SECTION 6 ESTIMATION OF CONSTRUCTION EXPENSE

SECTION 6 ESTIMATION OF CONSTRUCTION EXPENSE

The necessary total construction expense (excluding expense for incidental construction work) for this project is 1,884 million Yen (102 million Rs).

The items are shown in the Table S7-1 (Summary). The estimation of the expenses is made on the following conditions in preparing the budget.

(1) Considering the project will be taken effect in 1980, the expense was derived by increasing the expense for September 1979 by 7 %.

(2) The cost of equipment and construction material are both estimated on the condition of CIF site.

(3) The exchange rate for currency is as follows.

US$1 = ¥220

US$1 = Rs11.9

Rs1 = ¥18.5

(4) The breakdown of the total construction expense into respective items is given below.

1) Expense for equipment and installation work.
615 million Yen (33 million Rs)

2) Construction expense for transmitting station building and transmitting antenna.
1,078 million Yen (58 million Rs)

3) Consultant fee and expense for detail design.
191 million Yen (10 million Rs)

(5) The expense for the following incidental construction work is excluded from the construction expense.

1) Wiring work to the drop point and connection work at drop point. (voltage of drop point is 400V)

2) Water supply work and connection work at supply point.

3) Expense related to acquisition of construction site.

4) Site clearance and levelling.

5) Entrance road.

6) Fence and gate-post.

7) Necessary programme and engineering lines from Kathmandu Studio Centre to Pokhara Transmitting Station. (VHF-STL and engineering link between studio centre and transmitting station in Kathmandu are included in the construction expense.)

8) Drainage, complete sanitation and necessary connection work.

9) Staff quarter at Kathmandu and Pokhara Transmitting Station.

10) Security guards quarter at Kathmandu and Pokhara Transmitting Station.

11) Transport vehicles for operational and maintenance staff at Kathmandu and Pokhara Transmitting Station.

APPENDIX

C O N T E N T S

Appendix 1

17 June, 1979

Mr. Bhogya Prasad Shah,
Acting Director General,
Department of Broadcasting,
Ministry of Communications,
His Majesty's Government of Nepal.

Dear Sir,

Re: Establishment Programme of Medium Wave Broadcasting Network in the Kingdom of Nepal

I have the honour to submit herewith the Interim Report of the Preliminary Design Study on the afore mentioned subject.

Yours faithfully,

Seikichi Sakakibara,
The Leader,
Japanese Study Team.

INTERIM REPORT OF THE PRELIMINARY DESIGN STUDY

ON

THE ESTABLISHMENT PROGRAM OF MEDIUM WAVE BROADCASTING NETWORK

IN

THE KINGDOM OF NEPAL

JUNE 1979

JAPAN INTERNATIONAL COOPERATION AGENCY

CONTENTS

INTRODUCTION

In response to the request of His Majesty's Government of Nepal, the Government of Japan despatched a mission to the Kingdom of Nepal from the 24th of May to the 22nd of June, 1979, for Preliminary design study on the establishment programme of Medium Wave Broadcasting Network in the Kingdom of Nepal. The survey team, with the cooperation of Radio Nepal Staff, carried out the necessary field survey and studies over three weeks to obtain the data to make up a preliminary design report for the establishment programme.

As for the matter of the result of the survey is concerned, according to the Scope of Work for the Preliminary Design Study on the programme, completed in the Draft Final Report, and a team will be despatched to the Kingdom of Nepal for supplementary explanation of the said report.

It is expected that the result of this survey will be useful not only for the establishment programme of the Broadcasting services, but also for the enhancement of friendly cooperation between the Kingdom of Nepal and Japan.

Finally, the members of the survey team wish to express their sincere thanks to the staff of the Department of Broadcasting, Ministry of Communications, and all other organizations concerned for the friendly cooperation they have provided to the Mission.

****

2-1 BASIC PLAN

According to the Objective of Study Which is established in the Scope of Work for Preliminary Design Study on the programme:

1) Transmitter Station of 100 KW with an emergency transmitter is planned in Kathmandu and Pokhara, based upon field measurement survey and other essential survey, for expansion of the Medium Wave Broadcasting Service in Central and Western Development Zone.

As for the Studio facility:

2) A Studio centre of 1000 m^2 class accommodating 5 Studios is planned in Kathmandu to meet increasing demand of broadcasting production capacity. And the Studio Centre will be annexed to the existing Broadcasting House as far as broadcasting operation is concerned.

3) In Pokhara Transmitter Station, a production studio is planned to meet a need of local continuity operation or recording programme.

4) In addition, a Sound O.B.(Out side Broadcasting)Wagon is planned for a demand of O.B. recording programme covering Far Western Development Zone.

5) A STL and Engineering link is planned with UHF & VHF facility between studio center and transmitter station in Kathmandu because the site of transmitter lies on suburb of Kathmandu, and of the length of the span between them.

2-2 FACILITY PLAN

The plan of each complex is listed as follows, which is classified in group:

(1) KATHMANDU TRANSMITTER STATION

NO:	DESCRIPTION	QUANTITY
(1-1)	1. Transmitter 100KW	1
	2. Transmitter (Stand-by) 10KW	1
(1-2)	Attached Equipment	1 set.
(1-3)	Antenna (100 m Guyed Mast)	1
(1-4)	Power supply Equipment & Engine Generator (35KVA)	1 set.
(1-5)	STL (UHF Multiplex & VHF Engineering Link)	1 set.
(1-6)	-	-
(1-7)	Measuring Equipment & Tool	1 set.
(1-8)	Installation Material	1 set.
(1-9)	Spare Parts	1 set.
(1-10)	Building 600 Sq.m class.	1

(2) POKHARA TRANSMITTER STATION

NO:	DESCRIPTION	QUANTITY
(2-1)	1. Transmitter 100KW	1
	2. Transmitter (stand-by) 10KW	1
(2-2)	Attached Equipment	1 set
(2-3)	Antenna (100 m Guyed Mast)	1
(2-4)	Power Supply Equipment & Engine Generator (35 KVA)	1 set
(2-5)	-	-
(2-6)	Studio Facility	1 set
(2-7)	Measuring Equipment & Tool	1 set
(2-8)	Installation Material	1 set
(2-9)	Spare Parts	1 set
(2-10)	Building 600 Sq.m class	1
(2-11)	O.B. Van	1 set

(3) KATHMANDU STUDIO CENTRE

NO:	DESCRIPTION	QUANTITY
(3-1)	Master Control Facility (with X-tal Clock System & Continuity Production Facility)	1 set
(3-2)	Stuido Control Facility	4 set
(3-3)	Power Supply Equipment & Engine Generator (50 KVA Effective)	1 set
(3-4)	Measuring Equipment & Tool	1 set
(3-5)	Installation Material	1 set
(3-6)	Spare Parts	1 set
(3-7)	Building 1000 sq.m class.	1

2-3 BUILDING PLAN

2-3.1 Fundamental Design Concept

a. The basic building plan of the Studio Centre and the Transmitter Stations are based upon the result of the survey.

b. The plan of Preliminary Design will be completed according to the basic building plan. However, should modification and/or ammendments take place by Engineering design and/or by the arrangement of equipment, except considerable modifications in floor area and/or number of rooms.

c. Furniture for the above mentioned building will not be included in the drawing of preliminary design.

2-3.2 Site Plan ' Survey Map

As for the plan concerned, refer to attached drawings (Fig. 1 - Fig. 6). The site area shown on the Survey Maps occupy minimum area for the purpose.

2-3.3 Floor Plan

As for the plan concerned, refer to attached drawings (Fig. 7 - Fig. 9). The Studio Centre and Transmitter Stations are designed one-storied building.

2-3-4 STRUCTURE PLAN

1. Applied Standards

a. A.I.J.* Standards of reingforced concrete Structures.
b. A.I.J. Standards of Steel structures.
c. A.I.J. Standards of foundation structures.
d. J.I.S.**
e. Other applicable Japanese standards.

* A.I.J. (Architectural Institute of Japan)
** J.I.S. (Japan Industrial Standards)

2. Type of Structure

a. Building.
Frame, roof and floor slab, foundation and quake resisting wall will be of reinforced concrete structure.

b. Tower. (Guy Type)
Mast and Guy will be of steel. Foundation will be of reinforced concrete structure.

3. Allowable Soil Bearing Capacity

Allowable soil bearing capacity will be decided according to the result of soil investigation or other data.

2-3-5 Finishing

The material of all external and internal finish will be selected on the point of functional and economical.

Special acoustic treatment is required in every Studio and Control Room.

2-3.6 BUILDING EQUIPMENT PLAN

1. Airconditioning, Heating & Ventilation

The airconditioning system will be provided for Musical Studio and Master Control Room. The mechanical ventilation and heating system will be installed for other various rooms.
The heating source will be supplied by electricity.

2. Plumbing

Water will be supplied by city-water. Sewage pipe will be connected to a septic-tank, and after it is purified, water will be lead to existing drain -gutter with another drainage pipe.

Fire hydrant equipment will be provided too.

3. Power Arrangement

The following equipment will be provided:

a. Lighting and Plug socket system.

b. Motor power distribution system.

c. Earthing and Lightning Conductor system.

d. Alarm system.

e. Main line conduit works for Broadcasting.

f. Conduit works for telephone system.

g. Conduit and wiring works for clock system.

h. Installation of various broadcasting boards.

2-4 SERVICE AREA ESTIMATION

To estimate service area in case that 100 KW transmitting station were established in Kathmandu and Pokhara, the field strength of existing Kathmandu Station (FC = 792 KHz, Po = 100KW) was measured in Southern Terrai District and on the way to Pokhara at several points. The field strength was calculated based upon Ground Conductivity which was estimated by Mr. Hendriks, I.T.U. Expert and the data which was the result of measurement done by the Study Mission.

Table 1 shows the result of the field strength measurement of existing Kathmandu Station.

Ground Conductivity of 3 sites was measured in proposed Kathmandu, Pokhara Transmitter Station. The summary is shown as follows:

KATHMANDU (Prop. Site)	POKHARA (Prop. Site)	JANAKPUR (JADP)
About $1m^s/m$	About $0.5m^s/m$	About $1.5\ m^s/m$

The result of estimated service area in field strength 1 micro V/m (60 dB/micro V/m is shown on Fig. 10.

TABLE 1

Survey of Field Strength
Kathmandu Station
(792 KHz, 10.0KW)

NUMBER (c.f. map)	PLACE	TIME	FIELD STRENGTH (dB/micro V/m)	REMARKS
1	10km from NAUBISE	D	61	
2	PALUNG	D	63	
3	DAMAN VIEW TOWER	D	70	
4-1	HETAUDA	M	53±5	
4-2	"	D	43 *1	*1 Behind the mountain.
4-3	"	E	55	
4-4	"	N	59±5	
5	ADHABAR	D	44 *2	*2 In the Jungle
6-1	BIRGUNJ	E	57	
6-2	"	N	59	
7	BAGMATI RIVER	D	53	
8-1	MAHUWA (JADP)	D	50	
8-2	"	E	48±5	
9	JANAKPUR	D	51	
10	NAUBISE	D	80	
11	SIMPANI	D	62	
12	BENIGHAT	D	55	
13	KURINGHAT	D	51	
14	POKHARA	E	45±5	

* Symbols are as follows:

M : Morning Time.
D : Day Time.
E : Evening Time.
N : Night Time.

2-5 CONSTRUCTION SCHEDULE

The construction schedule is attached herewith.
The total construction period is estimated 24 months from the date of Contract on the programe.

