



**Environmental Study of Mirsharai Upazila, Chattogram
Sound, Air Pollution (Dust Particles) and Water Quality in
Different Locations**

URBAN DEVELOPMENT DIRECTORATE (UDD)
Ministry of Housing and Public Works
Government of the People's Republic of Bangladesh
June, 2019



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Abbreviations & Acronyms

DoE	Department of Environment
ECR	Environmental Conservation Rule
ECA	Environmental Conservation Act
IFC	International Finance Corporation
OSHA	Occupational Safety and Health Administration
EZ	Economic Zone
APHA	American Public Health Association
db	Decibel
PM	Particulate Matter
TDS	Total Dissolved Solids
DO	Dissolved Oxygen
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen demand

Executive Summary

The research work is carried out to get a picture of Noise, Air Pollution and Water quality in different locations of Mirsharai Upazila, Chattogram & to set a baseline environmental standard conducive for implementing the necessary projects.

The first chapter of this report describes the background, objective & methodology of the work. This chapter gives an idea of the aim and overall work process.

The second chapter deals with the description of the monitoring & sampling locations. Some identified locations were under consideration of this research work.

The third chapter provides the related applicable standards of noise, air and water quality. The collected data are compared with these standards to get the view of the current situation of the area which is under the work boundary.

The fourth chapter shows the results and discussions. This chapter gives the detailed data of air quality, noise quality and water quality of the inspected locations. On the basis of the already set standard optimum limit, these data are compared with relevant standards which are discussed in this chapter. From the result it has been observed that air quality is quite good at Mirsharai. Noise level is quite high in this area which might be caused for the vehicular movement or nearby market. And the surface water which were considered to be tested has been found to be quite polluted which might be a result of domestic and industrial discharge in the surface water.

The fifth chapter deals with recommendation & conclusion. In this chapter, some recommendations are presented that can help in future to protect the environment of Mirsharai upazila. Any development project plans in this area should consider the present scenario of the place and should take enough measures to prevent pollution for the sake of environmental conservation as well as retention of economic activities.

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Chapter 1: Background, Objective & Methodology

1.1 Background

Mirsharai is an upazila of Chittagong District in the division of Chattogram, Bangladesh. It is located at 22° 46.3' North 91° 34.5' East. It is surrounded by Tripura, Chhagalnaiya and Feni sadar on the north, Sitakundo and Sandwip on the south, Fatikchhari on the east, Sonagazi and Companiganj on the west. It is approximately 60 km away from Chattogram city.



Figure-1: Google map of Mirsharai Upazila

^aWith smooth communication by all means of road, rail and waterways, it is a potential location for economic cum industrial development. In addition Mirsharai is blessed with an abundance of natural resources and scenic beauties having hilly forest areas, hill streams and waterfalls of Chattogram Hill Tracts on the one side and the Bay of Bengal on the other side. At the same time, Mirsharai is blessed with the excellent geographical advantage, making it a suitable location to establish a bay terminal for the Chattogram Port Authority. In tourism sector with holistic planning and establishment of easy accessibility, Mirsharai can be a great tourist attraction. The work of establishing one of the largest Economic Zones (EZ) has also commenced in Mirsharai.

In Economic Zone, there will be many different types of industries which will generate sounds, dusts and waste water from different process of industries and all of these might have some major impact on the environment. On the other hand, this new economic zone will come up with a lot of human intervention on the nature which will cause hindrances on natural flow of water resources as well as subsistence of polluted water may cause impact on the encircled mangrove forests on which a good number of peoples' livelihood depends and can have a major impact on the present and potential fisheries livestock projects. Moreover, present water sources will have to meet the increased future demand of water.

So, this analysis and study is necessary to know the present state of Sound & Air pollution and water contamination Level.

1.2 Rationale of the Study

This study depicts the present scenario of the sound, air pollution and water contamination level in Mirsharai Upazila during the time period of June 12, 2019 to June 14, 2019. This study will aware the policy makers and project implementing authority to take the necessary measures (if needed) for the project.

1.3 Aim & Objective of the Study

- ◆ To get a real time picture of Noise, Air Pollution and Water quality in different locations of Mirsharai Upazila, Chattogram.
- ◆ Setting a baseline environmental standard conducive for implementing the necessary projects.

1.4 Methodology

Tools & Techniques:

Materials: The dust level in the air has been monitored by real time monitor Handheld Particle Counter HAL-HPC300 manufactured by Hal Technology, USA 2015.

The noise level of the environment has been monitored by the Digital Sound level meter SL-4010.

Methods:

- ◆ Noise Level Monitoring- Noise level in each location has been monitored separately for 8 hour in Day time (8.00 am to 1.00 pm & 2.00 pm to 5.00 pm) and for 3 hour in night time (8.00pm to 11.00pm). Noise level has been measured for a 1 hour interval and in each hour 3 data has been collected and recorded; the lowest and highest sound pressure levels have been considered and compared with the standard of DoE (ECR 97, Schedule-4).

Sound pressure has been measured in terms of decibel (dB). The instrument is based on IEC 651.

Instrument Detail

Instrument Name	: Digital Sound Level Meter
Measuring Range	: 35 to 130 db.
Resolution	: 0.1 dB
Accuracy	: ± 3.5 db.
Year of manufacture	: 2015

- ◆ **Air Quality Monitoring-** The air quality of selected location of Mirsharai Upazila (n=03) has been monitored by using a particle counter. Each location has been monitored separately for 8 hours in day time (8.00 am to 1.00 pm & 2.00 pm to 5.00 pm) and for 3 hours at night time (8.00pm to 11.00pm). Air pollution has measured for 1 hour interval, in each hour 3 data have been collected and recorded for each parameter; the lowest and highest values have noted and the average value has considered and compared with the DoE (ECR 97, Schedule-4). The Particulate Matter (PM) of different sizes such as PM 0.5, PM 2.5, PM 5, PM 10 & TSP has been assessed by the particle counter. The particle counter utilizes the laser technology for single particle detection.

The scattering of light from the particles in the sampling air stream is converted into electrical pulses, which is then measured and calculated as a particle size.

Particulate Counter Specification:

Size Range : 0.3 μ m~10 μ m

Flow Rate : 2.83 Liter/min (0.1cfm)

Counting Efficiency : 50 \pm 20%@0.3 μ m; 100 \pm 10%@0.5 μ m

- ◆ **Water Test:** Water test has been done for different parameters by using different standard method including APHA method. The tests have been performed using high tech calibrated instrument at Qtex Testing Laboratory Division. The test has been carried out according to the **Standard Operating Procedure**. Test methods for the tested parameters are as bellows:

Parameters	Test Methods
pH	APHA 4500-H+ B
Temperature	APHA 2550. B
Conductivity	APHA 2510 B
Total Dissolved Solids (TDS)	APHA 2540 C
Arsenic (As)	Test Strip Color Match
Iron (Fe)	Color Disc
Free Chlorine	DPD/ Color Test
Total Chlorine	DPD/ Color Test
Total Coliform	Membrane Filtration
Dissolved Oxygen (DO)	APHA 4500-O G
Biochemical Oxygen Demand (BOD ₅)	APHA 5210 .B
Chemical Oxygen demand (COD)	APHA 5220. B
Calcium (Ca)	Atomic Absorption
Potassium (K)	Flame Photometry

Chapter 2: Monitoring & Sampling Location

2.1 Monitoring and Sampling Location

All data have been recorded from the locations specified by the UDD and are listed below:

Table-1: Air quality and noise level monitoring sites and their location

Name of Location	Monitoring Point	Coordinates
Location 1: Baraiyarhat	Point-1: Beside Foot Over Bridge	Longitude: 91.53442 Latitude: 22.89445
	Point-2: In front of Municipal Office	Longitude: 91.53270 Latitude: 22.89321
Location 2: Mirsharai	Point-1: Beside Foot Over Bridge	Longitude: 91.57079 Latitude: 22.77720
	Point-2: In front of Municipal Office	Longitude: 91.56985 Latitude: 22.77711
Location 3: bu Torab Bazar	Point-1: Bazar Mor	Longitude: 91.55727 Latitude: 22.74806
	Point-2: In front of 11 No. Moghadiya Union Parishad Bhaban	Longitude: 91.55535 Latitude: 22.74888

Table-2: Water Sampling sites and their location

Sl. No.	Sample ID	Location	Coordinates
01	Qtex/2019/10111/SW	Khalyachara Canal (West Khalyachara, 12 No. Khalyachara Union)	Longitude: 91.57658 Latitude: 22.76146
02	Qtex/2019/10112/SW	Moliyai Canal (Moliyai Village)	Longitude: 91.51902 Latitude: 22.76977
03	Qtex/2019/10113/SW	Ichakhali canal (Ichakhali Union)	Longitude: 91.47882 Latitude: 22.76456
04	Qtex/2019/10114/SW	Mohamaya Lake (Near Rubber Dame)	Longitude: 91.56056 Latitude: 22.81424
05	Qtex/2019/10115/SW	Mohamaya Lake (Chowdhuryhat, Durgapur Union, Beside Durgapur Rahmania Eidgah Maydan)	Longitude: 91.53302 Latitude: 22.81257
06	Qtex/2019/10116/SW	Mohamaya Lake (Jholonpull, 6 No. Ichakhali Union, Beside Govt. Primary School)	Longitude: 91.49356 Latitude: 22.81269
07	Qtex/2019/10117/SW	Baromashi Canal (Between Backside of BSRM & Hill)	Longitude: 91.55409 Latitude: 22.86190
08	Qtex/2019/10118/SW	Baromashi Canal (Beside Dhaka Chittagong Highway, Near BSRM)	Longitude: 91.54032 Latitude: 22.87497
09	Qtex/2019/10119/SW	Baromashi Canal (Between South Side of Chutikha Dighi and North Side of Jorarganj Bazar in Jorarganj)	Longitude: 91.52933 Latitude: 22.81424

2.2 Location Map

The location of air, noise monitoring and water sampling in Mirsharai Upazila are given below:

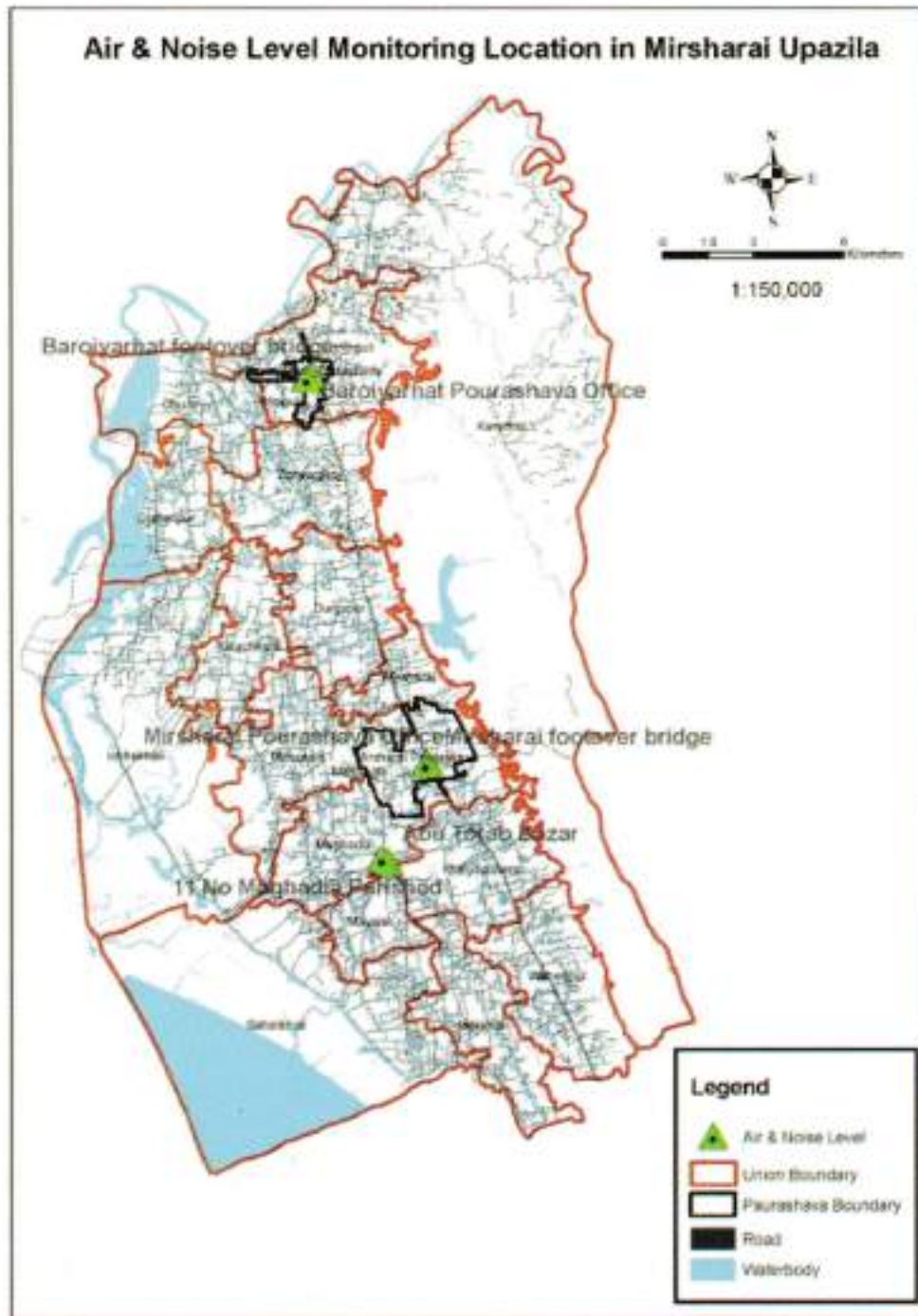


Figure-2: Air & Noise Level Monitoring Location in Mirsharai Upazila

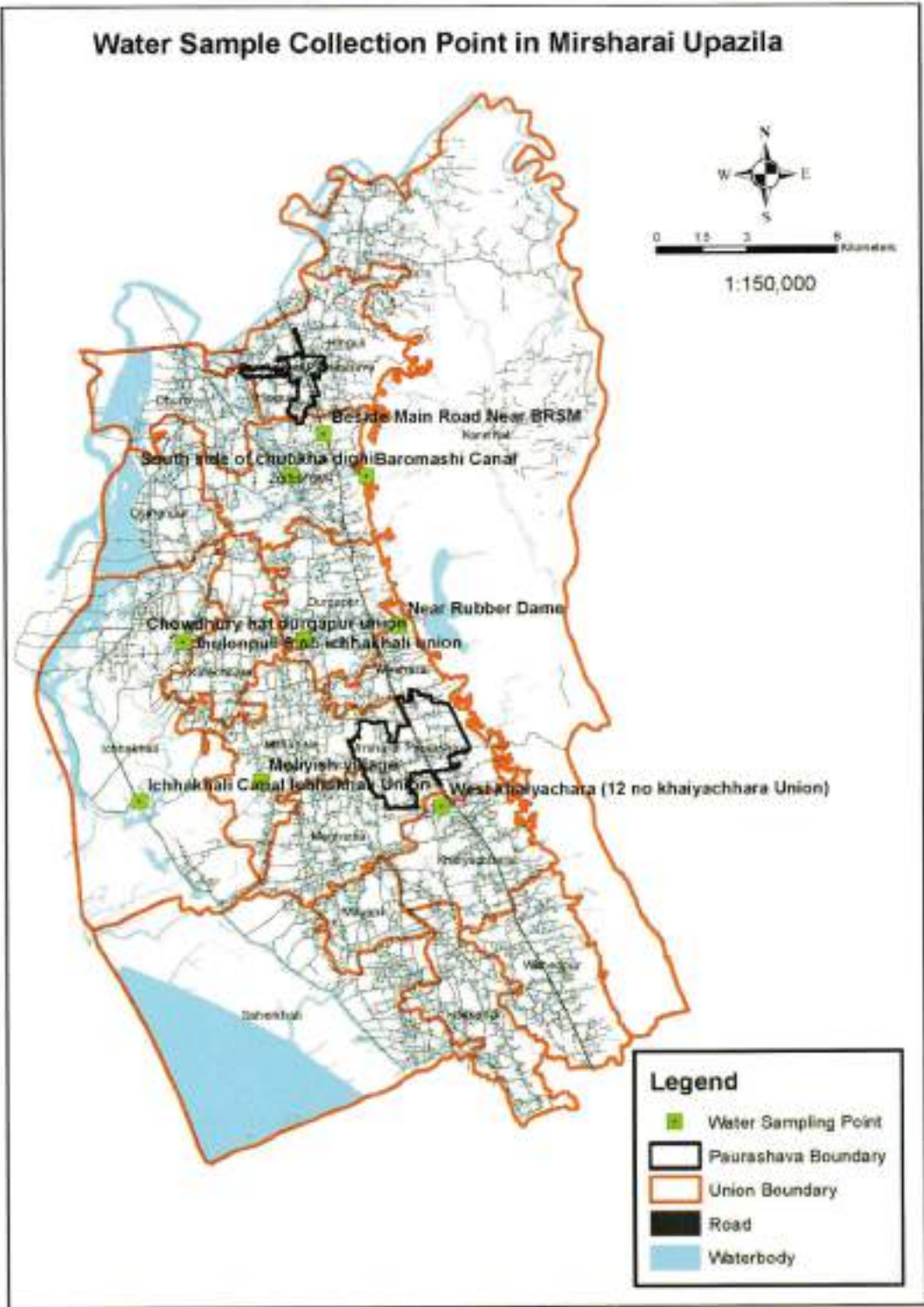


Figure-3: Water Sample Collection Point in Mirsharai Upazila

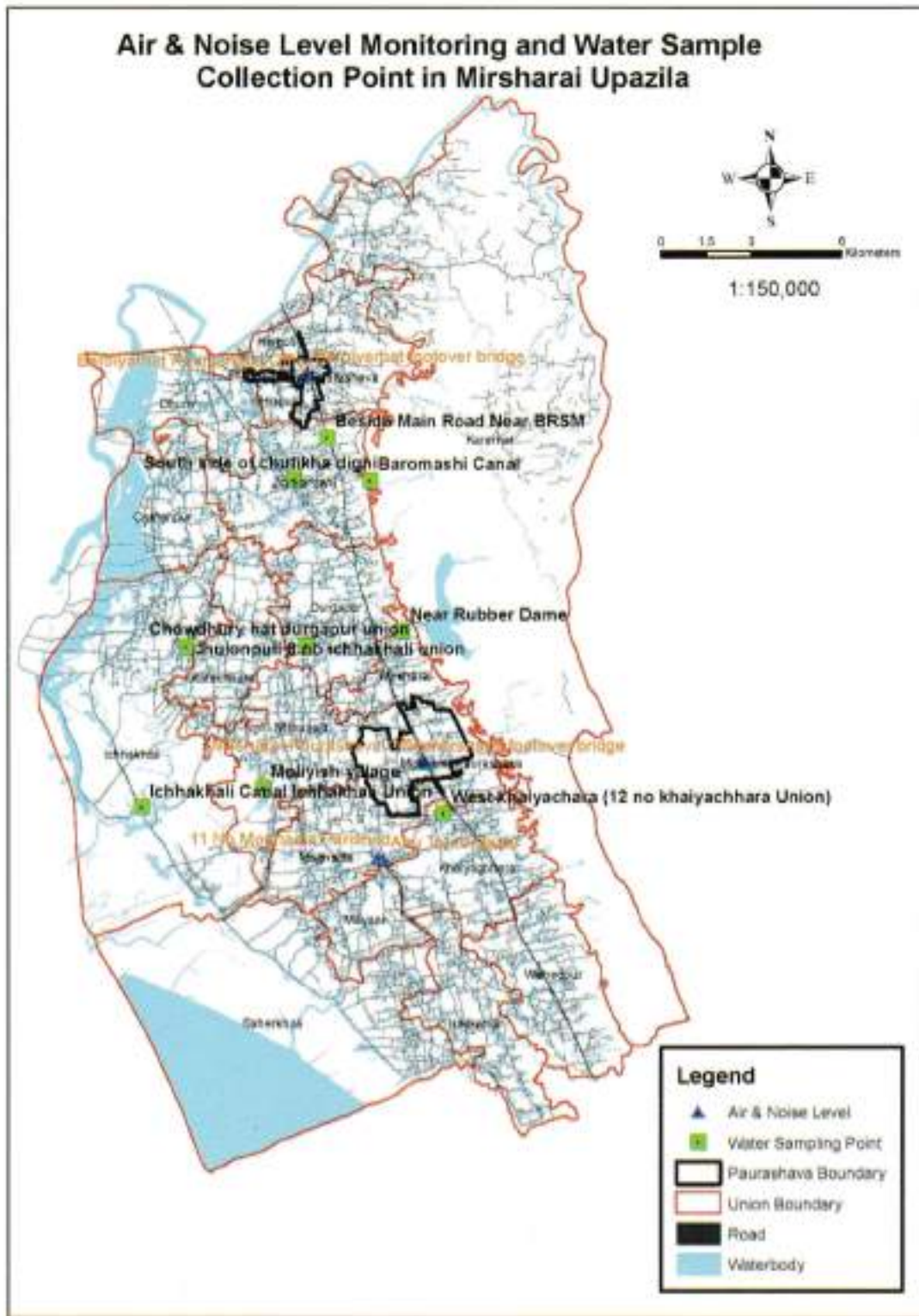


Figure-4: Air & Noise Level Monitoring and Water Sample Collection Point in Mirsharai Upazila at a glance

