ACTION PLAN FOR SONAI RIVER AT SONAI, SILCHAR

PRIORITY V

1. Basic information about the Stretch

Sonai River is one of the major Southbank tributary of the Barak River. The river originates from Lushai Hills of Mizoram state and falls in the Barak River at Sonaimukh. The river basin comprises a major part of Barak Valley which includes a part of Cachar district of Assam and a part of state Mizoram.

The length of Sonai River 145.13 km. The average breadth of the basin is 50m and width is 27.818 km with its catchment area of 2875 km². The river Sonai flows through the heart of Silchar town, the district headquarter of Cachar district. 82% of annual flow occurs in between May to October which is considered as rainy season. The annual rate of erosion on the river bank is 8000 hector.

1.1 Polluted river stretch/length

The length of the polluted stretch of Sonai River is approximately 15 KM(Sonai to Dakshin Mohanpur) (Fig 1).

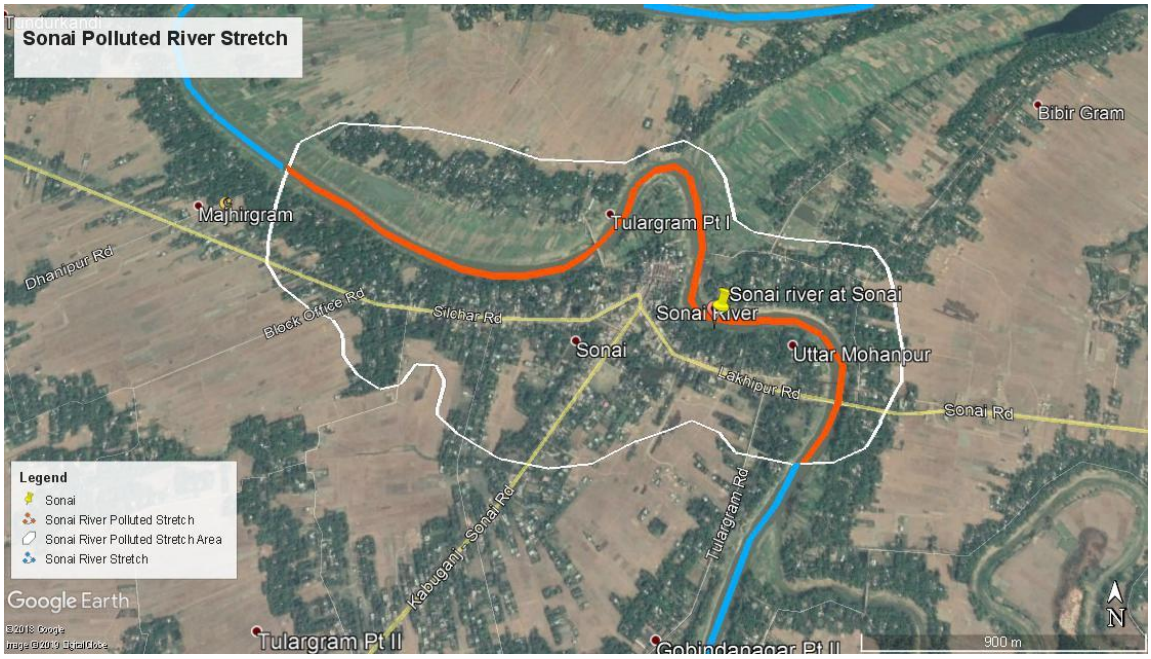

Fig 1: Map showing the polluted river stretch of Sonai river at Sonai

2. Background:

In compliance of the direction of Hon'ble National Green Tribunal, Principal Bench, New Delhi in the matter of news published in 'The Hindu' authored by Jacob Koshy, Titled 'More river stretches are now critically polluted CPCB', Government of Assam constituted River Rejuvenation Committee (RRC) vide memorandum673/2018 dated 19/12/2018 for effective abatement of pollution, rejuvenation, protection and management of the identified polluted stretches, for bringing the polluted river stretches to be fit at least for bathing purposes within six months

3. Basis of Action Plan for Sonai polluted river stretch

The action plan for rejuvenation, protection and management of the identified polluted river stretch of Assam has been prepared based on the following

- As per direction of Hon'ble National Green Tribunal, Principal Bench, New Delhi in the matter of news published in 'The Hindu' authored by Jacob Koshy, Tiltled 'More river stretches are now critically polluted CPCB'
- Comprehensive report on Prevention and Control of Pollution in River Hindon: An Action Plan for Rejuvenation' [Submitted in compliance to Hon'ble National Green Tribunal]

4. Components of Action Plan

(a) Industrial Pollution Control

- Inventorisation of industries
- Categories of industry and effluent quality
- Treatment of effluents, compliance with standards and mode of disposal of effluents
- Regulatory regime.