TABLE 2

CONSTRUCTION SCHEDUL

PROJECT \ MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. KATHMANDU STUDIO CENTER						MANUFACTURE										TRANSPORTATION					TEST TRANSMISSION				
1 EQUIPMENT																						INSTALLATION			
2 BUILDING		TRANSPORTATION											CONSTRUCTION												
2. KATHMANDU TRANSMITTER STATION						MANUFACTURE										TRANSPORTATION					TEST TRANSMISSION				
1 EQUIPMENT																						INSTALLATION			
2 BUILDING		TRANSPORTATION														CONSTRUCTION									
3 ANTENNA		MANUFACTURE				TRANSPORTATION							CONSTRUCTION												
4 ANTENNA FOUNDATION		MANUFACTURE				TRANSPORTATION							CONSTRUCTION												
3. POKHARA TRANSMITTER STATION									MANUFACTURE							TRANSPORTATION					TEST TRANSMISSION				
1 EQUIPMENT																						INSTALLATION			
2 BUILDING			TRANSPORTATION													CONSTRUCTION									
3 ANTENNA		MANUFACTURE						TRANSPORTATION					CONSTRUCTION												
4 ANTENNA FOUNDATION		MANUFACTURE				TRANSPORTATION							CONSTRUCTION												

2-6 Personnel Plan and Training Program.

2-6-1 Personnel Plan

Requested Staff Organization Chart to cope with the expansion of the broadcasting service, due to the construction project, a tentative plan is proposed from Radio Nepal, which is listed as follows:

(1) New Studio Complex Grand total 63

Engineer (in-charge) 1

(1-1) Operation Group Total 40

	M.	D.	N.	Sub total
1) Assistant Engineer (one per shift)	1	1	1	3
2) Supervisors	1	1	1	3
3) Technical Assistant	5	5	5	15
4) Junior Tech. Asst.	4	4	4	12
5) Mechanics	1	1	1	3
6) Peon	1	2	1	4

(1-2) Maintenance & O.B. Group Total 22

1) Asst. Engineer	2
2) Technical Assistants	10
3) Junior Tech. Assistants	6
4) Mechanics	2
5) Peon	2

(2) Pokhara Studio Grand Total 16

(2-1) Operation Group Total 9

	M.	D.	N.	Sub Total
1) Shift Supervisor (Technician)	1	1	1	3
2) Tech. Assistant	1	1	1	3
3) Junior Tech. Assistants	1	1	1	3

(2-2) Maintenance & O.B. Group Total 7

1) Asst. Engineer (Studio Maintenance)	1
2) Tech. Asst.	2
3) Junior Tech. Asst.	2
4) Mechanics	2

(3) M.W. Transmitter Station Kathmandu/Pokhara Grand Total 123 Engineer (in-charge)

Each Station Total 61

(3-1) Operation Group Total 24

	M.	D.	N.	Sub total
1) Shift Engineer	1	1	1	3
2) Shift Supervisor (Technician)	1	1	1	3
3) Tech. Assistant	2	2	2	6
4) Junior Tech. Asst.	2	2	2	6
5) Mech. J.T.A.	1	1	1	3
6) Mechanics	1	1	1	3

(3-2) Maintenance Group Total 18

1) Asst. Engineer (Maintenance)	1
2) Tech. Asst. (Radio)	3
3) Tech. Asst. (Electrical)	2
4) Tech. Asst. (Mechanical)	2
5) Junior Tech. Asst.	4
6) Mech. J.T.A.	2
7) Mechanics	4

(3-3) Tech. Administration Group Total 19

1) Senior Clerk (NASU) (Administration)	1
2) Senior Clerk (NASU) (Stores)	1
3) Junior Clerk (Administration)	2
4) Junior Clerk (Stores)	4
5) Typist	2
6) Driver	1
7) Gardener	2
8) Peon	6

Grand Total of the Staff - 202

2-6-2 Traning Program.

To cope with the expansion of the broadcasting service, following plan was proposed from Radio Nepal:

1) Pre-Installation Training

	Studio Center	Kathmandu TX	Pokhara TX	Concurrent	Total
1) Engineer	2	2	2	2	8
2) Techincian	3	1	6		9

(2) Post - installation training (each year for 5 consecutive years)

1) Engineer 2
2) Techiician 4

(30) Prpgram producer training.

1st year	4
2nd "	2
3rd "	2
4th "	2
5th "	2
Total	12

(4) In - country training.

Expert service will be requested from the Government of Nepal to the Government of Japan. The service will cover the operation, maintenance and planning of the broadcasting system and facilities in addition to the in-country trainings. Terms and conditions are confirmed on the service.

2-7 INFRASTRUCTURE

As for the infrastructure which is required for the programme, fundamentally, construction schedule does not cover its arrangement and budget. However, the capacity of some supply is estimated as follows:

1. Electric Main Supply:

Kathmandu Studio Centre - 150 KVA
Kathmandu Transmitter Station - 600 KVA
Pokhara Transmitter Station - 600KVA

2. City Water Supply: (cf. P.74)

Kathmandu Studio Centre - 10 Ton/day
Kathmandu Transmitter Station - 5 Ton/day
Pokhara Transmitter Station - 5 Ton/day

The following items are to be completed prior to the beginning of the schedule:

1. Each construction site shall be cleared completely.
2. Land leveling of the site.
3. Access road.
4. If necessary, fence around the site and the gate.
5. Electric power supply shall be completed atdrop point (6600V).
6. Necessary telecommunication channels are to be provided to the site.
7. Water supply and incidental drainage arrangement including complete sanitary facility.

APPENDIX 1

The place of the construction site

(1) Kathmandu Transmitter Station (Sainbu)
   1) Location: Lalitpur, Kathmandu
   2) Longitude: 85 degree 18' 30" E
   3) Latitude: 27 degree 39' 10" N
   4) Altitude: 1351 m A.S.L.*

(2) Pokhara Transmitter Station
   1) Location: Male patan, Pokhara
   2) Longitude: 83 degree 59' 00" E
   3) Latitude: 28 degree 13' 10" N
   4) Altitude: 902 m A.S.L.

(3) Kathmandu Studio Centre
   1) Location: Singh Durbar, Kathmandu
   2) Longitude: 85 degree 19' 35" E
   3) Latitude: 27 degree 41' 45" N
   4) Altitude: 1285 m A.S.L.

The above lisbed indication are decided by Radio Nepal, While, altitude of each site is refered to map sheet 10 (Kathmandu) which is a blue print sheet in Radio Nepal, and map sheet 7 (Pokhara) which is a blue print sheet in Department of Housing & physical Planning, H.M.G.

* A.S.L. (Above sea level)

Appendix 2

Appendix 1-2 Record of Discussion

RECORD OF DISCUSSION BETWEEN THE JAPANESE STUDY TEAM AND THE DEPARTMENT OF BROADCASTING HMG OF NEPAL FOR THE PRELIMINARY DESIGN STUDY ON THE ESTABLISHMENT PROGRAMME OF MEDIUM WAVE BROADCASTING NETWORK IN THE KINGDOM OF NEPAL.

Attached herewith is the " Record of discussion " that has been agreed between the Japanese Study Team and the Department of Broadcasting, H. M. G. of Nepal for afore-mentioned subject.

It should be noted that this " Record of Discussion " does not legally bind both Governments.

榊原盛一

Seiichi Sakakibara
The Leader
Japanese Study Team

B. P. Shah

Bhogya Prasad Shah
Acting Director General
Department of Broadcasting
(Radio Nepal)
Ministry of Communications
His Majesty's Government of Nepal.

Kathmandu
Dated the 18th June 1979.

RECORD OF DISCUSSION

Following points were discussed and agreed upon by the Preliminary Design Survey Team (24th May to 22nd June 1979) of the Japan International Co-operation Agency and the Officials of the Department of Broadcasting, His Majesty's Government of Nepal.

1) Based upon Field Measurement Survey, Transmitting Stations of the 100 KW Power each complete with necessary equipments and Building have been planned at Kathmandu and Pokhara with emergency Transmitters of 10 KW power backed up by Engine Generator for expansion of the Medium Wave Broadcasting Service in the Central and Western Development Regions.

2) A studio Centre accomodating 5 studios with all necessary equipments and building has been planned in Kathmandu to meet the increasing demand of broadcasting production capacity. This will also have Standby Engine Generator.

3) In Pokhara Transmitting Station, a production studio has been planned to meet the needs of local continuity operation or recording programme. In addition, a sound outside broadcasting wagon has also been planned for Pokhara station.

4) A studio to transmitter link and engineering link with UHF and VHF facility between Studio Centre and the proposed transmitting station in Kathmandu has been planned.

5) The following requirements of the Department of Broadcasting, HMG of Nepal were taken note of by the Japanese Team : -

   i) Studio complex at seperate location in Pokhara.
   ii) Sound Outside Broadcasting Wagon for Kathmandu Studio Centre.
   iii) Necessary equipment for news monitoring.
   iv) Requirement of station vehicles during and after installation.

6) Personnel Plan and Training Programme to cope with the expansion of the broadcasting services were also discussed. It was agreed that an official request should be made by HMG through proper channels to the Japanese Government for the training of Radio Nepal's technical and production staff in Japan and for the services of an Expert for in-country training as well as to assist the Department in operation, maintenance and planning for a period of 2 years.

7) The total construction period of the project was estimated as 24 months from the date of contract on the programme.

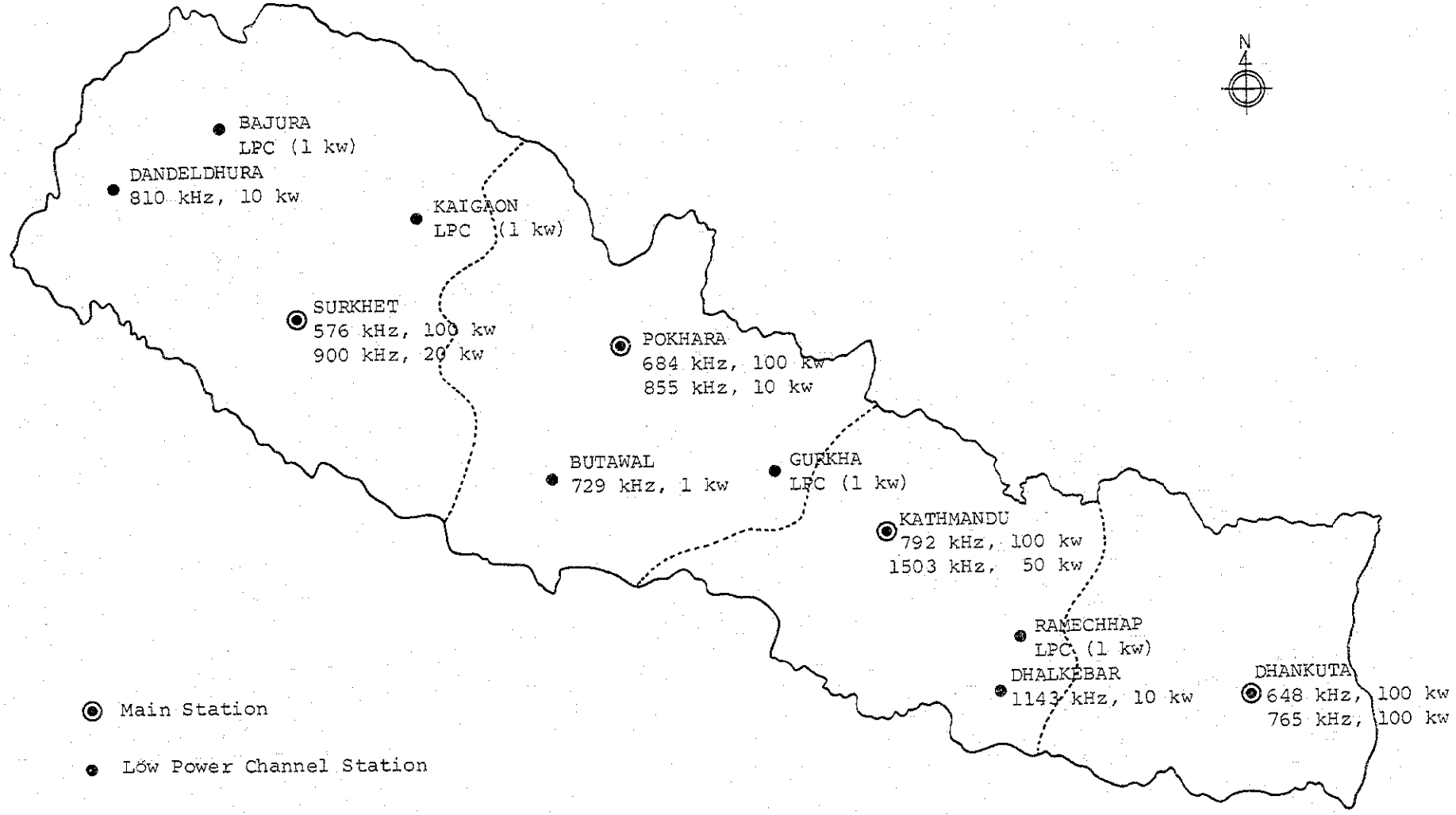
8) As for the infrastructure, which is required for the Programme, the following items are to be completed by HMG Nepal prior to the beginning of the construction schedule :

