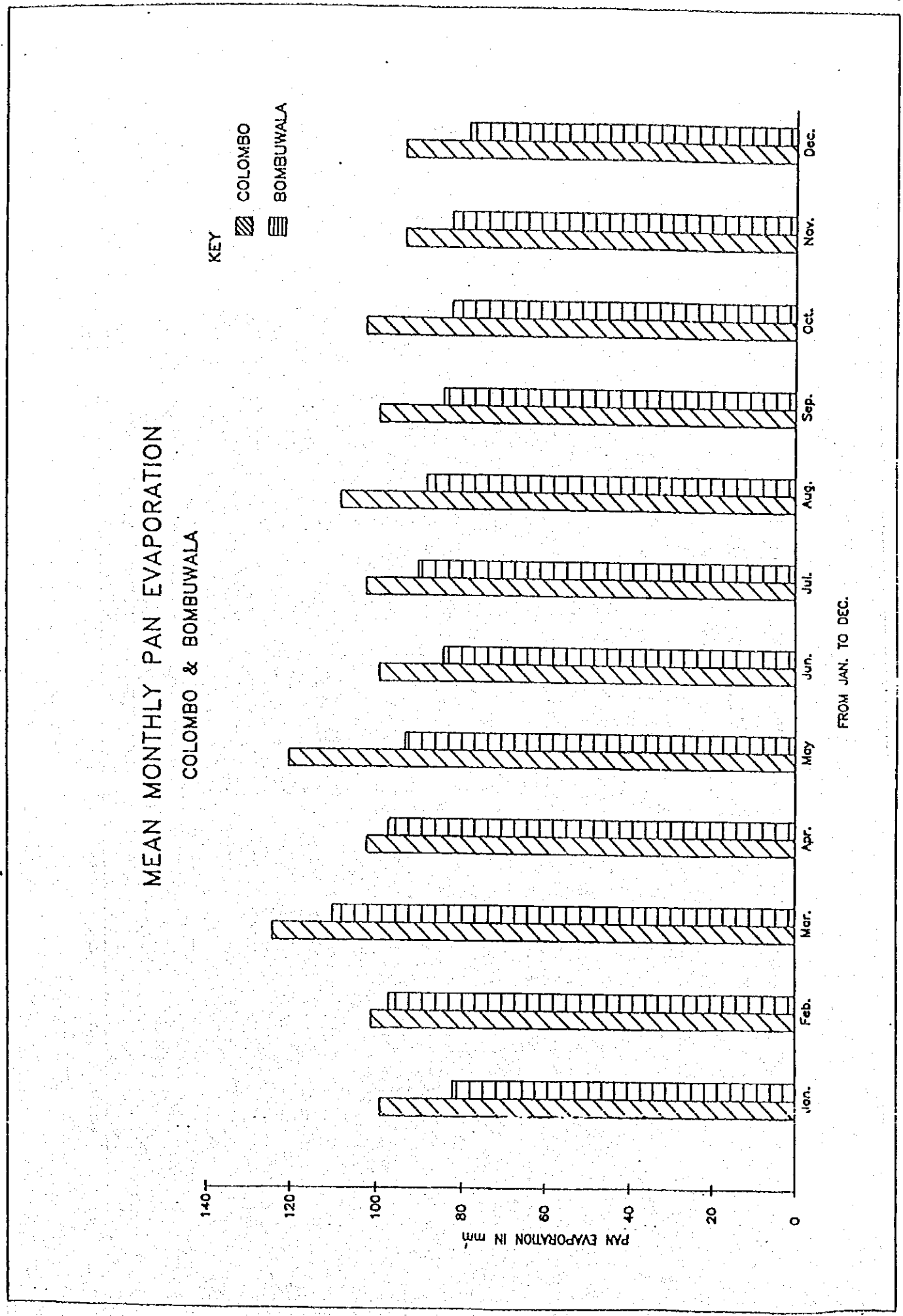
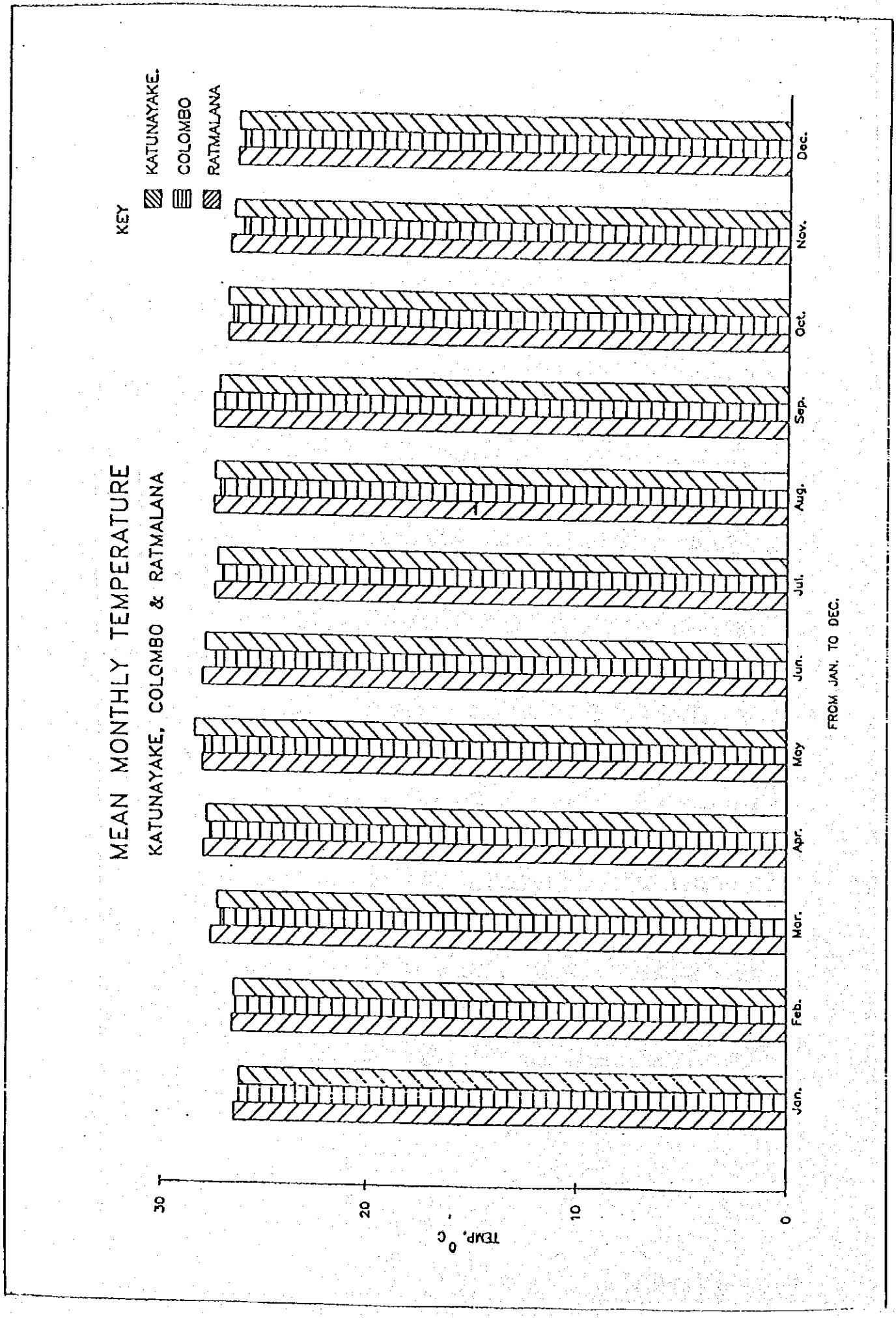
Fig. 5-1-1 (C)


MEAN MONTHLY PAN EVAPORATION
COLOMBO & BOMBUWALA
KEY
COLOMBO
BOMBUWALA
PAN EVAPORATION IN mm
0
20
40
60
80
100
120
140
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.
FROM JAN. TO DEC.


MEAN MONTHLY TEMPERATURE
KATUNAYAKE, COLOMBO & RATMALANA
KEY
KATUNAYAKE.
COLOMBO
RATMALANA
TEMP. °C
30
20
10
0
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.
FROM JAN. TO DEC.

MEAN MONTHLY RELATIVE HUMIDITY – KATUNAYAKE, COLOMBO & RATMALANA

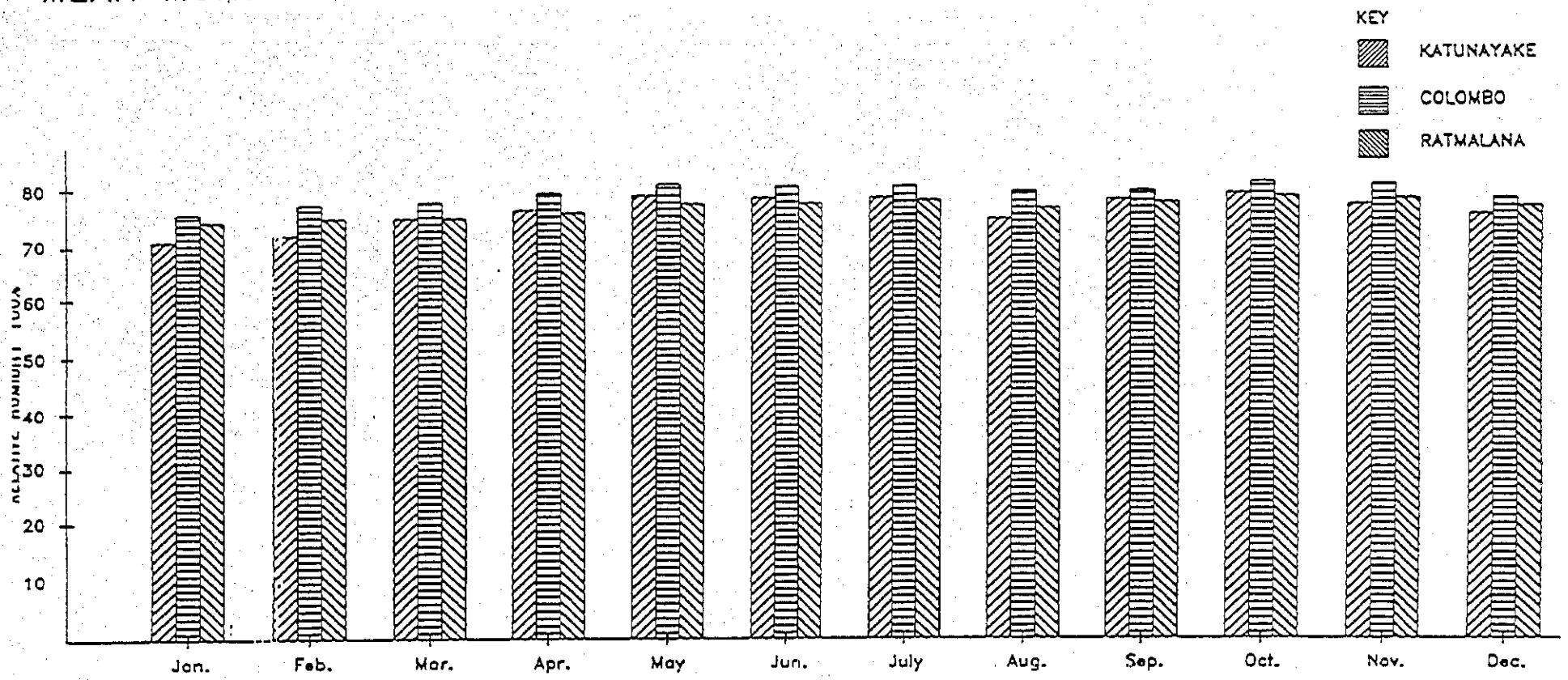


Fig. 5-1-1 (E)

Fig. 5-1-1 (F)

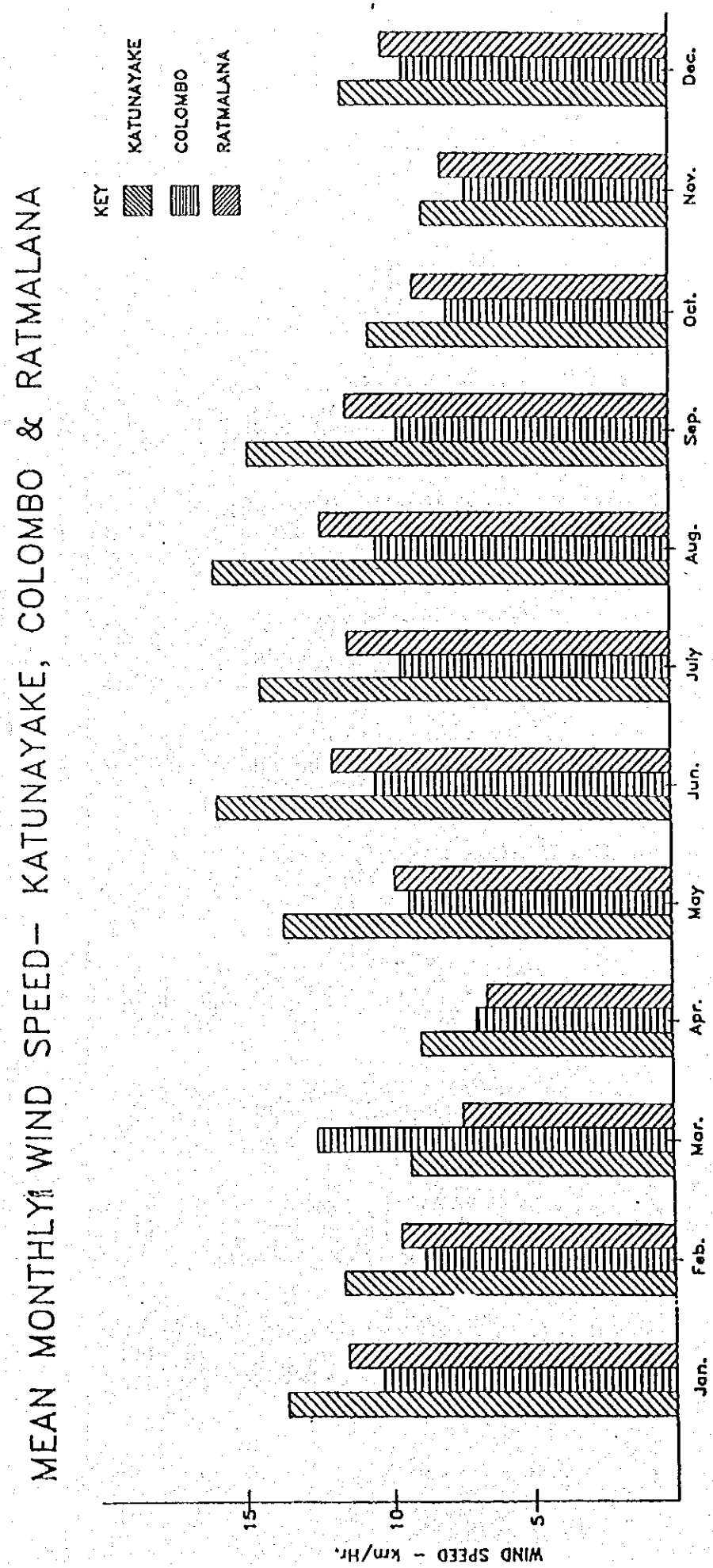

MEAN MONTHLY WIND SPEED- KATUNAYAKE, COLOMBO & RATMALANA
KEY
KATUNAYAKE
COLOMBO
RATMALANA
WIND SPEED - km/Hr.
15
10
5
Jan.
Feb.
Mar.
Apr.
May
Jun.
July
Aug.
Sep.
Oct.
Nov.
Dec.

