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2) List of Land aquisition and Demolishing cost, 1988 : Department of Roads. (D.O.R)

3) Unit cost of Materials in Nepal, 1989 : Department of Housing and Financial Planning, District Secretary

4) Labor cost in Nepal, 1989 : ditto

5) Lubricant rate in Nepal, 1989 : Department of Roads. (D.O.R)

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7) Wardwise Distribution of Houses in KATHMANDU, 1987 :

8) List of Planned Utility services at Bridge sites, 1989 : Department of Roads. (D.O.R)

9) Organization of Department of Roads, 1989 : Department of Roads. (D.O.R)

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11) Equipment - wise list of Heavy Equipment in Bagmati Zone office, 1989 : D.O.R.

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1) Traffic volume records in Kathmandu, 1988, 1989 : D.O.R.

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3) - ditto - 1981 ~ 1982 Vol. I , Jul. 1984

4) - ditto - 1983 ~ 1984 Vol. I , Sep. 1986

5) - ditto - 1985 ~ 1986 Feb. 1988

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2) Flood Records on Bishnumati River, ~ 1985 :

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3) Specification for Road and Bridge Works. Fifth impression 1985 : Department of Transport, Scottish Development Department, Welsh Office.

4) National Building Code of INDIA 1970, Group 2, Part VI, Structural Design : Indian Standards Institution.

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1) Nepal Central Development Region, S=1:500,000 : H.M.G. Survey Department, Topographical Survey Branch, 1985

2) Kathmandu Metropolitan Area, S=1:2,000, Sheet No. 11, 13, 17, 24, 31 : UNDP Kathmandu Water Supply & Sewerage Project

3) Base Map Derived from LANDSAT Imagery, MAP II, Eastern sheet and Western sheet, S=1:500,000 : H.M.G. National Remote Sensing Centre, Nepal, 1984

4) Land Utilization Map, Central Development Region, S=1:50,000 : H.M.G. Survey Department, Topographical Survey Branch, 1984

5) Geological Map No.72 E - A, Central Development Region, S=1:125,000 : H.M.G. Survey Department, Topographical Survey Branch, 1984

6) Nepal Administrative, S=1:2,000,000 : H.M.G. Survey Department, Topographical Survey Branch, 1987

7) NEPAL S=1:1,000,000, H.M.G. Survey Department, Topographical Survey Branch, 1986

8) NEPAL S=1:1,500,000, EAST NEPAL S=1:50,000 : APA PRESS, Singapore

9) Kathmandu Valley S=1:50,000 : Nepal - Kartenwerk der Arbeitsgemeinschaft für vergleichende Hochgebirgsforshung Nr. 1, 1977.

10) Kathmandu City S=1:10,000 : Nepal - Kartenwerk der Arbeitsgemeinschaft für vergleichende Hochgebirgsforshung Nr. 21, 1979.

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16) INDIAN SUBCONTINENT S=1:4,000,000 : NELLES VERLAG.

(1) ROAD LENGTH, INFLUENCED POPULATION AND INFLUENCED AREA

Plan	Year	Description	Total Length (km)	Influenced Population (person)	Influenced Area (km2)
-	1951		376	21,250	378
	1956	First Five Year Plan	624	13,600	228
	1962	Second Five Year Plan	1,193	7,970	119
	1965	Third Five Year Plan	2,049	5,130	69
	1970	Fourth Five Year Plan	2,504	4,600	57
	1974/75	Fifth Five Year Plan	3,173	3,800	45
	1975/76	First Year of Fifth Five Year Plan	3,444	3,594	42
	1976/77	Second Year of Fifth Five Year Plan	4,136	3,132	35
	1977/78	Third Year of Fifth Five Year Plan	4,594	2,921	32
	1978/79	Fourth Year of Fifth Five Year Plan	4,691	2,925	31
	1979/80	Fifth (Final) Year of Fifth five Year Plan	4,940	2,844	28
	1980/81	First Year of the Sixth Five Year Plan	5,021	2,869	28
	1981/82	Second Year of the Sixth Five Year Plan	5,270	2,854	28
	1982/83	Third Year of the Sixth Five Year Plan	5,546	2,894	27
	1983/84	Fourth Year of the Sixth Five Year Plan	5,717	2,882	25
	1984/85	Final Year of Seventh Five Year Plan	5,925	2,840	25
	The Seventh Plan				
	1985/86	First Year of the Seventh Five Year Plan	6,039	2,841	24
	1986/87	Second Year of Current Plan	6,306	2,775	23

Source: Department of Road

(2) ROAD DEVELOPMENT IN NEPAL

Name of Road	Total Length km	Date of Start	Date of Completion	Foreign Assistance
1. Thankot-Naubise	17	1953	1956	India
(Reconstruction)	17	1978	1982	World Bank
2. Naubise-Mugling	84	1967	1974	China
3. Naubise-Bhainse	97	1953	1956	India
4. Bhainse-Hetauda	10	1958	1967	U.S.A.
5. Hetauda-Narayangarh	78	1973	1983	A.D.B.
6. Narayangarh-Butwal	116	1969	1975	U.K.
7. Narayangarh-Mugling	36	1978	1982	China
8. Khaireni-Gorkha	25	1978	1982	China
9. Mugling-Pokhara	90	1967	1974	China
10. Dhangadi-Dadeldhura	140	1967	-	U.S.A.
11. Pokhara-Sunauli	184	1964	1972	India
12. Kohalpur-Banbasa	204	1973	-	Nepal-India
13. Hetauda-Raxaul	57	1958	1967	U.S.A.
14. Kohalpur-Surkhet	92	1975	-	Nepal
15. Kathmandu-Kodari	114	1963	1967	China
16. Kathmandu-Trishuli	68	1957	1963	Nepal-India-U.S.A
17. Butwal-Kohalpur	251	1973	-	India
A. Butwal-Chandrauta	-	-	-	-
B. Chandrauta-Krishna-nagar	-	-	-	-
C. Chandrauta-Shivapur	-	-	-	-
18. Bhairahawa-Lumbini	22	1973	1978	Nepal
19. Pathalaiya-Dhalkebar	109	1967	1972	U.S.S.R.
20. Dhalkebar-Rajbiraj	95	1967	1974	India
21. Rajbiraj-Itahari	69	1967	1974	India
22. Itahari-Kakarbhitta	92	1967	1974	India
23. Charali-Ilam	78	-	-	Nepal
24. Jogbani-Dharan	50	-	-	U.K.
25. Lamosangu-Jiri	110	1975	-	Switzerland
26. Dharan-Dhankuta	50	1976.	1985	U.K.

Source: Department of Road

(3) FINANCIAL TARGETS FOR THE ROAD AND BRIDGE DURING THE SEVENTH PLAN

Programme	In Million rupees Expenditure
A. Roads Development:	
A.1 Central Level	2,987.0
i. Highway Construction	(1,780.0)
ii. Feeder Roads Construction	(600.0)
iii. Major Urban Roads	(69.0)
iv. Roads under the IRDPs and Maintenance	(105.0)
v. Highway Reconstruction and Maintenance	(300.0)
vi. Equipment for Roads Construction and Maintenance Establishment of Workshop and Training	(73.0)
vii. Feasibility Study, Surveys and Designs	(25.0)
vii. Miscellaneous	(35.0)
A.2 District Level	394.5
i. Current Road Projects	
ii. Roads to be constructed on the basis of Feasibility Studies	
iii. Miscellaneous	
Total	3,381.5
B. Bridges	149.4
i. New Bridge Construction	
ii. Reconstruction of Bridges	
iii. Feasibility Study and Survey Design.	
iv. Backlog Projects from the Sixth Plan.	
C. Suspension Bridges	199.1
C.1 Central Level	(5.0)
i. Training Programme	
ii. National Highway Development Masterplan	
iii. Suspension Bridge Masterplan	
iv. Study and Research on Cable Crossing	
v. Directory of Suspension Bridge Construction and Maintenance	
C.2 District Level	(194.1)
i. Current Suspension Bridges	
ii. Suspension Bridges to be Undertaken after Feasibility Studies	
iii. Miscellaneous	
Grand Total (A+B+C)	3,730.0

Rainfall in mm

Kathmandu

Year	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual	Max in 24 hrs. and date
1965	1.7	4.8	16.5	37.5	47.5	349.5	345.5	342.0	82.7	62.6	42.9	Nil	1333.2	72.0 18 June
1966	37.4	40.4	0.6	8.1	82.9	163.8	396.7	437.0	43.9	9.4	1.2	3.4	1224.8	115.2 24 Aug.
1967	Nil	1.3	51.2	60.8	11.6	245.0	476.4	353.5	142.9	Nil	5.9	Nil	1348.6	134.0 10 July
1968	30.5	9.0	44.8	28.9	130.2	331.8	442.0	279.2	83.3	139.5	0.0	0.0	1519.2	62.4 18 May
1969	9.7	2.2	44.6	31.3	60.5	114.8	315.9	340.9	123.0	65.0	2.3	0.0	1110.2	59.1 19 Aug.
1970	24.2	23.1	24.9	41.9	85.6	235.5	458.1	310.8	197.4	34.5	3.8	0.0	1439.8	68.0 16 July
1971	4.3	7.0	21.9	176.1	145.2	697.5	230.6	256.5	59.7	80.3	1.9	0.0	1681.0	109.0 12 June
1972	2.6	25.3	82.6	35.8	82.6	226.8	529.0	204.7	203.2	93.9	23.0	0.0	1509.5	107.4 28 July
1973	23.6	41.8	43.6	23.6	91.6	400.3	416.0	418.4	373.9	126.7	7.0	0.0	1969.2	96.9 11 Aug.
1974	15.0	4.9	15.1	38.4	119.3	80.8	324.6	285.0	212.4	30.3	0.0	9.7	1135.5	53.4 11 Sept.

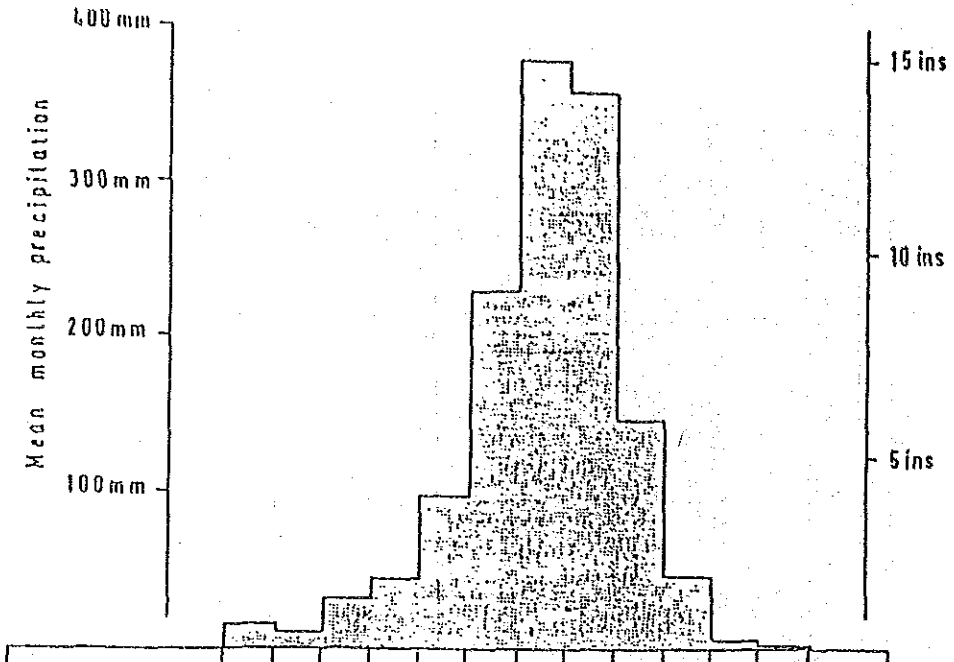
Year		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Max Date	Min Date	Year
	Mean	2.076	1.465	3.338	0.518	1.581	19.11	49.21	55.48	62.15	39.19	9.276	3.752	335	0.16	20.73
1973	Max daily	5.56	14.5	17.2	3.09	4.02	66.2	245	160	217	127	15.2	24.6	25 July	4June	245
	Min daily	1.15	0.39	0.38	0.23	0.36	0.18	7.82	22.5	25.8	15.8	5.56	0.52	'73	'73	0.18
	Mean	1.604	0.721	0.714	1.142	4.263	2.282	47.29	79.82	61.56	15.09	7.180	4.912	350	0.15	10.04
1974	Max Daily	8.72	2.10	2.88	3.15	18.0	17.5	177	200	171	36.2	9.70	6.43	30 Aug.	20	200
	Main daily	0.82	0.33	0.16	0.24	0.20	0.29	2.10	22.2	15.0	10.2	5.86	3.40	'74	March '74	0.16

Location - Latitude 27° 39' 40" N, Longitude 85° 17' 50" E

Drainage area - 585 sq. km.

