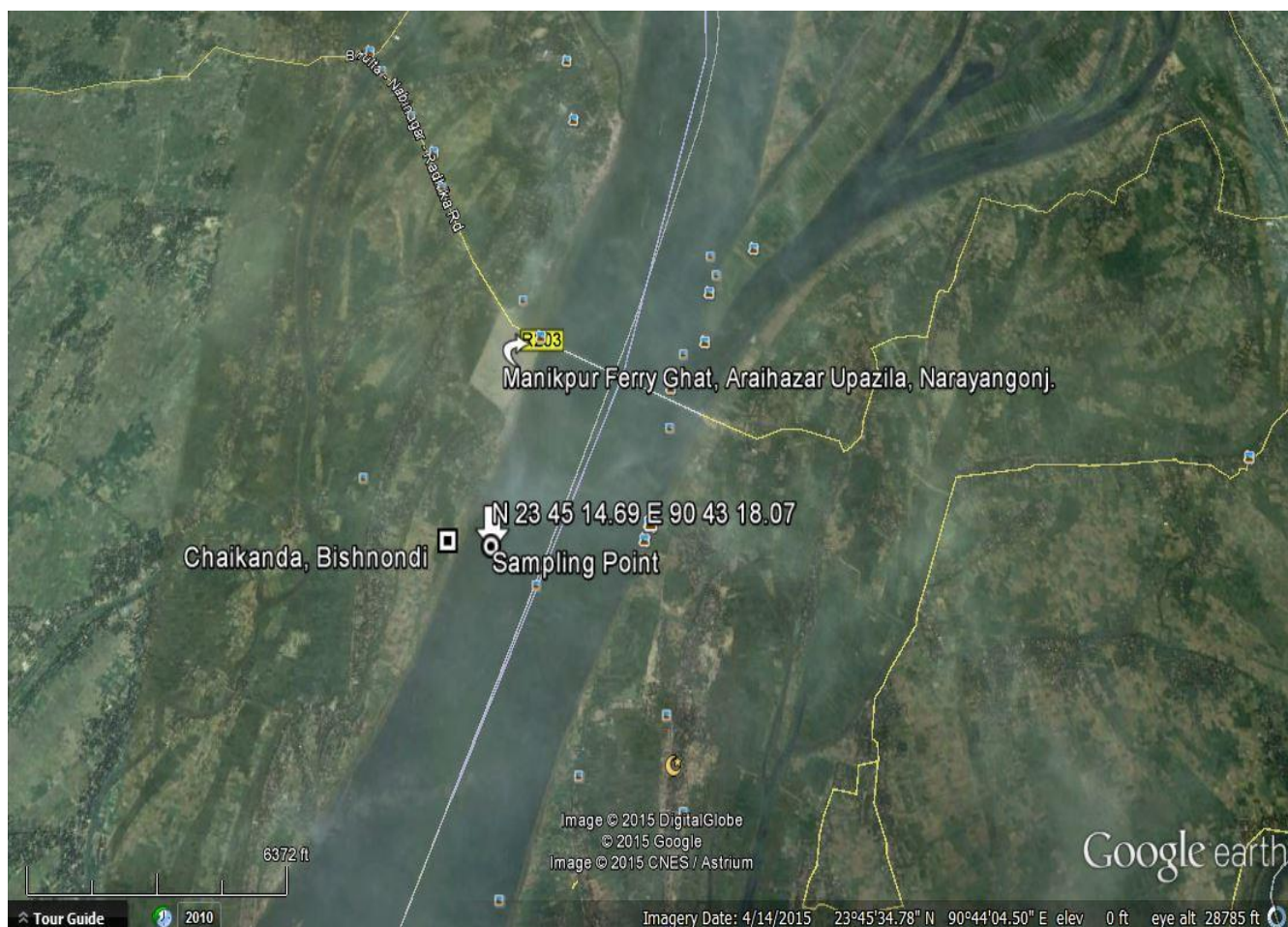


# SURFACE WATER QUALITY MONITORING NEAR BISHNONDI POINT, MEGHNA RIVER

## Dhaka Environmentally Sustainable Water Supply Project (DESWSP), DWASA



Prepared By

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**1. BACKGROUND**

The population of Dhaka city is increasing day by day. Dhaka Water Supply and Sewerage Authority (DWASA) provides water supply to about 90% of the Dhaka city population. DWASA has been relying heavily on groundwater as a source of water supply, but current abstraction is beyond sustainable yields. Groundwater resources are depleting, and the water table is falling by 2-3 meters per year, which makes the lifetime of deep tube wells shorter. The main existing source of surface water is also being polluted rapidly. Out of the total 2,400 MLD currently provided by DWASA, 450 MLD is provided by the Saidabad WTP, which abstracts surface water from the nearby Sitalakhya River. The river water quality is deteriorating, particularly in terms of high ammonia concentration during the dry season owing to uncontrolled industrial effluent discharges into the river. The project will provide more reliable and improved security of water supply in Dhaka by developing a new surface water supply scheme for supply augmentation, which includes the development of a water intake at Meghna River. A surface water treatment plant with capacity 500MLD is proposed to be constructed by DWASA at Gandharbpur. For this project purpose DWASA have selected four sampling points for feasibility study at Meghna River. The information of these four points are given in **Table: 1**

**Table 1: Four Sampling Locations**

Sl. #	Location
1	Bishnondi Point at AraihasarFerrighat
2	Chaitankanda point
3	Nunertech point, Near Anandabazar
4	Near Meghna bridge point

It is utmost priority to obtain for one full year water quality monitoring of the Bishnondi intake point [Chaitankanda, Bishnandi, (Coordinates: 23° 45' 14.69" N 90° 43' 18.07" E) in preparation of the design and implementation of Gandharbpur surface water treatment plant.

**2. DURATION OF THE STUDY:** From 15<sup>th</sup> February, 2014 to 20<sup>th</sup> June, 2015

**3. SURVEY METHODOLOGY:**

**3.1 Survey of Seasonal Variation:**

1. Monthly samples: Samples were collected on monthly basis from March 2014 to June 2015;
2. Weekly samples: Samples were collected on weekly basis in the all season: March 2014 to June 2015;

- Water quality analysis (field test only): The following parameters were analysed for: Temperature, pH, Salinity, Conductivity, Turbidity, Dissolved Oxygen (DO), TDS and Ammonia by using portable instruments/field test kit.

### 3.2 Survey for Special Pollutants:

- Sampling: Four samples were collected from each sampling point in the Pre monsoon (in the month of Mid-April 2014); Rainy season (in the month of Mid-July 2014);, Cool dry season (in the month of Mid December 2014); and Starting of pre- monsoon next year (in the month of Mid-February 2015).
- Water quality analysis: The following parameters were analysed in DPHE water quality laboratory: Barium; Cadmium; Chloride; Chromium (hexavalent); Coliform (faecal); BOD; COD; Lead; Mercury; Nitrate (NO<sub>3</sub>); Nitrite; Phosphate; TOC; Pesticides; Oil & Grease; Fluoride; Selenium; Zinc; Sulphate; Copper; Ammonia; Boron; Nickel and Sodium.

### 3.3 Survey for Daily Variation:

- Sampling: Samples were collected and analysed on hourly basis throughout a full day of 12 hours at Chaitankanda sampling points, both at the dry season (March 2010) and the wet season (July 2010);
- Water quality analysis (field test only): The following parameters were analysed in field: Temperature, pH, Salinity, Conductivity, Turbidity, Dissolved Oxygen (DO), TDS and Ammonia by using portable instruments and field test kits.

## 4. STATUS OF SURVEY

Based on survey methodology all samples were collected and tested. The survey status is given in **Table: 2**

**Table 2: Status of Survey**

Type of survey	Category of sampling	Time framework (Component wise as per TOR)	Status of sample collection	Field or Lab test	Status of water test
Survey of seasonal variation	Monthly sampling	March 2014 to June 2015	Completed	Field test	Completed
	Weekly sampling	March 2014 to June 2015	Completed	Field test	Completed
Survey for special pollutants	Pre monsoon and	in the month of Mid-April 2014	Completed	Laboratory test	Completed
	Rainy season	in the month of Mid-July 2014	Completed	Laboratory test	Completed
	Cool dry season	in the month of Mid December 2014	Completed	Laboratory test	Completed

Type of survey	Category of sampling	Time framework (Component wise as per TOR)	Status of sample collection	Field or Lab test	Status of water test
	Starting of pre-monsoon next year	in the month of Mid-February 2015	Completed	Laboratory test	Completed
Survey of daily variation Hourly basis	Pre monsoon and	in the month of Mid-April 2014	Completed	Field test	Completed
	Rainy season	in the month of Mid-July 2014	Completed	Field test	Completed
	Cool dry season	in the month of Mid-December 2014	Completed	Field test	Completed
	Starting of pre-monsoon next year	in the month of Mid-February 2015	Completed	Field test	Completed

## 5. HOURLY DWASA MEGHNA RIVER SURFACE WATER QUALITY MONITORING

### (1) Sample location: Chaitankanda, Bishnondi, Meghna river

(GIS Location: 23° 45' 14.69 N & 90° 43' 18.07 E)

### (2) Field Observations:

Upon arrival at a sampling site, visual observations were recorded on the appearance of the water and data related to water quality given in **Table: 3**

**Table 3: Hourly Field Observation at Chaitankanda Intake**

Sampling Date & Time	Parameter	Observation
5-4-2014 & 7.00am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 8.02am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 9.00am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 10.00am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 11.00am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 12.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 1.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 2.03pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 3.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 4.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 5.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 6.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 7.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 7.05am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 8.00am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 9.01am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓

Sampling Date & Time	Parameter	Observation
19-7-2014 &10.00am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 &11.02am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 &12.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 1.01pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 2.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 3.03pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 4.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 5.02pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 6.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19-7-2014 & 6.55pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 7.05am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 8.00am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 9.04am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 10.00am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 &11.03am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 &12.05pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 1.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 2.02pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 3.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 4.01pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 5.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12-12-2014 & 6.05pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 7.12 am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 8.00 am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 9.05 am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 &10.01 am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 &11.00 am	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 &12.02pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 1.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 2.02pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 3.01pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 4.03pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 5.00pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14-02-2015 & 5.5pm	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5-4-2014 & 7.00am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 8.02am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 9.00am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 10.00am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 11.00am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 12.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 1.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic

Sampling Date & Time	Parameter	Observation
5-4-2014 & 2.03pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 3.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 4.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 5.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 6.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 7.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 7.05am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 8.00am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 9.01am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 10.00am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 11.02am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 12.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 1.01pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 2.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 3.03pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 4.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 5.02pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 6.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19-7-2014 & 6.55pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 7.05am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 8.00am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 9.04am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 10.00am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 11.03am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic

Sampling Date & Time	Parameter	Observation
12-12-2014 & 12.05pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 1.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 2.02pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 3.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 4.01pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 5.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12-12-2014 & 6.05pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & .12 am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 8.00 am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 09.05 am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 10.01 am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 11.00 am	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 12.02pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 01.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 02.02pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 03.01pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 04.03pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 05.00pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14-02-2015 & 05.5pm	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5-4-2014 & 7.00am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 8.02am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 9.00am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 10.00am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 11.00am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓

Sampling Date & Time	Parameter	Observation
5-4-2014 & 12.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 1.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 2.03pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 3.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 4.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 5.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 6.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 7.00pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 7.05am	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 8.00am	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 9.01am	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 10.00am	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 11.02am	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 12.00pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 1.01pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 2.00pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 3.03pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 4.00pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 5.02pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 6.00pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
19-7-2014 & 6.55pm	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
12-12-2014 & 7.05am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 8.00am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 9.04am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓

Sampling Date & Time	Parameter	Observation
12-12-2014 & 10.00am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 11.03am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 12.05pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 1.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 2.02pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 3.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 4.01pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 5.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
12-12-2014 & 6.05pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 07.12 am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 08.00 am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 09.05 am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 10.01 am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 11.00 am	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 12.02pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 01.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 02.02pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 03.01pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 04.03pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 05.00pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
14-02-2015 & 05.5pm	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5-4-2014 & 7.00am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
5-4-2014 & 8.02am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
5-4-2014 & 9.00am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
5-4-2014 & 10.00am	Day	Cloudy/ Sunny ✓ / Hot ✓ / Cool
5-4-2014 & 11.00am	Day	Cloudy/ Sunny ✓ / Hot ✓ / Cool
5-4-2014 & 12.00pm	Day	Cloudy/ Sunny ✓ / Hot ✓ / Cool
5-4-2014 & 1.00pm	Day	Cloudy/ Sunny ✓ / Hot ✓ / Cool

Sampling Date & Time	Parameter	Observation
5-4-2014 & 2.03pm	Day	Cloudy/ Sunny ✓ / Hot ✓/ Cool
5-4-2014 & 3.00pm	Day	Cloudy/ Sunny ✓ / Hot ✓/ Cool
5-4-2014 & 4.00pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
5-4-2014 & 5.00pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
5-4-2014 & 6.00pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
5-4-2014 & 7.00pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 & 7.05am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 & 8.00am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 & 9.01am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 &10.00am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 &11.02am	Day	Cloudy ✓/ Sunny / Hot/ Cool
19-7-2014 &12.00pm	Day	Cloudy ✓/ Sunny / Hot/ Cool
19-7-2014 & 1.01pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 & 2.00pm	Day	Cloudy ✓/ Sunny / Hot/ Cool
19-7-2014 & 3.03pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 & 4.00pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 & 5.02pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19-7-2014 & 6.00pm	Day	Cloudy ✓/ Sunny / Hot/ Cool
19-7-2014 & 6.55pm	Day	Cloudy ✓/ Sunny / Hot/ Cool
12-12-2014 &7.05am	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 &8.00am	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 &9.04am	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 & 10.00am	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 &11.03am	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 &12.05pm	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 & 1.00pm	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 & 2.02pm	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 & 3.00pm	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 & 4.01pm	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 & 5.00pm	Day	Cloudy/ Sunny / Hot/ Cool ✓
12-12-2014 & 6.05pm	Day	Cloudy/ Sunny / Hot/ Cool ✓
14-02-2015 & 07.12 am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 & 08.00 am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 09.05 am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &10.01 am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &11.00 am	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &12.02pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &01.00pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &02.02pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &03.01pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &04.03pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &05.00pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14-02-2015 &05.5pm	Day	Cloudy/ Sunny ✓ / Hot/ Cool
5-4-2014 & 7.00am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
5-4-2014 & 8.02am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓

Surface Water Quality Monitoring Near Bishnondi Point, Meghna River

Sampling Date & Time	Parameter	Observation
5-4-2014 & 9.00am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 10.00am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 11.00am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 12.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 1.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 2.03pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 3.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 4.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 5.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 6.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
5-4-2014 & 7.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 7.05am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 8.00am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 9.01am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 10.00am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 11.02am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 12.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 1.01pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 2.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 3.03pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 4.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 5.02pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 6.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
19-7-2014 & 6.55pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √

Surface Water Quality Monitoring Near Bishnondi Point, Meghna River

Sampling Date & Time	Parameter	Observation
12-12-2014&7.05am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014&8.00am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014&9.04am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014& 10.00am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014 &11.03am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014&12.05pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014 & 1.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014 & 2.02pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014 & 3.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014 & 4.01pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014 & 5.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
12-12-2014 & 6.05pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &07.12 am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &08.00 am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 09.05 am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &10.01 am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &11.00 am	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &12.02pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &01.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &02.02pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &03.01pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015&04.03pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &05.00pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √
14-02-2015 &05.5pm	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None √

Sampling Date & Time	Parameter	Observation
5-4-2014 & 7.00am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 8.02am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 9.00am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 10.00am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 11.00am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 12.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 1.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 2.03pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 3.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 4.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 5.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 6.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
5-4-2014 & 7.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 7.05am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 8.00am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 9.01am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014&10.00am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014&11.02am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014&12.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 1.01pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 2.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 3.03pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 4.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 5.02pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None

Sampling Date & Time	Parameter	Observation
19-7-2014 & 6.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19-7-2014 & 6.55pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 &7.05am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 &8.00am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 &9.04am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 & 10.00am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 &11.03am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 &12.05pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 & 1.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 & 2.02pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 & 3.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 & 4.01pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 & 5.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12-12-2014 & 6.05pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &07.12 am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &08.00 am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 09.05 am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &10.01 am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &11.00 am	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &12.02pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &01.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &02.02pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &03.01pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 &04.03pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None

Sampling Date & Time	Parameter	Observation
14-02-2015 & 05.00pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14-02-2015 & 05.5pm	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None

### 5.1 Hourly Water Quality Test Parameters (Field Tests)

Hourly samples were collected at daytime in four seasons to analyze Temperature, pH, Salinity, Conductivity, Turbidity, DO, TDS & Ammonia using field test kits. The field tests results are given in **Table: 4** and the graphical presentation of the hourly monitoring results are given in **Figure: 1** to **Figure: 8**.

**Table 4: Hourly Water Quality Test Parameters at Chaitankanda Intake**

Date & Time	Depth (m)	Temp (°C)	pH	Salinity (gm/kg)	EC (µS/cm)	Turbidity (mg/L)	DO (mg/L)	TDS (mg/L)	NH <sub>3</sub> (mg/L)
Bangladesh Standard (Surface water) E.C.R. 1997		40	6-9	-	1200	-	≥6	2100	5
Bangladesh Standard (Drinking water) E.C.R. 1997		20-30	6.5-8.5	-	-	10	6	1000	0.5
5-4-2014 & 7.00am	9.2	26.8	7.7	0.07	158.3	0.63	7.69	60	0
5-4-2014 & 8.02am	9.1	27.6	7.62	0.07	159.6	0.62	7.84	62.5	0
5-4-2014 & 9.00am	9	28	7.69	0.07	160.8	0.63	7.94	75	0
5-4-2014 & 10.00am	9.1	28.6	7.64	0.08	167.6	0.87	8.1	79.5	0
5-4-2014 & 11.00am	9.2	28.8	8.06	0.07	154.8	0.77	8.22	73.4	0
5-4-2014 & 12.00pm	9.2	29.5	8.15	0.08	163.8	0.81	8.35	77.5	0
5-4-2014 & 1.00pm	9.25	30.3	8.04	0.07	153.6	0.75	8.28	73.8	0
5-4-2014 & 2.03pm	9.25	29.2	8.14	0.07	161.7	0.75	8.39	76.2	0
5-4-2014 & 3.00pm	9.3	29.3	7.94	0.07	154.5	0.65	8.33	73.3	0
5-4-2014 & 4.00pm	9.2	29	7.97	0.08	164.6	0.95	8.32	78.1	0
5-4-2014 & 5.00pm	9	28.8	7.68	0.08	160.9	1.3	7.97	75.2	0
5-4-2014 & 6.00pm	9	27.6	7.63	0.07	159.7	2	7.81	65.1	0
5-4-2014 & 7.00pm	9.1	26.5	7.72	0.08	158.4	2.05	7.68	63.2	0
19-7-2014 & 7.05am	6.55	28.9	7.62	0.03	59.4	10.86	7.15	29.6	0
19-7-2014 & 8.00am	6.55	29.8	7.66	0.03	61.7	14.81	7.17	29.2	0
19-7-2014 & 9.01am	6.5	30	7.47	0.03	59.7	10.25	7.32	28	0
19-7-2014 & 10.00am	6.5	29.7	7.46	0.03	60.3	14.38	7.28	30.2	0
19-7-2014 & 11.02am	6.5	29.3	7.43	0.03	68.2	12.62	7.25	32.1	0
19-7-2014 & 12.00pm	6.5	30.2	7.48	0.03	61.9	15.84	7.44	29.1	0
19-7-2014 & 1.01pm	6.75	30.6	7.53	0.03	63.3	15.52	7.35	29.8	0

Surface Water Quality Monitoring Near Bishnondi Point, Meghna River

Date & Time	Depth (m)	Temp (°C)	pH	Salinity (gm/kg)	EC (µS/cm)	Turbidity (mg/L)	DO (mg/L)	TDS (mg/L)	NH <sub>3</sub> (mg/L)
<b>Bangladesh Standard (Surface water) E.C.R. 1997</b>		<b>40</b>	<b>6-9</b>	<b>-</b>	<b>1200</b>	<b>-</b>	<b>≥6</b>	<b>2100</b>	<b>5</b>
<b>Bangladesh Standard (Drinking water) E.C.R. 1997</b>		<b>20-30</b>	<b>6.5-8.5</b>	<b>-</b>	<b>-</b>	<b>10</b>	<b>6</b>	<b>1000</b>	<b>0.5</b>
19-7-2014 & 2.00pm	6.75	30.4	7.51	0.03	67.9	9.48	7.41	31.9	0
19-7-2014 & 3.03pm	6.75	30.3	7.46	0.03	66.5	10.3	7.6	30.6	0
19-7-2014 & 4.00pm	7	30	7.62	0.03	59.7	14.6	7.34	28.9	0
19-7-2014 & 5.02pm	7	29.7	7.54	0.03	61.6	10.11	7.28	30.2	0
19-7-2014 & 6.00pm	6.75	29.8	7.48	0.03	60	12.32	7.19	29.5	0
19-7-2014 & 6.55pm	6.5	29.2	7.53	0.03	63.2	9.44	7.15	29.1	0
12-12-2014&7.05am	7.5	21.4	7.54	0.05	108.3	6.89	7.82	52.6	0.5
12-12-2014&8.00am	7.25	22.7	7.51	0.05	112.4	6.97	7.93	52.4	0.5
12-12-2014&9.04am	7.25	21.5	7.52	0.05	113.1	7.01	7.88	53.5	0.5
12-12-2014&10.00am	7	21.6	7.59	0.05	108.9	6.27	7.94	51.4	0.5
12-12-2014 &11.03am	7.25	22.1	7.5	0.05	111.6	5.63	7.97	52.9	0.5
12-12-2014&12.05pm	7.25	21.5	7.53	0.05	109.3	6.32	8	51.1	0.5
12-12-2014 & 1.00pm	7.5	21.7	7.62	0.05	113.8	5.51	7.94	53.9	0.5
12-12-2014 & 2.02pm	7.75	22.2	7.6	0.05	113.3	4.62	7.79	53.5	0.5
12-12-2014&3.00pm	8	22.7	7.59	0.05	116.9	4.46	7.75	55.3	0.5
12-12-2014&4.01pm	7.75	22.6	7.58	0.05	115.8	4.89	7.62	54.9	0.5
12-12-2014 & 5.00pm	7.75	22.3	7.62	0.05	111.2	5.12	7.89	55.3	0.5
12-12-2014 & 6.05pm	7.25	22	7.58	0.05	114.3	5.42	7.8	54.6	0.5
14-02-2015&07.12 am	6.5	19.8	7.52	0.05	97.4	2.52	8.51	48.4	0.5
14-02-2015&08.00 am	6.5	19.9	7.58	0.05	99.3	1.96	8.42	42.2	0.5
14-02-2015 09.05 am	6.5	20.3	7.6	0.05	91.2	2.19	8.37	37.4	0.5
14-02-2015&10.01 am	6.75	21.2	7.57	0.05	89.1	2.22	8.33	40.4	0.5
14-02-2015&11.00 am	6.75	21.3	7.49	0.05	101.2	1.86	8.29	38.9	0.5
14-02-2015&12.02pm	7	21.5	7.62	0.05	112.7	1.59	8.62	49.6	0.5
14-02-2015&01.00pm	7	22.2	7.53	0.05	123.2	1.96	8.78	50.3	0.5
14-02-2015&02.02pm	7	23.3	7.5	0.05	105.3	2.44	8.8	59.3	0.5
14-02-2015&03.01pm	7	22.6	7.48	0.05	124.1	1.94	8.9	58.6	0.5
14-02-2015&04.03pm	6.75	22.1	7.52	0.05	121.4	1.59	8.82	52.1	0.5
14-02-2015&05.00pm	6.75	21.8	7.57	0.05	109.5	1.33	8.37	54.2	0.5
14-02-2015&05.5pm	6.5	21.2	7.62	0.05	98.9	1.89	8.48	50.7	0.5

