
TABLES

Table 1 Results of Water Quality Test
(Basic Design Report on Water Supply Project in Lusaka)

No.	サイト名	採水区分	EC	pH	Fe	No2-N	No3-N	NH4-N	F	加鈣硬度	総硬度	Cl	大腸菌群	一般細菌
			μS/cm		ppm	mg/l	mg/l	mg/l	ppm	ppm	ppm	ppm	個/ml	個/ml
1	George	浅井戸	900	6.70	0.5	0.060	-	0.4	0	285	525	165	32	24
2	Soweto	浅井戸	810	6.74	0.5	0.030	-	0.0	0	270	725	80	70	68
3	Desai	浅井戸	1,300	6.80	0.5	0.060	-	0.4	0	325	515	120	44	80
4	Chikolokoso	浅井戸	1,100	7.05	0.5	0.015	-	0.4	0	245	515	115	汚染大	汚染大
5	Paradise	浅井戸	840	7.02	0.5	0.006	-	0.4	0	280	510	75	43	65
6	George	浅井戸	730	7.14	0.5	0.000	1.15	0.0	0	220	460	45	16	41
7	George	深井戸	1,000	6.60	0.5	0.015	-	0.4	0	370	765	170	0	3
8	Twikatne	LWSC 井戸 No.70	760	6.75	0.2	0.006	-	0.4	0	325	565	110	1	3
9	North mead	42	720	7.05	0.2	0.000	0.46	0.0	0	225	370	30	1	29
10	Mass media	31	710	7.10	0.2	0.000	1.15	0.0	0	285	365	35	0	42
11	Chelston	9	710	7.04	0.2	0.000	0.46	0.0	0	220	355	30	0	20
12	Chainda	4	750	7.06	0.2	0.000	1.15	0.0	0	260	445	35	0	17
13	Show ground	49	720	7.06	0.2	0.000	0.46	0.0	0	275	400	30	0	14
14	Leopard hill	22	710	7.04	0.2	0.000	1.15	0.0	0	285	405	30	0	0
15	Old pump sta.	43	700	7.14	0.2	0.000	1.15	0.0	0	245	415	25	0	0
16	Bauleni	1	770	7.04	0.2	0.000	2.30	0.0	0	270	435	30	0	9
17	International	16	690	7.03	0.2	0.000	0.46	0.0	0	220	390	30	0	1
18	Lumumba 4b	27	370	7.30	0.2	0.000	0.46	0.0	0	115	230	20	0	5
19	Chunga	12	840	7.21	0.2	0.000	0.23	0.0	0	210	230	60	0	31
20	Kafue river	河川水	260	7.80	0.2	0.000	0.00	0.4	0	65	120	15	3	33
21	Kizito LWSC	水道水	390	7.41	0.2	0.000	1.15	0.4	0	115	200	20	0	6
22	George LWSC	水道水	480	7.24	0.5	0.000	2.30	0.4	0	150	265	30	0	1
水質基準	WHO		2000	7.0 -8.5	0.3	-	40	0.5	1.0	-	100 - 500	200	0	-
	日本		-	5.8 -8.6	0.3		10		0.8	-	300	200	陰性	100

File

Table 2 Results of Water Quality Test of Deep Wells (LWSC)

LUSAKA WATER AND SEWERAGE COMPANY

MEMORANDUM

TO : Manager Water Supply
FROM : Manager Water Quality Assurance
DATE : March 3, 2003
REF : EWQL/561.0030/MWQA/ac
SUBJ : Weekly Potable Water Quality Status report - LUSAKA

Please find attached a weekly status report on potable water quality from boreholes and reservoirs for the week ended March 2, 2003

25 out of 36 samples collected from boreholes and reservoirs for bacteriological analysis were satisfactory according to Zambian Standards for drinking water.



G. CHIKAMA.

Cc: Director of Engineering
Senior Engineer- Production and transmission

INIC - Too numerous to count

2002

200 |

PRODUCTION BOREHOLES AND RESERVOIRS - LUSAKA
Weekly Water Quality Status Report
 FROM 24 /02/03 to 02/03/03

No	LOCATION	DATE OF SAMPLE	BACTERIAL COUNT		RES Cl ₂ mg/L	Remark
			T.C/100ml	F.C/100ml		
1	BAULENI	28/02/03	0	0	NC	S
2	BUCKLEY I	25/02/03	0	0	NC	S
3	BUCKLEY II	25/02/03	0	0	<0.1	S
4	CHAINDA					Not sampled
5	CHAWAMA 1	27/02/03	TNTC	0	NC	U
6	CHAWAMA 3					No sampling pt
7	CHAWAMA RES	28/02/03	0	0	1.0	S
8	CHELSTONE 2					Not sampled
9	CHELSTONE 3					Not sampled
10	CHELSTONE NEW RES	25/02/03	0	0	0.5	S
11	CHILENJE SOUTH					OFF
12	CHUNGA 1 B.H					Not sampled
13	CHUNGA 2 B.H					Not sampled
14	FREEDOM B.H	25/02/03	0	0	NC	S
15	HEADOFFICE					Not sampled
16	HIGHCOURT RES	27/02/03	TNTC	0	1.0	U
17	IBEX HILL B.H	27/02/03	8	0	NC	U
18	INT SCHOOL 6A					unaccessible
19	INT SCHOOL 6B					unaccessible
20	INT SCHOOL 6C					unaccessible
21	INT SCHOOL 6D					unaccessible
22	INT SCHOOL 6E	27/02/03	0	0	NC	S
23	INT SCHOOL 6F	27/02/03	0	0	NC	S
24	JOHN HOWARD B.H	25/02/03	0	0	<0.1	S
25	JOHN LAING B.H	28/02/03	1	0	<0.1	S
26	KALINGALINGA 7C					Not sampled
27	KAMANGA B.H 7					Not sampled
28	LAKE ROAD B.H	27/02/03	3	0	NC	S
29	LEOPARDS HILL 1	27/02/03	TNTC	0	NC	U
30	LEOPARDS HILL 11	27/02/03	20	0	NC	U
31	LILAYI 1	25/02/03	TNTC	0	NC	U
32	LILAYI 11	25/02/03	0	0	NC	S
33	LUMUMBA RES					Not sampled
34	LUMUMBA 4A					Not sampled
35	MALOFARM I					Not sampled
36	MALOFARM 11					OFF
37	MASS MEDIA 1	27/02/03	0	0	NC	S
38	MASS MEDIA 2	27/02/03	1	0	NC	S
39	MASS MEDIA 3	27/02/03	TNTC	0	NC	U
40	MASS MEDIA 4	27/02/03	0	0	NC	S
41	MASS MEDIA NEW RES	27/02/03	0	0	<0.1	S
42	MATERO TANKS					Not sampled
43	MULUNGUSHI 6A					Not sampled
44	MULUNGUSHI 6H	27/02/03	0	0	NC	S
45	NIPA B.H					Not sampled

46	NORTHMEAD 1	27/02/03	6	0	NC	U
47	NORTHMEAD 2	27/02/03	7	0	NC	U
48	NGOMBE	25/02/03	0	0	0.6	S
49	NRDC B.H I					Not sampled
50	NRDC B.H II					Not sampled
51	NRDC B.H III					Not sampled
52	NRDC B.H IV					Not sampled
53	OLD PUMP STATION	27/02/03	0	0	NC	S
54	PARIRENYATWA	27/02/03	0	0	NC	S
55	PARKS NURSERY	27/02/03	0	0	NC	S
56	PLANT 1					Not sampled
57	PLANT 2					Not sampled
58	QUARRIES	28/02/03	15	0	<0.1	U
59	ROADSIDE 1					Not sampled
60	ROADSIDE 2					OFF
61	ROADSIDE 4					Not sampled
62	ROADSIDE 5					OFF
63	ROADSIDE 6					Not sampled
64	SHAFT 5	25/02/03	16	0	NC	U
65	SHOWGROUNDS					Pump uplifted
66	ST. PARK WEST	27/02/03	0	0	0.3	S
67	ST. PARK EAST	27/02/03	1	0	0.4	S
68	UTH	25/02/03	0	0	<0.1	Not sampled
69	Venta 1 B. H					Not sampled
70	Venta 2 B. H					Not sampled
71	Venta 3 B. H					Not sampled
72	WATER WORKS 1					Pump uplifted
73	WATERWORKS 2					Not sampled
74	WOODLAND TOWER	27/02/03	3	0	1.0	S

Key: T.C – Total coliforms S - Satisfactory NC - not chlorinated
 F.C – Faecal coliforms U- Unsatisfactory

SUMMARY

- Total number of chlorinated boreholes and reservoirs - 20
- Total number of samples collected from chlorinated boreholes and reservoirs -13
- Number of samples satisfactory - 11 (85 %)
- Total number of unchlorinated boreholes - 54
- Total number of samples collected from unchlorinated boreholes - 23
- Number of samples satisfactory - 14 (61 %)

PRODUCTION BOREHOLES AND RESERVOIRS - LUSAKA
Weekly Water Quality Status Report
 FROM 25/02/02 to 03/03/02

No	LOCATION	DATE OF SAMPLE	BACTERIAL COUNT		RES Cl ₂ mg/L	Remark
			T.C/100ml	F.C/100ml		
1	BAULENI	27/02/02	0	0	<0.1	S
2	BUCKLEY	26/02/02	0	0	0.8	S
3	CHAINDA	28/02/02	0	0	NIL	S
4	CHAWAMA 1	26/02/02	0	0	NC	S
5	CHAWAMA 3	"	0	0	"	S
6	CHAWAMA RES	"	0	0	0.2	S
7	CHELSTONE 2	28/02/02	0	0	NC	S
8	CHELSTONE 3	"	0	0	"	S
9	CHELSTONE TOWER	"	0	0	"	S
10	CHILENJE SOUTH	27/02/02	0	0	NC	S
11	CHUNGA 1	03/03/02	0	0	0.1	S
12	CHUNGA 2	"	0	0	0.1	S
13	FREEDOM	26/02/02	0	0	0.8	S
14	GEORGE COMPLEX 1	03/03/02	0	0	NC	S
15	GEORGE COMPLEX 2	"	0	0	"	S
16	GEORGE COMPLEX 3	"	1	0	"	S
17	GEORGE COMPLEX 4	"				Pump off
18	GEORGE COMPLEX 5	"	0	0	"	S
19	GEORGE COMPLEX 6	"	0	0	"	S
20	GEORGE COMPLEX 7	"	8	0	"	U
21	GEORGE COMPLEX 8	"	0	0	"	S
22	G. COMPLEX 1 RES	"	0	0	NIL	S
23	G. COMPLEX 2 RES	"	0	0	<0.1	S
24	G. COMPLEX 3 RES	"	0	0	0.3	S
25	G. COMPLEX 4 RES	"	0	0	0.7	S
26	G. COMPLEX 5 RES	"	0	0	0.1	S
27	G. COMPLEX 6 RES	"	0	0	0.6	S
28	G. COMPLEX 7 RES	28/02/02	0	0	0.1	S
29	G. COMPLEX 8 RES					
30	HEADOFFICE					
31	HIGHCOURT RES	25/02/02	0	0	0.2	S
32	IBEX HILL	27/02/02	1	0	NC	S
33	INT SCHOOL 6A	27/02/02	0	0	NC	S
34	INT SCHOOL 6B	"	0	0	"	S
35	INT SCHOOL 6C	"	2	0	"	S
36	INT SCHOOL 6D	"	0	0	"	S
37	INT SCHOOL 6E	"	0	0	"	S
38	JOHN HOWARD					
39	JOHN LAING	25/02/02	10	1	NIL	U
40	KALINGALINGA 7C	28/02/02	0	0	<0.1	S
41	LAKE ROAD	27/02/02	1	0	NC	S

42	LEOPARDS HILL 1	27/02/02	1	0	NC	S
43	LILAYI ROAD 1	"	2	0	"	S
44	LILAYI ROAD 2	"	1	0	"	S
45	LUMUMBA RES	25/02/02	0	0	0.4	S
46	LUMUMBA RD 4A					
47	MALOFARM 1	28/02/02	0	0	NC	S
48	MALOFARM 2	"	0	0	"	S
49	MASS MEDIA 1	27/02/02	0	0	NC	S
50	MASS MEDIA 2	"				Pump off
51	MASS MEDIA 3	"	0	0	nc	S
52	MATERO TANKS					
53	MULUNGUSHI 6A					
54	MULUNGUSHI 6H	28/02/02	0	0	NC	S
55	NIPA					
56	NORTHMEAD 1	26/02/02	0	0	NC	S
57	NORTHMEAD 2	"	12	0	"	U
58	N'GOMBE					
59	OLD P/STATION	25/02/02	3	0	NC	S
60	PARIRENYATWA	"	7	0	"	U
61	PARKS NURSERY	02/03/02	INTC	0	"	U
62	PLANT 1	25/02/02	0	0	0.8	S
63	PLANT 2	"	0	0	0.8	S
64	QUARRIES	"	0	0	NIL	S
65	ROADSIDE 1	"	5	0	NC	U
66	ROADSIDE 2	"	2	0	"	S
67	ROADSIDE 4	"	0	0	"	S
68	ROADSIDE 5	"				Pump off
69	ROADSIDE 6	"	0	0	"	S
70	SHAFT 5	27/02/02	0	0	NC	S
71	SHOWGROUNDS	28/02/02	0	0	"	S
72	ST PARK EAST	27/02/02	0	0	0.3	S
73	ST PARK WEST	28/02/02	0	0	<0.1	S
74	UTH	26/02/02	0	0	0.4	S
75	WATERWORKS 1	25/02/02	0	0	NC	S
76	WATERWORKS 2	"	56	0	"	U
77	WOODLAND TOWER	27/02/02	0	0	0.3	S

Key: T.C - Total coliforms S - Satisfactory NC - not chlorinated
F.C - Faecal coliforms U - Unsatisfactory

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06/03/2001

F14

WEEKLY WATER QUALITY STATUS REPORT
FROM 26/02/00 TO 02/03/01

1. Production boreholes and reservoirs

No.	LOCATION	STATUS		BACTERIAL COUNT		DATE OF SAMPLE	REMARKS
		ON	OFF	T.C/100ml	F.C/100ml		
1	BAULENI						
2	BUCKLEY						
3	CHAINDA			0	0	02/03/01	S
4	CHAWAMA 1			TNTC	0	01/03/01	
5	CHAWAMA 3						
6	CHAWAMA RES			0	0	28/02/01	S
7	CHELSTONE 2			3	0	02/03/01	S
8	CHELSTONE 3			4	0	"	U
9	CHILENJE SOUTH						
10	CHUNGA 1			0	0	26/02/01	S
11	CHUNGA 2			0	0	26/02/01	S
12	FREEDOM						
13	GEORGE COMPLEX 1						
14	GEORGE COMPLEX 3			3	0	26/02/01	S
15	GEORGE COMPLEX 4			0	0	"	S
16	GEORGE COMPLEX 5			0	0	26/02/01	S
17	GEORGE COMPLEX 6						
18	GEORGE COMPLEX 8			0	0	26/02/02	S
19	GEORGE COMP. main						
20	HEADOFFICE						
21	HIGHCOURT RES						
22	IBEX HILL						
23	INT SCHOOE 6A			0	0	27/02/01	S
24	INT SCHOOL 6B			9	0	27/02/01	U
25	INT SCHOOL 6C			3	0	"	S
26	INT SCHOOL 6D			0	0	"	S
27	INT SCHOOL 6E						
28	JOHN HOWARD						
29	JOHN LANG			0	0	01/03/01	S
30	LAKE ROAD						
31	LEOPARDS HILL 1						
32	LEOPARDS HILL 2						
33	LILAYI ROAD 1						
34	LILAYI ROAD 2						
35	LUMUMBA RES			0	0	27/02/01	S
36	LUMUMBA RD 4A						
37	MALOFARM 1			26	0	02/03/01	U
38	MALOFARM 2			1	1	"	U
39	MASS MEDIA 1			6	0	27/02/01	S
40	MASS MEDIA 2						
41	MASS MEDIA 3			0	0	27/02/01	S
42	MULUNGUSHI 6A						
43	MULUNGUSHI 6H			11	2	02/03/01	U
44	NIPA						
45	NORTHMEAD 1			3	2	28/02/01	S
46	NORTHMEAD 2			14	3	28/02/01	S

47	N'GOMBE						
48	OLD P/STATION						
49	PARRENYATWA		1	0	27/02/01		S
50	PARKS NURSERY						
51	QUARRIES		0	0	01/03/01		S
52	ROADSIDE 1		7	0	27/02/01		S
53	ROADSIDE 2		0	0	27/02/01		S
54	ROADSIDE 4		TNTC	6	27/02/01		
55	ROADSIDE 5		21	0	27/02/01		S
56	ROADSIDE 6		3	0	"		S
57	SHAFT 5						
58	SHOWGROUNDS		6	2	02/03/01		S
59	STEWART PARK EAST						
60	STEWART PARK WEST		5	3	28/02/01		S
61	TWIKATANE						
62	UTH		1	0	26/02/01		S
63	WATERWORKS 1						
64	WATERWORKS 2						
65	WOODLANDS TOWER						
66	CHELSTONE TOWER		2	1	02/03/01		U

2. Per-Urban Delivery Points

No.	LOCATION	BACTERIAL COUNT		DATE OF SAMPLE	REMARKS
		T.C/100ml	F.C/100ml		
1	BAULENI CO				
2	LINDA CO				
3	CHAINDA CO				
4	CHAWAMA CO (QUARRY LINE)	0	0	01/03/01	S
5	CHAWAMA CO (BH LINE)				
6	FREEDOM CO				
7	KANYAMA CO	0	0	28/02/01	S
8	CHIBOLYA CO				
9	KUOMBOKA QUARRY LINE	0	0	01/03/01	S
10	CHAISA CO				
11	LILANDA				
12	MISISI CO	0	0	01/02/01	S
13	N'GOMBE CO				
14	KALINGALINGA CO				
15	KUKU CO	1	0	01/03/01	S
16	JOHN HOWARD CO	0	0	01/03/01	S
17	JOHN LANG CO (QUARRY LINE)	0	0	01/03/01	S
18	JOHN LANG (BH LINE)	0	0	"	S
19	N'GOMBE CO				

