

2.4 EFFECT OF THE PROJECT

From the hydraulic analysis results, water amount and population are summarized in Table D.2.6, according to effective pressure. The amount of 92,167 m³/day, less than 10 m effective pressure is considered as suppressed under the current system or without the measure, based on our field pressure measurement. Using the suppression factor developed in "water demand", suppressed amount is estimated as a quarter of 92,167 m³/day, namely 23,000 m³/day.

Similarly, the suppressed amount is estimated to be 12,200 m³/day after the existing pipe connections. Suppressed amount with this measure is smaller than that of without measure by 10,800 m³/day. Therefore, this reduced amount is considered as effect of the existing pipe connection.

TABLE D.2.6 (1) COMPARISON OF WATER PRESSURE BY REHABILITATION MEASURES
-- HOURLY MAXIMUM (1), 1995 --

Effective Pressure Rank (m)	No. of Node				Water Consumption (m ³ /day)			
	Current System	Existing Pipe Connect.	Main Pipe	Middle Zone Laying	Current System	Existing Pipe Connection	Main Pipe Laying	Middle Zone
- 0	45	31	0	0	58,357	43,519	0	0
0 - 5	13	2	0	0	15,849	402	0	0
5 - 10	20	1	0	0	17,961	4,761	0	0
10 - 15	16	16	0	0	18,673	13,412	0	0
15 - 20	12	11	15	17	25,827	18,478	19,711	22,942
20 - 25	6	19	27	35	2,482	27,640	35,509	50,978
25 - 30	7	8	28	31	16,314	11,343	34,318	36,334
30 - 35	7	8	16	29	6,068	13,693	24,984	31,401
35 - 40	4	9	12	14	2,633	12,150	16,218	15,162
40 - 45	1	7	11	6	0	4,640	15,461	6,491
45 - 50	0	1	2	1	0	763	2,621	763
50 - 55	0	6	8	1	0	5,896	7,877	0
55 - 60	0	5	5	1	0	2,247	2,247	263
60 - 65	0	4	4	0	0	1,372	1,372	0
65 - 70	0	3	3	0	0	4,023	4,023	0
70 - 75	1	1	1	0	176	0	0	0
75 - 80	0	0	0	0	0	0	0	0
80 - 85	0	0	0	0	0	0	0	0
85 - 90	0	0	0	0	0	0	0	0
90 - 95	0	0	0	0	0	0	0	0
95 - 100	0	0	0	0	0	0	0	0
100 - 105	0	0	0	0	0	0	0	0
105 - 110	0	0	0	0	0	0	0	0
<hr/>								
< 10m	78	34	0	0	92,167	48,682	0	0
> 10m	54	98	132	135	72,171	115,656	164,338	164,338
Total	132	132	132	135	164,338	164,338	164,338	164,338

TABLE D.2.6 (2) COMPARISON OF WATER PRESSURE BY REHABILITATION MEASURES
-- HOURLY MAXIMUM (2), 1995 --

Effective Pressure Rank (m)	Population			
	Current System (person) (%)	Existing Pipe Connection (person) (%)	Main Pipe Laying (person) (%)	Middle Zone (person) (%)
- 0	582,822 (38.4)	402,936 (26.5)	0 (0.0)	0 (0.0)
0 - 5	93,189 (6.1)	1,386 (0.1)	0 (0.0)	0 (0.0)
5 - 10	126,815 (8.3)	10,854 (0.7)	0 (0.0)	0 (0.0)
10 - 15	149,081 (9.8)	62,389 (4.1)	0 (0.0)	0 (0.0)
15 - 20	292,860 (19.3)	169,827 (11.2)	138,101 (9.1)	174,470 (11.5)
20 - 25	31,543 (2.1)	271,239 (17.9)	342,219 (22.5)	539,133 (35.5)
25 - 30	161,075 (10.6)	86,198 (5.7)	238,360 (15.7)	283,359 (18.7)
30 - 35	55,775 (3.7)	187,774 (12.4)	274,688 (18.1)	326,329 (21.5)
35 - 40	24,914 (1.6)	99,099 (6.5)	135,566 (8.9)	133,204 (8.8)
40 - 45	0 (0.0)	63,842 (4.2)	190,804 (12.6)	47,561 (3.1)
45 - 50	0 (0.0)	11,683 (0.8)	28,925 (1.9)	11,683 (0.8)
50 - 55	0 (0.0)	89,517 (5.9)	108,081 (7.1)	0 (0.0)
55 - 60	0 (0.0)	25,964 (1.7)	25,964 (1.7)	3,605 (0.2)
60 - 65	0 (0.0)	11,223 (0.7)	11,223 (0.7)	0 (0.0)
65 - 70	0 (0.0)	25,413 (1.7)	25,413 (1.7)	0 (0.0)
70 - 75	1,270 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)
75 - 80	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
80 - 85	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
85 - 90	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
90 - 95	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
95 - 100	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
100 - 105	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
105 - 110	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
<hr/>				
< 10m	802,826 (52.8)	415,176 (27.3)	0 (0.0)	0 (0.0)
> 10m	716,513 (47.2)	1,104,163 (72.7)	1,519,339 (100.0)	1,519,339 (100.0)
Total	1,519,339 (100.0)	1,519,339 (100.0)	1,519,339 (100.0)	1,519,339 (100.0)

TABLE D.2.6 (3) COMPARISON OF WATER PRESSURE BY REHABILITATION MEASURES
-- HOURLY MINIMUM (1), 1995 --

Effective Pressure Rank (m)	No. of Node				Water Consumption (m ³ /day)			
	Current System	Existing Pipe Connect.	Main Pipe	Middle Zone Laying	Current System	Existing Pipe Connection	Main Pipe Laying	Middle Zone
- 0	0	0	0	0	0	0	0	0
0 - 5	0	0	0	0	0	0	0	0
5 - 10	1	0	0	0	1,495	0	0	0
10 - 15	2	0	0	0	567	0	0	0
15 - 20	0	0	0	0	0	0	0	0
20 - 25	1	0	0	0	1,056	0	0	0
25 - 30	5	0	0	1	6,019	0	0	0
30 - 35	14	8	6	6	14,177	5,841	5,153	5,143
35 - 40	13	7	8	8	17,895	10,269	8,725	8,725
40 - 45	12	8	4	12	22,538	22,356	15,779	20,374
45 - 50	14	20	18	25	17,270	19,191	18,514	19,826
50 - 55	24	20	19	22	39,752	31,820	30,150	34,171
55 - 60	26	24	17	19	30,153	27,688	31,686	35,374
60 - 65	17	11	26	35	12,016	8,583	15,746	32,483
65 - 70	2	1	1	4	1,227	603	603	3,530
70 - 75	0	0	0	2	0	0	0	889
75 - 80	1	7	7	1	176	6,439	6,442	3,811
80 - 85	0	8	7	0	0	5,317	3,281	0
85 - 90	0	5	3	0	0	8,547	4,023	0
90 - 95	0	4	3	0	0	9,805	5,259	0
95 - 100	0	7	9	0	0	6,989	15,430	0
100 - 105	0	1	2	0	0	889	2,664	0
105 - 110	0	1	2	0	0	0	889	0
<hr/>								
< 10m	1	0	0	0	1,495	0	0	0
> 10m	131	132	132	135	162,843	164,338	164,338	164,338
Total	132	132	132	135	164,338	164,338	164,338	164,338

**TABLE D.2.6 (4) COMPARISON OF WATER PRESSURE BY REHABILITATION MEASURES
-- HOURLY MINIMUM (2), 1995 --**

Effective Pressure Rank (m)	Population			
	Current System (person) (%)	Existing Pipe Connection (person) (%)	Main Pipe Laying (person) (%)	Middle Zone (person) (%)
- 0	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
0 - 5	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
5 - 10	10,792 (0.7)	0 (0.0)	0 (0.0)	0 (0.0)
10 - 15	7,368 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)
15 - 20	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
20 - 25	7,618 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)
25 - 30	74,465 (4.9)	0 (0.0)	0 (0.0)	0 (0.0)
30 - 35	162,429 (10.7)	78,669 (5.2)	62,104 (4.1)	62,104 (4.1)
35 - 40	232,679 (15.3)	150,958 (9.9)	143,440 (9.4)	143,440 (9.4)
40 - 45	281,730 (18.5)	277,931 (18.3)	206,402 (13.6)	246,791 (16.2)
45 - 50	173,983 (11.5)	164,602 (10.8)	164,188 (10.8)	207,548 (13.7)
50 - 55	352,761 (23.2)	235,174 (15.5)	267,109 (17.6)	292,522 (19.3)
55 - 60	152,515 (10.0)	114,594 (7.5)	149,412 (9.8)	193,392 (12.7)
60 - 65	48,677 (3.2)	36,042 (2.4)	65,315 (4.3)	279,176 (18.4)
65 - 70	13,057 (0.9)	2,079 (0.1)	2,079 (0.1)	31,791 (2.1)
70 - 75	0 (0.0)	0 (0.0)	0 (0.0)	8,712 (0.6)
75 - 80	1,270 (0.1)	88,305 (5.8)	88,305 (5.8)	53,868 (3.5)
80 - 85	0 (0.0)	82,190 (5.4)	49,312 (3.2)	0 (0.0)
85 - 90	0 (0.0)	77,377 (5.1)	25,413 (1.7)	0 (0.0)
90 - 95	0 (0.0)	123,201 (8.1)	80,094 (5.3)	0 (0.0)
95 - 100	0 (0.0)	79,510 (5.2)	181,352 (11.9)	0 (0.0)
100 - 105	0 (0.0)	8,712 (0.6)	26,107 (1.7)	0 (0.0)
105 - 110	0 (0.0)	0 (0.0)	8,712 (0.6)	0 (0.0)
< 10m	10,792 (0.7)	0 (0.0)	0 (0.0)	0 (0.0)
> 10m	1,508,547 (99.3)	1,519,339 (100.0)	1,519,339 (100.0)	1,519,339 (100.0)
Total	1,519,339 (100.0)	1,519,339 (100.0)	1,519,339 (100.0)	1,519,339 (100.0)

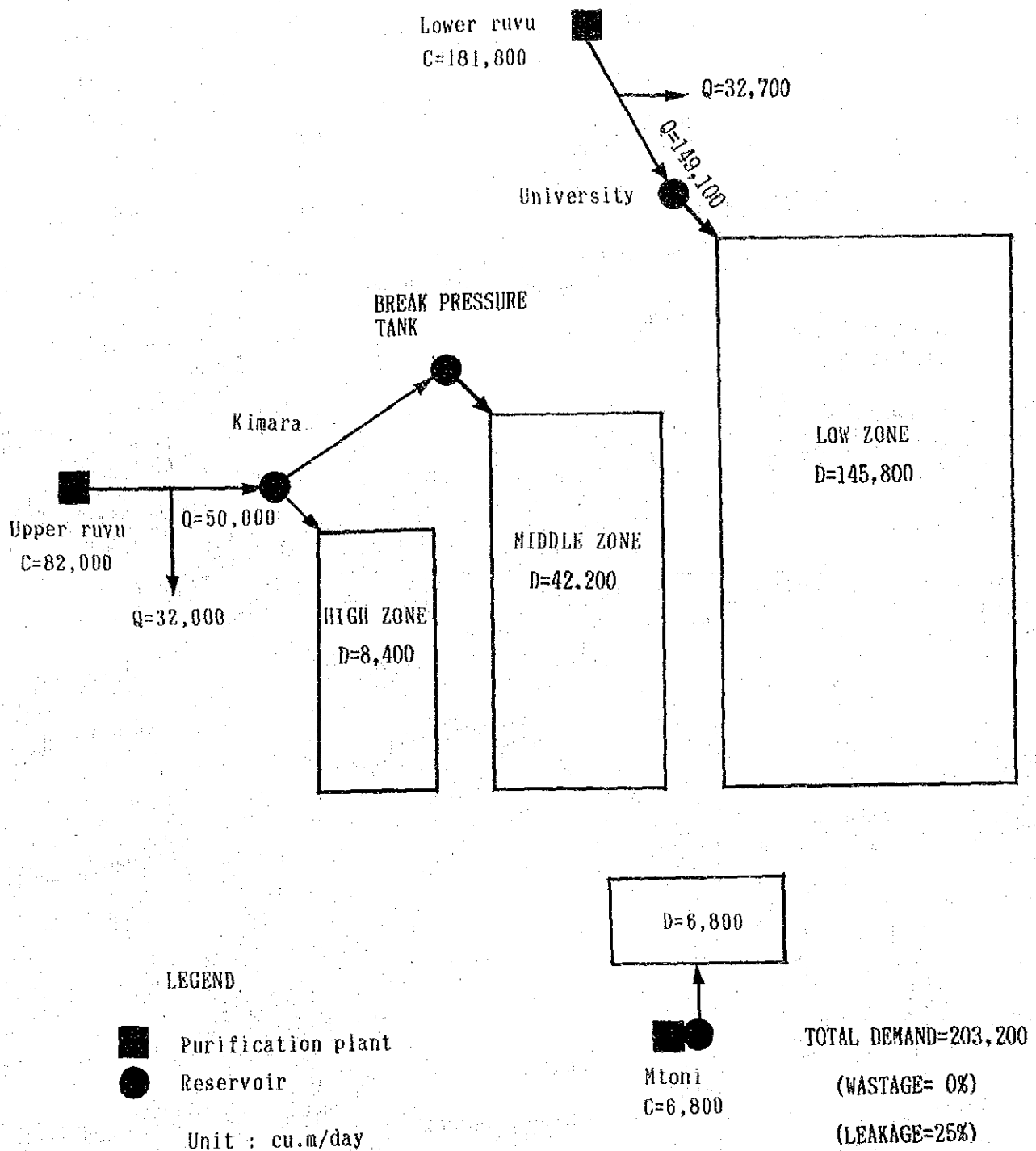
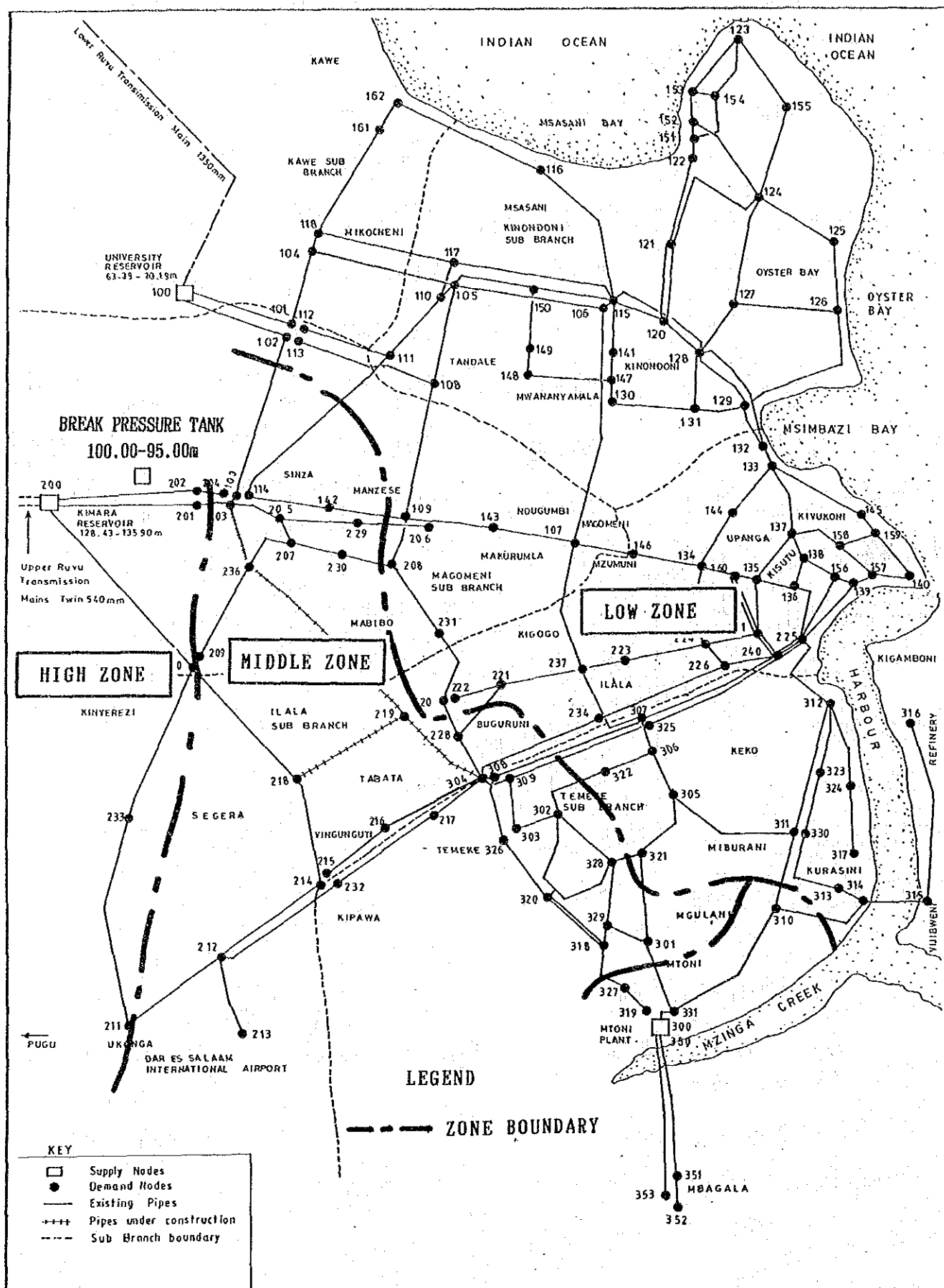


FIG. D.2.1

WATER DEMAND AND SUPPLY IN 1995

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY



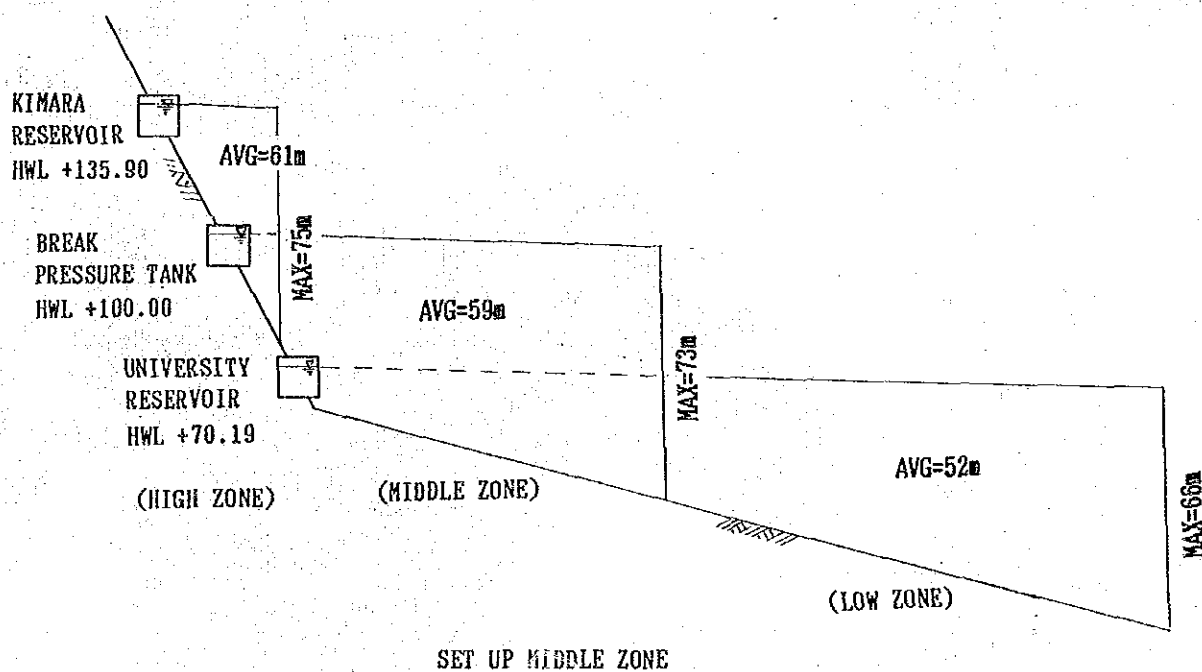
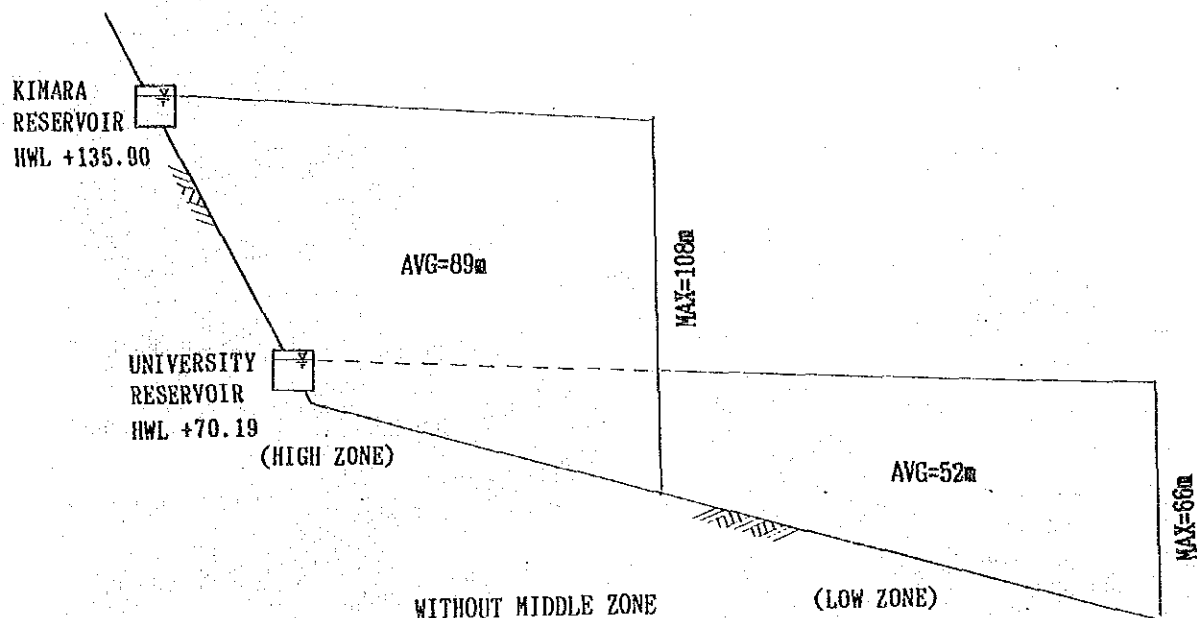


