2,109.3	3,933.3	---	---	6,311.1	---	---	---	---	---	3,809.3	7,207.4
TOTAL OF ITEMS [1] & [2]		2,683.1	24,556.3	30,676.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	20,628.7	35,530.2	635.4	19,416.3	26,362.8	1,569.7	---	8,416.0	9,985.7	1,704.4	15,499.4	30,009.7
[3] TAX (VAT)		---	---	---	---	---	---	---	---	22,650.5	5,329.5	---	---	---	---	---	---	---	---	19,131.2	4,501.5
[4] CONTINGENCY		---	---	4,601.5	---	---	---	---	---	3,094.3	5,329.5	---	---	3,954.4	---	---	---	---	---	2,324.9	4,501.5
[5] ADMINISTRATION		---	---	---	---	---	---	---	---	755.0	177.7	---	---	---	---	---	---	---	---	537.7	150.0
GRAND-TOTAL		2,683.1	24,556.3	35,277.9	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	47,128.6	46,367.0	635.4	19,416.3	30,317.2	1,569.7	---	8,416.0	9,985.7	1,704.4	37,593.2	39,162.7

NOTE: EQUIP.; EQUIPMENT, P/S; PUMPING STATION, F-M/C-V; FLOW METER AND CONTROL VALVE, VAT ; VALUE ADDED TAX, EXCHANGE RATES; 1 US$ = ¥ 135 AND 1 US$ = TT$ 4.25,

Table 12 LIST OF MONITORING AND CONTROL EQUIPMENT IN PHASE I BY CENTRAL SUPERVISORY SYSTEM (1)

NOTE: AN; ANNUBAR, P ; PROPELLAR TYPE, RES; RESERVOIR, (300); PIPE DIAMETER(MM),
AP; AIR PURGE TYPE, PF; PARSHALL FLUME, IT ; INTAKE, "*"; EXISTINGS TO BE USED,
AV; ALTITUDE VALVE, V ; VENTURI TUBE, WW ; WATERWORKS, "¥"; EXISTINGS (REPLACEMENT PERIPHERALS),
B ; BOURDON TUBE, RD; ROAD, OT ; OFF-TAKE, "#"; INSTALLATION OF CONTROL EQUIPMENT,
BU; BUTTERFLY VALVE, Av; AVENUE, JCT; JUNCTION,
CV; CONE VALVE, HW; HIGH WAY, IC ; INTERCONNECTION,
F ; FLOAT TYPE, SH; SHEET, BPS; BOOSTER PUMPING STATION,
O ; ORIFICE PLATE, ST; STREET, D ; DIFFERENTIAL PRESSURE TYPE,

RTU NO. & LOCATION	MONITORING POINT	PHASE I														
		EQUIPMENT TO BE INSTALLED				NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
		LEVEL METER	PRESS GAUGE	FLOW METER	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
1 NORTH OROPOUCHE WW												5				
	RAW WATER	F		¥ PF		1		1								
	CLEAR WATER RESERVOIR	* D-2				2										
	DISTRIBUTION (1050)			AN				1								
2 HOLLIS WW												3				
	IMPOUNDING RESERVOIR	F				1										
	RAW WATER (300)			AN				1								
	DISTRIBUTION (600)			AN				1								
3 GILL TRACE												15				
	QUARE WATER TANK	D				1										
	QUARE DISTRIBUTION (300)		¥ B	¥ V			1	1								
	GILL TRACE OT (300)		B	AN	BU		1	1	1						1	SITE
	QUARE(1) OT (150)		B	AN	BU		1	1	1						1	SITE
	QUARE(2) OT (150)		B	AN	BU		1	1	1						1	SITE
	TO SANGRE GRANDE OT (400)		B	AN	BU		1	1	1						1	SITE
4 ARIPO BPS												15				
	ARIPO(NEW)RAW WATER (300)			¥ O				1								
	ARIPO(OLD)RAW WATER (250)			AN				1								
	FORT READ RESERVOIR (250)	D		AN		1		1								
	FORT READ RESERVOIR (300)	D		AN		1		1								
	ARIPO BPS (300)		B	¥ V	BU		1	1	1						1	SITE
	CUMOTO(1) OT (300)		B	AN	BU		1	1	1						1	SITE
	CUMOTO(2) OT (300)		B	AN	BU		1	1	1						1	SITE
5 GUANAPO JUNCTION												11				
	GUANAPO RAW WATER (300)			AN				1								
	GUANAPO RESERVOIR (300)	D				1										
	GUANAPO WW DIST. (300)		B	AN	BU		1	1	1						1	SITE
	DOUBLE BRIDGE OT (150)		B	AN	BU		1	1	1						1	SITE
	GUANAPO JUNCTION OT (300)		B	AN	BU		1	1	1						1	SITE
6 DEMERARA JUNCTION												6				
	DEMERARA JCT OT (300)		B	AN	BU		1	1	1						1	SITE
	TUMPUNA JCT OT (300)		B	AN	BU		1	1	1						1	SITE
7 ARIMA OLD RESERVOIR												17				
	ARIMA NEW RESERVOIR (375)	F		AN		1		1								
	ARIMA OLD RESERVOIR (200)	D		AN		1		1								
	TO MORENO ST OT (150)		B	AN	BU		1	1	1						1	SITE
	QUESNEL ST OT (300)		B	AN	BU		1	1	1						1	SITE
	OMERA JCT OT (150)		B	AN	BU		1	1	1						1	SITE
	ARIMA BPS (300)		B	AN	BU		1	1	1						1	SITE
	ARIMA WELL (200)			AN				1								
	ARIMA B/PUMPS															
8 MAUSICA JUNCTION												18				
	OLTON RD OT (150)		B	AN	BU		1	1	1						1	SITE
	BOYS LANE OT (200)		B	AN	BU		1	1	1						1	SITE
	MAUSICA JCT OT (150)		B	AN	BU		1	1	1						1	SITE
	CARAPO OT (300)		B	AN	BU		1	1	1						1	SITE
	MAUSICA OT (300)		B	AN	BU		1	1	1						1	SITE
	MALONEY JCT OT (300)		B	AN	BU		1	1	1						1	SITE
9 AROUCA WW												9				
	CLEAR WATER TANK	D				1										
	DISTRIBUTION (200)			AN	BU			1	1						1	SITE
	BORNE AREA #1 OT (150)		B	AN	BU		1	1	1						1	SITE
	LOPINOT IC OT (300)		B	AN	BU		1	1	1						1	SITE
10 CAURA WW												5				
	RAW WATER (400)			AN				1								
	CLEAR WATER TANK	D				1										
	DISTRIBUTION (400)		B	AN	BU		1	1	1						1	SITE
11 TACARIGUA WW												12				
	CLEAR WATER RESERVOIR	¥ D				1										
	DISTRIBUTION(1) (300)		B	AN	BU		1	1	1						1	SITE
	DISTRIBUTION(2) (400)		B	AN	BU		1	1	1						1	SITE
	TO CAURA BPS OT (225)		B	AN	BU		1	1	1						1	SITE
	PASEA RD OT (175)		B	AN			1	1								

Table 12 LIST OF MONITORING AND CONTROL EQUIPMENT IN PHASE I BY CENTRAL SUPERVISORY SYSTEM (2)

NOTE: AN; ANNUBAR, P ; PROPELLAR TYPE, RES; RESERVOIR, (300); PIPE DIAMETER(MM),
AP; AIR PURGE TYPE, PF; PARSHALL FLUME, IT ; INTAKE, "*"; EXISTINGS TO BE USED,
AV; ALTITUDE VALVE, V ; VENTURI TUBE, WW ; WATERWORKS, "¥"; EXISTINGS (REPLACEMENT PERIPHERALS),
B ; BOURDON TUBE, RD; ROAD, OT ; OFF-TAKE, "#"; INSTALLATION OF CONTROL EQUIPMENT.
BU; BUTTERFLY VALVE, Av; AVENUE, JCT; JUNCTION,
CV; CONE VALVE, HW; HIGH WAY, IC ; INTERCONNECTION,
F ; FLOAT TYPE, SH; SHEET, BPS; BOOSTER PUMPING STATION,
O ; ORIFICE PLATE, ST; STREET, D ; DIFFERENTIAL PRESSURE TYPE,

RTU NO. & LOCATION	MONITORING POINT	PHASE I													
		EQUIPMENT TO BE INSTALLED				NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
		LEVEL METER	PRESS GAUGE	FLOW METER	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
12 FLOW CONTROL STATION												11				
	PIARCO JCT OT (300)		B	AN	BU		1	1	1						1	SITE
	BY-PASS OT (300)		B	AN	BU		1	1	1						1	SITE
	FLOW CONTROL STATION(800)		B-2	¥ V	# CV-2		2	1	2						2	SITE
13 ST AUGUSTINE RESERVOIR												10				
	RESERVOIR (750)	F		AN	AV	1		1								
	ST JOHN RD OT (300)		B	AN			1	1								
	TO TUNAPUNA OT (150)		B	AN			1	1								
	RABIR ST OT (200)		B	AN			1	1								
	RIVERSIDE RD OT (100)		B	AN			1	1								
14 TUNAPUNA BPS												48				
	TUNAPUNA(1) (150)		B	AN	BU		1	1	1						1	CSS
	TUNAPUNA(2) (200)		B	AN	BU		1	1	1						1	CSS
	TUNAPUNA(3) (525)		B	AN			1	1								
	PASEA ST OT (100)		B	AN	BU		1	1	1						1	SITE
	TUNAPUNA RIVER (1) (300)		B	AN	BU		1	1	1						1	SITE
	TUNAPUNA RIVER (2) (525)		B	AN	BU		1	1	1						1	SITE
	TUNAPUNA B/PUMPS									6	25		3	CSS		
15 ST JOSEPH RESERVOIR												15				
	RESERVOIR	F				1										
	TO ST JOSEPH OT (225)		B	AN	BU		1	1	1						1	SITE
	TO RIDER MAIN OT (200)		B	AN	BU		1	1	1						1	SITE
	MENDEZ STEEL SH. OT (200)		B	AN	BU		1	1	1						1	SITE
	MATERNITY HP. OT (100)		B	AN	BU		1	1	1						1	SITE
	ST JOSEPH(1) (175)			AN				1								
	ST JOSEPH(2) (300)			AN				1								
16 VALSAYN WW												41				
	RAW WATER (750)			¥ V				1								
	CLEAR WATER RESERVOIR	¥ D				1										
	DISTRIBUTION (750)		¥ B	¥ V	BU		1	1	1						1	SITE
	BOOSTER SUCTION (450)		¥ B	¥ AN			1	1								
	BOOSTER DELIVERY (450)		¥ B	AN	BU		1	1	1						1	CSS
	VALSAYN B/PUMPS									6	25		3	CSS		
17 URIAH BUTLER HW JUNCTION												3				
	STAG/NESTL OT (300)		B	AN	BU		1	1	1						1	SITE
18 MT. HOPE RESERVOIR												23				
	RESERVOIR (600)	D		AN	AV	1		1								
	CARIB(1) OT (150)		B	AN	BU		1	1	1						1	SITE
	CARIB(2) OT (200)		B	AN	BU		1	1	1						1	SITE
	MT. HOPE OT (300)															
	GORDON ST (1) OT (200)		B	AN	BU		1	1	1						1	SITE
	GORDON ST (2) OT (200)		B	AN	BU		1	1	1						1	SITE
	GORDON ST (3) OT (300)		B	AN	BU		1	1	1						1	SITE
	BROOM ST OT (200)		B	AN	BU		1	1	1						1	SITE
	TO SANTA CRUZ OT (250)		B	AN	BU		1	1	1						1	SITE
19 MALICK RESERVOIR												11				
	RESERVOIR (750)	D		AN	AV	1		1								
	TO BARATARIA OT (300)		B	AN	BU		1	1	1						1	SITE
	SIXTH Av. OT (300)		B	AN	BU		1	1	1						1	SITE
	TO LADY YOUNG Av. OT (450)		B	AN	BU		1	1	1						1	SITE
20 EL SOCORRO WW												49				
	RAW WATER (750)			¥ V				1								
	CLEAR WATER RESERVOIR	¥ AP				1										
	BOOSTER SUCTION (900)		¥ B				1									
	BOOSTER DELIVERY (600)		¥ B	¥ AN	BU		1	1	1						1	CSS
	DISTRIBUTION (400)		¥ B	¥ AN	BU		1	1	1						1	SITE
	EL SOCORRO RD OT (150)		B	AN	BU		1	1	1						1	SITE
	DON MIGUEL RD OT (150)		B	AN	BU		1	1	1						1	SITE
	ELEVENTH ST OT (150)		B	AN	BU		1	1	1						1	SITE
	EL SOCORRO B/PUMPS									6	25		3	CSS		
21 LAVENTILLE												3				
	TO LAVENTILLE OT (300)		B	AN	BU		1	1	1						1	SITE
22 BLACK RIVER												12				