Key: T.C - Total coliforms
F.C - Faecal coliforms
S - Satisfactory
U - Unsatisfactory

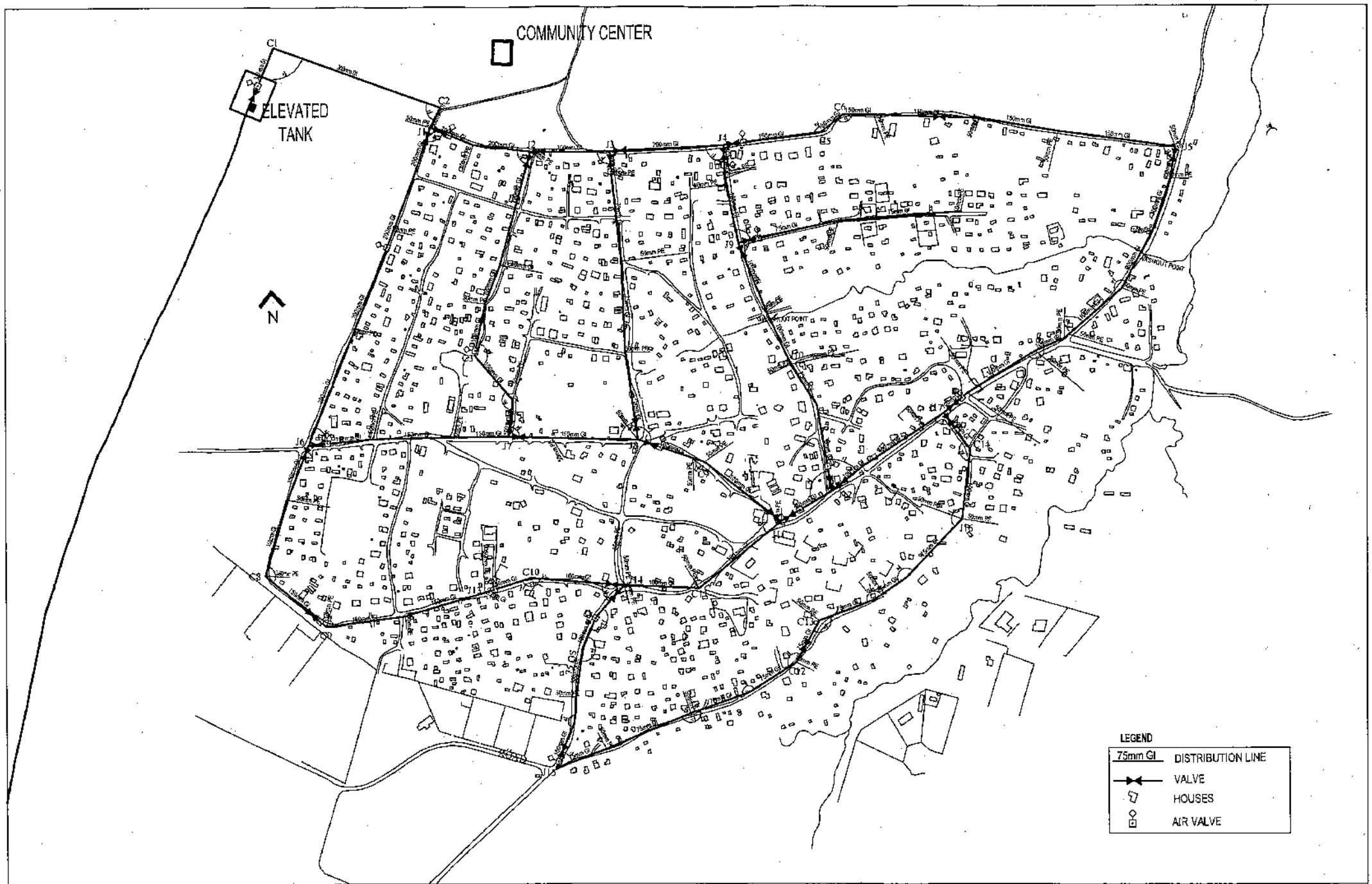
PREPARED BY: Mr G. CHIKAMA

Water Quality Assurance Department
Page 2 of 2

FIGURES

Basic Design Drawing (Drawing List)

No.	Title
General Layout	
Drawing-1	General Plan of Water Supply Facilities (Distribution) -
Drawing-2	General Plan of Water Supply Facilities (Borehole, Transmission Pipe) - Ngombe
Drawing-3	General Plan of Water Supply Facilities - Kalikiliki
Drawing-4	General Plan of Water Supply Facilities - Freedom
Drawing-5	System Diagram of Water Supply System
Water Intake	
Drawing-6	Borehole Location Plan
Drawing-7	Borehole Structure and Installation of Submersible Pump
Drawing-8	Borehole Starter Room
Drawing-9	Borehole Cap Piping
Transmission	
Drawing-10	Rising Main - Ngombe (1/5)
Drawing-11	Rising Main - Ngombe (2/5)
Drawing-12	Rising Main - Ngombe (3/5)
Drawing-13	Rising Main - Ngombe (4/5)
Drawing-14	Rising Main - Ngombe (5/5)
Drawing-15	Rising Main - Kalikiliki (1/2)
Drawing-16	Rising Main - Kalikiliki (2/2)
Distribution	
Drawing-17	Distribution Center Layout - Ngombe
Drawing-18	Distribution Center Layout - Kalikiliki
Drawing-19	Distribution Center Layout - Freedom
Drawing-20	Chlorination House
Drawing-21	Steel Elevated Tank (Ngombe: 300m ³)
Drawing-22	Steel Elevated Tank (Kalikiliki, Freedom: 100m ³)
Drawing-23	Public Tap
Drawing-24	Standard Drawing of Pipe Bedding
Drawing-25	Thrust Block and Washout
Drawing-26	Valve Box



LEGEND

75mm GI	DISTRIBUTION LINE
— —	VALVE
◇	HOUSES
□	AIR VALVE

LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

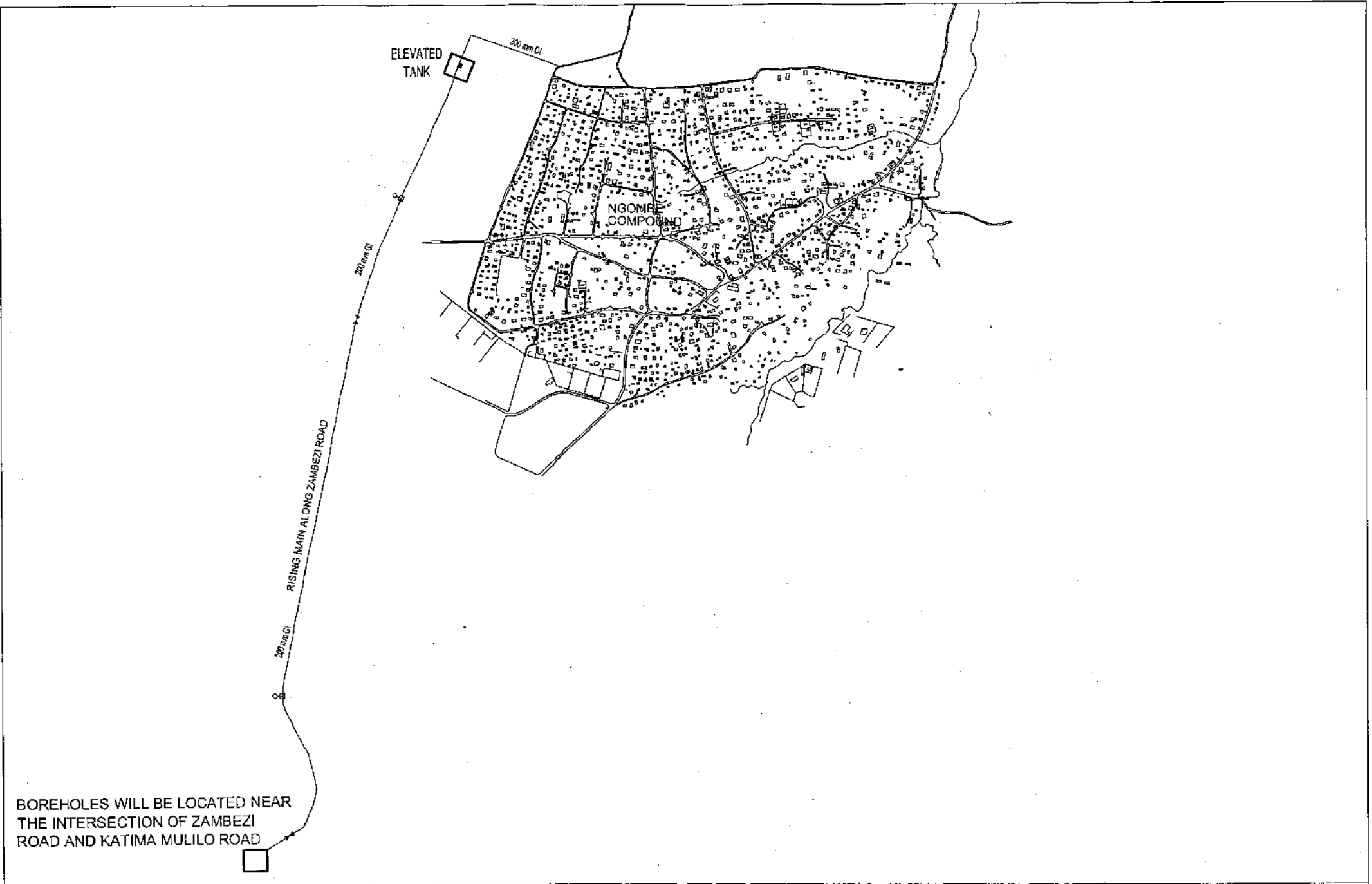
JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

DRAWING No. D-1

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

TITLE: General Plan of Water Supply Facilities (Distribution) - Ngombe



BOREHOLES WILL BE LOCATED NEAR THE INTERSECTION OF ZAMBEZI ROAD AND KATIMA MULILO ROAD

LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

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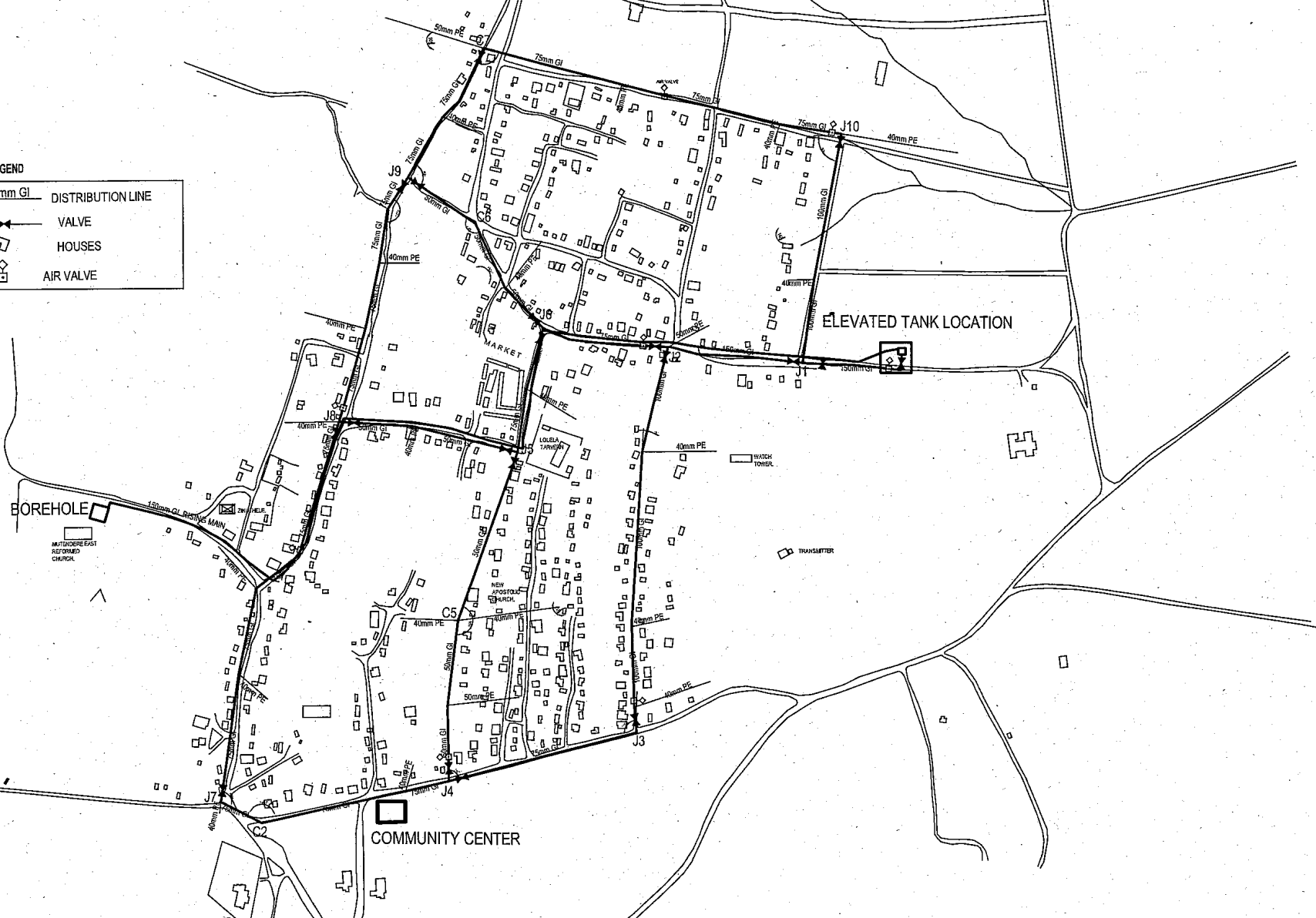
DRAWING No:
D-2

TITLE: General Plan of Water Supply Facilities (Borehole, Transmission Pipe) - Ngombe



LEGEND

- 75mm GI DISTRIBUTION LINE
- VALVE
- HOUSES
- AIR VALVE

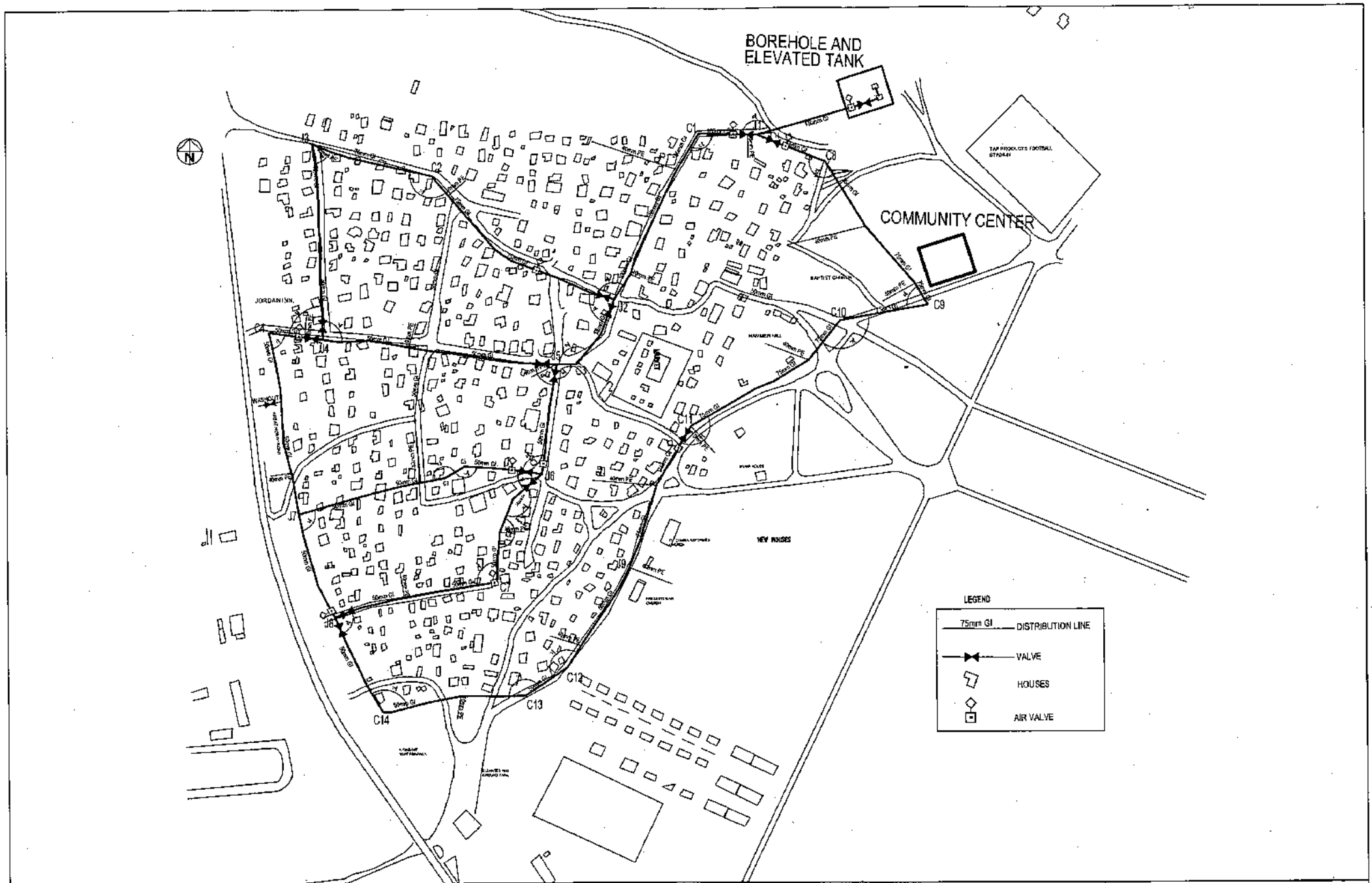


LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY
MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