(b) Identification, Channelization, Treatment and Utilization of Treated Domestic Sewage

- Identification of towns in the catchment of river
- Town-wise Estimation of quantity of sewage generated and existing sewage treatment capacities to arrive at the gap between the sewage generation and treatment capacities;

- Identification of towns for installing sewerage system and sewage treatment plants.
- Storm water drains now carrying sewage and sullage joining river and interception and diversion of sewage to STPs,
- Treatment and disposal of septage and controlling open defecation.

(c) River catchment/Basin Management-Controlled ground water extraction and periodic quality assessment

- Periodic assessment of groundwater resources and regulation of ground water extraction by industries particularly in over exploited and critical zones/blocks.
- Ground water re-charging /rain water harvesting
- Periodic ground water quality assessment and remedial actions in case of contaminated groundwater tube wells/bore wells or hand pumps.
- Assessment of the need for regulating use of ground water for irrigation purposes.

(d) Flood Plain Zone

- Regulating activities in flood plain zone.
- Management of Municipal, Plastic, Hazardous, Bio-medical and Electrical and Electronic wastes.
- Greenery development- Plantation plan.

(e) Ecological/Environmental Flow (E-Flow)

- Issues relating to E-Flow
- Irrigation practices

(d) Such other issues which may be found relevant for restoring water quality to the prescribed standards.

5. Action Plan as per direction of Hon'ble NGT

The components to be discussed in the action plan for rejuvenation, protection and management of identified polluted stretch of Sonai River are as follows

5.1. Industrial Pollution Control

No Industrial estate/notified industrial area are located in the demarcated Sonai River catchment area. However two industries belonging to green categories such as food and beverages category are situated in the periphery of the demarcated river stretch. No polluting discharge finds its way to river Sonai since ETPs are functional in the concern industries. Moreover, directions were issued by the PCBA to all the defaulting industrial units to operate their ETPs. The details of the industrial units are presented in **Table I** below.

Following are the suggestions for control of industrial pollution control

- The industry that will extract groundwater for manufacturing process should not operate unless they possess valid permission for groundwater extraction from Central Ground Water Authority.
- No industries should discharge their effluent directly into drains without treatment; rather they should reuse their treated effluent/sewage.
- Direction to be issued to the units which are not complying to the effluent discharge norms as per Section 5 of the Environment (Protection) Act, 1986, by PCBA for ensuring compliance to the discharge norms.

6. Identification, Channelization, Treatment and Utilization of Treated Domestic Sewage

6.1. Major towns located on the bank

Majhirgram, Tulargram Pt1, Uttar Mohanpur and Kaptanpur is the major town/village located on the bank of the Sonai river with population less than 10,000.

6.2. Town wise estimation of quantity of sewage generated and existing sewage treatment capacities

According to 2011 census the population of Sonai circle area is 7768. As per census roll, all of the population of Sonai circle lives in the urban area. There is no any STP at present. Sewage generation and gaps in treatment are presented in **Table II** below.

6.3. Identification of towns for installing sewerage system and sewage treatment plants.

Sewage Treatment Plant and sewerage system can be installed in Sonai Circle area in consultation with the Urban Local bodies, Silchar Municipal body and district administration.

Table II: Sewage generation and gaps in treatment

S. N	Area	Population as per 2011 census	Water Consumption (KLD) @135 lpcd	Sewage Generation (KLD)	No. of STPs Proposed	Existing Treatment capacity (KLD)	Total Gaps in KLD
1	Uttar Mohanpur	2599	350 KLD	280 KLD	01	Nil	**836**
2	Tulargram Pt1	3414	460 KLD	368 KLD			
3	Majhirgram	1755	236 KLD	188 KLD			
Total		**7768**	**1046** KLD	**836** KLD			

6.4. Water Quality of the river stretch

There is one (01) sampling location of Sonai River under NWMP as per the following.

