CHAPTER – 3

BASELINE ENVIRONMENTAL STATUS

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BASELINE ENVIRONMENTAL STATUS

The baseline status of environmental quality in the vicinity of project site serves as the basis for identification, prediction and evaluation of impacts. The baseline environmental quality is assessed through field studies within the impact zone for various components of the environment, viz. air, noise, water, land and socio-economic. The baseline environmental quality has been assessed during October, 2008 to December, 2008) in a study area of 10 km radial distance from the project site. Location map of the project site with study area is given in figure-3.1.

Knowledge of baseline environmental status of the study area is useful for Impact Assessment Process of assessing and predicting the environmental consequences of the significant actions. Significant action depicts direct adverse changes caused by the action and its effect on the health of the biota including flora, fauna and human being, socio-economic conditions, current use of land and resources, physical and cultural heritage properties and biophysical surroundings. Baseline data generation of the following environmental attributes is essential in EIA studies.

1. Meteorology
2. Ambient Air Quality
3. Ambient Noise Quality
4. Surface and Ground water Quality
5. Soil Quality & Geological Features
6. Land use pattern
7. Biological Information
8. Socio-economic status survey

3.1 ESTABLISHMENT OF IMPACT ZONE

Deciding whether a proposed action is likely to cause significant adverse environmental effects is central to the concept and practice of EIA. Before proceeding for baseline data generation, it is important to know the boundary limits and framework, so that the data generated can be effectively utilized for impact assessment. In this context, delineate of impact zone plays an important role. Generally the impact zone for industrial actions is classified into three parts; Core Zone, buffer Zone and Unaffected Zone, as illustrated below. The area of impact zone invariably changes from project to project and depends on the nature and magnitude of activities.

- Core Zone (Host and Proximate Area where the proposed activities is completed)- This area is closest to the activity where the background quality of environmental and human health is always at high risk. This involves risks due to steady state, transient and accidental release of pollutants, noise, increased traffic congestion and social stress. The immediate vicinity of the plant that is around 3 km radius is factual core zone in this case.

- Buffer zone (Moderately affected area)- Being a little away from the activity, the discharge pollutants need time lag to be transported to this area and gets attenuated/diluted to a considerable extent. However, the associated risk shall be real during brake-down, failure or upset conditions, and simultaneously with adverse meteorological and hydrological factors. Distance from 3 km to 7 km around the project site in the factual buffer zone in this case. This is based on the mathematical modeling study and air pollution dispersion pattern.

- Unaffected Zone- This area shall not be at risk of serious damage to life, health and property. Here the impact becomes small enough to become imperceptible and/or inconsequent and/or insignificant and normal life activities shall prevail without any disturbances due to the activity. Distance away from the 7 km buffer zone is the factually unaffected zone in this case.

While generating the baseline status of physical and biological environment of the study area, the concept of impact zone has been considered. The Impact zone selection is based on preliminary screening and modeling studies. For demography and socio-economics, block wise data has been collected and used for the assessment of impacts.

FIGURE - 3.1 LOCATION MAP OF THE PROJECT SITE WITH STUDY AREA

3.2 METEOROLOGY

Air borne pollutants is dispersed by atmospheric motion. Knowledge of these motions, which range is scale from turbulent diffusion to long-range transport by weather systems, is essential to simulate such dispersion and quality of impacts of air pollution on the environment. The purpose of EIA is to determine whether average concentrations are likely to encounter at fixed locations (Know as the receptor), due to the given sources (locations and rates of emission known), under idealized atmospheric conditions. It is imperative that one should work with idealized condition and all analysis pertaining to air turbulence and ambient air or noise pollution should be done with meteorological conditions, which can at best be expected to occur. The details of measurement technique, instruments, specification of measurement standards and accuracy of instruments are adopted from the Indian Standard: 8829-1978 "Guideline for micrometeorological technique in Air Pollution Studies." Care is taken to install the anemometer within a distance of six times the height of nearest vertical terrain elements (house, trees etc.) and height of 10 m from the average ground level of the fetch area. Meteorology data has been collected from the nearest IMD observatory located at Guwahati.

3.2.1 CLIMATE

The climate of the study area is humid and tropical. A hot and humid pre-monsoon from March to mid May, a prolonged southwest monsoon or rainy season from mid May to September, a pleasant post-monsoon or retreating monsoon from October to November and a cold pleasant winter from December to February are the characteristics of the general climate. Summer runs concurrently with the later part of the pre-monsoon season and continues throughout the monsoon season.

The four climatic seasons viz. pre-monsoon, monsoon, post-monsoon and winter could be considered as comprising of the following months:

Pre-monsoon	: March, April and May
Monsoon	: June, July, August and September
Post-monsoon	: October and November
Winter	: December, January and February

Sometimes, the monsoon commences in mid-May and ends in mid-September. Therefore, the boundaries between the seasons are not very rigid. The months October, November and December are considered to be representative study period**.**

The average gradient is gentle with a moderate slope. The mean daily maximum temperature during winter is about 25° C and minimum is 11° C. The mean daily maximum temperature during summer is 34° C and the minimum is 24° C. The relative humidity varies from month to month and increases from 76% to 84% during the South west monsoon and is about 77% in rest of the year. The humidity varies throughout the year but seldom drops down below 67%. The average annual rainfall is 1541.7 mm. Rainfall is confined mainly during the monsoon season.

3.2.2 WIND SPEED

The wind blown from NNE, NE and N sector is observed to be predominant and a typical diurnal shift in wind direction was not observed during study period.

The wind rose diagram and stability class distribution processed by ISCST3 software from data collected at site is shown in figure-3.1A and figure-3.1B respectively.