DRAWING No: D-3
TITLE: General Plan of Water Supply Facilities - Kalikiliki



LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY

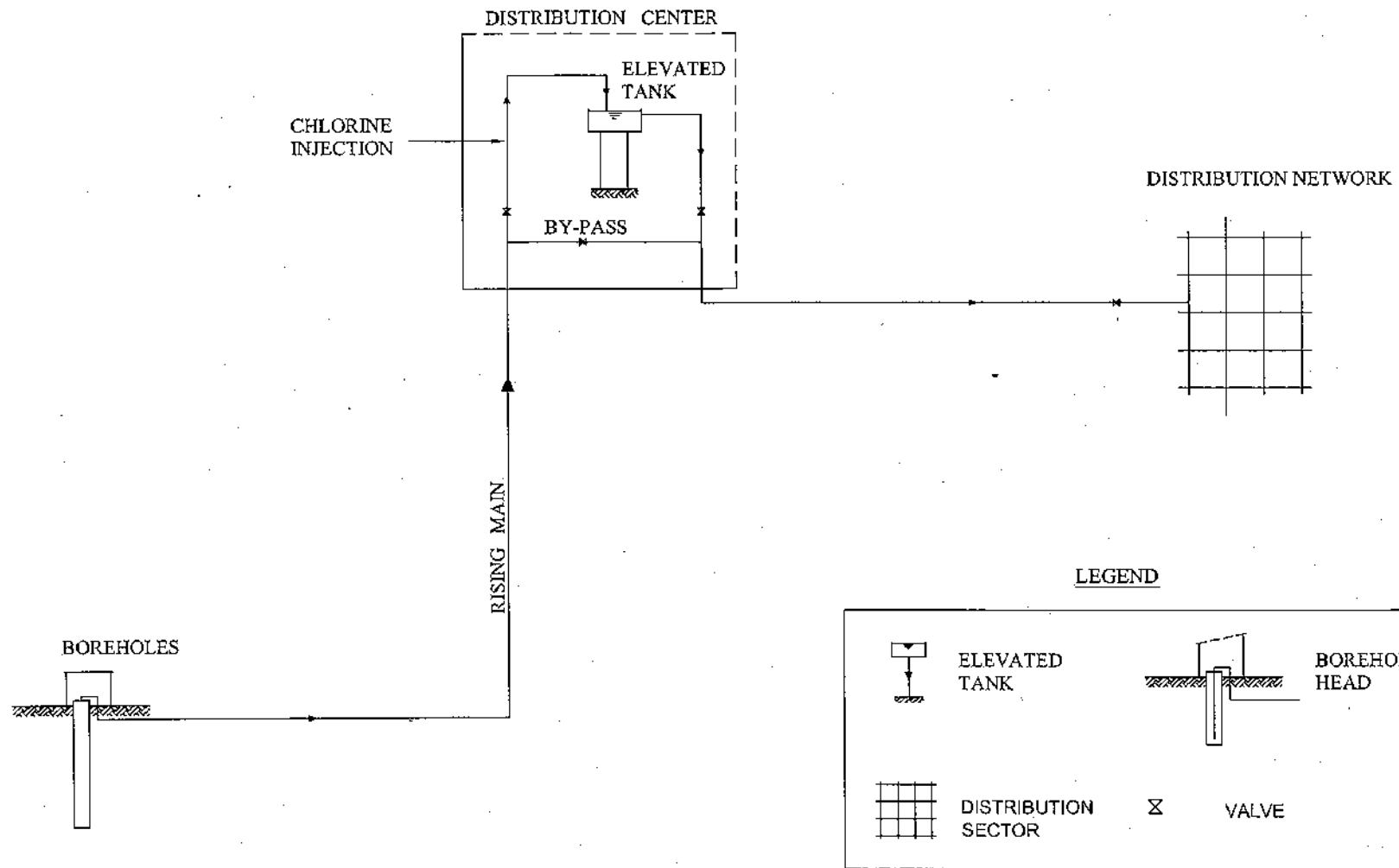
NIPPON KOEI CO., LTD.

DRAWING No:
D-4

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

TITLE:
General Plan of Water Supply Facilities - Freedom

DISTRIBUTION SYSTEM-SCHEMATIC



LIVING ENVIROMENTAL EMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

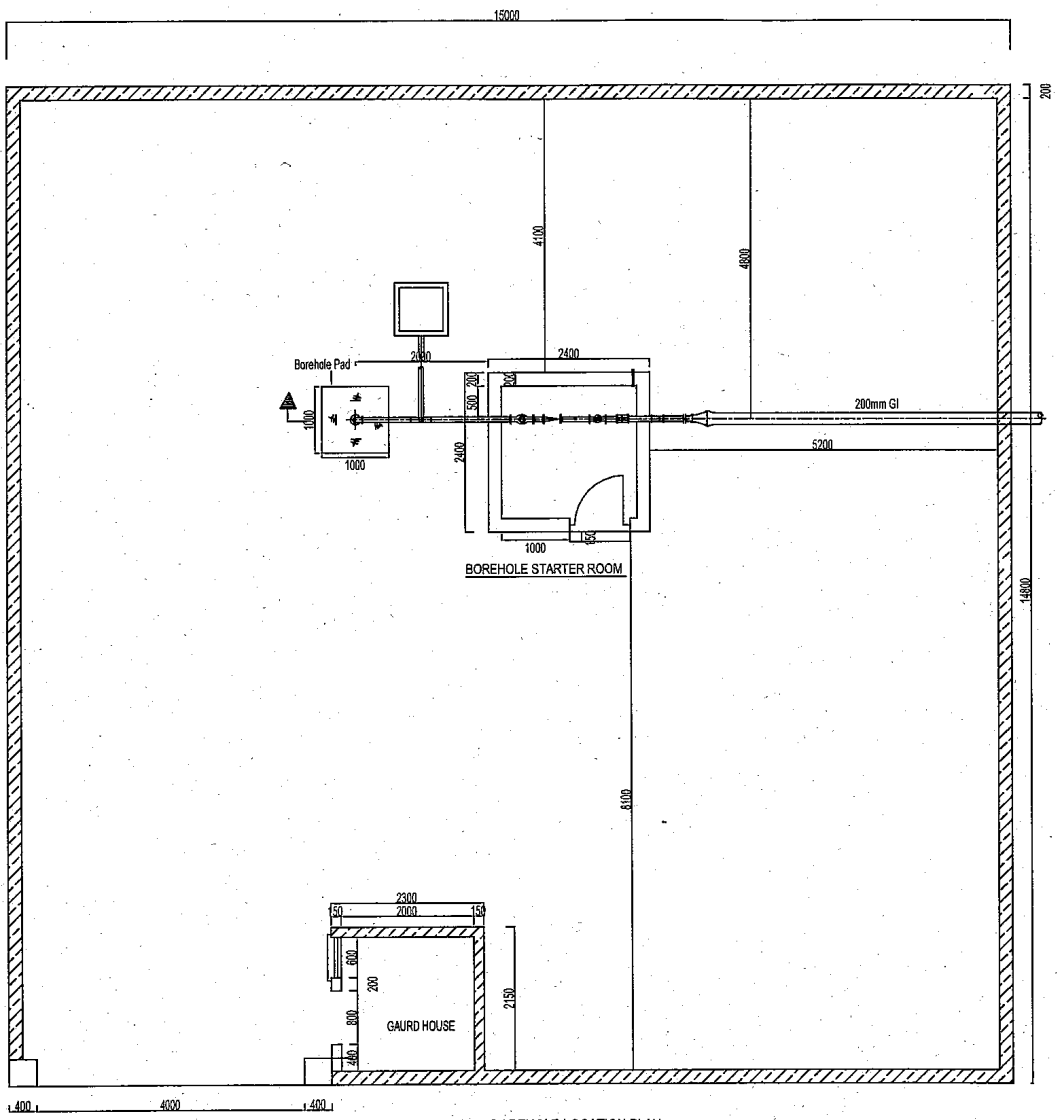
JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

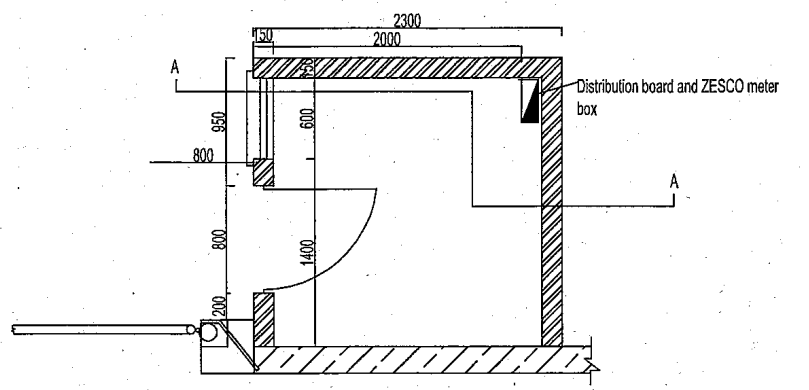
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MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

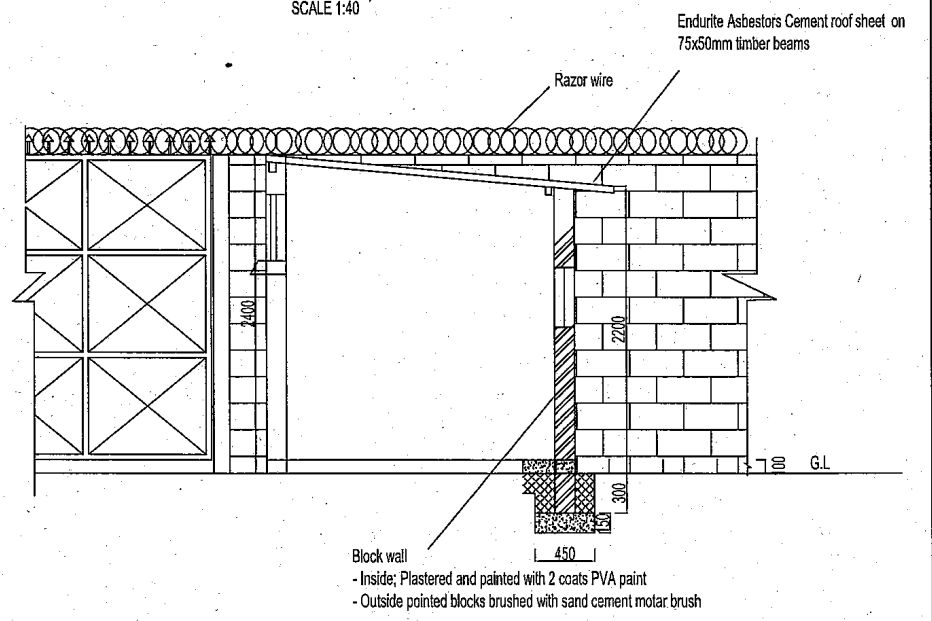
TITLE: **System Diagram of Water Supply**



BOREHOLE LOCATION PLAN
Scale 1:80

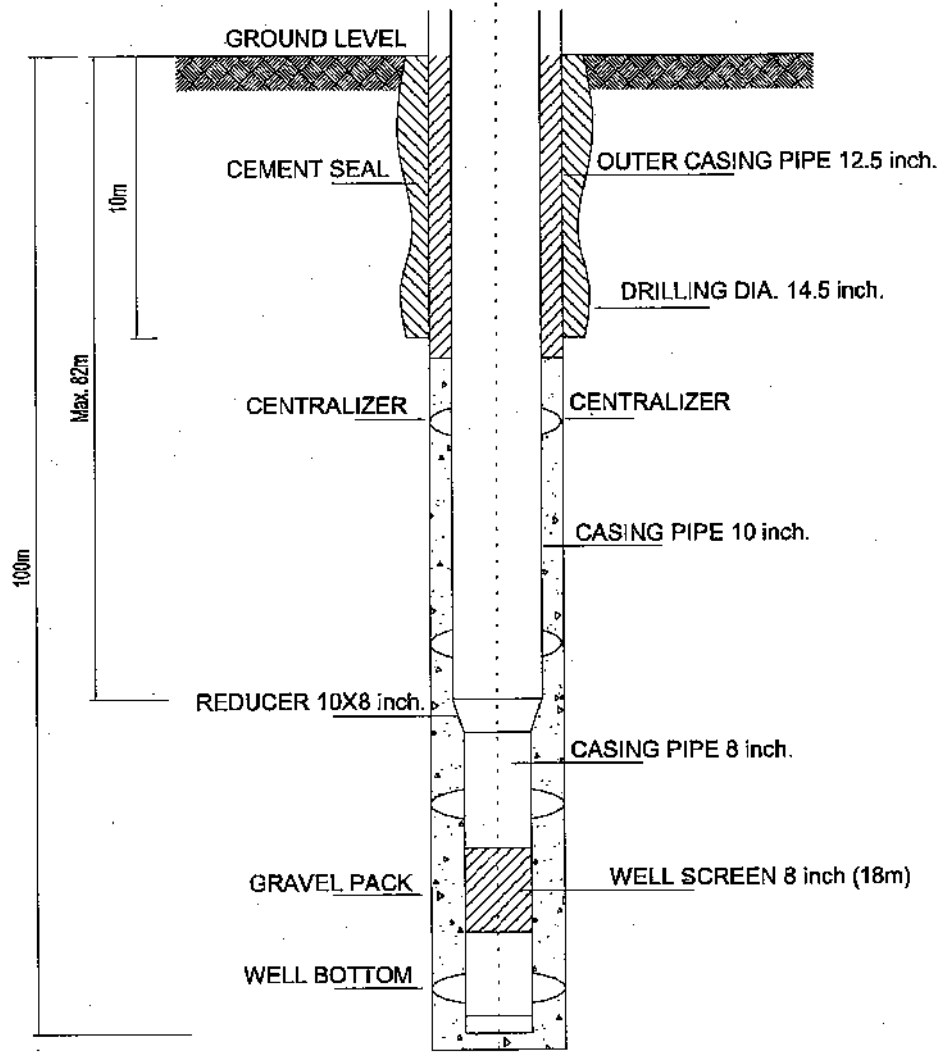


PLAN OF GUARD HOUSE
SCALE 1:40

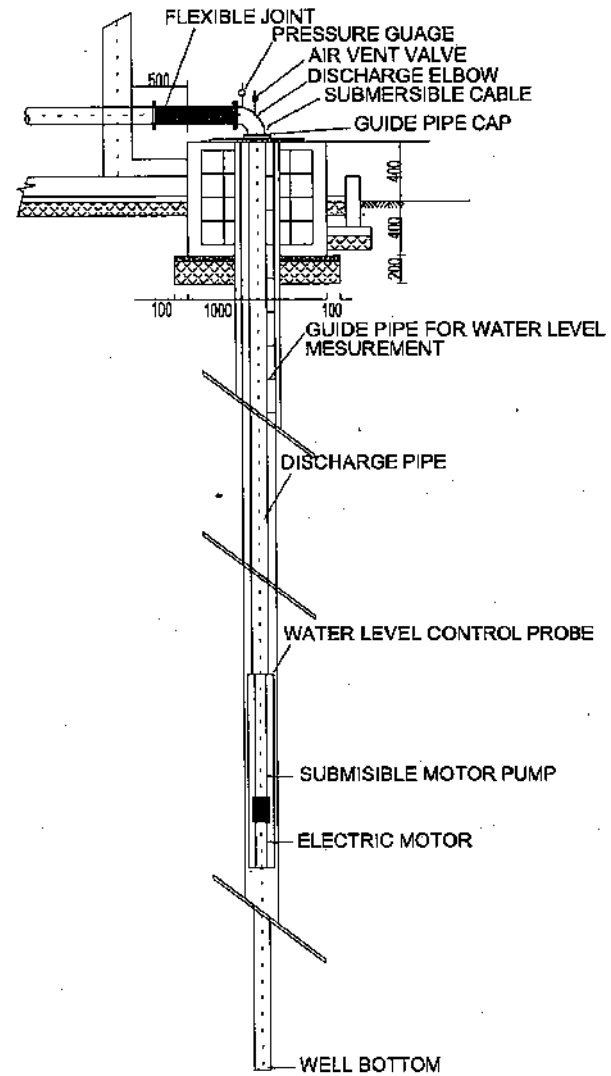


SECTION A-A
SCALE 1:40

LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD.	DRAWING No: D-6
	MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA		TITLE: Borehole Location Plan



BOREHOLE STRUCTURE



SUBMERSIBLE MOTOR PUMP INSTALLATION

LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY

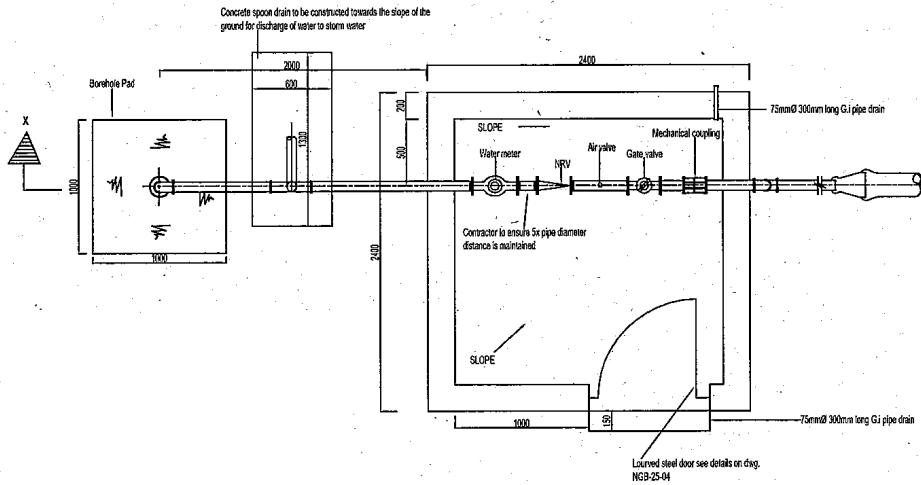
MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

