

表-12 CSS (第一期) のための一次計器一覧表 (2)

NOTE: AN: ANNUBAR, P: PROPELLAR TYPE, RES: RESERVOIR, (300); PIPE DIAMETER(MM),
 AP: AIR PURGE TYPE, PF: PARSHALL FLUME, IT: INTAKE, "X": EXISTINGS TO BE USED,
 AV: ALTITUDE VALVE, V: VENTURI TUBE, WW: WATERWORKS, "Y": EXISTINGS (REPLACEMENT PERIPHERALS),
 B: BOURDON TUBE, RD: ROAD, OT: OFF-TAKE, "Z": INSTALLATION OF CONTROL EQUIPMENT,
 BU: BUTTERFLY VALVE, Av: AVENUE, JCT: JUNCTION,
 CV: CONE VALVE, IM: 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	P H A S E 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.	VALVE PLACE NO.	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	Y 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)			Y V				1											
	CLEAR WATER RESERVOIR	Y D				1													
	DISTRIBUTION (750)		Y B	Y V	BU		1	1	1									1	SITE
	BOOSTER SUCTION (450)		Y B	Y AN			1	1											
	BOOSTER DELIVERY (450)		Y 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)			Y V				1											
	CLEAR WATER RESERVOIR	Y AP				1													
	BOOSTER SUCTION (900)		Y B				1	1											
	BOOSTER DELIVERY (600)		Y B	Y AN	BU		1	1	1									1	CSS
	DISTRIBUTION (400)		Y B	Y 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				

表-12 CSS (第一期) のための一次計器一覽表 (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 ALARM	TOTAL	PUMP 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	BU		1	1	1							1	SITE
	BARRACK (750)		B	AN	BU		1	1	1							1	SITE
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.	Y AP				1											
	TUMPUNA WEIR	F				1											
	TO/FROM RESERVOIR (1200)			Y V-2				2									
	RIVER DISCH. VALVE (1200)				Y BU-2				2							2	CARONI
	TUMPUNA S.L./PUMPS									12	59				6	CARONI	
28	CARONI WTP														9		
	RAW WATER	Y AP		Y PF		1		1									
	CLEAR WATER RESERVOIR	Y AP				1											
	CARONI NORTH (900)	* B	Y AN	Y BU		1	1	1	1							1	CARONI
	CARONI SOUTH (1200)	* B	Y AN	Y BU		1	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)			Y O				1									
	CLEAR WATER RESERVOIR	D				1											
	DISTRIBUTION (600)	Y B	Y V	BU		1	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	CARAPICHTAMA														7		
	CARAPICHTAMA 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		

表-13 CSS機器の仕様

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	SIZE ABOUT HEIGHT 2.0 M, WIDTH 7.0 M
UNINTERRUPTIBLE POWER 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 POWER 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 POWER 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,

表-14 計測機器類の仕様

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/cm ² - 10 kg/cm ²
(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, ROTTER, 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,

表—15 第一期建設費

ITEM	NAME OF FACILITIES AND EQUIPMENT	P H A S E 1									
		FOREIGN CURRENCY (US\$)			LOCAL CURRENCY (TT\$)					TOTAL (TT\$)	TOTAL (US\$)
		PRIMARY EQUIPMENT	INSTRUMENTATION	TOTAL (US\$)	F-M/C-V CHAMBER	BUILDING WORKS	INSTAL-LATION	SUB-TOTAL (CIVIL)	SUPPLY TRANSPORTATION		
[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	---	---	---	---	---	---	---	---	---	---
	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
[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,

