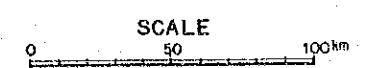


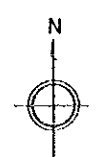
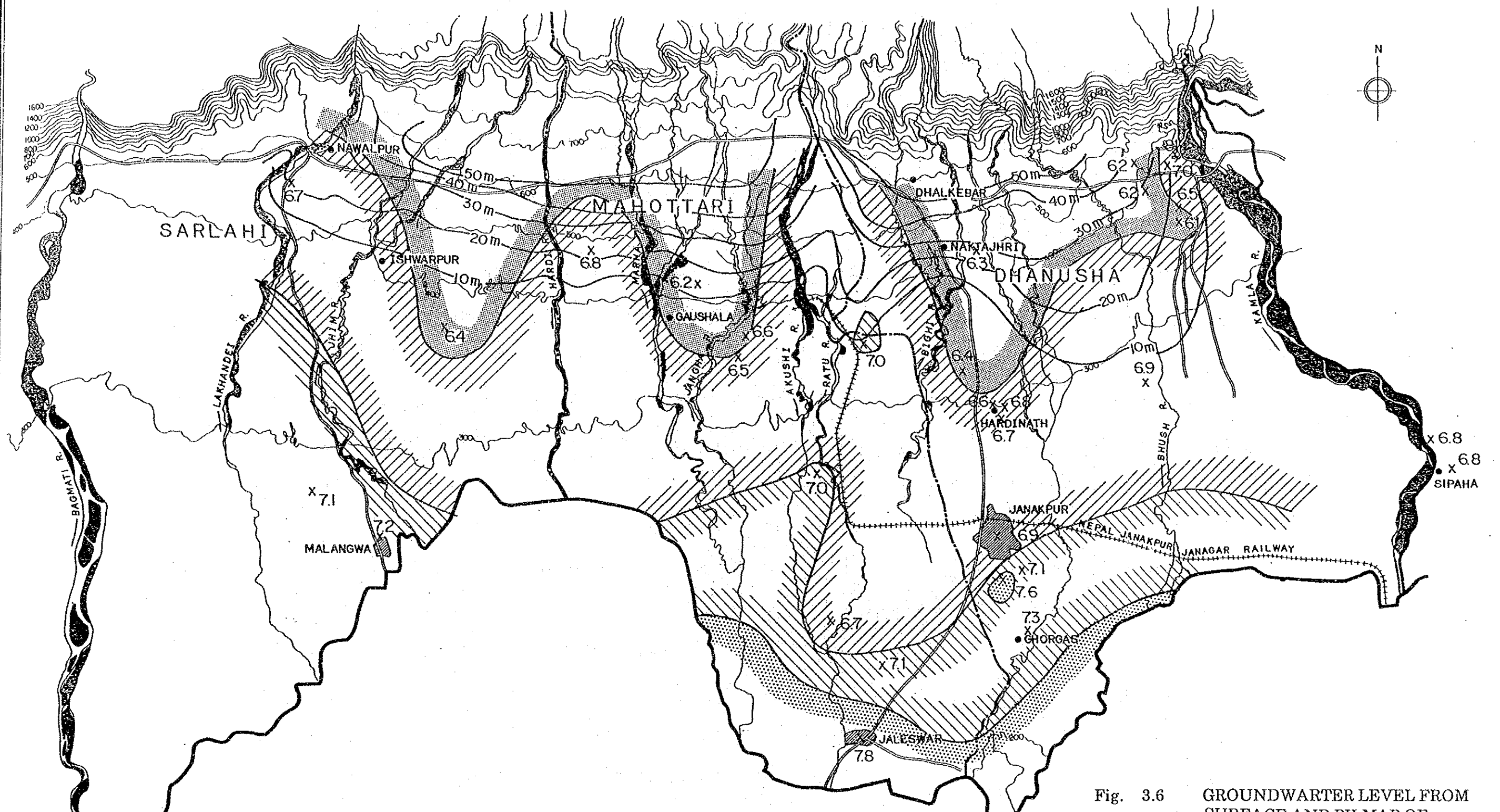
LEGEND

- 300 CONTOUR
- RIVER
- ROAD
- RAILWAY
- TOWNSHIP
- NATIONAL BOUNDARY
- ZONE BOUNDARY
- DISTRICT BOUNDARY
- GROUNDWATER CONTOUR OF UNCONFINED AQUIFER
- THE AREA OF 150 MICRO MHO/CM OR LESS IN ELECTRIC CONDUCTIVITY
- THE AREA OF 7.0 OR MORE IN PH VALUE
- 110, 6.0 110 : CONDUCTIVITY (MHO/CM)
6.0 : PH VALUE
- x SHALLOW WELL POINT
- 22°C TEMPERATURE (°c)

Fig. 3.5 PH, CONDUCTIVITY & TEMPERATURE DISTRIBUTION MAP OF SHALLOW WELL WATER



HIS MAJESTY'S GOVERNMENT OF NEPAL	
TERAI GROUNDWATER DEVELOPMENT PROJECT	
TITLE OF DRAWING	
Date	Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY	



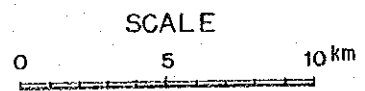
LEGEND

- 300 CONTOUR
- RIVER
- ROAD
- RAILWAY
- TOWNSHIP
- NATIONAL BOUNDARY
- ZONE BOUNDARY
- DISTRICT BOUNDARY
- OBSERVED WELL
- PH VALUE
- GROUNDWATER DEPTH FROM SURFACE

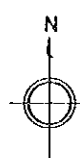
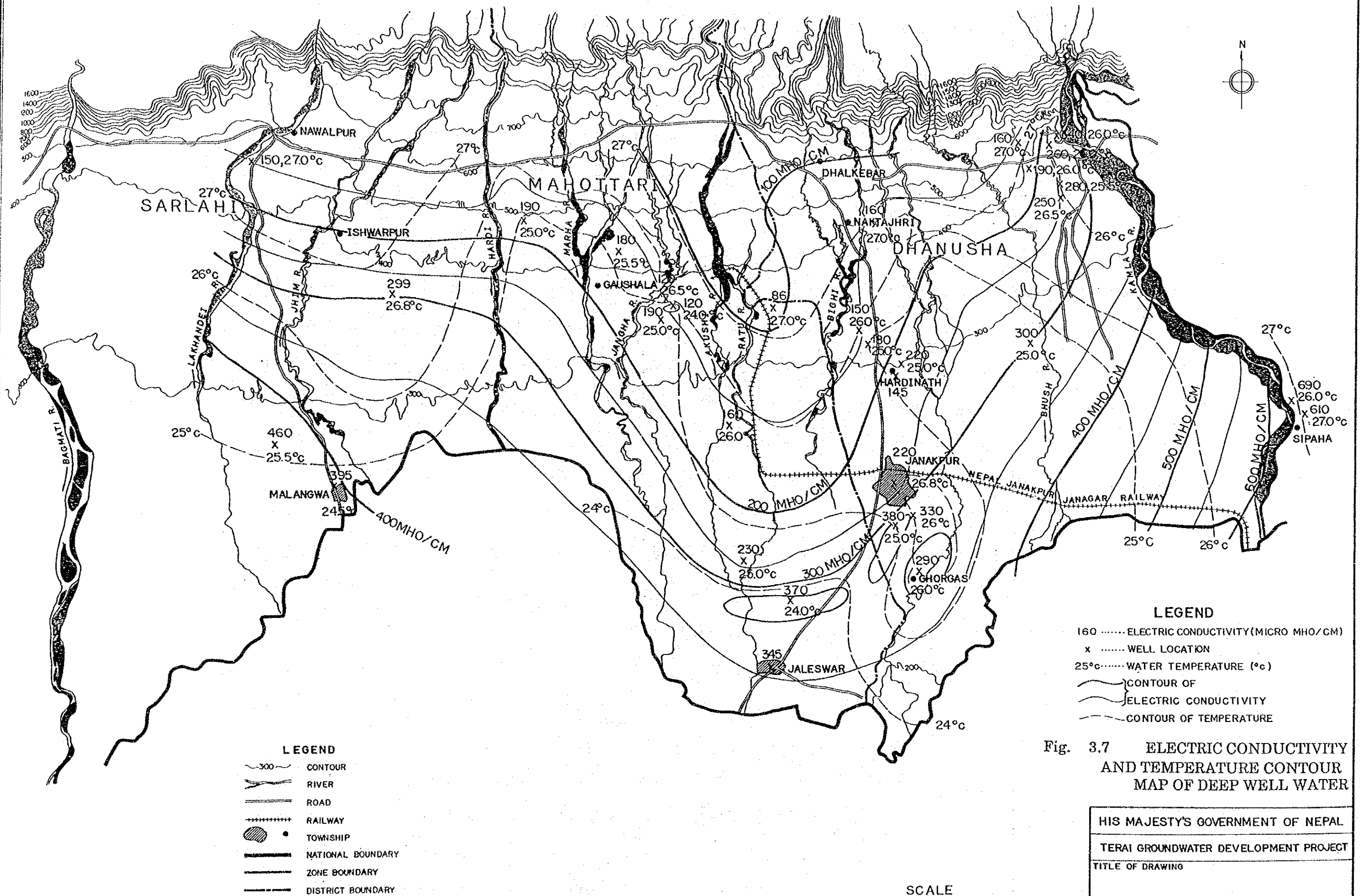
CLASS PH value

- ~ 6.5
- 6.6 ~ 7.0
- 7.1 ~ 7.4
- 7.5 ~

Fig. 3.6 GROUNDWATER LEVEL FROM SURFACE AND PH MAP OF CONFINED AQUIFER



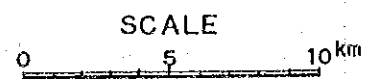
HIS MAJESTY'S GOVERNMENT OF NEPAL			
TERAI GROUNDWATER DEVELOPMENT PROJECT			
TITLE OF DRAWING			
Date	MAY 1987	Drawing No.	3-7
JAPAN INTERNATIONAL COOPERATION AGENCY			



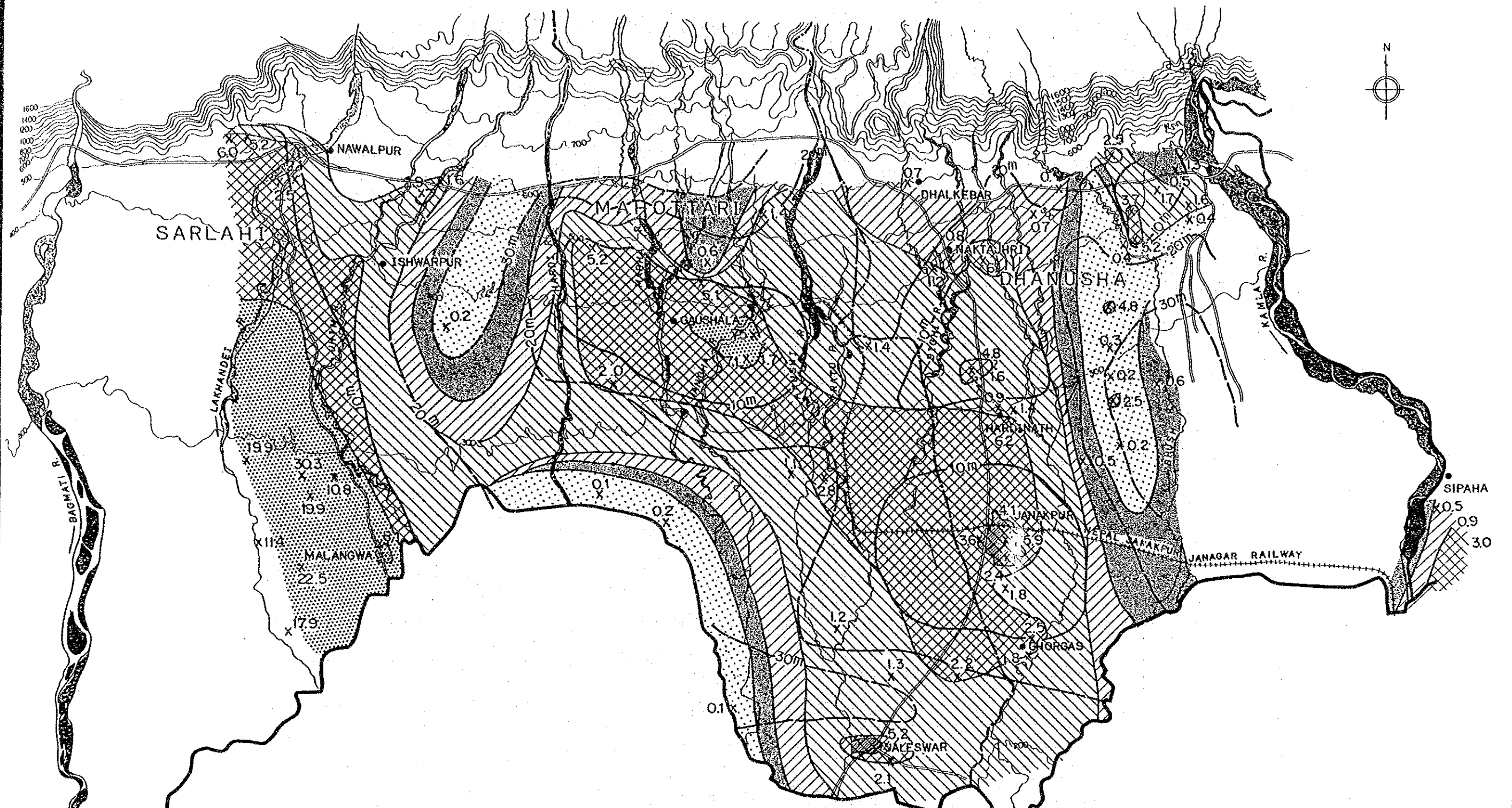
- LEGEND**
- ~300~ CONTOUR
 - RIVER
 - ROAD
 - RAILWAY
 - TOWNSHIP
 - NATIONAL BOUNDARY
 - ZONE BOUNDARY
 - DISTRICT BOUNDARY

- LEGEND**
- 160 ELECTRIC CONDUCTIVITY (MICRO MHO/CM)
 - x WELL LOCATION
 - 25°C WATER TEMPERATURE (°C)
 - CONTOUR OF ELECTRIC CONDUCTIVITY
 - CONTOUR OF TEMPERATURE

Fig. 3.7 ELECTRIC CONDUCTIVITY AND TEMPERATURE CONTOUR MAP OF DEEP WELL WATER



HIS MAJESTY'S GOVERNMENT OF NEPAL		
TERAI GROUNDWATER DEVELOPMENT PROJECT		
TITLE OF DRAWING		
Date	Drawing No.	
JAPAN INTERNATIONAL COOPERATION AGENCY		