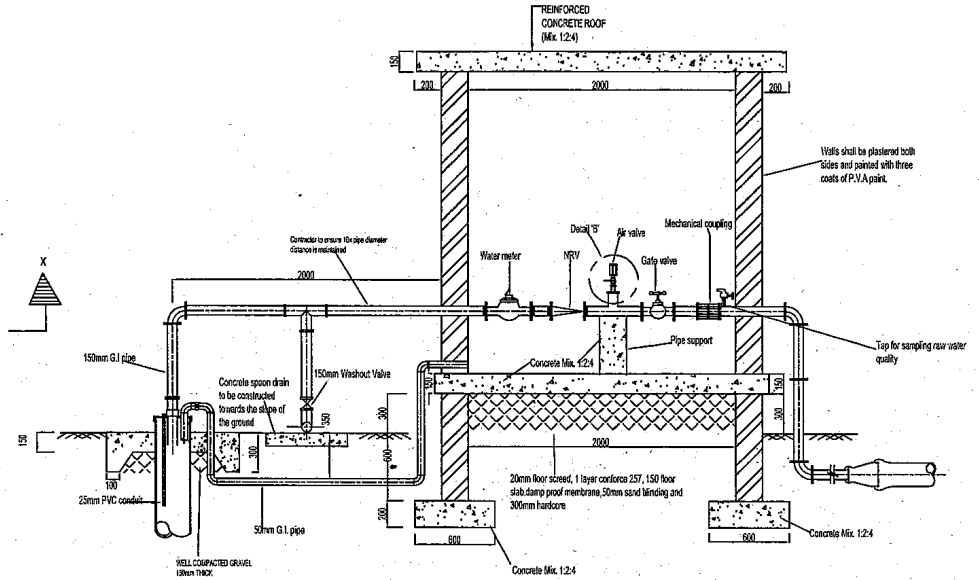
DRAWING No:

D-7

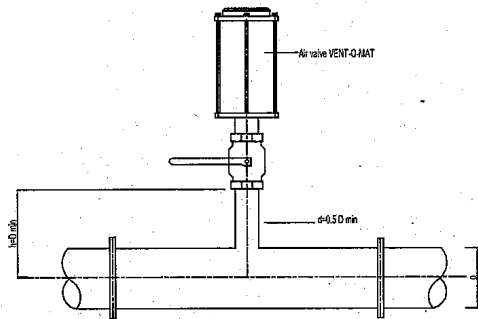
TITLE: Borehole Structure and Installation of Submersible Pump



BOREHOLE STARTER ROOM PLAN
Scale 1:40

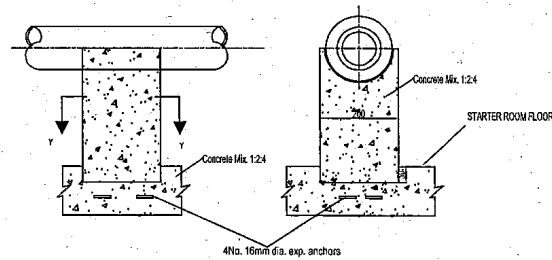


SECTION X-X
Scale 1:40



DETAIL 'B'
NTS

NOTE:
D= outer diameter

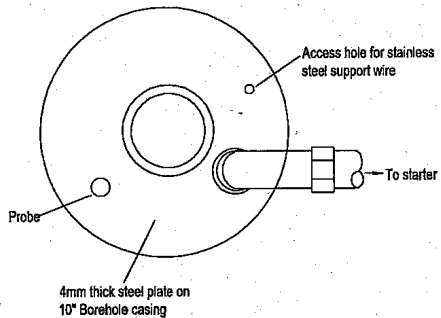


SECTION Y-Y
NOT TO SCALE

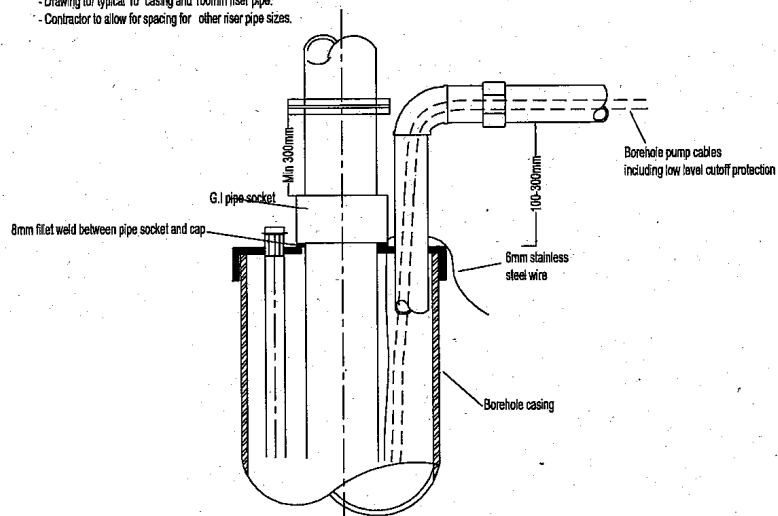
PIPE SUPPORT DETAIL
NOT TO SCALE

NOTE:

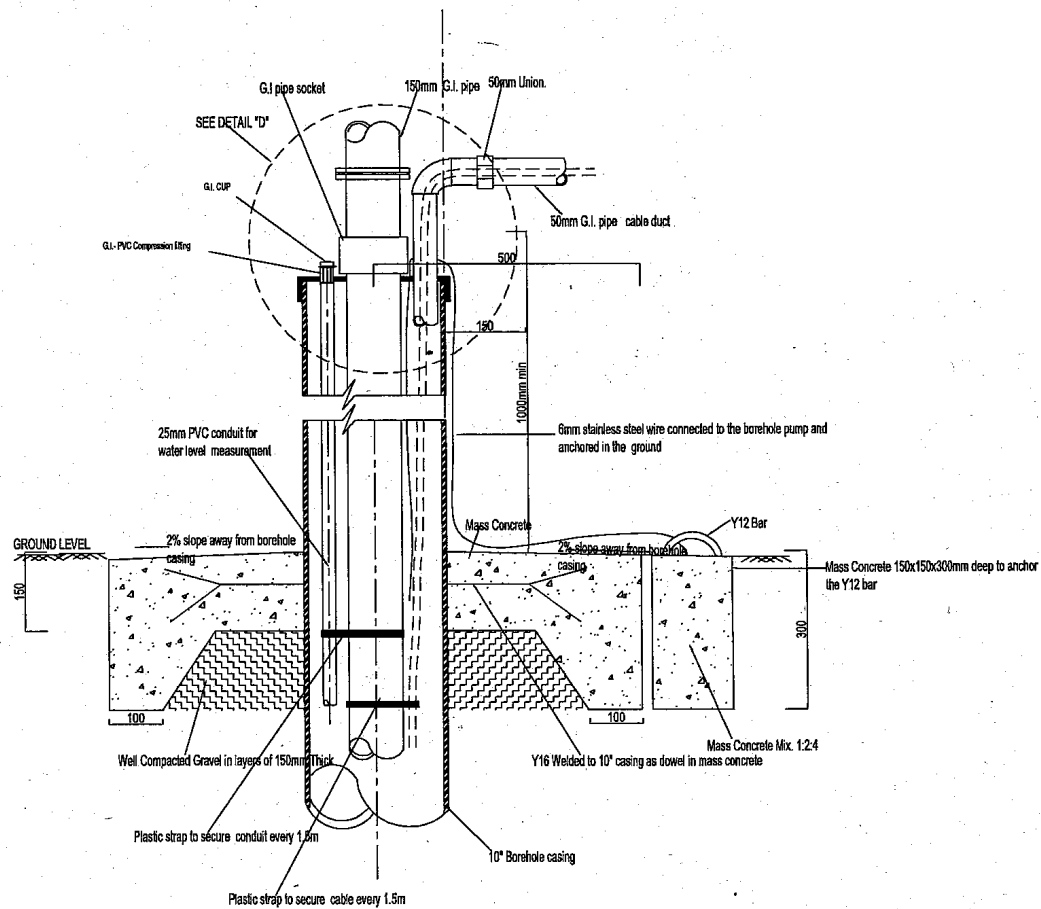
- 1) Discharge piping as per pump manufacturer's specifications or as directed by the project manager.
- 2) All accessories, e.g. door locks, priming and painting, plastering on walls, etc. to be included in Contractor's unit price.
- 3) Drawing is typical for 10" cased borehole.



Note:
 - Drawing for typical 10" casing and 100mm riser pipe.
 - Contractor to allow for spacing for other riser pipe sizes.



DETAIL 'D'
 Not to Scale



DETAIL 'A' BOREHOLE CAP
 Scale 1:10

LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF
 UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

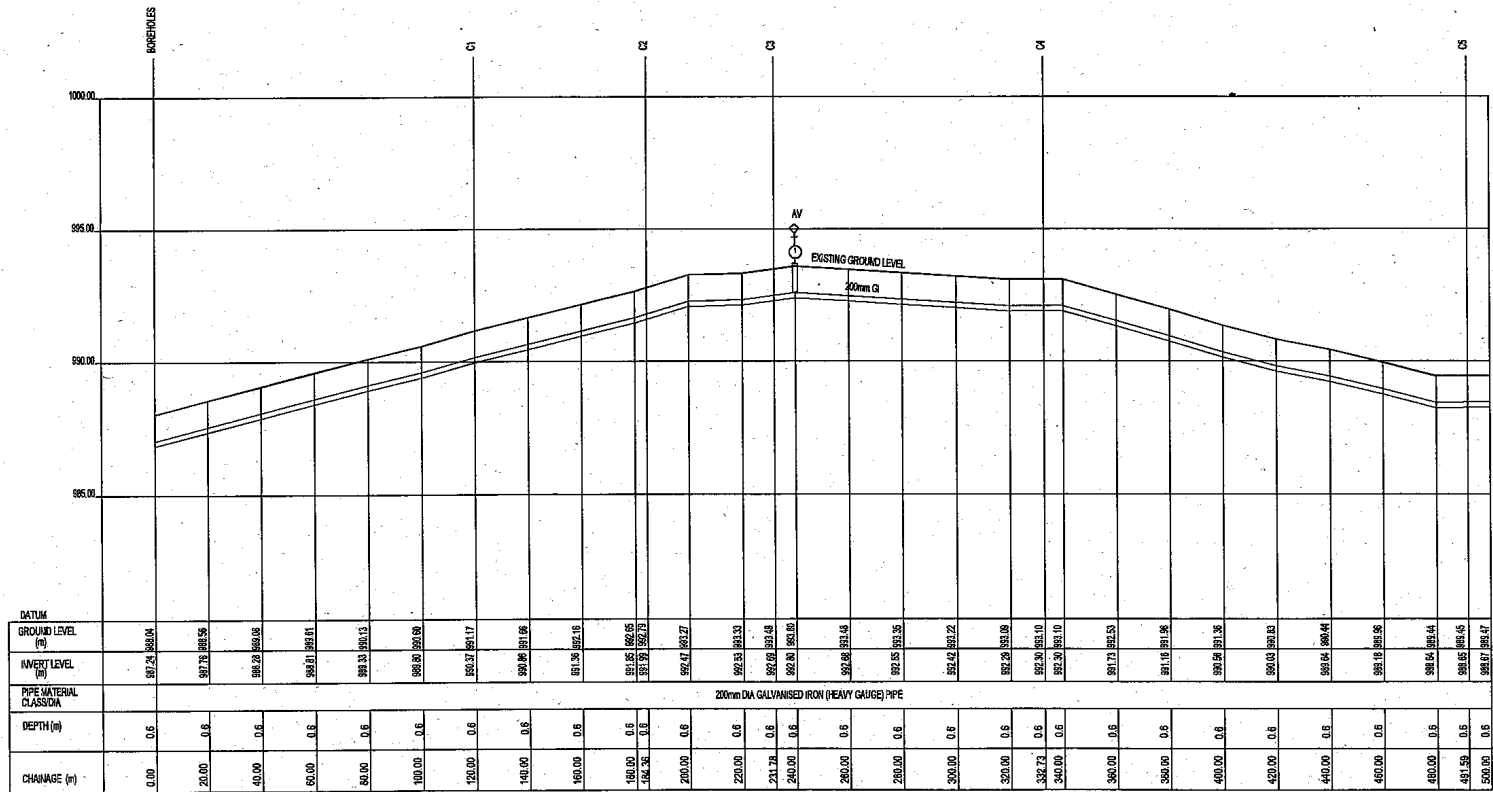
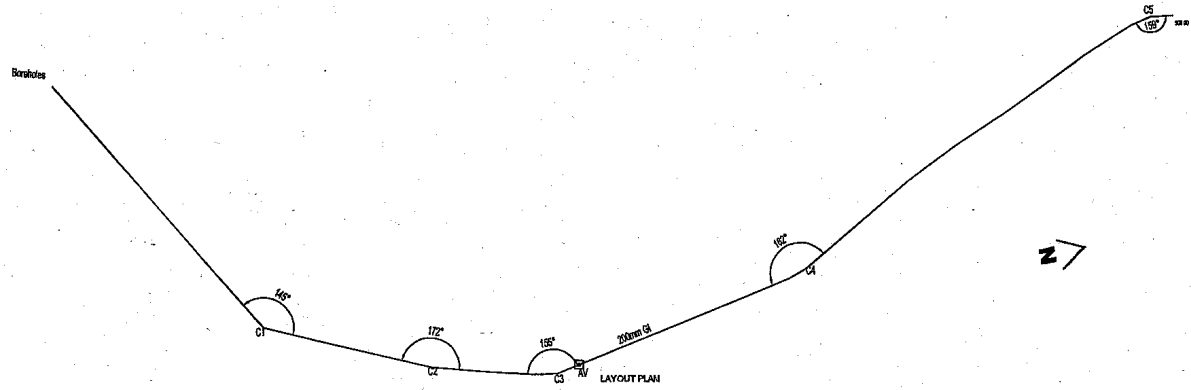
DRAWING No:

D-9

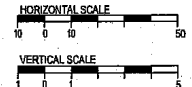
MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

TITLE:

Borehole Cap Piping



- LEGEND
- C1 CORNER NUMBER
 - SCOUR VALVE
 - AIR VALVE
 - CHAMBER NUMBER

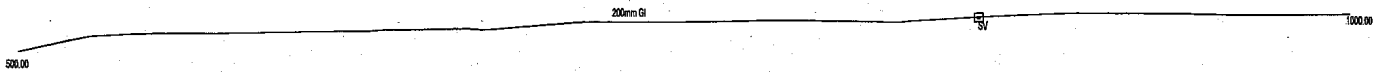


LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

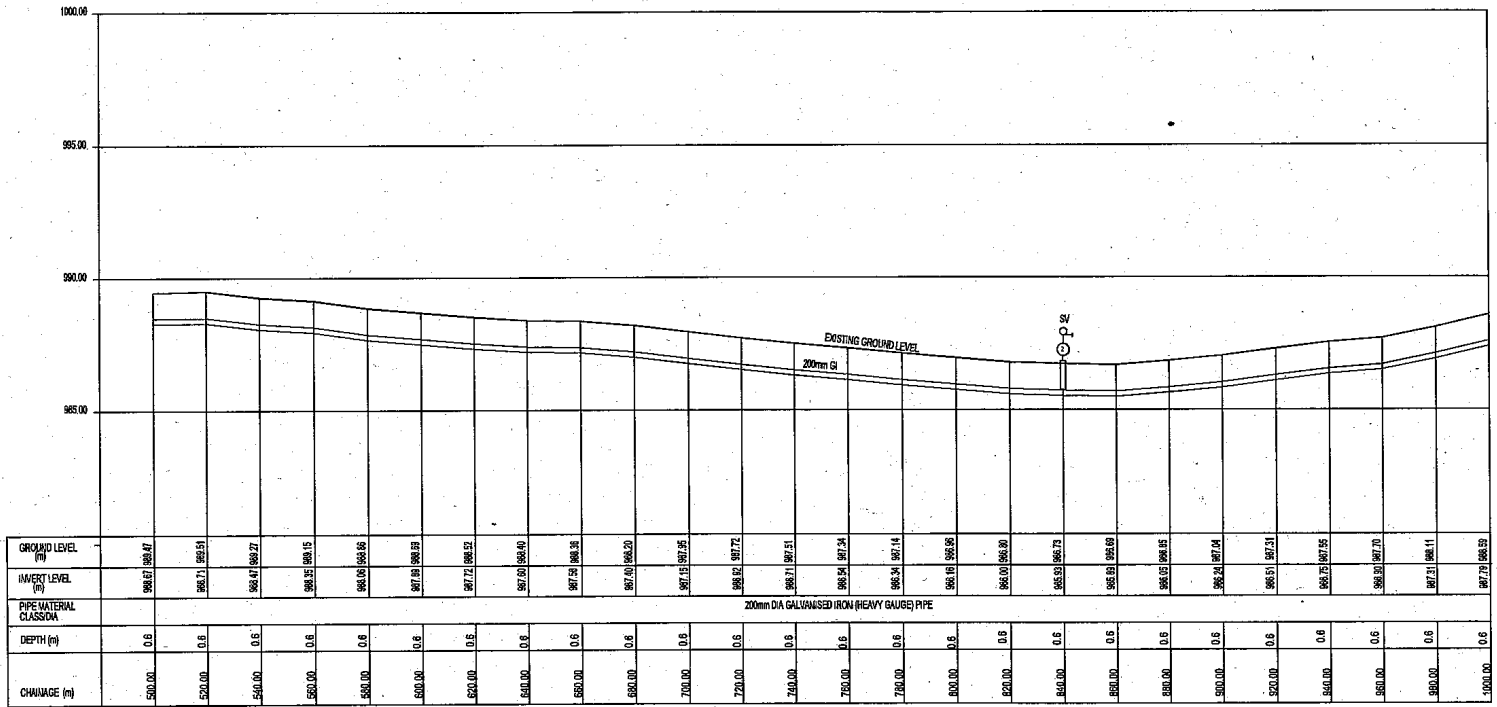
JAPAN INTERNATIONAL COOPERATION AGENCY
 MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