表一 1 6 经济利益表

ITEM	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2005	2007	2008	2008	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	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	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	272818
Water Demand(m3/day)	255682	273599	281753	290149	298795	307681	316611	326419	336211	346238	356830	367035	377593	388330	399436	410788	422537	434631	447051	459837	472998	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	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	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	193182
WITH PROJECT																										
Un-accounted-for Water (%)	50	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	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	327382	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945
Water Demand(m3/day)	255682	273599	281753	290149	298795	307681	316611	326419	336211	346238	356830	367035	377593	388330	399436	410788	422537	434631	447051	459837	472998	486516	500430	514742	529464	
Sales Volume(m3/day)	265682	272818	272818	272818	272818	307681	316911	326419	327382	327382	327382	377593	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945
Annual Sales Volume(1000m3)	96974	99579	99579	99579	99579	112043	115673	119143	119494	119494	130243	133968	137799	139410	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	217868	224405	231137	231819	231819	252671	259998	267331	270455	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	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	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	

表一 1.8 財務便益表

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(m ³ /day)																										
WITHOUT PROJECT																										
In-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	50
Volume of Water Loss(m ³ /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	272818
Available Sales Volume(m ³ /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	272818
Water Demand(m ³ /day)	265682	273598	281753	280149	288795	307681	316911	326419	336211	346298	356630	367035	377533	388330	399438	410788	422537	434621	447051	459837	472988	486516	500430	514742	529464	
Sales Volume(m ³ /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	272818
Annual Sales Volume (1000m ³)	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	99579
Average Water Revenue(T\$/m ³)	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	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	98583
WITH PROJECT																										
In-accounted-for Water (%)	50	50	50	50	50	40	40	40	40	40	40	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Volume of Water Loss(m ³ /day)	272818	272818	272818	272818	272818	218254	218254	218254	218254	218254	218254	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691	163691
Available Sales Volume(m ³ /day)	272818	272818	272818	272818	272818	327382	327382	327382	327382	327382	327382	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945	381945
Water Demand(m ³ /day)	265682	273598	281753	280149	288795	307681	316911	326419	336211	346298	356630	367035	377533	388330	399438	410788	422537	434621	447051	459837	472988	486516	500430	514742	529464	
Sales Volume(m ³ /day)	265682	272818	272818	272818	272818	307681	307681	307681	307681	307681	307681	356630	356630	356630	356630	356630	356630	356630	356630	356630	356630	356630	356630	356630	356630	356630
Annual Sales Volume (1000m ³)	96974	99579	99579	99579	99579	112304	112304	112304	112304	112304	130243	130243	130243	130243	130243	130243	130243	130243	130243	130243	130243	130243	130243	130243	130243	
Average Water Revenue(TT\$/m ³)	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	111181	111181	111181	111181	128941	128941	128941	128941	128941	128941	128941	128941	128941	128941	128941	128941	128941	128941	128941	
Reduction of Personal Cost (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	12588	15933	19389	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	34887	40081	40081	40081	40081	40081	40081	40081	40081	40081	40081	40081	40081	40081	

表一 1 9 用途別平均水価概算表

Customer Category	1990			1995		
	Annual Water Demand* (m3/year)	Water Rate** (TTS/m3)	Annual Revenue (TTS)	Annual Water Demand* (m3/year)	Water Rate** (TTS/m3)	Annual Revenue (TTS)
a. Domestic	68877026	1.08	74387188	77695276	2.64	204780549
b. Industrial/	2748947	0.51	1401963	3508910	1.50	5250783
Agriculture						
c. Commercial/	1374474	1.87	2570266	1754455	4.49	7876174
Public						
d. Special	28255745	0.51	14410430	34246344	1.30	44631658
Industrial						
e. Total or Average	101256192	0.92	92769847	117204985	2.24	262539164
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.

表-20 CSS (代替案-A) のための一次計器一覧表 (1)