However the individual location maps are also given below:

◆ **Noise Level & Air Quality Monitoring Location Map**

The Location map (03 location, 06 sampling sites) is given below. The individual location maps are given subsequently:



Figure-5: Baralyarhat (Foot Over Bridge) Satellite Map



Figure-6: Baralyarhat (Municipal Office) Satellite Map



Figure-7: Mirsharai (Foot Over Bridge) Satellite Map



Figure-8: Mirsharai (Municipal Office) Satellite Map

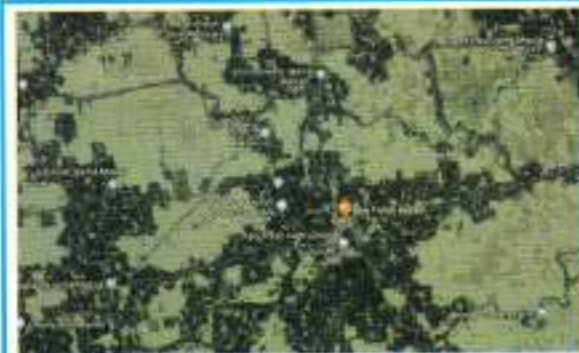


Figure-9: Abu Torab Bazar (Bazar Mor) Satellite Map



Figure-10: Abu Torab (11 No. Moghadiya Union Parishad Bhaban) Satellite Map

Water Quality Monitoring Location Map



Figure-11: Khaiyachara Canal (West Khaiyachara, 12 No. Khaiyachara Union)



Figure-12: Moliyai Canal (Moliyai Village)



Figure-13: Ichakhali canal (Ichakhali Union)



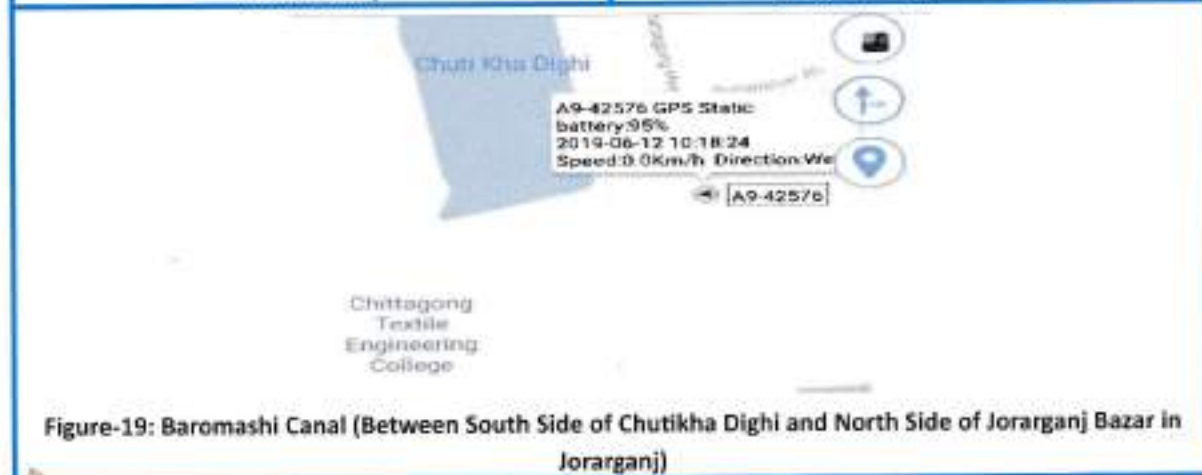
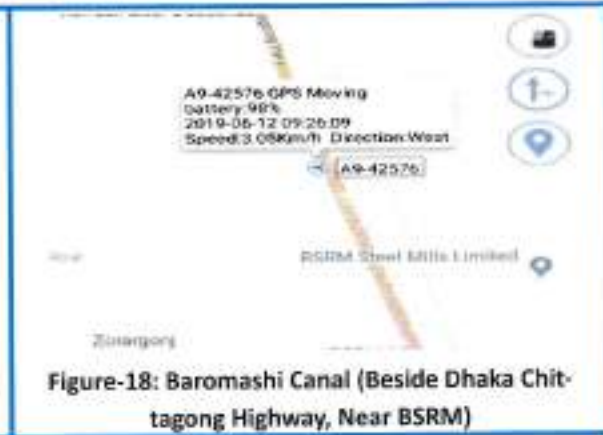
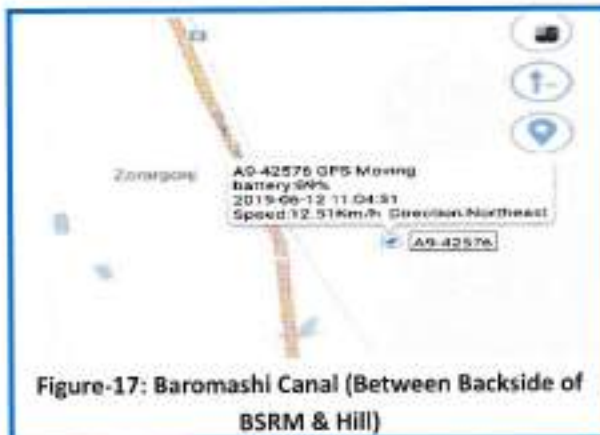
Figure-14: Mohamaya Lake (Near Rubber Dame)



Figure-15: Mohamaya Lake (Chowdhuryhat, Durgapur Union, Beside Durgapur Rahmania Eidgah Maydan)



Figure-16: Mohamaya Lake (Jholonpull, 6 No. Ichakhali Union, Beside Govt. Primary School)



Chapter 3: Applicable Standards

In Bangladesh all environmental standards are published by DoE (Department of Environment). Environmental Conservation Act which published in 1995 (ECA 95) had given the main framework for the Environmental Laws in Bangladesh. Later on in 1997 Environmental Conservation rule (ECR 97) was published which came up with applicable rules and regulations. Moreover different International standards also have a prominent influence on Bangladesh environmental rules regulations. Particularly IFC (World Bank) and OSHA standards have great influence in industrial and commercial sector. A summary of different standards are given below in tabular form.

3.1 Noise Level Standards

There are different noise level standard for different types of area set by different authorities. To have a glance and compare the data are presented in tabular form below:

Noise Standard	Industrial Area (dBA)	Commercial Area (dBA)	Residential Area (dBA)	Silent Zone (Includes area up to a radius of 100 m around educational institute, monuments, health center, hospital, archeological site and govt. designated area) (dBA)	Mixed Area (dBA)
DoE (ECR 97, Schedule-4)	Day: 75 Night: 70	Day: 70 Night: 60	Day: 50 Night: 50	Day: 45 Night: 35	Day: 60 Night: 50
Note: Day time is counted from 6am to 9pm and Night time is counted from 9pm to 6 am					
IFC (World Bank)	Day: 70 Night: 70	Day: 70 Night: 70	Day: 55 Night: 45	Day: 55 Night: 45 (For Educational Institution)	Day: 75 Night: 70
Note: Day time is counted from 7:00 to 22:00 and Night time is counted from 22:00 to 7:00. The standard is set for 1 hour average					
OSHA	Maximum permissible noise level is 90 dB for 8 hour exposure. Note: This standard is set for different time weighted average of exposure. No standard is set for different zone.				

3.2 Ambient Air Quality Standards

Agency	Particulate Matter Density	Comment
According to ECR 97 (amendment 2005), Schedule-2	SPM : 200 µg/m ³ (24 hour average) PM 2.5 : 65 µg/m ³ (8 hour average) PM 10 : 150 µg/m ³ (8 hour average)	In ECR 97 schedule 2 before amendment the standards were set for different zone. But in amendment of ECR 97 in 2005 the area categorization has been omitted. So now there is no zone wise standard for ambient air.
US EPA	PM 2.5 : 35 µg/m ³ (24 hour average) PM 10 : 150 µg/m ³ (24 hour average)	No area categorization has been set
WHO	PM 2.5 : 25 µg/m ³ (24 hour average) PM 10 : 50 µg/m ³ (24 hour average)	No area categorization has been set

3.3 Water Quality Standards

3.3.1 Inland Surface Water Standards:

Best Practice Based Classification	According to ECR 97 (Schedule-3)			
	Parameters			
	pH	BOD (mg/L)	DO (mg/L)	Total Coliform (Number/100)
a. Source of drinking water for supply only after disinfecting	6.5-8.5	2 or less	6 or above	50 or less
b. Water usable for recreational activity	6.5-8.5	3 or less	5 or more	200 or less
c. Source of drinking water supply after conventional treatment	6.5-8.5	6 or less	6 or more	5000 or less
d. Water usable by fisheries	6.5-8.5	6 or less	5 or more	-
e. Water usable by various process and cooling industries	6.5-8.5	10 or less	5 or more	5000 or less
f. Water usable for irrigation	6.5-8.5	10 or less	5 or more	1000 or less

3.3.2 Drinking Water Standards:

Parameters	Unit	BANGLADESH STANDARD FOR DRINKING WATER QUALITY (ECR 97)	WHO GUIDELINE FOR DRINKING WATER QUALITY
pH	-	6.5 – 8.5	6.5 – 8.5
Temperature	°C	20 - 30	-
Conductivity	µS/cm	-	≤ 250
TDS	mg/L	≤ 1000	≤ 1000
Arsenic	mg/L	≤ 0.05	≤ 0.01
Iron	mg/L	0.3- 1.0	≤ 0.3
Free Chlorine	mg/L	≤ 0.2	-
Total Chlorine	mg/L	-	≤ 5
Total Coliform	CFU/100 mL	0	0
DO	mg/L	≥ 6	-
BOD5	mg/L	≤ 0.2	-
COD	mg/L	≤ 4	-
Calcium	mg/L	≤ 75	≤ 75
Potassium	mg/L	≤ 12	-

Chapter 4: Results and Discussion

4.1 Noise Level and Air Quality Monitoring

Noise level and air quality monitoring has been done in 3 locations. Every location has been monitored in two shifts, Day and night. Sampling has been conducted from June 12, 2019 to June 14, 2019; at day time monitoring has been done from 8.00 am to 1.00 pm & 2.00 pm to 5.00 pm & at night it has been done from 8.00 pm to 11.00 pm.

4.1.1 Noise Monitoring (Representing Data in table & graph)

The Noise monitoring results of 03 locations are given below in table & as graphical presentation comparing with standard limit:

1.A. Location: Baroiyarhat Point-01 (Beside Foot Over Bridge)- Longitude: 91.53442 Latitude: 22.89445

Noise Monitoring Date: 12.06.2019

Table-3: Noise Level Monitoring Data at Baroiyarhat Point-01 (Beside Foot Over Bridge)

Sl. No.	Time	Noise (db)	Highest Noise (db)	Lowest Noise (db)
01	8.00 AM-9.00 AM	64.7	69.4	64.5
		69.4		
		67.5		
02	9.00 AM-10.00 AM	70.5	74.2	66.6
		66.6		
		74.2		
03	10.00 AM-11.00 AM	71.2	80.9	71.2
		80.9		
		76.9		
04	11.00 AM-12.00 PM	63.6	77.6	63.6
		67.4		
		77.6		
05	12.00 PM-1.00 PM	72.6	78.1	72.6
		78.1		
		74.2		
06	2.00 PM-3.00 PM	70.2	75.5	70.2
		75.5		
		74.9		
07	3.00 PM-4.00 PM	69.8	71.2	68.5
		71.2		
		68.5		
08	4.00 PM-5.00 PM	70.2	70.2	67.1
		67.1		
		69.9		
Average: 74.4 (Day)				
09	8.00 PM-9.00 PM	75.5	76.9	74.6
		76.9		
		74.6		
10	9.00 PM-10.00 PM	72.6	75.6	72.6
		73.8		
		75.6		
11	10.00 PM-11.00 PM	71.8	78.8	71.8
		72.6		
		78.8		
Average: 74.7 (Night)				

Graphical Representation:

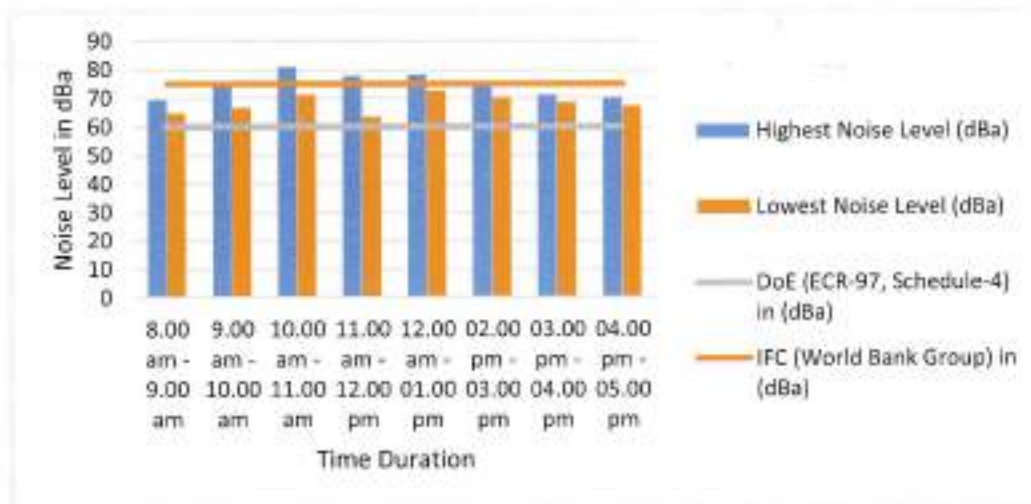


Figure-20: Day Time Noise Level Data Comparison with Standard Limit at Baroiyarhat Point-01 (Beside Foot Over Bridge)

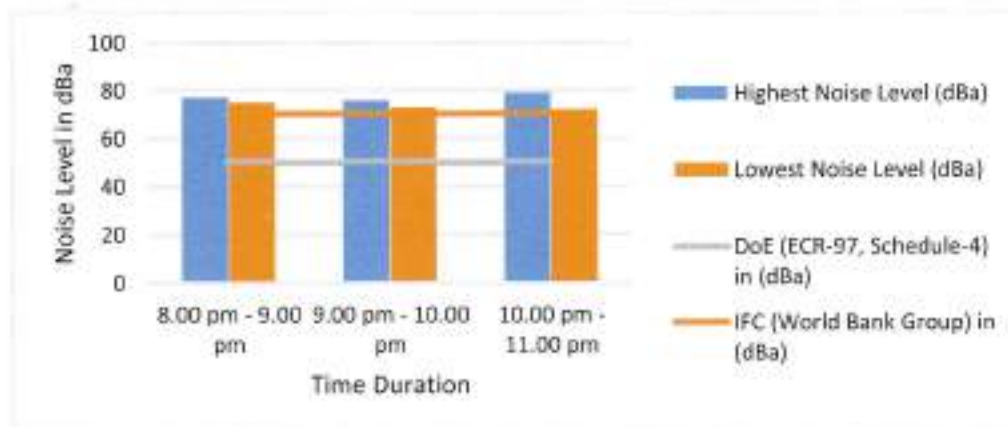


Figure-21: Night Time Noise Level Data Comparison with Standard Limit at Baroiyarhat Point-01 (Beside Foot Over Bridge)

The noise level quality at Baraiyarhat Pouroshova (Point-02, Baraiyarhat Pouroshova Office) has been analyzed. It has been observed that the average noise level for day time is within the maximum permissible limit & for night time it has exceeded the permissible limit (i.e. 60 db for day, 50 db for night specified by ECR [Environment Conservation Rules]-97). The data shows that average noise level are around 55.2 db (Day) & 53.9 db (Night) which are respectively 4.8 db (8.0%) lower & 3.9 db (7.8%) higher than the standard limit specified for day and night time by ECR-97. The high Noise level might result from vehicle movement & nearby local market. Among all of the monitoring data, noise level from 3.00 PM to 4.00 PM at this location has been found to be the highest i.e. 59.2 db. But this value is within the maximum permissible limit for day time (0.8 db i.e. 1.3% lower than the standard limit of ECR-97).

