

Environmental Monitoring Report

For the period covering July–December 2019
Project Number: 38412-023
November 2021

India: MFF - Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program — Tranche 1

Prepared by the Flood and River Erosion Management Agency of Assam (FREMAA) for the State Government of Assam and the Asian Development Bank.

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BI-ANNUAL REPORT ON IMPLEMENTATION OF EMP

(OPERATION PHASE TRANCHE 1)

**Project No 38412
Loan No 2684-IND**

**India: Multitranche Financing Facility –
Assam Integrated Flood and Riverbank Erosion Risk
Management Investment Program**

Reporting Period – July 2019 to December 2019

Submitted by Executing Agency



Flood and River Erosion Management Agency of Assam (FREMAA)

Prepared by FREMAA for the State Government of Assam and the Asian Development Bank (ADB)

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**Bi-Annual Report on Implementation of Environmental Management Plan
July 2019 to December 2019**

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ABBREVIATIONS

ADB – Asian Development Bank
AIFRERMIP – Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program
CBFRML – Community based flood risk management and livelihood
EIA – Environmental impact assessment
EMP – Environmental management plan
EMoP – Environmental Monitoring Plan
FRERM – Flood and riverbank erosion risk management
FREMAA - Flood and River Erosion Management Agency of Assam
MFF – Multitranche financing facility
MIS – Management information system
MoEF&CC – Ministry of Environment Forests and Climate Change
GOI – Government of India
NGOs – Nongovernment organizations
PMU – Project management unit
SEIA – Summary environmental impact assessment
SGOA – State government of Assam
SIO – Subproject implementation office
SPCB – State Pollution Control Board
UNDP – United Nations Development Program
WRD – Water Resources Department

LOAN PROCESSING HISTORY

Approval of PPTA 26 September 2008
Fact-finding Mission 27 January-7 February 2009
Management Review Meeting (MRM) 9 October 2009
Appraisal Mission-1 1-16 February 2010
Appraisal Mission (Final) 27 April – 10 May 2010
Staff Review Meeting (SRM) 29 July 2010
Loan Negotiations for MFF and Tranche 1 7-8 September 2010
Board Circulation 29 September 2010
Board Approval 19 October 2010
Project 1 Approval IV October 2010
Loan Agreement Signing November/December 2010
Loan Effectiveness December/January 2010
Physical Completion Date 31 March 2017
Loan physical completion date 31 July 2017
Loan Closing Date 30 September 2017

1. Introduction.

The **Flood and River Erosion Management Agency of Assam (FREMAA)** was set up in 2010-11 as an Executing Agency (EA) under Society Registration Act 1860. It is a special purpose vehicle established for implementation of the Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program (AIFRERMIP) funded by ADB with provision of comprehensive, cost-effective and sustainable structural and non-structural measures in Palasbari, Gumi and Dibrugarh under Tranche 1, in accordance with government and ADB's policies and procedures.

Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program is likely to affect an area larger than the sites or facilities subject to physical works. The project under the program of Tranche-1 therefore come under *Category A* according to ADB Safeguard Policy Statement (SPS, 2009). Overall, the two subprojects (Dibrugarh, Palasbari and Gumi) are needed primarily to safeguard the people, property and environment from frequent floods of the Brahmaputra River, and strongly supported by the stakeholders. The FREMAA aims to integrate key Environmental Safeguards at all the levels of planning and implementation so that critical natural ecosystem. The flood plains of Brahmaputra and the resources, are not adversely impacted. Nevertheless, close monitoring during during operation phase is being operationalized so that any unforeseen impact will be determined and apply corresponding mitigation measures. The FREMAA aims to integrate key Environmental Safeguards at all the levels of planning and implementation so that the natural ecosystem are maintained and are least disturbed.

Sound environmental management is critical to sustainable development and poverty reduction. Without committed efforts to safeguard the environment, pressure will continue to build on the land, forests, water systems, wetlands, and other natural resources on which people depend for their livelihoods. ADB's environmental and social safeguards are cornerstone of its support to inclusive economic growth and environmental sustainability. The objectives of the SPS is to avoid, or when avoidance is not possible, to minimize and mitigate adverse project impacts on the environment and affected people.

The goal of the ADB's SPS is to promote the environmental and social sustainability of ADB supported projects by protecting people and their environment from potential adverse impacts and enhancing the benefits provided. This goal is integral to achieving environmentally sustainable and socially inclusive growth and poverty reduction in Asia and the Pacific, a defining element of ADB's Long-Term Strategic Framework, Strategy 2020.

In complying with the SPS requirements:

- (i) environmentally sustainable projects are primarily achieved through a good project design during project preparation and effective environmental management during project implementation;
- (ii) integrating environmental considerations into the project feasibility study and design calls for the incorporation of environmental assessment and management into the economic, financial, institutional, social, and technical analysis of a project; and
- (iii) good environmental assessment and management enables the continued improvement of environmental performance throughout the life of a project, and can lead to enhanced economic, financial, and social outcomes.

Provisions for compliance:

The FREMAA aims to integrate key Environmental Safeguards at all the levels of planning, implementation and operation as well so that critical natural ecosystem and the resources are not impacted in this biodiversity hotspot. There was a need for recognition and following the compliance with national and state system and regulations on environmental standards by the contractors. Some of the specific environmental parameters were to be monitored periodically to check the compliance. This helps in maintaining environmental sustainability along with inclusive economic growth and compliance to government standards. Besides above, for achieving the compliance following specific arrangements were made in the contract.