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, "Y": 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 PRESSURE	TOTAL	CONTROL VALVE	WATER LEVEL	WATER PRESSURE	FLOW RATE	STATUS	PUMP STATUS	ALARM	TOTAL	PUMP NO.	PLACE	VALVE NO.	PLACE
1 NORTH OROPOUCHE WW	RAW WATER	F		Y PF	1		1												
	CLEAR WATER RESERVOIR DISTRIBUTION (1050)	* D-2		AN	2				2										
				AN			1												
2 KOLLIS WW	IMPOUNDING RESERVOIR RAW WATER (300)	F		AN	1				1										
	DISTRIBUTION (600)			AN			1												
3 GILL TRACE	QUARE WATER TANK	D			1				1										
	QUARE DISTRIBUTION (300)		Y B	Y V		1	1												
	GILL TRACE OT (300)		B	AN		1	1			BU		1	1					1	SITE
	QUARE (1) OT (150)		B	AN		1	1			BU		1	1					1	SITE
	QUARE (2) OT (150)		B	AN		1	1			BU		1	1					1	SITE
TO SANGRE GRANDE OT (400)		B	AN		1	1			BU		1	1					1	SITE	
4 ARIPO BPS	ARIPO(NEW)RAW WATER (300)			Y 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	Y 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	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	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	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	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	CLEAR WATER TANK DISTRIBUTION (200)	D		AN	1		1				1								
	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	RAW WATER (400)			AN			1						1						
	CLEAR WATER TANK DISTRIBUTION (400)	D		AN	1		1				1								
11 TACARIGUA WW	CLEAR WATER RESERVOIR DISTRIBUTION(1) (300)	Y D			1		1				1								
	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					1	SITE

表 20 CSS (代替案-A) のための一次計器一覧表 (3)

NOTE: AN; ANNUBAR, F; FLOAT TYPE, Av; AVENUE, WW; WATERWORKS, (300); PIPE DIAMETER(ØM),
 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	P H A S E 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)			EQUIPMENT TO BE CONTROLLED									
		LEVEL METER	PRESS GAUGE	FLOW METER	WATER LEVEL	WATER PRESSURE	FLOW TOTAL	CONTROL VALVE	WATER LEVEL	WATER PRESSURE	FLOW VALVE	PUMP STATUS	ALARM STATUS	TOTAL	PUMP NO.	PLACE	VALVE NO.	PLACE	
	BLACK RIVER (1) OT (300)		B	AN		1	1			BU		1	1					1	SITE
	BLACK RIVER (2) OT (450)		B	AN		1	1			BU		1	1					1	SITE
	BLACK RIVER (3) OT (525)		B	AN		1	1			BU		1	1					1	SITE
	TO LADY YOUNG RD OT (300)		B	AN		1	1			BU		1	1					1	SITE
23	PICTON NO. 3 RESERVOIR																	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
	PRIZAR LANDS ST OT (100)		B	AN		1	1			BU		1	1	1					1
	KERR RD OT (100)		B	AN		1	1			BU		1	1	1					1
24	SERVOL LIFE CENTER																	9	
	BEETHAM DUMP OT (100)		B	AN		1	1			BU		1	1	1					1
	SERVOL LIFE C. OT (100)		B	AN		1	1			BU		1	1	1					1
	TO LAVENTILLE OT (525)		B	AN		1	1			BU		1	1	1					1
25	KNAGGS HILL																	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
	TO CASCADE OT (600)		B	AN		1	1			BU		1	1	1					1
	TO ST CLAIR OT (350)		B	AN		1	1			BU		1	1	1					1
	WESTERN MAIN ROAD (525)		B	AN		1	1			BU		1	1	1					1
	FROM SAVANNAH WELLS (300)		B	AN		1	1			BU		1	1	1					1
	BARRACK (750)		B	AN		1	1			BU		1	1	1					1
26	NATIONAL FLOUR MILL																	3	
	NFM OT (100)		B	AN		1	1			BU		1	1	1					1
	PORT AUTHORITY (300)																		
	POST OFFICE (300)																		
	NATIONAL STADIUM (300)																		
27	TUMPUNA STORAGE LIFT PS																	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
	TUMPUNA S.L./PUMPS														12	59		6	CARONI
28	CARONI WTP																	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 SOUTH (1200)		* B	¥ AN		1	1			¥ BU		1	1	1					1
29	KELLY VILLAGE																	3	
	KELLY VILLAGE OT (300)		B	AN		1	1			BU		1	1	1					1
30	SCALE YARD																	6	
	SCALE YARD OT (300)		B	AN		1	1			BU		1	1	1					1
	HINGKING RD OT (300)		B	AN		1	1			BU		1	1	1					1
31	LAS LOMAS WW																	5	
	RAW WATER (600)			¥ O			1						1						
	CLEAR WATER RESERVOIR DISTRIBUTION (600)	D			1		1				1		1	1					1
			¥ B	¥ V															
32	JERNINGHAM JUNCTION																	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
33	CHAGUANAS																	6	
	CHAGUANAS OT (300)		B	AN		1	1			BU		1	1	1					1
	LANGE PARK OT (300)		B	AN		1	1			BU		1	1	1					1
34	CARLSEN FIELD WW																	7	
	CLEAR WATER RESERVOIR DISTRIBUTION(1) (200)	F			1						1								
	DISTRIBUTION(2) (250)		B	AN		1	1			BU		1	1	1					1
			B	AN		1	1			BU		1	1	1					1
35	CARAPICHAIMA																	7	
	CARAPICHAIMA OT (200)		B	AN		1	1			BU		1	1	1					1
	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																	9	

