

Location : **Naya Bazar-17, Kirtipur**
 Monitoring Date : 06-12-2002
 Monitoring time interval : 10 mins for each specified hours
 Weather condition : Cloudy and fine
 Height of monitoring : 1.5 m from the ground
 Distance from road : 15

Unit: dB(A)

Percentile Sound Pressure Level	Monitoring Hours				
	6:00	9:00	13:00	16:00	19:00
L _{min}	47	50	49	51	41
L ₉₅	47	52	50	53	46
L ₉₀	49	53	51	54	47
L ₅₀	53	58	56	60	55
L ₁₀	66	68	67	67	63
L ₅	70	71	70	70	68
L _{max}	72	82	80	79	71
L _{eq}	62	67	65	65	60
L _{dn}	69				

Source: Field Survey, 2002

Location : **TU Gate -3, Kirtipur**
 Monitoring Date : 06-12-2002
 Monitoring time interval : 10 mins for each specified hours
 Weather condition : Cloudy and partial cool and fine
 Height of monitoring : 1.5 m from the ground
 Distance from road : 35 m

Unit: dB(A)

Percentile Sound Pressure Level	Monitoring Hours				
	6:00	9:00	13:00	16:00	19:00
L _{min}	42	43	44	43	34
L ₉₅	43	47	49	46	41
L ₉₀	45	49	51	48	44
L ₅₀	50	55	57	56	51
L ₁₀	59	61	63	64	61
L ₅	66	63	65	66	62
L _{max}	69	71	69	72	62
L _{eq}	57	58	59	60	56
L _{dn}	64				

Source: Field Survey, 2002

Location : **Bhatkepati, Kirtipur**
 Monitoring Date : 06-12-2002
 Monitoring time interval : 10 mins for each specified hours
 Weather condition : Cloudy, windy and partial cool and fine
 Height of monitoring : 1.5 m from the ground
 Distance from road : 15 m

Unit: dB(A)

Percentile Sound Pressure Level	Monitoring Hours				
	6:00	9:00	13:00	16:00	19:00
L_{min}	44	44	43	43	36
L_{95}	48	47	47	47	38
L_{90}	49	48	47	48	39
L_{50}	57	55	51	50	43
L_{10}	63	62	52	51	49
L_5	65	64	54	52	52
L_{max}	70	70	68	62	60
L_{eq}	60	59	53	50	46
L_{dn}	66				

Source: Field Survey, 2002

5. Janakpur City

Location : **Infront of Janaki Mandir (Garden)**
 Monitoring Date : 10-12-2002
 Monitoring time interval : 10 mins for each specified hours
 Weather condition : Partially cool and fine
 Height of monitoring : 1.5 m from the ground
 Distance from road : 25 m

Unit: dB (A)

Percentile Sound Pressure Level	Hours				
	6:00	9:00	13:00	16:00	19:00
L_{min}	61	59	55	56	58
L_{95}	62	60	56	57	58
L_{90}	63	62	56	58	60
L_{50}	68	70	61	63	76
L_{10}	74	84	70	72	85
L_5	75	85	71	73	86
L_{max}	77	86	73	77	88
L_{eq}	70	78	65	68	80
L_{dn}	76				

Source: Field Survey, 2002

Location : **Bhanu Chowk**
 Monitoring Date : 10 - 12 - 2002
 Monitoring time interval : 10 mins for each specified hours
 Weather condition : Partially cool and fine
 Height of monitoring : 1.5 m from the ground
 Distance from road : 4 m

Unit: dB (A)

Percentile Sound Pressure Level	Hours				
	6:00	9:00	13:00	16:00	19:00
L_{min}	57	55	53	55	49
L_{95}	58	56	56	56	50
L_{90}	59	58	57	58	51
L_{50}	62	65	65	65	58
L_{10}	71	76	76	75	71
L_5	74	78	78	78	73
L_{max}	78	79	80	79	79
L_{eq}	67	71	71	71	67
L_{dn}	73				

Source: Field Survey, 2002

Location : **Ramanada Chowk**
 Monitoring Date : 10 - 12 - 2002
 Monitoring time interval : 10 mins for each specified hours
 Weather condition : Partially cool and fine
 Height of monitoring : 1.5 m from the ground
 Distance from road : 5 m

Unit: dB (A)

Percentile Sound Pressure Level	Hours				
	6:00	9:00	13:00	16:00	19:00
L_{min}	47	48	55	48	45
L_{95}	49	50	56	49	47
L_{90}	51	50	58	50	48
L_{50}	57	58	65	62	55
L_{10}	67	74	76	77	67
L_5	68	77	78	78	68
L_{max}	69	79	79	79	70
L_{eq}	61	68	71	70	61
L_{dn}	69				

Source: Field Survey, 2002

Location : Infront of Yatri Niwas Gate, Maharaj Sagar
 Monitoring Date : 10 - 12- 2002
 Monitoring time interval : 10 mins for each specified hours
 Weather condition : Partially cool and fine
 Height of monitoring : 1.5 m from the ground
 Distance from road : 4 m

Unit: dB (A)

Percentile Sound Pressure Level	Hours				
	6:00	9:00	13:00	16:00	19:00
L _{min}	47	46	41	43	43
L ₉₅	48	47	43	44	44
L ₉₀	49	48	44	45	44
L ₅₀	58	55	51	52	50
L ₁₀	65	66	61	64	57
L ₅	66	68	64	66	60
L _{max}	69	69	69	69	65
L _{eq}	61	61	57	59	53
L _{dn}	66				

Source: Field Survey, 2002

6. Ambient Sound Pressure Level at Industrial Area

S. N.	Location	Leq (dBA)	
		Day Shift (8 hours)	Night Shift (8 hours)
1	Main Gate, BID	73.9	67.6
2	Balaju Traning Institute, BID	62.7	54.3
3	Balaju Yantra Shala, BID	77.7	70.1
4	Chiraj Foam Ind. Pvt. Ltd, BID	62.5	53.6
5	Suprime Textile, PID	61.3	57.7
6	Himal Tents. Pvt. Ltd, PID	61.2	56.1
7	Main Gate, PID	70.4	69.5