As stated in the EMP FREMAA, the SIOs are monitoring the Tranche - 1 project areas during the operation phase also. It is a third report of the operation phase of Tranche - 1.

Measures for monitoring are of air, water, noise, compensatory afforestation, crop cultivation, etc are under the preview of the environmental safeguard measures under the project.

Structural works of the two subproject areas under Tranche-1 were :

Palasbari Sub Project:

Palasbari Reach (Construction works completed before June, 2017)

1. Palasbari Erosion Protection under water works below LWL (4.9 Km).
2. Construction of Palasbari Embankment and slope protection work above LWL along Brahmaputra river at Palasbari. (5.1 Km.)

Gumi Reach (Construction works completed before December, 2016)

3. Construction of under water and Bank Revetment with loose boulder crates over geobag apron including supply of boulders and wire mesh nets for Gumi erosion Protection works along the Brahmaputra river. (4.5 Km)

Dibrugarh Subproject (Construction works completed before June, 2017)

- (i) Raising, Strengthening Upgradation and Construction of Road Works for Dibrugarh Town protection (DTP) Dyke along the Brahmaputra River in Dibrugarh – 8.53 Km,
- (ii) 1.8 km of bank protection through pro-siltation measures along the town protection dykes, (Fabrication and Launching of Porcupines Lot-1, Lot 2, Lot 3 and Lot 4)and
- (iii) Construction of Revetments, Geobag Aprons for Mothola Oakland Bank Area, Dibrugarh Erosion Protection Works from Ch. 000 to ch 2400m

Table -1. **Achievement of Major Civil Works Packages**

Sl. No.	Description of the work	Physical Progress
1	Palasbari Erosion Protection underwater works below Working Low Water Level (WLWL) with two layers of sand filled geo-bags at apron.	100%
2	Gumi Erosion Protection Works	100%
3	Construction of Palasbari Embankment with black topped road and slope protection works above LWL along the Brahmaputra river	100%
4	Construction of Revetments, Geo-bag Apron, for Mothalla – Oakland bank protection works along the Brahmaputra River, Dibrugarh	100%
5	Raising, Strengthening, Up-gradation and Construction of Road Works for Dibrugarh Town Protection (DTP) Dyke	100%
6	Fabrication, Supply and Installation of Pre-Stressed Concrete (PSC) Porcupines (4 lots) at Oakland and DTP Dyke area.	100%

1.1. Monitoring Report Purpose.

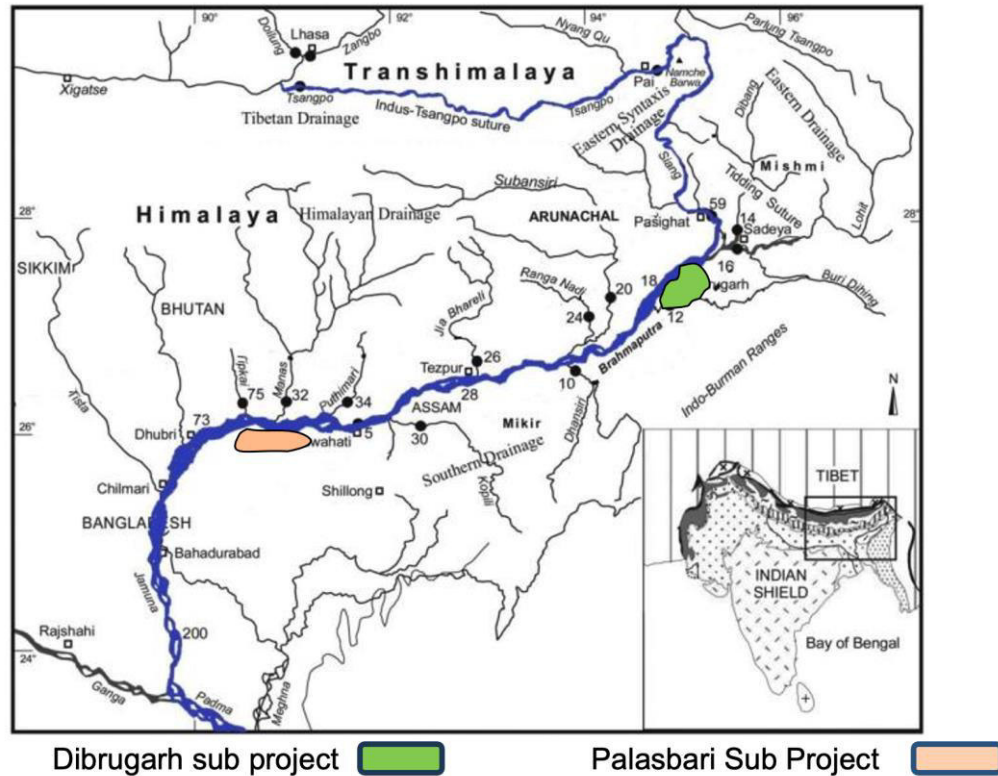
This project at two sub project sites (Dibrugarh, Palashbari and Gumi) in Assam is implemented by FREMAA through Water Resource Department, Assam in accordance with SPS of 2009 and Ministry of Environment, Forest and Climate Change (GOI) Guidelines so as to ensure that all environmental monitoring measures and whenever applicable Environmental mitigation measures as given in Environmental Impact Assessment and subsequent Environmental Management Plans incorporating all the Environmental concerns of the project, even in the operation stage.