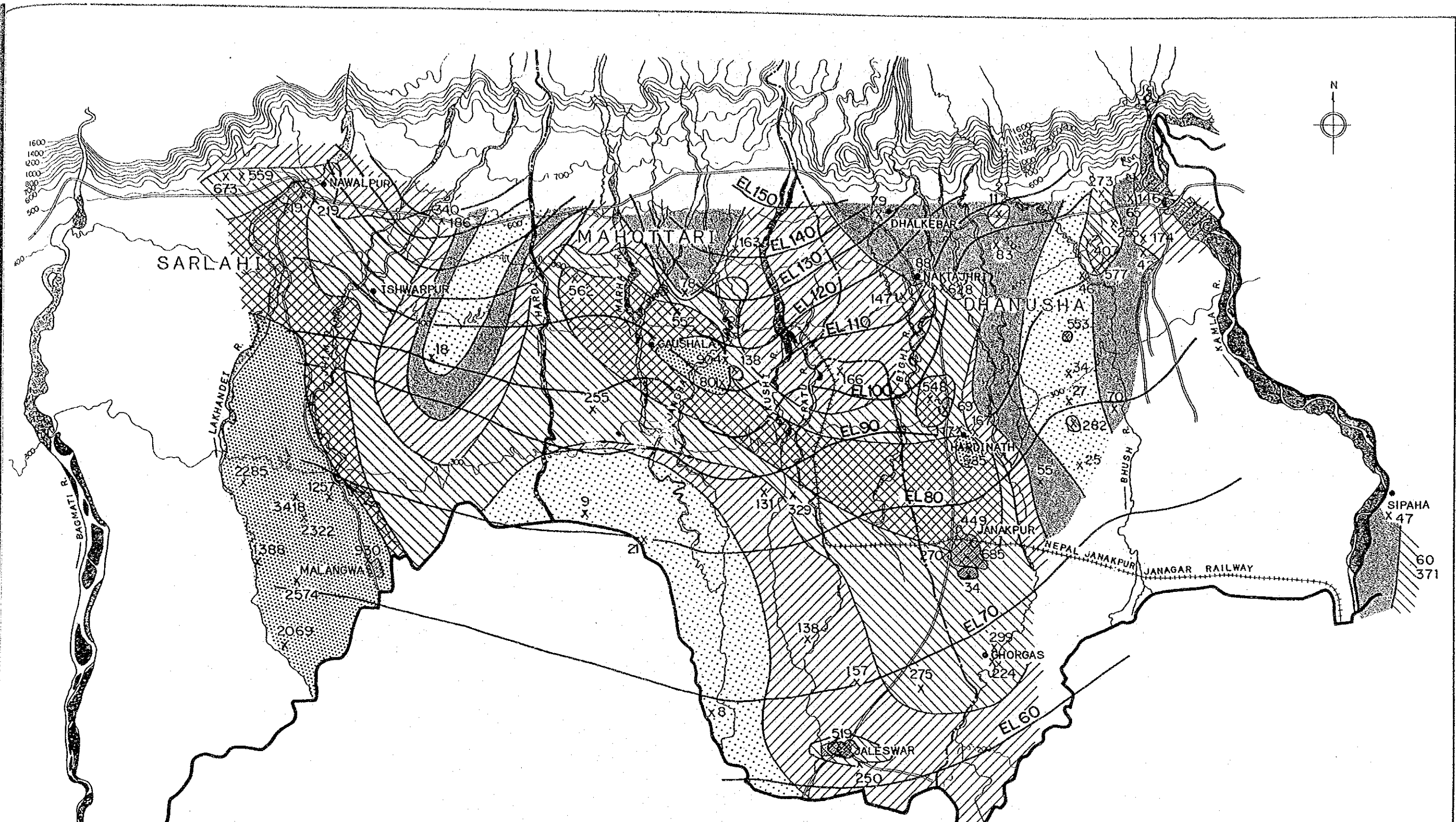
LEGEND

	CONTOUR		CLASS	SPECIFIC CAPACITY (L/SEC/M)	CAPACITY (M ² /DAY)		WELL POINT
	RIVER			~ 0.4	(= ~ 42)		10 m DRAWDOWN CONTOUR
	ROAD			0.5 ~ 0.6	(= 43 ~ 59)		20 m DRAWDOWN CONTOUR
	RAILWAY			0.7 ~ 0.9	(= 60 ~ 85)		30 m DRAWDOWN CONTOUR
	TOWNSHIP			1.0 ~ 1.9	(= 86 ~ 172)		
	NATIONAL BOUNDARY			2.0 ~ 6.9	(= 173 ~ 599)		
	ZONE BOUNDARY			7.0 ~ 31.0	(= 600 ~ 2,700)		
	DISTRICT BOUNDARY						

SCALE 0 50 100km

Fig. 3.8 SPECIFIC CAPACITY MAP OF DEEP TUBEWELL

HIS MAJESTY'S GOVERNMENT OF NEPAL		
TERAI GROUNDWATER DEVELOPMENT PROJECT		
TITLE OF DRAWING		
Date	Drawing No.	
JAPAN INTERNATIONAL COOPERATION AGENCY		



LEGEND

300	CONTOUR	<table border="0"> <tr> <td>CLASS</td> <td>TRANSMISSIVITY (M²/DAY)</td> </tr> <tr> <td></td> <td>~ 49</td> </tr> <tr> <td></td> <td>50 ~ 99</td> </tr> <tr> <td></td> <td>100 ~ 199</td> </tr> <tr> <td></td> <td>200 ~ 399</td> </tr> <tr> <td></td> <td>400 ~ 799</td> </tr> <tr> <td></td> <td>800 ~ 3,500</td> </tr> </table>	CLASS	TRANSMISSIVITY (M²/DAY)		~ 49		50 ~ 99		100 ~ 199		200 ~ 399		400 ~ 799		800 ~ 3,500	x WELL POINT
CLASS	TRANSMISSIVITY (M²/DAY)																
	~ 49																
	50 ~ 99																
	100 ~ 199																
	200 ~ 399																
	400 ~ 799																
	800 ~ 3,500																
	RIVER	299 TRANSMISSIVITY VALUE (M ² /DAY)															
	ROAD	GROUNDWATER CONTOUR OF CONFINED AQUIFER															
	RAILWAY																
	TOWNSHIP																
	NATIONAL BOUNDARY																
	ZONE BOUNDARY																
	DISTRICT BOUNDARY																

Fig. 3.9 TRANSMISSIVITY
MAP OF DEEP TUBEWELLS

SCALE
0 50 100km

HIS MAJESTY'S GOVERNMENT OF NEPAL		
TERAI GROUNDWATER DEVELOPMENT PROJECT		
TITLE OF DRAWING		
Date	Drawing No.	
JAPAN INTERNATIONAL COOPERATION AGENCY		

Fig 3.10 ORGANIZATION AND STAFFING OF TIATSP

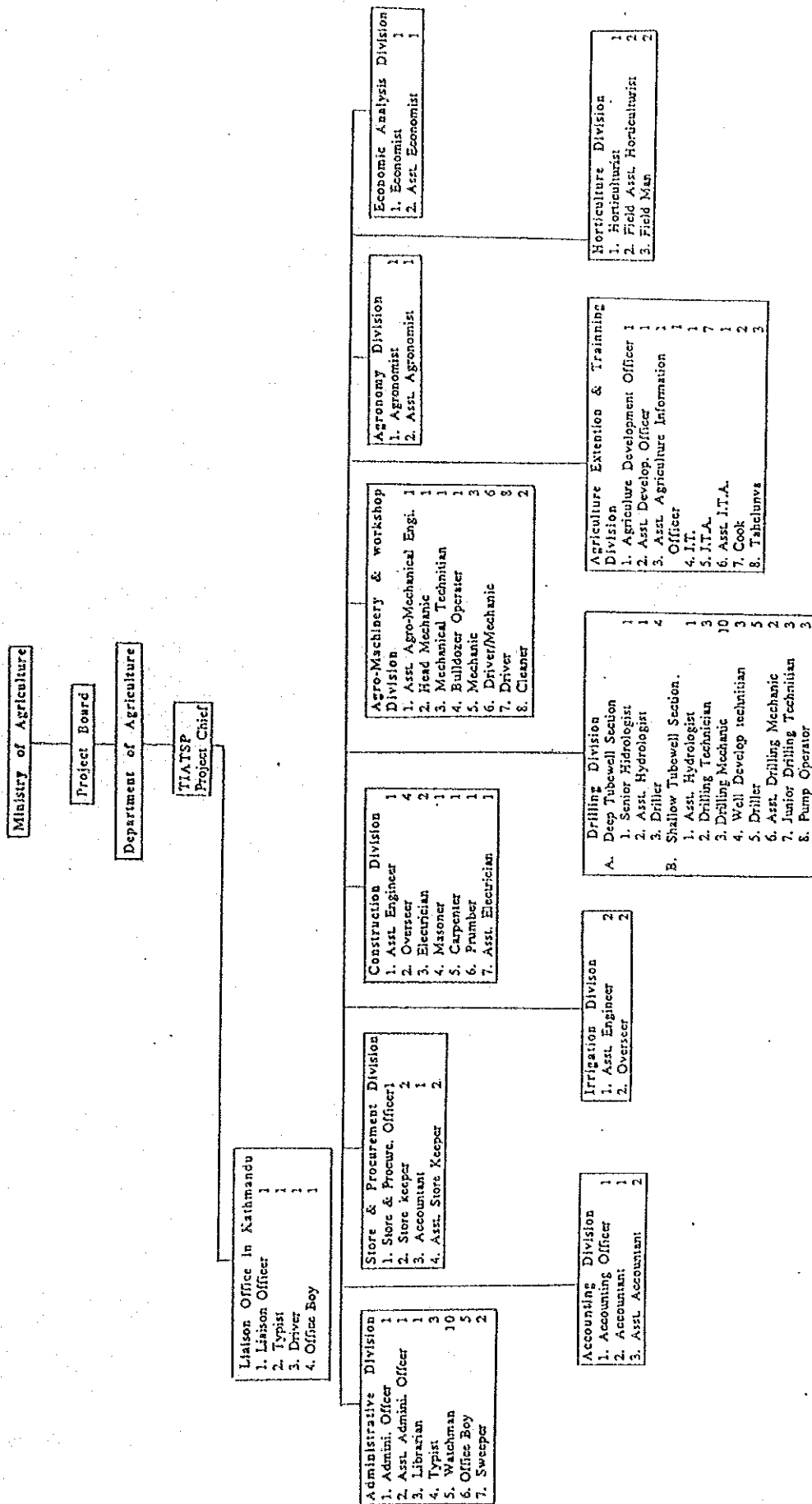
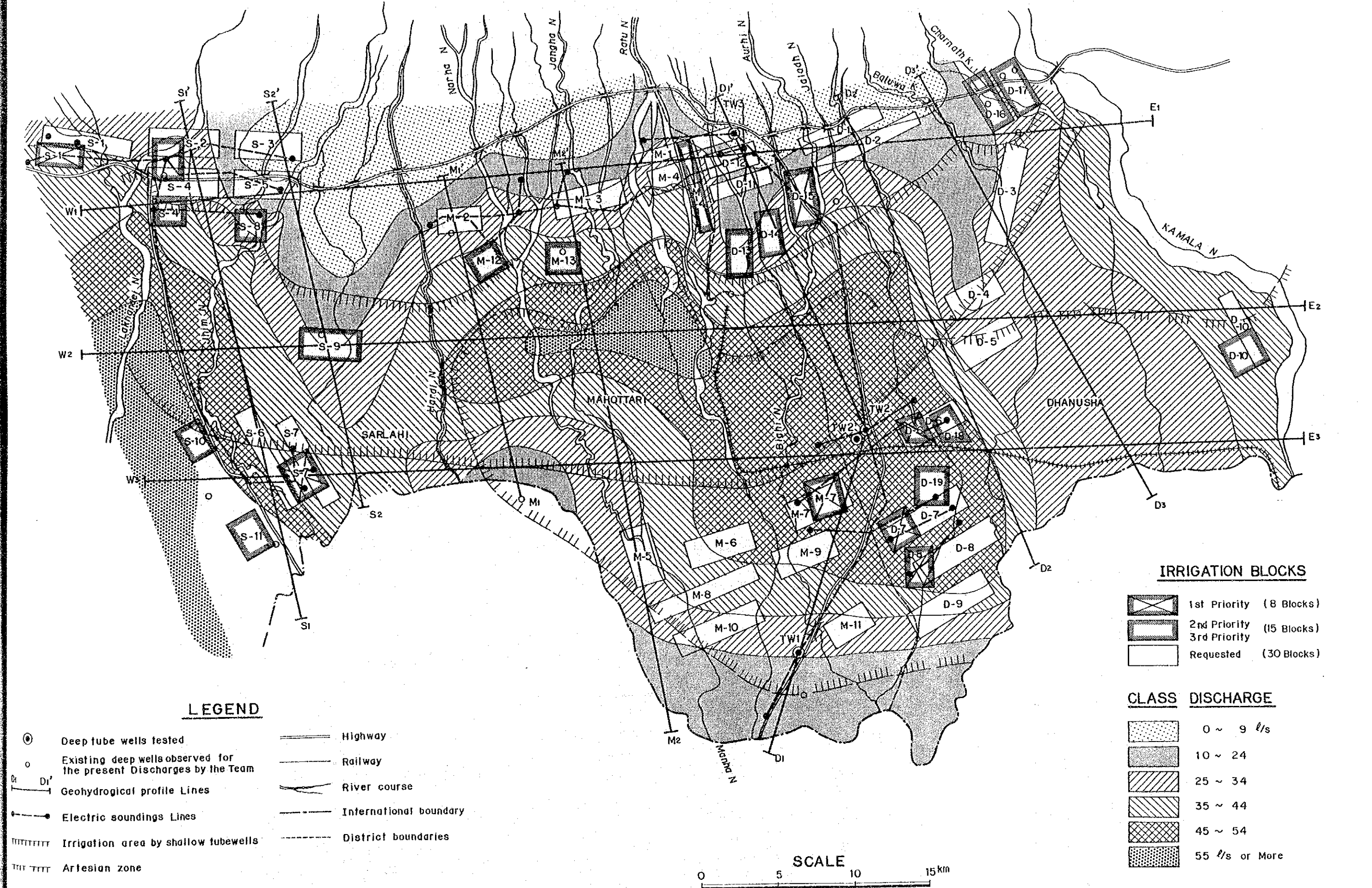


Fig. 4.1 GROUNDWATER POTENTIAL MAP AND LOCATION MAP OF DEVELOPMENT BLOCK



LEGEND

- ⊙ Deep tube wells tested
- Existing deep wells observed for the present Discharges by the Team
- Di' Geohydrological profile Lines
- Electric soundings Lines
- ||||| Irrigation area by shallow tubewells
- ||||| Artesian zone
- ==== Highway
- Railway
- River course
- International boundary
- District boundaries