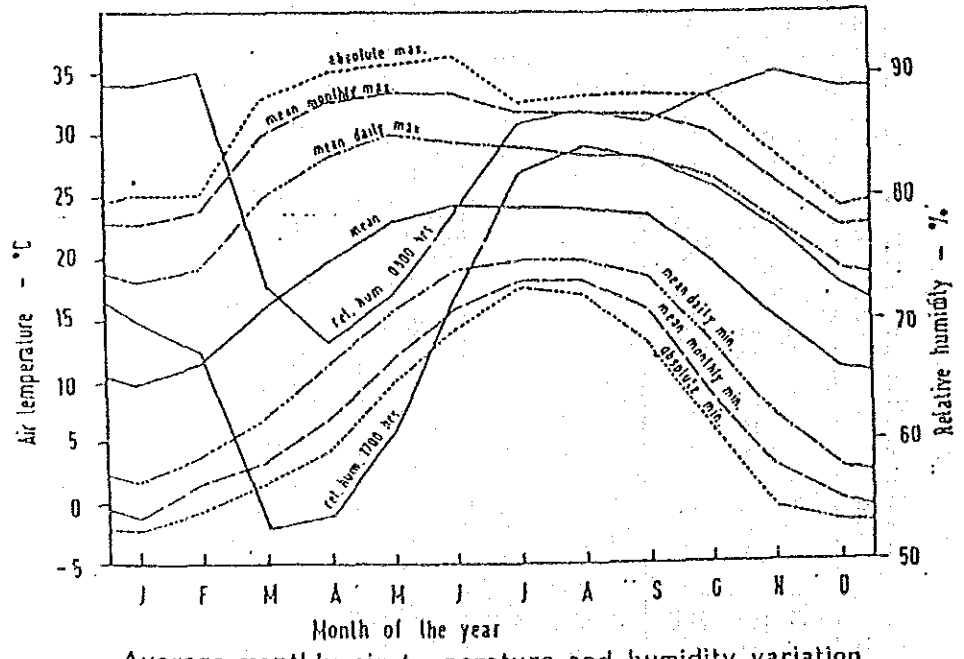
Note: The nearest gauging station from the bridge site in the Chobhar gauging station (Station No. 550) at Chobhar gorge.

(5) PRECIPITATION, AIR TEMPERATURE AND HUMIDITY IN KATHMANDU



Month.	J	F	M	A	M	J	J	A	S	O	N	D	Year
Mean precip.(mm)	17.9	15.7	32.0	45.0	97.7	229.2	378.9	358.4	147.1	47.2	6.9	1.8	1378
Std. deviation (mm)	19.5	19.8	21.2	33.1	53.3	77.2	105.7	84.8	65.5	47.8	13.8	3.5	21.9

Monthly precipitation based on 1948-1970 data



Average monthly air temperature and humidity variation

(6) DISCHARGE AND GAUGE HEIGHT
(BAGMATI RIV., CHOBAR)

Station name: Chovar
River: Bagmati River
Station no.: 550

Date: 23 July 1989

EXTREME DISCHARGES

MAXIMUM INSTANTANEOUS			MINIMUM INSTANTANEOUS		
Discharge (cumec)	Gauge height (meters)	Date	Discharge (cumec)	Gauge height (meters)	Date
206	6.29	1 Sep. 1963	0.15	1.55	14 June 1963
251	6.76	3 Sep. 1964	0.020	1.40	9 June 1964
395	8.10	9 July 1965	0.040	1.40	13 June 1965
634	11.55	24 Aug. 1966	0.18	1.57	21 Apr. 1966
680	12.25	10 July 1967	0.57	1.56	4 June 1967
497	9.60	4 Oct. 1968	0.24	1.65	28 May 1968
431	8.70	19 Aug. 1969	0.44	1.64	14 June 1969
582	10.22	16 July 1970	0.24	1.40	1 Mar. 1970
617	10.57	12 June 1971	0.36	1.58	21 Mar. 1971
876	13.16	28 July 1972	0.046	1.30	8 June 1972
335	7.66	25 July 1973	0.16	1.42	4 June 1973
350	7.82	30 Aug. 1974	0.15	1.41	20 Mar. 1974
591	10.31	3 Aug. 1975	0.20	1.10	6 June 1975
245	6.66	30 June 1976	0.49	1.27	20 Mar. 1976
299	7.26	20 June 1977	0.28	1.27	26 Mar. 1977
407	8.45	16 July 1978	0.84	1.48	9 Mar. 1978
416	8.55	21 Aug. 1979	0.29	1.28	7 June 1979
254	6.75	31 July 1980	0.31	1.36	18 Apr. 1980

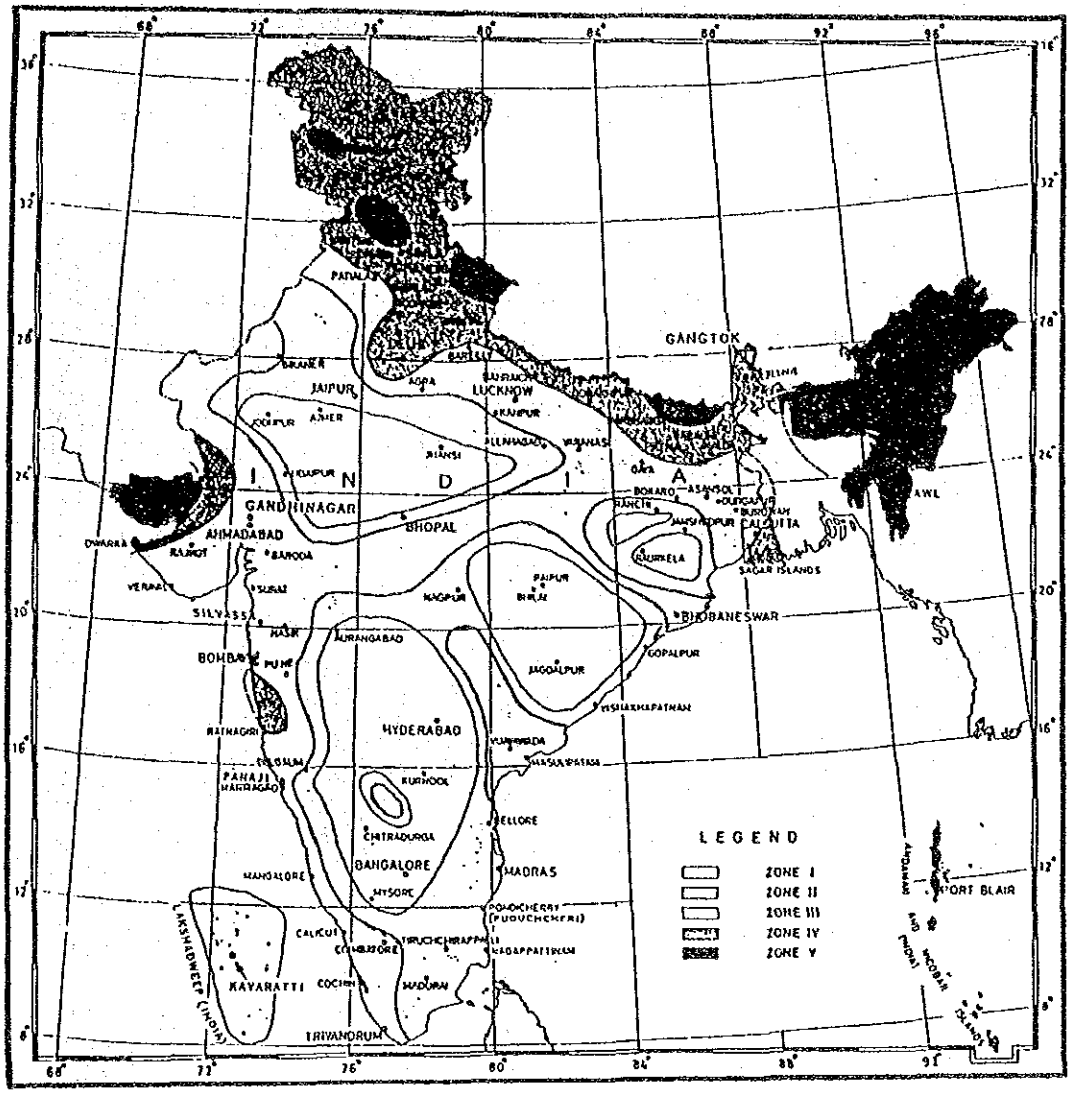
(7) SEISMIC COEFFICIENTS FOR SOME IMPORTANT TOWNS (NBCI)

SEISMIC COEFFICIENTS FOR SOME IMPORTANT TOWNS

Town	Zone	Horizontal Seismic Coefficient α_h	Town	Zone	Horizontal Seismic Coefficient α_h
Agra	III	0·04	Jabalpur	III	0·04
Ahmadabad	III	0·04	Kanpur	III	0·04
Ajmer	I	0·01	Katmandu	V	0·08
Allahabad	II	0·02	Kohima	V	0·08
Almora	IV	0·05	Kurnool	I	0·01
Ambala	IV	0·05	Lucknow	III	0·04
Amritsar	IV	0·05	Ludhiana	IV	0·05
Asansol	III	0·04	Madras	II	0·02
Aurangabad	I	0·01	Madurai	II	0·02
Bahraich	IV	0·05	Mandi	V	0·08
Bangalore	I	0·01	Mangalore	III	0·04
Barauni	IV	0·05	Monghyr	IV	0·05
Bareilly	III	0·04	Moradabad	IV	0·05
Baroda	III	0·04	Myosre	I	0·01
Bhatinda	III	0·04	Nagpur	II	0·02
Bhilai	I	0·01	Nainital	IV	0·05
Bhopal	II	0·02	Nasik	III	0·04
Bhubaneswar	III	0·04	Nellore	II	0·02
Bhuj	V	0·08	Panjim	III	0·04
Bikaner	III	0·04	Patiala	III	0·04
Bokaro	III	0·04	Patna	IV	0·05
Bombay	III	0·04	Pilibhit	IV	0·05
Burdwan	III	0·04	Pondicherry	II	0·02
Calcutta	III	0·04	Poona	III	0·04
Calicut	III	0·04	Raipur	I	0·01
Chandigarh	IV	0·05	Rajkot	III	0·04
Chitradurga	I	0·01	Ranchi	II	0·02
Coimbatore	III	0·04	Roorkee	IV	0·05
Cuttack	III	0·04	Raurkela	I	0·01
Darbhanga	V	0·08	Sadiya	V	0·08
Darjeeling	IV	0·05	Simla	IV	0·05
Dehra Dun	IV	0·05	Sironj	I	0·01
Delhi	IV	0·05	Srinagar	V	0·08
Durgapur	III	0·04	Surat	III	0·04
Gangtok	IV	0·05	Tezpur	V	0·08
Gauhati	V	0·08	Thanjavur	II	0·02
Gaya	III	0·04	Tiruchchirappalli	II	0·02
Gorakhpur	IV	0·05	Trivandrum	III	0·04
Hyderabad	I	0·01	Udaipur	II	0·02
Imphal	V	0·08	Varanasi	III	0·04
Jaipur	II	0·02	Vijayawada	III	0·04
Jamshedpur	II	0·02	Vishakhapatnam	II	0·02
Jhansi	I	0·01			
Jodhpur	I	0·01			
Jorhat	V	0·08			

NOTE — The coefficients given are according to *5.2.1* and should be suitably modified for important structures according to *5.2.2* and *5.4*.

(8) SEISMIC ZONES (NBCI)



The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. Based upon Survey of India map with the permission of the Surveyor General of India. © Government of India copyright 1975

Fig. 13 Map of India Showing Seismic Zones

(9) LIST OF EARTHQUAKES OF MORE THAN 5 MAGNITUDE IN RICHTER SCALE, OCCURRED WITHIN THE NEPAL REGION

LIST OF EARTHQUAKES OF MORE THAN 5 MAGNITUDE

ON RICHTER SCALE, OCCURED WITHIN THE NEPAL REGION

Y	M D	EPCL AREA	LAT. DEG N	LONG DEG E	DEPT KM	INT MM	MAG	REF
1966	1218	WEST NEPAL	29.6	81.0			5.0	USC
1966	1221		29.65	80.79			5.2	ISC
1967	0105		30.0	86.0			5.2	LAO
1967	0814		28.0	80.0			5.0	LAO
1967	1218		29.46	81.71			5.0	ISC
1968	0527	NEPAL	29.7	80.4			5.1	USV
1969	0204		28.3	81.4			5.1	LAO
1969	0211		28.1	82.7			6.2	LAO
1969	0213		27.9	85.4			5.0	LAO
1969	0213		28.0	81.8			5.3	LAO
1969	0224		27.9	85.6			5.2	LAO
1969	0303		30.04	79.84			5.0	ISC
1969	0305		29.2	81.1			5.2	HARI
1970	0212		29.24	81.57			5.3	ISC
1970	0226		27.62	85.7			5.0	ISC
1971	0503	TIBET	30.79	84.33	27		5.3	ISC
1971	1204	NEPAL	27.93	87.95	29		5.2	ISC
1972	0204	TIBET	30.34	84.47	18		5.1	ISC
1972	0315	TIBET	30.425	84.502	33		5.3	NEIS
1972	0428	TIBET	31.34	84.92	32		5.0	ISC
1973	0102	TIBET	61.17	88.08	43		5.1	ISC
1973	0422	TIBET	28.135	86.993	33		5.2	NEIS
1973	1016	NEPAL	28.219	82.945	33		5.2	NEIS
1974	0303	TIBET	30.74	86.32			5.5	ISC
1974	0324	NEPAL	27.66	86.0			5.4	ISC
1974	0927	NEPAL	28.59	85.51	20		5.5	ISC
1974	1223	NEPAL	29.32	81.38	45		5.2	ISC
1975	0131	NEPAL	28.1	84.729	33		5.4	NEIS
1975	0619		26.74	87.5			5.1	NEIS
1975	0906	NEPAL	29.21	81.95	33		5.1	ISC
1975	1126	TIBET	28.15	87.8	33		5.0	ISC
1976	0510	NEPAL	29.284	81.46	33		5.2	NEIS
1976	0914	TIBET	29.795	89.559	82		5.5	NEIS
1976	0929	NEPAL	29.817	81.39	33		5.0	NEIS
1976	1023	TIBET	28.676	86.228	63		5.1	NEIS
1977	0106	TIBET	31.048	88.058	33		5.2	NEIS
1977	0316	TIBET	31.3	89.38	33		5.0	ISC
1977	1118	TIBET	32.693	88.388	33		6.5	NEIS
1978	0210	NEPAL	28.03	84.7			5.3	ISC
1978	0808	TIBET	32.27	83.1			5.1	ISC
1978	1004	NEPAL	27.834	85.963	33		5.2	NEIS
1979	0520	NEPAL INDIA BORDER	30.029	80.31	33		5.9	NEIS