The principle objectives of the report are to:

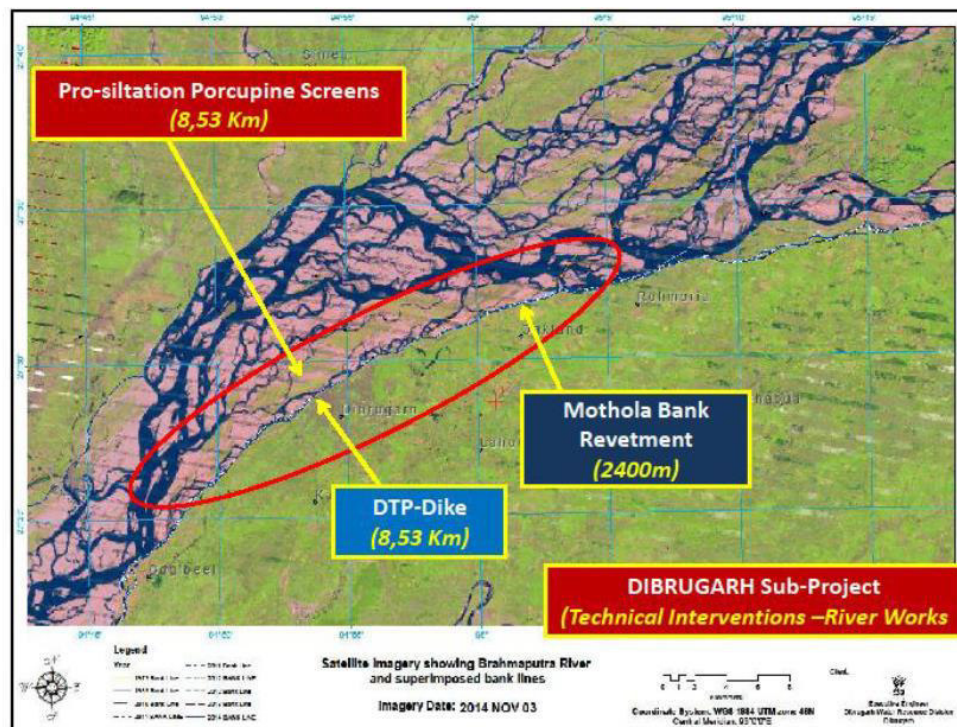
- document and disclose the environment safeguard activities during project operation such as avoiding and mitigation of negative impacts that arises from the project from July to December 2019.
- ensure that EIA recommendations, and environmental management plan (EMP) and environmental monitoring plan (EMoP) are adequately followed to meet the Environmental Compliances of statutory requirements of MoEF&CC, GOI and ADB SPS.

The Bi-Annual Report on the implementation of EMP ending on the month of December, 2019 delineates:

- Environmental Monitoring of the project from July 2019 to December 2019 considering the environmental activities along with environmental compliances of statutory requirements of MoEF&CC, GOI and agreement conditions.
- This report also highlights the gaps and deficiencies while executing the environmental management.



Map-1. Project sites in Assam along the river Brahmaputra



Map-2. Project sites in Dibrugarh



Map-3. Project sites in Palsbari and Gumi

1.2. Provision for Compliance:

The FREMAA aims to integrate key Environmental Safeguards at all the levels so that critical natural ecosystem and the resources are not adversely impacted in this biodiversity hotspot. Specific environmental parameters are to be monitored periodically to check the compliance. This helps in maintaining environmental sustainability along with inclusive economic growth. Besides above, for achieving the compliance following specific arrangements were made in the EMP during the operation phase.

- Measures for monitoring and preventing pollution of air, water, noise,
- Other measures like, emergency response plan, etc are also under the preview of the environmental safeguard measures under the project.

2. Summary of Environmental Mitigation and Compensation Measures Implemented

The implementation of environmental safeguards is satisfactory based onsite visits, reviews reports river morphology, water levels, and discussions with

stakeholders. During the operation, no major safeguard issues were identified and no major gaps in EMP implementation noticed (except the test of ambient environment). Grievance redress mechanisms (GRMs) were operational and no complaints were received during July to December 2019.

2.1. Monitoring site specific environment conditions

The following parameters are to be monitored with the frequencies described.

For Air Quality : SPM, RSPM, SO₂, NO_x, CO, Pb - Within 100 m of sensitive locations/settlement –Continuous 24- hourly, twice a week, for two weeks once every year (summer).

Surface Water - pH, BOD, COD, TDS, TSS, DO, Oil and Grease – from Brahmaputra River - Once during the dry season.

Ground water - pH, BOD, DO, total coliform, As, Cd, Mn and Ground Water levels – Construction site, Rehabilitation site, service areas.

Noise - Noise Level in dB (A) – Near the construction sites and sensitive locations close to embankment – One day hourly measurement, once in six months.