i) Acquisition of necessary land area at construction sites.
ii) Access Roads.
iii) Site Clearance, levelling and drainage.
iv) Security Fencing and gate.
v) Water supply and facility.
vi) Electric Power Supply at drop point. The drop point should be, according to Japanese Standard, either at 400 V, or 3.3 KV or 6.6 KV but not 11 KV.
vii) Necessary Programme and Engineering Link (including necessary converter equipments) from Kathmandu Studio Centre to Pokhara Transmitting Station shall be arranged and provided.

9) Necessary ancillary equipment, test and measuring equipment, tools and spare parts have been planned for the three stations.

Appendix 1-3 WARC Frequency Assignment

Frequency assignment for the Kingdom of Nepal, is based on the Administrative Conference, Final Act, Additional Document-1.



M/F CHANNEL PLAN

Table A1-3-1

Final Acts of the Regional administrative LF/MF Broadcasting Conference (Regions 1 and 3) Geneva, 1975.
Annex 1, Plan for the Assignment of Frequencies to Broadcasting Stations in the Medium Frequency Bands.
(other than to stations using Low-Power Channels)

	Assigned frequency (kHz)	Name of transmitting station	Country symbol	Geographicl coordinates of of transmitting station	Necessary bandwidth (kHz)	Carrier power (kw)	Authorized radiation		Restrictions on radiation (For directional antennas only)		Antenna		Ground conduc-tivity (mS/m)	Hours of operation (GMT)	Remarks
							Maximum radiation (dB)	Azimuth of maximum radiation	Azimuths defining the sector of limited radiation	Maximum radiation in the sector (dB)	Type	Height (m)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
36	792	KATMANDU	NPL	85E20 27N45	A20	100	20.4				A	100	4	2200-1900	
46	1503	KATMANDU	NPL	85E20 27N45	A20	50	17.4				A	50	4	2200-1900	
39	684	POKHRA	NPL	83E58 28N16	C 9	100	20.4				A	120	4	2200-1900	
23	855	POKHRA	NPL	83E58 28N16	A20	10	10.6				A	120	4	2200-1900	
32	576	SURKHET	NPL	81E38 28N36	A20	100	20.4				A	120	4	2200-1900	
51	900	SURKHET	NPL	81E38 28N36	A20	20	13.6				A	120	4	2200-1900	
44	648	DHANKUTA	NPL	87E19 27N00	A20	100	20.4				A	120	4	2200-1900	
30	765	DHANKUTA	NPL	87E19 27N00	A20	100	20.6				A	120	4	2200-1900	
31	810	DANDELDHURA	NPL	80E35 27N18	A20	10	10.4				A	60	4	2200-1900	
53	1143	DHALKEBAR	NPL	86E02 26N58	A20	10	10.4				A	60	4	2200-1900	
24	729	BUTAWAL	NPL	83E29 27N42	A20	1	0.4				A	60	4	2200-1900	

Appendix 1 to the Plan, Frequency Assignments to Stations in the Low-Power Channels.

	Assigned frequency (kHz) (Channel number)	Name of transmitting station	Country symbol	Geographical coordinates of transmitting station	Necessary bandwidth (kHz)	Carrier power (kw)	Effective monopole radiated power (e.m.r.p.) (kw)	Antenna height (m)	Ground conduc-tivity (mS/m)	Hours of operation (GMT)	Remarks
	1	2	3	4	5	6	7	8	9	10	11
1	1485	BAJURA	NPL	81E22 29N22	A20	1	0.50	60	5	2200-1900	
2	(107)	GORKHA	NPL	84E38 27N02	A20	1	0.50	60	5	2200-1900	
3	1485	KAIGAON	NPL	82E48 29N02	A20	1	0.50	60	5	2200-1900	
4	1485	RAMECHHAP	NPL	86E04 27N20	A20	1	0.50	60	5	2200-1900	
51	1584	BAJURA	NPL	81E22 29N22	A20	1	0.50	60	5	2200-1900	
52	1584	GORKHA	NPL	84E38 28N02	A20	1	0.50	60	5	2200-1900	
53	1584	KAIGAON	NPL	82E48 29N02	A20	1	0.50	60	5	2200-1900	
54	1584	RAMECHHAP	NPL	86E04 27N20	A20	1	0.50	60	5	2200-1900	
12	1602	BAJURA	NPL	81E22 29N22	A20	1	0.50	60	5	2200-1900	
13	1602	GORKHA	NPL	84E38 28N02	A20	1	0.50	60	5	2200-1900	
14	1602	KAIGAON	NPL	82E48 29N02	A20	1	0.50	60	5	2200-1900	
15	1602	RAMECHHAP	NPL	8-E04 27N20	A20	1	0.50	60	5	2200-1900	

Appendix 1-4 The Basis of Determining the Broadcasting Service Area (60 dB μV/m)

The minimum field strength intensity for the Kingdom of Nepal, calculated in accordance with the method proposed by the Administrative Conference, Additional Technical Document is 60 dB/0 dB = 1 μV (at 1 MHz), and the nominal practical field strength intensity (E_{nom}) for daytime ground wave service is 63 dB, and for nighttime ground wave service, it is 71 dB for the rural area and 77 dB for the urban area.

The results of investigation of sensitivity of receiving sets in Japan are given in the following Table.

In addition, the field strength intensity for the broadcasting service in the south Terai area was assumed as to be in the range of 60 dB (0 dB = 1 μV/m), according to the actual reception test.

Table A 1-4-1

Type of receiver	Portable radio	Radio attached to cassette tape recorder	Home radio	car radio
Noise limited sensitivity (dB) (see note)	49 - 76	54 - 60	58 - 59	35 - 37

Note: The minimum input signal (0 dB = 1 μV/m) for obtaining a standard output level of S/N = 30 dB.
[Excerpt from Radio Engineering Investigation of Characteristics of Standard Broadcast Receivers (Investigation Committee, Radio Engineering Corporation, Japan, May 1977)]

Appendix 1-5 Field Strength Data

Results of field strength measurements from Kathmandu to Southern Terai Area.

Table A 1-5-1 Field Strength Intensity of Kathmandu, Kumartar 10 kW Station

Table A 1-5-2 Field Strength Intensity of Foreign Wave in the same district as above.

Table A1-5-1

Survey of Field Strength (Kathmandu Station 792 kHz, 10 KW) - 30. May ∿ 9. Jun/1979 -

Item No: cf. Map	Place	Time		Field Strength (dB/μV)	Remarks
1.	Metrang.	D	10:50 ∿	61	Naubise → 10 km South
2.	Palung	"	11:55 ∿	63	120 km to Raxaul
3.	Bhase Dhobau	"		70	Himalaya View Tower top (≃ 8000 ft high)
4.-(1)	Hetauda	M	6:00 ∿ 45	53±5	Fading
-(2)	"	D	13:25 ∿	43	at the River, Behind the mountain (Cf. Fig. A6-1)
-(3)	"	E	18:15 ∿ 45	55	17:00 E=54 dB
-(4)	"	N	21:45 ∿	59±5	Fading
5.	Adhabar	D	9:55 ∿	44	In the jungle
6.-(1)	Birganj	D	16:15 ∿ 30	57	Hotal SAMJANA top (Cf. Fig. A6-2)
-(2)	"	N	21:30 ∿	59	" Light Fading
7.	Bagmati River	D	12:10 ∿ 30	53	River West Side (Cf. Fig. A6-3)
8.-(1)	Mahuwa (JADP)	D	11:00 ∿	50	
-(2)	"	E	18:55 ∿	48±5	Fading (4 ∿ 5" cycle), about 1 kHz Beet.
9.	Janakpur	D	13:40 ∿	51	Airport
10.	Naubise	D	10:20 ∿	80	
11.	Simpani	"	11:00 ∿	62	
12.	Benighat	"	12:00 ∿	55	(Cf. Fig. A6-4)
13.	Kuringhat	"	12:41 ∿	51	
14.	Pokhara	E	18:30 ∿	45±5	Light Fading

Table A1-5-2

Survey of Field Strength (Another Station)

Item No:	Place & Time	Frequency (kHz) *1	Field Strength (dB/μV)	Remarks
	Hetauda M (6:00 ∿)	915 1243 1340 1449	50 ∿ 60 39 ∿ 46 25 30 ∿ 35	Fading "
	E (18:15 ∿)	915 1135 1340	62 65 40	Prog. India " China?
	D (13:25 ∿) River	915	49	With about 1 kHz Beet
	N (21:45)	595 715 840 915 975 1135 3425 5005	∿ 50 ∿ 53 43±2 70±3 ∿ 63 ∿ ∿ 73 70±10 60±10	Prog. India, Fading " , Calcutta? " " " , Fading " } Radio Nepal (KTM) " , with Fading
	Birganj D (16:15 ∿) N (21:30 ∿)	595 915 985 1090 1140 3425 5005	55 72 60±2 55±1 75±4 75±7 70±5	Prog. India " " , Fading Fading R. Nepal, " " "
	Bagmati Rv. (Birgauj→Janak.) D (12:10)	675	37	other freq. nothing
	Janakpur (JADP) E (18:55 ∿)	660 695 1140	55 ∿ 70 64 58	
	(Air Port) D (13:40 ∿)	620 915	60 53	(Kathmandu)
	Pokhara E (18:40 ∿)	620 660 695 820 915 985 1010 1060 1085 1140 1240 1270 1300 1340 1450 1600 3425 5005	54±2 51±3 50±1 43±3 50±5 41±2 51 50 39 70±5 47±2 42±5 47±10 52±2 51±3 40 75±6 75±8	 Noisy, Fading Fading Noisy Fading (3 ∿ 5" cycle) Noisy Fading (deep) Noisy R. Nepal Fading (0.5 ∿ 1" cycle)

Appendix 1-6 Profile Map

Example of profile map for a transmitting station located in Kathmandu valley.