FIGURE - 3.2A WIND ROSE DIAGRAM

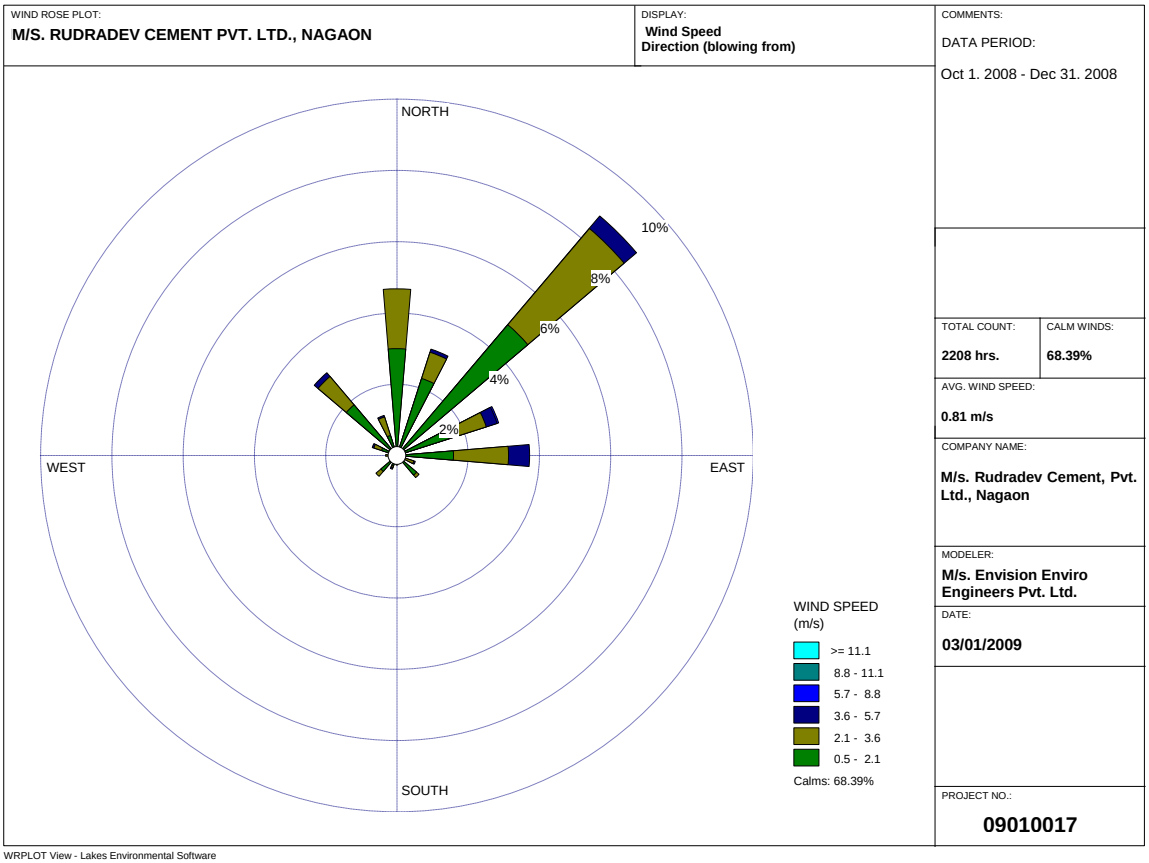
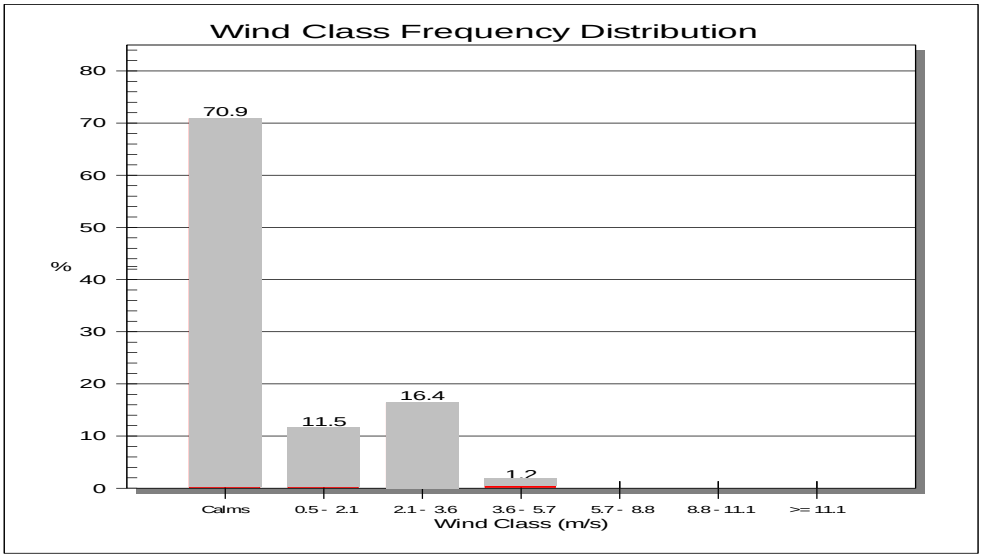


FIGURE - 3.2B STABILITY CLASS DISTRIBUTION



3.3 AIR ENVIRONMENT

3.3.1 DESIGN OF NETWORK FOR AMBIENT AIR QUALITY MONITORING LOCATIONS

The air quality status in the impact zone is assessed through a network of ambient air quality monitoring locations. The tropical climatic conditions mainly control the transport and dispersion of air pollutant during various seasons.

