

PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN
STUDY
ON
THE IMPROVEMENT OF MA'ALLA AND TAWAHI
SEWERAGE SYSTEM IN ADEN
FINAL REPORT

VOL. 4
DRAWINGS

JANUARY, 1990

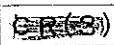
JAPAN INTERNATIONAL COOPERATION AGENCY

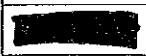
PEOPLES DEMOCRATIC REPUBLIC OF YEMEN
STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM IN ADEN

FINAL REPORT
VOL. 4
DRAWINGS

JANUARY, 1990

JICA

S S S

90 - 005 (4/4)

S S S

90 - 005 (4/4)

JICA LIBRARY



1083468171

国際協力事業団

21337

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI

SEWERAGE SYSTEM IN ADEN

PRELIMINARY DRAWINGS

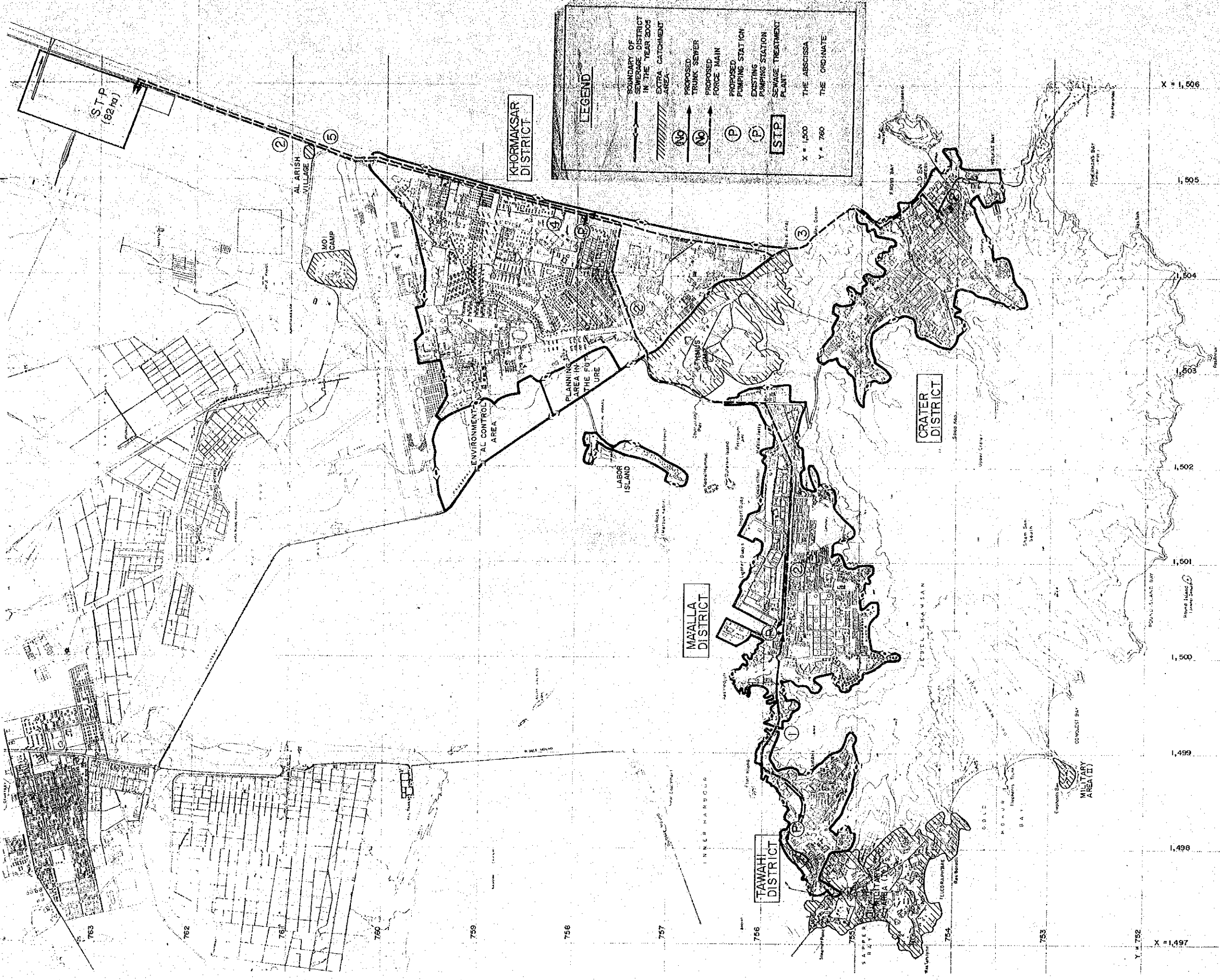
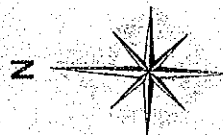
NO. OF DRAWING	DRAWING TITLE	SCALE
1	SEWERAGE GENERAL PLAN	1:20,000
2	INDEX MAP	1:20,000
3	EXISTING SEWERAGE PLAN IN MA'ALLA DISTRICT	1: 5,000
4	EXISTING SEWERAGE PLAN IN TAWAHI DISTRICT	1: 5,000
5	EXISTING SEWERAGE PLAN IN CRATER DISTRICT	1: 5,000
6	EXISTING SEWERAGE PLAN IN KHORMAKSAR DISTRICT	1: 5,000
7	EXISTING SEWERAGE PLAN IN KHORMAKSAR DISTRICT	1: 5,000
8	EXISTING SEWERAGE PLAN IN KHORMAKSAR DISTRICT	1: 5,000
9	LEVELING SURVEY PLAN(1/6) IN MA'ALLA DISTRICT	1: 5,000
10	LEVELING SURVEY PLAN(2/6) IN TAWAHI DISTRICT	1: 5,000
11	LEVELING SURVEY PLAN(3/6) IN CRATER DISTRICT	1: 5,000
12	LEVELING SURVEY PLAN(4/6) IN KHORMAKSAR DISTRICT	1: 5,000
13	LEVELING SURVEY PLAN(5/6) IN KHORMAKSAR DISTRICT	1: 5,000
14	LEVELING SURVEY PLAN(6/6) IN KHORMAKSAR DISTRICT	1: 5,000
14	PROPOSED SEWERAGE SYSTEM FOR MA'ALLA AND KHORMAKSAR DISTRICTS	1: 5,000
15	PROPOSED SEWERAGE SYSTEM FOR MA'ALLA DISTRICT(1/4)	1: 2,500
16	PROPOSED SEWERAGE SYSTEM FOR MA'ALLA DISTRICT(2/4)	1: 2,500
17	PROPOSED SEWERAGE SYSTEM FOR MA'ALLA DISTRICT(3/4)	1: 2,500
18	PROPOSED SEWERAGE SYSTEM FOR MA'ALLA DISTRICT(4/4)	1: 2,500
19	PROPOSED SEWERAGE SYSTEM FOR TAWAHI DISTRICT (1/3)	1: 2,500
20	PROPOSED SEWERAGE SYSTEM FOR TAWAHI DISTRICT (2/3)	1: 2,500
21	PROPOSED SEWERAGE SYSTEM FOR TAWAHI DISTRICT (3/3)	1: 2,500
22	PROPOSED SEWERAGE SYSTEM FOR CRATER DISTRICT (1/3)	1: 2,500
23	PROPOSED SEWERAGE SYSTEM FOR CRATER DISTRICT (2/3)	1: 2,500
24	PROPOSED SEWERAGE SYSTEM FOR CRATER DISTRICT (3/3)	1: 2,500
25	PROPOSED SEWERAGE SYSTEM FOR CRATER DISTRICT (4/4)	1: 2,500