FIG. D.2.3

WATER PRESSURE BETWEEN WITHOUT MIDDLE ZONE AND SET UP ZONE

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

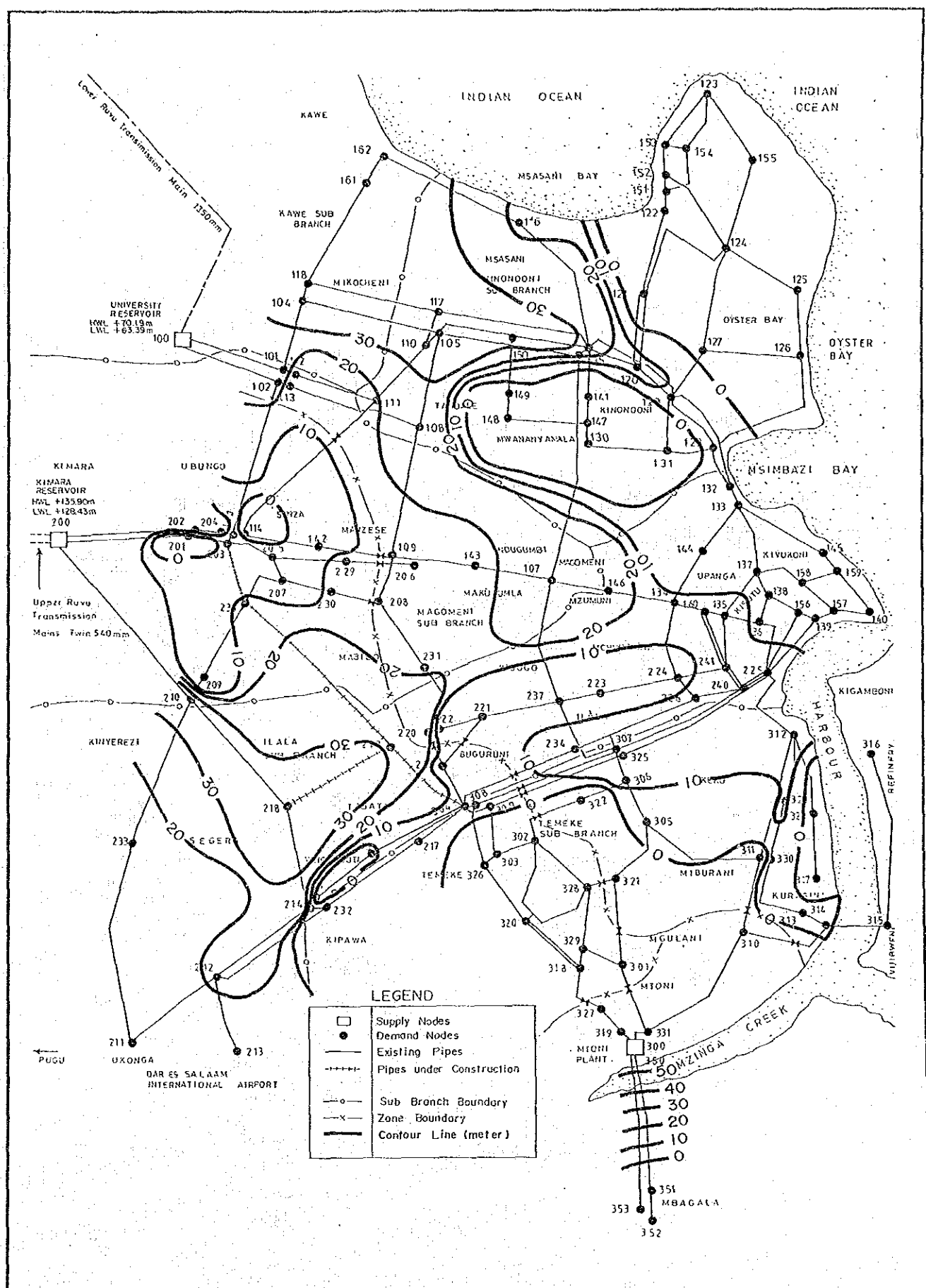


FIG. D.2.5

RESULT OF HYDRAULIC ANALYSIS IN CASE A IN 1995

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

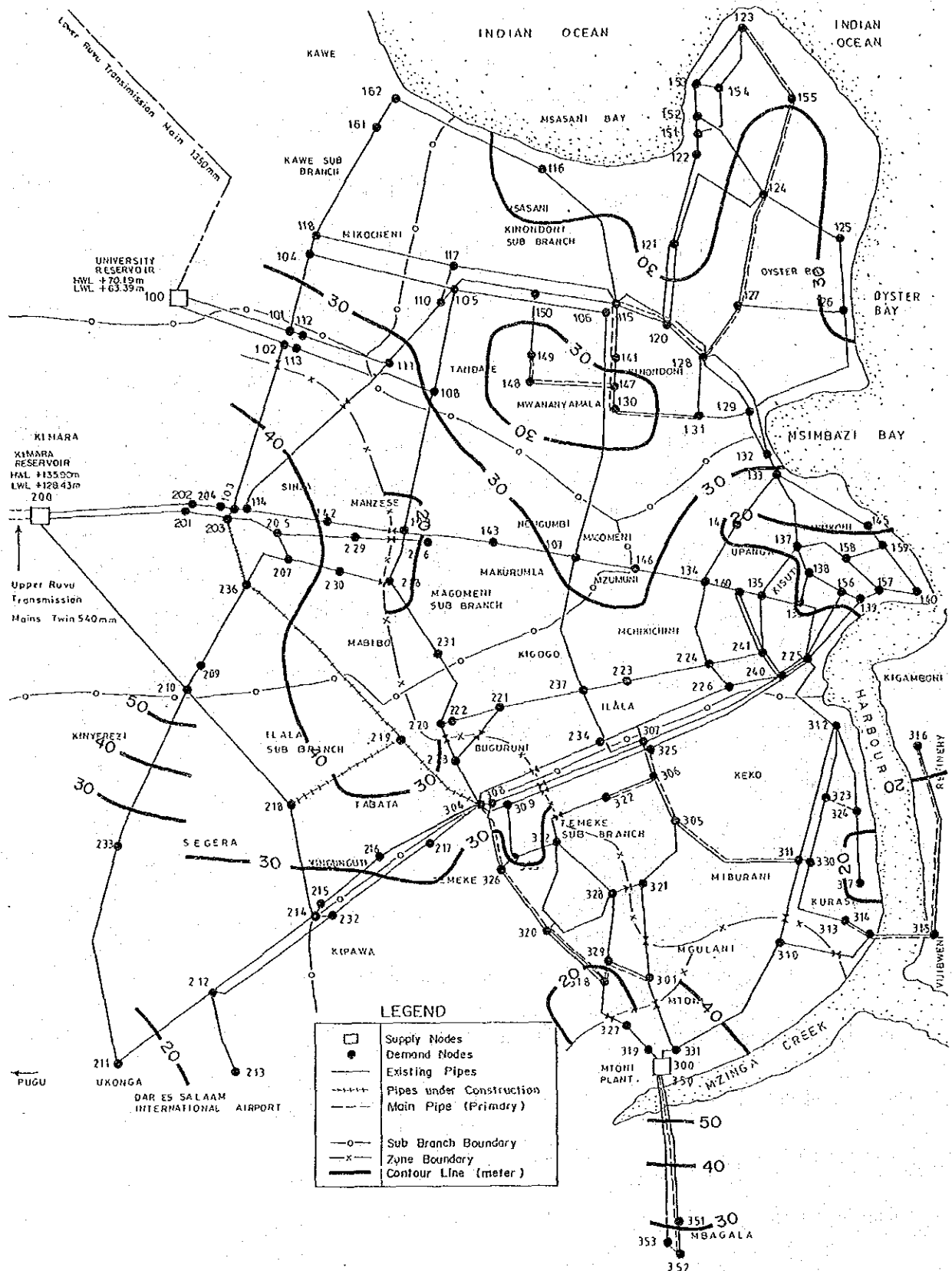


FIG. D.2.6

RESULT OF HYDRAULIC ANALYSIS IN CASE E
IN 1995

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

3. PRELIMINARY DESIGN

Drawings for the preliminary design which are dealt in section 5.5, Main Report, are shown in this section.

3.1 TYPICAL CROSS SECTION

Since there are several underground pipeline structures on the proposed roads, they have been investigated to confirm location of the existing pipeline along the main roads. The following are the items investigated;

- * Planned pipe routes.
- * Traffic conditions.
- * Underground Conditions.
- * Pipe lengths, crossing locations.
- * Construction method.
- * Obstacles in carrying vehicles, machines and materials for construction
- * Consultation with the road authority to confirm special conditions.
- * Information from other underground structures (electricity, telephone and sewage)

Based on the preparatory study for the third on-site survey, eight sections were selected for further investigation as per the details outlined above. Figure D.3.1 shows the exact location of the selected sections and Figure D.3.2 show the typical cross sections at each site.

3.2 REPLACEMENT OF SERVICE PIPE WITH DISTRIBUTION PIPE

Total lengths of distribution pipes in DSM which are to replace with long, small-diameter service pipes, are estimated to be 90 km from data in the three model areas (refer to section 5.5.3, Main Report). In the three model areas, the lengths of the distribution pipes are 510 m in Kariakoo area, 480 m in Magomeni and 500 m in Kinondoni area as shown in Figure D.3.3.

3.3 EXISTING PIPE CONNECTION

Trial diggings were conducted to ascertain connection of pipes and open/close position of valves in key connections (see Figure C.4.15, Appendix C). The connections confirmed with the trial diggings are shown in Figure C.4.16, Appendix C. Details are referred to section 5.5.4, Main Report.

3.4 MAIN LAYING PROGRAMME (SECONDARY) *

(1) Tabata Area

This 270 hectare tract is located between two distribution mains - the Kimara to Kipawa main and the Ubungu to TAZARA station main along Nelson Mandela Road. Furthermore, a connecting pipe between the two mains was constructed through this area under the "Upper Ruvu Rehabilitation Project".

Almost 80 hectares of the land is occupied by commercial and institutional users, almost 30 % of the total area. Although a third of households have been already developed in the housing area, the roads that have been planned have not yet been completed. Branch pipes are, therefore, designed for the existing trunk roads branching off from the existing 200 mm PVC and 400 mm F.R.P. pipes.

(2) Mbezi Beach

Mbezi Beach area is typical of newly developing housing areas, where one or two-storied detached houses are common. The area, especially between Mbezi and Ndumbwi rivers has been developed and covers more than one-third of the planned area. Consequently, the need for a new branch pipe is high.

(3) Yombo Area

Yombo area is located just north of the Yombo railway marshaling yard and consists of traditional housing within a 150 hectare tract. Development has been taking place rapidly and will be further accelerated in the near future.

(4) Ukonga Area

Ukonga area is western part of DSM and is located along the Pugu road. After completion of the Upper Ruvu rehabilitation project, this area will have sufficient water pressure and water amount from Kimara reservoir in spite of the high ground elevation. Therefore, installation of branch pipes have been planned along both sides of Pugu Road.

(5) Kigamboni Area

The oil refinery is located in Kigamboni but there is an insufficient pipe network. Since it is located opposite the harbour, this area can be developed in the near future.

3.5 LOWER RUVU TREATMENT PLANT

The followings are the rehabilitation programmes in the Lower Ruvu treatment plant.

* refer to section 5.5.6, Main Report.

- (1) supply and install low water level sensor, raw water pump station (see Figure D.3.4)
- (2) supply and install sludge pipe in the clarifier (see Figure D.3.5) and
- (3) repair chlorine feeder pipe (see Figure D.3.6).

3.6 MTONI TREATMENT PLANT

The followings are the rehabilitation programmes in the Mtoni treatment plant.

- (1) repair coagulation basin (see Figure D.3.7)
 - replacement of training wall (wooden),
 - replacement of baffle (metal),
 - painting and repair of wall and bottom (metal)
- (2) repair alum dosing equipment (see Figure D.3.8)
 - replacement of mixer
 - replacement of pump and pipe
 - repair solution tank
- (3) repair soda ash equipment (see Figure D.3.8)
 - replacement of pipe
- (4) repair disinfection equipment.
 - replacement of bleaching powder tank (see Figures D.3.8 and D.3.9)

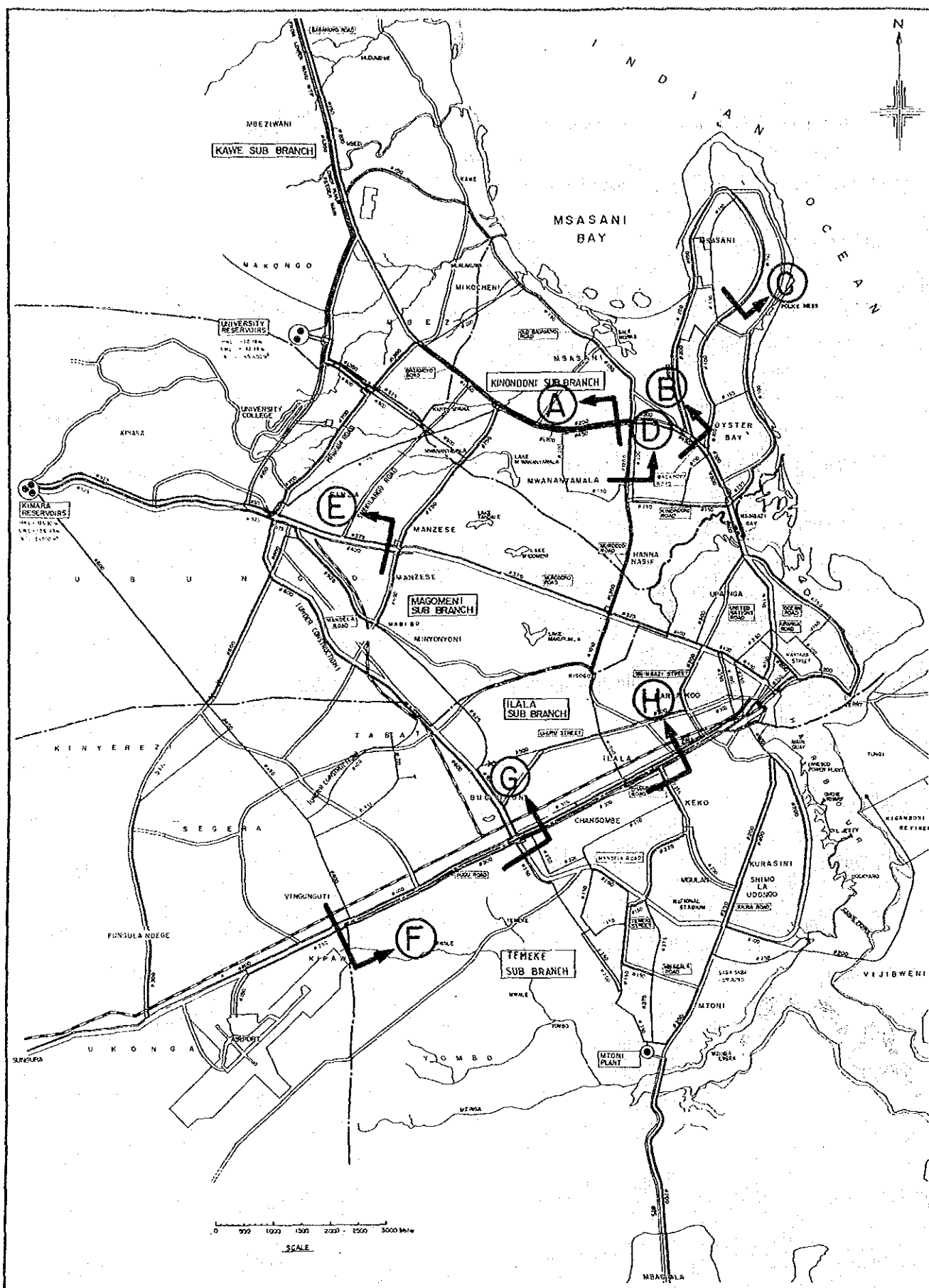
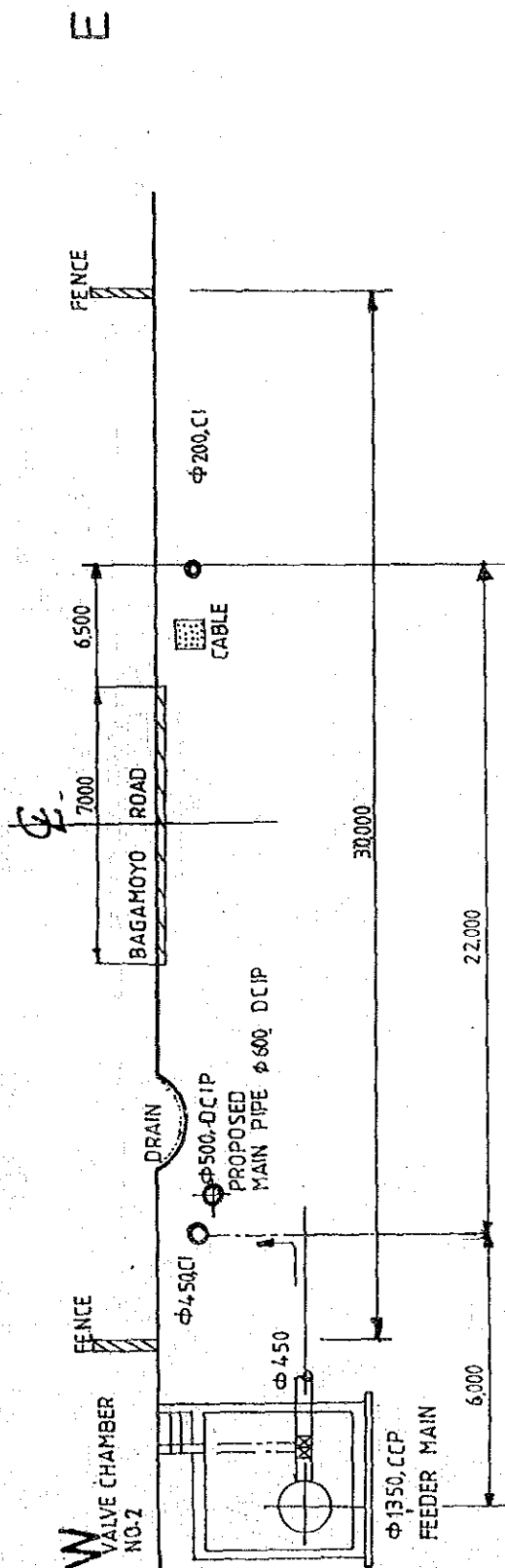


FIG. D.3.1

LOCATION OF TYPICAL CROSS SECTIONS

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

SECTION A



SECTION B

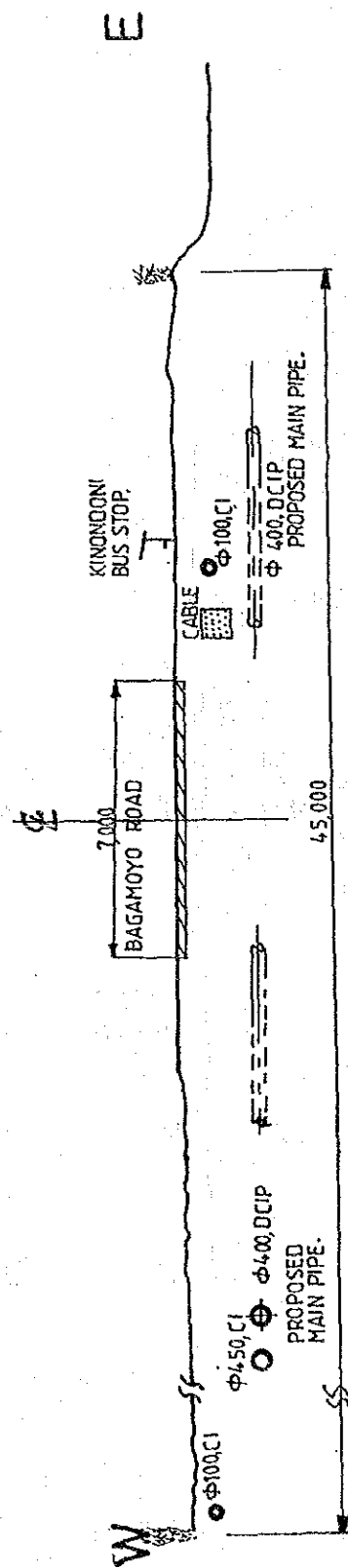
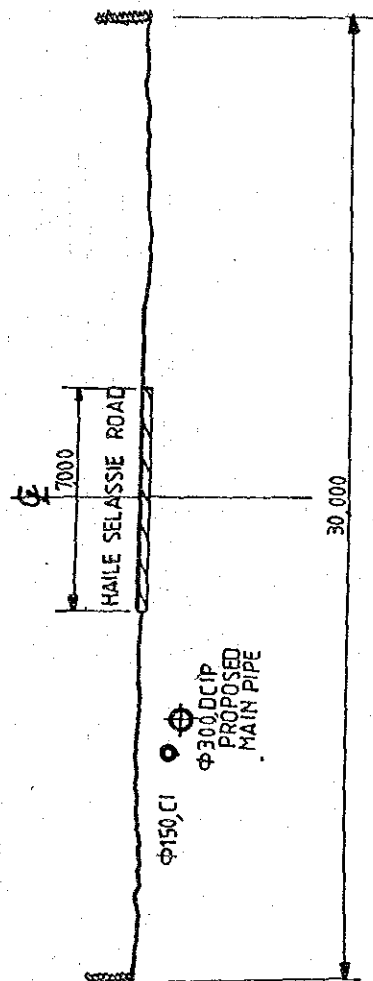


FIG. D.3.2

TYPICAL CROSS SECTIONS (1/4)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

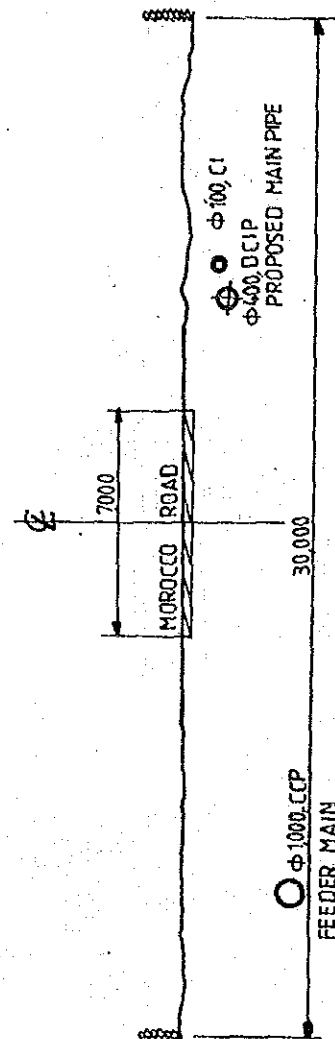
SECTION C



E

W

SECTION D



E

W

FIG. D.3.2

TYPICAL CROSS SECTIONS (2/4)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