Table 12 LIST OF MONITORING AND CONTROL EQUIPMENT IN PHASE 1 BY CENTRAL SUPERVISORY SYSTEM (3)

NOTE: AN; ANNUBAR, P ; PROPELLAR TYPE, RES; RESERVOIR, (300); PIPE DIAMETER(MM),
AP; AIR PURGE TYPE, PF; PARSHALL FLUME, IT ; INTAKE, "*"; EXISTINGS TO BE USED,
AV; ALTITUDE VALVE, V ; VENTURI TUBE, WW ; WATERWORKS, "Y"; EXISTINGS (REPLACEMENT PERIPHERALS),
B ; BOURDON TUBE, RD; ROAD, OT ; OFF-TAKE, "#"; INSTALLATION OF CONTROL EQUIPMENT.
BU; BUTTERFLY VALVE, Av; AVENUE, JCT; JUNCTION,
CV; CONE VALVE, HW; HIGH WAY, IC ; INTERCONNECTION,
F ; FLOAT TYPE, SH; SHEET, BPS; BOOSTER PUMPING STATION,
O ; ORIFICE PLATE, ST; STREET, D ; DIFFERENTIAL PRESSURE TYPE,

RTU NO. & LOCATION	MONITORING POINT	PHASE I													
		EQUIPMENT TO BE INSTALLED				NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
		LEVEL METER	PRESS GAUGE	FLOW METER	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
	BLACK RIVER (1) OT (300)		B	AN	BU		1	1	1						1	SITE
	BLACK RIVER (2) OT (450)		B	AN	BU		1	1	1						1	SITE
	BLACK RIVER (3) OT (525)		B	AN	BU		1	1	1						1	SITE
	TO LADY YOUNG RD OT (300)		B	AN	BU		1	1	1						1	SITE
23	PICTON NO. 3 RESERVOIR											16				
	PICTON #1 RESERVOIR (400)	* D		AN	AV	1		1								
	PICTON #2 RESERVOIR (750)	* D-2		AN	AV-2	2		1								
	PICTON #3 RESERVOIR (900)	* D		AN	AV	1		1								
	MASALLAH ST OT (100)		B	AN	BU		1	1	1						1	SITE
	PRIZAR LANDS ST OT (100)		B	AN	BU		1	1	1						1	SITE
	KERR RD OT (100)		B	AN	BU		1	1	1						1	SITE
24	SERVOL LIFE CENTER											9				
	BEETHAM DUMP OT (100)		B	AN	BU		1	1	1						1	SITE
	SERVOL LIFE C. OT (100)		B	AN	BU		1	1	1						1	SITE
	TO LAVENTILLE OT (525)		B	AN	BU		1	1	1						1	SITE
25	KNAGGS HILL											19				
	RESERVOIR (525)	* D-2		AN	* AV-2	2		1								
	TO BELMONT OT (300)		B	AN	BU		1	1	1						1	SITE
	TO CASCADE OT (600)		B	AN	BU		1	1	1						1	SITE
	TO ST CLAIR OT (350)		B	AN	BU		1	1	1						1	SITE
	WESTERN MAIN ROAD (525)		B	AN	BU		1	1	1						1	SITE
	FROM SAVANNAH WELLS (300)		B	AN			1	1								
	BARRACK (750)		B	AN			1	1								
26	NATIONAL FLOUR MILL											3				
	NFM OT (100)		B	AN	BU		1	1	1						1	SITE
	PORT AUTHORITY (300)															
	POST OFFICE (300)															
	NATIONAL STADIUM (300)															
27	TUMPUNA STORAGE LIFT PS											77				
	ARENA IMPOUNDING RES.	¥ AP				1										
	TUMPUNA WEIR	F				1										
	TO/FROM RESERVOIR (1200)			¥ V-2				2								
	RIVER DISCH. VALVE (1200)				¥ BU-2				2						2	CARONI
	TUMPUNA S.T./PUMPS									12	59		6	CARONI		
28	CARONI WTP											9				
	RAW WATER	¥ AP		¥ PF		1		1								
	CLEAR WATER RESERVOIR	¥ AP				1										
	CARONI NORTH (900)		* B	¥ AN	¥ BU		1	1	1						1	CARONI
	CARONI SOUTH (1200)		* B	¥ AN	¥ BU		1	1	1						1	CARONI
29	KELLY VILLAGE											3				
	KELLY VILLAGE OT (300)		B	AN	BU		1	1	1						1	SITE
30	SCALE YARD											6				
	SCALE YARD OT (300)		B	AN	BU		1	1	1						1	SITE
	HINGKING RD OT (300)		B	AN	BU		1	1	1						1	SITE
31	LAS LOMAS WW											5				
	RAW WATER (600)			¥ O				1								
	CLEAR WATER RESERVOIR	D				1										
	DISTRIBUTION (600)		¥ B	¥ V	BU		1	1	1						1	SITE
32	JERNINGHAM JUNCTION											5				
	TO LAS LOMAS OT (600)		B	AN			1	1								
	JERNINGHAM JCT OT (300)		B	AN	BU		1	1	1						1	SITE
33	CHAGUANAS											6				
	CHAGUANAS OT (300)		B	AN	BU		1	1	1						1	SITE
	LANGE PARK OT (300)		B	AN	BU		1	1	1						1	SITE
34	CARLSEN FIELD WW											7				
	CLEAR WATER RESERVOIR	F				1										
	DISTRIBUTION(1) (200)		B	AN	BU		1	1	1						1	SITE
	DISTRIBUTION(2) (250)		B	AN	BU		1	1	1						1	SITE
35	CARAPICHAIMA											7				
	CARAPICHAIMA OT (200)		B	AN	BU		1	1	1						1	SITE
	TO CARLSEN FIELD OT (300)		B	AN			1	1								
	TO FREEPORT WW OT (300)		B	AN			1	1								
36	WARDEN OFFICE											9				

Table 12 LIST OF MONITORING AND CONTROL EQUIPMENT IN PHASE I BY CENTRAL SUPERVISORY SYSTEM (4)

NOTE: AN; ANNUBAR, P ; PROPELLAR TYPE, RES; RESERVOIR, (300); PIPE DIAMETER(MM),
AP; AIR PURGE TYPE, PF; PARSHALL FLUME, IT ; INTAKE, "*"; EXISTINGS TO BE USED,
AV; ALTITUDE VALVE, V ; VENTURI TUBE, WW ; WATERWORKS, "¥"; EXISTINGS (REPLACEMENT PERIPHERALS),
B ; BOURDON TUBE, RD; ROAD, OT ; OFF-TAKE, "#"; INSTALLATION OF CONTROL EQUIPMENT,
BU; BUTTERFLY VALVE, Av; AVENUE, JCT; JUNCTION,
CV; CONE VALVE, HW; HIGH WAY, IC ; INTERCONNECTION,
F ; FLOAT TYPE, SH; SHEET, BPS; BOOSTER PUMPING STATION,
O ; ORIFICE PLATE, ST; STREET, D ; DIFFERENTIAL PRESSURE TYPE,