DRAWING No: D-10
 TITLE: Rising Main - Ngombe (1/5)



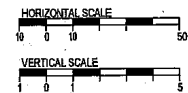
LAYOUT PLAN



LONGITUDINAL SECTION OF RISING MAIN

LEGEND

C1	CORNER NUMBER
□	SCOUR VALVE
◇	AIR VALVE
⊙	CHAMBER NUMBER



LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

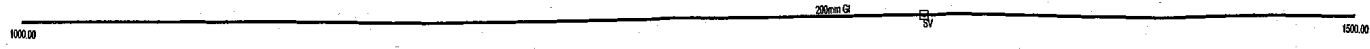
DRAWING No:

D-11

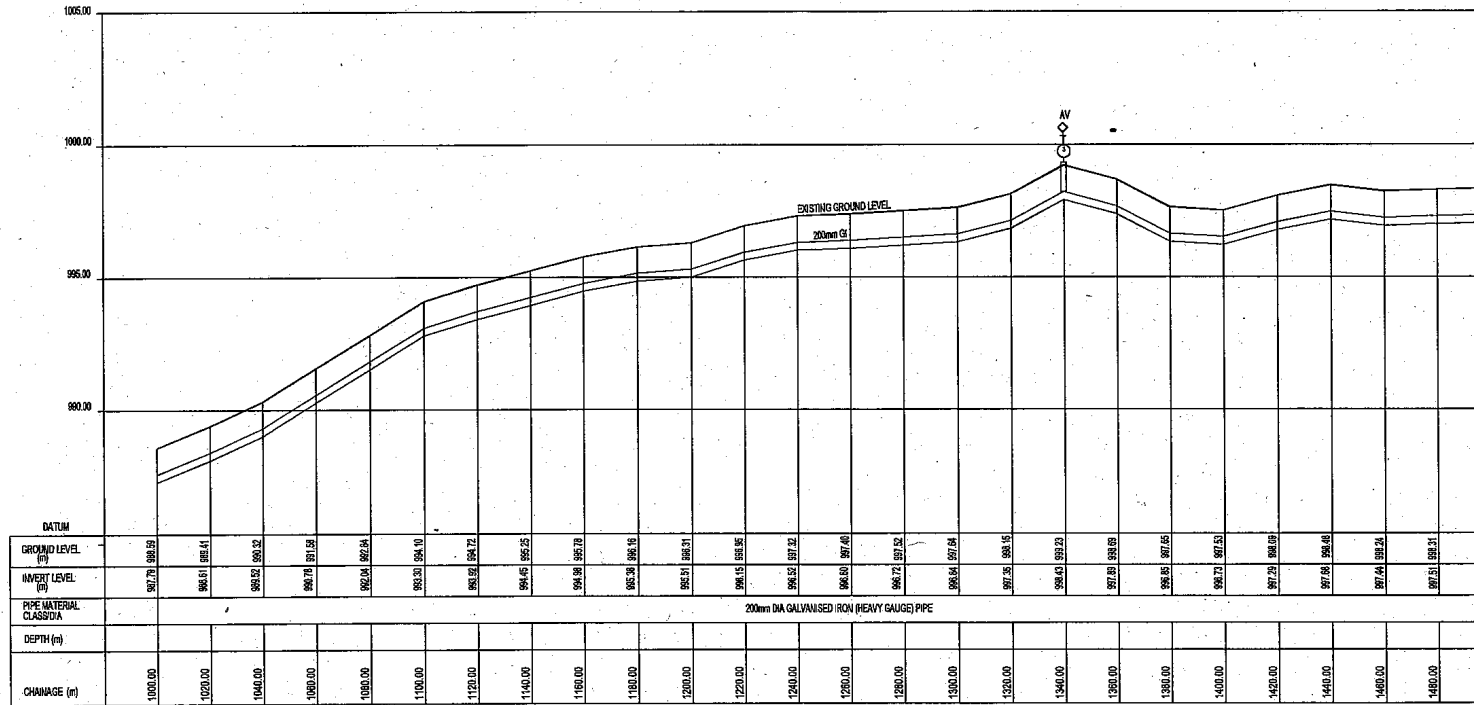
MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

TITLE:

Rising Main - Ngombe (2/5)



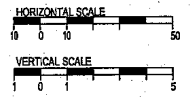
LAYOUT PLAN



LONGITUDINAL SECTION OF RISING MAIN

LEGEND

C1	CORNER NUMBER
□	SCOUR VALVE
◇	AIR VALVE
○	CHAMBER NUMBER

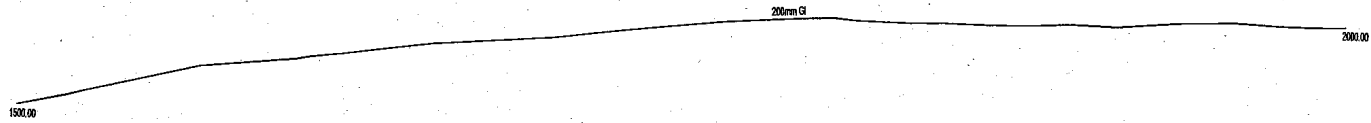


LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

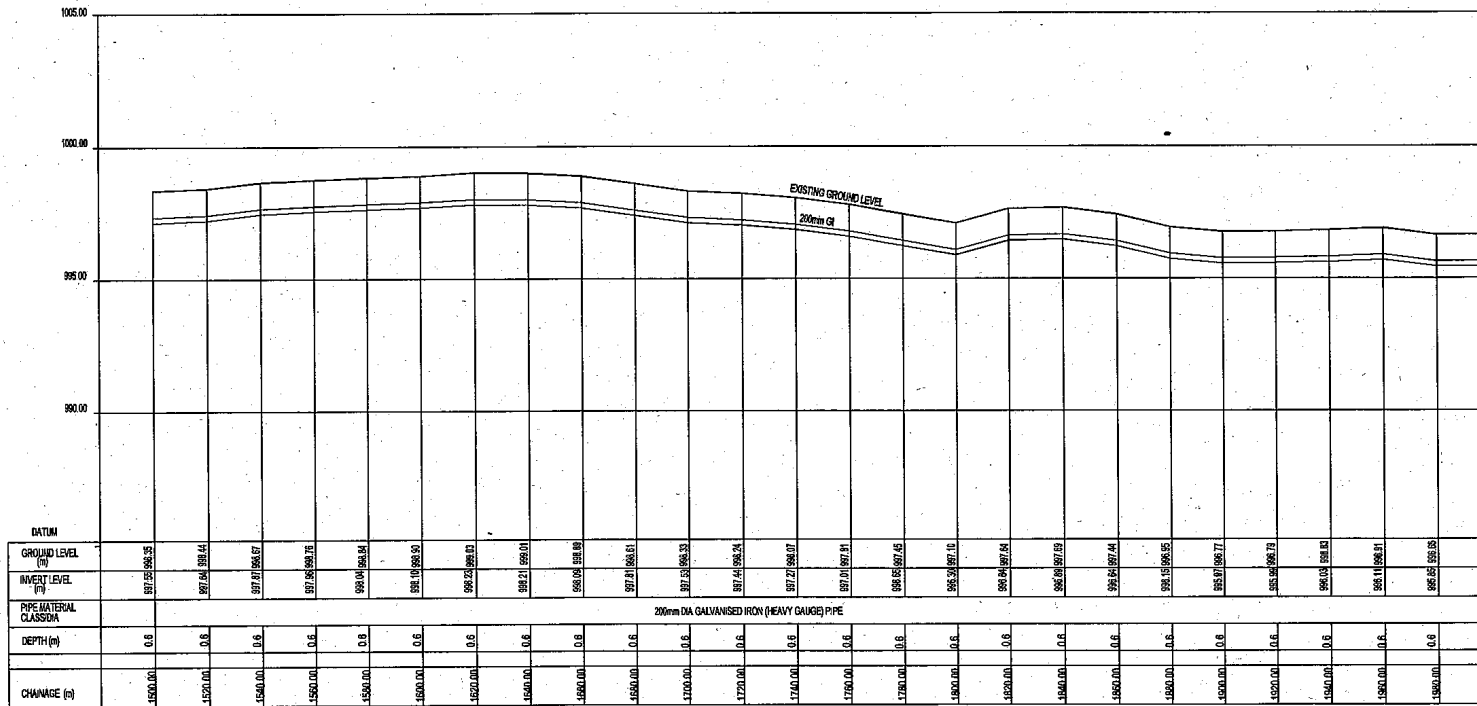
JAPAN INTERNATIONAL COOPERATION AGENCY
 MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

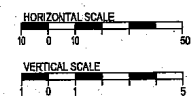
DRAWING No: D-12
 TITLE: Rising Main - Ngombe (3/5)



LAYOUT PLAN



LONGITUDINAL SECTION OF RISING MAIN

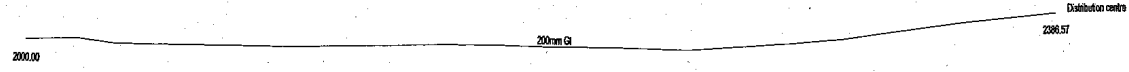


LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

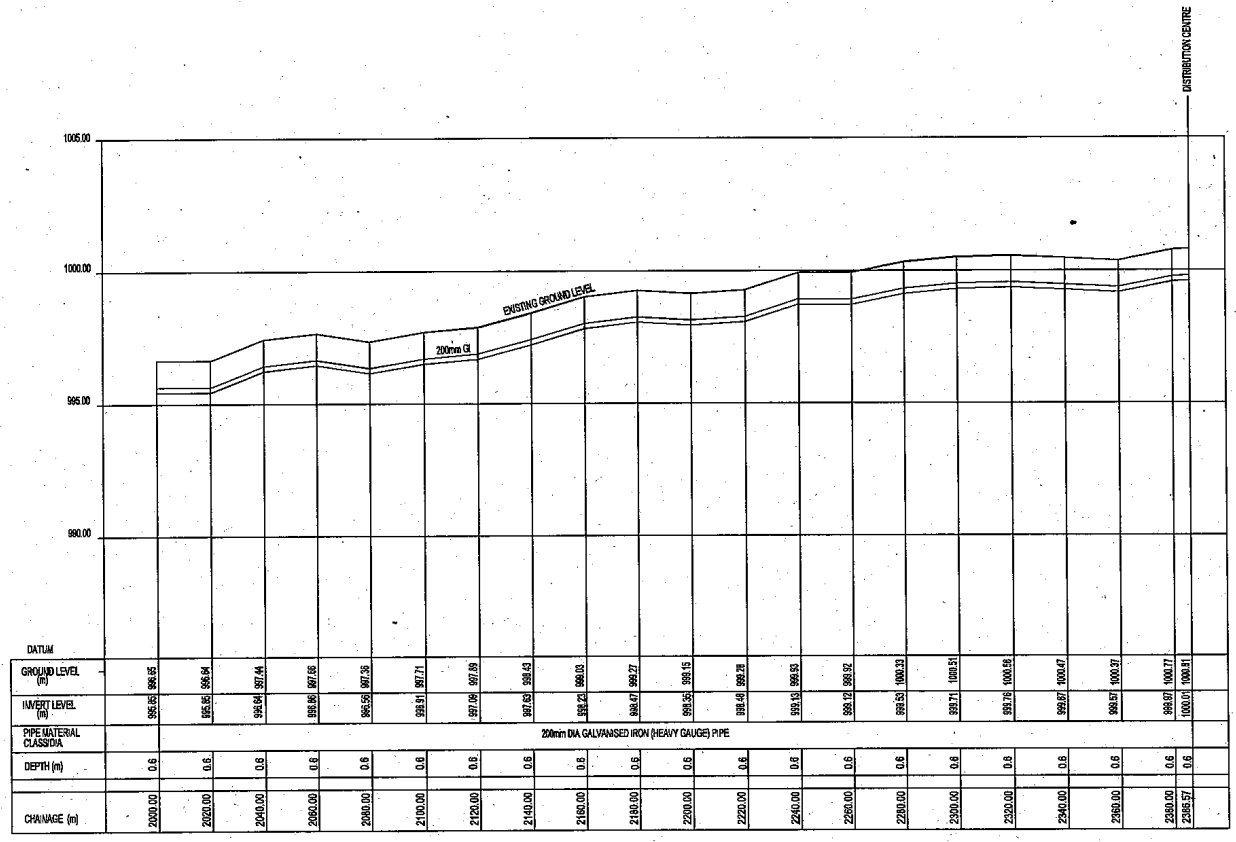
JAPAN INTERNATIONAL COOPERATION AGENCY
 MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

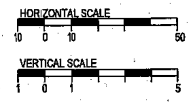
DRAWING No: D-13
 TITLE: Rising Main - Ngombe (4/5)



LAYOUT PLAN



LONGITUDINAL SECTION OF RISING MAIN

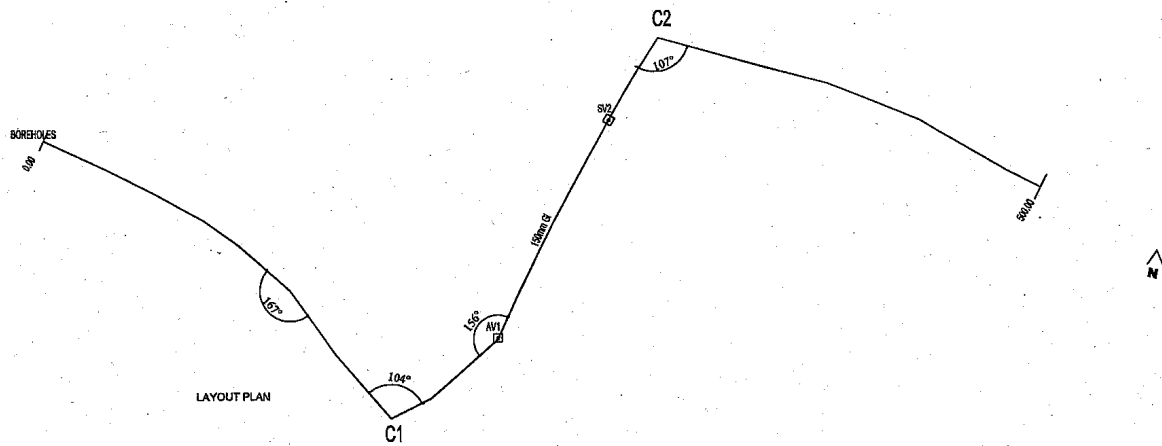


LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

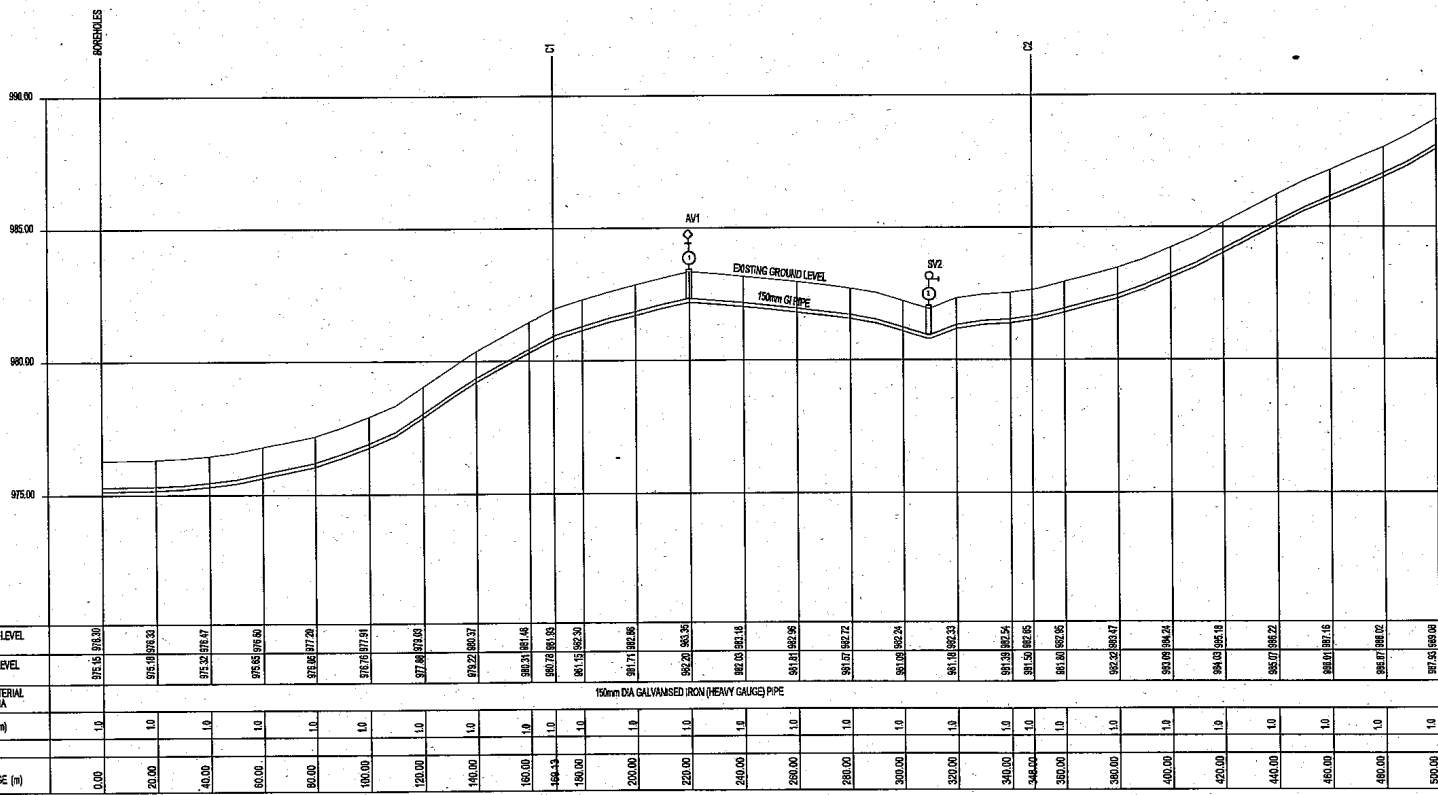
JAPAN INTERNATIONAL COOPERATION AGENCY
 MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