Fig. 5-1-1(G)


MEAN MONTHLY RAINFALL RECORDED AT
KENILWARTH (UPPER KELANI)
RAINFALL - MM
900
800
700
600
500
400
300
200
100
0
Jan.
Feb.
Mar.
Apr.
May
Jun.
July
Aug.
Sep.
Oct.
Nov.
Dec.
MONTHS

Fig. 5-1-J (H)

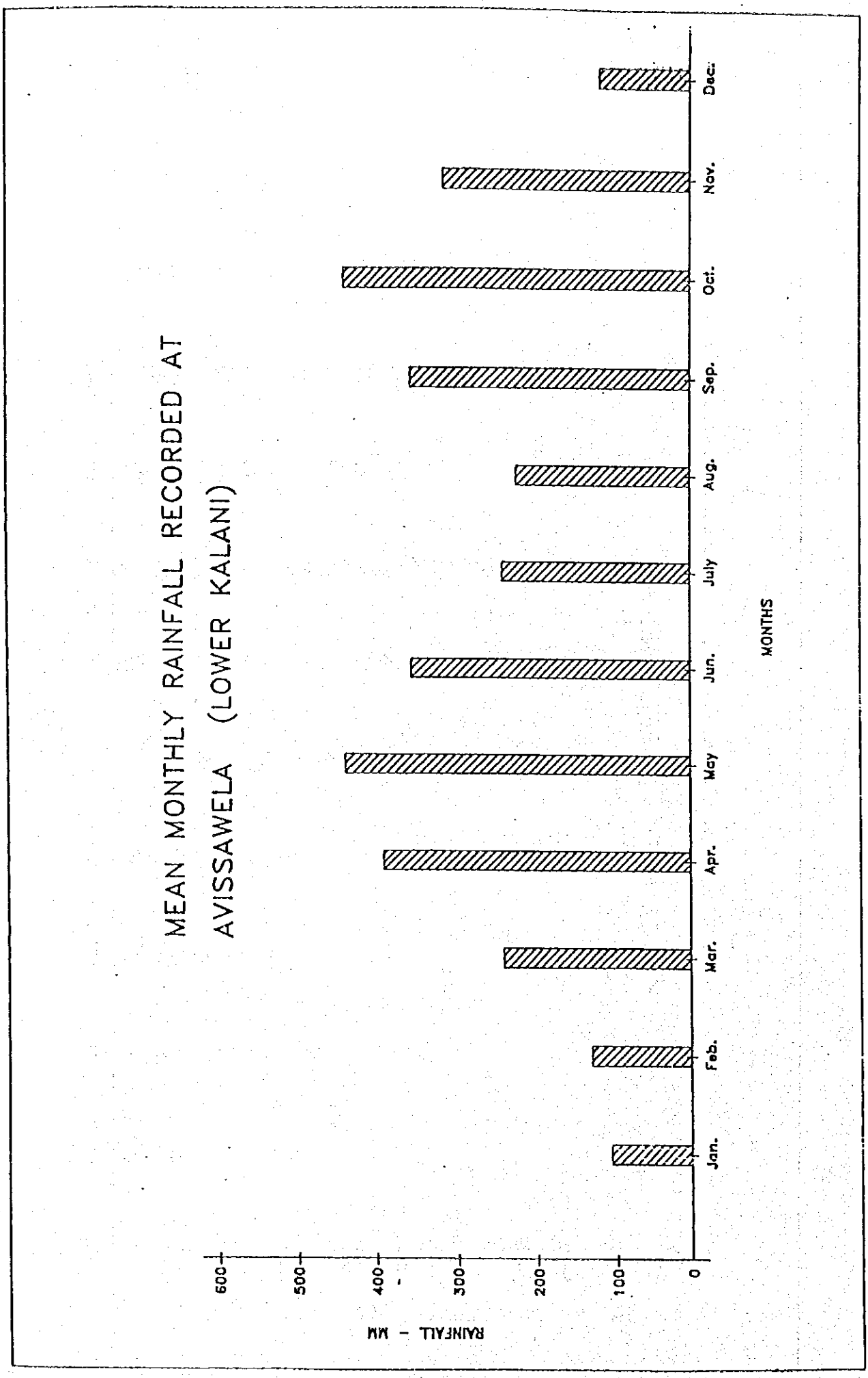
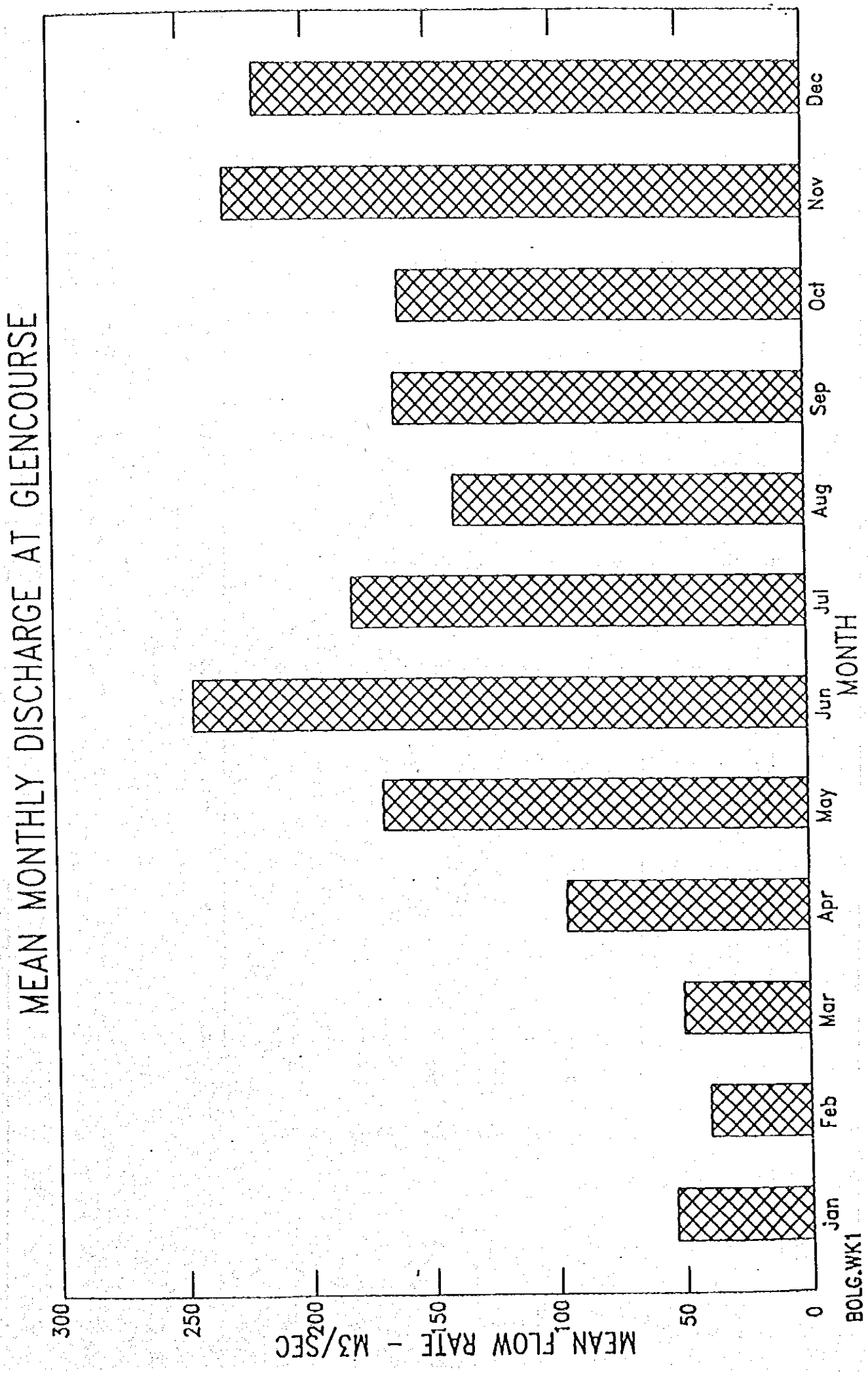

MEAN MONTHLY RAINFALL RECORDED AT
AVISSAWELA (LOWER KALANI)
RAINFALL - MM
600
500
400
300
200
100
0
Jan.
Feb.
Mar.
Apr.
May
Jun.
July
Aug.
Sep.
Oct.
Nov.
Dec.
MONTHS

Fig. 5-1-1 (I)


MEAN MONTHLY DISCHARGE AT GLENCOURSE
MEAN FLOW RATE - M3/SEC
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
MONTH
BOLG.WK1

PEAK FLOODS RECORDED AT KELANI GANGA AT HANWELLA AND THE MOVING AVERAGE

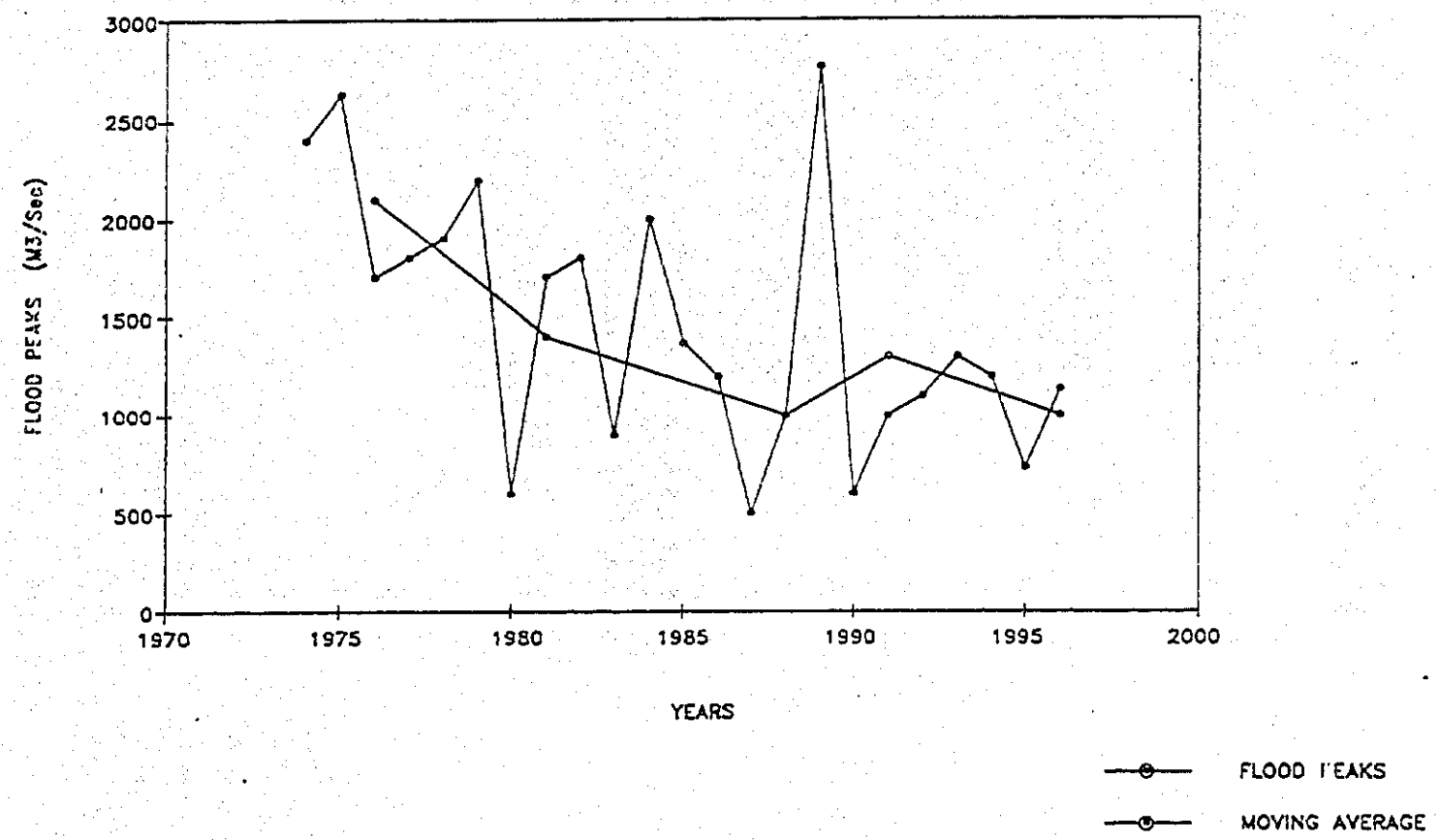
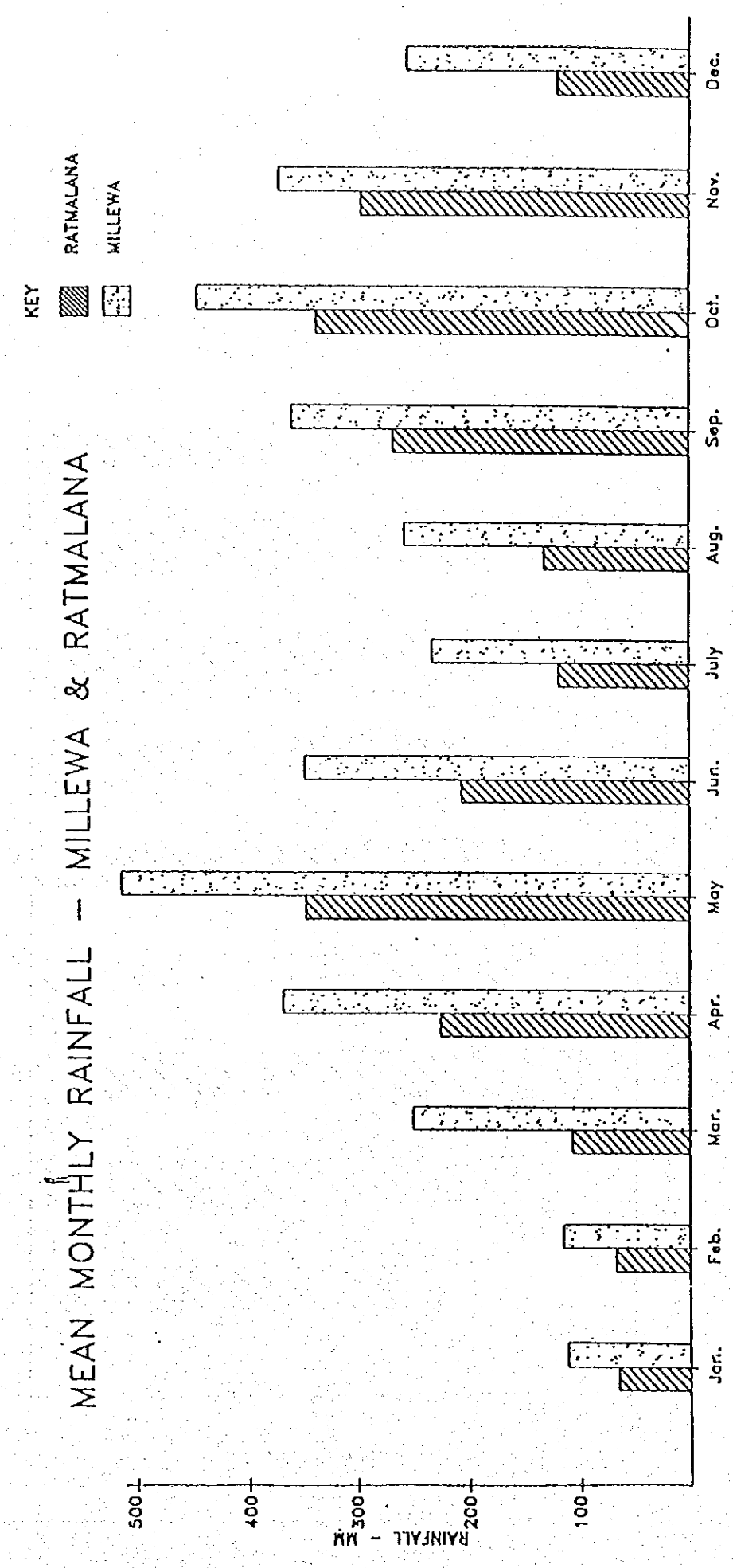


Fig. 5-1-1 (J)

Fig. 5-1-1 (K)


MEAN MONTHLY RAINFALL - MILLEWA & RATMALANA
KEY
RATMALANA
MILLEWA
Jan.
Feb.
Mar.
Apr.
May
Jun.
July
Aug.
Sep.
Oct.
Nov.
Dec.
RAINFALL - MM
100
200
300
400
500