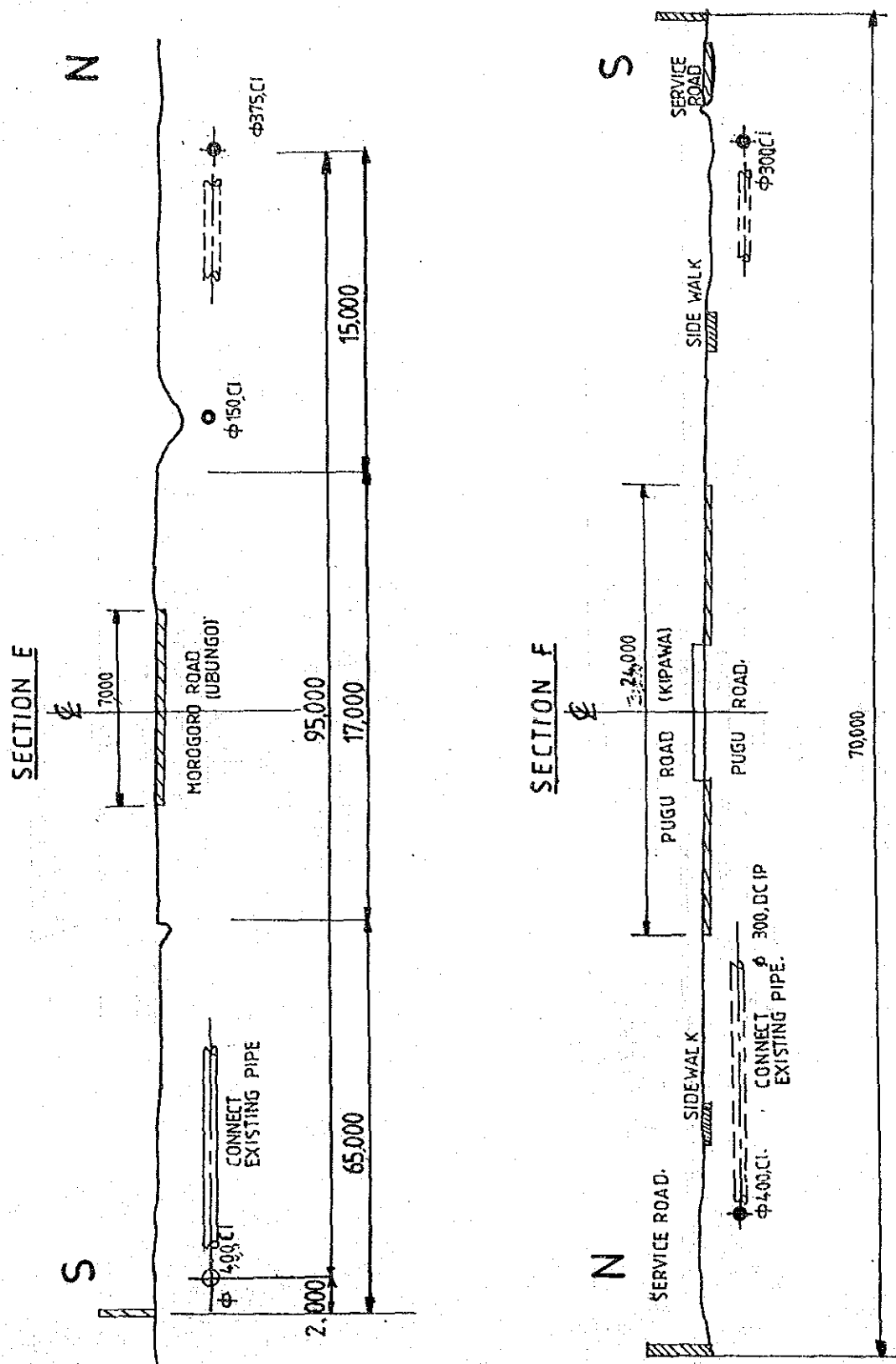
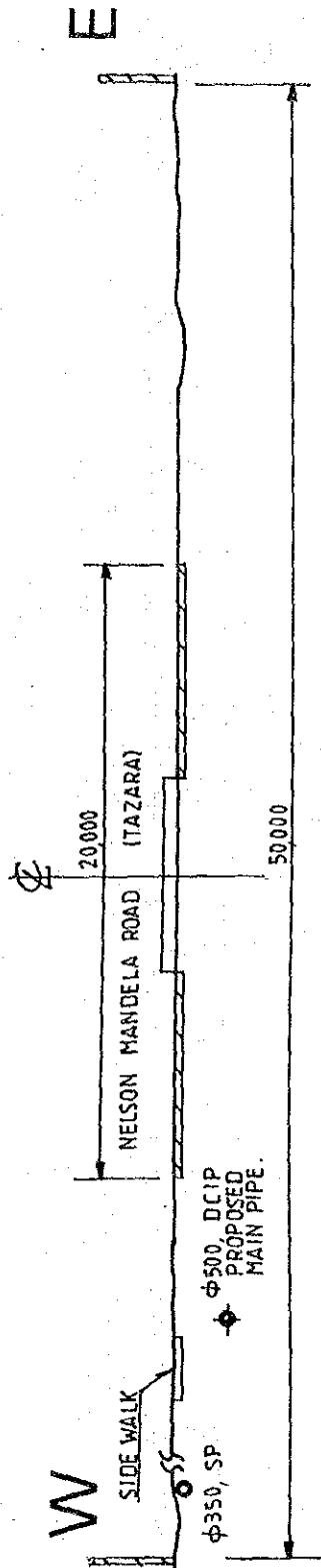


FIG. D.3.2

TYPICAL CROSS SECTIONS (3/4)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

SECTION G



SECTION H

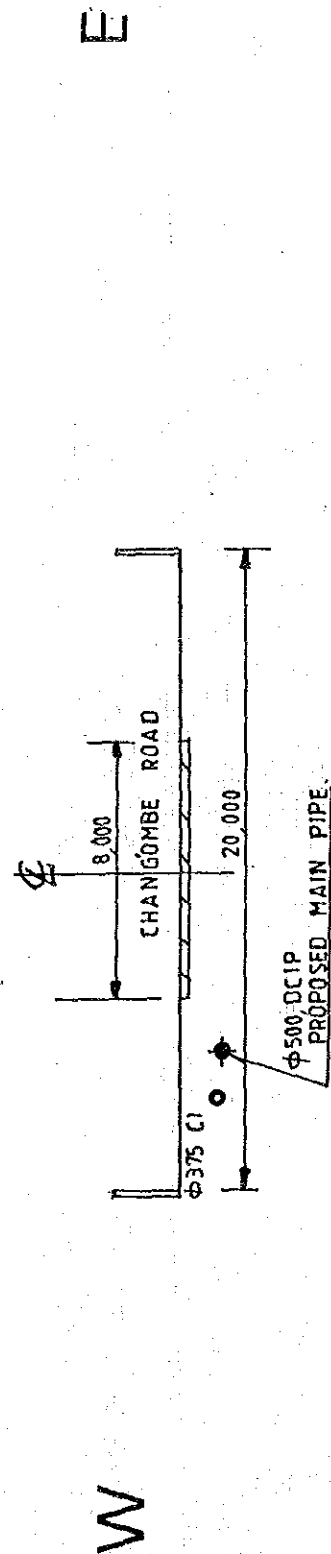


FIG. D.3.2

TYPICAL CROSS SECTIONS (4/4)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

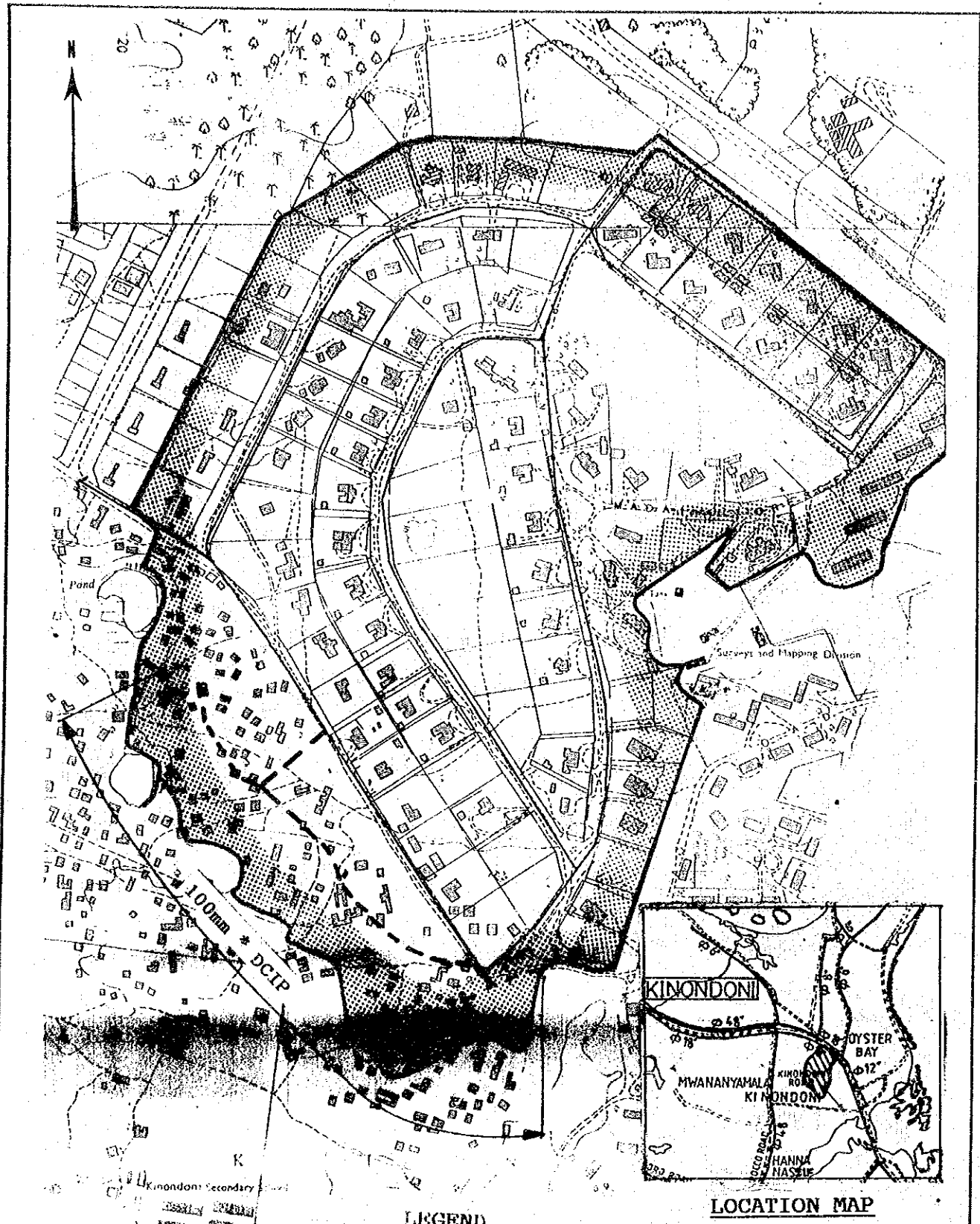
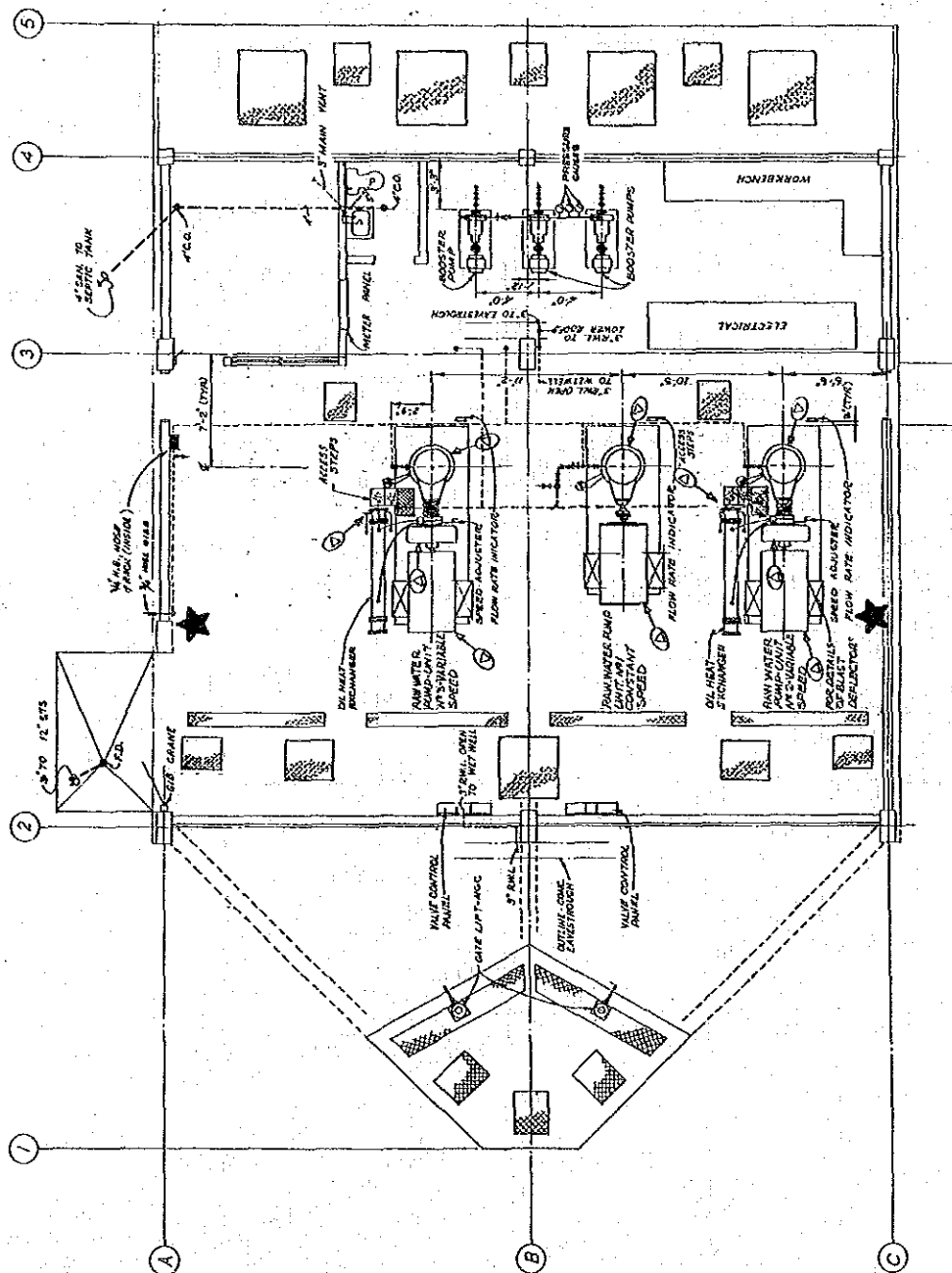


FIG. D.3.3 (2)

PROPOSED DISTRIBUTION PIPE, KINONDONI AREA



PLAN

LEGEND

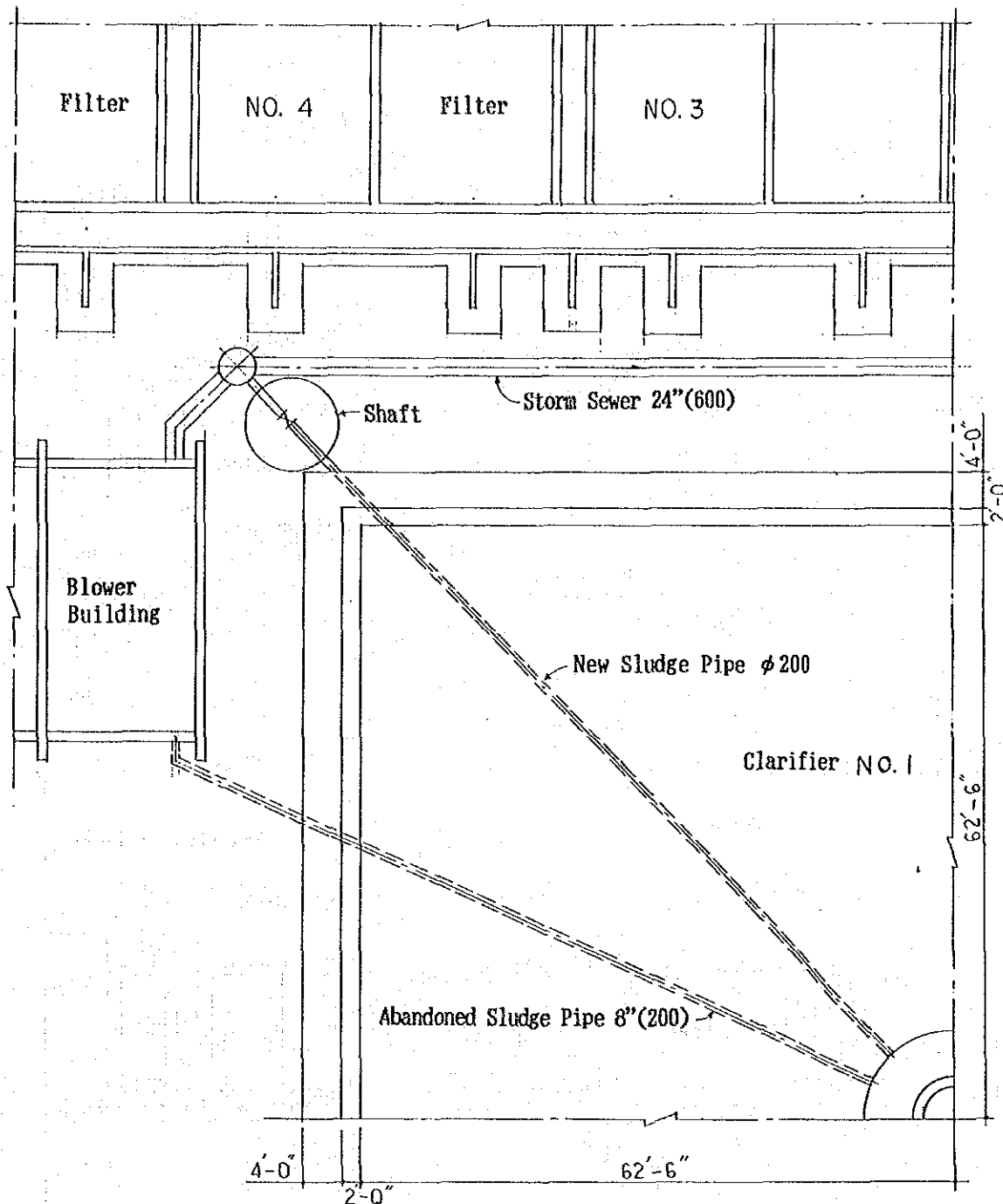
★ : Replacement of Low Water Level Sensor

