

APPENDIX V
BASIC DESIGN DRAWINGS



RURAL WATER SUPPLY DEPARTMENT

MINISTRY OF ELECTRICITY AND WATER

REPUBLIC OF YEMEN

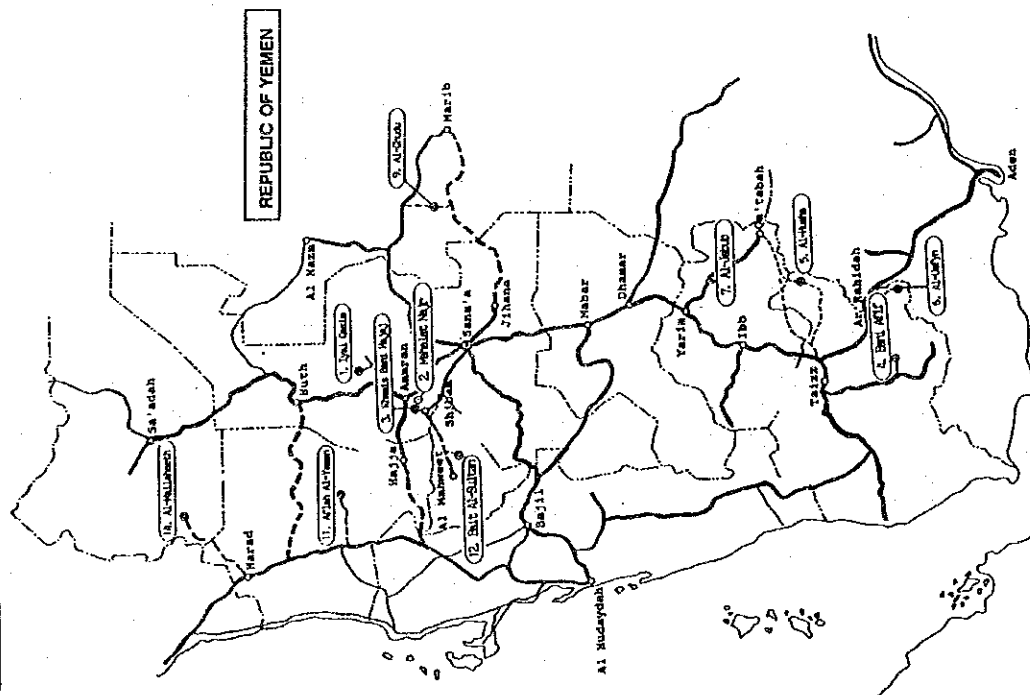
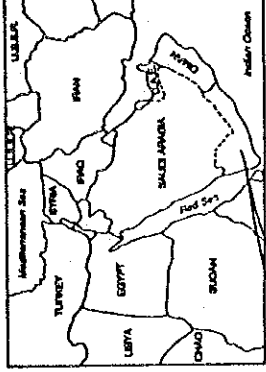
RURAL WATER SUPPLY PROJECT

**BASIC DESIGN
DRAWINGS**

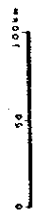
DECEMBER 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

DRAWING TITLE	DWG. NO.	DRAWING TITLE	DWG. NO.
List of Drawings	A-V-1	B. DETAILS OF WATER SUPPLY FACILITIES	
Location Map of Project Map	A-V-3	Typical Structure of Well	A-V-27
A. SITE PLAN		Typical Pump House construction Type A	A-V-28
No.14 Al Mallaheeth : Site Plan	A-V-5	Typical Pump House construction Type B	A-V-29
No.1 Iyal Qasim : Site Plan	A-V-7	Typical Pump House construction Type C	A-V-30
No.6 Al Usfyn : Site Plan	A-V-9	Water Tank Details : 24 m ³ Ground Tank	A-V-31
No.11 Aflah Al Yaman : Site Plan	A-V-11	Water Tank Details : 48 m ³ Ground Tank	A-V-32
No.9 Al Ghudu : Site Plan	A-V-13	Water Tank Details : 75 m ³ Ground Tank	A-V-33
No.3 Khamis Bani Hajaj : Site Plan	A-V-15	Water Tank Details : 90 m ³ Ground Tank	A-V-34
No.5 Al Husha : Site Plan	A-V-17	Water Tank Details : 120 m ³ Ground Tank	A-V-35
No.12 Bait Al Sultan : Site Plan	A-V-19	Water Tank Details : 180 m ³ Ground Tank	A-V-36
No.4 Bani Afif : Site Plan	A-V-21	Public Fountain	A-V-37
No.7 Al Jubub : Site Plan	A-V-23		
No.2 Maharat Najr : Site Plan	A-V-25		

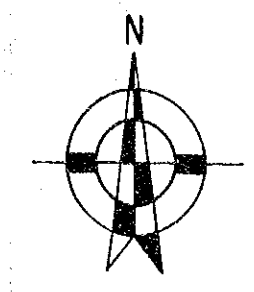
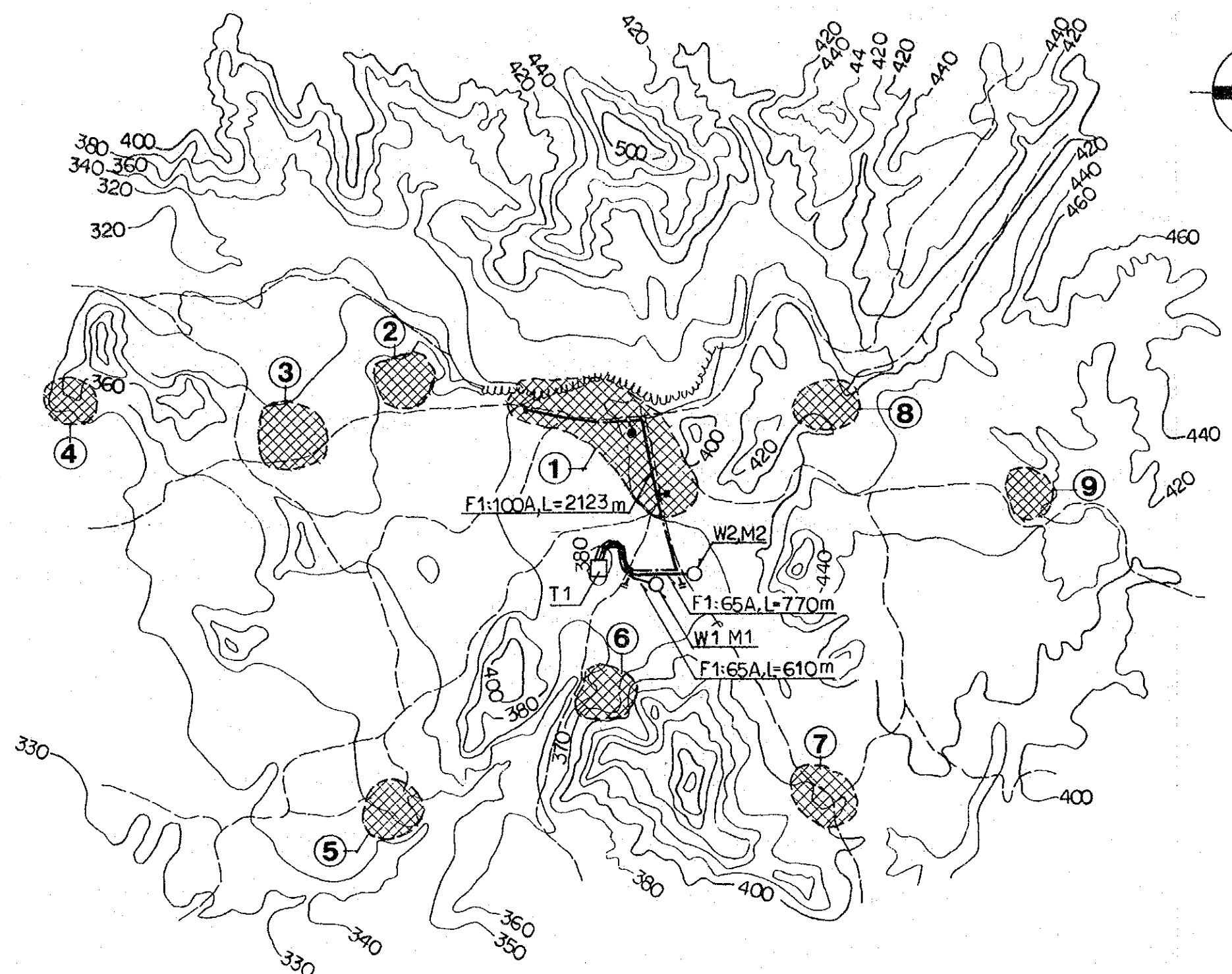


Sites for Implementation		Sites for Reference			
Site No.	Project Site	Governorate	Site No.	Project Site	Governorate
1.	Iyal Gasim	Sana'a	2.	Maharat Najr	Sana'a
6.	Al Ustyn	Taizz	3.	Khamis Bani Hajar	Sana'a
9.	Al Ghudu	Marib	4.	Bani Afif	Taizz
11.	Alifish Al Yaman	Hajjah	5.	Al Husa	Taizz
14.	Al Mallaheth	Sa'dah	7.	Al Jabub	Ibb
			12.	Bait Al Sultan	Al Mahweet.



REPUBLIC OF YEMEN
RURAL WATER SUPPLY PROJECT
Location Map of Project Sites
JAPAN INTERNATIONAL COOPERATION AGENCY
JICA

A. SITE PLAN

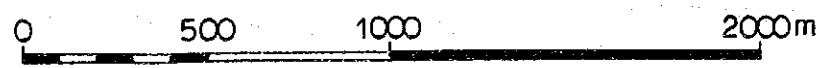


LEGEND

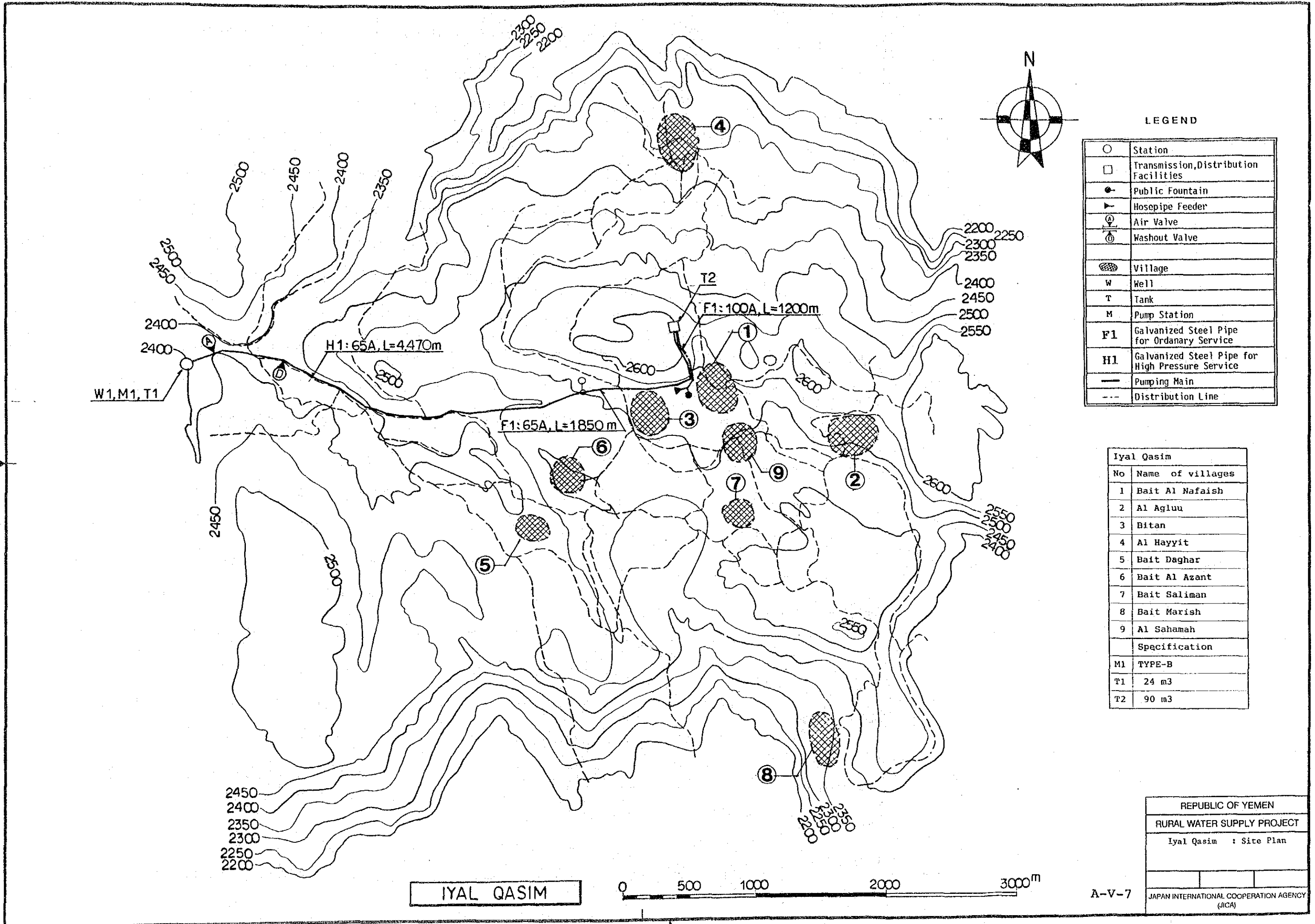
○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
⊕	Air Valve
⊗	Washout Valve
⊞	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
---	Distribution Line