RTU NO. & LOCATION	MONITORING POINT	PHASE I													
		EQUIPMENT TO BE INSTALLED				NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
		LEVEL METER	PRESS GAUGE	FLOW METER	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
	WARDEN OFFICE OT (300)		B	AN	BU		1	1	1						1	SITE
	COUVA LANE OT (300)		B	AN	BU		1	1	1						1	SITE
	POINT LISAS OT (600)		B	AN	BU		1	1	1						1	SITE
37 TRINGEN II												3				
	TRINGEN II OT (300)		B	AN	BU		1	1	1						1	SITE
38 CALIFORNIA RESERVOIR												2				
	RESERVOIR (900)	D		AN	AV	1		1								
39 TCL												3				
	TCL OT (300)		B	AN	BU		1	1	1						1	SITE
40 MARAVELLA												3				
	MARAVELLA OT (300)		B	AN	BU		1	1	1						1	SITE
41 SAN FERNANDO BPS												49				
	SAN F'DO RESERVOIR (750)	¥ D		AN	AV	1		1								
	MARRYAT RESERVOIR (600)	¥ D		AN		1		1								
	NAPARIMA RESERVOIR	¥ D				1										
	BOOSTER SUCTION (900)		¥ B	¥ AN			1	1								
	BOOSTER DELIVERY (900)		¥ B		* BU		1		1						1	CSS
	ROUND ABOUT(1) OT (300)		B	AN	BU		1	1	1						1	SITE
	ROUND ABOUT(2) OT (525)		B	AN	BU		1	1	1						1	SITE
	FIRE BRIGADE OT (375)		B	AN	BU		1	1	1						1	SITE
	SAN F'DO B/PUMPS									6	25		3	CSS		
42 MOSQUITO CREEK												3				
	TO MOSQUITO CR. OT (600)		B	AN	BU		1	1	1						1	SITE
43 ST CLEMENT												6				
	ST CLEMENT (1) OT (200)		B	AN	BU		1	1	1						1	SITE
	ST CLEMENT (2) OT (250)		B	AN	BU		1	1	1						1	SITE
44 DAISY												3				
	DAISY OT (400)		B	AN	BU		1	1	1						1	SITE
45 MALGRETOUTE BPS												64				
	BOOSTER SUCTION (900)		¥ B	¥ V			1	1								
	BOOSTER DELIVERY (900)		¥ B		BU		1		1						1	CSS
	BUEN INTENTO OT (300)		B	AN	BU		1	1	1						1	SITE
	TO PRINCESS TOWN OT (300)		B	AN	BU		1	1	1						1	SITE
	TO MALGRETOUTE OT (300)		B	AN	BU		1	1	1						1	SITE
	MALGRETOUTE B/PUMPS									10	41		5	CSS		
46 BROTHER ROAD												9				
	BROTHER ROAD OT (150)		B	AN	BU		1	1	1						1	SITE
	TO PIPARO/ARCH OT (250)		B	AN	BU		1	1	1						1	SITE
	TO ST JULIAN OT (375)		B	AN	BU		1	1	1						1	SITE
47 TCO BPS												68				
	BOOSTER SUCTION (900)		¥ B				1									
	BOOSTER DELIVERY (900)		¥ B	¥ V	BU		1	1	1						1	CSS
	RIO CLARO OT (300)		B	AN	BU		1	1	1						1	SITE
	TCO B/PUMPS									12	49		6	CSS		
48 NAVET WW												9				
	HIGH DAM	F				1										
	LOW DAM	F				1										
	STORAGE LIFT PS (1200)			AN				1								
	RAW WATER (450)			AN·4				4								
	CLEAR WATER RESERVOIR	F				1										
	DISTRIBUTION (900)			AN				1								
	TOTAL	38	127	160	124	38	127	160	113	58	249	745	29		113	
	= LIST OF ITEMS =	¥AP 4 D 11 *D 8 ¥D 5 F 10	¥B 14 B 111 *B 2	¥AN 6 AN139 ¥O 2 ¥PF 2 ¥V 11	AV 9 *AV 2 BU106 *BU 1 ¥BU 4 #CV 2								6 23	CARONI CSS	102 7 4	SITE CSS CARONI

Table 13 PROPOSED SPECIFICATIONS OF CSS HARDWARE

COMPONENTS OF SYSTEM HARDWARE	QUANTITY	SPECIFICATIONS
(1) CENTRAL DATA PROCESSING SYSTEM (CDPS)		
CENTRAL PROCESSING UNIT (CPU)	2	MAIN MEMORY RAM 8 MB, CACHE 120 KB
FIXED DISK DRIVE	2	CAPACITY 547 MB, SPEED 2.4 MB/S
FLEXIBLE DISK DRIVE	2	CAPACITY 1.2 MB
CARTRIDGE TAPE DRIVE	2	CAPACITY 150 MB, SPEED 88 KB/S
COMMUNICATION INTERFACE	2	TYPE 16 bit, SPEED 10 KB/S
SERIAL INTERFACE	2	INTERVAL 10 ms
SERIAL INPUT/OUTPUT INTERFACE	2	SPEED 9600 bps
CRT DISPLAY	2	20 INCHES, COLOR, DISPLAY 4992 CHARACTERS
HARD COPIER	1	SPEED 60 S, COLOR 7
LINE PRINTER	1	SPEED 240 LINE/MINUTE, NUMBER OF CHARACTERS 136/LINE
SERIAL PRINTER	1	SPEED 120 C/S, NUMBER OF CHARACTERS 136/LINE
SYSTEM CONSOLE	1	CRT 12 INCHES, NUMBER OF CHARACTERS 136/LINE
GRAPHIC PANEL	1	SIZW ABOUT HEIGHT 2.0 M, WIDTH 7.0 M
UNINTERRUPTIBLE POWERN SUPPLY	1	15 KVA, BACK UP 1 HOUR
MODEM	2	SPEED 4800 bps
(2) REMOTE TERMINAL UNIT (RTU)		
INTERNAL CONTROLLER	48	MICROPROCESSOR MAIN MEMORY RAM 512 KB
SERIAL INPUT/OUTPUT INTERFACE	48	INTERVAL 10 ms
PROCESS I/O INTERFACE	48	INPUT/OUTPUT DC 4 - 20 mA, INPUT FAILURE ALARM
(3) DATA RADIO COMMUNICATION SYSTEM		
(CSS BUILDING)		
UHF TRANSCEIVER	2	413.250 MHz, 418.025 MHz, 10 W
COMMUNICATION INTERFACE	2	POLLING 5 Minutes, SPEED 200 bps, MANUAL POLLING
(REPEATER STATION)		
UHF REPEATER	2	413.250 MHz, 418.025 MHz, 10 W
VHF REPEATER	2	153.950 MHz, 159.960 MHz, 1 W
UNINTERRUPTIBLE POWERN SUPPLY	1	1 KVA, BACK UP 4 HOURS
(RTU STATION)		
VHF TRANSCEIVER	48	153.950 MHz, 159.960 MHz, 1 W
COMMUNICATION INTERFACE	48	POLLING 5 Minutes, SPEED 200 bps
UNINTERRUPTIBLE POWERN SUPPLY	48	1 KVA, BACK UP 1 HOUR
(4) REGIONAL OFFICE		
WORK STATION (CRT AND COMPUTER)	2	20 INCHES, COLOR, MAIN MEMORY 8 MB, FDD 200 MB
OPTICAL CHARACTER READER (OCR)	2	RESOLUTION 300 DOT PER INCH, SCANNER
HARD COPIER	2	SPEED 60 S, COLOR 7

NOTE:
RAM; RANDOM ACCESS MEMORY, MB; MEGA-BYTE, KB; KILO-BYTE, MB/S; MEGA-BYTE PER SECOND, KB/S; KILO-BYTE PER SECOND, ms; MILLI-SECOND, bps; BIT PER SECOND, S; SECOND, C/S; CHARACTER PER SECOND, M; METER, KVA; KILO-VOLT-AMPERE, DC; DIRECT CURRENT, mA; MILLI-AMPERE, MHz; MEGA-HERTZ, W; WATT, I/O; INPUT/OUTPUT, FDD; FIXED DISK DRIVE,

Table 14 PROPOSED SPECIFICATIONS OF MONITORING AND CONTROL EQUIPMENT

COMPONENTS OF MONITORING AND CONTROL EQUIPMENT	QUANTITY	SPECIFICATIONS
(1) MONITORING EQUIPMENT		
LEVEL METER : FLOAT TYPE	10	DRUMS, FLOAT & FLOAT CABLE
: DIFFERENTIAL PRESSURE TYPE	11	DIAPHRAGM PRESSURE TRANSDUCER
FLOW METER : ANNUBAR TYPE	139	DIA. 100 MM - 1,200 MM,
		ACCURACY; ±1%, BI-DIRECTIONAL FLOW SENSING
PRESSURE GAUGE: BOURDON TUBE TYPE	111	PRESSURE RANGE; 0 kg/cm2 - 10 kg/cm2
(2) INSTRUMENTATION		
LEVEL METER : AIR PURGE TYPE	4	INDICATOR, TRANSMITTER (DC 4 - 20 mA)
: DIFFERENTIAL PRESSURE TYPE	24	INDICATOR, TRANSMITTER (DC 4 - 20 mA)
: FLOAT TYPE	10	INDICATOR, TRANSMITTER (DC 4 - 20 mA)
FLOW METER : ANNUBAR TYPE	160	INDICATOR, ROOTER, TRANSMITTER (DC 4 - 20 mA)
PRESSURE GAUGE: BOURDON TUBE TYPE	125	INDICATOR, TRANSMITTER (DC 4 - 20 mA)
(3) CONTROL EQUIPMENT		
CONTROL VALVE : BUTTERFLY VALVE	106	MOTOR DRIVEN, FCD, DIA. 100 MM - 1,200 MM
CONTROL PANEL FOR CONTROL VALVE	113	INDICATOR, ONE LOOP CONTROLLER
INSTRUMENT PANEL FOR RTU AND CONTROL VALVE	113	INDICATOR, ONE LOOP CONTROLLER
REMOTE CONTROL PANEL FOR BOOSTER PUMPS	6	PUSH BUTTON, INDICATOR

NOTE: DC; DIRECT CURRENT, mA; MILLI-AMPERE, DIA.; DIAMETER, MM; MILLIMETER,

Table 15 SUMMARY OF COST ESTIMATE FOR PHASE I PROJECT

ITEM	NAME OF FACILITIES AND EQUIPMENT	PHASE I									
		FOREIGN CURRENCY (US$)			LOCAL CURRENCY (TT$)						TOTAL (US$)
		SUPPLY			CIVIL WORKS				SUPPLY		
		PRIMARY EQUIPMENT	INSTRUMENT -ATION	TOTAL (US$)	F-M/C-V CHAMBER	BUILDING WORKS	INSTAL-LATION	SUB-TOTAL (CIVIL)	TRANS-PORTATION	TOTAL (TT$)	
[1]	CONSTRUCTION WORKS										
	[CSS]										
	FLOW METER	494.2	1,329.8	1,824.0	1,438.4	---	775.2	2,213.6	155.0	2,368.7	2,381.3
	CONTROL VALVE	2,156.4	3,779.8	5,936.2	1,396.5	---	2,522.9	3,919.4	504.6	4,424.0	6,977.1
	LEVEL METER	32.5	279.6	312.0	---	---	132.6	132.6	26.5	159.1	349.5
	PRESSURE GAUGE	---	566.7	566.7	---	---	240.8	240.8	48.2	289.0	634.7
	CSS's CENTRAL EQUIP	---	5,861.9	5,861.9	---	385.3	1,902.6	2,287.9	380.5	2,668.4	6,489.7
	REGIONAL OFFICE	---	211.6	211.6	---	---	89.9	89.9	18.0	107.9	236.9
	REPEATER STATION	---	219.1	219.1	---	---	93.1	93.1	18.6	111.7	245.4
	RTU STATION	---	11,832.0	11,832.0	---	2,219.5	5,028.6	7,248.1	1,005.7	8,253.8	13,774.1
	BOOSTER P/S	---	226.7	226.7	---	---	96.3	96.3	19.3	115.6	253.9
	SPARE PARTS	---	249.3	249.3	---	---	---	---	21.2	21.2	254.3
	SUB-TOTAL	2,683.1	24,556.3	27,239.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	18,519.5	31,596.9
	[LSS]										
	FLOW METER	---	---	---	---	---	---	---	---	---	---
	SUB-TOTAL	---	---	---	---	---	---	---	---	---	---
	T O T A L	2,683.1	24,556.3	27,239.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	18,519.5	31,596.9
[2]	ENGINEERING SERVICES	---	---	3,437.0	---	---	---	---	---	2,109.3	3,933.3
	TOTAL OF ITEMS [1] & [2]	2,683.1	24,556.3	30,676.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	20,628.7	35,530.2
[3]	TAX (VAT)	---	---	---	---	---	---	---	---	22,650.5	5,329.5
[4]	CONTINGENCY	---	---	4,601.5	---	---	---	---	---	3,094.3	5,329.5
[5]	ADMINISTRATION	---	---	---	---	---	---	---	---	755.0	177.7
	GRAND-TOTAL	2,683.1	24,556.3	35,277.9	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	47,128.6	46,367.0