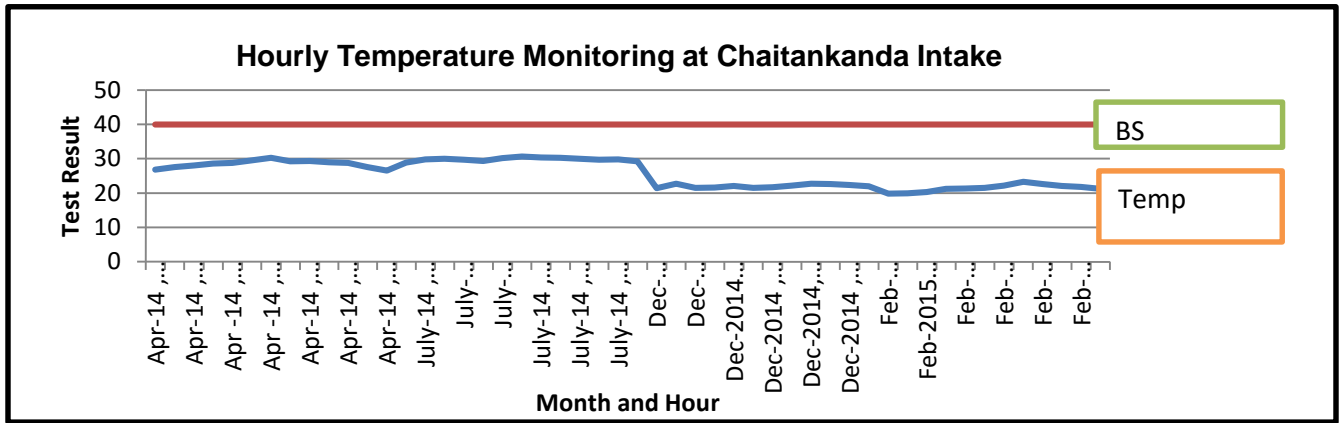


Figure 1: Hourly Temperature Monitoring at Chaitankanda Intake

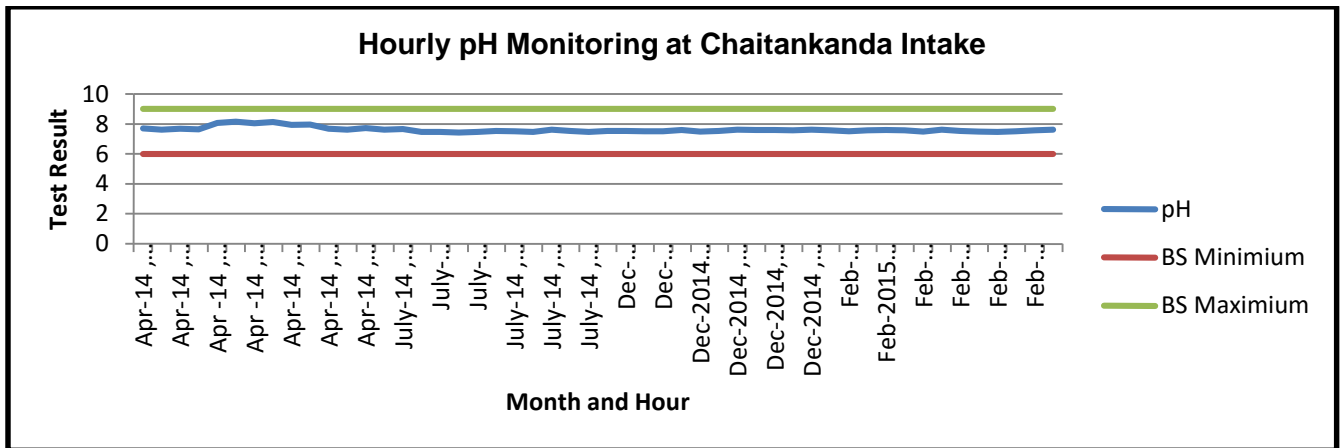


Figure 2 : Hourly pH Monitoring at Chaitankanda Intake

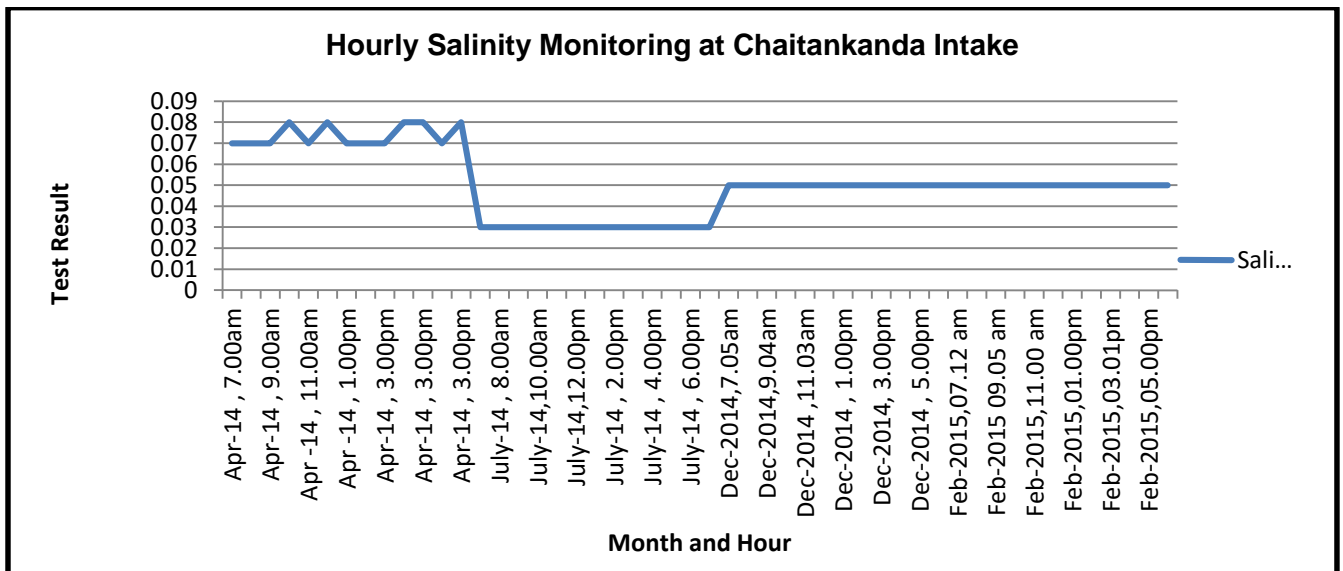


Figure 3: Hourly Salinity Monitoring at Chaitankanda Intake



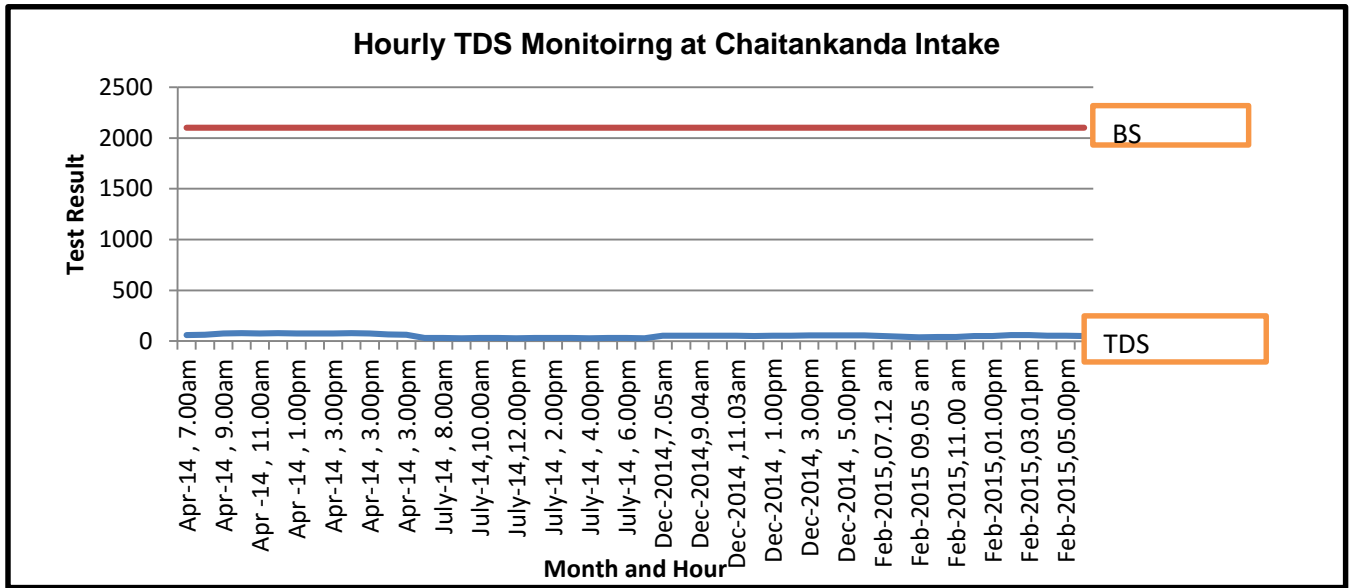


Figure 7: Hourly TDS Monitoring at Chaitankanda Intake

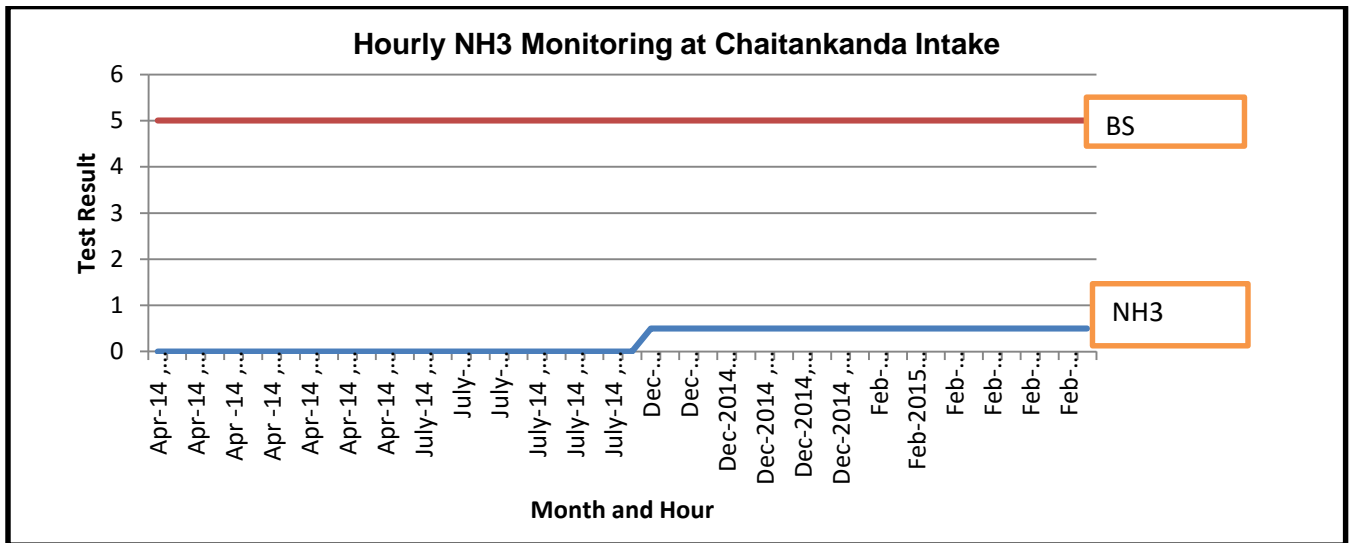


Figure 8: Hourly NH<sub>3</sub> Monitoring at Chaitankanda Intake

5.2 Observation on Hourly Sampling:

Samples were collected on hourly basis from February 2014 to June 2015 and the test parameters were Temperature, pH, Salinity, Conductivity, Turbidity, DO, TDS & Ammonia to understand the hourly variation of surface water quality in the study area where probable surface water intake points are considering for DWASA surface water treatment plant. The hourly observations are as below:

**Temperature:** The temperature of the surface water of Meghna River is found (Max=30.60°C; Min=19.8°C; Avg= 25.588°C) respectively during this fourteen month. According to Bangladesh Surface Water Quality Standard, the acceptable limit of temperature is 40°C.

**pH:** Tolerance level of pH value(6-9) was observed in sampling area during survey time. The surface water of Meghna River point was showing pH value (Max=8.15; Min=7.43&Avg=7.623).

**Salinity:** The maximum salinity level was 0.08; minimum salinity was 0.03 and average salinity was 0.051 in Chaitankanda Intake point. There is no Bangladesh Standard of Surface Water for salinity.

**Conductivity:** It does indicate the amount of dissolved solids (such as salt) in water. The surface water of Meghna River point was showing conductivity value Max=167.6; Min=59.4 & Avg=110.278). According to Bangladesh Surface Water Quality Standard, the accept limit of Conductivity is 1200.

**Turbidity:** Turbidity values were found at Meghna River. The maximum turbidity was 15.84 NTU; minimum turbidity was 0.62 NTU and average turbidity was 5.3182 in Chaitankanda Intake sampling point. There is no Bangladesh Surface Water Quality Standard for turbidity.

**Dissolved Oxygen (DO):** It was observed that the DO values at Chaitankanda Intake sampling point in Meghna River were shown DO (Max=8.9 mg/l; Min=7.15mg/l; Avg= 7.9374mg/l) respectively during these fourteen months. According to Bangladesh Surface Water Quality Standard, the accept limit of DO is 6 or more.

**Total Dissolved Solids (TDS):** It was observed that the TDS values of at Chaitankanda Intake sampling point at Meghna River were shown TDS (Max=79.5 mg/l; Min=28mg/l; Avg= 50.89mg/l) respectively during these fourteen months. According to Bangladesh Surface Water Quality Standard, the accept limit of TDS is 2100 mg/l.

**Ammonia (NH<sub>3</sub>-N):** The maximum ammonia was 0.5 mg/l; minimum ammonia was 0 mg/l and average ammonia was 0.24 in Chaitankanda Intake sampling point. According to Bangladesh Surface Water Quality Standard, the accept limit of ammonia is 5 mg/l.

## 6. WEEKLY DWASA MEGHNA RIVER SURFACE WATER QUALITY MONITORING

**(1) Sample location: Chaitankanda, Bishnondi, Meghna river**

(GIS Location: 23° 45' 14.69 N & 90° 43' 18.07 E)

**(2) Field Observations:**

Upon arrival at Chaitankanda Intake sampling site, The visual observations were recorded on the appearance of the water and other data related to water quality are given in **Table: 5**

**Table 5: Weekly Field Observation at Chaitankanda Intake Point**

Sampling Week	Parameter	Observation
1 <sup>st</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
2 <sup>nd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
3 <sup>rd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓

Sampling Week	Parameter	Observation
4 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
5 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
6 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
7 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
8 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
9 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
10 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
11 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
12 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
13 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
14 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
15 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
16 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
17 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
18 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
19 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
20 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
21 <sup>st</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
22 <sup>nd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
23 <sup>rd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
24 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
25 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
26 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
27 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
28 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
29 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
30 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
31 <sup>st</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
32 <sup>nd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
33 <sup>rd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
34 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
35 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
36 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
37 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
38 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
39 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
40 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
41 <sup>st</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
42 <sup>nd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
43 <sup>rd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
44 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
45 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
46 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
47 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
48 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
49 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
50 <sup>th</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓

Sampling Week	Parameter	Observation
51 <sup>st</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
52 <sup>nd</sup>	Water color	Greenish/reddish/yellowish/muddy/colorless ✓
1 <sup>st</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
2 <sup>nd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
3 <sup>rd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
4 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
5 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
6 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
7 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
8 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
9 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
10 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
11 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
12 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
13 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
14 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
15 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
16 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
17 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
18 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
19 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
20 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
21 <sup>st</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
22 <sup>nd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
23 <sup>rd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic

Sampling Week	Parameter	Observation
24 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
25 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
26 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
27 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
28 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
29 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
30 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
31 <sup>st</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
32 <sup>nd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
33 <sup>rd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
34 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
35 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
36 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
37 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
38 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
39 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
40 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
41 <sup>st</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
42 <sup>nd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
43 <sup>rd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
44 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
45 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
46 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
47 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic

Sampling Week	Parameter	Observation
48 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
49 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
50 <sup>th</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
51 <sup>st</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
52 <sup>nd</sup>	Water appearance	Unusual amount of floating matter ✓ /debris/foam/weeds/plastic
1 <sup>st</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
2 <sup>nd</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
3 <sup>rd</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
4 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
5 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
6 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
7 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
8 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
9 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
10 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
11 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low ✓/ None
12 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low ✓/ None
13 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low ✓/ None
14 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
15 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
16 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
17 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
18 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
19 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
20 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
21 <sup>st</sup>	Rainfall in last 24h	Heavy/Medium/ Low ✓/ None
22 <sup>nd</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
23 <sup>rd</sup>	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
24 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
25 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
26 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
27 <sup>th</sup>	Rainfall in last 24h	Heavy ✓/Medium/ Low/ None
28 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
29 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
30 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
31 <sup>st</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
32 <sup>nd</sup>	Rainfall in last 24h	Heavy/Medium ✓/ Low/ None
33 <sup>rd</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
34 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low ✓/ None
35 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
36 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
37 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓

Sampling Week	Parameter	Observation
38 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
39 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
40 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
41 <sup>st</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
42 <sup>nd</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
43 <sup>rd</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
44 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
45 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
46 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
47 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
48 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
49 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
50 <sup>th</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
51 <sup>st</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
52 <sup>nd</sup>	Rainfall in last 24h	Heavy/Medium/ Low/ None ✓
1 <sup>st</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
2 <sup>nd</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
3 <sup>rd</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
4 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
5 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
6 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
7 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot ✓/ Cool
8 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot ✓/ Cool
9 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
10 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot ✓/ Cool
11 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot ✓/ Cool
12 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
13 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
14 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot ✓/ Cool
15 <sup>th</sup>	Day	Cloudy ✓/ Sunny / Hot/ Cool
16 <sup>th</sup>	Day	Cloudy ✓/ Sunny / Hot/ Cool
17 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
18 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
19 <sup>th</sup>	Day	Cloudy ✓/ Sunny / Hot/ Cool
20 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
21 <sup>st</sup>	Day	Cloudy ✓ / Sunny / Hot/ Cool
22 <sup>nd</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
23 <sup>rd</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
24 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
25 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
26 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
27 <sup>th</sup>	Day	Cloudy ✓/ Sunny / Hot/ Cool
28 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
29 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
30 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
31 <sup>st</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
32 <sup>nd</sup>	Day	Cloudy ✓ / Sunny / Hot/ Cool

Sampling Week	Parameter	Observation
33 <sup>rd</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
34 <sup>th</sup>	Day	Cloudy ✓/ Sunny / Hot/ Cool
35 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
36 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
37 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
38 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot ✓/ Cool
39 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
40 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
41 <sup>st</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
42 <sup>nd</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
43 <sup>rd</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
44 <sup>th</sup>	Day	Cloudy/ Sunny / Hot/ Cool ✓
45 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
46 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
47 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
48 <sup>th</sup>	Day	Cloudy/ Sunny / Hot/ Cool ✓
49 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
50 <sup>th</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
51 <sup>st</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
52 <sup>nd</sup>	Day	Cloudy/ Sunny ✓ / Hot/ Cool
1 <sup>st</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
2 <sup>nd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
3 <sup>rd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
4 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
5 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
6 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
7 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
8 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
9 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
10 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
11 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
12 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
13 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓

Sampling Week	Parameter	Observation
14 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
15 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
16 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
17 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
18 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
19 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
20 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
21 <sup>st</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
22 <sup>nd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
23 <sup>rd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
24 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
25 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
26 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
27 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
28 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
29 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
30 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
31 <sup>st</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
32 <sup>nd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
33 <sup>rd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
34 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
35 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
36 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
37 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓

Sampling Week	Parameter	Observation
38 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
39 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
40 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
41 <sup>st</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
42 <sup>nd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
43 <sup>rd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
44 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
45 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
46 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
47 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
48 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
49 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
50 <sup>th</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
51 <sup>st</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
52 <sup>nd</sup>	Unusual Odor	Hydrogen Sulfide odor/ Musty odor/ Sewage odor/ None ✓
1 <sup>st</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton/ others Water Hyacinth / None ✓
2 <sup>nd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton/ others Water Hyacinth / None ✓
3 <sup>rd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton/ others Water Hyacinth / None ✓
4 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton/ others Water Hyacinth ✓ / None ✓
5 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton ✓ / others Water Hyacinth ✓ / None
6 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton ✓ / others Water Hyacinth ✓ / None
7 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton ✓ / others Water Hyacinth ✓ / None
8 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton ✓ / others Water Hyacinth ✓ / None
9 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton ✓ / others Water Hyacinth ✓ / None

Sampling Week	Parameter	Observation
10 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
11 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
12 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
13 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
14 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
15 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
16 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
17 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
18 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
19 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
20 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
21 <sup>st</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
22 <sup>nd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
23 <sup>rd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
24 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
25 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
26 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
27 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
28 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
29 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
30 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
31 <sup>st</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
32 <sup>nd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
33 <sup>rd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None

Sampling Week	Parameter	Observation
34 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
35 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
36 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
37 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
38 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
39 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
40 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
41 <sup>st</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
42 <sup>nd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
43 <sup>rd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
44 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
45 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
46 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
47 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
48 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
49 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
50 <sup>th</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
51 <sup>st</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None
52 <sup>nd</sup>	Biological Activity	Excessive growth of algal/ Phytoplankton✓/ others Water Hyacinth✓ / None

### 6.1 Weekly Water Quality Test Parameters (Field Tests)

Weekly Samples were collected from Bishnondi Intake point (Chaitankanda, Bishnondi) and 61 weeks were monitored the following parameters: Alkalinity, Temperature, Salinity, Conductivity, Turbidity, DO, TDS, Ammonia, Hardness & Arsenic using field test kits. The field tests results are given in **Table: 6** and the graphical presentation of the weekly monitoring results are given in **Figure: 9 to Figure: 18**.