NO. OF DRAWING	DRAWING TITLE	SCALE
26	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (1/10)	1:2,500
27	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (2/10)	1:2,500
28	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (3/10)	1:2,500
29	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (4/10)	1:2,500
30	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (5/10)	1:2,500
31	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (6/10)	1:2,500
32	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (7/10)	1:2,500
33	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (8/10)	1:2,500
34	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (9/10)	1:2,500
35	PROPOSED SEWERAGE SYSTEM FOR KHORMAKSAR DISTRICT (10/10)	1:2,500
36	FORCE MAIN PROFILE(1/2)	SV 1: 100 SH 1:2,500
37	FORCE MAIN PROFILE(2/2)	SV 1: 100 SH 1:2,500
38	FORCE MAIN PROFILE(3/2)	SV 1: 100 SH 1:2,500
39	FORCE MAIN PROFILE(4/2)	SV 1: 100 SH 1:2,500
40	FORCE MAIN PROFILE(5/2)	SV 1: 100 SH 1:2,500
41	FORCE MAIN PROFILE(6/2)	SV 1: 100 SH 1:2,500
42	FORCE MAIN PROFILE(7/2)	SV 1: 100 SH 1:2,500
43	FORCE MAIN PROFILE(8/2)	SV 1: 100 SH 1:2,500
44	FORCE MAIN PROFILE(9/2)	SV 1: 100 SH 1:2,500
45	GRAVITY SEWER PROFILE IN MA'ALLA DISTRICT	SV 1: 100 SH 1:2,500
46	GRAVITY SEWER PROFILE IN TAWAHI DISTRICT	SV 1: 100 SH 1:2,500
47	PLANS AND SECTION FOR MA'ALLA PUMPING STATION	1: 100
48	PLANS AND SECTION FOR TAWAHI PUMPING STATION	1: 100
49	PLANS AND SECTION FOR CRATER PUMPING STATION	1: 100
50	PLANS AND SECTION FOR KHORMAKSAR PUMPING STATION	1: 100

NO. OF DRAWING	DRAWING TITLE	SCALE
51	PROPOSED LAYOUT PLAN FOR ABYAN ROAD STP	1:2,000
52	HYDRAULIC PROFILE OF ABYAN ROAD STP	SV 1:100 SH NONE
53	INLET WORKS FOR ABYAN ROAD STP	1: 50
54	PLANS AND SECTION	1: 50
55	STRUCTURAL DETAILS OF ABYAN ROAD STP	1: 50
56	PLAN, SECTION AND ELEVATIONS ADMINISTRATION BUILDING	1:100
57	STRUCTURAL STANDARD DETAILS (1/2)	1: 50
58	STRUCTURAL STANDARD DETAILS (2/2)	AS SHOWN
59	TYPICAL CROSS SECTIONS FOR FORCE MAIN	1:100
59	SNEEGER'S PASSAGE	AS SHOWN

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM

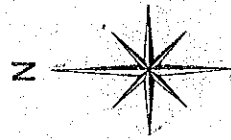
DATE	JICA
1989	
SCALE	DRAWING NO.



LEGEND

- BOUNDARY OF SEWERAGE DISTRICT IN THE YEAR 2005
- ▨ EXTRA CATCHMENT AREA
- PROPOSED TRUNK SEWER
- PROPOSED FORCE MAIN
- Ⓟ PROPOSED PUMPING STATION
- Ⓟ EXISTING PUMPING STATION
- Ⓟ SEWERAGE TREATMENT PLANT
- STP
- X = 1,500 THE ABSCISSA
- Y = 760 THE ORDINATE

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM SEWERAGE GENERAL PLAN	DATE	JICA
	JAN. 1990	DRAWING NO.
	SCALE	1
	1 : 20,000	



LEGEND

- BOUNDARY OF SEWERAGE DISTRICT
- INDEX OF 1:2,500 MAPS
- MA'ALLA
- INDEX OF 1:5,000 MAPS

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHL SEWERAGE SYSTEM









INDEX MAP

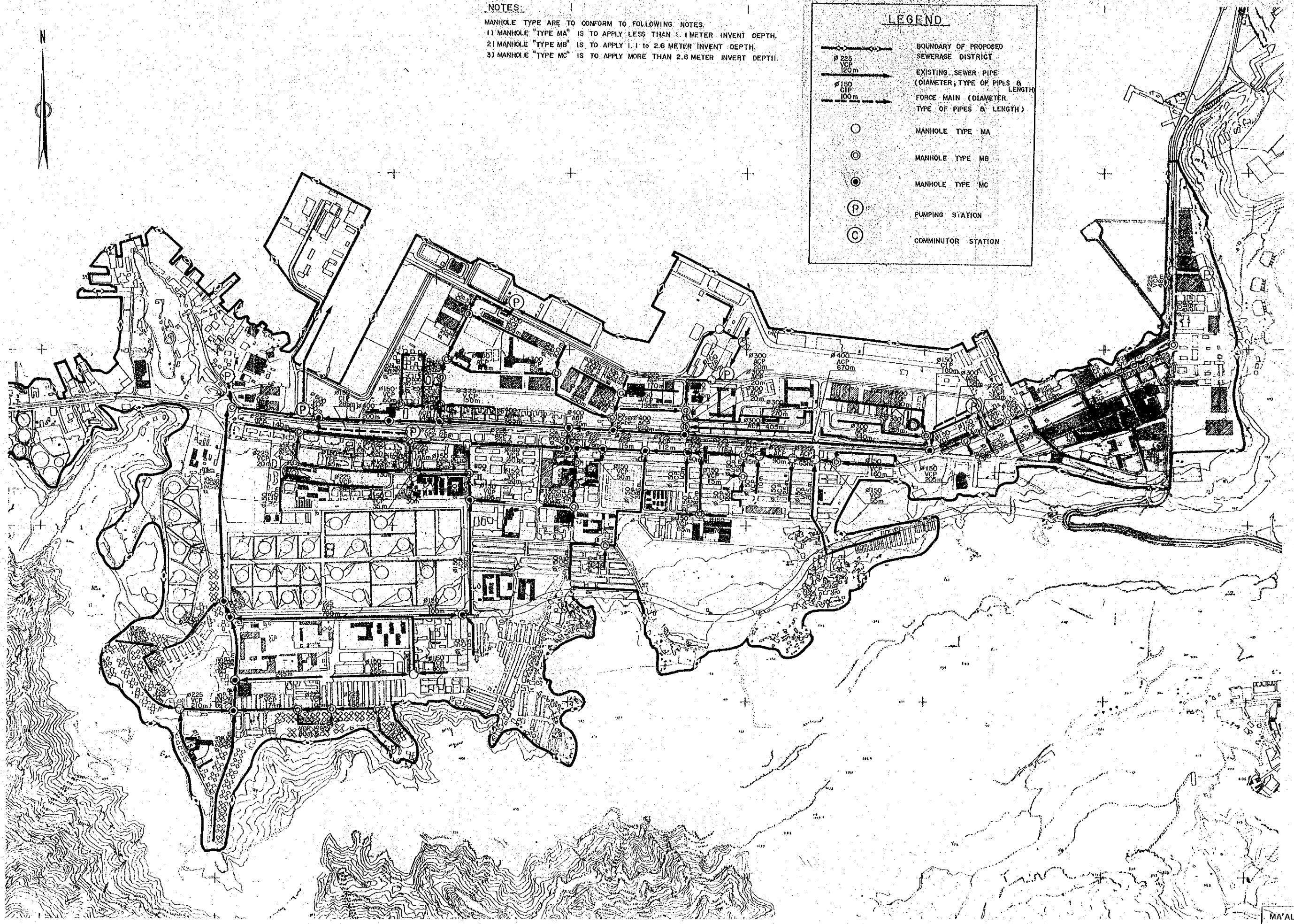
DATE	JAN. 1990	JICA
SCALE	1 : 20,000	DRAWING NO.
		2

NOTES:

- MANHOLE TYPE ARE TO CONFORM TO FOLLOWING NOTES.
 1) MANHOLE "TYPE MA" IS TO APPLY LESS THAN 1.1 METER INVERT DEPTH.
 2) MANHOLE "TYPE MB" IS TO APPLY 1.1 TO 2.6 METER INVERT DEPTH.
 3) MANHOLE "TYPE MC" IS TO APPLY MORE THAN 2.6 METER INVERT DEPTH.