NOTE: EQUIP.; EQUIPMENT, P/S; PUMPING STATION, F-M/C-V; FLOW METER AND CONTROL VALVE,
VAT ; VALUE ADDED TAX, EXCHANGE RATES; 1 US$ = ¥ 135 AND 1 US$ = TT$ 4.25,

TABLE 16 ECONOMIC BENEFIT STREAM

ITEM	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Production(m3/day)	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636
WITHOUT PROJECT																									
Un-accounted-for Water(%)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Volume of Water Loss(m3/day)	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818
Available Sales Volume(m3/day)	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818
Water Demand(m3/day)	265682	273599	281753	290149	298795	307681	316911	326419	336211	346298	356830	367035	377533	388330	399436	410788	422537	434621	447051	459837	472988	486516	500430	514742	529464
Sales Volume(m3/day)	265682	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818
Annual Sales Volume(1000m3)	96974	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579
Average Water Revenue(TT$/m3)	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94
Annual Water Revenue(TT$1000)	188129	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182	193182
WITH PROJECT																									
Un-accounted-for Water(%)	50	50	50	50	50	40	40	40	40	40	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Volume of Water Loss(m3/day)	272818	272818	272818	272818	272818	218254	218254	218254	218254	218254	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691
Available Sales Volume(m3/day)	272818	272818	272818	272818	272818	327382	327382	327382	327382	327382	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945
Water Demand(m3/day)	265682	273599	281753	290149	298795	307681	316911	326419	336211	346298	356830	367035	377533	388330	399436	410788	422537	434621	447051	459837	472988	486516	500430	514742	529464
Sales Volume(m3/day)	265682	272818	272818	272818	272818	307681	316911	326419	327382	327382	356830	367035	377533	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945
Annual Sales Volume(1000m3)	96974	99579	99579	99579	99579	112304	115673	119143	119494	119494	130243	133968	137799	139410	139410	139410	139410	139410	139410	139410	139410	139410	139410	139410	139410
Average Water Revenue(TT$/m3)	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94
Annual Water Revenue(TT$1000)	188129	193182	193182	193182	193182	217869	224405	231137	231819	231819	252671	259898	267331	270455	270455	270455	270455	270455	270455	270455	270455	270455	270455	270455	270455
Savings in Personal Costs (TT$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Incremental Revenue Benefits (TT$ 1000)	0	0	0	0	0	24686	31223	37955	38636	38636	59489	66715	74148	77273	77273	77273	77273	77273	77273	77273	77273	77273	77273	77273	77273
Total Benefits(TT$1000)	0	0	0	0	0	24686	31223	37955	38636	38636	59489	66715	74148	77273	77273	77273	77273	77273	77273	77273	77273	77273	77273	77273	77273

Table 17 ECONOMIC BENEFIT AND COST STREAM

(TT$ 1000)

Year	C S S					Leakage Reduction					Metering					Total Costs	Benefit	B - C
	Initial	Replace-ment	O & M	Residual Value	Sub-total	Initial	Replace-ment	O & M	Residual Value	Sub-total	Initial	Replace-ment	O & M	Residual Value	Sub-total			
1992	2,816	0	0	0	2,816	23,647	0	0	0	23,647	17,544	0	0	0	17,544	44,007	0	-44,007
1993	6,385	0	0	0	6,385	26,035	0	0	0	26,035	17,544	0	0	0	17,544	49,964	0	-49,964
1994	72,552	0	0	0	72,552	17,298	0	0	0	17,298	17,544	0	0	0	17,544	107,394	0	-107,394
1995	100,472	0	0	0	100,472	18,379	0	0	0	18,379	17,544	0	0	0	17,544	136,395	24,686	-111,709
1996	0	0	1,795	0	1,795	18,379	0	823	0	19,202	0	0	915	0	915	21,912	31,223	9,311
1997	0	0	1,795	0	1,795	18,379	0	823	0	19,202	0	0	915	0	915	21,912	37,955	16,043
1998	0	0	1,795	0	1,795	18,379	0	823	0	19,202	0	0	915	0	915	21,912	38,636	16,724
1999	0	0	1,795	0	1,795	18,379	0	823	0	19,202	0	0	915	0	915	21,912	38,636	16,724
2000	0	0	1,795	0	1,795	0	0	823	0	823	0	0	915	0	915	3,533	59,489	55,956
2001	0	0	1,795	0	1,795	0	0	823	0	823	0	0	915	0	915	3,533	66,715	63,182
2002	0	0	1,795	0	1,795	0	0	823	0	823	0	17,544	915	0	18,459	21,077	74,148	53,071
2003	0	0	1,795	0	1,795	0	0	823	0	823	0	17,544	915	0	18,459	21,077	77,273	56,196
2004	0	42,015	1,795	0	43,810	0	0	823	0	823	0	17,544	915	0	18,459	63,092	77,273	14,181
2005	0	58,749	1,795	0	60,544	0	0	823	0	823	0	17,544	915	0	18,459	79,826	77,273	-2,553
2006	0	0	1,795	0	1,795	0	0	823	0	823	0	0	915	0	915	3,533	77,273	73,740
2007	0	0	1,795	0	1,795	0	6,391	823	0	7,214	0	0	915	0	915	9,924	77,273	67,349
2008	0	0	1,795	0	1,795	0	6,391	823	0	7,214	0	0	915	0	915	9,924	77,273	67,349
2009	0	0	1,795	0	1,795	0	0	823	0	823	0	0	915	0	915	3,533	77,273	73,740
2010	0	0	1,795	0	1,795	0	0	823	0	823	0	0	915	0	915	3,533	77,273	73,740
2011	0	0	1,795	0	1,795	0	0	823	0	823	0	0	915	0	915	3,533	77,273	73,740
2012	0	0	1,795	0	1,795	0	0	823	0	823	0	17,544	915	0	18,459	21,077	77,273	56,196
2013	0	0	1,795	0	1,795	0	0	823	0	823	0	17,544	915	0	18,459	21,077	77,273	56,196
2014	0	0	1,795	-7,692	-5,897	0	0	823	-6,391	-5,568	0	17,544	915	-42,106	-23,647	-35,111	77,273	112,384
																	EIRR=	9.6 %

Table 18 FINANCIAL BENEFIT STREAM

ITEM	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Production(m3/day)	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636	545636
WITHOUT PROJECT																									
Un-accounted-for Water(%)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Volume of Water Loss(m3/day)	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818
Available Sales Volume(m3/day)	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818
Water Demand(m3/day)	265682	273599	281753	290149	298795	307681	316911	326419	336211	346298	356830	367035	377533	388330	399436	410788	422537	434621	447051	459837	472988	486516	500430	514742	529464
Sales Volume(m3/day)	265682	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818	272818
Annual Sales Volume(1000m3)	96974	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579	99579
Average Water Revenue(TT$/m3)	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Annual Water Revenue(TT$1000)	96004	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583	98583
WITH PROJECT																									
Un-accounted-for Water(%)	50	50	50	50	50	40	40	40	40	40	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Volume of Water Loss(m3/day)	272818	272818	272818	272818	272818	218254	218254	218254	218254	218254	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691
Available Sales Volume(m3/day)	272818	272818	272818	272818	272818	327382	327382	327382	327382	327382	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945
Water Demand(m3/day)	265682	273599	281753	290149	298795	307681	316911	326419	336211	346298	356830	367035	377533	388330	399436	410788	422537	434621	447051	459837	472988	486516	500430	514742	529464
Sales Volume(m3/day)	265682	272818	272818	272818	272818	307681	316911	326419	327382	327382	356830	367035	377533	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945
Annual Sales Volume(1000m3)	96974	99579	99579	99579	99579	112304	115673	119143	119494	119494	130243	133968	137795	139410	139410	139410	139410	139410	139410	139410	139410	139410	139410	139410	139410
Average Water Revenue(TT$/m3)	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Annual Water Revenue(TT$1000)	96004	98583	98583	98583	98583	111181	114516	117951	118299	118299	128941	132628	136421	138016	138016	138016	138016	138016	138016	138016	138016	138016	138016	138016	138016
Reduction of Personal Cost (TT$1000)	0	0	0	0	0	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648
Incremental Revenue Benefits (TT$ 1000)	0	0	0	0	0	12598	15933	19369	19717	19717	30358	34045	37839	39433	39433	39433	39433	39433	39433	39433	39433	39433	39433	39433	39433
Total Benefits(TT$1000)	0	0	0	0	0	13246	16581	20017	20365	20365	31006	34693	38487	40081	40081	40081	40081	40081	40081	40081	40081	40081	40081	40081	40081

Table 19 ESTIMATED AVERAGE WATER RATE BY CUSTOMER CATEGORY

Customer Category	1990					1995				
	Annual Water Demand* (m3/year)	%	Water Rate** (TT$/m3)	Annual Revenue (TT$)	%	Annual Water Demand* (m3/year)	%	Water Rate** (TT$/m3)	Annual Revenue (TT$)	%
a. Domestic	68877026	68	1.08	74387188	80	77695276	66	2.64	204780549	78
b. Industrial/ Agriculture	2748947	3	0.51	1401963	2	3508910	3	1.50	5250783	2
c. Commercial/ Public	1374474	1	1.87	2570266	3	1754455	1	4.49	7876174	3
d. Special Industrial	28255745	28	0.51	14410430	16	34246344	29	1.30	44631658	17
e. Total or Average	101256192	100	0.92	92769847	100	117204985	100	2.24	262539164	100
f. Domestic Category Per Capia Demand (lpcd)	215.4					223.8				

Notes:

* Annual water demand was estimated by JICA study team.

** Water rates in 1990 were taken as the same as an average of those in 1988 and 1989. Average water rate in 1990 is different from the actual figure of 0.99 since the former is based on the estimated water demand.