DRAWING No: D-14
 TITLE: Rising Main - Ngombe (5/5)



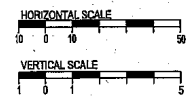
LAYOUT PLAN



LONGITUDINAL SECTION OF RISING MAIN

LEGEND

C1	CHAMBER
○	SCOUR VALVE
◇	AIR VALVE
○	CHAMBER NUMBER

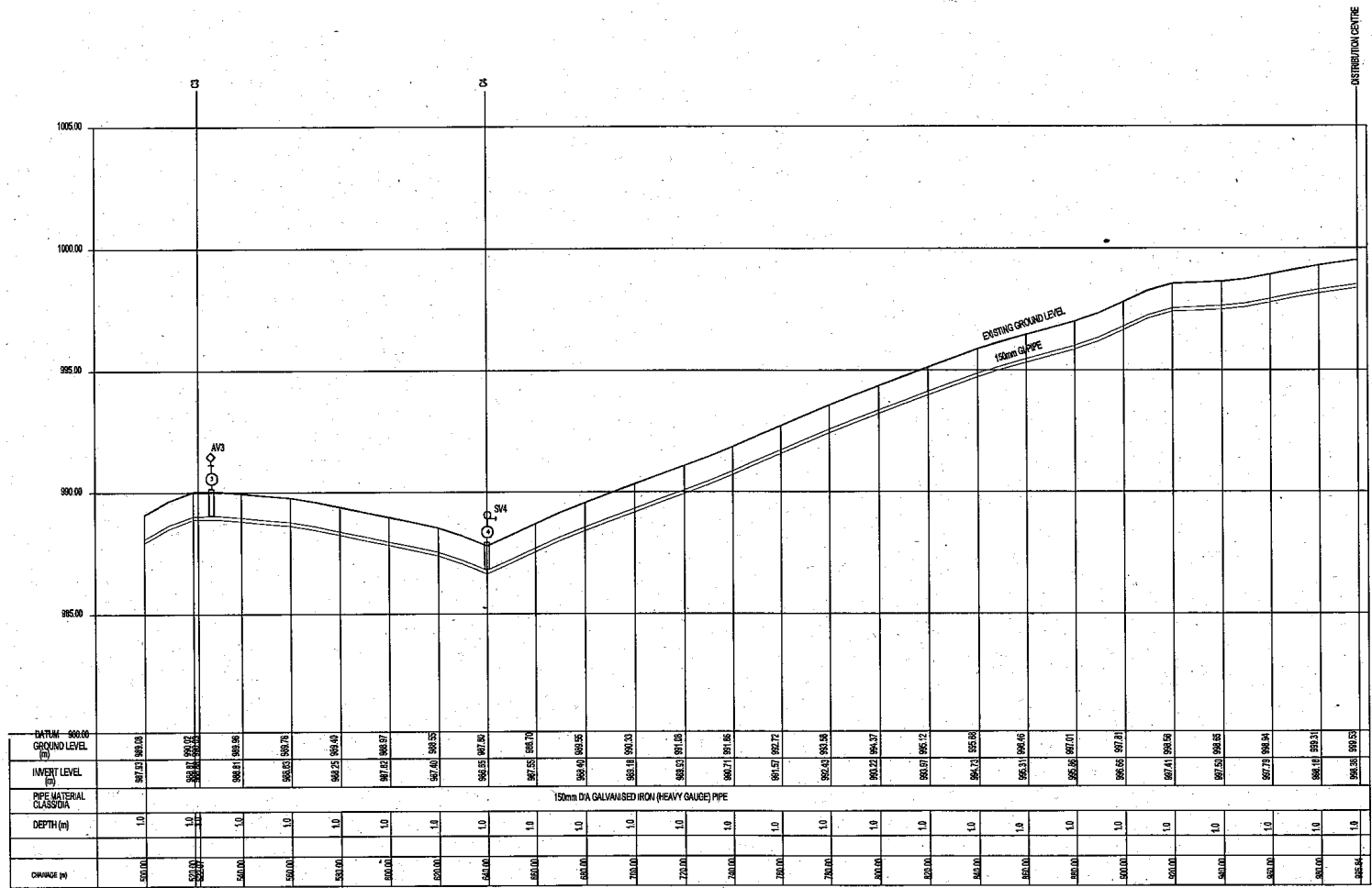
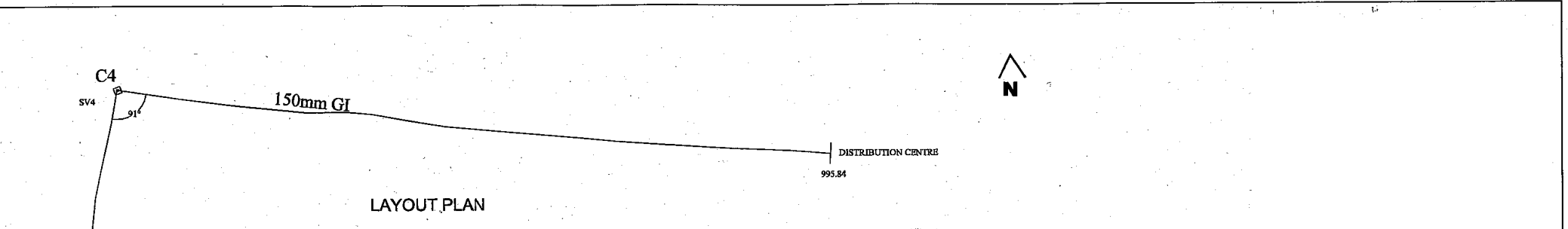


LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY
 MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

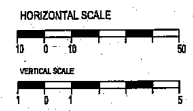
DRAWING No: D-15
 TITLE: Rising Main - Kalikiliki (1/2)



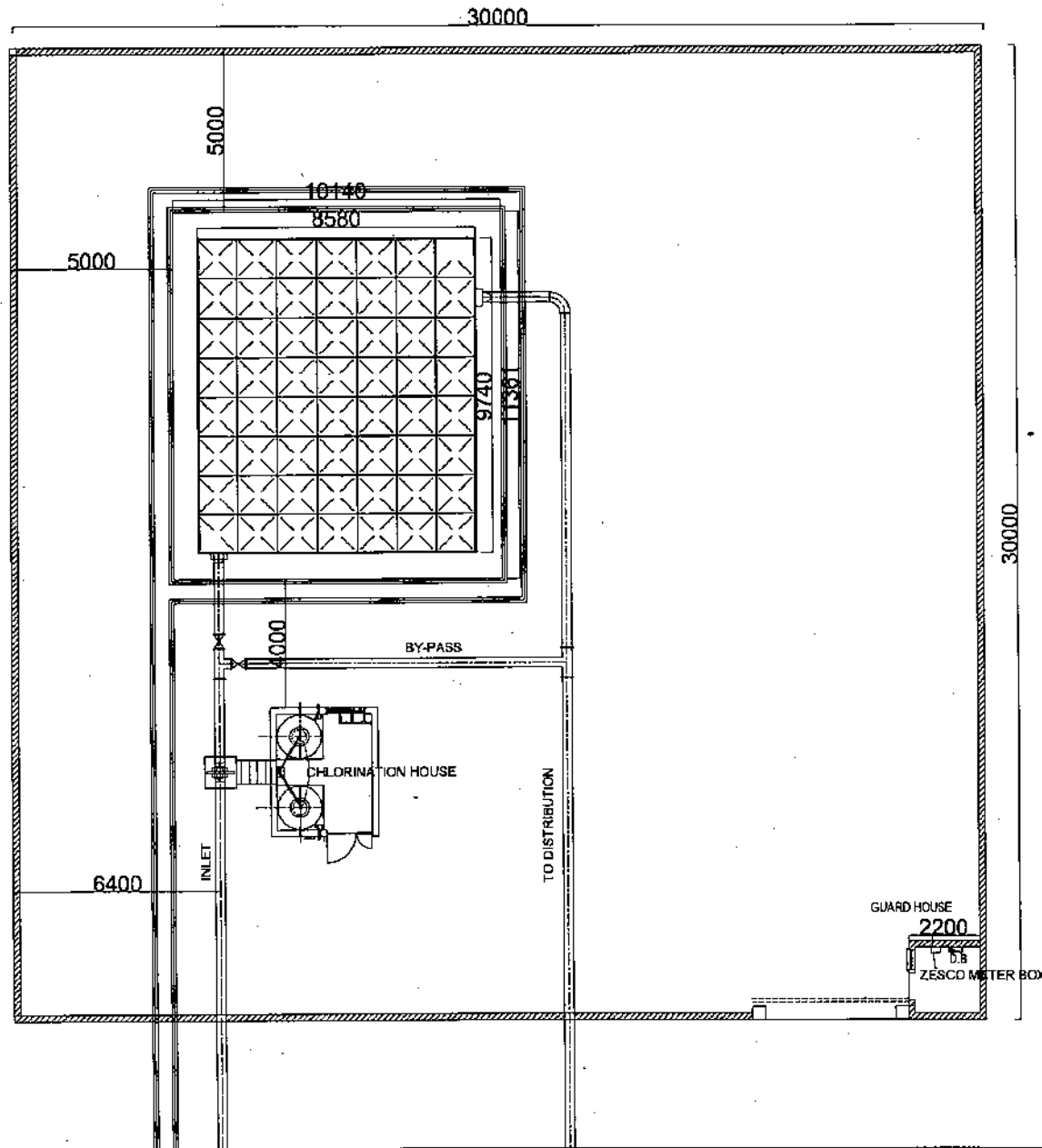
DATUM	986.00																			
GROUND LEVEL (m)	997.00	997.02	997.04	997.06	997.08	997.10	997.12	997.14	997.16	997.18	997.20	997.22	997.24	997.26	997.28	997.30	997.32	997.34	997.36	997.38
INVERT LEVEL (m)	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00
PIPE MATERIAL CLASS/Ø	150mm DA GALVANISED IRON (HEAVY GAUGE) PIPE																			
DEPTH (m)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CHAMBER (m)	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00	997.00

KEY

C4	SCOUR VALVE
AV3	AIR VALVE
○	CHAMBER NUMBER



LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD.	DRAWING No: D-16
	MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA		TITLE: Rising Main - Kalikiliki (2/2)



LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

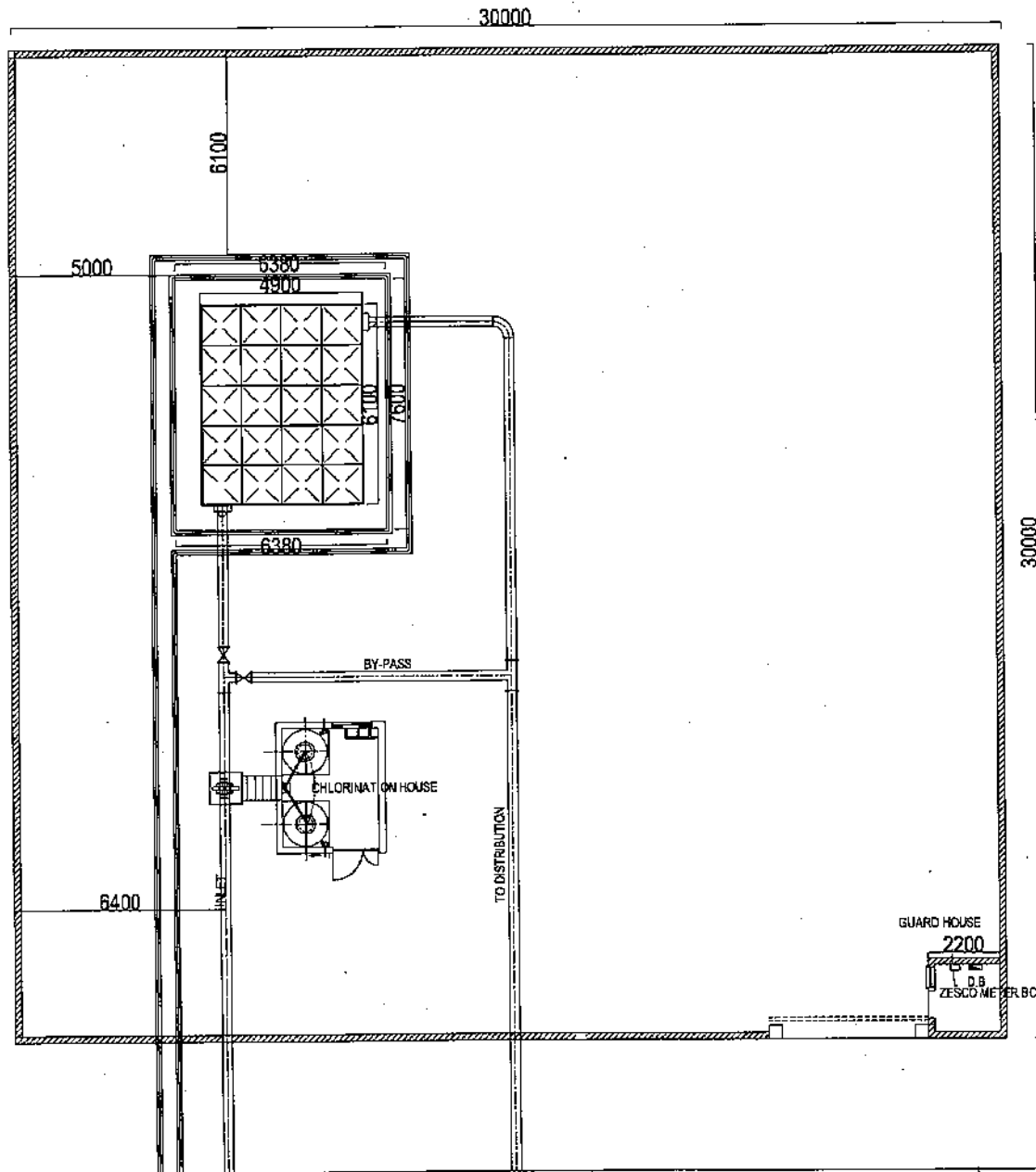
NIPPON KOEI CO., LTD.

DRAWING No.