The baseline studies for air environment include identification of specific air pollutants prior to implementation of the project. The Rapid Environmental Impact Assessment (REIA) study requires monitoring of baseline air quality during one season. Accordingly, air quality monitoring was carried out in the winter season from October 1, 2008 to December 31, 2008. The baseline status of the air environment is assessed through a systematic air quality surveillance programme, which is planned based on the following criteria:

- Topography / terrain of the study area
- Regional synoptic scale climatologically normal
- Densely populated areas within the region
- Location of surrounding industries
- Representation of regional background
- Representation of valid cross-sectional distribution in downwind direction

3.3.2 RECONNAISSANCE

Reconnaissance was undertaken to establish the baseline status of air environment in the study region. Eight Ambient Air Quality Monitoring (AAQM) locations were selected based on guidelines of network sitting criteria. All AAQM locations were selected within the study area of 10 km radial distance from the project site.

3.3.3 METHODOLOGY FOR AMBIENT AIR QUALITY MONITORING

The ambient air quality monitoring was carried out in accordance with guidelines of Central Pollution Control Board (CPCB) of June 1998 and National Ambient Air Quality Standards (NAAQS) of CPCB of May 1994. Ambient Air Quality Monitoring (AAQM) was carried out at eleven locations during October 1st, 2008 to December 31st, 2008 for parameters such as Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM), Sulphur Dioxide (SO_2) and Oxides of Nitrogen (NOx). Sampling locations were selected from the study area of 10 km radial distance around the plant site. The monitoring was carried out 24 hours a day twice a week per location in the study area except the project site, where continuous monitoring was carried out. Twenty Six numbers of observations were taken at each monitoring location except the project site. The locations of the different stations with respect to its distance and direction from project site are shown in table-3.1 and figure-3.3 respectively.

The values for mentioned concentrations of various pollutants at all the monitoring locations were processed for different statistical parameters like arithmetic mean, minimum concentration, and maximum concentration and percentile values. The existing baseline levels of SPM, RSPM, SO_2 and NO_x are expressed in terms of various statistical parameters as given in tables-3.2 National ambient air quality monitoring standards are enclosed as **Annexure-I1.**

TABLE - 3.1 DETAILS OF AMBIENT AIR QUALITY MONITORING LOCATIONS

SR. NO.	NAME OF VILLAGE	BEARING W.R.T. PROJECT SITE	APPROXIMATE RADIAL DISTANCE FROM PROJECT SITE (KM)	TYPE OF AREA
1.	Project Site (A1)	-	0	Industrial
2.	Dekeruva (A2)	S	4.0	Residential
3.	Nagayanpam (A3)	SW	5.2	Residential
4.	Bher Bheri (A4)	SW	2.2	Residential
5.	Reng Beng (A5)	S	1.6	Residential
6.	Mikir Gaon (A6)	WSW	7.6	Residential

