

# Appendices

**Appendix – I**  
**(Reference paragraph – 2.1)**  
**Position of Technical staff**

Sl. No.	Name of Post	Sanctioned Strength	Person in Position	Excess/Shortage
<b>Scientist</b>				
1.	Chief Environment Scientist	1	1	-
2.	Addl. Chief Env. Scientist	1	-	(-) 1
3.	Sr. Env. Scientist	3	-	(-) 3
4.	Exe. Env. Scientist	6	11	(+) 5
5.	Asstt. Env. Scientist	7	5	(-) 2
6.	Total			
7.	Asstt. Env. Scientist	10	5	(-) 5
8.	Scientific Asstt.-I	2	-	(-) 2
9.	Scientific Asstt.-II	1	1	-
10.	Scientific Asstt.-III	6	4	(-) 2
<b>Engineering</b>				
1	Chief Env. Scientist (CES)	1	1	-
2	Addl. Chief Env. Engineer	2	2	-
3	Sr. Env. Engineer	5	5	-
4	Executive Engineer	8	8	-
5	Asstt. Executive Engineer	18	18	-
6	Asstt. Engineer	30	27	(-) 3
<b>Total</b>		<b>101</b>	<b>88</b>	

*Source: PCBA*

**Position of non-technical staff**

Sl. No.	Name of cadre	Sanctioned strength	Person in position	Shortage
1.	Finance & Accounts	17	13	(-) 4
2.	HR & Administration	119	104	(-) 15
3.	Planning & Research	11	8	(-) 3
4.	IT	6	5	(-) 1
<b>Total</b>		<b>153</b>	<b>130</b>	

*Source: PCBA*

**Appendix – II**  
**(Reference paragraph – 3.2)**

**List of Parameters under National Water Quality Monitoring Programme**

Sl. No.	Parameters	
A	<b>Core Parameters</b>	1.pH 2. Temperature 3. Conductivity ( $\mu\text{mhos/cm}$ ) 4. Dissolved Oxygen (DO) 5. Bio-Chemical Oxygen Demand (BOD) 6.Nitrate-N (mg/l) 7. Nitrite-N (mg/l) 8. Fecal Coliform (MPN/100 ml) 9. Total Coliform (MPN/100 ml)
B	<b>General Parameters</b>	1.Turbidity (NTU) 2. Phenolphthalein Alkalinity as $\text{CaCO}_3$ 3. Total Alkalinity as $\text{CaCO}_3$ 4. Chlorides (mg/l) 5.Chemical Oxygen Demand (COD) (mg/l) 6. Total Kjeldahi-N as N (mg/l) 7. Ammonia-N as N (mg/l) 8. Hardness as $\text{CaCO}_3$ 9. Calcium as $\text{CaCO}_3$ 10. Sulphate (mg/l) 11.Sodium (mg/l) 12. Total Dissolved Solids (mg/l) 13. Total Fixed Dissolved Solids (mg/l) 14. Total Suspended Solid (mg/l) 15. Phosphate (mg/l) 16. Boron (mg/l) 17. Magnesium as $\text{CaCO}_3$ 18. Potassium (mg/l) 19. Fluoride (mg/l)
C	<b>Bio-Monitoring</b>	1.Saprobity Index 2. Diversity Index 3. P/R Ratio
D	<b>Trace Metals</b>	1.Arsenic ( $\mu\text{g/L}$ ) 2. Cadmium ( $\mu\text{g/L}$ ) 3.Copper ( $\mu\text{g/L}$ ) 4. Lead ( $\mu\text{g/L}$ ) 5. Chromium (Total) ( $\mu\text{g/L}$ ) 6. Nickel ( $\mu\text{g/L}$ ) 7. Zinc ( $\mu\text{g/L}$ ) 8. Mercury ( $\mu\text{g/L}$ ) 9. Iron (Total) ( $\mu\text{g/L}$ )
E	<b>Pesticides</b>	1.Alpha BHC ( $\mu\text{g/L}$ ) 2. Beta BHC ( $\mu\text{g/L}$ ) 3. Gama BHC ( $\mu\text{g/L}$ ) 4. O P DDT ( $\mu\text{g/L}$ ) 5. P P DDT ( $\mu\text{g/L}$ ) 6. Alpha Endosulphan ( $\mu\text{g/L}$ ) 7. Beta Endosulphan ( $\mu\text{g/L}$ ) 8. Aldrin ( $\mu\text{g/L}$ ) 9.Dieldrin ( $\mu\text{g/L}$ ) 10. Carboryl (Carbamate) ( $\mu\text{g/L}$ ) 11. 2-4 D ( $\mu\text{g/L}$ ) 12. Malathian ( $\mu\text{g/L}$ ) 13. Methyl Parathian ( $\mu\text{g/L}$ ) 14. Anilophos ( $\mu\text{g/L}$ ) 15. Chloropyriphos ( $\mu\text{g/L}$ )