1.B. Location: Baroiyarhat Point-02 (In front of Municipal Office)- Longitude: 91.53270 Latitude: 22.89321
 Noise Monitoring Date: 12.06.2019

Table-4: Noise Level Monitoring Data at Baroiyarhat Point-02 (In front of Municipal Office)

Sl. No.	Time	Noise (db)	Highest Noise (db)	Lowest Noise (db)
01	8.00 AM-9.00 AM	50.4	51.2	49.9
		51.2		
		49.9		
02	9.00 AM-10.00 AM	55.7	57.0	54.9
		54.9		
		57.0		
03	10.00 AM-11.00 AM	57.3	58.2	56.4
		56.4		
		58.2		
04	11.00 AM-12.00 PM	57.1	58.3	54.4
		58.3		
		54.4		
05	12.00 PM-1.00 PM	58.2	58.2	55.1
		56.6		
		55.1		
06	2.00 PM-3.00 PM	52.2	52.6	51.5
		52.6		
		51.5		
07	3.00 PM-4.00 PM	58.4	59.2	52.9
		59.2		
		52.9		
08	4.00 PM-5.00 PM	53.8	58.1	53.6
		56.2		
		58.1		
Average: 73.0 (day)				
09	8.00 PM-9.00 PM	53.2	56.4	53.2
		54.1		
		56.4		
10	9.00 PM-10.00 PM	57.2	57.2	53.9
		53.9		
		54.2		
11	10.00 PM-11.00 PM	55.8	55.8	49.1
		49.1		
		51.5		
Average: 77.1 (Night)				

Graphical Representation:

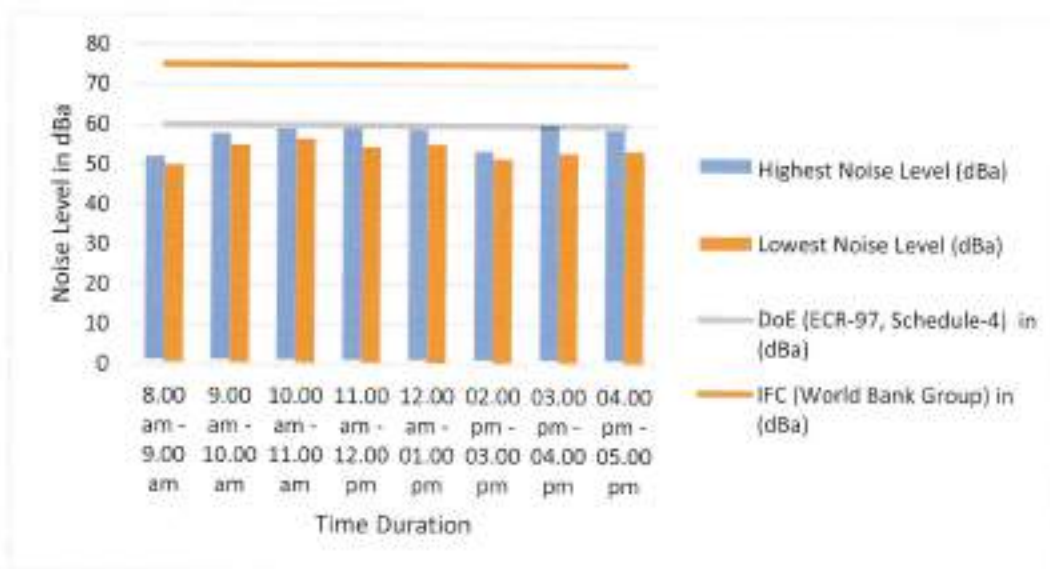


Figure-22: Day Time Noise Level Data Comparison with Standard Limit at Baroiyarhat Point-02 (In front of Municipal Office)

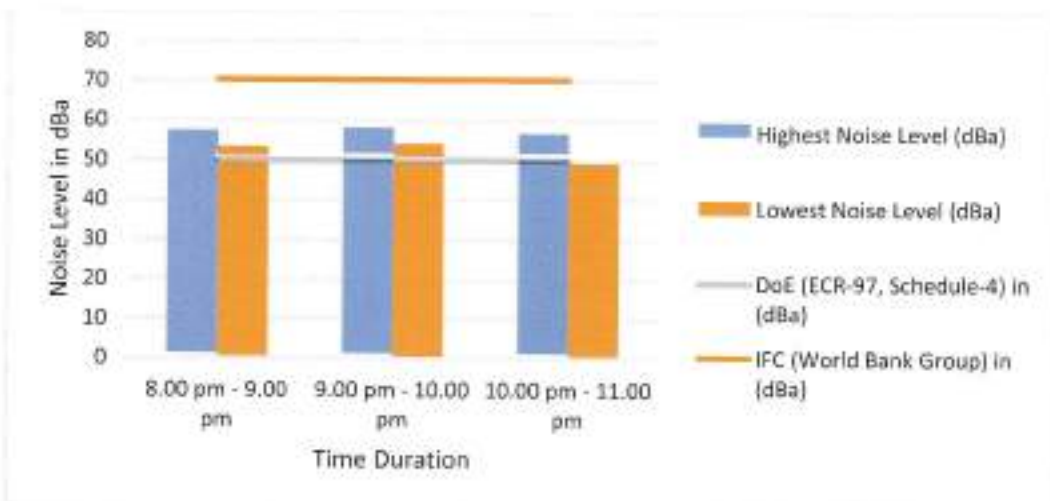


Figure-23: Night Time Noise Level Data Comparison with Standard Limit at Baroiyarhat Point-02 (In front of Municipal Office)

The noise level quality at Baraiyarhat Pouroshova (Point-02, Baraiyarhat Pouroshova Office) has been analyzed. It has been observed that the average noise level for day time is within the maximum permissible limit & for night time it has exceeded the permissible limit (i.e. 60 db for day, 50 db for night specified by ECR [Environment Conservation Rules]-97). The data shows that average noise level are around 55.2 db (Day) & 53.9 db (Night) which are respectively 4.8 db (8.0%) lower & 3.9 db (7.8%) higher than the standard limit specified for day and night time by ECR-97. The high Noise level might result from vehicle movement & nearby local market. Among all of the monitoring data, noise level from 3.00 PM to 4.00 PM at this location has been found to be the highest i.e. 59.2 db. But this value is within the maximum permissible limit for day time (0.8 db i.e. 1.3% lower than the standard limit of ECR-97).

2.A. Location: Mirsharai_Point-01 (Beside Foot Over Bridge)- Longitude: 91.57079 Latitude: 22.77720
 Noise Monitoring Date: 13.06.2019

Table-5: Noise Level Monitoring Data at Mirsharai_Point-01 (Beside Foot Over Bridge)

Sl. No.	Time	Noise (db)	Highest Noise (db)	Lowest Noise (db)
01	8.00 AM-9.00 AM	73.3	77.6	73.3
		76.4		
		77.6		
02	9.00 AM-10.00 AM	70.8	80.2	70.8
		80.9		
		79.8		
03	10.00 AM-11.00 AM	76.6	78.2	70.7
		78.2		
		70.7		
04	11.00 AM-12.00 PM	73.2	73.2	67.9
		68.8		
		67.9		
05	12.00 PM-1.00 PM	62.4	72.2	62.4
		66.5		
		72.2		
06	2.00 PM-3.00 PM	73.2	73.2	70.6
		70.6		
		72.2		
07	3.00 PM-4.00 PM	69.4	74.1	69.4
		73.9		
		74.1		
08	4.00 PM-5.00 PM	76.5	76.5	72.2
		72.2		
		75.9		
Average: 73.0 (day)				
09	8.00 PM-9.00 PM	77.9	79.7	77.9
		79.7		
		78.5		
10	9.00 PM-10.00 PM	80.2	80.2	73.1
		76.6		
		73.1		
11	10.00 PM-11.00 PM	76.2	80.4	70.9
		80.4		
		70.9		
Average: 77.1 (Night)				

Graphical Representation:

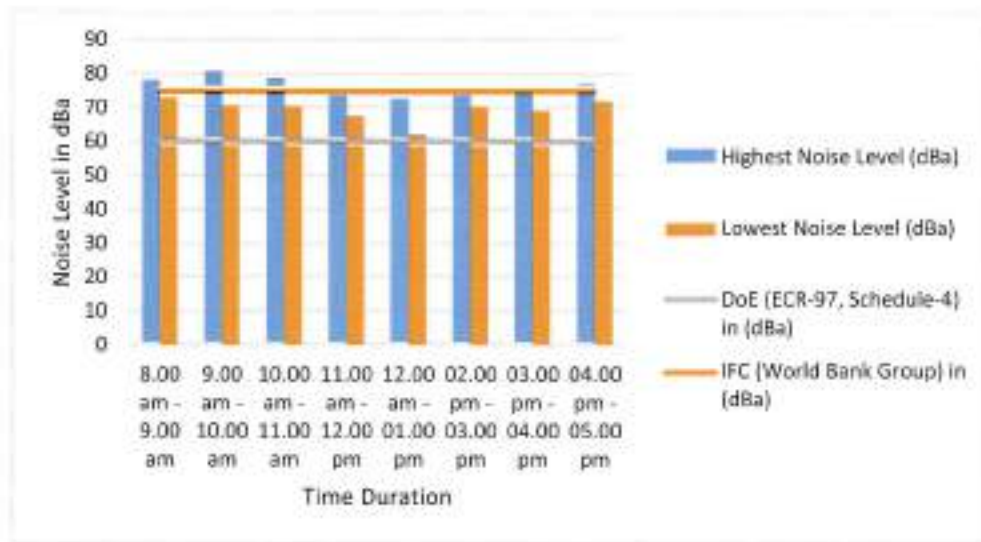


Figure-24: Day Time Noise Level Data Comparison with Standard Limit at Mirsharai_Point-01 (Beside Foot Over Bridge)

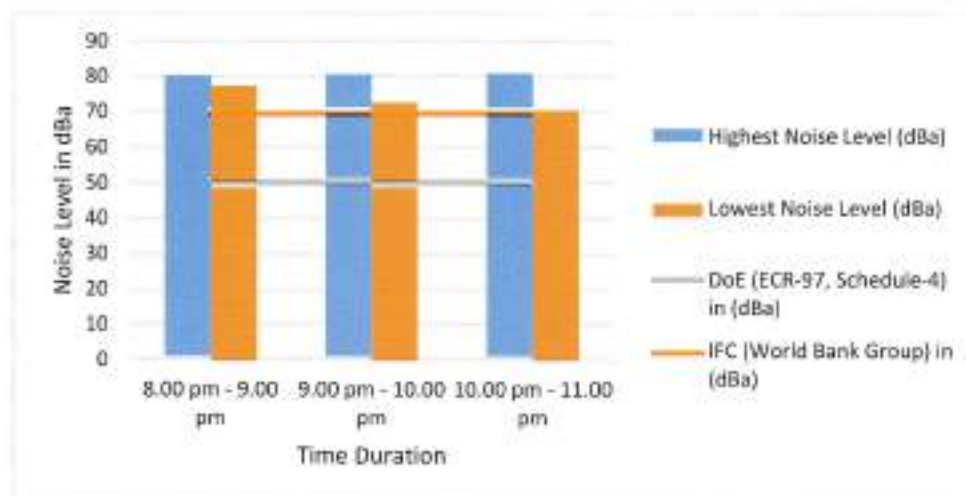


Figure-25: Night Time Noise Level Data Comparison with Standard Limit at Mirsharai_Point-01 (Beside Foot Over Bridge)

The noise level quality at Mirsharai Pouroshova (Point-01, Foot Over Bridge) has been analyzed. It has been observed that the average noise level for day & night time has exceeded the permissible limit (i.e. 60 db for day, 50 db for night specified by ECR [Environment Conservation Rules]-97). The data shows that average noise level are around 73.0 db (Day) & 77.1 db (Night) which are respectively 13.0 db (21.7%) & 27.1 db (54.2%) higher than the standard limit specified for day and night time by ECR-97. The high Noise level might result from vehicle movement & nearby local market. Among all of the monitoring data, noise level from 10.00 PM to 11.00 PM at this location has been found to be the highest i.e. 80.4 db which is 20.4 db (34.0%) higher than the standard limit of ECR-97 due to huge vehicular movement and their continuous horns at that time.

2.B. Location: Mirsharai_Point-02 (In front of Municipal Office)- Longitude: 91.56985 Latitude: 22.77711
 Noise Monitoring Date: 13.06.2019

Table-6: Noise Level Monitoring Data at Mirsharai_Point-02 (In front of Municipal Office)

Sl. No.	Time	Noise (db)	Highest Noise (db)	Lowest Noise (db)
01	8.00 AM-9.00 AM	52.2	52.8	50.4
		50.4		
		52.8		
02	9.00 AM-10.00 AM	54.3	54.3	53.0
		53.9		
		53.0		
03	10.00 AM-11.00 AM	59.8	59.8	54.7
		58.6		
		54.7		
04	11.00 AM-12.00 PM	51.2	53.6	51.2
		53.6		
		51.9		
05	12.00 PM-1.00 PM	56.8	66.7	56.8
		60.2		
		66.7		
06	2.00 PM-3.00 PM	52.6	53.4	51.9
		51.9		
		53.4		
07	3.00 PM-4.00 PM	62.5	65.2	62.5
		65.2		
		63.9		
08	4.00 PM-5.00 PM	59.2	59.2	57.2
		58.8		
		57.2		
Average: 56.4 (Day)				
09	8.00 PM-9.00 PM	48.8	50.8	47.6
		47.6		
		50.8		
10	9.00 PM-10.00 PM	49.9	51.7	48.8
		51.7		
		48.8		
11	10.00 PM-11.00 PM	49.2	54.9	49.2
		53.6		
		54.9		
Average: 50.6 (Night)				

Graphical Representation:

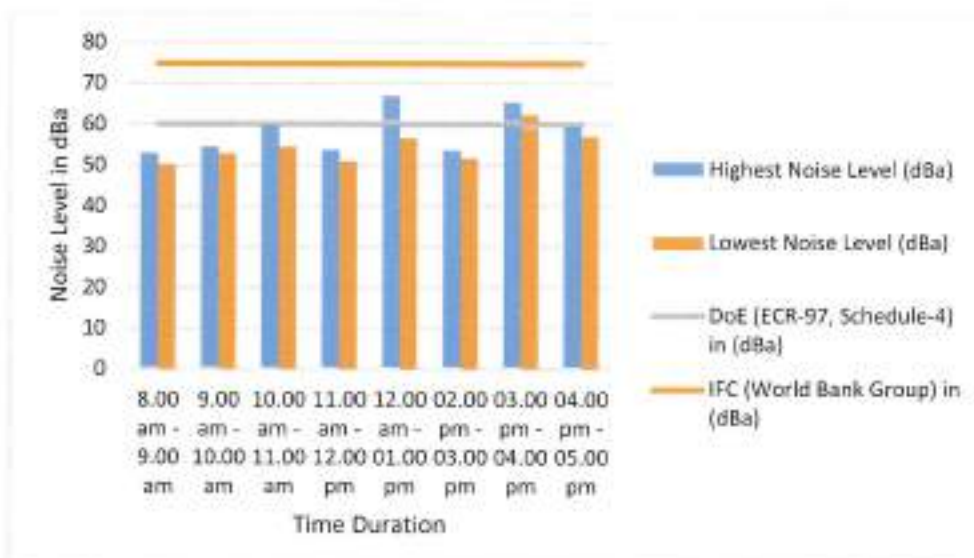


Figure-26: Day Time Noise Level Data Comparison with Standard Limit at Mirsharai_Point-02 (In front of Municipal Office)

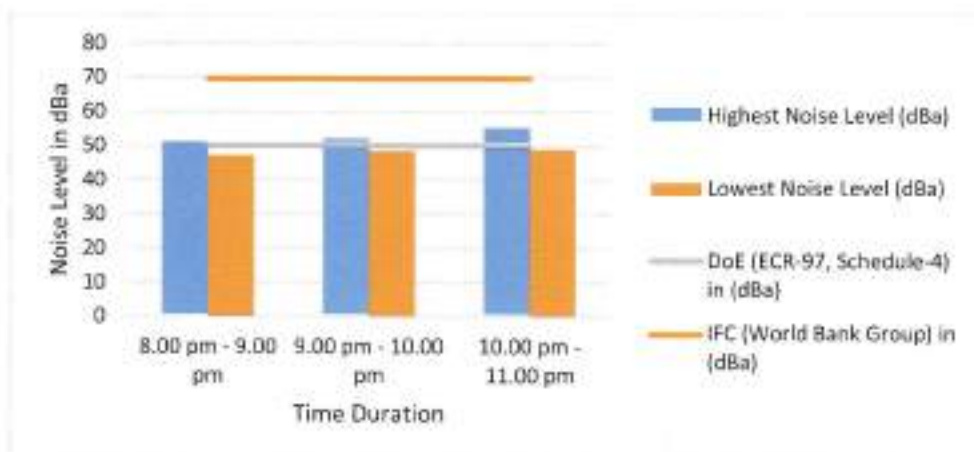


Figure-27: Night Time Noise Level Data Comparison with Standard Limit at Mirsharai_Point-02 (In front of Municipal Office)

The noise level quality at Mirsharai Pouroshova (Point-02, Mirsharai Pouroshova Office) has been analyzed. It has been observed that the average noise level for day time is within the maximum permissible limit & for night time it has exceeded the permissible limit (i.e. 60 db for day, 50 db for night specified by ECR [Environment Conservation Rules]-97). The data shows that average noise level are around 56.4 db (Day) & 50.6 db (Night) which are respectively 3.6 db (6.0%) lower & 0.6 db (1.2%) higher than the standard limit specified for day and night time by ECR-97. The high Noise level might result from nearby CNG Stand, vehicle movement & nearby local market. Among all of the monitoring data, noise level from 12.00 PM to 1.00 PM at this location has been found to be the highest i.e. 66.7 db which is 6.7 db (11.2%) higher than the standard limit of ECR-97 due to huge vehicular movement at that time.