Al Mallaheeth	
No	Name of villages
1	Al Mallaheeth
2	Al Marwy : Alalla
3	Al Marwy : Assfal
4	Assagen
5	Al Matla
6	Al Ladh
7	Assafia
8	Tarrany
9	Marrwa
Specification	
T1	120 m ³
M1	Existing Machinery
	House
M2	TYPE-A

AL MALLAHEETH



REPUBLIC OF YEMEN	
RURAL WATER SUPPLY PROJECT	
Al Mallaheeth : Site Plan	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	



LEGEND

○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
Ⓐ	Air Valve
Ⓑ	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

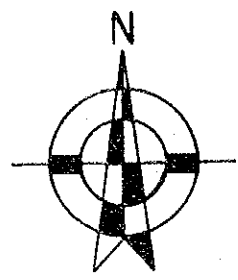
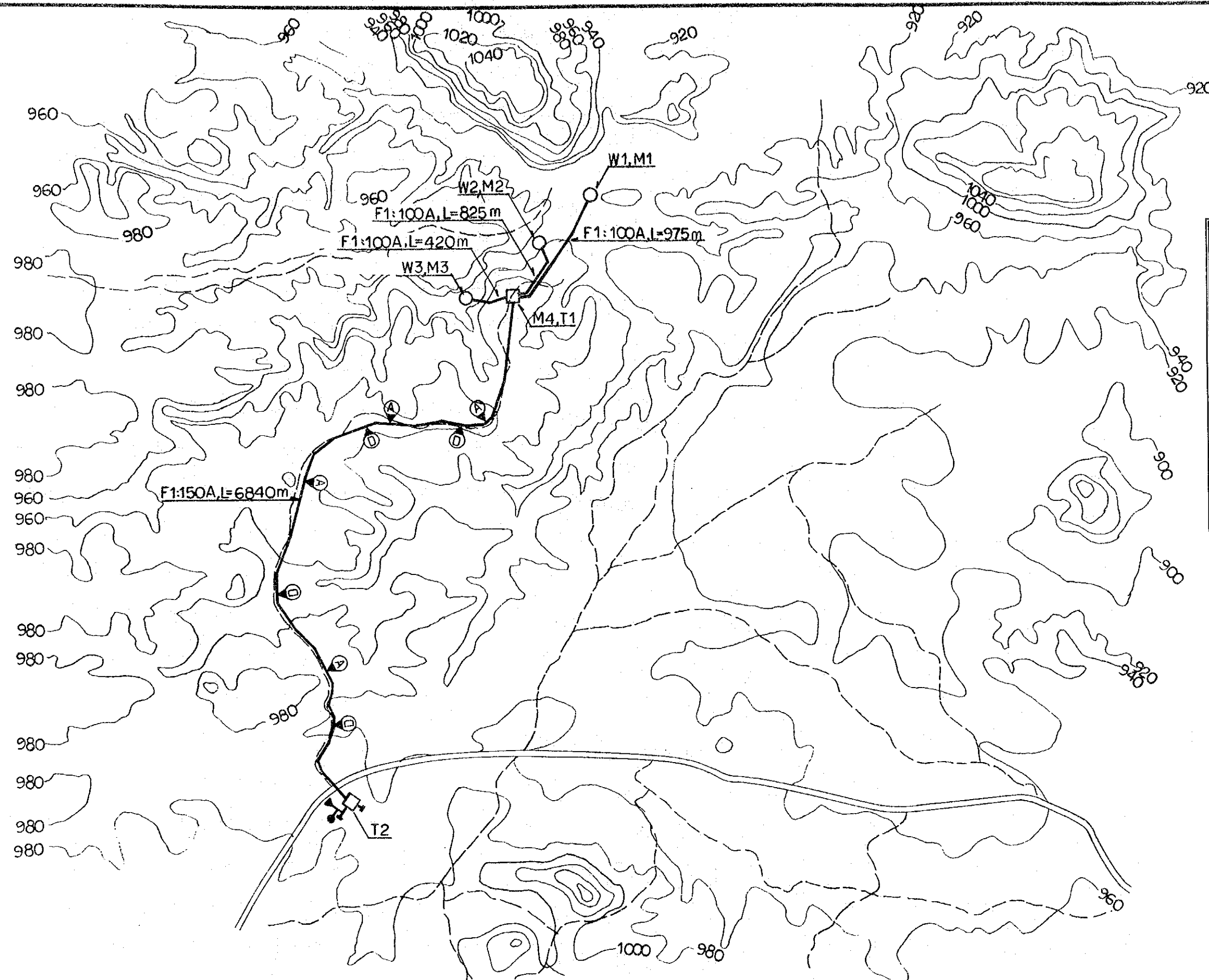
Iyal Qasim	
No	Name of villages
1	Bait Al Nafaish
2	Al Agluu
3	Bitan
4	Al Hayyit
5	Bait Daghar
6	Bait Al Azant
7	Bait Saliman
8	Bait Marish
9	Al Sahamah
Specification	
M1	TYPE-B
T1	24 m3
T2	90 m3

IYAL QASIM



A-V-7

REPUBLIC OF YEMEN
RURAL WATER SUPPLY PROJECT
Iyal Qasim : Site Plan
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



LEGEND

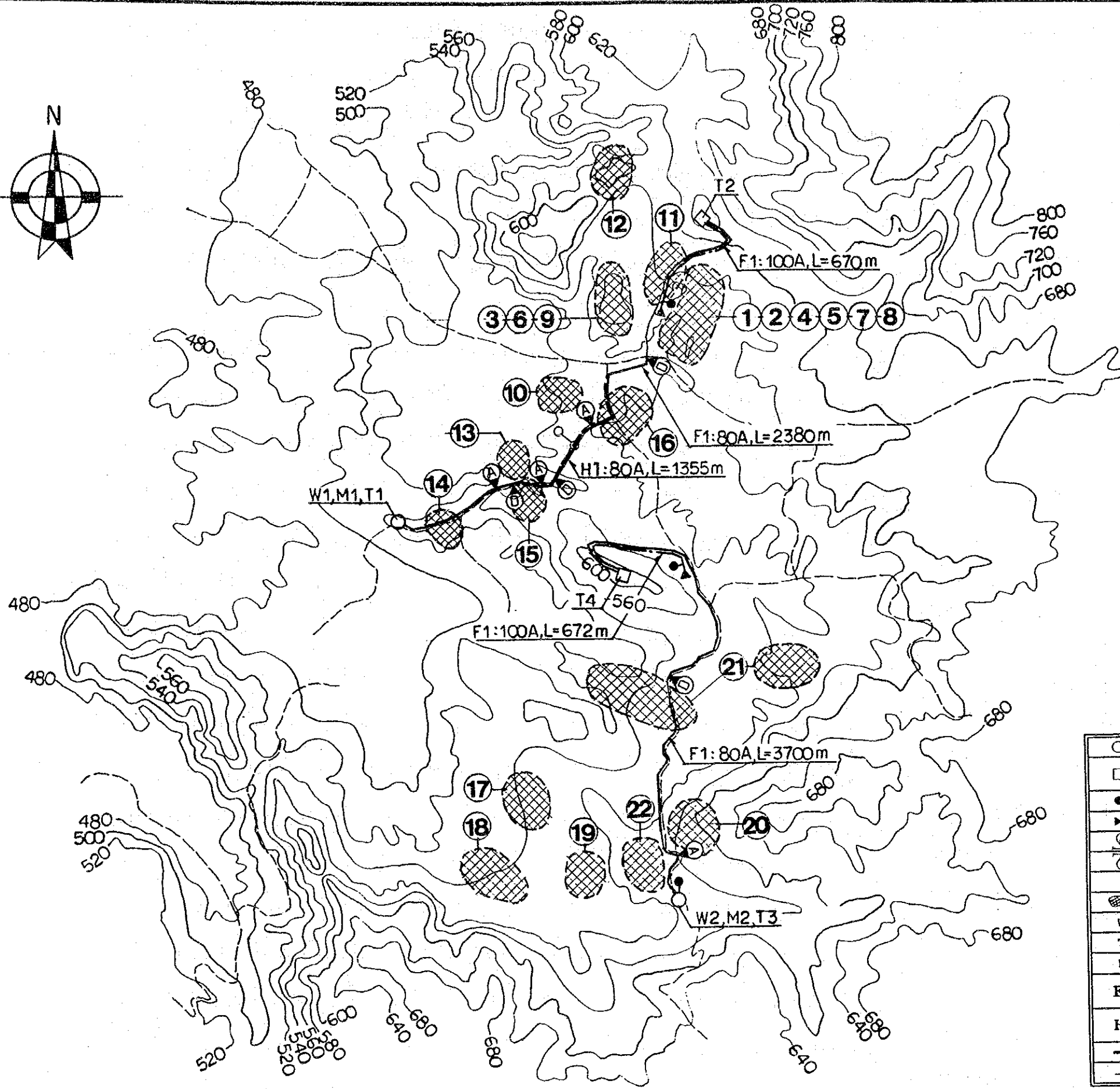
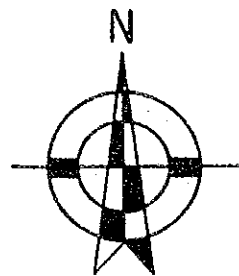
○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
⊕	Air Valve
⊖	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

Al Usfyn	
	Specification
M1	TYPE-A
M2	TYPE-A
M3	TYPE-A
M3	TYPE-D
T1	48 m ³
T2	120 m ³

AL USFYN



REPUBLIC OF YEMEN	
RURAL WATER SUPPLY PROJECT	
Al Usfyn	: Site Plan
A-V-9	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	



AFLAH AL YAMAN



Aflah Al Yaman	
No	Name of villages
1	Al Qadh
2	Al Qhareb
3	Assahl
4	Assoaq
5	Qaddat
6	Al Manather
7	Al Athariah
8	Morssa
9	Al Anad
10	Bait Saleh
11	Al Mahrabah
12	Addeer
13	Al Dakhwazh
14	Adharr
15	Assoadamh
16	Al Akawrrh
17	Al Kawillah
18	Al handy
19	Asswady
20	Arrubu
21	Astrabah
22	Al Kanah
Specification	
M1	TYPE-B
M2	TYPE-B
T1	24 m3
T2	120 m3
T3	48 m3
T4	120 m3

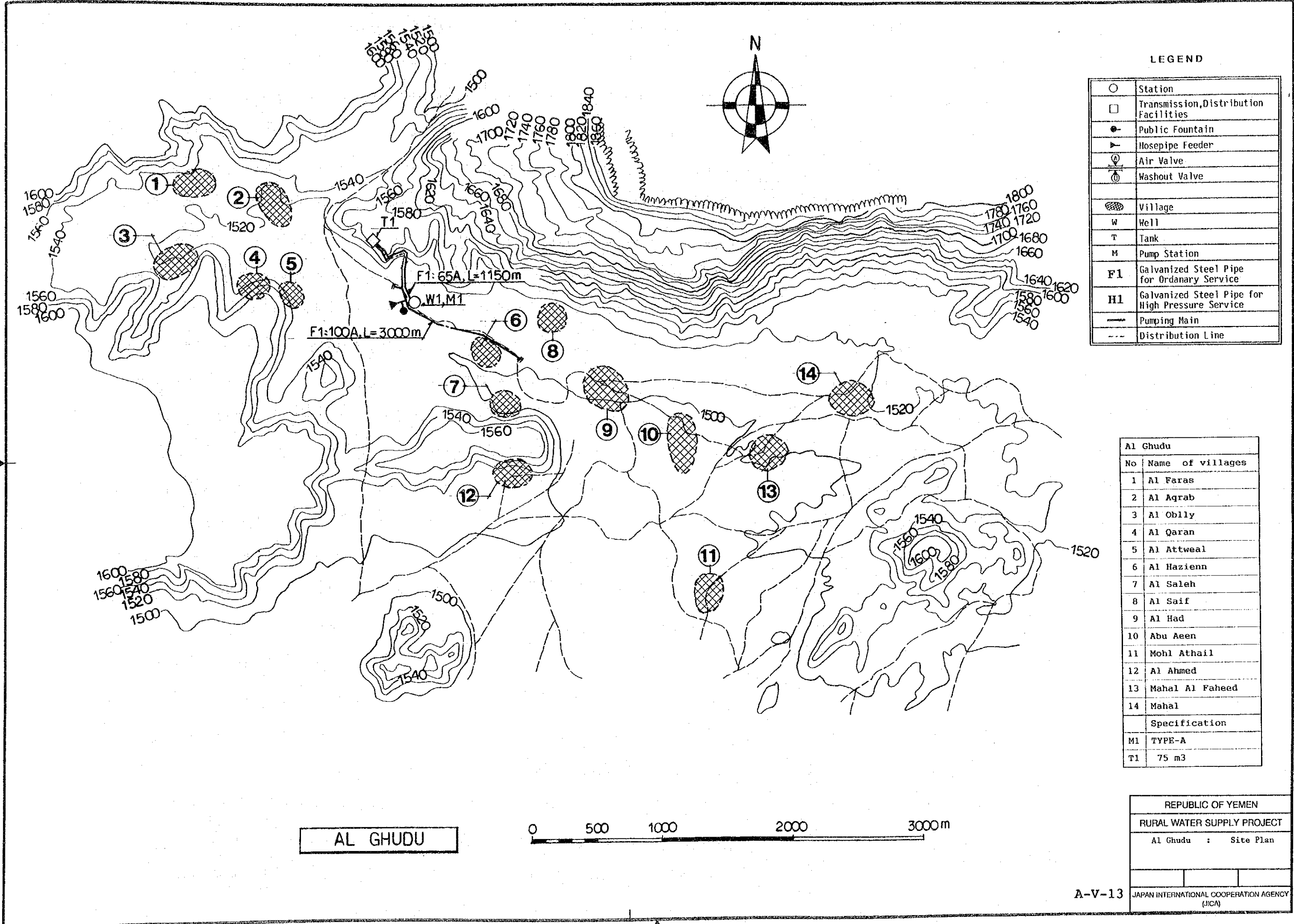
LEGEND

○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
⊕	Air Valve
⊖	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