Source: Field Survey, 2002

Annex 7: List of International Noise Level Standard

Noise level standard set by Developed Countries

Area category	Standard dBA set by Japan(Leq)	Standard dBA set by Bridgeport city USA (Leq)
High Traffic	65	63
Residential cum commercial	60	57
Commercial cum Tourist	60	57
Public Places	48	48

Source: Sapkota *et al.* (1999)

Noise Limits recommended by WHO

Limit (dBA)	Situation or effect
75	Negligible risk for hearing impairment
30	Excellent speech intelligibility
55	Fairly good speech intelligibility
45	No sleep disturbance
90	Discotheques and other ball rooms
35	Hospital room
55	Residential areas, outdoors, daytime
45	Residential areas, outdoors, night time

Ambient Noise Standard set by India (Feb, 2000)

Category of Area	Limit in dBA Leq	
	Day Time	Night Time
Industrial area	75	70
Commercial area	65	55
Residential area	55	45
Silence area	50	40

US Environmental Guideline to Ambient Noise in Industrial Application

Location Category	Day Time	Night Time
Residential (measured at nearest distance)	60 dBA	55 dBA
Commercial	65	60
Industrial	75	75

WHO Guideline values for community noise in Specific Environments, 1999

Specific environment	Critical health effect(s)	L _{Aeq} [dB]	Time base [hours]	L _{Amax, fast} [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
School class rooms and pre-schools, indoors	Speech intelligibility, Disturbance of information extraction, Message communication	35	During class	-
Pre-school Bedrooms, indoors	Sleep disturbance	30	Sleeping-time	45
School, playground outdoor	Annoyance (external source)	55	During play	-
Hospital, ward rooms, indoors	Sleep disturbance, night-time	30	8	40
	Sleep disturbance, daytime and evenings	30	16	-
Hospitals, treatment rooms, indoors	Interference with rest and recovery	#1		
Industrial, commercial shopping and traffic areas, indoors and outdoors	Hearing impairment	70	24	110
Ceremonies, festivals and entertainment events	Hearing impairment (patrons: ≤ 5 times/year)	100	4	110
Public addresses, indoors and outdoors	Hearing impairment	85	1	110
Music through headphones/carphones	Hearing impairment (free-field value)	85 #4	1	110
Impulse sounds from toys, fireworks and firearms	Hearing impairment (adults)	-		140 #2
	Hearing impairment (children)	-		120 #2
Outdoors in parkland and conservation areas	Disruption of tranquillity	#3		

1: as low as possible;

#2: peak sound pressure (not L_{Amax, fast}), measured 100 mm from the ear;

#3: existing quiet outdoor areas should be preserved and the ratio of intruding noise to natural background sound should be kept low;

#4: under headphones, adapted to free-field values

Annex 8: Environmental Noise Pollution Survey Sample A

NOISE POLLUTION SURVEY QUESTIONNAIRE

2003

Questionnaires for the survey on Noise Pollution and its Health effect.

(All response is kept confidential and used only for the research purpose. Also you have right to refuse to answer before the interview starts and during the course of interview)

Name: Smrta Shrestha Age/Sex: 20/female

Name of Place: Bhimse ngola VDC/Ward: 34

City: Kathmandu Types of environmental settings at: Bhimse ngola

Distance from Noise sources: 10m Types of Noise source: vehicles

Occupation: Teaching

(Will you please type "Y" for Yes, "N" for No and "DN" for Don't Know while answering the following the Question in the Blank underline.)

1) Do you know "Noise" is considered as Environmental Pollution?

a) Yes b) No c) Don't Know

2) Do you know that Noise effects human health?

a) Yes b) No c) Don't Know

3) How many hours a day you spent in this setting?

a) <3 b) 3-6 c) 6-9 d) 9-12 e) >12

4) What kind of noise do you perceive most in your area?

S. No	Source of Noise	Yes/No	S. No.	Source of Noise	Yes/No
1	Traffic Noise	Y	8	If Other (specify)	
2	Aero plane	Y	9		
3	Construction		10		
4	Audio/Loud speaker		11		
5	Religious (Bhajan/ bell)	Y	12		
6	Industrial/Mechanical		13		
7	Crowd	Y	14		

5) Do you feel following health effect due to noise? Please answer the question using the following scale.

0- No; 1-High; 2- Medium; 3- Low; 4-Negligible

S. No.	Health Effect	0	1	2	3	4
1	Couldn't hear properly until other speak loudly	✓				
2	Get often tired working in noisy area			✓		
3	Make Irritate (increase in temper/ Aggressive)		✓			
4	Get Headache				✓	
5	Speech disturbance			✓		
6	Sleep disturbance	✓				
7	Chest pain	✓				
8	Feeling of Vomiting			✓	✓	
9	Feel Dizzy		✓			
10	Make difficulties in concentration		✓			

6) What should we need to do to control the Noise?

S. No.	Activity	Tick if Yes	S. No.	Activity	Tick if Yes
1	Restriction in horn		6	Standard/ Law setting	✓
2	Plantation aside the road	✓	7		
3	Removing noisy vehicle	✓	8		
4	Enclosing the noise source		9		
5	Awareness	✓	10		

7) Do you have any comment on "Noise"?

Noise causes different effects on our life. So everyone should try to reduce noises. Noise pollution disturbs our mental health so it must be controlled.

Thank you.

Please sent reply to the following Address

Mr. Santosh Shrestha: shr_santosh@hotmail.com; shr_santosh@yahoo.com

Mr. Sandeep Chamling Rai: s_chamling@hotmail.com

Noise Research

Environment Health Department

Nepal Health Research Council, Ramshah Path, Kathmandu, Nepal.