FIGURE - 3.3 LOCATION OF AMBIENT AIR QUALITY MONITORING STATIONS

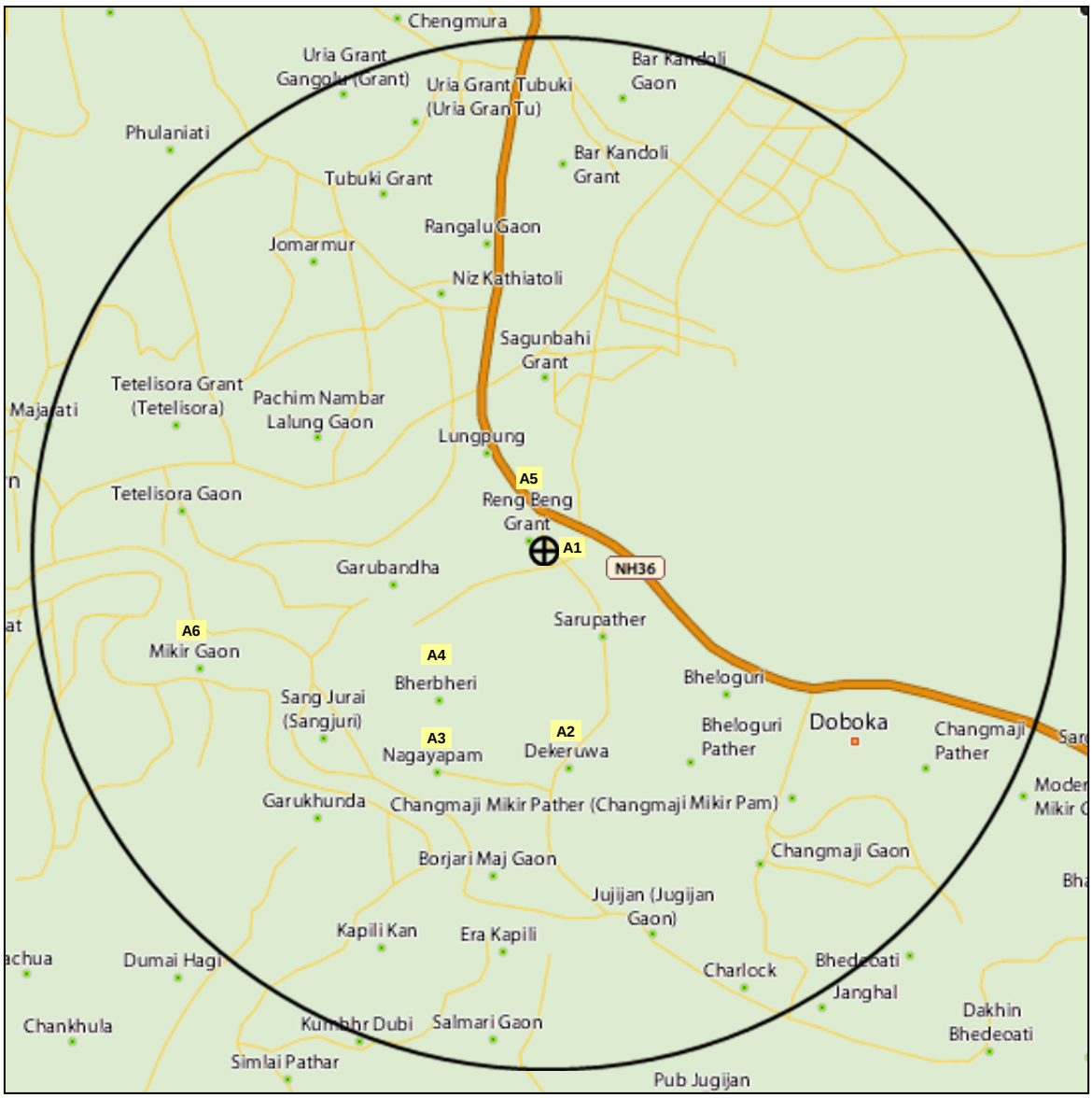


TABLE - 3.2 AMBIENT AIR QUALITY STATUS

Unit: µg/m^3 **Period: 24 Hours**

SR. NO.	SAMPLING LOCATION	SPM	RSPM	SO_2	NO_X
		AVERAGE (MIN-MAX)			
1.	Project Site (A 1)	139 (82-162)	48 (43-72)	10 (9 - 11)	19 (18-20)
2.	Dekeruva (A2)	122 (110-155)	39 (27-54)	8 (7-9)	14 (13-15)
3.	Nagayanpam (A3)	128 (124-138)	36 (29-48)	9 (8 - 10)	15 (13 - 16)
4.	Bher Bheri (A4)	119 (106-159)	42 (31-58)	8 (7-10)	15 (13-18)
5.	Reng Beng (A5)	172 (132-189)	62 (53-81)	10 (9-11)	18 (17-19)
6.	Mikir Gaon (A6)	125 (103-132)	28 (20-36)	8 (7-9)	13 (12-14)

TABLE - 3.2(CONT.) AMBIENT AIR QUALITY STATUS: 98TH PERCENTILE

SR. NO.	SAMPLING LOCATION	98th PERCENTILE			
		SPM	RSPM	SO_2	NO_X
1.	Project Site (A1)	162	72	11	20
2.	Dekeruva (A2)	155	54	9	15
3.	Nagayanpam (A3)	138	48	10	16
4.	Bher Bheri (A4)	159	58	10	18
5.	Reng Beng (A5)	189	81	11	19
6.	Mikir Gaon (A6)	132	36	9	14

3.4 WATER ENVIRONMENT

3.4.1 SOURCE OF WATER

Water source of the study area is ground water.

3.4.2 METHODOLOGY FOR WATER QUALITY MONITORING

Physico-chemical parameters have been analyzed to ascertain the baseline status existing surface water and ground water bodies. Samples were collected once during the study period in November, 2008. The details of surface and ground water sampling locations are given in table-3.3 and sampling locations of water quality monitoring are shown in figure-3.4. The Indian standard specification for drinking water is enclosed as Annexure-III and CPCB standards of classification of inland surface water as Annexure-IV. The physico-chemical characteristics of the different water samples are presented in the tables-3.4.

TABLE - 3.3 DETAILS OF GROUND AND SURFACE WATER MONITORING LACATIONS

SR. NO.	SAMPLING LOCATIONS	BEARING W. R.T. PROJECT SITE	APPROXIMATE RADIAL DISTANCE FROM PROJECT SITE (KM)
1.	Project site (GW1)	-	0
2.	Dekeruva (GW2)	S	4.0
3.	Bher Bheri (GW3)	SW	2.2
4.	Reng-Beng (GW4)	S	1.6
5.	Mikir Gaon (GW5)	WSW	7.6