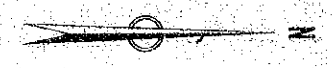
LEGEND

-  BOUNDARY OF PROPOSED SEWERAGE DISTRICT
-  EXISTING SEWER PIPE (DIAMETER, TYPE OF PIPES & LENGTH)
-  FORCE MAIN (DIAMETER, TYPE OF PIPES & LENGTH)
-  MANHOLE TYPE MA
-  MANHOLE TYPE MB
-  MANHOLE TYPE MC
-  PUMPING STATION
-  COMMUNUTOR STATION



MA'ALLA

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM	DATE	JICA
	JAN. 1990	
	SCALE	DRAWING NO.
EXISTING SEWERAGE PLAN IN MA'ALLA DISTRICT	1 : 5,000	3

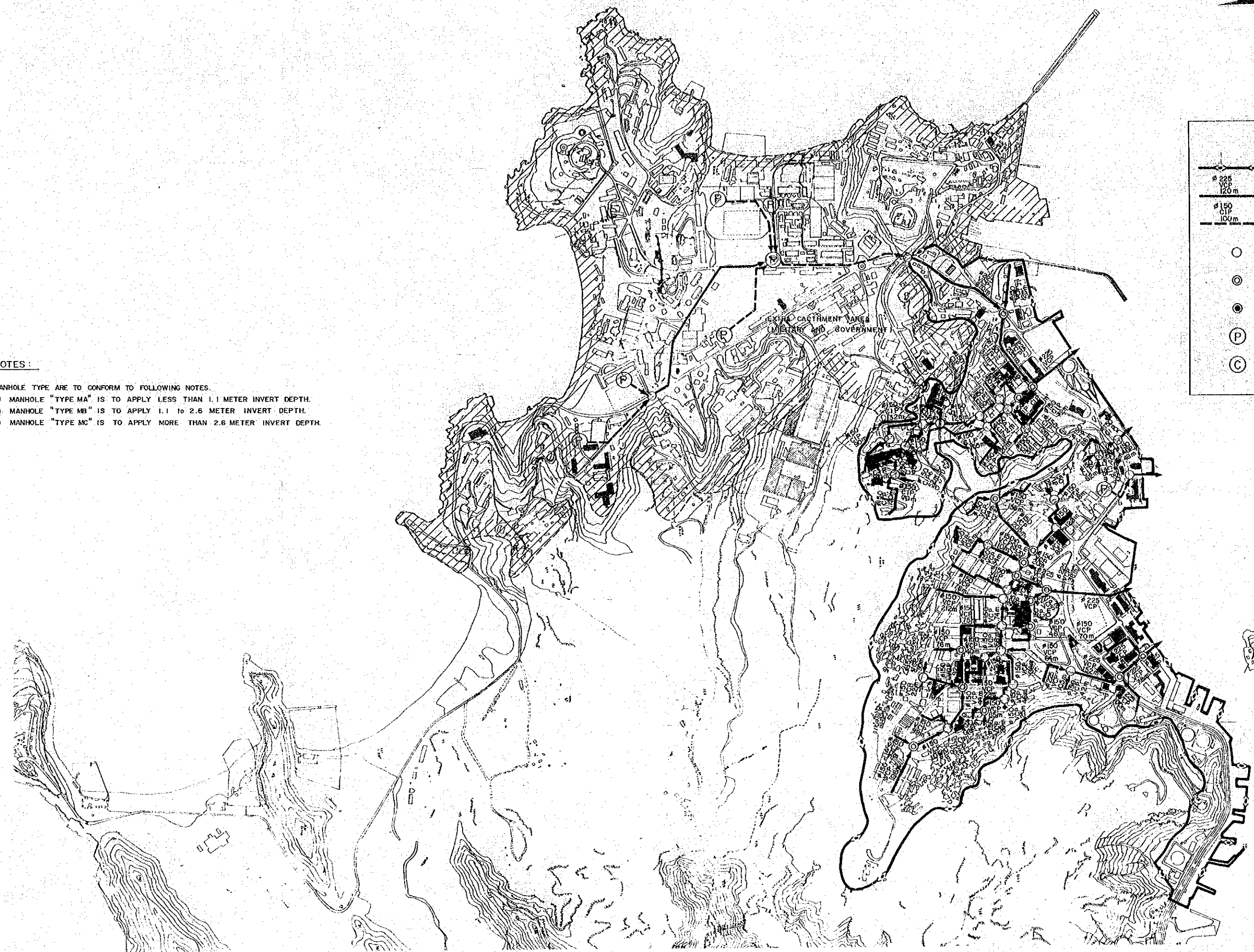


LEGEND

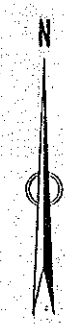
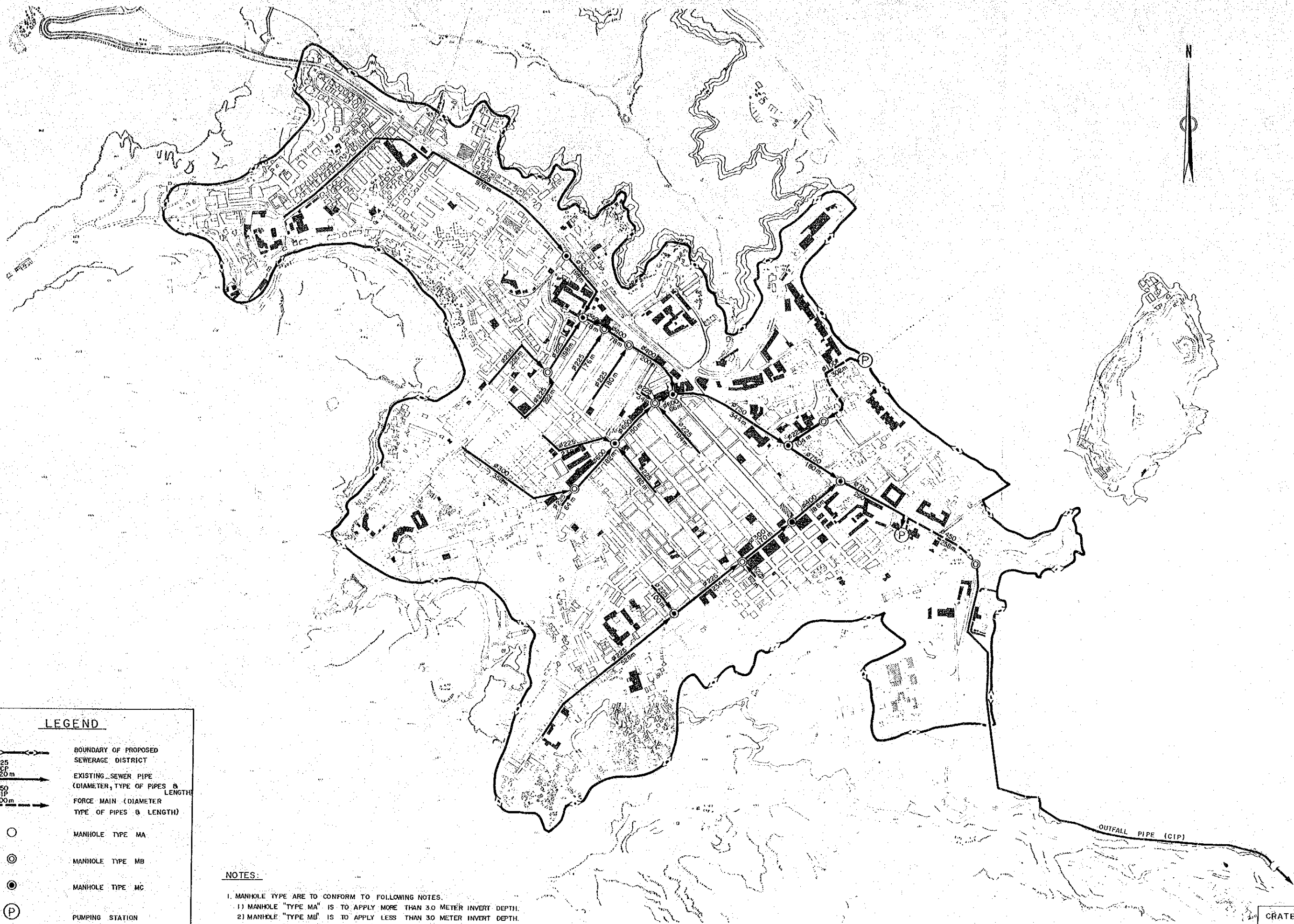
	BOUNDARY OF PROPOSED SEWERAGE DISTRICT
	EXISTING SEWER PIPE (DIAMETER, TYPE OF PIPES & LENGTH)
	FORCE MAIN (DIAMETER, TYPE OF PIPES & LENGTH)
	MANHOLE TYPE MA
	MANHOLE TYPE MB
	MANHOLE TYPE MC
	PUMPING STATION
	COMMINUTOR STATION

NOTES :

- MANHOLE TYPE ARE TO CONFORM TO FOLLOWING NOTES.
- 1) MANHOLE "TYPE MA" IS TO APPLY LESS THAN 1.1 METER INVERT DEPTH.
 - 2) MANHOLE "TYPE MB" IS TO APPLY 1.1 TO 2.6 METER INVERT DEPTH.
 - 3) MANHOLE "TYPE MC" IS TO APPLY MORE THAN 2.6 METER INVERT DEPTH.



FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM EXISTING SEWERAGE PLAN IN TAWAHI DISTRICT	TAWAHI	
	DATE	JICA
	JAN. 1990	DRAWING NO.
SCALE	1 : 5,000	4



LEGEND	
	BOUNDARY OF PROPOSED SEWERAGE DISTRICT