SCALE
0 5 10 15 20
Unit : Foot

FIG. D.3.4

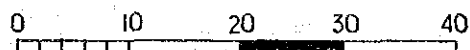
REPLACE LOW WATER LEVEL SENSOR,
RAW WATER PUMP STATION, LOWER RUVU

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY



P L A N

S C A L E

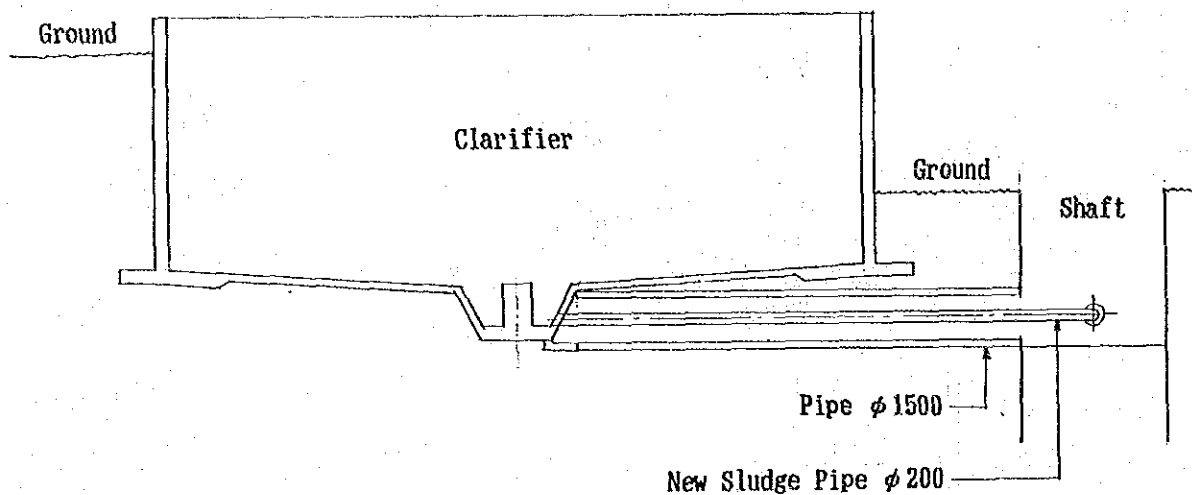


Unit : Foot

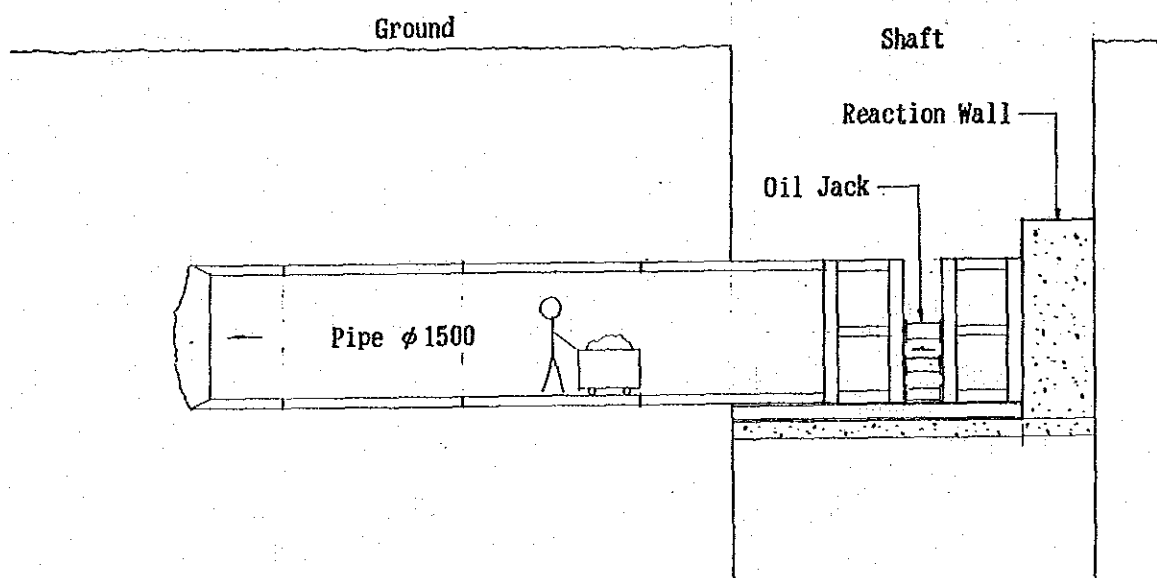
FIG. D.3.5

REPLACE SLUDGE PIPE, CLARIFIER,
LOWER RUVU (2/3)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY



PROFILE

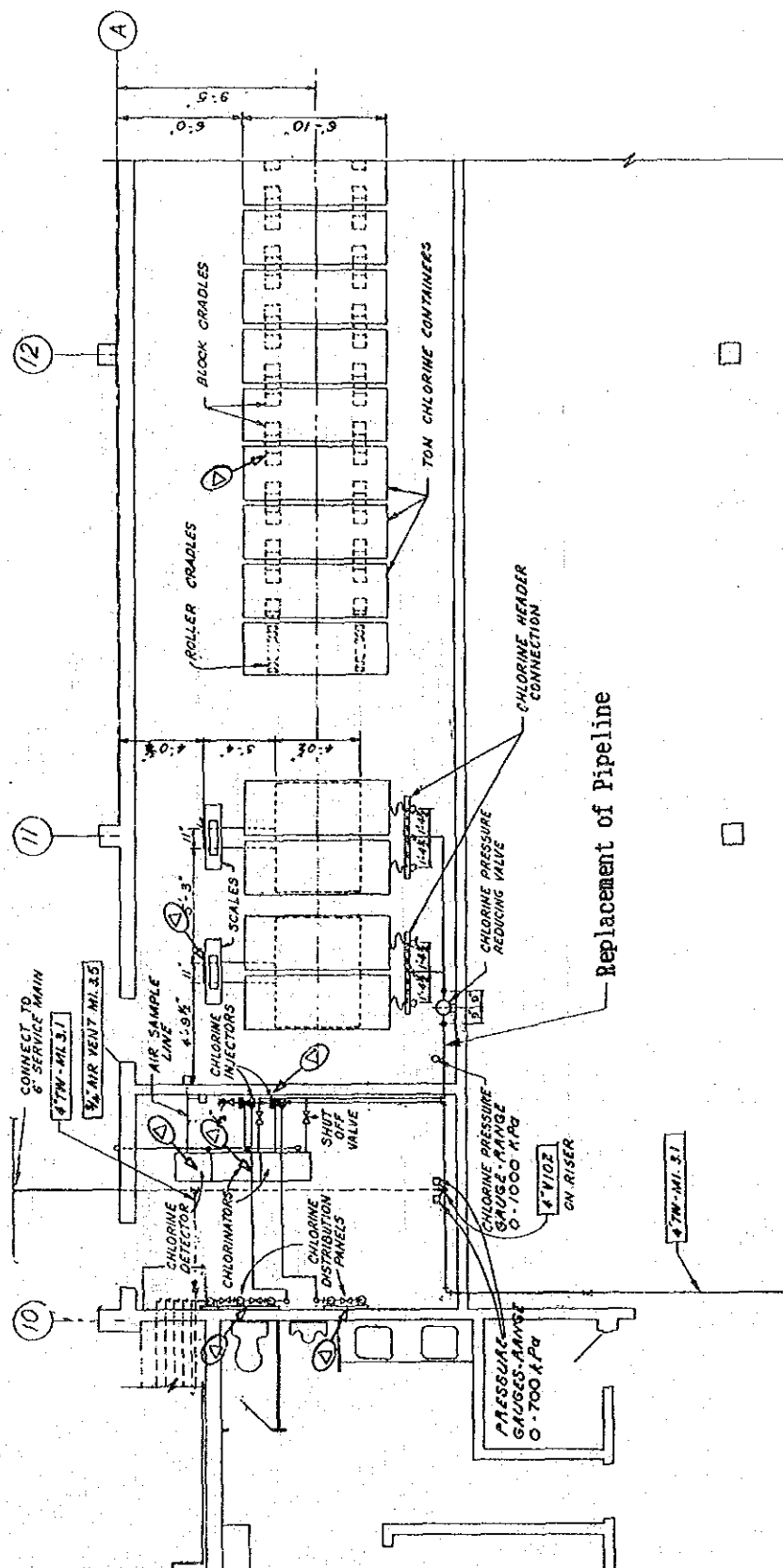


DETAIL OF PUSHING TECHNIQUE

FIG. D3.5

REPLACE SLUDGE PIPE, CLARIFIER,
LOWER RUVU (3/3)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY



PLAN

SCALE



Unit : Foot

FIG. D3.6

REPLACE CHLORINE FEED PIPE, LOWER RUVU

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

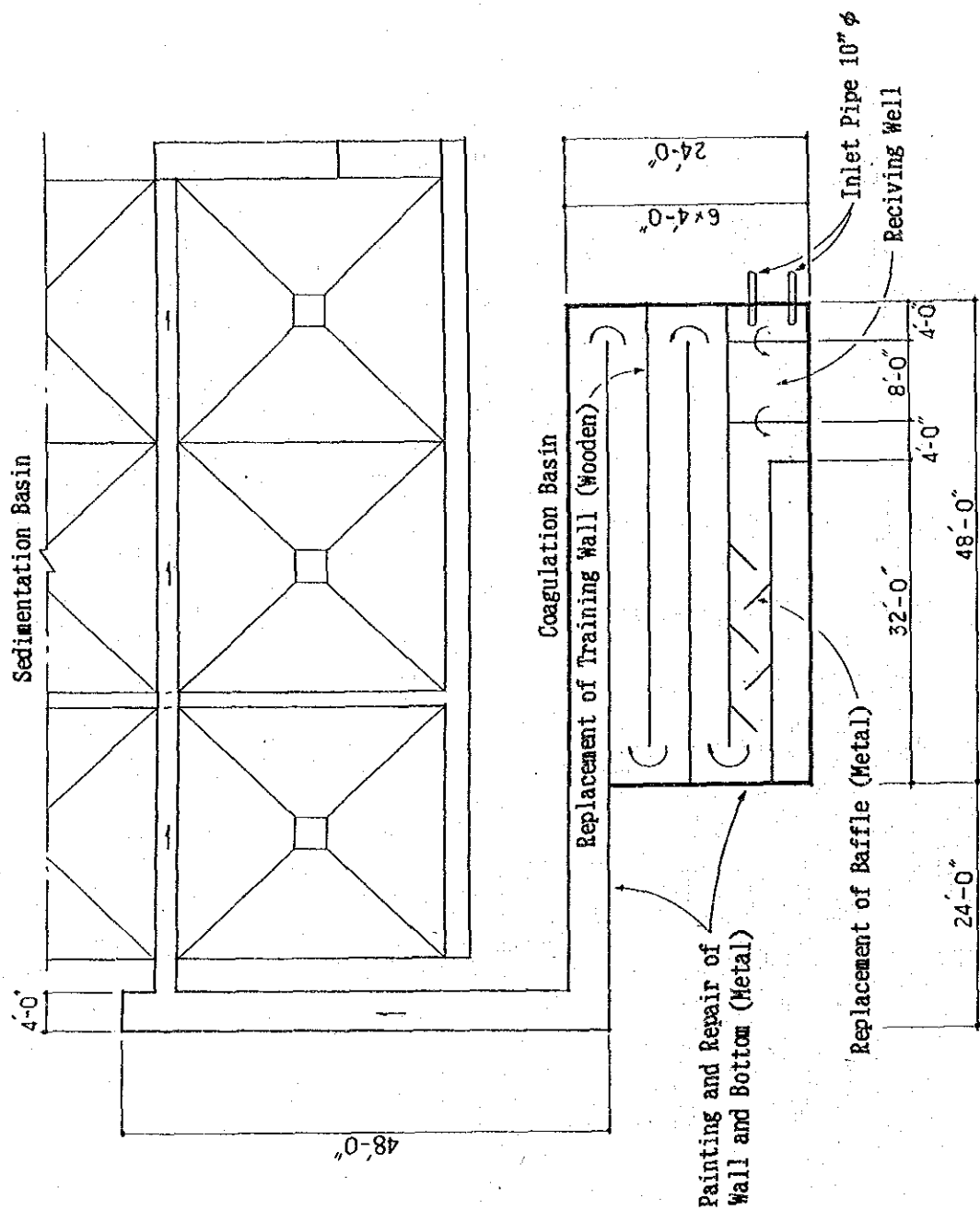


FIG. D.3.7

REPAIR OF RECEIVING WELL AND COAGULATION BASIN, MTONI (1/3)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

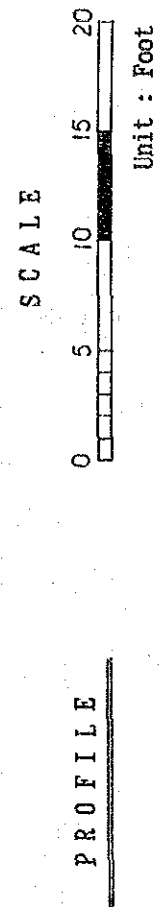
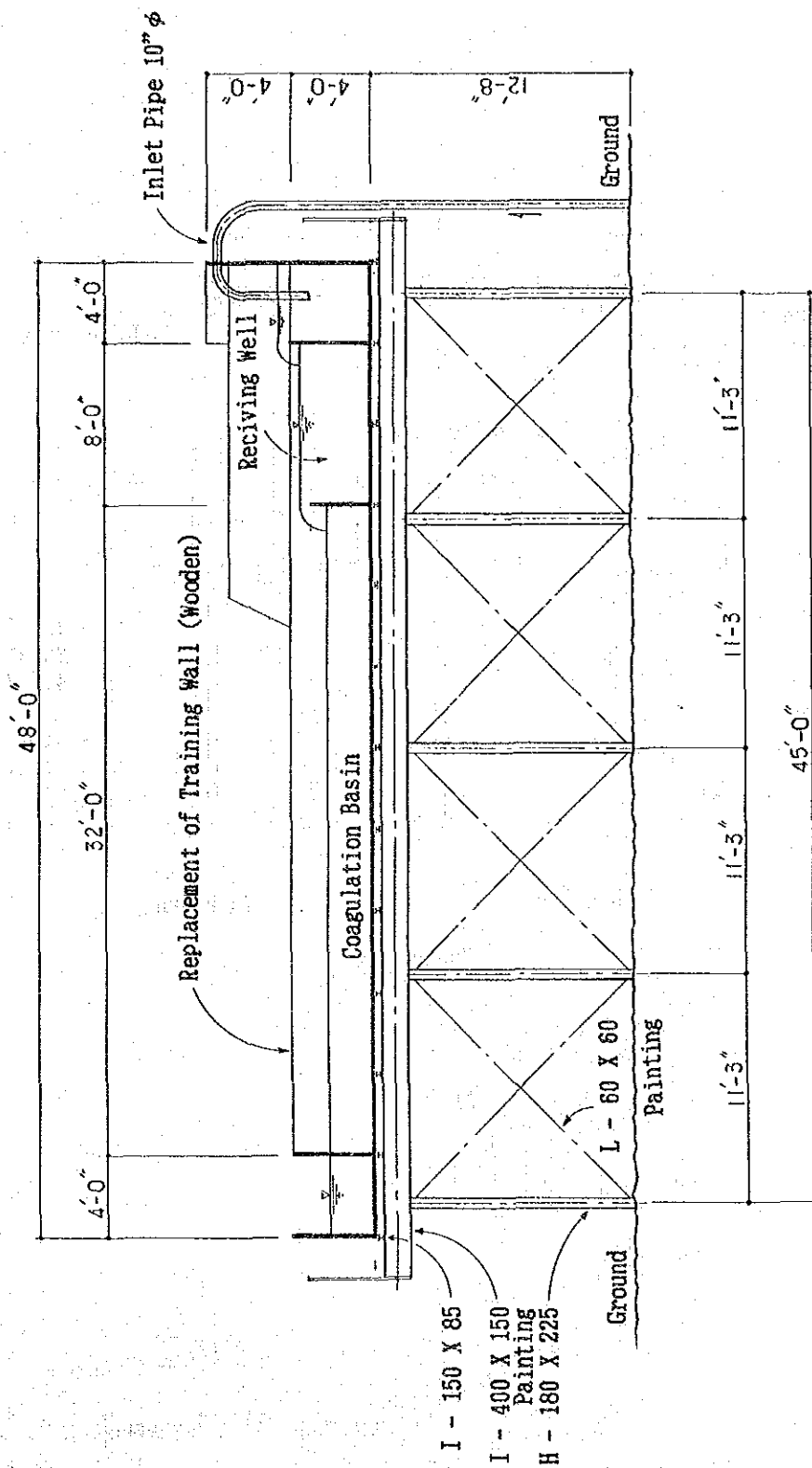
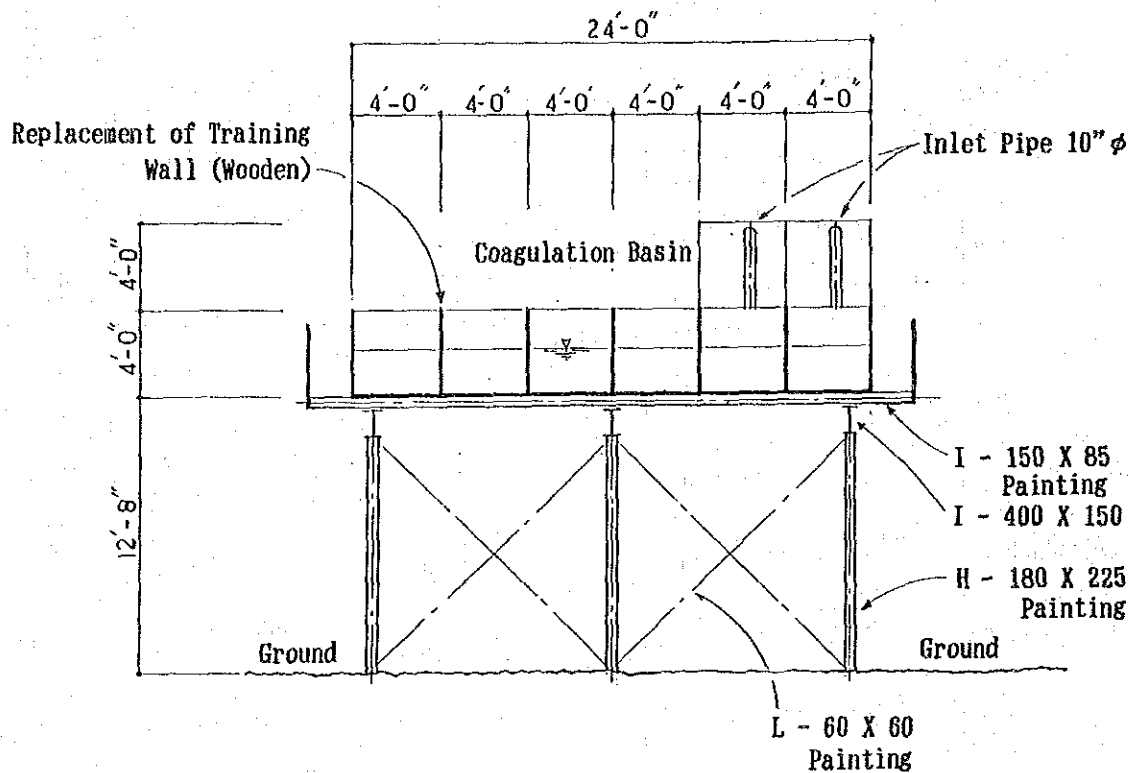


FIG. D3.7

REPAIR OF RECEIVING WELL AND COAGULATION BASIN, MTONI (2/3)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY



SECTION

SCALE

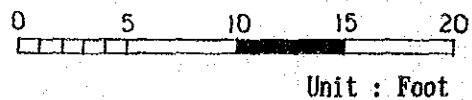


FIG. D.3.7

REPAIR OF RECEIVING WELL AND COAGULATION BASIN, MTONI (3/3)

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

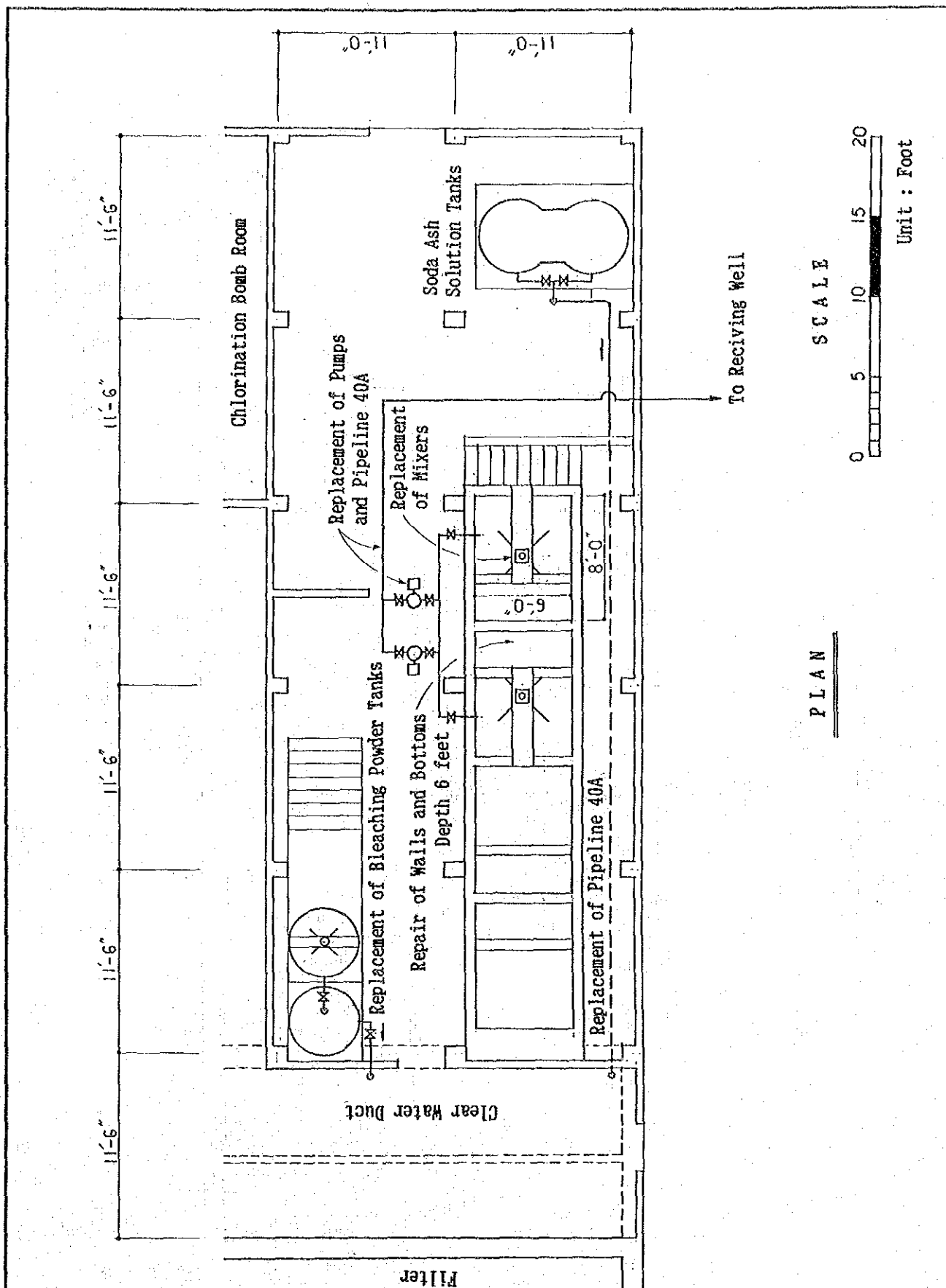


FIG. D.3.8 REPAIR OF CHEMICAL DOSING EQUIPMENT, MTONI

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

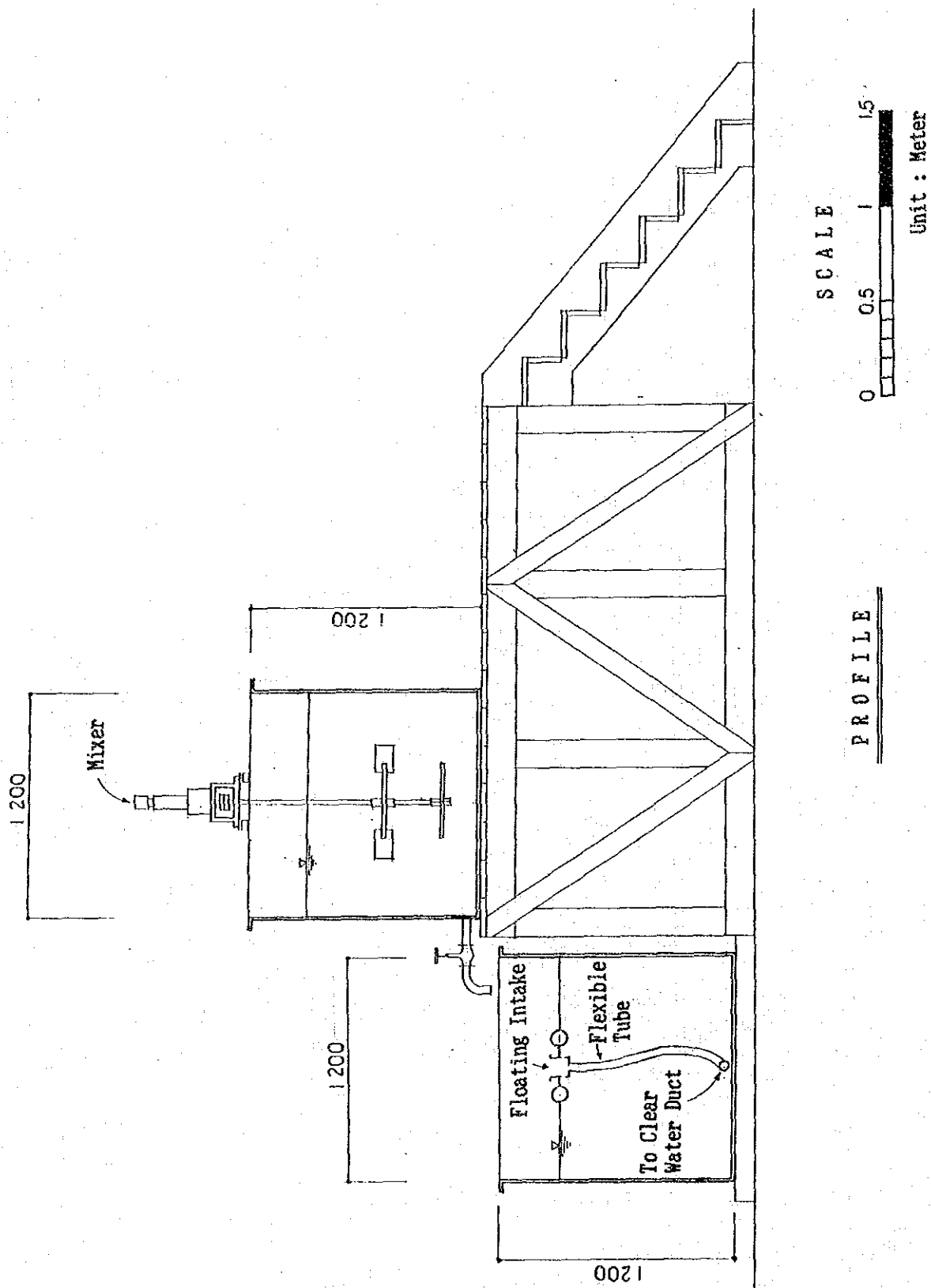


FIG. D.3.9

REPAIR OF BLEACHING POWDER DOSING EQUIPMENT, MTONI

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

4 BASIS FOR COST ESTIMATION

(1) GENERAL

All costs for this scale of construction varies significantly depending upon the source of financing, bidding procedures and contract method used in DSM. Therefore, for cost estimation, the following assumptions are made.

(i) Even though all rehabilitation work will be by means of multiple contracts, for ease of estimation, this has not been considered. Engineering services for basic design and construction supervision shall be needed for detailed design.

(ii) Materials and equipment are assumed to be imported from the following countries, taking into account their availability and experience from similar work in DSM.

* Mechanical and electrical equipment : Japan

* Ductile cast iron pipe : Japan

* uPVC pipe : Kenya

* Air scoring units : England

(iii) In order to estimate the project cost for the entire rehabilitation, the method of unit construction cost can be adopted for the distribution and service mains. After investigation of market prices of construction materials in DSM in November, 1990, unit cost for both labour/worker and basic materials/services has been settled and some items were quoted outside Tanzania.

(2) LABOUR OFFICE AND COST

Labour costs vary between government employees and those from private institutions as do salaries between one employer and another. The basic minimum wages are stipulated and controlled by the Government. Appendix shows the results of research conducted at various offices and construction companies, and also shows monthly salaries (minimum) at the time of employment, according to level of education, period of training, type of work and experience.

(3) MATERIALS AND PRODUCTS IN DAR ES SALAAM

Most basic construction materials are available in DSM.

These include materials such as:

(i) cement

(ii) crushed stone

- (iii) sand
- (iv) timber products
- (v) steel reinforcement bars and steel products
- (vi) concrete products e.g. blocks etc.

The above materials are available in hardware shops or at production points. The quality of the materials vary, but most are of good quality. Factories are mostly situated along Pugu Road and are within a 15 km radius from the city centre, with the exception of Wazo Hill - Portland cement which is about 30 km from the city centre.

Most materials are produced throughout the year and terms of payment could either be cash or cheque, depending on the client. Prices shown in this report include all taxes, with the exception of the electricity tariff from TANESCO, on which is slapped a 5 % government tax.

Materials which are not available in Tanzania can be imported from anywhere in the world, with the exception of South Africa, Taiwan and South Korea, countries with which Tanzania has no political and commercial ties.

(4) RESEARCH OF PRICES OF CONSTRUCTION MATERIALS AND SERVICES

- 1) LABOUR COST
- 2) UNIT CONSTRUCTION COSTS FOR COMPONENT WORKS
- 3) PRICES OF MATERIALS
- 4) TRANSPORTATION
- 5) MACHINERIES & EQUIPMENTS
- 6) OTHERS.