表-20 CSS (代替案-A) のための一次計器一覽表 (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, "X"; EXISTINGS TO BE USED,
 AV; ALTITUDE VALVE, P; PROPELLAR TYPE, SH; SHEET, JCT; JUNCTION, "Y"; 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	P H A S E I																	
		S T E P 1						S T E P 2				S T E P 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 FLOW	TOTAL	CONTROL VALVE	WATER LEVEL	WATER FLOW	VALVE	PUMP STATUS	ALARM STATUS	TOTAL	PUMP NO.	PLACE	VALVE NO.	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																		
	TRINGEN II OT (300)		B	AN		1	1		BU		1	1	1					1	SITE
38	CALIFORNIA RESERVOIR																		
	RESERVOIR (900)		D		AN	1		1	AV	1			1						
39	TCL																		
	TCL OT (300)		B	AN		1	1		BU		1	1	1					1	SITE
40	MARAVELLA																		
	MARAVELLA OT (300)		B	AN		1	1		BU		1	1	1					1	SITE
41	SAN FERNANDO BPS																		
	SAN F DO RESERVOIR (750)	Y	D		AN	1		1	AV	1			1						
	MARRYAT RESERVOIR (600)	Y	D		AN	1		1		1			1						
	NAPARIMA RESERVOIR	Y	D			1				1									
	BOOSTER SUCTION (900)		Y	B	Y	AN		1					1	1					
	BOOSTER DELIVERY (900)		Y	B				1		*	BU		1	1				1	CSS
	ROUND ABOUT(1) OT (300)		Y	B				1			BU		1	1	1			1	SITE
	ROUND ABOUT(2) OT (525)		B		AN			1			BU		1	1	1			1	SITE
	FIRE BRIGADE OT (375)		B		AN			1			BU		1	1	1			1	SITE
	SAN F DO B/PUMPS														6	25		3	CSS
42	MOSQUITO CREEK																		
	TO MOSQUITO CR. OT (600)		B		AN			1	1		BU		1	1	1			1	SITE
43	ST CLEMENT																		
	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																		
	DAISY OT (400)		B		AN			1	1		BU		1	1	1			1	SITE
45	MALGRETOUTE BPS																		
	BOOSTER SUCTION (900)		Y	B	Y	V		1	1				1	1					
	BOOSTER DELIVERY (900)		Y	B				1			BU		1	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																		
	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																		
	BOOSTER SUCTION (900)		Y	B				1					1						
	BOOSTER DELIVERY (900)		Y	B	Y	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																		
	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					
	T O T A L		38	127	160	38	127	160	325	124	38	127	160	113	58	249	745	29	113
	- LIST OF ITEMS -		YAP 4	YB 14	YAN 6					AV 9								6	CARONI
			D 11	B 111	AN139					AV 2								23	CSS
			D 8	B 2	PO 2					BU106									7
			YD 5		YV 2					BU 1									4
			F 10		YV 11					BU 4									
										CV 2									