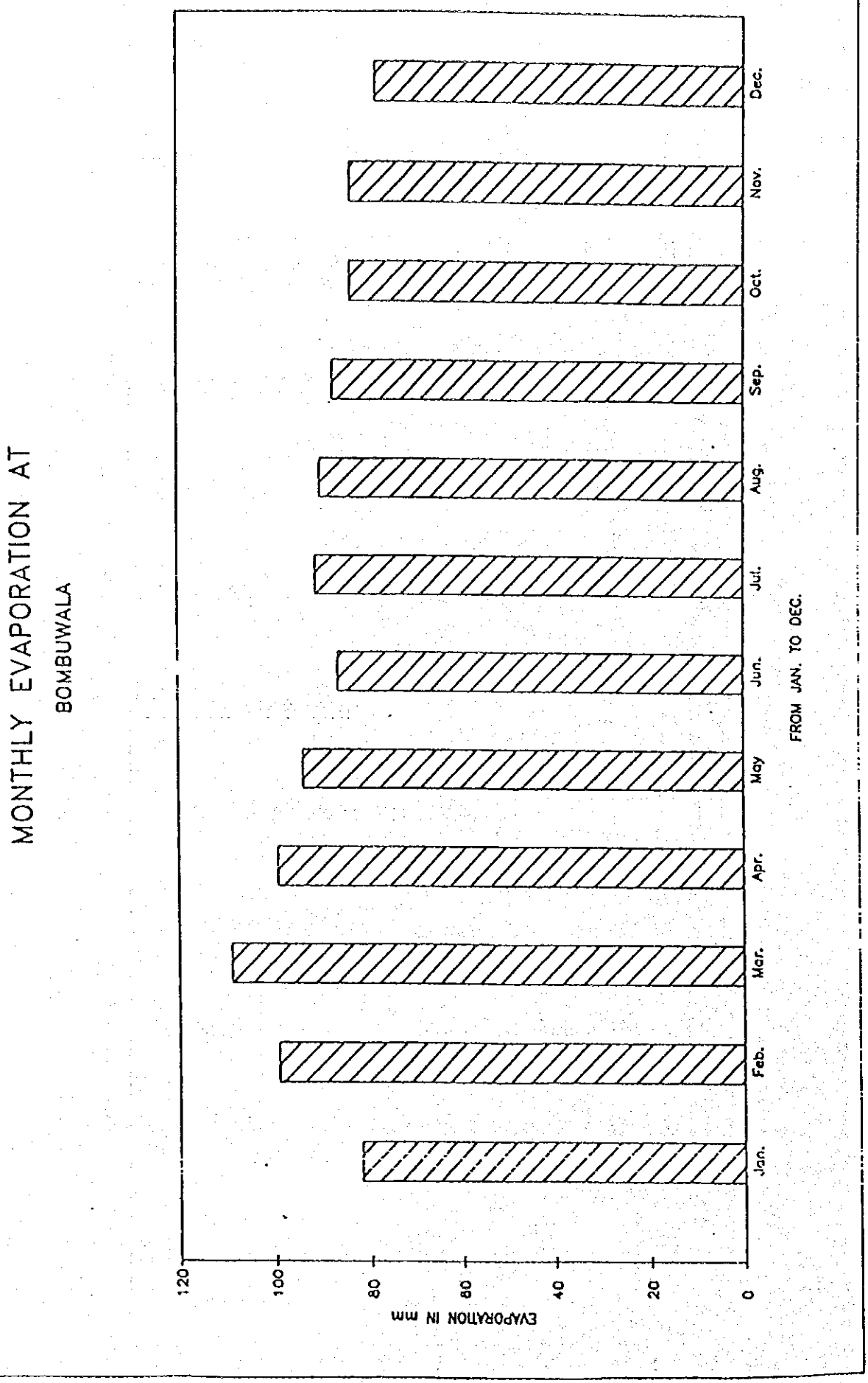
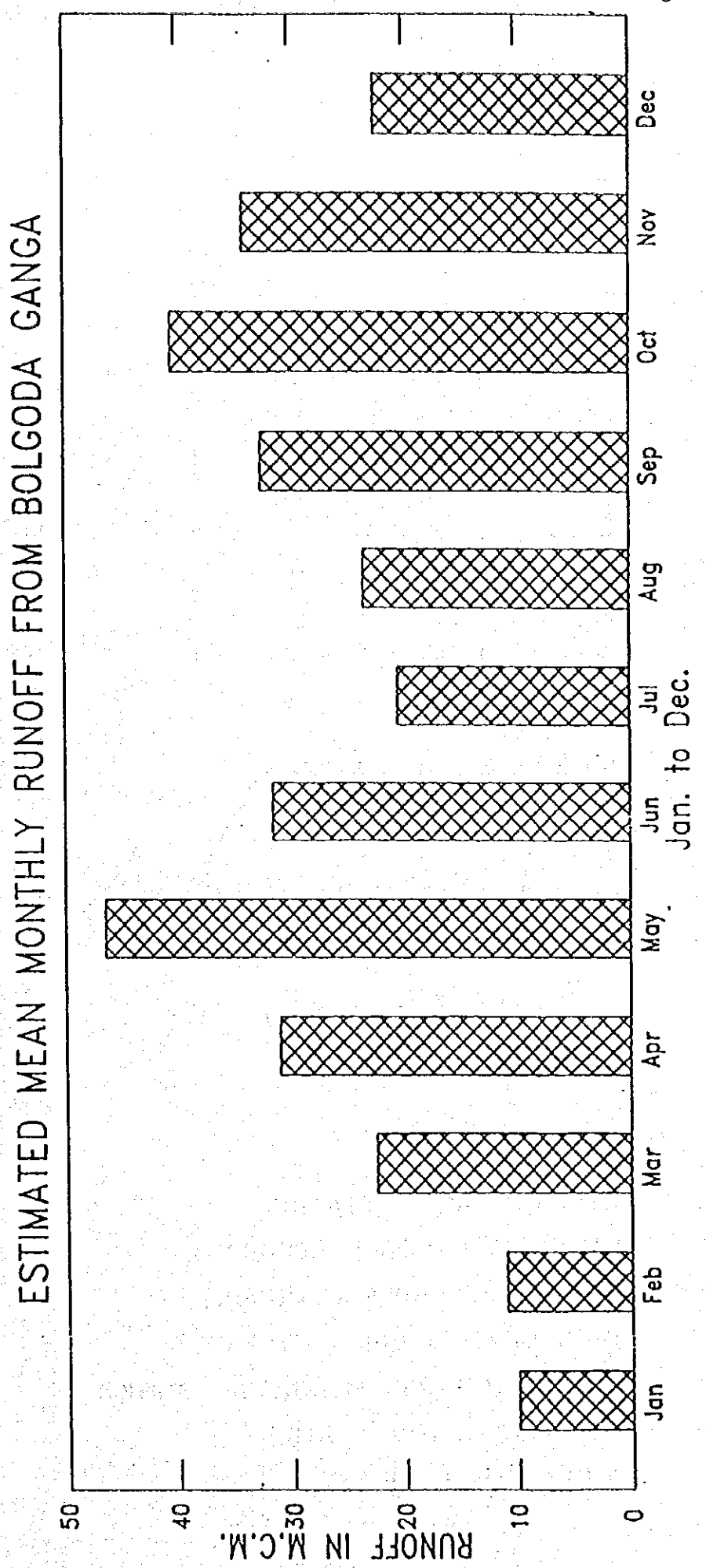
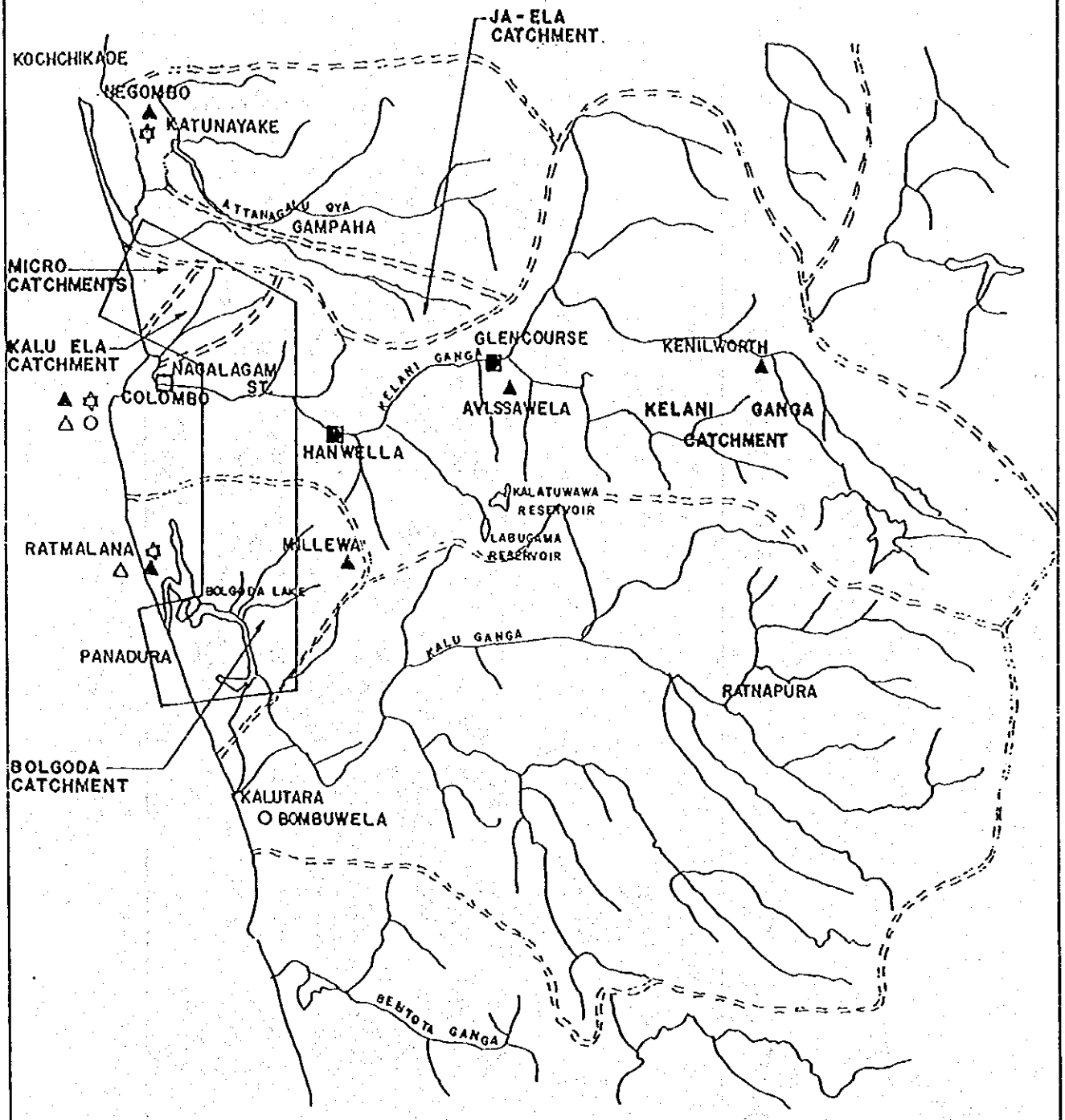

MONTHLY EVAPORATION AT
BOMBUWALA
EVAPORATION IN mm
120
100
80
60
40
20
0
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.
FROM JAN. TO DEC.

Fig. 5-1-17(M)


ESTIMATED MEAN MONTHLY RUNOFF FROM BOLGODA GANGA
RUNOFF IN M.C.M.
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan. to Dec.

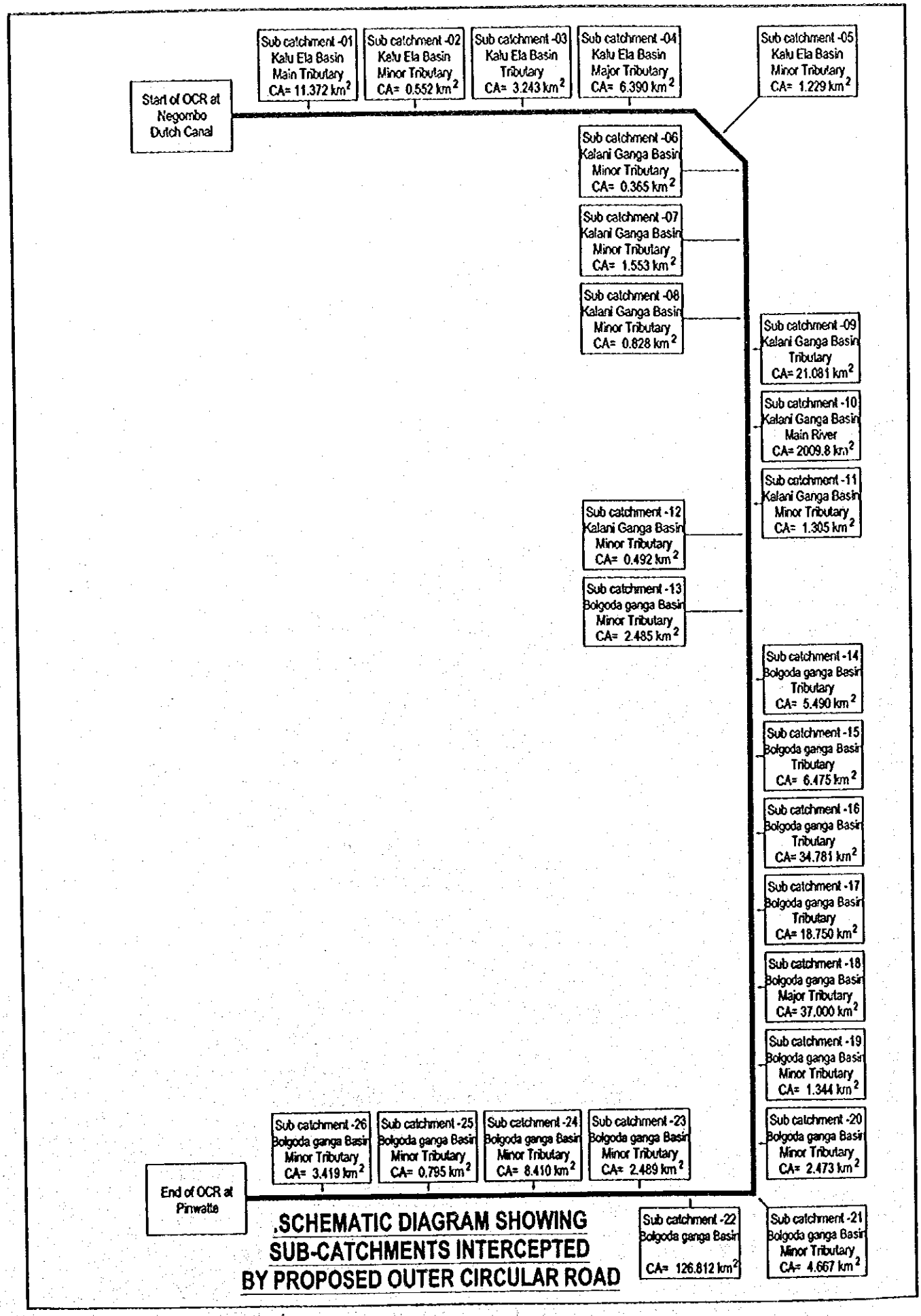
MAP SHOWING LOCATIONS OF STATIONS RECORDING HYDRO-METEOROLOGICAL DATA

Fig. 5-1-1(N)



LEGEND

- ✡ METEOROLOGICAL STATION
- △ AUTOMATIC RAINFALL RECORDER
- ▲ RAINFALL RECORDER (24 HOUR)
- □ RIVER LEVEL GAUGING STATION
- ● RIVER DISCHARGE MEASURING STATION
- ○ PAN EVAPORATION STATION
- ====== CATCHMENT BOUNDARY



SCHEMATIC DIAGRAM SHOWING SUB-CATCHMENTS INTERCEPTED BY PROPOSED OUTER CIRCULAR ROAD

DATA ON WATER & AIR QUALITY AND NOISE LEVELS

Certificate of Analysis

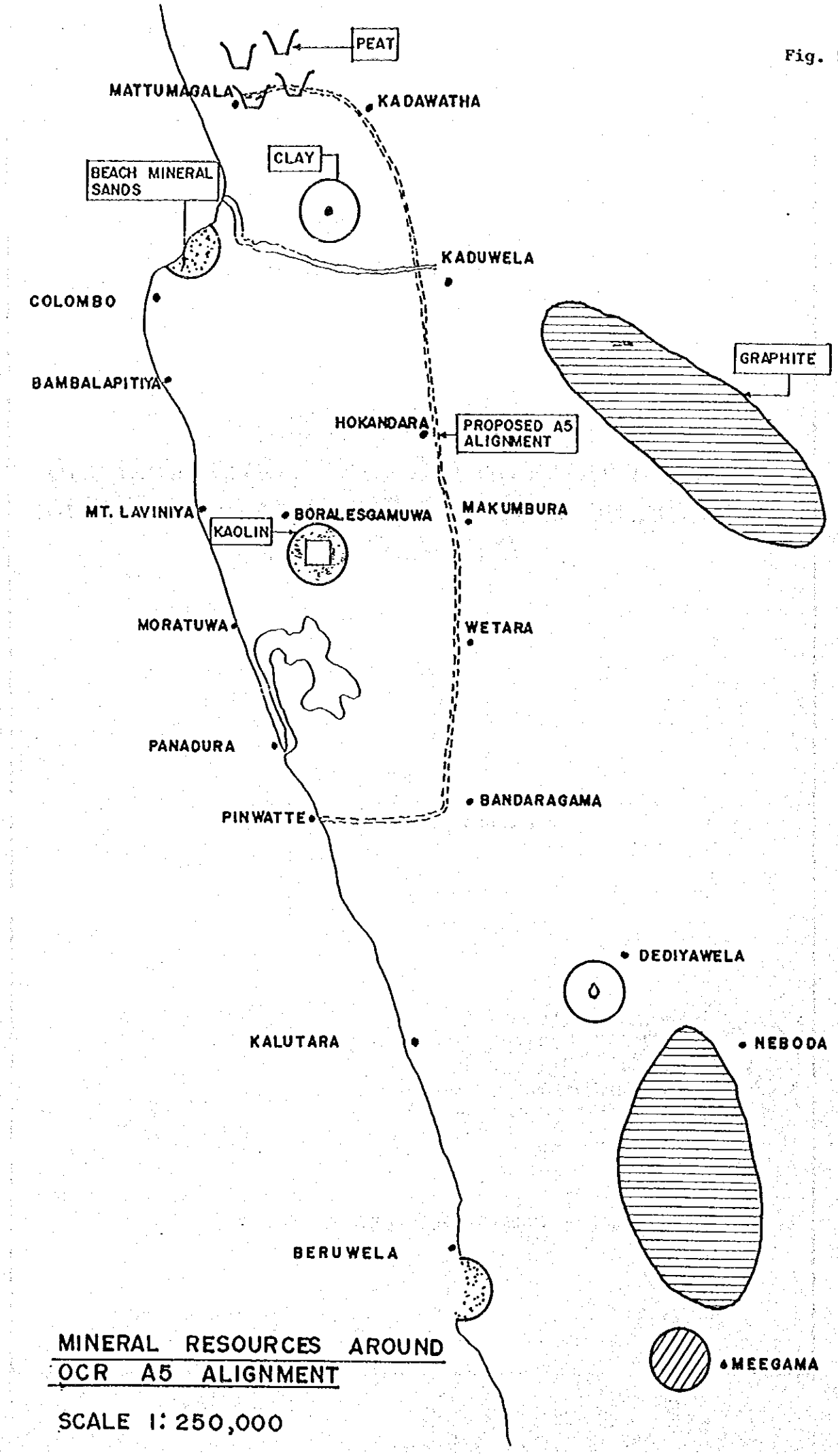
Surface Water Quality of Bolgoda and Kelani Hydrological sub Catchments for the EIA on Proposed Outer Circular Highway

September 1999

Environmental Division
NATIONAL BUILDING RESEARCH ORGANISATION
99/1, Jawatta Road, Colombo-05.
Tel : 94-1-588946, 501834, 500354
Fax : 502611 e-mail : nabro@slt.lk

Ministry of Urban Development, Housing & Construction

Fig. 5-1-15



MINERAL RESOURCES AROUND OCR A5 ALIGNMENT

SCALE 1: 250,000

Surface Water Quality of Bolgoda and Kelani Hydrological sub Catchments for the EIA on Proposed Outer Circular Highway

Issued by : Environmental Division
National Building Research Organisation
99/1, Jawatta Rd,
Colombo 05

Issued to : Mr.Sunil P Goonethilake
Engineering Consulatants Ltd
N0. 1098
Sri Jayawardenapura Mawatha
Rajagiriya

Total No.of pages : 10

Analysed .....
Scientist/ WQ

Checked .....
Co-ordinator/ WQ

Certified .....
Head/ Environmental Division

National Building Research Organisation
99/1, Jawatta Road
COLOMBO-5.

Contents

Report on the surface water quality status of Bolgoda and Kelani Hydrological sub catchments for the EIA on proposed outer circular Highway

1. Objective

The objective of the assessment is to study the background surface water quality status of sub catchments of Bolgoda and Kelani, to estimate the potential impacts on surface water quality due to proposed outer circular highway project.

2. Scope

The assessment on surface water quality status of sub catchments of Bolgoda and the Kelani, covers the analysis of water for general water quality status, nutrient pollution, organic pollution, and for sewage pollution. In addition, oil and grease content of the water samples were measured specifically to assess the current levels of oil pollution due to transport industry.

3. Sampling locations

The canals, rivers and the lakes of Bolgoda and Kelani catchments, which drains the water from areas where proposed high- way is to be constructed were selected for sample collection. The criteria used to select the sampling points were the representativeness with respect to water quality and the quantity, the accessibility and resource constrains. Based on the said criteria, 11 sampling points were decided as the representative points to reflects the quality status of the said two catchments. Refer annexure II for location map on surface water quality sampling points.