GW= Ground water

FIGURE - 3.4 LOCATIONS OF WATER SAMPLING STATIONS

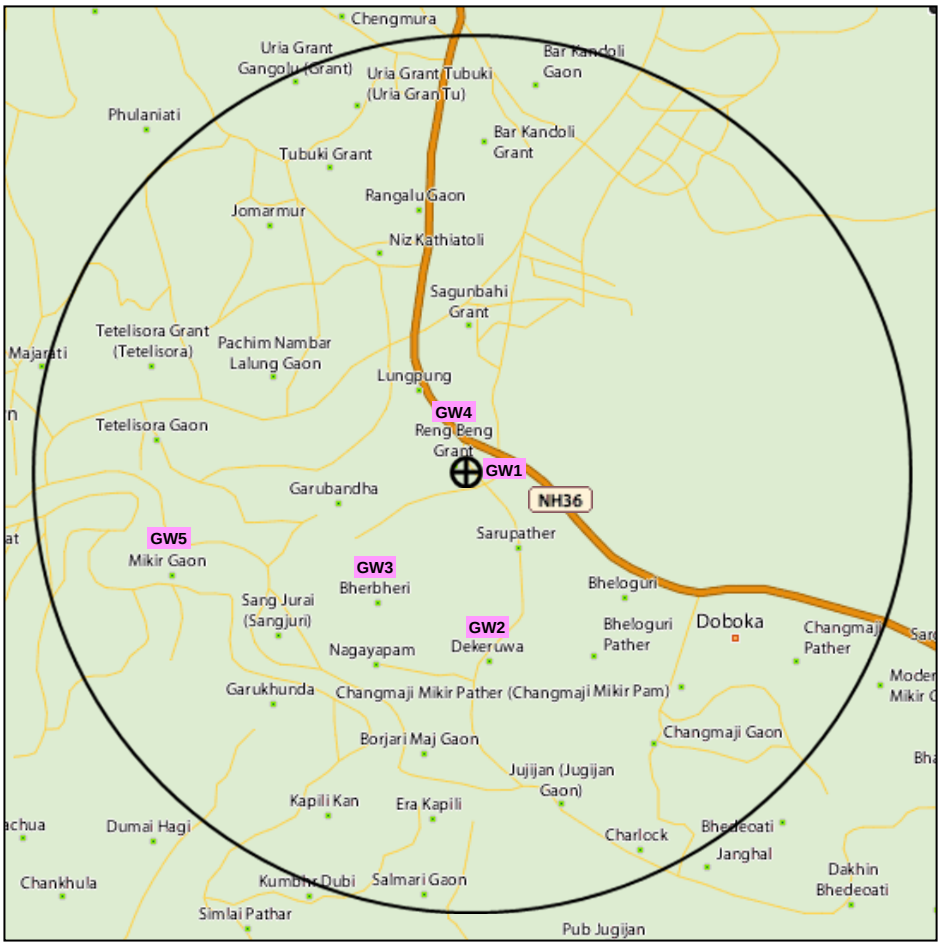


TABLE - 3.4 BASELINE WATER QUALITY

SR. NO.	PARAMETERS	PROJECT SITE (GW1)	DEKERUVA (GW2)	BHER -BHERI (GW4)	RENG-BENG (GW5)	MIKIR GAON (GW6)
1.	Temp (^oC)	27	27	27	26	27
2.	pH	7.17	7.16	7.18	7.18	7.14
3.	Turbidity (NTU)	1.2	1.3	1.2	1.2	1.3
4.	Conductivity (µs/cm)	206	215	220	209	201
5.	T.H. (as $CaCO_3$)	155	129	152	142	106
6.	C.H (as $CaCO_3$)	111	82	107	110	80
7.	M.H (as $MgCO_3$)	44	47	45	32	26
8.	Total Alkalinity (mg/l)	147	145	162	152	142
9.	Iron (mg/l)	0.05	0.05	0.04	0.04	0.03
10.	Nitrates (mg/l)	0.4	0.5	0.6	0.4	0.3
11.	Ammonical Nitrogen (mg/l)	0.02	0.01	0.02	0.01	0.02
12.	Phosphates (mg/l)	0.7	0.6	0.5	0.7	0.6
13.	Fluoride (mg/l)	0.2	0.3	0.25	0.3	0.2
14.	Sodium as Na (mg/l)	0.3	0.4	0.5	0.6	0.6
15.	Potassium (mg/l)	1.3	1.5	1.8	1.7	1.5
16.	D. O. (mg/l)	3.0	3.4	3.3	3.2	3.3
17.	TDS (mg/l)	280	275	260	273	274
18.	Chlorides (mg/l)	24	25	23	21	24
19.	BOD_3 (mg/l)	1.3	1.4	1.3	1.4	1.3
20.	COD (mg/l)	4.3	4.2	4.1	4.2	4.3
21.	Oil & Grease (mg/l)	BDL	BDL	BDL	BDL	BDL

GW= Ground water, SW= Surface water, T.S.S. =Total Suspended Solids, T.D.S.= Total Dissolved Solids C.O.D.= Chemical Oxygen Demand, B.O.D.=Bio-logical oxygen Demand, BDL= Below Detectable Limit

3.5 NOISE ENVIRONMENT

The objective of the noise pollution survey around the project site was to identify existing noise sources and to measure background noise levels. The study was carried out in the following steps:

- Reconnaissance
- Identification of noise sources and measurement of noise levels
- Measurement of noise levels due to transportation
- Community noise levels

3.5.1 RECONNAISSANCE

The details of location of background & transportation noise monitoring station are given in table-3.5, while the results of noise monitoring are given in table-3.6.

3.5.2 EQUIVALENT SOUND LEVELS OR EQUIVALENT CONTINUOUS EQUAL ENERGY LEVEL (L_{eq})

There is large number of noise scales and rating methods based on some sort of average of weighted average quantities derived from the detailed noise characteristics. Equivalent sound levels or Equivalent continuous equal energy level (L_{eq}) is a statistical value of sound pressure level that can be equated to any fluctuating noise level and forms a useful measure of noise exposure and forms basis of several of the noise indices used presently.

L_{eq} is defined as the constant noise level, which over a given time, expands the same amount of energy, as is expanded by the fluctuating level over the same time. This value is expressed by the equation:

$$L_{eq} = 10 \log \sum_{i=1}^{i=n} (10)^{Li/10} \times ti$$

Where, n = Total number of sound samples,

Li = The noise level of any i^{th} sample

ti = Time duration of i^{th} sample,

Expressed as fraction of total sample time

Leq has gained wide spread acceptance as a scale for the measurement of long term noise exposure. Hourly equipment noise levels in the identified impact zone are monitored for day and time separately using sound level meter. All the values are reported in Leq and in case of equipment noise, Sound pressure level are monitored 1.5 m away from the machine and assessed with respect to standard prescribed in factory Act.

3.5.3 METHODOLOGY FOR NOISE MONITORING

Noise standards have been designated for different types of area, i.e. residential, commercial, industrial and silence zones, as per 'The Noise Pollution (Regulation and Control) Rules, 2000, Notified by Ministry of Environment and Forests, New Delhi, February 14, 2000. Different standards have been stipulated for day time (6 am to 10 pm) and night time (10 pm to 6 am).

Ambient noise level monitoring was done at same locations where ambient air monitoring was carried out within a study area. The locations are away from the major roads and major noise sources so as to measure ambient noise levels. One day monitoring was carried out at all the locations November 2006. The frequency of monitoring was set at an interval of 15 seconds over a period of 10 minutes per hour for 24-hours. The observed Equivalent sound levels (Leq) values in dBA are given in table-3.6 for each monitoring location in distinguished form of day time (6 am to 10 pm) and night time (10 pm to 6 am).