3.A. Location: Abu Torab Bazar_Point-01 (Bazar Mor)- Longitude: 91.55727 Latitude: 22.74806
 Noise Monitoring Date: 13.06.2019

Table-7: Noise Level Monitoring Data at Abu Torab Bazar_Point-01 (Bazar Mor)

Sl. No.	Time	Noise (db)	Highest Noise (db)	Lowest Noise (db)
01	8.00 AM-9.00 AM	58.9	62.0	58.9
		60.1		
		62.0		
02	9.00 AM-10.00 AM	60.2	63.5	60.2
		61.3		
		63.5		
03	10.00 AM-11.00 AM	61.7	61.7	60.7
		60.9		
		60.7		
04	11.00 AM-12.00 PM	72.7	80.1	72.7
		80.1		
		74.6		
05	12.00 PM-1.00 PM	64.5	72.2	64.5
		72.2		
		69.9		
06	2.00 PM-3.00 PM	64.4	68.1	63.5
		63.5		
		68.1		
07	3.00 PM-4.00 PM	62.9	67.9	61.5
		61.5		
		67.9		
08	4.00 PM-5.00 PM	72.2	72.2	65.8
		67.4		
		65.8		
Average: 65.7 (Day)				
09	8.00 PM-9.00 PM	68.7	68.7	61.9
		65.6		
		61.9		
10	9.00 PM-10.00 PM	61.2	62.8	61.2
		62.6		
		62.8		
11	10.00 PM-11.00 PM	58.4	62.5	58.4
		61.2		
		62.5		
Average: 62.8 (Night)				

Graphical Representation:

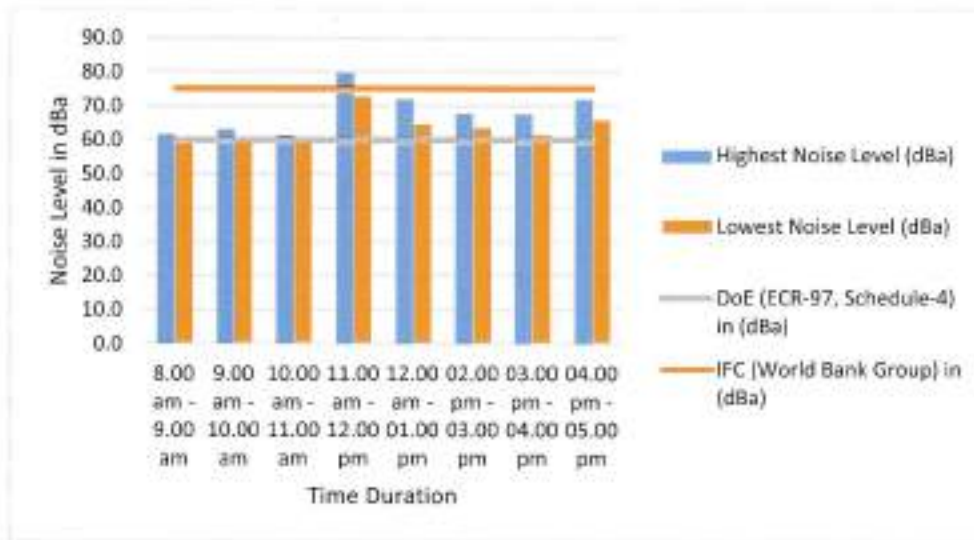


Figure-28: Day Time Noise Level Data Comparison with Standard Limit at Abu Torab Bazar_Point-01 (Bazar Mor)

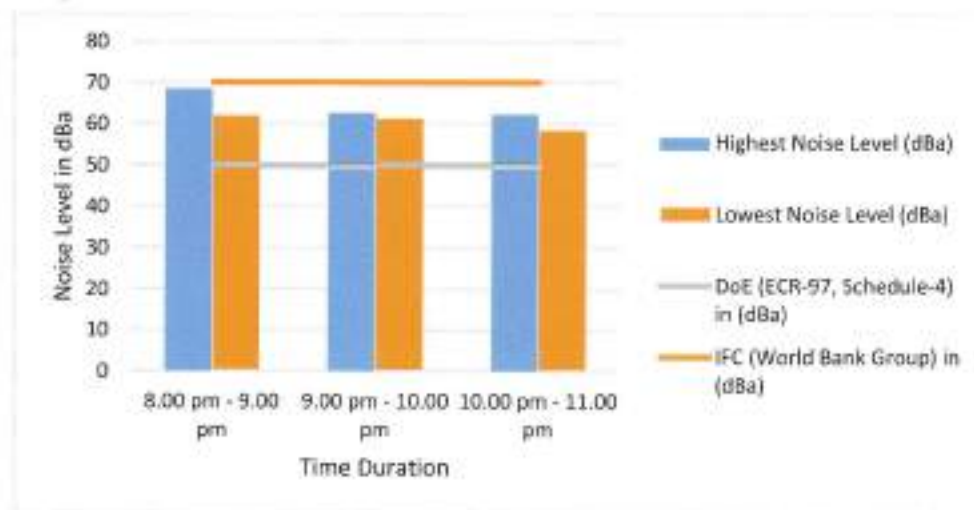


Figure-29: Night Time Noise Level Data Comparison with Standard Limit at Abu Torab Bazar_Point-01 (Bazar Mor)

The noise level quality at Abu Torab Bazar (Point-01) has been recorded. It has been observed that the average noise level for day & night time has crossed the permissible limit (i.e. 60 db for day, 50 db for night specified by ECR [Environment Conservation Rules]-97). The data shows that average noise level are around 65.7 db (Day) & 62.8 db (Night) which are respectively 5.7 db (9.5%) & 12.8 db (25.6%) higher than the standard limit specified for day and night time by ECR-97. The high Noise level might result from vehicle movement & nearby local market. Among all of the monitoring data, noise level from 11.00 AM to 12.00 PM at this location has been found to be the highest i.e. 80.1 db which is 20.1 db (33.5%) higher than the standard limit of ECR-97 due to huge vehicular movement at that time.

3.B. Location: Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban)-
 Longitude:91.55535 Latitude: 22.74888

Noise Monitoring Date: 13.06.2019

Table-8: Noise Level Monitoring Data at Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban)

Sl. No.	Time	Noise (db)	Highest Noise (db)	Lowest Noise (db)
01	8.00 AM-9.00 AM	58.9	61.2	58.9
		59.8		
		61.2		
02	9.00 AM-10.00 AM	64.1	64.1	59.8
		62.2		
		59.8		
03	10.00 AM-11.00 AM	65.9	73.2	65.9
		73.2		
		68.9		
04	11.00 AM-12.00 PM	62.2	71.1	59.5
		71.1		
		59.5		
05	12.00 PM-1.00 PM	59.9	64.7	58.2
		58.2		
		64.7		
06	2.00 PM-3.00 PM	56.7	59.4	56.7
		59.4		
		56.9		
07	3.00 PM-4.00 PM	73.2	73.2	66.3
		66.3		
		69.8		
08	4.00 PM-5.00 PM	59.7	61.0	56.6
		56.6		
		61.0		
Average: 62.9 (Day)				
09	8.00 PM-9.00 PM	56.4	59.3	56.4
		58.2		
		59.3		
10	9.00 PM-10.00 PM	52.3	58.1	52.3
		58.1		
		56.5		
11	10.00 PM-11.00 PM	58.4	58.7	55.2
		55.2		
		58.7		
Average: 57.0 (Night)				

Graphical Representation:

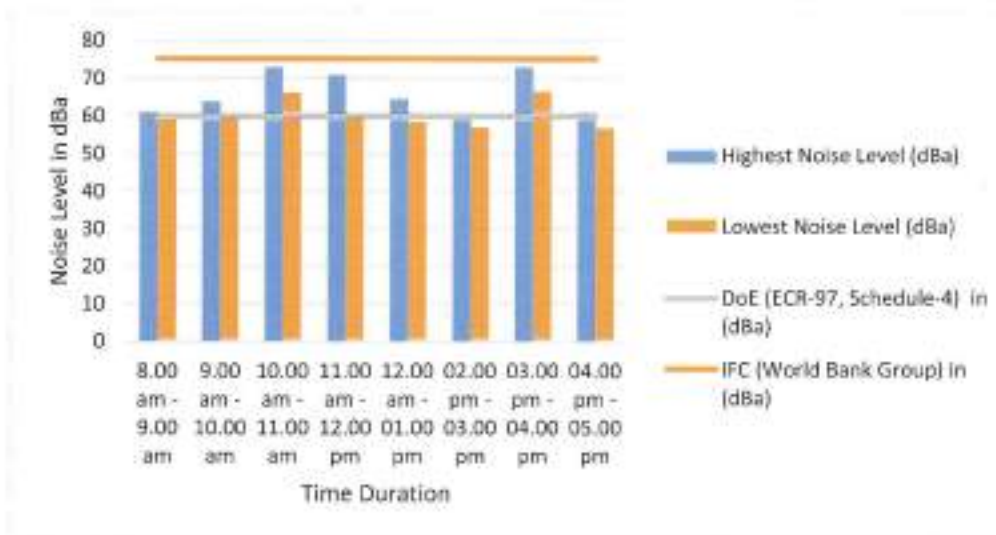


Figure-30: Day Time Noise Level Data Comparison with Standard Limit at Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban)

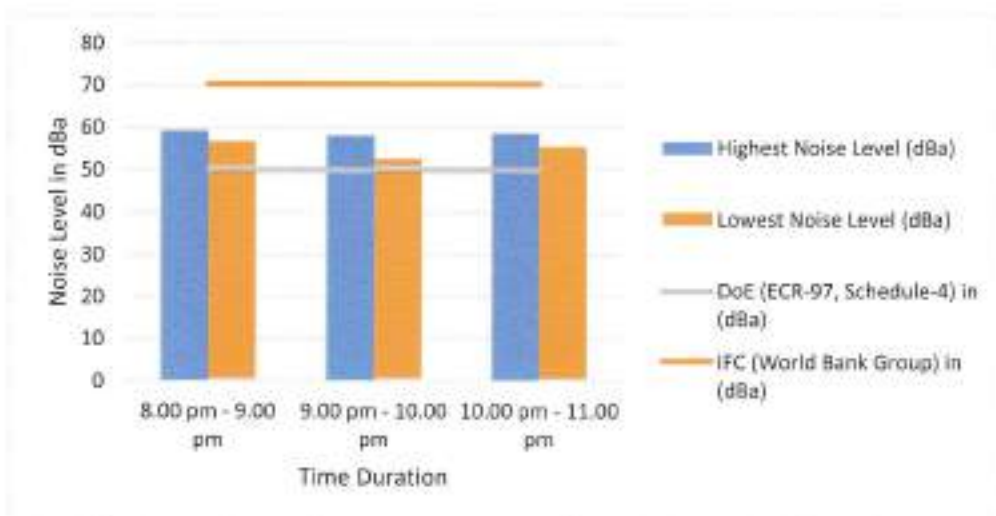


Figure-31: Night Time Noise Level Data Comparison with Standard Limit at Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban)

The noise level quality at Abu Torab Bazar (Point-02, Moghadia Union Parishad) has been analyzed. It has been observed that the average noise level at day & night time has exceeded the permissible limit (i.e. 60 db for day, 50 db for night specified by ECR [Environment Conservation Rules]-97). The data shows that average noise level are around 62.9 db (Day) & 57.0 db (Night) which are respectively 2.9 db (4.8%) & 7.0 db (14.0%) higher than the standard limit specified for day and night time by ECR-97. The high Noise level might result from vehicle movement & nearby local market. Among all of the monitoring data, noise level from 10.00 AM to 11.00 AM and from 3.00 PM to 4.00 PM at this location has been found to be the highest i.e.73.2 db which is 13.2 db [22.0%] higher than the standard limit of ECR-97 due to huge vehicular movement at that time.

Average Noise Level Data of All Location:

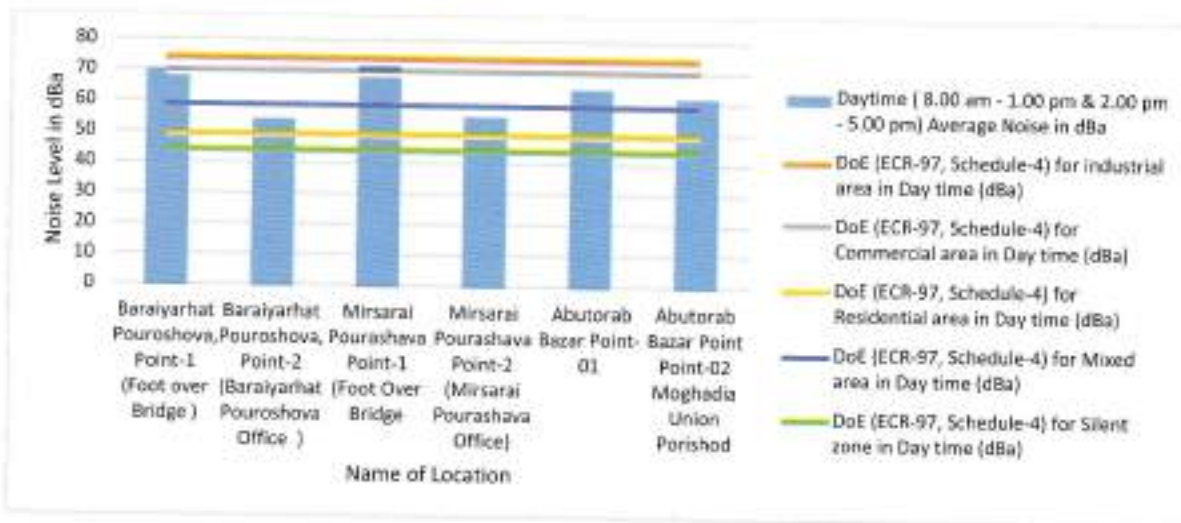


Figure-32: Average Day Time Noise Level Data Comparison with Standard Limit at All Location

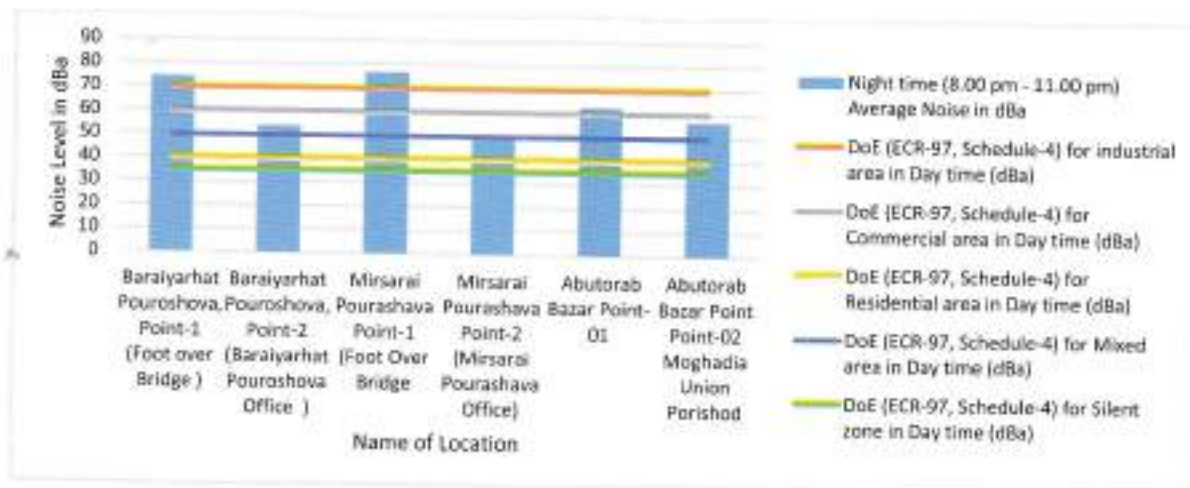


Figure-33: Average Night Time Noise Level Data Comparison with Standard Limit at All Location

Result Analysis of Noise Level Monitoring: All the monitoring locations are situated at mixed area. From the analysis it has been observed that the average noise level at all locations both at day and night time has exceeded the permissible limit specified by ECR (Environment Conservation Rules)-97 except for day time the noise level is within the maximum permissible limit at Baraiyarhat Pouroshova (Point-02, Baraiyarhat Pouroshova Office) & Mirsarai Pouroshova (Point-02, Mirsarai Pouroshova Office). All the deviation percentages from standard limit have been mentioned in the above sections separately for each location.

4.1.2 Air Monitoring as Dust particle (Representing Data in data table & graph)

The air quality of the selected locations of Mirsharai has been monitored by using a particle counter. Air has been monitored in terms of dust particle TSP (total suspended particulate) and particulate matter (PM). The Particulate Matter (PM) of different sizes such as **PM 0.5, PM 2.5, PM 5, PM 10 & TSP** has been assessed by particle counter. The particle counter utilizes the laser technology for single particle detection. The scattering of light from the particles in the sampling air stream is converted into electrical pulses, which is then measured and calculated as a particle size. Monitoring has been conducted for 1 hour interval. In every hour, 3 data for every parameter has been taken. Each location has monitored separately, 8 hour in Day time (8.00 am to 1.00 pm & 2.00 pm to 5.00 pm) and 3 hour in night time (8.00pm to 11.00pm). The unit used for dust particle is $\mu\text{g}/\text{m}^3$ (or PPM). The Air monitoring results of 03 locations are given below in data table and as graphical presentation.

1.A. Baroiyarhat Point-01 (Beside Foot Over Bridge)- Longitude: 91.53442 Latitude: 22.89445, Air Monitoring Date: 12.06.2019

Table-9: Air Quality Monitoring Data at Baroiyarhat Point-01 (Beside Foot Over Bridge)

	Time	Particulate Matter ($\mu\text{g}/\text{m}^3$)					
		PM 0.5	PM 2.5	PM 5	PM 10	TSP	
Day Time	8.00AM-9.00AM	10	37	39	45	64	
		9	35	38	44	63	
		8	36	37	45	64	
	9.00AM-10.00AM	7	38	42	46	66	
		8	36	40	44	63	
		10	35	39	43	61	
	10.00AM-11.00AM	10	51	55	62	89	
		11	52	56	61	87	
		11	54	68	61	87	
	11.00AM-12.00PM	12	54	58	63	90	
		13	55	59	67	96	
		14	53	61	68	97	
	12.00 PM-1.00PM	11	42	46	51	73	
		13	43	49	53	76	
		14	47	51	56	80	
	2.00 PM-3.00PM	10	51	54	56	80	
		13	48	52	57	81	
		15	43	47	51	73	
3.00 PM-4.00PM	12	42	48	52	74		
	10	52	56	60	86		
	15	57	61	65	93		
4.00 PM-5.00PM	12	52	56	62	89		
	10	55	59	63	90		
	11	58	62	66	94		
	Average	11	47	51	56	80	
Night Time	8.00 PM-9.00PM	12	45	49	53	76	
		14	43	47	51	73	
		15	47	50	54	77	
	9.00 PM-10.00PM	13	42	46	50	71	
		14	50	56	60	86	
		17	45	50	54	77	
	10.00 PM-11.00 PM	15	47	51	55	79	
		10	39	44	49	70	
		11	35	39	44	63	
		Average	13	44	48	52	75

Graphical Representation:

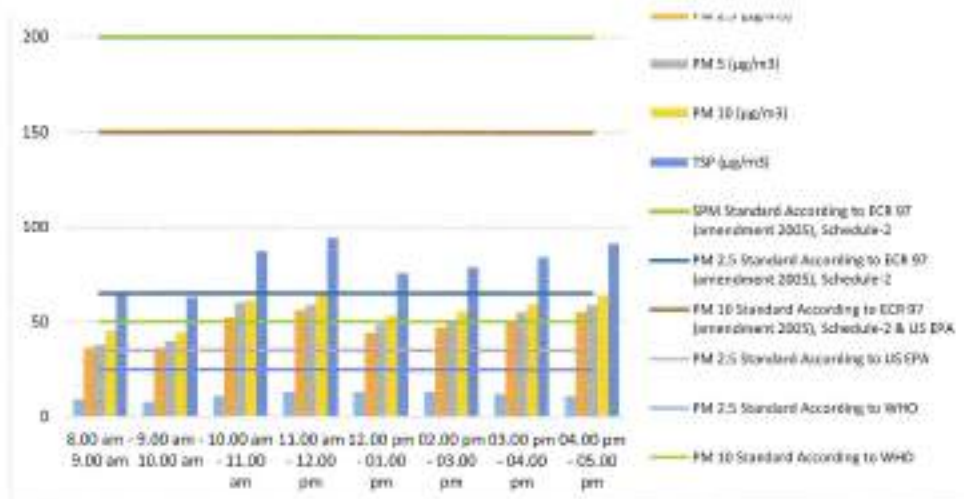


Figure-34: Day Time Air Quality Data Comparison with Standard Limit of ECR 97 at Baroiyarhat Point-01 (Beside Foot Over Bridge)

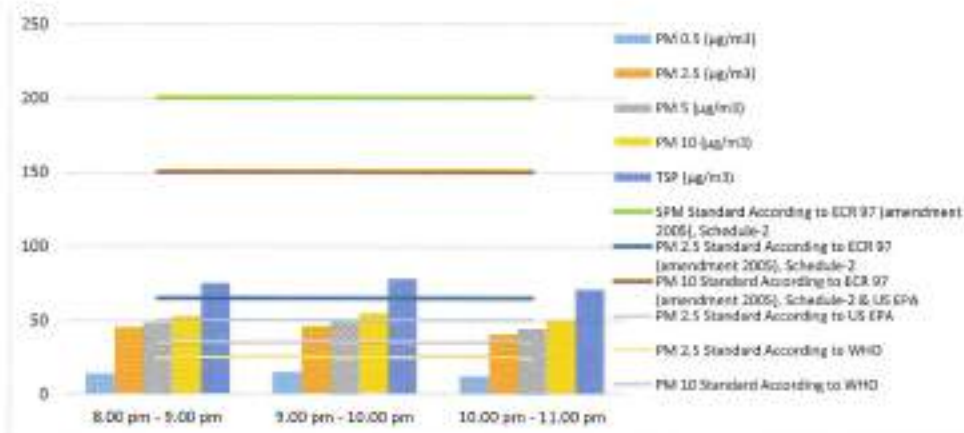


Figure-35: Night Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Baroiyarhat Point-01 (Beside Foot Over Bridge)

Air quality at Baroiyarhat Point-01 (Beside Foot Over Bridge) has been analyzed for the concentration of Particulate Matter of different sizes such as PM 0.5, PM 2.5, PM 5, PM 10 and TSP. It has been observed that the concentration of Particulate Matter at this point is within the optimum limit (i.e. 65 µg/m³ for PM_{2.5}, 150 µg/m³ for PM₁₀ & 200 µg/m³ for TSP specified by ECR [Environment Conservation Rules]-97). For day time, the average values of PM_{2.5}, PM₁₀ and TSP have been found to be 47 µg/m³, 56 µg/m³, 80 µg/m³ respectively which are 18 µg/m³ (27.7%), 94 µg/m³ (62.7%) and 120 µg/m³ (60.0%) lower than the standard limit of ECR-97. For night time, the average values of PM_{2.5}, PM₁₀ and TSP have been found to be 44 µg/m³, 52 µg/m³, 75 µg/m³ respectively which are 21 µg/m³ (32.3%), 98 µg/m³ (65.3%) and 125 µg/m³ (62.5%) lower than the standard limit of ECR-97.