The river Kelani was not considered for the sampling, as databases of several on going monitoring programs on quality status of this river are available, at present.

Table 1.0 explains in brief the nature of sub catchments covered by each sampling point.

Table 1.0

Location No	Sub Catchement name/ River Basin	Description of the water body/ Sampling Location	Type of the surface water body	Land use type of the sub catchment
1	Bolgoda Ganga Basin	Bolgoda north lake near Keselwatta	Lake	Marsh, water bodies, plantations, built up areas, home gardens
2	Bolgoda Ganga Basin	Thalpitiya Sea outlet	Canal(Ela)	Built up areas, home gardens
3	Bolgoda Ganga Basin	Bolgoda South lake below Panwila	Lake	Marsh, water bodies, plantations, built up areas, home gardens
4	Bolgoda Ganga Basin	Bolgoda ganga near Mahabellana	River	Marsh, water bodies, plantations, built up areas, home gardens
5	Bolgoda Ganga Basin	Bolgoda ganga at Hirana Thotupola	River	Marsh, water bodies, plantations, built up areas, home gardens
6	Bolgoda Ganga Basin	Large tributary Maha Oya near Batuwandara	Canal (ela)	Marsh, plantations, built up areas, home gardens, and paddy.
7	Bolgoda Ganga Basin	Upper reachs of Maha Oya near Diyagama	Canal(ela)	Paddy, Built up areas, home gardens
8	Kelani Ganga Basin	Tributary - ..... Kaduwela	Canal (ela)	Paddy, built up areas, home gardens
9	Kelani Ganga Basin	RB Tributary – Below Kaduwela	Canal (ela)	Paddy, Plantations, Built up areas, home gardens, Marsh
10	Kalu Ela Basin	Tributary from North East	Canal (ela)	Paddy, Built up areas, Home gardens
11	Kalu Ela Basin	Main Kalu Ela-Wattala/ Mabole	River	Marsh, Paddy, Built up areas, Home gardens

4. Sampling duration and Frequency

Due to time limitations, the sampling represents the water quality status of only one season, the Southwest monsoon period. The samples from location Nos. 1to 6 were collected on 01.09.99 and from location Nos. 7 to 11 were collected on 03/09/99.

5. Samplo collection

Samples were collected using a 5L plastic bucket. Special bacteriological bottles were used to collect the samples for bacteriologic assessments.

6. Analysis

Collection, preservation and analysis of samples were performed according to Standards Methods for the Analysis of Water and the Wastewater, 16th (1985) and 19th (1997) editions.

7. Results

For sample locations: Refer annexed map of hydrological catchements

Table 2.0

Location No.	pH	Tem 0C	Conductivity µs cm^{-1}	Turbidity NTU	Sechchi depth, cm	DO mg/l	BOD Mg/l	$NH_3(N)$ mg/l	$NO_2(N)$ mg/l	$NO_3(N)$ mg/l	COD mg/l
1	6.7	28.5	2350.0	0.05	80	5.65	5.2	0.74	0.001	0.018	8.0
2	7.6	29.6	4580.0	0.1	165	4.85	3.5	0	0.016	0.059	8.0
3	7.0	28.6	619.0	0.07	100	4.7	3.4	0	0.003	0.018	10.0
4	6.5	28.9	276.0	0.12	75	4.25	3.4	0.15	0.004	0.024	10.0
5	6.9	30.4	957.0	0.02	170	6.35	5.6	0.08	0	0.018	10.0
6	6.6	27.7	69.0	0.2	35	5.05	3.8	0.53	0.004	0.021	10.0
7	6.4	25.1	42.0	0.42	25	6.25	4.95	0	0.007	0.021	10.0
8	6.3	26.3	50.0	0.1	45	3.8	2.7	0.09	0.006	0.006	12.0
9	6.8	26.3	251.0	0.18	40	4.1	10	1.1	0.34	0.28	20.0
*10	6.7	25.6	104.0	0.38	40	5.5	30	0.18	0.009	0.032	65.0
*11	6.6	28.5	155.0	0.17	50	1.0	32	5.5	0.009	0	90.0

Table 2.1

Sample No.	SS mg/l	Hardness as $CaCO_3$ mg/l	Oil & grease mg/l	TKN (N) mg/l	Total P (P) mg/l	Feacal coliform count/100 ml	Total coliform Count/100 ml	Standard Plate count No/ml
1	7.0	264	<1	0.862	0.072	360	1380	640
2	14.0	564	<1	0.085	0.062	30	1150	1780
3	8.0	104	<1	0.024	0.052	760	1700	350
4	16.0	40	<1	0.202	0.06	1220	2530	430
5	3.0	120	<1	0.111	0.084	50	70	610
6	10.0	36.0	<1	0.631	0.125	2300	3150	370
7	90.0	12.0	<1	0.03	0.136	2300	4000	11100
8	25.0	32.0	<1	0.116	0.020	2000	3000	4000
9	39.0	40.0	<1	0.704	0.568	2000	3000	4300
*10	46.0	28.0	<1	0.251	0.143	10000	121000	23000
*11	20.0	36.0	<1	6.26	0.070	780	840	20000

Algal Blooms were observed

Annexure 1

Abbreviations

Tem ^0C	- Temperature ^0C
DO	- Dissolved Oxygen , mg/l
BOD	- Biochemical Oxygen Demand, mg/l
NH_3 (N)	- Ammonia Nitrogen as N , mg/l
NO_3 (N)	- Nitrate Nitrogen as N, mg/l
NO_2 (N)	- Nitrite Nitrogen as N, mg/l
COD	- Chemical Oxygen Demand, mg/l
SS	- Suspended Solids , mg/l
TKN	- Total Kjeldahl Nitrogen as N, mg/l
Total P	- Total phosphorus as P, mg/l

Minimum dissolved oxygen content, lower Kelani River, 1973 - 1974 (Baldwin, 1991)

Location	Distance from mouth (km)	Dissolved oxygen (% saturation)
Kitulgala	96	68
Ambatale	14.6	18
Kelaniya	12	53
Madampitiya	1.5	36
Mattakkuliya	1	28
Modera	0	21

Water quality at Ambatale intake, Kelani River
(NBRO - 1989)

Parameter	Unit	1988-1989		1973-1974
		Average	Range	
Dissolved oxygen	mg/l	7.2	6.2-13.2	1.5-8.7
PH		6.5	5.9-7.0	5.1-7.5
Suspended solids	mg/l	9.1	0.4-40	11.6-180
COD	mg/l	19.7	4.6-50.6	1.2-3.9
Nitrate	mg/l	0.12	0.02-0.2	0.25-2.65
Free Ammonia	mg/l	0.61	0.04-6.1	0.08-1.8
SAR		0.38	0.1-2.3	

Mean values of Temperature, pH, Salinity, Alkalinity and Dissolved Oxygen for a two year period in Bolgoda Lake during 1987 - 1988

Parameter	Mean
Temperature (C^0)	30.35
pH	6.91
Salinity (ppt)	1.42
Alkalinity (ppm)	42.21
Dissolved Oxygen (mg/l)	9.15

Monthly mean values of Turbidity, Transparency, Temperature and total monthly rainfall at South Lake during 1980 – 1981

Month	Turbidity (NTU)	Transparency (m)	Temperature (C^0)	Rainfall (mm)
October 80	9.6	1.39	29.90	370.3
November	5.41	1.44	29.70	333.5
December	8.51	1.54	28.51	211.1
January 81	2.42	1.66	29.26	155.2
February	0.97	1.67	29.86	83.3
March	2.47	1.35	32.08	69.4
April	2.66	1.38	31.93	268.6
May	2.17	1.54	31.25	528.9
June	3.00	1.61	28.59	187.6
July	2.63	1.49	28.67	19.6
August	2.06	1.59	29.46	97.7
September	2.34	1.50	29.98	144.5
Average	3.68	1.51	29.92	

KELANI GANGA BASIN

WATER QUALITY

AGADIV	pH	EC	TOTAL ALKALINITY	TOTAL HARDNESS	F-	NO3	TOTAL IRON
Awissawella	7.6	250	154	128	0.7	0.0	1.5
Biyagama	7.2	250	103	106	0.6	0.1	1.2
Dehiovita	7.6	90	56	32	0.3	0.0	5.6
Deraniyagala	8.2	200	138	120	0.6	0.0	1.2
Galigamuwa	8.0	260	128	120	0.5	0.0	4.0
Hanwella	7.1	200	138	92	0.5	0.1	0.8
Homagama	8.1	190	94	65	0.6	0.0	0.7
Kadawatha	-	-	-	-	-	-	-
Kaduwela	7.8	260	100	112	0.6	0.0	0.5
Kegalle	8.1	455	156	120	0.6	0.0	18.0
Kelaniya	7.4	66	31	28	0.7	0.0	1.6
Kolonnawa	8.0	200	122	62	0.5	0.0	0.2
Kotte	6.7	140	72	48	1.4	0.0	-
Mahara	7.4	250	121	110	0.5	0.0	2.2
Ruwanwella	7.0	120	50	26	0.5	0.0	1.1
Warakapola	7.3	280	228	104	0.5	0.0	4.0
Weke	7.4	375	124	196	0.5	0.0	1.0
Yatiyantota	-	-	-	-	-	-	-
Wattala	8.1	200	80	30	0.6	0.0	0.6
Ehaliyagoda	-	240	112	104	0.7	0.0	0.2

GROUND WATER QUALITY - BOLGODA BASIN

WELL NO.	VILLAGE	pH	EC	Cl-	TOTAL HARDNESS	TOTAL IRON	FREE NH3	ALB. NH3	NO3	NO2	F1	TOT. PO4	TDS	TOT. ALK	SO4	COL	TUR
	DS DIVISION : BANDARAGAMA	7.1	533	27	264	5.18	-	-	0.72	<0.001	0.6	0.06	332	127	8.4	40	34
	DS DIVISION : DEHIWALA	6.7	1416	395	328	14.43	1.96	0.11	0.74	0.13	0.5	0.21	177	78	12.1	38	20
	DS DIVISION : HOMAGAMA	7.7	258	24	65	0.54	-	-	0.15	-	0.6	-	170	85	18.5	-	-
	DS DIVISION : HORANA	7.2	186	16	77	2.3	-	-	0.08	-	0.66	-	108	88	13.6	-	-
	DS DIVISION : KALUTARA	7.2	988	332	326	0.29	-	-	0.53	-	0.45	-	48	28	1.3	-	10
	DS DIVISION : KESBEWA	6.9	157	19	62	0.78	0.04	0.13	>0.1	0.001	0.5	>0.04	113	80	7.9	5	7.4
	DS DIVISION : MAHARAGAMA	6.6	153	16	63	0.93	>0.01	>0.01	>0.1	0.15	0.63	>0.04	59	64	6.25	5	2.2
	DS DIVISION : MORATUWA	6.7	267	36	76	0.3	0.12	>0.01	>0.1	>0.001	0.45	>0 04	180	70	30.3	>5	3.1
	DS DIVISION : NUGEGODA	7.7	206	28	70	7.52	>0.01	>0.01	>0.1	>0.001	0.5	0.4	31	145	67.1	>5	1.4
	DS DIVISION : PANADURA	6.9	303	34	105	0.96	0.59	>0.01	1.92	0.001	>0.5	0.06	190	81	20.7	35	9.4

Table 5.1.16 (E)

MINISTRY OF URBAN DEVELOPMENT, HOUSING & CONSTRUCTION

NATIONAL BUILDING RESEARCH ORGANISATION

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Telephone - 588946, 501824, 503826, 500354 Fax - 502611 Email - nbro@sll.lk

Our Ref. NBRO/ENV/26101/99/109
AQP/99/19

Your Ref.

Date 03rd September 1999

CLIENT: Mr. Sunil P Goonetilleke,
Engineering Consultants Ltd,
No. 1098,
Sri Jayawardenapura Mawatha,
Rajagiriya.

AMBIENT AIR QUALITY REPORT OF THE ENVIRONMENTAL IMPACT ASSESMENT (EIA) STUDY FOR THE OUTER CIRCULAR HIGHWAY

1. SCOPE

Request was made by the client, Engineering Consultants Ltd, from the Environmental Division of the National Building Research Organisation (NBRO) to assess the existing Ambient Air Quality with respect to Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Suspended Particulate Matters (SPM) along the area of the proposed Outer Circular Highway Road Project for its Environmental Impact Assessment (EIA) study.

2. SAMPLING

A team of officers of the Environmental Division of the National Building Research Organisation (NBRO) carried out the above monitoring programme on 20th, 23rd, 25th and 27th of August 1999 and samples were collected from eight selected locations, along the proposed Outer Circular Highway project area (refer map), for the determinations of ambient concentrations of Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2) and Suspended Particulate Matter (SPM).

cont...2

NBRO/ENV/26101/99/109
AQP/99/19

3. DESCRIPTION OF SAMPLING LOCATIONS:

Location	Description
L1	Sri Amaramuni Viharaya, Pangnananda Mawatha Dibbadde, Panadura.
L2	Sri Wajiraramaya, Mahawatta, Alubomulle.
L3	Sarvodaya Training Centre, Walmilla, Bandaragama.
L4	Sumanapuspikaramaya, Kahatuduwa (Homagama Road)
L5	135, Hewagama Kaduwela.
L6	Rukmalgama Viharaya, Rukmale, Pannipitiya.
L7	474/4, Ranjith Mawatha, Puwakwatiya Kadawatha.
L8	Thapowanaramaya, Mathtumagala Ragama
L9	High level road, Closed to No.322/1, Makumbura, Pannipitiya
L10	Pamunuwila Maha Vidyalaya, Pamunuwila, Sapugaskanda.
L11	No. 528, Daluggala Road, Sapugaskanda.

Table 1: Details of Ambient Air Sampling Locations (Refer Map)

Note:

1. **L9** – Monitoring was carried out for the southern highway EIA study by the Environmental Division of NBRO with same methodology.

2. **L10, L11** - Monitoring was carried out for the Central Environmental Authority using Mobile Air Quality Monitoring Laboratory unit. Results and Methodology are annexes as Annex 01.

cont...3

4. ANALYSIS

Parameter	Methodology	Reference	Instrumentation
SO_2	Pararosaniline Method (Colorimetry)	Selected methods Of measuring Air Pollutants, *WHO no. 24-1976 pp 34	UV/VIS Spectrophotometer Shimadzu UV/VIS Recording Spec: (UV - 1608)
NO_2	altzman Method (Colorimetry)	Selected methods Of measuring Air Pollutants, *WHO no.24-1976 pp 73	UV/VIS spectrophotometer Shimadzu UV/VIS (UV - 1608)
SPM	Hi- volume Sampling & Gravimetry	Selected methods Of measuring Air Pollutants, *WHO no. 24-1976 pp 3	Analytical balance, Sartorius analytical balance (284)

TABLE 2: Analytical methods used for the determination of each pollutant

Note 2: The permissible Ambient Air Quality Standards stipulated by the Central Environmental Authority (Extra Ordinary Gazette, No. 850/4, Dec. 20, 1994):

POLLUTANT	TIME AVERAGE	CONCENTRATION ($\mu g/m^3$)
NO_2	8 hour	150
SO_2	8 hour	120
SPM	8 hour	350

con....4

5. RESULTS

Date	LOCATION	START TIME (hrs.)	TIME AVERAGE (hrs.)	CONCENTRATION/(μg/m³)		
				NO_2	SO_2	SPM
20.08.99	L1	10:00	08:00	9.54	13.50	178
	L2	10:30	08:00	3.47	9.97	93
23.08.99	L3	09:30	08:00	5.38	8.49	103
	L4	10:00	08:00	7.94	11.70	197
25.08.99	L5	09:05	08:00	11.20	20.20	267
	L6	09:25	08:00	6.95	8.82	111
27.08.99	L7	09:00	08:00	13.97	29.0	102
	L8	09:35	08:00	6.87	20.28	41
12.02.99	L9	09:15	08:00	44.69	47.8	197

Table 3: Concentrations of Pollutants at the each Location.

.....
Mr. R.P.Samarakkody
Co-ordinator/Air Quality

.....
Mr. H.D.S.Premasiri
Scientist/Air Quality

.....
Eng. Mrs. C.Wethasinghe
Head/Environmental Division

HEAD/ENVIRONMENTAL DIVISION
National Building Research Organisation
99/1, Jawatta Road
COLOMBO-5.

CLIENT: Mr. Sunil P Goonetilleke,
Engineering Consultants Ltd,
No. 1098,
Sri Jayawardenapura Mawatha,
Rajagiriya.

1. SCOPE :

The client requested Air Quality data from the Mobile Air Quality Monitoring Laboratory at Sapugaskanda area for the preparation of Environmental Impact Assessment (EIA) study report for the Proposed Outer Circular Highway Project.