REPUBLIC OF YEMEN
 RURAL WATER SUPPLY PROJECT
 Aflah Al Yaman : Site Plan

A-V-11

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



LEGEND

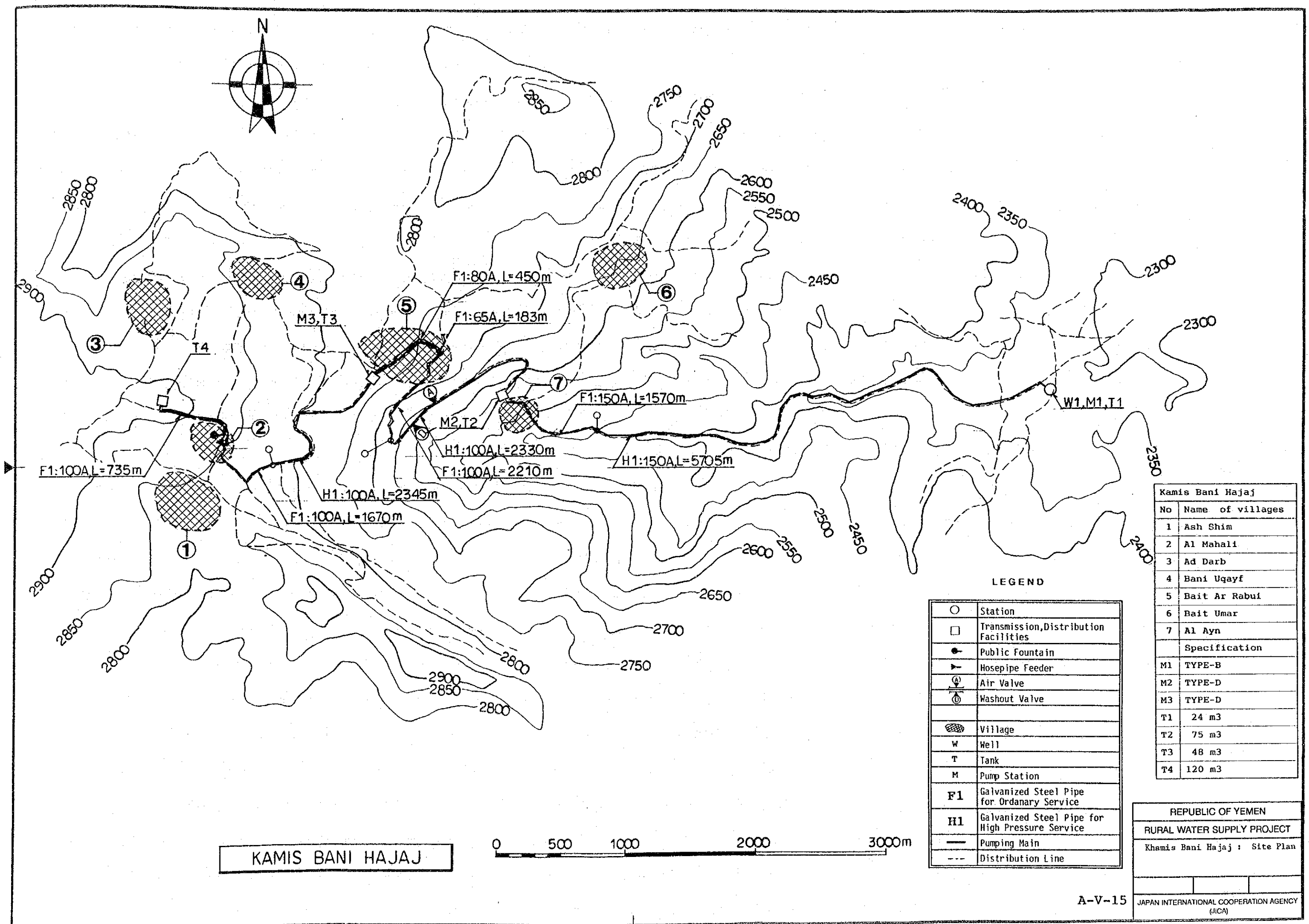
○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
⊕	Air Valve
⊗	Washout Valve
⊘	
⊙	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

Al Ghudu	
No	Name of villages
1	Al Faras
2	Al Agrab
3	Al Obily
4	Al Qaran
5	Al Attweal
6	Al Hazienn
7	Al Saleh
8	Al Saif
9	Al Had
10	Abu Aeen
11	Mohl Athail
12	Al Ahmed
13	Mahal Al Faheed
14	Mahal
Specification	
M1	TYPE-A
T1	75 m3

AL GHUDU



REPUBLIC OF YEMEN	
RURAL WATER SUPPLY PROJECT	
Al Ghudu : Site Plan	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	



KAMIS BANI HAJAJ



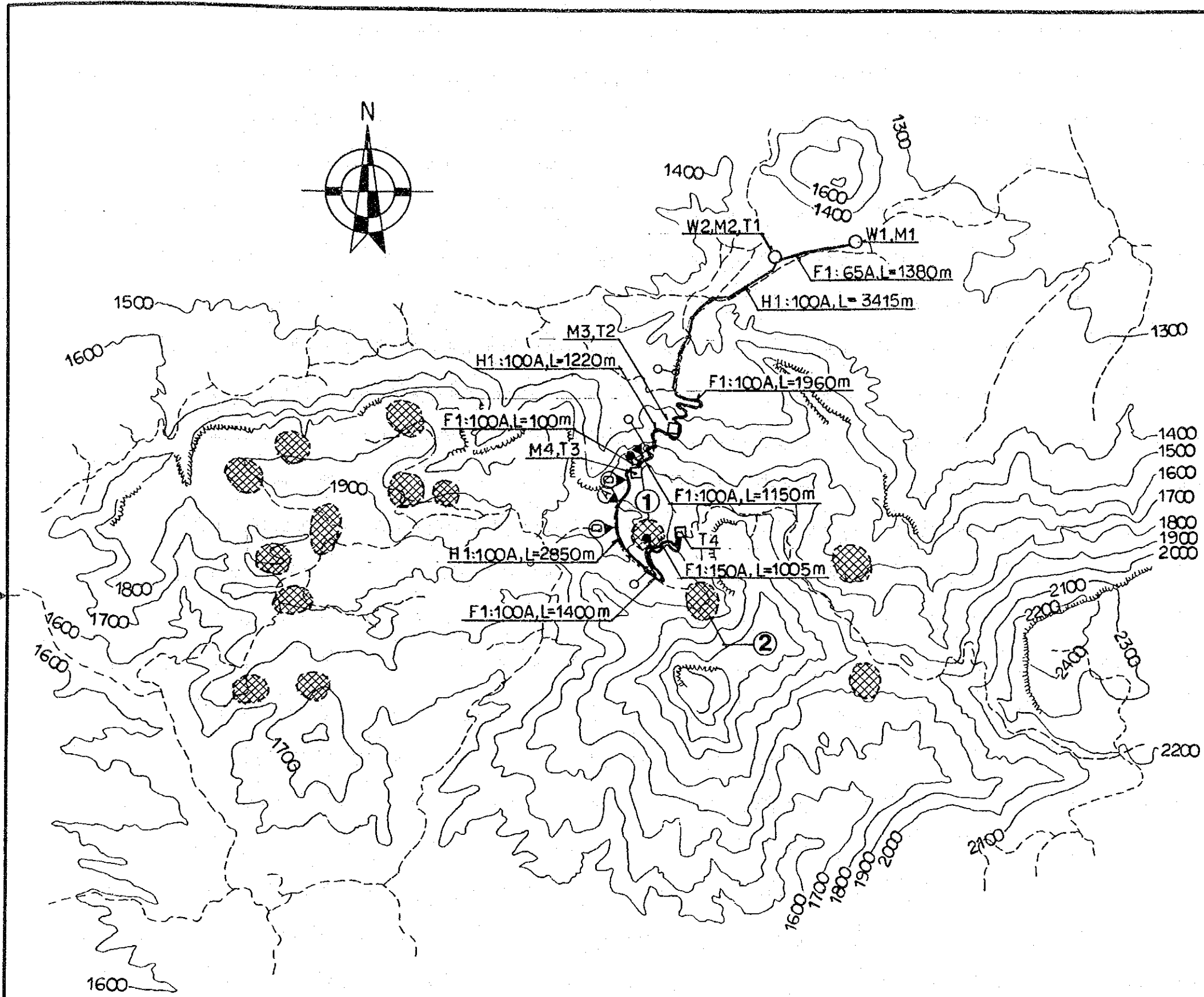
LEGEND

○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
Ⓐ	Air Valve
Ⓢ	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

Kamis Bani Hajaj	
No	Name of villages
1	Ash Shim
2	Al Mahali
3	Ad Darb
4	Bani Uqayf
5	Bait Ar Rabui
6	Bait Umar
7	Al Ayn
Specification	
M1	TYPE-B
M2	TYPE-D
M3	TYPE-D
T1	24 m3
T2	75 m3
T3	48 m3
T4	120 m3

REPUBLIC OF YEMEN
 RURAL WATER SUPPLY PROJECT
 Kamis Bani Hajaj : Site Plan

A-V-15
 JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

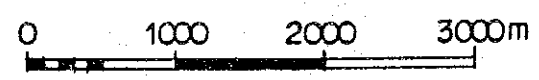


LEGEND

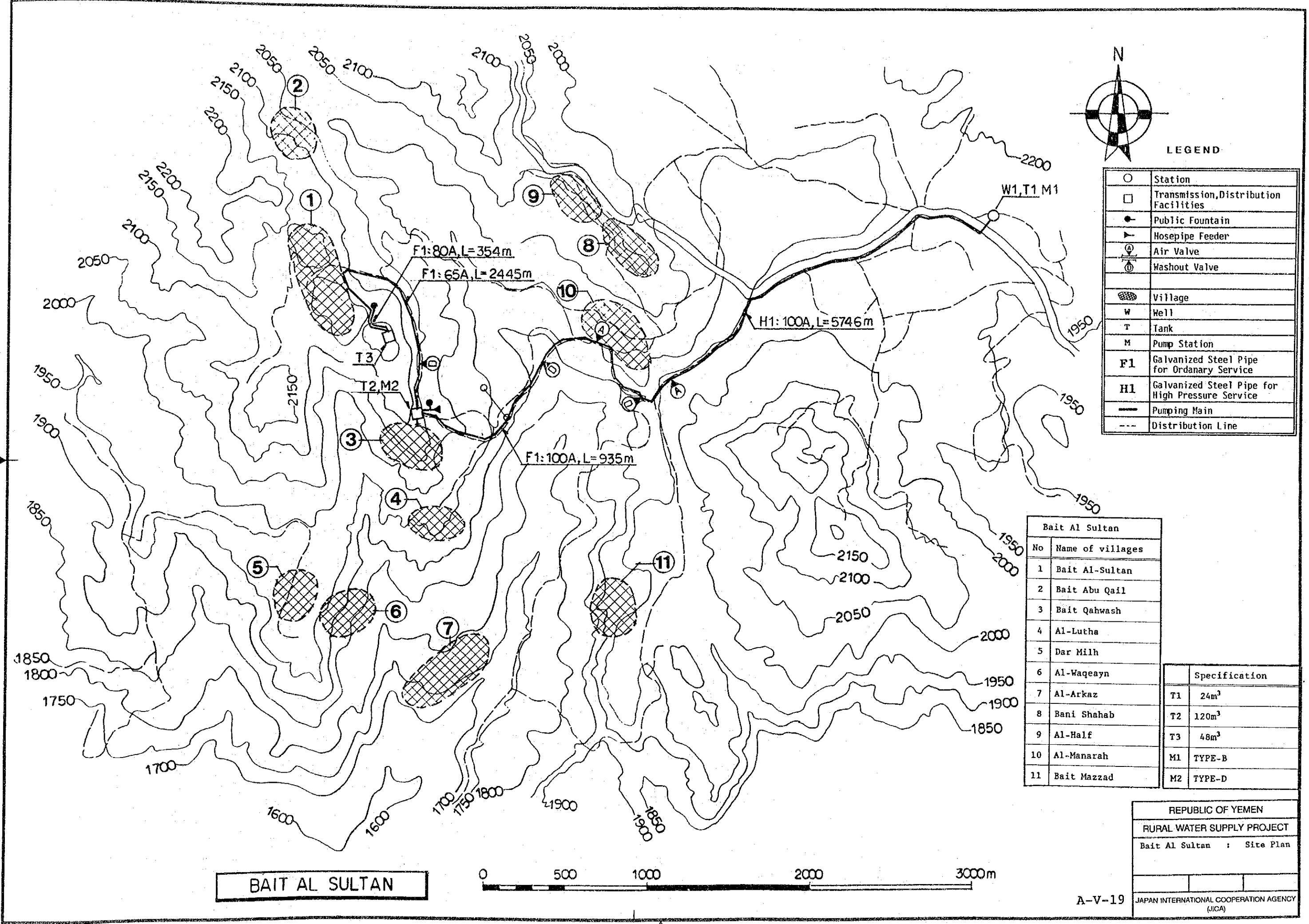
○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
⌋	Hosepipe Feeder
⊕	Air Valve
⊖	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

Al Husha	
No	Name of villages
1	Zuran
2	Shrb Zuran
Specification	
M1	TYPE-A
M2	TYPE-B
M3	TYPE-D
M4	TYPE-D
T1	36 m3
T2	36 m3
T3	90 m3
T4	180 m3