Table 20 LIST OF MONITORING AND CONTROL EQUIPMENT IN PHASE I BY CENTRAL SUPERVISORY SYSTEM - OPTION A (1)

NOTE: AN; ANNUBAR, AP; AIR PURGE TYPE, AV; ALTITUDE VALVE, B ; BOURDON TUBE, BU; BUTTERFLY VALVE, CV; CONE VALVE, F ; FLOAT TYPE, O ; ORIFICE PLATE, P ; PROPELLAR TYPE, PF; PARSHALL FLUME, V ; VENTURI TUBE, RD; ROAD, Av ; AVENUE, HW ; HIGH WAY, SH ; SHEET, ST ; STREET, RES; RESERVOIR, IT ; INTAKE, WW ; WATERWORKS, OT ; OFF-TAKE, JCT; JUNCTION, IC ; INTERCONNECTION, BPS; BOOSTER PUMPING STATION, D ; DIFFERENTIAL PRESSURE TYPE, (300); PIPE DIAMETER(MM), "*"; EXISTINGS TO BE USED, "¥"; EXISTINGS(REPLACEMENT PERIPHERALS), "#"; INSTALLATION OF CONTROL EQUIPMENT,

NUMBER & NAME OF RTU STAT. TO BE INSTALLED [STEP 2]	NAME OF MONITORING POINT	PHASE I																	
		STEP 1							STEP 3										
		EQUIPMENT TO BE INSTALLED			NUMBER OF MONITORING DATA BY RECORDER				INSTALL EQUIP.	NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
		LEVEL METER	PRESS GAUGE	FLOW METER	WATER LEVEL	WATER PRESS	FLOW RATE	TOTAL	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
1 NORTH OROPOUCHE WW								5								5				
	RAW WATER	F		¥ PF	1		1			1		1								
	CLEAR WATER RESERVOIR	* D·2			2					2										
	DISTRIBUTION (1050)			AN			1					1								
2 HOLLIS WW								3								3				
	IMPOUNDING RESERVOIR	F			1					1										
	RAW WATER (300)			AN			1					1								
	DISTRIBUTION (600)			AN			1					1								
3 GILL TRACE								11								15				
	QUARE WATER TANK	D			1					1										
	QUARE DISTRIBUTION (300)		¥ B	¥ V		1	1				1	1								
	GILL TRACE OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	QUARE(1) OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	QUARE(2) OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	TO SANGRE GRANDE OT (400)		B	AN		1	1		BU		1	1	1						1	SITE
4 ARIPO BPS								12								15				
	ARIPO(NEW) RAW WATER (300)			¥ O			1					1								
	ARIPO(OLD) RAW WATER (250)			AN			1					1								
	FORT READ RESERVOIR (250)	D		AN	1		1			1		1								
	FORT READ RESERVOIR (300)	D		AN	1		1			1		1								
	ARIPO BPS (300)		B	¥ V		1	1		BU		1	1	1						1	SITE
	CUMOTO(1) OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	CUMOTO(2) OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
5 GUANAPO JUNCTION								8								11				
	GUANAPO RAW WATER (300)			AN			1					1								
	GUANAPO RESERVOIR (300)	D			1					1										
	GUANAPO WW DIST. (300)		B	AN		1	1		BU		1	1	1						1	SITE
	DOUBLE BRIDGE OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	GUANAPO JUNCTION OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
6 DEMERARA JUNCTION								4								6				
	DEMERARA JCT OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	TUMPUNA JCT OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
7 ARIMA OLD RESERVOIR								13								17				
	ARIMA NEW RESERVOIR (375)	F		AN	1		1			1		1								
	ARIMA OLD RESERVOIR (200)	D		AN	1		1			1		1								
	TO MORENO ST OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	QUESNEL ST OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	OMERA JCT OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	ARIMA BPS (300)		B	AN		1	1		BU		1	1	1						1	SITE
	ARIMA WELL (200)			AN			1					1								
	ARIMA B/PUMPS																			
8 MAUSICA JUNCTION								12								18				
	OLTON RD OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	BOYS LANE OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	MAUSICA JCT OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	CARAPO OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	MAUSICA OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	MALONEY JCT OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
9 AROUCA WW								6								9				
	CLEAR WATER TANK	D			1					1										
	DISTRIBUTION (200)			AN			1		BU			1	1						1	SITE
	BORNE AREA #1 OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	LOPINOT IC OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
10 CAURA WW								4								5				
	RAW WATER (400)			AN			1					1								
	CLEAR WATER TANK	D			1					1										
	DISTRIBUTION (400)		B	AN		1	1		BU		1	1	1						1	SITE
11 TACARIGUA WW								9								12				
	CLEAR WATER RESERVOIR	¥ D			1					1										
	DISTRIBUTION(1) (300)		B	AN		1	1		BU		1	1	1						1	SITE
	DISTRIBUTION(2) (400)		B	AN		1	1		BU		1	1	1						1	SITE
	TO CAURA BPS OT (225)		B	AN		1	1		BU		1	1	1						1	SITE
	PASEA RD OT (175)		B	AN		1	1				1	1								

Table 20 LIST OF MONITORING AND CONTROL EQUIPMENT IN PHASE I BY CENTRAL SUPERVISORY SYSTEM - OPTION A (2)

NOTE: AN; ANNUBAR, F ; FLOAT TYPE, Av ; AVENUE, WW ; WATERWORKS, (300); PIPE DIAMETER(MM),
AP; AIR PURGE TYPE, O ; ORIFICE PLATE, HW ; HIGH WAY, OT ; OFF-TAKE, "*"; EXISTINGS TO BE USED,
AV; ALTITUDE VALVE, P ; PROPELLAR TYPE, SH ; SHEET, JCT; JUNCTION, "¥"; EXISTINGS(REPLACEMENT PERIPHERALS),
B ; BOURDON TUBE, PF; PARSHALL FLUME, ST ; STREET, IC ; INTERCONNECTION, "#"; INSTALLATION OF CONTROL EQUIPMENT,
BU; BUTTERFLY VALVE, V ; VENTURI TUBE, RES; RESERVOIR, BPS; BOOSTER PUMPING STATION,
CV; CONE VALVE, RD; ROAD, IT ; INTAKE, D ; DIFFERENTIAL PRESSURE TYPE,

NUMBER & NAME OF RTU STAT. TO BE INSTALLED [STEP 2]	NAME OF MONITORING POINT	PHASE I																		
		STEP 1							STEP 3									EQUIPMENT TO BE CONTROLLED		
		EQUIPMENT TO BE INSTALLED			NUMBER OF MONITORING DATA BY RECORDER				INSTALL EQUIP.	NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)								PUMP		VALVE	
		LEVEL METER	PRESS GAUGE	FLOW METER	WATER LEVEL	WATER PRESS	FLOW RATE	TOTAL	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	NO.	PLACE	NO.	PLACE
12 FLOW CONTROL STATION								7								11				
	PIARCO JCT OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	BY-PASS OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	FLOW CONTROL STATION(800)		B·2	¥ V		2	1		# CV-2		2	1	2						2	SITE
13 ST AUGUSTINE RESERVOIR								10								10				
	RESERVOIR (750)	F		AN	1		1		AV	1		1								
	ST JOHN RD OT (300)		B	AN		1	1				1	1								
	TO TUNAPUNA OT (150)		B	AN		1	1				1	1								
	RABIR ST OT (200)		B	AN		1	1				1	1								
	RIVERSIDE RD OT (100)		B	AN		1	1				1	1								
14 TUNAPUNA BPS								12								48				
	TUNAPUNA(1) (150)		B	AN		1	1		BU		1	1	1						1	CSS
	TUNAPUNA(2) (200)		B	AN		1	1		BU		1	1	1						1	CSS
	TUNAPUNA(3) (525)		B	AN		1	1				1	1								
	PASEA ST OT (100)		B	AN		1	1		BU		1	1	1						1	SITE
	TUNAPUNA RIVER (1) (300)		B	AN		1	1		BU		1	1	1						1	SITE
	TUNAPUNA RIVER (2) (525)		B	AN		1	1		BU		1	1	1						1	SITE
	TUNAPUNA B/PUMPS													6	25		3	CSS		
15 ST JOSEPH RESERVOIR								11								15				
	RESERVOIR	F			1					1										
	TO ST JOSEPH OT (225)		B	AN		1	1		BU		1	1	1						1	SITE
	TO RIDER MAIN OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	MENDEZ STEEL SH. OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	MATERNITY HP. OT (100)		B	AN		1	1		BU		1	1	1						1	SITE
	ST JOSEPH(1) (175)			AN			1					1								
	ST JOSEPH(2) (300)			AN			1					1								
16 VALSAYN WW								8								41				
	RAW WATER (750)			¥ V			1					1								
	CLEAR WATER RESERVOIR	¥ D			1					1										
	DISTRIBUTION (750)		¥ B	¥ V		1	1		BU		1	1	1						1	SITE
	BOOSTER SUCTION (450)		¥ B	¥ AN		1	1				1	1								
	BOOSTER DELIVERY (450)		¥ B	AN		1	1		BU		1	1	1						1	CSS
	VALSAYN B/PUMPS													6	25		3	CSS		
17 URIAH BUTLER HW JUNCTION								2								3				
	STAG/NESTL OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
18 MT. HOPE RESERVOIR								16								23				
	RESERVOIR (600)	D		AN	1		1		AV	1		1								
	CARIB(1) OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	CARIB(2) OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	MT. HOPE OT (300)																			
	GORDON ST (1) OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	GORDON ST (2) OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	GORDON ST (3) OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	BROOM ST OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	TO SANTA CRUZ OT (250)		B	AN		1	1		BU		1	1	1						1	SITE
19 MALICK RESERVOIR								8								11				
	RESERVOIR (750)	D		AN	1		1		AV	1		1								
	TO BARATARIA OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	SIXTH Av. OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	TO LADY YOUNG Av. OT (450)		B	AN		1	1		BU		1	1	1						1	SITE
20 EL SOCORRO WW								13								49				
	RAW WATER (750)			¥ V			1					1								
	CLEAR WATER RESERVOIR	¥ AP			1					1										
	BOOSTER SUCTION (900)		¥ B			1					1									
	BOOSTER DELIVERY (600)		¥ B	¥ AN		1	1		BU		1	1	1						1	CSS
	DISTRIBUTION (400)		¥ B	¥ AN		1	1		BU		1	1	1						1	SITE
	EL SOCORRO RD OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	DON MIGUEL RD OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	ELEVENTH ST OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	EL SOCORRO B/PUMPS													6	25		3	CSS		
21 LAVENTILLE								2								3				
	TO LAVENTILLE OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
22 BLACK RIVER								8								12				

Table 20 LIST OF MONITORING AND CONTROL EQUIPMENT IN PHASE I BY CENTRAL SUPERVISORY SYSTEM - OPTION A (3)