**Table 6: Weekly Water Quality Test Parameters at Chaitankanda Intake**

Sampli ng Week	Date & Time	Dep th (m)	Alkal inity (mg/ L)	Temp (°C)	pH	Sali nity (gm /kg)	Conduc tivity (µS/cm)	Turbi dity (JTU )	DO (mg /L)	TDS (mg/L )	NH <sub>3</sub> (mg/ L)	Hard. (mg/L )	As (mg/ L)
<b>Bangladesh Standard (SW) E.C.R. 1997</b>			-	40	6-9	-	1200	-	4.5- 8	2100	5	-	0.2
<b>Bangladesh Standard (DW) E.C.R. 1997</b>			-	20-30	6.5- 8.5	-	-	10	6	1000	0.5	200- 500	0.05
1 <sup>st</sup>	15-02-14 & 12.05pm	8.2	75	21.1	8.4	2	71	1.26	9.75	48	0.5	72	-
2 <sup>nd</sup>	22-02-14 &11.00 am	8.3	60	24.5	7.6	1	95	1.88	8.95	51	0	60	-
3 <sup>rd</sup>	01-03-14 &11.05 am	8.15	60	25.2	8	1	97	0.09	8.42	55	0	52.5	-
4 <sup>th</sup>	08-03-14 & 1-30 pm	9	75	25.6	7.9	1.5	63	2.4	8.06	62	0	52.5	0
5 <sup>th</sup>	15-3-14 & 11.40 am	7.25	60	26.6	7.92	1.5	145.8	0.75	8.06	68	0	30	-
6 <sup>th</sup>	22-3-14 & 11.40am	9.25	60	29.1	7.74	1.5	170.4	1.95	7.89	64	0	60	-
7 <sup>th</sup>	29-03-14 & 1.35 pm	9	54	32.7	7.91	1.5	174	2.16	7.64	79	0	45	-
8 <sup>th</sup>	05-04-14 & 9-00 am	9	66	28	7.69	0.07	160.8	0.63	7.94	75	0	225	0
9 <sup>th</sup>	12-4-14 &12.20 pm	9.1	67.5	30	8.24	0.08	163.4	2.18	7.72	78.2	0	30	-
10 <sup>th</sup>	19-4-14 &12.10p m	9.2	75	32.3	8.33	0.08	163	3.59	7.68	76.6	0	52.5	-
11 <sup>th</sup>	26-04-14 &12.40 pm	8	63	33.4	8.56	0.08	158.3	3.88	7.52	76.2	0	60	-
12 <sup>th</sup>	03-05-14 &11-00 am	8	60	31.8	8.2	0.08	160.4	3.74	7.62	75.8	0	60	-
13 <sup>th</sup>	10-05- 14&12- 10 pm	7.5	67.5	30.3	8.25	0.08	170.4	8.04	8.01	80.5	0	52.5	0
14 <sup>th</sup>	17-05-14 &12.10 pm	8.5	48	33.8	7.54	0.07	162.2	40.68	6.63	77	0	45	-

Surface Water Quality Monitoring Near Bishnondi Point, Meghna River

Sampli ng Week	Date & Time	Dep th (m)	Alkal inity (mg/ L)	Temp (°C)	pH	Sal inity (gm /kg)	Conduc tivity (µS/cm)	Turbi dity (JTU )	DO (mg /L)	TDS (mg/L )	NH <sub>3</sub> (mg/ L)	Hard. (mg/L )	As (mg/ L)
<b>Bangladesh Standard (SW) E.C.R. 1997</b>			-	40	6-9	-	1200	-	4.5- 8	2100	5	-	0.2
<b>Bangladesh Standard (DW) E.C.R. 1997</b>			-	20-30	6.5- 8.5	-	-	10	6	1000	0.5	200- 500	0.05
15 <sup>th</sup>	24-05-14 &4.00pm	8.5	52.5	28.9	7.41	0.05	108.3	36.91	7.24	51.1	0	30	-
16 <sup>th</sup>	31-05-14 &1.40 pm	8.5	36	27.2	7.36	0.04	88.9	15.62	7.27	42.1	0	30	-
17 <sup>th</sup>	07-06-14 & 3-45 pm	8	48	31.2	7.57	0.05	100.9	13.6	7.43	47.5	0	45	0
18 <sup>th</sup>	14-06-14 & 3-20 pm	8	45	34	8.22	0.04	89.3	14.98	7.68	42.5	0	52.5	-
19 <sup>th</sup>	21-06- 14& 4.10 pm	7.5	36	29.1	7.56	0.04	84.6	15.78	7.41	39.6	0	30	-
20 <sup>th</sup>	28-06-14 &11.20a m	7.75	32	32	7.41	0.03	69.8	19.44	7.15	32.6	0	30	-
21 <sup>st</sup>	5-07-14 &1.20 pm	7	24	28.9	7.56	0.03	62.1	10.59	7.52	29.3	0	24	0
22 <sup>nd</sup>	14-07-14 &10.00 pm	7	21	31.6	7.65	0.03	59.3	12.13	7.4	27.8	0	21	-
23 <sup>rd</sup>	19-7-14 & 09.01 am	6.5	3	30	7.47	0.03	59.7	10.25	7.32	28	0	21	-
24 <sup>th</sup>	26-7-14 & 09.40am	7	22.5	30.2	7.41	0.03	62.9	16.83	7.59	30.3	0	22.5	-
25 <sup>th</sup>	02-8-14 & 09.30 am	7	30	31.2	7.56	0.03	74.2	12.95	7.47	35	0	30	-
26 <sup>th</sup>	09-8-14 & 11-47 am	7	22.5	30.6	7.29	0.03	65.4	29.43	7.39	30.7	0	22.5	0
27 <sup>th</sup>	16-08-14 &2.10 pm	7.5	30	28.7	7.37	0.03	68.8	20.49	7.4	32.5	0	30	-
28 <sup>th</sup>	23-08-14 &12.05 pm	7.5	30	30.3	7.42	0.02	53.7	17.6	7.5	24.9	0	24	-
29 <sup>th</sup>	30-08-14 &1.40 pm	7.75	36	29.9	7.31	0.02	51.7	16.86	7.4	24.6	0	30	-
30 <sup>th</sup>	05-09-14 &11.15 am	7.5	27	31	7.22	0.03	60.1	18.13	7.24	28.2	0	36	0

Surface Water Quality Monitoring Near Bishnondi Point, Meghna River

Sampli ng Week	Date & Time	Dep th (m)	Alkal inity (mg/ L)	Temp (°C)	pH	Sali nity (gm /kg)	Conduc tivity (µS/cm)	Turbi dity (JTU )	DO (mg /L)	TDS (mg/L )	NH <sub>3</sub> (mg/ L)	Hard. (mg/L )	As (mg/ L)
<b>Bangladesh Standard (SW) E.C.R. 1997</b>			-	40	6-9	-	1200	-	4.5- 8	2100	5	-	0.2
<b>Bangladesh Standard (DW) E.C.R. 1997</b>			-	20-30	6.5- 8.5	-	-	10	6	1000	0.5	200- 500	0.05
31 <sup>st</sup>	13-09-14 & 3-00 pm	7.25	30	30.8	7.45	0.03	77.3	22.7	7.16	36.2	0	36	-
32 <sup>nd</sup>	20-09-14 & 11.30 am	7.5	39	29.7	7.45	0.03	65.9	21.92	7.3	31.1	0	36	-
33 <sup>rd</sup>	27-09-14 & 11.05 am	7	36	30.2	7.35	0.03	62.2	20.21	7.29	28.5	0	27	-
34 <sup>th</sup>	02-10-14 & 10.45 am	7.25	33	30.8	7.39	0.03	60.6	16.4	7.14	29.4	0	18	-
35 <sup>th</sup>	11-10-14 & 11.48 am	7.5	21	31	7.4	0.03	58.6	13.6	6.87	27.5	0	15	0
36 <sup>th</sup>	18-10- 14 & 5.00 pm	6.5	36	31.2	7.3	0.04	82.3	12.82	7.46	38	0	42	-
37 <sup>th</sup>	25-10-14 & 12.20 pm	7	36	29.1	7.52	0.03	75.2	25.2	7.21	37.1	0	36	-
38 <sup>th</sup>	01-11-14 & 02.05 pm	7.5	39	28.2	7.43	0.03	76.9	17.13	7.08	36.2	0	39	0
39 <sup>th</sup>	07-11-14 & 11.40 am	7.25	36	28.7	7.76	0.04	81.1	15.89	7.48	38.1	0	36	-
40 <sup>th</sup>	15-11-14 & 01.55 pm	7	39	28.5	7.39	0.05	100.4	11.25	7.29	47.9	0	39	-
41 <sup>st</sup>	22-11-14 & 12.10 pm	7	36	26.5	7.67	0.04	96.8	8.55	7.51	45.5	0	30	-
42 <sup>nd</sup>	29-11-14 & 12.40 pm	6.5	30	25.1	7.52	0.04	96.5	8.22	7.57	45.7	0	33	0
43 <sup>rd</sup>	06-12-14 & 11.30 am	7.75	39	23.8	7.83	0.05	108.5	2.57	7.85	51.5	0	39	-
44 <sup>th</sup>	12-12-14 & 3-00 pm	8	45	22.7	7.59	0.05	116.9	4.46	7.75	55.3	0.05	57	-
45 <sup>th</sup>	20-12-14 & 3.10 pm	7	39	24.3	7.69	0.05	110.7	6.25	8.12	52.6	0.5	52	-

Surface Water Quality Monitoring Near Bishnondi Point, Meghna River

Sampli ng Week	Date & Time	Dep th (m)	Alkal inity (mg/ L)	Temp (°C)	pH	Sali nity (gm /kg)	Conduc tivity (µS/cm)	Turbi dity (JTU )	DO (mg /L)	TDS (mg/L )	NH <sub>3</sub> (mg/ L)	Hard. (mg/L )	As (mg/ L)
<b>Bangladesh Standard (SW) E.C.R. 1997</b>			-	40	6-9	-	1200	-	4.5- 8	2100	5	-	0.2
<b>Bangladesh Standard (DW) E.C.R. 1997</b>			-	20-30	6.5- 8.5	-	-	10	6	1000	0.5	200- 500	0.05
46 <sup>th</sup>	27-12-14 &1.40 pm	6.75	39	17.9	7.71	0.06	120.6	3.17	8.21	56.9	0.5	36	-
47 <sup>th</sup>	03-01-15 &1.20 pm	6.5	36	21.5	7.79	0.06	125.5	5.78	8.04	58.9	0.5	48	0
48 <sup>th</sup>	10-01-15 &10.15 am	7	45	17.7	7.59	0.05	122.5	4.63	7.98	57.4	0.5	48	-
49 <sup>th</sup>	24-01-15 &11.35 am	6.75	54	23.4	7.89	0.06	123.9	1.36	8.52	58.5	0.5	45	0
50 <sup>th</sup>	31-01-15 &02.10 pm	7.25	63	21.6	7.74	0.05	119.9	0.84	8.31	56.6	0.5	60	-
51 <sup>st</sup>	07-02-15 &11.35 am	7.5	57	21.9	7.64	0.05	126.6	0.73	8.57	60	0	63	-
52 <sup>nd</sup>	14-02-15 &02.45 am	7	39	22.6	7.48	0.05	124	1.94	8.9	58.6	0.5	36	-
53 <sup>rd</sup>	25-04- 15, 11:40 pm	7	76	29	8.28	0.08	177.3	6.07	7.97	83.8	0.5	71	-
54 <sup>th</sup>	2-05-15, 12.15 pm	7	51	29.9	7.52	0.05	117.9	41.9	6.82	54.5	0.5	60	-
55 <sup>th</sup>	9-05-15, 12.10 pm	7	45	31	7.64	0.05	100	39.68	6.91	46.6	0.5	63	-
56 <sup>th</sup>	16-05-15 , 12.30 am	7.5	30	30.6	7.48	0.04	95.2	23.58	6.98	44.6	0.5	45	-
57 <sup>th</sup>	23-05-15 12.30 pm	7.5	45	31.6	7.56	0.04	95.4	18.57	6.34	45.5	0.5	51	-
58 <sup>th</sup>	30-05-15 12.20 pm	7	42	30.7	7.72	0.05	99.5	20.41	6.51	46.5	0.5	54	-
60 <sup>th</sup>	6-06-15 12.15 pm	7.5	48	31	7.63	0.04	87.9	22.64	6.58	41.6	0.5	51	-
61 <sup>st</sup>	13-06-15 12.30 pm	8	39	26.4	7.35	0.03	71.2	40.27	6.54	33.2	0.5	51	-