2. LOCATION :

1. Pamunuwila Maha Vidyalaya, Pamunuwila, Sapugaskanda.
2. No. 528, Daluggala Road, Sapugaskanda.

3. METHODOLOGY :

PARAMETER	METHODOLOGY
Nitric Oxide	Chemiluminisence
Nitrogen Dioxide	Chemiluminisence
Sulphur Dioxide	Flourometric
Carbon Monoxide	IR photometric
Ozone	Photometric
PM 10	Gravimetric

.....
Mr. R.P.Samarakkody
Co-ordinator/ Air Quality Programme

.....
Mr.S.R.Jasingha
Project Scientist/Air Quality Programme

.....
Eng. Mrs. C. Wethasinghe,
Head, Environmental Division

ENVIRONMENTAL DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1,JAWATTA ROAD, COLOMBO-5. Tel : 94-1-588946, 501834, 503826

Monthly Data Summary

Location : Pamunuwila Maha Vidyalaya
Period : 21 August, 1998 to 30 August, 1998

Parameter	Maximum (ppm)	Date	Hour	Wind Speed (kmph)	Wind Direction (degrees)	Temperature (°C)
Nitrogen Dioxide	0.015	24-Aug-98	11:00	4.75	137.8	26.3
Sulphur Dioxide	0.041	29-Aug-98	8:00	2.49	103.3	24.3
Carbon Monoxide	3.161	25-Aug-98	22:00	3.03	166.4	25.7
Ozone	0.054	25-Aug-98	22:00	3.03	166.4	25.7

Location : No. 528, Daluggala Rd, Sapugaskanda
Period : 31 August 1998 to 09 September, 1998

Parameter	Maximum (ppm)	Date	Hour	Wind Speed (kmph)	Wind Direction (degrees)	Temperature (°C)
Nitrogen Dioxide	0.013	09-Sep-98	3:00	4.26	225.9	23.6
Sulphur Dioxide	0.064	09-Sep-98	3:00	4.26	225.9	23.6
Carbon Monoxide	2.213	05-Sep-98	16:00	1.098	152.2	22.7
Ozone	0.114	04-Sep-98	20:00	4.54	226.8	25.6

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5.1.17 (B)

ENVIRONMENTAL DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1, JAWATTA ROAD, COLOMBO-5. Tel : 94-1-588946, 501834, 503826 Fax : 94-1-502611

Data Capture Report

Location : Pamunuwila Maha Vidyalaya
Period : 21 August, 1998 to 30 August, 1998

PARAMETER	TOTAL HOURS	VALID HOURS	PERCENT CAPTURED
Ozone	230	127	55.2
Sulphur Dioxide	230	200	87.0
Carbon Monoxide	230	168	73.0
Nitrogen Dioxide	230	207	90.0
Wind Speed	240	223	92.9
Wind Direction	240	223	92.9
Temperature	240	223	92.9

Location : No. 528, Daluggala Rd, Sapugaskanda
Period : 31 August, 1998 to 09 September, 1998

PARAMETER	TOTAL HOURS	VALID HOURS	PERCENT CAPTURED
Ozone	230	98	42.6
Sulphur Dioxide	230	203	88.3
Carbon Monoxide	230	185	80.4
Nitrogen Dioxide	230	215	93.5
Wind Speed	240	226	94.2
Wind Direction	240	226	94.2
Temperature	240	226	94.2

5.1.17 (B) 1

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Parameter : Nitric Oxide
Unit : ppm

Location : Pamunuwila Maha Vidyalaya

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
21-Aug-98	0.005	0.003	C/L	0.006	0.008	0.009	0.016	0.029	0.031	0.025	0.012	0.009	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	N/D	N/D	0.013	0.031
22-Aug-98	N/D	N/D	C/L	N/D	N/D	N/D	N/D	N/D	N/D	-999	0.001	0.001	0.001	0.001	0.001	N/D	0.001	0.001	N/D	N/D	N/D	N/D	N/D	N/D	0.001	0.001
23-Aug-98	N/D	N/D	C/L	N/D	0.004	N/D	N/D	N/D	N/D	0.011	0.001	0.001	0.001	0.007	0.001	0.001	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0.004	0.002	0.007
24-Aug-98	0.011	0.008	C/L	0.002	N/D	N/D	0.008	N/D	N/D	0.004	0.010	0.033	0.002	N/D	N/D	N/D	N/D	N/D	N/D	0.001	0.001	N/D	0.002	0.002	0.007	0.033
25-Aug-98	N/D	N/D	C/L	0.001	0.006	0.007	0.010	0.010	0.027	0.023	0.002	0.002	0.001	0.001	0.001	-999	0.001	0.001	0.001	N/D	-999	-999	0.002	N/D	0.006	0.023
26-Aug-98	N/D	0.001	C/L	N/D	N/D	0.002	0.001	0.007	0.015	0.005	0.001	-999	0.001	0.001	0.001	N/D	N/D	N/D	N/D	N/D	0.001	0.001	0.002	0.001	0.003	0.015
27-Aug-98	0.002	0.028	C/L	0.002	0.025	0.030	0.025	0.015	0.025	0.040	0.001	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0.002	0.003	0.002	0.001	0.015	0.040
28-Aug-98	N/D	0.045	C/L	0.040	0.027	0.040	0.044	0.031	0.015	0.015	0.001	N/D	N/D	N/D	0.001	0.001	0.001	0.002	0.001	N/D	0.002	0.006	0.008	0.007	0.017	0.045
29-Aug-98	0.006	0.003	C/L	0.007	0.011	0.009	0.011	0.013	0.019	0.007	0.001	N/D	N/D	N/D	N/D	0.001	N/D	N/D	N/D	N/D	N/D	N/D	0.001	N/D	0.007	0.019
30-Aug-98	0.001	0.003	C/L	0.006	0.013	0.012	0.011	0.014	0.011	0.005	0.001	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.008	0.014
Average	0.005	0.013	C/L	0.009	0.013	0.016	0.016	0.017	0.022	0.013	0.003	0.009	0.001	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.003	0.003		
Maximum	0.011	0.045	C/L	0.040	0.027	0.040	0.044	0.031	0.031	0.040	0.012	0.033	0.002	0.007	0.001	0.001	0.001	0.002	0.001	0.001	0.002	0.006	0.008	0.007		

Std. Dev. 0.011

Location : No. 528, Daluggala Rd, Sapugaskanda

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
31-Aug-98	0.004	0.004	C/L	0.007	0.006	0.004	0.008	0.008	0.009	0.005	0.008	0.014	0.001	N/D	0.001	0.001	0.001	0.003	0.002	0.012	0.021	0.031	0.037	0.038	0.009	0.038
01-Sep-98	0.071	0.017	C/L	0.004	0.003	0.002	0.007	0.008	0.003	0.004	0.004	0.001	0.001	0.001	N/D	N/D	0.001	N/D	0.001	0.001	0.001	0.003	0.002	0.005	0.007	0.071
02-Sep-98	0.004	N/D	C/L	0.001	0.001	0.001	0.001	0.004	0.005	0.003	0.001	0.002	N/D	N/D	N/D	N/D	N/D	0.001	0.001	0.003	0.003	0.002	0.001	0.004	0.002	0.005
03-Sep-98	0.004	0.005	C/L	0.001	0.001	0.001	0.002	0.006	0.007	0.005	0.007	0.004	0.001	N/D	0.001	0.001	N/D	N/D	N/D	-999	0.003	0.001	0.002	0.006	0.003	0.007
04-Sep-98	0.007	0.007	C/L	0.006	0.004	0.004	0.003	0.004	0.004	0.005	0.006	0.005	0.005	0.003	0.001	0.001	0.001	-999	-999	0.016	0.010	0.037	0.065	0.001	0.009	0.065
05-Sep-98	N/D	N/D	C/L	0.055	0.001	N/D	N/D	N/D	N/D	0.018	0.001	0.001	N/D	0.010	0.010	N/D	N/D	N/D	N/D	-999	N/D	N/D	N/D	N/D	0.014	0.055
06-Sep-98	N/D	N/D	C/L	0.001	0.001	0.001	N/D	N/D	0.003	0.016	0.002	0.009	0.002	0.003	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0.001	0.010	0.004	0.010
07-Sep-98	0.003	0.001	C/L	N/D	N/D	N/D	0.001	N/D	0.001	0.011	0.013	0.015	0.017	0.024	0.016	0.022	0.010	0.015	N/D	0.002	0.007	0.011	0.001	0.002	0.008	0.024
08-Sep-98	0.001	N/D	C/L	N/D	N/D	0.020	0.025	0.001	0.002	0.012	0.034	0.032	0.053	0.020	0.005	0.005	0.006	0.024	0.021	0.022	0.001	N/D	N/D	0.005	0.016	0.053
09-Sep-98	N/D	N/D	C/L	0.096	0.062	0.013	0.004	0.001	0.001	0.013	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.026	0.096
Average	0.013	0.007	C/L	0.021	0.010	0.006	0.006	0.005	0.004	0.015	0.008	0.009	0.011	0.010	0.006	0.006	0.004	0.011	0.006	0.009	0.007	0.013	0.016	0.009		
Maximum	0.071	0.017	C/L	0.096	0.062	0.020	0.025	0.008	0.009	0.018	0.034	0.032	0.053	0.024	0.016	0.022	0.010	0.024	0.021	0.022	0.021	0.037	0.065	0.038		

Std. Dev. 0.014 Missing data or Outliers are coded as -999 C/L : Calibration Cycle N/D : Not Detected

NBRO/ENV/15050/98/3101

5.1.17 (B)

ENVIRONMENTAL DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
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Tel : 94-1-588946, 501834, 503826 Fax : 94-1-502611 e-mail : nabro@sit.lk

Parameter : Oxides of Nitrogen
Unit : ppm

Location : Pamunuwila Maha Vidyalaya

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
21-Aug-98	0.011	0.007	C/L	0.012	0.015	0.017	0.025	0.039	0.041	0.028	0.018	0.017	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.003	0.005	0.018	0.041
22-Aug-98	0.006	0.005	C/L	0.008	0.006	0.004	0.003	0.003	0.004	-999	0.004	0.003	0.004	0.004	0.003	0.003	0.004	0.005	0.003	0.003	0.004	0.004	0.003	0.005	0.004	0.008
23-Aug-98	0.004	0.002	C/L	0.002	0.014	0.002	0.001	0.002	0.004	0.006	0.006	0.005	0.009	0.021	0.005	0.003	0.002	0.002	0.002	0.002	0.005	0.005	0.004	0.013	0.005	0.021
24-Aug-98	0.021	0.018	C/L	0.007	0.001	0.002	0.019	0.004	0.005	0.010	0.020	0.049	0.009	0.003	0.003	0.002	0.003	0.003	0.004	0.009	0.011	0.011	0.015	0.013	0.011	0.049
25-Aug-98	0.002	0.006	C/L	0.008	0.015	0.015	0.017	0.017	0.031	0.033	0.007	0.006	0.004	0.004	0.004	-999	0.003	0.004	0.004	0.005	-999	-999	0.012	0.009	0.010	0.033
26-Aug-98	0.008	0.008	C/L	0.004	0.004	0.008	0.005	0.014	0.022	0.011	0.008	-999	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.005	0.008	0.010	0.012	0.008	0.007	0.023
27-Aug-98	0.009	0.037	C/L	0.007	0.032	0.038	0.034	0.023	0.036	0.052	0.005	0.003	0.002	0.003	0.003	0.002	0.002	0.002	0.003	0.004	0.011	0.013	0.013	0.010	0.015	0.052
28-Aug-98	0.007	0.055	C/L	0.048	0.035	0.048	0.052	0.038	0.035	0.023	0.005	0.003	0.003	0.004	0.004	0.004	0.005	0.006	0.005	0.005	0.010	0.017	0.019	0.018	0.019	0.055
29-Aug-98	0.015	0.010	C/L	0.014	0.018	0.015	0.017	0.019	0.022	0.013	0.005	0.003	0.004	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.008	0.009	0.008	0.009	0.009	0.028
30-Aug-98	0.010	0.011	C/L	0.012	0.019	0.016	0.017	0.019	0.017	0.011	0.004	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.014	0.019
Average	0.009	0.016	C/L	0.012	0.016	0.017	0.019	0.018	0.022	0.021	0.008	0.011	0.005	0.006	0.004	0.003	0.003	0.004	0.003	0.005	0.008	0.010	0.010	0.010		
Maximum	0.021	0.055	C/L	0.048	0.035	0.048	0.052	0.039	0.041	0.052	0.020	0.049	0.009	0.021	0.005	0.004	0.005	0.006	0.005	0.009	0.011	0.017	0.019	0.018		

Std. Dev. 0.011

Location : No. 528, Daluggala Rd, Sapugaskanda

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
31-Aug-98	0.013	0.010	C/L	0.012	0.010	0.009	0.012	0.012	0.015	0.012	0.018	0.023	0.005	0.003	0.003	0.003	0.005	0.007	0.007	0.023	0.033	0.007	0.048	0.048	0.015	0.048
01-Sep-98	0.083	0.025	C/L	0.011	0.009	0.007	0.014	0.015	0.016	0.014	0.013	0.005	0.005	0.005	0.002	0.002	0.004	0.004	0.004	0.007	0.007	0.013	0.012	0.015	0.013	0.083
02-Sep-98	0.012	0.004	C/L	0.006	0.005	0.005	0.005	0.009	0.011	0.010	0.006	0.005	0.002	0.002	0.002	0.002	0.002	0.004	0.006	0.013	0.014	0.012	0.011	0.013	0.007	0.014
03-Sep-98	0.012	0.012	C/L	0.006	0.006	0.006	0.007	0.012	0.012	0.012	0.017	0.011	0.005	0.004	0.004	0.004	0.004	0.003	0.004	-999	0.014	0.011	0.011	0.014	0.009	0.017
04-Sep-98	0.014	0.013	C/L	0.011	0.009	0.008	0.007	0.009	0.013	0.012	0.014	0.013	0.013	0.009	0.004	0.004	0.005	-999	-999	0.022	0.019	0.047	0.076	0.006	0.016	0.076
05-Sep-98	0.004	0.003	C/L	0.065	0.005	0.002	0.002	0.002	0.005	0.028	0.006	0.004	0.004	0.015	0.015	0.003	0.004	0.006	0.006	N/D	0.008	0.009	0.008	0.006	0.010	0.065
06-Sep-98	0.005	0.006	C/L	0.005	0.008	0.005	0.004	0.004	0.008	0.011	0.007	0.017	0.007	0.008	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.008	0.020	0.006	0.020
07-Sep-98	0.010	0.007	C/L	0.002	0.002	0.002	0.003	0.004	0.005	0.005	0.020	0.025	0.029	0.036	0.027	0.033	0.016	0.024	0.003	0.008	0.015	0.007	0.007	0.008	0.013	0.036
08-Sep-98	0.006	0.003	C/L	0.002	0.002	0.024	0.032	0.006	0.007	0.008	0.043	0.044	0.066	0.027	0.010	0.011	0.009	0.032	0.027	0.030	0.008	0.005	0.004	0.010	0.018	0.066
09-Sep-98	0.003	0.003	C/L	0.110	0.072	0.018	0.012	0.007	0.005	0.007	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.026	0.110
Average	0.016	0.009	C/L	0.023	0.013	0.009	0.010	0.008	0.010	0.012	0.016	0.016	0.015	0.012	0.006	0.007	0.006	0.010	0.008	0.015	0.013	0.013	0.021	0.016		
Maximum	0.083	0.025	C/L	0.110	0.072	0.024	0.032	0.015	0.016	0.028	0.043	0.044	0.066	0.036	0.027	0.033	0.016	0.032	0.027	0.030	0.033	0.047	0.076	0.048		

Std. Dev. 0.015 Missing data or Outliers are coded as -999 C/L : Calibration Cycle N/D : Not Detected

NBRO/ENV/15050/98/3101

5.1.17 (b)

ENVIRONMENTAL DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1,JAWATTA ROAD, COLOMBO-5. Tel : 94-1-588946, 501834, 503826 Fax : 94-1-502611 e-mail : nabro@slt.lk

rameter : Nitrogen Dioxide
it : ppm

cation : Pamunuwila Maha Vidyalaya

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
-Aug-98	0.005	0.003	C/L	0.005	0.007	0.007	0.009	0.009	0.009	0.007	0.008	0.007	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.003	0.005	0.006	0.009
-Aug-98	0.006	0.004	C/L	0.007	0.005	0.004	0.003	0.003	0.004	0.002	0.003	0.002	0.003	0.003	0.002	0.002	0.003	0.004	0.003	0.002	0.004	0.004	0.003	0.004	0.003	0.007
-Aug-98	0.004	0.002	C/L	0.002	0.009	0.002	0.001	0.002	0.004	0.004	0.004	0.004	0.007	0.013	0.004	0.003	0.001	0.001	0.001	0.002	0.004	0.005	0.004	0.008	0.004	0.013
-Aug-98	0.010	0.009	C/L	0.004	0.001	0.002	0.010	0.004	0.004	0.006	0.010	0.015	0.007	0.003	0.002	0.002	0.002	0.003	0.004	0.008	0.010	0.011	0.013	0.011	0.007	0.015
-Aug-98	0.002	0.005	C/L	0.007	0.008	0.008	0.007	0.006	0.008	0.010	0.005	0.004	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.004	0.006	0.006	0.009	0.008	0.005	0.010
-Aug-98	0.007	0.006	C/L	0.003	0.004	0.005	0.003	0.006	0.007	0.006	0.005	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.003	0.005	0.006	0.009	0.010	0.007	0.005	0.010
-Aug-98	0.008	0.009	C/L	0.005	0.007	0.007	0.008	0.008	0.009	0.011	0.004	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.008	0.011	0.010	0.009	0.006	0.011
-Aug-98	0.006	0.009	C/L	0.007	0.006	0.007	0.007	0.007	0.007	0.007	0.003	0.002	0.002	0.003	0.003	0.003	0.004	0.004	0.003	0.005	0.008	0.011	0.011	0.010	0.006	0.011
-Aug-98	0.009	0.008	C/L	0.007	0.006	0.008	0.006	0.008	0.008	0.006	0.004	0.002	0.003	0.002	0.002	0.003	0.003	0.002	0.003	0.003	0.005	0.005	0.007	0.008	0.005	0.009
-Aug-98	0.008	0.007	C/L	0.006	0.006	0.005	0.006	0.005	0.006	0.005	0.003	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.006	0.008
erage	0.007	0.006	C/L	0.005	0.006	0.005	0.006	0.006	0.007	0.006	0.005	0.004	0.004	0.004	0.003	0.002	0.002	0.003	0.003	0.004	0.006	0.008	0.008	0.008		
ximum	0.010	0.009	C/L	0.007	0.009	0.008	0.010	0.009	0.009	0.011	0.010	0.015	0.007	0.013	0.004	0.003	0.004	0.004	0.004	0.008	0.010	0.011	0.013	0.011		

d. Dev. 0.003

cation : No. 528, Daluggala Rd, Sapugaskanda

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
-Aug-98	0.009	0.006	C/L	0.005	0.005	0.005	0.006	0.005	0.006	0.007	0.010	0.009	0.004	0.003	0.003	0.003	0.004	0.005	0.006	0.011	0.012	0.006	0.011	0.009	0.007	0.012
-Sep-98	0.011	0.008	C/L	0.006	0.006	0.005	0.008	0.007	0.010	0.010	0.008	0.004	0.004	0.004	0.002	0.002	0.003	0.003	0.004	0.006	0.006	0.010	0.010	0.010	0.006	0.011
-Sep-98	0.008	0.004	C/L	0.006	0.004	0.004	0.004	0.005	0.006	0.007	0.005	0.004	0.002	0.002	0.002	0.002	0.002	0.003	0.005	0.010	0.010	0.010	0.009	0.009	0.005	0.010
-Sep-98	0.008	0.006	C/L	0.005	0.004	0.005	0.005	0.005	0.005	0.006	0.009	0.006	0.004	0.003	0.003	0.003	0.003	0.003	0.003	-999	0.010	0.009	0.008	0.008	0.006	0.010
-Sep-98	0.006	0.006	C/L	0.005	0.004	0.004	0.004	0.005	0.009	0.006	0.008	0.007	0.007	0.005	0.003	0.003	0.004	0.004	0.001	0.002	0.008	0.009	0.010	0.005	0.005	0.010
-Sep-98	0.004	0.003	C/L	0.009	0.004	0.003	0.002	0.002	0.005	0.010	0.005	0.003	0.003	0.004	0.005	0.003	0.004	0.006	0.006	0.005	0.007	0.009	0.007	0.006	0.005	0.010
-Sep-98	0.005	0.005	C/L	0.004	0.005	0.004	0.003	0.003	0.005	0.004	0.005	0.008	0.005	0.005	0.002	0.002	0.002	0.002	0.003	0.002	0.004	0.004	0.007	0.009	0.004	0.009
-Sep-98	0.007	0.006	C/L	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.006	0.009	0.011	0.011	0.010	0.011	0.005	0.009	0.003	0.006	0.008	0.006	0.006	0.006	0.006	0.011
-Sep-98	0.005	0.003	C/L	0.002	0.002	0.003	0.007	0.005	0.004	0.004	0.009	0.011	0.012	0.006	0.005	0.005	0.003	0.007	0.006	0.008	0.005	0.004	0.003	0.005	0.005	0.012
-Sep-98	0.002	0.002	C/L	0.013	0.009	0.004	0.008	0.006	0.005	0.003	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.006	0.013
erage	0.007	0.005	C/L	0.006	0.005	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.006	0.005	0.004	0.004	0.003	0.005	0.004	0.006	0.008	0.007	0.008	0.007		
ximum	0.011	0.008	C/L	0.013	0.009	0.005	0.008	0.007	0.010	0.010	0.010	0.011	0.012	0.011	0.010	0.011	0.005	0.009	0.006	0.011	0.012	0.010	0.011	0.010		

d. Dev. 0.003 Missing data or Outliers are coded as -999 C/L : Calibration Cycle N/D : Not Detected