Table III: Monitoring Locations Details

Sampling Location	Coordinates
Sonai river at Sonai	24°44'0.14" N 92°53'37.05" E

The latest water quality trend of Sonai River in terms of BOD value from Jan 2016 till April 2019 is presented below:

Table IV: BOD value in mg/l of Sonai River at Sonai

Year	BOD Value	Year	BOD Value	Year	BOD Value	Year	BOD Value
Jan-16	1.9	Jan-17	2.6	Jan-18	2	Jan-19	1.6
Feb-16	0.9	Feb-17	2.2	Feb-18	2	Feb-19	2.2
Mar-16	0.9	Mar-17	2.2	Mar-18	1.3	Mar-19	2.3
Apr-16	0.6	Apr-17	2.3	Apr-18	2.2	Apr-19	2.4
May-16	1.2	May-17	2	May-18	2.2	-	-
Jun-16	1.2	Jun-17	1.1	Jun-18	2	-	-
Jul-16	**3.0**	Jul-17	2.2	Jul-18	2.6	-	-
Aug-16	**4.4**	Aug-17	2.3	Aug-18	2	-	-
Sep-16	**3.8**	Sep-17	2.1	Sep-18	2	-	-
Oct-16	1.2	Oct-17	1.7	Oct-18	2.2	-	-
Nov-16	2	Nov-17	1.9	Nov-18	2	-	-
Dec-16	2.5	Dec-17	2.4	Dec-18	**5.7**	-	-

The above data indicates that the BOD load is above 3 mg/l only on four (04) occasions out of Forty (40) samplings carried out from July 2016 till April 2019. The water quality of the river stretch is improving from October 2016 to November 2018.

Floods have been never ending sorrow for the people of Assam. The flood water washes out the top soil layer along with the debris in the catchment area of the river which is having high organic load resulting in increasing of BOD level beyond permissible limit at one occasion in December 2018.

6.5. Drains contributing to pollution

There are no major outfall/drains in to the Sonai River in the polluted stretch area. However small storm water drains are joining the river which carries the sewage along with the storm water runoff from the Silchar town and Sonai circle.

6.6. Characteristics of the major drains

Small storm water drains carries residential wastes throughout the Sonai town . Direct dumping of residential and commercial garbage into the drains is making it shallower and heavily silted. As a result, during rainy season water overflows and inundates the areas. It is also observed that the drains of the town are also becoming a regular garbage-dumping site. Moreover, these drains are not planned properly to carry even the regular water.

6.7. Flow details of the major drains contributing to river pollution

Action initiated to measure the flow of various out falling drains.

6.8. Sewage generation from the towns located on the banks of the polluted river

The main contributor of pollution in the river is municipal sewage. There are no treatment systems for the sewages which ultimately find its way to water bodies without treatment. Moreover, sewage treatment facility has not been set up yet in Assam.

However it was observed that, there is no any severe impact on Sonai River due to BOD load. As the river is perennial and voluminous, the effect is negligible. However, in this regard a STP of 1 MLD capacity has been proposed for the Sonai circle area.

6.9. Number of Sewage treatment plants present and treatment capacity, and gaps

There is no any sewage treatment plant at present and the gap in treatment is 836 KLD.

6.10. Number of STPs proposed and capacity

As per Sewage generation one (01) number of STP has been proposed with 1 MLD capacity.

6.11. Interception and diversion of drains /in situ treatment given

One (01) number of STP has been proposed along with interceptor drains for in situ treatment before outfall.

6.12. Drainage system/ sewerage network present/proposed

There is no proper sewerage system at present. In this project one (01) number of STP along with interceptor drains for collection of the sewage of the basin has been proposed. All the sewage of the catchment area of the river shall be collected by interceptor drains and shall be treated in the proposed STP and shall be reused for other activities.

6.13. Treatment and Disposal of Septage and controlling Open Defecation

Some of the households in the towns are equipped with septic tanks and some of the slum dwellers in the catchment areas of the river have kuccha latrines. However, around 1014 toilets have been constructed in the Sonai circle area under the 'IHHL' mission which is an initiative of Swachh Bharat Abhiyan to achieve open defecation free area.

Following remedial actions will be taken in consideration of treatment and disposal of sewage

- Sewage Treatment plant should be installed for treatment
- Public awareness to control open defecation and understand the importance of toilets.

7. Controlled Ground water Extraction and quality Assessment

Ground water is mainly used for drinking and irrigation purposes and industrial use is considered to be negligible. Water supply schemes are executed by Assam Public Health Engineering Department through construction of

ground water structures like dug well, hand pump and deep tube wells, etc. Ground water is used for irrigation purposes mainly through shallow tube wells implemented by Agriculture Department. The existing gross ground water draft for irrigation is 1133.35 mcm.