	EXISTING SEWER PIPE (DIAMETER, TYPE OF PIPES & LENGTH)
	FORCE MAIN (DIAMETER TYPE OF PIPES & LENGTH)
	MANHOLE TYPE MA
	MANHOLE TYPE MB
	MANHOLE TYPE MC
	PUMPING STATION
	COMMINUTOR STATION

NOTES:

- MANHOLE TYPE ARE TO CONFORM TO FOLLOWING NOTES.
 - MANHOLE "TYPE MA" IS TO APPLY MORE THAN 3.0 METER INVERT DEPTH.
 - MANHOLE "TYPE MB" IS TO APPLY LESS THAN 3.0 METER INVERT DEPTH.
 - MANHOLE "TYPE MC" IS TO APPLY FOR DROP MANHOLE WHICH IS MORE THAN 0.60 METER DROP.
- PIPE MATERIAL IS ASBESTOS CEMENT

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM EXISTING SEWERAGE PLAN IN CRATER DISTRICT	DATE	JICA
	JAN. 1990	DRAWING NO.
	SCALE	5
	1 : 5,000	

CRATER



PLANNING AREA
IN THE FUTURE

LABOR ISLAND

LEGEND

	BOUNDARY OF PROPOSED SEWERAGE DISTRICT
	EXISTING SEWER PIPE (DIAMETER, TYPE OF PIPES & LENGTH)
	FORCE MAIN (DIAMETER, TYPE OF PIPES & LENGTH)
	MANHOLE TYPE MA
	MANHOLE TYPE MB
	MANHOLE TYPE MC
	PUMPING STATION
	COMMINUTOR STATION

NOTES

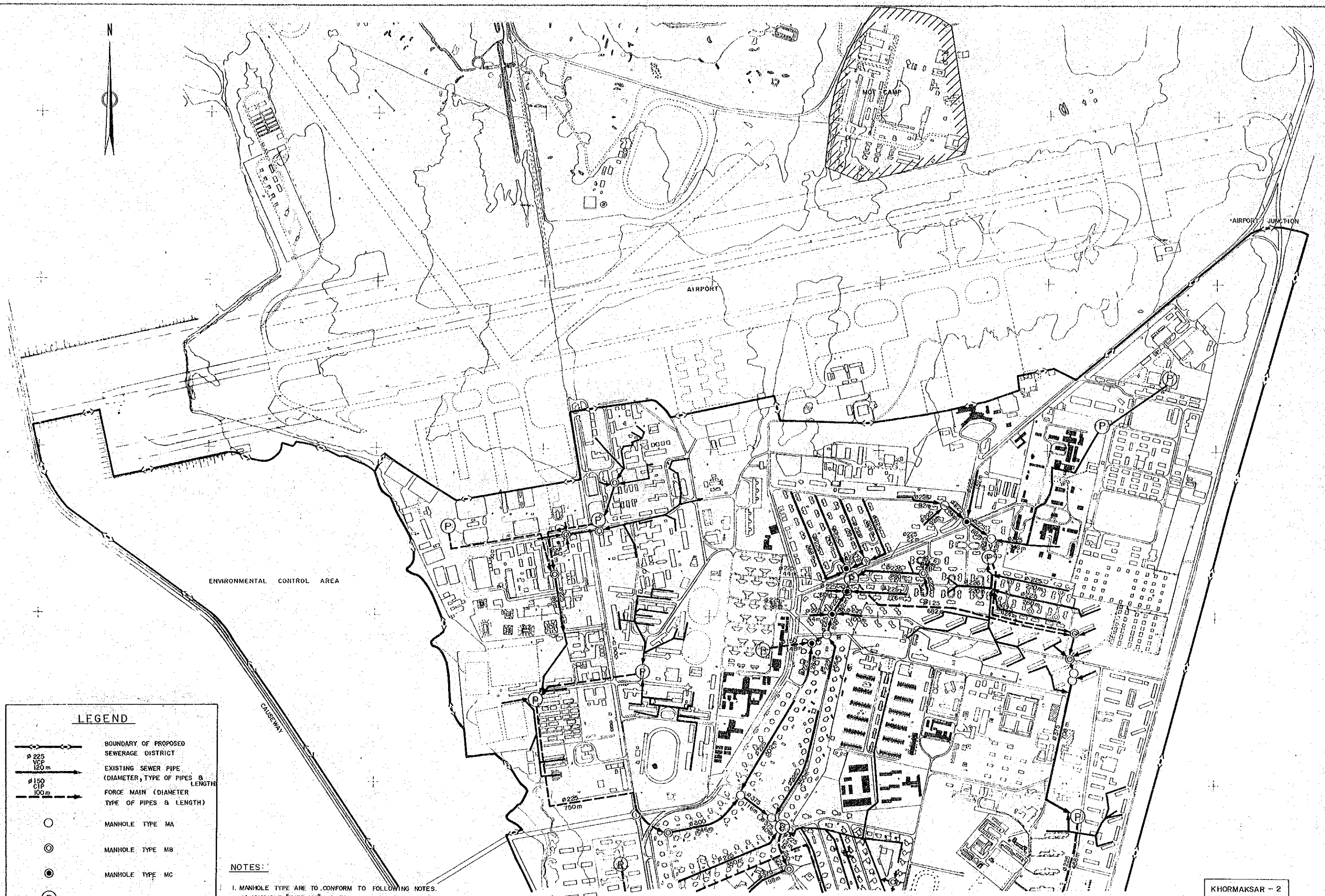
1. MANHOLE TYPE ARE TO CONFORM TO FOLLOWING NOTES.
 - 1) MANHOLE "TYPE MA" IS TO APPLY MORE THAN 3.0 METER INVERT DEPTH.
 - 2) MANHOLE "TYPE MB" IS TO APPLY LESS THAN 3.0 METER INVERT DEPTH.
 - 3) MANHOLE "TYPE MC" IS TO APPLY FOR DROP MANHOLE WHICH IS MORE THAN 0.60 METER DROP.
2. PIPE MATERIAL IS ASBESTOS CEMENT.