BRO/ENV/15050/98/3101

5.1.17 (B)

ENVIRONMENTAL DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1,JAWATTA ROAD, COLOMBO-5.
Tel : 94-1-588946, 501834, 503826 Fax : 94-1-502811 e-mail : nabro@slt.lk.

Parameter : Sulphur Dioxide
Unit : ppm

Location : Pamunuwila Maha Vidyalaya

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
21-Aug-98	0.006	0.003	C/L	0.004	0.008	0.009	0.014	0.012	0.014	0.011	0.007	0.006	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.002	0.004	0.008	0.014
22-Aug-98	0.007	0.006	C/L	0.013	0.008	0.005	0.004	0.002	0.007	-999	0.003	0.003	0.005	0.006	0.006	0.004	0.005	0.008	0.003	0.002	0.003	0.003	0.002	0.002	0.005	0.013
23-Aug-98	0.002	0.001	C/L	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.004	0.004	0.016	0.007	0.004	0.002	0.001	0.001	0.001	0.002	0.002	0.002	0.004	0.003	0.016
24-Aug-98	0.008	0.006	C/L	0.004	0.001	0.001	0.004	0.003	0.003	0.004	0.009	-999	0.006	0.002	0.001	N/D	0.001	0.001	0.001	0.003	0.004	-999	0.005	0.005	0.004	0.009
25-Aug-98	0.002	0.002	C/L	0.010	0.018	0.020	0.020	0.012	0.031	0.018	0.005	0.005	0.005	0.004	0.005	-999	N/D	0.005	0.005	0.004	-999	-999	0.005	0.006	0.010	0.031
26-Aug-98	0.006	0.005	C/L	0.003	0.002	0.004	0.003	0.005	0.007	0.008	0.005	-999	0.002	0.004	0.005	0.005	0.004	0.002	0.002	0.003	0.004	0.006	0.006	0.005	0.004	0.008
27-Aug-98	0.004	0.012	C/L	0.005	0.010	0.018	0.016	0.010	0.016	0.027	0.007	0.003	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.005	0.007	0.006	0.006	0.007	0.027
28-Aug-98	0.005	0.023	C/L	0.022	0.017	0.024	0.022	0.018	0.014	0.014	0.004	0.002	0.003	0.004	0.005	0.008	0.009	0.010	0.004	0.003	0.004	0.008	0.009	0.009	0.010	0.024
29-Aug-98	0.007	0.006	C/L	0.005	0.010	0.010	0.013	0.020	0.041	0.014	0.006	0.004	0.005	0.005	0.005	0.007	0.005	0.003	0.003	0.002	0.003	0.003	0.004	0.004	0.008	0.041
30-Aug-98	0.005	0.004	C/L	0.005	0.018	0.027	0.026	0.011	0.012	0.006	0.003	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.012	0.027
Average	0.005	0.007	C/L	0.007	0.009	0.012	0.012	0.009	0.014	0.012	0.005	0.004	0.004	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.004	0.005	0.005	0.005		
Maximum	0.008	0.023	C/L	0.022	0.018	0.027	0.026	0.020	0.041	0.027	0.009	0.006	0.006	0.016	0.007	0.007	0.009	0.010	0.005	0.004	0.005	0.008	0.009	0.009		

Std. Dev. 0.008

Location : No. 528, Daluggala Rd, Sapugaskanda

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
31-Aug-98	0.010	0.004	C/L	0.005	0.003	0.004	0.024	0.004	0.007	0.008	0.011	0.019	0.009	0.005	0.004	0.004	0.004	0.016	0.014	0.025	0.027	0.007	0.028	0.024	0.011	0.028
01-Sep-98	0.043	0.013	C/L	0.005	0.004	0.002	0.006	0.005	0.008	0.014	0.007	0.004	0.005	0.005	0.001	N/D	0.003	0.002	0.004	0.007	0.005	0.007	0.006	0.004	0.007	0.043
02-Sep-98	0.003	0.003	C/L	0.010	0.005	0.006	0.006	0.005	0.008	0.011	0.005	0.004	0.003	0.003	0.002	0.003	0.003	0.005	0.007	0.008	0.009	0.008	0.005	0.005	0.005	0.011
03-Sep-98	0.004	0.003	C/L	0.001	0.001	0.002	0.002	0.004	0.004	0.004	0.005	0.006	0.005	0.003	0.003	0.003	0.004	0.003	0.004	-999	0.008	0.007	0.004	0.005	0.004	0.007
04-Sep-98	0.004	0.003	C/L	0.006	0.004	0.003	0.003	0.004	-999	0.008	0.007	0.009	0.012	0.008	0.008	0.010	0.011	-999	-999	-999	0.025	0.024	0.034	0.003	0.010	0.034
05-Sep-98	0.002	0.002	C/L	0.018	0.003	0.002	0.002	0.004	0.009	0.017	0.007	0.004	0.003	0.004	0.006	0.002	0.002	0.003	0.003	-999	-999	0.006	0.004	0.003	0.005	0.018
06-Sep-98	0.003	0.002	C/L	0.002	0.005	0.002	0.002	0.001	0.002	0.003	0.003	0.013	0.009	0.010	0.003	0.003	0.004	0.002	0.005	0.003	0.003	0.002	0.005	0.004	0.004	0.013
07-Sep-98	0.002	0.003	C/L	N/D	-999	-999	-999	-999	-999	-999	0.002	0.008	0.013	0.020	0.019	0.020	0.014	0.027	0.003	0.010	0.008	0.003	0.002	0.002	0.010	0.027
08-Sep-98	0.002	0.001	C/L	N/D	N/D	0.004	0.009	0.003	0.003	0.003	0.013	0.025	0.004	0.025	0.009	0.016	0.006	0.013	0.015	0.018	0.005	0.003	0.002	0.002	0.009	0.025
09-Sep-98	0.002	0.001	C/L	0.064	0.025	0.008	0.007	0.004	0.005	0.003	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.013	0.064
Average	0.008	0.004	C/L	0.014	0.006	0.004	0.005	0.004	0.006	0.008	0.007	0.010	0.007	0.009	0.006	0.008	0.008	0.009	0.007	0.012	0.011	0.007	0.010	0.006		
Maximum	0.043	0.013	C/L	0.064	0.025	0.008	0.009	0.005	0.008	0.017	0.013	0.025	0.013	0.025	0.019	0.020	0.014	0.027	0.015	0.025	0.027	0.024	0.034	0.024		

Std. Dev. 0.008 Missing data or Outliers are coded as -999 C/L : Calibration Cycle N/D : Not Detected

NBRO/ENV/15050/98/3101

5.1.17 (B)

ENVIRONMENTAL DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1,JAWATTA ROAD, COLOMBO-5. Tel : 94-1-588946, 501834, 503826 Fax : 94-1-502611 e-mail : nabro@sit.lk

arameter : Carbon Monoxide
nit : ppm

ocation : Pamunuwila Maha Vidyalaya

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
1-Aug-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.055	0.049	0.052	0.055
2-Aug-98	0.054	0.034	C/L	0.035	0.029	-999	-999	0.011	0.020	1.617	0.055	0.079	0.070	0.080	0.083	0.053	0.065	0.074	0.083	0.054	0.103	0.121	0.108	0.148	0.142	1.617
3-Aug-98	0.094	0.109	C/L	0.104	0.106	0.094	0.152	0.145	0.204	0.231	0.266	0.204	0.397	0.323	0.216	0.174	0.130	0.109	0.109	0.184	0.235	0.263	0.198	0.167	0.185	0.397
4-Aug-98	0.123	0.061	C/L	0.040	0.036	0.066	0.064	0.056	0.111	0.196	0.195	-999	-999	-999	-999	-999	-999	0.374	0.068	0.361	0.494	-999	-999	-999	0.162	0.494
5-Aug-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	0.222	0.078	0.036	0.025	-999	-999	-999	N/D	N/D	-999	-999	3.161	0.208	0.622	3.161
6-Aug-98	0.181	0.171	C/L	0.110	0.083	0.087	0.132	0.267	0.282	0.219	0.161	0.165	-999	-999	0.318	0.054	0.075	0.081	0.105	0.147	0.270	0.733	0.523	0.267	0.212	0.733
7-Aug-98	0.247	0.164	C/L	0.086	0.074	0.082	0.129	0.168	0.194	0.123	0.104	0.045	0.038	0.046	0.042	0.038	0.046	0.042	0.045	0.118	0.425	0.612	0.521	0.235	0.157	0.612
8-Aug-98	0.111	0.066	C/L	0.039	0.035	0.042	0.057	0.168	0.210	0.177	0.122	0.064	0.040	0.040	0.044	0.059	0.059	0.061	0.063	0.131	0.266	0.987	0.877	0.732	0.193	0.987
9-Aug-98	0.510	0.286	C/L	0.154	0.127	0.088	0.133	0.245	0.382	0.168	0.107	0.044	0.043	0.035	0.034	0.035	0.042	0.061	0.045	0.051	0.173	0.195	0.379	0.310	0.158	0.510
10-Aug-98	0.234	0.351	C/L	0.202	0.197	0.193	0.205	0.236	0.318	0.200	0.127	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.228	0.351
verage	0.194	0.155	C/L	0.096	0.086	0.094	0.127	0.162	0.215	0.366	0.142	0.118	0.111	0.093	0.109	0.069	0.070	0.115	0.074	0.149	0.285	0.489	0.728	0.267		
aximum	0.510	0.351	C/L	0.202	0.197	0.193	0.205	0.267	0.382	1.617	0.266	0.222	0.397	0.323	0.318	0.174	0.130	0.374	0.109	0.361	0.494	0.987	3.161	0.732		

td. Dev. 0.301

ocation : No. 528, Daluggala Rd, Sapugaskanda

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
-Aug-98	0.559	0.372	C/L	0.270	0.218	0.258	0.299	0.420	0.455	0.277	0.154	0.106	0.097	0.100	0.109	0.091	0.110	0.112	0.133	0.113	0.113	0.083	0.106	0.085	0.202	0.559
-Sep-98	0.047	0.073	C/L	0.163	0.173	0.195	0.396	0.645	0.649	0.317	0.275	0.147	0.144	0.104	0.051	0.048	0.047	0.047	0.057	0.067	0.124	0.124	0.347	0.768	0.218	0.768
-Sep-98	0.516	0.183	C/L	0.150	0.148	0.153	0.198	0.335	0.478	0.359	0.233	0.186	0.176	0.184	0.151	0.122	0.121	0.130	0.147	0.236	0.781	0.354	0.500	0.602	0.280	0.781
-Sep-98	0.504	0.415	C/L	0.178	0.133	0.129	0.241	0.415	0.517	0.391	0.263	0.118	0.190	0.150	0.123	0.106	0.097	0.108	0.116	-999	0.265	0.305	0.366	0.364	0.250	0.517
-Sep-98	0.403	0.431	C/L	0.244	0.175	0.157	0.144	0.203	-999	-999	-999	-999	0.274	0.183	0.095	0.121	0.115	-999	-999	-999	-999	-999	-999	-999	0.212	0.431
-Sep-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	2.213	0.081	0.108	-999	-999	-999	0.190	0.103	0.539	2.213
-Sep-98	0.168	0.182	C/L	0.124	0.159	0.14[illegible]	0.123	0.141	0.218	0.220	0.139	0.260	0.088	0.082	0.073	0.059	0.060	0.193	0.101	0.085	0.123	0.155	0.126	0.234	0.141	0.260
-Sep-98	0.231	0.098	C/L	0.049	0.060	0.06[illegible]	0.104	0.089	0.108	0.105	0.059	0.044	0.095	0.071	0.068	0.035	0.048	0.046	0.043	0.067	0.124	0.180	0.247	0.239	0.099	0.247
-Sep-98	0.169	0.057	C/L	0.041	0.030	0.03[illegible]	0.035	0.112	0.131	0.12[illegible]	0.049	0.038	-999	0.064	0.107	0.108	0.117	0.141	0.150	0.192	0.237	0.208	0.175	0.134	0.111	0.237
-Sep-98	0.147	0.060	C/L	0.043	0.041	0.0[illegible]	0.104	0.144	0.090	0.031	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.078	0.147
verage	0.305	0.208	C/L	0.140	0.126	0.130	0.183	0.278	0.331	0.228	0.167	0.128	0.152	0.117	0.097	0.086	0.325	0.107	0.107	0.127	0.252	0.201	0.257	0.316		
aximum	0.559	0.431	C/L	0.270	0.218	0.258	0.396	0.645	0.649	0.391	0.275	0.260	0.274	0.184	0.151	0.122	2.213	0.193	0.150	0.236	0.781	0.354	0.500	0.768		

td. Dev. 0.206 Missing data or Outliers are coded as -999 C/L : Calibration Cycle N/D : Not Detected

BRO/ENV/15050/98/3101

5.1.17 (B)

ENVIRONMENTAL DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1,JAWATTA ROAD, COLOMBO-5.
Tel : 94-1-588946, 501834, 503826 Fax : 94-1-502611 e-mail : nabro@sit.lk

Parameter : Ozone
Unit : ppm

Location : Pamunuwila Maha Vidyalaya

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
21-Aug-98	0.008	0.008	C/L	0.007	0.005	0.004	0.003	0.001	0.003	0.004	0.009	0.011	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.010	0.007	0.006	0.011
22-Aug-98	0.007	0.010	C/L	0.006	0.008	0.010	0.011	0.012	0.011	-999	N/D	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.009	0.012
23-Aug-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
24-Aug-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.007	0.006	-999	0.001	N/D	0.005	0.007
25-Aug-98	0.007	0.005	C/L	0.002	0.001	0.001	0.001	0.002	-999	-999	0.012	0.005	0.025	0.013	0.012	-999	0.019	0.013	0.014	0.016	-999	0.002	0.054	0.026	0.012	0.054
26-Aug-98	-999	0.002	C/L	0.004	0.004	0.002	0.004	0.015	0.016	0.002	0.019	-999	0.021	0.010	0.019	0.019	0.020	0.023	0.025	0.015	0.012	0.012	0.008	0.007	0.013	0.026
27-Aug-98	0.009	0.015	C/L	0.004	0.002	0.002	0.002	0.003	0.016	0.006	0.019	0.018	0.018	0.030	0.023	0.026	0.025	0.020	0.022	0.015	0.007	-999	0.004	0.001	0.013	0.030
28-Aug-98	0.003	0.001	C/L	N/D	N/D	N/D	N/D	0.003	0.003	0.011	0.019	0.014	0.015	0.021	0.022	0.022	0.018	0.015	0.018	0.014	0.007	0.004	0.003	0.003	0.011	0.022
29-Aug-98	0.002	N/D	C/L	N/D	N/D	N/D	N/D	0.001	0.003	0.007	0.011	0.017	0.018	0.018	0.019	0.019	0.022	-999	-999	-999	-999	-999	-999	-999	0.012	0.022
30-Aug-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
Average	0.006	0.007	C/L	0.005	0.004	0.004	0.004	0.005	0.009	0.006	0.015	0.013	0.019	0.018	0.019	0.022	0.021	0.018	0.020	0.013	0.008	0.006	0.013	0.009		
Maximum	0.009	0.015	C/L	0.007	0.008	0.010	0.011	0.015	0.026	0.011	0.019	0.018	0.025	0.030	0.023	0.026	0.025	0.023	0.025	0.016	0.012	0.012	0.054	0.026		