The details of estimated ground water resource in Cachar district is presented in **Table V** below.

Table V: Estimation of ground water resource in the Cachar district

Net annual Ground Water Availability	**1133.35 MCM**	**Ground water recharging mechanism**	**Rain water harvesting**
Net annual ground water draft	39.21	Recharging of groundwater is done by creation of Pond/lakes under government schemes.	The roof top rainwater harvesting is practiced.
Projected demand for domestic and industrial use up to 2025	52.46		
Stage of ground water development	4%		

Irrigation Practices in Cachar District

Certain schemes such as Lift Irrigation Scheme (LIS), Flow Irrigation Schemes (FIS) and Deep Tubewell (DTW) have been taken up for Cachar district by the irrigation Department of Assam in collaboration with the Central government.

7.1. Status of Ground Water

As per CGWB report, the interpretation of the results of the chemical analysis shows that ground water is fresh and suitable for both the domestic and irrigation purposes. Higher contents of iron more than permissible limit occurring sporadically require treatment before being used for drinking purpose. The district is still under 'Safe' category.

7.2. Remedial Actions

The following remedial actions will be taken in consideration of contaminated ground water sources, controlled ground water extraction and periodic quality assessment

- Ground water of deeper aquifers should be analyzed for periodic assessment of Iron.

- Alternate sources of drinking water should be explored and prioritized.
- Awareness campaigns about health hazards due to intake of excessive Iron is the need of the time.
- Role of pesticides used for agricultural activity should be carefully observed.
- Survey should be conducted regarding ground water uses by different categories such as domestic, Industries etc and also to identify the over exploited and critical areas in the river stretches with respect to ground water extraction.
- Effective management of industrial effluent or sewage for preventing contamination of ground water sources.
- The industry that will extract groundwater for manufacturing process should not operate unless they possess valid permission for groundwater extraction from Central Ground Water Authority.
- Strict vigilance and conducting inspection of the industries to rule out any forceful treated effluent injection in to ground water resources.
- Roof top rain water harvesting techniques should be encouraged for industrial, commercial or individual households and community.

8. Flood Plain Zone

The following are the identified flood prone area for the polluted Sonai river stretch

Name of River	Flood plain areas
Sonai River	Tulargram Pt1, Uttarm Mohanpur

The Sonai river embankment details are as follows

S.N	Embankment	Length (km)
1	Left bank	21.40
2	Right Bank	26.61

8.1. Regulating activities in the Flood Plain Zone

Further following activities need to be regulated in the flood plain zones.

S.No	Action points	Responsible authority
1	Plantation in the flood plain zone	Forest Department
2	Checking Encroachment	Local administration

3	Demarcation of the flood plain zone	Water Resource Department
4	Prohibition of disposal of all kinds of wastes	District Administration

8.2. Waste management status and proposed actions for Municipal solid waste, industrial waste and Bio medical waste management

Table VI: Waste management status and proposed actions

Type	Status	Proposed Action	Authority
Industrial Waste	➢ Authorisation has been granted to different industries in line with Water act 1974, Hazardous Waste (Management, Handling and Transboundary Movement) Rule, 2008 as amended. ➢ Regular monitoring by PCBA to ensure that the terms and conditions are strictly adhered in accordance with the prescribed standards.	➢ Direction issued to the industries to identify the non-point sources and arrest contamination of storm water. ➢ Directions to be issued to the defaulter units.	Pollution Control Board Assam
Municipal waste management	➢ At Present Municipal Solid wastes are being dumped unscientifically by Cachar Municipality Board. ➢ ULBs are to prepare DPR for Solid waste management of the city in consultation with state governments. ➢ Municipal Body has engaged NGOs ward wise for collection of Municipal Solid Waste from the generation point for treatment and disposal. ➢ The wastes are being segregated into dry and wet waste categories and are collected separately and transported to disposal site.	➢ Directions have been issued by Pollution control Board, Assam to concerned Municipality Board in this regard. ➢ Implementation of segregation of waste at source ➢ Door-to-door garbage Collection of waste ➢ Formation of Sanitation task Force ➢ Formation of Neighbourhood Community ➢ Awareness campaigns ➢ Processing and disposal of waste	Cachar Municipality Board
Plastic waste	➢ At present plastic wastes are being dumped along with Municipal solid waste.	➢ Issue directions to Municipal Board to segregate and collect plastic waste and initiate	Cachar Municipality Board