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM

EXISTING SEWERAGE PLAN IN KHORMAKSAR DISTRICT

KHORMAKSAR - 1

DATE	JICA
JAN. 1990	
SCALE	DRAWING NO.
1:5,000	6



LEGEND

- BOUNDARY OF PROPOSED SEWERAGE DISTRICT
- EXISTING SEWER PIPE (DIAMETER, TYPE OF PIPES & LENGTH)
- FORCE MAIN (DIAMETER, TYPE OF PIPES & LENGTH)
- MANHOLE TYPE MA
- MANHOLE TYPE MB
- MANHOLE TYPE MC
- PUMPING STATION
- COMMINUTOR STATION

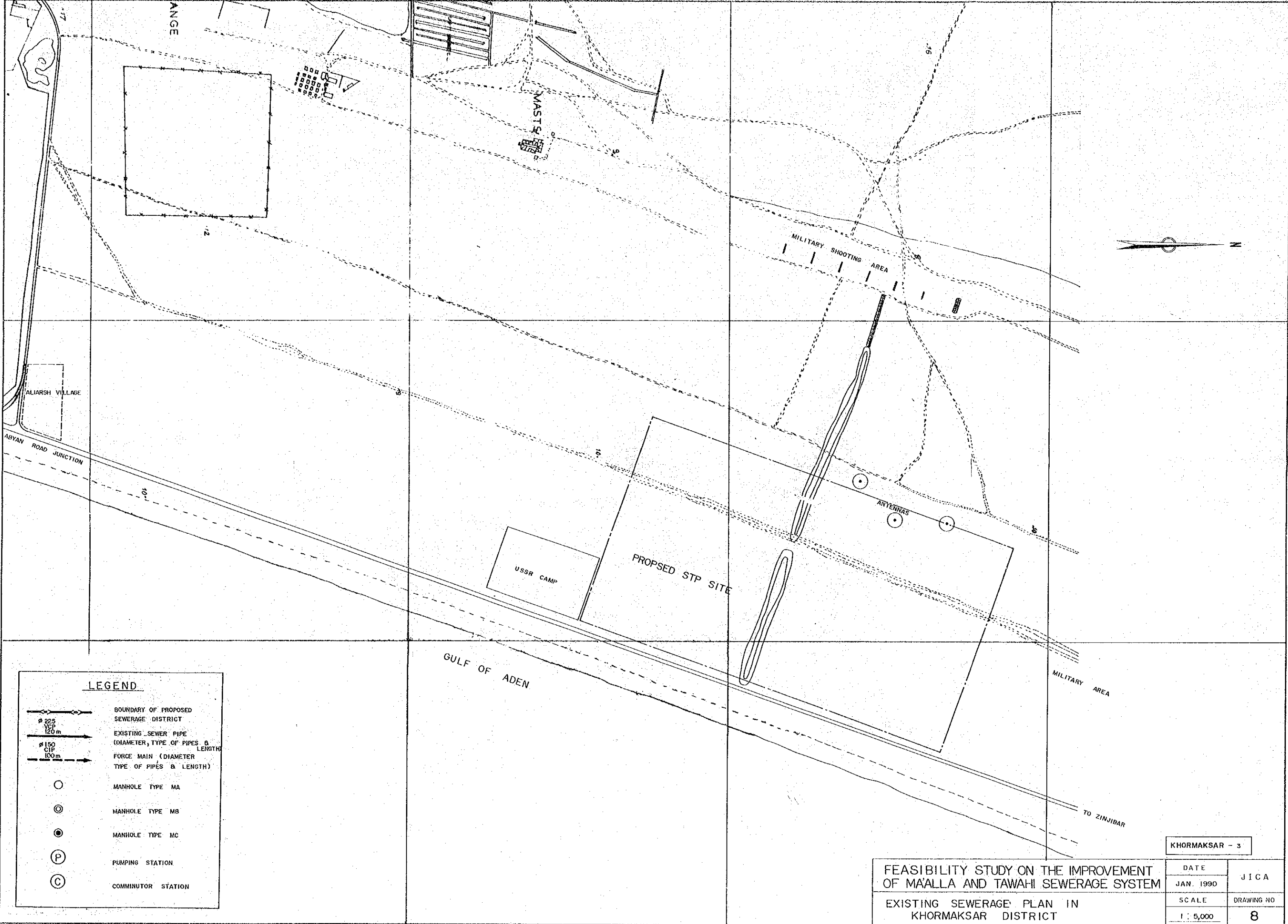
NOTES:

1. MANHOLE TYPE ARE TO CONFORM TO FOLLOWING NOTES.
 - 1) MANHOLE "TYPE MA" IS TO APPLY MORE THAN 3.0 METER INVERT DEPTH.
 - 2) MANHOLE "TYPE MB" IS TO APPLY LESS THAN 3.0 METER INVERT DEPTH.
 - 3) MANHOLE "TYPE MC" IS TO APPLY FOR DROP MANHOLE WHICH IS MORE THAN 0.60 METER DROP.
2. PIPE MATERIAL IS ASBESTOS CEMENT.