LIST OF EARTHQUAKES OF MORE THAN 5 MAGNITUDE

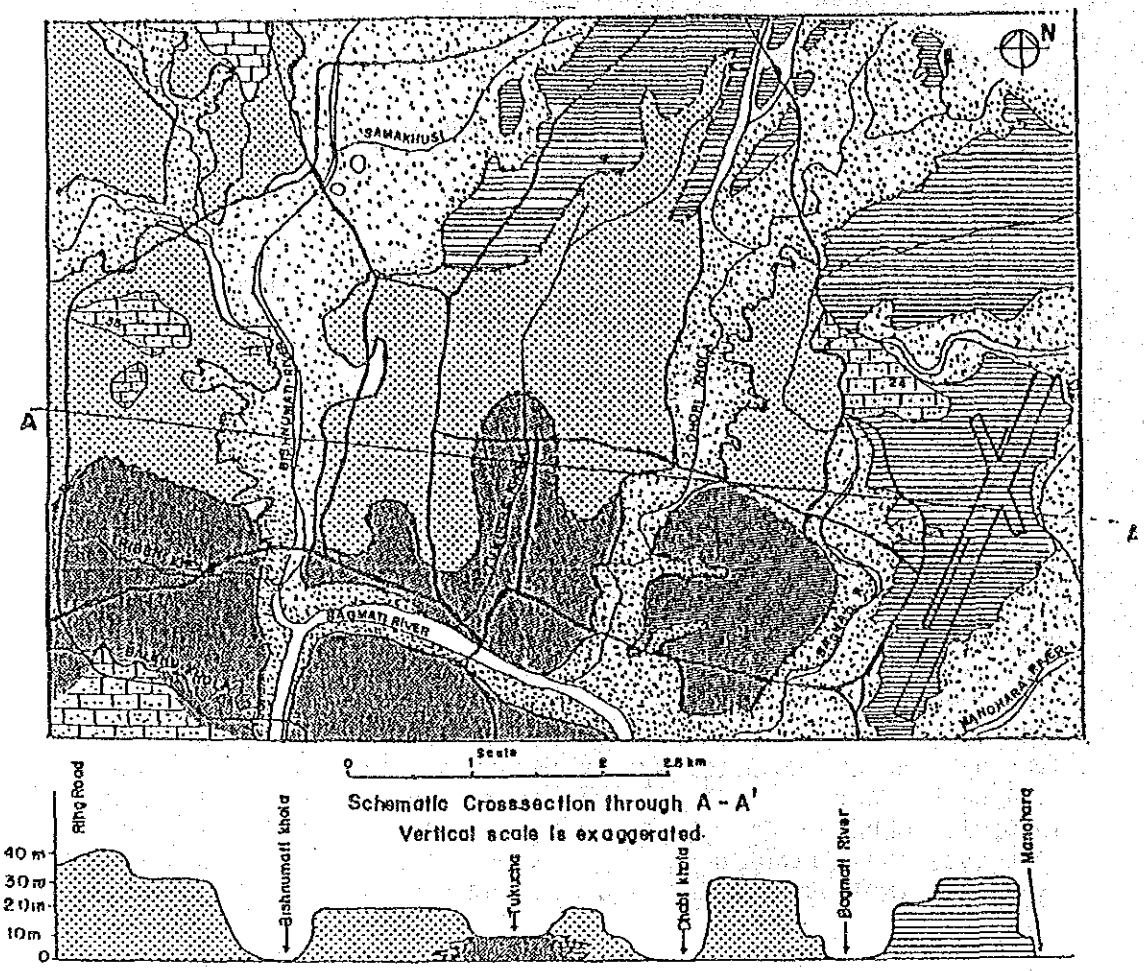
ON RICHTER SCALE, OCCURED WITHIN THE NEPAL REGION

Y	M D	EPCL AREA	LAT DEG N	LONG DEG E	DEPT KM	INT MM	MAG	REF
1979	0619	NEPAL INDIA BORDER	26.74	87.48			5.2	ISC
1980	0222	TIBET	30.55	88.86	14		5.7	ISC
1980	0625	TIBET	30.13	81.76	28		5.1	ISC
1980	0729	NEPAL	29.34	81.21	3		5.7	ISC
1980	0729	NEPAL	29.598	81.092	18		6.1	NEIS
1980	1008	TIBET	31.354	87.666	33		5.0	NEIS
1980	1010	NEPAL	29.17	81.208	33		5.0	NEIS
1980	1118	TIBET	29.55	85.18	24		5.0	ISC
1980	1119	SIKKIM	27.4	88.8			6.0	ISC
1981	0515		29.504	81.942			5.1	
1982	0405		27.496	88.894			5.1	NEIS
1983	0202	INDIA CHINA BORDER	27.032	92.87	33		5.2	NEIS
1983	0301	INDIA CHINA BORDER	28.61	95.982	33		5.0	NEIS
1984	0219	NEPAL INDIA BORDER	29.659	80.55	58		5.0	NEIS
1984	0415	TIBET	31.586	82.262	33		5.0	NEIS
1984	0518	NEPAL	29.606	81.884	33		5.6	NEIS
1984	0521	INDIA BANGLADESH	23.663	91.519	33		5.3	NEIS
1984	1230	INDIA BANGLADESH	24.598	92.839	33		5.6	NEIS

Abbreviation

Y = year
M = month
D = day
EPCL = epicentre location
LAT = latitude
LONG = longitude
DEPT = depth of hypocentre

(10) GEOLOGICAL MAP OF KATHMANDU CITY

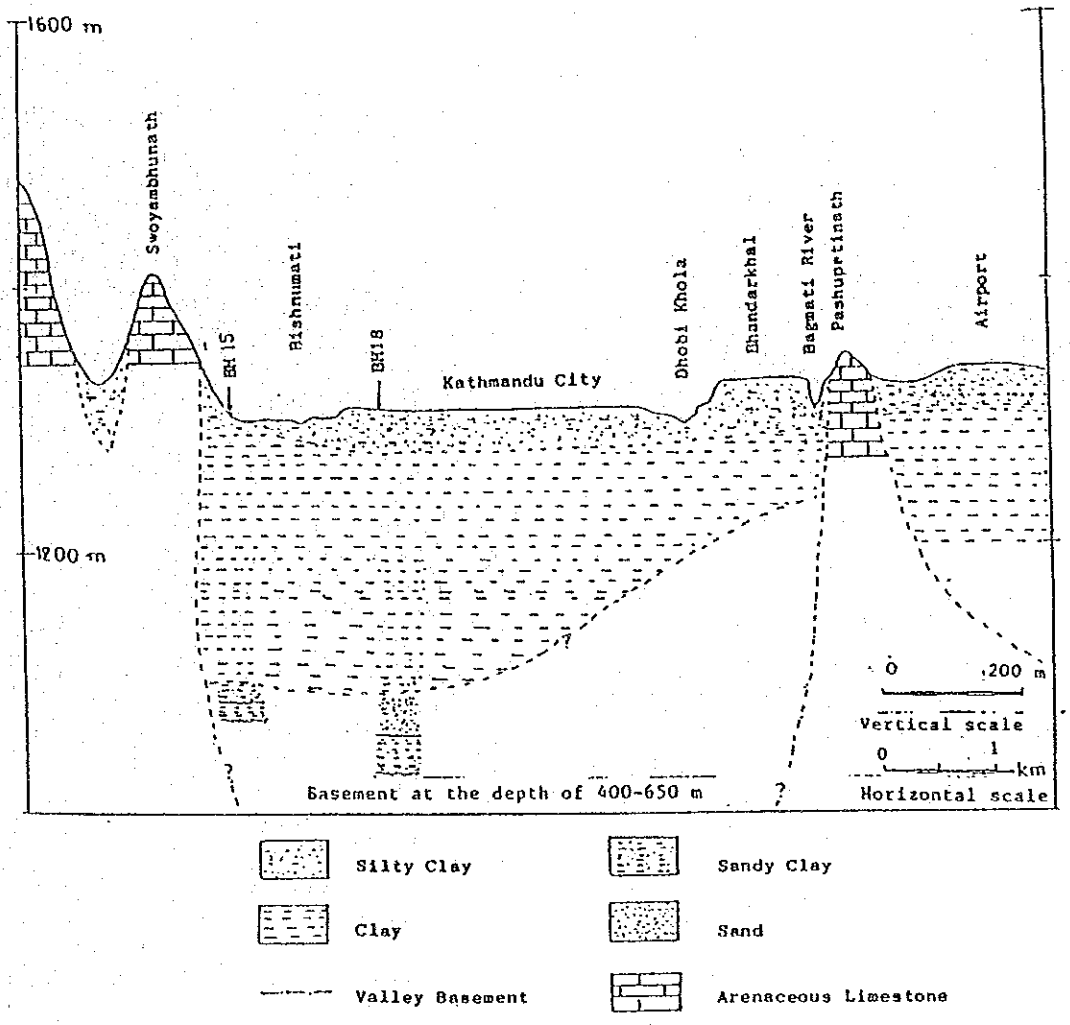


LEGEND

- Limestone
- Arenaceous Limestone
- Lake Delta Facies: Coarse and Fine Sand Interlayered with Thin Clay
- Proximal Lake Facies: Lamination of Fine Sand and Clay
- Distal Lake Facies: Black Carbonaceous Clay
- Flood Plain

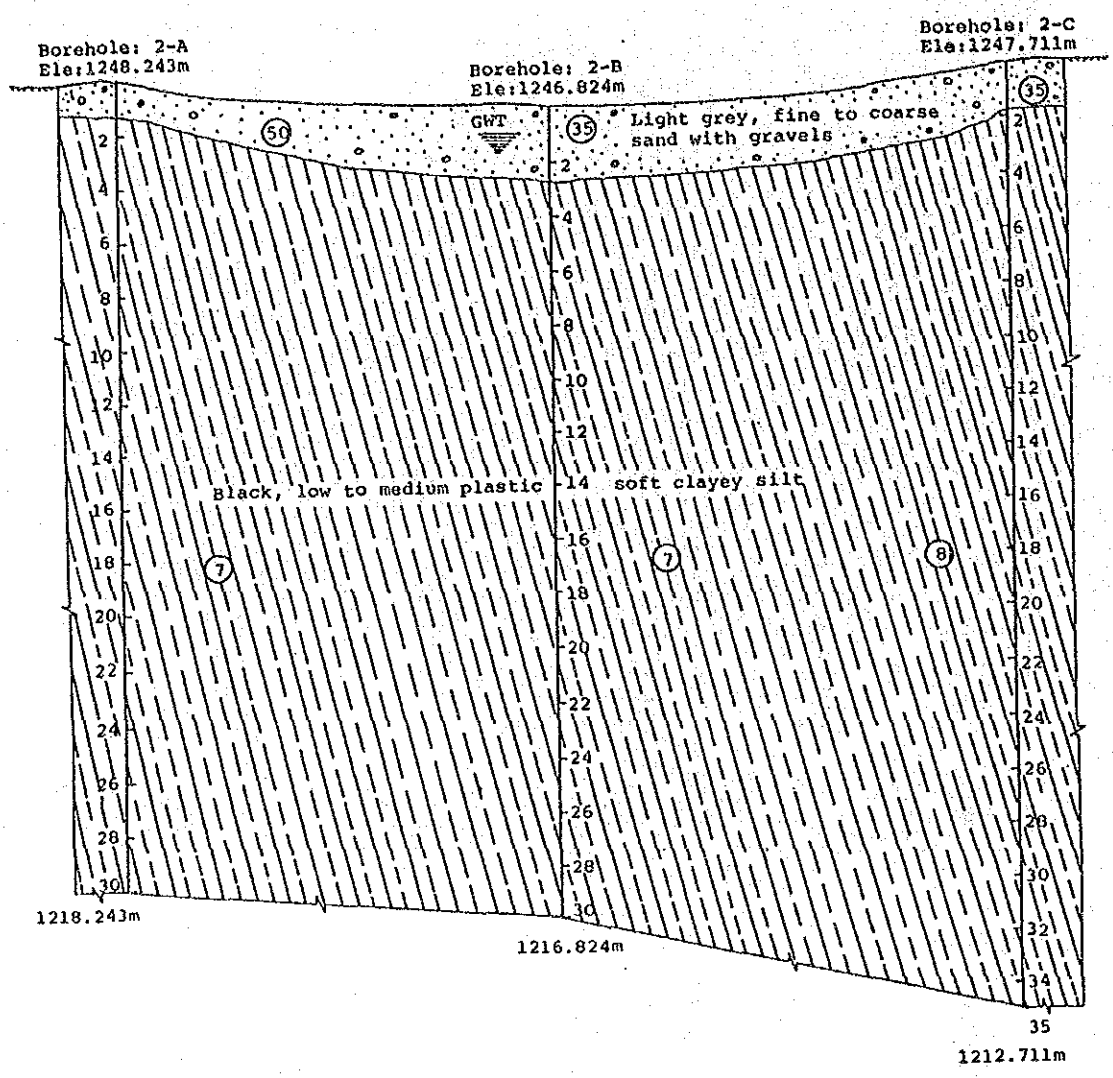
Geological Map of Kathmandu City

(11) GEOLOGICAL CROSS SECTION IN THE KATHMANDU VALLEY



Cross Section in E-W Direction
between Swayambhu and Pashupatinath

(12) SOIL PROFILES AT BRIDGE SITE



(50) average SPT for the strata

Fig-8 Geological profile at bridge construction site of Bishnumati river (Dallu)