Type	Status	Proposed Action	Authority
		necessary steps to channelize the waste to authorized agencies for recycling and reprocessing	
Hazardous waste	➢ No hazardous wastes are directly disposed in the river	➢ Awareness campaign regarding health and other issues related to Hazardous waste	Pollution Control Board Assam
Bio-Medical waste	➢ Segregation at the source under Biomedical waste Management Rules, 1998 as amended	➢ Direction issued to all HCF unit to implement the BMW Rules, 2016 as ammended in all HCF Units. (As per guidelines of CPCB)	HCF units, PCBA
E –waste	➢ No bulk consumers and generators have been identified.	➢ Not Applicable	Pollution Control Board Assam

8.3. Gaps identified in waste management

About 5 MT of municipal solid wastes per day are being dumped unscientifically.

8.4. Greenery development - Plantation Plan

State has initiated afforestation in the degraded forestland, also raising roadside plantation besides creating check dams/embankments in the river catchment areas to combat erosion and soil conservation.

The following remedial actions has to be initiated in consideration of greenery development

- Raise plantation along the river bank to control the flow run off water directly to the river
- Bamboo species to be raised as it is a good soil binder thereby stabilize the banks of the river from erosion

9. Environmental Flow (E-Flow)

9.1. Stretch of river perennial or non- perennial/flow available/water usage in the stretch

The entire river stretch is perennial. The discharge of Sonai River recorded as per the master plan of Brahmaputra Board is 3656.00 cum. It is also observed that even during the dry season, the river maintains 82% of the average flow recorded.

9.2. Irrigation practices in the river

The high volume of discharge and water level of the river can be of great use for good irrigation practices for the people.

10. Identified organisations responsible for preparation and execution of the action plans

Organisations responsible for preparation and execution of the action plans are as follows:

- Secretary to the Govt. of Assam, Environment and Forest department
- Secretary to the Govt. of Assam, Urban Development department
- Commissioner, Industries and Commerce, Assam
- Member Secretary, Pollution Control Board Assam
- Commissioner, Guwahati Municipal Corporation
- Commissioner to the Govt. of Assam, Water Resource Department
- Divisional Forest officer, Social Forestry, Basistha, Guwahati -29

11. Monitoring mechanism proposed for implementation of action plans

The water quality assessment and evaluation of impacts is necessary to understand the river state at various stages of the project implementation and post implementation of the project. Therefore the water quality assessment and evaluation of the project achievements is essential component for the long term benefit of the project. The monitoring and evaluation also indicate for taking corrective measure at appropriate time. The ill effects may be controlled by taking step at right time for right cause. The monitoring & evaluation schedule and plan proposed is as under.

11.1 Water Quality Stations (WQS):

The water quality monitoring will include following parameters, which shall be monitored at monthly interval or as and when required. The one complete unit to be purchased and identified parameters to be monitored at defined sampling stations.

The sampling station is:

- Sonai River at Sonai.

The parameters to be monitored are as follows.

1	pH	6	Bio-Chemical Oxygen Demand (BOD)
2	Turbidity	7	Faecal coliform
3	Conductivity	8	Total coliform
4	Temperature		
5	Dissolved Oxygen (DO)		

Most of the parameters will be monitored manually and will be incorporated in database.

12. Public Mass awareness etc.

Any river conservation project to be implemented successfully, public awareness is of utmost importance. Unless the public are made aware about the irreversible damage and pollution caused by indiscriminate littering and dumping of waste and garbage in drain and water bodies connected to Sonai River, the project cannot be implemented in true sense of the word to achieve conservation. Some members of the communities are already aware that there is a need for river conservation programme and that they will be benefitted. Hence, it should be ensured with the following points

- The communities are effectively involved in all the stages of the project cycle from conceptualization, to preparation, to finalization, to implementation and finally O & M.
- Public Awareness & Public Participation should be affront-end activity of the project
- The entire programme of conservation should be conceived, formulated, implemented, monitored and evaluated in close consultation with the stake holding communities.

- Therefore, education and awareness programmes are key to the sustainability of the various components implemented as part of the river restoration project.