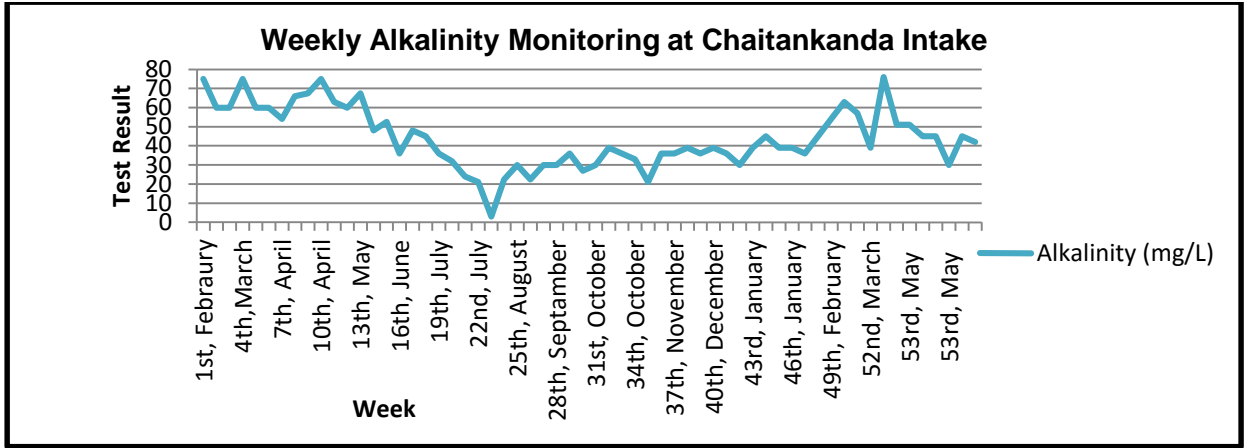


Figure 9: Weekly Alkalinity Monitoring at Chaitanda Intake

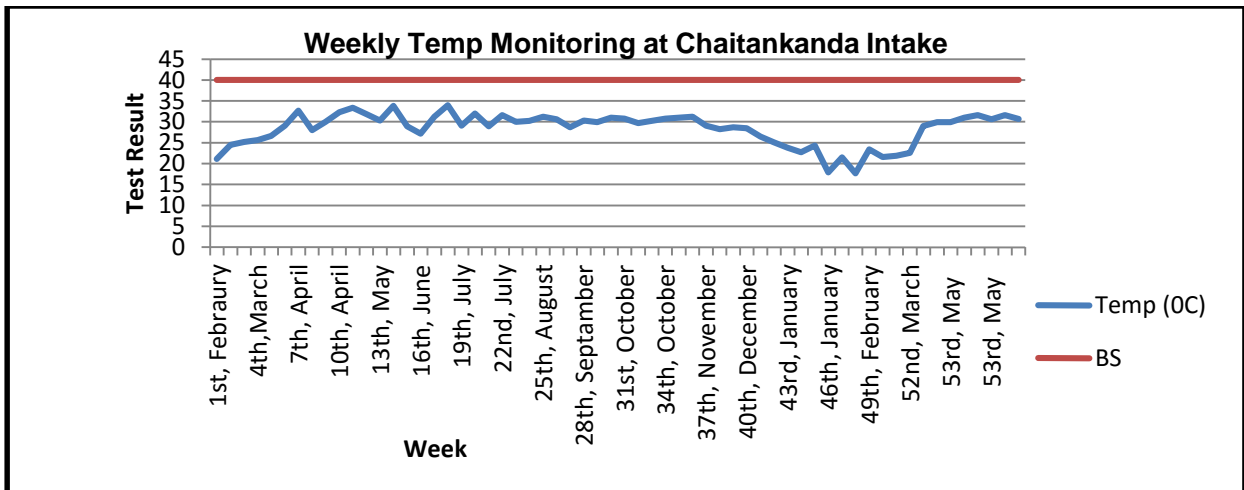


Figure 10: Weekly Temp Monitoring at Chaitankanda Inka

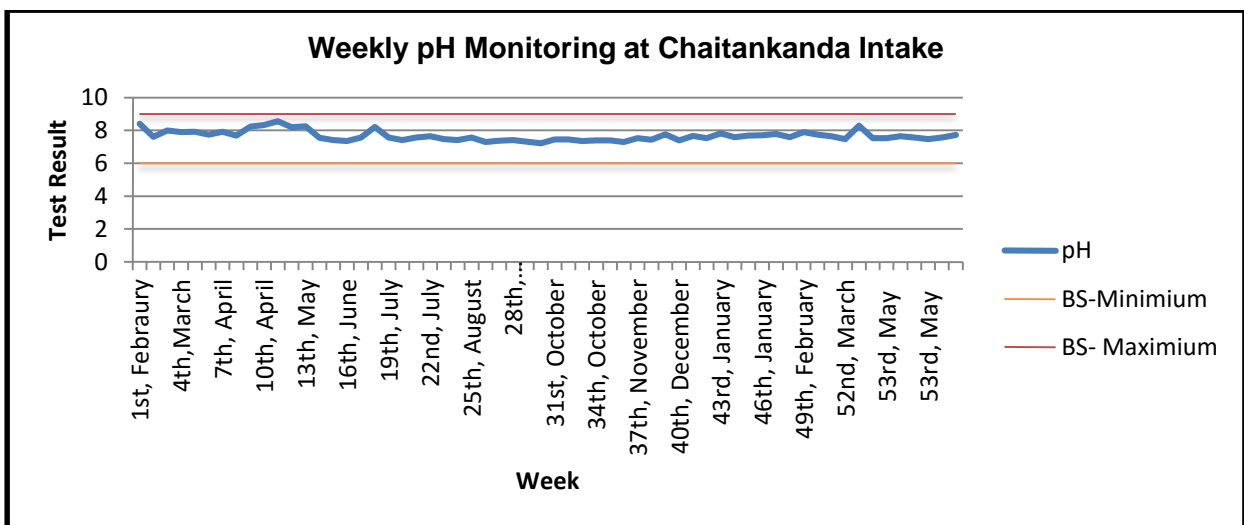


Figure 11: Weekly pH Monitoring at Chaitankanda Intake

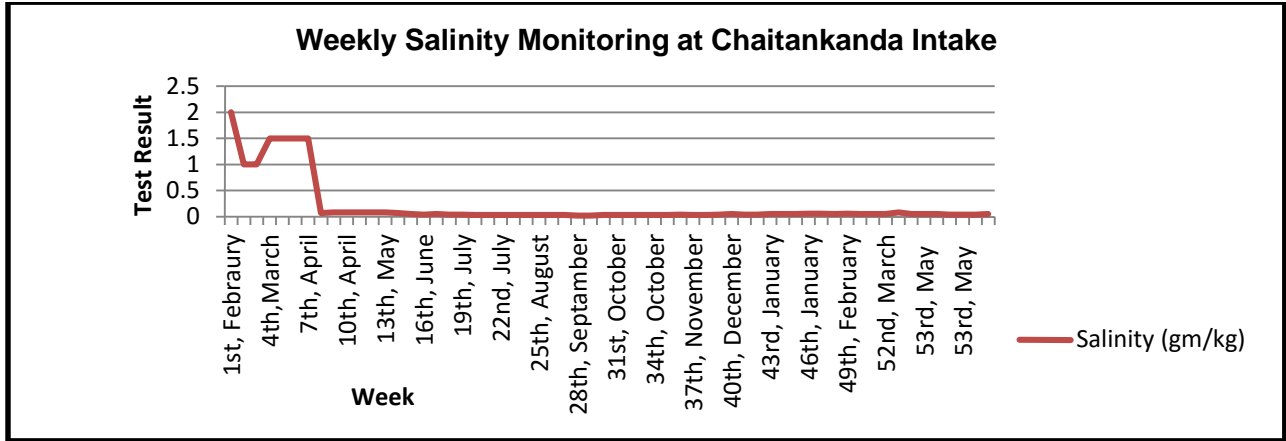


Figure 12: Weekly Salinity Monitoring at Chaitankanda Intake

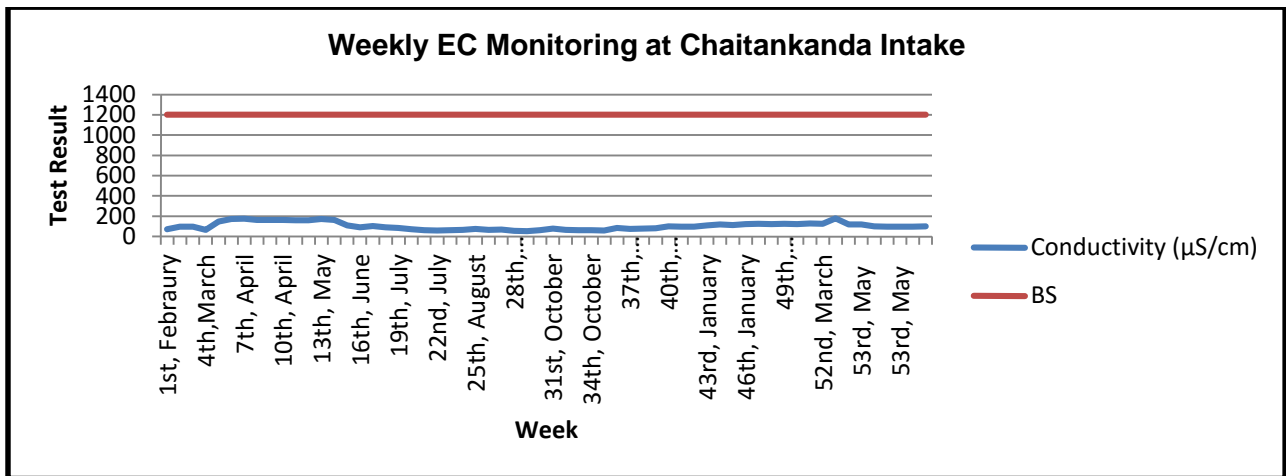


Figure 13: Weekly EC Monitoring at Chaitankanda Intake

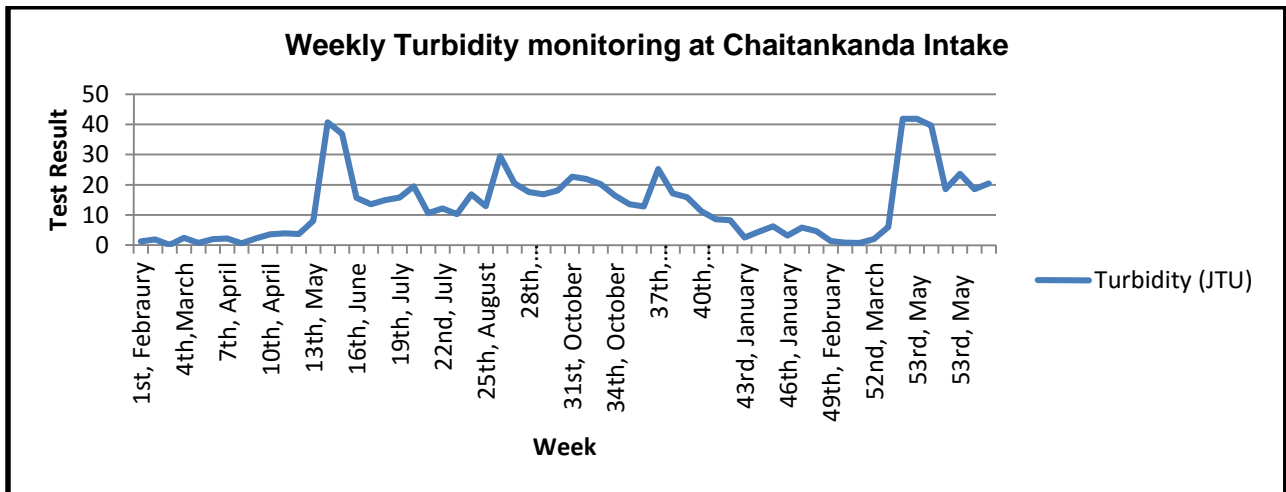


Figure 14: Weekly Turbidity at Chaitankanda Intake

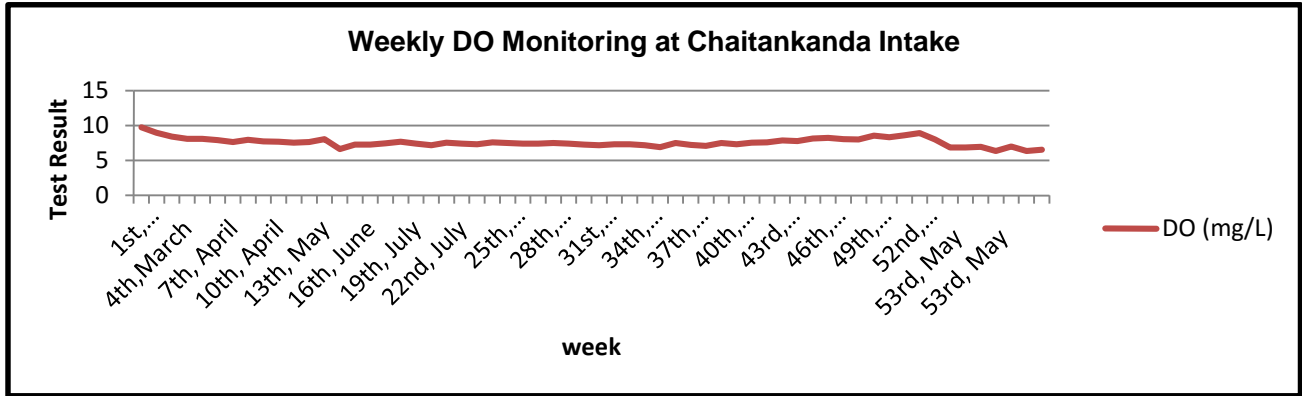


Figure 15: Weekly DO Monitoring at Chaitankanda Intake

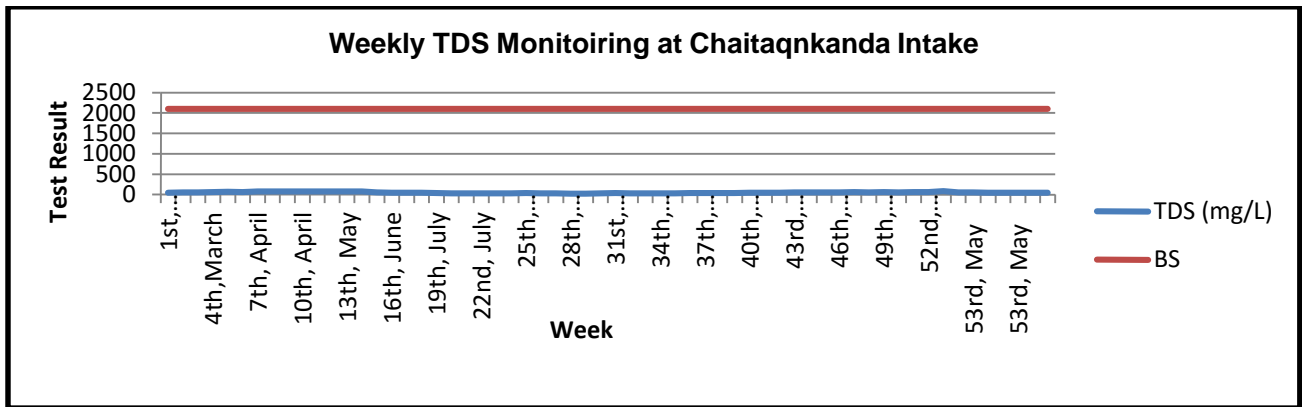


Figure 16: Weekly TDS Monitoring at Chaitankanda Intake

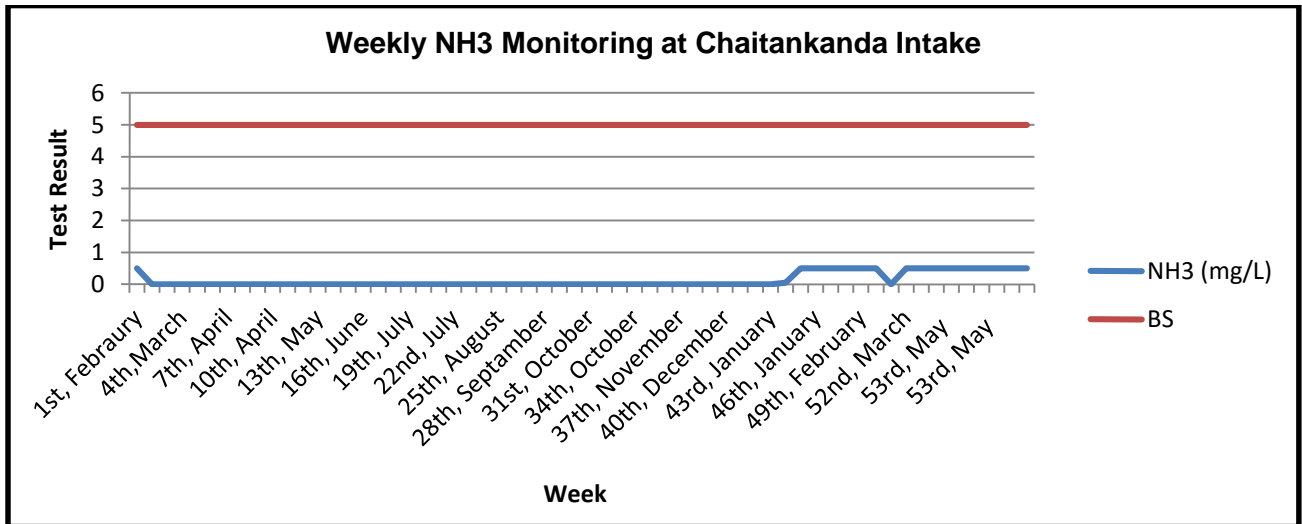
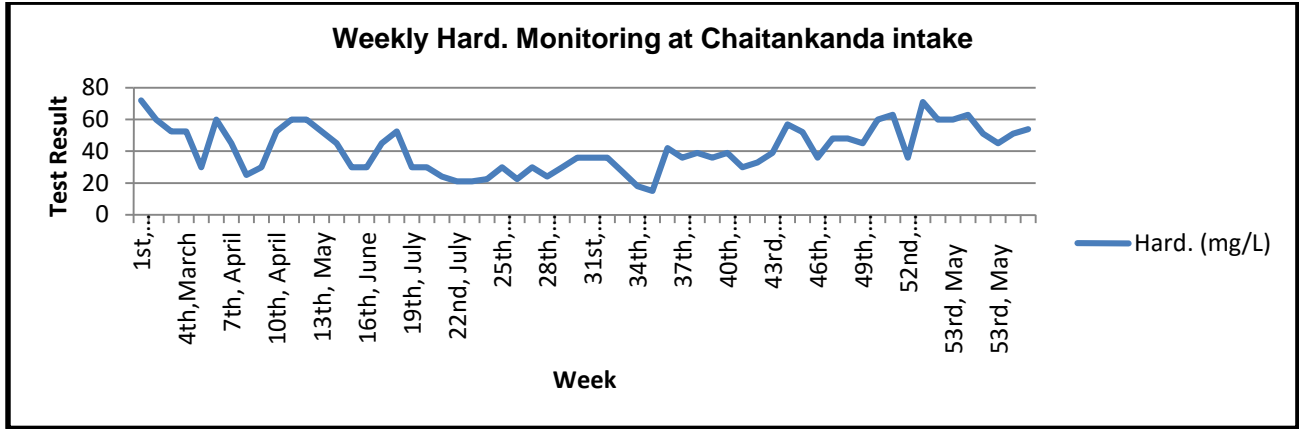


Figure 17: Weekly NH<sub>3</sub> Monitoring at Chaitankanda Intake



**Figure 18: Weekly Hard: Monitoring at Chaitankanda Intake**

**6.2 Observation on Weekly Sampling (Field Test):**

Samples were collected on weekly basis from February 2014 to June 2015 and the test parameters were Temperature, pH, Salinity, Conductivity, Turbidity, DO, TDS, Ammonia, Alkalinity, Total Hardness & Arsenic to understand the weekly variation of surface water quality in the study area where probable surface water intake points are considering for DWASA surface water treatment plant. The weekly observations are as below:

**Alkalinity:** The test value of Alkalinity at Chaitankanda Intake point: maximum 76 mg/l; minimum 3 mg/l; average 43.97 mg/l. There is no Bangladesh Standard for Alkalinity.

**Temperature:** The surface water at Chaitankanda Intake sampling point in Meghna River were shown temperature (Max=34<sup>0</sup>c; Min=17.7<sup>0</sup>c; Avg= 28.34<sup>0</sup>c) respectively during thisfourteen months. According to Bangladesh Surface Water Quality Standard, the accept limit of temperature is 40<sup>0</sup>c.

**pH:** Tolerance level of pH value (6-9) was observed in sampling area during survey time. The surface water of Meghna River point was showing pH value (Max=8.56; Min=7.22 & Avg=7.66).

**Salinity:** Salinity values were found at Meghna River. The maximum salinity was 2; minimum salinity was 0.02 and average salinity was 0.207 in sampling point. There is no Bangladesh Surface Water Quality Standard for salinity.

**Conductivity:** It does indicate the amount of dissolved solids (such as salt) in water. The surface water of Meghna River point was showing conductivity value (Max=177.3 μS/cm; Min=51.7 μS/cm & Avg=102.43 μS/cm). According to Bangladesh Surface Water Quality Standard, the accept limit of Conductivity is 1200 μS/cm.

**Turbidity:** The maximum turbidity was 41.9 NTU; minimum turbidity was 0.09 NTU and average turbidity was 13.18 NTU in Chaitankanda sampling point. There is no Bangladesh Surface Water Quality Standard for turbidity.

**Dissolved Oxygen (DO):** It was observed that the DO values of sampling point at Meghna River were shown DO (Max=9.75 mg/l; Min=6.34 mg/l; Avg=7.57mg/l) respectively during these fourteen months. According to Bangladesh Surface Water Quality Standard, the accept limit of DO is 6 or more.

**Total Dissolved Solids (TDS):** It was observed that the TDS values of sampling point at Meghna River were shown TDS (Max=83.8 mg/l; Min=24.6 mg/l; Avg= 49.03 mg/l) respectively during these fourteen months. According to Bangladesh Surface Water Quality Standard, the accept limit of TDS is 2100 mg/l.

**Ammonia (NH<sub>3</sub>-N):** The maximum ammonia was 0.5 mg/l; minimum ammonia was 0 mg/l and average ammonia was 0.23 mg/l in Chaitankanda Intake sampling point. According to Bangladesh Surface Water Quality Standard, the accept limit of ammonia is 5 mg/l.

**Total Hardness:** The total Hardness at chaitankanda Intake Point were: maximum 72 mg/l; minimum 15 mg/l and average 41.69 mg/l respectively. There is no Bangladesh Standard for Total Hardness.

### 6.3 Weekly Water Quality Parameters (Laboratory Tests)

Weekly Samples were collected from Bishnondi Intake point (Chaitankanda, Bishnondi) and 61 weeks were monitored the following parameters: Total Suspended Solids & Color. The analyses of the parameters have been performed in DPHE Central Laboratory, Dhaka. The test results are given in **Table: 7** and the graphical presentation of the weekly monitored results are given in **Figure: 19 and Figure: 20**.

**Table 7: Weekly Water Quality Parameters at Chaitankanda Intake**

Samplin g Week	Date & Time	Depth (m)	TSS (mg/L), 5 meter above	TSS (mg/L), 2 meter above	Color (Hazen)	TSS (mg/L)
<b>Bangladesh Standard (SW, ECR 1997</b>			<b>150</b>	<b>150</b>	<b>-</b>	<b>150</b>
<b>Bangladesh Standard (DW, ECR 1997</b>			<b>-</b>	<b>-</b>	<b>15</b>	<b>-</b>
1 <sup>st</sup>	15-2-14 & 12.05 pm	8.2	-	-	5.8	1.0
2 <sup>nd</sup>	22-2-14 & 1.00am	8.3	-	-	4.2	4.6
3 <sup>rd</sup>	01-03-14 & 11.05 am	8.15	-	-	3.2	2
4 <sup>th</sup>	08-03-14 & 1-30 pm	9	-	-	4.6	3.9
5 <sup>th</sup>	15-3-14 & 11.40am	7.25	-	-	4.14	4.5
6 <sup>th</sup>	22-3-14 & 11.40am	9.25	-	-	3.75	5.3
7 <sup>th</sup>	29-03-14 & 1.3pm	9	-	-	5.4	4.9
8 <sup>th</sup>	05-04-14 & 9-00 am	9	-	-	4.2	5.2
9 <sup>th</sup>	12-4-14 & 12.20pm	9.1	-	-	5	-
10 <sup>th</sup>	19-4-14 & 12.10pm	9.2	-	-	2.4	-
11 <sup>th</sup>	26-04-14 & 12.40 pm	8	5.6	4.9	5.4	-
12 <sup>th</sup>	03-05-14 & 11-00 am	8	-	-	3.75	-
13 <sup>th</sup>	10-05-14 & 12-10 pm	7.5	5.5	5.1	4.1	-
14 <sup>th</sup>	17-05-14 & 12.10 pm	8.5	-	-	5.8	-

Samplin g Week	Date & Time	Depth (m)	TSS (mg/L), 5 meter above	TSS (mg/L), 2 meter above	Color (Hazen)	TSS (mg/L)
<b>Bangladesh Standard (SW, ECR 1997</b>			<b>150</b>	<b>150</b>	<b>-</b>	<b>150</b>
<b>Bangladesh Standard (DW, ECR 1997</b>			<b>-</b>	<b>-</b>	<b>15</b>	<b>-</b>
15 <sup>th</sup>	24-05-14 & 4.00 pm	8.5	15	17	9.6	-
16 <sup>th</sup>	31-05-14 & 1.40 pm	8.5	-	-	10.4	-
17 <sup>th</sup>	07-06-14 & 3-45 pm	8	12	14	9.6	-
18 <sup>th</sup>	14-06-14 & 3-20 pm	8	-	-	11.6	-
19 <sup>th</sup>	21-06-14 & 4.10 pm	7.5	8	9	4.2	-
20 <sup>th</sup>	28-06-14 & 11.20am	7.75	-	-	6.7	-
21 <sup>st</sup>	5-07-14 & 1.20 pm	7	10	12	9.2	-
22 <sup>nd</sup>	14-07-14 & 10.00 pm	7	-	-	8.2	-
23 <sup>rd</sup>	19-7-14 & 09.01 am	6.5	9	10	6.7	-
24 <sup>th</sup>	26-7-14 & 9.40am	7	-	-	8	-
25 <sup>th</sup>	02-8-14 & 09.30 am	7	10	12	7.5	-
26 <sup>th</sup>	09-8-14 & 11-47 am	7	-	-	10.4	-
27 <sup>th</sup>	16-08-14 & 2.10 pm	7.5	10	12	8	-
28 <sup>th</sup>	23-08-14 & 12.05 pm	7.5	-	-	7.9	-
29 <sup>th</sup>	30-08-14 & 1.40 pm	7.75	15	17	7.8	-
30 <sup>th</sup>	05-09-14 & 11.15 am	7.5	-	-	7.6	-
31 <sup>st</sup>	13-09-14 & 3-00 pm	7.25	8	10	5	-
32 <sup>nd</sup>	20-09-14 & 11.30 am	7.5	-	-	6.7	-
33 <sup>rd</sup>	27-09-14 & 11.05 am	7	8	9	5	-
34 <sup>th</sup>	02-10-14 & 10.45 am	7.25	-	-	4	-
35 <sup>th</sup>	11-10-14 & 11.48 am	7.5	6	30	5	-
36 <sup>th</sup>	18-10-14 & 5.00 pm	6.5	-	-	5	-
37 <sup>th</sup>	25-10-14 & 12.20 pm	7	9.5	6	12	-

Surface Water Quality Monitoring Near Bishnondi Point, Meghna River

Samplin g Week	Date & Time	Depth (m)	TSS (mg/L), 5 meter above	TSS (mg/L), 2 meter above	Color (Hazen)	TSS (mg/L)
<b>Bangladesh Standard (SW, ECR 1997</b>			<b>150</b>	<b>150</b>	<b>-</b>	<b>150</b>
<b>Bangladesh Standard (DW, ECR 1997</b>			<b>-</b>	<b>-</b>	<b>15</b>	<b>-</b>
38 <sup>th</sup>	01-11-14 & 02.05 pm	7.5	-	-	11	-
39 <sup>th</sup>	07-11-14 & 11.40 am	7.25	7.5	8	14	-
40 <sup>th</sup>	15-11-14 & 01.55 pm	7	-	-	11	-
41 <sup>st</sup>	22-11-14 & 12.10 pm	7	9	9	13	-
42 <sup>nd</sup>	29-11-14 & 12.40 pm	6.5	-	-	10	-
43 <sup>rd</sup>	06-12-14 & 11.30 am	7.75	8	9	13	-
44 <sup>th</sup>	12-12-14 & 3-00 pm	8	-	-	13	-
45 <sup>th</sup>	20-12-14 & 3.10 pm	7	9	9	12	-
46 <sup>th</sup>	27-12-14 & 1.40 pm	6.75	-	-	11	-
47 <sup>th</sup>	03-01-15 & 1.20 pm	6.5	9	9	14	-
48 <sup>th</sup>	10-01-15 & 10.15 am	7	-	-	12	-
49 <sup>th</sup>	24-01-15 & 11.35 am	6.75	8.5	8	11	-
50 <sup>th</sup>	31-01-15 & 02.10 pm	7.25	-	-	11	-
51 <sup>st</sup>	07-02-15 & 11.35 am	7.5	8	8	12	-
52 <sup>nd</sup>	14-02-15 & 02.45 am	7	-	-	11	-
53 <sup>rd</sup>	25-04-15, 11:40 pm	7	9	4	4.9	-
54 <sup>th</sup>	2-05-15, 12.15 pm	7	-	-	5.2	-
55 <sup>th</sup>	9-05-15, 12.10 pm	7	22	16	19.2	-
56 <sup>th</sup>	16-05-15, 12.30 pm	7.5	-	-	14.7	-
57 <sup>th</sup>	23-05-15 12.30 pm	7.5	8	7	12.3	-
58 <sup>th</sup>	30-05-15 12.20pm	7	-	-	8.7	-
59 <sup>th</sup>	6-06-15 12.15 pm	7.5	8	5	9.2	-
60 <sup>th</sup>	13-06-15 12.30pm	8	-	-	8.3	-
61 <sup>st</sup>	20-06-15 1.30 pm	7.5	-	-	6.9	-