All measurements were carried out when the ambient conditions were unlikely to adversely affect the results.

TABLE - 3.5 DETAILS OF LOCATION OF BACKGROUND & TRANSPOTATION NOISE MONITORING STATIONS

SR. NO.	NAME OF VILLAGE	BEARING W.R.T. PROJECT SITE	APPROXIMATE RADIAL DISTANCE FROM PROJECT SITE
1.	Project site (N1)	-	0
2.	Dekeruva (N2)	S	4.0
3.	Bher Bheri(N3)	SW	2.2
4.	Reng-Beng (N4)	S	1.6
5.	Mikir Gaon(N5)	WSW	7.6

TABLE - 3.6 BACKGROUND NOISE LEVELS

SR. NO.	LOCATION	CATEGORY OF AREA	Noise Level (Leq) in dBA (Day time) (0600 to 2100 hrs.)	Noise Level (Leq) in dBA (Night time) (2100 to 0600 hrs.)
1.	Project site (N1)	Industrial	63 – 69	57 – 61
2.	Dekeruva (N2)	Residential	37 – 48	32.1 – 39.3
3.	Bher Bheri (N3)	Residential	47 – 51	31.2 – 38
4.	Reng-Beng (N4)	Residential	36 – 47	31 – 38
5.	Mikir Gaon (N5)	Residential	38.4 – 51.6	34.6 – 39.4

CPCB recommendation for community noise exposure in different category of area (i.e. residential, commercial, industrial and silence zone) is enclosed as Annexure-V, while Damage risk criteria for hearing loss given by occupational safety & health administration (OSHA) is enclosed as Annexure-VI. The observed noise levels were below the stipulated standards of CPCB.

3.5.4 NOISE LEVELS DUE TO TRANSPORTATION

Noise levels were also measured at four different locations in November, 2008. The equivalent noise level Leq (60 min average) measured at a distance of 10 m and 20 m from the edge of the road at each of the locations are presented in table-3.7.

TABLE - 3.7 NOISE LEVELS DUE TO TRANSPORTATION

SR. NO.	SAMPLING LOCATION	NOISE LEVEL IN dBA		TIME
		10 m FROM EDGE OF THE ROAD	20 m FROM EDGE OF THE ROAD	
1.	National Highway 36 (NT1)	63.8 59.14	60.67 60.5	Day Night

3.5.5 COMMUNITY NOISE LEVELS

The communities close to the project site are not exposed to major noise sources. The commercial activities and transport apart from natural sources contribute to community noise levels. The noise levels close to project site were low and within the stipulated standards of CPCB for the respective designated areas.

3.6 LAND ENVIRONMENT

3.6.1 METHODOLOGY FOR SOIL MONITORING

Soil samples were collected from different locations within the study area in November 2008. The locations selected for collection of soil samples are presented in table-3.8. The monitoring locations are shown in figure-3.5.

The analysis results of soil samples collected from the study area given in table-3.9.

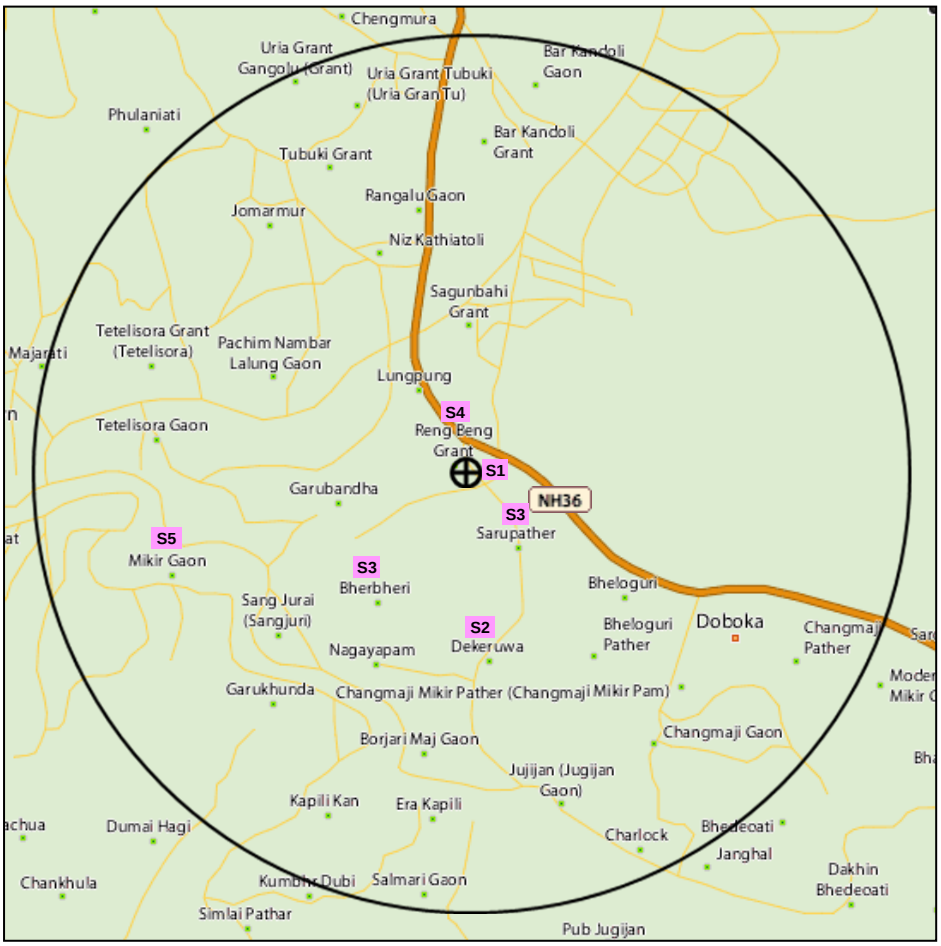
TABLE - 3.8 SAMPLING LOCATIONS: SOIL QUALITY