IRRIGATION BLOCKS

- 1st Priority (8 Blocks)
- 2nd Priority (15 Blocks)
- 3rd Priority
- Requested (30 Blocks)

CLASS DISCHARGE

- 0 ~ 9 l/s
- 10 ~ 24
- 25 ~ 34
- 35 ~ 44
- 45 ~ 54
- 55 l/s or More

SCALE



Fig. 4.2 STANDARD OF THE DEEP TUBEWELL TYPES

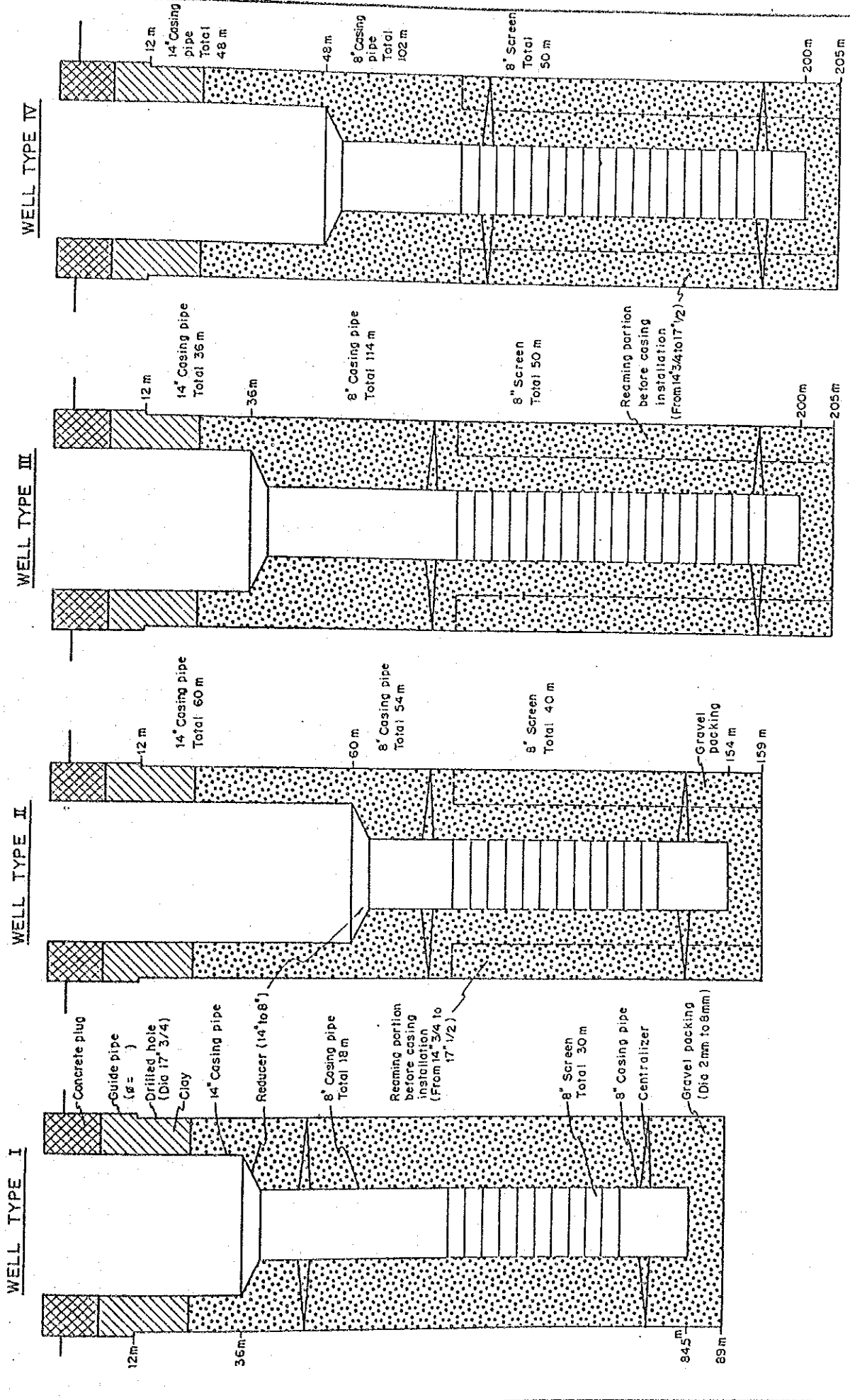
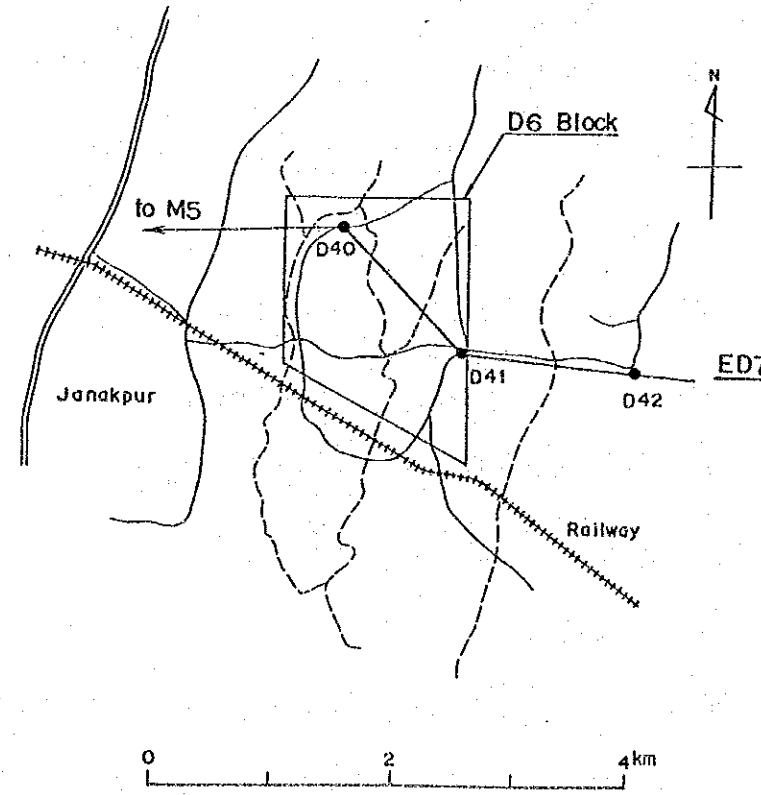
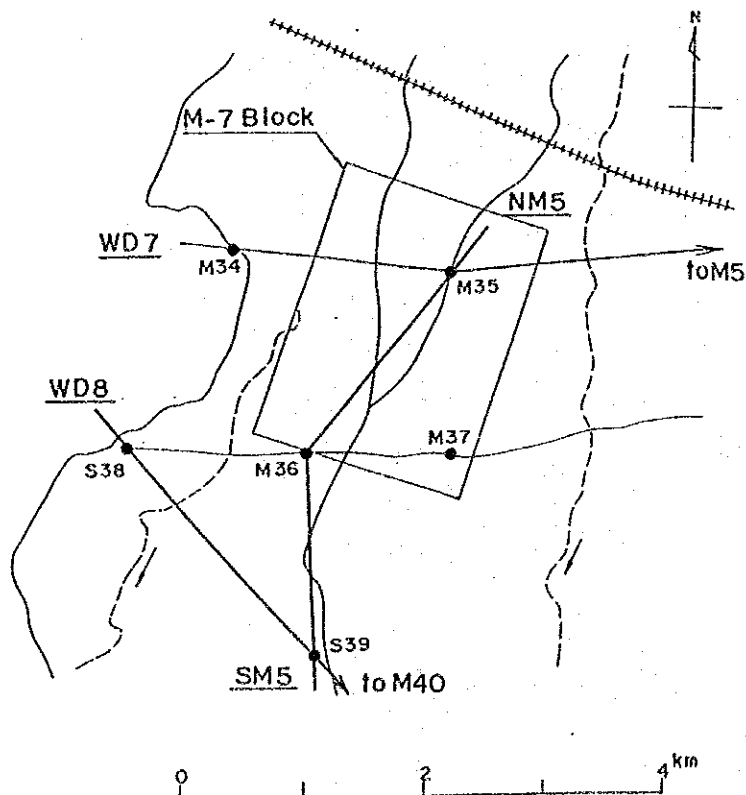
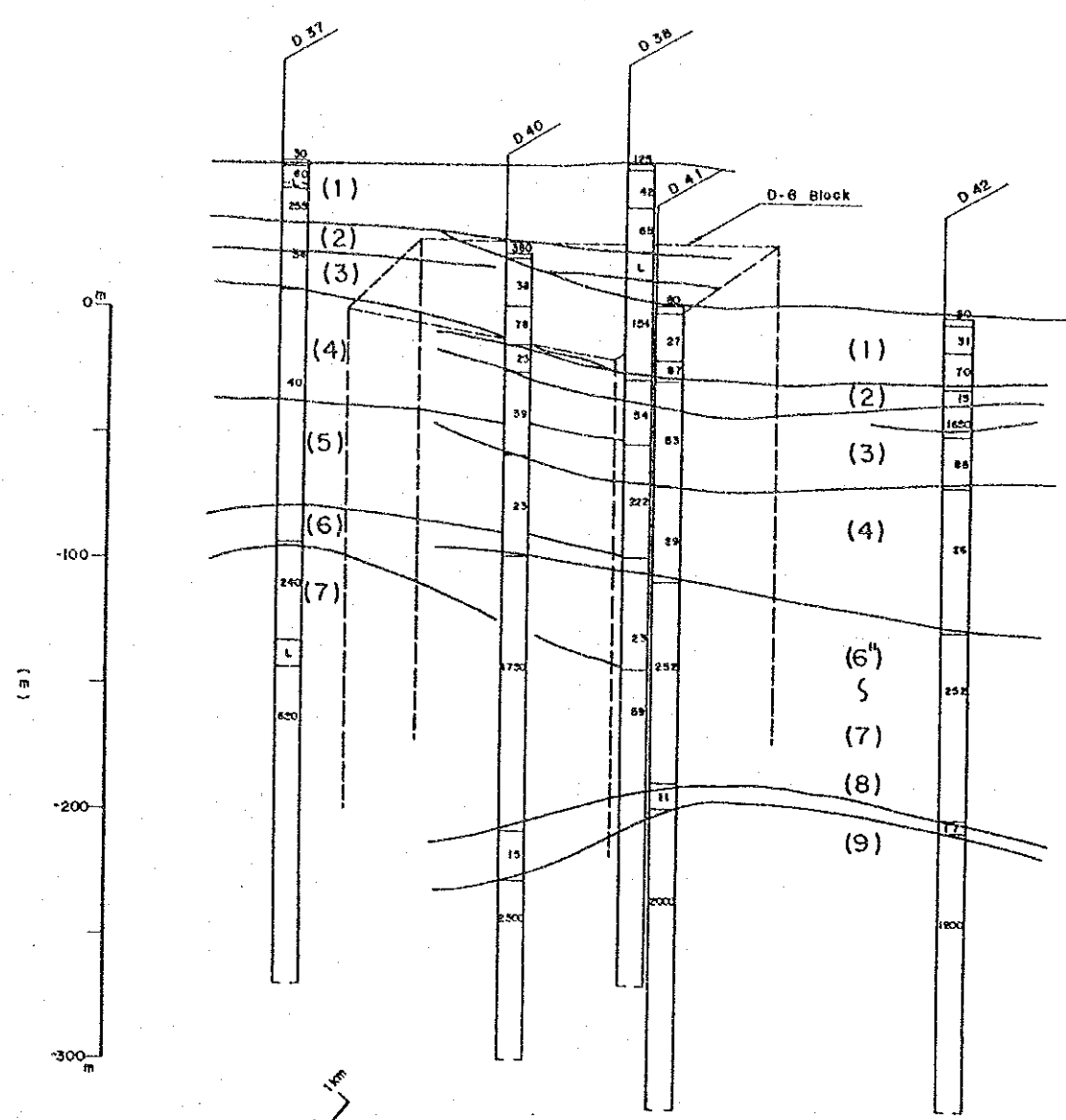
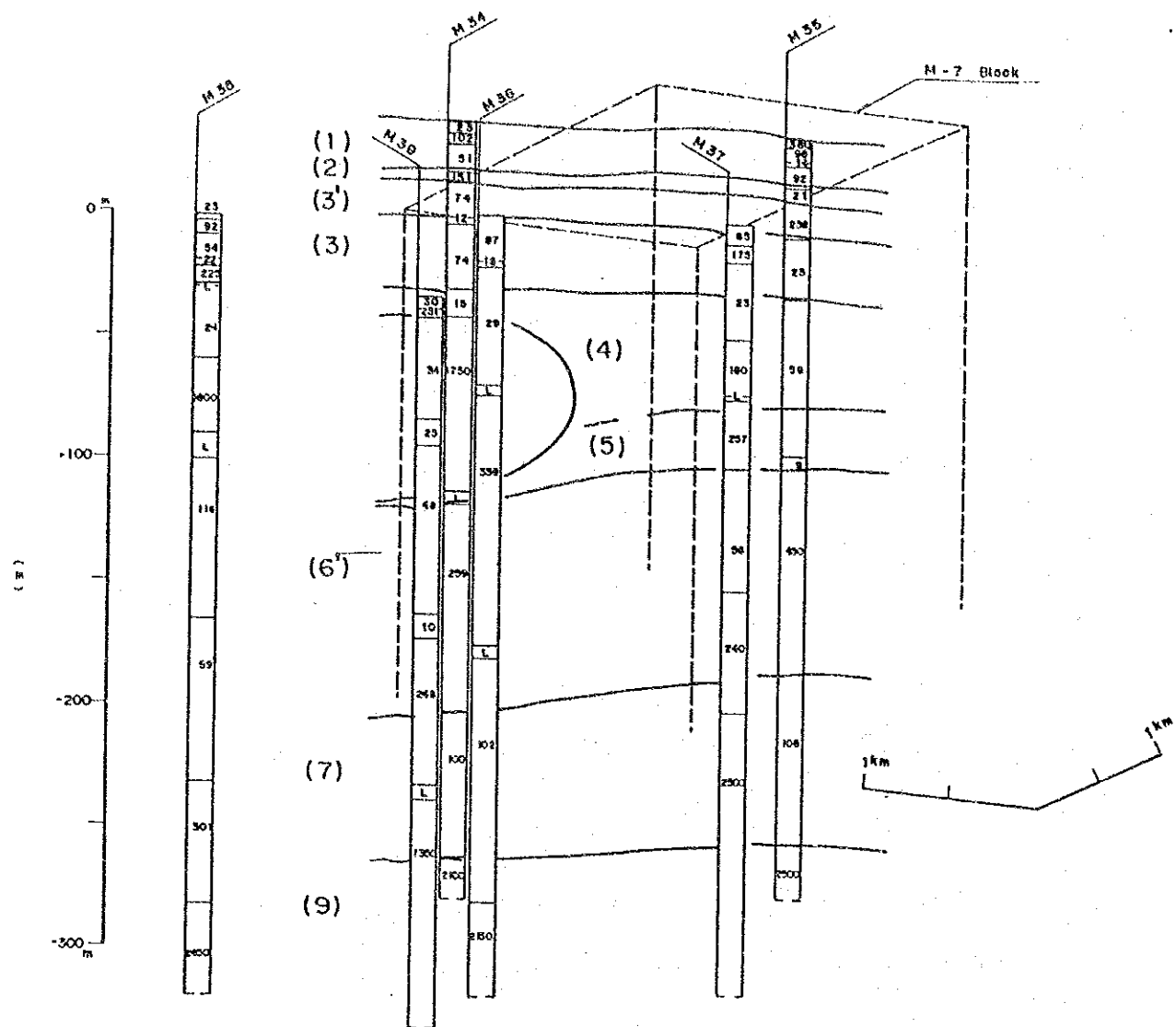