13. Action Plan

Table VII: Action Points

Type	Action Points	Responsible Authority	Time Targeted
Industries	a) Strict observation/ monitoring of industrial effluent/waste water discharge strictly for compliance. a) Stringent action against non-complying industrial units b) No industry should operate or continue manufacturing process unless they possess valid permission for ground water extraction from Central Ground Water Authority (CGWA) c) Small service providing units like street food selling vendors, laundry etc should not be allowed to dispose solid, liquid or semi-liquid wastes directly into the drains or sewers. d) Set up online monitoring system in the major industries. e) To stress all the industrial units to adopt cleaner technology and	**Pollution Control Board Assam**	**3 Months (June, 2019 To August, 2019)**

Type	Action Points	Responsible Authority	Time Targeted
	take appropriate measures for reduction of effluent, recycling and reuse of treated water Directions has been issued for Zero Liquid Discharge (ZLD) in the major polluting industrial units		
Interception and treatment of raw sewage	a) The quality of waste water flowing in the drains of identified polluted stretch have to be analysed and studied to assess the drain wise characteristics of waste water. b) Concerned departments should design the installation of Sewage Treatment Plant (STP) based on flow details of the drains and utilization capacity and ensure that each households are connected to the sewers as applicable. c) Sewage Treatment Plant should also consider treatment and disposal of sewage for river catchment area settlement including discharge from toilets constructed under Swachh Bharat Mission d) To trap the discharge using strainers before falling into river.	**PCBA/ ULBs/ District Administration/ Water Resource Department**	**2 Years (June,2019 to May, 2021)**

Type	Action Points	Responsible Authority	Time Targeted
	e) Channelization including diversion of sewage generated from households to sewer lines/interception of all the drains presently carrying sewage and for ensuing proper treatment through the upcoming STPs. f) Local administration should provide pucca latrines to all the households through Individual Households Latrines (IHHL) Scheme under Swachh Bharat Mission.		
Ground Water Assessment	a) Conducting survey regarding ground water usage by category wise such as domestic, community, etc. and also identification of over exploited and critical blocks in the river stretches with respect to the ground water extraction. b) Carry out assessment of ground water survey in the catchment area of the identified polluted stretch once in a year to ensure quality. c) To promote roof top rain water harvesting by individual households	**PCBA/CGWA**	**Continuous**
Flood Plain Zone	a) Conservation of the river through watershed management.		

Type	Action Points	Responsible Authority	Time Targeted
	b) Cleaning of the river bed and bank. c) Afforestation on both the banks to prevent soil erosion d) Recreational activities to be promoted. e) Erection of pathway of the river banks. f) Checking encroachment in the flood plain zone of the polluted river stretch g) Prohibition of disposal of municipal, plastic, biomedical and other wastes in the polluted stretch of the river bank h) Demarcation of the flood plain zone.	**Soil Conservation Department/ Water Resource/ Forest Department/ Tourism Department/PWD Assam/ULBs**	**6 Months (February,2020 to July, 2020)**
	The plan for the polluted stretches of the river may be implemented in a time bound manner by fragmenting activities as a) Modification of consent conditions in and around the polluted stretches. b) Surveillance of sources of pollution in contrast to the norms. c) Assessment of water quality of the polluted stretches on monthly basis has already been commencing d) The monitoring committee may convene meeting of	**Pollution Control Board Assam**	**3 Months (June,2019 to August, 2020)** **c) Monthly Basis**

Type	Action Points	Responsible Authority	Time Targeted
	Stakeholder organizations on Quarterly basis with under the chairmanship of Chief Secretary		
Solid Waste	a) Prohibition of direct disposal of solid waste in the river banks. b) Frequent River Surface cleaning by removal of debris, plastics etc.	**ULBs/ Water Resource Department**	**3 Months (November, 2019 to January, 2020)**
Environmental Flow	a) Flow measurement of the river should be carried out by the concerned department and the record has to be maintained b) Fresh water flowing through escape channels/small barrages should be checked. c) The river can be of good potential for irrigation practices and should be carried out by the farmers.	**Water Resource Department**	**Continuous**
Public Awareness	a) Awareness programs to highlight the issues related with the direct discharge of solid waste and open defecation. b) Mass awareness to conserve water.	**ULBs/PCBA/NGOs**	**Continuous**

14. Budget Estimate

1	No. of STPs	01 No.
2	Capacity of STP	1 MLD
3	Life of STPs	25 years
4	Cost of STPs & Sewerage System	4.95 crores
7	For Captive power	0.5 Crore
Total Amount		**Rs. 5.45 Crores**

Members of River Rejuvenation Committee (RRC)

Secretary to the Govt of Assam
Environment & Forest Department

Secretary to the Govt of Assam
Urban Development Department

20/7/19

Commissioner
Industries and Commerce Assam

Member Secretary
Pollution Control Board Assam