Fig. A 1-6-1 Kathmandu --> Hetauda

Fig. A 1-6-2 Kathmandu --> Birganj

Fig. A 1-6-2' Kathmandu --> Anti-Birganj

Fig. A 1-6-3 Kathmandu --> Malangwa

Fig. A 1-6-3' Kathmandu --> Anti-Malangwa

Fig. A 1-6-4 Kathmandu --> Gurkha, Pokhara

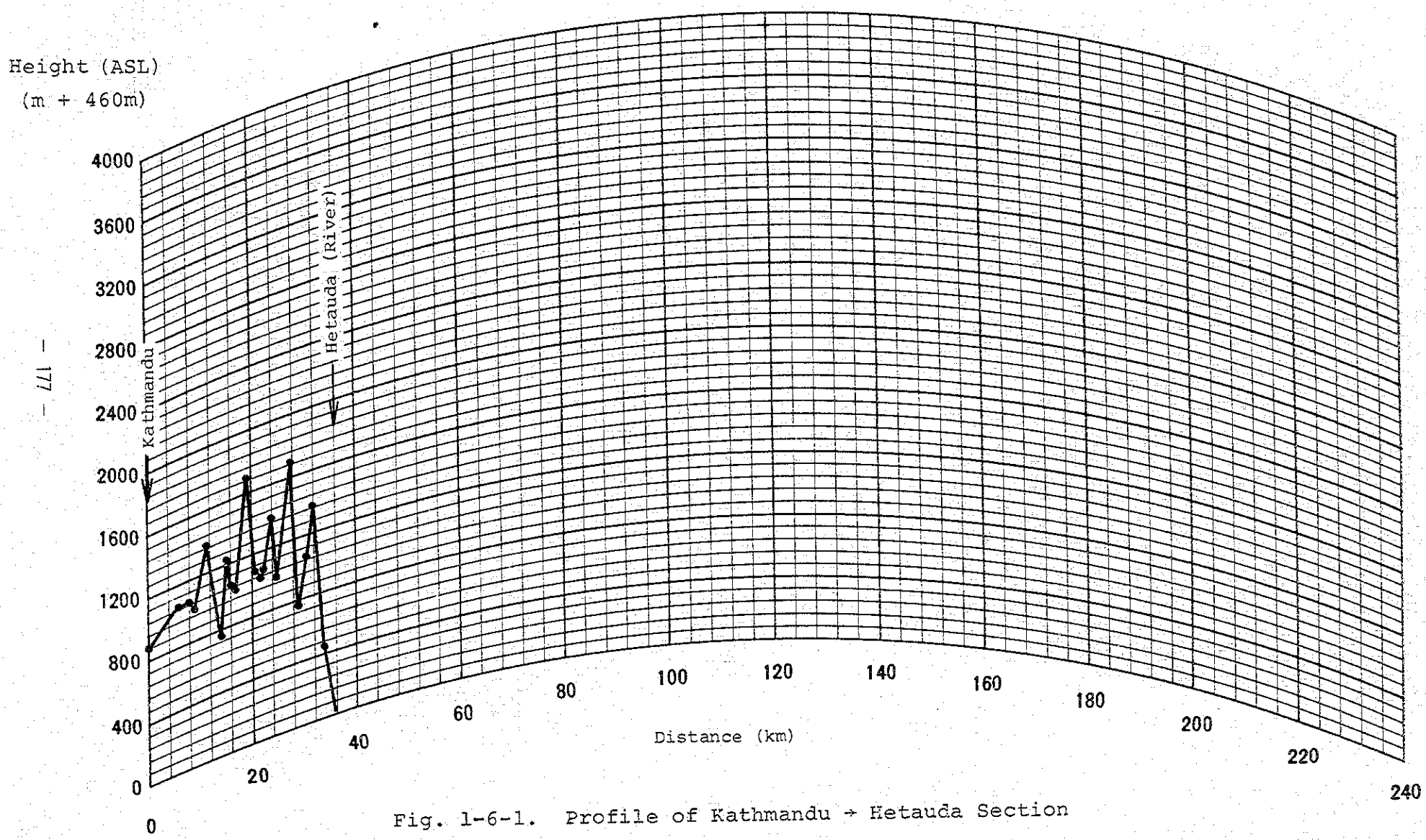


Fig. 1-6-1. Profile of Kathmandu → Hetauda Section

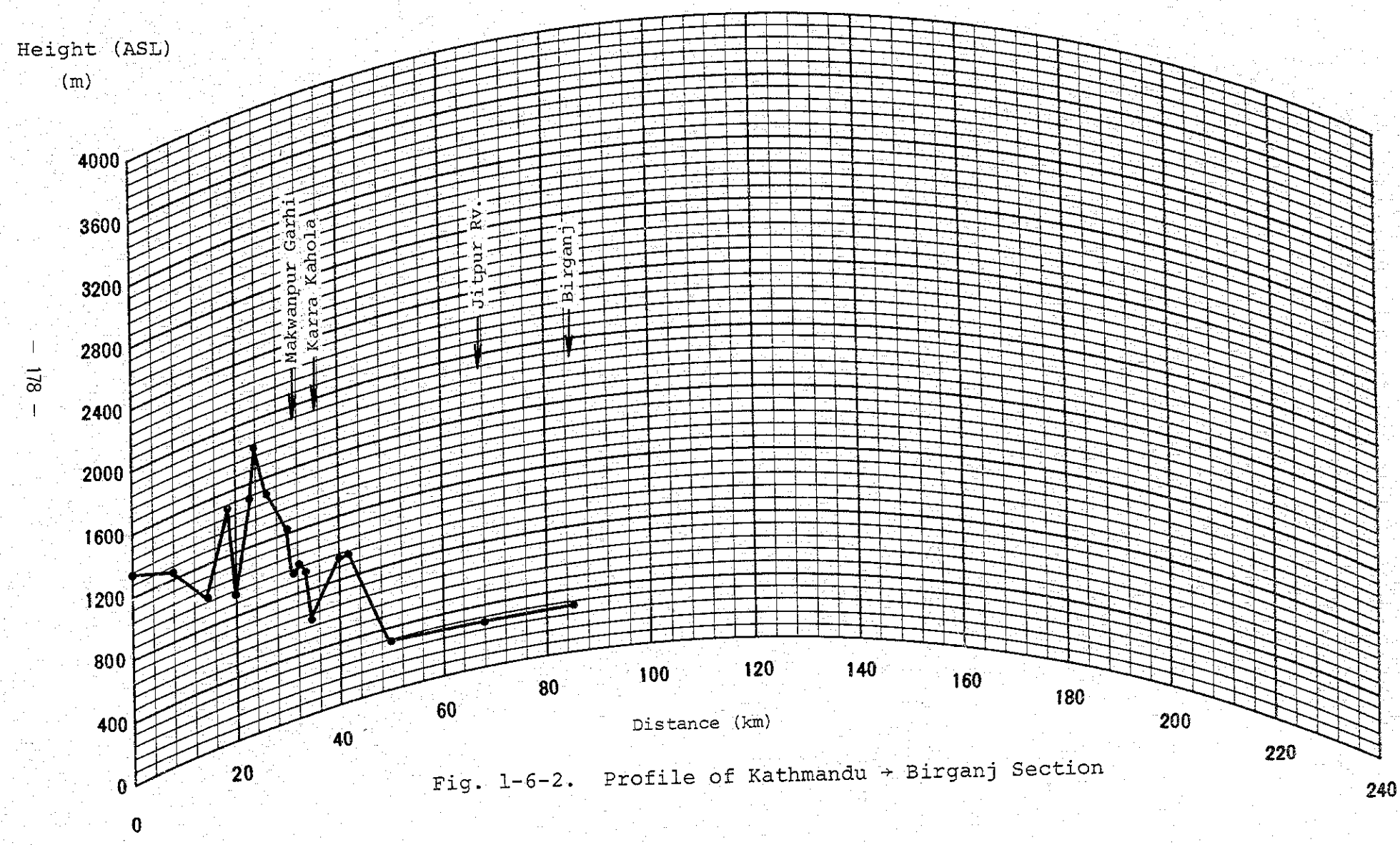