Fig. 4.3 RESULTS OF ELECTRIC SOUNDING ANALYSIS (1/4)



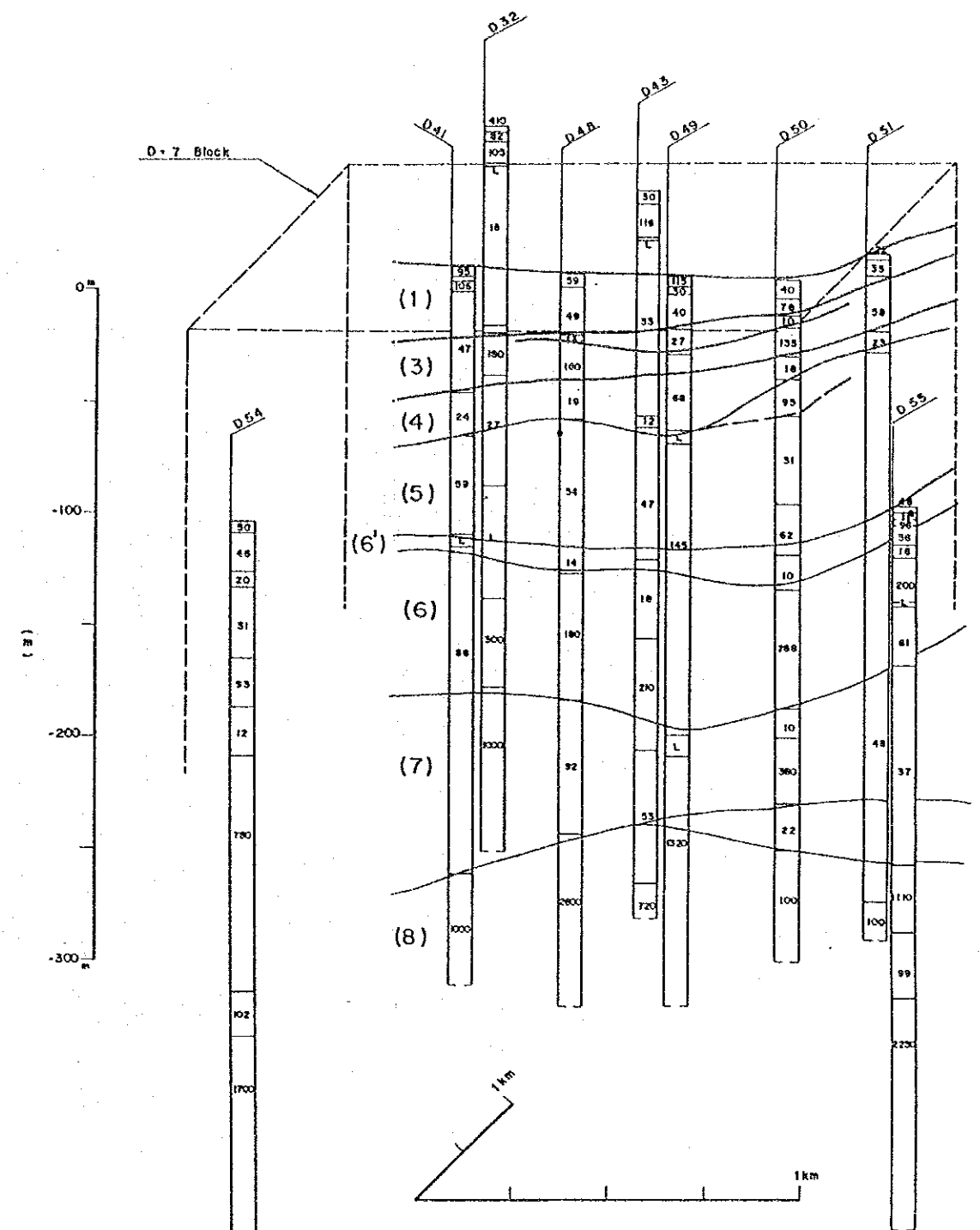
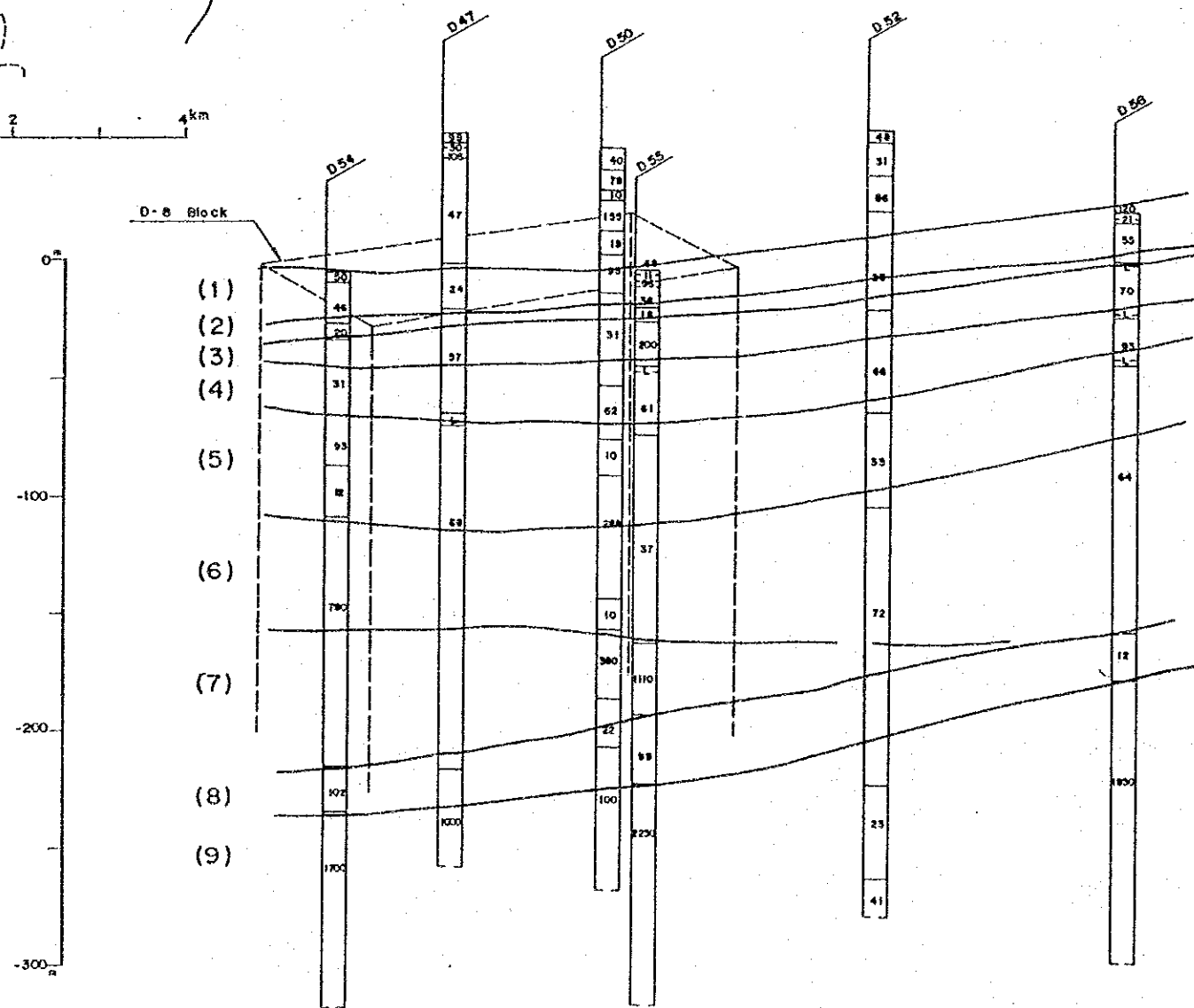
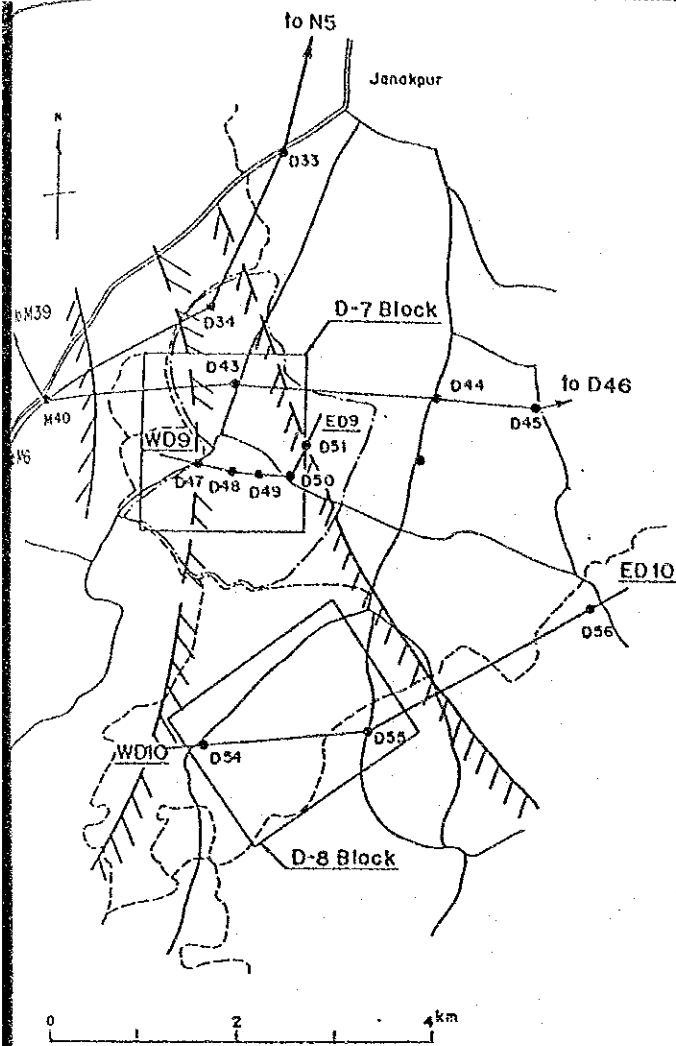
- LEGEND**
- HIGH WAY
 - ROAD
 - RIVER
 - ELECTRIC SOUNDINGS POINTS
 - ELECTRIC SOUNDINGS LINES
 - IRRIGATION BLOCK

HIS MAJESTY'S GOVERNMENT OF NEPAL		
TERAI GROUNDWATER DEVELOPMENT PROJECT		
TITLE OF DRAWING		
Date	Drawing No.	
JAPAN INTERNATIONAL COOPERATION AGENCY		

Fig. 4.3 RESULTS OF ELECTRIC SOUNDING ANALYSIS (2/4)

LEGEND

- ==== HIGH WAY
- ROAD
- - - RIVER
- ELECTRIC SOUNDINGS POINTS
- ELECTRIC SOUNDINGS LINES
- IRRIGATION BLOCK
- ||||| HIGH POTENTIALTY AREA OF DEEP GROUND WATER