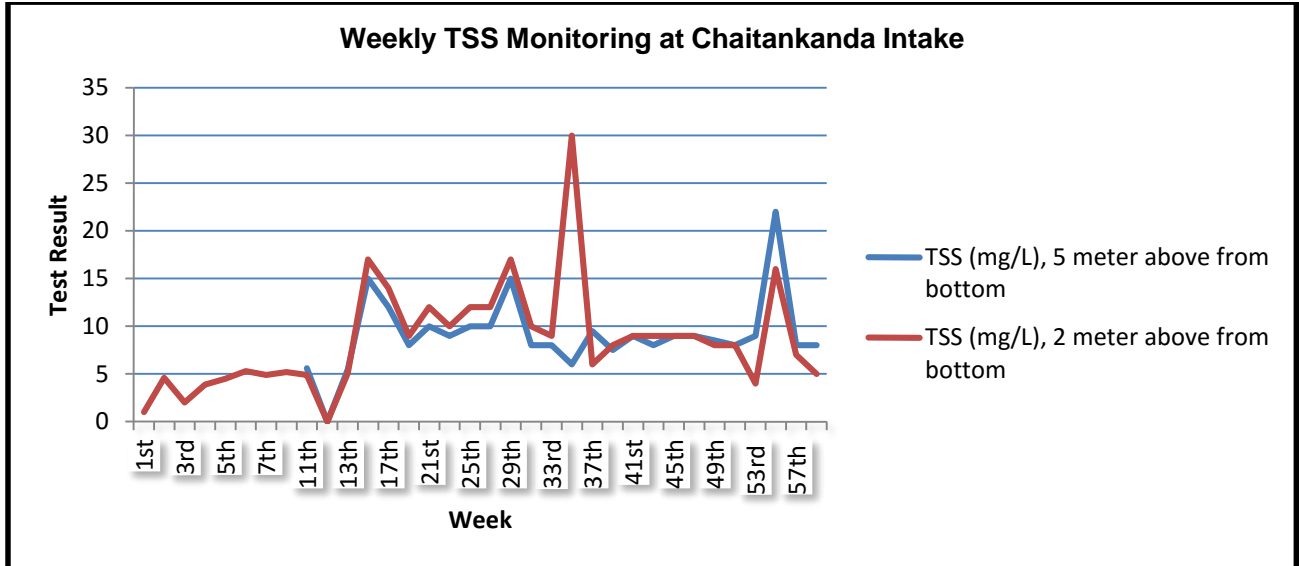


Figure 19: Weekly TSS Monitoring at Chaitankanda Intake

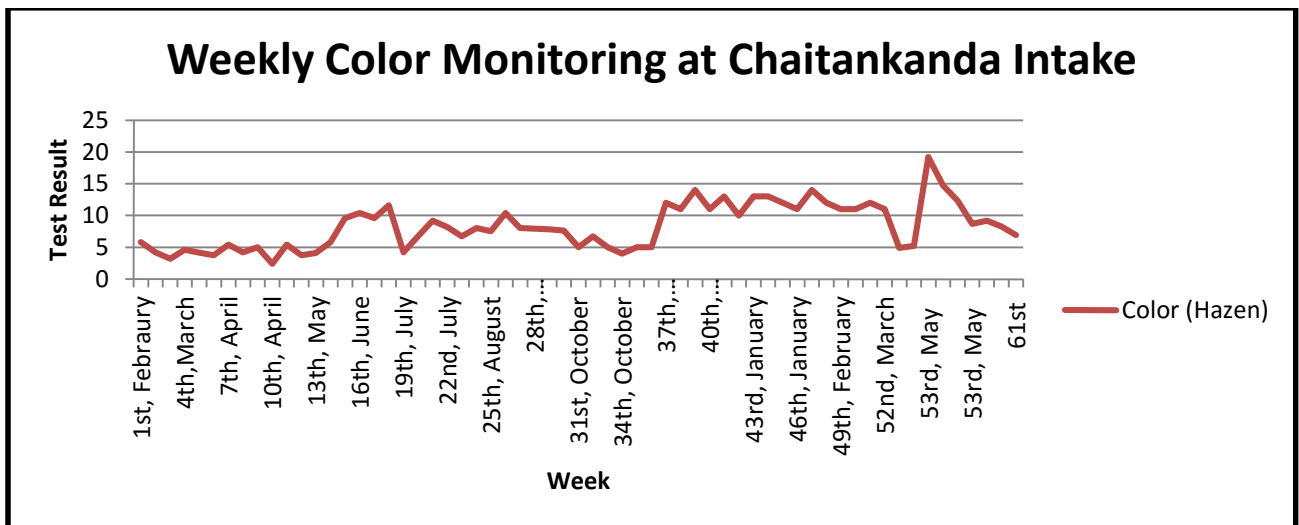


Figure 20: Weekly Color Monitoring at Chaitankanda Intake

**6.4 Observation On Weekly Sampling of TSS and Color:**

Three samples were collected from Chaitankanda Intake point to analysed TSS and Color in DPHE laboratory, Dhaka. The TSS were two samples, one was 5m above from the bottom and another was 2m from the bottom at the same sampling point. The Color sample was 2m from the bottom. Samples were collected on weekly basis from February 2014 to May 2015.

**Total Suspended Solid (TSS):** Environmental waters may contain a variety of solid or dissolved impurities. In quantifying levels of these impurities, suspended solids is the term used to describe particles in the water column. Practically, they are defined as particles large enough to not to pass through the filter used to separate them the water Suspended Solids absorb heat from sunlight,

which increases water temperature and subsequently decreases levels of dissolved oxygen in water body.

**The analysed results of TSS at 5m above from the bottom are:** maximum 22 mg/l; minimum 5.5 mg/l; average 9.50 mg/l.

**The analysed results of TSS at 2m above from the bottom are:** maximum 30 mg/l; minimum 1 mg/l and average 8.83 mg/l.

**Color:** Test results of color: Maximum: 19.2 Hazen; Minimum: 2.4 Hazen; Average: 8.29 Hazen.

### 6.5 Weekly Water Level Measurement in Addition To Depth At Every Sampling Point at Intake, Chaitankanda, Meghna river

**(1) Sample location: Chaitankanda, Bishnondi, Meghna River**  
(GIS Location: 23° 45' 14.69 N & 90° 43' 18.07 E)

**Table 8: Weekly Water level measurement at Chaitankanda Intake**

Sampling Week	Date & Time	Measurement time	Parameter	Water level + Depth (M)
1 <sup>st</sup>	-	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Meters depth from surface to river bottom
2 <sup>nd</sup>	-	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Meters depth from surface to river bottom
3 <sup>rd</sup>	-	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Meters depth from surface to river bottom
4 <sup>th</sup>	-	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Meters depth from surface to river bottom
5 <sup>th</sup>	-	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Meters depth from surface to river bottom
6 <sup>th</sup>	22-3-14 & 11.40am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) -11.25 Gauge was in water
7 <sup>th</sup>	29-03-14 & 1.35 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 4 Gauge was bank of the river
8 <sup>th</sup>	05-04-14 & 9-00 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 4 Gauge was bank of the river
9 <sup>th</sup>	12-4-14 & 12.20pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 3 Gauge was in water
10 <sup>th</sup>	19-4-14 & 12.10pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 0 Gauge was in water

Surface Water Quality Monitoring Near Bishnondi Point, Meghna River

Sampling Week	Date & Time	Measurement time	Parameter	Water level + Depth (M)
11 <sup>th</sup>	26-04-14& 12.40pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 5 Gauge was in water
12 <sup>th</sup>	03-05-14& 11-00 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 5 Gauge was in water
13 <sup>th</sup>	10-05-14& 12-10pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 1 Gauge was in water
14 <sup>th</sup>	17-05-14 &12.10pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 11Gauge was in water
15 <sup>th</sup>	24-05-14 & 4.00pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 11Gauge was in water
16 <sup>th</sup>	31-05-14 & 1.40 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 11Gauge was in water
17 <sup>th</sup>	07-06-14 & 3-45 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) -10 Gauge was in water
18 <sup>th</sup>	14-06-14 & 3-20 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 10 Gauge was in water
19 <sup>th</sup>	21-06-14 & 4.10 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 2 Gauge was in water
20 <sup>th</sup>	28-06-14 &11.20am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 6 Gauge was in water
21 <sup>st</sup>	5-07-14 & 1.20 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 8 Gauge was in water
22 <sup>nd</sup>	14-07-14& 10.00 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 0 Gauge was in water
23 <sup>rd</sup>	19-7-14 & 09.01 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 4 Gauge was in water
24 <sup>th</sup>	26-7-14 & 09.40am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 5 Gauge was in water
25 <sup>th</sup>	02-8-14 & 09.30 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 3 Gauge was in water
26 <sup>th</sup>	09-8-14 & 11-47 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 3 Gauge was in water
27 <sup>th</sup>	16-08-14 & 2.10 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 8 Gauge was in water
28 <sup>th</sup>	23-08-14& 12.05 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 11 Gauge was in water
29 <sup>th</sup>	30-08-14 & 1.40 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 15 Gauge was in water
30 <sup>th</sup>	05-09-14 & 11.1 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 12 Gauge was in water
31 <sup>st</sup>	13-09-14 & 3-00 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 0 Gauge was in water
32 <sup>nd</sup>	20-09-14 &11.30am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was bank of the river
33 <sup>rd</sup>	27-09-14& 11.05 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 0 Gauge was in water
34 <sup>th</sup>	02-10-14& 10.45 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 1 Gauge was in water

Sampling Week	Date & Time	Measurement time	Parameter	Water level + Depth (M)
35 <sup>th</sup>	11-10-14& 11.48am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - 3 Gauge was in water
36 <sup>th</sup>	18-10-14 &5.00 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was bank of the river
37 <sup>th</sup>	25-10-14 &12.20pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
38 <sup>th</sup>	01-11-14 &02.05pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
39 <sup>th</sup>	07-11-14& 11.40 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
40 <sup>th</sup>	15-11-14 & 01.5 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
41 <sup>st</sup>	22-11-14 & 12.1 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
42 <sup>nd</sup>	29-11-14 & 12.4 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
43 <sup>rd</sup>	06-12-14 & 11.3 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
44 <sup>th</sup>	12-12-14 & 3-00 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
45 <sup>th</sup>	20-12-14 & 3.10 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
46 <sup>th</sup>	27-12-14 & 1.40 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
47 <sup>th</sup>	03-01-15 & 1.20 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
48 <sup>th</sup>	10-01-15& 10.15 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
49 <sup>th</sup>	24-01-15& 11.35 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
50 <sup>th</sup>	31-01-15& 02.10 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
51 <sup>st</sup>	7-02-15 & 11.35 am	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent
52 <sup>nd</sup>	14-02-15& 02.45 pm	During Weekly Sampling	Water Level	(1) - Meters above national datum (2) - Gauge was absent

## 7. MONTHLY DWASA MEGHNA RIVER SURFACE WATER QUALITY MONITORING

**Sample location:Chaitankanda, Bishnondi, Meghna river**

(GIS Location: 23° 45' 14.69 N & 90° 43' 18.07 E)

### 7.1 Monthly Water Quality Parameters (Laboratory Tests)

Monthly Samples were collected from Bishnondi Intake point (Chaitankanda, Bishnondi) and total fourteen months were monitored. The tested parameters are Arsenic, Aluminum, Iron, Total Dissolved Solids & Algae. The analyses of the parameters have been done in DPHE Central Laboratory, Dhaka and BUET laboratory, Dhaka. The test results are given in **Table: 9**

**Table 9: Monthly Water Quality Parameters at Chaitankanda Intake**

Sampl ing Month	Sampling Week	Date & Time	Depth (m)	Arsenic (mg/L)	Aluminum (mg/L)	Iron (mg/L)	Mangane se (mg/L)	TDS (mg/L )	Algae (µg/L)
<b>Bangladesh Standard (SW, RCR 1997)</b>				<b>0.2</b>	<b>-</b>	<b>2</b>	<b>5</b>	<b>2100</b>	<b>-</b>
<b>Bangladesh Standard (DW, ECR 1997)</b>				<b>0.05</b>	<b>0.2</b>	<b>0.3-1</b>	<b>0.1</b>	<b>1000</b>	<b>-</b>
1 <sup>st</sup>	4 <sup>th</sup>	08-03 14 & 1-30 pm	9	0.002	0.315	<0.09	<0.05	65	208
2 <sup>nd</sup>	8 <sup>th</sup>	05-04-14 & 9-00 am	9	0.003	0.291	<0.09	<0.05	74	590
3 <sup>rd</sup>	9 <sup>th</sup>	12-4-14 & 12.20 pm	9.1	-	-	-	-	-	1087
	10 <sup>th</sup>	19-4-14 & 12.10 pm	9.2	-	-	-	-	-	973
	12 <sup>th</sup>	26-4-14 & 12.10 pm	8.0	-	-	-	-	-	1181
	13 <sup>th</sup>	10-05-14 & 12-10 pm	7.5	0.002	0.28	<0.09	<0.05	81	-
4 <sup>th</sup>	17 <sup>th</sup>	07-06-14 & 3-45 pm	8	0.004	0.298	0.68	<0.05	41	-
5 <sup>th</sup>	21 <sup>st</sup>	5-07-14 & 1.20 pm	7	0.002	0.278	0.3	<0.05	26	-
6 <sup>th</sup>	23 <sup>rd</sup>	19-7-2014 & 9.01am	6.5	0.001	0.27	0.22	<0.05	25	-
7 <sup>th</sup>	30 <sup>th</sup>	05-09-14 & 11.15 am	7.5	0.002	0.269	1	<0.05	24	-
8 <sup>th</sup>	35 <sup>th</sup>	11-10-14 & 11.48 am	7.5	0.001	0.24	0.53	<0.05	30	-
9 <sup>th</sup>	38 <sup>th</sup>	01-11-14 & 02.05 pm	7.5	0.002	0.269	1	<0.05	24	-
10 <sup>th</sup>	41 <sup>st</sup>	22-11-14 & 12.10 pm	7	-	-	-	-	-	389
	42 <sup>nd</sup>	29-11-14 & 12.40 pm	6.5	0.001	0.15	0.5	0.2	46.6	-
	43 <sup>rd</sup>	06-12-14 & 11.30 am	7.75	-	-	-	-	-	423
11 <sup>th</sup>	45 <sup>th</sup>	20-12-14 & 3.10 pm	7	-	-	-	-	-	396
	47 <sup>th</sup>	03-01-15 & 2.15 pm	6.5	0.001	0.15	0.34	<LOQ	52.5	409

Sampl ing Month	Sampling Week	Date & Time	Depth (m)	Arsenic (mg/L)	Aluminum (mg/L)	Iron (mg/L)	Mangane se (mg/L)	TDS (mg/L )	Algae (µg/L)
12 <sup>th</sup>	49 <sup>th</sup>	24-01-15 & 11.35 am	6.75	0.001	0.15	0.41	0.05	50.7	644
	51 <sup>st</sup>	07-02-15 & 11.35 am	7.5	–	–	–	–	–	456
13 <sup>th</sup>	54 <sup>th</sup>	9-05-15 & 12.10 pm	7	0.001	0.23	0.54	0.08	40	–
14 <sup>th</sup>	56 <sup>th</sup>	23-05-15 & 12.30pm	7.5	–	–	–	–	–	416
	57 <sup>th</sup>	13-06-15 & 12.30pm	8	0.002	0.27	0.32	<0.05	62	–

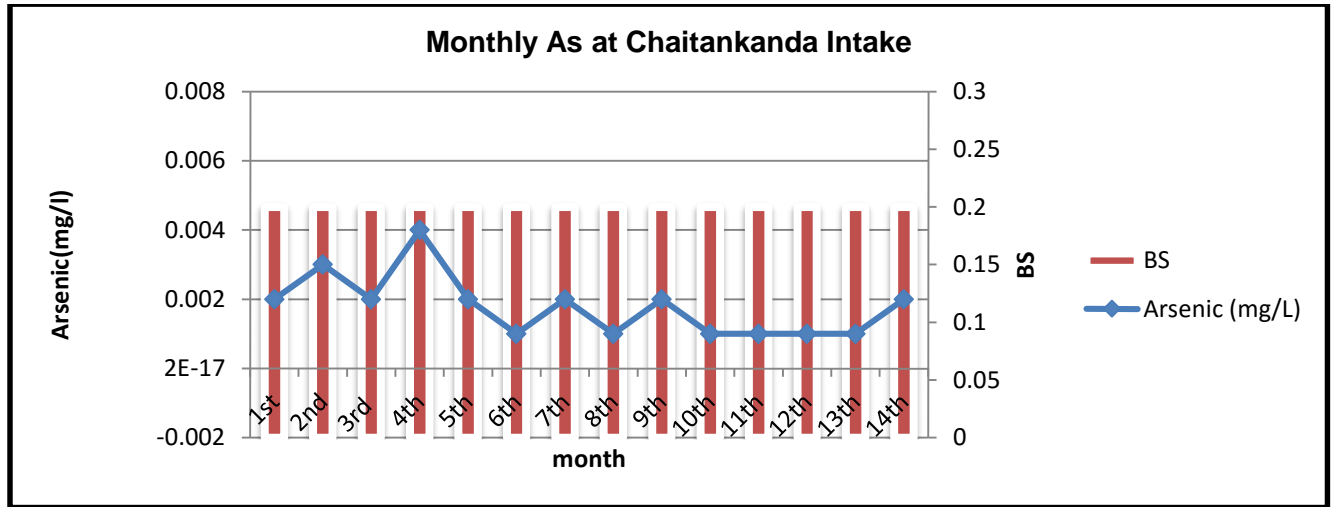


Figure 21: Monthly Arsenic at Chaitankanda Intake.

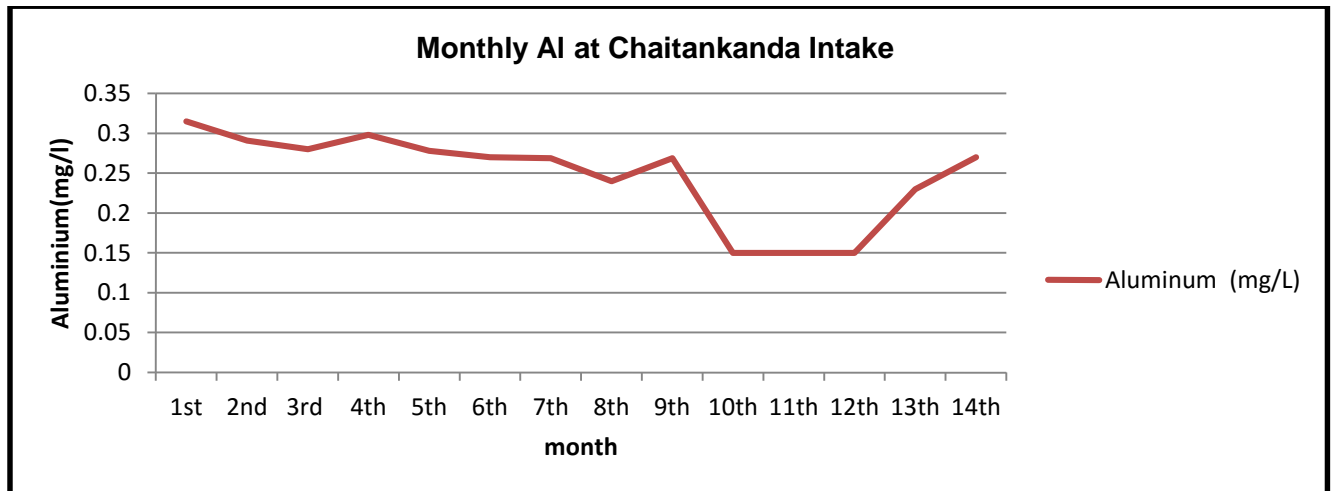


Figure 22: Monthly Aluminum Monitoring at Chaitankanda Intake

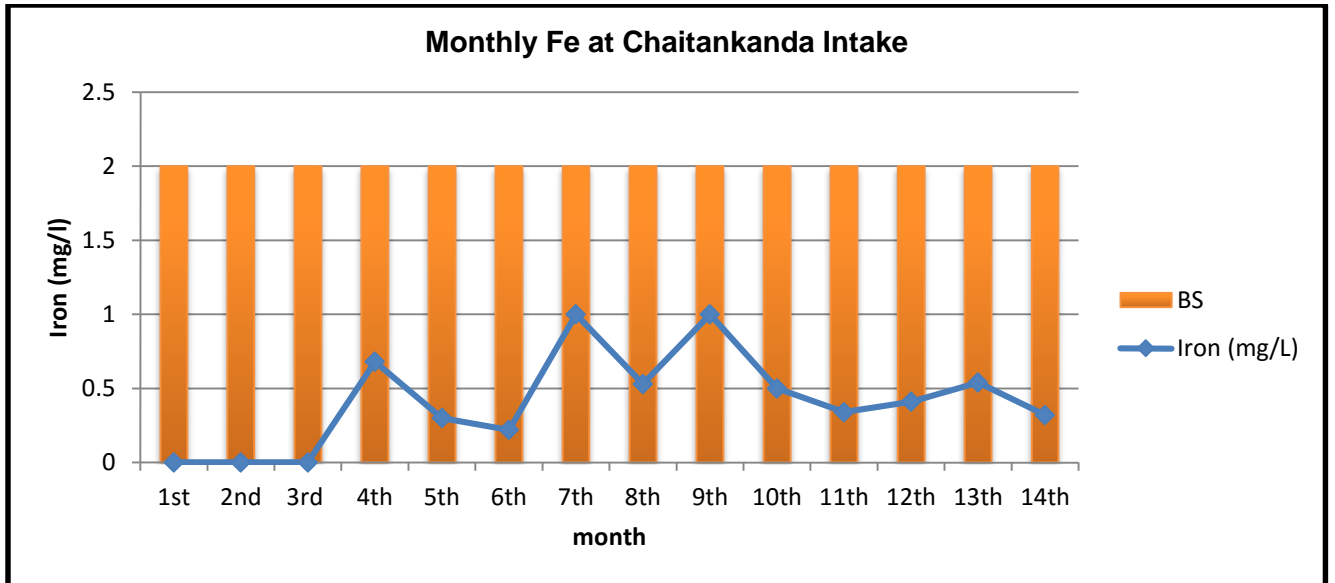


Figure 23: Monthly Iron Monitoring at Chaitankanda Intake

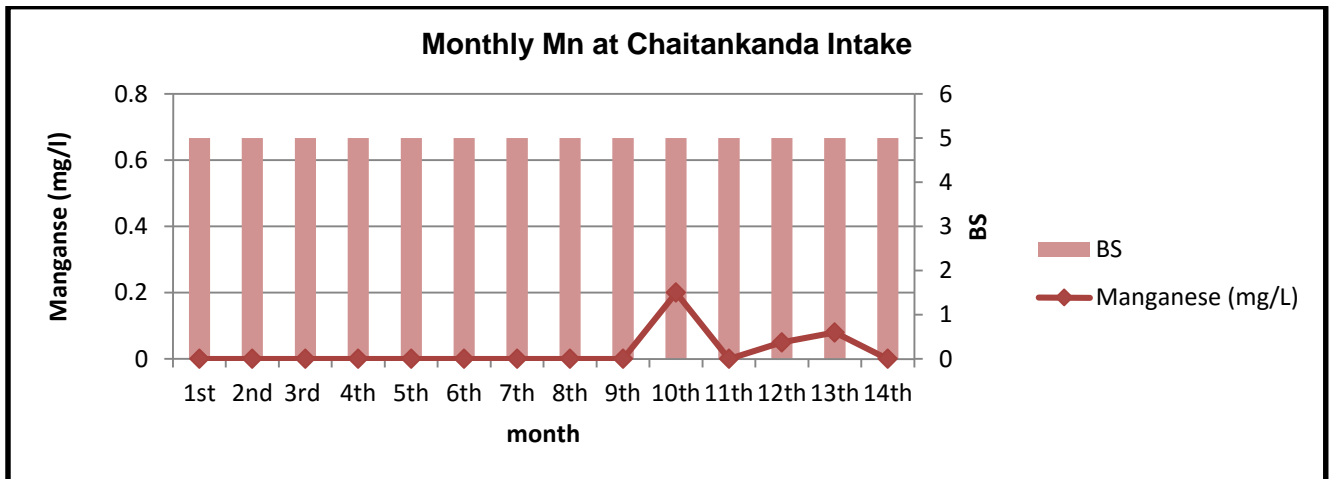


Figure 24: Monthly Manganese Monitoring at Chaitankanda Intake.