Annex 9: Clinical Examination

Health Information Sheet Environmental Noise Pollution Research Nepal Health Research Council Ramshah Path, Kathmandu, Nepal

Sample No.: _____ Sampling Date: 22/4/2003
Location: Kupondele Non EG Investigator: Dr. Sunil Kumar Joshi
Name: Bhawesh Singh Sex: M
Age: 18 yrs Address: Kupondele

Occupational History

Occupation /Address	Duration of Service	Envnt Noise	Health effect	PPE (Y/N)
Present: student - 10 + 2		Sev/Mod/Mil/Nor		
Past:		Sev/Mod/Mil/Nor		

Personal History

Drinking: Y/N ✓ Amount _____ Smoking/chewing: Y/N ✓ No. of Cigarette...../day
Allergy: Y/N not significant yet Duration of Smoking _____
Sleep: (N) Irritability: -
Bowel habit: (N) Appetite: (N)

General Health

BP: 90/60 mm hg Weight: 57 kg Pulse: _____

Chief Complaints:

no complain

Past Medical History

Cardio-Vascular	Respiratory	Genitourinary
NAD	NAD	NAD
Gastrointestinal NAD	Others -	

Accident

Yes/ No ✓ Effect: _____

Investigation

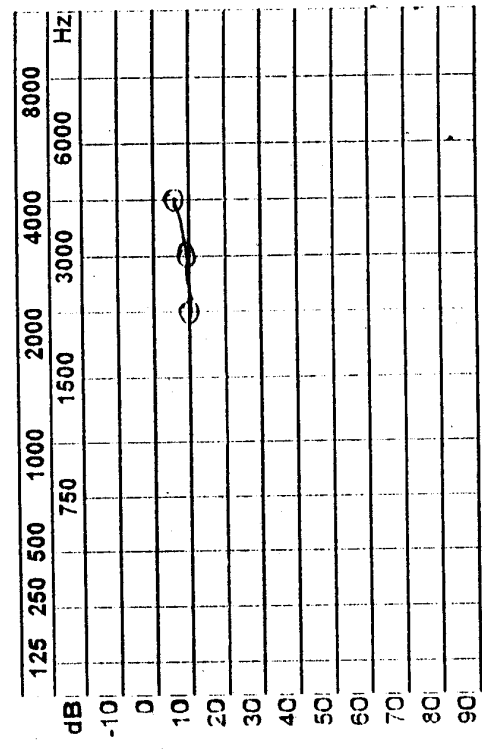
Audiometry:

Health Effect

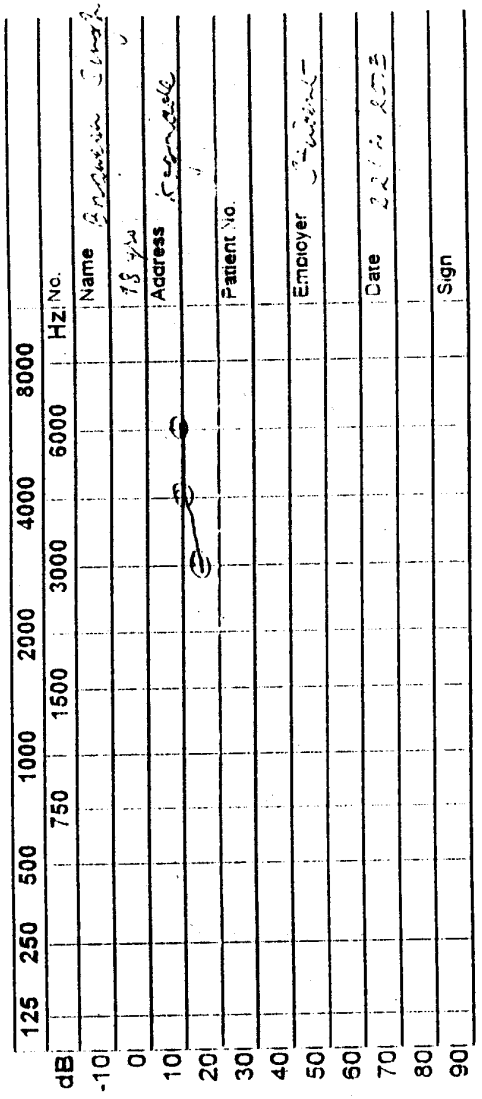
No NI hearing loss.

AUDIOGRAM

Right Ear



Left Ear



Name Arjun Singh
 Address 18/24
 Patient No.
 Employer
 Date 22/11/2023
 Sign

Result:

61

Health Information Sheet
Environmental Noise Pollution Research
Nepal Health Research Council
Ramshah Path, Kathmandu, Nepal

Sample No.:

Sampling Date 22/1/2022

Location: Kuponole, Exposed G.

Investigator: Dr. Sunil Kumar Joshi

Name: *Mina Bista*

Sex: *F*

Age: *23*

Address: *Kuponole*

Occupational History

Occupation /Address	Duration of Service	Envnt Noise	Health effect	PPE (Y/N)
---------------------	---------------------	-------------	---------------	-----------

Present: *Housewife*

Sev/Mod/Mil/Nor *NA*

Past:

Sev/Mod/Mil/Nor

Personal History

Drinking: *Y(N)* Amount

Smoking/chewing: *Y(N)* No. of Cigs/day

Allergy: *Y(N)* *Prop*

Duration of Smoking

Sleep:

Irritability: *Clear*

Bowel habit:

Appetite:

General Health

BP: *90/60*

Weight: *40 kg*

Pulse: *72*

Chief Complaints:

Past Medical History

Cardio-Vascular

Respiratory

Gastrointestinal

Others: *Headache*

Accident

Yes/No

Effect:

Investigation

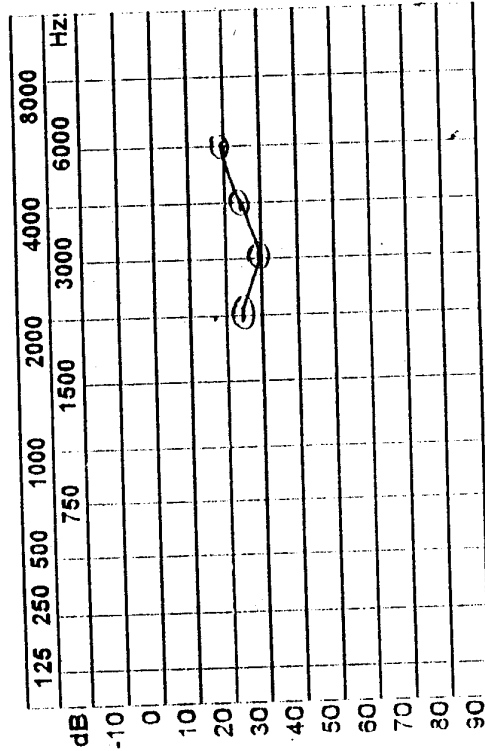
Audiometry:

Health Effect

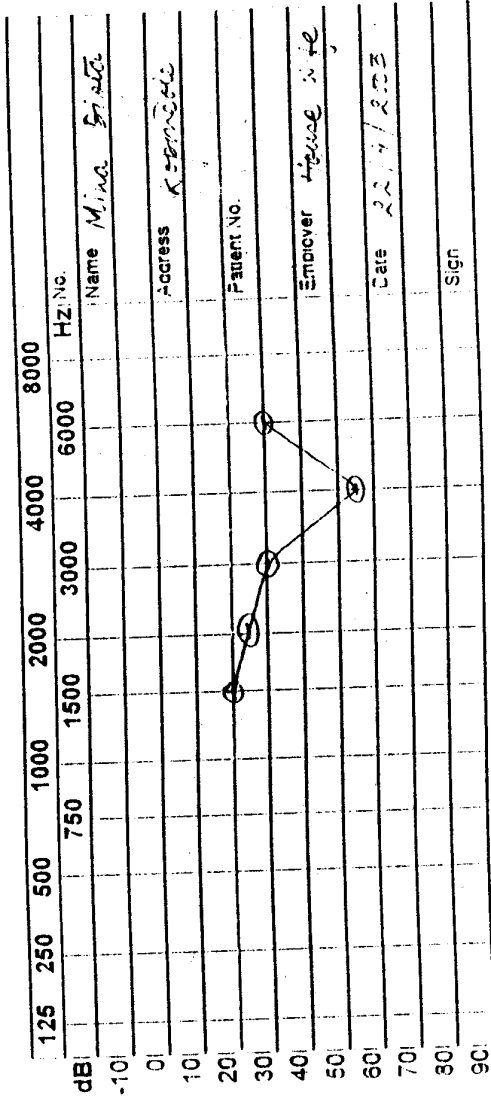
LE *Moderately severe hearing loss*

AUDIOGRAM

Right Ear



Left Ear



Name *Mina Bhatia*

Address *Kembridge*

Patient No.

Employer *Housewife*

Date *22/7/2023*

Sign

Result:

Annex 10: Clinical analysis

Smoking status of the subjects

Group	Smoking status of the subjects		
	No	Yes	Total
Non Exposed	23	2	25
Exposed	35	1	36
Total	58	3	61

Note: History of exposure to noise, those residing or working by the main road are taken as exposed.

Duration of smoking of the Subjects

Group	Duration Smoking status of the subjects			
	Non smoker	<20 years	20-40 years	Total
Non Exposed	22	2	1	25
Exposed	34	2		36
Total	56	4	1	61

Note: History of exposure to noise, those residing or working by the main road are taken as exposed.

Previous History of Cardio Vascular Disease

Group	Previous history of cardio vascular disease		
	No	Yes	Total
Non Exposed	19	6	25
Exposed	20	16	36
Total	39	22	61

Note: History of exposure to noise, those residing or working by the main road are taken as exposed.

Previous History of Respiratory Disease

Group	Previous history of respiratory disease		
	No	Yes	Total
Non Exposed	25		25
Exposed	34	2	36
Total	59	2	61

Note: History of exposure to noise, those residing or working by the main road are taken as **exposed**.

Previous History of Genitourinary Disease

Group	Previous history of genitourinary disease		
	No	Yes	Total
Non Exposed	25		25
Exposed	32	4	36
Total	57	4	61

Note: History of exposure to noise, those residing or working by the main road are taken as **exposed**.

Noise Induced Hearing Loss

Group	Age category (Years)	Noise induced hearing loss		
		No	Yes	Total
Non Exposed	1-15	2	0	
	16-35	8	0	
	36-50	4	6	
	+50	2	3	
Total		16	9	25
Exposed	1-15	1	0	
	16-35	10	13	
	36-50	1	7	
	+50	0	4	
Total		12	24	36
Total		28	33	61

Note: History of exposure to noise, those residing or working by the main road are taken as **exposed**.

Audiometry of Right Ear

Group	Audiometry of Right ear						Total
	No noise induced hearing loss	Slight noise induced hearing loss Noise	Mild noise induced hearing loss	Moderately noise induced hearing loss	Moderately severe noise induced hearing loss	Severe noise induced hearing loss	
Non Exposed	23	1	1	0			25
Exposed	18	9	4	5			36
Total	41	10	5	5			61

Note: History of exposure to noise, those residing or working by the main road are taken as exposed.