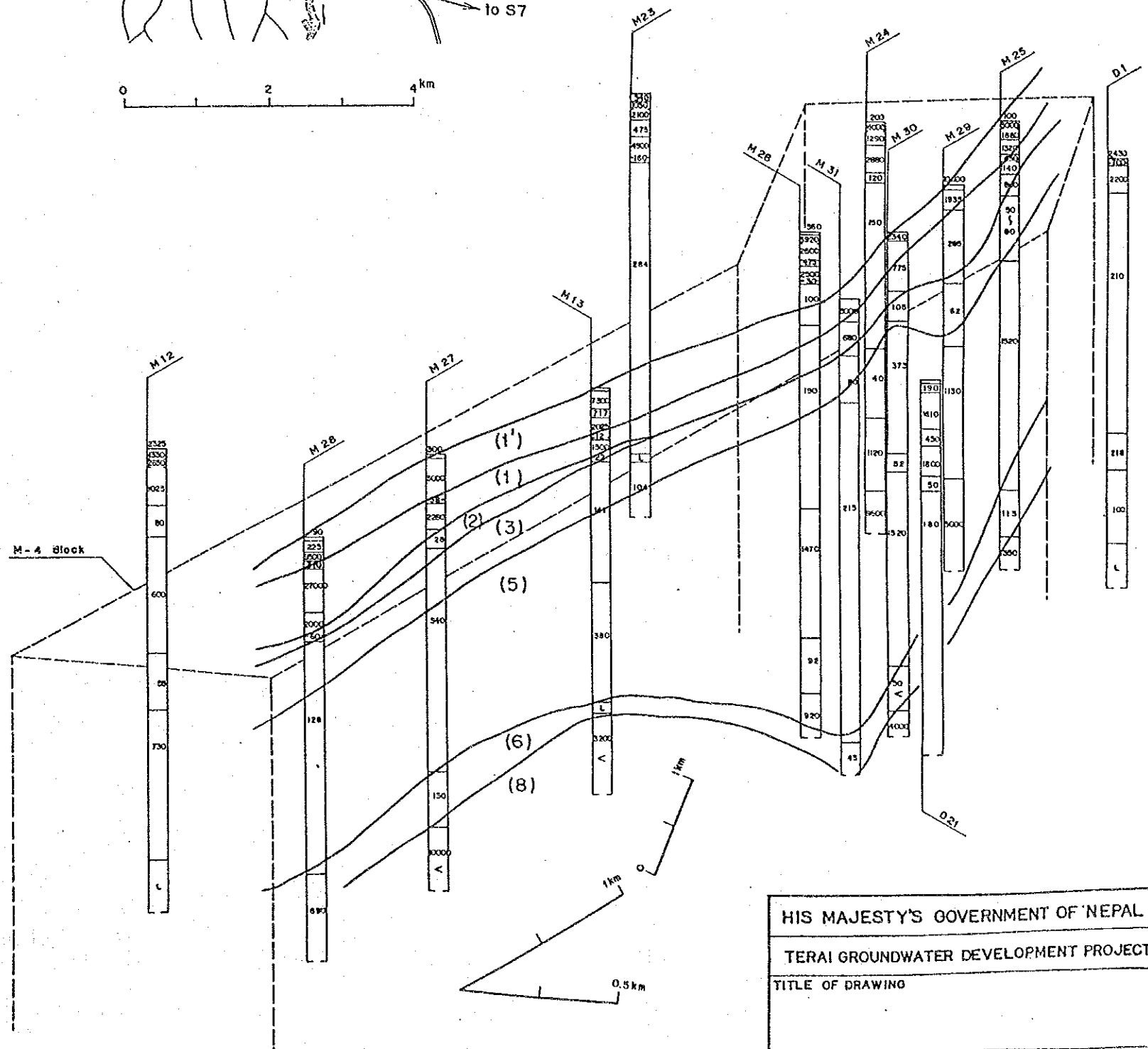
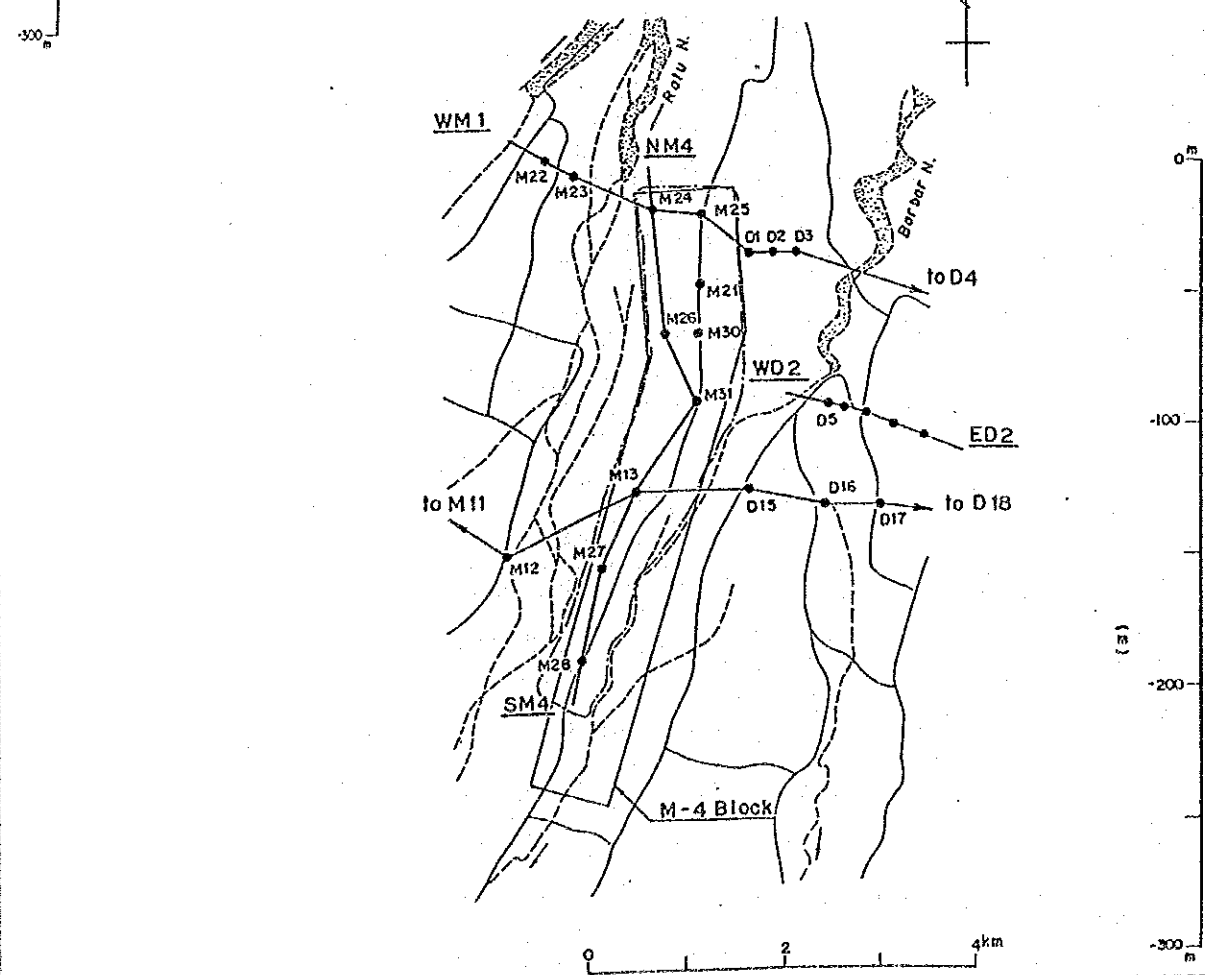
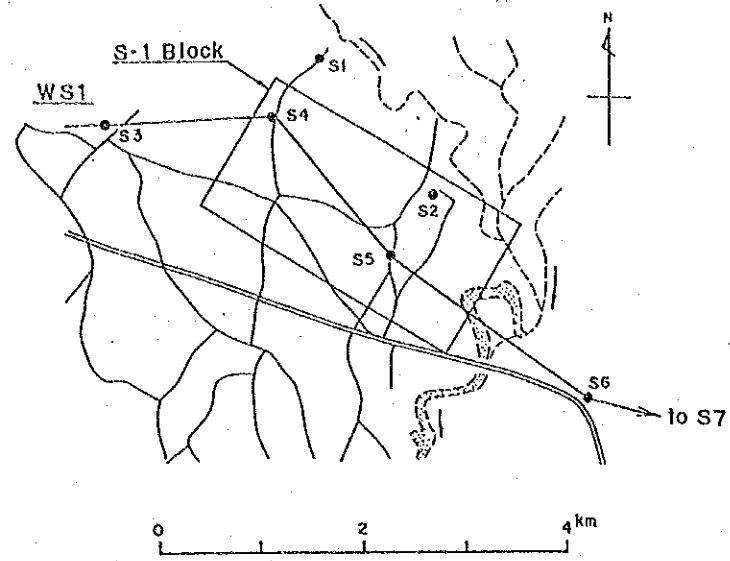
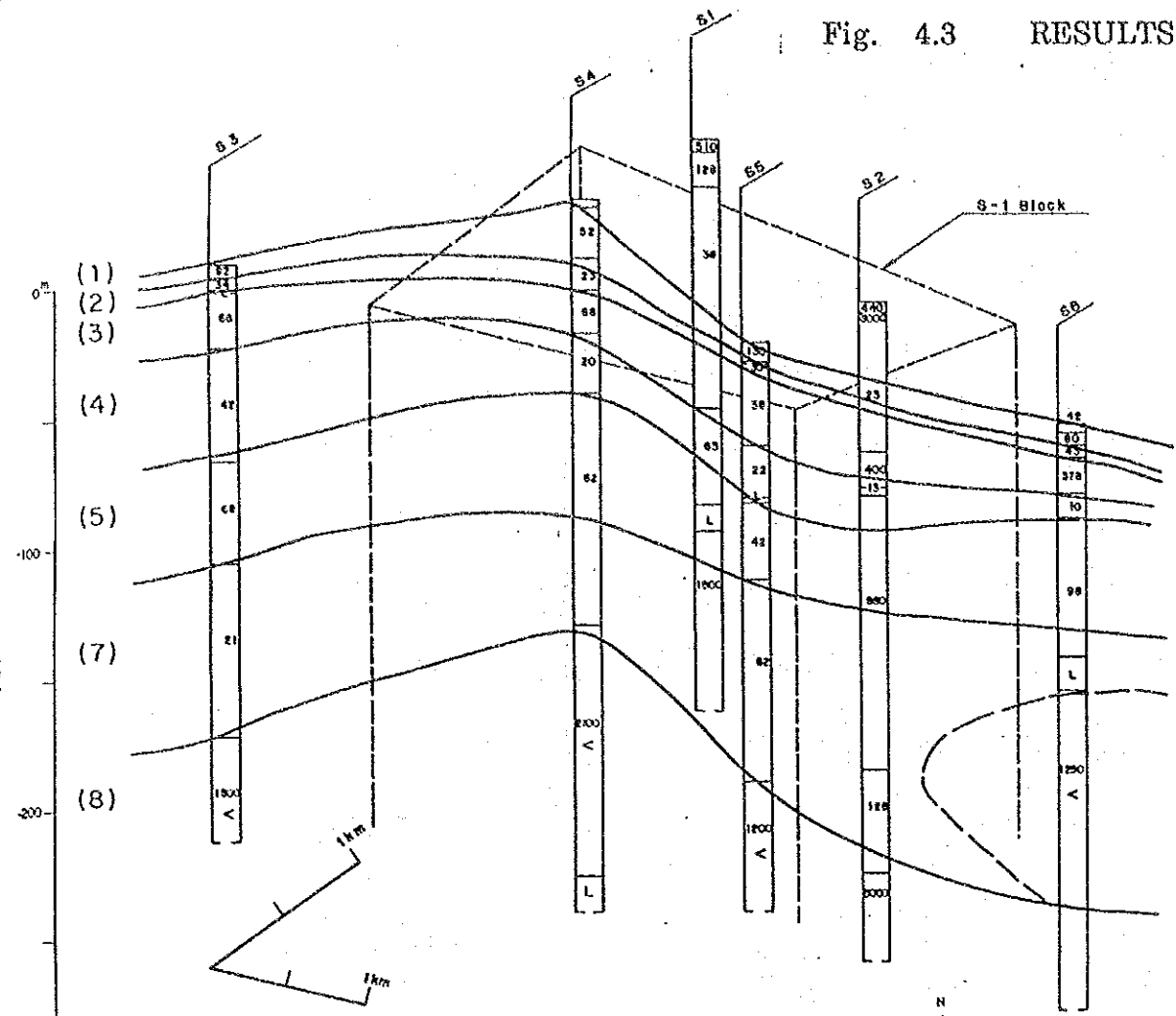


HIS MAJESTY'S GOVERNMENT OF NEPAL		
TERAI GROUNDWATER DEVELOPMENT PROJECT		
TITLE OF DRAWING		
Date	Drawing No.	
JAPAN INTERNATIONAL COOPERATION AGENCY		

Fig. 4.3 RESULTS OF ELECTRIC SOUNDING ANALYSIS (3/4)

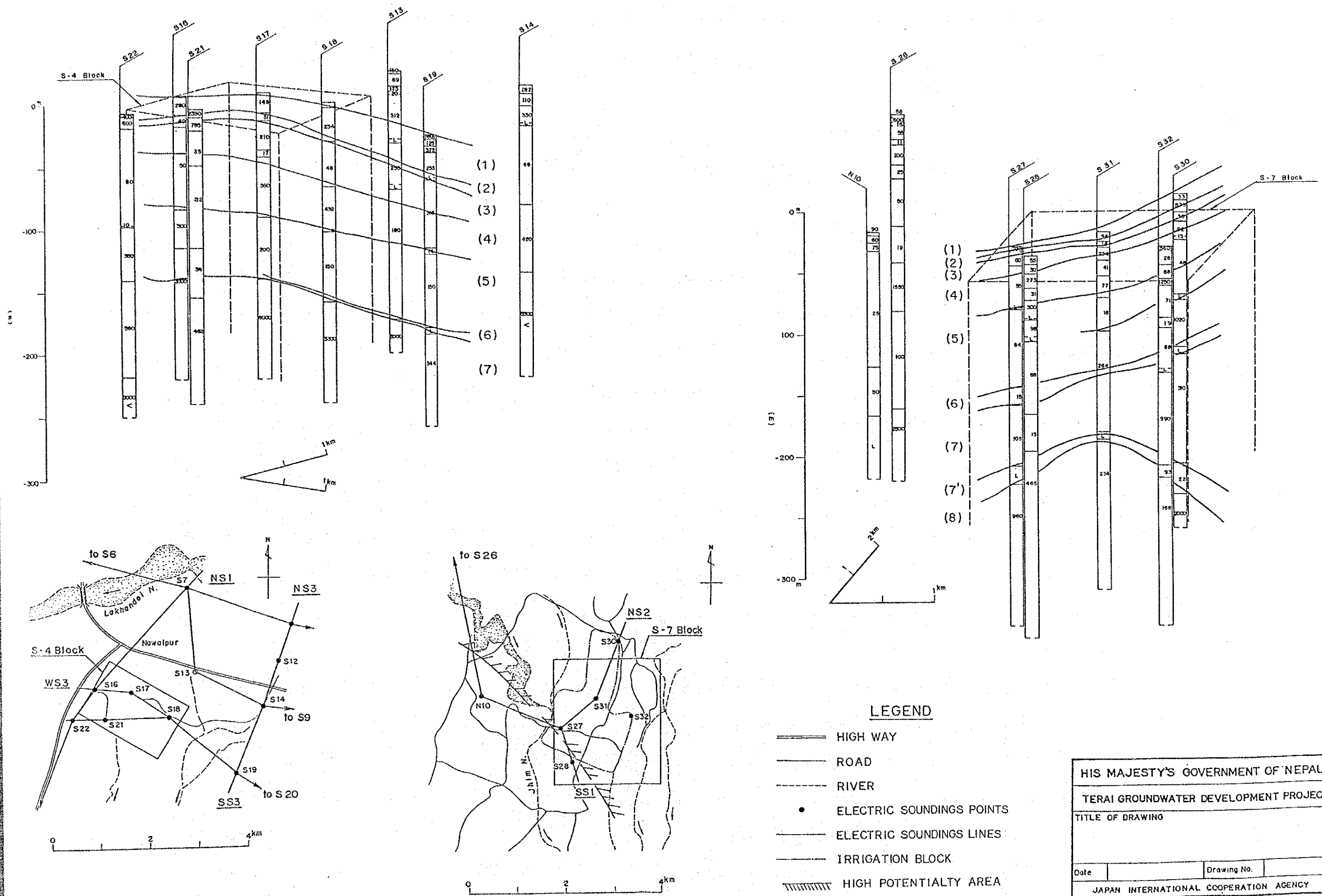
LEGEND

- ===== HIGH WAY
- ROAD
- RIVER
- ELECTRIC SOUNDINGS POINTS
- ELECTRIC SOUNDINGS LINES
- IRRIGATION BLOCK



HIS MAJESTY'S GOVERNMENT OF NEPAL		
TERAI GROUNDWATER DEVELOPMENT PROJECT		
TITLE OF DRAWING		
Date	Drawing No.	
JAPAN INTERNATIONAL COOPERATION AGENCY		

Fig. 4.3 RESULTS OF ELECTRIC SOUNDING ANALYSIS (4/4)



HIS MAJESTY'S GOVERNMENT OF NEPAL	
TERAI GROUNDWATER DEVELOPMENT PROJECT	
TITLE OF DRAWING	
Date	Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY	