Std. Dev. 0.009

Location : No. 528, Daluggala Rd, Sapugaskanda

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Average	Maximum
31-Aug-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
01-Sep-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
02-Sep-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
03-Sep-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.067	-999	-999	0.067	0.067
04-Sep-98	-999	-999	C/L	-999	-999	-999	-999	-999	-999	0.001	N/D	0.003	N/D	0.011	-999	0.004	-999	-999	-999	-999	0.114	-999	-999	0.003	0.023	0.114
05-Sep-98	0.003	0.004	C/L	0.004	0.020	0.026	0.023	0.020	-999	-999	0.028	0.037	0.019	0.001	0.010	0.012	0.015	0.015	0.010	-999	0.007	-999	-999	0.001	0.014	0.037
06-Sep-98	0.001	0.001	C/L	0.007	0.004	0.004	0.004	0.004	0.009	0.027	0.004	0.008	0.013	0.022	0.018	0.019	0.018	0.026	0.025	0.023	0.009	0.017	0.011	0.005	0.012	0.027
07-Sep-98	0.004	0.001	C/L	0.006	0.007	0.008	-999	N/D	0.007	0.009	0.022	0.015	0.017	0.014	0.008	0.018	0.016	0.003	0.025	-999	0.028	0.012	-999	-999	0.013	0.029
08-Sep-98	0.008	0.008	C/L	0.004	0.005	0.004	0.003	0.005	0.007	-999	-999	0.013	0.006	0.013	0.012	0.011	0.012	0.007	0.008	0.006	0.010	-999	0.002	0.009	0.008	0.013
09-Sep-98	0.010	0.006	C/L	N/D	0.001	0.005	0.004	0.005	0.004	0.007	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999	0.005	0.010
Average	0.005	0.004	C/L	0.005	0.007	0.009	0.009	0.009	0.007	0.016	0.018	0.015	0.014	0.012	0.012	0.013	0.015	0.013	0.017	0.015	0.034	0.032	0.007	0.005		
Maximum	0.010	0.008	C/L	0.007	0.020	0.026	0.023	0.020	0.009	0.028	0.028	0.037	0.019	0.022	0.018	0.019	0.018	0.026	0.025	0.023	0.114	0.067	0.011	0.009		

Std. Dev. 0.015 Missing data or Outliers are coded as -999 C/L : Calibration Cycle N/D : Not Detected

NBRO/ENV/15050/98/3101

5.1.17 (B)

ENVIRONMENTAL DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1, JAWATTA ROAD, COLOMBO-5. Tel : 94-1-588946, 501834, 503826 Fax : 94-1-502611

PM - 10 Data

Location : Pamunuwila Maha Vidyalaya
Period : 21 August, 1998 to 30 August, 1998

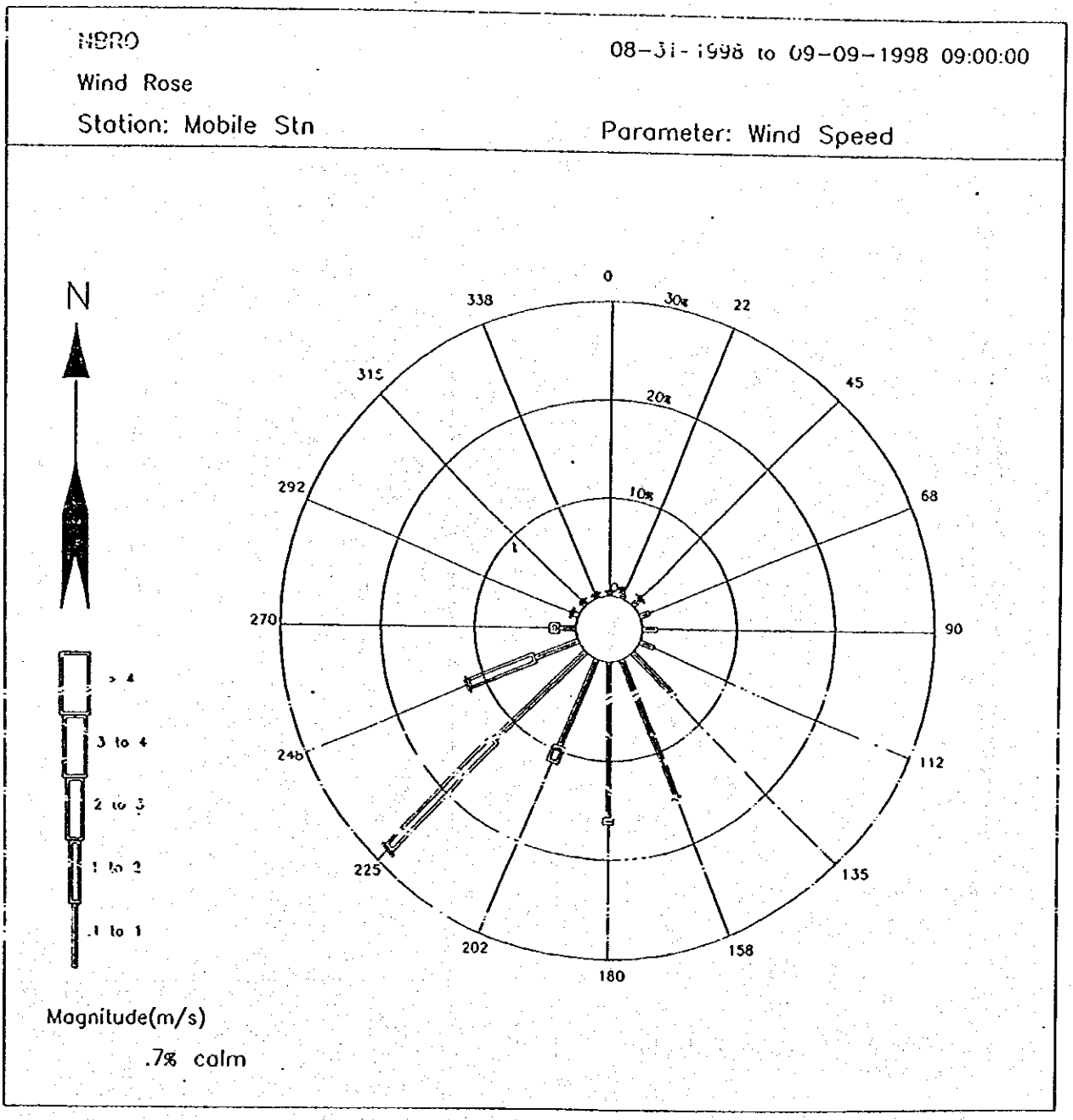
Date	Start Time (hrs.)	Run Time (hrs.)	Concentration ($\mu g/m^3$)
Saturday, 22-Aug-98	11:45	23.7	56
Monday, 24-Aug-98	18:35	24.0	52
Tuesday, 25-Aug-98	21:30	20.9	52
Wednesday, 26-Aug-98	18:30	23.7	57
Thursday, 27-Aug-98	18:20	24.0	54
Friday, 28-Aug-09	18:30	22.1	67
Saturday, 29-Aug-98.	16:45	17.4	68

Location : No. 528, Daluggala Rd, Sapugaskanda
Period : 31 August, 1998 to 09 September, 1998

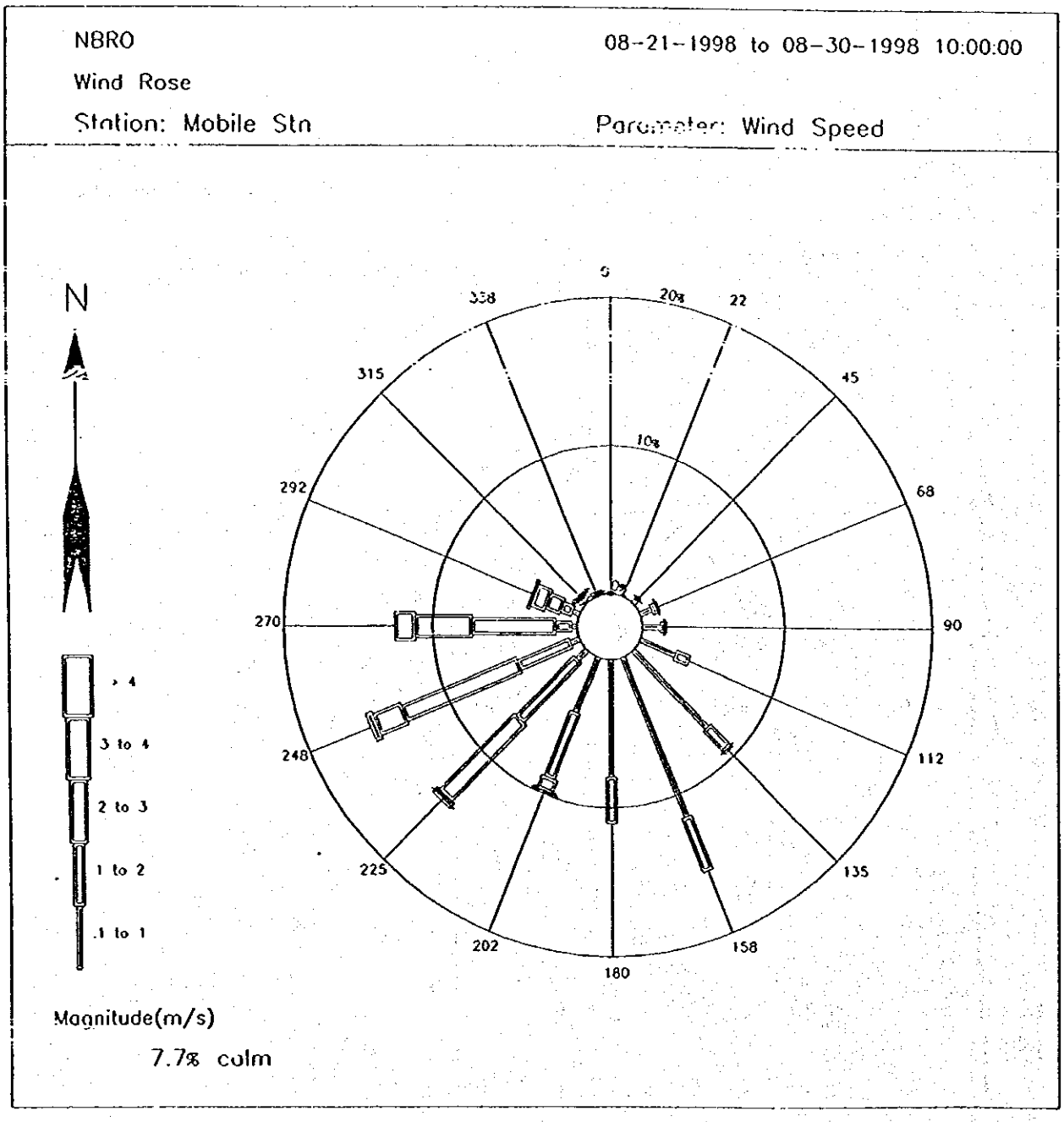
Date	Start Time (hrs.)	Run Time (hrs.)	Concentration ($\mu g/m^3$)
Monday, 31-Aug-98	18:30	21.6	45
Tuesday, 01-Sep-98	18:45	25.3	53
Wednesday, 02-Sep-98	20:00	23.6	62
Thursday, 03-Sep-98	20:00	23.6	41
Friday, 04-Sep-98	20:05	20.9	30
Saturday, 05-Sep-98	17:00	24.1	31
Sunday, 06-Sep-98	17:15	24.0	34
Monday, 07-Sep-98	18:45	24.0	33
Tuesday, 08-Sep-98	19:40	17.9	46

NBRO/ENV/15050/98/310

5.1.17(B)



Location: No. 528, Daluggala Rd. Sapugaskanda



Location: Pamunuwila Maha Vidyalaya

MINISTRY OF URBAN DEVELOPMENT, HOUSING & CONSTRUCTION

NATIONAL BUILDING RESEARCH ORGANISATION

99/1, Jawatte Road, Colombo 5, Sri Lanka.
Telephone - 583946, 501824, 503826, 500354 Fax - 502611 Email - nbro@sltnet.lk

Our Ref. NBRO/ENV/26101/99/213
AQP/99/19

Your Ref.

Date 03rd September 1999

CLIENT :Mr. Sunil P Goonetilleke,
Engineering Consultants Ltd,
No. 1098,
Sri Jayawardenapura Mawatha,
Rajagiriya.

REPORT ON THE AMBIENT NOISE LEVELS FOR THE ENVIRONMENTAL IMPACT ASSESMENT (EIA) STUDY FOR THE OUTER CIRCULAR HIGHWAY

1. SCOPE

At the request of the Client to monitor the Noise levels for the above project, a team of officers of the Environmental Division of the National Building Research Organisation (NBRO) carried out the monitoring programme at thirteen locations within the area of the proposed Outer Circular Highway, on August 1999.

2. NOISE LEVEL MEASUREMENTS :

Four sets of continuous noise level measurements of fifteen minute intervals were taken at thirteen locations (refer map) at a receiver height of 1.5m from the ground level.

2.1 MEASURING INSTRUMENT :

- Sound level meter : Cirrus CR:703 A
- Calibrator : Cirrus CR:513 A

The sound level meter conforms to the requirements of Type 1 of both IEC 651 and IEC 804.

cont...2

2.2. METHOD OF MESURMENTS:

The sound level measurements were carried out generally in accordance with the methods laid down in International Organisation for Standardization (ISO) 1996(part1,2,3,) and BS 4142;1990.

The equivalent continuous A weighted sound pressure level ($L_{Aeq,T}$) was measured for a periods of T (15 minutes) with the integrated time of one (01) second in the FAST selection mode of the meter.

3. DESCRIPTION OF LOCATIONS

Location A : Pinwatte – Panadura, opposite Pinwatta Trading Company 44, Galle Road, Pinwatte, Panadura.

Location B : Sri Amaramuni Viharaya, Pangnananda Mawatha, Dibbadde, Panadura.

Location C : Horana-Panadura road (Near Rammkkana Bridge)

Location D : Sarvodaya Training Centre, Walmilla, Bandaragama.

Location E : Piliyandala – Horana road, Kahatuduwa Junction, Closed to Homagama road

Location F : At the High level road, Makumbura – (opposite Munchee Factory main entrance)

Location G : 135, Hewagama, Kaduwela.(about 100m away from the low level road)

Location H : Dharmaloka Viharaya, Pore, Athurugiriya, (about 100m away from the main road)

Location I : No 86, Thaldiyawala road, Rukmale, Pannipitiya

Location J : Colombo – Kandy road, near Ranjith lane, Puwakwatiya, Kadawatha.

Location K : Welisara, Colombo – Negombo road – Near Milkfood Packaging Factory

Location L : Thapowanaramaya, Mathtumagala Ragama

Location M : At the entrance of the Thuduwegedara Church, Horape

Cont....3

4. RESULTS

Noise level measurements of each location are given in following tables.

- **Location : A:- Pinwatte - Panadura (Galle road)**

Date : 20/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
09.18	77.9	80.1	62.8	99.7	Vehicular traffic
12.27	77.5	80.4	59.5	95.6	Vehicular traffic
18.30	79.3	79.8	61.7	102.0	Vehicular traffic
21.28	75.8	79.1	56.6	95.9	Vehicular traffic

- **Location : B:- Sri Amaramuni Viharaya,Pangnananda Mawatha, Dibbadde, Panadura.**

Date : 20/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
10.01	48.4	48.6	43.7	67.2	-
13.23	56.2	52.4	43.1	84.6	Dogs, Peoples
17.53	50.5	51.8	44.9	69.7	Peoples
21.03	46.7	47.8	43.4	66.7	sea waves

- **Location: C:- Horana-Panadura road (Near Rammukkana Bridge)**

Date : 20/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
11.19	69.8	72.0	49.2	93.8	Vehicular traffic
14.14	73.0	75.1	49.0	93.4	Vehicular traffic
17.09	72.4	74.3	48.8	93.3	Vehicular traffic
20.30	68.8	69.8	50.1	95.5	Vehicular traffic

cont...4

- **Location: D:- Sarvodaya Training Centre, Walmilla,Bandaragama.**

Date : 23/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
09.13	42.5	44.7	37.9	56.2	-
12.07	44.5	47.4	37.7	59.8	-
16.42	46.3	44.1	34.0	74.6	-
20.00	45.0	46.6	41.0	67.5	-

- **Location: E:- Piliyandala – Horana road (Kahatuduwa Junction)**

Date : 23/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
10.06	69.7	72.7	57.0	86.8	Vehicular traffic
12.53	69.9	72.6	55.7	92.2	Vehicular traffic
18.09	71.1	72.6	60.7	95.8	Vehicular traffic
21.41	63.6	66.8	50.0	79.4	Vehicular traffic

- **Location: F:- At the High level road, Opposite to the Munchee Factory main entrance, Makumbura.**

Date : 25/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
08.06	78.3	81.1	63.6	94.3	Vehicular traffic
12.11	78.0	79.8	61.8	100.9	Vehicular traffic
18.38	78.7	80.1	63.0	99.4	Vehicular traffic
22.38	73.2	75.9	53.4	94.0	Vehicular traffic

Cont...5

- **Location: G:- 135, Hewagama, Kaduwela.**

Date : 25/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
09.58	55.6	57.7	47.2	73.3	Vehicles, Dogs
13.29	51.0	53.6	44.3	64.4	Vehicles, People
17.15	53.5	55.9	46.0	69.9	Vehicles
20.55	54.0	56.8	47.8	68.7	Vehicles

- **Location : H:- Dharmaloka Viharaya, Pore, Athurugiriya**

Date : 25/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
10.37	53.0	54.8	43.9	72.9	Vehicles, People, Dogs
12.50	51.9	55.3	44.0	67.9	Vehicles
19.52	50.4	51.3	45.5	79.5	Vehicles
21.24	49.1	50.8	44.7	63.4	-

- **Location: I:- No 86, Thaldiyawala road, Rukmale, Pannipitiya**

Date : 25/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
11.44	51.8	51.4	40.8	77.0	Vehicular traffic
14.00	52.5	51.0	40.0	75.0	Vehicular traffic
19.08	53.3	51.4	40.9	79.4	Vehicular traffic
22.10	53.8	53.6	49.8	73.7	Vehicular traffic

Cont...6

- **Location J: Colombo – Kandy road, Puwakwatiya, Kadawatha.**

Date : 27/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
09.47	78.8	81.9	63.8	95.5	Vehicular traffic
12.10	78.8	81.2	61.2	98.8	Vehicular traffic
18.26	78.0	80.0	62.1	98.7	Vehicular traffic
21.17	76.4	79.2	57.5	94.9	Vehicular traffic

- **Location : K:- Colombo – Negombo road, closed to the Milk Food Packaging Factory, Welisara.**

Date : 27/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
10.24	81.4	83.8	70.4	98.0	Vehicular traffic
13.12	81.6	83.7	71.7	100.7	Vehicular traffic
17.45	80.8	82.6	72.1	101.7	Vehicular traffic
20.39	80.8	83.2	71.0	100.4	Vehicular traffic

- **Location L: Thapowanaramaya, Mathtumagala, Ragama**

Date : 27/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
11.02	51.9	52.8	43.7	75.8	Birds, Vehicles
14.30	53.1	56.0	45.1	67.1	Dogs, Vehicles
19.16	54.7	48.8	39.9	77.2	Vehicle, People
21.00	50.5	52.0	40.0	76.0	Aeroplane

Cont..7

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- **Location: M:- Thuduwegedara Church, Horape**

Date : 27/08/99

Start Time (hrs.)	Leq dB(A)	L_{10} dB(A)	L_{90} dB(A)	L_{max} dB(A)	Sources
15.21	54.2	55.0	41.7	77.4	Vehicle, People
17.00	54.0	55.0	41.0	68.5	Vehicle, People
20.03	52.9	54.3	46.7	69.7	Household activities
21.40	48.0	50.0	44.5	70.5	Household activities

- **Leq** : The equivalent noise level generated during the sampling period.