AL HUSHA



REPUBLIC OF YEMEN	
RURAL WATER SUPPLY PROJECT	
Al Husha : Site Plan	
A-V-17	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	



LEGEND

○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
└	Hosepipe Feeder
⊕	Air Valve
⊖	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

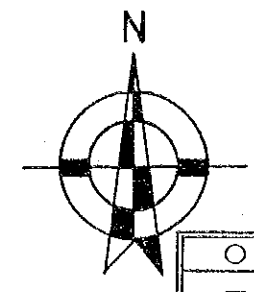
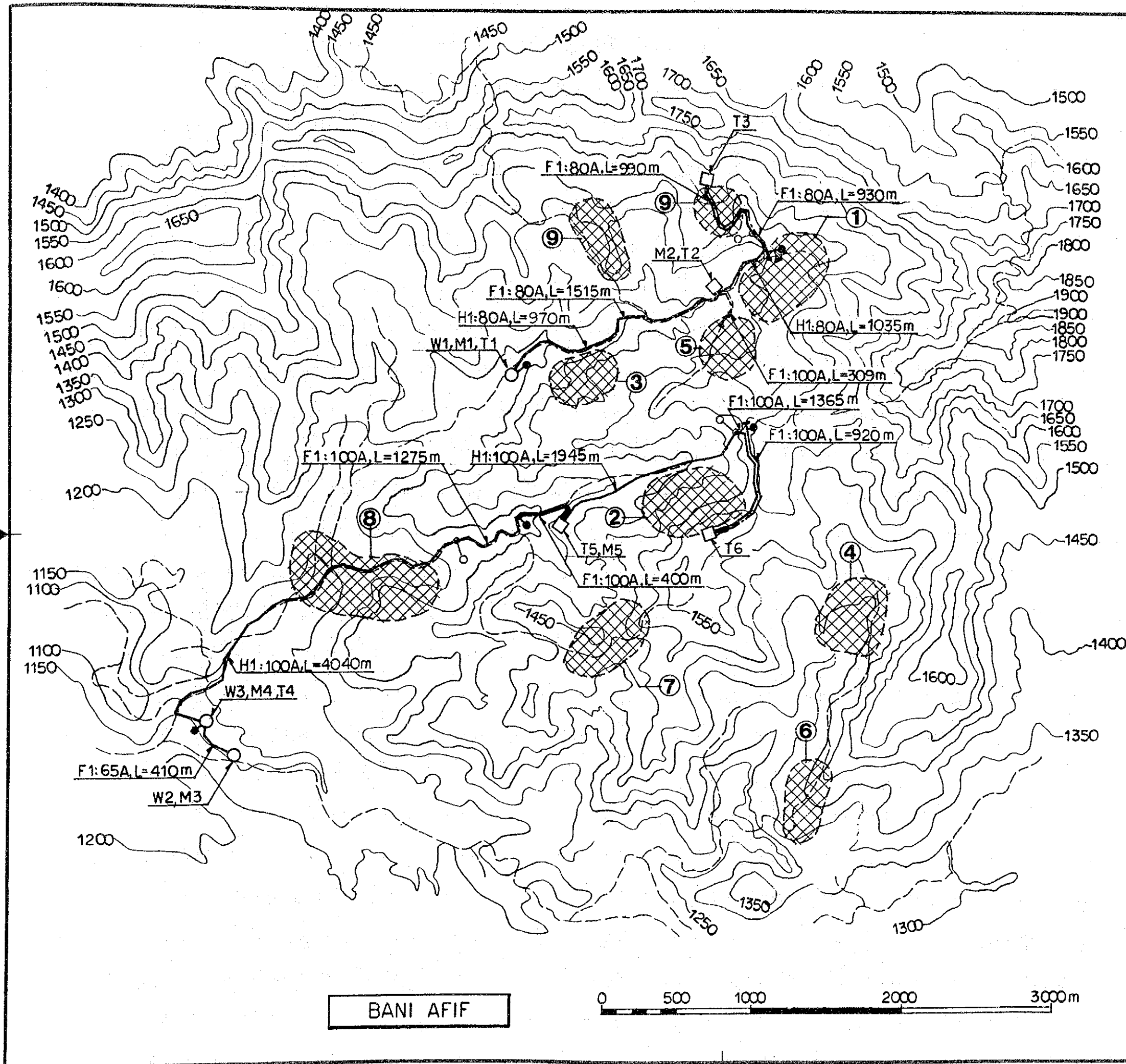
Bait Al Sultan	
No	Name of villages
1	Bait Al-Sultan
2	Bait Abu Qail
3	Bait Qahwash
4	Al-Lutha
5	Dar Milh
6	Al-Waqeayn
7	Al-Arkaz
8	Bani Shahab
9	Al-Half
10	Al-Manarah
11	Bait Mazzad

Specification	
T1	24m ³
T2	120m ³
T3	48m ³
M1	TYPE-B
M2	TYPE-D

BAIT AL SULTAN



REPUBLIC OF YEMEN
 RURAL WATER SUPPLY PROJECT
 Bait Al Sultan : Site Plan
 JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



LEGEND

○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
⊕	Air Valve
⊖	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

Bani Afif	
No	Name of villages
1	Al-Minam
2	Al-Areth
3	Al-Maqam
4	Al-Ujaylah
5	Arradah
6	Annaberah
7	Al-Quhaym
8	Al-Miqtar
9	Suwamah
Specification	
T1	24m ³
T2	90m ³
T3	36m ³
T4	24m ³
T5	75m ³
T6	144m ³
M1	TYPE-B
M2	TYPE-A
M3	TYPE-B
M4	TYPE-D
M5	TYPE-D

REPUBLIC OF YEMEN

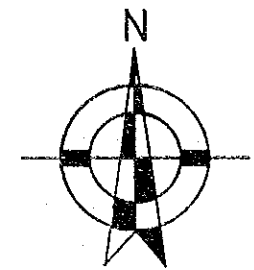
RURAL WATER SUPPLY PROJECT

Bani Afif : Site Plan

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

BANI AFIF

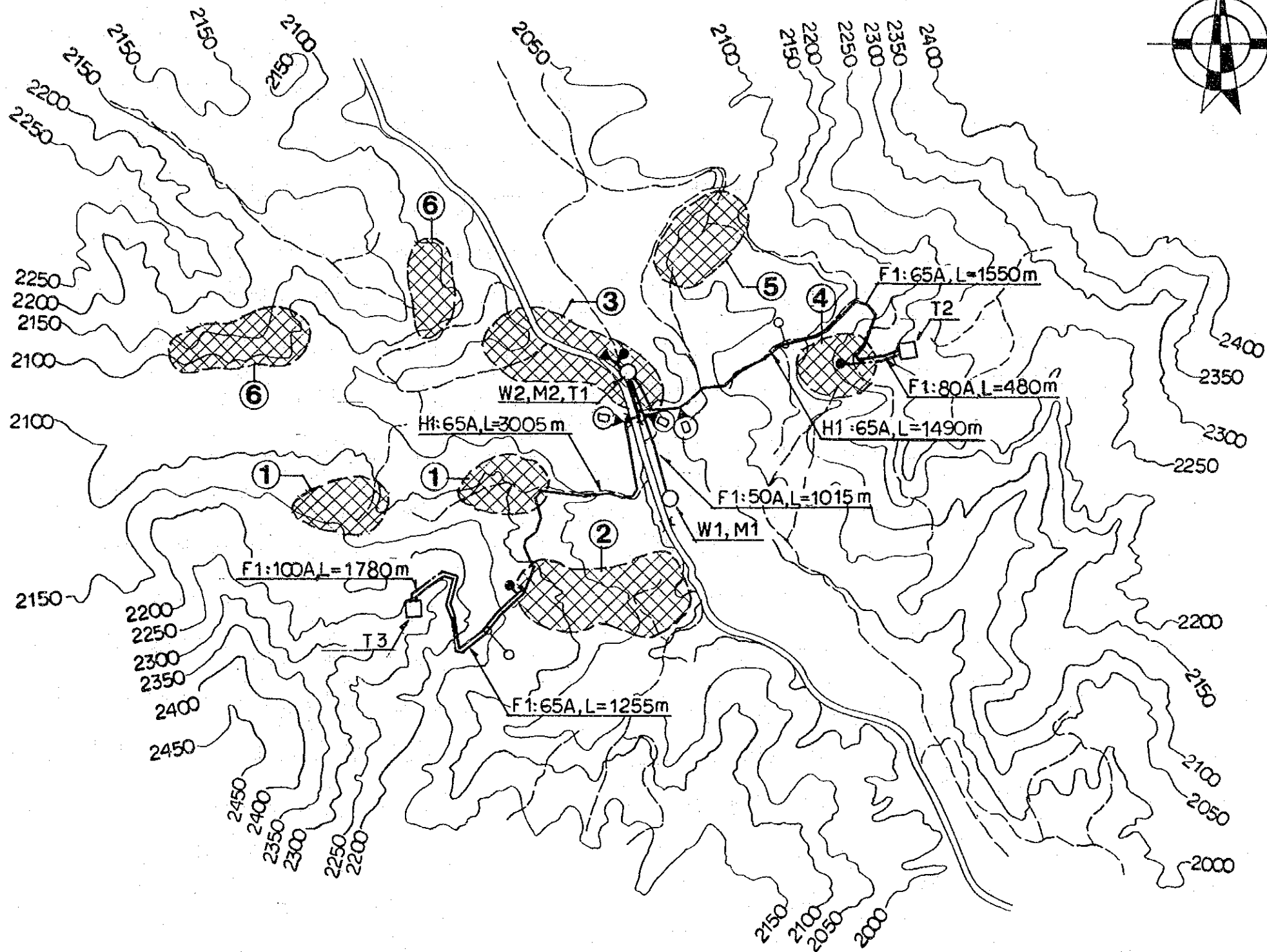




LEGEND

○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
⊕	Air Valve
⊖	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
- - -	Distribution Line

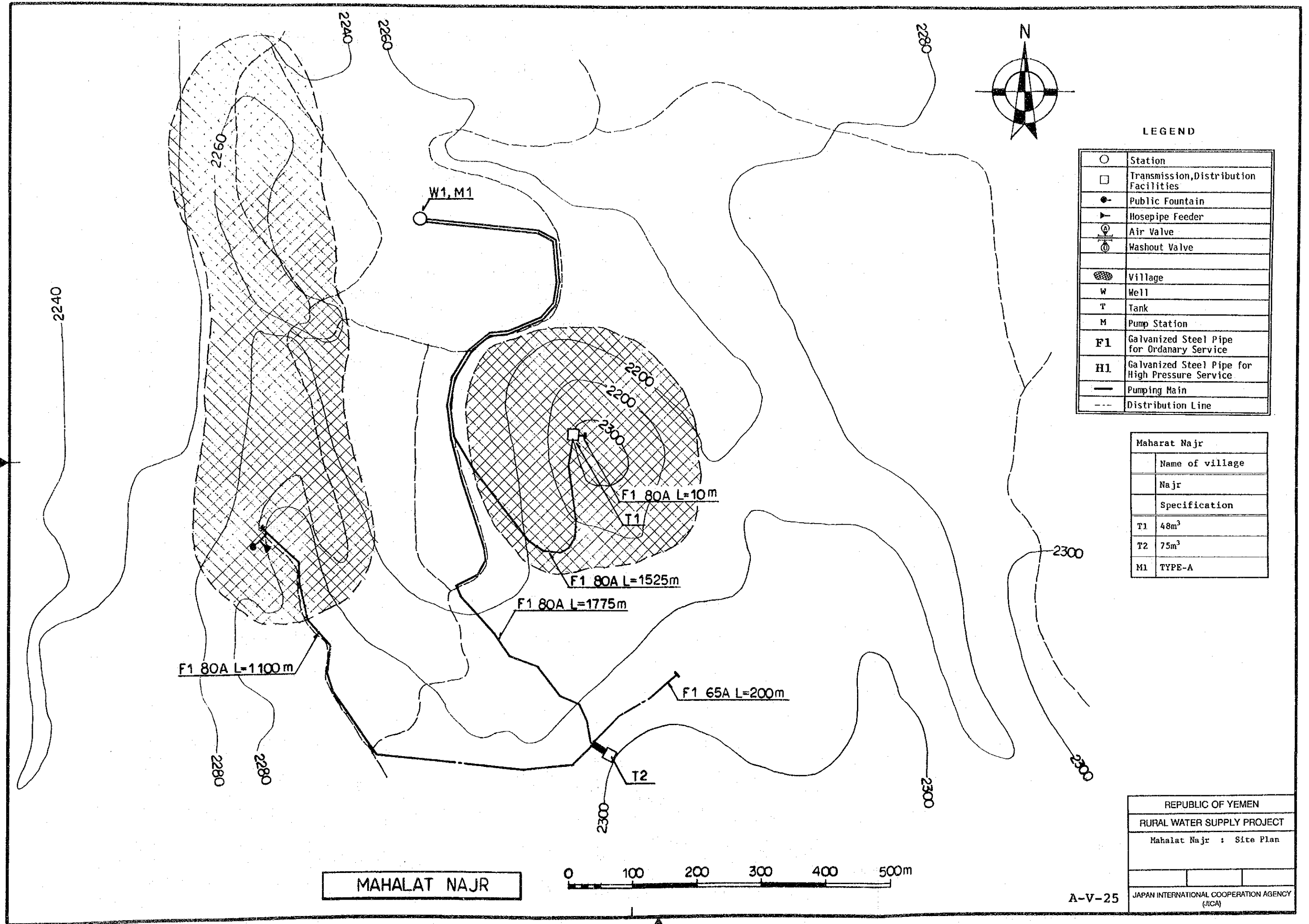
Al Jabub	
No	Name of villages
1	Hirrimah
2	Aqham : Al-Mallahah
3	Al-Jabub
4	Kawlat Bahal
5	Al-Khubaniyah : Qarn Ambari
6	Habar : Bait Badr
Specification	
T1	24m ³
T2	48m ³
T3	48m ³
M1	TYPE-A
M2	TYPE-C