KHORMAKSAR - 2

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM
 EXISTING SEWERAGE PLAN IN KHORMAKSAR DISTRICT

DATE	JAN. 1990	JICA
SCALE	1:5,000	DRAWING NO
		7



LEGEND

- BOUNDARY OF PROPOSED SEWERAGE DISTRICT
- EXISTING SEWER PIPE (DIAMETER, TYPE OF PIPES & LENGTH)
- FORCE MAIN (DIAMETER, TYPE OF PIPES & LENGTH)
- MANHOLE TYPE MA
- MANHOLE TYPE MB
- MANHOLE TYPE MC
- PUMPING STATION
- COMMUNOTOR STATION

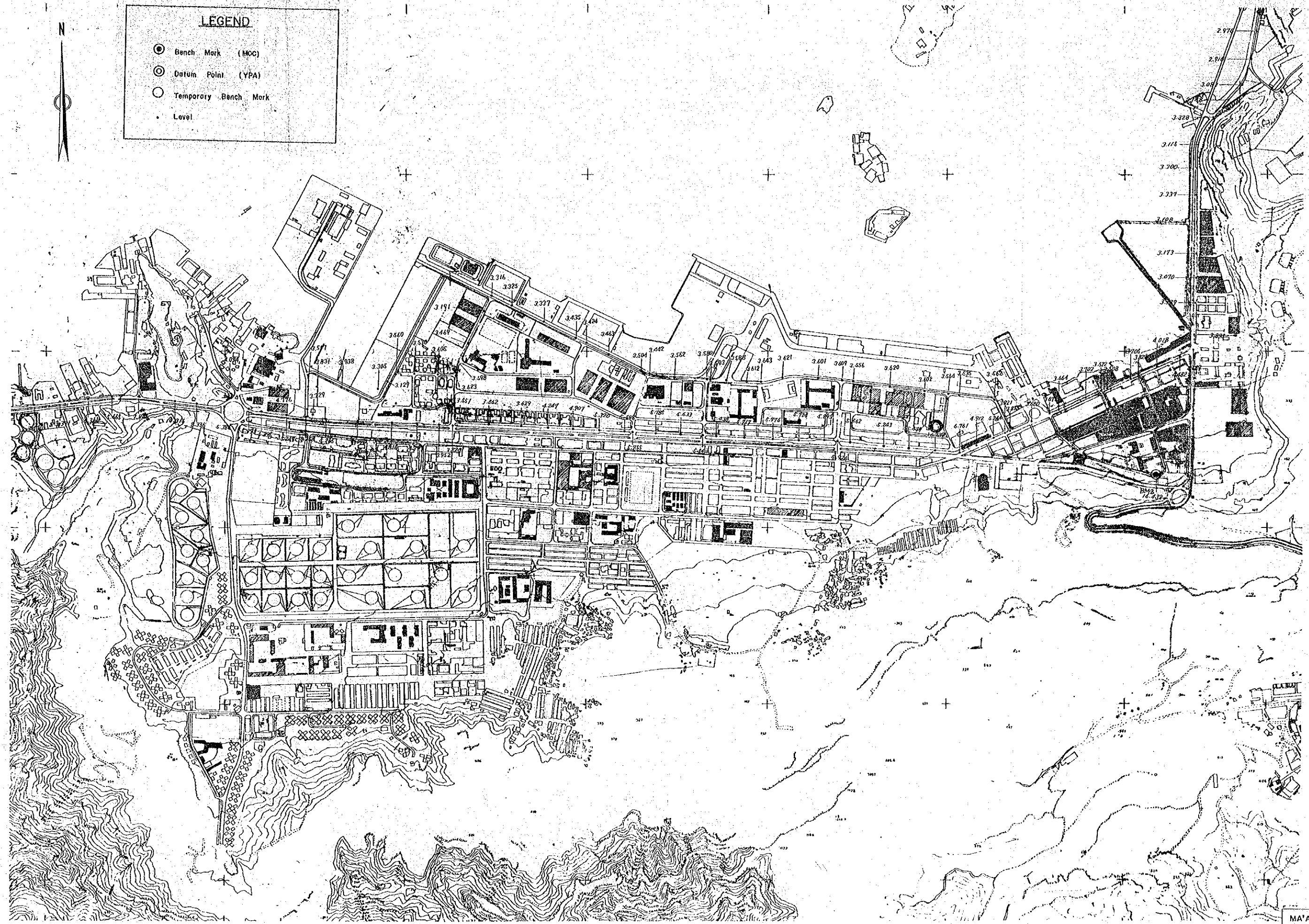
KHORMAKSAR - 3

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM
 EXISTING SEWERAGE PLAN IN KHORMAKSAR DISTRICT

DATE	JAN. 1990	JICA
SCALE	1 : 5,000	DRAWING NO
		8

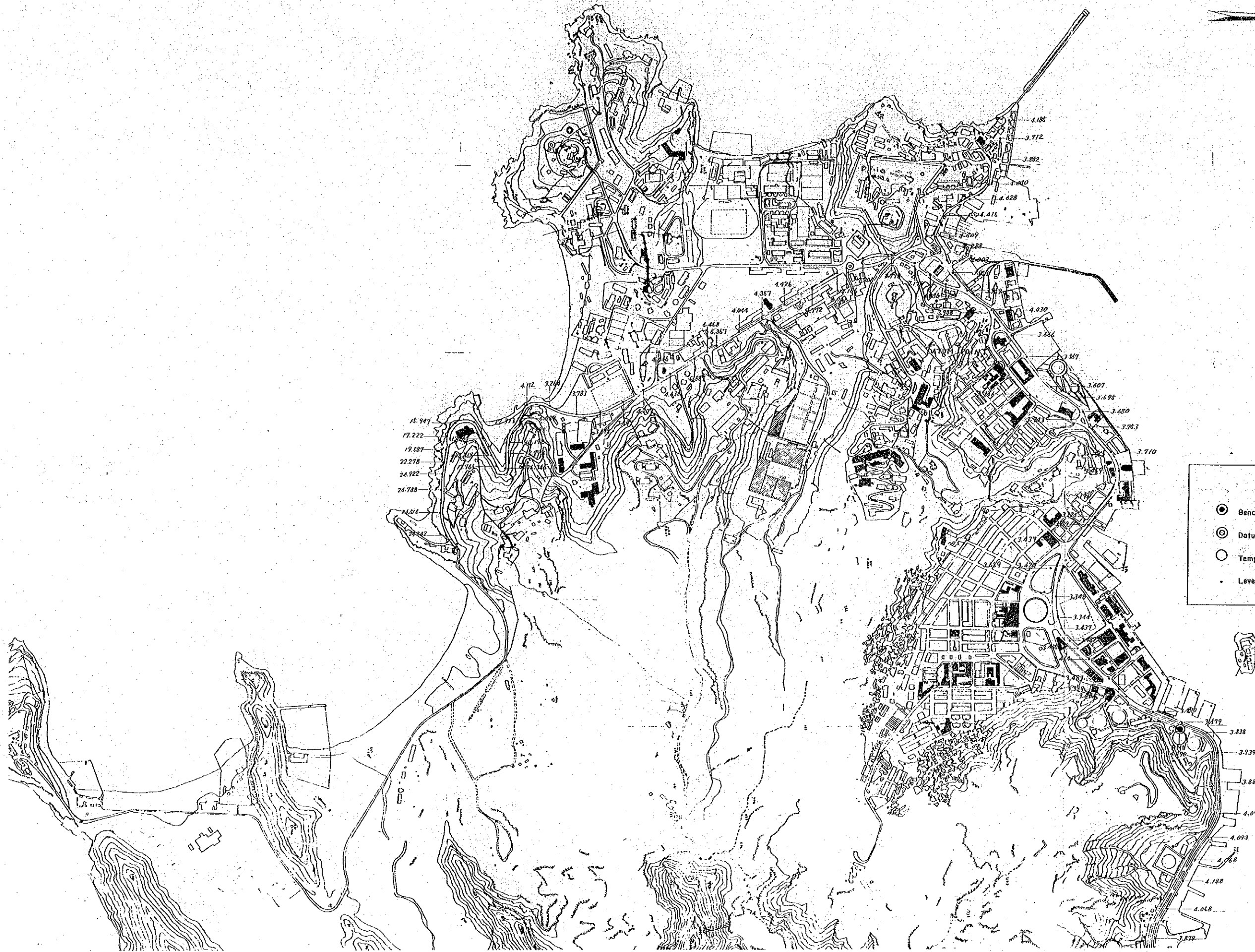
LEGEND

- Bench Mark (MOC)
- Datum Point (YPA)
- Temporary Bench Mark
- Level



MA'ALLA

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM		DATE	JICA
LEVELING SURVEY PLAN (1/6)		JAN. 1990	
IN MA'ALLA DISTRICT		SCALE	DRAWING NO
		1 : 5,000	9