表-23 代替案-AおよびBの建設費の比較

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
	PHASE I - STEP 1			PHASE I - STEP 2 & 3			REPLACEMENT OF STEP 3													
OPTION A																				
[1] CONSTRUCTION	85	133	1,381	2,688			11,979	16,259					1,034	1,403				7,349	9,971	52,659
[2] ENGINEERING SERVICES	35	109	107	194		477	1,082	599	1,088											3,824
SUB-TOTAL	120	242	2,088	2,883		477	12,578	17,340					1,034	1,403				7,349	9,971	56,483
[3] TAX (VAT)	13	29	313	432		71	162	1,867	2,601				135	210				1,102	1,496	8,472
[4] CONTINGENCY	13	29	313	432		71	162	1,867	2,601				135	210				1,102	1,496	8,472
[5] ADMINISTRATION	0	1	10	14		2	3	63	87				3	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
NET PRESENT VALUE																				
5% [43,722]																				
10% [27,981]																				
12% [23,816]																				
15% [18,995]																				
OPTION B																				
[1] CONSTRUCTION	578	1,311	13,407	18,190									8,257	11,501						51,355
[2] ENGINEERING SERVICES	578	1,311	1,726	1,319																3,932
SUB-TOTAL	1,156	2,622	15,133	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
NET PRESENT VALUE																				
5% [52,442]																				
10% [40,418]																				
12% [36,885]																				
15% [32,505]																				

NOTE: EXCHANGE RATES; 1 US\$ = ¥135.425 AND 1 US\$ = ¥135.%; DISCOUNT RATE

表-24 経済便益ならびに費用一覧表 (代替案-A)

UNIT: TJS 1,000

YEAR	C S S				LEASAGE REDUCTION				METER INSTALLATION				TOTAL COSTS (C)	BENEFIT (B)	B - C
	INITIAL INVESTMENT	REPLACE-MENT	RESIDUAL VALUE	SUB-TOTAL	INITIAL INVESTMENT	REPLACE-MENT	RESIDUAL VALUE	SUB-TOTAL	INITIAL INVESTMENT	REPLACE-MENT	RESIDUAL VALUE	SUB-TOTAL			
1992	866	0	0	866	23,647	0	0	23,647	17,544	0	0	17,544	42,057	0	-42,057
1993	1,962	0	0	1,962	26,035	0	0	26,035	17,544	0	0	17,544	45,541	0	-45,541
1994	21,243	0	0	21,243	17,298	0	0	17,298	17,544	0	0	17,544	56,095	0	-56,095
1995	29,319	0	0	29,319	18,379	0	0	18,379	17,544	0	0	17,544	65,242	24,686	-40,556
1996	0	534	0	534	18,379	0	823	19,202	0	915	0	915	20,651	31,223	-10,572
1997	1,958	0	0	1,958	18,379	0	823	19,202	0	915	0	915	22,609	37,955	-15,346
1998	4,448	0	0	4,448	18,379	0	823	19,202	0	915	0	915	25,099	38,636	-13,537
1999	47,891	0	0	48,425	18,379	0	823	19,202	0	915	0	915	68,542	38,636	-29,906
2000	66,113	0	0	66,647	18,379	0	823	19,202	0	915	0	915	68,365	59,489	-8,866
2001	0	0	1,738	1,738	0	0	0	823	0	915	0	915	3,476	66,715	-63,239
2002	0	0	1,738	1,738	0	0	0	823	0	915	0	915	21,020	74,148	-53,128
2003	0	0	1,738	1,738	0	0	0	823	0	915	0	915	21,020	77,273	-56,253
2004	0	5,244	0	6,982	0	0	0	823	0	915	0	915	26,264	77,273	-51,009
2005	0	7,115	0	8,853	0	0	0	823	0	915	0	915	28,139	77,273	-49,138
2006	0	0	1,738	1,738	0	0	0	823	0	915	0	915	3,476	77,273	-73,797
2007	0	0	1,738	1,738	0	6,391	0	7,214	0	915	0	915	9,867	77,273	-67,406
2008	0	0	1,738	1,738	0	6,391	0	7,214	0	915	0	915	9,867	77,273	-67,406
2009	0	34,674	0	36,412	0	0	0	823	0	915	0	915	38,150	77,273	-39,123
2010	0	41,046	0	48,764	0	0	0	823	0	915	0	915	50,522	77,273	-26,751
2011	0	0	1,738	1,738	0	0	0	823	0	915	0	915	3,476	77,273	-73,797
2012	0	0	1,738	1,738	0	0	0	823	0	915	0	915	21,020	77,273	-56,253
2013	0	0	1,738	1,738	0	0	0	823	0	915	0	915	21,020	77,273	-56,253
2014	0	0	1,738	1,738	-49,032	0	0	-47,294	0	915	-6,391	-5,588	-59,130	77,273	136,403
	173,800	94,080		158,875	12,782			158,875	70,176	122,808					