SR. NO.	SAMPLING LOCATION	BEARING W.R.T. PROJECT SITE	APPROXIMATE RADIAL DISTANCE FROM PROJECT SITE (KM)
1.	Project site (S1)	-	0
2.	Dekeruva (S2)	S	4.0
3.	Bher Bheri (S3)	SW	2.2
4.	Reng-Beng (S4)	S	1.6
5.	Mikir Gaon (S5)	WSW	7.6
6.	Sarupathar (S6)	S	0.9

TABLE - 3.9 PHYSICO-CHEMICALS CHARACTERISTICS OF SOIL

SR. NO.	PARAMETERS	PROJECT SITE (S1)	DEKERUVA (S2)	NAGAYANPAM (S3)	BHE-BHERI (S4)	RENG-BENG (S5)	MIKIR GAON (S6)	SARUPATHAR (S7)
1.	Porosity (%)	29	25.5	34	39	41	29	31
2.	W.H.C. (%)	32.3	28.9	36.2	40.5	43.6	31.9	33
3.	Bulk Density (gm/cm^3)	1.31	1.20	1.40	1.42	1.52	1.33	1.31
4.	pH	6.6	8.2	7.1	6.9	5.5	8.1	7.3
5.	Organic Carbon (mg/kg)	1.65	0.89	1.22	0.66	0.65	1.88	1.42
6.	Organic Matter (mg/kg)	2.84	1.31	2.07	1.20	0.90	3.24	2.31
7.	Nitrogen (mg/kg)	0.071	0.032	0.085	0.048	0.056	0.090	0.075
8.	Phosphate (mg/kg)	0.02	0.04	0.05	0.07	0.08	0.11	0.04
9.	Potassium (mg/kg)	0.93	0.061	0.02	0.080	0.052	0.04	0.06
10.	Magnesium (mg/kg)	1.12	0.39	0.81	0.25	0.45	0.98	1.10
11.	Iron (mg/kg)	0.93	0.62	0.66	0.43	0.51	0.82	0.80
12.	Zinc (mg/kg)	0.030	0.041	0.018	0.025	0.034	0.023	0.023
13.	Lead (mg/kg)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.	Chromium (mg/kg)	0.15	0.031	0.08	0.044	0.052	0.10	0.13
15.	Calcium (mg/kg)	78	123	225	90	156	156	90
16.	Sodium (mg/kg)	200	235	332	218	310	200	230
17.	Manganese (mg/kg)	95	150	258	105	185	168	95

FIGURE - 3.5 LOCATIONS OF SOIL SAMPLING STATIONS



3.7 SOCIO - ECONOMIC ENVIRONMENT

An assessment of socio - economic environment forms an integral part of an EIA study. Therefore, baseline information for the same was collected during the study period. The baseline socio - economic data collected for the study region, has been identified for the four major indicators viz. demography, civic amenities, economy and social culture. The baseline status of the above indicators is compiled in forthcoming sections.

3.7.1 POPULATION DATA

On an average, District Nagaon has population density of about 604 persons per sq. km. (2001 Census data). Village wise demographic data of the region of interest is given in the table-3.10. While population details (i.e. population distribution, population density and sex ration) of the study area, and District Kamrup are given in table-3.11 and graphical representation is given in figure-3.6.

TABLE - 3.10 POPULATION DATA AS PER CENSUS – 2001

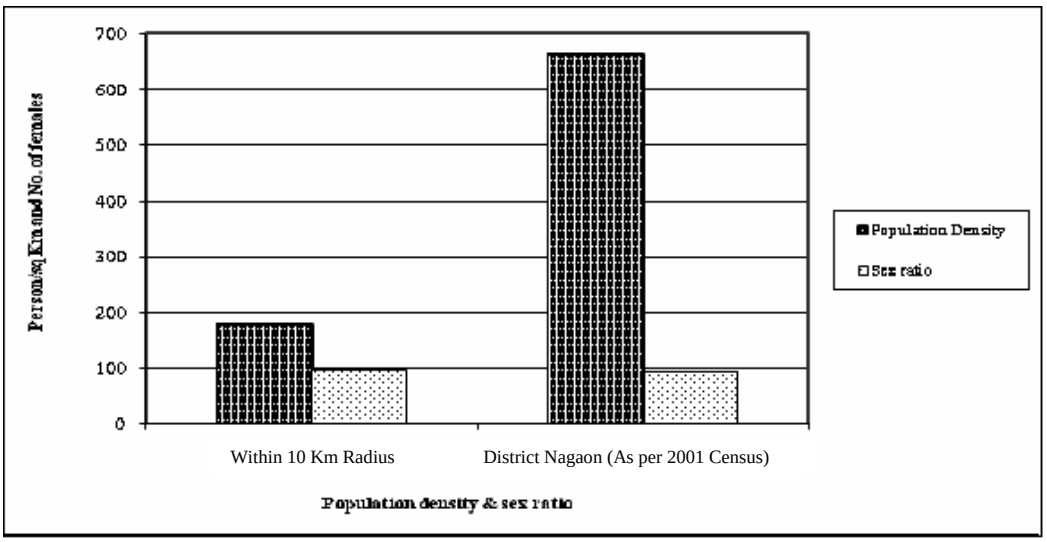
SR. NO.	NAME OF THE VILLAGE	AREA (Hectares)	TOTAL POPULATION	TOTAL MALE	TOTAL FEMALE
1.	Garubandha	265	1266	664	602
2.	Bheloguri	361	4371	2204	2167
3.	Bheloguri	361	4371	2204	2167
4.	Mikirgaon	487	1693	902	791
5.	Borjari Maj Gaon	31	1046	535	511
6.	Era-Kapili	110	1692	802	890
7.	Jujijan (Jugijan Gaon)	254	2405	1222	1183