NOTE: AN; ANNUBAR, AP; AIR PURGE TYPE, AV; ALTITUDE VALVE, B ; BOURDON TUBE, BU; BUTTERFLY VALVE, CV; CONE VALVE,
F ; FLOAT TYPE, O ; ORIFICE PLATE, P ; PROPELLAR TYPE, PF; PARSHALL FLUME, V ; VENTURI TUBE, RD; ROAD,
Av ; AVENUE, HW ; HIGH WAY, ST ; STREET, RES; RESERVOIR, IT ; INTAKE,
WW ; WATERWORKS, OT ; OFF-TAKE, JCT; JUNCTION, IC ; INTERCONNECTION, BPS; BOOSTER PUMPING STATION, D ; DIFFERENTIAL PRESSURE TYPE,
(300); PIPE DIAMETER(MM), "*"; EXISTINGS TO BE USED, "¥"; EXISTINGS(REPLACEMENT PERIPHERALS), "#"; INSTALLATION OF CONTROL EQUIPMENT,

NUMBER & NAME OF RTU STAT. TO BE INSTALLED [STEP 2]	NAME OF MONITORING POINT	PHASE I STEP 1 EQUIPMENT TO BE INSTALLED			NUMBER OF MONITORING DATA BY RECORDER				PHASE I STEP 3 INSTALL EQUIP.	NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
		LEVEL METER	PRESS GAUGE	FLOW METER	WATER LEVEL	WATER PRESS	FLOW RATE	TOTAL	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
	BLACK RIVER (1) OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	BLACK RIVER (2) OT (450)		B	AN		1	1		BU		1	1	1						1	SITE
	BLACK RIVER (3) OT (525)		B	AN		1	1		BU		1	1	1						1	SITE
	TO LADY YOUNG RD OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
23 PICTON NO.3 RESERVOIR								13								16				
	PICTON #1 RESERVOIR (400)	* D		AN	1		1		AV	1		1								
	PICTON #2 RESERVOIR (750)	* D-2		AN	2		1		AV-2	2		1								
	PICTON #3 RESERVOIR (900)	* D		AN	1		1		AV	1		1								
	MASALLAH ST OT (100)		B	AN		1	1		BU		1	1	1						1	SITE
	PRIZAR LANDS ST OT (100)		B	AN		1	1		BU		1	1	1						1	SITE
	KERR RD OT (100)		B	AN		1	1		BU		1	1	1						1	SITE
24 SERVOL LIFE CENTER								6								9				
	BEETHAM DUMP OT (100)		B	AN		1	1		BU		1	1	1						1	SITE
	SERVOL LIFE C. OT (100)		B	AN		1	1		BU		1	1	1						1	SITE
	TO LAVENTILLE OT (525)		B	AN		1	1		BU		1	1	1						1	SITE
25 KNAGGS HILL								15								19				
	RESERVOIR (525)	* D-2		AN	2		1		* AV-2	2		1								
	TO BELMONT OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	TO CASCADE OT (600)		B	AN		1	1		BU		1	1	1						1	SITE
	TO ST CLAIR OT (350)		B	AN		1	1		BU		1	1	1						1	SITE
	WESTERN MAIN ROAD (525)		B	AN		1	1		BU		1	1	1						1	SITE
	FROM SAVANNAH WELLS (300)		B	AN		1	1				1	1								
	BARRACK (750)		B	AN		1	1				1	1								
26 NATIONAL FLOUR MILL								2								3				
	NFM OT (100)		B	AN		1	1		BU		1	1	1						1	SITE
	PORT AUTHORITY (300)																			
	POST OFFICE (300)																			
	NATIONAL STADIUM (300)																			
27 TUMPUNA STORAGE LIFT PS								4								77				
	ARENA IMPOUNDING RES.	¥ AP			1					1										
	TUMPUNA WEIR	F			1					1										
	TO/FROM RESERVOIR (1200)			¥ V-2			2					2								
	RIVER DISCH. VALVE (1200)								¥ BU-2				2						2	CARONI
	TUMPUNA S.L./PUMPS													12	59		6	CARONI		
28 CARONI WTP								7								9				
	RAW WATER	¥ AP		¥ PF	1		1			1		1								
	CLEAR WATER RESERVOIR	¥ AP			1					1										
	CARONI NORTH (900)		* B	¥ AN		1	1		¥ BU		1	1	1						1	CARONI
	CARONI SOUTH (1200)		* B	¥ AN		1	1		¥ BU		1	1	1						1	CARONI
29 KELLY VILLAGE								2								3				
	KELLY VILLAGE OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
30 SCALE YARD								4								6				
	SCALE YARD OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	HINGKING RD OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
31 LAS LOMAS WW								4								5				
	RAW WATER (600)			¥ O			1					1								
	CLEAR WATER RESERVOIR	D			1					1										
	DISTRIBUTION (600)		¥ B	¥ V		1	1		BU		1	1	1						1	SITE
32 JERNINGHAM JUNCTION								4								5				
	TO LAS LOMAS OT (600)		B	AN		1	1				1	1								
	JERNINGHAM JCT OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
33 CHAGUANAS								4								6				
	CHAGUANAS OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	LANGE PARK OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
34 CARLSEN FIELD WW								5								7				
	CLEAR WATER RESERVOIR	F			1					1										
	DISTRIBUTION(1) (200)		B	AN		1	1		BU		1	1	1						1	SITE
	DISTRIBUTION(2) (250)		B	AN		1	1		BU		1	1	1						1	SITE
35 CARAPICHAIMA								6								7				
	CARAPICHAIMA OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	TO CARLSEN FIELD OT (300)		B	AN		1	1				1	1								
	TO FREEPORT WW OT (300)		B	AN		1	1				1	1								
36 WARDEN OFFICE								6								9				

Table 20 LIST OF MONITORING AND CONTROL EQUIPMENT IN PHASE I BY CENTRAL SUPERVISORY SYSTEM - OPTION A (4)

NOTE: AN; ANNUBAR, F ; FLOAT TYPE, Av ; AVENUE, WW ; WATERWORKS, (300); PIPE DIAMETER(MM),
AP; AIR PURGE TYPE, O ; ORIFICE PLATE, HW ; HIGH WAY, OT ; OFF-TAKE, "*"; EXISTINGS TO BE USED,
AV; ALTITUDE VALVE, P ; PROPELLAR TYPE, SH ; SHEET, JCT; JUNCTION, "¥"; EXISTINGS(REPLACEMENT PERIPHERALS),
B ; BOURDON TUBE, PF; PARSHALL FLUME, ST ; STREET, IC ; INTERCONNECTION, "#"; INSTALLATION OF CONTROL EQUIPMENT,
BU; BUTTERFLY VALVE, V ; VENTURI TUBE, RES; RESERVOIR, BPS; BOOSTER PUMPING STATION,
CV; CONE VALVE, RD; ROAD, IT ; INTAKE, D ; DIFFERENTIAL PRESSURE TYPE,

NUMBER & NAME OF RTU STAT. TO BE INSTALLED [STEP 2]	NAME OF MONITORING POINT	PHASE I STEP 1 EQUIPMENT TO BE INSTALLED			PHASE I STEP 1 NUMBER OF MONITORING DATA BY RECORDER				PHASE I STEP 3 INSTALL EQUIP.	PHASE I STEP 3 NUMBER OF MONITORING DATA BY CENTRAL SUPERVISORY SYSTEM (CSS)							EQUIPMENT TO BE CONTROLLED			
		LEVEL METER	PRESS GAUGE	FLOW METER	WATER LEVEL	WATER PRESS	FLOW RATE	TOTAL	CONTROL VALVE	WATER LEVEL	WATER PRESS	FLOW RATE	VALVE STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PUMP PLACE	VALVE NO.	VALVE PLACE
	WARDEN OFFICE OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	COUVA LANE OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	POINT LISAS OT (600)		B	AN		1	1		BU		1	1	1						1	SITE
37 TRINGEN II								2								3				
	TRINGEN II OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
38 CALIFORNIA RESERVOIR								2								2				
	RESERVOIR (900)	D		AN	1		1		AV	1		1								
39 TCL								2								3				
	TCL OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
40 MARAVELLA								2								3				
	MARAVELLA OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
41 SAN FERNANDO BPS								14								49				
	SAN F'DO RESERVOIR (750)	¥ D		AN	1		1		AV	1		1								
	MARRYAT RESERVOIR (600)	¥ D		AN	1		1			1		1								
	NAPARIMA RESERVOIR	¥ D			1					1										
	BOOSTER SUCTION (900)		¥ B	¥ AN		1	1				1	1								
	BOOSTER DELIVERY (900)		¥ B			1			* BU		1		1						1	CSS
	ROUND ABOUT(1) OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	ROUND ABOUT(2) OT (525)		B	AN		1	1		BU		1	1	1						1	SITE
	FIRE BRIGADE OT (375)		B	AN		1	1		BU		1	1	1						1	SITE
	SAN F'DO B/PUMPS													6	25		3	CSS		
42 MOSQUITO CREEK								2								3				
	TO MOSQUITO CR. OT (600)		B	AN		1	1		BU		1	1	1						1	SITE
43 ST CLEMENT								4								6				
	ST CLEMENT (1) OT (200)		B	AN		1	1		BU		1	1	1						1	SITE
	ST CLEMENT (2) OT (250)		B	AN		1	1		BU		1	1	1						1	SITE
44 DAISY								2								3				
	DAISY OT (400)		B	AN		1	1		BU		1	1	1						1	SITE
45 MALGRETOUTE BPS								9								64				
	BOOSTER SUCTION (900)		¥ B	¥ V		1	1				1	1								
	BOOSTER DELIVERY (900)		¥ B			1			BU		1		1						1	CSS
	BUEN INTENTO OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	TO PRINCESS TOWN OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	TO MALGRETOUTE OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	MALGRETOUTE B/PUMPS													10	41		5	CSS		
46 BROTHER ROAD								6								9				
	BROTHER ROAD OT (150)		B	AN		1	1		BU		1	1	1						1	SITE
	TO PIPARO/ARCH OT (250)		B	AN		1	1		BU		1	1	1						1	SITE
	TO ST JULIAN OT (375)		B	AN		1	1		BU		1	1	1						1	SITE
47 TCO BPS								5								68				
	BOOSTER SUCTION (900)		¥ B			1					1									
	BOOSTER DELIVERY (900)		¥ B	¥ V		1	1		BU		1	1	1						1	CSS
	RIO CLARO OT (300)		B	AN		1	1		BU		1	1	1						1	SITE
	TCO B/PUMPS													12	49		6	CSS		
48 NAVET WW								9								9				
	HIGH DAM	F			1					1										
	LOW DAM	F			1					1										
	STORAGE LIFT PS (1200)			AN			1					1								
	RAW WATER (450)			AN-4			4					4								
	CLEAR WATER RESERVOIR	F			1					1										
	DISTRIBUTION (900)			AN			1					1								
	TOTAL	38	127	160	38	127	160	325	124	38	127	160	113	58	249	745	29		113	
	= LIST OF ITEMS =	¥AP 4 D 11 *D 8 ¥D 5 F 10	¥B 14 B 111 *B 2	¥AN 6 AN139 ¥O 2 ¥PF 2 ¥V 11					AV 9 *AV 2 BU106 *BU 1 ¥BU 4 #CV 2								6 23	CARONI CSS	102 7 4	SITE CSS CARONI