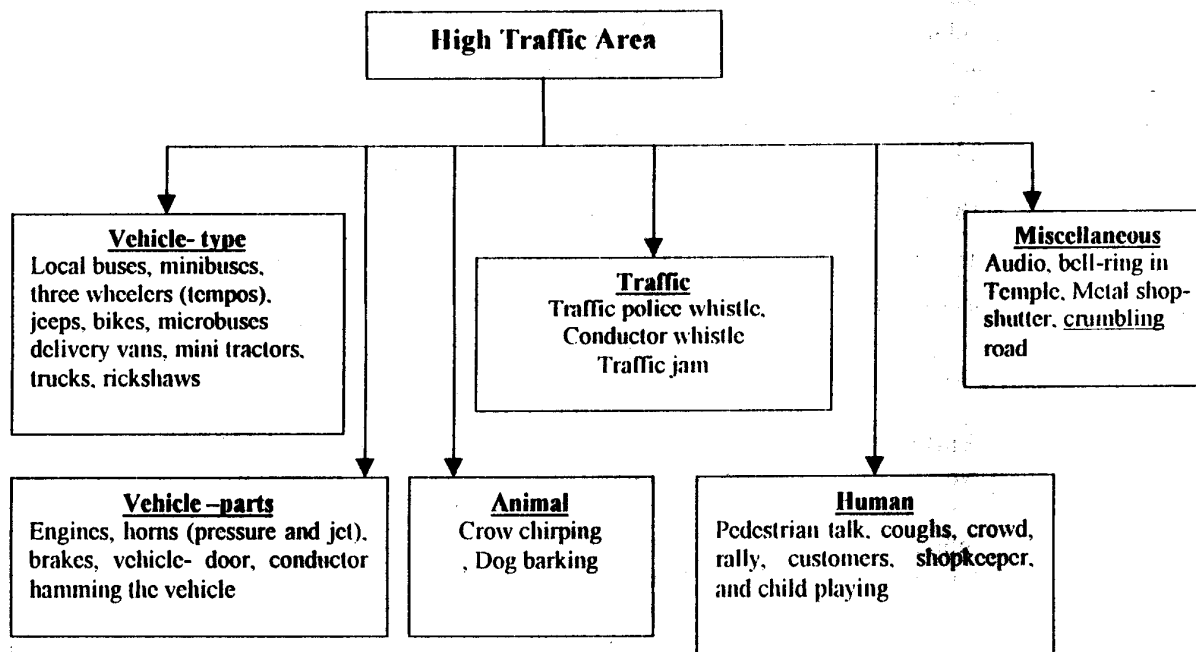
Audiometry of Left Ear

Group	Audiometry of Left ear						Total
	No noise induced hearing loss	Slight noise induced hearing loss Noise	Mild noise induced hearing loss	Moderately noise induced hearing loss	Moderately severe noise induced hearing loss	Severe noise induced hearing loss	
Non Exposed	17	2	2	2	1	1	25
Exposed	15	2	11	4	2	2	36
Total	32	4	13	6	3	3	61

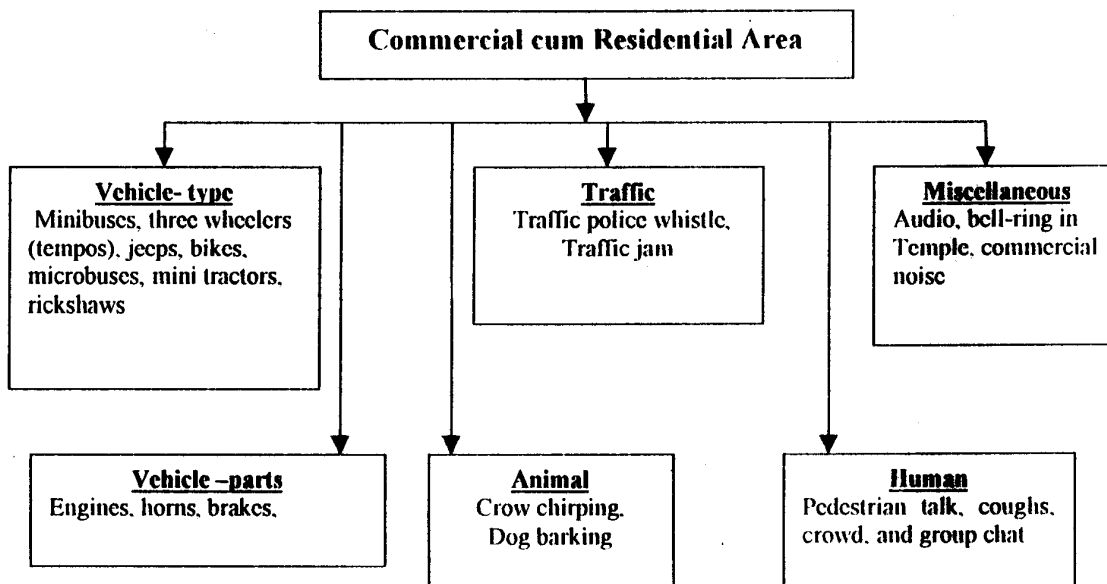
Note: History of exposure to noise, those residing or working by the main road are taken as exposed.

Annex 11: Major Noise Sources identified during time of Field Assessment of Noise Pollution

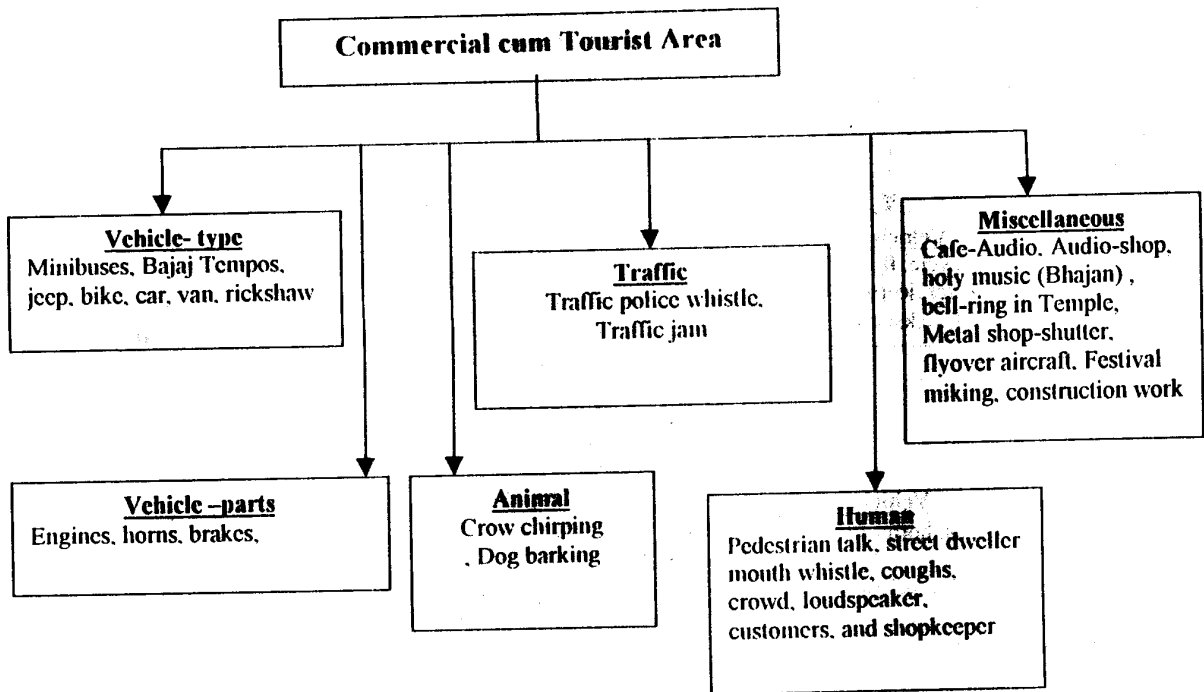
1) Major Noise Source in High Traffic Area:



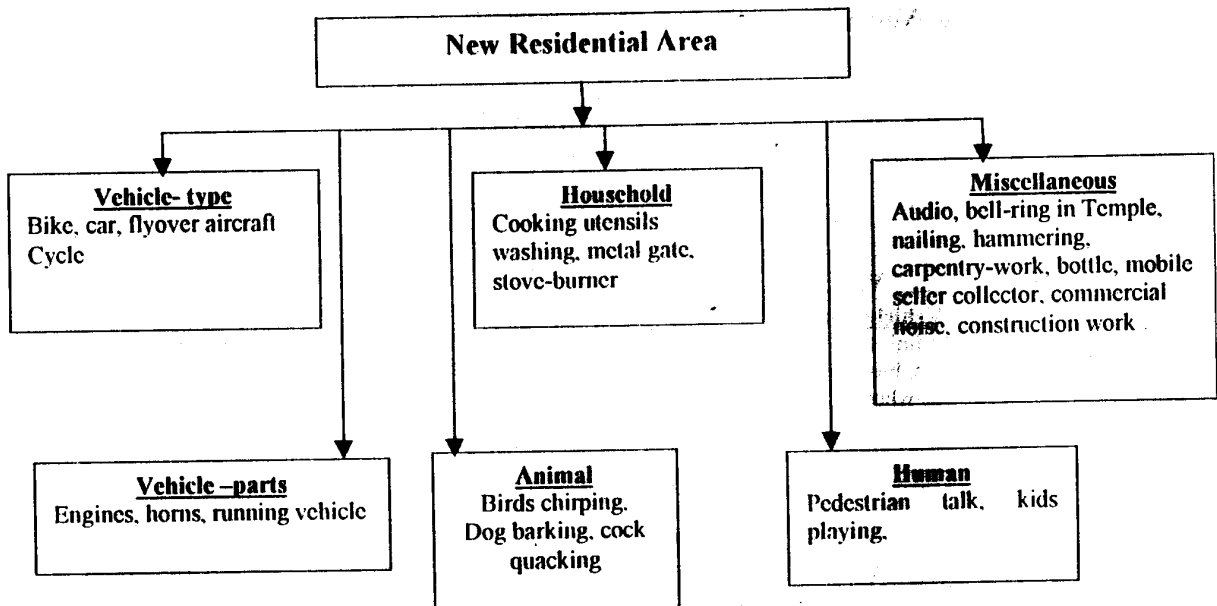
2) Major Noise Source in Commercial cum Residential Area:



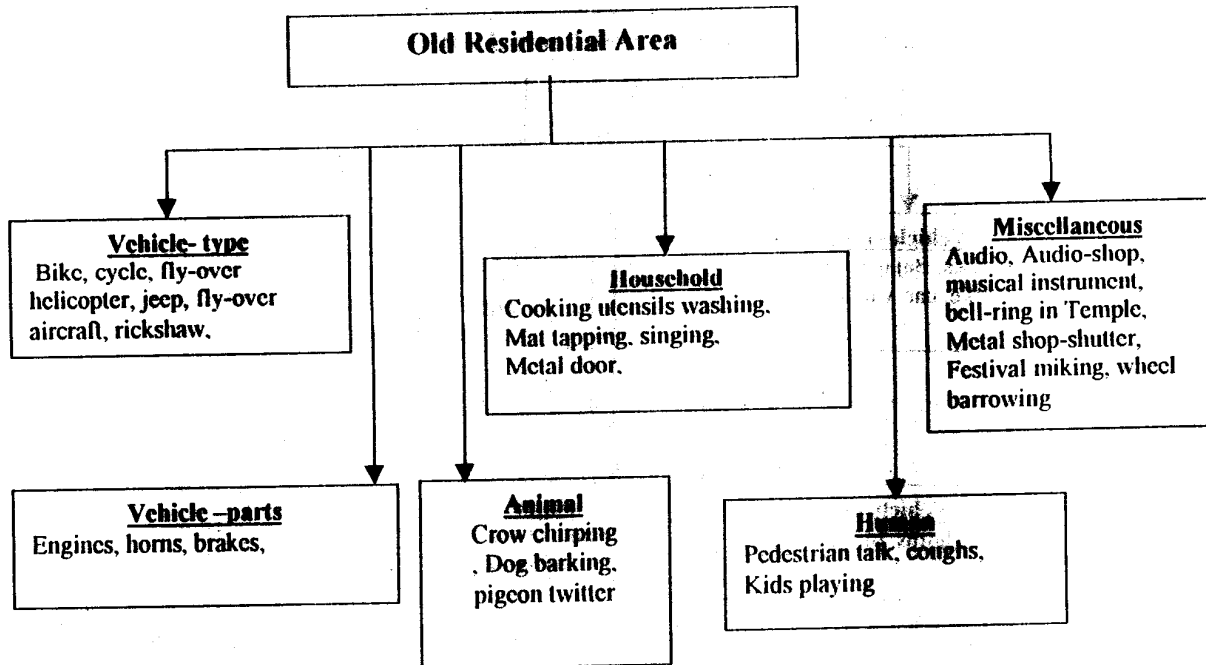
3) Major Noise Source in Commercial cum Tourist Area:



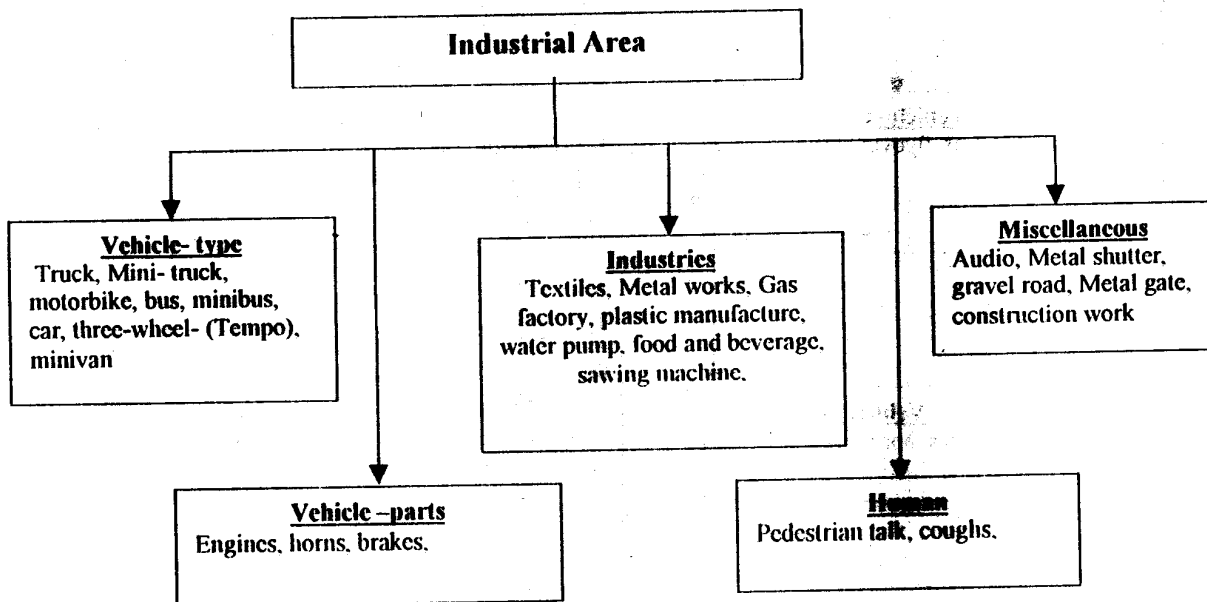
4) Major Noise Source in New Residential Area:



5) Major Noise Source in Old Residential Area:



6) Major Noise Source in Industrial Area:



Annex 12
PICTORIAL HIGHLIGHT



Photo 1: Noise monitoring at Manbhawan, Lalitpur, Mr. Jan A. Speets, WHO along with Monitoring Team

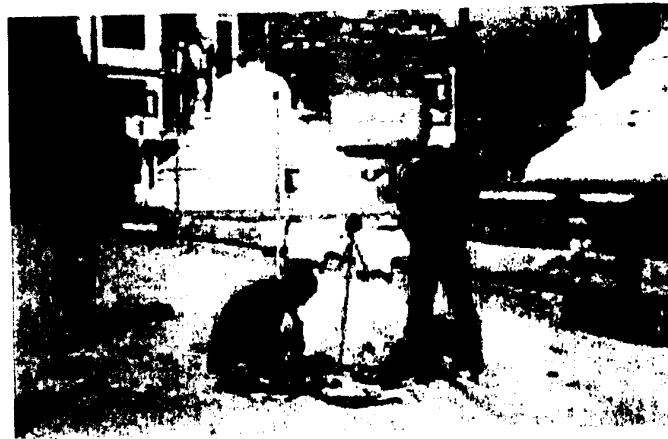


Photo 2: Noise Monitoring at Pimbahal, Lalitpur City.



Photo 3: Noise monitoring at Thamel Chowk, Kathmandu City.



Photo 4: Noise Monitoring at Mangal Bazar, near Patan Durbar Square, Lalitpur.



Photo 5: Noise Monitoring at the Gate of Balaju Industrial District.

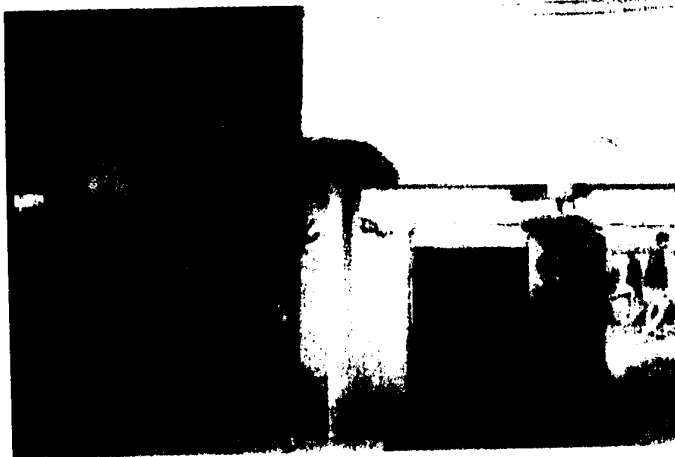


Photo 6: Noise monitoring at the gate of Patan Industrial District.



Photo 7: Clinical Examination of the community living in Kupondole, Lalitpur.



Photo 8: Audiometric Test in the community not exposed to Noise.

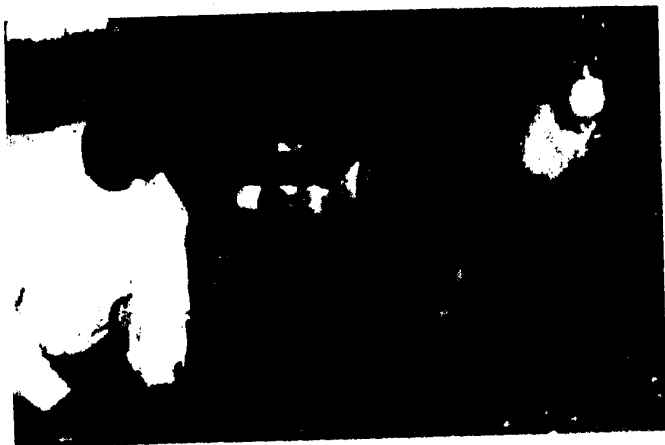
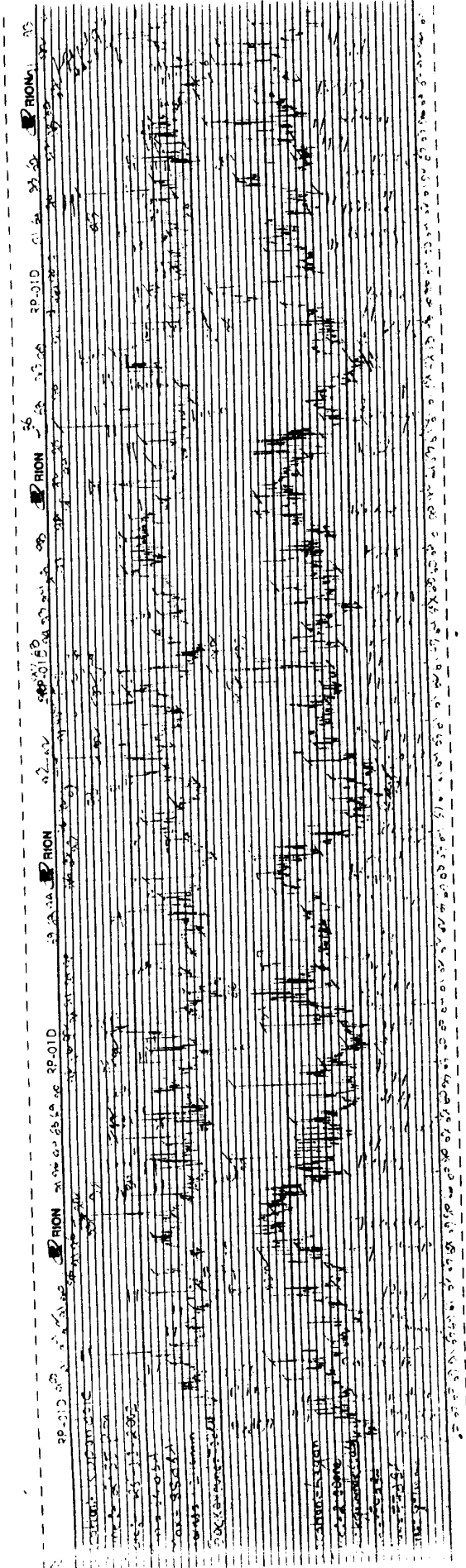