Fig. 6.1 TENTATIVE WORK SCHEDULE FOR BASIC DESIGN STUDY - PHASE II

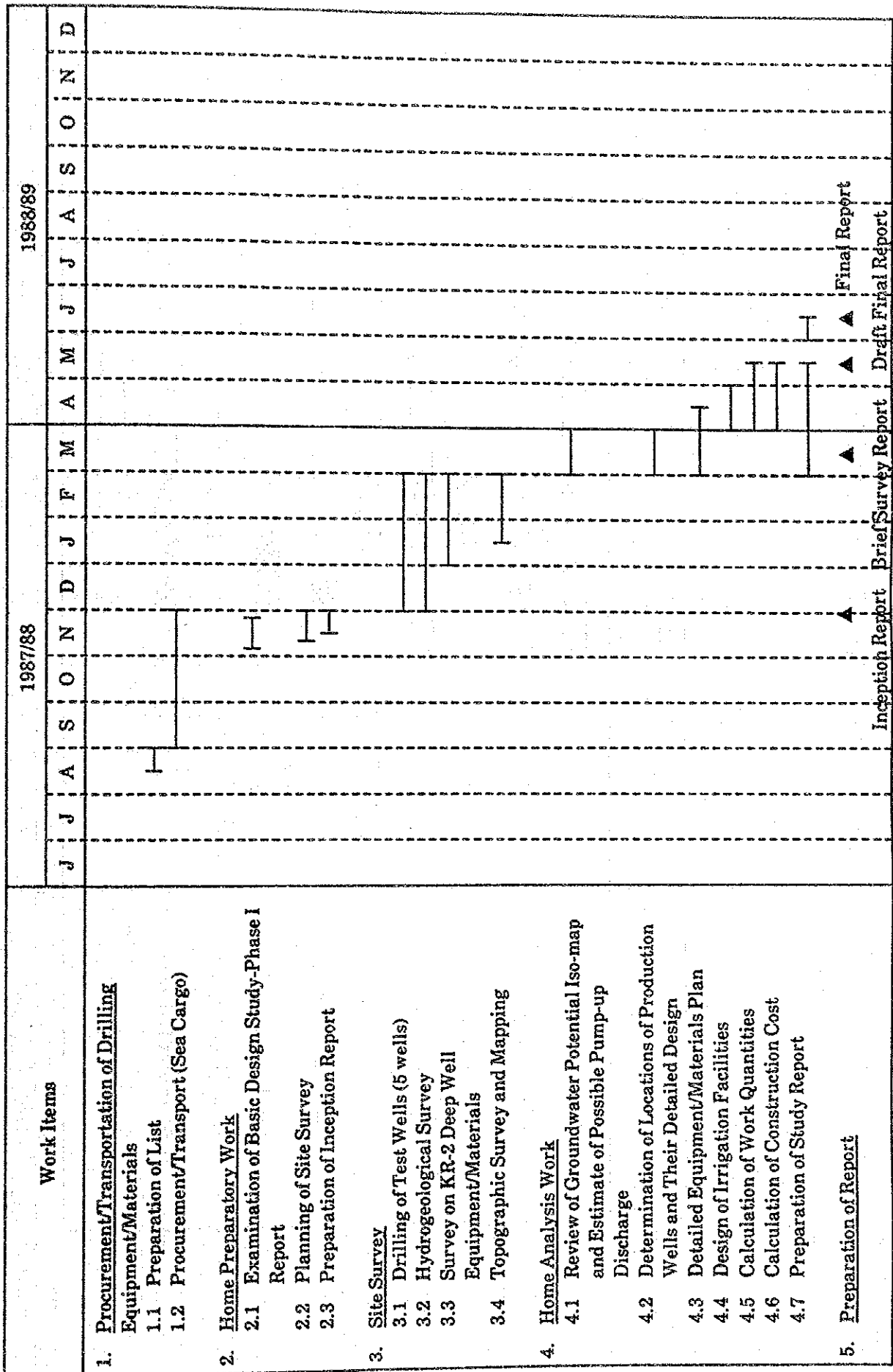
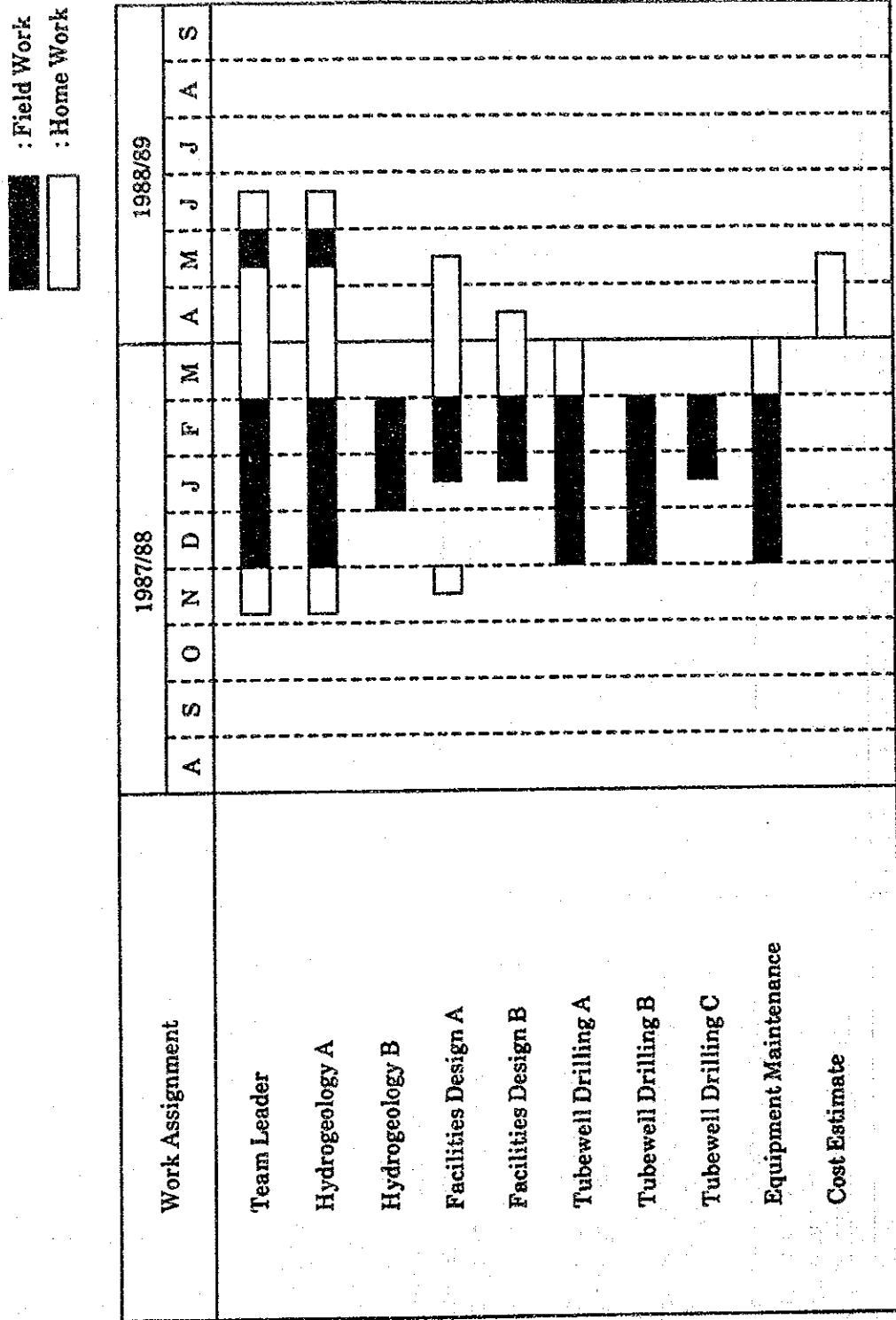


Fig. 6.2 TENTATIVE ASSIGNMENT SCHEDULE FOR BASIC DESIGN STUDY - PHASE II



Note : The above schedule may be subject to the discussions among the Japanese government officials concerned in future.

ATTACHMENT

LIST OF ATTACHMENTS

- ATTACHMENT – I MEMBER OF STUDY TEAM
- ATTACHMENT – II ITENERARY OF STUDY TEAM
- ATTACHMENT – III LIST OF COLLECTED DATA AND REPORTS
- ATTACHMENT – IV OFFICIALS CONCERNED AND COUNTERPART PERSONNELS
- ATTACHMENT – V COUNTRY DATA
- ATTACHMENT – VI MINUTES OF DISCUSSION

ATTACHMENT - I

MEMBER OF BASIC DESIGN SURVEY TEAM

Masanori FURUYA	Team Leader, Grant Aid Division, Bureau of Economic Cooperation, Ministry of Foreign Affairs
Masayuki WADA	Senior Hydrogeologist, Groundwater Development Plan Professional Officer, Resources Division, Planning Department, Agricultural Structure Improvement Bureau, Ministry of Agriculture, Forestry and Fisheries
Ryuji MATSUNAGA	Coordinator, First Basic Design Study Division, Grant Aid Planning and Survey Department, Japan International Cooperation Agency
Yoshimitsu MASE	Irrigation and Drainage Engineer, Irrigation and Drainage Department, Nippon Koei Co.,Ltd.
Tadao SUZUMURA	Hydrogeologist-A, Investigation and Planning Department, Nippon Koei Co.,Ltd.
Fumio NAKATA	Hydrogeologist-B, Investigation and Planning Department, Nippon Koei Co.,Ltd.
Soichiro YUMOTO	Irrigation and Drainage Design Engineer-A, Irrigation and Drainage Department, Nippon Koei Co.,Ltd.
Kazuyuki SHIMAZAKI	Irrigation and Drainage Design Engineer-B, Irrigation and Drainage Department, Nippon Koei Co.,Ltd.
Osamu NAGATA	Drilling Expert, Irrigation and Drainage Department, Nippon Koei Co.,Ltd.

MEMBER OF EXPLANATION MISSION OF DRAFT FINAL REPORT

Masanori FURUYA	Team Leader, Grant Aid Division, Bureau of Economic Cooperation, Ministry of Foreign Affairs
Ryuji MATSUNAGA	Coordinator, First Basic Design Study Division, Grant Aid Planning and Survey Department, Japan International Cooperation Agency
Yoshimitsu MASE	Irrigation and Drainage Engineer, Irrigation and Drainage Department, Nippon Koei Co.,Ltd.
Soichiro YUMOTO	Irrigation and Drainage Design Engineer, Irrigation and Drainage Department, Nippon Koei Co.,Ltd.

ITINERARY OF STUDY TEAM

(From January 7 to March 10, 1987)

No.	Date	Description
1.	Jan. 7 (Wed.)	Departure from Tokyo for Bangkok (Messrs. Matsunaga, Mase, Suzumura, Nakata, Yumoto, Shimazaki and Nagata)
2.	Jan. 8 (Thu.)	Departure from Bangkok and arrival at Kathmandu Courtesy call to Embassy of Japan and JICA Nepal Office
3.	Jan. 9 (Fri.)	Courtesy call to Ministry of Foreign Affairs, Ministry of Finance, Ministry of Agriculture (Messrs. Matsunaga, Mase and Yumoto)
4.	Jan. 10 (Sat.)	Preparation for site reconnaissance.
5.	Jan. 11 (Sun.)	Departure from Kathmandu for Janakpur
6.	Jan. 12 (Mon.)	Courtesy call to TIATSP Discussion and field reconnaissance
7.	Jan. 13 (Tue.)	Departure from Janakpur (Messrs. Matsunaga and Mase) Field survey and investigation (Others)
8.	Jan. 14 (Wed.)	Courtesy call to Ministry of Agriculture and Discussion (Messrs. Matsunaga and Mase), Selection of test drilling points and topographic survey area (Others)
9.	Jan. 15 (Thu.)	Departure from Kathmandu to Tokyo via Bangkok (Mr. Matsunaga) Discussion at JICA Nepal Office (Mr. Mase) Field survey and investigation (Others)
10.	Jan. 16 (Fri.)	Departure from Kathmandu to Janakpur (Mr. Mase) Field survey and investigation (Others)
11.	Jan. 17 (Sat.)	Field survey and investigation
12.	Jan. 18 (Sun.)	Discussion with TIATSP (Mr. Mase) Field survey and investigation (Others)
13.	Jan. 19 (Mon.)	Field survey and investigation

No.	Date	Description
18.	Jan. 24 (Sat.)	Field survey and investigation Departure from Kathmandu to Janakpur (Mr. Yumoto)
19.	Jan. 25 (Sun.)	Field survey and investigation
20.	Jan. 26 (Mon.)	Field survey and investigation
		}
23.	Jan. 29 (Thu.)	Field survey and investigation
24.	Jan. 30 (Fri.)	Departure from Kathmandu to Janakpur (Mr. Yumoto) Field survey and investigation
25.	Jan. 31 (Sat.)	Field survey and investigation
		}
36.	Feb. 11 (Wed.)	Field survey and investigation
37.	Feb. 12 (Thu.)	Departure from Janakpur to Kathmandu (Mr. Mase) Discussion about pump-up test (Mr. Suzumura) Field survey and investigation
38.	Feb. 13 (Fri.)	Field survey and investigation
39.	Feb. 14 (Sat.)	Preparation of interim report (Mr. Mase) Field survey and investigation (Others)
40.	Feb. 15 (Sun.)	Departure from Kathmandu to Janakpur (Mr. Mase) Field survey and investigation
41.	Feb. 16 (Mon.)	Field survey and investigation
		}
49.	Feb. 24 (Tue.)	Field survey and investigation
50.	Feb. 25 (Wed.)	Field survey and investigation Preparation of minutes of discussion (Mr. Mase) Departure from Tokyo to Bangkok (Messrs. Furuya and Wada)

No.	Date	Description
51.	Feb. 26 (Thu.)	Field survey and investigation Preparation of minutes of discussion (Mr. Mase) Departure from Bangkok to Kathmandu (Messrs. Furuya and Wada)
52.	Feb. 27 (Fri.)	Field survey and investigation
53.	Feb. 28 (Sat.)	Field survey and investigation Departure from Kathmandu from Janakpur (Messrs. Furuya and Wada)
54.	Mar. 1 (Sun.)	Discussion with TIATSP
55.	Mar. 2 (Mon.)	Discussion with TIATSP
56.	Mar. 3 (Tue.)	Departure from Janakpur to Kathmandu
57.	Mar. 4 (Wed.)	Discussion with Ministry of Agriculture
58.	Mar. 5 (Thu.)	Discussion with Ministry of Agriculture (Mr. Mase)
59.	Mar. 6 (Fri.)	Departure from Bangkok to Tokyo
60.	Mar. 7 (Sat.)	Discussion with Ministry of Agriculture (Mr. Mase)
61.	Mar. 8 (Sun.)	Discussion with Ministry of Agriculture (Mr. Mase)
62.	Mar. 9 (Mon.)	Departure from Kathmandu to Bangkok (Mr. Mase)
63.	Mar. 10 (Tue.)	Departure from Bangkok to Tokyo (Mr. Mase)

ITINERARY OF EXPLANATION MISSION

(From May 29 to June 5, 1987)