AL JABUB



REPUBLIC OF YEMEN
RURAL WATER SUPPLY PROJECT
Al Jubub : Site Plan
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

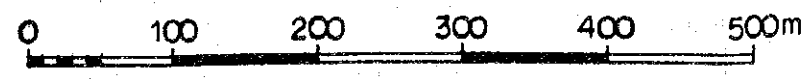


LEGEND

○	Station
□	Transmission, Distribution Facilities
●	Public Fountain
▶	Hosepipe Feeder
⊕	Air Valve
⊖	Washout Valve
▨	Village
W	Well
T	Tank
M	Pump Station
F1	Galvanized Steel Pipe for Ordinary Service
H1	Galvanized Steel Pipe for High Pressure Service
—	Pumping Main
---	Distribution Line

Maharat Najr	
	Name of village
	Najr
	Specification
T1	48m ³
T2	75m ³
M1	TYPE-A

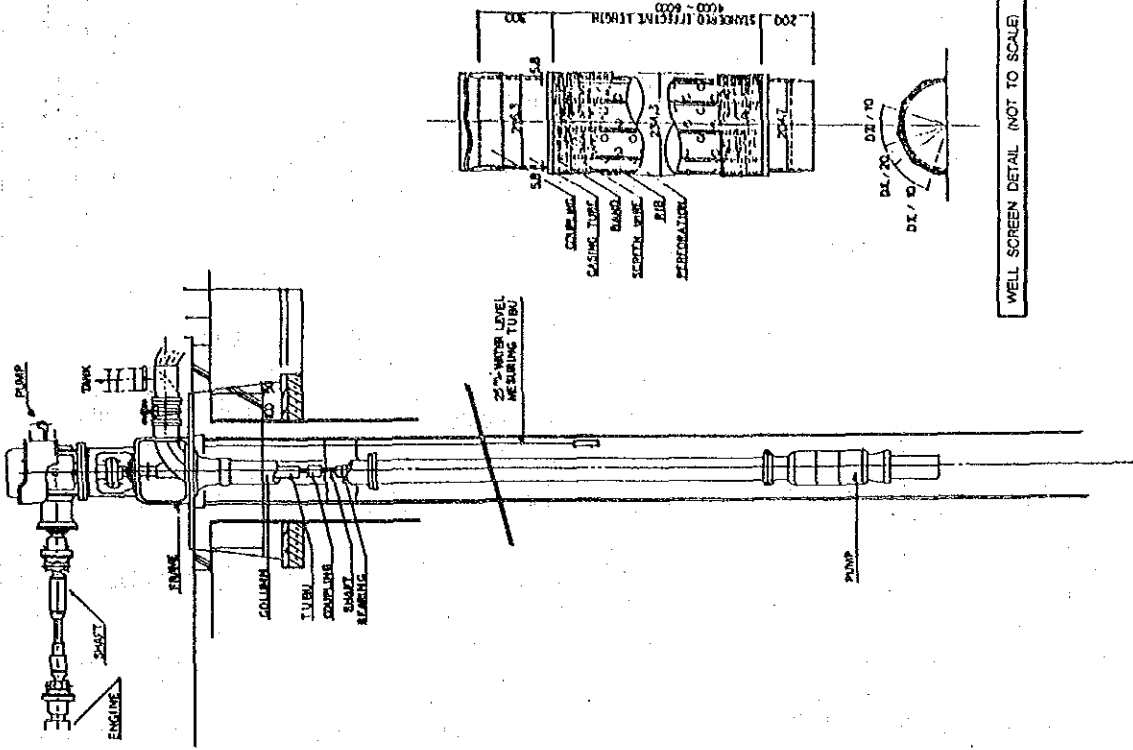
MAHALAT NAJR



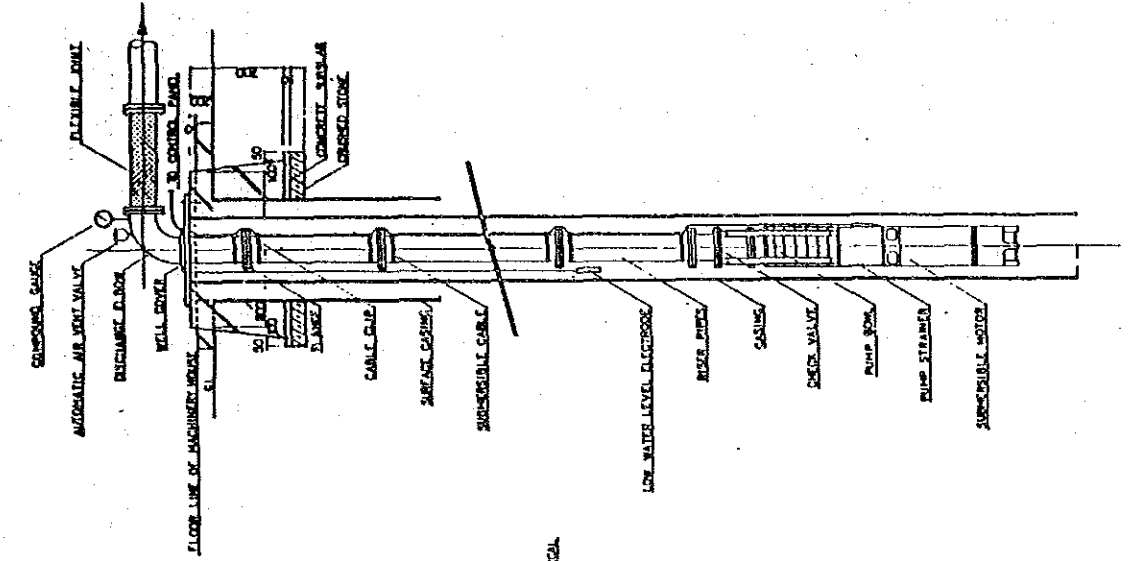
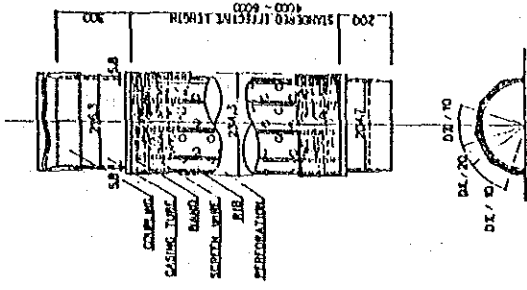
REPUBLIC OF YEMEN	
RURAL WATER SUPPLY PROJECT	
Mahalat Najr : Site Plan	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	

A-V-25

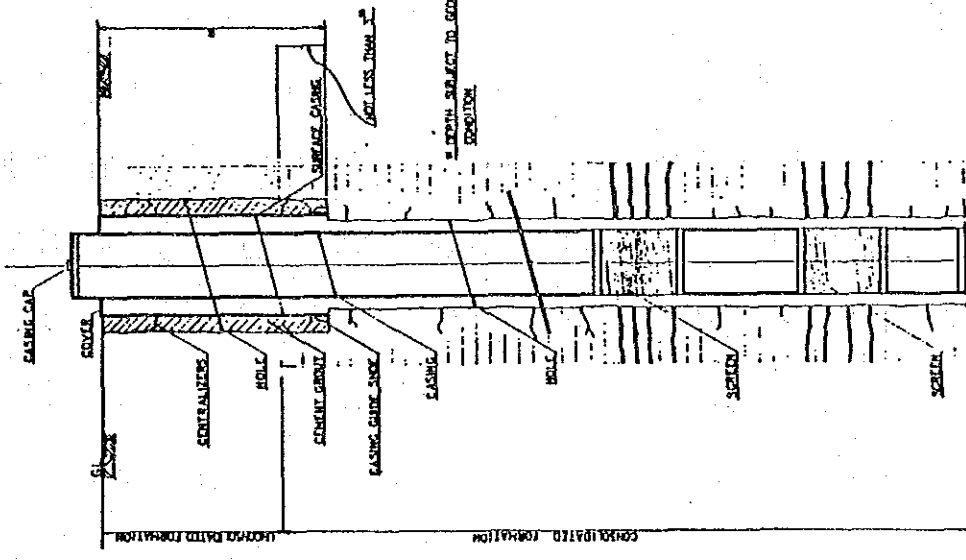
B. DETAILS OF WATER SUPPLY FACILITIES



WELL SCREEN DETAIL (NOT TO SCALE)



DETAIL OF SUBMERSIBLE PUMP INSTALLATION (NOT TO SCALE)



TYPICAL SECTION OF WATER WELL (NOT TO SCALE)

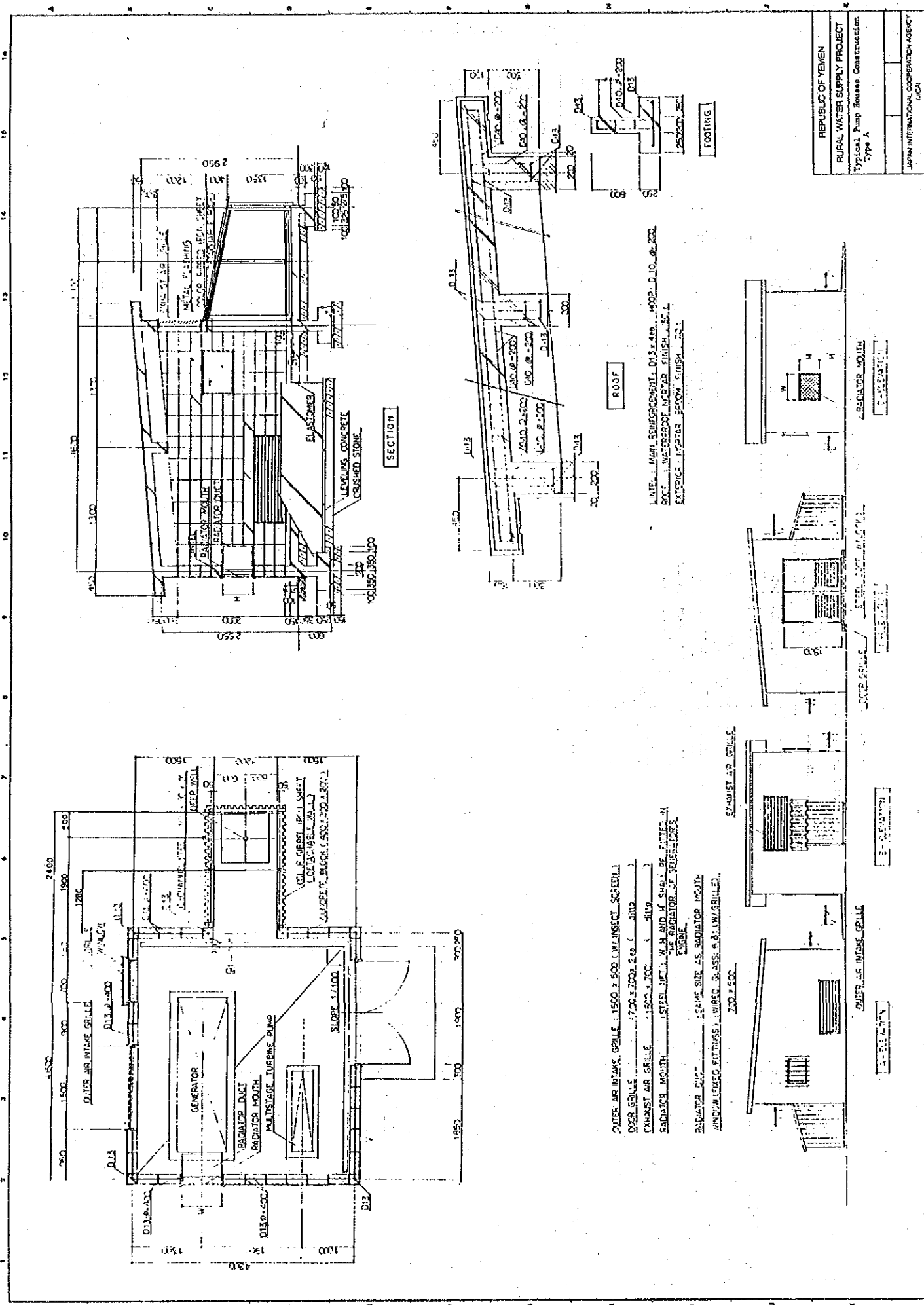
REPUBLIC OF YEMEN
RURAL WATER SUPPLY PROJECT
Typical Structure of Well

DETAIL OF BORE-HOLE PUMP INSTALLATION (NOT TO SCALE)

DETAIL OF SUBMERSIBLE PUMP INSTALLATION (NOT TO SCALE)

TYPICAL SECTION OF WATER WELL (NOT TO SCALE)