For Operation phase SIOs carried out regular checks on the stipulations mentioned in the EMP except the test of Air, Water, Noise in the completed reaches. Tests of ambient environment (Surface water quality Gumi, Dibrugarh) were carried out for the period July 2019 to December 2019. Results of the tests reflected in this report.

2.2. Measures taken to reduce pollution and check compliance to standards:

Several measures taken to reduce the environmental pollution during operation phase, some of them are:

- **Air**
 - Checked air quality by Pollution Control Board (PCB) approved laboratory (Dibrugarh on 04/12/19; Gumi on 30/07/19 and Palasbari on 19/11/19)
- **Noise**
 - Horns not used, unless essential
 - Checked Noise level by PCB approved lab (Dibrugarh on 27/11/19, Gumi on 30/07/19 and Palasbari on 19/11/19)
- **Surface water quality**
 - Store fuel and lubricants away from the river channels (awareness for the boat man)
 - Checked surface water quality by PCB approved lab (Gumi on 30/07/19, Dibrugarh on 27/11/19, and Palasbari on 19/11/19)
- **Ground water quality**
 - Checked ground water quality by PCB approved lab (Gumi on 30/07/19, Dibrugarh on 27/11/19)

- **Pollution**

- Spills of oils on the site and on river regularly checked by SIO
- Surface discharges monitored

2.3. Status of the mechanisms present for the Implementation of EMP during operation phase (status as of 31.12.2019)¹

As most of the SIO's doing the ADB supported works for the first time, they do not have the knowledge about the safeguards requirements during operation phase by the ADB. To improve the scenario following Actions were taken:

- Meetings were organized for the awareness of SIO's on the environmental safeguard of ADB (Strategy and directions), testing of selected environmental parameters, national environmental standards, acts and rules of MoEF&CC, GOI and Government of Assam.
- In all the meetings with SIO's during field visits and review meetings it has been emphasized to carry out the required numbers of tests as per EMP.
- Moreover, special efforts have been made from FREMAA and PMC so that that SIO's adheres to the EMP norms even after completion of the works.
- Monitoring Terrestrial and aquatic fauna status.
- Benefit assessment of the support during the project as a whole (done by Benefit Monitoring and Evaluation team.)
- Fish availability was also assessed.

3. Summary of Environmental Monitoring

3. 1. Compliance Inspection

Following the EMP stipulations, SIOs engaged their officers to inspect the environmental safeguards of the project areas. Borrow area converted to fishpond as per borrow area rehabilitation plan, and top soil were spread properly in the rest of the area.

3.1.1. Summary of Inspection Activities

Officers under SIOs monitor the day to day environmental safeguards at the site and reports to the SIO. Moreover, FREMAA also monitored the implementation of the EMP (Table- 2).

¹ En-Vision, Green Tech Environmental Engineer & Consultants, Envirocom are the Approved Laboratories of Pollution Control Board, Assam.

Table 2. Showing the site inspections by FREMAA and SIO.

List of Meetings Attended (Period July, 2019 to December, 2019)




No.	Date	Locations	Meetings Results	Key outcome	
1	21.11.2019	Dibrugarh	Operation phase monitoring of EMP. Terrestrial and aquatic fauna status, and river morphology discussed for T1 works.	Monitoring of river morphology carried out in Tranche 1 site by Institutional Strengthening Consultant. Test of ambient environment.	
2	29.11.2019	Gumi	Operation phase monitoring of EMP. Fish productivity in the reach, monitoring of river morphology etc discussed.	Monitoring fish markets for fish availability and records of crop cultivation from SIO office.	
3	20.11.2019 & 24.12.2019	Palasbari	Operation phase monitoring of EMP. Terrestrial and aquatic fauna status, River morphology discussed for T1 works.	Monitoring fish markets for fish availability from SIO office.	

Table 3. Field visit carried out by the experts of PMC, during July to December, 2019.

No.	Date	Place of visit	Meeting with	Results
1	29.11.2019	Gumi works	WRD, Villagers, FREMAA	-aquatic migratory birds visited in the reach. -dolphin sighted -fishes found in the reach -crops cultivated in the area

2	24.12.2019	Palasbari embankment and Palasbari Apron	WRD, Villagers, FREMAA	-aquatic migratory birds visited in the reach. -dolphin sighted -fishes found in the reach
3	21.11.2019 & 22.11.2019	DTP Dyke, Mothola Oakland, Dibrugarh	WRD, Villagers, FREMAA	-aquatic migratory birds visited in the reach. -fishes found in the reach

Table 4. Compliance with ADB's Safeguard Requirements – Tranche- I – Environment

Environmental Safeguards :

Environmental Loan Covenants		Responsibility	Status of Compliance
1	All the Project facilities are designed, implemented, operated and maintained in accordance with applicable laws, and regulations of the Government of India, State of Assam and ADB's SPS (2009)	FREMAA, SIO	Under Compliance in accordance with ADB Environmental Policy and SPS Guideline. Acts and rules related to Water, Air, Noise, Environment, Biodiversity of Government of India and Govt. of Assam. (Test of ambient environment carried out in the month of July, November and December, 2019 in different reaches.)
2	Social and environmental safeguard unit	FREMAA	Under Compliance; comprising of Land acquisition expert, resettlement expert and environmental expert.
3	Monitoring of quality of Air, Water Noise at the project sites	FREMAA, SIO, Contractor	Under Compliance. Within the acceptable limits of the Environmental Standards, Central Pollution Control Board, Ministry of Environment and Forest, GOI. of the projects where tests were already been conducted during Operation phase monitoring done in the month of July, 2019 in Gumi, November 2019 at Palasbari and in December 2019 at Dibrugarh.