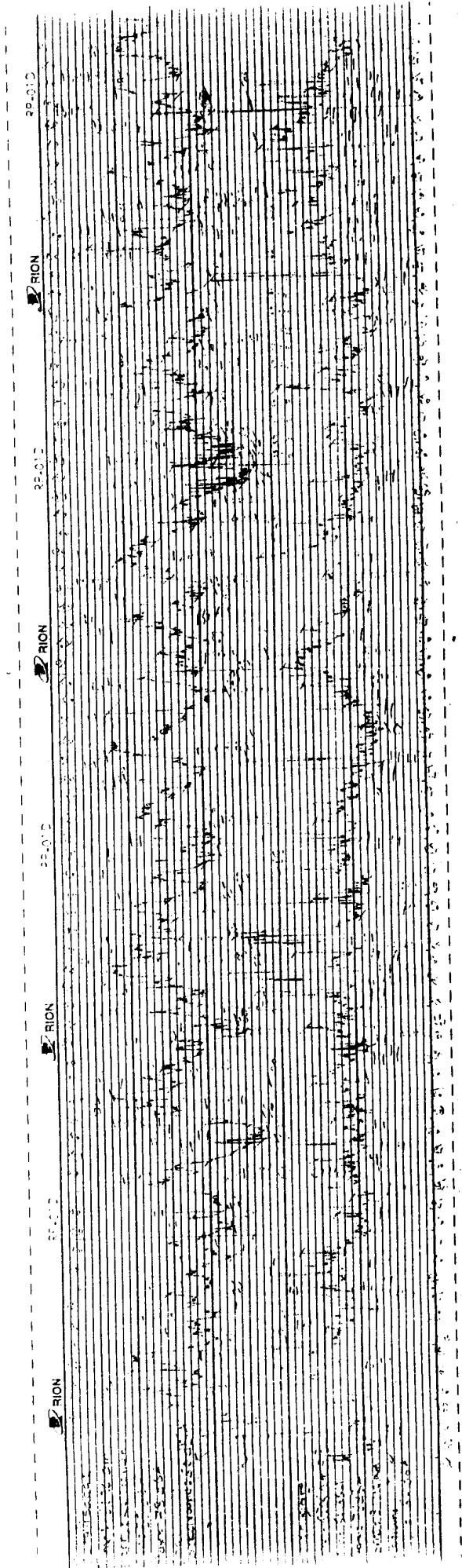
Photo 9: Audiometric Test in the community exposed to Noise.

Annex 13: Graph showing Sound Pressure Level in Different Settings

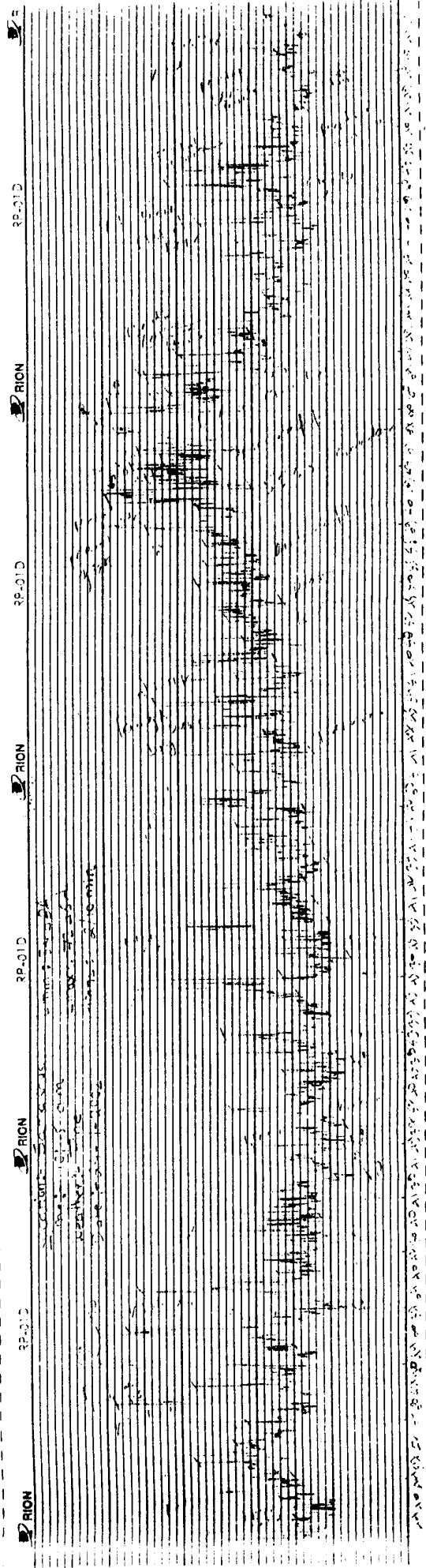
A Graph Showing Sound Pressure Level in Kupondole, Lalitpur and Lagan Tole, Kathmandu in 25-11-2002



A Graph Showing Sound Pressure Level in Putalisadak and Shahidgate, Kathmandu in 26-11-2002



A Graph Showing Sound Pressure Level in Samkhushi, Lalitpur in 24-11-2002



A Graph Showing Sound Pressure Level in Bhanu Chowk, Janakpur in 24-11-2002