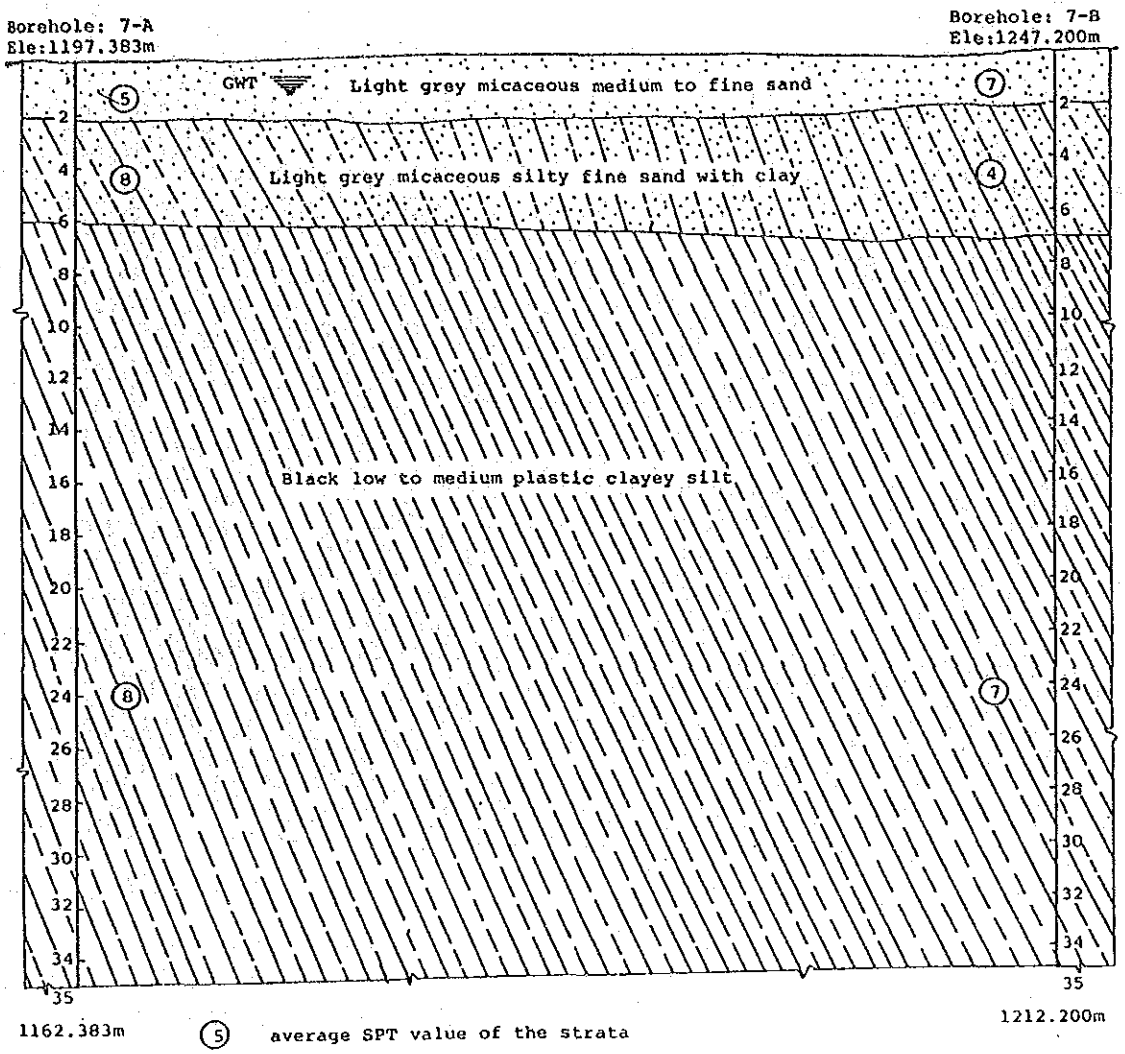
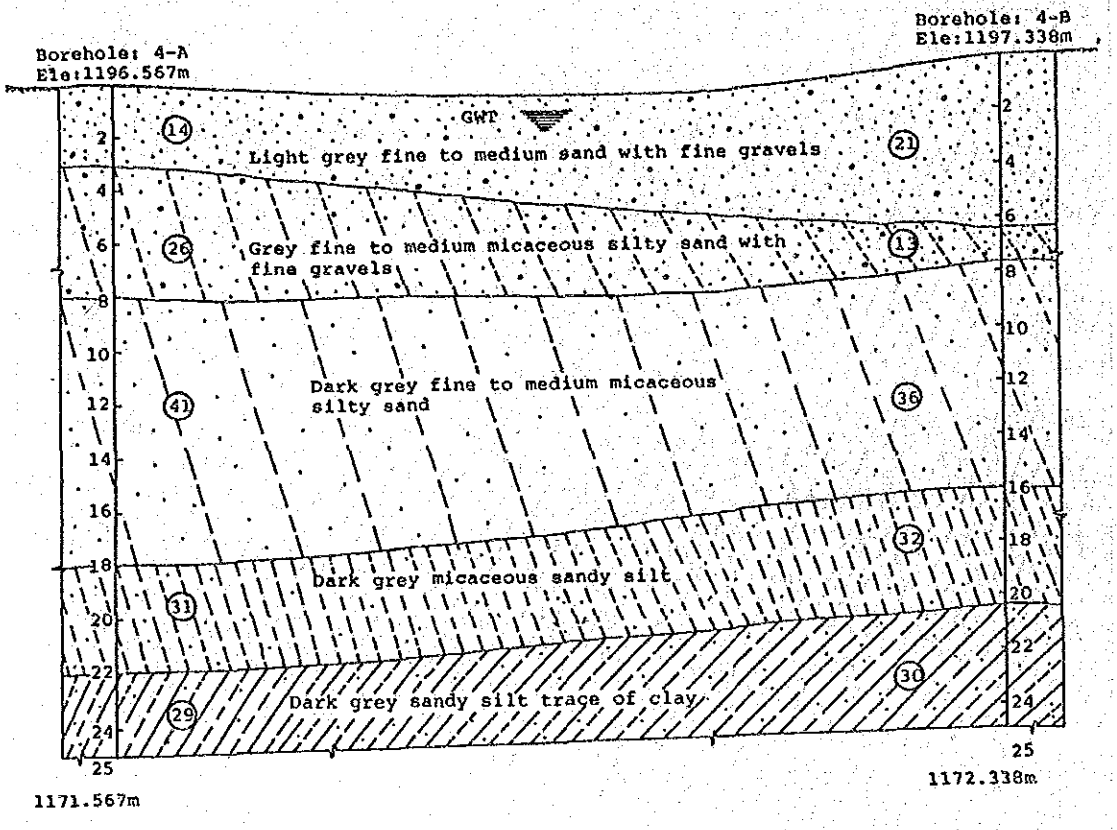
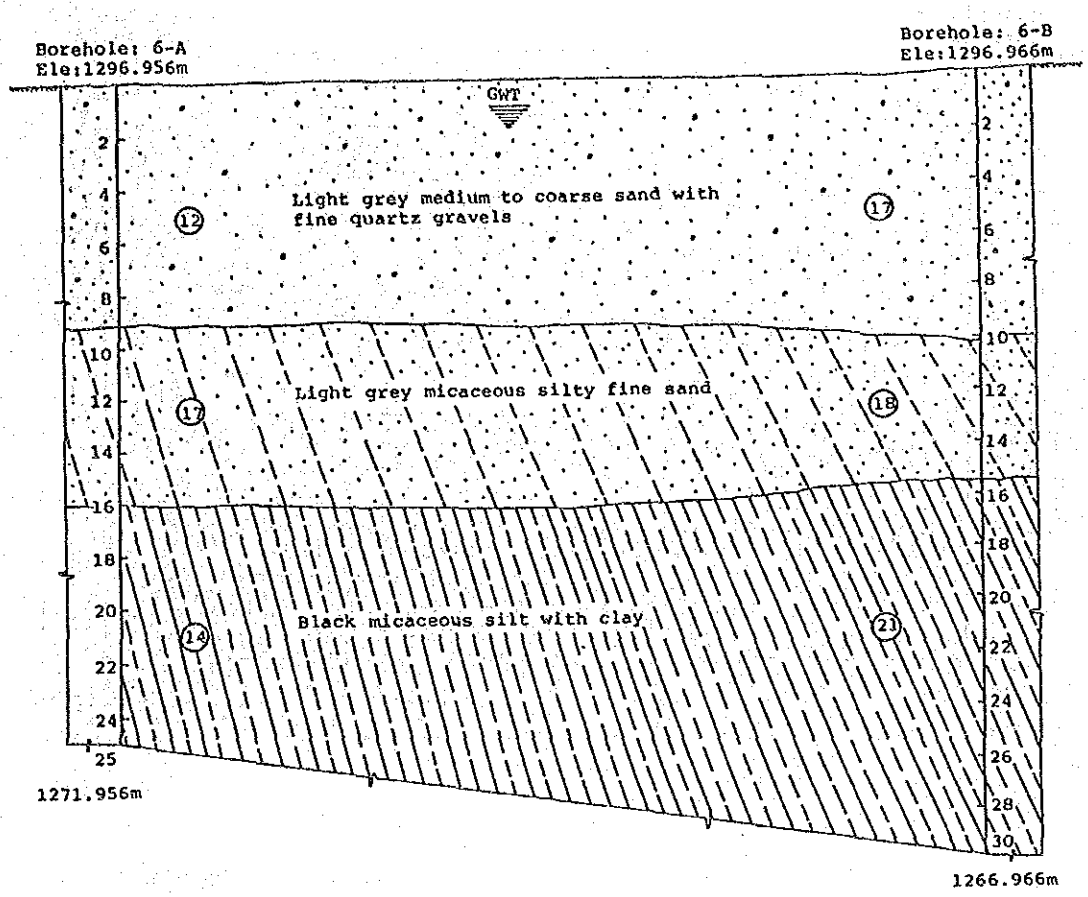


Fig- 11 Geological profile at the bridge construction site of Dhobikhola (Babarmahal)



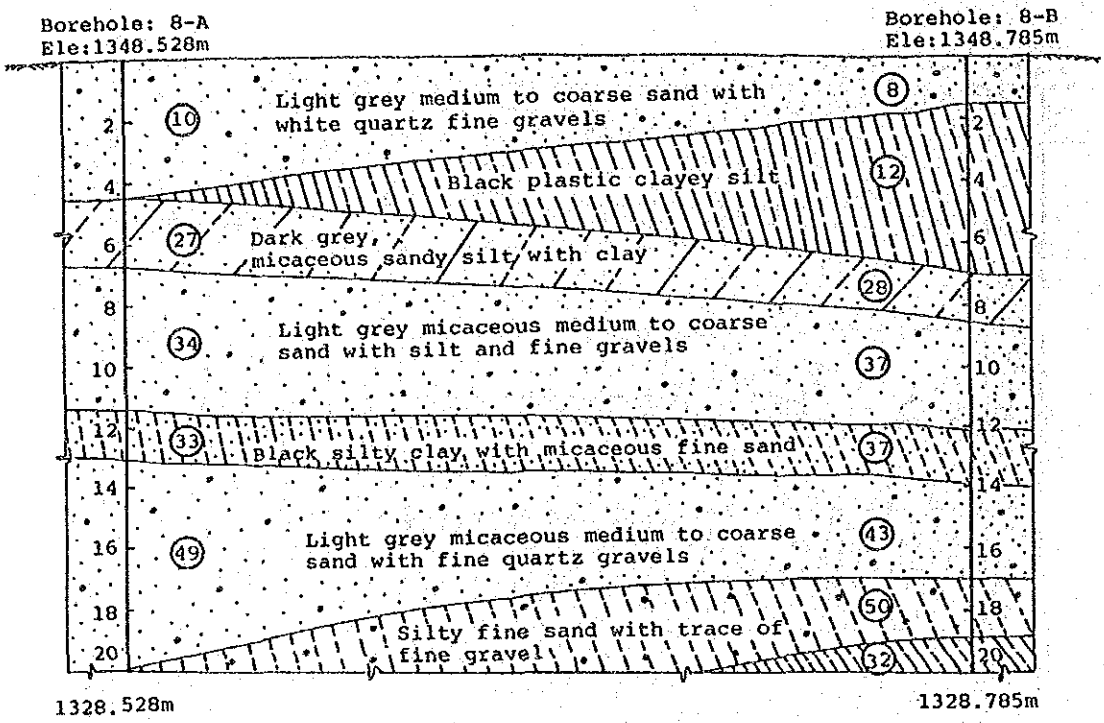
(14) average SPT of the strata

Fig- 9 Geological profile at the bridge construction site of Dhobikhola river (Kalopul)