Environmental Loan Covenants		Responsibility	Status of Compliance
4	Prepare and implement Environmental Management Plan under all the contract packages of the works	Contractor, SIO, FREMAA,	Under Compliance : EMP's prepared under and submitted to the SIOs. Works completed as per EMP in the later stage of the project.
5	All monitoring and mitigations measures indicated in the EIA and respective EMP are undertaken for the project	SIO, FREMAA	Under Compliance : Any unpredicted environmental impacts monitored by SIO office. So far no issues. Terrestrial and aquatic animals records were kept. Fish records were also kept at SIO office. Sites regularly monitored by SIO for compliance.
6	An environmental assessment and review framework for implementation of minor CBFRM measures	SIO, FREMAA	As highland were not created under CBFRM, but villagers were trained under DDMA's and kits were distributed to cope flood. Other than that ambient environment was monitored.
7	Semi Annual Report on implementation of EMP	FREMAA	Under Compliance : Semi / Bi Annual Report submitted for the period of January, 2019 to June, 2019. Compilation going on for the period of July, 2019 to December, 2019 (this report).

Condition of the embankment :

The overall condition of the embankment is good. No inundation occurred after completion of the embankment in all the three sites (Palasbari, Gumi and Dibrugarh) as shown in the following photographs.

Photographs of the present conditions of theTranche 1 works



DTP Dyke



DTP dyke is maintained by WRD



Fishing activities near Mothola Oakland



Mothola Oakland – Dibrugarh



Maintenance of embankment by WRD



Gumi Works



Regular Monitoring of embankment by WRD

3.1.2. Mitigation Compliance:

Following measures were taken to meet the compliance.

- **Preservation of trees**
 - Protection of trees for their preservation.
Major trees near the embankment in Dibrugarh DTP Dyke (3 nos) were protected. These were very old trees, providing shades and they will increase the aesthetic value of the embankment.
 - Monitoring of the planted trees.
Survival rate of the planted trees are 80 %. More trees will be planted next monsoon. As the trees were planted by NGOs in Palashbari they are maintaining the trees. In Dibrugarh the trees were planted by District Administration and they are maintaining those trees.
- All **natural channels** were monitored by SIO and were monitored before monsoon season. WRD officials regularly monitor the embankments and river course. In most of the cases by visual observation and in critical situation bathymetry study are also carried out. If any damage is observed in the embankment they are immediately repaired.
- **Consultation with Fisherman in the Tranche-1 reach.**
During the field visit fisherman were interviewed. List of species found in the reach were recorded.