1) LABOUR COST

TABLE D.4.1 LABOUR COST

DESCRIPTION	Scientific/ Technical Profession	Other Profession
1. PRIMARY SCHOOL LEAVERS:	T.Shs.	T.Shs.
a) With no training	2,535.00	2,500.00
b) With a one training	3,285.00	3,225.00
c) With a 2 years training	3,405.00	3,285.00
d) With a 3 years training	3,920.00	3,780.00
e) With a 4 years training	4,110.00	3,920.00
2. HOLDERS OF SECONDARY SCHOOL CERTIFICATE (ORDINARY LEVEL)		
a) With no training	3,405.00	3,345.00
b) With a one year training	3,920.00	3,780.00
c) With a two years training	4,745.00	4,525.00
d) With a three years training	4,965.00	4,745.00
e) With a four years training	5,185.00	4,965.00
3. HOLDERS OF HIGH SCHOOL CERTIFICATE (ADVANCED LEVEL)		
a) With no training	4,015.00	3,825.00
b) With a one year training	4,965.00	4,745.00
c) With a two years training	5,185.00	4,965.00
4. HOLDERS OF ORDINARY DIPLOMAS:	5,185.00	4,965.00
5. HOLDERS OF ADVANCED DIPLOMAS OR UNIVERSITY DEGREES:	7,205.00	
in Archeology, Engineering, Surveying, Architect.		
6. ARTISANS: e.g. Carpenters, Plumbers etc.		
a) Holders of Trade Test Grade III	3,405.00	
b) Holders of Trade Test Grade II	3,875.00	
c) Holders of Trade Test Grade I	4,585.00	

* The above salaries do not include: Transport allowance T.Shs.500,
House allowance 10% monthly salary.

TABLE D.4.2 LABOUR COSTS

TYPE OF LABOUR	UNIT	COST (T.Shs.)	
		(A)	(B)
Common worker	day	250/=	150/=
Concrete mixer operator	day	500/=	250/=
Steel worker	day	500/=	300/=
Carpenter	day	600/=	250/=
Brick Builder	day	600/=	250/=
Plumber	day	650/=	250/=
Operator (Construction machine)	day	500/=	350/=
Electric worker	day	650/=	300/=
Welder	day	650/=	300/=
Plasterer	day	600/=	250/=
Site Engineer	day	3,000/=	*500/=
Site Manager	day	3,000/=	500/=
Office boy	day	250/=	150/=
Driver (Light)	day	500/=	150/=
Driver (Heavy)	day	500/=	200/=
Typist	day	350/=	-
Foreman	day	350/=	350/=
Clerk	day	350/=	-
Watchman	day	350/=	-

* minimum

Source: (A) Tender Prices, RAVJI CONSTRUCTION CO., LTD, P.O. BOX 9562, DSM
(B) BIASCI & COMPANY LTD, CIVIL & BUILDING CONTRACTORS,
P.O. BOX 2933, DAR ES SALAAM

1)-1 CONDITIONS OF EMPLOYMENT

- i) The number of normal working hours shall not exceed 45 hours per week. Working hours in excess of 45 hours shall be treated as overtime.
- ii) One normal working week shall consist of 6 days.
- iii) Probation period will depend on type and duration of employment.
- iv) A casual labourer is one who gets paid at each end of the day's work.
- v) All workers, except casual labourers shall pay income tax.
- vi) The employer shall be liable to pay housing allowance, where these services are not made available by the employer to the employee.
- vii) In the case of female employees, they are eligible to 84 days maternity leave with full pay once every year.

1)-2 INCOME TAX

MONTHLY INCOME	RATES PAYABLE
----------------	---------------

- | | |
|---|---|
| a) Where such income does not exceed T.Shs. 2,250/=... | N I L |
| b) Where such income exceeds T.Shs. 2,250/= but does not exceed T.Shs. 2,500/= | 7.5 % of the amount in excess of T.Shs. 2,250/=. |
| c) Where such income exceeds T.Shs. 2,500/= but does not exceed T.Shs. 5,000/= | T.Shs. 18/75 plus 10% of the amount in excess of T.Shs. 2,500/=. |
| d) Where such income exceeds T.Shs. 5,000/= but does not exceed T.Shs. 7,500/=.. | T.Shs. 268/75 plus 15% of the amount in excess of T.Shs. 5,000/=. |
| e) Where such income exceeds T.Shs. 7,500/= but does not exceed T.Shs. 10,000/= .. | T.Shs. 643/75 plus 17.5% of the amount in excess of T.Shs. 7,500/=. |
| f) Where such income exceeds T.Shs. 10,000/= but does not exceed T.Shs. 12,500/=.. | T.Shs. 1,081/25 plus 20% of the amount in excess of T.Shs. 10,000/= |
| g) Where such income exceeds T.Shs. 12,500/= but does not exceed T.Shs. 15,000/= .. | T.Shs. 1,581/25 plus 22.5% of the amount in excess of 12,500/= |
| h) Where such income exceeds T.Shs. 15,000/= but does not exceed 17,500/= .. | T.Shs. 2,143/75 plus 25% of the amount in excess of 15,000/= |
| i) Where such income exceeds 17,500/= but does not exceed 20,000/= .. | T.Shs. 2,768/75 plus 27.5% of the amount in excess of 17,500/= |
| j) Where such exceeds 20,000/= but does not exceed 22,500/= .. | T.Shs. 3,456/25 plus 30% of the amount in excess of 20,000/= |
| k) Where such income exceeds 22,500/= but does not exceed 25,000/= .. | T.Shs. 4,206/= plus 35% of the amount in excess of 22,500/= |

1) Where such income exceeds 25,000/= ..

T.Shs. 5,081/25 plus 40% of the amount in excess of 25,000/=

* Source of information: INCOME TAX ACT 1973 AND THE FINANCE BILL 1990.

1)-3 ALLOWANCES

Allowances due to an employee are:

(a) Transport allowance which is T.Shs. 500/= in DSM

(b) House allowance which is 10% of monthly salary.

1)-4 INSURANCE

The employer shall be obliged to buy Insurance cover for his employees. This is known as Workmen Compensation and is calculated as follows:

(a) {Total annual Earnings x Rate (Tariff)}/1,000

(b) Definitions:

Earnings: Basic salary + Any remuneration which is constant in nature

e.g. Overtime, Transport allowance etc.

Rate (Tariff): These are controlling tariffs which are calculated according to the degree of risk faced by workers during working time. They are as follows:

i) Common worker	40/10
ii) Concrete mixer operator	"
iii) Steel worker	"
iv) Carpenter	"
v) Brick Builder	"
vi) Plumber	"
vii) Operator	"
viii) Electric worker	"
ix) Welder	"
x) Plasterer	"
xi) Site Engineer	21/75
xii) Site Manager	1/70
xiii) Office boy	9/95
xiv) Driver (Light)	19/55
xv) Driver (Heavy)	40/10
xvi) Typist	1/70

xvii)Foreman	40/10
xviii)Clerk	1/70
xix)Watchman	17/40

2) UNIT CONSTRUCTION COSTS FOR COMPONENT WORKS

2)-1 UNIT CONSTRUCTION COSTS FOR COMPONENT WORKS

Following are prices for the above as supplied by the following companies/offices:

ITEM	SOURCE
COLUMN A IN TABLE COLUMN B IN TABLE	Tender for rehabilitation of Road to BABATI 1990 Ministry of Works. V. BIASCI & COMPANY LIMITED, CIVIL & BUILDING CONTRACTOR, P.O. BOX 2933 DAR ES SALAAM * All prices are contractor's prices, not tendering prices.
COLUMN C IN TABLE (ITEMS 1 through 17)	WADE ADAMS CONSTRUCTION LTD, TANZANIA BRANCH P.O. BOX 5158, DAR ES SALAAM * Items 1 through 17 includes profit but excludes general costs such as site supervision, plant and transport.
(ITEMS 18 & 19)	UNITED CONSTRUCTION CO., LTD, P.O.BOX 2357, DAR ES SALAAM * Items 18 & 19 includes mixing, transporting, laying and compaction.

TABLE D.4.3 UNIT CONSTRUCTION COSTS FOR COMPONENT WORKS

Type of Labor	Unit	(A)	Cost (T.Shs.) (B)	(C)
1.Excavation ---- Sand	m ³	750/=	250/=	600/=
2.Excavation ---- sand with rock	m ³	3,500/=	300/=	300/=
3.Excavation ---- rock	m ³	6,000/=	350/=	600/=
4.Backfilling	m ³	650/=	250/=	80/=
5.Banking	m ³	650/=	250/=	140/=
6.Soil disposal (L = 20km)	m ³	500/=	500/=	900/=
7.Sheeting by timber up to 3 m deep	m ²	-	1,200/=	-
8.Sheeting by timber deeper than 3 m	m ²	-	1,300/=	-
9.Sheeting by sheet pile deeper than 3 m	m ²	-	1,800/=	-
10.Lean concrete (135kg/cm ²)	m ³	20,000/=	18,000/=	14,560/=
11.Plain structural concrete (165kg/cm ²)	m ³	22,000/=	20,000/=	15,000/=
12.Reinforced concrete (210kg/cm ²)	m ³	30,000/=	23,000/=	15,800/=
13.Form work for substructure	m ²	1,500/=	1,300/=	1,400/=
14.Form work for super structure	m ²	1,500/=	1,500/=	2,000/=
15.Masonry work	m ³	1,800/=	2,400/=	13,000/=
16.Reinforcement work	kg	-	-	160/=
17.Cement mortar plastering	m ²	600/=	400/=	500/=
18.Asphalt pavement (t = 5 cm)	m ²	4,800/=	-	3,950/=
19.Asphalt pavement (t = 11 cm)	m ²	4,800/=	-	8,690/=

2)-2 UNIT CONSTRUCTION COST FOR DISTRIBUTION MAINS AND BRANCHES
(UNIT: T.Shs. per metre)

ITEM & DESCRIPTION	Foreign Currency	Local Currency	TOTAL
DIP (Type T, DN10)			
200	4,420	14,750	19,170
250	5,770	20,150	25,920
300	6,640	23,540	30,180
350	7,030	28,280	35,310
400	9,250	35,720	44,970
450	9,670	40,670	50,340
500	12,280	49,400	61,680
600	16,220	65,400	81,620
700	19,720	82,370	102,090
800	23,970	101,980	125,950
900	29,160	119,230	148,390
uPVC (PR Joint)			
50	2,230	330	2,500
75	2,550	940	3,490
100	2,760	980	3,740
150	3,560	1,950	5,510

Note: (1) Each pipes include fitting and others.
(2) Unit Cost is direct cost only.

3) PRICES OF MATERIALS

The following prices/price Lists have been supplied by:

- (a) Cement and concrete blocks: THE NEW TWIGA CEMENT UBUNGO DEPOT
- (b) Aggregates: Tanzania Sand & Stone Quarries, P.O. Box 3851, DAR ES SALAAM
- (c) Timber Products: Sao Hill Saw mill Ltd, P.O. Box 4730, DAR ES SALAAM.
- (d) Plastic Products: Tanganyika Tegry (Plastic) Ltd, P.O. Box 2219, DAR ES SALAAM.
- (e) Steel Products: National Steel Corporation Ltd, P.O. Box 2818, DAR ES SALAAM.
- (f) Electricity charges: Tanzania Electrical Supply co., Limited, P.O. Box 9024, DAR ES SALAAM.
- (g) Fuels Lubricants and L.P. Gas: AGIP (TANZANIA) LTD, AGIP HOUSE, P.O. Box 9540, DAR ES SALAAM.
- (h) Acetylene & Oxygen Gas: Tanzania Oxygen Limited, P.O. Box 911, DAR ES SALAAM.

TABLE D.4.4 CEMENT & CONCRETE BLOCK UNIT PRICE

ITEMS	DESCRIPTION	UNIT	PRICE (T.Shs.)	REMARKS
1.	Ordinary Portland Cement	50kg	880/=	Ex-depot price
2.	Concrete Block 6"x9"x18" (s/c)*	PC	95/=	"
3.	Concrete Block 6"x9"x18" (Ch.)*	PC	120	"
4.	Hollow Concrete block 6"x9"x18"	PC	70/=	"
5.	Concrete Block 4"x9"x18"	Pc.	80/=	"
6.*	Transport of cement:			
	a) From factory to DSM	Ton	1200/=	
	b) From factory to DSM suburbs	ton	1500/=	
	c) Average price for transport	ton/km	25/=	

NOTE: * S/C - sand cement block
 * Ch. - block with chipping
 * Transport in item 6 is by the cement Company trucks.

SOURCE: THE NEW TWIGA CEMENT, UBUNGO DEPOT, DAR ES SALAAM.

TABLE D.4.5 AGGREGATES UNIT PRICE

ITEM	DESCRIPTION	UNIT	PRICE (T.Shs.)	REMARKS
1.	Crusher stone (0 to 5mm)	7ton truck	1755/=	Ex-Quarry price
2.	Crusher stone (5 to 12mm)	m ³	3325/=	"
3.	Crusher stone (12 to 20mm)	m ³	3535/=	"
4.	Crusher stone (20 to 30mm)	m ³	3535/=	"
5.	Manually treated stone	m ³	2625/=	"
6.	Rubber stone	m ³	2365/=	"
7.	Sand	7ton truck	2700/=	"
8.	Average transport charge	m ³ /km	143/50	

SOURCE: Tanzania Sand & Stone Quarries, P.O. Box 3831, DAR ES SALAAM.

TABLE D.4.6 TIMBER PRODUCTS UNIT PRICE

SAO HILL SAW MILL LTD, PUGU ROAD BRANCH, DAR ES SALAAM.

SIZE	R.METER PER m ³	ROUGH TIMBER		ROUGH TIMBER	
		PRICE PER m ³	PRICE PER Rm	PRICE PER m ³	PRICE PER Rm
25 X 50	800	32,400	40.50	44,550	55.70
25 X 75	533		60.80		83.60
25 X 100	400		81.00		111.35
25 X 125	320		101.25		139.20
25 X 150	266.6		121.55		167.10
25 X 175	228.5		141.80		195.00
25 X 200	200		162.00		222.75
25 X 225	177.7		182.30		250.70
25 X 250	160		202.50		278.45
25 X 275	145.4		222.85		306.30
25 X 300	133.3		243.05		334.20
50 x 50	400	32,400	81.00		111.35
50 x 75	266.6		121.55		167.10
50 x 100	200		162.00		222.75
50 x 125	160		202.50		278.45
50 x 150	133		243.05		334.20
50 x 175	114		284.20		390.80
50 x 200	100		324.00		445.50
50 x 225	80.00		364.90		501.70
50 x 250	80		405.00		556.90
50 x 300	72.7		486.50		612.80
75 x 75	177.7	32,400	182.30		250.70
75 x 100	133		143.50		334.20
75 x 125	106.6		303.90		417.90
75 x 150	88.8		364.90		501.70
75 x 175	76		426.30		586.20
75 x 200	66.6		486.50		668.90
75 x 225	59		549.15		755.05
75 x 250	53		611.30		840.55
75 x 275	48		669.40		920.45
75 x 300	44		729.70		1003.35
100 x 100	100	32,400	324.00		445.50
100 x 125	80		405.00		556.90
100 x 150	66.6		486.50		668.90
100 x 150	57		568.40		781.60
100 x 175	50		648.00		891.00
100 x 225	44		736.35		1012.50
100 x 250	40		810.00		1113.75
100 x 275	36.3		892.55		1227.30
100 x 300	33.3		973.00		1337.85

TABLE D.4.7 STEEL PRODUCTS UNIT PRICE

DESCRIPTION/SIZE	WEIGHT PER	PRICE PER TON
1. <u>M.S. PLAIN PLATES</u>		
8 X 4 X 3/16	116.332	200,000/=
8 X 4 X 1/4	154.630	280,000/=
8 X 4 X 5/16	187.580	209,380/=
8 X 4 X 1	609.00	280,000/=
8 X 4 X 1.5	934.00	280,000/=
8 X 4 X 2	1,234.00	200,000/=
2. <u>M.S. SHEETS I/R</u>		
8 X 4 X 24G	14.09	226,400/=
8 X 4 X 20G	23.03	226,400/=
8 X 4 X 18G	29.26	226,400/=
8 X 4 X 16G	37.32	226,400/=
3. <u>M.S. REQUIRED PLATES</u>		
8 X 4 X 1/8	90.00	260,000/=
8 X 4 X 3/16	135.00	280,000/=
4. <u>STAINLESS STEEL SHEETS AISI 304</u>		
8 X 4 X 20G	21.59	1,234,510/=
8 X 4 X 18G	27.99	1,234,510/=
8 X 4 X 16G	37.67	1,234,510/=
8 X 4 X 12G	61.30	1,234,510/=
8 X 4 X 3mm	72.856	1,234,510/=
8 x 4 x 4mm	95.90	1,234,510/=
8 x 4 x 6mm	142.86	1,592,940/=
8 x 4 x 25	152.86	1,234,510/=
8 x 4 x .5	316.00	1,242,010/=
5.		
75mm x 6mtrs	208.080	240,000/=
90mm x 6mtrs	309.000	240,000/=
100mm x 6mtrs	357.000	240,000/=
120 x 6mtrs	554.000	240,000/=
160mm x 6mtrs	946.800	240,000/=
175mm x 6mtrs	1,131.00	240,000/=
6. <u>H.S. ROUND BARS</u>		
8mm x 12mtrs	4.740	150,000/=
10mm x 12mtrs	7.400	170,000/=
12mm x 12mtrs	10.650	162,107/=
38mm x 6mtrs	53.41	42,414/=
40mm x 6mtrs	59.19	70,690/=
50mm x 6mtrs	99.90	70,690/=
7. <u>WIRE ROD COILS</u>		
5.5mm		124,000/=
8mm		150,000/=
8. <u>M.S. ANGLES</u>		
20mm x 20mm x 3mtrs	5.80	199,000/=
25mm x 25mm x 3m	7.20	199,000/=
45mm x 45mm x 5m	20.50	186,950/=
75mm x 75mm x 6m	41.00	199,000/=
9. <u>HARD RAIL ANGLES</u>		
40mm x 40m x 3m	11.58	170,000/=

TABLE D.4.7 CONTINUED

DESCRIPTION/SIZE	WEIGHT PER	PRICE PER TON
10. M.S. CHANNELS		
80 x 45 x 6m	52.60	189,890/=
140 x 60 x 7m	96.30	189,890/=
200 x 75 x 7mm	152.00	189,890/=
11. M.S. SQUARE BARS		
40mm x 40mm x 6mtrs	75.36	42,412/30
12. TEE BARS		
35mm x 35mm x 4m	13.04	196,660/=
50mm x 50mm x 6m	22.70	196,660/=
13. HOLLOW SECTION		
50 x 50 x 1.5mm	17.64	196,660/=
60 x 60 x 2mm	22.12	196,660/=
14. M.S. Flat BARS		
16mm x 4.5mm x 6mtrs	3.800	196,660/=
40mm x 10mm	18.840	101,085/55
50mm x 12mm	28.26	101,085/55
60mm x 6mm	16.96	60,651/35
75mm x 6mm	21.20	101,085/66
70mm x 12mm	39.56	101,085/55
90mm x 12mm	63.60	101,085/=
100mm x 8mm	37.60	101,085/=
15. HEXAGONAL BARS		
25mm x 6mtrs	25.494	240,000/=
28mm x 6mtrs	33.00	240,000/=
45mm x 6mtrs	85.00	240,000/=
46mm x 6mtrs	86.340	240,000/=
50mm x 62mtrs	104.040	240,000/=
16. STEELROLLING MILLS - TANGA - PRODUCTS		
12mm x 12mtrs	10.65	162,107/=
16mm x 12mtrs	18.95	158,746/=
20mm x 12mtrs	29.60	156,225/=
25mm x 62mtrs	46.25	152,863/=

TABLE D.4.8 GALCE PRODUCTS (ALAF) UNIT PRICE
GI - SHEETS/RIDGINGS

GALVANIZED CORRUGATED IRON SHEETS 11 x 3" CORRUGATION WIDTH 1000mm	PRICE PER METER
35G 2M - 2.5 - 3M	410.75
32G 2M - 2.5 - 3M	451.40
30G 2M - 2.5 - 3M	609.50
20G 2M - 2.5 - 3M	752.00
26G 2M - 2.5 - 3M	877.10
GALVANIZED RIDGINGS	
32G 1.03M x 250mm	245.00
30G 1.03M x 250mm	271.00
28G 1.83M x 330mm	572.00
26G 1.83M x 330mm	877.10

TABLE D.4.8 CONTINUED

SPECIAL STEEL (EX AUSTRALIA)	WEIGHT PER METER	PRICE PER KG
(A) DIE STEEL DIN. 1.2080		
FLAT BARS		
25mm x 6mm	1.178	271.80
50mm x 12mm	4.710	271.80
SPECIAL STEEL (EX AUSTRALIA)	WEIGHT PER METER	PRICE PER KG
SQUARE BARS		
25mm x 25mm	4.906	271.80
40mm x 40mm	12.560	271.80
50.8mm x 50.8mm	19.700	271.80
50mm x 50mm	19.620	271.80
ROUNDS BARS 23mm	3.853	271.80
HIGH CARBON STEEL DIN 1.2510	8	
FLAT BARS		
52.4mm x 12mm	8.635	271.80
SQUARE BARS		
40mm x 40mm	12.560	271.80
ROUNDS BARS		
30mm	5.549	271.80
18. CASE HARDENING STEEL DIN		
1.5919		
ROUNDS BARS		
25mm	3.853	271.80
30mm	3.053	271.80
19. PEPECO PRODUCTS ALAF		
Light Galv. Pipe	PRICE	PER PIECE
Class (A) 1/2		1,340/=
3/4		1,970/=
1"		2,820/=
HOLLOW SECTION TUBES		
1 x 1"		1,460/=
1.1/2 x 1.100		1,910/=
2" x 1"		2,290/=
1.1/2 x 1.1/2		2,290/=
ROUND FURNITURES		
7/8"		830/=
1"		960/=
1.1/4		1,460/=

TABLE D.4.9 ELECTRICITY CHARGES

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED ELECTRICITY TARIFFS WITH EFFECT FROM 1ST JANUARY 1990 BILLINGS

TARIFF NO. 1 RESIDENTIAL

Applicable to premises used exclusively for domestic and private residential purposes:-

0 - 100 KWH	T.Shs. 0.80 per KWH
101 - 1000 KWH	T.Shs. 1.15 per KWH
1001 - 2500 KWH	T.Shs. 6.50 per KWH
2501 - 7500 KWH	T.Shs. 21.25 per KWH
Over 7500 KWH	T.Shs. 50.00 per meter
Customer service	reading period
Charge up to 1000 KWH	T.Shs. 200.00 per meter
Customer service	reading period

TARIFF NO. 2: LIGHT COMMERCIAL

Applicable to shops, restaurants, theatres, hotels clubs, harbours, schools, hospitals, airports, lodging house, group of residential premises with one meter and on premises where similar business or trade is conducted and where consumption is less than 10,000 kilowatt hours per meter reading period:-

0 - 200 KWH	T.Shs. 2.00 PER KWH
201 - 1000 KWH	T.Shs. 11.00 PER KWH
1001 - 10000 KWH	T.Shs. 29.00 PER KWH
Over 10000 KWH	T.Shs. 47.50 PER KWH
Customer service	
Charge up to 200 KWH	T.Shs. 100.00 PER METER
Customer service	
Charge over 200 KWH	

TEMPORARY SUPPLIES:

Temporary supplies will be given on this tariff.