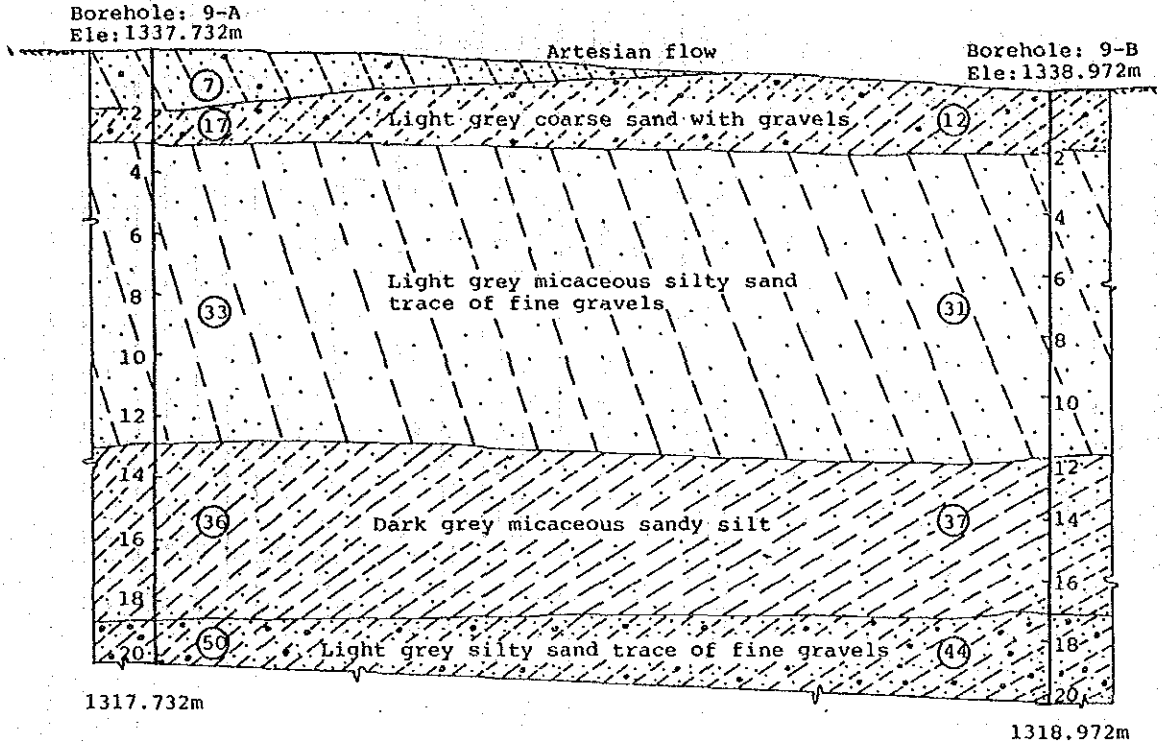
(12) average SPT for the strata

Fig- 10 Geological profile at the bridge construction site of Dhobikhola river (Handigaon)



(10) average SPT for the strata

Fig-12 Geological profile at the bridge construction site of Mahadeo khola



(7) average SPT for the strata

Fig- 13 Geological profile at the bridge construction site of Manmatta river (Branch of Manohara river)

(13) SOIL BORING LOG

Borehole: 2-A

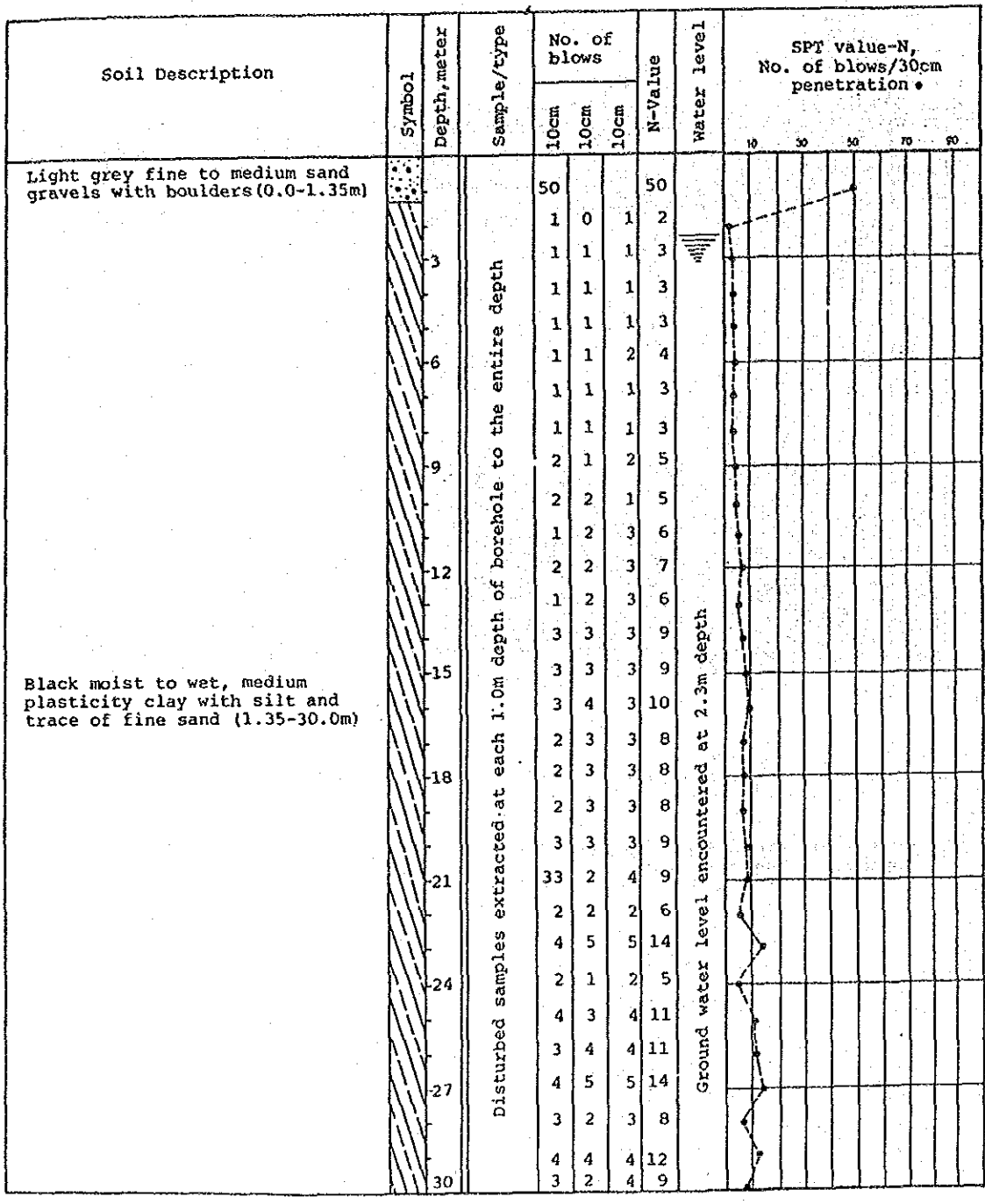
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation:1248.243

Location: Bishnumati

Total depth: 30.0m

Date: 20-25/10/89



Borehole: 2-B

Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation:1246.824

Location: Bishnumati

Total depth: 30.0m

Date: 20-25/10/89

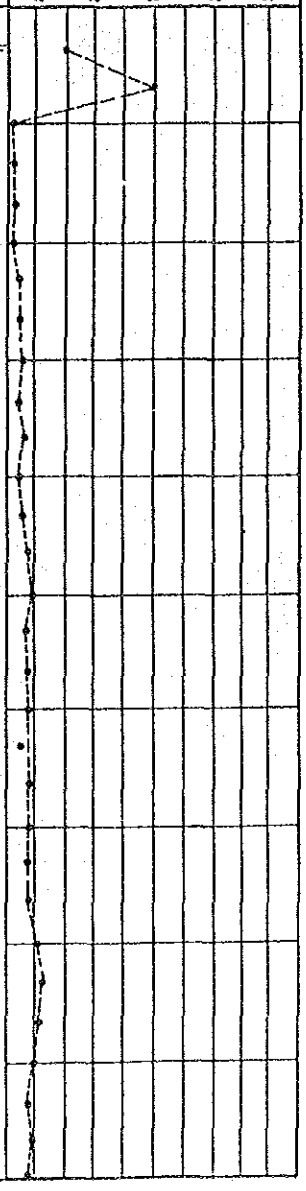
Soil Description	Depth, meter	No. of blows 10cm	10cm	10cm	N-Value
Light grey medium to coarse, sand and gravels with boulder (0.0-2.8m)		11	5	4	20
		50			50
	3	1	1	1	3
		1	1	1	3
		1	1	1	3
	6	1	1	1	3
		2	1	2	5
		1	2	2	5
	9	2	2	2	6
		1	2	2	5
		2	2	3	7
	12	2	1	2	5
		1	2	3	6
Black moist to wet medium plasticity clay with silt (2.80-30.0m)		2	3	3	8
	15	3	4	3	10
		3	2	2	7
		3	2	3	8
	18	3	3	3	9
		1	2	2	5
		2	3	3	8
	21	3	2	4	9
		2	3	3	8
		3	2	4	9
	24	3	3	5	11
		3	5	4	12
		3	4	4	11
	27	3	3	4	10
		3	3	3	9
		3	4	3	10
	30	3	2	2	8

Symbol

Sample/type: Disturbed samples extracted at each 1.0m depth of the borehole to the entire depth

Water level: Ground water level encountered at 1.0m depth

SPT value-N, No. of blows/30cm penetration



Borehole: 2-C

Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation: 1247.711

Location: Bishnumati

Total depth: 35.0m

Date: 1-4/11/89

Soil Description	Depth, meter	Sample/type	No. of blows 10cm	10cm	10cm	N-Value
Light grey fine to medium sand gravels with boulders (0.0m-1.9m)			10	6	5	21
			25	15	10	50
	3		1	1	1	3
			1	0	1	2
			1	1	1	3
	6		1	1	2	4
			1	2	2	5
		UD1	1	2	2	5
	9		2	2	2	6
		UD2	2	2	2	6
			1	2	2	5
	12	UD3	1	2	3	6
			1	2	3	6
		UD4	2	2	3	7
Black moist to wet medium plasticity clay with silt (1.9m-35.0m)	15		2	3	4	9
			2	3	4	9
			4	4	4	12
	18	UD5	2	3	4	9
			2	4	4	10
		UD6	2	3	3	8
	21		2	3	3	8
			3	3	3	9
			3	3	4	10
	24		3	3	4	10
			3	3	4	10
			3	3	4	10
	27		3	4	5	12
			3	4	4	11
			2	4	4	10
* Average SPT from 30m to 35m	30		3	3	4	11*

Water level encountered at 1.0m depth

SPT value-N, No. of blows/30cm penetration •

10 30 50 70 90

Borehole: 4-A

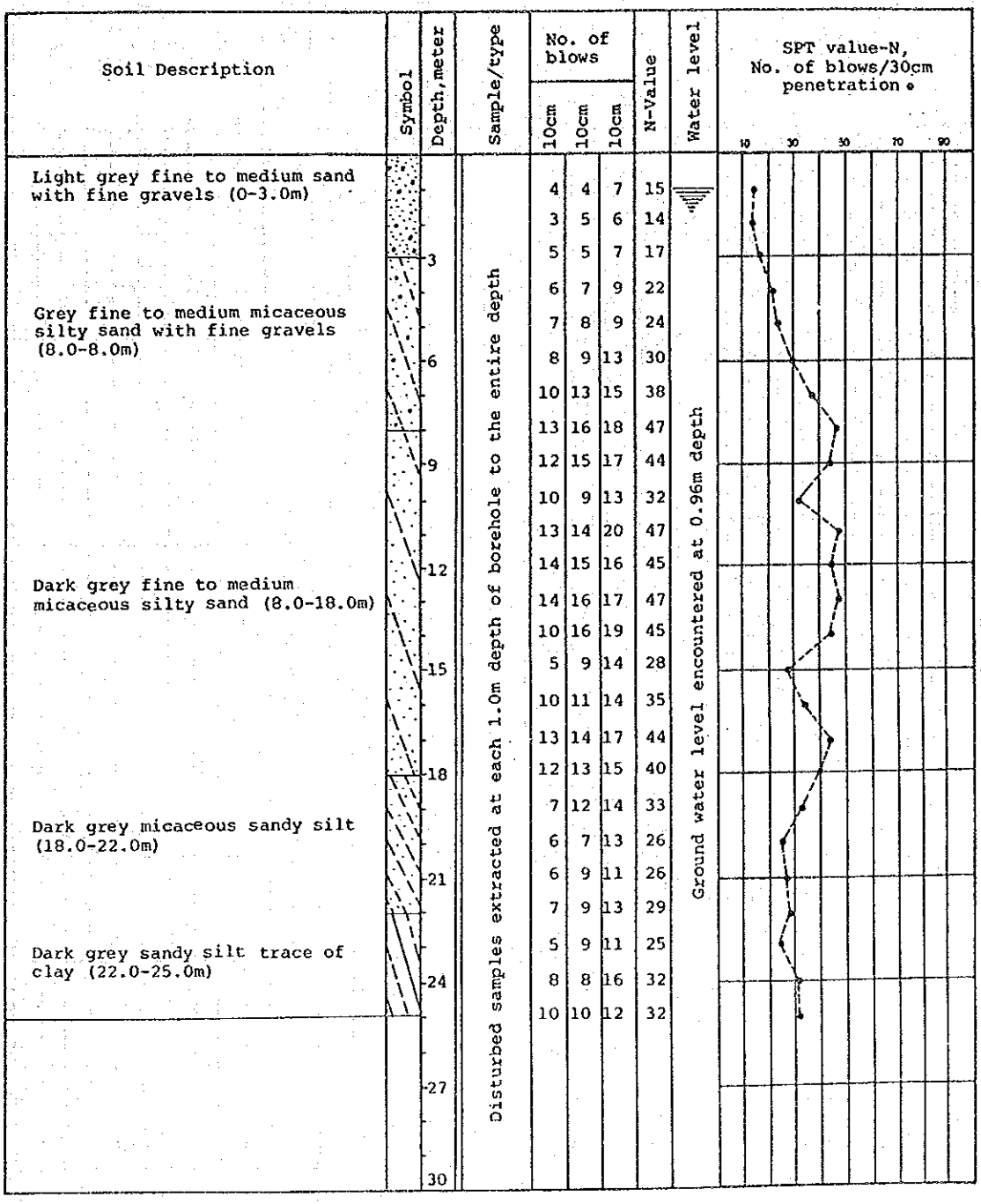
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation:1196.567