No.	Date	Description
1.	May 29 (Fri.)	Departure from Tokyo for Bangkok
2.	May 30 (Sat.)	Arrival at Kathmandu Courtesy call to Japanese Ambassador
3.	May 31 (Sun.)	Courtesy call to Ministry of Agriculture
4.	Jun. 1 (Mon.)	Explanation and discussion on the draft final report at Department of Agriculture
5.	Jun. 2 (Tue.)	
6.	Jun. 3 (Wed.)	Signing of the minutes of discussion at Ministry of Agriculture
7.	Jun. 4 (Thu.)	Departure from Kathmandu for Bangkok
8.	Jun. 5 (Fri.)	Arrival at Tokyo

LIST OF COLLECTED DATA AND REPORTS

1. Maps

- (1) Base Map Derived from Landsat Imagery,
Scale : 1/500,000, 2 sheets
- (2) Topographic Map, Scale : 1/50,000, 10 sheets
- (3) Land Utilization Map, Scale : 1/50,000, 12 sheets
- (4) Land Capability Map, Scale : 1/50,000, 12 sheets
- (5) Land System Map, Scale : 1/50,000, 12 sheets
- (6) Topographic Map, Scale : 1/1,000,000, 1 sheet

2. Data and Reports on Statistics and National Development Plan, etc.

- (1) Population Census - 1981, 10 Volumes
- (2) Nepal District Profiles
- (3) Nepal in Figures
- (4) Basic Principles of National Accounts
- (5) A Comparative Study of the National Sample Census of Agriculture of Nepal
- (6) Food Statistics of Nepal, 1981
- (7) Quarterly Economic Bulletin, Nepal
- (8) National Sample Census of Agriculture, 1981/82, Nepal
- (9) Main Economic Indicators (Monthly Report), August, 1986
- (10) Handbook of Agricultural Statistics of Nepal
- (11) Agricultural Statistics of Nepal, 1983
- (12) Agricultural Marketing Information Bulletin, Aug. ~ Sept., 1986
- (13) Agricultural Marketing Information Bulletin, Apr. ~ May, 1986
- (14) Agricultural Marketing Information Bulletin, 2042
- (15) Area, Population and Yield Rate of Cash Crops (1985/86)
- (16) Price Index of Danusha District
- (17) Balance of National Account from 1974 to 1985
- (18) The Seventh Five Year Plan (1985/86 - 1989/90)
- (19) Foreign Aid and Development in Nepal
- (20) Rice in Nepal

- (21) Nepal's Fiscal Issues
- (22) Organization Chart of HMGN
- (23) Statistical Pocket Book, Nepal, 1986

3. Hydrological Data

(1) Daily Rainfall

- Janakpur Airport (1111) : 1969 ~ 1984
- Hardinath (1114) : 1968 ~ 1982

(2) Monthly Meteorological Data (Hardinath)

- Temperature : 1971 ~ 1982
- Humidity : 1971 ~ 1982
- Evaporation : 1972 ~ 1983
- Wind Velocity : 1972 ~ 1983
- Sunshine Hours : 1972 ~ 1983

4. Progress Reports of JADP

No.1	November 1977
No.6	May 1982
No.7	March 1983
No.8	March 1984
No.9	August 1985
No.10	March 1986

5. Data and Records on Groundwater Development (Drilling Logs, Pump - up Test Results)

- (1) Mahottari District Groundwater Irrigation Project (DIHM) for about 20 sites
- (2) JADP for about 6 sites

6. Cadastral Maps (Scale : 1/2,400)

The cadastral maps of about 1,350 sheets were collected at site for the 30 development blocks requested by HMGN as listed below.

No	Danusha District		Mahottari District		Sarlahi District	
	Panchayat	Sheets	Panchayat	Sheets	Panchayat	Sheets
1	MANSING PATTI	10	MADAIGRA PATTI	9	HARIPUR	24
2	GHORGAS	10	RATAULIGOHI	13	BRAMHAPURI	19
3	MAHOWA	12	ITAHARWA	9	ATRAULI	38
4	BENGA SHIBAPUR	14	BANAULI	10	NETRAGANJ	3
5	BASAHYA	11	SARPALLO	14	HARIWAN	87
6	BENGADAWAR	29	VATAULIYA	9	BABARGANJ	18
7	MAKHANAHA	12	SAHASAULA	15	MALANGWA	12
8	BHUCHAKRAPUR	25	GONARPURA	10	B E N G I	16
9	TEJNAGAR	27	SANDHA	10	BISHNUPUR	25
10	LOHANA	12	EKADARA BELA	13	BELA	28
11	KUWARAMPUR	15	SISBA KATAIYA	10	CHANDRANAGAR	10
12	DEOPURA	13	MANARA KATTI	9	PARSA	
13	DANUSHA	15	MAJHAURA	11	PACHHAWARI	34
	GHOVINDPUR				ISHWARPUR	15
14	YANGYABHUMI	32	MANARA	16	BHELI	
15	KAPILESHWAR	9	POKHARVINDA	9		
16	KANAKPATTI	11	KISANNAGAR	23		
17	PUSPBALPUR	16	KHUTAPIPARADHI	26		
18	BATESHAWAR	13	BAHADURGANJ(No.1)	26		
19	SHANTIPUR	12	BANAUTA	20		
20	BHARATPUR	37	VAMARAPURA	24		
21	LBATOLEE	30	SONAUL	10		
22	HARIHARPUR	26	PIPRA KABIRGAMA	16		
23			BALWA	20		
24			DHIRAPUR	17		
25			EKARAHYA	11		
26			KOLHVAA BAGIYA	9		
27			GADHBHETAPUR	9		
28			PDAUL TILGADA	10		
29			MAHOTTARI	14		
30			SAHODAINA	16		
31			BADIYA BANCHAURI	12		
32			DAMHI MAHESPUR	10		
33			BAHADURGANG(No.5)	17		
34			BAHADURGANG(No.3)	21		
35			BAHADURGANG(No.15)	29		
36			LAXMINIYA BAIRGIYA	17		
37			BIGALPURA	21		
38			SHIB BHAKTI KHOR	18		
39			BHARATPUR KHOR	33		
40			NOKAILWA	35		
T o - tal	22 Panchayat	391 Sheets	40 Panchayat	631 Sheets	13 Panchayat	329 Sheets

OFFICIALS CONCERNED AND COUNTERPART PERSONNELS

1. Officials Concerned

Mr. K. B. Shrestha	:	Joint Secretary, Ministry of Foreign Affairs
Mr. P. P. Dahal	:	Joint Secretary, Ministry of Finance
Mr. A. N. Rana	:	Secretary, Ministry of Agriculture
Mr. R. B. Singh	:	Joint Secretary, Ministry of Agriculture
Mr. P. P. Gorkhali	:	Director General, Department of Agriculture
Mr. S. N. Regmi	:	Deputy Director General, Department of Agriculture
Mr. M. M. Shrestha	:	Chief of Farm Irrigation and Water Utilization Section, Department of Agriculture
Mr. K. Kaneko	:	Ambassador Extraordinary and Plenipotentiary, Embassy of Japan
Mr. R. Izawa	:	Counsellor, Embassy of Japan
Mr. T. Hashimoto	:	Third Secretary, Embassy of Japan

2. Counterpart Personnels

Mr. B. B. Shah	:	Project Manager, TIATSP
Mr. R. P. Upadhyaya	:	Irrigation Engineer, TIATSP
Mr. R. P. Singh	:	Construction Engineer, TIATSP
Mr. T. B. Thapa	:	Agricultural Development Officer, TIATSP
Mr. B. B. Mukhiya	:	Senior Drilling Technician, TIATSP
Mr. A. Mahato	:	Junior Agricultural Technician, TIATSP
Mr. D. N. Yadav	:	Junior Technician, TIATSP

COUNTRY DATA

I. Basic Index

1. Name of country : Kingdom of Nepal
- Capital of country : Kathmandu
- Population of capital : 235,000 (in 1981)

2. Land and population (in 1981)
 - Area : 147,200 km²
 - Population : 15,022,839
 - Density of population : 102 persons/km²
 - Growth rate of population : 2.7 %
 - Ratio of urban population : 6.4 %
 - Average span of human life : 48 years

3. Form of government
Panchayat system (No political activity of party is allowed.)

4. Religion
Hinduism (89.5%), Buddhism (5.3%), Islamism (2.7%), others (2.5%)

5. Language
Nepalese (58.4%), Maithili (11.1%), Bhojpuri (7.6%), others (22.9%)

6. Race
 - Parbato (Hindu natives of Nepal) : 49%
 - Madits (Indian Nepalese) : 25%
 - Himarayan natives : 16%
 - Terai natives : 6%
 - Newalese natives, Tibetan natives. : 4%
 - and others

7. Education
 - Adult literacy rate : 28.9% (in 1985)
 - (Total population)
 - Enrollment ratio of : 78.0% (in 1980)
 - primary school

8. Currency and Currency rate
 - Currency : Rupee (NRs.)
 - Currency rate : US\$ 1 = NRs. 21.7 (in 1986/87)

9. Climate and topography

The Kingdom of Nepal is the rectangular-shaped country laying east to west along the southern edge of the Himarayan range, and surrounded by Tibet of China to the north and Indian Asia continental to the other side. The area extends from 26°N to 30°N of latitude and from 80°E to 88°E of longitude, and is 150,000km² equivalent to about 1.9 times of the Hokkaido island. The width of the area from east to west is about 900km and from north to south is about 200km in maximum. The country is located on the southern slope of the Himarayan range and its land elevation varies widely from the Terai plain of about 100m to the mountainous area more than 4,000m in the living area of human beings.

Therefore, the land of the country is divided into six ecological areas considering the above changes in temperature and rainfall from north to south and the change of climate from monsoon in eastern region to dry in western region.

II. Socio-economic Index

1. Gross Domestic Product (GDP) in 1982.

GDP	:	US\$ 2,348,000,000
GDP per capita	:	US\$ 154
Annual growth rate	:	4.4% (1980 - 1985)

2. Structure of GDP

Agriculture, forestry and fishery	:	55.5%
Industry	:	3.9%
Services	:	40.6%

3. Composition of official export

(Unit : 10⁶ NRs.)

Items	1981/82	1982/83	1983/84	1984/85
1. Food and live animals	735.9	327.7	584.1	992.1
2. Tobacco and beverages	18.5	13.3	5.3	5.0
3. Crude materials, inedibles except fuels	397.3	336.4	372.7	486.8
4. Mineral fuel and lubricants	1.0	0.7	3.3	1.0
5. Animal and vegetable oils and fats	44.0	42.2	67.6	57.1

Items	1981/82	1982/83	1983/84	1984/85
6. Chemicals and drugs	1.5	1.8	6.3	1.2
7. Manufactured goods classified chiefly by materials	225.4	357.3	581.6	649.1
8. Machinery and transport equipment	9.1	7.9	24.4	33.7
9. Miscellaneous manufactured articles	55.1	44.6	57.7	513.4
10. Commodity & transactions not classified according to land	0.8	0.1	0.8	1.2
Total	1,491.5	1,132.0	1,703.9	2,740.6

Source : Statistical Pocket Book, Nepal, 1986

4. Composition of official import

(Unit : 10⁶ NRs.)

Items	1981/82	1982/83	1983/84	1984/85
1. Food and live animals	619.2	924.7	728.4	782.9
2. Tobacco and beverages	35.6	62.5	71.8	79.4
3. Crude materials, inedibles except fuels	142.6	206.3	266.2	424.5
4. Mineral fuel and lubricants	579.3	701.9	749.2	918.8
5. Animal and vegetable oils and fats	64.3	66.3	78.5	122.7
6. Chemicals and drugs	599.2	646.0	698.4	908.0
7. Manufactured goods classified chiefly by materials	555.5	1,936.8	1,801.9	2,376.9
8. Machinery and transport equipment	892.0	1,181.0	1,651.2	1,671.4

Items	1981/82	1982/83	1983/84	1984/85
9. Miscellaneous manufactured articles	430.2	584.3	466.3	450.6
10. Commodity & transactions not classified according to land	12.3	4.3	2.4	6.9
Total	4,930.2	6,313.9	6,514.4	7,742.1

Source : Statistical Pocket Book, Nepal, 1986

5. Labor force (in 1981)
Labor force : 6,850,000 (Male : 4,480,000)

6. Inflation rate

(Unit : %)					
Year	1980~81	1981~82	1982~83	1983~84	1984~85
Rate	13.4	10.4	14.4	6.2	4.1

Source : Economic Survey, Fiscal Year 1985~86, Ministry of Finance

7. Balance of payments

(Unit : 10 ⁶ NRs.)					
Items	1981/82	1982/83	1983/84	1984/85	
1. Trade balance	-3,542.0	-5,197.0	-4,823.6	-5,060.1	
Exports	1,496.0	1,135.8	1,709.9	2,764.9	
Imports	4,948.0	6,332.8	6,533.5	7,825.0	
2. Services	1,378.0	1,634.9	1,406.8	1,392.0	
3. Unrequited transfers	1,681.7	1,890.7	2,073.4	2,256.5	
4. Current account balance	-392.3	-1,671.4	-1,343.4	-1,411.6	
5. Official capital	774.1	924.4	1,203.5	1,097.3	
6. Miscellaneous capital	119.7	72.0	13.9	-552.4	
7. Changes in reserves	-501.5	-575.0	126.0	866.7	

Source : Statistical Pocket Book, Nepal, 1986

8. International reserves

(Unit : 10⁶ US\$)

Description	1981	1982	1983	1984	1985
1. Gold	6.39	6.39	6.39	6.39	6.39
2. SDRs	0.83	0.51	0.71	0.13	0.05
3. IMF reserve franche position	6.47	6.18	6.05	5.81	5.91
4. Foreign exchange	182.15	219.49	149.95	110.80	64.14
Total	195.84	232.57	163.10	123.13	76.49

Source : Statistical Pocket Book, Nepal, 1986

III. Development Index

1. National development plan

(1) Past national development plan.

His Majesty's Government of Nepal had established and implemented first to sixth five year plans as of 1985 to execute the national development policy putting emphasis on the agricultural development, and to overcome the backwardness by providing nation with sufficient basic requirement and increasing production and employment opportunity.

The achievements and basic development policy of the Sixth Five Year Plan completed in July 1985 are stated below.

Basic development policy

- i) To give priority to the development of the agricultural sector.
- ii) To give emphasis on the development of cottage and small scale industries.
- iii) To encourage the development of export trade and of tourism.
- iv) To encourage the conservation of natural resources and stress on the development of water resources.

v) To give topmost priority to the full utilization of the already created infrastructure.

vi) To improve the absorptive capacity of the economy.

vii) To control population growth rate.

Achievements of the Sixth Five Year Plan

i) Economic growth rate.

(Unit : %)

Items	Agriculture sector	Non-agriculture sector	Gross domestic Product	Per capita income
Fifth Plan Period(1975-80)	-1.10	7.30	2.30	-0.40
Base Year 1979/80	-4.80	1.40	-2.30	-5.00
Sixth Plan Target	3.20	5.60	4.30	2.00
<u>Achievements</u>	<u>4.70</u>	<u>4.00</u>	<u>4.40</u>	<u>1.70</u>

ii) GDP (at current prices)

(Unit : 10⁹NRs.)