TARIFF NO. 3: LIGHT INDUSTRIAL

Applicable to premises engaged in production of any article/commodity or in Industrial process where the main use of electricity is for motive power, or an electrochemical or electrothermal process and where the consumption is less than 10,000 kilowatt hours (KWH) per meter reading period:-

0 - 1500 KWH	T.Shs. 4.60 PER KWH
1501 - 3000 KWH	T.Shs. 12.50 PER KWH
3001 - 10000 KWH	T.Shs. 27.60 PER KWH
Over 1000 KWH	T.Shs. 500.00 PER METER
Customer service charge	

TARIFF NO. 4: LOW VOLTAGE SUPPLY

Applicable for general use where the consumption is more than 10,000 kilowatt hours per meter reading period:-

- a) Demand charged: T.Shs. 1000.00 per KVA of billing demand (B.D) per meter reading period.
The KVA maximum demand (M.D) indicator shall be reset every meter reading period.

- b) Units charge:-

First 150 times B.D (KVA) units,	T.Shs. 13.90 per KWH
Next 150 times B.D (KLV) Unit,	T.Shs. 9.50 per KWH
Remainder of units	T.Shs. 8.00 per KWH

- c) Customer service charge T.Shs. 20,000 per meter reading period

TARIFF 4A: AGRICULTURAL CONSUMERS

Applicable to Agricultural consumers whose consumption is more than 5,000 units per meter reading period engaged in direct raw farm produce production and/or processing.

- a) Demand charge: T.Shs. 340.00 per KVA of Billing Demand (B.D) per meter reading period.

The KVA Maximum demand (M.D) indicator shall be reset every meter reading period.

- b) Units Charge: T.Shs. 3.30 per KWH

- c) Customer service charge: T.Shs. 20,000.00 per meter reading period.

TARIFF NO. 5: HIGH VOLTAGE SUPPLY

Applicable for general use where power is metered at 11 KV and above.

- a) Demand charge: T.Shs. 910.00 per KVA of Billing Demand (B.D) per meter reading period.

The KVA maximum demand (M.D) indicator shall be reset every meter reading period.

- b) Units charge:

First 150 times B.D (KVA) units T.Shs. 13.20 per KWH

Next 150 times B.D (KVA) units T.Shs. 9.00 per KWH

Next 150 times B.D (KVA) units T.Shs. 7.00 per KWH

Remainder of units T.Shs. 6.00 per KWH

- c) Customer services charge: T.Shs. 30,000.00 per meter reading period.

TARIFF NO. 5A: HIGH VOLTAGE SUPPLY ENERGY INTENSIVE CUSTOMER

Applicable to high tension consumers whose demand is above 5,000 KVA and consumption above 800,000 KWH per meter reading period.

- a) Demand charges: T.Shs. 760.00 per KVA of Billing Demand (B.D) per meter period.

The KVA maximum demand (M.D) indicator shall be reset every meter reading period.

- b) Units charge: T.Shs. 7.50 per KWH

- c) Customer service charge T.Shs. 50,000.00 per meter reading period.

TARIFF NO. 6: PUBLIC LIGHTING

Applicable to public lighting and places of worship

All units T.Shs. 2.85 per KWH

TARIFF NO. 8: WATER SUPPLY ACCOUNTS

Applicable to all Public Water Supply pumping installations with consumption above 10,000 units per meter reading period.

- a) Maximum demand charge: T.Shs. 470.00 per KVA of Billing Demand per meter reading period.

The maximum demand indicator will be reset every meter reading period.

- b) Units charge: T.Shs. 6.40 per KWH

- c) Customer service charge: T.Shs. 20,000.00 per meter reading period.

TARIFF NO. 9: ZANZIBAR SUPPLY

Maximum demand T.Shs. 83.33 per KVA of Maximum Demand during each meter period.

The KVA maximum demand indicator shall be reset every meter reading period.

Maximum demand readings are taken at Mtoni substation while the units reading are taken at Ubungo substation.

-
- NOTE: 1. Billing Demand (B.D) is the higher of the KVA Maximum Demand (M.D) during the month and 60% of the highest KVA Maximum Demand for the preceding 11 months; provided that during the first year of operation the billing demand shall be the higher of the KVA Maximum demand during the month, and 60% of the highest KVA Maximum demand recorded commencing from the month the consumer is connected.
2. Meter reading period is the period of time elapsing between any consecutive readings of the meter

and/or maximum demand indicator installed by the company but with exception of their first and last period; each such a period shall be as near to thirty days as possible.

3. These tariffs are applicable only to supply of electricity to consumers with power factor not lower than 0.9 in case of lighting loads or 0.8 in case of other loads, otherwise power factor surcharge shall be applied on the normal charge.

TABLE D.4.10 FUEL AND LUBRICANTS UNIT PRICE

Item Description	Unit	Price (T.Shs.)	Remarks
1. Super Petrol	litre	121/=	
2. Regular Petrol	litre	117/=	
3. Kerosene	litre	52/=	
4. Diesel (GASOIL)	litre	61/50	
5. Industrial Diesel	litre	55/=	
6. Delivery Charges:			
a) within Dar es Salaam	litre/km	90/=	
b) up-country rough road	litre/km	24/=	
c) up-country tarmac road	litre/km	22/50	
LUBRICANTS:			
7. Motoroil HD . 40	litre	232/50	
8. Super motor oil	litre	245/10	
9. Diesel Oil D/Alfa 40	litre	245/=	
10. D/Signa 40	litre	245/=	
11. Hydraulic oil LH.32-100	litre	210/=	
12. Grease	kg	250/00	
13. Brake Fluid	litre	495/=	
14. L.P. Gas	kg	80/=	

TABLE D.4.11 OTHER UNIT PRICE

Items No. Description	Unit	Price (T.Shs.)	Remarks
1. Deposit per cylinder (GAS)	1 Cylinder	10,000/=	
2. Rental charge per annum	1 "	4,800/=	
3. Customer Card per annum	m ³	100/=	
4. Oxygen gas	m ³	200/=	
5. Acetylene gas	m ³	490/60	
6. Gasoline (super)	litre	164/=	Petrol
7. " (Regular)	"	164/=	"
8. Diesel	"	92/=	"
9. Kerosene	"	83/=	"
TAP WATER:			
10. Domestic	1000 Gal.	57/25	from NUWA
11. Institutions	"	90/=	"
12. Commercial	"	192/=	"
13. Industries	"	248/40	"
14. Caustic Lime	50kg bag	475/=	Shop price
15. Flush doors size 80" x 32"	pc	4,330/=	Factory price
16. Plywood size 8ft x 4ft x 12 mm	pc	3,550/=	"
17. Chipboard size 8ft x 4ft x 13mm	pc	2,725/=	"
18. Chipboard size 8ft x 4ft x 19mm	pc	3,945/=	"

4) TRANSPORTATION

TABLE D.4.12 TRANSPORTATION UNIT PRICE

D.4.12.1 PORT CHARGES:

i) LOOSE CARGO:

- A) Wharfage 1.5% of C.I.F. value
- B) Handling..... T.Shs. 12/= per tonne (or volume)
- C) Storage
 - First 5 days T.Shs. 12/= per tonne (or volume)
 - Next 5 days T.Shs. 18/= per tonne (or volume)
 - Rest of days T.Shs. 24/= per tonne/day (or volume)
- D) Late documentation ... T.Shs. 12/= per tonne per day.

ii) CONTAINERS

LENGTH	HANDLING	STORAGE
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20ft	16,000/=	2000/= per day
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40ft	24,000/=	4000/= per day
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Other charges are similar to loose cargo charges.

N.B. Calculations shall be done by either weight or volume depending which is higher.

D.4.12.2 INLAND TRANSPORTATION:

a) Within the City Limits:

- i) 20ft container..... T.Shs.20,000/=
- ii) 40ft container..... T.Shs.40,000/=
- iii) 20ft container (if returnable to port) T.Shs.25,000/=
- iv) Loose cargo..... T.Shs. 1,500/= per tonne

b) Out of the City Limits:

- i) 20ft container..... T.Shs. 50,000/=
 - ii) 40ft container..... T.Shs.100,000/=
-

5) MACHINERIES & EQUIPMENTS

Most of the above mentioned are imported from other countries.

6) OTHERS.

It should be noted that all prices shown in this report are for the month of November 1990. The prices are liable to change anytime and this is due to devaluation of the Tanzania shilling.

5 COST ESTIMATE AND DISBURSEMENT SCHEDULE *

Costs required for the proposed rehabilitation projects are estimated based on prices in November, 1990. Provided herein are basic costs which do not include physical contingencies and administrative costs, which are given in the "disbursement schedule".

Table D.5.1 summarizes the basic cost estimated for each rehabilitation item, broken down into foreign and local currency portions. Breakdown of the basic costs for the each measure are given in Tables D.5.2 to D.5.17 while disbursement schedules of each measure are shown in Tables D.5.18 to D.5.30.

TABLE D.5.1 TOTAL PROJECT COST

(Unit : million T.Shs.)

Measure	Foreign currency	Local currency	TOTAL
a. Leakage control measure (Transmission System)	31	12	43
b. Leakage control measure (Distribution system)			
Including Mapping System	1,275	603	1,878
c. Existing pipe connection	238	58	296
d. Main pipe laying (primary)	1,492	338	1,830
e. Main pipe laying (secondary)	121	245	366
f. Pipe cleaning	619	80	699
g. Middle zone creation	1,181	667	1,848
h. Treatment plant	54	5	59
j. Meter installation	524	15	538
k. Arrears, illegal connection	0	123	123
Total	5,535	2,146	7,680

(at November, 1990 price level, Exchange rate US\$ 1 = T.Shilings 200 = Japanese Yen 140)

* refer to section 5.6, Main Report.

**TABLE D.5.2 COST ESTIMATE FOR LEAKAGE CONTROL MEASURE
(TRANSMISSION LINE) (MEASURE a)**

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 Replace Pressure Reducing Valve					
Pressure Reducing Valve and pipe 150	set	16	20,701	0	20,701
Subsidiary Work	piece	16	0	9,313	9,313
Reinstallation Work	piece	16	0	2,450	2,450
Total			20,701	11,763	32,464
2 Replace Water Meter in Off-take					
Water Meter 75 and Material	set	10	2,962	0	2,962
Subsidiary Work	piece	10	1,523	0	1,523
Reinstallation Work	piece	10	0	22	22
Water Meter 150 and Material	set	6	4,934	0	4,934
Subsidiary Work	piece	6	1,018	0	1,018
Reinstallation Work	piece	6	0	77	77
Total			10,437	99	10,536
Grand Total			31,138	11,862	43,000

**TABLE D.5.3 COST ESTIMATE FOR LEAKAGE CONTROL MEASURES
(DISTRIBUTION: MEASURE b PART 1)**

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
REPLACE SERVICE PIPE WITH DISTRIBUTION PIPE 100	m	90,000	180,000	432,000	612,000

TABLE D.5.4 COST ESTIMATE FOR LEAKAGE CONTROL MEASURES
(DISTRIBUTION: MEASURE b PART 2)

(Unit: T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
NUWA					
Expert	man-month	36	102,857	0	102,857
Chief Engineer	man-month	72	0	720	720
Engineer	man-month	216	0	1,800	1,800
Technician	man-month	1,440	0	8,640	8,640
Driver	man-month	1,020	0	3,360	3,360
Sub Total			102,857	14,520	117,377
Employment					
Labor	man-month	7,200	0	30,000	30,000
Operator	man-month	840	0	3,960	3,960
Sub Total			0	33,960	33,960
Total (1)			102,857	48,480	151,337
Vehicle					
Bicycle	Nos.	0	0	0	0
Truck with Crane (4ton)	No.	6	64,286	0	64,286
Truck with Crane (2ton)	Nos.	5	32,143	0	32,143
Leakage Survey Car	Nos.	3	21,429	0	21,429
Sub Total			117,857	0	117,857
Filed Study Equipment					
Ultrasonic Flowmeter	set	0	0	0	0
Water Meter	set	3	686	0	686
Water Pressure Recorder	set	0	0	0	0
Pressure Gage	set	3	116	0	116
Ear Piece	set	3	120	0	120
Leak Detector	set	6	6,429	0	6,429
Iron Pipe and	set	3	3,600	0	3,600
Live Cable Locator			0	0	0
Sound Wave type	set	3	7,714	0	7,714
Pipeline Detector			0	0	0
Hose	Nos.	6	634	0	634
Installation Device	set	3	6,429	0	6,429
Transceiver	Nos.	9	1,857	0	1,857
Torch	Nos.	18	129	0	129
Master Pressure Meter	set	1	743	0	743
Master Water Meter	set	1	386	0	386
Sub Total			28,841	0	28,841

TABLE D.5.4 CONTINUED

(Unit: T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
Repair Tool					
Threader Machine	set	10	5,571	0	5,571
Tap Machine for Metal	set	10	7,429	0	7,429
Tap Machine for non-metal	set	10	3,714	0	3,714
Pipe Cutter for Metal (Large)	set	7	19,500	0	19,500
Pipe Cutter for non-metal (Large)	set	7	2,600	0	2,600
Pipe Cutter for Metal (Small)	set	9	3,214	0	3,214
Pipe Cutter for non-metal (Small)	set	9	1,929	0	1,929
Pipewrench	set	25	9,657	0	9,657
Spanner	set	27	5,200	0	5,200
Pipe Vise	set	13	7,243	0	7,243
Sub Total			66,057	0	66,057
Construction Equipment					
Shovel	piece	100	0	200	200
Pick	piece	50	0	100	100
Concrete Breaker	set	4	1,714	0	1,714
Water Pump	Nos.	4	3,714	0	3,714
Generator	Nos.	4	18,286	0	18,286
Sub Total			23,714	300	24,014
Total (2)			236,470	300	236,770
Oil Fee					
Diesel 15X25X12X100/5	kl	510	0	63,000	63,000
Oil	Nos.	85	0	3,500	3,500
Total (3)			0	66,500	66,500
Install Flow Meter Connector for Block	blocks	300	410,786	45,000	455,786
Install Valve for Block	set	350	85,000	1,750	86,750
Total (4)			495,786	46,750	542,536
Material for Repair					
Repair Valve etc.	piece	600	4,058	0	4,058
Repair Fire Hydrant	piece	100	342	0	342
Repair Expansion Joint	piece	700	3,702	0	3,702
Repair Distribution Pipe	piece	1,000	75,716	0	75,716
Repair Branching	piece	1,000	7,857	0	7,857
Repair Curb Cock	piece	4,100	38,750	0	38,750
Repair Expansion Joint	piece	5,200	5,014	0	5,014
Repair Service Pipe	piece	8,000	17,143	0	17,143
Repair Tap	piece	50,000	104,379	0	104,379
Total (5)			256,960	0	256,960
Grand Total			1,092,073	162,030	1,254,103

**TABLE D.5.5 COST ESTIMATE FOR MAPPING
(MEASURE b: PART 3)**

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
NUWA					
Engineer	man-month	60	0	600	600
Technician	man-month	480	0	2,880	2,880
Sub Total				3,480	3,480
Drawing Equipment					
Copy Machine (1-1)	set	1	3,214	0	3,214
Blue Printing Machine	set	1	857	0	857
Drawing Case	set	8	0	400	400
Drawing Tool	set	8	3,429	0	3,429
Sub Total			7,500	400	7,900
Articles of Consumption					
Film for Drawing 92 cm x 20m	roll	6	0	240	240
Film for Second Drawing Size A1	box	1	0	40	40
Blue Printing Roll Paper A1	roll	50	0	400	400
Copy Paper A3	box	12	0	72	72
Copy Paper A4	box	24	0	72	72
Sub Total			0	824	824
Total			7,500	4,704	12,204

**TABLE D.5.6 COST ESTIMATE FOR EXISTING PIPE CONNECTION
(MEASURE c)**

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 NODE 101-112 (825mm)	lump sum	1	22,000	5,000	27,000
2 NODE 106-115 (450mm)	lump sum	1	11,000	3,000	14,000
3 NODE 103-114 (525mm)	lump sum	1	11,000	3,000	14,000
4 NODE 103-204 (525mm)	lump sum	1	11,000	3,000	14,000
5 NODE 207-209 (600mm)	lump sum	1	28,000	7,000	35,000
6 NODE 109-206 (400mm)	lump sum	1	18,000	5,000	23,000
7 NODE 214-215 (400mm)	lump sum	1	23,000	5,000	28,000
8 NODE 214-232 (300mm)	lump sum	1	17,000	4,000	21,000
9 NODE 220-222 (300mm)	lump sum	1	6,000	2,000	8,000
10 NODE 234-307 (300mm)	lump sum	1	3,000	1,000	4,000
11 NODE 307-325 (400mm)	lump sum	1	10,000	3,000	13,000
12 NODE 221-223 (400mm)	lump sum	1	18,000	4,000	22,000
13 NODE 303-326 (250mm)	lump sum	1	16,000	4,000	20,000
14 NODE 209-235 (600mm)	lump sum	1	44,000	9,000	53,000
Total			238,000	58,000	296,000

TABLE D.5.7 COST ESTIMATE FOR MAIN PIPE LAYING
(PRIMARY: MEASURE d)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 Kinondoni					
Supply and Install 400mm	m	1,600	117,000	138,000	117,000
Supply and Install 300mm	m	1,000	40,000	10,000	50,000
Supply and Install 200mm	m	2,000	50,000	12,000	62,000
Sub-total			229,000	272,000	229,000
2 Msasani					
Supply and Install 500mm	m	1,000	84,000	18,000	102,000
Supply and Install 400mm	m	2,900	174,000	38,000	212,000
Supply and Install 300mm	m	1,300	52,000	13,000	65,000
Supply and Install 200mm	m	1,500	38,000	9,000	47,000
Sub-total			348,000	78,000	426,000
3 Temeke					
Supply and Install 500mm	m	2,300	193,000	41,000	234,000
Supply and Install 400mm	m	2,000	120,000	26,000	146,000
Sub-total			313,000	67,000	380,000
4 S & L Pipe at Kurasini					
Supply and Install 500mm	m	1,300	109,000	23,000	132,000
Supply and Install 400mm	m	1,700	102,000	22,000	124,000
Supply and Install 250mm	m	1,300	44,000	10,000	54,000
Supply and Install 200mm	m	500	13,000	3,000	16,000
Sub-total			268,000	58,000	326,000
5 Kigamboni					
Supply and Install 300mm	m	5,100	204,000	51,000	255,000
Sub-total			204,000	51,000	255,000
6 Mbagala					
Supply and Install 250mm	m	5,100	173,000	41,000	214,000
Sub-total			173,000	41,000	214,000
Total		15,300	1,524,000	511,000	1,830,000

TABLE D.5.8 COST ESTIMATE FOR MAIN PIPE LAYING
(SECONDARY: MEASURE e)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 Mbezi					
Supply and Install 100mm	m	10,000	20,000	48,000	68,000
Supply and Install 150mm	m	4,300	17,000	27,000	44,000
Sub-total			37,000	75,000	112,000
2 Tabata					
Supply and Install 100mm	m	6,500	13,000	31,000	44,000
Supply and Install 150mm	m	2,800	11,000	17,000	28,000
Sub-total			24,000	48,000	72,000
3 Ukonga					
Supply and Install 100mm	m	3,100	6,000	15,000	21,000
Supply and Install 150mm	m	1,300	5,000	8,000	13,000
Sub-total			11,000	23,000	34,000
4 Yombo					
Supply and Install 100mm	m	5,800	12,000	28,000	40,000
Supply and Install 150mm	m	2,500	10,000	16,000	26,000
Sub-total			22,000	44,000	66,000
5 Kigamboni					
Supply and Install 100mm	m	7,400	15,000	36,000	51,000
Supply and Install 150mm	m	3,100	12,000	19,000	31,000
Sub-total			27,000	55,000	82,000
Total			121,000	245,000	366,000

**TABLE D.5.9 COST ESTIMATE FOR PIPE CLEANING COST
(MEASURE D)**

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
NUWA					
Expert	man-month	24	68,571	0	68,571
Engineer	man-month	120	0	1,200	1,200
Technician	man-month	1,440	0	8,640	8,640
Driver	man-month	480	0	1,920	1,920
Sub Total			68,571	11,760	80,331
Employment					
Labor	man-month	2,520	0	12,600	12,600
Operator	man-month	480	0	2,880	2,880
Sub Total			0	15,480	15,480
Total (1)			68,571	27,240	95,811
Vehicle					
Truck with Crane (4ton)	Nos	8	85,714	0	85,714
Sub Total			85,714	0	85,714
Cleaning & Lining					
Lining Machine with Trowel	set	3	6,000	0	6,000
Lining Winch	set	3	25,286	0	25,286
Mortar Pump	set	3	3,857	0	3,857
Mortar Mixer & Hose	set	3	17,571	0	17,571
Compressor & Air Hose	set	3	15,429	0	15,429
Seal Coat Machine	set	3	3,429	0	3,429
Wire Winch etc.	set	3	21,857	0	21,857
Roller	set	3	7,286	0	7,286
Pronger	set	3	3,857	0	3,857
Scraper	set	3	11,143	0	11,143
Others(transceiver,Hose,etc)	lump sum	1	2,857	0	2,857
Sub Total			118,572	0	118,572
Scouring					
Scouring Machine	set	2	19,143	0	19,143
Spare Parts	l.s.	1	0	1,000	1,000
Others(Transceiver,Hose,etc.)	l.s.	1	1,429	0	1,429
Sub Total			20,572	1,000	21,572
Repair Tool					
Pipe Cutter for Metal	set	3	8,357	0	8,357
Others(Pipewrench,Spanner, Pipe Vise etc.)	set	1	10,000	0	10,000
Sub Total			18,357	0	18,357
Construction Equipment					
Water Pump	Nos	8	7,429	0	7,429
Generator	Nos	8	36,571	0	36,571
Others(Shovel,Pick,etc)	set	1	0	700	700
Sub Total			44,000	700	44,700
Total (2)			287,215	1,700	288,915
Oil Fee					
Diesel 30X25X12X100/5	kl	240	0	36,000	36,000
Oil	Nos	40	0	2,000	2,000
Sub Total			0	38,000	38,000
Total (3)			0	38,000	38,000
Material					
S & I Valve	Nos	120	29,145	0	29,145
Thimble	Nos	5,200	148,571	0	148,571
Portland Cement	t	540	0	12,960	12,960
Sand	t	740	52,856	0	52,856
Admixture	t	54	10,029	0	10,029
Seal Coat	t	25	22,145	0	22,145
Sub Total			262,746	12,960	275,706
Total (4)			262,746	12,960	275,706
Grand Total			618,532	79,900	698,432

TABLE D.5.10 COST ESTIMATE FOR MIDDLE ZONE CREATION

(MEASURE g)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 Break Pressure Tank (10,600 m ³)	lump sum	1	195,000	459,000	654,000
2 Supply and Install Pipe at Ubungo (900 mm)	m	2,800	566,000	118,000	684,000
3 Supply and Install Pipe at Vingunguti (500 mm)	m	5,000	420,000	90,000	510,000
Total			1,181,000	667,000	1,848,000

TABLE D.5.11 COST ESTIMATE FOR TREATMENT PLANT (MTONI)

(MEASURE h: PART 1)