**Source: Central Pollution Control Board (CPCB)**

**Appendix – III**  
**(Reference paragraph – 3.5.1)**  
**Estimation of Fluoride and Arsenic content in ground water**

Sl. No.	District	No. of samples	Fluoride content (mg/l)		Arsenic content (µg/l)		No. of samples having concentration higher than permissible limit	
			Max	Min	Max	Min	Fluoride	Arsenic
1.	Golaghat	37	1.73	0.38	107.08	1.97	10	24
2.	Karimganj	37	0.91	0.25	102.20	0.49	-	10
3.	Karbi-Anglong	7	3.47	0.04	0.80	0.35	02	-
4.	Cachar	11	0.54	0.33	34.12	0.04	-	01
5.	Lakhimpur	16	0.84	0.64	11.42	2.89	-	01
6.	Nagaon	44	0.96	0.31	9.53	0.22	-	-
7.	Kamrup	122	2.10	0.06	15.62	0.01	17	02
8.	Dhubri	30	0.78	0.44	9.27	1.29	-	-
9.	Hailakandi	19	0.85	0.25	40.49	1.43	-	02
10.	Dhemaji	13	0.71	0.50	5.80	1.89	-	-
11.	Jorhat	19	1.01	0.69	90.03	47.46	01	08
Total		<b>355</b>					<b>30</b>	<b>48</b>

*Source: PCBA*

**Appendix – IV**  
**(Reference paragraph – 4.1)**

Sl.	Air Pollutant	Possible Sources	Effects
1.	<b>Sulphur Dioxide (SO<sub>2</sub>)</b> - A corrosive gas that cannot be seen or smelted at low levels but can have a “rotten egg” smell at high levels	Sulphur Dioxide (SO <sub>2</sub> ) mostly comes from the burning of coal or oil in power plants. It also comes from factories that make chemicals, paper, or fuel.	Sulphur Dioxide exposure can affect people who have asthma or emphysema by making it more difficult for them to breathe. It can also irritate people’s eyes, noses and throats. It can also harm trees and crops, damage buildings, etc. SO <sub>2</sub> reacts in the atmosphere to form acid rain.
2.	<b>Nitrogen Dioxide (NO<sub>2</sub>)</b> - It is a reddish brown toxic gas with characteristic sharp, biting odour and is a prominent air pollutant.	NO <sub>2</sub> mostly comes from power plants, industries, cars, burning of bio-mass and fossil fuels.	People who are exposed to NO <sub>2</sub> for long time have a higher chance of getting respiratory infections. It can also react in the atmosphere to form Ozone, acid rain, particles which can harm plants and animals.
3.	<b>Particulate Matter (PM<sub>10</sub>, PM<sub>2.5</sub>)</b> - Particulate Matter is a complex mixture of suspended solid and liquid matter.	PM can be divided into two types-coarse particles and fine dust. Coarse particles are formed from sources like road dust, construction work. Fine dust is formed when fuel is burned in automobiles and power plants.	PM that is small enough can enter lungs and cause health problems. Some of these problems include asthma, bronchitis, and pneumonia in older people. PM <sub>2.5</sub> contributes to cancer.
4.	<b>Carbon Monoxide (CO)</b> - A gas that comes from the burning of fossil fuels.	CO is released when engines burn fossil fuels. Emissions are higher when engines are not turned properly. Cars emit a lot of CO. Furnaces and heaters in the home can emit high concentrations of CO, too, if they are not properly maintained.	CO makes it hard for body parts to get the oxygen they need to run correctly. Exposure to CO makes people feel dizzy and tired and gives them headaches. Elderly people with heart disease are hospitalised more often when they are exposed to higher amounts of CO.
5.	<b>Ozone (O<sub>3</sub>)</b> - A gas that can be found in two places-near the ground (Troposphere) major part of smog and upper atmosphere (Stratosphere) a protective layer which screens out harmful ultraviolet rays.	It is formed when NO <sub>2</sub> and volatile organic compounds mix in sunlight. NO <sub>2</sub> come from burning gasoline, coal or other fossil fuels.	O <sub>3</sub> can lead to more frequent asthma attacks in people who have asthma and can cause throats, coughs and breathing difficulty. It can also hurt plants and crops.
6.	<b>Lead</b> - A blue gray metal that is very toxic.	Lead can come from power plants and other industrial sources. Lead also comes from cars in areas where unleaded gasoline is not used. Lead paint is an important source of lead, especially in houses where paint is peeling. Lead in old pipes can also be a source of lead in drinking water.	High amounts of lead can be dangerous for small children and can lead to lower IQs and kidney problems. For adults, exposure to lead can increase the chance of having heart attacks or strokes.