SR. NO.	NAME OF THE VILLAGE	AREA (Hectares)	TOTAL POPULATION	TOTAL MALE	TOTAL FEMALE
8.	Charlock	234	1283	647	636
9.	Janghal Block	376	2236	1150	1086
10.	Changmaji Mikir Pather (Changmaji Mikir Pam)	273	1224	626	598
11.	Changmaji Gaon	548	4922	2517	2405
12.	Changmaji Pather	244	2524	1278	1246
13.	Barkandoli Grant No.1	265	898	452	446
14.	Tubuki Grant	258	3007	1538	1469
15.	Lungpung	235	1974	983	991
16.	Tetelisora Gaon	247	1587	817	770
17.	Tetelisora Grant (Tetelisora)	341	1462	721	741
18.	Rangalu Gaon	206	2447	1227	1220
19.	Niz Kathiatoli	238	2463	1257	1206
20.	Jomarmur	252	1455	761	694
21.	Reng Beng Grant	125	1085	544	541
22.	Garubandha	301	836	431	405
23.	Sarupather	194	2258	1193	1065
24.	Bherbheri	216	1637	831	806
25.	Dekeruwa	24	1188	616	572
26.	Nagayapam	347	2970	1548	1422
27.	Sang Jurai (Sangjuri)	287	1623	804	819

TABLE - 3.11 POPULATION DENSITIES AND SEX RATIO

NAME	POPULATION (PERSONS)	POPULATION DENSITY (PERSON/SQ. KM.)	SEX RATIO (NO. OF FEMALES PER 1000 MALES)
Within 10 Km Radius	55923	178.09	96,4
District Nagaon (As per 2001 Census)	2036342	662.4	94.79

FIGURE - 3.6 GRAPHICAL REPRESENTATION POPULATION DENSITY AND SEX RATIO



3.7.2 LITERACY DATA

The literacy rate is a major factor, which influences the socio-cultural condition of a particular place. Literacy rate data as per 2001 Census, in within 10 km radius of project site, district Nagaonis given in table-3.12.

TABLE - 3.12 LITERACY RATE

NAME	MALE LITERACY (%)	FEMALE LITERACY (%)	TOTAL LITERACY (%)
District Nagaon (As per 2001 Census)	62.28	68.52	55.57

3.7.3 OCCUPATIONAL STRUCTURE

In economic development of the region its geographical location, natural resources, business and employment, industries and manpower play vital role. The occupational structure of the area is as follow:

Classifications of workers:

a) Cultivators : 3, 03,587

b) Small & Marginal Farmers : 2,36,263

c) Agricultural Labourers : 81,800

d) Artisans : 32,621

g) Other workers : 1,68,606

3.8 LAND USE PATTERN

Land use, in general, reflects the human beings activities on land, whereas the word land cover indicates the vegetation, agricultural and artificial manmade structures covering the land surfaces. Identification and periodic surveillance of land uses and vegetation covers, in the vicinity of any developmental activity is one of the most important components for an environmental impact assessment, which would help determine the impact of the project development activity on the land use pattern.

3.8.1 AREA UNDER DIFFERENT LANDUSE

The land use classification of Nagaon district under the respective classifications is as follows

a. Geographical Area : 3,83,100 ha.

b. Net Sown area : 2,17,805 ha.

c. Forest Area. : 90,342 ha.

d. Fallow Land. : 9,468 ha.

e. Land not available for cultivation. : 53,536 ha.

f. The area brought under high yeilding variety seeds: 1,74,427

g. Cropping Intensity: 92% Overall land utilization. : 1,304

3.9 BIOLOGICAL ENVIRONMENT

Pisciculture is a major allied agrl. enterprises in the district. The mighty Brahmaputra as well as the large water bodies like beels and low lying swamps are the natural breeding places for large variety of fishes and provide large capture for markets both within and outside the district. The district has also large number of culture fisheries mostly ponds.

The major agricultural crops grown in the district are paddy, potato, mustard, jute, sugarcane, wheat and other vegetables. Besides these crops, the district produces various types of horticultural fruits like banana, papaya, litchi, pineapple, lemon etc. and other plantation crops such as coconut, arecanut etc. Tea cultivation is also done mostly in the organized sector.

Nagaon district has a total geographical area of 3,83,100 hectares of which 23.6 percent are covered by forest. About 14.0 percent of total geographical area are not available for cultivation which are used either for non agricultural purposes or barren/uncultivable land. Further, 25453 hectares i.e., 6.6 percent are uncultivated land under pasture, trees etc., 4298 hectares (1.1%) are cultivable wasteland. About 9468 hectares (2.5%) are left fallow land of which 2057 hectares (i.e. 21.7%) are permanent fallow. The district have a potential of utilising 13766 hectares of additional land for cultivation.
The district has net and gross cropped areas of 2,17,805 ha. and 417218 hectares respectively, the net cropped area being 57 percent of the total geographical area. About 1,47,410 hectares (63.5%) out of the net cropped areas is put under multiple cropping with an average cropping intensity 192 % as against 152.43% for the state.

The topography, agro-climatic conditions, prevalence of fertile soil and long tradition of growing plantation and horticulture crops enables commercial cultivation of several crop varieties. Banana, pineapple, citrus are the major fruit crops grown in the district. In addition, other crops grown are Litchi, Guava, Mango, Mandarin oranges and papaya. Though most of these fruits are produced since time immemorial, the productivity levels are very low due to lack of scientific approach in their cultivation.