(Unit: thousand T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1. Receiving Well and Coagulation Basin					
1.1 Paint and Repair Wall	sq.m	801	4,463	1,121	5,584
1.2 Replacement of Baffle Board	piece	5	207	205	412
1.3 Replacement of Training Wall	piece	5	1,200	445	1,645
Total (1)			5,870	1,771	7,641
2. Alum dosing Equipment					
2.1 Repair Solution Tank	sq.m	49	280	49	329
2.2 Supply and Install Mixer	set	2	2,160	200	2,360
2.3 Supply and Install Dosing Pump	nos.	2	10,140	200	10,340
2.4 Supply and Install Pipe 40Ax5500	piece	20	314	10	324
Total (2)			12,894	459	13,353
3. Soda Ash Dosing Equipment					
Supply and Install Pipe 40Ax5500	piece	10	157	5	162
Supply and Install Valve 40A	nos.	4	183	6	189
Total (3)			340	11	351
4. Disinfection Equipment					
4.1 Supply and Install Measuring Device in Calcium Hypochlorite	set	1	743	100	843
4.2 Supply and Install Solution Tank	set	1	657	100	757
4.3 Supply and Install Mixer	set	1	574	100	674
Total (4)			1,974	300	2,274
Total (1 - 4)			21,078	2,541	23,619
5. Common Temporary Cost	%	9	1,897	229	2,126
6. Site Expenses	%	12	2,529	305	2,834
7. Overhead Expenses	%	10	2,108	254	2,362
Total (5 - 7)			6,534	788	7,322
Grand Total (1 - 7)			27,612	3,329	30,941

TABLE D.5.12 COST ESTIMATE FOR TREATMENT PLANT (LOWER RUVU)

(MEASURE h: PART 2)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 Raw Water Pump Station					
Low Water Level Sensor	set	2	400	56	456
Total (1)			400	56	456
2 Repair Sludge Pipe Leakage, Sedimentation Basin					
2.1 Pipe Materials					
Pipe 200x5000	piece	7	500	0	500
Flanged Spigot 200	piece	1	21	0	21
Flanged Socket 200	piece	1	36	0	36
Collar 200	piece	8	160	0	160
Valve 200	nos.	1	486	0	486
Headstock	nos.	1	357	0	357
Mechanical Joint	set	12	171	0	171
Sub Total (2.1)			1,731	0	1,731
2.2 Installation Works					
Installation Pipe 200	meter	35	12	3	14
Installation Valve 200	nos.	1	3	1	4
Installation Headstock for Valve 200	nos.	1	3	1	4
Jointing 200	piece	12	0	3	3
Valve Box	piece	1	143	200	343
Sub Total (2.2)			161	207	368
2.3 Pushing Works					
Concrete Breaking at Base of Clarifier	cu.m	2	14	2	16
liner Plate for Shaft D=4500	meter	6	5,477	0	5,477
Pipe HP 1500	piece	13	3,584	0	3,584
Collar 1500	set	12	771	0	771
Pushing 1500	meter	30	6,429	1,500	7,929
Sub Total (2.3)			16,276	1,502	17,778
2.4 Earth Works					
Excavation	cu.m	100	16	7	23
Backfill	cu.m	75	14	6	19
Removal of Surplus Soil	cu.m	25	11	5	16
Sub Total (2.4)			41	17	58
Total (2)			18,209	1,727	19,936
3 Disinfection Equipment					
3.1 Replacement of Pipe and Valve					
Pipe 25Ax5500	piece	4	29	2	31
Reducing Valve 25A	nos.	1	929	1	929
Pressure Gage 25A	nos.	1	143	1	143
Total (3)			1,100	3	1,103
Total (1 - 3)			19,709	1,786	21,495
4. Common Temporary Cost	%	9	1,774	161	1,935
5. Site Expenses	%	12	2,365	214	2,579
6. Overhead Expenses	%	10	1,971	179	2,150
Total (4 - 6)			6,110	554	6,664
Grand Total (1 - 6)			25,819	2,340	28,159

TABLE D.5.13 COST ESTIMATE FOR TREATMENT PLANT (LOWER RUVU)
(MEASURE I: PART 1)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 Intake Main					
1.1 Pipe Materials					
Pipe DIP 1800x6000	piece	20	44,571	0	44,571
Fittings	%	30	13,371	0	13,371
Sluice Gate 1650x1650	nos.	2	16,914	0	16,914
Headstock for Sluice Sluice Gate	nos.	2	4,629	0	4,629
Sub Total (1.1)			79,486	0	79,486
1.2 Installation Works					
Installation of Pipe 1800	meter	120	333	182	514
Installation of Sluice Gate 1650x1650	nos.	2	66	41	107
Installation of Head stock for Sluice Gate	nos.	2	66	41	107
Sub Total (1.2)			466	263	729
1.3 Earth Works					
Sheet Piles Z=10 mtrs.	piece	750	27,857	9,000	36,857
Timbering for Sheet Piles	ton	80	5,371	368	5,739
Excavation	cu.m	2,800	452	188	640
Backfill	cu.m	2,400	432	180	612
Removal of Surplus Soil	cu.m	400	178	82	260
Sub Total (1.3)			34,290	9,818	44,108
Total (1)			114,242	10,081	124,322
2 Grit Chamber					
2.1 Earth Works					
Excavation	cu.m	28,300	4,568	1,896	6,465
Backfill	cu.m	17,200	3,096	1,290	4,386
Removal of Surplus Soil	cu.m	11,100	4,932	2,276	7,207
Sub Total (2.1)			12,596	5,462	18,058
2.2 Concrete Works					
Concrete	cu.m	3,900	5,571	117,000	122,571
Reinforcement Steel Bars	ton	390	45,686	25,350	71,036
Form Work	sq.m	7,800	5,571	11,700	17,271
Appurtenant Work	%	10	5,683	15,405	21,088
Sub Total (2.2)			62,511	169,455	231,966
2.3 Pipe Works					
2.3.1 Pipe Materials					
Pipe DIP 1800x6000	piece	15	33,429	0	33,429
Pipe DIP 1400x6000	piece	15	19,286	0	19,286
Fittings	%	50	26,357	0	26,357
Sluice Gate 1350x1350	nos.	8	47,086	0	47,086
Headstock for Sluice Sluice Gate	nos.	8	14,857	0	14,857
Sub Total (2.3.1)			141,014	0	141,014
2.3.2 Installation Works					
Installation of Pipe 1800	meter	90	249	136	386
Installation of Pipe 1400	meter	90	158	36	194
Installation of Sluice Gate 1650x1650	nos.	8	154	135	289
Installation of Headstock for Sluice Gate	nos.	8	154	135	289
Sub Total (2.3.2)			714	443	1,158

Note; This measure is not selected but used for economic evaluation.

TABLE D.5.13 CONTINUED (MEASURE i: PART 1)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
2.3.3 Earth Works					
Excavation	m ³	7,200	1,162	482	1,645
Backfill	m ³	6,800	1,224	510	1,734
Removal of Surplus Soil	m ³	400	178	82	260
Sub Total (2.3.3)			2,564	1,074	3,638
Sub Total (2.3)			144,293	1,518	145,811
2.4 Mechanical Works					
Fine Screen	set	4	228,571	16,000	244,571
Crane	set	4	34,286	2,400	36,686
Sub Total (2.4)			262,857	18,400	281,257
Total (2)			482,257	194,834	677,092
3 Raw Water Pump Station					
Low Water Level Sensor	set	2	400	56	456
Total (3)			400	56	456
4 Repair Sludge Pipe Leakage, Sedimentation Basin					
4.1 Pipe Materials					
Pipe 200x5000	piece	7	500	0	500
Flanged Spigot 200	piece	1	21	0	21
Flanged Socket 200	piece	1	36	0	36
Collar 200	piece	8	160	0	160
Valve 200	nos.	1	486	0	486
Headstock	nos.	1	357	0	357
Mechanical Joint	set	12	171	0	171
Sub Total (4.1)			1,731	0	1,731
4.2 Installation Works					
Installation Pipe 200	meter	35	12	3	14
Installation Valve 200	nos.	1	3	1	4
Installation Headstock for Valve 200	nos.	1	3	1	4
Jointing 200	piece	12	0	3	3
Valve Box	piece	1	143	200	343
Sub Total (4.2)			161	207	368
4.3 Pushing Works					
Concrete Breaking at Base of Clarifier	cu.m	2	14	2	16
liner Plate for Shaft D=4500	meter	6	5,477	0	5,477
Pipe HP 1500	piece	13	3,584	0	3,584
Collar 1500	set	12	771	0	771
Pushing 1500	meter	30	6,429	1,500	7,929
Sub Total (4.3)			16,276	1,502	17,778
4.4 Earth Works					
Excavation	cu.m	100	16	7	23
Backfill	cu.m	75	14	6	19
Removal of Surplus Soil	cu.m	25	11	5	16
Sub Total (4.4)			41	17	58
Total (4)			18,209	1,727	19,936

Note; This measure is not selected but used for economic evaluation.

TABLE D.5.13 CONTINUED

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
5.1 Replacement of Underdrain System					
5.1.1 Materials					
Plenum	piece	3,456	20,736	8,294	29,030
Strainer	piece	55,296	134,290	0	134,290
Sand	cu.m	983	5,617	42,269	47,886
Sub Total (5.1.1)			160,643	50,563	211,207
5.1.2 Installation and Removal					
Plenum	piece	3,456	7,406	3,456	10,862
Strainer	piece	55,296	0	11,059	11,059
Sand	cu.m	983	281	492	772
Sub Total (5.1.2)			7,687	15,007	22,693
Sub Total (5.1)			168,330	65,570	233,900
5.2 Replacement of Headstock					
Headstock for Existing Gate	nos.	16	29,714	0	29,714
Installation of Headstock	nos.	16	153	207	360
Sub Total (5.2)			29,867	207	30,074
Total (5)			198,197	65,777	263,974
6 Chemical Dosing Equipment					
Repair of Alum Solution Tank	sq.m	190	1,086	570	1,656
Total (6)			1,086	570	1,656
7 Disinfection Equipment					
7.1 Replacement of Pipe and Valve					
Pipe 25Ax5500	piece	4	29	2	31
Reducing Valve 25A	nos.	1	929	1	929
Pressure Gage 25A	nos.	1	143	1	143
Sub Total(7.1)			1,100	3	1,103
Total (7)			1,100	3	1,103
8 Access Road					
Repair of Access Road	sq.m	169,800	48,514	271,680	320,194
Total (8)			48,514	271,680	320,194
Total (1 - 8)			864,005	544,728	1,408,733
9 Common Temporary Cost	%	9	77,760	49,026	126,786
10 Site Expenses	%	12	103,681	65,367	169,048
11 Overhead Expenses	%	10	86,400	54,473	140,873
Total (9 - 11)			267,842	168,866	436,707
Grand Total (1 - 11)			1,131,846	713,593	1,845,440

Note; This measure is not selected but used for economic evaluation.

TABLE D.5.14 COST ESTIMATE FOR TREATMENT PLANT (MTONI)
(MEASURE I: PART 2)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 Buza Dam					
1.1 Repair Embankment					
Soil	cu.m	1,680	1,894	8,025	9,919
filling	cu.m	1,680	1,085	450	1,535
Sub Total (1.1)			2,978	8,476	11,454
1.2 Supply and Install Pipe and Valve					
Pipe 350x6000 DIP	piece	467	60,710	0	60,710
Fittings	%	303	18,213	0	18,213
Valve	nos.	26	1,126	0	1,126
Excavation	cu.m	4,312	1,368	530	1,898
Backfill	cu.m	4,043	1,184	461	1,645
Removal of Surplus Soil	cu.m	269	120	55	175
Sub Total (1.2)			82,720	1,046	83,766
Total (1)			85,698	9,522	95,220
2 Receiving Well and Coagulation Basin					
2.1 Paint and Repair Wall	sq.m	801	4,463	1,121	5,584
2.2 Replacement of Baffle Board	piece	5	207	205	412
2.3 Replacement of Training Wall	piece	5	1,200	445	1,645
Total (2)			5,870	1,771	7,641
3 Sedimentation Basin					
3.1 Supply and Install Sludge Valve 3"	nos.	3	1,599	30	1,629
3.2 Supply and Install Effluent Trough 200w x145h x 7500l	piece	24	9,943	2,400	12,343
Total (3)			11,541	2,430	13,971
4 Filter					
4.1 Supply and Install Strainer 16.6 x 112.5mm	piece	5,076	18,854	914	19,767
4.2 Supply and Install Washout Valve	nos.	2	3,114	200	3,314
4.3 Backwash Pipe Line					
Pipe DIP 350x6000	piece	1	130	0	130
Cross 350x350	piece	1	206	0	206
Reducer 350x250	piece	2	120	0	120
Flanged Spigot 350	piece	2	149	0	149
Special Collar 350	piece	2	169	0	169
Mechanical Joint Accessories 350	piece	8	274	0	274
Valve 350	nos.	1	563	0	563

TABLE D.5.14 CONTINUED (MEASURE i: PART 2)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
4.3 Headstock for 350 Valve	nos.	1	626	0	626
Pipe DIP 250x5000	piece	5	371	0	371
Reducer 250x150	piece	1	37	0	37
Flanged Spigot 250	piece	6	291	0	291
Special Collar 250	piece	4	154	0	154
Mechanical Joint Accessories 250	piece	15	279	0	279
Valve 250	nos.	3	964	0	964
Headstock for 250 Valve	nos.	3	1,877	0	1,877
Pipe DIP 150x5000	piece	1	46	0	46
Tee 150x150	piece	1	37	0	37
Bend 150x90	piece	1	30	0	30
Flanged Socket 150	piece	1	16	0	16
Flanged Spigot 150	piece	1	24	0	24
Collar 150	piece	4	63	0	63
Mechanical Joint Accessories 150	piece	7	77	0	77
150 Valve	nos.	1	139	0	139
Pipe SP 50x5500	piece	1	9	0	9
Socket 50	piece	2	1	0	1
Flange 50	piece	2	6	0	6
Valve 50	piece	1	49	0	49
Installation of Pipe 350	meter	6	2	1	3
Installation of Pipe 250	meter	25	9	2	11
Installation of Pipe 150	meter	5	2	0	2
Jointing 350	piece	8	0	3	3
Jointing 250	piece	15	0	4	4
Jointing 150	piece	7	0	2	2
Jointing 50	piece	2	0	0	0
Installation of Valve 350	piece	1	4	2	6
Installation of Valve 250	piece	3	10	3	13
Installation of Valve 150	piece	1	3	1	4
Installation of Valve 50	piece	1	3	0	3
Excavation	cu.m	6	10	4	15
Backfill	cu.m	6	11	5	16
Removal of Surplus	cu.m		1	1	2
Valve Chamber	piece		0	1,800	1,800
Sub Total (4.3)			6,761	1,827	8,588
Total (4)			28,729	2,941	31,670

Note: This measure is not selected but used for economic evaluation.

TABLE D.5.14 CONTINUED (MEASURE i: PART 2)

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
5 Alum dosing Equipment					
5.1 Repair Solution Tank	sq.m	49	280	49	329
5.2 Supply and Install Mixer	set	2	2,160	200	2,360
5.3 Supply and Install Dosing Pump	nos.	2	10,140	200	10,340
5.4 Supply and Install Pipe 40Ax5500	piece	20	314	10	324
Total (5)			12,894	459	13,353
6 Soda Ash Dosing Equipment					
Supply and Install					
Pipe 40Ax5500	piece	10	157	5	162
Valve 40A	nos.	4	183	6	189
Total (6)			340	11	351
7 Disinfection Equipment					
7.1 Supply and Install Measuring Device in					
Calcium Hypochlorite	set	1	743	100	843
7.2 Supply and Install Solution Tank	set	1	657	100	757
7.3 Supply and Install Mixer	set	1	574	100	674
Total (7)			1,974	300	2,274
8 Supply and Water Quality Test Equipment					
Jar Tester	set	1	474	0	474
Turbidimeter	set	1	1,090	0	1,090
Alkalinity	set	1	29	0	29
PH Meter	set	1	277	0	277
Residual Chlorine Meter	set	1	320	0	320
Total (8)			2,190	0	2,190
Total (1 - 8)			149,237	17,434	166,672
9 Common Temporary Cost	%	9	13,431	1,569	15,000
10 Site Expenses	%	12	17,908	2,092	20,001
11 Overhead Expenses	%	10	14,924	1,743	16,667
Total (9 - 11)			46,263	5,405	51,668
Grand Total (1 - 11)			195,501	22,839	218,340

Note; This measure is not selected but used for economic evaluation.

**TABLE D.5.15 COST ESTIMATE FOR METERING
(MEASURE J)**

(Unit: 1,000 T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
NUWA					
Technician (is Persons)	Man.M	744	0	0	0
Driver	Man.M	240	0	960	960
Sub Total			0	960	960
Employment					
Labor	Man.M	720	0	3,600	3,600
Sub Total			0	3,600	3,600
Total (1)			0	4,560	4,560
Vehicle					
Bicycle	Nos	20	1,286	0	1,286
Truck (2ton)	Nos	4	14,857	0	14,857
Sub Total			16,143	0	16,143
Installation Tool					
Threader Machine	Sets	4	2,229	0	2,229
Pipe Cutter for Metal	Sets	4	1,429	0	1,429
Pipe Cutter for Nonmetal	Sets	4	857	0	857
Pipewrench	Sets	4	743	0	743
Spanner	Sets	4	371	0	371
Pipe Vise	Sets	4	2,229	0	2,229
Sub Total			7,857	0	7,857
Construction Tool					
Shovel	Piece	12	0	24	24
Pick	Piece	6	0	12	12
Sub Total			0	36	36
Verification and Repair Equipment					
Master Water Meter	set	4	646	0	646
Driver	set	4	11	0	11
Penchi	set	4	34	0	34
Nipper	set	4	23	0	23
Spanner	set	4	57	0	57
Vice	set	4	1,314	0	1,314
Sub Total			2,086	0	2,086

TABLE D.5.15 CONTINUED (MEASURE J)

Oil Fee					
Diesel 5x25x12x100/5	kl	60	0	9,000	9,000
Oil	Nos	20	0	1,000	1,000
Sub Total			0	10,000	10,000
Total (2)			26,086	10,036	36,122
Material					
Water Meter	piece	15,000	282,857	0	282,857
Socket for Meter	piece	30,000	94,286	0	94,286
Straight Pipe	piece	15,000	49,286	0	49,286
Elbow 90	piece	30,000	8,571	0	8,571
Elbow 45	piece	5,000	2,571	0	2,571
Socket	piece	15,000	4,500	0	4,500
Union	piece	15,000	15,643	0	15,643
Nipple	piece	15,000	4,071	0	4,071
Bushing	piece	5,000	1,857	0	1,857
Valve	piece	15,000	34,286	0	34,286
Sub Total			497,929	0	497,929
Total (3)			497,929	0	497,929
Grand Total			524,014	14,596	538,610

**TABLE D.5.16 COST ESTIMATE FOR ARREASA AND ILLEGAL CONNECTION
(MEASURE k)**

(Unit: thousand T.Shs.)

Description	Unit	Quantity	Foreign Currency	Local Currency	Total
1 Reward	l.s.	1	24,000	96,000	120,000
2 Motorcycle	Nos.	10	2,000	0	2,000
3 Oil	l.s.	1	200	800	1,000
Total			26,200	96,800	123,000

TABLE D.5.17 DISBURSEMENT SCHEDULE FOR LEAKAGE CONTROL MEASURE (TRANSMISSION) (MEASURE a)

(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990		1991		1992		1993		1994		1995	
			Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.
1 Replace Pressure Reducing Valve and pipe 150	sets	16	0	20,701		20,701	0	0	0	0	0	0	0	0
Subsidiary Work	pics.	16	0		9,313	9,313	0	0	0	0	0	0	0	0
Reinstallation Work	pics.	16	0		2,450	2,450	0	0	0	0	0	0	0	0
Total			0	20,701	11,763	32,464	0	0	0	0	0	0	0	0
2 Replace Water Meter in Off-take														
Water Meter 75mm and Material	sets	10	0	2,962		2,962	0	0	0	0	0	0	0	0
Subsidiary Work	pics.	10	0	1,523		1,523	0	0	0	0	0	0	0	0
Reinstallation Work	pics.	10	0		22	22	0	0	0	0	0	0	0	0
Water Meter 150mm and Material	sets	6	0	4,934		4,934	0	0	0	0	0	0	0	0
Subsidiary Work	pics.	6	0	1,018		1,018	0	0	0	0	0	0	0	0
Reinstallation Work	pics.	6	0		77	77	0	0	0	0	0	0	0	0
Total			0	10,437	99	10,536	0	0	0	0	0	0	0	0
Grand Total			0	31,138	11,862	43,000	0	0	0	0	0	0	0	0

TABLE D.5.18 DISBURSEMENT SCHEDULE FOR LEAKAGE CONTROL MEASURE (DISTRIBUTION) (MEASURE b: PART 1)

(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990		1991		1992		1993		1994		1995	
			Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.
REPLACE SERVICE PIPE WITH DISTRIBUTION PIPE 100mm	m	90,000											180,000	432,000
													612,000	612,000

TABLE D.5.19 DISBURSEMENT SCHEDULE FOR LEAKAGE CONTROL MEASURE (DISTRIBUTION) (MEASURE B: PART 2)

(Unit: T.Shs. 1,000)

Description	Unit	Quan- tity	1990 Total	1991		1992		1993		1994		1995	
				F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.
NUMA													
Expert	Man-M	36	0	34,286	0	34,286	34,286	0	34,286	0	0	0	0
Chief Engineer	Man-M	72		144	0	144	144	0	144	0	144	0	144
Engineer	Man-M	216		360	0	360	360	0	360	0	360	0	360
Technician	Man-M	1,440		1,728	0	1,728	1,728	0	1,728	0	1,728	0	1,728
Driver	Man-M	1,020		672	0	672	672	0	672	0	672	0	672
Employment													
Labor	Man-M	7,200		6,000	0	6,000	6,000	0	6,000	0	6,000	0	6,000
Operator	Man-M	840		792	0	792	792	0	792	0	792	0	792
Total (1)				34,286	9,696	43,982	34,286	9,696	43,982	34,286	9,696	43,982	34,286
Vehicle													
Bicycle	Nos.	0		0	0	0							
Truck with Crane (4ton)	No.	6		64,286	0	64,286							
Truck with Crane (2ton)	Nos.	5		32,143	0	32,143							
Leakage Survey Car	Nos.	3		21,429	0	21,429							
Sub Total				117,857	0	117,857							
Filed Study Equipment													
Ultrasonic Flowmeter	Sets	0	(12,857)	0	0	0							
Water Meter	Sets	3		686	0	686							
Water Pressure Recorder	Sets	0	(729)	0	0	0							
Pressure Gage	Sets	3		116	0	116							
Ear Piece	Sets	3	(120)	120	0	120							
Leak Detector	Sets	6		6,429	0	6,429							
Iron Pipe and	Sets	3	(3,600)	3,600	0	3,600							
Live Cable Locator	Sets	3		0	0	0							
Sound Wave type	Sets	3	(7,714)	7,714	0	7,714							
Pipeline Detector	Sets	3		0	0	0							
Hose	Nos.	6		634	0	634							
Installation Device	Sets	3		6,429	0	6,429							
Transceiver	Nos.	9	(1,486)	1,857	0	1,857							
Torch	Nos.	18		129	0	129							
Master Pressure Meter	set	1		743	0	743							
Master Water Meter	set	1		386	0	386							
Sub Total			(26,506)	28,841	0	28,841							