Fishing activities in Palasbari

Table 5: List of Fish species found in the 3 reaches during monitoring²

Palasbari	IUCN Status	Gumi	IUCN Status	Dibrugarh	IUCN Status
<i>Chitala chitala</i>	NT	<i>Chitala chitala</i>	NT	<i>Angilla bengalensis</i>	-
<i>Notopterus notopterus</i>	LC	<i>Notopterus notopterus</i>	LC	<i>Gudusia chapra</i>	LC
<i>Gudusia chapra</i>	LC	<i>Tenuulosa ilisha</i>	LC	<i>Cirrhinus reba</i>	LC
<i>Tenuulosa ilisha</i>	LC	<i>Gonialosa manmina</i>	LC	<i>Labeo calbasu</i>	LC
<i>Gonialosa manmina</i>	LC	<i>Setipinna phasa</i>	LC	<i>Labeo gonius</i>	LC
<i>Setipinna phasa</i>	LC	<i>Chela cachius</i>	LC	<i>Systomus sarana</i>	LC
<i>Chela cachius</i>	LC	<i>Amblypharyngodon mola</i>	LC	<i>Pethia ticto</i>	LC
<i>Amblypharyngodon mola</i>	LC	<i>Danio rerio</i>	LC	<i>Puntius sophore</i>	LC
<i>Cabdio morar</i>	LC	<i>Esomus danricus</i>	LC	<i>Salmostoma bacaila</i>	LC
<i>Danio rerio</i>	LC	<i>Rasbora rasbora</i>	LC	<i>Devario devario</i>	LC
<i>Esomus danricus</i>	LC	<i>Gibelion catla</i>	LC	<i>Raiamas bola</i>	LC
<i>Rasbora rasbora</i>	LC	<i>Cirrhinus mrigala</i>	LC	<i>Garra gotyla</i>	LC
<i>Gibelion catla</i>	LC	<i>Cirrhinus reba</i>	LC	<i>Garra nasuta</i>	LC
<i>Cirrhinus mrigala</i>	LC	<i>Ctenopharyngodon idella</i>	-	<i>Psilorhynchus balitora</i>	LC
<i>Cirrhinus reba</i>	LC	<i>Cyprinus carpio</i>	VU	<i>Acanthocobitis botia</i>	LC
<i>Ctenopharyngodon idella</i>	-	<i>Labeo bata</i>	LC	<i>Schistura scaturigina</i>	LC
<i>Cyprinus carpio</i>	VU	<i>Labeo calbasu</i>	LC	<i>Cantophrys gongota</i>	-
<i>Labeo bata</i>	LC	<i>Labeo gonius</i>	LC	<i>Botia dario</i>	LC
<i>Labeo calbasu</i>	LC	<i>Labeo rohita</i>	LC	<i>Pseudocheneisis sulcatus</i>	-
<i>Labeo gonius</i>	LC	<i>Acanthocobitis botia</i>	LC	<i>Chanda nama</i>	LC
<i>Labeo rohita</i>	LC	<i>Botia dario guntea</i>	LC	<i>Mastacembelus armatus</i>	LC
<i>Pethia conchoniis</i>	LC	<i>Sperata seenghala</i>	LC	<i>Macrognathus pancalus</i>	LC
<i>Pethia ticto</i>	LC	<i>Mystus cavasius</i>	LC	<i>Xenentodon cancila</i>	LC
<i>Acanthocobitis botia</i>	LC	<i>Mystus vittatus</i>	LC	<i>Olyra longicaudata</i>	LC
<i>Lepidocephalus guntea</i>	LC	<i>Rita rita</i>	LC	<i>Heteropneustes fossilis</i>	LC
<i>Botia dario guntea</i>	LC	<i>Ompok bimaculatus</i>	NT	<i>Clarias batrachus</i>	LC
<i>Sperata aor</i>	LC	<i>Wallago attu</i>	VU	<i>Laguvia shawi</i>	DD
<i>Sperata seenghala</i>	LC	<i>Eutropiichthys vacha</i>	LC	<i>Glossobius giuris</i>	-
<i>Mystus cavasius</i>	LC	<i>Xenentodon cancila</i>	LC	<i>Channa punctatus</i>	LC
<i>Mystus vittatus</i>	LC	<i>Chanda nama</i>	LC	<i>Channa striatus</i>	LC
<i>Rita rita</i>	LC	<i>Glossogobius giuris</i>	LC	<i>Tor tor</i>	DD
<i>Ompok bimaculatus</i>	NT	<i>Laubuka laubuca</i>	LC		
<i>Wallago attu</i>	VU	<i>Devario devario</i>	LC		
<i>Eutropiichthys vacha</i>	LC				
<i>Xenentodon cancila</i>	LC				
<i>Chanda nama</i>	LC				
<i>Glossogobius giuris</i>	LC				

LC- Ceast Concern, NT- Near Threatened, VU- Vulnerable, DD- Data Deficient.
Scientific name as per: fishbase.org

² Direct observation and during interview with local people

- **Crop Cultivation in the area:**

Table 6: Crop cultivation in area after protection works in Tranche 1

Dibrugarh	Palasbari	Gumi
Rice Mustard	Rice Mustard Sweet potato Tomato Cabbage Potato Cauliflower	Brinjal Cabbage Cauliflower German Turnip Sweet potato Tomato Rice Potato Brinjal Pumpkin Mustard



Palasbari area



Gumi area

3.1.3. Mitigation Effectiveness

- To monitor the mitigation effectiveness the parameters mentioned in EMP were monitored.
- No complaints were lodged to SIO on environmental pollution by any of the fringe villagers, NGO's or other institutions during the reporting period (July to December 2019).
- Results of the ambient environmental tests carried out during July and December, 2019 were within the permissible limit of Central Pollution Control Board, MoEF&CC, GOI.

To determine the mitigation effectiveness the following parameters were monitored.

Table-9 : Mitigation Effectiveness during July to December, 2019

Parameters	Palashbari– Embankment and Palashbari–Apron	Gumi	Dibrugarh – DTP Dyke & Mothola Oakland
Ambient Air quality	Within the permissible limit Test done on 19/11/2019	Within the permissible limit Test Done on 30/07/2019	Within the permissible limit Test done on 04/12/2019)
Surface Water Quality	Within the permissible limit. Test done on 19/11/2019.	Within the permissible limit. Test done on : 30/07/2019.	Within the permissible limit. Test done on : 27/11/2019.
Ground water quality	Within the permissible limit.	Within the permissible limit. Test done on 30/07/2019.	Within the permissible limit. Test done on : 27/11/2019.
Noise level	Within the permissible limit. Test done on 19/11/2019.	Within the permissible limit Test done on : 30/07/2019.	Within the permissible limit Test done on : 27/11/2019.
Complain lodged by the local residents on Environmental pollution July to December, 2019	No complaints lodged	No complaints lodged	No complaints lodged

	Status	Explanatory comments
Mitigation Effectiveness	Good	<ul style="list-style-type: none"> No complaints were lodged to SIO on environmental pollution by any of the fringe villagers, NGO's or other institutions Results of the ambient environmental tests were within the permissible limit of Central Pollution Control Board, MoEF&CC, GOI. Monthly environmental monitoring of the embankment, Drainage, fish diversity, Birds diversity, discharge, etc reviewed by SIO's.
Overall Compliance	Good	<ol style="list-style-type: none"> Labour camp sites properly rehabilitated. All the borrow areas were either rehabilitated or utilized by the community as per the Borrow Area Management Plan.