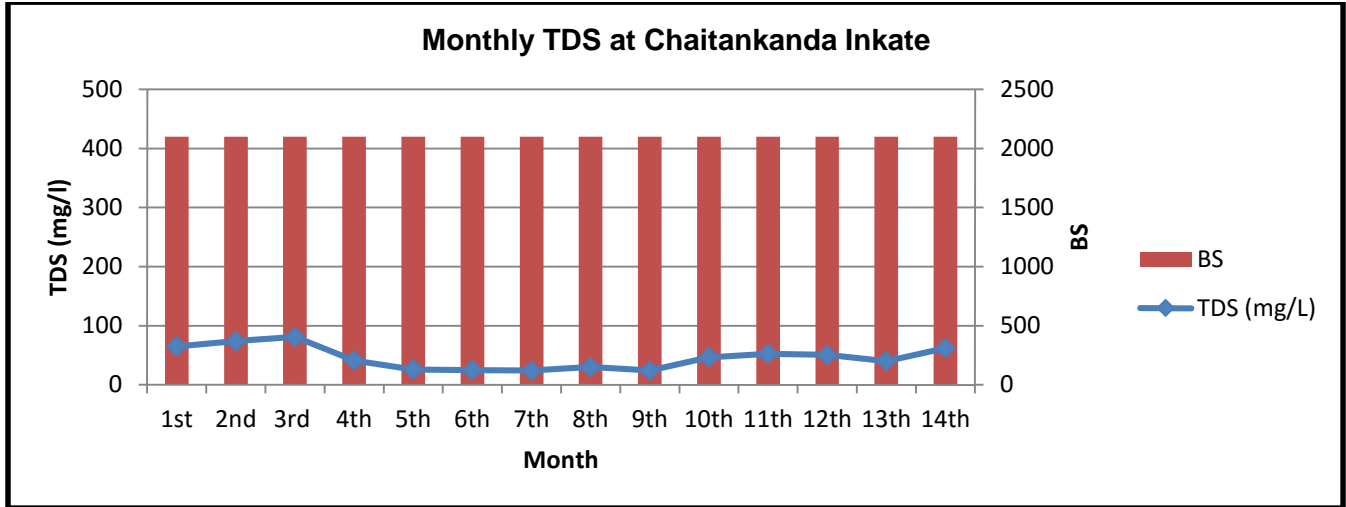


Figure 25: Monthly TDS Monitoring at Chaitankanda Intake

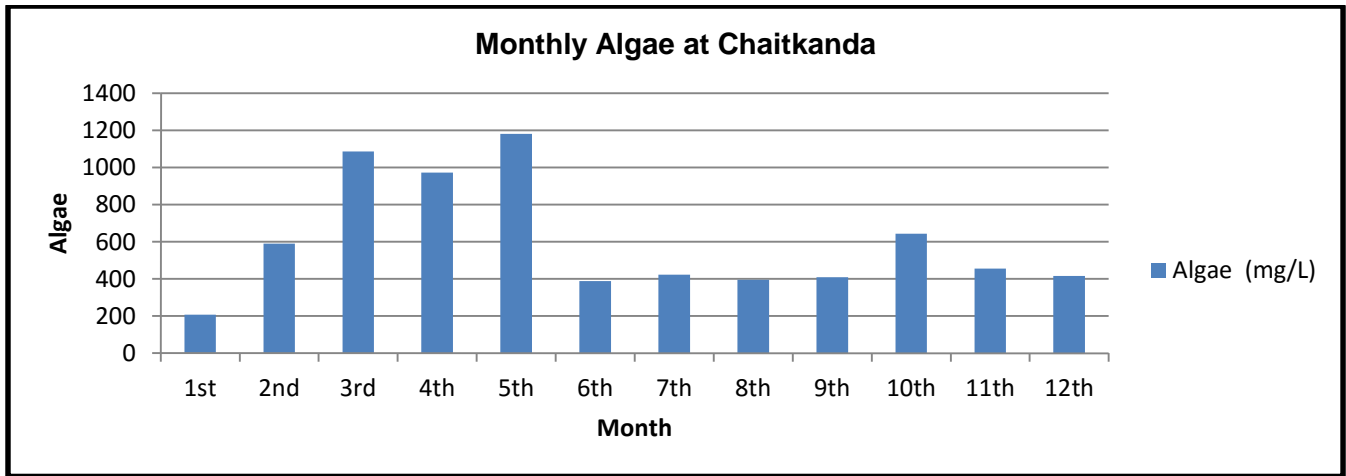


Figure 26: Monthly Algae Monitoring at Chaitankanda Intake

**7.2 Observation on Monthly Sampling at Chaitankanda Intake Point:**

Monthly Samples were collected from February 2014 to June 2015 at Chaitankanda Intake point to test in DPHE Central Laboratory, Dhaka and BUET Laboratory. The following parameters were tested: Arsenic; Aluminium; Iron; Manganese; TDS and Algae to understand the monthly variation of surface water quality in the study area where probable surface water intake points are considering for DWASA surface water treatment plant. The monthly observations are as below:

**Arsenic:** The observation of Arsenic which are found from the test report are: Maximum 0.004 mg/l; minimum 0.001 mg/l; and average 0.0017 mg/l. The Bangladesh Standard for Arsenic is 0.2 mg/l for surface water.

**Aluminium:** The observation of Aluminium which are found from the test report are: Maximum 0.31 mg/l; minimum 0.15 mg/l; and average 0.24 mg/l. There is no Bangladesh Standard for Aluminium for surface water.

**Iron:** The observation of Iron which are found from the test report are: Maximum 1 mg/l; minimum 0 mg/l; and average 0.41 mg/l. The Bangladesh Standard for Iron is 2 mg/l for surface water.

**Manganese:** The observations of Manganese which are found from the test report are: Maximum 2 mg/l; minimum 0 mg/l; and average 0.023 mg/l. The Bangladesh Standard for Manganese is 5 mg/l for surface water.

**TDS:** The observations of TDS which are found from the test report are: Maximum 81 mg/l; minimum 24 mg/l; and average 45.84 mg/l. The Bangladesh Standard for TDS is 2100 mg/l for surface water.

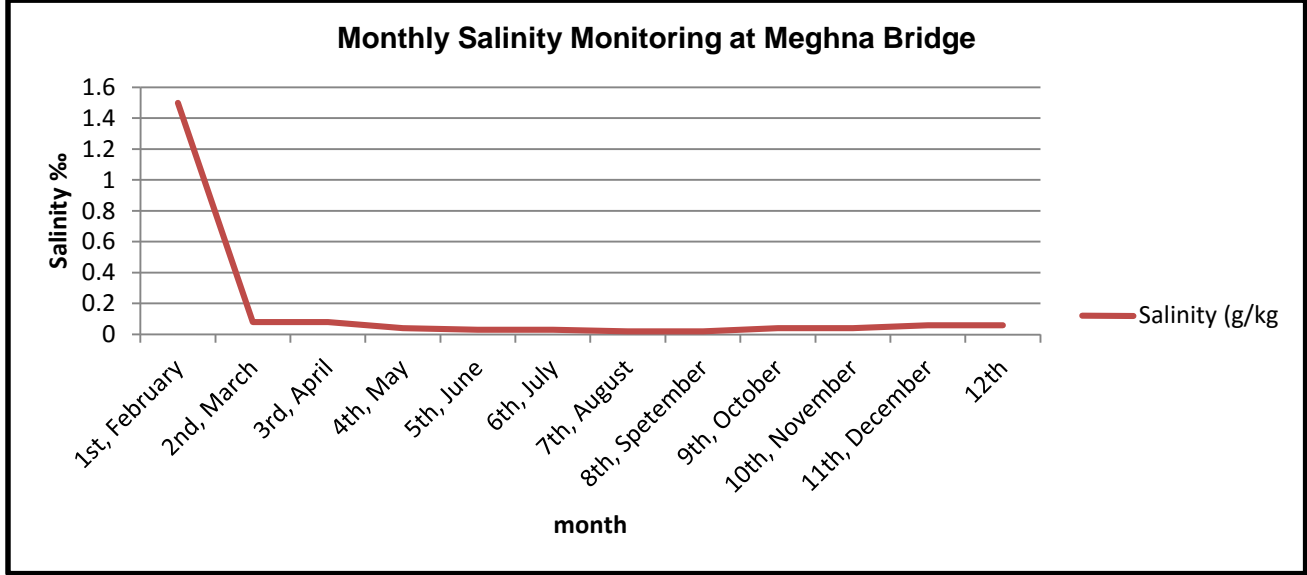
**Algae:** The observations of Algae which are found from the test report are: Maximum 1181 µg/l; minimum 208 µg/l; and average 597.66 µg/l. There is no Bangladesh Standard for Algae.

### 7.3 Monthly River Water Salinity Test at Meghna Bridge Spot During High Tide:

The Monthly Samples were collected from Near Meghna Bridge for testing salinity. The salinity was tested using field test Kit. Total twelve months were monitored for salinity test. The tests results are given in **Table: 10** and the graphical presentation of salinity given in **Figure: 27**

**Table 10: Monthly Salinity at Meghna Bridge During High Tide**

Sampling Month	Sample Location	Date & Time	Tide	Parameter	Salinity (g/kg)
<b>Bangladesh Standard (Surface water)</b>				<b>E.C.R. 1997</b>	<b>-</b>
<b>Bangladesh Standard (Drinking water)</b>				<b>E.C.R. 1997</b>	<b>-</b>
1 <sup>st</sup>	Near Meghna Bridge	08-03-14 & 3-35 pm	During high tide	Salinity	1.5
2 <sup>nd</sup>	Near Meghna Bridge	05-04-14 & 9-00 am	During high tide	Salinity	0.08
3 <sup>rd</sup>	Near Meghna Bridge	10-05-14 & 2-58 pm	During high tide	Salinity	0.08
4 <sup>th</sup>	Near Meghna Bridge	07-06-14 & 3-45 pm	During high tide	Salinity	0.04
5 <sup>th</sup>	Near Meghna Bridge	5-07-14 & 1.20 pm	During high tide	Salinity	0.03
6 <sup>th</sup>	Near Meghna Bridge	09-08-14 & 01-35 pm	During high tide	Salinity	0.03
7 <sup>th</sup>	Near Meghna Bridge	05-09-14 & 11.15 am	During high tide	Salinity	0.02
8 <sup>th</sup>	Near Meghna Bridge	11-10-14 & 1.25 pm	During high tide	Salinity	0.02
9 <sup>th</sup>	Near Meghna Bridge	01-11-14 & 04.00 pm	During high tide	Salinity	0.04
10 <sup>th</sup>	Near Meghna Bridge	29-11-14 & 12.40 pm	During high tide	Salinity	0.04
11 <sup>th</sup>	Near Meghna Bridge	03-01-15 & 4.15 pm	During high tide	Salinity	0.06
12 <sup>th</sup>	Near Meghna Bridge	24-01-15 & 11.35 am	During high tide	Salinity	0.06



**Figure 27: Monthly Salinity Monitoring at Meghna Bridge**

**7.4 Observation On Monthly Salinity Sampling And Testing:**

Samples were monitored for salinity on monthly basis near Meghna River Bridge. The observation on the salinity: maximum 1.5 g/kg minimum 0.02 g/kg and average 0.16 g/kg. There is no Bangladesh Standard for salinity.

**7.5 Monthly River Water Salinity Test at Four Different Points Between Meghna Bridge and Proposed New Intake Location:**

Monthly Sample from Near Meghna Bridge, Bishnondi Point, Chaitankanda point and Nunertech, Near Anandabazar point was collected twelve month to analyze Salinity using field test kit. The test results are given in **Table: 11** and the graphical presentations are given in **Figure: 28**.

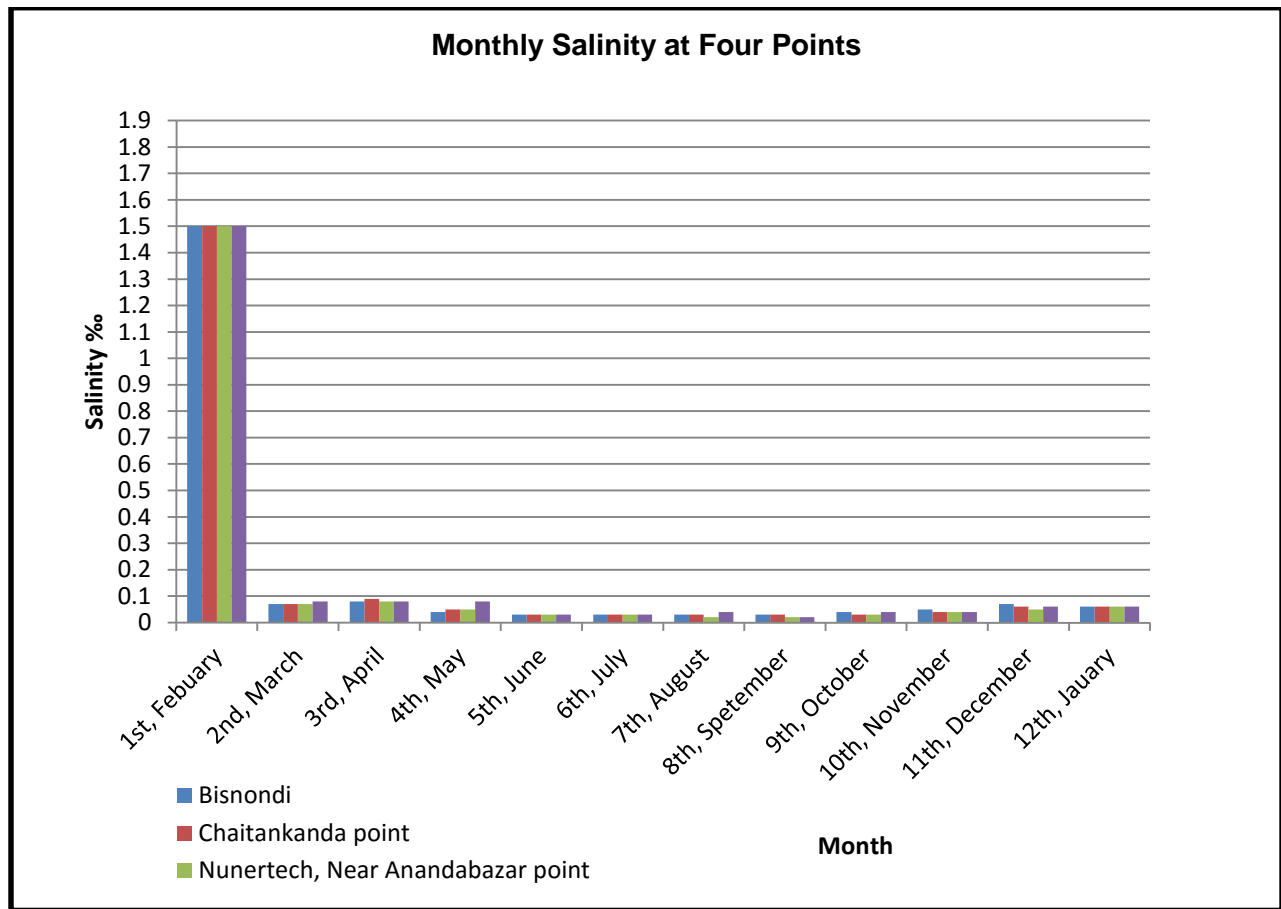
**Table 11: Monthly River Water Salinity test at four different points between Meghna Bridge and proposed new intake location**

Sampling Month	Sampling Week	Sample Location	Date & Time	Measurement time	Salinity (g/kg)
<b>Bangladesh Standard (Surface water) E.C.R. 1997</b>					-
<b>Bangladesh Standard (Drinking water) E.C.R. 1997</b>					-
1 <sup>st</sup>	4 <sup>th</sup>	Bishnondi Point	08-03-14 & 1-15 pm	During monthly sampling	1.5
2 <sup>nd</sup>	8 <sup>th</sup>	Bishnondi Point	05-04-14 & 9-00 am	During monthly sampling	0.07
3 <sup>rd</sup>	13 <sup>th</sup>	Bishnondi Point	10-05-14 & 11-40am	During monthly sampling	0.08
4 <sup>th</sup>	17 <sup>th</sup>	Bishnondi Point	07-06-14 & 3-15 pm	During monthly sampling	0.04

Sampling Month	Sampling Week	Sample Location	Date & Time	Measurement time	Salinity (g/kg)
<b>Bangladesh Standard (Surface water) E.C.R. 1997</b>					-
<b>Bangladesh Standard (Drinking water) E.C.R. 1997</b>					-
5 <sup>th</sup>	21 <sup>st</sup>	Bishnondi Point	5-07-14 & 1.00 pm	During monthly sampling	0.03
6 <sup>th</sup>	26 <sup>th</sup>	Bishnondi Point	09-8-14 & 11-30 am	During monthly sampling	0.03
7 <sup>th</sup>	30 <sup>th</sup>	Bishnondi Point	05-09-14 & 10.55 am	During monthly sampling	0.03
8 <sup>th</sup>	31 <sup>st</sup>	Bishnondi Point	11-10-14 & 11.25am	During monthly sampling	0.03
9 <sup>th</sup>	38 <sup>th</sup>	Bishnondi Point	01-11-14 & 01.45pm	During monthly sampling	0.04
10 <sup>th</sup>	42 <sup>nd</sup>	Bishnondi Point	29-11-14 & 12.20pm	During monthly sampling	0.05
11 <sup>th</sup>	47 <sup>th</sup>	Bishnondi Point	03-01-15 & 01.45pm	During monthly sampling	0.07
12 <sup>th</sup>	49 <sup>th</sup>	Bishnondi Point	24-01-15 & 11.35am	During monthly sampling	0.06
1 <sup>st</sup>	4 <sup>th</sup>	Chaitankanda point	08-03 -14 & 1-30 pm	During monthly sampling	1.5
2 <sup>nd</sup>	8 <sup>th</sup>	Chaitankanda point	05-04-14 & 9-00 am	During monthly sampling	0.07
3 <sup>rd</sup>	13 <sup>th</sup>	Chaitankandapoint	10-05-14 & 12-10pm	During monthly sampling	0.09
4 <sup>th</sup>	17 <sup>th</sup>	Chaitankanda point	07-06-14 & 4-35 pm	During monthly sampling	0.05
5 <sup>th</sup>	21 <sup>st</sup>	Chaitankanda point	5-07-14 & 1.20 pm	During monthly sampling	0.03
6 <sup>th</sup>	26 <sup>th</sup>	Chaitankanda point	09-8-14 & 11-47 am	During monthly sampling	0.03
7 <sup>th</sup>	30 <sup>th</sup>	Chaitankanda point	05-09-14 & 11.15 am	During monthly sampling	0.03
8 <sup>th</sup>	31 <sup>st</sup>	Chaitankanda point	11-10-14 & 11.48am	During monthly sampling	0.03
9 <sup>th</sup>	38 <sup>th</sup>	Chaitankanda point	01-11-14 & 02.05pm	During monthly sampling	0.03
10 <sup>th</sup>	42 <sup>nd</sup>	Chaitankanda point	29-11-14 & 12.40pm	During monthly sampling	0.04
11 <sup>th</sup>	47 <sup>th</sup>	Chaitankanda point	03-01-15 & 02.00pm	During monthly sampling	0.06
12 <sup>th</sup>	49 <sup>th</sup>	Chaitankanda point	31-01-15 & 11.35 m	During monthly sampling	0.06
1 <sup>st</sup>	4 <sup>th</sup>	Nunertech, Near Anandabazar point	08-03 -14 & 2-40 pm	During monthly sampling	1.5
2 <sup>nd</sup>	8 <sup>th</sup>	Nunertech, Near Anandabazar point	05-04-14 & 9-00 am	During monthly sampling	0.07

Sampling Month	Sampling Week	Sample Location	Date & Time	Measurement time	Salinity (g/kg)
<b>Bangladesh Standard (Surface water) E.C.R. 1997</b>					-
<b>Bangladesh Standard (Drinking water) E.C.R. 1997</b>					-
3 <sup>rd</sup>	13 <sup>th</sup>	Nunertech, Near Anandabazar point	10-05-14 & 1-40 pm	During monthly sampling	0.08
4 <sup>th</sup>	17 <sup>th</sup>	Nunertech, Near Anandabazar point	07-06-14 & 3-45 pm	During monthly sampling	0.05
5 <sup>th</sup>	21 <sup>st</sup>	Nunertech, Near Anandabazar point	5-07-14 & 2.10 pm	During monthly sampling	0.03
6 <sup>th</sup>	26 <sup>th</sup>	Nunertech, Near Anandabazar point	09-8-14 & 12-50 pm	During monthly sampling	0.03
7 <sup>th</sup>	30 <sup>th</sup>	Nunertech, Near Anandabazar point	05-09-14 & 12.05 pm	During monthly sampling	0.02
8 <sup>th</sup>	31 <sup>st</sup>	Nunertech, Near Anandabazar point	11-10-14 & 12.45pm	During monthly sampling	0.02
9 <sup>th</sup>	38 <sup>th</sup>	Nunertech, Near Anandabazar point	01-11-14 & 03.15pm	During monthly sampling	0.03
10 <sup>th</sup>	42 <sup>nd</sup>	Nunertech, Near Anandabazar point	29-11-14 & 2.10 pm	During monthly sampling	0.04
11 <sup>th</sup>	47 <sup>th</sup>	Nunertech, Near Anandabazar point	03-01-15 & 3.00 pm	During monthly sampling	0.05
12 <sup>th</sup>	49 <sup>th</sup>	Nunertech, Near Anandabazar point	07-02-15 & 02.10pm	During monthly sampling	0.06
1 <sup>st</sup>	4 <sup>th</sup>	Near Meghna bridge	08-03 -14 & 3-35 pm	During monthly sampling	1.5
2 <sup>nd</sup>	8 <sup>th</sup>	Near Meghna bridge	05-04-14 & 9-00 am	During monthly sampling	0.08
3 <sup>rd</sup>	13 <sup>th</sup>	Near Meghna bridge	10-05-14 & 2-58 pm	During monthly sampling	0.08
4 <sup>th</sup>	17 <sup>th</sup>	Near Meghna bridge	07-06-14 & 5-20 pm	During monthly sampling	0.08
5 <sup>th</sup>	21 <sup>st</sup>	Near Meghna bridge	5-07-14 & 3.30 pm	During monthly sampling	0.03
6 <sup>th</sup>	26 <sup>th</sup>	Near Meghna bridge	09-8-14 & 01-35 pm	During monthly sampling	0.03
7 <sup>th</sup>	30 <sup>th</sup>	Near Meghna bridge	05-09-14 & 12.55 pm	During monthly sampling	0.04
8 <sup>th</sup>	31 <sup>st</sup>	Near Meghna bridge	11-10-14 & 1.25 pm	During monthly sampling	0.02

Sampling Month	Sampling Week	Sample Location	Date & Time	Measurement time	Salinity (g/kg)
Bangladesh Standard (Surface water) E.C.R. 1997					-
Bangladesh Standard (Drinking water) E.C.R. 1997					-
9 <sup>th</sup>	38 <sup>th</sup>	Near Meghna bridge	01-11-14 & 04.00pm	During monthly sampling	0.04
10 <sup>th</sup>	42 <sup>nd</sup>	Near Meghna bridge	29-11-14 & 03.00pm	During monthly sampling	0.04
11 <sup>th</sup>	47 <sup>th</sup>	Near Meghna bridge	03-01-15 & 4.15 pm	During monthly sampling	0.06
12 <sup>th</sup>	49 <sup>th</sup>	Near Meghna bridge	14-02-15 & 02.45pm	During monthly sampling	0.06



**Figure 28: Monthly Salinity Monitoring at Four Points**

**7.6 Observation on Monthly Salinity Monitoring:**

Samples were collected on monthly basis from February 2014 to January 2015 from Near Meghna Bridge, Bishnondi Point, Chaitankanda point and Nunertech, Near Anandabazar point.