Location: Dhobikhola

Total depth: 25m

Date: 20-24/10/89



Borehole: 4-B

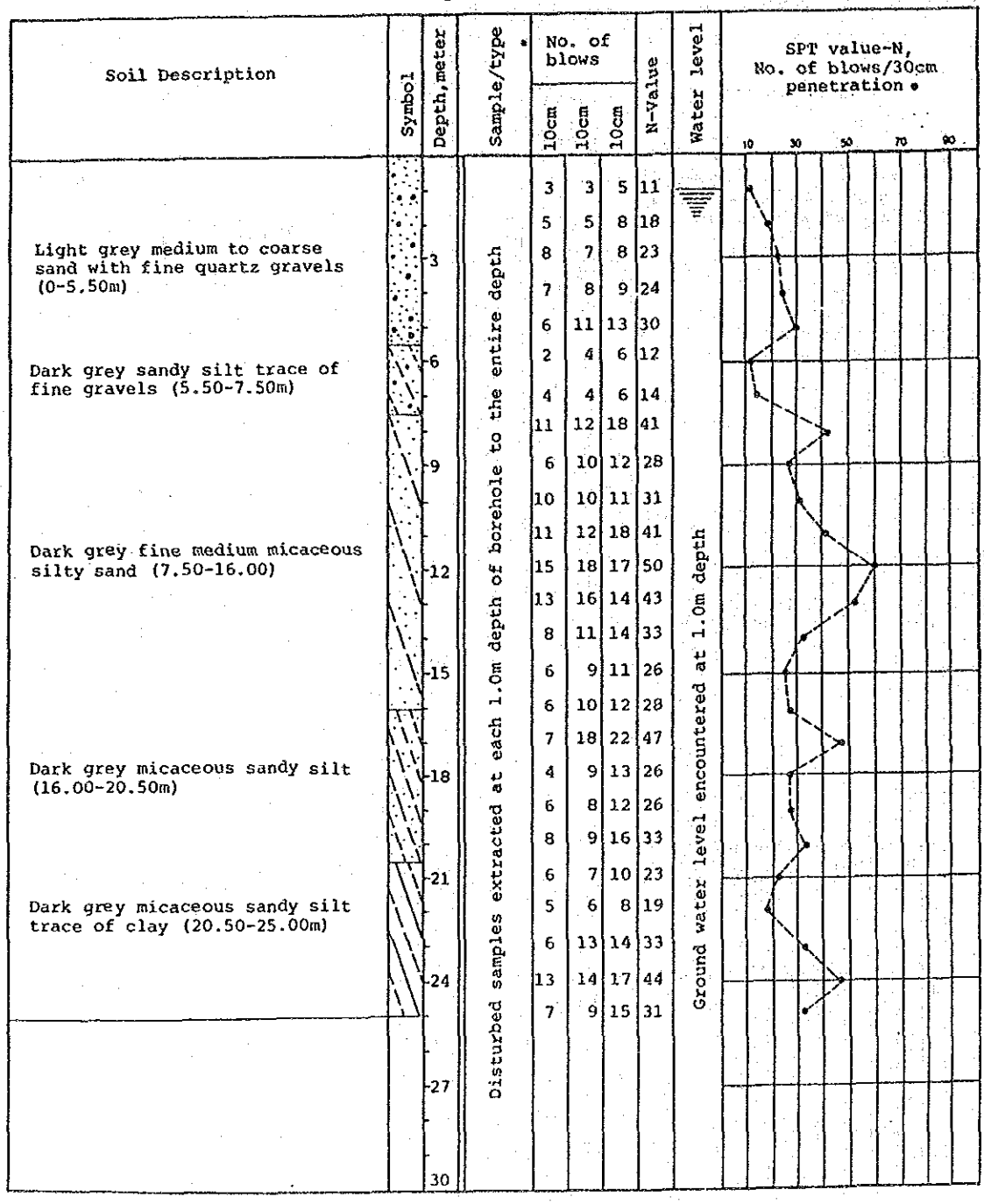
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation:1197.338

Location: Dhobikhola

Total depth: 25.00m

Date: 20-23/10/89



Borehole: 6-A

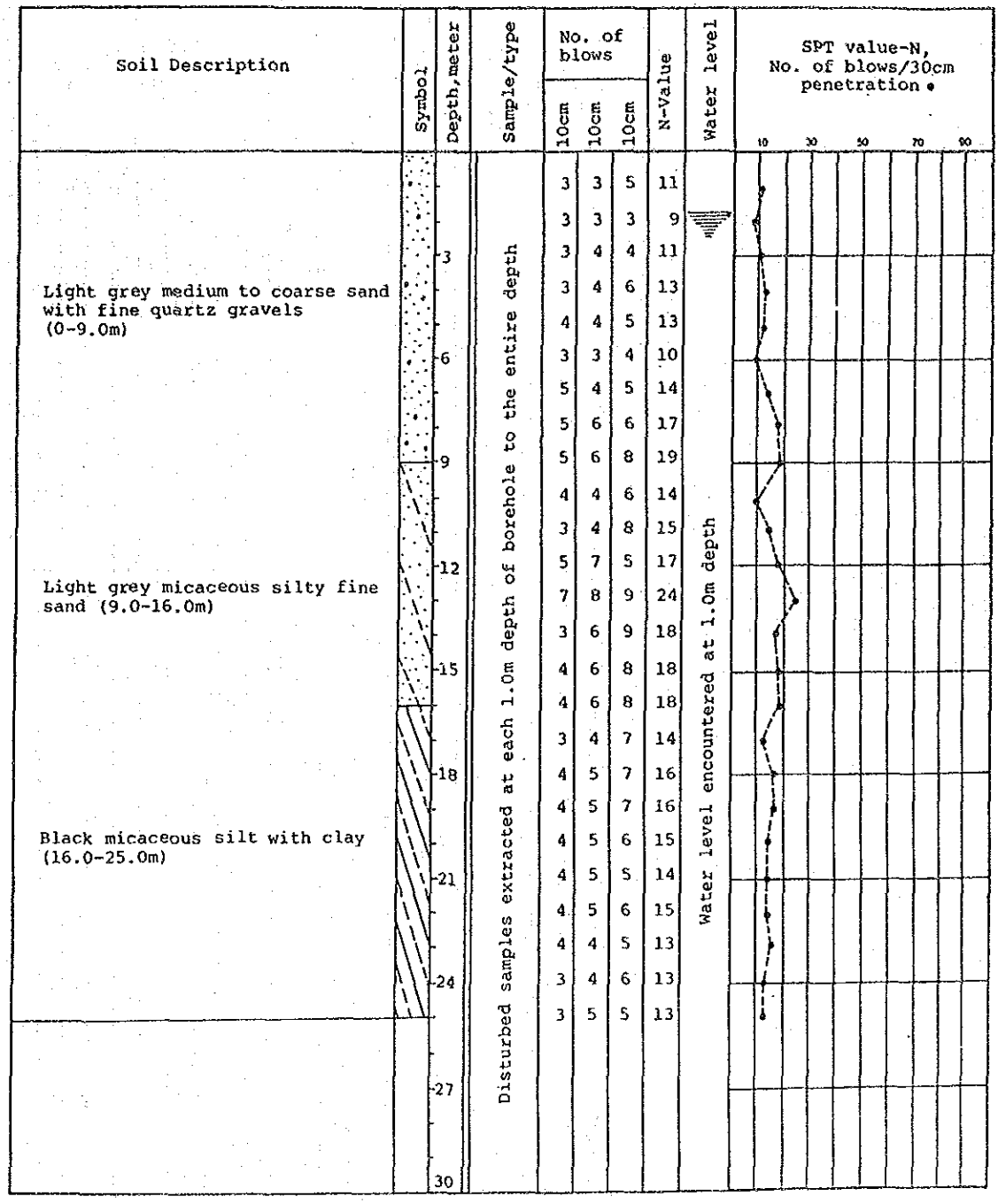
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation:1296.956

Location: Dhobikhola

Total depth: 25.0m

Date: 24-27/10/89



Borehole: 6-B

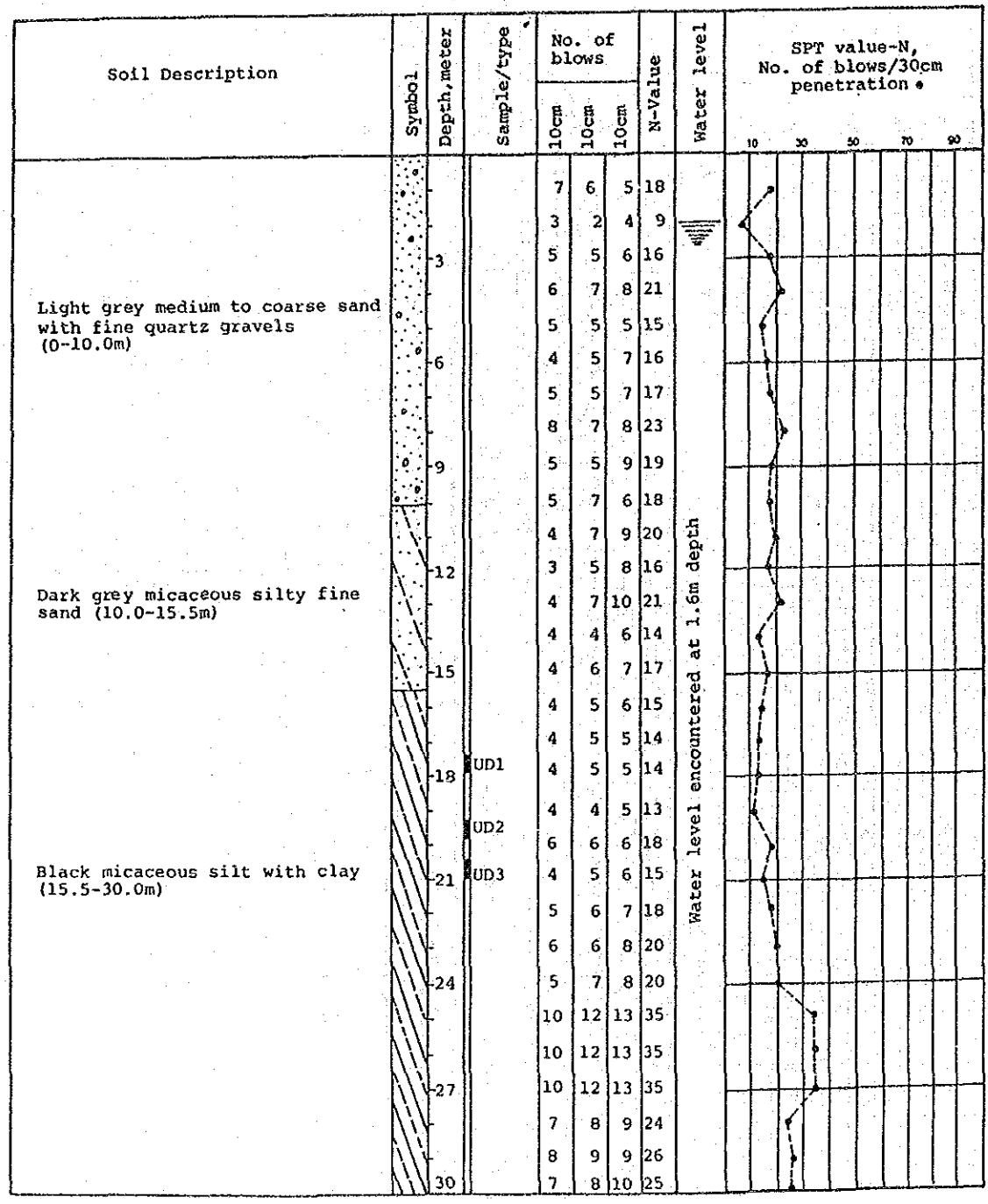
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation:1296.966