LEGEND

- ⊙ Bench Mark (MOC)
- ⊕ Datum Point (YPA)
- Temporary Bench Mark
- Level

TAWAHI

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM	DATE	JICA
	JAN. 1990	
LEVELING SURVEY PLAN (2/6) IN TAWAHI DISTRICT	SCALE	DRAWING NO.
	1 : 5,000	10

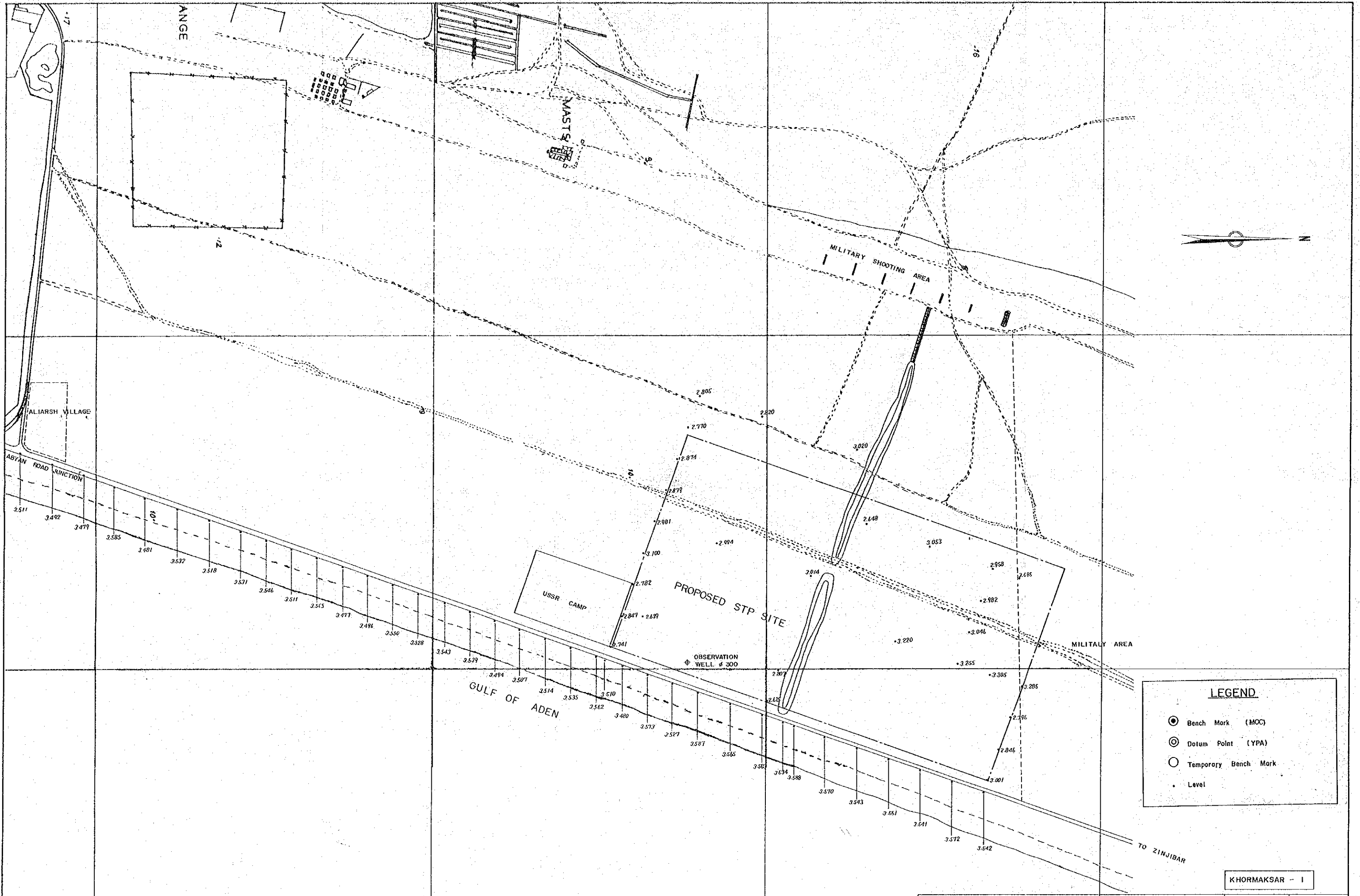


LEGEND

- Bench Mark (MOC)
- ⊙ Datum Point (YPA)
- Temporary Bench Mark
- Level
- (MH) Manhole

CRATER

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM LEVELING SURVEY PLAN (3/6) IN CRATER DISTRICT	DATE	JICA
	JAN. 1990	DRAWING NO.
	SCALE	11
	1 : 5,000	



LEGEND

- ⊙ Bench Mark (MOC)
- ⊕ Datum Point (YPA)
- Temporary Bench Mark
- Level

KHORMAKSAR - I

FEASIBILITY STUDY ON THE IMPROVEMENT
OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM
LEVELING SURVEY PLAN IN (4/6)
KHORMAKSAR DISTRICT