EIRR= 12.5%

表-25 財務便益ならびに費用一覧表 (代替案-A)

UNIT: IT'S 1,000

YEAR	C S S				LEAKAGE REDUCTION				METER INSTALLATION				TOTAL COSTS		BENEFIT		
	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	SUB-TOTAL	INITIAL INVESTMENT	REPLACE-MENT	O & M	RESIDUAL VALUE	SUB-TOTAL	TOTAL COSTS	[B]	B - C
1992	893	0	0	0	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	26,635	0	0	0	26,635	18,496	0	0	0	18,496	47,354	0	-47,354
1994	21,900	0	0	0	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	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	19,924	0	874	0	19,924	18,496	0	972	0	972	21,446	15,933	-5,513
1997	2,019	0	550	0	19,924	0	874	0	19,924	18,496	0	972	0	972	23,495	19,369	-4,096
1998	4,586	0	550	0	19,924	0	874	0	19,924	18,496	0	972	0	972	26,032	19,717	-6,315
1999	49,372	0	550	0	19,924	0	874	0	19,924	18,496	0	972	0	972	70,838	30,358	-40,460
2000	68,157	0	550	0	19,924	0	874	0	19,924	18,496	0	972	0	972	70,553	34,045	-36,508
2001	0	0	1,792	0	874	0	874	0	874	18,496	0	972	0	972	3,638	38,497	-34,849
2002	0	0	1,792	0	874	0	874	0	874	18,496	0	972	0	972	22,134	40,081	-17,947
2003	0	0	1,792	0	874	0	874	0	874	18,496	0	972	0	972	22,134	40,081	-17,947
2004	0	5,406	1,792	0	874	0	874	0	874	18,496	0	972	0	972	27,540	40,081	-12,541
2005	0	7,336	1,792	0	874	0	874	0	874	18,496	0	972	0	972	29,470	40,081	-10,612
2006	0	0	1,792	0	874	0	874	0	874	18,496	0	972	0	972	3,638	40,081	-36,443
2007	0	0	1,792	0	874	6,684	874	0	7,558	18,496	0	972	0	972	10,322	40,081	-28,759
2008	0	0	1,792	0	874	5,684	874	0	7,558	18,496	0	972	0	972	10,322	40,081	-28,759
2009	0	35,747	1,792	0	874	0	874	0	874	18,496	0	972	0	972	38,385	40,081	-12,068
2010	0	48,501	1,792	0	874	0	874	0	874	18,496	0	972	0	972	52,139	40,081	-12,058
2011	0	0	1,792	0	874	0	874	0	874	18,496	0	972	0	972	3,638	40,081	-36,443
2012	0	0	1,792	0	874	0	874	0	874	18,496	0	972	0	972	22,134	40,081	-17,947
2013	0	0	1,792	0	874	0	874	0	874	18,496	0	972	0	972	22,134	40,081	-17,947
2014	0	0	1,792	-50,549	874	0	874	-6,584	-5,310	18,496	0	972	-44,330	-24,922	-79,483	40,081	119,570
	179,176	96,989			168,022	13,368			73,984	128,472							

FIRR= 1.5%

JICA