1.B. Baroiyarhat Point-02 (In front of Municipal Office)- Longitude: 91.53270 Latitude: 22.89321
 Air Monitoring Date: 12.06.2019

Table-10: Air Quality Monitoring Data at Baroiyarhat Point-02 (In front of Municipal Office)

	Time	Particulate Matter ($\mu\text{g}/\text{m}^3$)				
		PM 0.5	PM 2.5	PM 5	PM 10	TSP
Day Time	8.00AM-9.00AM	8	24	29	32	46
		6	25	31	36	51
		6	25	32	39	56
	9.00AM-10.00AM	7	27	34	41	59
		6	27	35	43	61
		5	29	36	42	60
	10.00AM-11.00AM	7	27	31	34	49
		7	28	32	39	56
		6	27	31	48	69
	11.00AM-12.00PM	9	26	30	35	50
		7	29	34	37	53
		8	27	31	36	51
	12.00 PM-1.00PM	9	26	30	34	49
		7	25	29	33	47
		8	29	33	37	53
	2.00 PM-3.00PM	11	33	37	41	59
		13	31	35	40	57
		15	29	36	41	59
	3.00 PM-4.00PM	12	28	32	36	51
		11	24	30	24	34
17		42	46	40	57	
4.00 PM-5.00PM	15	41	45	49	70	
	11	35	40	44	63	
	12	30	35	39	58	
Average	9	29	34	38	55	
Night Time	8.00 PM-9.00PM	11	32	36	60	86
		13	27	32	54	77
	9.00 PM-10.00PM	12	24	30	57	81
		15	31	35	58	83
		10	35	39	65	93
	10.00 PM-11.00 PM	11	31	36	56	80
		9	29	33	43	61
		13	35	39	47	67
	Average	8	32	36	40	57
	Average	11	31	35	53	76

Graphical Representation:

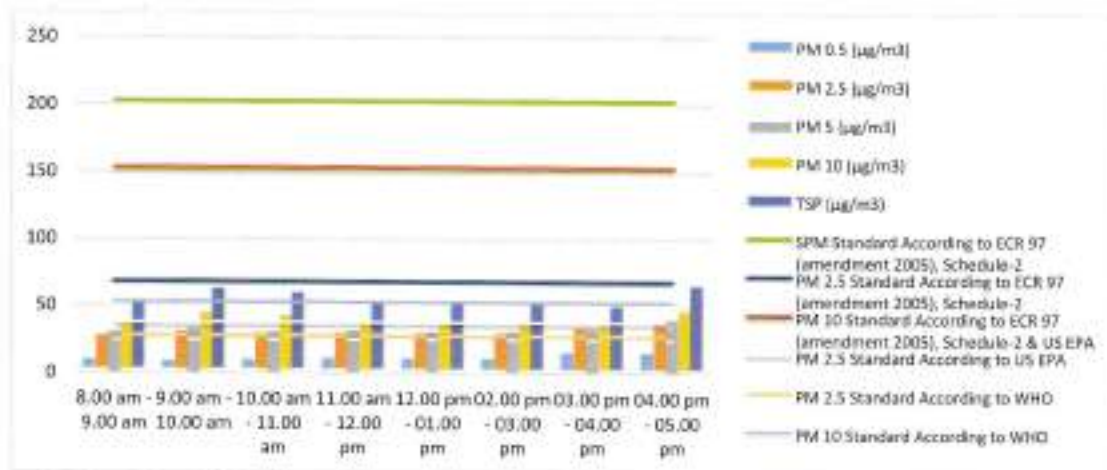


Figure-36: Day Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Baroiyarhat Point-02 (In front of Municipal Office)

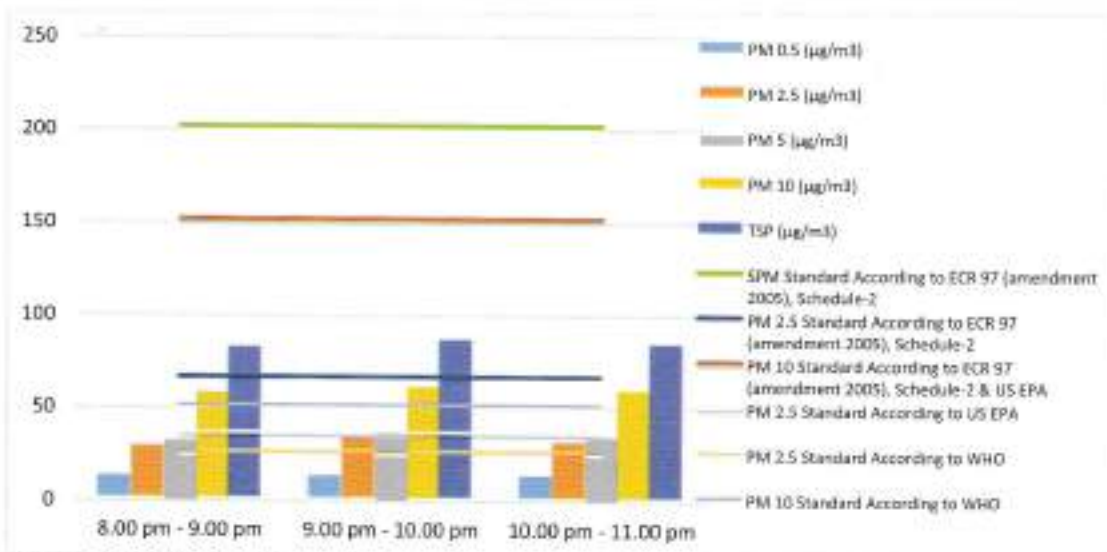


Figure-37: Night Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Baroiyarhat Point-02 (In front of Municipal Office)

Air quality at Baroiyarhat Point-02 (In front of Municipal Office) has been analyzed for the concentration of Particulate Matter of different sizes such as PM 0.5, PM 2.5, PM 5, PM 10 and TSP. It has been observed that the concentration of Particulate Matter at this point is within the optimum limit (i.e. 65 µg/m³ for PM2.5, 150 µg/m³ for PM10 & 200 µg/m³ for TSP specified by ECR [Environment Conservation Rules]-97). For day time, the average values of PM2.5, PM10 and TSP have been found to be 29 µg/m³, 38 µg/m³, 55 µg/m³ respectively which are 36 µg/m³ (55.4%), 112 µg/m³ (74.7%) and 145 µg/m³ (72.5%) lower than the standard limit of ECR-97. For night time, the average values of PM2.5, PM10 and TSP have been found to be 31 µg/m³, 53 µg/m³, 76 µg/m³ respectively which are 34 µg/m³ (52.3%), 97 µg/m³ (64.7%) and 124 µg/m³ (62.0%) lower than the standard limit of ECR-97.

2.A. Mirsharai_Point-01 (Beside Foot Over Bridge)- Longitude: 91.57079 Latitude: 22.77720

Air Monitoring Date: 13.06.2019

Table-11: Air Quality Monitoring Data at Mirsharai_Point-01 (Beside Foot Over Bridge)

	Time	Particulate Matter ($\mu\text{g}/\text{m}^3$)				
		PM 0.5	PM 2.5	PM 5	PM 10	TSP
Day Time	8.00AM-9.00AM	7	31	35	38	54
		10	40	45	50	71
		11	46	47	46	66
	9.00AM-10.00AM	10	47	51	56	80
		8	35	39	43	61
		9	70	72	73	104
	10.00AM 11.00AM	7	30	32	34	49
		8	29	35	38	54
		7	26	27	28	40
	11.00AM 12.00PM	13	42	42	44	63
		12	38	40	41	59
		11	37	41	44	63
	12.00 PM-1.00PM	10	41	44	58	83
		11	42	49	58	83
		11	42	46	65	93
	2.00 PM-3.00PM	9	34	38	42	60
		8	32	36	40	57
		7	34	37	43	61
	3.00 PM-4.00PM	7	31	35	39	56
		8	33	39	45	64
6		43	48	53	76	
4.00 PM-5.00PM	13	47	51	55	79	
	12	45	49	54	77	
	15	31	36	40	57	
Average	10	39	42	47	67	
		Particulate Matter ($\mu\text{g}/\text{m}^3$)				
Night Time	Time	PM 0.5	PM 2.5	PM 5	PM 10	TSP
	8.00 PM-9.00PM	23	69	73	75	107
		17	60	64	68	97
		17	57	61	63	90
	9.00 PM-10.00PM	16	55	59	65	93
		15	54	58	64	91
		16	43	47	67	96
	10.00 PM-11.00 PM	13	47	53	53	76
		12	32	40	52	74
		11	38	39	45	64
	Average	16	51	55	61	88

Graphical representation:

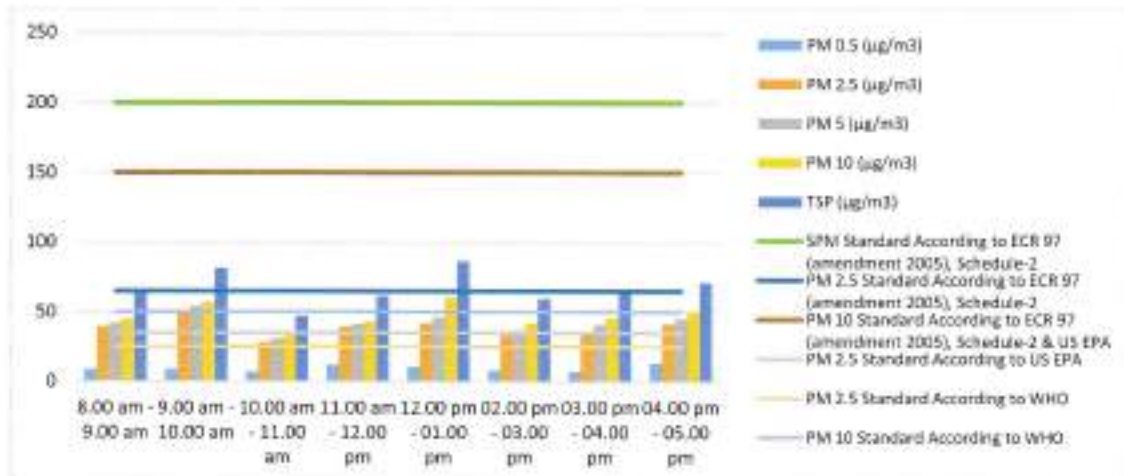


Figure-38: Day Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Mirsharai_Point-01 (Beside Foot Over Bridge)

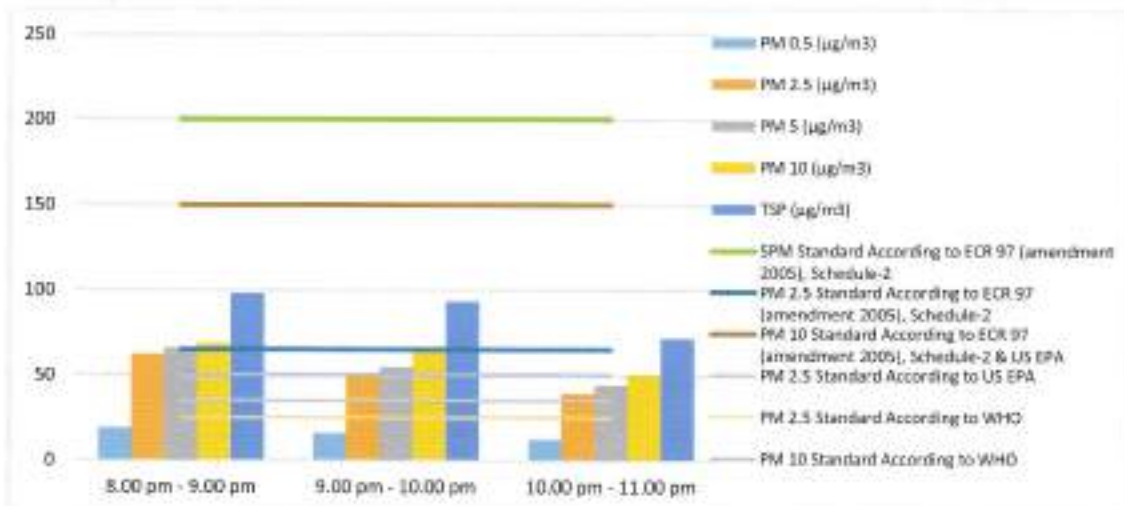


Figure-39: Night Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Mirsharai_Point-01 (Beside Foot Over Bridge)

Air quality at Mirsharai_Point-01 (Beside Foot Over Bridge) has been analyzed for the concentration of Particulate Matter of different sizes such as PM 0.5, PM 2.5, PM 5, PM 10 and TSP. It has been observed that the concentration of Particulate Matter at this point is within the optimum limit (i.e. 65 µg/m³ for PM_{2.5}, 150 µg/m³ for PM₁₀ & 200 µg/m³ for TSP specified by ECR [Environment Conservation Rules]-97). For day time, the average values of PM_{2.5}, PM₁₀ and TSP have been found to be 39 µg/m³, 47 µg/m³, 67 µg/m³ respectively which are 26 µg/m³ (40.0%), 103 µg/m³ (68.7%) and 133 µg/m³ (66.5%) lower than the standard limit of ECR-97. For night time, the average values of PM_{2.5}, PM₁₀ and TSP have been found to be 51 µg/m³, 61 µg/m³, 88 µg/m³ respectively which are 14 µg/m³ (21.5%), 89 µg/m³ (59.3%) and 112 µg/m³ (56.0%) lower than the standard limit of ECR-97.

2.B. Mirsharai_Point-02 (In front of Municipal Office)- Longitude: 91.56985 Latitude: 22.77711

Air Monitoring Date: 13.06.2019

Table-12: Air Quality Monitoring Data at Mirsharai_Point-02 (In front of Municipal Office)

	Time	Particulate Matter ($\mu\text{g}/\text{m}^3$)				
		PM 0.5	PM 2.5	PM 5	PM 10	TSP
Day Time	8.00AM-9.00AM	6	20	23	29	41
		6	21	24	29	41
		6	20	22	26	37
	9.00AM-10.00AM	5	22	23	25	36
		5	26	24	30	43
		6	26	27	29	41
	10.00AM-11.00AM	11	45	47	48	69
		10	45	48	49	70
		10	44	47	50	71
	11.00AM-12.00PM	11	43	45	49	70
		10	42	46	50	71
		10	40	45	51	73
	12.00 PM-1.00PM	9	42	47	52	74
		10	43	45	50	71
		11	42	43	49	70
	2.00 PM-3.00PM	9	43	45	48	69
		3	12	13	14	20
		3	13	15	17	24
	3.00 PM-4.00PM	2	12	16	19	27
		4	14	18	22	31
2		13	17	20	29	
4.00 PM-5.00PM	2	12	13	14	20	
	3	9	10	11	16	
	3	9	11	12	17	
Average	7	27	30	33	47	
Night Time	8.00 PM-9.00PM	11	47	51	56	80
		10	48	52	61	87
		11	49	54	62	89
	9.00 PM-10.00PM	9	50	55	63	90
		8	47	53	60	86
		7	47	49	61	87
	10.00 PM-11.00 PM	11	48	52	59	84
		10	46	51	57	81
		11	44	48	56	80
	Average	10	47	52	59	85

Graphical Representation:

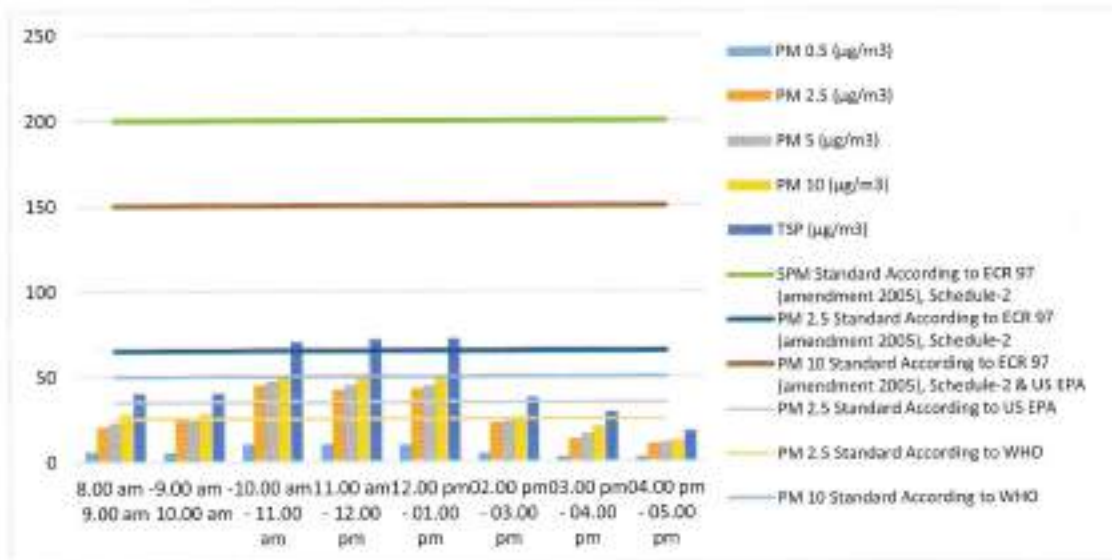


Figure-40: Day Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Mirsharai Point-02 (In front of Municipal Office)

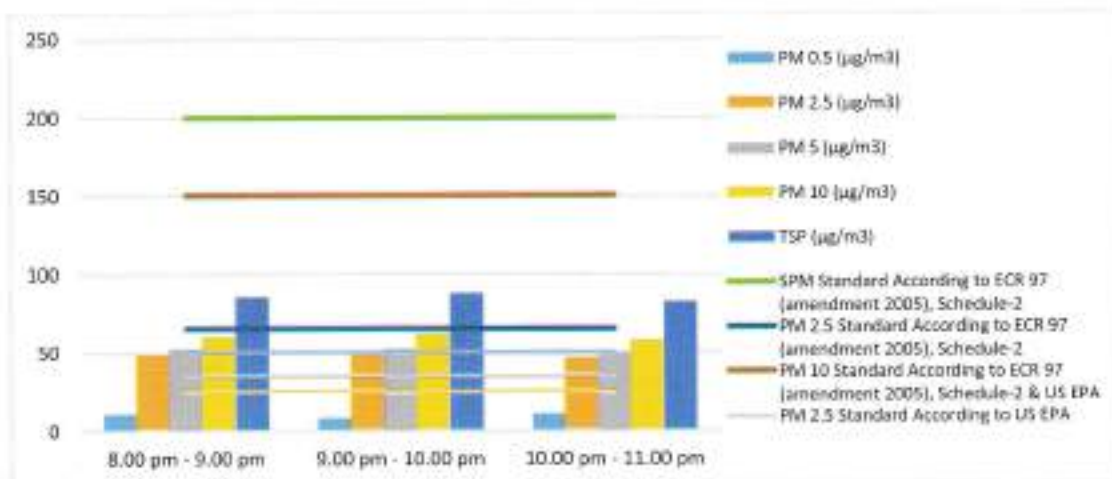


Figure-41: Night Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Mirsharai Point-02 (In front of Municipal Office)

Air quality at Mirsharai Point-02 (In front of Municipal Office) has been analyzed for the concentration of Particulate Matter of different sizes such as PM 0.5, PM 2.5, PM 5, PM 10 and TSP. It has been observed that the concentration of Particulate Matter at this point is within the optimum limit (i.e. 65 µg/m³ for PM2.5, 150 µg/m³ for PM10 & 200 µg/m³ for TSP specified by ECR [Environment Conservation Rules]-97). For day time, the average values of PM2.5, PM10 and TSP have been found to be 27 µg/m³, 33 µg/m³, 47 µg/m³ respectively which are 38 µg/m³ (58.5%), 117 µg/m³ (78.0%) and 153 µg/m³ (76.5%) lower than the standard limit of ECR-97. For night time, the average values of PM2.5, PM10 and TSP have been found to be 47 µg/m³, 59 µg/m³, 85 µg/m³ respectively which are 18 µg/

m³ (27.7%), 91 µg/m³ (60.7%) and 115 µg/m³ (57.5%) lower than the standard limit of ECR-97.