Fig. 1-6-2. Profile of Kathmandu → Birganj Section

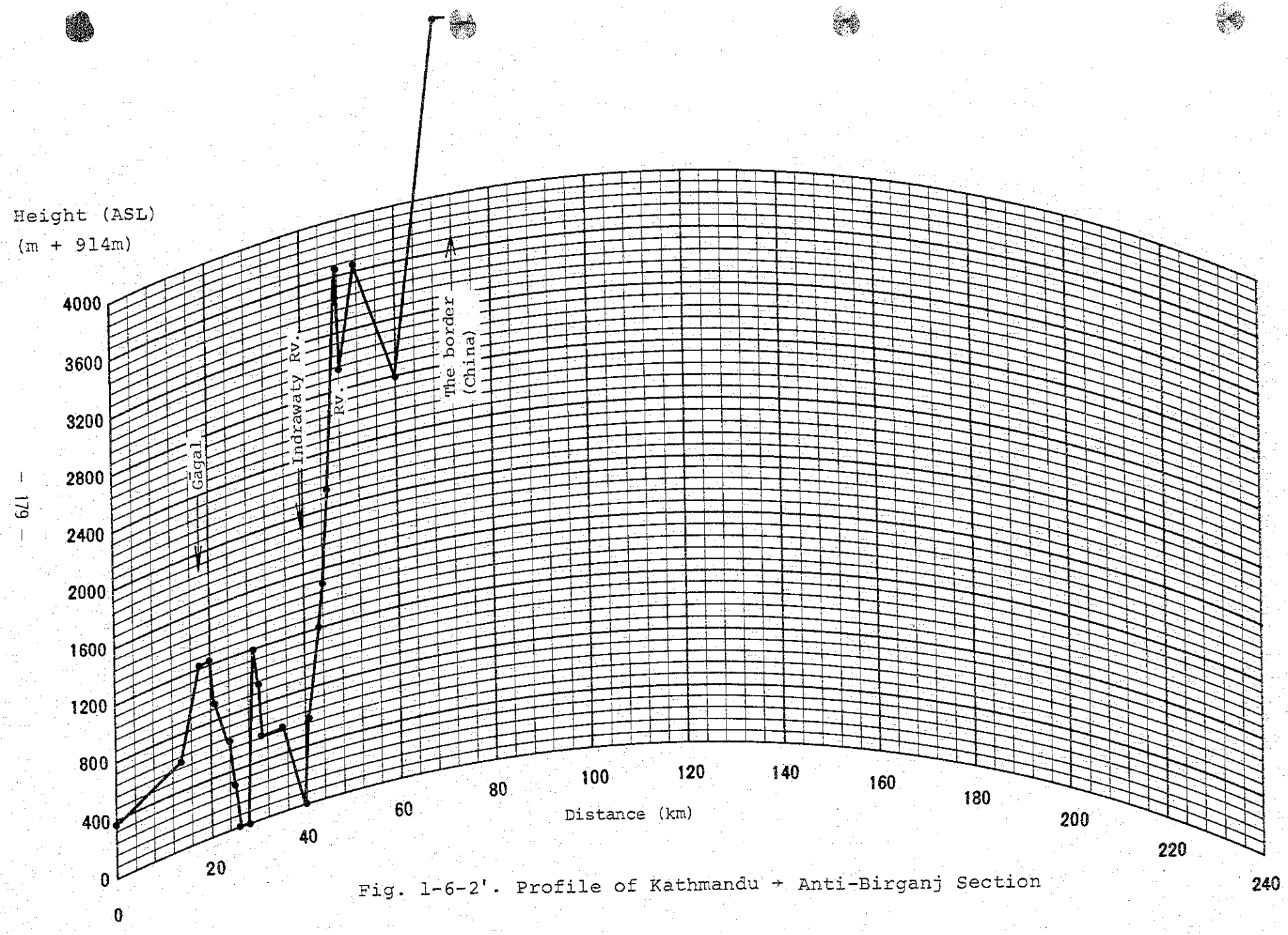


Fig. 1-6-2'. Profile of Kathmandu → Anti-Birganj Section

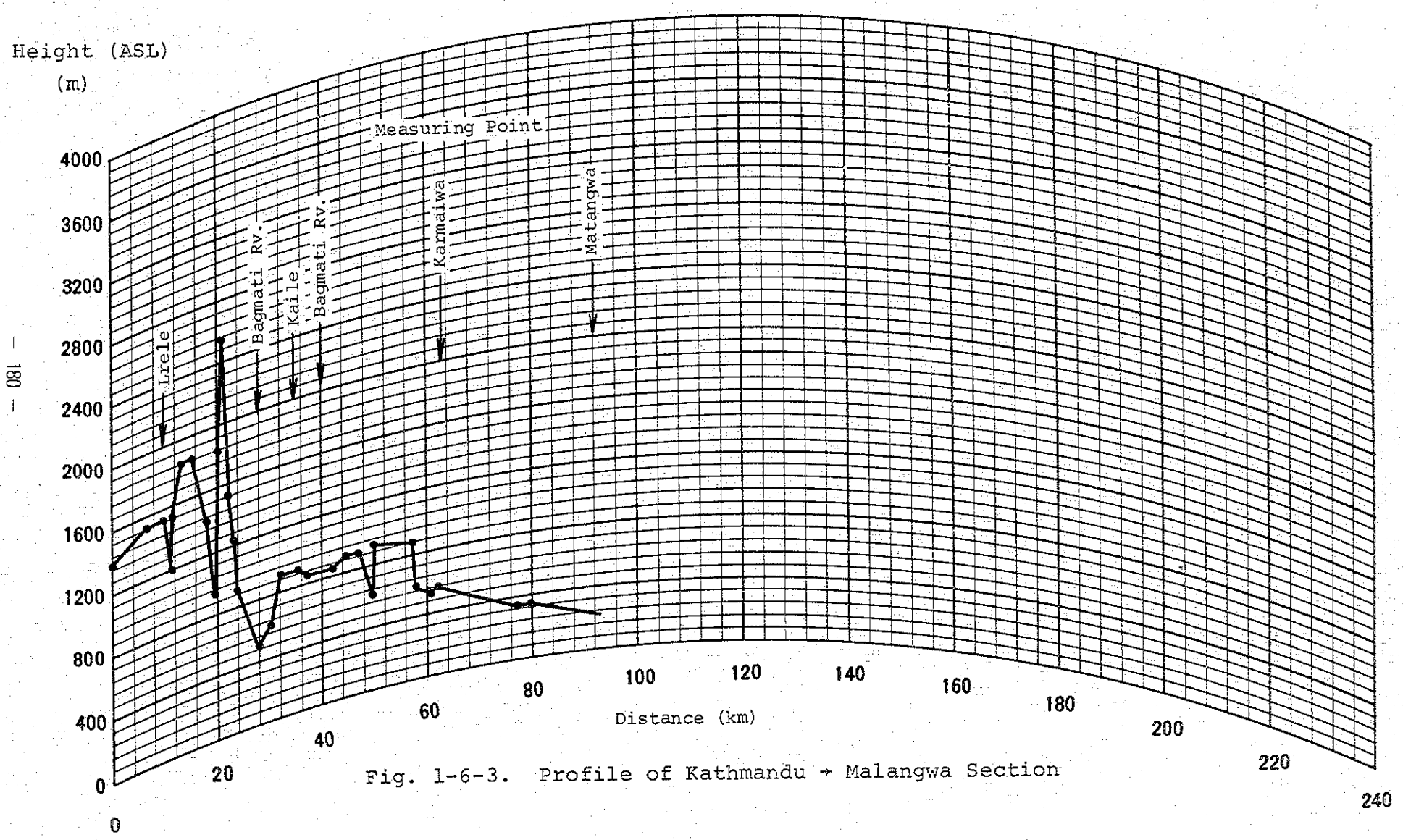


Fig. 1-6-3. Profile of Kathmandu → Malangwa Section

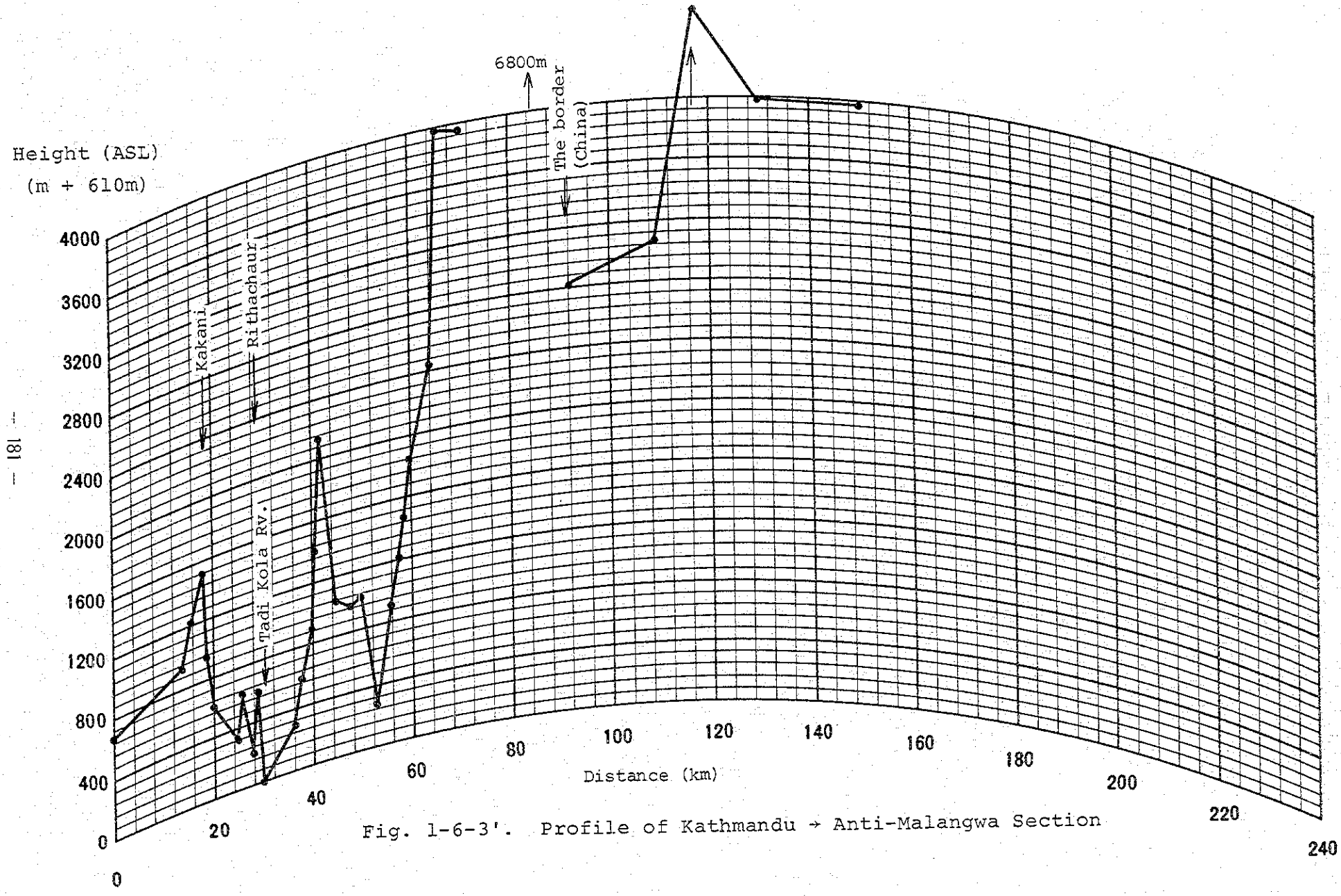


Fig. 1-6-3'. Profile of Kathmandu → Anti-Malangwa Section