**Bishnondi Point:** The salinity result in Bishnondi Point are: Maximum: 1.5 g/kg; Minimum: 0.03 g/kg; Average: 0.169 g/kg.

**Chaitankanda Point:** The salinity result in Chaitankanda Point are: Maximum: 1.5 g/kg; Minimum: 0.03 g/kg; Average: 0.168 g/kg.

**Nunertech, Near Anandabazar point:** The salinity result in Nunertech, near Anandabazar Point are: Maximum: 1.5 g/kg; Minimum: 0.02 g/kg; Average: 0.165 g/kg

**Near Meghna Bridge:** The salinity result in Near Meghna Bridge Point are: Maximum: 1.5 g/kg; Minimum: 0.02 g/kg; Average: 0.171 g/kg

## 8. QUARTERLY DWASA MEGHNA RIVER SURFACE WATER QUALITY MONITORING

**Sample location: Chaitankanda, Bishnondi, Meghna river**

(GIS Location: 23° 45' 14.69 N & 90° 43' 18.07 E)

Quarterly samples from Bishnondi Intake point (Chaitankanda, Bishnondi) was collected four quarter to analyze Barium Cadmium, Chloride, Chromium, Faecal Coliform, BOD, COD, Lead, Mercury, Nitrate, Nitrite, Phosphate, TOC, Oil & Grease, Fluoride, Selenium, Zinc, Sulphate, Copper, Ammonia, Boron, Nickel, Sodium,  $\alpha$ -BHC,  $\gamma$ -BHC,  $\beta$ -BHC, Heptachlor, Aldrin, Hepatachloro Epoxide Isomer, Dieldrin, 4,4 -DDE, Endrin, 2,4 -DDT, 4,4 DDT, 4,4 DDD&2,4 DDT. The analyses of the parameters have been done in DPHE Central Laboratory, Dhaka and BCSIR laboratory, Dhaka. The test results are given in **Table: 12** and the graphical presentation of the test results are give in **Figure:29 to Figure: 43**

**Table 12: Quarterly Water Quality Monitoring at Chaitankanda**

Parameter	Unit	Bangladesh Standard (DW, ECR 1997)	Bangladesh Standard (SW, ECR 1997)	1 <sup>st</sup> Quarter test result	2 <sup>nd</sup> Quarter test result	3 <sup>rd</sup> Quarter test result	4 <sup>th</sup> Quarter test result
Barium	mg/l	0.01	-	0.045	0.041	0.038	0.087
Cadmium	mg/l	0.005	0.50	0.0008	0.0005	<0.00015	<0.00015
Chloride	mg/l	150-600	600	16	70	6	7
Chromium	mg/l	0.05	0.50	0.009	0.007	0.001	0.001
Fecal Coliform	cfu	0 no. / 100mL	-	850	460	290	210
BOD	mg/l	0.2	50	10	8	4	3.19
COD	mg/l	4.0	200	28	24	20	22
Lead	mg/l	0.05	0.1	<0.002	<0.002	<0.002	<0.002
Mercury	mg/l	0.001	0.01	<0.002	<0.00015	<0.00015	<0.00015
Nitrite	mg/l	<1.0	-	0.04	0.06	0.06	0.04
Nitrate	mg/l	10	10	2.1	1.71	1.1	1
Phosphate	mg/l	6.0	-	0.38	<0.12	0.13	0.2
TOC	mg/l	-	-	2.1	1.93	1.81	1.15
Oil & Grease	mg/l	0.01	10	0.31	0.23	0.19	0.15
Fluoride	mg/l	1.0	2.0	<0.10	<0.10	<0.10	<0.10
Selenium	mg/l	0.01	0.05	<0.002	<0.002	<0.002	<0.002
Zinc	mg/l	5.0	5.0	<0.08	<0.08	<0.08	<0.08

Parameter	Unit	Bangladesh Standard (DW, ECR 1997)	Bangladesh Standard (SW, ECR 1997)	1 <sup>st</sup> Quarter test result	2 <sup>nd</sup> Quarter test result	3 <sup>rd</sup> Quarter test result	4 <sup>th</sup> Quarter test result
Sulphate	mg/l	400	-	5	3	3	5
Copper	mg/l	1.0	0.05	<0.26	<0.26	<0.26	<0.26
Ammonia	mg/l	0.50	5.0	<0.10	0.21	0.3	0.39
Boron	mg/l	1.0	2.0	<0.20	<0.20	<0.20	<0.20
Nickel	mg/l	0.10	1.0	0.013	0.015	0.11	0.1
Sodium	mg/l	200	-	21	18	20	25
α-BHC	mg/l	-	-	Not Detected	Not Detected	-	-
γ-BHC	mg/l	-	-	Not Detected	Not Detected	-	-
β-BHC	mg/l	-	-	Not Detected	Not Detected	-	-
Heptachlor	mg/l	-	-	Not Detected	Not Detected	-	-
Aldrin	mg/l	-	-	Not Detected	Not Detected	-	-
Hepatachloro Epoxide Isomer	mg/l	-	-	Not Detected	Not Detected	-	-
Dieldrin	mg/l	-	-	Not Detected	Not Detected	-	-
4,4 -DDE	mg/l	-	-	Not Detected	Not Detected	-	-
Endrin	mg/l	-	-	Not Detected	Not Detected	-	-
2,4 -DDT	mg/l	-	-	Not Detected	Not Detected	-	-
4,4 DDT	mg/l	-	-	Not Detected	Not Detected	-	-
4,4 DDD	mg/l	-	-	Not Detected	Not Detected	-	-
2,4 DDT	mg/l	-	-	Not Detected	Not Detected	-	-