3.A. Abu Torab Bazar_Point-01 (Bazar Mor)- Longitude: 91.55727 Latitude: 22.74806

Air Monitoring Date: 14.06.2019

Table-13: Air Quality Monitoring Data at Abu Torab Bazar_Point-01 (Bazar Mor)

	Time	Particulate Matter (µg/m ³)					
		PM 0.5	PM 2.5	PM 5	PM 10	TSP	
Day Time	8.00AM-9.00AM	11	68	71	73	104	
		12	67	70	72	103	
		11	67	69	71	101	
	9.00AM-10.00AM	10	66	69	69	99	
		17	68	70	71	101	
		16	72	70	74	106	
	10.00AM-11.00AM	15	72	71	74	106	
		16	71	73	75	107	
		44	74	75	80	114	
	11.00AM-12.00PM	22	78	79	80	114	
		20	79	82	85	121	
		17	71	73	76	109	
	12.00 PM-1.00PM	25	93	97	101	144	
		23	88	92	94	134	
		21	82	88	89	127	
	2.00 PM-3.00PM	19	73	77	81	116	
		18	74	77	80	114	
		17	76	80	82	117	
	3.00 PM-4.00PM	12	51	55	77	110	
		11	52	56	76	109	
10		52	57	75	107		
4.00 PM-5.00PM	10	23	27	38	54		
	9	22	26	37	53		
	8	22	27	37	53		
	Average	16	65	68	74	105	
Night Time	8.00 PM-9.00PM	15	52	56	86	123	
		21	94	94	95	136	
	9.00 PM-10.00PM	17	66	68	70	100	
		12	46	50	59	84	
		11	43	48	60	86	
	10.00 PM-11.00 PM	13	41	49	60	86	
		14	49	55	63	90	
		13	51	54	61	87	
		Average	12	52	58	60	86
		Average	14	55	59	68	98

Graphical Representation:

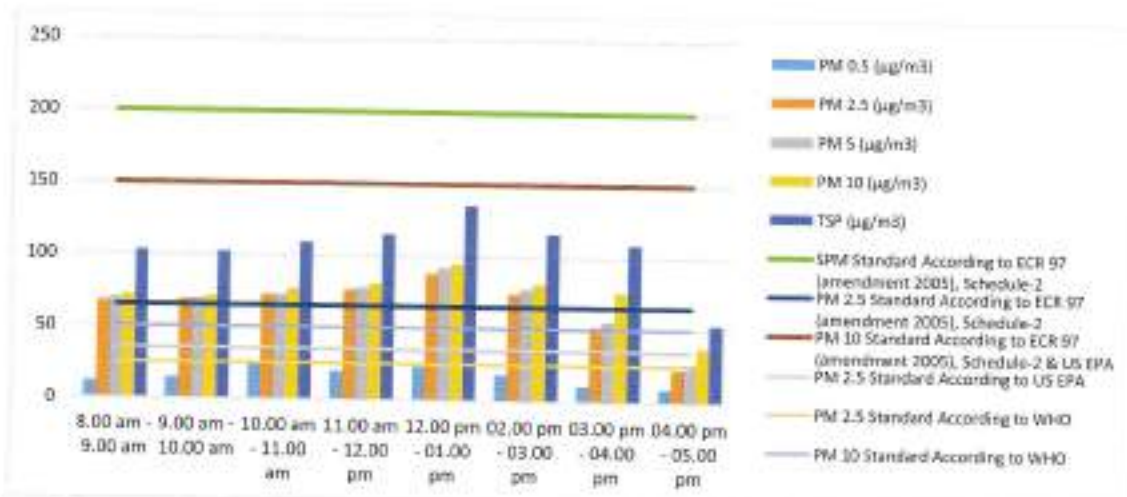


Figure-42: Day Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Abu Torab Bazar_Point-01 (Bazar Mor)

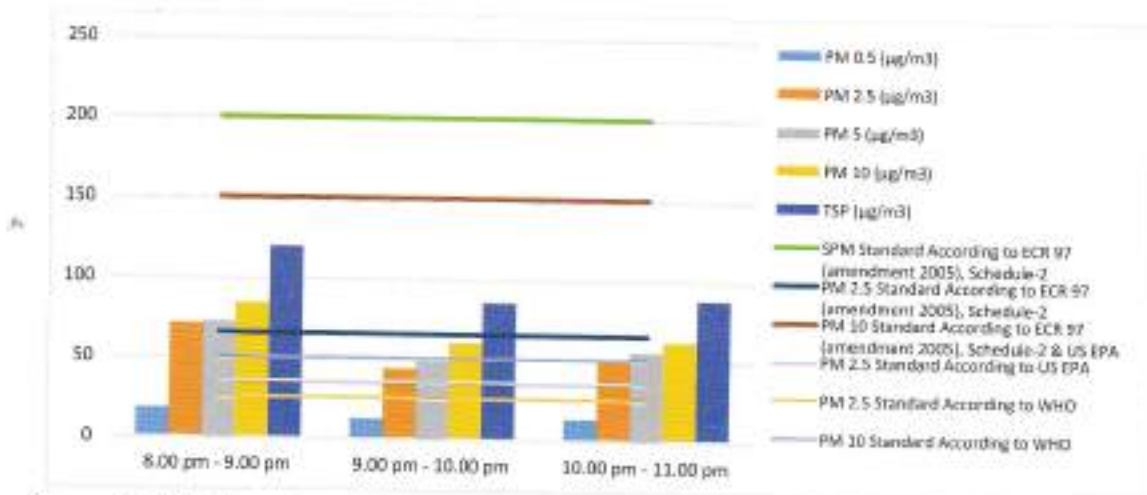


Figure-43: Night Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Abu Torab Bazar_Point-01 (Bazar Mor)

Air quality at Abu Torab Bazar_Point-01 (Bazar Mor) has been analyzed for the concentration of Particulate Matter of different sizes such as PM 0.5, PM 2.5, PM 5, PM 10 and TSP. It has been observed that the concentration of Particulate Matter at this point is within the optimum limit (i.e. 65 µg/m³ for PM_{2.5}, 150 µg/m³ for PM₁₀ & 200 µg/m³ for TSP specified by ECR [Environment Conservation Rules]-97). For day time, the average values of PM_{2.5}, PM₁₀ and TSP have been found to be 65 µg/m³, 74 µg/m³, 105 µg/m³ respectively where PM_{2.5} is exactly same as standard limit, PM₁₀ is 76 µg/m³ (50.7%) lower than the standard limit and TSP is 95 µg/m³ (47.5%) lower than the standard limit of ECR-97. For night time, the average values of PM_{2.5}, PM₁₀ and TSP have been found to be 55 µg/m³, 68 µg/m³, 98 µg/m³ respectively which are 10 µg/m³ (15.4%), 82 µg/m³ (54.7%) and 102 µg/m³ (51.0%) lower than the standard limit of ECR-97.

3.B. Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban)- Longitude: 91.55535 Latitude: 22.74888

Air Monitoring Date: 14.06.2019

Table-14: Air Quality Monitoring Data at Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban)

	Time	Particulate Matter ($\mu\text{g}/\text{m}^3$)					
		PM 0.5	PM 2.5	PM 5	PM 10	TSP	
Day Time	8.00AM-9.00AM	10	41	44	51	73	
		10	42	46	49	70	
		9	43	47	49	70	
	9.00AM-10.00AM	10	41	46	47	67	
		10	39	43	46	66	
		12	40	45	47	67	
	10.00AM-11.00AM	10	38	42	45	64	
		11	37	41	46	66	
		12	49	57	62	89	
	11.00AM-12.00PM	12	52	56	64	91	
		17	68	68	69	99	
		15	55	58	69	99	
	12.00 PM-1.00PM	13	52	56	67	96	
		15	60	64	71	101	
		14	67	68	69	99	
	2.00 PM-3.00PM	15	58	60	63	90	
		17	63	65	69	99	
		13	50	52	56	80	
3.00 PM-4.00PM	8	31	34	38	54		
	8	22	35	37	53		
	8	31	36	36	51		
4.00 PM-5.00PM	9	44	45	66	94		
	8	47	51	70	100		
	9	48	56	68	97		
	Average	11	47	51	56	81	
Night Time	8.00 PM-9.00PM	17	65	69	72	103	
		18	64	68	71	101	
	9.00 PM-10.00PM	17	63	67	70	100	
		10	44	48	61	87	
		11	54	58	59	84	
	10.00 PM-11.00 PM	10	49	53	52	74	
		8	34	38	41	59	
		7	36	38	40	57	
		Average	5	37	38	39	56
		Average	11	50	53	56	80

Graphical Representation:

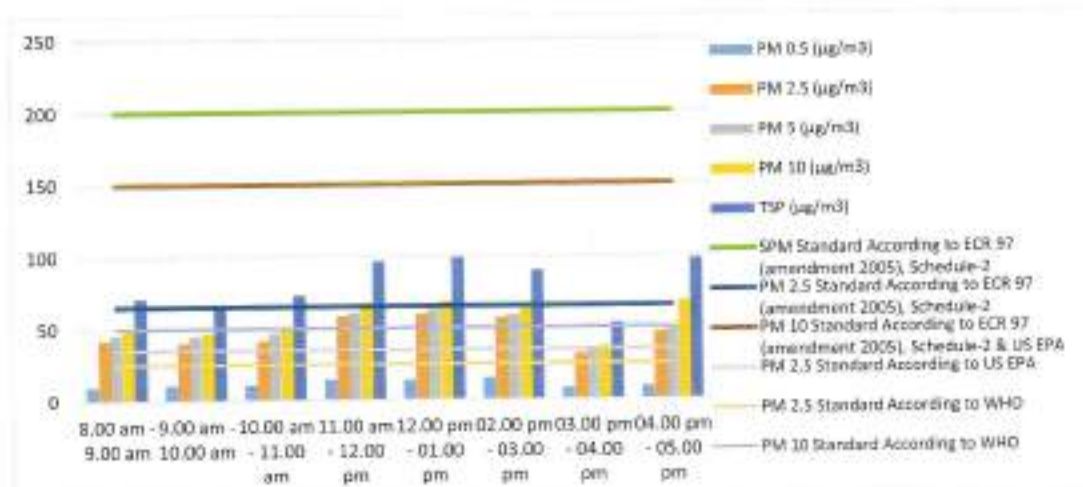


Figure-44: Day Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban)

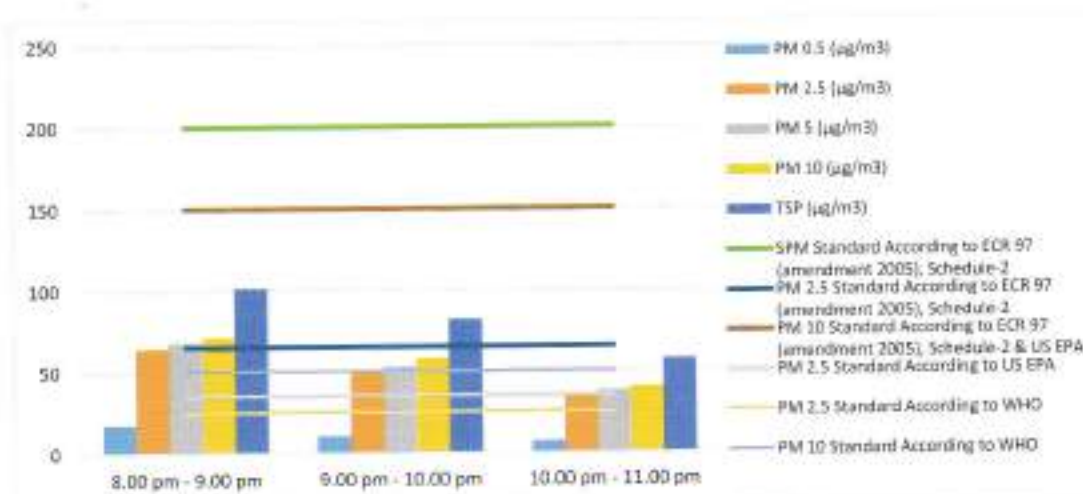


Figure-45: Night Time Air Quality Data Comparison with Standard Limit of ECR 97, US EPA, WHO at Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban)

Air quality at Abu Torab Bazar_Point-02 (In front of 11 No. Moghadiya Union Parishod Bhaban) has been analyzed for the concentration of Particulate Matter of different sizes such as PM 0.5, PM 2.5, PM 5, PM 10 and TSP. It has been observed that the concentration of Particulate Matter at this point is within the optimum limit (i.e. 65 µg/m³ for PM2.5, 150 µg/m³ for PM10 & 200 µg/m³ for TSP specified by ECR [Environment Conservation Rules]-97). For day time, the average values of PM2.5, PM10 and TSP have been found to be 47 µg/m³, 56 µg/m³, 81 µg/m³ respectively which are 18 µg/m³ (27.7%), 94 µg/m³ (62.7%) and 119 µg/m³ (59.5%) lower than the standard limit of ECR-97. For night time, the average values of PM2.5, PM10 and TSP have been found to be 50 µg/m³, 80 µg/m³ respectively which are 15 µg/m³ (23.1%), 94 µg/m³ (62.7%) and 120 µg/m³ (60.0%) lower than the standard limit of ECR-97.

Average Air Quality Data of All Location:



Figure-46: Average Day Time Air Quality Data Comparison with Standard Limit at All Location



Figure-47: Average Night Time Air Quality Data Comparison with Standard Limit at All Location

Result Analysis of Air Quality Monitoring: From the analysis it has been observed that the average concentration of Particulate Matter at all location is within the optimum limit specified by ECR (Environment Conservation Rules)-97 both for day and night time. All the percentage values by which the data are lower than standard limit have been mentioned in the above sections separately for each location.

4.2 Water Quality Monitoring

Water samples have been collected from 9 nos of locations. pH, Temperature, Conductivity, Total Dissolved Solids (TDS), Arsenic (As), Iron (Fe), Free Chlorine, Total Chlorine, Total Coliform, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD5), Chemical Oxygen demand (COD), Calcium (Ca) and Potassium (K) have been tested for each sample. Water samples have been collected on June 12, 2019 by Qtex Assessor.

Sampling Procedure:

Sampling of surface water has been conducted by following grab sampling method. As per Qtex Technical Procedure "TP-10_Sampling Plan & Procedure" water sample has been collected by Qtex assessor who has proper training and relevant knowledge on sampling technique. Sample is collected in sterilized bottle. The assessor used hand gloves during collecting sample for avoiding any contamination. In case of handling & storing the sample Qtex technical procedure "TP 11 _Procedure for Sample Approval & Rejection, Reception, Handling/Transportation, Storage & Disposal" has been followed. As per TP 11 the sample containers are carefully packed to avoid any breakage or cross contamination. For transporting the sample from project area to Qtex laboratory, ice box has been used to carry the sample bottle. All samples are properly stored from the time they arrive at the laboratory until disposal. Samples has been stored in refrigerator at 4°C prior to analysis which preserve the majority of physical, chemical and biological characteristics in the short term (< 24 hours). The sample testing process has been started by Qtex analyst within 24 hours of receiving the sample.