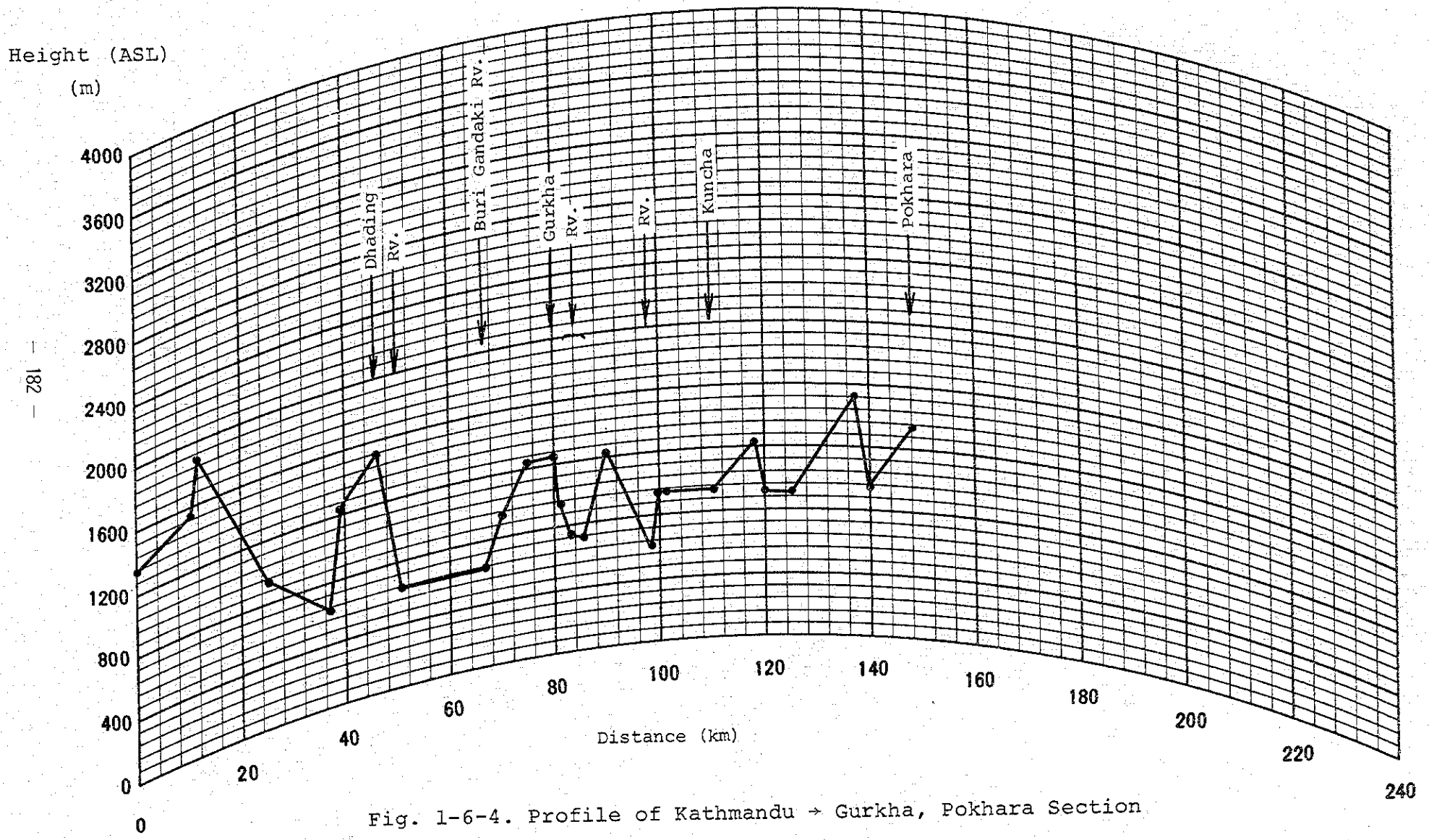
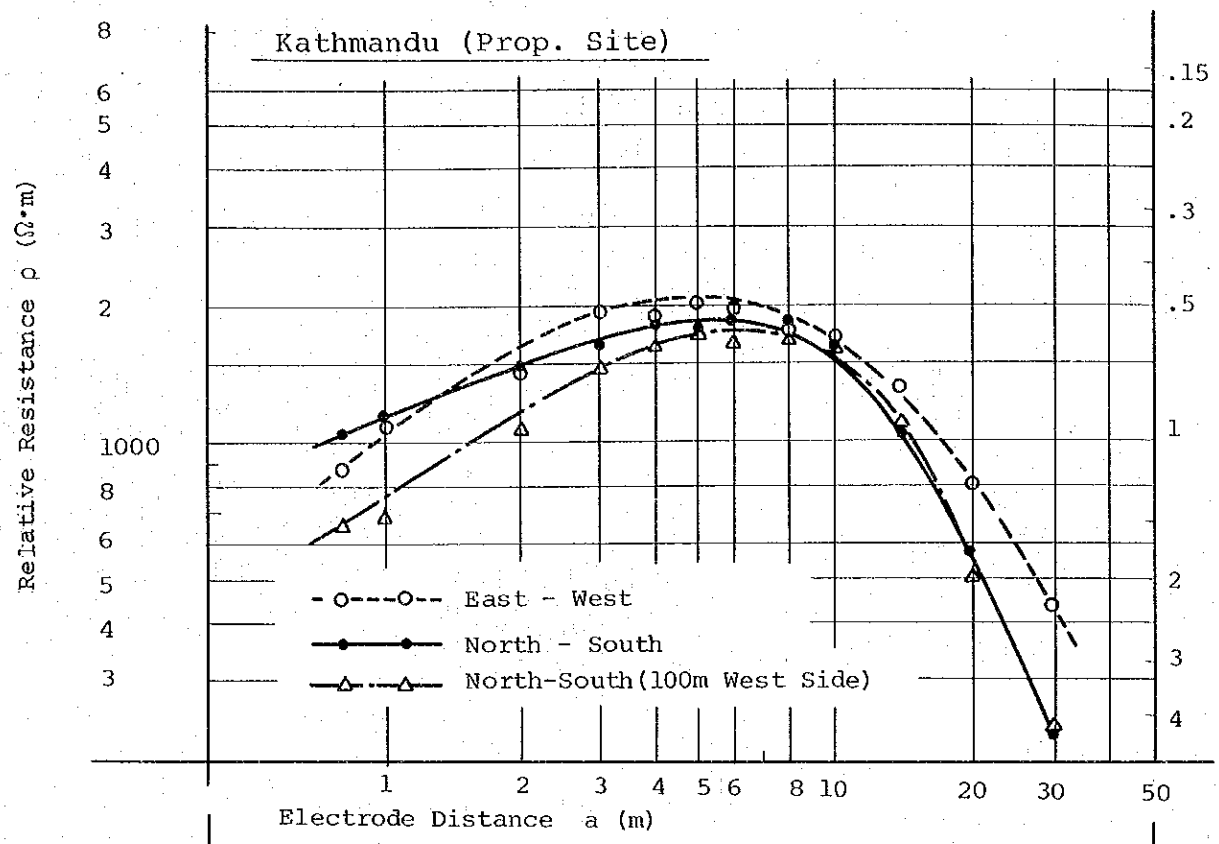


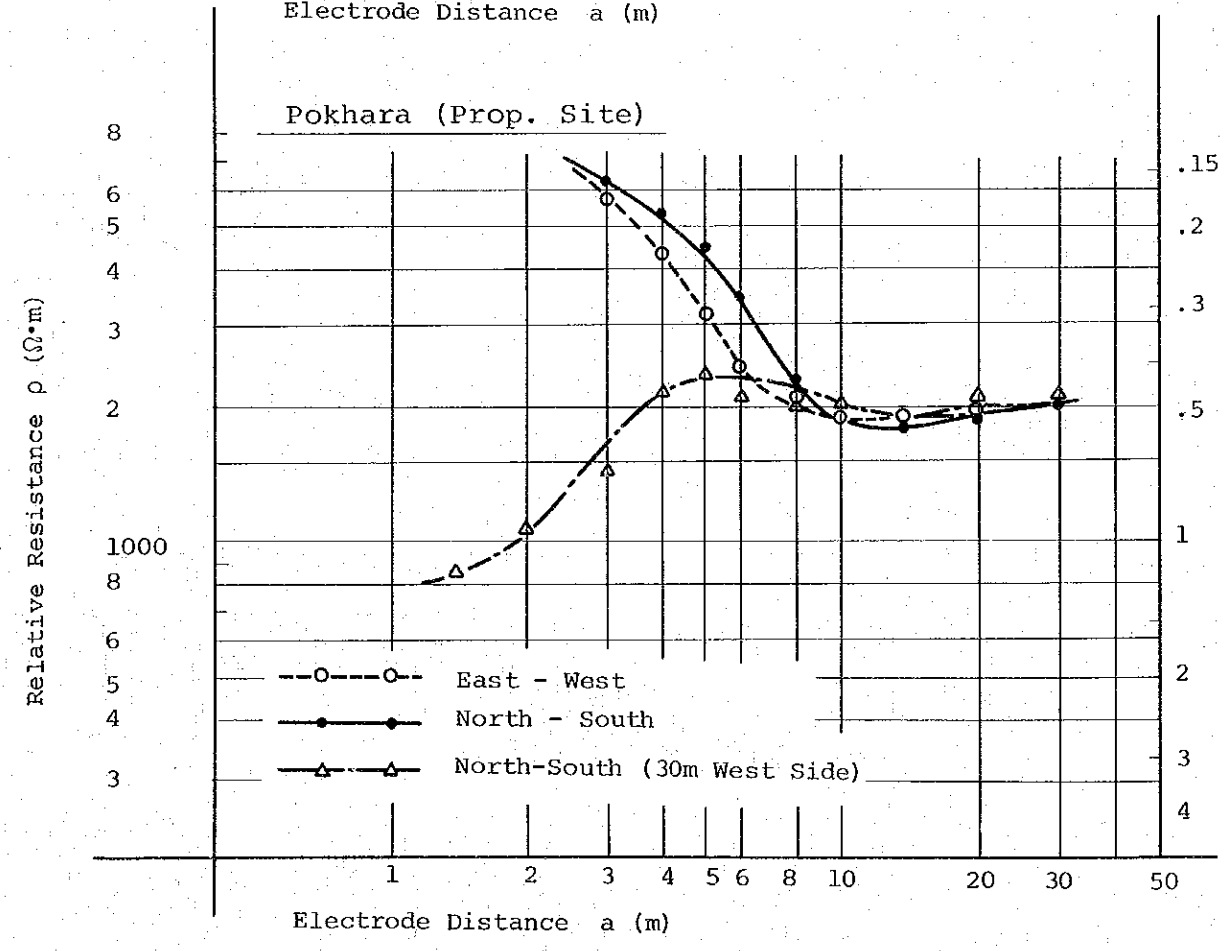
Fig. 1-6-4. Profile of Kathmandu → Gurkha, Pokhara Section

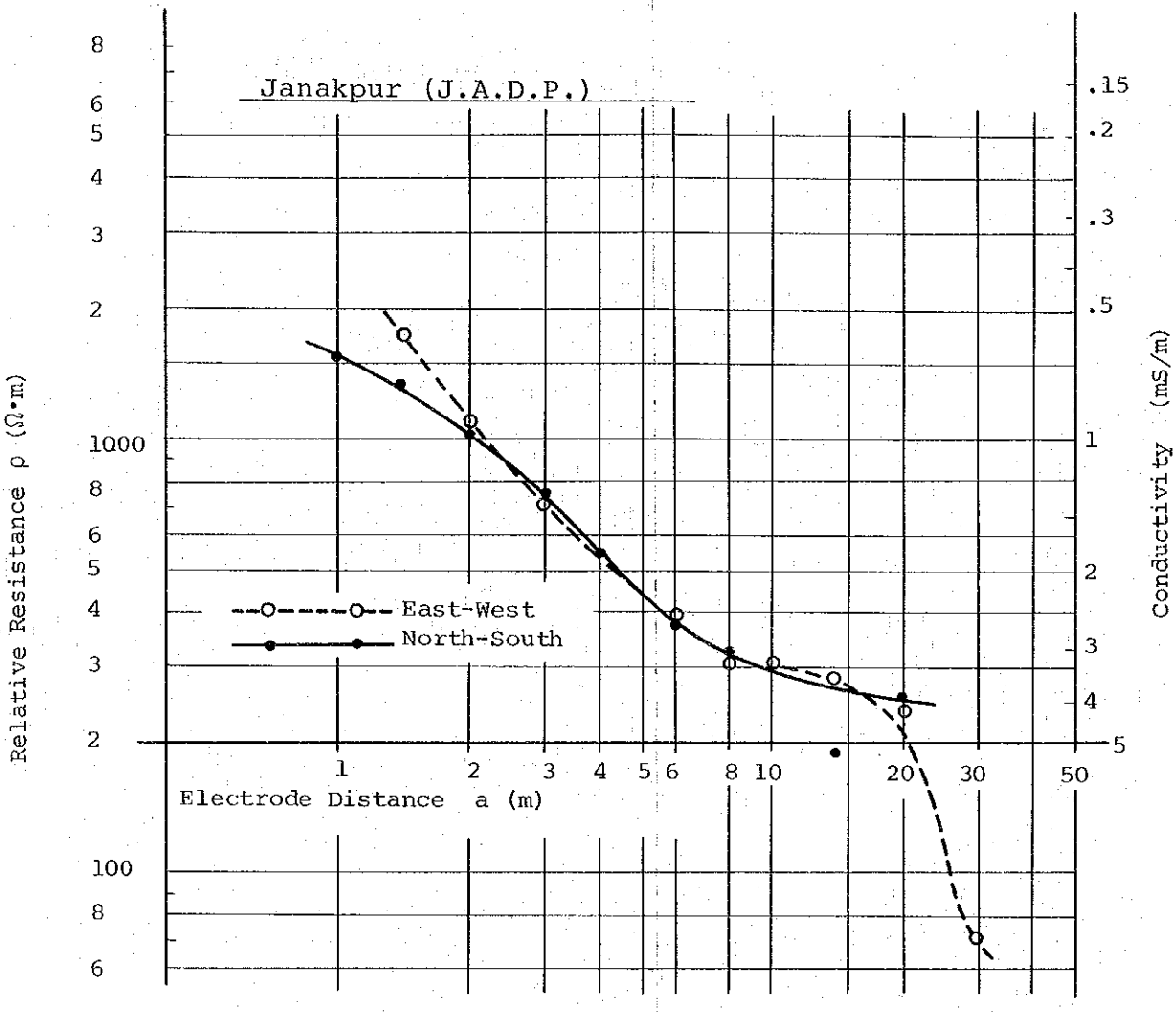
Appendix 1-7 Ground Conductivity Data

Results of ground conductivity measured at Kathmandu, Pokhara and Janakpur.