		<ol style="list-style-type: none"> 3. The environmental standards (Central Pollution Control Board, MoEF&CC, GOI) applicable for the sites are kept at the SIO office for reference. This helps SIOs to compare the results of the tests of ambient environment. 4. Monitoring of the planted trees. Satisfactory survival rate monitored by the Forest Department and district administration. Maintenance of the tree saplings were poor. But supplementary plantation required against the dead saplings. 5. Consultation with fisherman revealed that there was no impact on the fish catch and diversity. 6. River morphology monitoring was done by SIO and DHI of FREMAA through Bathymetric survey and analysis of satellite images. 7. Discharge data were also recorded by SIO. 8. Crop production also became stable after protection from erosion.
--	--	--

3.2. Ambient Environment Monitoring Program

To monitor the ambient environment the following parameters are to be monitored with the frequencies described in the EMP. All the tests were performed from the Pollution Control Board, Assam and its approved laboratories during construction stage. Test of ambient environment initiated for operation phase as per EMP done between July to December 2019.

- **For Air Quality :**
SPM, RSPM, SO₂, NO_x, - With in 100 m of sensitive locations/ settlement
–Continuous 24- hourly, once every year.
- **Surface Water :**
pH, BOD, COD, TDS, TSS, DO, Oil and Grease – from Brahmaputra River
- Once during the dry season.
- **Ground Water :**
pH, BOD, COD, TDS, TSS, DO, Oil and Grease – from Brahmaputra River
- Once during start of construction phase.
- **Noise :**
Noise Level in dB (A) – Near the sensitive locations close to embankment
– One day hourly measurement, once in six months.

3.2.1. Summary of Monitoring

Table-10 : Ambient Environment Monitoring Plan (Operation Phase)

Attribute	Parameter	Special Guidance	Standards	Duration	Location
Air	SO ₂ , NO _x , SPM, RSPM, CO, Pb	High volume sampler to be located 50m from the river bank site Downwind direction. Use method specified by PCB, Assam for analysis	Air (prevention and Control of Pollution) Rules, CPCB, 2009	24 hours Sampling	Along the river bank area
Surface Water	pH, BOD, COD, TDS, TSS, DO	Grab sample collected from source and Analyse as per Standard Methods for Examination of Water	Indian Standards for Inland Surface Waters (IS: 2296, 1982)	Grab Sampling	Along the Surface water sources
Noise	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at a distance of 15 m from the river bank.	MoEF&CC Noise Rules, 2000	Leq in dB(A) of day time and night time	Along the river bank

3.2.2 Results

Results of the sampling tests on the selected parameters for air quality, noise level, surface water and ground water by Pollution Control Board approved laboratories provided some indicators to compare them with the baseline information and national permissible standards during the construction phase. The test results of the samples collected lies within permissible limits described in the '*Environmental Standards for Ambient Air, Automobiles, Fuels, Industries and Noise, 2000*' (Central Pollution Control Board) and a minor difference between the baseline and the test results during the work being observed, this suggest that the contractor's activity has complied with the contract stipulations on protection of environment.

Table-11. Quality of ambient Air at the site

Parameter	DTP Dyke & Mothola Oakland (4 th December 2019)	Palasbari Apron, & Palasbari Embankment, (19 th November)	Gumi (30 th July 2019)
PM 2.5	31.9	57	48
PM10	72.4	84	82.9
NO2	6.2	10	17.7
SO2	ND	<5	7.4
CO	ND	<1	ND
Pb	ND	<0.01	ND
Weather	Clear	Clear	Clear

Table-12. Noise Levels at the site

Parameter	Dibrugarh DTP Dyke & Mothola Oakland 27 th November, 2019	Palasbari Embankment & Apron 19 th November, 2019	Gumi 30 th July, 2019
Location	DTP Dyke		
Noise levels on dB (A) scale Day Time	59	68.8	60
Noise levels on dB (A) scale Night Time	41	45.6	ND