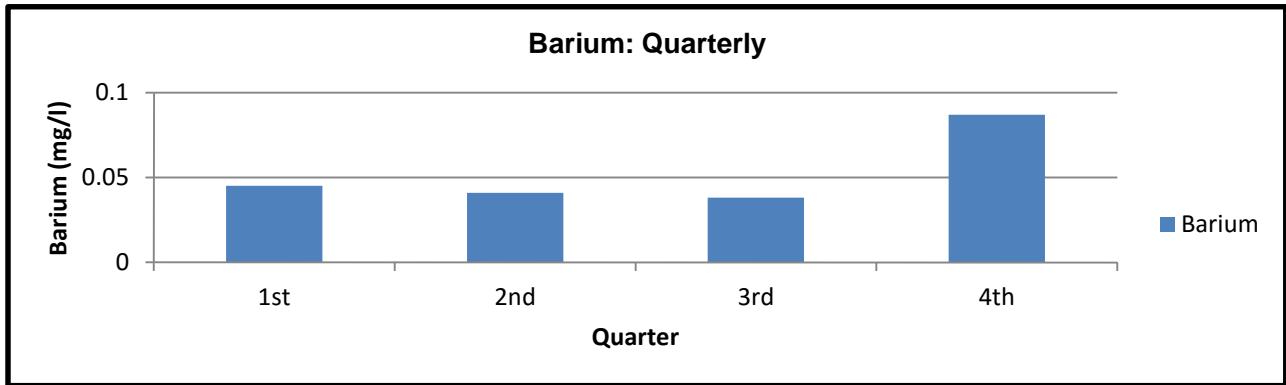


Figure 29: Quarterly Barium Monitoring at Chaitankanda Intake

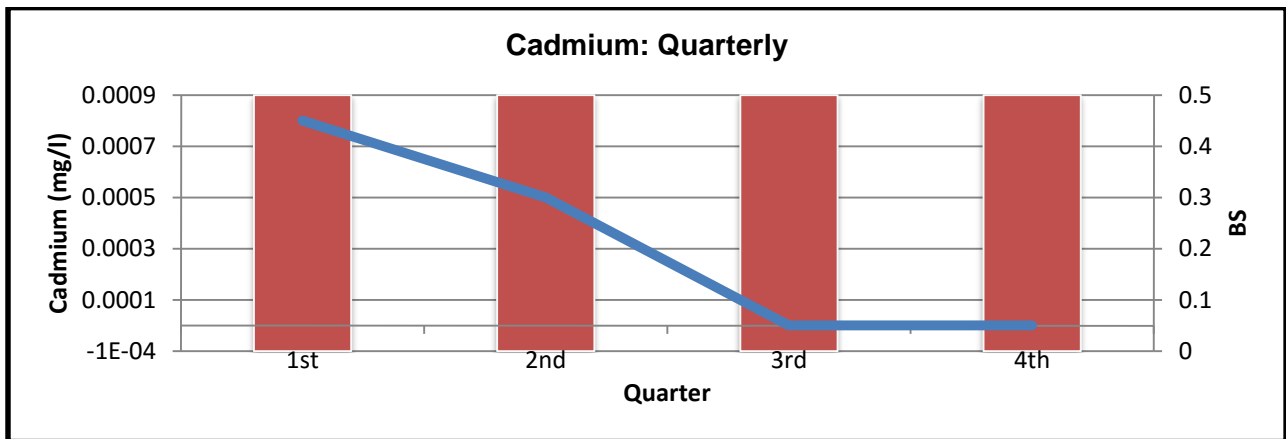


Figure 30: Quarterly Cadmium Monitoring at Chaitankanda Intake

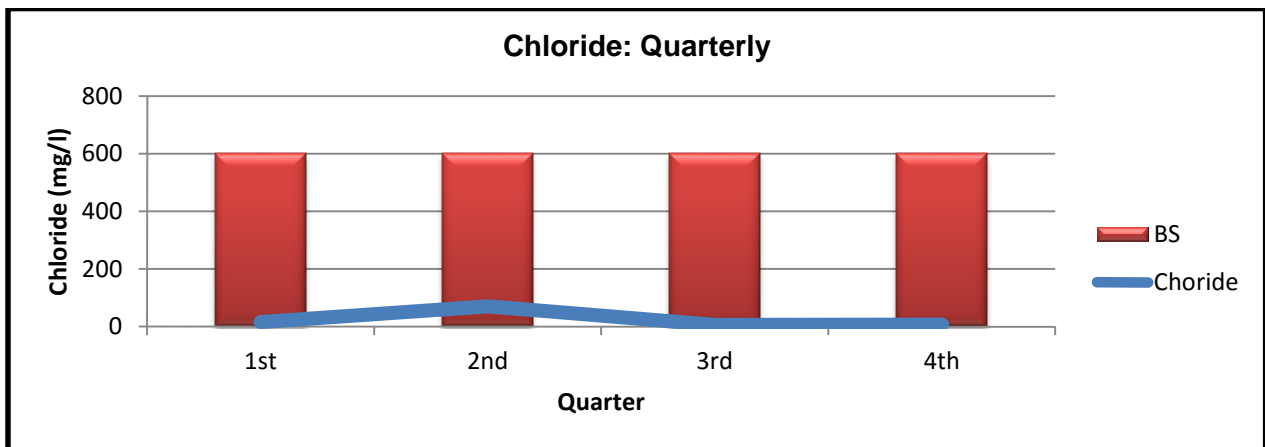


Figure 31: Quarterly Chloride Monitoring at Chaitankanda Intake

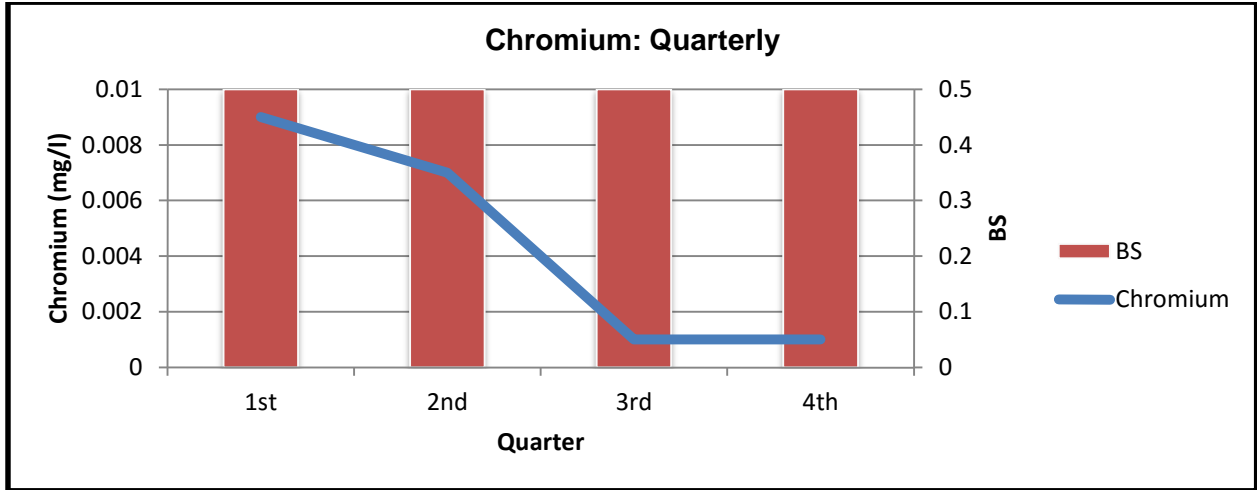


Figure 32: Quarterly Chromium Monitoring at Chaitankanda Intake

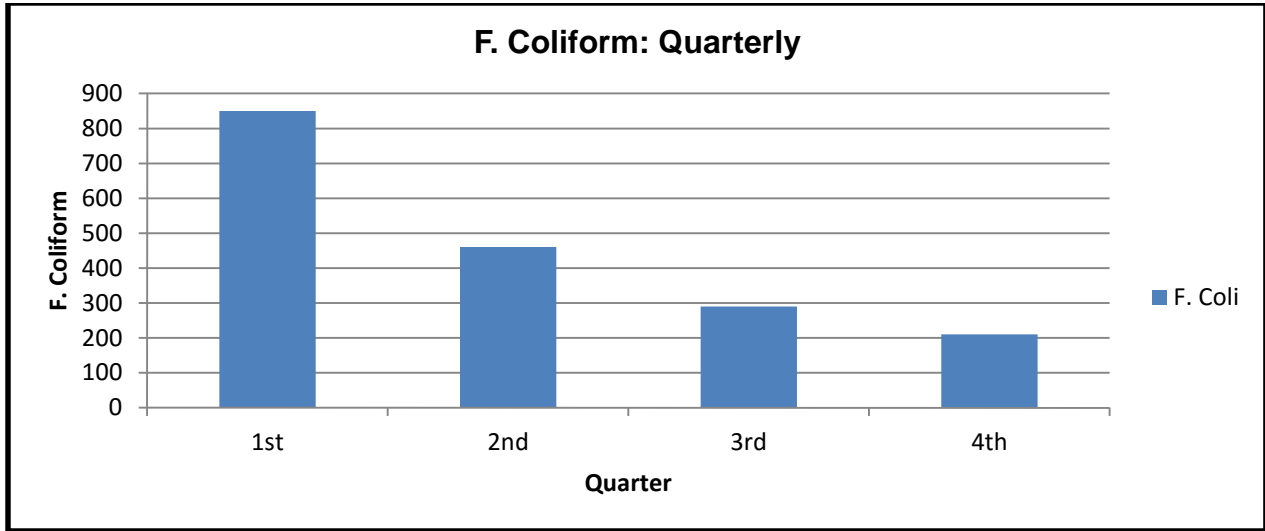


Figure 33: Quarterly F. Coliform Monitoring at Chaitankanda Intake

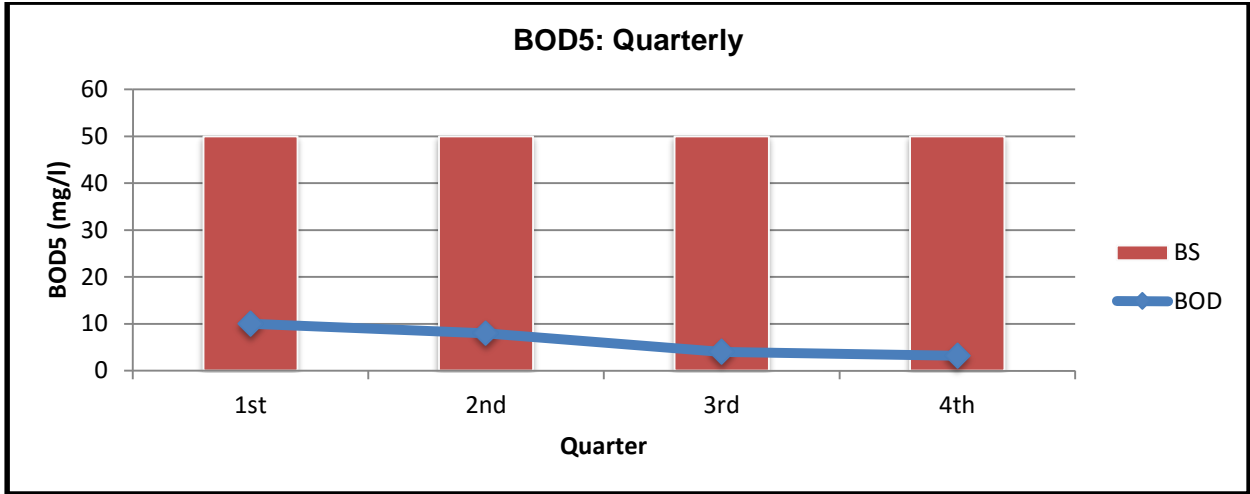


Figure 34: Quarterly BOD5 Monitoring at Chaitankanda Intake

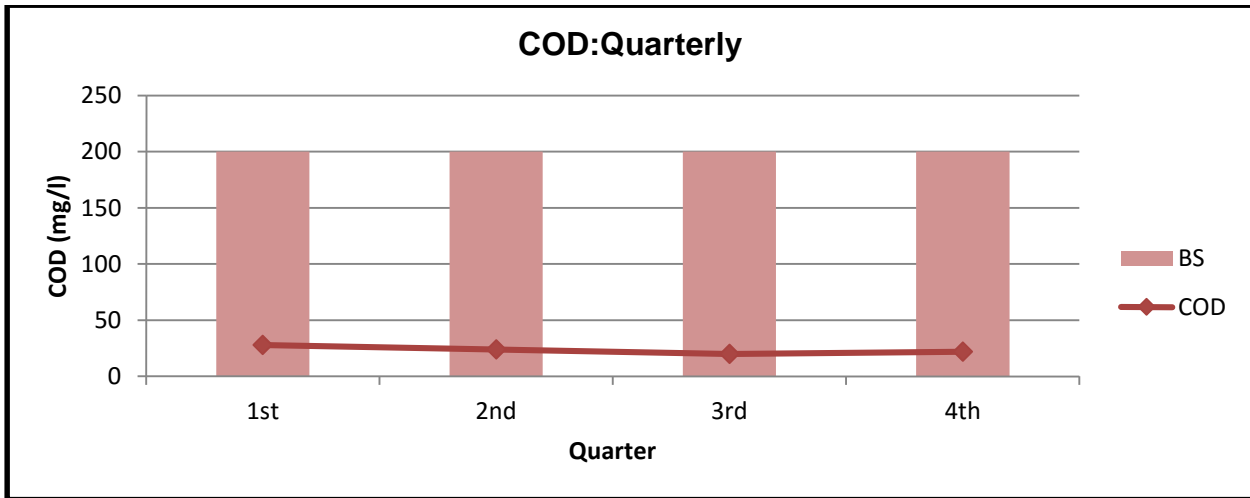


Figure 35: Quarterly COD Monitoring at Chaitankanda Intake

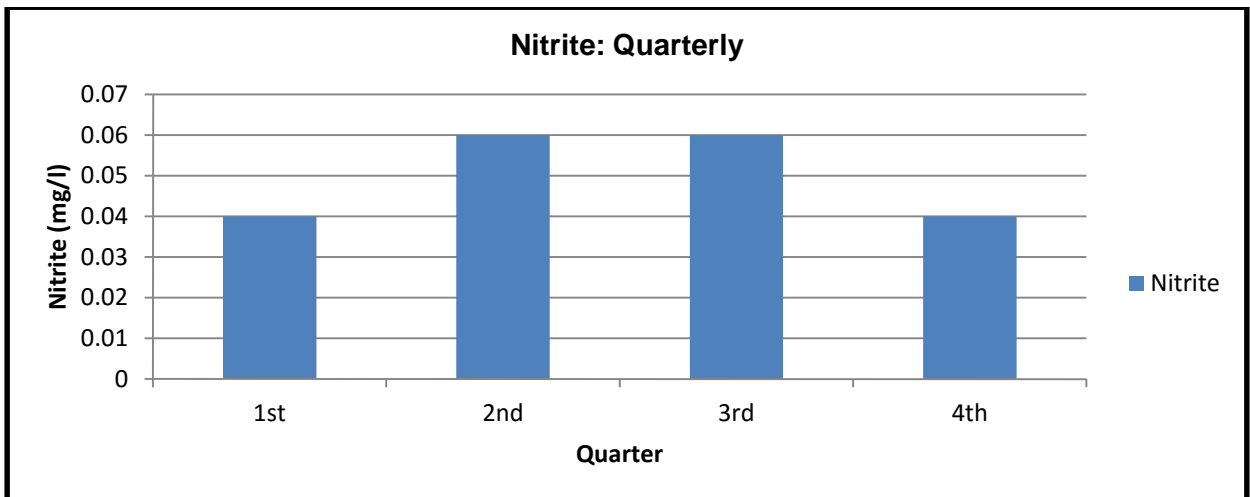


Figure 36: Quarterly Nitrite Monitoring at Chaitankanda Intake

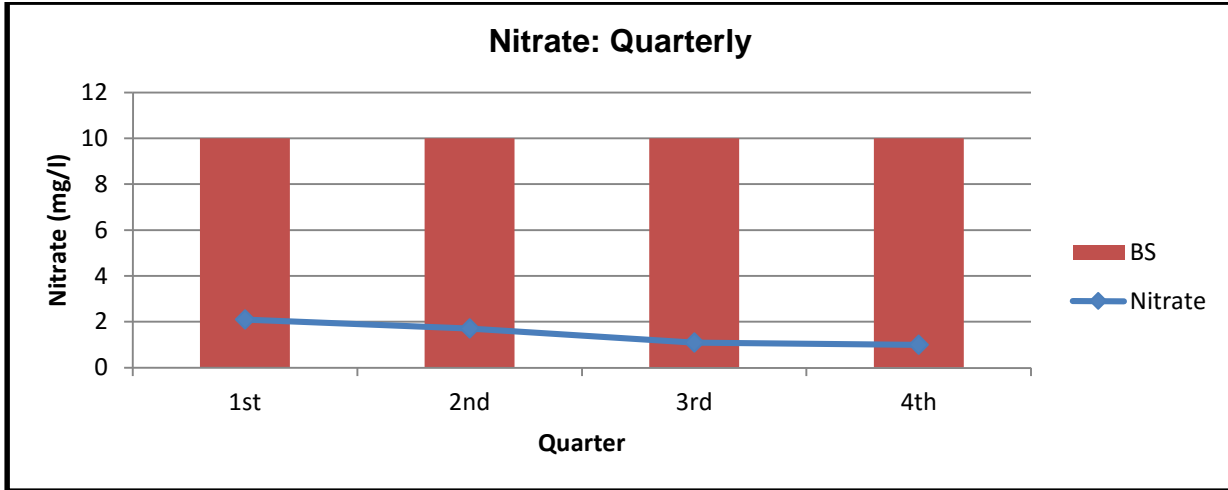


Figure 37: Quarterly Nitrate Monitoring at Chaitankanda Intake

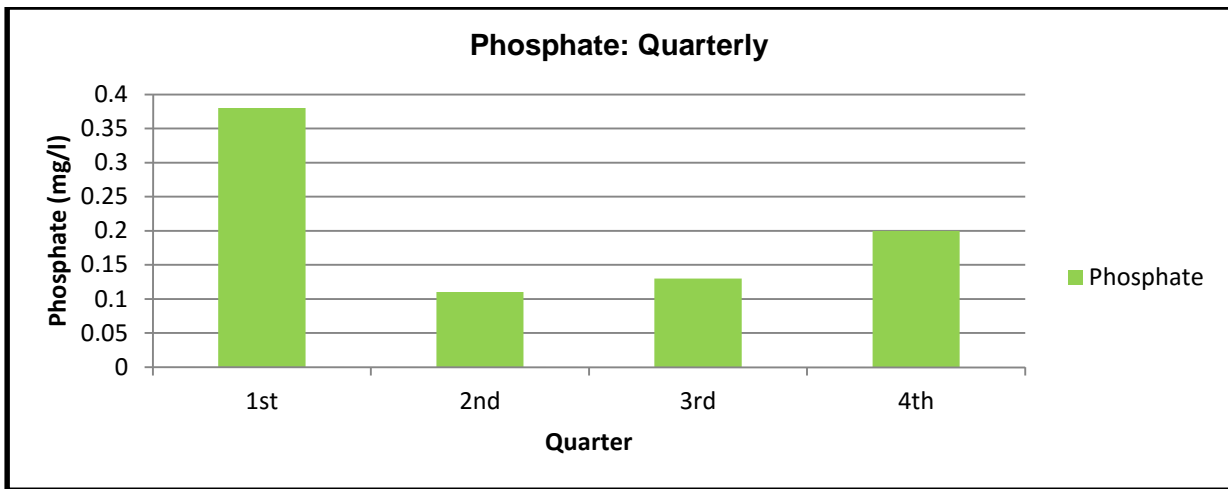


Figure 38: Quarterly Phosphate Monitoring at Chaitankanda Intake

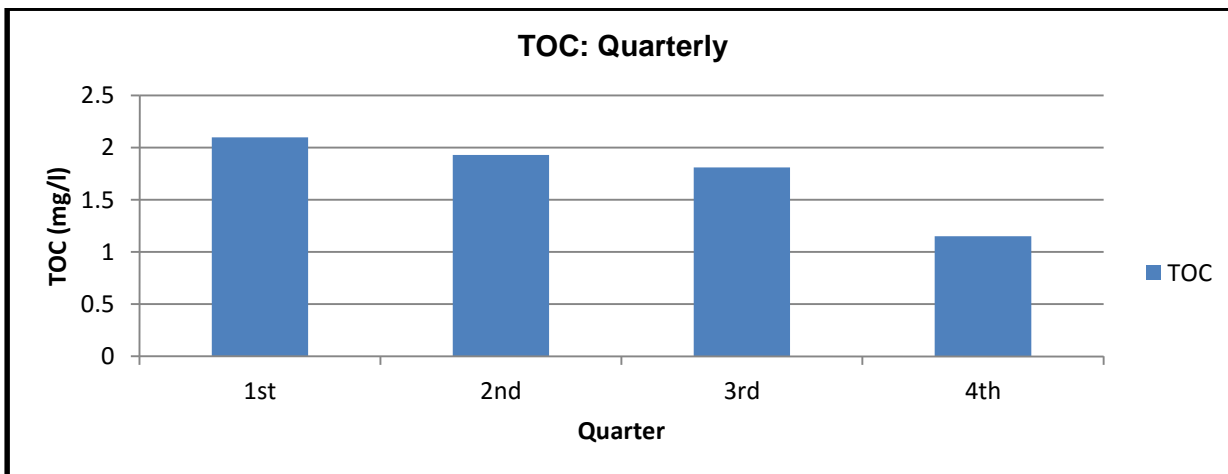


Figure 39: Quarterly TOC Monitoring at Chaitankanda Intake

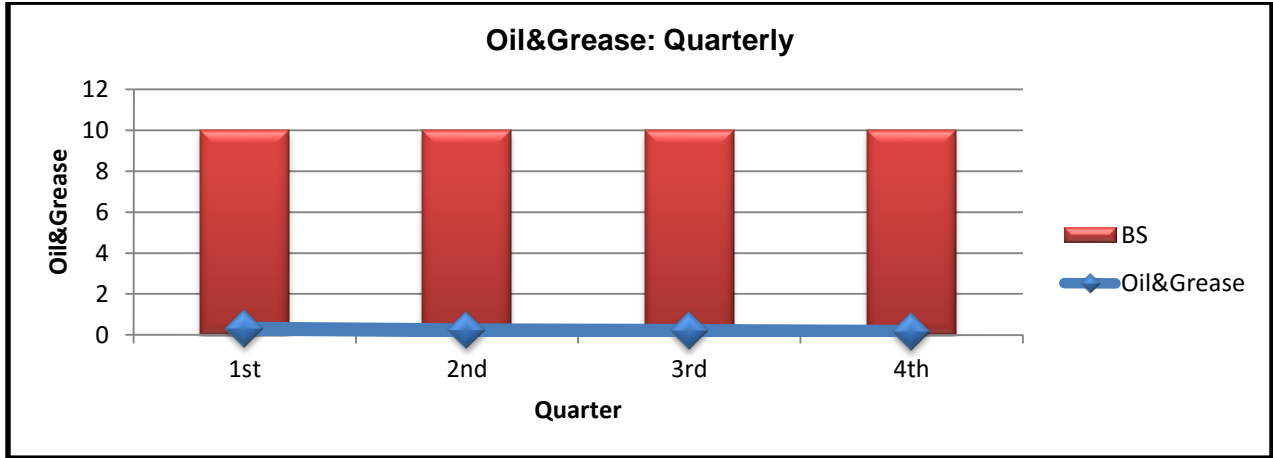


Figure 40: Quarterly Oil & Grease Monitoring at Chaitankanda Intake

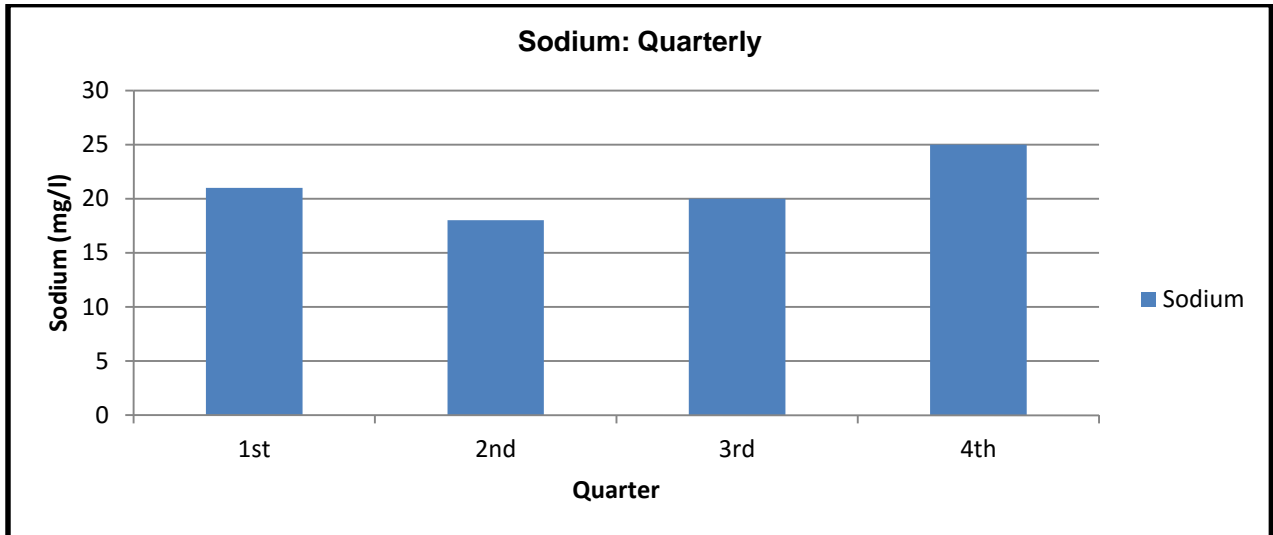


Figure 41: Quarterly Sodium Monitoring at Chaitankanda Intake

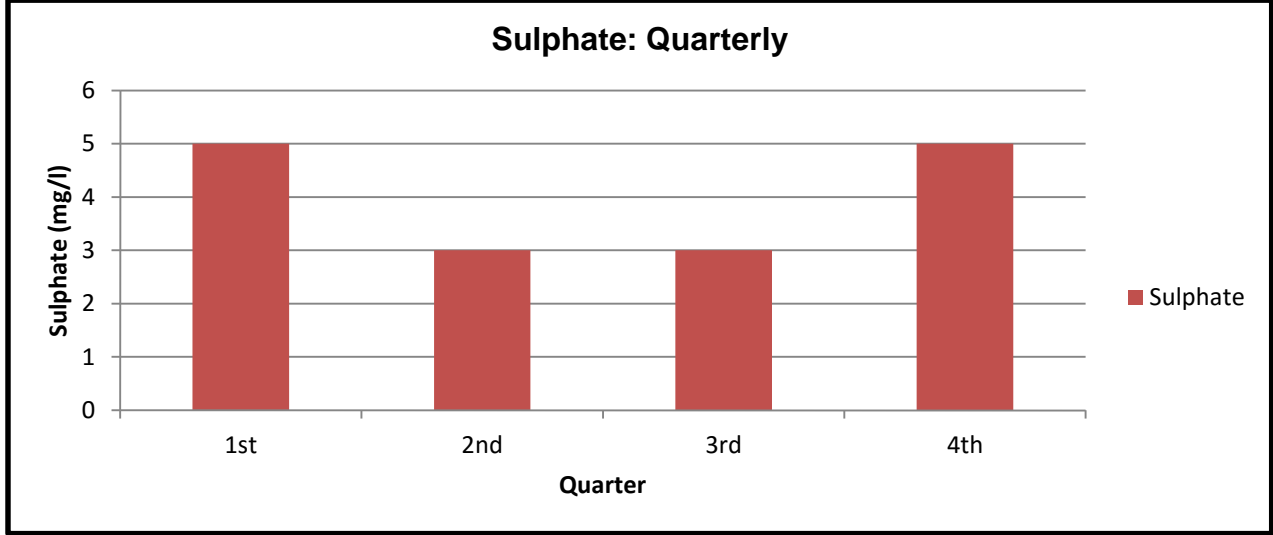


Figure 42: Quarterly Sulphate Monitoring at Chaitankanda Intake

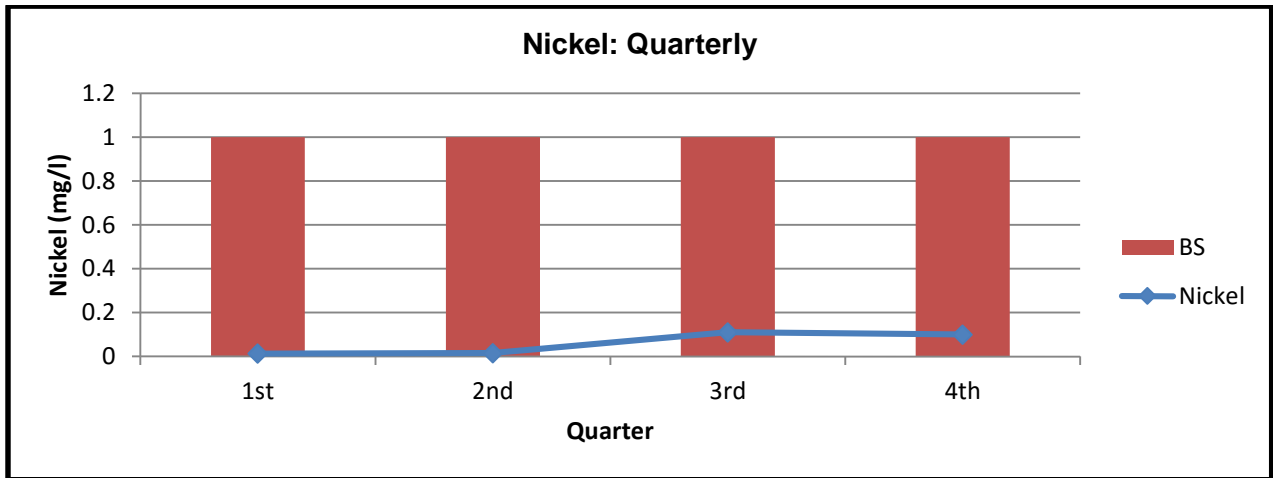


Figure 43: : Quarterly Nickel Monitoring at Chaitankanda Intake

### 8.1 Observation on Quarterly Sampling:

Quarterly samples from Bishnondi Intake point (Chaitankanda, Bishnondi) was collected four quarter to analyze Barium, Cadmium, Chloride, Chromium, Faecal Coliform, BOD, COD, Lead, Mercury, Nitrate, Nitrite, Phosphate, TOC, Oil & Grease, Fluoride, Selenium, Zinc, Sulphate, Copper, Ammonia, Boron, Nickel, Sodium,  $\alpha$ -BHC,  $\gamma$ -BHC,  $\beta$ -BHC, Heptachlor, Aldrin, Hepatachloro Epoxide Isomer, Dieldrin, 4,4 -DDE, Endrin, 2,4 -DDT, 4,4 DDT, 4,4 DDD&2,4 DDT. The analyses of the parameters have been done in DPHE Central Laboratory, Dhaka and BCSIR laboratory, Dhaka.

**Barium:** Maximum: 0.087 mg/l; Minimum: 0.038 mg/l; Average: 0.052 mg/l

**Cadmium:** Maximum: 0.0008 mg/l; Minimum: 0mg/l; Average: 0.0003 mg/l

**Chloride:** Maximum: 70 mg/l; Minimum: 6 mg/l; Average: 24.75 mg/l

**Chromium:** Maximum: 0.009 mg/l; Minimum: 0.001 mg/l; Average: 0.0045 mg/l

**Fecal Coliform:** Maximum: 850/100ml; Minimum: 210 /100ml; Average: 452/110ml

**BOD:** Maximum: 10 mg/l; Minimum: 3.19 mg/l; Average: 6.29 mg/l

**COD:** Maximum: 28 mg/l; Minimum: 20 mg/l; Average: 23.5 mg/l

**Mercury:** Not Detected

**Lead:** Not Detected

**Nitrate:** Maximum: 2.1 mg/l; Minimum: 1 mg/l; Average: 1.47 mg/l

**Nitrite:** Maximum: 0.06 mg/l; Minimum: 0.04 mg/l; Average: 0.05 mg/l

**Phosphate:** Maximum: 0.38 mg/l; Minimum: 0.11 mg/l; Average: 0.205 mg/l

**Sulphate:** Maximum: 5 mg/l; Minimum: 3 mg/l; Average: 4 mg/l

**TOC:** Maximum: 2.1 mg/l; Minimum: 1.5 mg/l; Average: 1.74 mg/l

**Oil & Grease:** Maximum: 0.31 mg/l; Minimum: 0.15 mg/l; Average: 0.88 mg/l

**Sodium:** Maximum: 25 mg/l; Minimum: 18 mg/l; Average: 21 mg/l

**Nickel:** Maximum: 0.11 mg/l; Minimum: 0.013 mg/l; Average: 0.059 mg/l

## 8.2 Pesticide:

The following pesticide were tested as special test at chaitankanda intake point quarterly:  $\alpha$ -BHC,  $\gamma$ -BHC,  $\beta$ -BHC, Heptachlor, Aldrin, Hepatachloro Epoxide Isomer, Dieldrin, 4,4 -DDE, Endrin, 2,4 -DDT, 4,4 DDT, 4,4 DDD&2,4 DDT.  $\alpha$ ,  $\beta$ ,  $\gamma$  Benzene Hexachloride are organochloride pesticide which were not detected at study point. Heptachlor is a broad-spectrum insecticide and the use of these items has been restricted in many countries. At present, the major use of heptachlor is for termite control by subsurface injection into soil. Heptachlor is quite persistent in soil, where it is mainly transformed to its epoxide. Heptachlor epoxide is very resistant to further degradation. Heptachlor and heptachlor epoxide bind to soil particles and migrate very slowly. Heptachlor was not detected of the surface water of Meghna River at chaitankanda Intake point. DDT (dichlorodiphenyltrichloroethane) is organochloride pesticide which has many isomers readily use as pesticides. DDT is a persistent organic pollutant that is readily adsorbed to soils and sediments, which can act both as sinks and as long-term sources of exposure contributing to terrestrial organisms. because of its lipophilic properties, DDT has a high potential to bioaccumulate, especially in predatory birds.<sup>[50]</sup> DDT, DDE, and DDD magnify through the food chain, with apex predators such as raptor birds concentrating more chemicals than other animals in the same environment. They are very lipophilic and are stored mainly in body fat. DDT and DDE are very resistant to metabolism; in humans, their half-lives are 6 and up to 10 years, respectively. These pesticides DDT also not detected in surface water of meghna River in the study area.

## 9. CONCLUSION:

Based on overall weekly Monitoring and analysis of the surface water of Meghna River at Chaitankanda Intake point, it is found that the quality of the Meghna River water is better. The maximum Ammonia is found 0.5 mg/l and average was found 0.13 mg/l where the Bangladesh Standard is 5 mg/l, so the amount of ammonia is far below from the Bangladesh Standard. The maximum Turbidity at chaitankanda Intake was 41.9 NTU and average is 13.185 NTU, there is no Bangladesh Standard for surface water turbidity. The average TDS was 49.03 mg/l when the Bangladesh Standard is 2100 mg/l so the test result is far below from the BS. The average DO at Chaitankanda Intake found 7.57, the Bangladesh Standard is 6 or more. The DO value was found more than BS. The average EC was 102.43  $\mu$ S/cm where the Bangladesh Standard is 1200  $\mu$ S/cm. So the EC is also below the BS. The average Total Hardness was 41.69 mg/l, there is no Bangladesh Standard for T. Hardness. The average Alkalinity was 43.97 mg/l, there is no surface water Bangladesh Standard for Alkalinity.

In monthly monitoring the heavy metal Arsenic was found 0.001 mg/l (average) where the Bangladesh Standard is 0.2 for surface water. This value is also far below the Bangladesh Standard. The average iron was 0.41 where the BS is 2. The average Manganese is 0.02 mg/l and Bangladesh Standard is 5 mg/l. The average Aluminum was found 0.24 mg/l, there is no Bangladesh Standard for Aluminum. The monthly TDS was found 45.84 mg/l which one is also closer the weekly value.

In quarterly monitoring the average Cadmium was found 0.0003 mg/l where Bangladesh Standard is 0.5 mg/l, so this value is far below form the BS. Other heavy metals like chromium Barium also found very trace amount. The heavy metal Lead and Mercury found nil. The BOD was found 6.29 mg/l and COD was found 23.5 mg/l respectively. There is no pesticide detected in the study area.

**Annexure 1**

**Photo 1 : Sampling Point at Chaitankanda Intake Photo 2: Sampling Point at Chaitankanda Intake**



**Photo 3: Sample Collection**

**Photo 4: Sample Collection**



**Photo 5: Meghna River View**



**Photo 6: Meghna River View**



**Photo 7: Field Testing**



**Photo 8: Field Testing**