- **L_{90}** : The equivalent noise level that exceeded more than 90 % of the sampling period.

.....
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Co-ordinator/Air Quality

.....
Mr. H.D.S.Premasiri
Scientist/Air Quality

.....
Eng.Mrs.C.Wethasinghe
Head/Environmental Division

HEAD/ENVIRONMENTAL DIVISION
National Building Research Organisation
99/1, Jawatta Road
COLOMBO-5.

DATA OF ECOLOGICAL SURVEYS

Table 5.2.1: Screening and Scoping evaluation for fauna and flora

Screening

No	Item	Description	Evaluation	Remarks and Reason
15	Flora and Fauna	Obstruction of breeding and extinction of species due to change of habitat	Yes	Breeding of some species will be affected. Extinction of species are very unlikely.

Scoping

No	Item	Evaluation	Remarks
15	Flora and fauna	B (Some impact is predicted)	Highway passes through some marshy areas rich in biodiversity

Matrix for scoping

No	Item	Overall evaluation	Reclamation and spatial occupancy (before operation	Operation of equipment (before operation)	Occupancy of land (after operation)	Operation of roads (after operation)	Accumulation of people (after operation)
15	Flora and fauna	X	X		X		

Table 5.2.2(A) Plant species recorded from homestead gardens in the study area y (within 1 km range on either side of the proposed high way)

Scientific name	Common name
Achras zapota	Sapadilla
Adathoda vasica	Pawatta
Aegle marmelos	Beli
Aerva lanata	Polpala
Albizia lebbeck	Mara
Allocasia macrorrhiza	Habarala
Aloe vera	Komarica
Alstonia macrophyla	Havari Nuga
Alstonia scholaris	Rukattana
Alternanthera sessilis	Mukunuwenna
Amaranthus spinosus	Thampala
Amorphophallus campanulatus	Kidaran
Anacardium occidentale	Kashew
Ananas comosus	Pineapple
Anthurium andreanum	Anthurium
Areca catechu	Puwak
Artocarpus heterophyllus	Jak
Artocarpus incisus	Breadfruit
*Artocarpus nobilis**	Bedi del
Asparagus falcata	Hatawariya
Averrhoea bilimbi	Bilin
Azadirachta indica	Neem
Bambusa valgaris	Bamboo
Bauhinia tomentosa	Pethan
Calophyllum inophyllum	Domba
Carallia brachiata	Dewata
Carica papaya	Papaw
Caryota urens	Kitul
Cassia auriculata	Ranawara
Casuarina equisetifolia	Kasa
Ceiba pontandra	Cotton
Cinnamomum verum	Cinnamon
Citrus aurantifolia	Lime

Citrus aurantium	Oranges
Cocos nucifera	Coconut
Coffea arabica	Coffee
Croton laccifer	Keppettiya
Cynometra cauliflora	Num num
*Dilenia retusa**	Godapora
*Dipterocarpus zeylanicum**	Hora
Drynatia quercifolia	Benduru
Eleocarpus serrata	Veralu
Ervatamia divaricata	Watusudda
Eugenia caryophyllus	Karabuneti
Eugenia malaccensis	Jambu
Euphorbia antiquorum	Daluk
Ficus racemosa	Attikka
Filicium decipiens	Pihimbiya
Flacourtia inermis	Lowi
*Garcinia quaesita**	Goraka
Gloriosa superba	Niyangala
Hibiscus rosasinensis	Hibiscus
Ipomoea aquatica	Kankun
Ipomoea batata	Sweet potato
Ixora coccinea	Rathambala
Kaemferia galanga	Higuru piyali
Lagenaria siceraria	Diya labu
Lannea coromandelica	Hik
Lasia sp	Wel kohila
Lasia spinosa	Kohila
Legenandra sp	Ketala
Lycopersicon esculentum	Tomato
Macaranga peltata	Kenda
Mangifera indica	Mango
Mangifera zeylanica	Atamba
Manihot esculenta	Cassava
Melia dubia	Lunumidella
Mesua ferea	Na
Mimosa pudica	Nidikumba
Mimusops elengi	Munamal
Murraya koenigii	Karapincha

Musa acuminata	Banana
Mussaenda frondosa	Mussenda
Nephelium lappaceum	Rambutan
Nerium oleander	Temple trees
Ochilandra stridula	Bata
Osbeckia octandra	Heen bovitiya
Panax fruticosum	Koppa kola
Pancratium zeylanicum	Wallunu
Persea gratissima	Avacado
Piper betle	Betel
Piper nigrum	Pepper
Plumeria acuminata	Araliya
Pogonatum sp	
Pothos octandra	Pota wel
Psidium guajava	Guava
Punica granatum	Pomegranate
Rejona dichotoma	Divikaduru
Saccharum officinarum	Sugar cane
Selaginella sp	
Seshania grandiflora	Katuru murunga
Sida humilis	Bewila
Solanum melongena	Brinjal
Spondias pinnata	Ambarella
*Stachyphrynium zeylanicum**	Hulankeeriya
Stachytarpheta indica	Balunakuta
Syzygium coryophyllatum	Dan
Tamarindus indica	Tamarind
Tectona grandis	Teak
Terminalia catappa	Kottamba
Theobroma cocoa	Cocoa
Tinospora cordifolia	Rasakinda
Trema orientalis	Gedumba
Vigna unguiculata	Bushitao
*Wormia triquetra**	Godapora
Wrightia zeylanica	Idda
Zingiber officinale	Ginger

* Endemic

Table 5.2.2(B): Plant species recorded from the scrub lands in the project area and its vicinity within 1 km range of the proposed highway route

Scientific name	Common name
Acalipha indica	Kuppameniya
Achyranthes aspera	Karal heba
Aerva lanata	Polpala
Agave veracruz	Goni gas
Ageratum conyaoides	Hulanthala
Alstonia macrophylla	Hawari nuga
Amorphophallus campanulatus	Kidaran
Argyreia populifelia	Girithilla
*Canarium zeylanicum**	Kekuna
Carallia brachiata	Dawata
Cassia allata	Aththora
Cassia auriculata	Ranawara
Clerodendron infortunatum	Pinna
Commelina diffusa	Girapala
Crotolaria retusa	Andanahiriya
Croton laccifer	Keppetiya
Cyclea burmanni	Kehi pittan
Desmodium heterophyllum	Maha undupiyali
Dilenia retusa *	Godapora
Diospyros insignis	Gona
Drymoglossum heterophyllum	Kasi pethi
Eupatorium odoratum	Podisinghomarang
Euphorbia antiquorum	Daluk
Ficus benghalensis	Nuga
Ficus racemosa	Attikka
Ficus religiosa	Bo
Flagellaria indica	Gowi Wel
Gleichenia linearis	Kekilla
Gloriosa superba	Niyangala
Gramineae sp	Grass
Hedyotis fruticosa	Weraniya
Hibicus furcatus	Napiritta
Ipomoea angustifolia	Heen madu

Ixora coccinea	Rathambala
Lantana camera	Gandapana
Lygodiim scandens	Pamba
Macaranga peltata	Kenda
Melastoma malabathricum	Bowitiya
Merremia umbellata	Kiri madu
Merremia hederacea	Pamba
Mikania scandens	Wathupalu
Mimosa pudica	Nidikumba
Mussaenda frondosa	Mussanda
Ocimum americanum	Madurutala
*Oskeckia octandra**	Heen bowitiya
Pancratium zeylanicum	Wal luunu
Phyla nodiflora	Hiramanadetta
Phoenix ceylonica *	Indi
Pothos scandens	Potawel
Rejoua dichotoma	Gon kaduru
Sida humilis	Bewila
Smilax sp	Kabarasa
Stachytarpheta indica	Balunakuta
Strychnos nuxvomica	Kaduru
Symplocos spicata	Bombu
Syzygium coryophyllatum	Dan
Tephrosia purpurea	Pila
Trema orientalis	Gedumba
Urena lobata	Apala
Vernonia cinera	Monarakudumbiya
Zizyophus napeka	Eraminiya

* Endemic

Table 5.2.2(C): Crop plants grown in the project area and its vicinity within 1 km range on either side of the proposed highway route.

Scientific name	Common name
Ananas comosus	Pineapple
Capsicum annuum	Chilies
Cinnamomum verum	Cinnamon
Cocos nucifera	Coconut
Cucumis sativus	Cucumber
Hevea brasiliensis	Rubber
Hibicus esculentus	Bandakka
Ipomea batata	Sweet potatoes
Lycopersicon esculentum	Tomato
Manihot esculenta	Cassava
Melanagromyza hibisci	Okra
Momordica charantia	Karawila
Musa acuminata	Banana
Oriza sativa	Paddy
Piper betle	Beetle
Piper nigrum	Black pepper
Solanum melongina	Brinjal
Trichosanthes anguina	Pathola
Vigna cylindrica	Maa

Table 5.2.2(D): Plant species recorded from the marshy areas and paddy fields in the project area and its vicinity within 1 km range on either side the proposed highway route.

Scientific name	Common name
Acrosticum aureum	Kerankoku
Alocasia sp	Diya habarala
Alternanthera sessilis	Mukunuwenna
Amaranthus sessilis	Thampala
Annona glabra	Welaththa
Aponogeton cripus	Kekatiya
Bacopa monniera	Lunuwila
Bambusa vulgaris	Bamboo
Brachiaria mutica	Diyathana
Cabomba sp	
Calapogonium sp	
Carex indica	
Cassia allata	Aththora
Centella asiatica	Gotukola
Cerbera manghas	Gon kaduru
Colocasia esculenta	
Commelina diffusa	Girapala
Cuscuta reflexa	Agamula nethi wel
Cyperus corymbosus	Gal eha
Cyperus haspan	
Cyperus iria	
Cyperus pangorei	
Cyperus rotundus	
Cyperus compressus	
Cyperus exaltatus	
Cyperus polystachyos	
Digitaria fuscescens	
Eichhornia crassipes	Japan jabara
Eleocharis octangula	
Eleocharis spiralis	
Eleocharis unioloides	

Fimbristylis umbellaris	Has pan
Fimbristylis miliaceae	Kudametta
Fimbristylis polystrichiodes	
Fimbristylis tetragona	
Fimbristylis acuminata	
Fuirena ciliaris	Kudu kedu
Fuirena umbellata	
Fuirena unicinata	
Hanguana malayana	Ketala
Hibicus tiliaceus	Belipatta
Hydrilla verticillata	Hydrilla
Hygrophila salicifolia	
Ipomoea aquatica	Kankun
Isachne globosa	Batadella
Ischaemum indicum	Grass
Ischaemum rugosum	Grass
Jussiaea peruviana	Berudiya nilla
Jussiaea repens	Berudiya nilla
Jussiaea suffruticosa	Berudiya nilla
Lasia spinosa	Kohila
Legenandra sp	Ketala
Leonotis sp	
Leucas sp	
Limnocharis flava	Diyagowa
Lugwigia perennis	
Lygodium microphyllatum	Pamba
Marsilea sp	
Monochoria vaginalis	Jabara
Monochoria hastata	Diya habarala
Mikania scandens	
Nephrolepis sp	
Nymphaea lotus	Olu
Nymphaea parvifolium	Kumudu
Nymphaea stellata	Manel
Ochlandra stridula	Bata
Oriza sativa	Paddy
Pandanus odoratissima	
	Wetakeiya

Panicum repens	Atora
Paspalum vaginatus	
Phargmatites karka	Nala gas
Polygonum barbatum	Kimbulwenna
Polygonum pulcherum	Sudu kimbulwenna
Pycreus polystachyos	
Pycreus puncticulatus	
Rhynchospora rubra	
Salvinia niolesta	Salvinia
Schoenoplectus grosus	Thunhiriya pan
Spermacoa sp	
Syzygium coryophyllum	
	Dan
Typha angustifolia	Hamba pan

Table 5.2.2(E): Aquatic plants recorded from the freshwater habitats in the project area and its vicinity within 1 km range on either side of the proposed highway route.

Scientific name	Common name
Aponogeton crispus	Kekatiya
Azolla pinnata	
Caboma sp	
Eichhornia crassipes	
Hydrilla verticillata	Hydrilla
Lemna minima	
Linocharis flava	Diya gowa
Monochoria vaginalis	
Myriophyllum indica	Diya hawariya
Nymphaea lotus	Olu
Nymphaea nouchali	
Nymphaea pubescens	Kumudu
Nymphaea stellata	Manel
Ottelia alismoides	
Slavinia molesta	
Spermacoa sp	
Utricularia flexuosa	
Valesneria spiralis	

Table 5.2.2(F): Phytoplankton species in the freshwater habitats in the project area and its vicinity within 1 km range on either side of the proposed highway route

Blue green algae

Anabaena
Aphanocapsa
Chroococcus
Coelosphaerium
Gloeocapsa
Gloeotheca
Lyngbia
Merismopedia
Microcystis
Nostoc
Oscillatoria
Phormidium
Polycystis
Raphidiopsis
Rivularia
Spirulina
Stigonema
Trichodesmium

Green algae

Ankistrodesmus
Arthrodesmus
Bulbochaete
Chlorogonium
Chodatella
Closterium
Cosmarium
Coelastrum
Desmidium
Euastrum
Gonatozygon

Gymnodinium
Kirchneriella
Metrium
Microsphora
Oedogonium
Ophiocytium
Pediastrum
Peridinium
Protoderma
Phacus
Planktonema
Protococcus
Selenastrum
Spirogyra
Staurastrum
Synura
Tribonema
Tetraedron
Volvox
Xanthidium
Zygnema

Diatoms

Achnanthus
Biddulphia
Cocconeis
Cyclotella
Cymbella
Diatoma
Epithemia
Eunotia
Gomphonema
Fragilaria
Frustula
Melosira
Nitzchia
Navicula

Pinnularia
Rhizosolenia
Synedra
Surirella
Stauroneis
Tabellaria

Table 5.2.3(A): Zooplankton recorded from the freshwater habitats in the project area and its vicinity within 1 km range on either side of the proposed highway route.

Rotifers

Brachionus sp
Keratella sp

Crustaceans

Copepods:

Canthocamptus sp
Onchocamptus sp

Cladocerans:

Ceriodaphnia sp
Leptodora sp
Moina sp

Table 5.2.3(B): Macro invertebrates recorded in the project area and its vicinity within 1 km range on either side of the proposed highway route.

Annelids

Aquatic:

Aeolosoma sp
Autophorus hymnae
Dero dorsalis
Dero zeylanica
Nais raviensis
Peloscolex sp
Pristina proboscidea
Pristina longiseta

Terrestrial:

Megascolex sp	Giant earthworm
Pheretima sp	Earthworm

Crustaceans

Caridina sp
Grandidierella megnae
Macrobarachium ressenbergii
Stegocephalus spinifer

Molluscs

Gastropods

Aquatic

Ancylus zeylanicus
Bithynia inconspicua
Faunas ater
Gyraulus saigonensis

Indoplanorbis sp
Melanoides tuberculata
Pila globsa
Pomacea canaliculata — Golden apple snail
Thiara acanthica

Terrestrial

Achatina fulica — Garden snail

Bivalves

Lamellidens marginalis

Insects

Aquatic Beetles

Berosus indicus
Cybister confusus
Gyrinus convexiusculus — Whirling beetle
Sphaerodema rusticum

Aquatic hemipterans

Caenis sp
Hydrometra greeni
Limnogonus nitidus
Limnogonus parvulus
Micronecta punctata
Plea frontalis
Ranatra filiformis

Butterflies

Chilades latus	Lime blue
Danaus chrysippus	Plain tiger
Danaus plexippus	Common tiger
Danaus septentrionis	Dark blue tiger
Eurema brigitta	Small grass yellow
Eurema hecaba	Common grass yellow
Graphium agamemnon	Tailed jay
Mycalesis mineus	Dark brand bush brown
Neptis hylas	Common sailor
Polydorus hector	Crimson rose
Precis alamana	Peacock pancy
Precis atlites	Grey pancy
Spialia galba	Indian shipper
Thelicata nyseus	Red pierrot
Zizina otis	Lesser grass blue

Odonates

Melacordulia sp
Pantata flavencens

Beetles

Dung beetles	
Lady bird beetles	
Oryctes rhinoceros	Coconut black beetle
Rhynchophorus ferrugineus	Red weevil