The test results are as below:

Table-15: Water Test Results

Sl. No.	Location	pH	Temp. perature (°C)	Conduc- tivity (µs/cm)	TDS (mg/L)	Arsepic (mg/L)	Iron (mg/L)	Free Chlor- ine (mg/L)	Total Chlor- ine (mg/L)	Total Coliform (CFU/100 ml)	DO (mg/L)	BOD5 (mg/L)	COD (mg/L)	Calcium-Ca (mg/L)	Potassi- um-K (mg/L)
01	Khaiyachara Canal (West Khaiyachara, 12 No. Khaiyachara Union)	7.33 at 30.7°C	30.0	386.0	320	<0.01	0.5	<0.1	<0.1	TNTC	8.29	159.6	752	6	6.1
02	Moliyai Canal (Moliyai Village)	7.44 at 30.7°C	29.0	291.0	232	<0.01	<0.1	<0.1	<0.1	14	6.03	125.4	724	4	3.2
03	Ichakhali canal (Ichakhali Union)	7.67 at 29.9°C	26.5	3.64 ms/cm	2164	<0.01	<0.1	<0.1	<0.1	8	8.09	122.4	704	23	1.0
04	Mohamaya Lake (Near Rubber Bame)	7.85 at 30.0°C	27.5	146.9	134	<0.01	0.5	<0.1	<0.1	46	8.20	105.6	688	3	4.3
05	Mohamaya Lake (Chowdhuryhat, Durgapur Union, Beside Durgapur Rahmania Eidgah Maydan)	7.51 at 29.0°C	27.0	137.6	52	<0.01	1.5	<0.1	<0.1	38	8.25	121.5	744	3	3.2
06	Mohamaya Lake (Jholompul, 6 No. Ichakhali Union, Beside Govt. Primary School)	7.68 at 29.2°C	32.0	420.0	244	<0.01	0.5	<0.1	<0.1	50	8.16	103.8	632	4	3.0
07	Baromashi Canal (Backside of BSRM –Between Hill)	7.80 at 29.6°C	26.5	200.5	224	<0.01	0.5	<0.1	<0.1	TNTC	8.36	129.6	692	2	4.3
08	Baromashi Canal (Beside Dhaka Chittagong Highway, Near BSRM)	7.86 at 29.5°C	26.0	220.0	100	<0.01	0.5	<0.1	<0.1	42	8.29	101.7	614	4	3.2
09	Baromashi Canal (South Side of Chutkha Dighi and North Side of Joraganj Bazar in Joraganj)	7.53 at 28.7°C	25.0	307.0	172	<0.01	1.5	0.4	0.5	TNTC	8.28	114.0	520	8	2.1

*TNTC= Too Numerous to Count

Graphical Representation:

♦ **Location 01:** Khaiyachara Canal (West Khaiyachara, 12 No. Khaiyachara Union) - Longitude: 91.57658 Latitude: 22.76146

Location 02: Moliyai Canal (Moliyai Village)- Longitude: 91.51902; Latitude: 22.76977

Location 03: Ichakhali canal (Ichakhali Union) - Longitude: 91.47882; Latitude: 22.76456

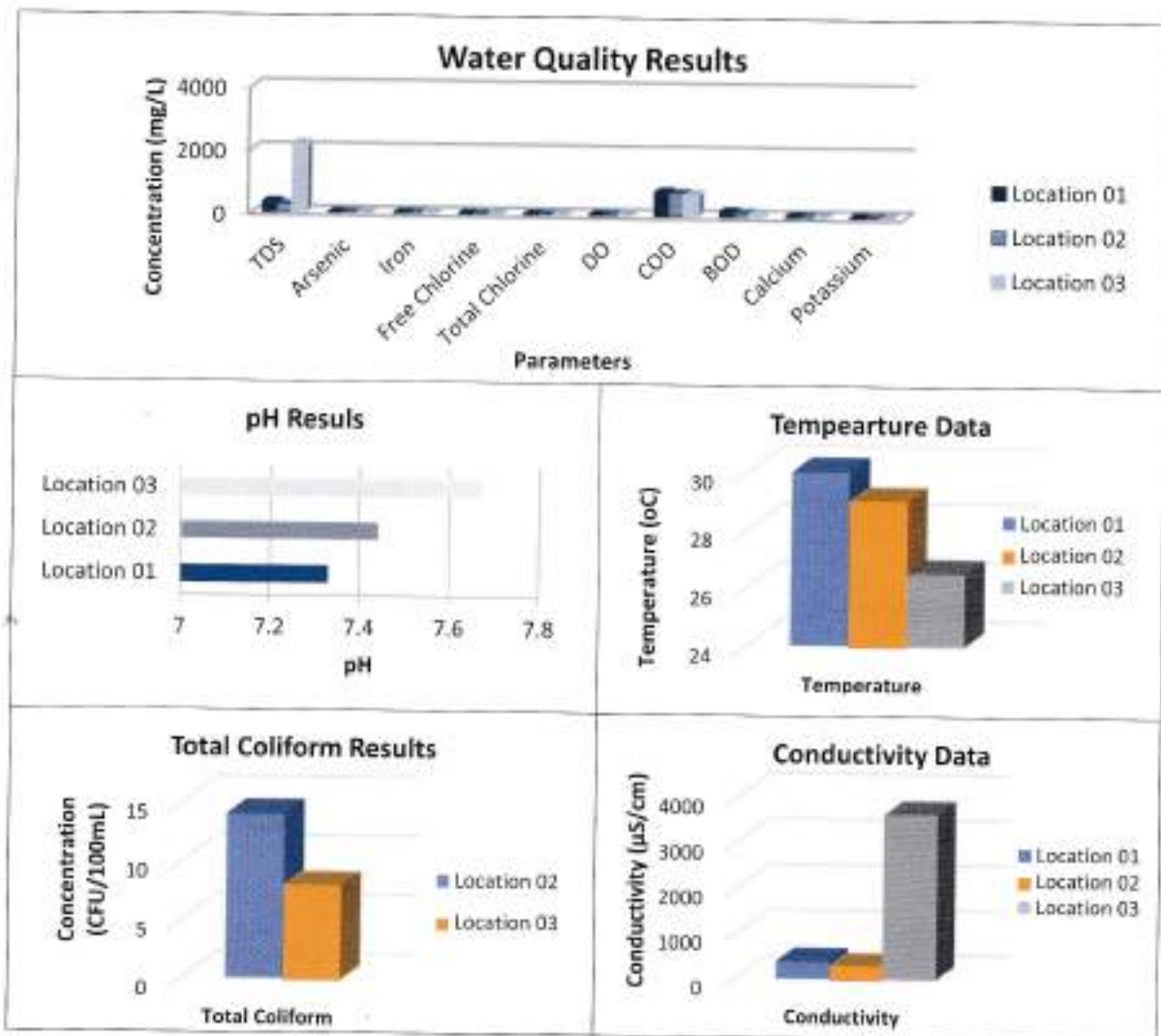


Figure-48: Water Quality Test Results of Location 01: Khaiyachara Canal (West Khaiyachara, 12 No. Khaiyachara Union); Location 02: Moliyai Canal (Moliyai Village) & Location 03: Ichakhali canal (Ichakhali Union)

◆ Location 04: Mohamaya Lake (Near Rubber Dame)- Longitude: 91.56056; Latitude: 22.81424

Location 05: Mohamaya Lake (Chowdhuryhat, Durgapur Union, Beside Durgapur Rahmania Eidgah Maydan)- Longitude: 91.53302; Latitude: 22.81257

Location 06: Mohamaya Lake (Jholonpull, 6 No. Ichakhali Union, Beside Govt. Primary School)- Longitude: 91.49356; Latitude: 22.81269

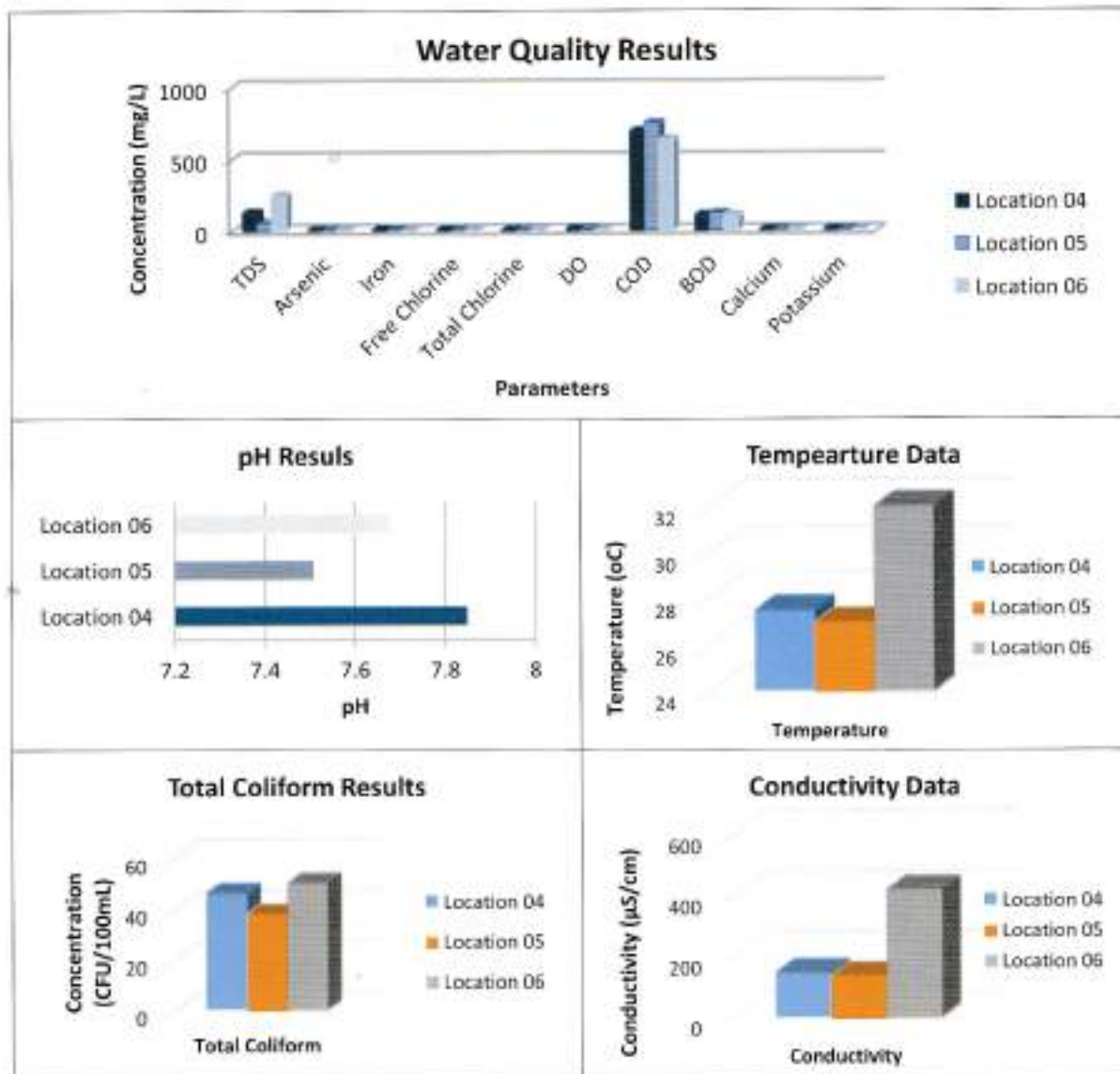


Figure-49: Water Quality Test Results of Location 04: Mohamaya Lake (Near Rubber Dame); Location 05: Mohamaya Lake (Chowdhuryhat, Durgapur Union, Beside Durgapur Rahmania Eidgah Maydan) & Location 06: Mohamaya Lake (Jholonpull, 6 No. Ichakhali Union, Beside Govt. Primary School)

◆ Location 07: Baromashi Canal (Between Backside of BSRM & Hill)- Longitude: 91.55409; Latitude: 22.86190

Location 08: Baromashi Canal (Beside Dhaka Chittagong Highway, Near BSRM)- Longitude: 91.54032; Latitude: 22.87497

Location 09: Baromashi Canal (Between South Side of Chutikha Dighi and North Side of Jorarganj Bazar in Jorarganj)- Longitude: 91.52933; Latitude: 22.81424

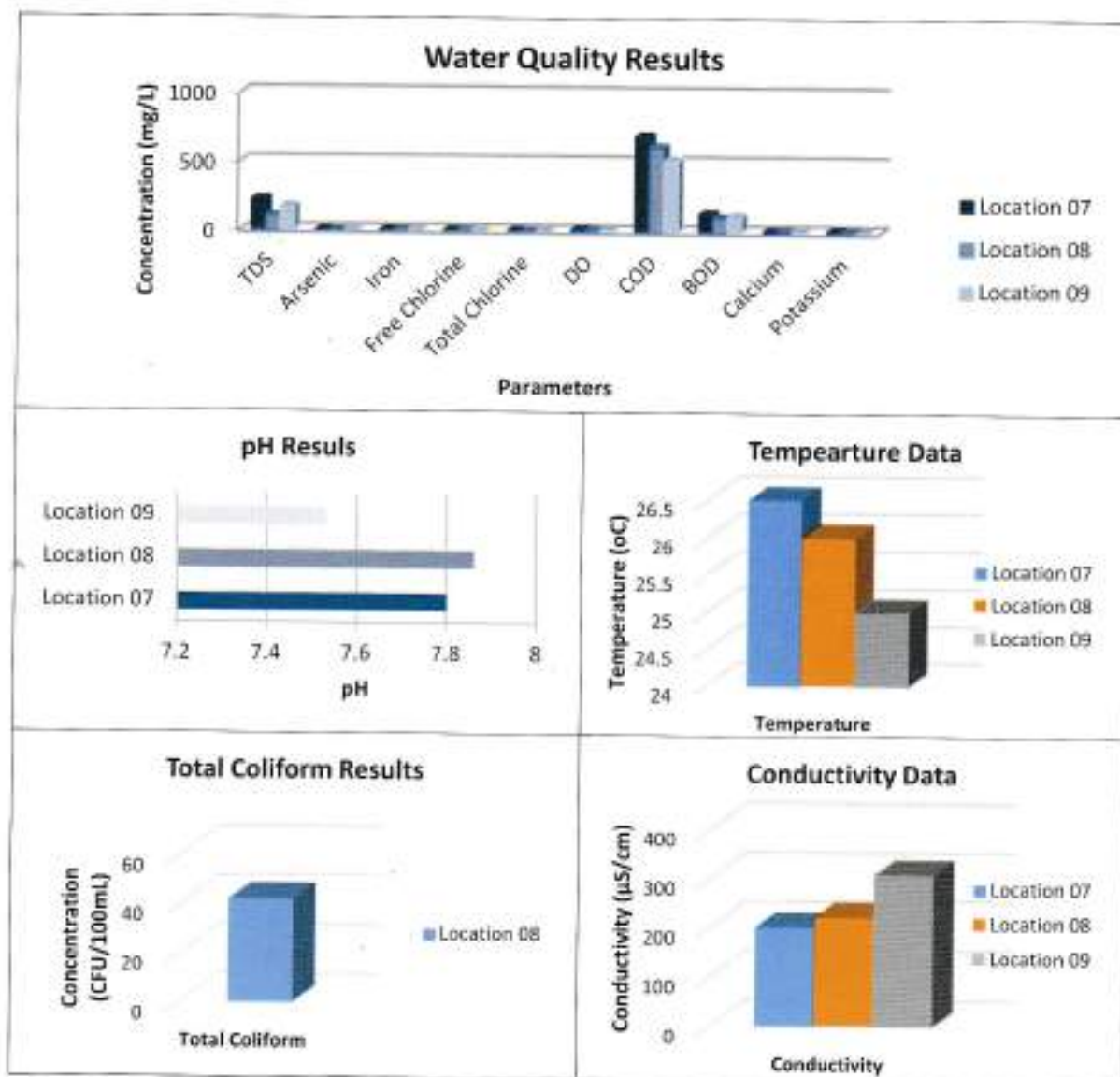


Figure-50: Water Quality Test Results of Location 07: Baromashi Canal (Between Backside of BSRM & Hill); Location 08: Baromashi Canal (Beside Dhaka Chittagong Highway, Near BSRM) & Location 09: Baromashi Canal (Between South Side of Chutikha Dighi and North Side of Jorarganj Bazar in Jorarganj)

Graphical Representation Comparing with Standard according to ECR 97:

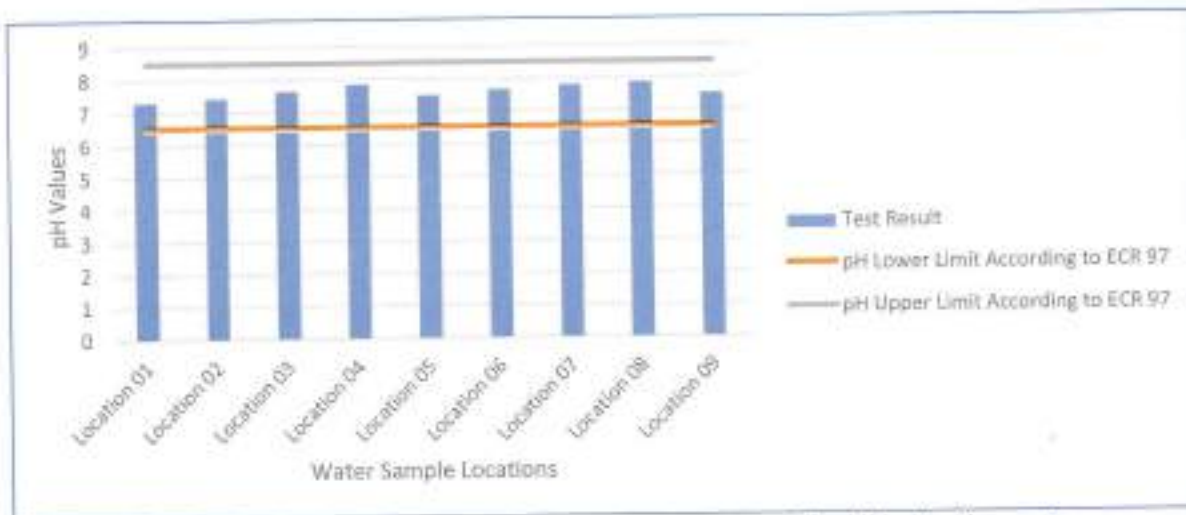


Figure-51: pH Comparison with standard according to ECR 97 for inland surface water

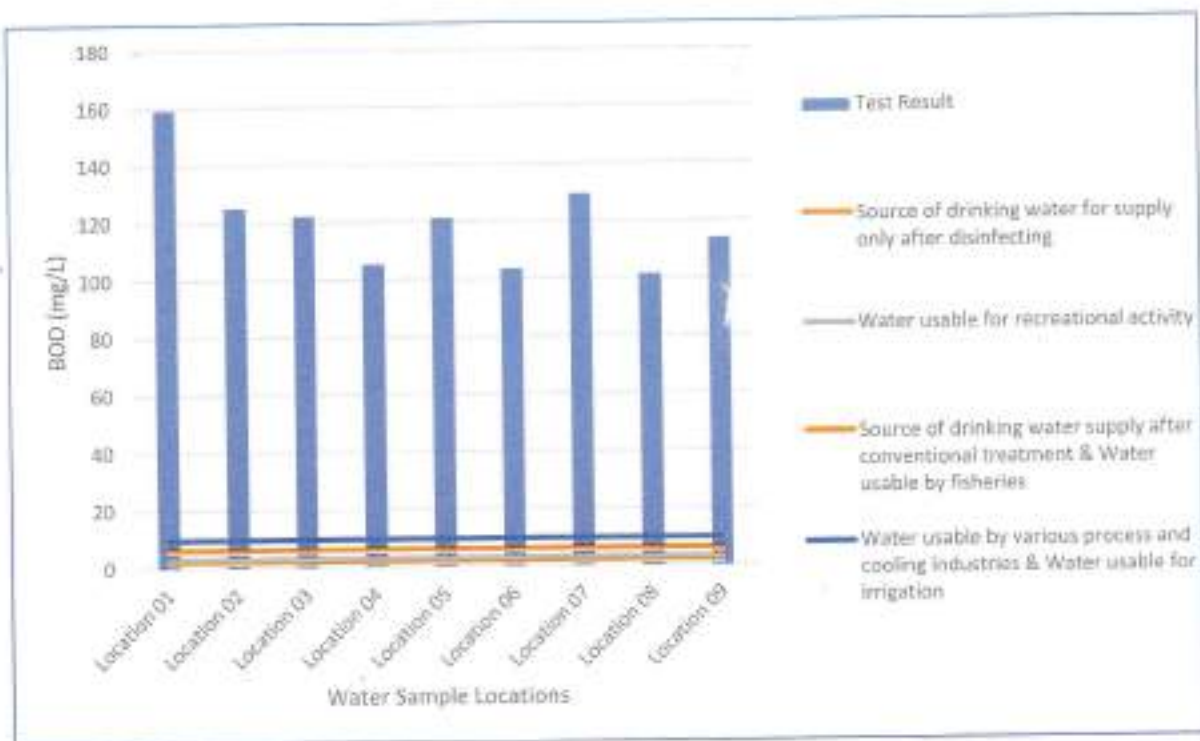


Figure-52: BOD Comparison with standard according to ECR 97 for inland surface water