Fig. A 1-7-1 Results of Ground Conductivity Measurement


Kathmandu (Prop. Site)
Relative Resistance ρ (Ω•m)
Conductivity (mS/m)
East - West
North - South
North-South(100m West Side)
Electrode Distance a (m)


Pokhara (Prop. Site)
Relative Resistance ρ (Ω•m)
Conductivity (mS/m)
East - West
North - South
North-South (30m West Side)
Electrode Distance a (m)



Note:
Measurement Instrument : Type 3244 (Yokogawa Electric Co.)

Fig. A1-7-1. Result of Grand Conductivity Measurement

Appendix 1-8 Rough Estimation of Incidental Construction Work Expense

(1) Wiring to drop point and connection work at drop point.

Kathmandu Studio Centre

Distribution line	0.5 km x 60,000 Rs	=	30,000 Rs
Drop point wiring	50 m x 1,000 Rs	=	50,000 Rs
Transformer	150 kVA 11 kV/400 V	=	100,000 Rs
	Total		180,000 Rs

Kathmandu Transmitting Station

Distribution line	1.5 km x 90,000 Rs	=	135,000 Rs
Drop point wiring	150 m x 1,000 Rs	=	150,000 Rs
Transformer	600 kVA 11 kV/400 V	=	200,000 Rs
	Total		485,000 Rs

Pokhara Transmitting Station

Distribution line	1.0 km x 60,000 Rs	=	60,000 Rs
Drop point wiring	200 m x 1,000 Rs	=	200,000 Rs
Transformer	600 kVA 11 kV/400 V	=	200,000 Rs
	Total		460,000 Rs
	Sub-total		1,125 Th. Rs
			(20,812.5 Th. Yen)

(2) Water supply and connection work at feed point.

Kathmandu Studio Centre

50 m x 200 Rs = 10,000 Rs

Kathmandu Transmitting Station

2,000 m x 120 Rs = 240,000 Rs

Pokhara Transmitting Station

1,000 m x 120 Rs = 120,000 Rs

Total 370 Th. Rs (6,845 Th. Yen)

(3) Acquisition of land of construction spot

Kathmandu Transmitting Station

$\frac{44,400}{506.25}$ Ropani x 10 Th. Rs = 877 Th. Rs

Pokhara Transmitting Station

$\frac{50,870}{506.25}$ Ropani x 20 Th. Rs = 2,010 Th. Rs

Total 2,887 Th. Rs

(53,409.5 Th. Yen)

(4) Civil work of construction spot

Kathmandu Studio Centre

1,300 m^2 x 30 Rs = 39 Th. Rs

Kathmandu Transmitting Station

$\frac{44,400}{506.25}$ Ropani x 1 Th. Rs = 88 Th. Rs

Pokhara Transmitting Station

$\frac{50,870}{506.25}$ Ropani x 1 Th. Rs = 100 Th. Rs

Total 227 Th. Rs

(4,199.5 Th. Yen)

(5) Access road

Kathmandu Studio Centre

5 m x 1 Th. Rs = 5 Th. Rs

Kathmandu Transmitting Station

170 m x 1 Th. Rs = 170 Th. Rs

Pokhara Transmitting Station

250 m x 1 Th. Rs = 250 Th. Rs

Total 425 Th. Rs

(7,862.5 Th. Yen)

(6) Guard fence and gate post

Kathmandu Studio Centre

0

Kathmandu Transmitting Station

(fence)	810 m x 310 Rs	= 251,100 Rs
(gate post)	one place	25,000 Rs

Pokhara Transmitting Station

(fence)	950 m x 380 Rs	= 361,000 Rs
(gate post)		25,000 Rs
	Total	662 Th. Rs
		(12,247 Th. Yen)

(7) Communications line

Laying expense

Studio Centre - Kathmandu TCC

laying of 10p cable, 6 km

material expense	150,000 Rs
construction expense	120,000 Rs
Total	270,000 Rs

Pokhara TCC - Transmitting Station

distance, 4 km

material expense	100,000 Rs
construction expense	40,000 Rs
Total	140,000 Rs

Channel Translator

1 pair (Mod. & Dem.)

material expense	190,000 Rs
construction expense	179,000 Rs
Total	369,000 Rs
Sub-total	779 Th. Rs
	(4,411.5 Th. Yen)

(8) Drainage, sewage and connection work

Kathmandu Studio Centre

Drainage 150 m x 400 Rs = 60,000 Rs

Sewage disposal & Sewage Drainage 100,000 Rs

Kathmandu Transmitting Station

Drainage 500 m x 200 Rs =100,000 Rs

Sewage disposal 30,000 Rs

Pokhara Transmitting Station

Drainage 150 m x 200 Rs = 30,000 Rs

Sewage disposal 30,000 Rs

Total 350 Th. Rs
(6,475 Th. Yen)

Grand Total 6,825 Th. Rs
(126,262.5 Th. Yen)

Appendix 1-9 Boring Test Data

Tribhuwan University

Institute of Engineering
The Central Material Testing Laboratory

Report

on

Soil Investigation Programme of Medium Wave Broadcasting Network Construction Site Bhaisepati, Kathmandu.

Kathmandu Nepal

1979

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
CONSULTANCY SERVICES
ANANDA NIKETAN, PULCHOWK
LALITPUR, NEPAL. Ph. 21636

Ref. No.

Date

CONTENTS

OF ENGINEERING

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INSTITUTE OF ENGINEERING
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ANANDA NIKETAN, PULCHOWK
LALITPUR, NEPAL. Ph. 21636

No.

Date

Final Report
on
Soil Investigation Programme of Medium Wave Broadcasting Network Construction Site
Bhaisepati, Kathmandu.

1) Introduction.

On the request of Japan International Co-operation Agency, Japan, The Institute of Engineering, Central Material Testing Laboratory proposed a programme of sub-soil investigation work of Medium Wave Broadcasting Network Construction Site at Bhaisepati in Kathmandu. The programme was approved by JICA, Japan and the work was carried out by the staff of Central Material Testing Laboratory. The approved programme included:

a) Site Inspection.
b) Field Work.
c) Laboratory Testing.
d) Recommendation.

2) Purpose of Investigation Work.

The purpose of soil investigation work was to reveal the soil conditions and obtain necessary data required to determine the bearing capacity of soil.

3) Site Inspection.

The site is located on a raised more or less level ground at a distance about 5 km. from Lalitpur town. It lies at the lower reach of Mahabharat range towards north and mainly is being used as a gravel quarry for local road construction.

P.T.O.

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4) **Field Work.**

The field work was started on 2nd June 1979 and completed on 14th June, 1979. A hard gravel stratum was encountered at elevation between 5.8 m to 15.5 m, so it was decided to terminate the bore hole at that point. An undisturbed sample was taken at elevation between 5.0 m to 5.8 m for direct shear test and at other elevations undisturbed samples could not be retrieved. The standard penetration test was conducted at every meter depth and altogether 13 disturbed samples were taken for laboratory tests.

5) **Ground Water Position.**

Position of ground water table could not be traced out upto investigated depth.

The laboratory testing work was done as per client's requirement. The results of laboratory testing has been supplied in the data summary sheet in the Appendix - 1.

7) **Description of Soil Strata.**

Between elevation 3.7 m to 5.0 m there is a layer of silt and clay sandwitched between two gravel layers at the top and underneath. The bore hole logs supplied in the Appendix - 2 gives the best representation of soil stratification, SPT values and natural moisture content.

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Recommendation

It is suggested to put down the foundation below elevation 5.0 m The no. of blows at this depth is 27. Based on this value and using the curve prescribed by Terzaghi's and Peck for a 3 m. wide foundation, the safe bearing capacity for a maximum settlement of 25 mm comes to be 25 tons/m^2.

Again from the direct shear test made on the sample obtained at this depth, the value of C = 1.7 ton/m^2 & ϕ = 37^0.

For ϕ = 37^0, the Terzaghi's Bearing Capacity Factors for local shear failure are :

$N_c' = 30$

$N_q' = 14$

$N_r' = 10$

Substituting revelant data in Terzaghi's equation we get,

$$q_{ult} = 1.3\,CN_c' + \gamma D_f N_q' + \tfrac{1}{2}\,b\gamma N_r'$$
$$= 1.3 \times 1.7 \times 30 + 1.8 \times 5 \times 14 + \tfrac{1}{2} \times 3 \times 1.8 \times 10$$
$$= 66.3 + 126 + 27$$
$$= 219.3$$

$$\therefore q_{safe} = \frac{219.3}{3}$$
$$= 73.3 \text{ t/m}^2 > 25 \text{t/m}^2$$

$\therefore$ Adopt safe bearing capacity = 25 t/m^2.

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APPENDIX - 1

TEST RESULT SHEET

Bore Hole No.:- 1

Location:- **Bhaisen Pati.**

Project:- **Medium Wave Broadcasting Net Work Radio Nepal**

Late:-

S. No.	Depth M.	Sieve Analysis % passing				Atterberg Limits			Natu-ral M.C.	Density		S.P.T. blows	Sp.Gr.	Direct Shear		qult kg/cm²	Consolidation				Compacti	
		Gravel %	Sand %	silt %	clay %	L.L.	P.L.	P.I.		Yw	YB			C kg/cm²	Ø		a_v	m_v	c_v	k	OMC	Ydr.
2.	0.60 to 2.15	26	22	39	13								2.66									
3.	2.15 to 3.70	49	13	15	23								2.70									
4.	3.70 to 4.15	0.12	5.88	59	35	29.5	17.35	12.15					2.62									
5.	4.15 to 4.75	0.76	9.24	55	35	29.4	16.55	12.85					2.62									
6.	4.75 to 5.00	1.26	14.74	48	36	24.9	16.44	8.46					2.68									
7.	5.00 to 5.80	1.54	14.46	61	23	28	-	-					2.665	0.17	37°							
8.	5.80 to 8.75	47.45	9.55	18	25	-	-	-					2.645									

TEST RESULT SHEET

Bore Hole No.:- 1 Project:- Medium Wave Broadcasting Net Work

Location:- Dhaisen Pati. Date:- Radio Nepal

S. No.	Depth m.	Sieve Analysis % passing				Atterberg Limits			Natu-ral M.C.	Density		S.P.T. blows	Sp.Gr	Direct Shear		qult kg/cm^2	Consolidation				Competi.	
		Gravel %	Sand %	silt %	clay %	L.L.	P.L.	P.I.		Yw	YB			C kg/cm^2	ø		a_v	m_v	c_v	k	CMC	Yd...
9	8.75 to 11.75	58.75	9.25	9	23								2.69									
10.	11.75 to 12.40	20	18	44	18								2.67									
11.	12.40 to 12.75	44	29	10	17								2.65									
12.	12.75 to 15.00	37	13	29	21								2.635									
13.	15.00 to 15.50	34.44	23.56	22	20								2.69									