Location: Dhobikhola

Total depth: 30.0m

Date: 24-28/10/89



Borehole: 7-A

Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation: 1197.383

Location: Dhobikhola

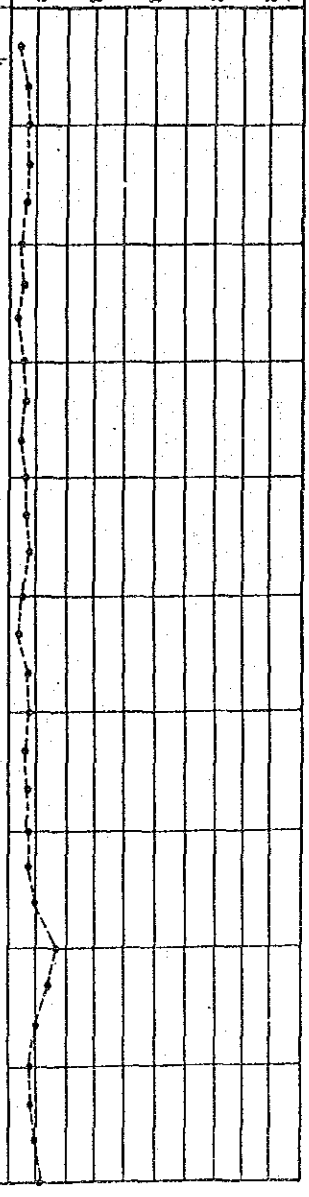
Total depth: 35.0m

Date: 5-9/11/89

Soil Description	Depth, meter	Sample/type	No. of blows 10cm	10cm	10cm	N-Value
Light grey micaceous medium to fine sand (0-2.2m)			2	2	1	5
			3	1	3	7
	3		2	3	3	8
Light grey micaceous silty fine sand with clay (2.2-6.0m)			2	3	4	9
			2	2	4	8
	6		1	2	2	5
			1	2	3	6
		UD1	1	1	2	4
	9		2	2	2	6
		UD2	2	2	3	7
			2	1	2	5
		UD3	2	2	2	6
	12		2	2	3	7
			3	2	3	8
		UD4	2	2	2	6
Black low to medium plastic clayey silt (6.0-35m)	15		1	2	2	5
		UD5	2	3	3	8
			2	2	3	7
	18		1	2	3	6
			2	3	4	9
			2	3	4	9
	21		2	3	4	9
			3	3	4	10
			4	5	7	16
	24		4	5	5	14
			3	3	4	10
			2	3	4	9
	27		2	3	4	9
			3	3	4	10
* 12 average SPT from 30m to 35m	30		3	4	4	12*

Water level: Ground water level encountered at 1.3m depth

SPT value-N, No. of blows/30cm penetration •



Borehole: 7-B

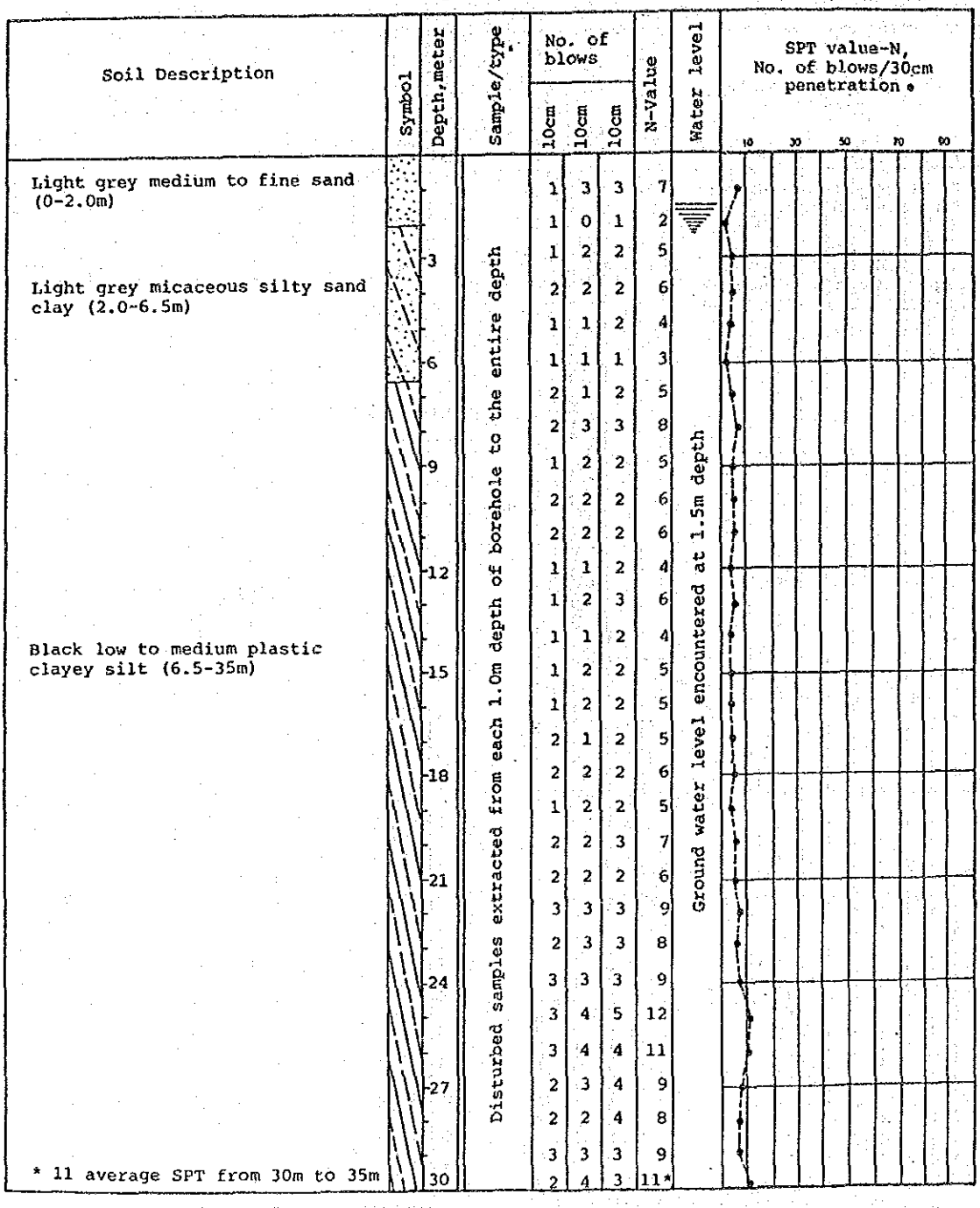
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation:1247.200

Location: Dhobikhola

Total depth: 35.0m

Date: 5-9/11/89



* 11 average SPT from 30m to 35m

Borehole: 8-A

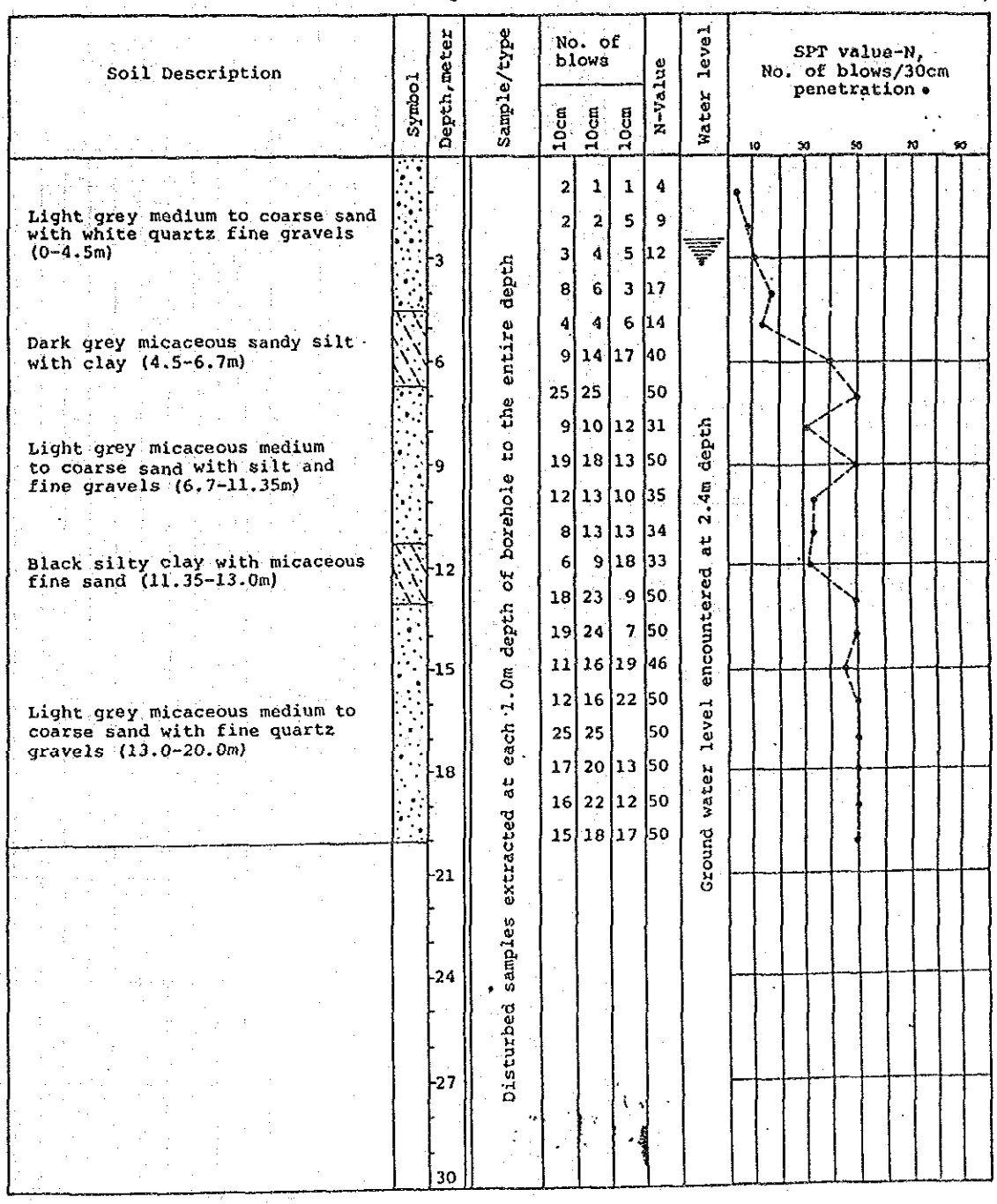
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation: 1346.528

Location: Mahadeo khola

Total depth: 20.0m

Date: 26Oct.-1Nov., 8



Borehole: 8-B

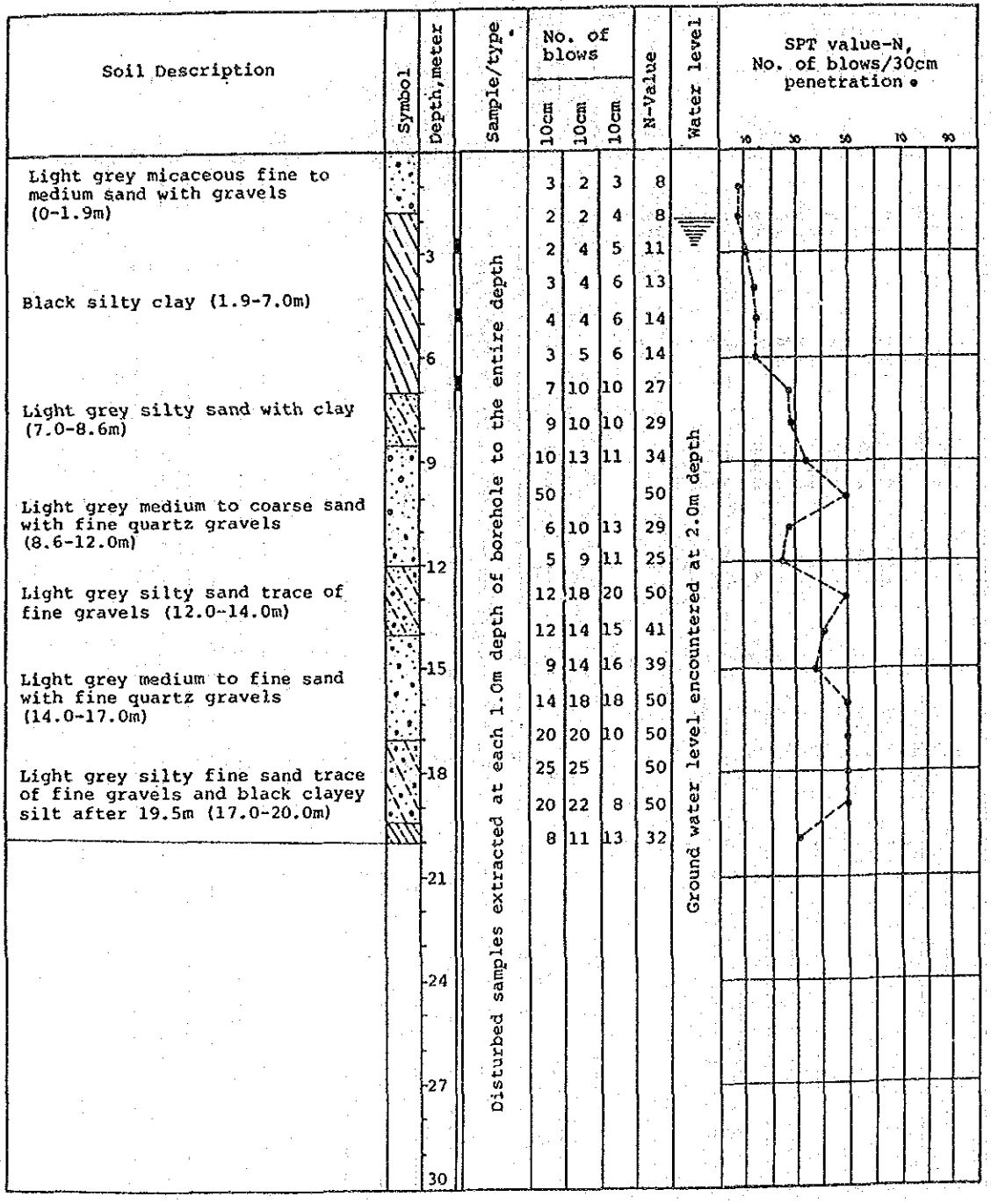
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation: 1348.785