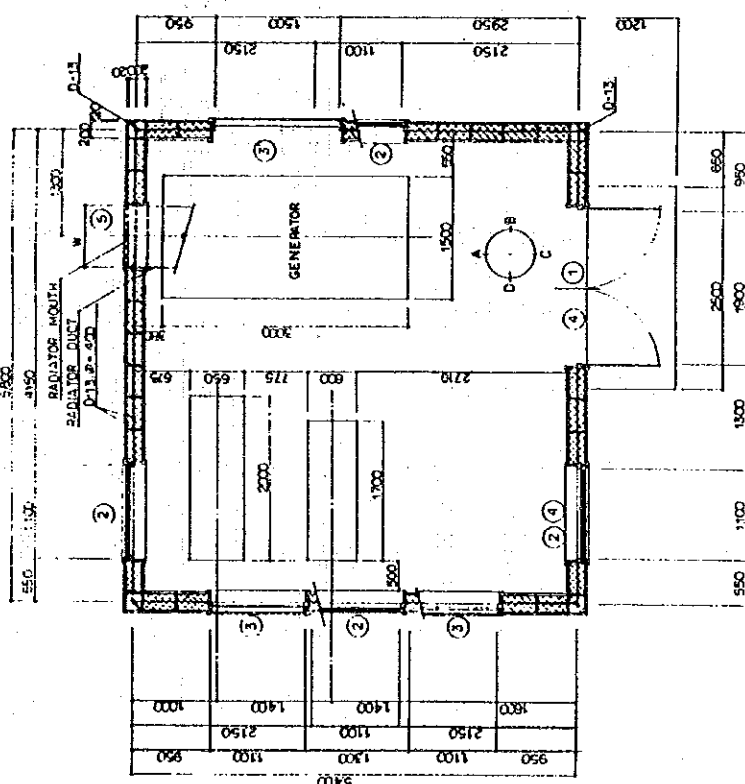
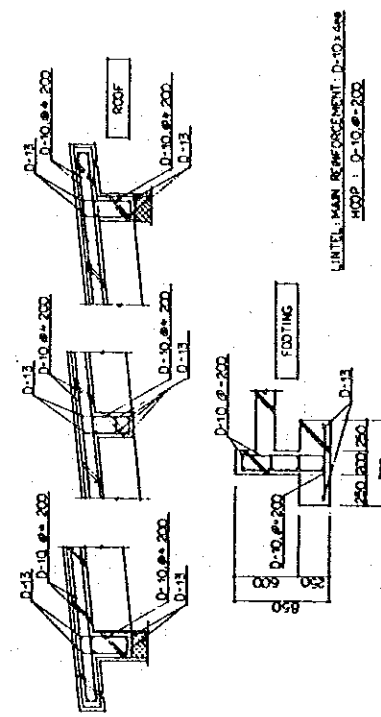
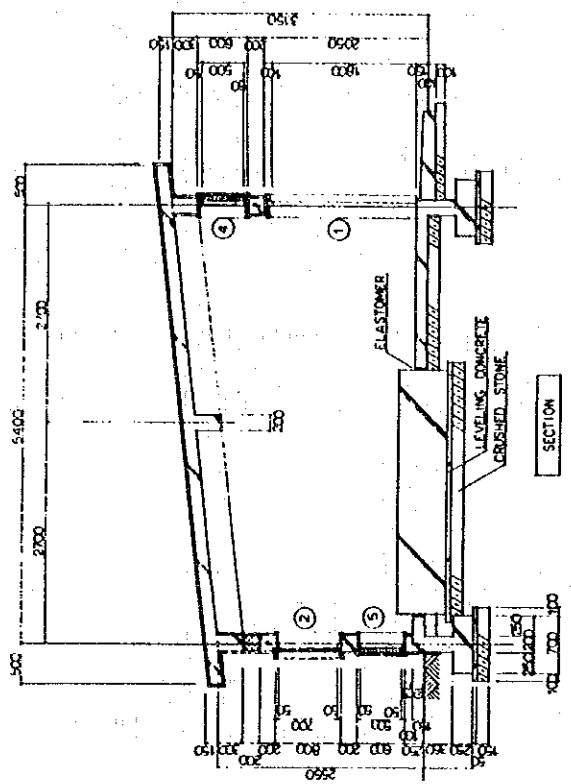
JAPAN INTERNATIONAL COOPERATION AGENCY
JICA



LINE 1. MAIN REINFORCEMENT D13 x 400. RODS D.10, 0.200.
 ROOF WATERPROOF MEMBRANE FINISH 20.1
 EXTERIOR FINISH 2500 FINISH 20.1

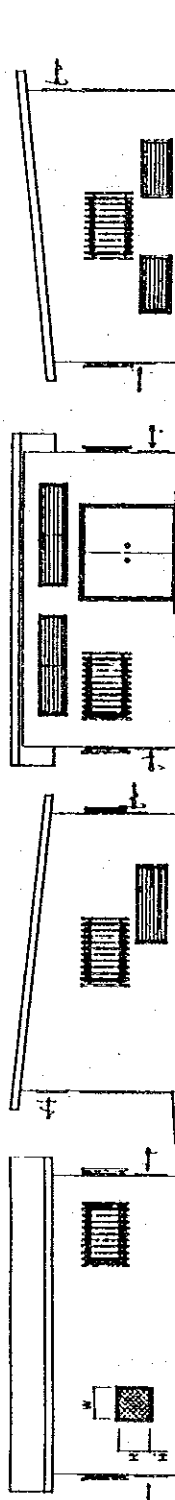
OUTER AIR INTAKE GRILLE 1500 x 500 (W/INSECT SCREEN)
 UPPER GRILLE 1700 x 200 (2 or 1) 1000
 EXHAUST AIR GRILLE 1150 x 200 (1) 419
 RADIATOR MOUTH 1500 x 200 (1) 419
 THE RADIATOR OF REGENERATOR'S ENGINE
 RADIATOR PUMP SAME SIZE AS RADIATOR MOUTH
 WINDOW (ALUMINUM FINISH) NUMBER 3-ASS. 6.8 (L/W) GRILLE 200 x 1500

REPUBLIC OF YEMEN
RURAL WATER SUPPLY PROJECT
Typical Pump House Construction Type A
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



PLAN

1	STEEL DOOR : 950 x 1800 x 20
2	FIXED WINDOW W/ WIRE GLASS 6.81 (W/GRILLE) : 700 x 700 x 4.15
3	OUTER AIR INTAKE GRILLE (W/INSECT SCREEN) : 1000 x 500 x 2.15 G.110
4	EXHAUST AIR GRILLE (W/INSECT SCREEN) : 2000 x 500 x 2.15
5	RADIATOR HOOTH (STEEL NET) W/H AND 'H' SHALL BE FITTED IN THE RADIATOR OF GENERATOR'S ENGINE
ROOF	WATERPROOF MORTAR FINISH : 30'
EXTERIOR	MORTAR BROOM FINISH : 20'
INTERIOR	G.110 : 20'

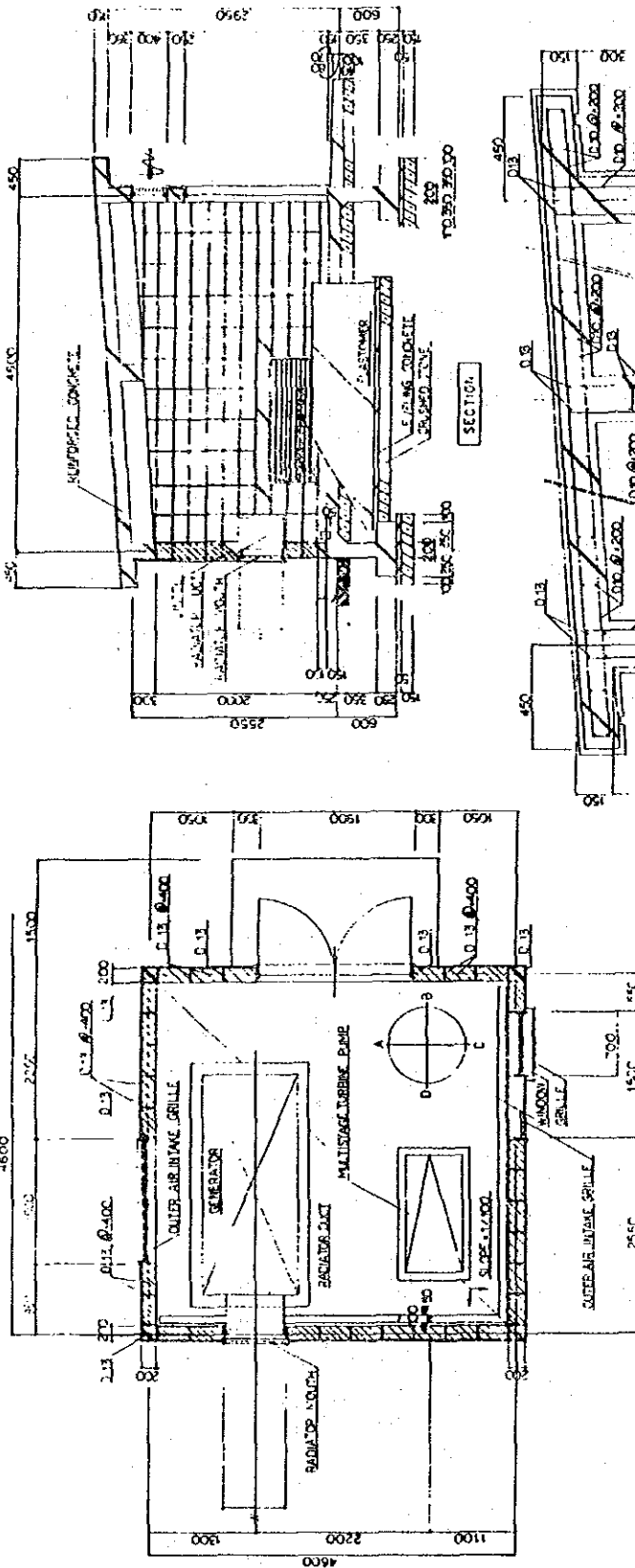


D ELEVATION

C ELEVATION

B ELEVATION

A ELEVATION



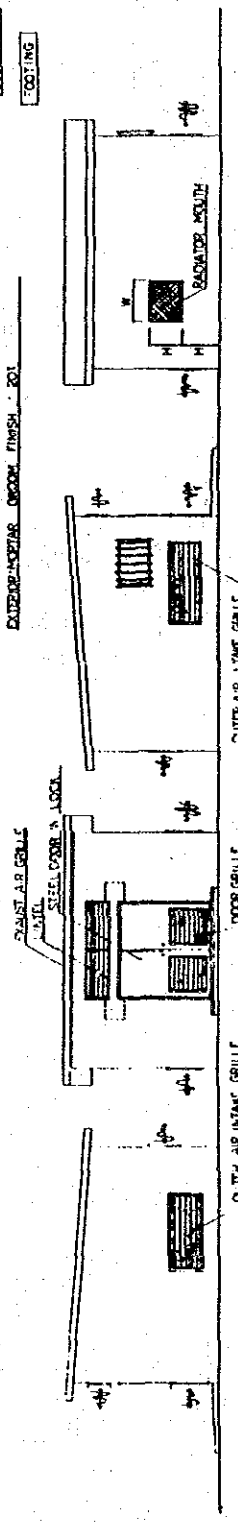
- OUTER AIR INTAKE GRILLE: 1550x500, 2mm W. INSECT SCREEN
- DOOR GRILLE: 700x700, 2mm W. INSECT SCREEN
- APPROX. AIR GRILLE: ENCLOSED
- EXHAUST MOUTH: STEEL NET WITH 8MM W. SMALL DI. FILTER IN FRONT OF GENERATOR ENGINE
- RADIATOR EXHAUST: SAME AS THE SIZE OF RADIATOR MOUTH
- MINIMUM EXHAUST TEMPERATURE: WETTED GLASS & BLW. GRILLE: 700x500

ROOF

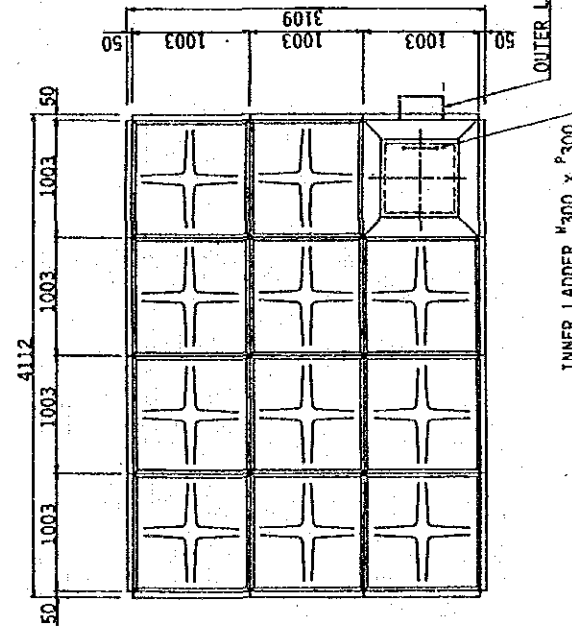
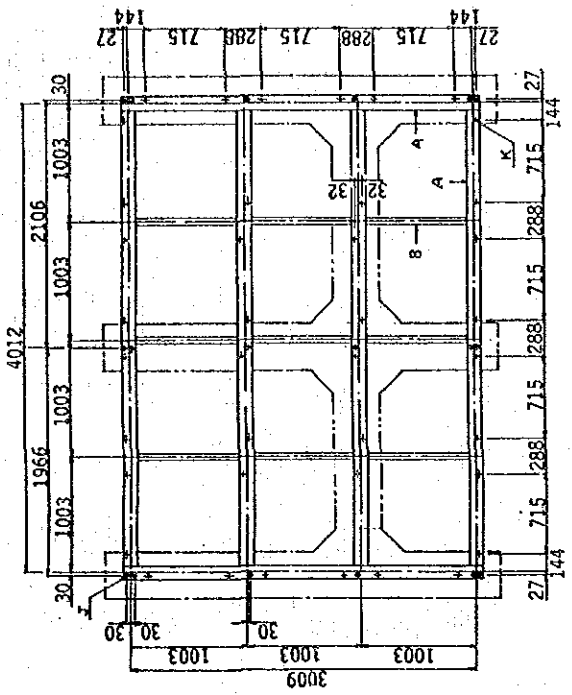
LINTEL: MAIN PERFORMANCE, DRAINAGE, WOOD, D.I.D. 200