D-17

TITLE

Distribution Center Layout - Ngombe



LIVING ENVIROMENTAL IMPROVEMENT PROJECT OF
UNPLANNED URBAN SETTLEMENTS IN LUSAKA

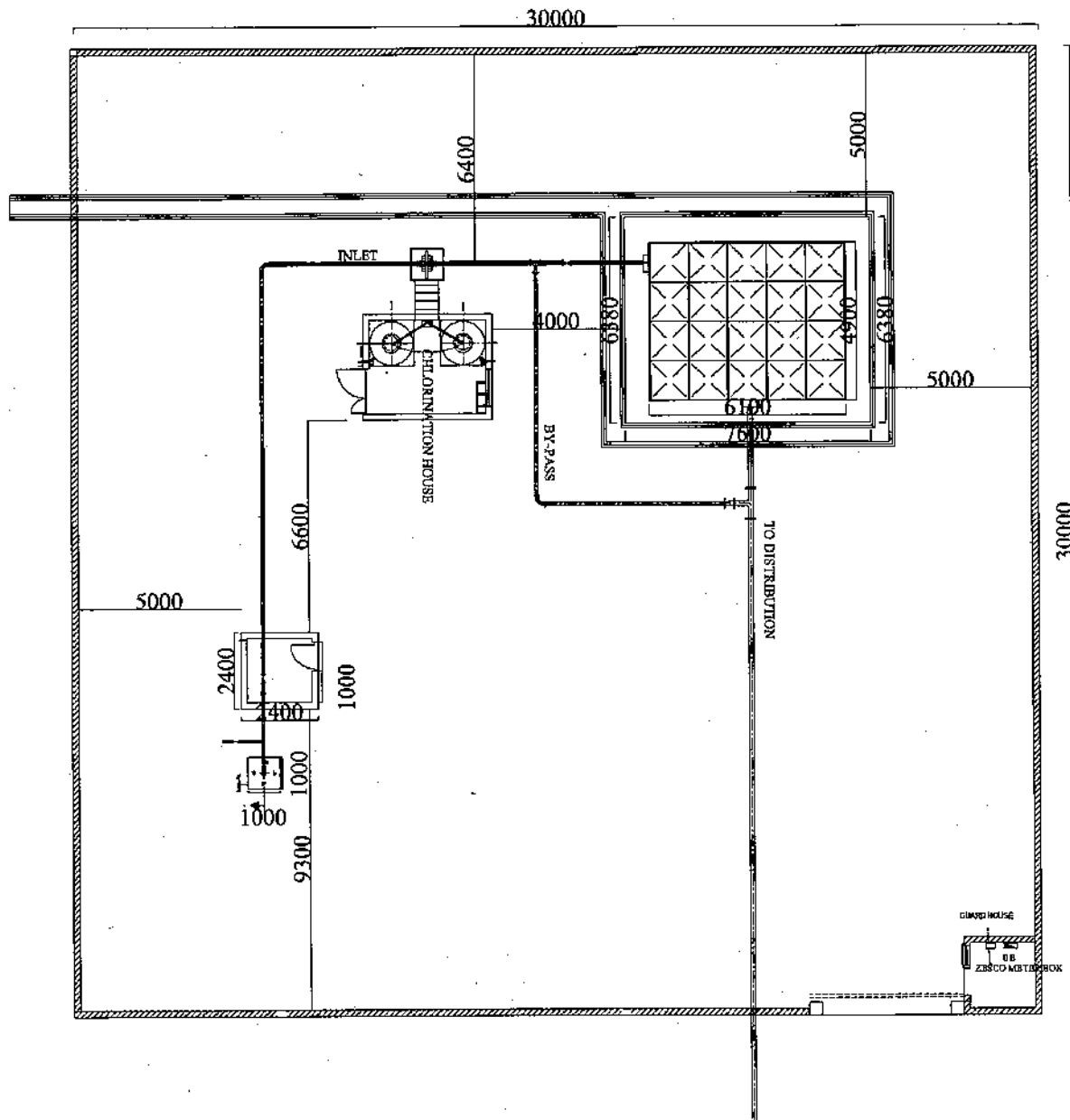
JAPAN INTERNATIONAL COOPERATION AGENCY

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

DRAWING No: D-18

TITLE: Distribution Center Layout -
Kalikillki



LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

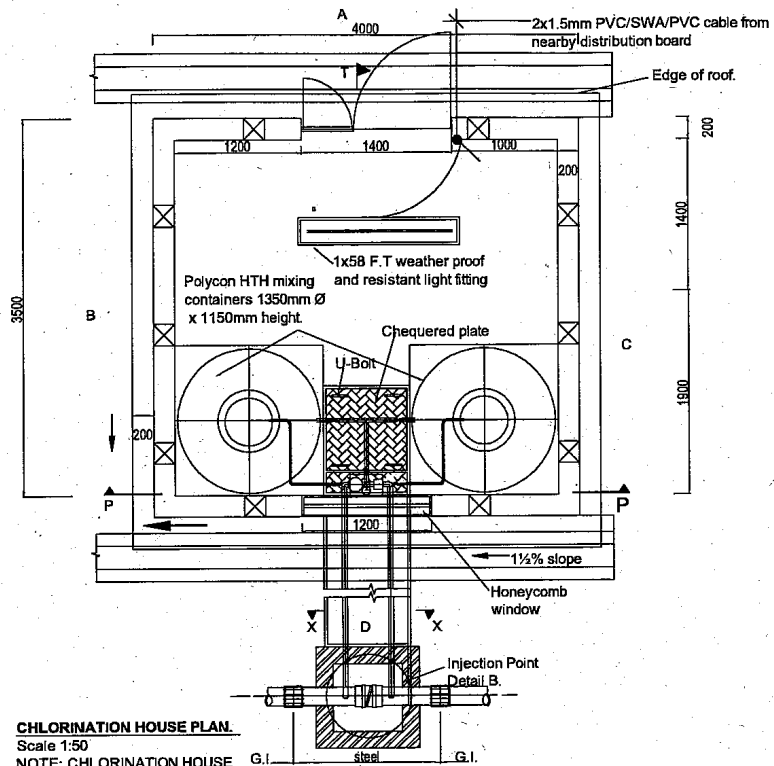
JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

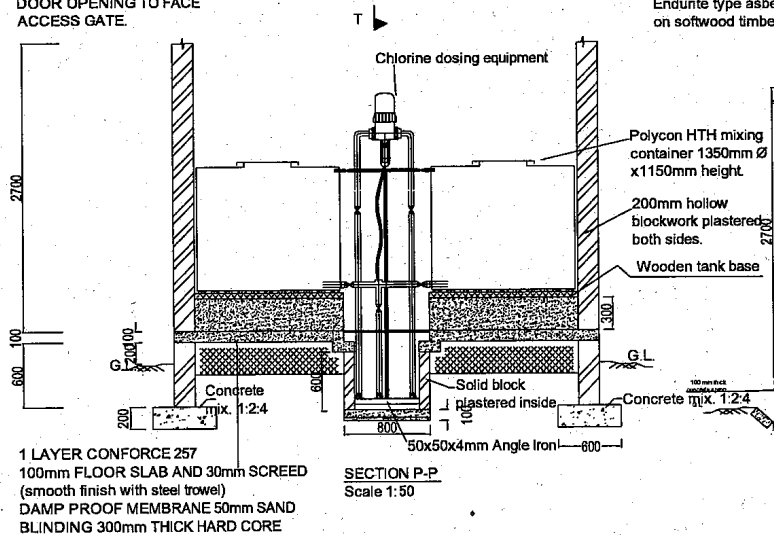
DRAWING No: D-19

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

TITLE: Distribution Center Layout - Freedom

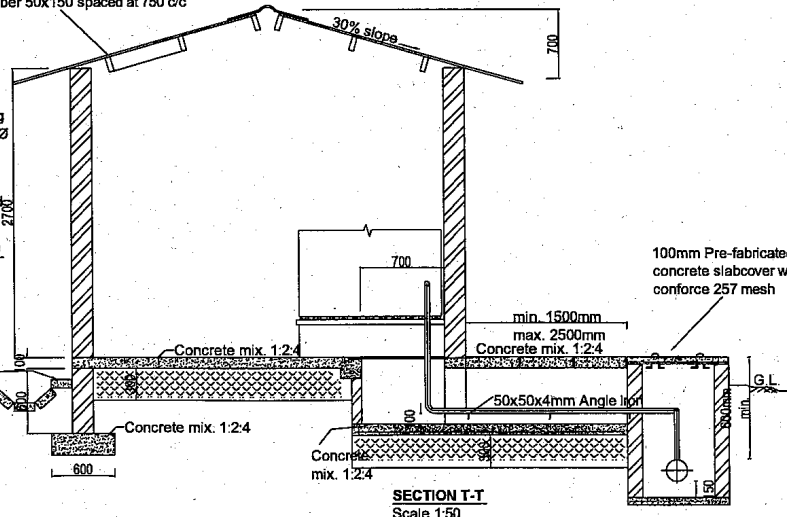


CHLORINATION HOUSE PLAN.
Scale 1:50
NOTE: CHLORINATION HOUSE
DOOR OPENING TO FACE
ACCESS GATE.

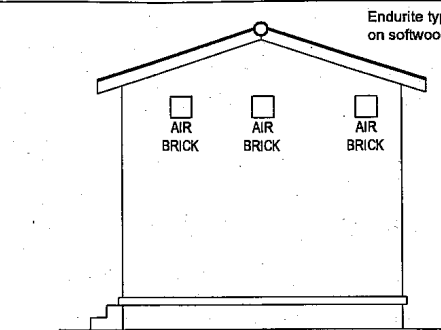


1 LAYER CONFORCE 257
100mm FLOOR SLAB AND 30mm SCREED
(smooth finish with steel trowel)
DAMP PROOF MEMBRANE 50mm SAND
BLINDING 300mm THICK HARD CORE

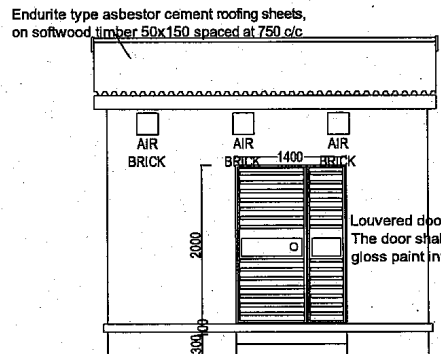
Endurite type asbestor cement roofing sheets,
on softwood timber 50x150 spaced at 750 c/c



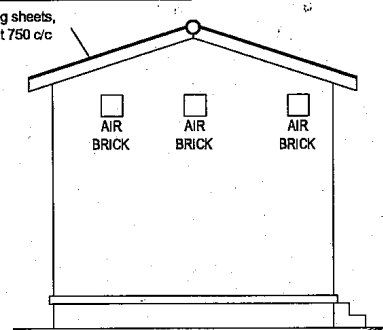
SECTION T-T
Scale 1:50



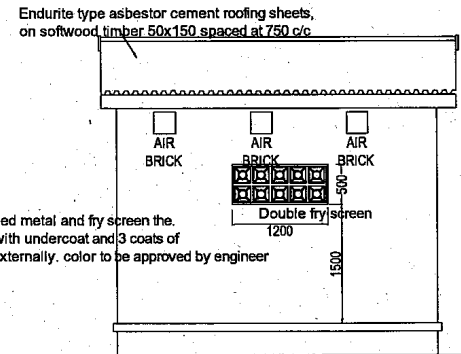
SIDE ELEVATION B
NOT TO SCALE



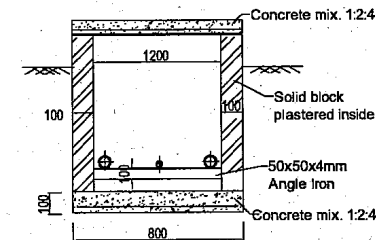
SIDE ELEVATION A
NOT TO SCALE



SIDE ELEVATION C
NOT TO SCALE



SIDE ELEVATION D
NOT TO SCALE



SECTION X-X
Scale 1:25

NOTE:

1. All accessories, e.g. door locks, padlock 82mm, priming and painting, plastering on walls to be included in the Contract and steel door etc to be provided in unit rates
2. External and internal walls up to a height of 1.5m shall be applied with undercoat and 3 coats of gloss paint and above that undercoat and 3 coats of PVA paint. Colour to be approved by the Engineer.
3. 20mm cover to Reinforcement.
4. Concrete grade 20

**LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF
UNPLANNED URBAN SETTLEMENTS IN LUSAKA**

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

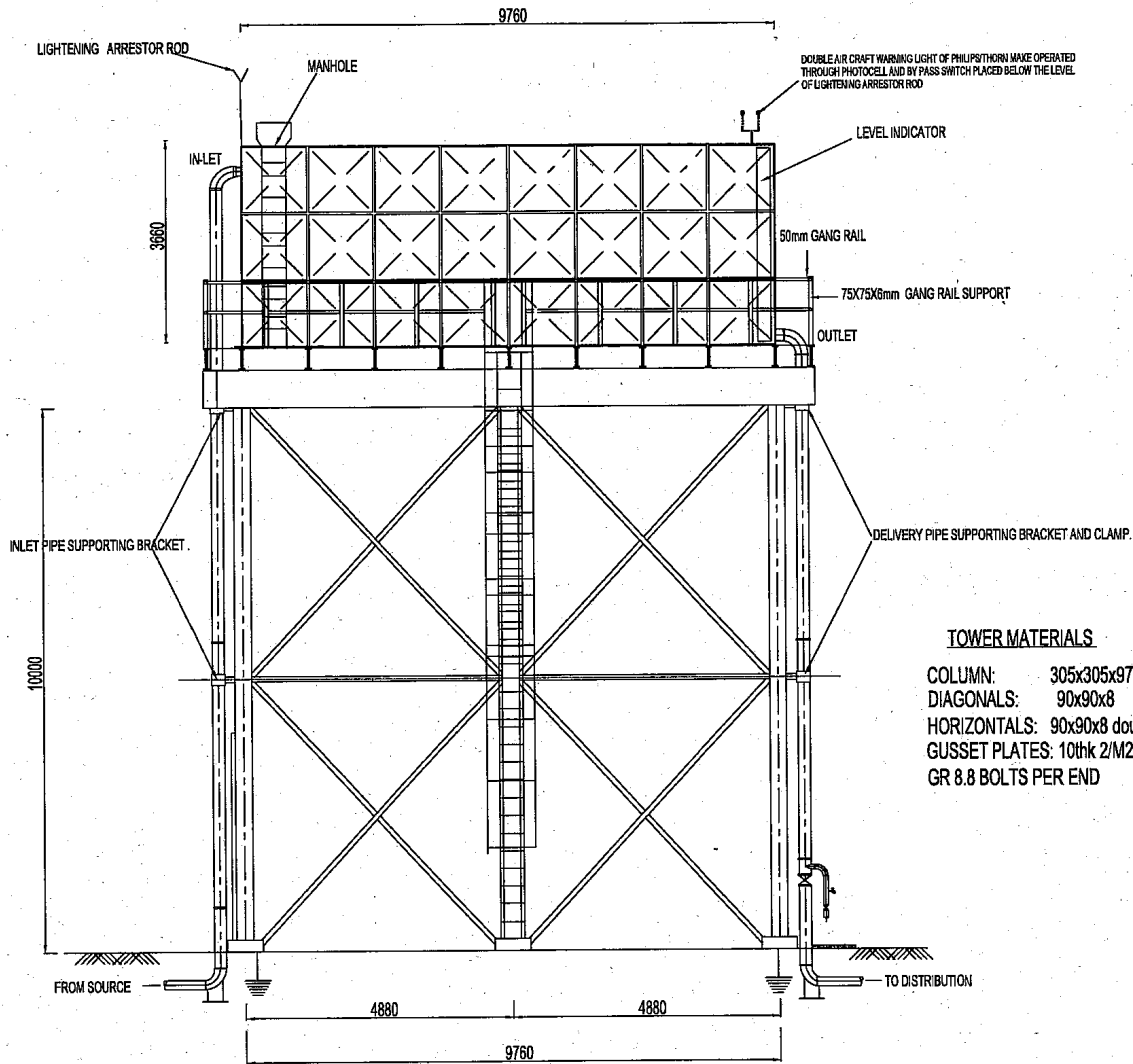
DRAWING No:

D-20

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

TITLE:

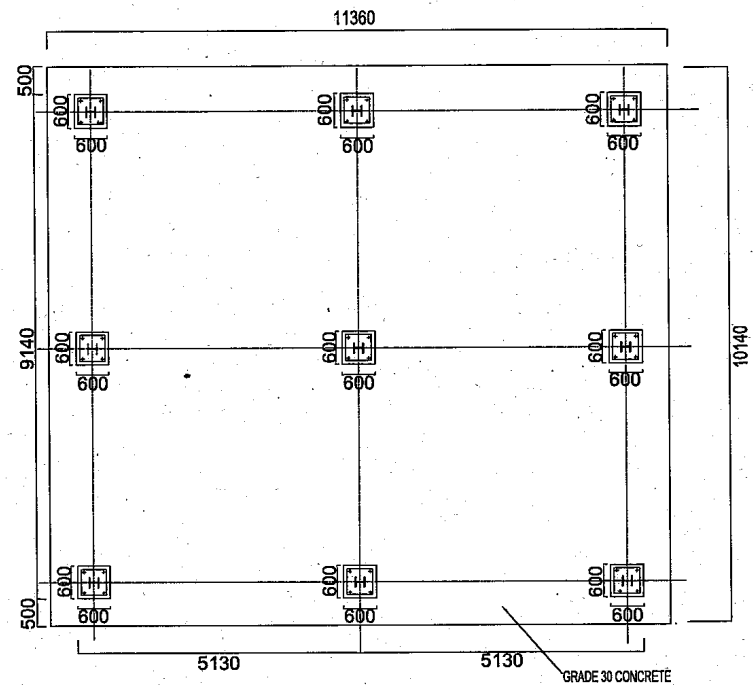
Chlorination House



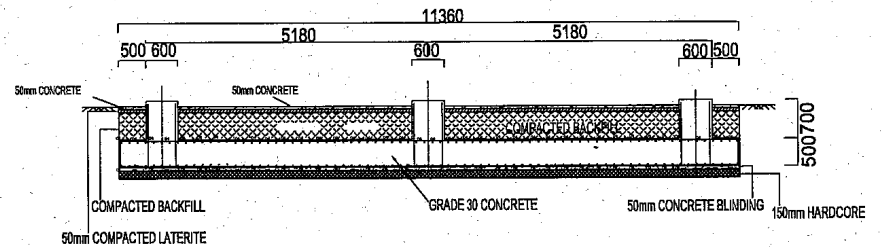
FRONT ELEVATION

TOWER MATERIALS

COLUMN: 305x305x97H
 DIAGONALS: 90x90x8
 HORIZONTALS: 90x90x8 double
 GUSSET PLATES: 10thk 2/M20
 GR 8.8 BOLTS PER END