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APPENDIX - 2

MEDIUM WAVE BROADCASTING NETWORK

CONSTRUCTION SITE

BHAISENPATI, KATHMANDU

BORE HOLE LOG 1

1 SCALE OF DEPTH IN METER	2 DEPTH IN METER	3 THICKNESS OF STRATA IN METER	4 SOIL DESCRIPTION	5 SYMBOL	6 S. P. T. N. VALUE	7 W.C. %	8 REMARK
	0·60	0·60	VEGITABLE TOP SOIL			10.71	
1.0		1·55	YELLOWISH GREY SILT WITH SOME SAND AND GRAVEL AND LITTLE CLAY		N = 28	9.64	WE TAKE S. P. T. AT EVERY 1 METER
2.0	2·15				15CM/50 BLOWS 1 CM/NEXT 5 BLOWS	28·24	
3.0	3·70	1·55	YELLOWISH GREY GRAVEL WITH LITTLE SAND AND SILT AND SOME CLAY		17·5CM/50 BLOWS 0·5CM/NEXT 5 BLOWS	21·42	11 DENOTES S.P.T. AT THAT METER
4.0		1·30	BLACK TO YELLOWISH BROWN SILT AND CLAY WITH LITTLE SAND AND TRACES OF GRAVEL		N = 9	22·57	
5.0	5·0				N = 27	23·88	N INDICATES NO. OF BLOWS
	5·80	0·80	YELLOWISH BROWN CLAYEY SILT WITH LITTLE SAND		10·5CM/50 BLOWS 0·5CM/NEXT 5 BLOWS	8·42	
6.0							
7.0					12CM/50 BLOWS 0·5CM/NEXT 5 BLOWS	14·41	
8.0			YELLOWISH GREY SILT WITH SOME SAND AND LITTLE CLAY AND SOME GRAVEL		9·8CM/50 BLOWS 0·2CM/NEXT 5 BLOWS	13·99	
9.0					7CM/50 BLOWS 0·3CM/NEXT 5 BLOWS	12·34	
10.0					20CM/50 BLOWS 0·8CM/NEXT 5 BLOWS	15·38	

BORE HOLE NO. 1

PREPARED BY THE CENTRAL MATERIAL TESTING LABORATORY

I. E. C. S.

DRAWN BY. R. PANT

CHECKED BY. R. K. POUDEL

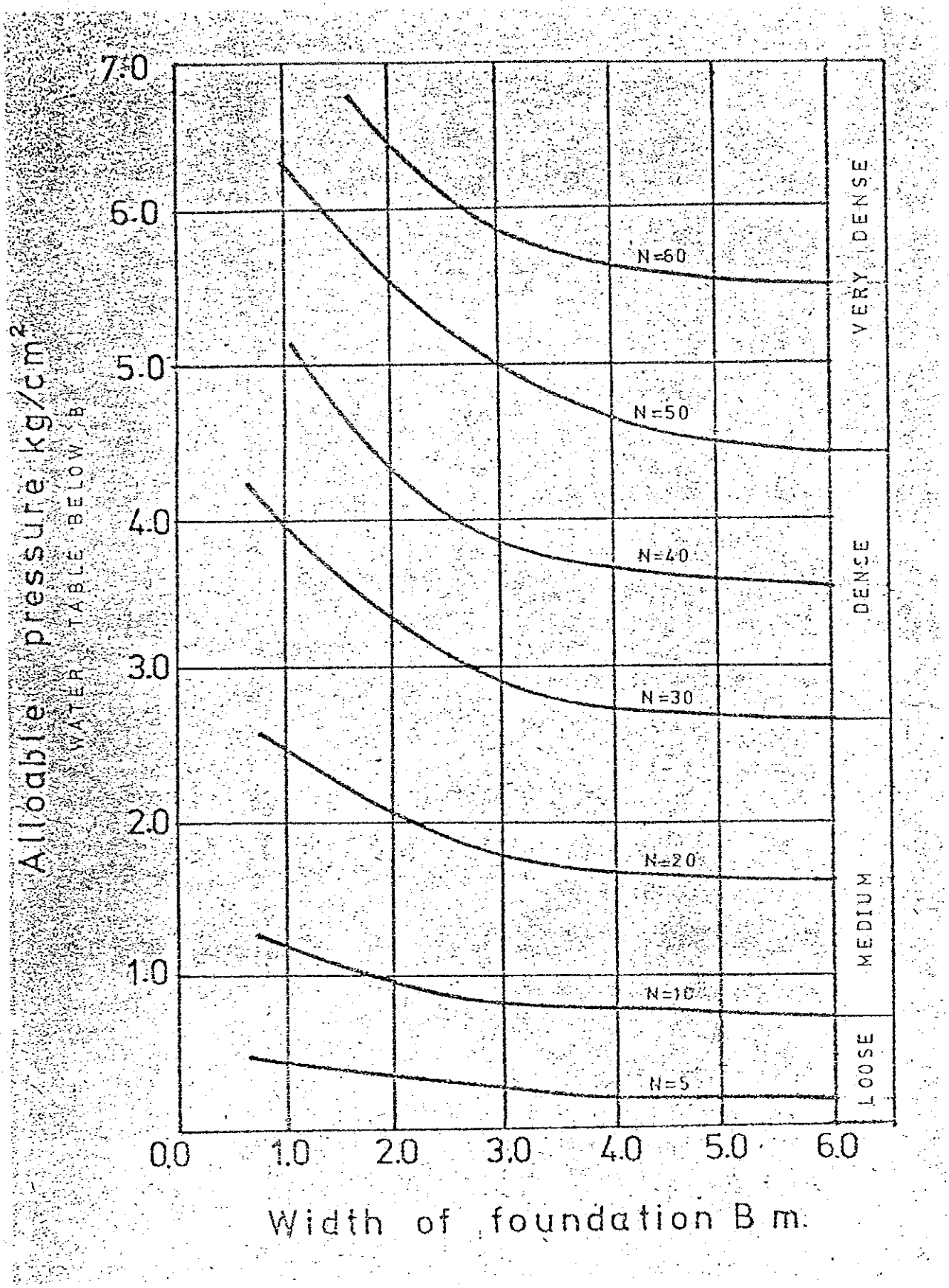
DATE. 036/4/14

BORE HOLE LOG CONTD.

1	2	3	4	5	6	7	8.
11.0	11·75	5·95			0·8CM/50 BLOWS 0·0CM/NEXT 5 BLOWS	10·08	
12.0	12·40	0·65	BLACK TO YELLOWISH GREY SILT WITH LITTLE SAND GRAVEL AND CLAY		6·0CM/50BLOWS 0·2CM/NEXT 5 BLOWS	15·66	
13.0					8·5CM/50 BLOWS 0·3CM/NEXT 5 BLOWS	12·12	
14.0		3·10	YELLOWISH WHITE TO LIGHT BLUE GRAVEL WITH SAND SILT AND CLAY		7·8CM/50 BLOWS 0·4CM/NEXT 5 BLOWS	10·12	
15.0	15·50				17CM/50 BLOWS 0·3CM/NEXT 5 BLOWS	20·35	
16.0							

BORE HOLE NO. 1	PREPARED BY C. M. T. L. I. E. C. S.	DRAWN BY. R. PANT CHECKED BY. R. K. POUDEL DATE 036/4/14

BORE HOLE NO.
DEPTH—5.40m
C = 0.17 KG/CM2
φ = 57°
SHEAR STRESS Kg/CM2
NORMAL STRESS


Allowable pressure kg/cm²
WATER TABLE BELOW B
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
N=60
N=50
N=40
N=30
N=20
N=10
N=5
VERY DENSE
DENSE
MEDIUM
LOOSE
Width of foundation B m.

Appendix 2 Personnel and Training Plan

With regard to the personnel plan, staff allocation for the fields which will be increased, in accordance with the construction programme, was compared with the present condition, and the fields of which personnel increase are indicated in the following.

In conclusion, 124 personnel is required, and of these personnel, 33 are related to clerical work, and this figure corresponds to about 27 % of the total increment of personnel.

With regard to the staff allocation, the Personnel Constitution Table (Reference material, Appendix - 1-1, p.14, 2-6-1, Personnel Plan), proposed to the Preliminary Design Survey Team of Japan, was referred to.

	Number of existing staff	Required number of staff for the project	Increase in number of staff
(1) Engineer in charge	0	2	2
(2) Assistant Engineer or Shift Engineer	5	14	9
(3) Technical Officer	2	0	-2
(4) Supervisor or Technician	0	12	12
(5) Technical Assistant R	30	48	26
E		4	
M		4	
(6) Junior Technical Assistant R	28	43	25
M		10	
(7) Mechanics	2	21	19
Technical staff sub-total	67	158	91

	Number of existing staff	Required number of staff for the project	Increase in number of staff
(8) Senior Clerk Adm.	0	2	2
Str.	0	2	2
(9) Junior Clerk Adm.	0	4	4
Str.	0	8	8
(10) Typist	0	4	4
(11) Driver	2	2	0
(12) Gardener	1	4	3
(13) Peon	8	18	10
Total	78	202	124

With regard to the training plan, there is a plan proposed to the Preliminary Design Survey Team of Japan by Radio Nepal (Appendix material 1-1 p.16, 2-6-2, Training Programme). The total of personnel are shown in the following.

1. Technical Field

(1) Training in advance to contruction work.

	(Total)	
1) Engineer	8	Studio -------- 2
		Transmitter --- 4
		General ------- 2
2) Technician	10	Studio -------- 3
		Transmitter --- 7

(2) Training of staff after construction work
(every year for a term of five years)

		(Sub-total)	(Total)
1)	Engineer	2	10
2)	Technician	4	20

Ground total (1) + (2)		(Grand total)
1)	Engineer	18
2)	Technician	30

The grand total of personnel and the personnel planned in the previous item are compared in the following. The difference in these two can be said to be the increment of personnel during the following five years.

		Training plan	Personnel plan	Difference
1)	Engineer or Assistant Engineer	18	11	7
2)	Supervisor or Technician	30	12	18

2. Programme Field ..... Training of programme producer

First year	4	These are consecutive years.
2nd year	2	
3rd year	2	
4th year	2	
5th year	2	
Total	12	

The present state of number of programme personnel of Radio Nepal, ranked above the "Gazetted Third Class" are as follows, and are considered to be appropriate for accepting the above training.

1)	Programming Section	7
2)	News Section	5
	Total	12

3. Considerations on Policy for Training Plan

(1) The nature of training abroad, in general, has a meaning to accept a higher level of training or training in new fields.

With regard to the training in the field of Radio Engineering and Radio Programme Production, it can be said that the level of Radio Nepal is equivalent to that of other experienced organization in the world.

(2) In accordance with the radio network expansion plan, the reason why Radio Nepal is considering about training abroad can be concluded to the following two points.

1) To investigate the state of broadcasting and related organization in foreign countries and study about the tendency of future broadcasting world.

2) To exchange opinions with foreign experts in their related fields.

(3) In case the training plan is considered under the aforementioned condition, the trainees after returning to country, can take part in instruction of domestic training course in their respective field, and in means of qualification, it can be said that person ranked above "Gazetted Third Class" will be appropriate. This will be person ranked above Assistant Engineers in the technical field.

(4) With regard to the training which is to take place in advance to the construction work, it may be impossible for the organization to send all responsible person for instance all Assistant Engineer abroad of certain field at once, thus training is to be conducted in two shifts at the least.

(5) The training plan for the time being for the present personnel, will be each as follows.

	Engineer or Assistant Engineer	Programme Producer or News Man
1st year	4	2
2nd year	4	2
3rd year	2	2
4th year	2	2
5th year	2	2
6th year	2	2
Total	16	12

However,

1) the training provided up to the second year is for the training to take in advance to the construction work.

2) The training of the 8 engineers up to the second year, is assuming that they will be sent to a different country, from the third year, to expand their knowledge in the Engineering field.

(6) In case the number of person increases, it will be necessary to amend the training plan or extend the successive year of training.