Table 21 SUMMARY OF COST ESTIMATE FOR CENTRAL SUPERVISORY SYSTEM (OPTION A)

UNIT: IN x 1,000

ITEM	NAME OF FACILITIES AND EQUIPMENT	PHASE I-STEP 1										PHASE I-STEP 3									
		FOREIGN CURRENCY (US$)			LOCAL CURRENCY (TT$)						TOTAL (US$)	FOREIGN CURRENCY (US$)			LOCAL CURRENCY (TT$)						TOTAL (US$)
		SUPPLY			CIVIL WORKS				SUPPLY			SUPPLY			CIVIL WORKS				SUPPLY		
		PRIMARY EQUIPMENT	INSTRUMENT -ATION	TOTAL (US$)	F-M/C-V CHAMBER	BUILDING WORKS	INSTAL-LATION	SUB-TOTAL (CIVIL)	TRANS-PORTATION	TOTAL (TT$)		PRIMARY EQUIPMENT	INSTRUMENT -ATION	TOTAL (US$)	F-M/C-V CHAMBER	BUILDING WORKS	INSTAL-LATION	SUB-TOTAL (CIVIL)	TRANS-PORTATION	TOTAL (TT$)	
[1]	CONSTRUCTION WORKS																				
	[CSS]																				
	FLOW METER	494.2	1,870.2	2,364.4	1,438.4	---	1,004.9	2,443.3	201.0	2,644.3	2,986.6	---	---	---	---	---	---	---	---	---	---
	CONTROL VALVE	---	---	---	---	---	---	---	---	---	---	2,156.4	3,779.8	5,936.2	1,396.5	---	2,522.9	3,919.4	504.6	4,424.0	6,977.1
	LEVEL METER	32.5	380.9	413.4	---	---	175.7	175.7	35.1	210.8	463.0	---	---	---	---	---	---	---	---	---	---
	PRESSURE GAUGE	---	988.9	988.9	---	---	420.3	420.3	84.1	504.3	1,107.6	---	---	---	---	---	---	---	---	---	---
	CSS's CENTRAL EQUIP	---	---	---	---	---	---	---	---	---	---	---	5,861.9	5,861.9	---	385.3	1,902.6	2,287.9	380.5	2,668.4	6,489.7
	REGIONAL OFFICE	---	---	---	---	---	---	---	---	---	---	---	211.6	211.6	---	---	89.9	89.9	18.0	107.9	236.9
	REPEATER STATION	---	---	---	---	---	---	---	---	---	---	---	219.1	219.1	---	---	93.1	93.1	18.6	111.7	245.4
	RTU STATION	---	---	---	---	---	---	---	---	---	---	---	11,832.0	11,832.0	---	2,219.5	5,028.6	7,248.1	1,005.7	8,253.8	13,774.1
	BOOSTER P/S	---	---	---	---	---	---	---	---	---	---	---	226.7	226.7	---	---	96.3	96.3	19.3	115.6	253.9
	SPARE PARTS	---	---	---	---	---	---	---	---	---	---	---	249.3	249.3	---	---	---	---	21.2	21.2	254.3
	SUB-TOTAL	526.7	3,240.0	3,766.7	1,438.4	---	1,600.8	3,039.3	320.2	3,359.4	4,557.1	2,156.4	22,380.3	24,536.7	1,396.5	2,604.9	9,733.4	13,734.8	1,967.9	15,702.7	28,231.5
	[DISTRICT OFFICE]																				
	PC & PRINTER	---	112.0	112.0	---	---	---	---	2.2	2.2	112.5	---	---	---	---	---	---	---	---	---	---
	SUB-TOTAL	---	112.0	112.0	---	---	---	---	2.2	2.2	112.5	---	---	---	---	---	---	---	---	---	---
	T O T A L	526.7	3,352.0	3,878.7	1,438.4	---	1,600.8	3,039.3	322.4	3,361.7	4,669.7	2,156.4	22,380.3	24,536.7	1,396.5	2,604.9	9,733.4	13,734.8	1,967.9	15,702.7	28,231.5
[2]	ENGINEERING SERVICES	---	---	489.4	---	---	---	---	---	382.6	579.4	---	---	2,823.9	---	---	---	---	---	1,788.4	3,244.7
	TOTAL OF ITEMS [1] & [2]	526.7	3,352.0	4,368.1	1,438.4	---	1,600.8	3,039.3	322.4	3,744.3	5,249.1	2,156.4	22,380.3	27,360.6	1,396.5	2,604.9	9,733.4	13,734.8	1,967.9	17,491.1	31,476.2
[3]	TAX (VAT)	---	---	---	---	---	---	---	---	3,346.3	787.4	---	---	---	---	---	---	---	---	20,066.1	4,721.4
[4]	CONTINGENCY	---	---	655.2	---	---	---	---	---	561.6	787.4	---	---	4,104.1	---	---	---	---	---	2,623.7	4,721.4
[5]	ADMINISTRATION	---	---	---	---	---	---	---	---	111.5	26.2	---	---	---	---	---	---	---	---	668.9	157.4
	GRAND-TOTAL	526.7	3,352.0	5,023.3	1,438.4	---	1,600.8	3,039.3	322.4	7,763.8	6,850.1	2,156.4	22,380.3	31,464.7	1,396.5	2,604.9	9,733.4	13,734.8	1,967.9	40,849.7	41,076.4

NOTE: EQUIP.: EQUIPMENT, P/S; PUMPING STATION, F-M/C-V; FLOW METER AND CONTROL VALVE, VAT: VALUE ADDED TAX, EXCHANGE RATES; 1 US$ = ¥ 135 AND 1 US$ = TT$ 4.25,

Table 22 SUMMARY OF COST ESTIMATE FOR CENTRAL SUPERVOSORY SYSTEM (OPTION B)

UNIT: IN x 1,000

ITEM	NAME OF FACILITIES AND EQUIPMENT	PHASE I										REPLACEMENT COST OF PHASE I									
		FOREIGN CURRENCY (US$)			LOCAL CURRENCY (TT$)						TOTAL (US$)	FOREIGN CURRENCY (US$)			LOCAL CURRENCY (TT$)						TOTAL (US$)
		SUPPLY			CIVIL WORKS				SUPPLY			SUPPLY			CIVIL WORKS				SUPPLY		
		PRIMARY EQUIPMENT	INSTRUMENT -ATION	TOTAL (US$)	F-M/C-V CHAMBER	BUILDING WORKS	INSTAL-LATION	SUB-TOTAL (CIVIL)	TRANS-PORTATION	TOTAL (TT$)		PRIMARY EQUIPMENT	INSTRUMENT -ATION	TOTAL (US$)	F-M/C-V CHAMBER	BUILDING WORKS	INSTAL-LATION	SUB-TOTAL (CIVIL)	TRANS-PORTATION	TOTAL (TT$)	
[1]	CONSTRUCTION WORKS																				
	[CSS]																				
	FLOW METER	494.2	1,329.8	1,824.0	1,438.4	---	775.2	2,213.6	155.0	2,368.7	2,381.3	---	1,329.8	1,329.8	---	---	565.2	565.2	113.0	678.2	1,489.4
	CONTROL VALVE	2,156.4	3,779.8	5,936.2	1,396.5	---	2,522.9	3,919.4	504.6	4,424.0	6,977.1	---	1,241.1	1,241.1	---	---	527.5	527.5	105.5	633.0	1,390.1
	LEVEL METER	32.5	279.6	312.0	---	---	132.6	132.6	26.5	159.1	349.5	---	279.6	279.6	---	---	118.8	118.8	23.8	142.6	313.1
	PRESSURE GAUGE	---	566.7	566.7	---	---	240.8	240.8	48.2	289.0	634.7	---	566.7	566.7	---	---	240.8	240.8	48.2	289.0	634.7
	CSS's CENTRAL EQUIP	---	5,861.9	5,861.9	---	385.3	1,902.6	2,287.9	380.5	2,668.4	6,489.7	---	3,486.9	3,486.9	---	---	1,481.9	1,481.9	296.4	1,778.3	3,905.3
	REGIONAL OFFICE	---	211.6	211.6	---	---	89.9	89.9	18.0	107.9	236.9	---	317.3	317.3	---	---	134.9	134.9	27.0	161.8	355.4
	REPEATER STATION	---	219.1	219.1	---	---	93.1	93.1	18.6	111.7	245.4	---	219.1	219.1	---	---	93.1	93.1	18.6	111.7	245.4
	RTU STATION	---	11,832.0	11,832.0	---	2,219.5	5,028.6	7,248.1	1,005.7	8,253.8	13,774.1	---	9,973.3	9,973.3	---	---	4,238.7	4,238.7	847.7	5,086.4	11,170.1
	BOOSTER P/S	---	226.7	226.7	---	---	96.3	96.3	19.3	115.6	253.9	---	---	---	---	---	---	---	---	---	---
	SPARE PARTS	---	249.3	249.3	---	---	---	---	21.2	21.2	254.3	---	249.3	249.3	---	---	---	---	21.2	21.2	254.3
	SUB-TOTAL	2,683.1	24,556.3	27,239.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	18,519.5	31,596.9	---	17,663.1	17,663.1	---	---	7,400.9	7,400.9	1,501.4	8,902.2	19,757.8
	[LSS]																				
	FLOW METER	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	SUB-TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	T O T A L	2,683.1	24,556.3	27,239.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	18,519.5	31,596.9	---	17,663.1	17,663.1	---	---	7,400.9	7,400.9	1,501.4	8,902.2	19,757.8
[2]	ENGINEERING SERVICES	---	---	3,437.0	---	---	---	---	---	2,109.3	3,933.3	---	---	---	---	---	---	---	---	---	---
	TOTAL OF ITEMS [1] & [2]	2,683.1	24,556.3	30,676.4	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	20,628.7	35,530.2	---	17,663.1	17,663.1	---	---	7,400.9	7,400.9	1,501.4	8,902.2	19,757.8
[3]	TAX (VAT)	---	---	---	---	---	---	---	---	22,650.5	5,329.5	---	---	---	---	---	---	---	---	12,595.5	2,963.7
[4]	CONTINGENCY	---	---	4,601.5	---	---	---	---	---	3,094.3	5,329.5	---	---	2,649.5	---	---	---	---	---	1,335.3	2,963.7
[5]	ADMINISTRATION	---	---	---	---	---	---	---	---	755.0	177.7	---	---	---	---	---	---	---	---	419.9	98.8
	GRAND-TOTAL	2,683.1	24,556.3	35,277.9	2,834.9	2,604.9	10,882.1	16,321.9	2,197.6	47,128.6	46,367.0	---	17,663.1	20,312.6	---	---	7,400.9	7,400.9	1,501.4	23,253.0	25,783.9

NOTE: EQUIP.; EQUIPMENT, P/S; PUMPING STATION, F-M/C-V; FLOW METER AND CONTROL VALVE, VAT; VALUE ADDED TAX, EXCHANGE RATES; 1 US$ = ¥ 135 AND 1 US$ = TT$ 4.25.