TABLE D.5.19 CONTINUED

(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990 Total	1991 F.C. L.C. Total	1992 F.C. L.C. Total	1993 F.C. L.C. Total	1994 F.C. L.C. Total	1995 F.C. L.C. Total
Repair Tool								
Threader Machine	set	10	(1,114)	5,571 0 5,571				
Tap Machine for Metal	set	10	(1,486)	7,429 0 7,429				
Tap Machine for Non-metal	set	10	(743)	3,714 0 3,714				
Pipe Cutter for Metal								
(Large)	set	7	(0)	19,500 0 19,500				
Pipe Cutter for Non-metal								
(Large)	set	7	(0)	2,600 0 2,600				
Pipe Cutter for Metal								
(Small)	set	9	(1,071)	3,214 0 3,214				
Pipe Cutter for Non-metal								
(Small)	set	8	(643)	1,929 0 1,929				
Pipe wrench	Sets	25	(743)	9,657 0 9,657				
Spanner	Sets	27	(0)	5,200 0 5,200				
Pipe Vise	Sets	13	(0)	7,243 0 7,243				
Sub Total			(5,800)	66,057 0 66,057				
Construction Equipment								
Shovel	Pics.	100	(0)	0 200 200				
Pick	Pics.	50	(0)	0 100 100				
Concrete Breaker	set	4	(857)	1,714 0 1,714				
Water Pump	Nos.	4	(1,857)	3,714 0 3,714				
Generator	Nos.	4	(9,143)	18,286 0 18,286				
Sub Total			(11,857)	23,714 300 24,014				
Total (2)			(44,163)	236,470 300 236,770				
Oil Fee								
Diesel 15X25X12X100/5	kl	510		0 12,600 12,600				
Oil	Nos.	85		0 700 700				
Total (3)				0 13,300 13,300				
Install Flow Meter								
Connector for Block	block	300		27,386 3,000 30,386				
Install Valve for Block	sets	350		6,071 125 6,196				
Total (4)				33,457 3,125 36,582				
Material for Repair								
Repair Valve etc.	Pics.	600		4,058 0 4,058				
Repair Fire Hydrant	Pics.	100		342 0 342				
Repair Expansion Joint	Pics.	700		0 0 0				
Repair Distribution Pipe	Pics.	1,000		0 0 0				
Repair Branching	Pics.	1,000		0 0 0				
Repair Curb Cock	Pics.	4,100		18,642 0 18,642				
Repair Expansion Joint	Pics.	5,200		0 0 0				
Repair Service Pipe	Pics.	8,000		0 0 0				
Repair Tap	Pics.	50,000		43,804 0 43,804				
Total (5)			(0)	66,846 0 66,846				
Grand Total			(44,163)	371,059 26,421 397,480	240,756 34,696 275,452	217,751 34,696 252,447	148,804 34,696 183,500	113,704 31,521 145,225

TABLE D.5.20 DISBURSEMENT SCHEDULE FOR LEAKAGE CONTROL MEASURE (MAPPING) (MEASURE b PART 3)

(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990 Total	1991 F.C. L.C. Total	1992 F.C. L.C. Total	1993 F.C. L.C. Total	1994 F.C. L.C. Total	1995 F.C. L.C. Total
NUWA								
Engineer	Man.M	60	0	0 120 120	0 120 120	0 120 120	0 120 120	0 120 120
Technician	Man.M	480	0	0 576 576	0 576 576	0 576 576	0 576 576	0 576 576
Sub Total			0	0 696 696	0 696 696	0 696 696	0 696 696	0 696 696
Drawing Equipment								
Copy Machine (1-1)	Set	1	(3,214)		0 0 0	0 0 0	0 0 0	0 0 0
Blue Printing Machine	Set	1		857 0 857	0 0 0	0 0 0	0 0 0	0 0 0
Drawing Case	sets	8		0 400 400	0 0 0	0 0 0	0 0 0	0 0 0
Drawing Tool	sets	8		3,429 0 3,429	0 0 0	0 0 0	0 0 0	0 0 0
Sub Total			(3,214)	4,286 400 4,686	0 0 0	0 0 0	0 0 0	0 0 0
Articles of Consumption								
Film for Drawing 92cmx20m	rolls	6		0 240 240	0 240 240	0 240 240	0 240 240	0 240 240
Film for Second Drawing								
Size A1	box	1		0 40 40	0 40 40	0 40 40	0 40 40	0 40 40
Blue Printing Roll Paper	rolls	50		0 400 400	0 400 400	0 400 400	0 400 400	0 400 400
Copy Paper A3	box	12		0 72 72	0 72 72	0 72 72	0 72 72	0 72 72
Copy Paper A4	box	24		0 72 72	0 72 72	0 72 72	0 72 72	0 72 72
Sub Total				0 824 824	0 824 824	0 824 824	0 824 824	0 824 824
Total			(3,214)	4,286 1,920 6,206	0 1,520 1,520	0 1,520 1,520	0 1,520 1,520	0 1,520 1,520

TABLE D.5.21 DISBURSEMENT SCHEDULE FOR EXISTING PIPE CONNECTION (MEASURE D)

(Unit: I.Shs. 1,000)

Description	Unit	Quan- tity	1990		1991		1992		1993		1994		1995		
			Total		F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.
1 NODE 101-112 (825)	L.S.	1			22,000	5,000	27,000								
2 NODE 106-115 (450)	L.S.	1	0		11,000	3,000	14,000	0	0	0	0	0	0	0	0
3 NODE 103-114 (525)	L.S.	1	0		11,000	3,000	14,000	0	0	0	0	0	0	0	0
4 NODE 103-204 (525)	L.S.	1	0		11,000	3,000	14,000	0	0	0	0	0	0	0	0
5 NODE 207-209 (600)	L.S.	1	0		28,000	7,000	35,000	0	0	0	0	0	0	0	0
6 NODE 109-206 (400)	L.S.	1	0		18,000	5,000	23,000	0	0	0	0	0	0	0	0
7 NODE 214-215 (400)	L.S.	1	0		23,000	5,000	28,000	0	0	0	0	0	0	0	0
8 NODE 214-232 (300)	L.S.	1	0		17,000	4,000	21,000	0	0	0	0	0	0	0	0
9 NODE 220-222 (300)	L.S.	1	0		6,000	2,000	8,000	0	0	0	0	0	0	0	0
10 NODE 234-307 (300)	L.S.	1	0		3,000	1,000	4,000	0	0	0	0	0	0	0	0
11 NODE 307-325 (400)	L.S.	1	0		10,000	3,000	13,000	0	0	0	0	0	0	0	0
12 NODE 221-223 (400)	L.S.	1	0		18,000	4,000	22,000	0	0	0	0	0	0	0	0
13 NODE 303-326 (250)	L.S.	1	0		16,000	4,000	20,000	0	0	0	0	0	0	0	0
14 NODE 209-235 (600)	L.S.	1	0		44,000	9,000	53,000	0	0	0	0	0	0	0	0
Total			0		238,000	58,000	296,000	0	0	0	0	0	0	0	0

Note: L.S. = Lump sum

TABLE D.5.22 DISBURSEMENT SCHEDULE FOR MAIN PIPE LAYING PRIMARY (MEASURE d)

(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990 Total	1991		1992		1993		1994		1995			
				F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total
1 Kinondoni															
Supply and Install 400	m	1,600	0	0	0	0	96,000	21,000	117,000	0	0	0	0	0	0
Supply and Install 300	m	1,000	0	0	0	0	40,000	10,000	50,000	0	0	0	0	0	0
Supply and Install 200	m	2,000	0	0	0	0	50,000	12,000	62,000	0	0	0	0	0	0
Sub-total			0	0	0	0	186,000	43,000	229,000	0	0	0	0	0	0
2 Msasani															
Supply and Install 500	m	1,000	0	0	0	0	84,000	18,000	102,000	0	0	0	0	0	0
Supply and Install 400	m	2,900	0	0	0	0	174,000	38,000	212,000	0	0	0	0	0	0
Supply and Install 300	m	1,300	0	0	0	0	52,000	13,000	65,000	0	0	0	0	0	0
Supply and Install 200	m	1,500	0	0	0	0	38,000	9,000	47,000	0	0	0	0	0	0
Sub-total			0	0	0	0	348,000	78,000	426,000	0	0	0	0	0	0
3 Temeke															
Supply and Install 500	m	2,300	0	0	0	0	0	193,000	41,000	234,000	0	0	0	0	0
Supply and Install 400	m	2,000	0	0	0	0	0	120,000	26,000	146,000	0	0	0	0	0
Sub-total			0	0	0	0	0	313,000	67,000	380,000	0	0	0	0	0
4 S & L Pipe at Kurasini															
Supply and Install 500	m	1,300	0	0	0	0	0	109,000	23,000	132,000	0	0	0	0	0
Supply and Install 400	m	1,700	0	0	0	0	0	102,000	22,000	124,000	0	0	0	0	0
Supply and Install 250	m	1,300	0	0	0	0	0	44,000	10,000	54,000	0	0	0	0	0
Supply and Install 200	m	500	0	0	0	0	0	13,000	3,000	16,000	0	0	0	0	0
Sub-total			0	0	0	0	0	268,000	58,000	326,000	0	0	0	0	0
5 Kigamboni															
Supply and Install 300	m	5,100	0	0	0	0	0	204,000	51,000	255,000	0	0	0	0	0
Sub-total			0	0	0	0	0	204,000	51,000	255,000	0	0	0	0	0
6 Mbagala															
Supply and Install 250	m	5,100	0	0	0	0	0	173,000	41,000	214,000	0	0	0	0	0
Sub-total			0	0	0	0	0	173,000	41,000	214,000	0	0	0	0	0
Total		15,300	0	0	0	0	534,000	121,000	655,000	958,000	217,000	1,175,000	0	0	0

TABLE D.5.23 DISBURSEMENT SCHEDULE FOR MAIN PIPE LAYING SECONDARY (MEASURE e)

(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990	1991		1992		1993		1994		1995		
			Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.
1 Mbezi														
Supply and Install 100mm	m	10,000									20,000	48,000	68,000	
Supply and Install 150mm	m	4,300									17,000	27,000	44,000	
Sub-total											37,000	75,000	112,000	
2 Tabata														
Supply and Install 100mm	m	6,500									13,000	31,000	44,000	
Supply and Install 150mm	m	2,800									11,000	17,000	28,000	
Sub-total											24,000	48,000	72,000	
3 Ukonga														
Supply and Install 100mm	m	3,100									6,000	15,000	21,000	
Supply and Install 150mm	m	1,300									5,000	8,000	13,000	
Sub-total											11,000	23,000	34,000	
4 Yombo														
Supply and Install 100mm	m	5,800									12,000	28,000	40,000	
Supply and Install 150mm	m	2,500									10,000	16,000	26,000	
Sub-total											22,000	44,000	66,000	
5 Kigamboni														
Supply and Install 100mm	m	7,400									15,000	36,000	51,000	
Supply and Install 150mm	m	3,100									12,000	19,000	31,000	
Sub-total											27,000	55,000	82,000	
Total											121,000	245,000	366,000	

TABLE D.5.24 DISBURSEMENT SCHEDULE FOR PIPE CLEANING (MEASURE D)

(Unit: T.shs. 1,000)

Description	Unit	Quantity	1990			1991			1992			1993			1994			1995		
			Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.
MANUA																				
Expert	Man.M	24	0	68,571		68,571	0		0			0			0			0		
Engineer	Man.M	120	0		240	240	0		240		240	240		240	240		240	240		240
Technician	Man.M	1,440	0		1,728	1,728	0		1,728		1,728	1,728		1,728	1,728		1,728	1,728		1,728
Driver	Man.M	480	0		384	384	0		384		384	384		384	384		384	384		384
Sub Total			0	68,571	2,352	70,923	0		2,352	2,352	0	2,352	2,352	0	2,352	2,352	0	2,352	2,352	0
Employment																				
Labor	Man.M	2,520	0		2,520	2,520	0		2,520		2,520	2,520		2,520	2,520		2,520	2,520		2,520
Operator	Man.M	480	0		576	576	0		576		576	576		576	576		576	576		576
Sub Total			0	0	3,096	3,096	0		3,096	3,096	0	3,096	3,096	0	3,096	3,096	0	3,096	3,096	0
Total (1)			0	68,571	5,448	74,019	0		5,448	5,448	0	5,448	5,448	0	5,448	5,448	0	5,448	5,448	0
Vehicle																				
Truck with Crane (4ton)	Mos	8	0	85,714		85,714	0		0		0	0		0	0		0	0		0
Sub Total			0	85,714		85,714	0		0		0	0		0	0		0	0		0
Cleaning & Lining																				
Lining Machine with Trowel	Sets	3	0	6,000		6,000	0		0		0	0		0	0		0	0		0
Lining Winch	Sets	3	0	25,286		25,286	0		0		0	0		0	0		0	0		0
Mortar Pump	Sets	3	0	3,857		3,857	0		0		0	0		0	0		0	0		0
Mortar Mixer & Hose	Sets	3	0	17,571		17,571	0		0		0	0		0	0		0	0		0
Compressor & Air Hose	Sets	3	0	15,429		15,429	0		0		0	0		0	0		0	0		0
Seal Coat Machine	Sets	3	0	3,429		3,429	0		0		0	0		0	0		0	0		0
Wire Winch etc.	Sets	3	0	21,857		21,857	0		0		0	0		0	0		0	0		0
Roller	Sets	3	0	7,286		7,286	0		0		0	0		0	0		0	0		0
Pronged	Sets	3	0	3,857		3,857	0		0		0	0		0	0		0	0		0
Scraper	Sets	3	0	11,143		11,143	0		0		0	0		0	0		0	0		0
Others(transceiver, Hose, etc)	l.s.	1	0	2,857		2,857	0		0		0	0		0	0		0	0		0
Sub Total			0	118,572	0	118,572	0		0	0	0	0		0	0		0	0		0

TABLE D.5.24 CONTINUED

(Unit: T.Shs. 1,000)

Description	Unit	Quan- tity	1990 Total	1991		1992		1993		1994		1995					
				F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	Total	
Scouring																	
Scouring Machine	Sets	2		19,143		19,143											
Spare Parts	l.s.	1		1,000		1,000											
Others(Transceiver,Hose, etc.)	l.s.	1		1,429		1,429											
Sub Total				20,572	1,000	21,572											
Repair Tool																	
Pipe Cutter for Metal	Sets	3	0	8,357		8,357	0										0
Others(Pipewrench, Spanner,Pipe Vise etc.)	Sets	1	0	10,000		10,000	0										0
Sub Total			0	18,357	0	18,357	0	0	0	0	0	0	0	0	0	0	0
Construction Equipment																	
Water Pump	Nos.	8	0	7,429		7,429	0										0
Generator	Nos.	8	0	36,571		36,571	0										0
Others(Shovel,Pick,etc)	Sets	1	0	700		700	0										0
Sub Total				44,000	700	44,700	0	0	0	0	0	0	0	0	0	0	0
Total (2)				287,215	1,700	288,915	0	0	0	0	0	0	0	0	0	0	0
Oil Fee																	
Diesel 30X25X12X100/5	kl	240		7,200		7,200	7,200		7,200	7,200		7,200	7,200		7,200	7,200	7,200
Oil	Nos.	40		400		400	400		400	400		400	400		400	400	400
Sub Total				0	7,600	7,600	7,600	0	7,600	7,600	0	7,600	7,600	0	7,600	7,600	7,600
Total (3)				0	7,600	7,600	7,600	0	7,600	7,600	0	7,600	7,600	0	7,600	7,600	7,600
Material																	
S & I Valve	Nos	120		5,829		5,829	5,829		5,829	5,829		5,829	5,829		5,829	5,829	5,829
Thimble	Nos	5,200		28,571		28,571	30,000		30,000	30,000		30,000	30,000		30,000	30,000	30,000
Portland Cement	t	540		2,400		2,400	2,640		2,640	2,640		2,640	2,640		2,640	2,640	2,640
Sand	t	740		10,000		10,000	10,714		10,714	10,714		10,714	10,714		10,714	10,714	10,714
Admixture	t	54		1,857		1,857	2,043		2,043	2,043		2,043	2,043		2,043	2,043	2,043
Seal Coat	t	25		4,429		4,429	4,429		4,429	4,429		4,429	4,429		4,429	4,429	4,429
Sub Total				50,686	2,400	53,086	53,015	2,640	55,655	53,015	2,640	55,655	53,015	2,640	55,655	53,015	55,655
Total (4)				50,686	2,400	53,086	53,015	2,640	55,655	53,015	2,640	55,655	53,015	2,640	55,655	53,015	55,655
Grand Total				406,472	17,148	423,620	53,015	15,688	68,703	53,015	15,688	68,703	53,015	15,688	68,703	53,015	68,703

TABLE D.5.25 DISBURSEMENT SCHEDULE FOR MIDDLE ZONE CREATION (MEASURE g)

(Unit: T.Shs. 1,000)

Description	Unit	Quan- tity	1990		1991		1992		1993		1994		1995		
			Total		F.C.	L.C.	Total		F.C.	L.C.	Total		F.C.	L.C.	Total
1 Break Pressure Tank (10,600m3)	L.s.	1											195,000	459,000	654,000
2 S & L Pipe at Ubungo (900mm)	m	2,800											566,000	118,000	684,000
3 S & L Pipe at Vingunguti (500mm)	m	5,000											420,000	90,000	510,000
Total													1,181,000	667,000	1,848,000

Note : S & I = supply and install

TABLE D.5.26 DISBURSEMENT SCHEDULE FOR LOWER RUVU (MEASURE h:PART 1)

(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990		1991		1992		1993		1994		1995	
			Total		F.C.	L.C.	Total		F.C.	L.C.	Total		F.C.	L.C.
1. Raw Water Pump Station Low Water Level Sensor	sets	2			400	56	456							
2. Repair Sludge Pipe Leakage, Sedimentation Basin														
2.1 Pipe Materials	Pics	7			500	0	500							
Pipe 200x5000	Pics	1			21	0	21							
Flanged Spigot 200	Pics	1			36	0	36							
Flanged Socket 200	Pics	8			160	0	160							
Collar 200	Pics	1			486	0	486							
Valve 200	nos.	1			357	0	357							
Headstock	nos.	1			171	0	171							
Mechanical Joint	sets	12			1,731	0	1,731							
Sub Total														
2.2 Installation Works														
Installation Pipe 200	meter	35			12	3	14							
Installation Valve 200	nos.	1			3	1	4							
Installation Headstock	nos.	1			3	1	4							
for Valve 200														
Jointing 200	Pics	12			0	3	3							
Valve Box	Pics	1			143	200	343							
Sub Total					161	207	368							
2.3 Pushing Works														
Concrete Breaking at	cu.m	2			14	2	16							
Base of Clarifier														
Liner Plate for Shaft	meter	6			5,477	0	5,477							
D=4500														
Pipe HP 1500	Pics	13			3,584	0	3,584							
Collar 1500	sets	12			771	0	771							
Pushing 1500	meter	30			6,429	1,500	7,929							
Sub Total					16,276	1,502	17,778							
2.4 Earth Works														
Excavation	cu.m	100			16	7	23							
Backfill	cu.m	75			14	6	19							
Removal of Soil	cu.m	25			11	5	16							
Sub Total					41	17	58							
Total (2)					18,209	1,727	19,936							
3. Replacement of Pipe and Valve, Disinfection Equipment														
Pipe 25Ax5500	Pics	4			29	2	31							
Reducing Valve 25A	nos.	1			929	1	929							
Pressure Gage 25A	nos.	1			143	1	143							
Total (3)					1,100	3	1,103							
Total (1 - 3)					19,709	1,786	21,495							
4. Common Temporary Cost	%	9			1,774	161	1,935							
5. Site Expenses	%	12			2,365	214	2,579							
6. Overhead Expenses	%	10			1,971	179	2,150							
Total (4 - 6)					6,110	554	6,664							
Grand Total (1 - 6)					25,819	2,340	28,159							

TABLE D.5.27 DISBURSEMENT SCHEDULE FOR MTONI (MEASURE h:PART 2)

(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990 Total	F.C.	L.C.	Total	1992 F.C.	L.C.	Total	1993 F.C.	L.C.	Total	1994 F.C.	L.C.	Total	1995 F.C.	L.C.	Total
1. Receiving Well and Coagulation Basin	sq.m	801																
1.1 Paint and Repair Wall	pics.	5		4,463	1,121	5,584												
1.2 Replacement of Baffle Board	pics.	5		207	205	412												
1.3 Replacement of Training Wall	pics.	5		1,200	445	1,645												
Total (1)				5,870	1,771	7,641												
2. Alum dosing Equipment	sq.m	49		280	49	329												
2.1 Repair Solution Tank	sets	2		2,160	200	2,360												
2.2 Supply and Install Mixer	nos.	2		10,140	200	10,340												
2.3 Supply and Install Dosing Pump	pics.	20		314	10	324												
2.4 Supply and Install Pipe 40Ax5500	pics.	20		12,894	459	13,353												
Total (2)																		
3. Soda Ash Dosing Equipment: Supply and Install pipe 40Ax5500 Valve 40A	pics.	10		157	5	162												
Total (3)		4		183	6	189												
4. Disinfection Equipment	Set	1		743	100	843												
4.1 Supply and Install Measuring Device in Calcium Hypochlorite	Set	1		657	100	757												
4.2 Supply and Install solution Tank	Set	1		574	100	674												
4.3 Supply and Install Mixer	Set	1		1,974	300	2,274												
Total (4)				21,078	2,541	23,619												
TOTAL (1 - 4)																		
5. Common Temporary Cost	%	9		1,897	229	2,126				0	0	0						
6. Site Expenses	%	12		2,529	305	2,834				0	0	0						
7. Overhead Expenses	%	10		2,108	254	2,362				0	0	0						
Total (5 - 7)				6,534	788	7,322				0	0	0						
Grand Total (1 - 7)				27,612	3,329	30,941				0	0	0						

TABLE D.5.28 DISBURSEMENT SCHEDULE FOR METERING (MEASURE I)

(Unit: T.Shs. 1,000)

Description	Unit	Quan- tity	1990 Total	1991		1992		1993		1994		1995	
				F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.
MUNA													
Technician	Man.M	744	-										
Driver	Man.M	240											
Labor	Man.M	720											
Total (1)													
Vehicle	Nos	20											
Bicycle	Nos	4											
Truck (2ton)													
Sub Total													
Installation Tool													
Threader Machine	Sets	4											
Pipe Cutter for Metal	Sets	4											
Pipe Cutter for Non-metal	Sets	4											
Pipe wrench	Sets	4											
Spanner	Sets	4											
Pipe Vise	Sets	4											
Sub Total													
Construction Tool													
Shovel	Piece	12											
Pick	Piece	6											
Sub Total													
Verification and Repair													
Equipment													
Master Water Meter	sets	4	(484)										
Driver	sets	4											
Penchi	sets	4											
Nipper	sets	4											
Spanner	sets	4											
Vice	sets	4											
Sub Total			(484)										
Oil Fee	kl	60											
Diesel	Nos.	20											
Oil													
Sub Total													
Total (2)			(484)										
Material													
Water Meter	Pics.	15,000											
Socket for Meter	Pics.	30,000											
Straight Pipe	Pics.	15,000											
Elbow 90	Pics.	30,000											
Elbow 45	Pics.	5,000											
Socket	Pics.	15,000											
Union	Pics.	15,000											
Nipple	Pics.	15,000											
Bushing	Pics.	5,000											
Valve	Pics.	15,000											
Sub Total													
Total (3)													
Grand Total			(484)										

TABLE D.5.29 DISBURSEMENT SCHEDULE FOR ARREARS AND ILLEGAL CONNECTION COST (MEASURE K)
(Unit: T.Shs. 1,000)

Description	Unit	Quantity	1990			1991			1992			1993			1994			1995		
			Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.
1 Reward	l.s.	1		24,000	0	24,000	24,000	0	24,000	24,000	0	24,000	24,000	0	24,000	24,000	0	24,000	0	24,000
2 Motorcycle	Nos.	10		2,000	0	2,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Oil	l.s.	1		200	0	200	200	0	200	200	0	200	200	0	200	200	0	200	0	200
Total				26,200	0	26,200	24,200	0	24,200	24,200	0	24,200	24,200	0	24,200	24,200	0	24,200	0	24,200