*Source: Central Pollution Control Board (CPCB)*

**Appendix – V**  
**(Reference paragraph – 4.2)**  
**Air Quality Monitoring Stations in Guwahati**

Sl. No.	Station Name	Station Code	Station Type	District	Location
1.	Bamunimaidam	193	Residential	Kamrup Metro (Greater Guwahati area)	Head Office Building of PCBA
2.	Khanapara	596	Residential		Central Dairy
3.	Gopinath Nagar	519	Residential		ITI Building
4.	Santipur	541	Residential		Near Pragjyotish College
5.	Gauhati University	602	Residential		Guwahati University Campus
6.	Boragaon	603	Residential		IASST Campus

*Source: PCBA*

**Appendix – VI**  
*(Reference paragraph – 4.3)*

Year	2010			2011			2012			2013			2014		
	Monitoring Stations	Range (Min-Max)	Mean	Range (Min-Max)	Mean	Range (Min-Max)	Mean	Range (Min-Max)	Mean	Range (Min-Max)	Mean	Range (Min-Max)	Mean	Range (Min-Max)	
				<b>SO<sub>2</sub> values</b>											
	Bamunimaidam	3.00-10.50	7.20	2.00-10.50	6.20	3.30-13.50	6.30	2.50-09.50	6.90	4.30-10.50	6.60				
	Khanapara	3.00-21.00	7.30	2.50-9.80	5.80	3.00-13.50	6.10	3.30-11.00	7.20	3.00-13.00	7.30				
	Gopinath Nagar	4.30-11.00	7.90	8.30-22.00	15.20	2.00-31.50	6.40	2.80-17.50	7.20	3.30-14.50	6.90				
	Santipur	4.50-12.50	7.10	2.50-9.00	5.90	3.00-11.75	6.20	4.00-9.80	6.80	3.30-9.50	6.60				
	Guwahati University	3.00-8.00	5.70	3.00-8.80	5.70	3.30-10.50	5.70	3.30-8.80	6.70	3.80-9.50	6.60				
	Boragaon	3.00-11.30	6.20	2.50-8.80	5.60	3.00-18.30	6.00	2.80-13.80	6.80	3.30-8.30	6.30				
				<b>NO<sub>2</sub> values</b>											
	Bamunimaidam	8.90-22.30	15.10	9.10-19.80	14.30	8.30-23.50	14.70	11.10-22.50	15.70	8.10-18.5	13.00				
	Khanapara	7.50-34.80	14.70	5.90-18.50	13.10	7.00-20.00	13.40	9.60-19.50	15.30	6.80-28.3	14.80				
	Gopinath Nagar	8.50-37.50	16.30	8.30-22.00	15.20	5.60-23.00	15.20	10.40-28.50	17.60	8.40-26.0	15.20				
	Santipur	10.60-22.80	15.30	7.00-18.50	13.80	7.30-22.50	14.00	10.30-21.30	14.70	7.30-19.0	12.40				
	Guwahati University	7.90-17.00	13.10	7.30-45.80	13.00	8.00-22.50	13.30	8.10-18.30	14.60	8.10-19.5	14.20				
	Boragaon	7.30-21.80	15.40	7.50-20.30	13.90	7.50-22.00	14.00	9.50-25.30	15.50	7.00-15.0	11.80				
				<b>RSPM Values</b>											
	Bamunimaidam	17.50-286.00	103.80	20.50-337.00	94.60	28.00-396.00	106.30	62.00-302.50	166.3	27.50-289.50	108.0				
	Khanapara	21.50-313.50	111.90	21.00-433.00	110.0	16.00-353.50	93.70	25.50-349.70	135.6	15.50-478.00	110.0				
	Gopinath Nagar	19.00-349.50	114.10	21.00-474.50	103.2	16.50-346.50	104.30	36.00-415.00	169.5	22.00-371.50	105.4				
	Santipur	21.00-296.50	106.30	17.00-267.00	96.90	16.50-307.00	88.60	45.00-312.00	138.8	19.50-135.00	53.70				
	Guwahati University	13.00-156.50	64.30	13.00-204.00	70.10	16.50-335.00	84.00	44.50-257.00	117.6	16.50-275.50	74.70				
	Boragaon	31.00-283.50	70.00	14.00-263.50	82.20	15.50-183.50	68.90	14.00-352.00	119.7	12.00-77.50	41.60				
				<b>SPM Values</b>											
	Bamunimaidam	28.50-598.50	195.10	39.00-761.00	170.9	68.00-713.50	209.60	116.00-529.50	293.4	61.50-454.50	180.20				
	Khanapara	38.00-622.50	203.60	42.50-663.50	195.6	44.00-568.00	190.70	49.00-545.00	251.4	67.50-645.50	246.80				
	Gopinath Nagar	40.00-597.00	207.10	35.50-621.00	196.4	52.50-718.00	211.00	70.00-771.00	312.0	37.50-529.00	175.70				
	Santipur	36.00-538.50	181.70	45.50-532.50	170.4	49.00-568.50	182.40	87.50-554.50	259.4	36.00-197.00	94.70				
	Guwahati University	34.50-408.00	129.50	26.00-385.50	143.0	33.00-372.00	150.30	77.00-441.50	206.6	24.00-395.00	128.50				
	Boragaon	51.00-595.00	126.70	31.00-558.50	160.5	38.50-315.00	130.90	25.50-599.00	224.1	31.00-153.50	82.30				