SOOT: ASPHALT WATERPROOFING, MOROCCAN 301

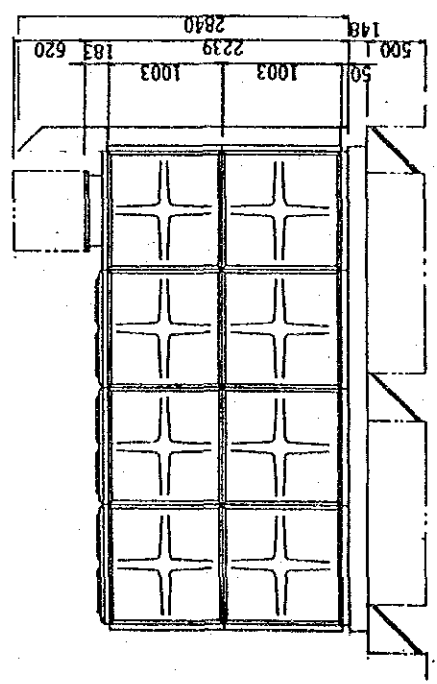
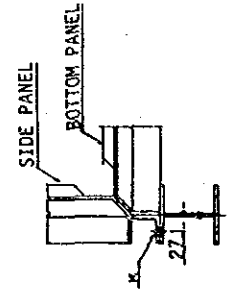
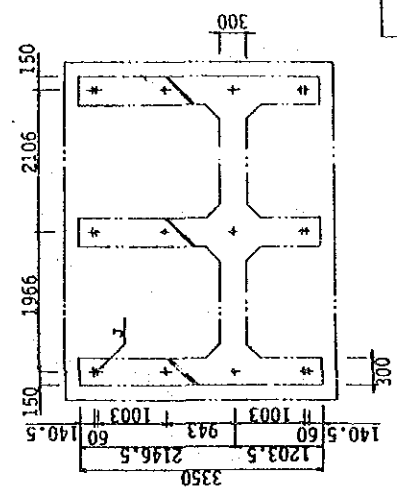
EXTERIOR: MORTAR, ORANGE FINISH, 201



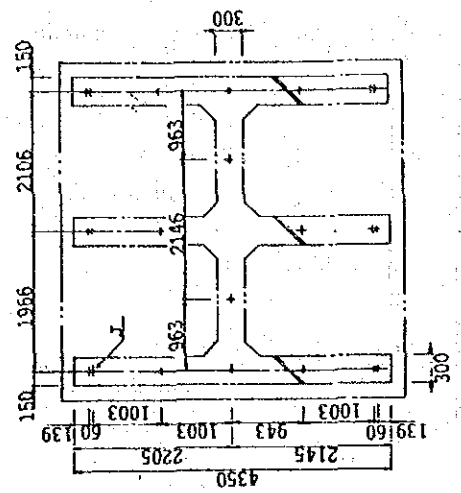
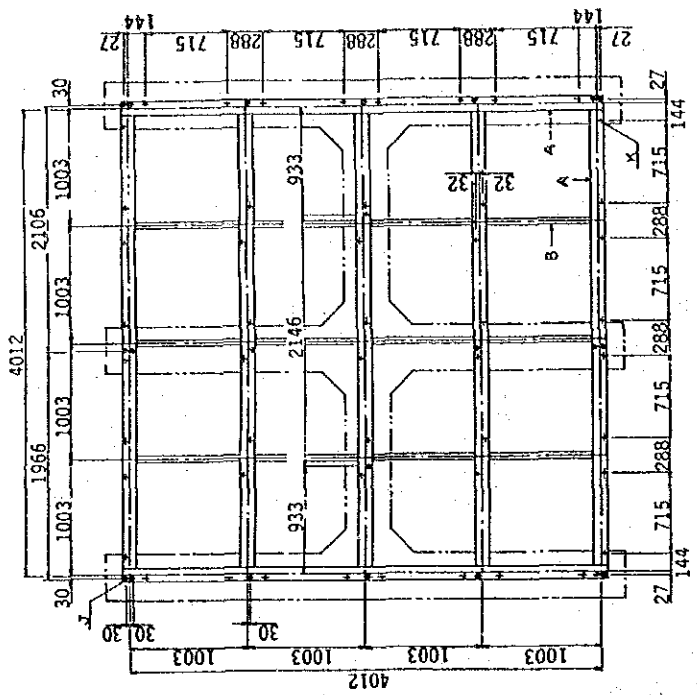
* SURFACE TREATMENT : EPOXY POWDER COATING (INTERNAL & EXTERNAL SURFACE).
 * THE STEEL FOUNDATION MUST BE LEVEL.



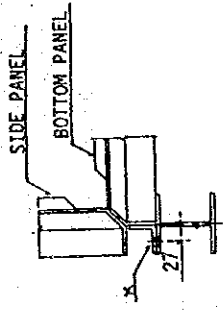
STEEL FOUNDATION NOTE	
K	40 - M12 ANCHOR BOLTS
J	18 - M16 FOUNDATION BOLTS
A	H - 148 x 100 x 6 x 9
B	H - 100 x 50 x 5 x 7



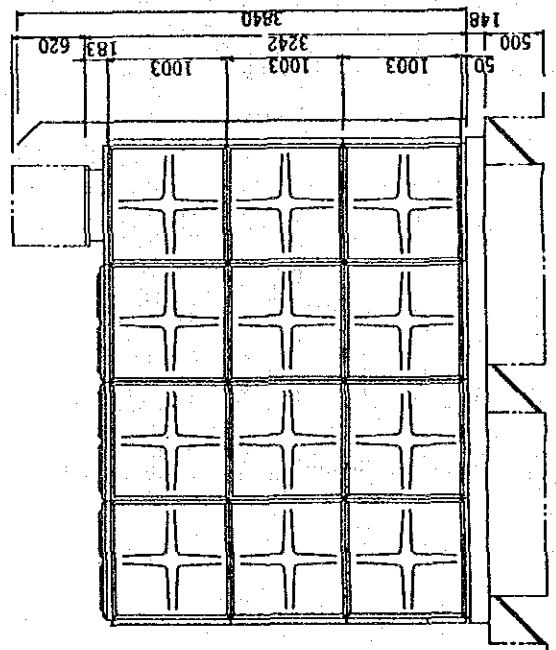
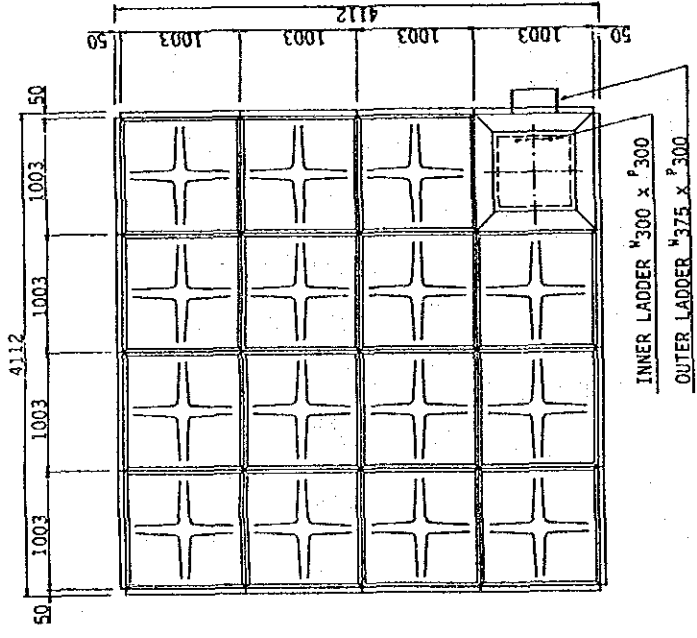
REPUBLIC OF YEMEN
RURAL WATER SUPPLY PROJECT
Water Tank Details : 28 " Ground Tank
JAPAN INTERNATIONAL COOPERATION AGENCY JICA

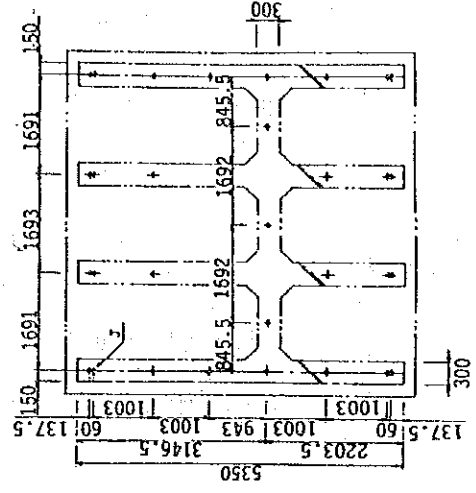
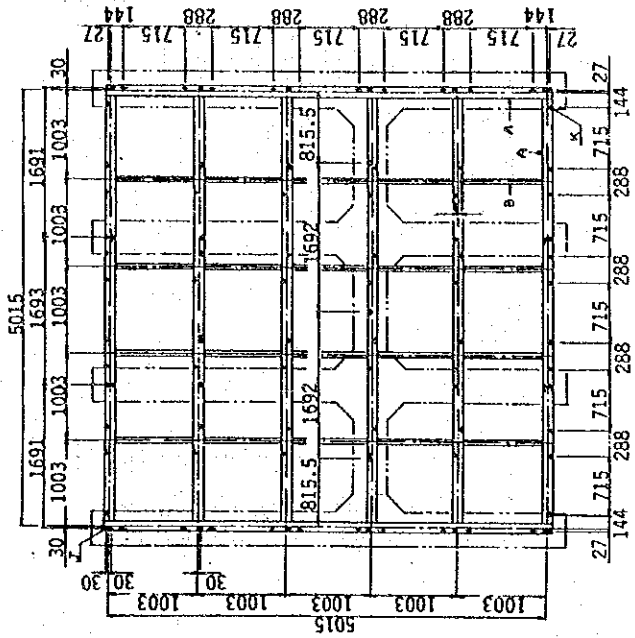


STEEL FOUNDATION NOTE	
50	- M12 ANCHOR BOLTS
22	- M16 FOUNDATION BOLTS
H	- 148 x 100 x 6 x 9
H	- 100 x 50 x 5 x 7

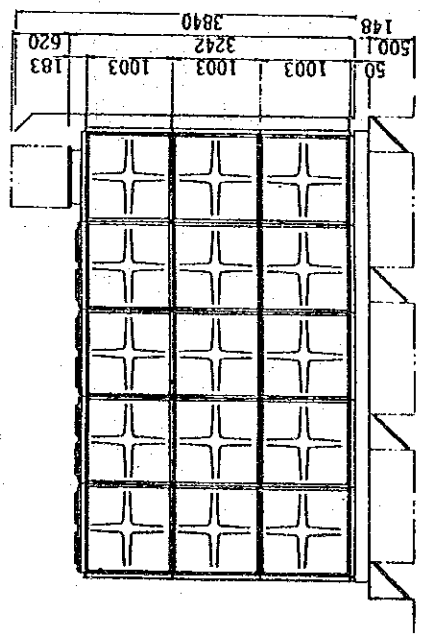
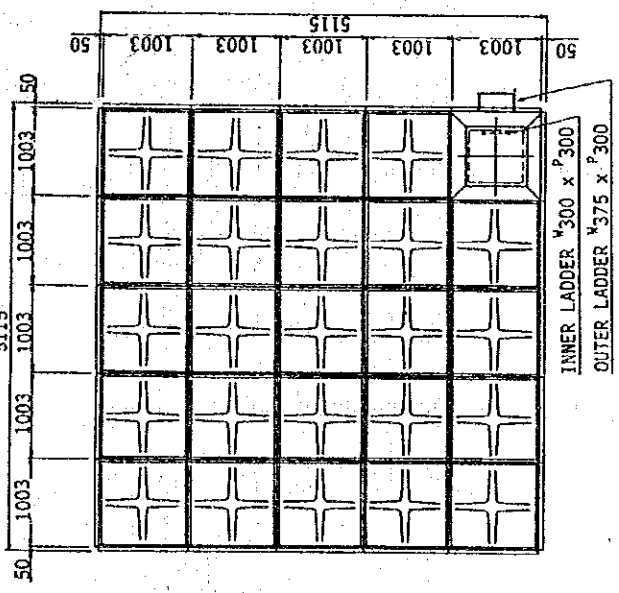
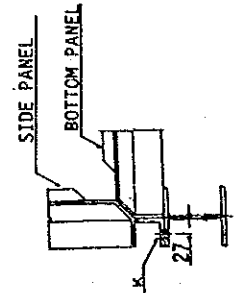


* SURFACE TREATMENT : EPOXY POWDER COATING (INTERNAL & EXTERNAL SURFACE).
 * THE STEEL FOUNDATION MUST BE LEVEL.