Description	1980/81	1984/85
Gross national product	27,307	42,138
Agriculture sector	15,679	22,075
Non-agriculture sector	11,628	20,063

iii) Production of major agricultural crops.

(Unit : %)

Description	Foodgrains	Cash Crops	All Major Crops
Fifth Plan Period(1975-80)	-2.80	1.60	-2.00
Base Year 1979/80	-2.90	-8.20	-2.10
Sixth Plan Target	2.80	3.90	3.00
<u>Achievements</u>	<u>6.20</u>	<u>4.30</u>	<u>5.90</u>

iv) Production index of major crops

(Base year : 1972/73 = 100)

Items	Weight	1980/81	1983/84
<u>Foodgrains</u>	<u>83.72</u>	<u>102.63</u>	<u>115.45</u>
Paddy	43.02	100.49	112.42
Maize	20.93	89.87	92.07
Wheat	11.63	144.25	191.56
Millet	6.98	86.88	82.15
Barley	1.16	89.96	87.00
<u>Cash Crops</u>	<u>16.28</u>	<u>114.22</u>	<u>118.51</u>
Sugarcane	1.16	192.26	202.47
Oilseeds	4.65	117.14	111.08
Tobacco	1.16	114.59	143.60
Jute	2.33	143.37	60.58
Potato	6.98	89.49	124.51
All major agricultural crops	100.00	104.52	115.95

v) Production index of principal industries.

(Base year : 1974/75 = 100)

Items	Weight	1980/81	1983/84
1. Jute goods	21.51	132.60	173.84
2. Sugar	16.39	100.79	146.70
3. Tobacco	14.23	60.35	123.63
4. Matches	2.12	96.46	169.03
5. Liquor	2.10	351.79	382.14
6. Soap	1.20	295.29	625.70

(Base year : 1974/75=100)

Items	Weight	1980/81	1983/84
7. Shoes	3.44	116.85	112.33
8. Leather	5.44	289.25	373.03
9. Agriculture tools	0.68	28.67	183.33
10. Tea	1.37	210.63	391.34
11. Stainless steel utensils	3.68	301.28	408.97
12. Brick and Tiles	4.49	100.26	116.36
13. Beer	1.82	212.06	447.97
14. Cotton Textiles	8.80	126.60	239.45
15. Cement	7.36	120.02	145.64
16. Biscuits	2.14	278.70	579.53
17. Plywood	0.34	683.53	260.96
18. Synthetic Textiles	2.89	206.47	318.88
All principal industries	100.00	143.12	211.63

vi) Development expenditure

(Unit: 10⁹ NRs.)

Items	Target of the Sixth Plan		Progress of the Sixth Plan at constant prices		Achievement in percentage at constant prices
	Amount	Percent	Amount	Percent	
Agriculture, Irrigation and Forest	660.00	30.4	435.35	27.9	66.6
Industry, Mining & Electricity	560.00	25.8	337.96	21.7	60.4
Transport and Communication	423.00	19.4	300.90	19.3	71.1
Social Services	516.00	23.7	443.68	29.5	86.0
Miscellaneous	16.00	0.7	40.39	2.6	52.4
Total	2175.00	100.0	1558.28	100.0	71.6

vii) Financial target and achievement of the Sixth Plan.

(Unit: 10⁹ NRs.)

Description	Target of the Sixth Plan 1979/80 constant prices	Achievement of the Sixth Plan 1979/80 constant prices	Achievement in percent (constant prices)
Development expenditure	21.7500	15.5828	71.6
Sources for financing			
Internal Resources	8.4900	7.6580	90.2
a) Savings	6.1600	3.5810	58.1
i) Revenue	13.9300	10.8594	78.0
ii) Regular expenditure	7.7700	7.2784	93.7
b) Deficit Finance	2.3300	4.0770	175.0
i) Internal loan(gross)	1.9800	4.0376	203.9
ii) Others	0.3500	0.0394	12.6
Foregin aid	13.2600	7.9248	59.8
a) Foregin grants	6.7900	7.9804	58.6
b) Foregin loans (gross)	6.4700	3.9444	61.0
Contribution of the foreign aid in total development expenditure (in percentage)	61.0	50.9	
Share of the deficit finance in internal resources (in percentage)	27.5	53.8	

viii) Foreign aid (at current prices)

(Unit : 10⁶NRs.)

Fiscal year	Grant	Loan	Total
1980/81	868.90	693.30	1,562.20
1981/82	993.30	729.90	1,723.20
1982/83	1,090.10	985.70	2,075.80
1983/84	1,145.90	1,373.90	2,519.80

(Unit : 10⁶NRs)

Fiscal year	Grant	Loan	Total
1984/85	1,470.00	1,880.00	3,350.00
Total	5,568.20	5,662.80	11,231.00

(2) Current national development plan.

The objectives and the basic development strategies set force in the Seventh Five Year Plan (1985/86~1989/90) are stated below.

Objectives

- i) To increase at a higher rate the production of agriculture and forestry, the power development, the small and cottage industries for export, and the tourism development on a large scale.
- ii) To increase opportunity for productive employment by the above item i).
- iii) To fulfil the minimum basic need of the people such as food grain, clothing, fuelwood, drinking water, primary health care and sanitation, primary and skill-based education, and minimum rural plansport facilities.

Basic development strategies

- i) To accord overall priority to the development of agricultural sector.
- ii) To put stress on the development of forest resources, and the soil conservation.
- iii) To put emphasis on the development of water resources.
- iv) To emphasize the development of industries.
- v) To emphasize the promotion of export trade.
- vi) To emphasize the tourism development.
- vii) To curb the population growth rate.
- viii) To consolidate the foundations of national economic integration.
- ix) To improve the management of the economy by decentralizing dicision-making and execution processes.
- x) To strengthen and consolidate the development administration.

2. National budget

(Unit : 10⁶ NRs.)

Description	1981/82	1982/83	1983/84	1984/85
1) Revenue	<u>3,672.8</u>	<u>3,931.7</u>	<u>4,285.9</u>	<u>5,806.8</u>
Tax Revenue	2,211.3	2,421.1	2,737.0	3,232.8
Non-tax Revenue	468.2	420.5	672.3	957.3
Foreign grant aid	993.3	1,090.1	876.6	1,616.7
2) Expenditure	<u>5,361.3</u>	<u>6,979.2</u>	<u>7,437.3</u>	<u>9,809.2</u>
Regular tax	1,634.4	1,997.1	2,273.5	3,079.2
Development	3,762.9	4,982.1	5,163.8	6,730.0
3) Balance(1-2)	-1,688.5	-3,047.5	-3,151.4	-4,022.4
4) Sources of financing deficit	1,688.5	3,047.5	3,151.4	4,022.4
Foreign loan	566.7	741.4	1,401.1	2,179.7
Reirnbursement	163.2	244.4	269.8	420.0
Internal loan	500.0	1,000.0	1,576.8	1,402.7
Cash balance	458.6	1,061.7	-96.3	-

Source : statistical pocket book, Nepal, 1986

3. Development expenditure

The following tables show the development expenditure in the public sector allocated in Sixth (1980-85) and Seventh (1985-90) Five Year Plan.

(Unit : 10⁶ NRs.)

Title	6th plan	7th plan	
	Amount	Amount	Percent
Agriculture, Irrigation & Forest	<u>6,828.8</u>	<u>8,875.9</u>	<u>30.6</u>
a) Agriculture	3,014.0	3,983.0	13.7
b) Irrigation	2,415.6	3,296.3	11.4
c) Land Reform	↓	27.2	0.0
d) Co-operative	86.8	27.2	0.0
e) Cadastral Survey	199.9	202.4	0.8
f) Forest	↓	1,257.0	4.3
g) Resettlement	1,031.6	41.0	0.2
h) Meteorology	44.7	0.2	

(Unit : 10⁶ NRs.)

Title	6th plan	7th plan	
	Amount	Amount	Percent
Industry, Mining and Power	<u>5,049.8</u>	<u>7,546.5</u>	<u>26.0</u>
a) Industry	↓	208.3	6.9
b) Cottage Industry	↓	399.5	1.4
c) Mining & Geology	1,775.7	128.0	0.4
d) Power and Energy	3,034.1	4,812.7	16.6
e) Commerce	196.5	80.2	0.3
f) Labour	13.6	3.34	0.1
g) Tourism	27.9	4.40	0.3
Transportation and Communications	<u>4,250.2</u>	<u>5,132.5</u>	<u>17.7</u>
a) Transportation	3,885.4	4,594.8	15.8
b) Communications	364.8	537.7	1.9
Social Services	<u>6,498.9</u>	<u>7,329.7</u>	<u>25.3</u>
a) Education & Culture	2,703.1	3,010.2	10.0
b) Health	1,019.6	1,337.0	4.6
c) Drinking Water	891.6	989.0	3.4
d) Panchayat	1,517.9	1,741.2	6.0
e) Housing and Town Planning	↓	158.1	0.5
f) Information and Broadcasting	↓	16.1	0.1
g) Social Welfare	416.7	78.1	0.3
Miscellaneous:	<u>602.0</u>	<u>115.4</u>	<u>0.4</u>
total	23,229.7	29,000.0	100.0

Source : The Seventh Plan (1985-90), National Planning Commission, June, 1985.

MINUTES OF DISCUSSION
ON
THE DRAFT REPORT OF THE BASIC DESIGN STUDY (PHASE I)
FOR
THE TARAI GROUNDWATER DEVELOPMENT PROJECT
IN THE KINGDOM OF NEPAL

The Government of Japan sent through the Japan International Co-operation Agency (JICA), the Basic Design Study Team headed by Mr. Masanori Furuya, an official of Grant Aid Division, Economic Co-operation Bureau, Ministry of Foreign Affairs to the Kingdom of Nepal from May 29 through June 5, 1987 to present and explain the draft report of the Basic Design Study (Phase I) on the Tarai Groundwater Development Project and to discuss about Basic Design Study (Phase 2).

After a series of discussions between the Basic Design Study Team and the authorities concerned of His Majesty's Government of Nepal, both sides confirmed the results attached herewith (See Attachment).

Kathmandu 3rd June 1987.

古谷 昌伯

Masanori FURUYA

Leader of the Basic Design
Study Team

R.B. Singh

R.B. Singh
Joint Secretary
Ministry of Agriculture

ATTACHMENT

1. The Nepal side fully understood the basic design proposal in the Draft Report of Phase I of Tarai Groundwater Development Project.
2. The Nepal side understood that the Basic Design Study-Phase II proposed in the Draft Report would be implemented in case when the execution of the phase II study be approved by the Ministries concerned of the Government of Japan.
3. The final approval for further processing of the Tarai Groundwater Development Project will be given by MOA/HICM only after receiving the report of successful results of proposed 5 test deep tubewells to be executed in Phase II as the Phase I test boring was unsuccessful to give positive results.
4. The Nepal side understood Japan's Grant Aid System and agreed to furnish the proposed survey team of the Basic Design Study-Phase II with the following arrangements, equipment, materials and facilities, provided that the phase II study be executed.

4.1.

To furnish latest data

- Recent results of both deep and shallow tubewell irrigation (irrigation area, cropping pattern, production operation hour of pumps etc.)
- All the data on tubewell drillings and pumping-out tests executed by JADP/TIATSP in the past
- Latest market prices of construction materials

- 4.2. To undertake procedure for and to obtain necessary permissions for entering each development block, drilling test tubewells, executing pumping-out tests at the existing tubewells, carrying out topographic survey, etc. for the field survey period.

M. J.

O.V.

4.3. To provide the survey team with the following counterparts throughout the field survey period.

- Irrigation Engineer	1 Person
- Agronomist	1 person
- Hydrogeologist	1 person
- Deep Tubewell Drilling Expert	1 person
- Deep Tubewell Drilling Operator	6 persons
- Deep Tubewell Drilling Assistant Operator	6 persons
- Surveyor	2 persons

5. Five deep tubewell test boring will be conducted in the following five blocks: D 7; M 4; S 1; S 4 and S 7. But in those Block where TIATSP has already completed the test drilling, only topography survey will be conducted in block S-1 and D-15.

6. All test deep tubewells after their successful results would also be counted as production well for use by the farmers. The design of the irrigation canal would be finalised only after verifying the discharge rate^{of} each test deep tubewell or production well.

7. To provide free of charge the survey team with the following major equipment and materials necessary for the drilling of 5 test tubewells, the pumping-out test of 20 existing tubewells, the hydrogeological survey and the electric sounding. However, any equipment, spareparts and materials that may be in short supply in TIATSP stock, such equipment, spareparts and materials will be sent by GOJ as mentioned in the draft report of the Basic Design Study Survey Team Phase I.

- Drilling rig (YRD-501R, TRD-500)	more than 3 units
- Mud pump	more than 3 units
- Tri-core bit (12½")	10 nos.
- Drilling rod	600 m
- Drilling tool	1 set
- Casting pipes	
20" conductor pipe (L = 3 m)	30 m
8" casing pipe (L = 6 m)	352 m

Q. M.P.

- Johnson screen (8", L = 3,25 m)	128.25 m
- Air compressor	more than 5 units
- Lifting pipe and air pipe for cleaning tubewell	
4"	170.5 m
1"	55 m
- Submersible motor pump for pumping-out test	
outer dia. 5", 45 l/ sec, 75 m head	2 units
outer dia. 6", 45 l/ sec, 35 m head	1 unit
- Diesel engine generator	5 units
- Triangular notch tank (2.5 m ³)	1 no.
- Portable diesel tank, (2 m ³ , steel plate)	3 nos.
- Gas welder	1 set
- Mud balance and viscosimeter	2 units
- DC engine welder	2 units
- Vehicles	
4t-cargo truck with 3t crane (with a driver)	5 units
fuel tank lorry (4,000 , with a driver)	1 unit
water tank lorry (4,000 , with a driver)	2 units
3.5t dump truck (with a driver)	2 units
wagon type jeep (with a driver)	3 units
- Spare parts of mud pump, etc.	1 lot
- Electric sounding instrument (ES-G2)	2 units
- (with code and electrode)	
- Electric logging instrument, Geologger 300	1 unit
- Groundwater table meter	6 units
- Fuel, lubricant and DSA of drivers engaged will be born by the Survey Team.	

8. Equipment and materials to be provided by TIATSP will be free of any charge and the Survey Team Phase II will have priority to use them.

V.

M.F.

9. To grant custom exemption for the whole equipment and materials to be imported from Japan for the execution of the basic design study-phase II as mentioned in Page 115 - 119 in the draft report of Phase I.
10. To furnish one office and three lodging houses to the survey team, together with proper accommodation throughout the field survey period.
11. The proposed Basic Design Study Survey Team Phase II if approved by Government of Japan, should come to Nepal to conduct the survey in January/February 1988.

M. P.

V.