Table 23 NET PRESENT VALUE FOR OPTIONS A AND B

UNIT: IN X US$ 1,000

DESCRIPTION / YEAR / ITEM	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOTAL
OPTION A	PHASE I - STEP 1				PHASE I - STEP 2 & 3					REPLACEMENT OF STEP 1					REPLACEMENT OF STEP 3					
[1] CONSTRUCTION	---	---	1,981	2,688	---	---	---	11,979	16,253	---	---	---	1,034	1,403	---	---	---	7,349	9,971	52,659
[2] ENGINEERING SERVICES	85	193	107	194	---	477	1,082	599	1,088	---	---	---	---	---	---	---	---	---	---	3,824
SUB-TOTAL	85	193	2,088	2,883	---	477	1,082	12,578	17,340	---	---	---	1,034	1,403	---	---	---	7,349	9,971	56,483
[3] TAX (VAT)	13	29	313	432	---	71	162	1,887	2,601	---	---	---	155	210	---	---	---	1,102	1,496	8,472
[4] CONTINGENCY	13	29	313	432	---	71	162	1,887	2,601	---	---	---	155	210	---	---	---	1,102	1,496	8,472
[5] ADMINISTRATION	0	1	10	14	---	2	5	63	87	---	---	---	5	7	---	---	---	37	50	282
TOTAL	111	252	2,725	3,762	---	622	1,411	16,414	22,629	---	---	---	1,349	1,831	---	---	---	9,591	13,013	73,710
			TOTAL =	6,850				TOTAL =	41,076				TOTAL =	3,180				TOTAL =	22,603	
NET PRESENT VALUE																				
5% [43,722]																				
10% [27,981]																				
12% [23,816]																				
15% [18,995]																				
OPTION B	PHASE I									REPLACEMENT OF PHASE I										
[1] CONSTRUCTION	---	---	13,407	18,190	---	---	---	---	---	---	---	---	8,257	11,501	---	---	---	---	---	51,355
[2] ENGINEERING SERVICES	578	1,311	726	1,319	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3,933
SUB-TOTAL	578	1,311	14,133	19,509	---	---	---	---	---	---	---	---	8,257	11,501	---	---	---	---	---	55,288
[3] TAX (VAT)	87	197	2,120	2,926	---	---	---	---	---	---	---	---	1,239	1,725	---	---	---	---	---	8,293
[4] CONTINGENCY	87	197	2,120	2,926	---	---	---	---	---	---	---	---	1,239	1,725	---	---	---	---	---	8,293
[5] ADMINISTRATION	3	7	71	98	---	---	---	---	---	---	---	---	41	58	---	---	---	---	---	276
TOTAL	754	1,711	18,443	25,459	---	---	---	---	---	---	---	---	10,775	15,009	---	---	---	---	---	72,151
			TOTAL =	46,367									TOTAL =	25,784						
NET PRESENT VALUE																				
5% [52,442]																				
10% [40,418]																				
12% [36,885]																				
15% [32,505]																				

NOTE: EXCHANGE RATES; 1 US$ = TT$ 4.25 AND 1 US$ = ¥ 135, %; DISCOUNT RATE

Table 24 ECONOMIC BENEFIT AND COST STREAM (OPTION-A)

UNIT: TT$ 1,000

YEAR	C S S					LEAKAGE REDUCTION					METER INSTALLATION					TOTAL COSTS [C]	BENEFIT [B]	B - C
	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	SUB-TOTAL	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	SUB-TOTAL	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	SUB-TOTAL			
1992	866	0	0	0	866	23,647	0	0	0	23,647	17,544	0	0	0	17,544	42,057	0	-42,057
1993	1,962	0	0	0	1,962	26,035	0	0	0	26,035	17,544	0	0	0	17,544	45,541	0	-45,541
1994	21,243	0	0	0	21,243	17,298	0	0	0	17,298	17,544	0	0	0	17,544	56,085	0	-56,085
1995	29,319	0	0	0	29,319	18,379	0	0	0	18,379	17,544	0	0	0	17,544	65,242	24,686	-40,556
1996	0	0	534	0	534	18,379	0	823	0	19,202	0	0	915	0	915	20,651	31,223	10,572
1997	1,958	0	534	0	2,492	18,379	0	823	0	19,202	0	0	915	0	915	22,609	37,955	15,346
1998	4,448	0	534	0	4,982	18,379	0	823	0	19,202	0	0	915	0	915	25,099	38,636	13,537
1999	47,891	0	534	0	48,425	18,379	0	823	0	19,202	0	0	915	0	915	68,542	38,636	-29,906
2000	66,113	0	534	0	66,647	0	0	823	0	823	0	0	915	0	915	68,385	59,489	-8,896
2001	0	0	1,738	0	1,738	0	0	823	0	823	0	0	915	0	915	3,476	66,715	63,239
2002	0	0	1,738	0	1,738	0	0	823	0	823	0	17,544	915	0	18,459	21,020	74,148	53,128
2003	0	0	1,738	0	1,738	0	0	823	0	823	0	17,544	915	0	18,459	21,020	77,273	56,253
2004	0	5,244	1,738	0	6,982	0	0	823	0	823	0	17,544	915	0	18,459	26,264	77,273	51,009
2005	0	7,115	1,738	0	8,853	0	0	823	0	823	0	17,544	915	0	18,459	28,135	77,273	49,138
2006	0	0	1,738	0	1,738	0	0	823	0	823	0	0	915	0	915	3,476	77,273	73,797
2007	0	0	1,738	0	1,738	0	6,391	823	0	7,214	0	0	915	0	915	9,867	77,273	67,406
2008	0	0	1,738	0	1,738	0	6,391	823	0	7,214	0	0	915	0	915	9,867	77,273	67,406
2009	0	34,674	1,738	0	36,412	0	0	823	0	823	0	0	915	0	915	38,150	77,273	39,123
2010	0	47,046	1,738	0	48,784	0	0	823	0	823	0	0	915	0	915	50,522	77,273	26,751
2011	0	0	1,738	0	1,738	0	0	823	0	823	0	0	915	0	915	3,476	77,273	73,797
2012	0	0	1,738	0	1,738	0	0	823	0	823	0	17,544	915	0	18,459	21,020	77,273	56,253
2013	0	0	1,738	0	1,738	0	0	823	0	823	0	17,544	915	0	18,459	21,020	77,273	56,253
2014	0	0	1,738	-49,032	-47,294	0	0	823	-6,391	-5,568	0	17,544	915	-24,727	-6,268	-59,130	77,273	136,403
	173,800	94,080				158,875	12,782				70,176	122,808						

EIRR= 12.5%

Table 25 FINANCIAL CASH FLOW (OPTION-A)

UNIT: TT$ 1,000

YEAR	C S S					LEAKAGE REDUCTION					METER INSTALLATION					TOTAL COSTS [C]	BENEFIT [B]	B - C
	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	SUB-TOTAL	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	SUB-TOTAL	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	SUB-TOTAL			
1992	893	0	0	0	893	28,064	0	0	0	28,064	18,496	0	0	0	18,496	47,453	0	-47,453
1993	2,023	0	0	0	2,023	26,835	0	0	0	26,835	18,496	0	0	0	18,496	47,354	0	-47,354
1994	21,900	0	0	0	21,900	17,873	0	0	0	17,873	18,496	0	0	0	18,496	58,269	0	-58,269
1995	30,226	0	0	0	30,226	19,050	0	0	0	19,050	18,496	0	0	0	18,496	67,772	12,598	-55,174
1996	0	0	550	0	550	19,050	0	874	0	19,924	0	0	972	0	972	21,446	15,933	-5,513
1997	2,019	0	550	0	2,569	19,050	0	874	0	19,924	0	0	972	0	972	23,465	19,369	-4,096
1998	4,586	0	550	0	5,136	19,050	0	874	0	19,924	0	0	972	0	972	26,032	19,717	-6,315
1999	49,372	0	550	0	49,922	19,050	0	874	0	19,924	0	0	972	0	972	70,818	30,358	-40,460
2000	68,157	0	550	0	68,707	0	0	874	0	874	0	0	972	0	972	70,553	34,045	-36,508
2001	0	0	1,792	0	1,792	0	0	874	0	874	0	0	972	0	972	3,638	38,487	34,849
2002	0	0	1,792	0	1,792	0	0	874	0	874	0	18,496	972	0	19,468	22,134	40,081	17,947
2003	0	0	1,792	0	1,792	0	0	874	0	874	0	18,496	972	0	19,468	22,134	40,081	17,947
2004	0	5,406	1,792	0	7,198	0	0	874	0	874	0	18,496	972	0	19,468	27,540	40,081	12,541
2005	0	7,336	1,792	0	9,128	0	0	874	0	874	0	18,496	972	0	19,468	29,470	40,081	10,612
2006	0	0	1,792	0	1,792	0	0	874	0	874	0	0	972	0	972	3,638	40,081	36,443
2007	0	0	1,792	0	1,792	0	6,684	874	0	7,558	0	0	972	0	972	10,322	40,081	29,759
2008	0	0	1,792	0	1,792	0	6,684	874	0	7,558	0	0	972	0	972	10,322	40,081	29,759
2009	0	35,747	1,792	0	37,539	0	0	874	0	874	0	0	972	0	972	39,385	40,081	696
2010	0	48,501	1,792	0	50,293	0	0	874	0	874	0	0	972	0	972	52,139	40,081	-12,058
2011	0	0	1,792	0	1,792	0	0	874	0	874	0	0	972	0	972	3,638	40,081	36,443
2012	0	0	1,792	0	1,792	0	0	874	0	874	0	18,496	972	0	19,468	22,134	40,081	17,947
2013	0	0	1,792	0	1,792	0	0	874	0	874	0	18,496	972	0	19,468	22,134	40,081	17,947
2014	0	0	1,792	-50,549	-48,757	0	0	874	-6,684	-5,810	0	18,496	972	-44,390	-24,922	-79,489	40,081	119,570
	179,176	96,989				168,022	13,368				73,984	129,472						

FIRR= 1.5%