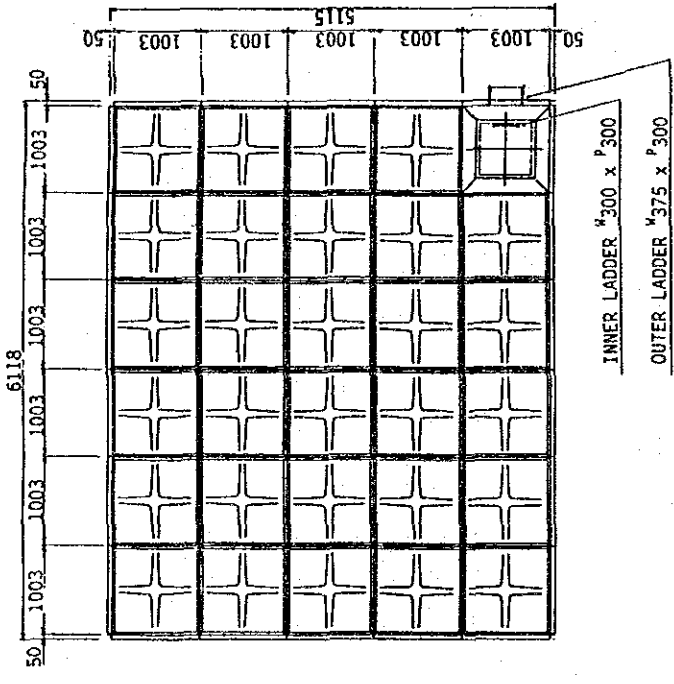
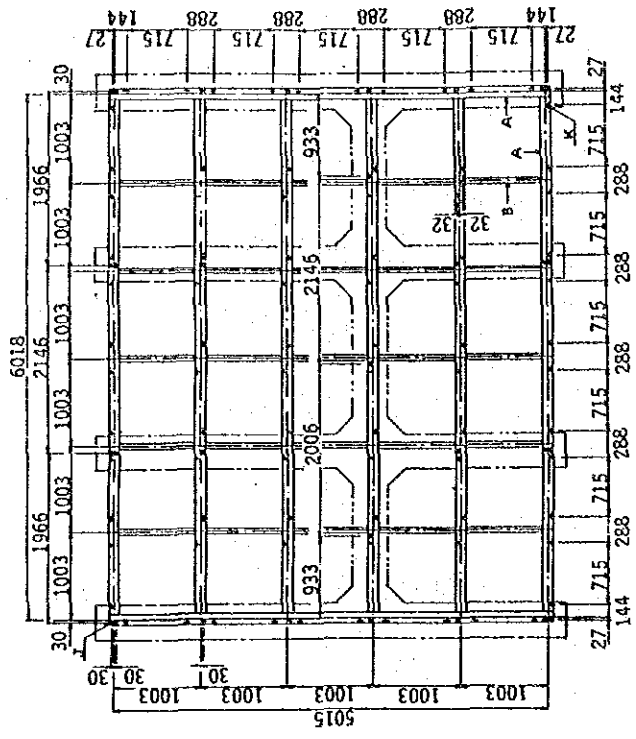




STEEL FOUNDATION NOTE	
72	- M12 ANCHOR BOLTS
28	- M16 FOUNDATION BOLTS
H	- 148 x 100 x 6 x 9
H	- 100 x 50 x 5 x 7

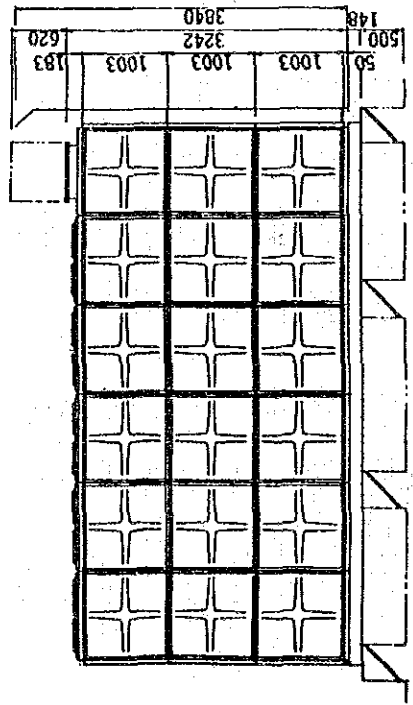
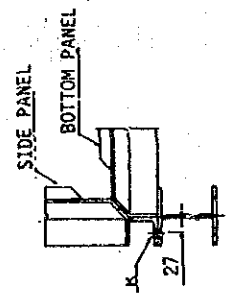
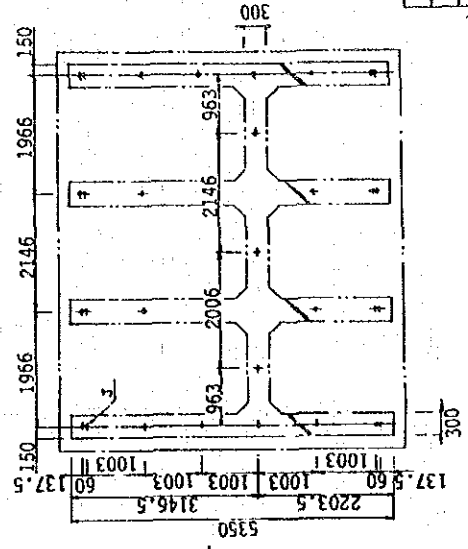


* SURFACE TREATMENT : EPOXY POWDER COATING (INTERNAL & EXTERNAL SURFACE).
 * THE STEEL FOUNDATION MUST BE LEVEL.

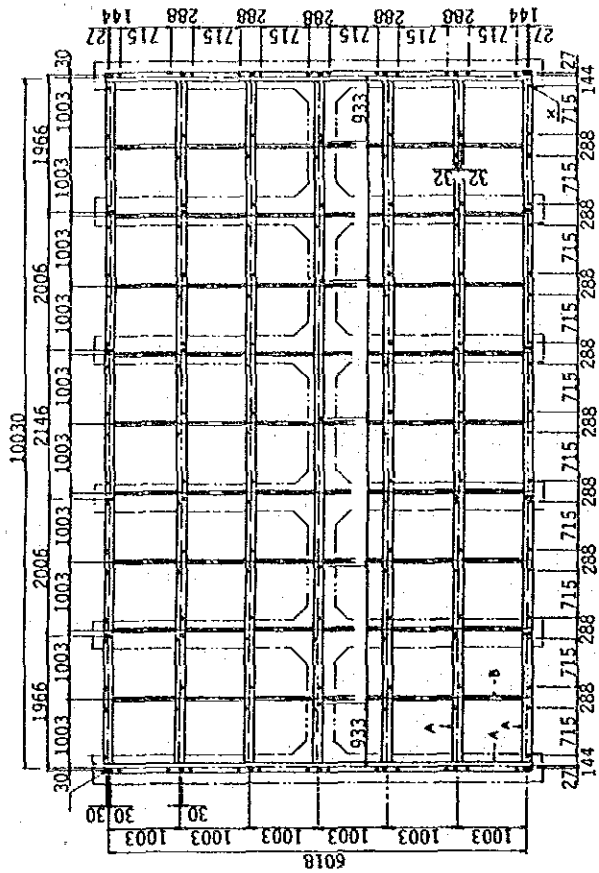


STEEL FOUNDATION NOTE

84 - M12 ANCHOR BOLTS
31 - M16 FOUNDATION BOLTS
H - 148 x 100 x 6 x 9
H - 100 x 50 x 5 x 7

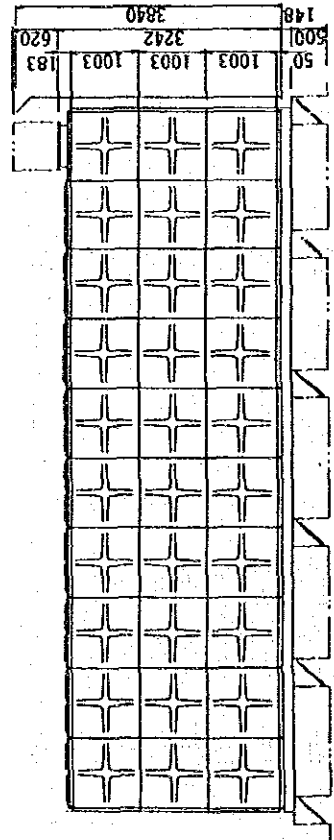
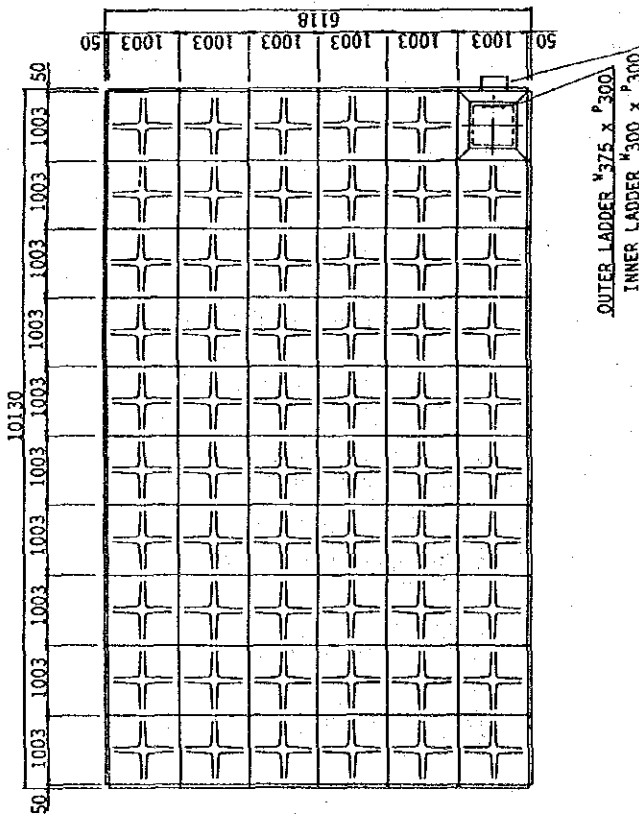
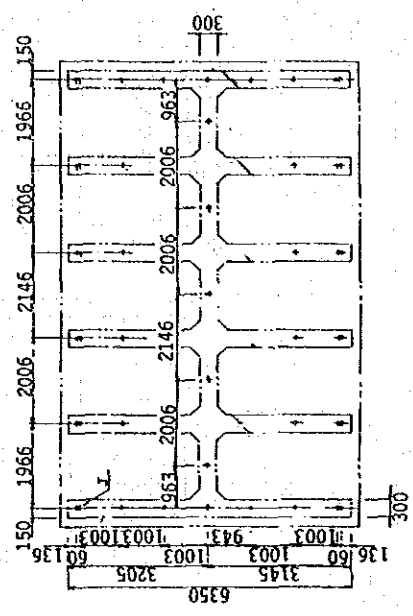


* SURFACE TREATMENT : EPOXY POWDER COATING (INTERNAL & EXTERNAL SURFACE).
 * THE STEEL FOUNDATION MUST BE LEVEL.



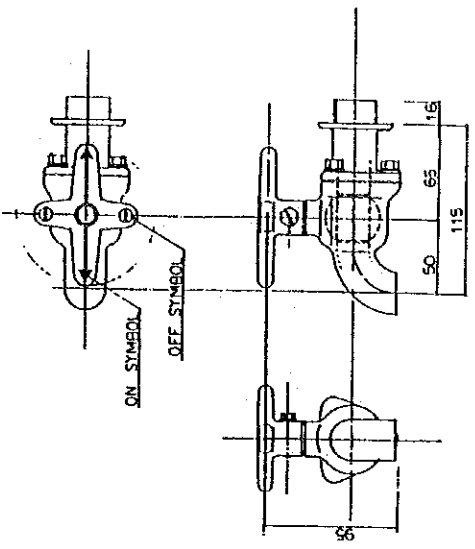
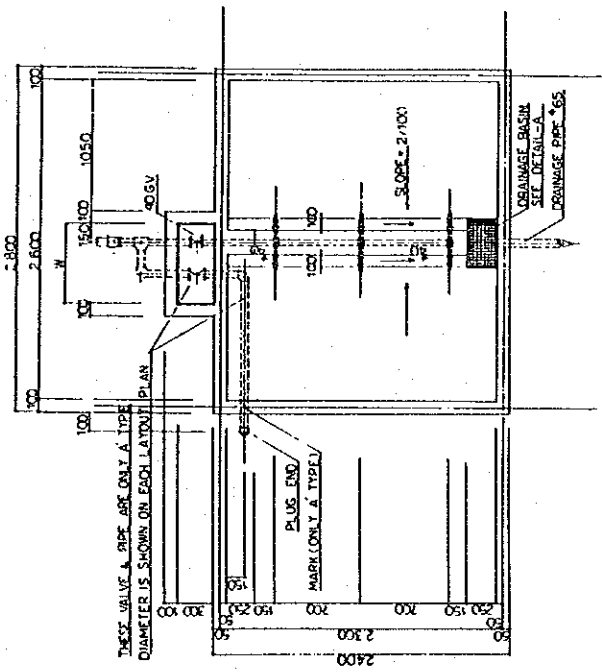
STEEL FOUNDATION NOTE

144 - M12 ANCHOR BOLTS
47 - M16 FOUNDATION BOLTS
H - 148 x 100 x 6 x 9
H - 100 x 50 x 5 x 7



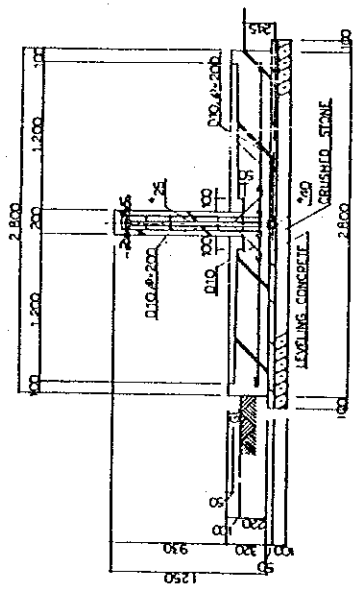
REPUBLIC OF YEMEN
 RURAL WATER SUPPLY PROJECT
 Water Tank Details
 180 m² Ground Tank
 JAPAN INTERNATIONAL COOPERATION AGENCY
 JICA

DETAIL OF PUBLIC FAUCET



NORMAL DIAMETER : 20 mm (3/4")
 VALVE TYPE : FULL BORE BALL VALVE
 ALLOWABLE PRESSURE : 10 kg/cm²

REFERENCE DRAWING OF WATER TAP FOR PUBLIC FOUNTAINS



6 - T A P