DATE	JICA
JAN. 1990	DRAWING NO.
SCALE	12
1 : 5,000	

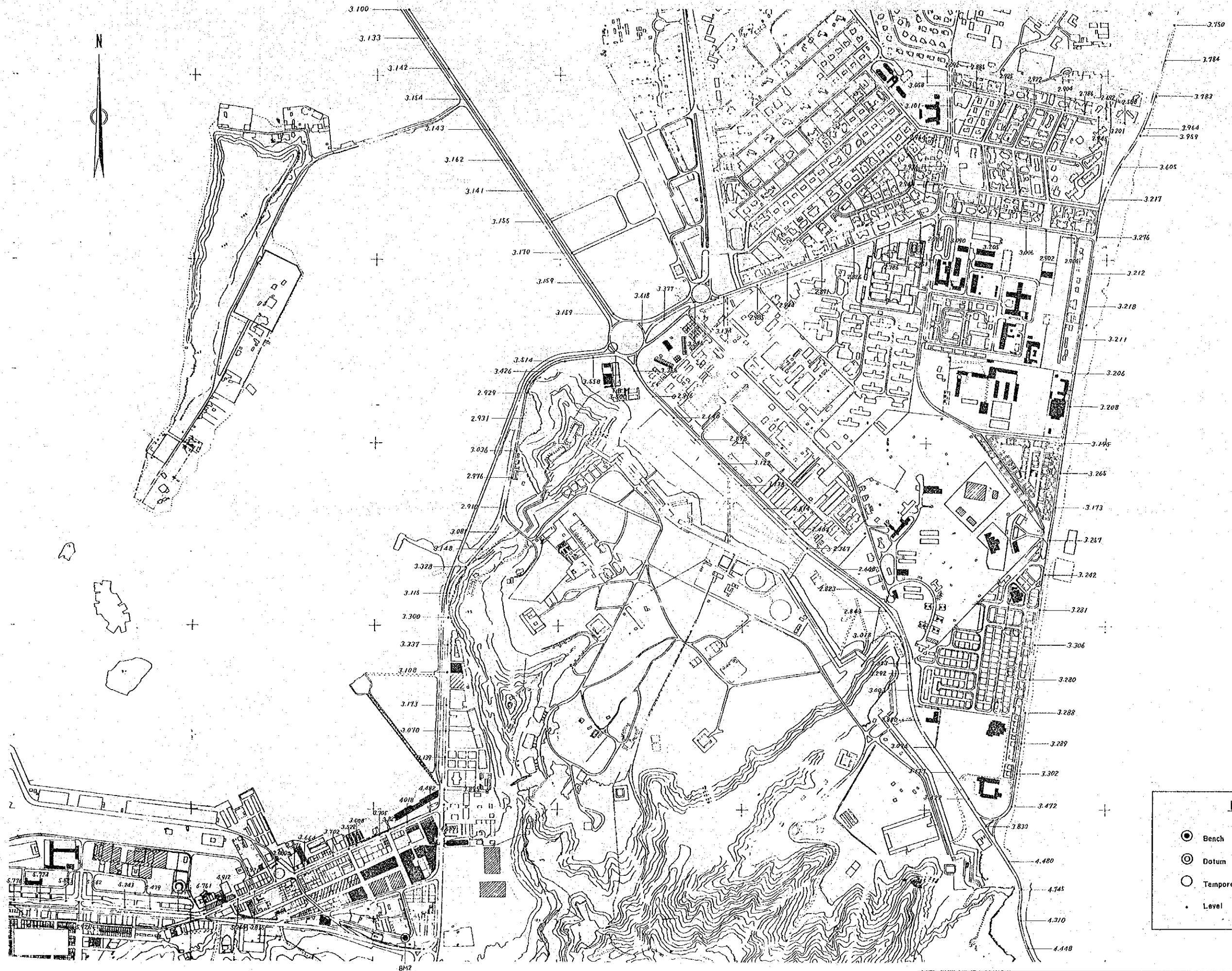


LEGEND

- ⊙ Bench Mark (MOC)
- ⊕ Datum Point (YPA)
- Temporary Bench Mark
- Level

FEASIBILITY STUDY ON THE IMPROVEMENT
OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM
LEVELING SURVEY PLAN (5/6)
IN KHORMAKSAR DISTRICT

KHORMAKSAR - 2	
DATE	JICA
JAN. 1990	DRAWING NO.
SCALE	13
1 : 5,000	



LEGEND

- Bench Mark (MOC)
- ⊙ Datum Point (YPA)
- Temporary Bench Mark
- Level

KHORMAKSAR - 3

FEASIBILITY STUDY ON THE IMPROVEMENT
OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM
LEVELING SURVEY PLAN (6 / 6)
IN MA'ALLA AND KHORMAKSAR DISTRICTS

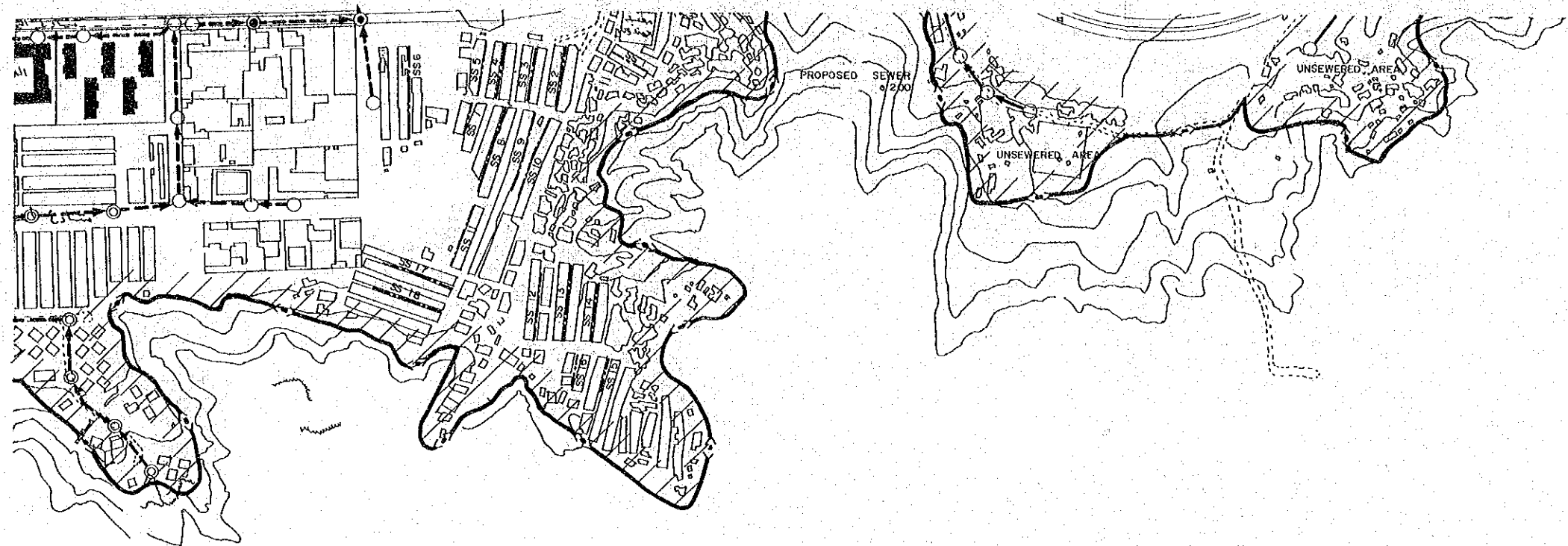
DATE	JAN. 1990	JICA
SCALE	1:5,000	DRAWING NO
		14



LEGEND	
	BOUNDARY OF SEWERAGE DISTRICT IN THE YEAR 2010
	EXISTING TRUNK SEWER
	SWEEPER'S PASSAGE
	PROPOSED TRUNK SEWER
	PROPOSED FORCE MAIN
	EXISTING PUMPING STATION
	PROPOSED PUMPING STATION
	AREA FOR FIRST PHASE UP TO 1995
	SEWAGE TREATMENT PLANT
	MANHOLE TYPE MA
	MANHOLE TYPE MB
	MANHOLE TYPE MC
	EXTRA CATCHMENT AREA

M - 1

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM	DATE	JICA
	JAN. 1990	
PROPOSED SEWERAGE SYSTEM FOR MA'ALLA DISTRICT (1/4)	SCALE	DRAWING NO.
	1 : 2,500	15



LEGEND	
	BOUNDARY OF SEWERAGE DISTRICT IN THE YEAR 2010
	EXISTING TRUNK SEWER
	SWEEPERS PASSAGE
	PROPOSED TRUNK SEWER
	PROPOSED FORCE MAIN
	EXISTING PUMPING STATION
	PROPOSED PUMPING STATION
	AREA FOR FIRST PHASE UP TO 1995
	SEWAGE TREATMENT PLANT
	MANHOLE TYPE MA
	MANHOLE TYPE MB
	MANHOLE TYPE MC
	EXTRA CATCHMENT AREA

M - 2

FEASIBILITY STUDY ON THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM	DATE	JICA
	JAN. 1990	
PROPOSED SEWERAGE SYSTEM FOR MA'ALLA DISTRICT (2/4)	SCALE	DRAWING NO.
	1 : 2,500	16