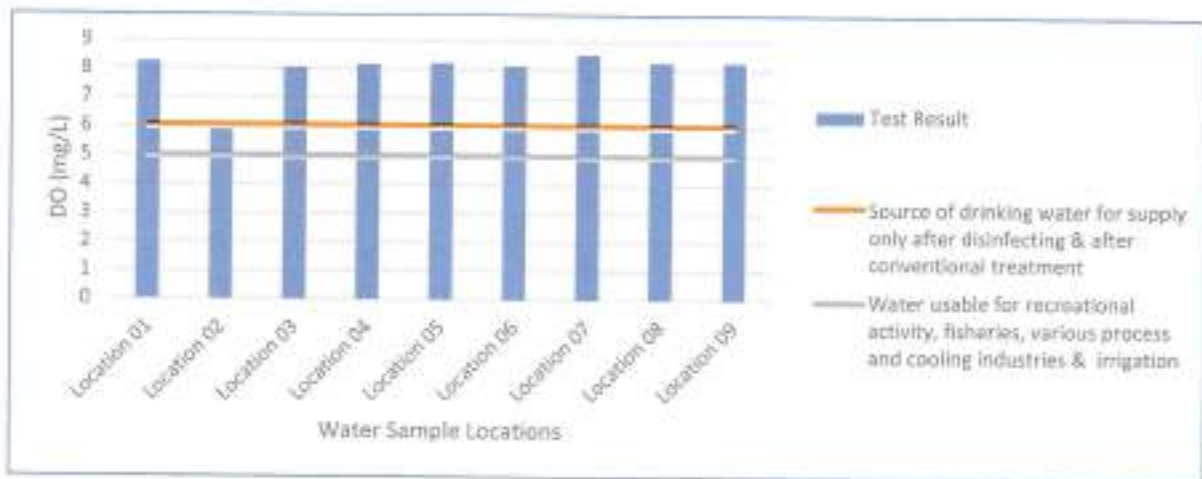


Figure-53: DO Comparison with standard according to ECR 97 for inland surface water

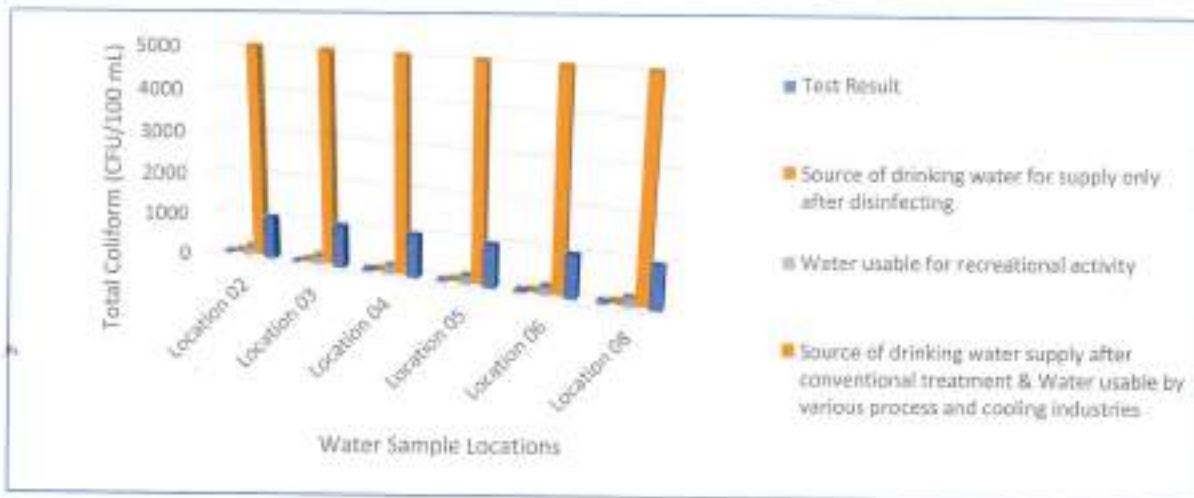


Figure-54: Total Coliform Comparison with standard according to ECR 97 for inland surface water

ECR (Environment Conservation Rules)-97 has set standard for inland surface water depending on its use. Comparing with ECR 97 it has been found that pH and DO values of the samples of all locations meet the standard limit. According to ECR-97 range of pH is **6.5 to 8.5**. According to ECR-97 the standard limit for DO is **≥6 mg/L** (considering source of drinking water for supply only after disinfecting & after conventional treatment) & **≥5 mg/L** (considering water usable for recreational activity, fisheries, various process and cooling industries & irrigation). The difference between the test results and standard limit (in percentage) are shown in the below table.

Location	pH value comparison with ECR-97 standard limit (i.e. 6.5 to 8.5 according to standard)	DO value comparison with ECR-97 standard limit	
		Considering source of drinking water for supply only after disinfecting & after conventional treatment (i.e. 6 mg/L or above according to standard)	Considering water usable for recreational activity, fisheries, various process and cooling industries & irrigation (i.e. 5 mg/L or above according to standard)
Khaliyachara Canal (West Khaliyachara, 12 No. Khaliyachara Union)	12.8% higher than the lower limit & 13.8% lower than the upper limit	38.2% higher than the lower limit	65.8% higher than the lower limit
Moliyai Canal (Moliyai Village)	14.5% higher than the lower limit & 12.5% lower than the upper limit	0.5% higher than the lower limit	20.6% higher than the lower limit
Ichakhali canal (Ichakhali Union)	18.0% higher than the lower limit & 9.8% lower than the upper limit	34.8% higher than the lower limit	61.8% higher than the lower limit
Mohamaya Lake (Near Rubber Dame)	20.8% higher than the lower limit & 7.6% lower than the upper limit	36.7% higher than the lower limit	64.0% higher than the lower limit
Mohamaya Lake (Chowdhuryhat, Durgapur Union, Beside Durgapur Rahmania Eidgah Maydan)	15.5% higher than the lower limit & 11.6% lower than the upper limit	37.5% higher than the lower limit	65.0% higher than the lower limit
Mohamaya Lake (Jholonpull, 6 No. Ichakhali Union, Beside Govt. Primary School)	18.2% higher than the lower limit & 9.6% lower than the upper limit	36.0% higher than the lower limit	63.2% higher than the lower limit
Baromashi Canal (Between Backside of BSRM & Hill)	20.0% higher than the lower limit & 8.2% lower than the upper limit	42.7% higher than the lower limit	71.2% higher than the lower limit
Baromashi Canal (Beside Dhaka Chittagong Highway, Near BSRM)	20.9% higher than the lower limit & 7.5% lower than the upper limit	38.2% higher than the lower limit	65.8% higher than the lower limit
Baromashi Canal (Between South Side of Chutikha Dighi and North Side of Jorarganj Bazar in Jorarganj)	15.8% higher than the lower limit & 11.4% lower than the upper limit	38.0% higher than the lower limit	65.6% higher than the lower limit

The values of BOD of the samples of all locations has been found to be extremely high compared to the standard. The values of Total Coliform are within the standard limit except the coliform of the sample water of three locations [Khaliyachara Canal (West Khaliyachara, 12 No. Khaliyachara Union); Baromashi Canal (Between Backside of BSRM & Hill) & Baromashi Canal (Between South Side of Chutikha Dighi and North Side of Jorarganj Bazar in Jorarganj)] has been found too much high. The variation from the standard limit is as below.

Location	BOD value comparison with ECR-97 standard limit			Total Coliform value comparison with ECR-97 standard limit				
	Considering source of drinking water for supply only after disinfecting (2 mg/L or less according to standard)	Considering water usable for recreational activity (3 mg/L or less according to standard)	Considering source of drinking water supply after conventional treatment & Water usable by fisheries (6 mg/L or less according to standard)	Considering water usable by various process and cooling industries & Water usable for irrigation (10 mg/L or less according to standard)	Considering source of drinking water for supply only after disinfecting (50 Number/100ml or less according to standard)	Considering water usable for recreational activity (200 Number/100ml or less according to standard)	Considering source of drinking water supply after conventional treatment & Water usable by various process and cooling industries (5000 Number/100ml or less according to standard)	Considering water usable for irrigation (1000 Number/100ml or less according to standard)
Khalyachara Canal (West Khalyachara, 12 No. Khalyachara Union)	157.6 mg/L higher	156.6 mg/L higher	153.6 mg/L higher	149.6 mg/L higher	Total Coliform of this location has been found too numerous to count			
Moliyai Canal (Moliyai Village)	123.4 mg/L higher	122.4 mg/L higher	119.4 mg/L higher	115.4 mg/L higher	72.0% lower than limit	93.0% lower than limit	99.7% lower than limit	98.6% lower than limit
Ichakhali canal (Ichakhali Union)	120.4 mg/L higher	119.4 mg/L higher	116.4 mg/L higher	112.4 mg/L higher	84.0% lower than limit	96.0% lower than limit	99.8% lower than limit	99.2% lower than limit
Mohamaya Lake (Near Rubber Dame)	103.6 mg/L higher	102.6 mg/L higher	99.6 mg/L higher	95.6 mg/L higher	8.0% lower than limit	77.0% lower than limit	99.1% lower than limit	95.4% lower than limit
Mohamaya Lake (Chowdhuryhat, Durgapur Union, Beside Durgapur Rahmania Eidgah Masjidan)	119.5 mg/L higher	118.5 mg/L higher	115.5 mg/L higher	111.5 mg/L higher	24.0% lower than limit	81.0% lower than limit	99.2% lower than limit	96.2% lower than limit
Mohamaya Lake (Jholonpult, 6 No. Ichakhali Union, Beside Govt. Primary School)	101.8 mg/L higher	100.8 mg/L higher	97.8 mg/L higher	93.8 mg/L higher	Same as standard limit	75.0% lower than limit	99.0% lower than limit	95.0% lower than limit
Baromashi Canal (Between Backside of BSRM & HIE)	127.6 mg/L higher	126.6 mg/L higher	123.6 mg/L higher	119.6 mg/L higher	Total Coliform of this location has been found too numerous to count			
Baromashi Canal (Beside Dhaka Chittagong Highway, Near BSRM)	99.7 mg/L higher	98.7 mg/L higher	95.7 mg/L higher	91.7 mg/L higher	16.0% lower than limit	79.0% lower than limit	99.2% lower than limit	95.8% lower than limit
Baromashi Canal (Between South Side of Churtikha Dighi and North Side of Jaraganj Bazar in Jaraganj)	112.0 mg/L higher	111.0 mg/L higher	108.0 mg/L higher	104.0 mg/L higher	Total Coliform of this location has been found too numerous to count			

4.3 Overall Result Summary

Noise level and air quality monitoring has been done in 3 locations. Every location has been monitored in two different points for two shifts-Day and night.

From the analysis of noise level data, it has been observed that the average noise level at all locations both at day and night time has exceeded the permissible limit specified by ECR (Environment Conservation Rules)-97 except for day time the noise level is within the maximum permissible limit at Baraiyarhat Pouroshova (Point-02, Baraiyarhat Pouroshova Office) & Mirsharai Pouroshova (Point-02, Mirsharai Pouroshova Office).

From the analysis of air quality data, it has been observed that the average concentration of Particulate Matter at all location is within the optimum limit specified by ECR (Environment Conservation Rules)-97 both for day and night time.

Water samples have been collected from 9 nos of locations. ECR (Environment Conservation Rules)-97 has set standard for inland surface water depending on its use. Comparing with ECR 97 it has been found that pH and DO values of the samples of all locations meet the standard limit. The values of BOD of the samples of all locations has been found to be extremely high compared to the standard. The values of Total Coliform are within the standard limit except the coliform of the sample water of three locations [Khaiyachara Canal (West Khaiyachara, 12 No. Khaiyachara Union); Baromashi Canal (Between Backside of BSRM & Hill) & Baromashi Canal (Between South Side of Chutikha Dighi and North Side of Jorarganj Bazar in Jorarganj)] has been found in higher range.

Chapter 5: Recommendation & Conclusion

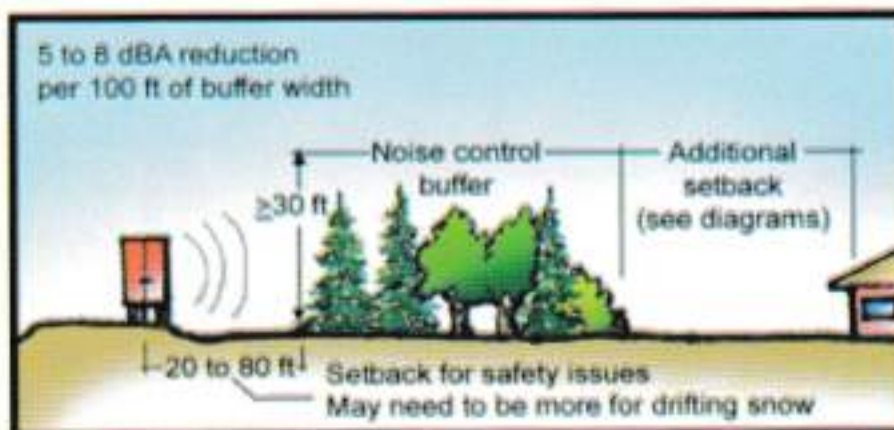
5.1 Recommendation

5.1.1 Recommendation for Noise Pollution Control

After the establishment of economic zone, vehicular movement in the concerning area will drastically increase. If the people at these locations stay continuously with the high level of noise, it may cause hearing damage in the long run. A step to create natural buffer (e.g. tree plantation) to control noise can be truly helpful. The concerning authority can think of planting trees to create this buffer. The below measures can be considered to control the noise pollution.

- ✓ Taking noise control measures in the noise generating machineries of the industries which would be established in future.
- ✓ Tree plantation to create natural buffer.
- ✓ Controlling vehicles with hydraulic horns.
- ✓ Creating awareness among the drivers and general people.

In most of the cases, high noise is generated due to vehicular movement. Studies says that a 100ft wide planted buffer will reduce noise by 5db to 8db. Using a barrier in the buffer such as a landform can significantly increase buffer effectiveness (10db to 15dB reduction per 100 ft wide buffer with 12 ft high landform). Buffer should be created to the closest possible location to the noise creating source. Evergreen species will offer year-around noise control. This can be pictured as bellows-



Buffer Guidelines for Noise Reduction Along Roads

Moderate Speed Road (<40 mph)

Plant a 20 to 50-foot wide buffer with the near edge of the buffer within 20 to 50 feet of the center of the nearest traffic lane

High Speed Road (≥40 mph)

Plant a 65 to 100-foot wide buffer with the near edge of the buffer within 50 to 80 feet of the center of the nearest traffic lane

*Source-USDA-General Technical report SRS 109.

5.1.2 Recommendation for Air Pollution Control

After the establishment of economic zone many industries will be introduced here which will definitely effect on the air quality of this area. The industries to be established should themselves take necessary steps to minimize the air pollution. Besides this, the concerning authority can take some steps to create vegetation in this area which will help to keep the air fresh and will also enhance the beauty of this area. A 65 to 600 ft wide buffer may reduce particulate pollution by around 40 to 75 percent. As the industries will add air pollution, tree buffer will help to reduce both particulate pollution and gaseous pollution. The buffering should be done around and close to the pollution source.

Plant Selection Criteria for Air Pollutant Removal can be as bellows:

- ✓ Evergreen trees can remove more pollutants however many conifer species are sensitive to common pollutants.
- ✓ Select plants with dense branching and twig structure.
- ✓ Leaves with hairy, resinous, and coarse surfaces capture more particles than smooth leaves. Smaller leaves are generally more efficient collectors than larger leaves.
- ✓ Herbaceous species may adsorb more gaseous pollutants.
- ✓ Use multiple species to minimize risks with low diversity.
- ✓ Use long-lived species that require minimal maintenance.
- ✓ Select species with pest and disease resistance.
- ✓ Select species suitable for the site



*Source-USDA-General Technical report SRS 109.

5.1.3 Recommendation for Water Pollution Control

From the comparison with surface water standard it is evident that the surface water is polluted quite highly. These pollutions might have occurred due to residential domestic wastewater discharged and industrial wastewater discharged. It should be taken care of that the effluent from the existing industries should be discharged in the surface water meeting the allowable limits. As many industries would be established at the proposed economic zone, there will be a major chance of water pollution from the effluent water discharge from those factories. So, those factories should take proper measures from the very beginning to treat their waste water before discharging outside. The water cannot be used as drinking water at present condition because it does not meet the required standard limits for drinking water. Before further use, the surface water should be treated as per the requirement for the corresponding usage.

After the establishment of the economic zone, a huge population entrance at this place would increase the demand of both drinking and domestic water. To meet up the future demand the project planning authority should take proper initiatives like availability of ground water, opportunity/ necessity of further treatment of surface water, rain water harvesting and moreover creating awareness among people about reducing the wastage of water.

5.2 Conclusion

The present study has been undertaken to have a quick random view of the noise, air and surface water quality in some major locations of Mirsharai upazila. It's a bird eye view of the real scenario. And the study duration was limited. So the number of representative samples were much less to make a concrete remarks. However this study is depicting a very picture of location in terms of sound & air pollution and surface water quality. To mitigate the pollutions the following measures can be undertaken:

- √ Controlling vehicles with hydraulic horns.
- √ Recovering the natural water bodies.
- √ Improving wastewater disposal system.
- √ Creating tree buffer to control air and noise pollution.
- √ Creating public awareness about air, noise and water pollution etc.

However in the economic zone, many industries will be established. As the impact on environment from different types of industries are different, so the pollution control steps will definitely depend on the industry type. So, the pollution control and mitigation measures should be taken considering the type of industries which would be established at the economic zone.

Annexure

Annexure-1: Onsite Monitoring Picture.

Baraiyarhat Pouroshova (Point-01: Foot over Bridge)



Noise Level Monitoring



Ambient Air Quality Monitoring



Noise Level Monitoring



Ambient Air Quality Monitoring

Mirsarai Pourashava (Point-01: Foot Over Bridge)



Noise Level Monitoring



Ambient Air Quality

Mirsarai Pourashava (Point-02: Mirsarai Pourashava Office)



Noise Level Monitoring



Ambient Air Quality

Abu Torab Bazar (Point-01: Abu Torab Bazar)



Noise Level Monitoring



Ambient Air Quality

Abu Torab Bazar (Point-02: Abu Torab Bazar Moghadia Union Porishod)



Noise Level Monitoring



Ambient Air Quality



URBAN DEVELOPMENT DIRECTORATE (UDD)
Ministry of Housing and Public Works
Government of the People's Republic of Bangladesh
June, 2019