ELEVATED TANK-FOUNDATION PLAN



ELEVATED TANK-FOUNDATION SECTION

LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

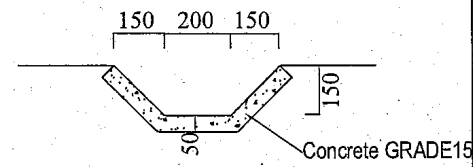
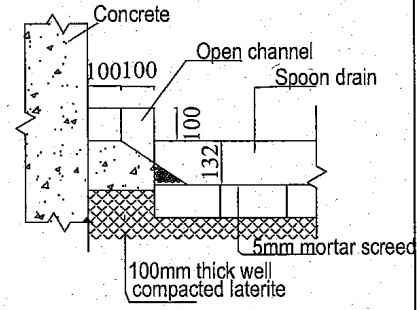
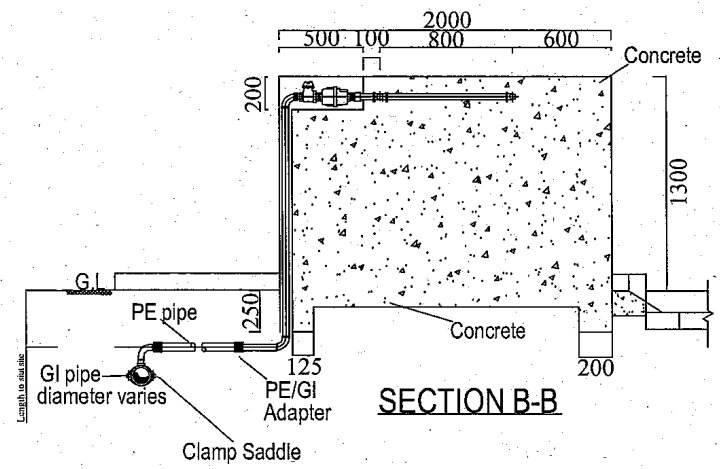
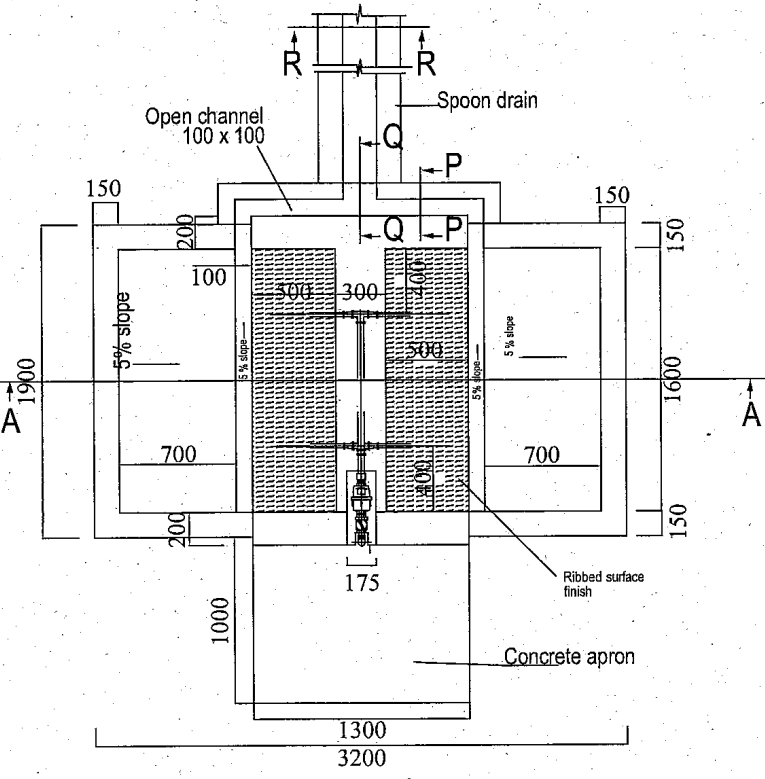
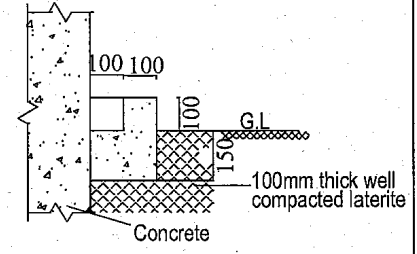
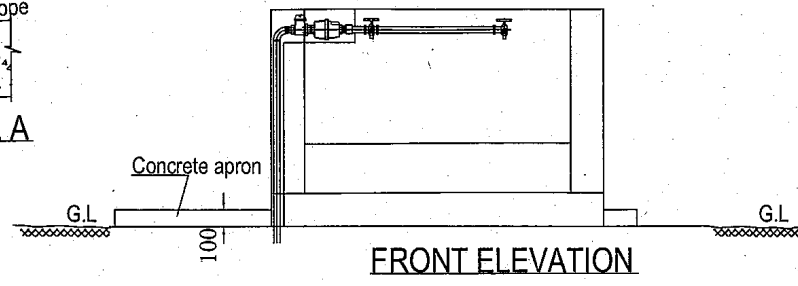
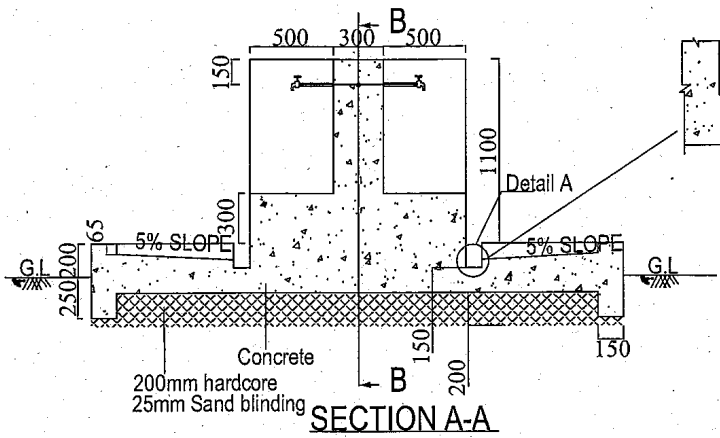
DRAWING No:

D-21

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

TITLE:

Steel Elevated Tank (Ngombe: 300m3)



NOTE: USE GRADE 30 CONCRETE.

LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF UNPLANNED URBAN SETTLEMENTS IN LUSAKA

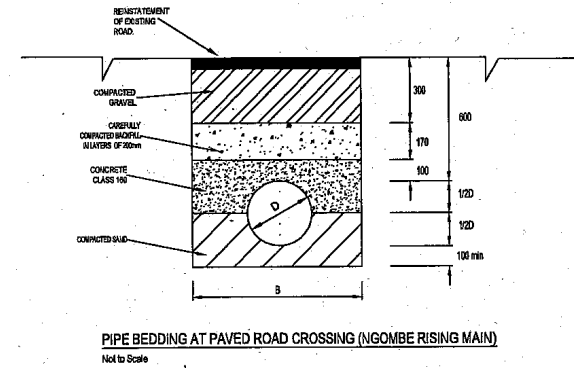
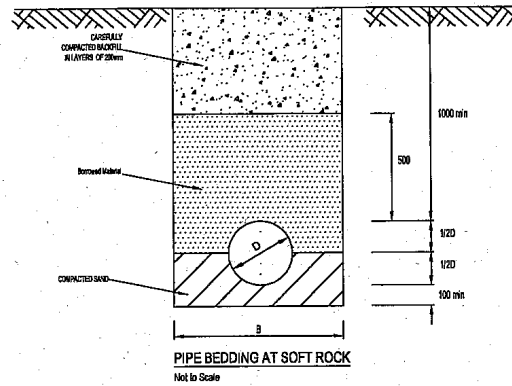
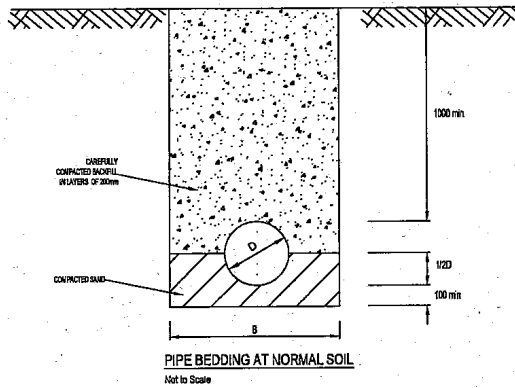
JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

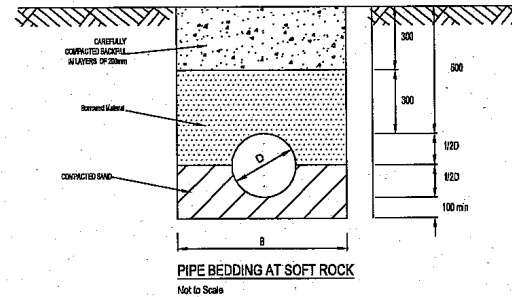
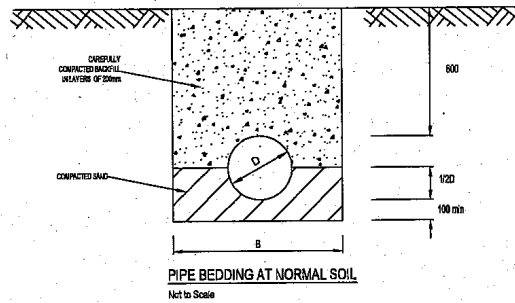
DRAWING No: D-23

MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

TITLE: Public Tap

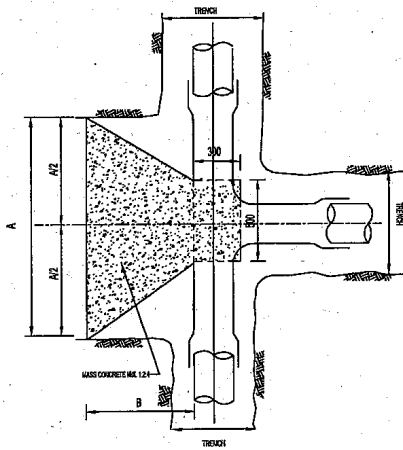


PIPE BEDDING for DIA. 100 to 300 mm

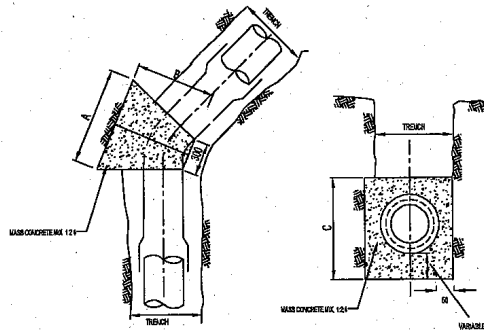


PIPE BEDDING for DIA. 40 to 75 mm and NGOMBE RISING MAIN

D (mm)	B (mm)
40	600
50	600
75	600
100	700
150	700
200	800
300	800



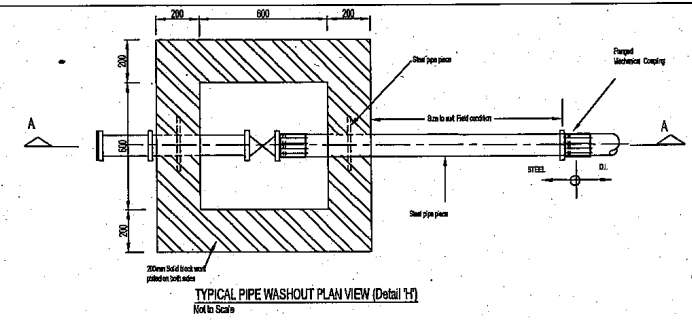
TEE
NOT TO SCALE



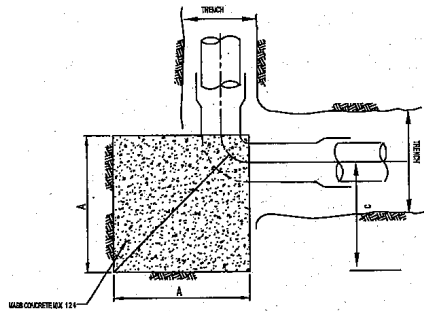
45° BEND, 22 1/2° BEND,
11 1/4° BEND
NOT TO SCALE

TYPICAL ELEVATION OF CONCRETE
THRUST BLOCK

NOTE:
ALL THRUST BLOCK SHALL BE PLACED AGAINST UNDISTURBED SOIL.
JOINTS WITH THRUST BLOCK ARE SHOWN AS SOCKET AND SPIGOT. CONNECTION MAY CHANGE
BASED ON PIPE MATERIAL.

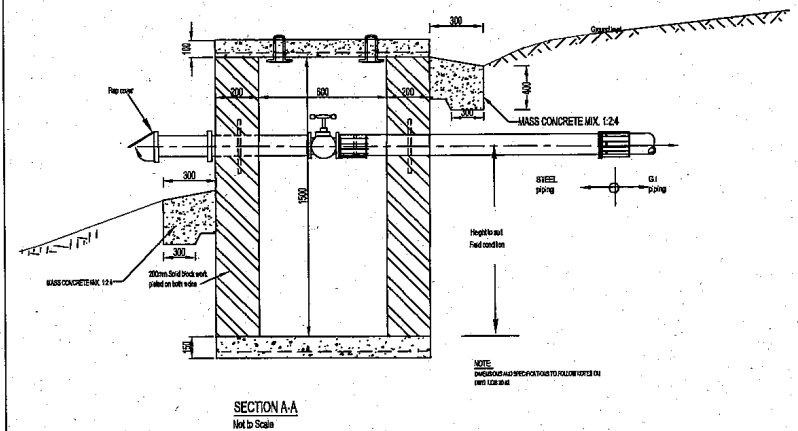


TYPICAL PIPE WASHOUT PLAN VIEW (Detail F)
Not to Scale



90° BEND
NOT TO SCALE

SITE FITTING	A (mm)	B (mm)	C (mm)	
TEE	200-100	1 200	500	500
	<75	600	400	350
90 BEND	300-250	1 300	-	600
	200-100	800	-	500
45 22 1/2 11 1/4 BEND	300-250	1 000	700	600
	200-100	500	500	500
	<75	400	400	350



SECTION A-A
Not to Scale

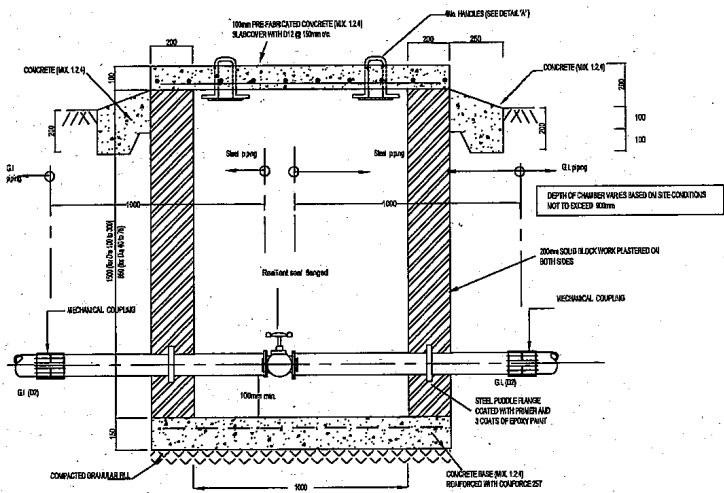
LIVING ENVIRONMENTAL IMPROVEMENT PROJECT OF
UNPLANNED URBAN SETTLEMENTS IN LUSAKA

JAPAN INTERNATIONAL COOPERATION AGENCY
MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

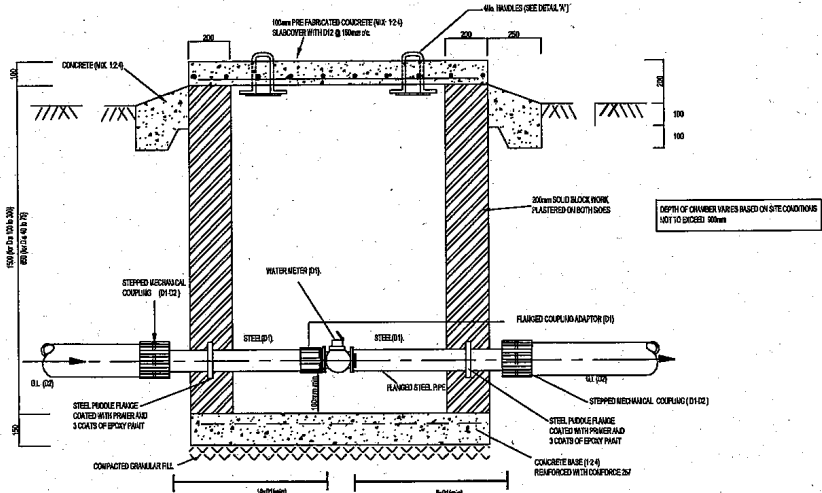
NIPPON KOEI CO., LTD.

DRAWING No:
D-25

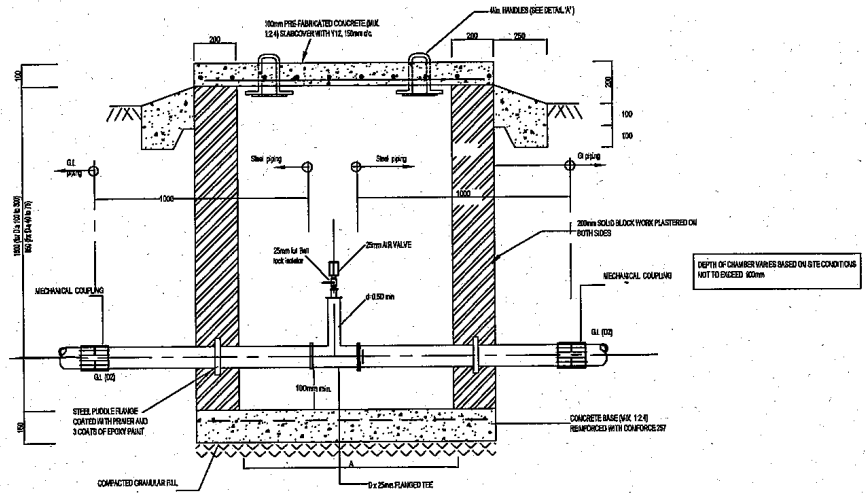
TITLE:
Thrust Block and Washout



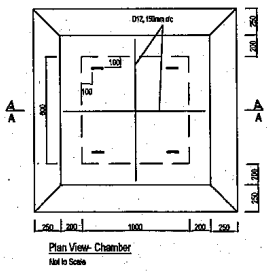
VALVE CHAMBER-Section A-A
Not to Scale



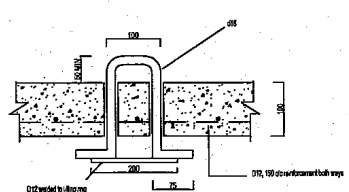
METER CHAMBER-Section A-A
Not to Scale



AIR VALVE CHAMBER-Section A-A
Not to Scale



Plan View - Chamber
Not to Scale



DETAIL A
1:5

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JAPAN INTERNATIONAL COOPERATION AGENCY
MINISTRY OF LOCAL GOVERNMENT AND HOUSING (MLGH) ZAMBIA

NIPPON KOEI CO., LTD.

DRAWING No: D-26
TITLE: Valve Box