Source PCBA

**Appendix – VII**  
**(Reference paragraph – 4.4.3)**  
**Industries emitted Particulate Matter (PM) in excess of the Standard**

Sl. No.	Name of Industry (M/s)	Stack Emission Standard for PM (mg/Nm <sup>3</sup> )	Actual Emission for PM monitored (mg/Nm <sup>3</sup> )	Year of monitoring
1.	K. D. Coke Industries, Jorabat	150	152	2011
2.	Parsnath coke Industries, Borsojai	150	153	2011
3.	Jalan Iron & Steel Works, RGB Road	150	167	2011
4.	SKJ Coke Industries, P. Boragaon	150	155	2011
5.	SM Cement, Jorabat	50	Kiln-78, Kiln-66	2011
6.	Raksha Cement Pvt. Ltd., Sonapur	50	Kiln-68, Kiln-72	2011
6.	JK Avatar Cements Pvt. Ltd., Byrnihat	50	Kiln-82, Kiln-75	2011
7.	Maha Sakti Cements, Byrnihat	50	76	2011
8.	Shiva Sakti Cements, Byrnihat	50	82	2011
9.	Purbanchal Cement Ltd., Jorabat	50	53	2011
10.	Radha Coke Products Pvt. Ltd., Jorabat	150	157	2012
11.	SKJ Coke Industries, P. Boragaon	150	164	2012
12.	SM Coke Industries, Jorabat	150	153	2012
13.	Kamrup Coke Industries, Beharbari	150	156	2012
14.	Shree Balaji Coke Industries, Azara	150	154	2012
15.	Ganesh Met Coke, Azara	150	158	2012
16.	River Valley Cement Corporation, Changsari	122	100	2012
17.	Topcem India, Gauripur	55	50	2013
18.	Jai Coke Industries, Puthimari	150	153	2013
19.	Jupitar Coke Industries, Beltola	150	155	2013
20.	Shiva Shakti Cement, Byrnihat	50	68	2013
21.	Mortex Coke, Tepesia	150	154	2013
22.	Progressive Fertichem,	1200	1227	2013
23.	Balaji Coke, Byrnihat	150	155	2013
24.	Raksha Cements Pvt. Ltd.	50	54	2013
25.	JDB Coke, Kamarkuchi	150	154	2013

Source : PCBA