Location: Mahadeo khola

Total depth: 20.0m

Date: 28Oct.-2Nov.,89



Borehole: 9-A

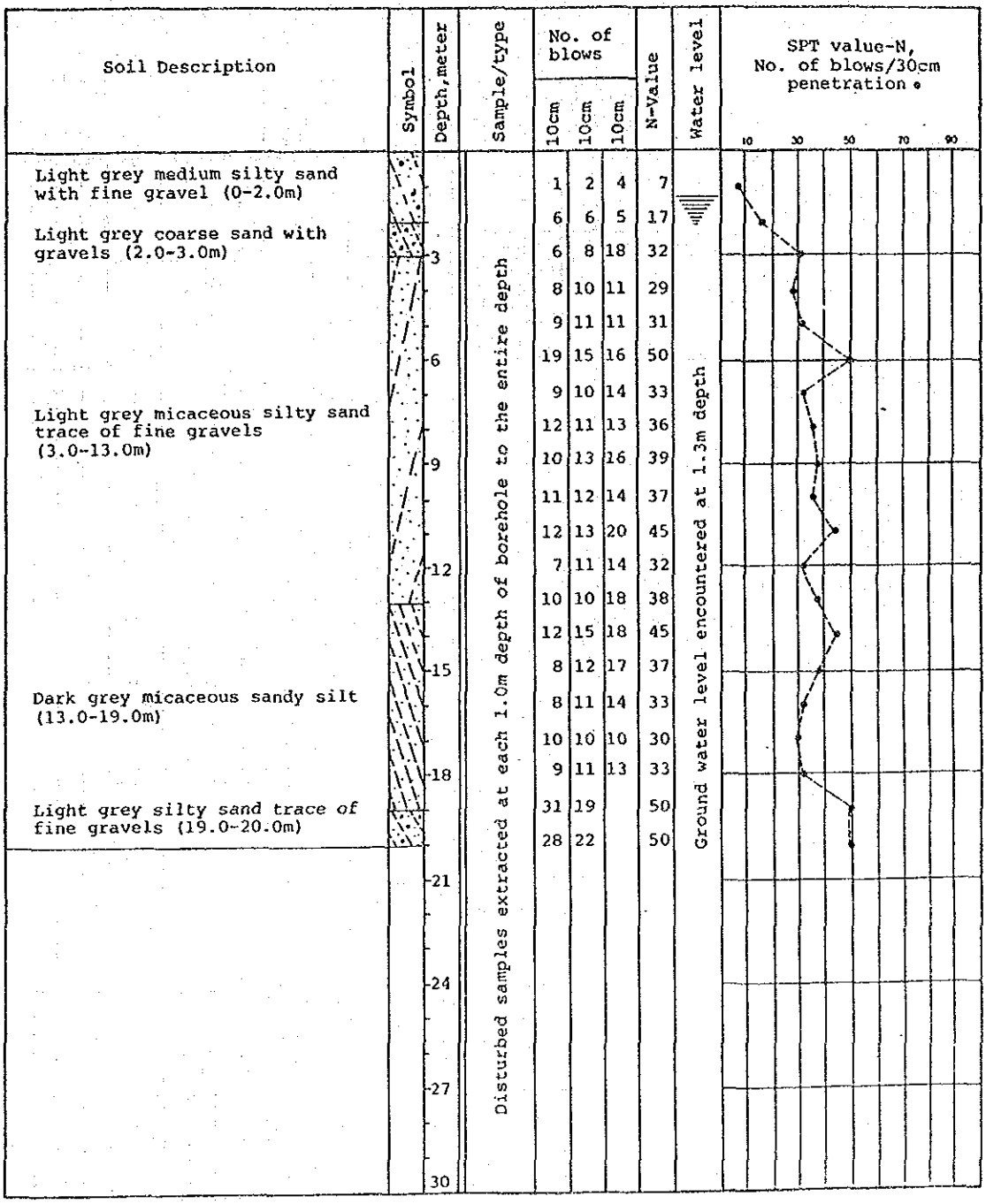
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation: 1337.732

Location: Manmatta khola

Total depth: 20.0m

Date: 3-5/11/89



Borehole: 9-B

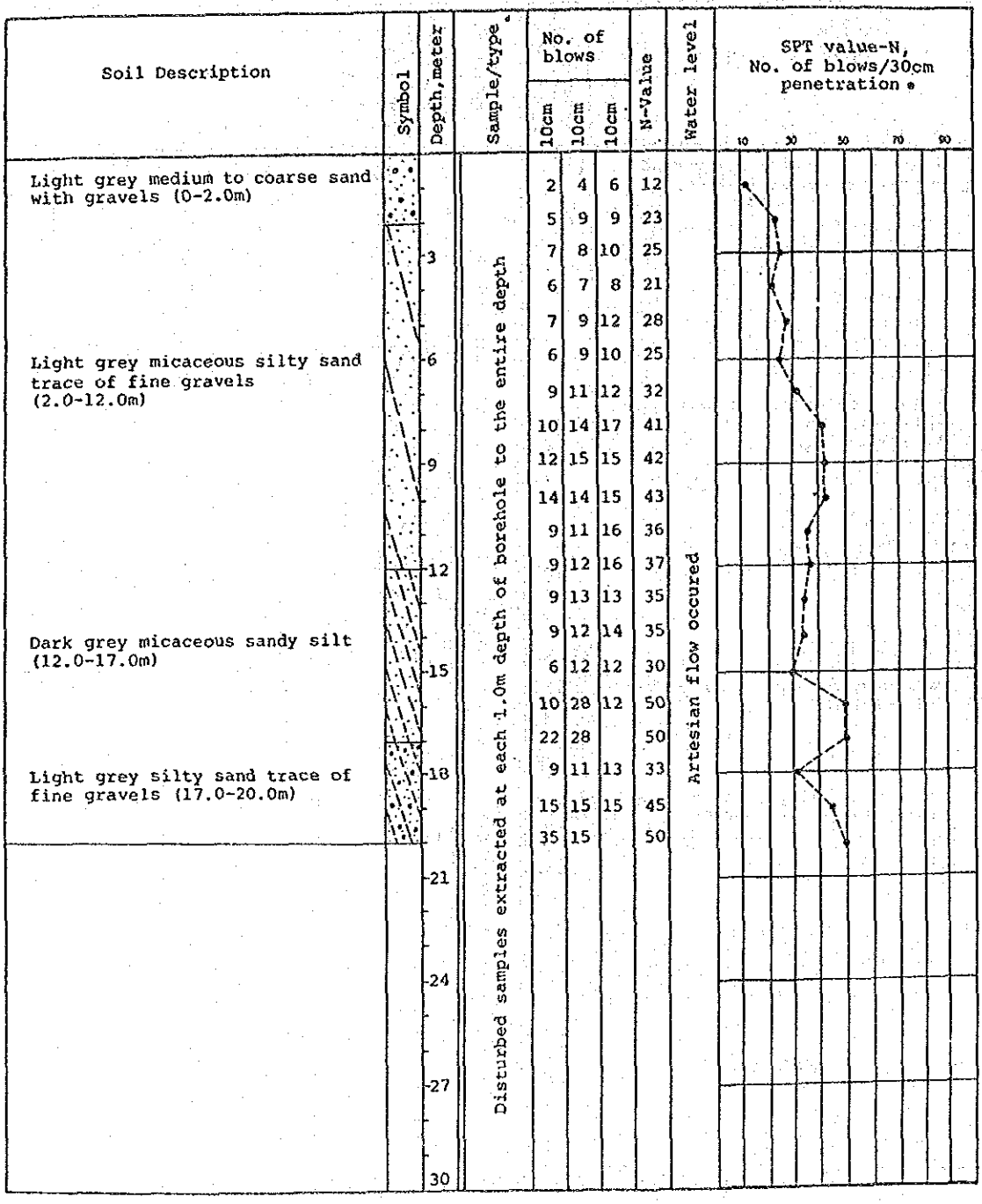
Project : Soil investigation and laboratory test for basic design study on reconstruction of Kathmandu valley bridges

Elevation:1338.972

Location: Manmatta khola

Total depth: 20.0m

Date: 2-5/11/89



3.7.7 - HS Loading

The HS loadings consist of a tractor truck with semi-trailer or the corresponding lane load as illustrated in Figures 3.7.7A and 3.7.6B. The HS loadings are designated by the letters HS followed by a number indicating the gross weight in tons of the tractor truck. The variable axle spacing has been introduced in order that the spacing of axles may approximate more closely the tractor trailers now in use. The variable spacing also provides a more satisfactory loading for continuous spans, in that heavy axle loads may be so placed on adjoining spans as to produce maximum negative moments.

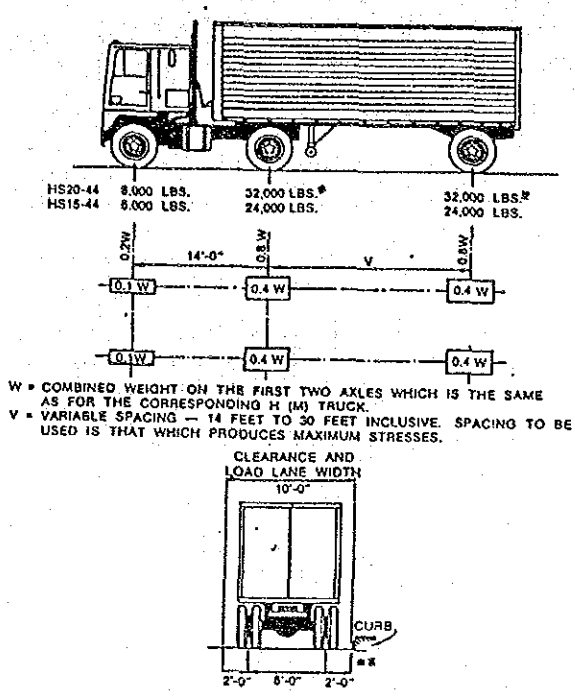
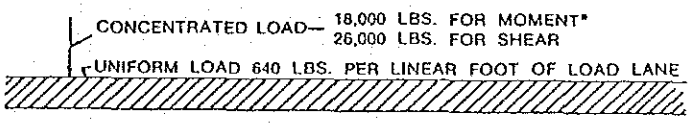


Figure 3.7.7A. Standard HS Trucks

*In the design of timber floors and orthotropic steel decks (excluding transverse beams) for HS 20 loading, one axle load of 24,000 pounds or two axle loads of 16,000 pounds each, spaced 4 feet apart may be used, whichever produces the greater stress, instead of the 32,000-pound axle shown.

**For slab design, the center line of wheels shall be assumed to be 1 foot from face of curb. (See Article 3.24.2).



H20-44 LOADING
HS20-44 LOADING

Fig. 3.7.6B

2.1.3 Live load loading on the 1st class and 2nd class bridges

The live load shall consist of the moving load of trucks (the T-loading and the L-loading), the sidewalk loading and the tramcar loading.

Table 2.1.2 T-loadings

Class of bridge	Loading	Gross weight W(ton)	Weight of a front wheel 0.1W(kg)	Weight of a rear wheel 0.4W(kg)	Width of a front wheel b_1 (cm)	Width of a rear wheel b_2 (cm)	Length of contact area of a wheel on the road-surface a(cm)
1st	T-20	20	2000	8000	12.5	50	20
2nd	T-14	14	1400	5600	12.5	50	20

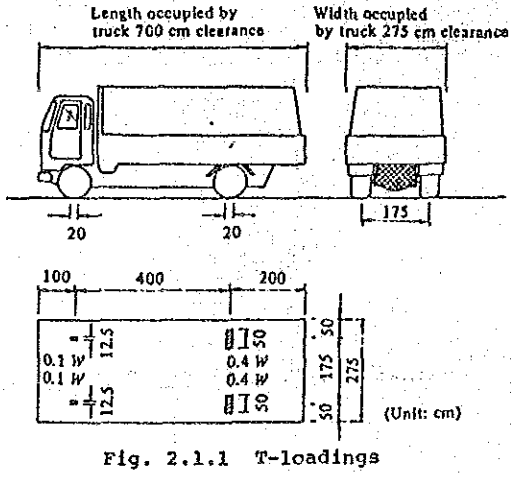


Fig. 2.1.1 T-loadings

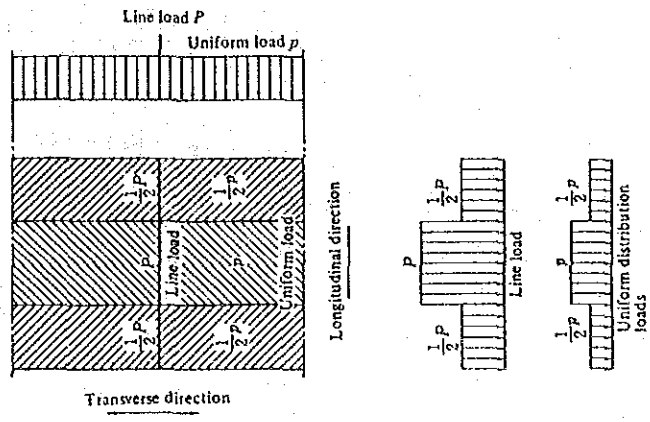


Fig. 2.1.3 L-loadings

Table 2.1.3 L-loadings

Class of bridge	Loading	Main loads (up to 5.5 meters in width)				Sub-loads
		Line load P (kg/m)	Uniform load, p (kg/m^2)			
			$L \leq 80$	$80 < L \leq 130$	$L > 130$	
1st	L-20	5,000	350	430-L	300	50% of main loads
2nd	L-14	70% of those of 1st class				

where,

L = Span length in meters.

For the suspended span and the can- tilever span in a cantilever bridge, those span lengths L_1 and L_2, respectively, shall be taken as shown in Fig. 2.1.4.

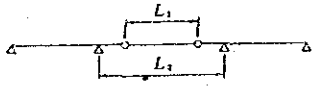


Fig. 2.1.4 How to take the span length in the suspended span

JICA