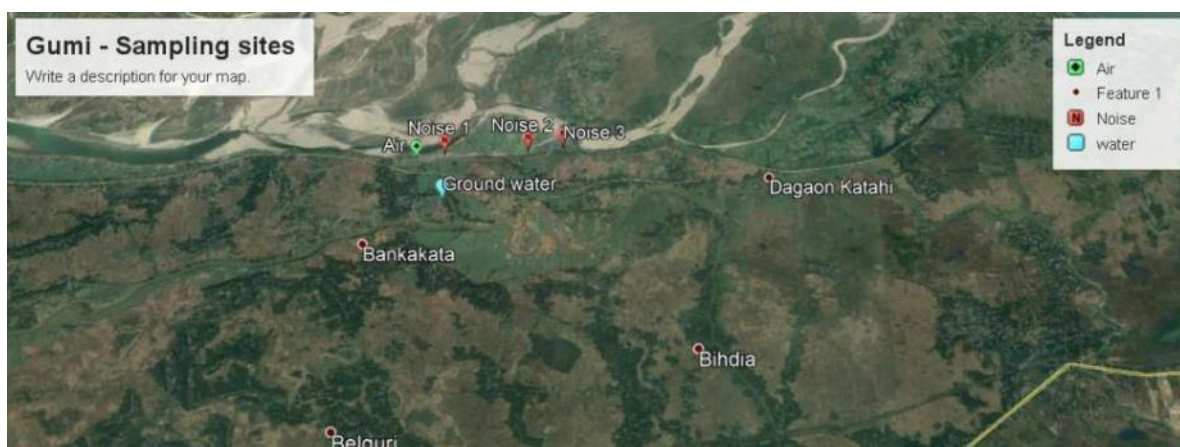
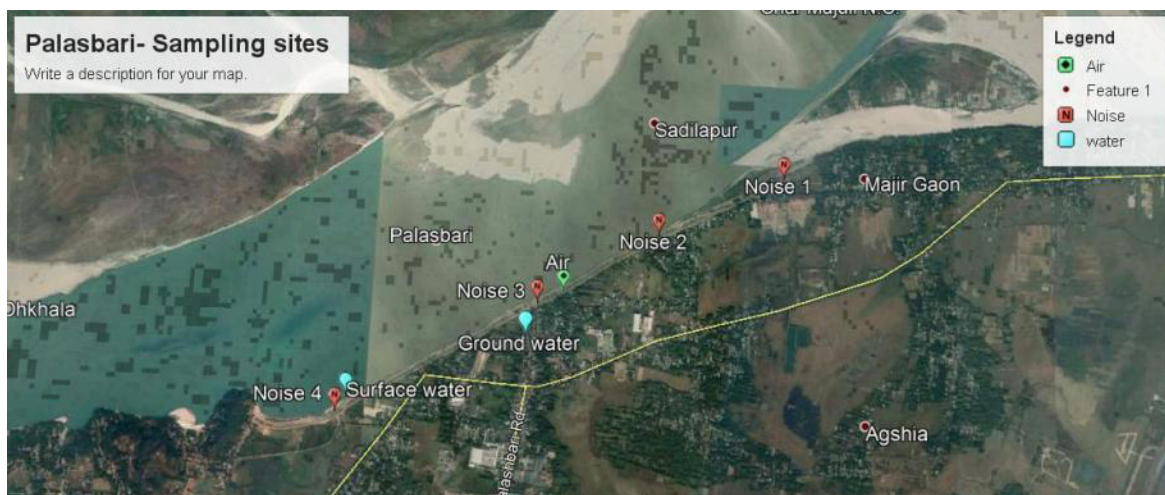
Table-13. Quality of Ground Water at the site

Parameters	Unit	Gumi 30/07/2019	Dibrugarh 27/11/2019
Location		Tube well	Tube well
Colour	Hazen	20	1
Odour		Un objectionable	Odourless
Temperature	°C	18.2	
Turbidity	NTU	3	0.08
pH		7.64	7.1
TDS	mg/l	130	234
Oil & Grease	mg/l	<5	
Caco3	mg/l	47	96
Chloride as Cl	mg/l		16
Sulphates as SO ₄	mg/l		
Phenols	mg/l		
BOD	mg/l	3.9	
Lead Pb	mg/l	0.001	ND
Arsenic as As	mg/l	<0.01	ND
Iron as Fe	mg/l	0.291	0.11
Phosphates	mg/l	-	
Sulphates	mg/l		31
Copper	mg/l	0.057	ND
Calcium	mg/l		39
Floride	mg/l	0.4	<0.01
Magnasium	mg/l		5.1
Zinc	mg/l	0.282	ND
Nitrate	mg/l		ND
Total Coliforms	MNP/100ml	Absent	
E Coli	MNP/100ml	Absent	
Total Hardness			33
COD		20.3	

Table-14. Quality of Surface Water at the site

		Gumi	Dibrugarh	Palasbari
Parameters	Unit	30/07.2019	27/11/2019	19/11/2019
		Brahmaputra River Down Stream of the work	Brahmaputra River, DTP Dyke Up stream	Brahmaputra River
Temp	°C			23.8
BOD	mg/l		Nil	<2
Chloride as Cl	mg/l	17.5	5	9
Colour	Hazen			6
Cu	mg/l			<0.05
Cr	mg/l			<0.01
CN	mg/l			<0.05
DDT	mg/l			BDL
Detergents	mg/l			<1
Dissolved Oxygen	mg/l	5.8	7.8	6.2
Fe	mg/l			<0.06
Fluoride	mg/l			<0.1
Pb	mg/l			<0.1
Oil & Grease	mg/l		Nil	<5
pH		7.45	7.3	7.9
Phenols	mg/l			<0.005
Se	mg/l			<0.05
Sulphates as SO ₄	mg/l	16.4		96
TDS	mg/l	162.5	175	135
Total Coliform	MNP/100ml			Present
Total suspended solid	mg/l		71.9	

Test of ambient environment monitoring sites:



Regular checking of the embankments was carried out by SIO. Following monitoring were also carried out during July to December, 2019.

- Terrestrial and aquatic fauna status
- Fish productivity
- Cropping pattern
- Soil erosion and siltation
- Visual check on Drainage Congestion
- River Hydrology, Morphology and Sediment Transport

Table 15 : Monitoring of Environment Components during operation Phase

Location	Environmental Component	Parameter	Frequency	Remark
Dibrugarh and Gumi; and Palasbari	Fisheries	Fish productivity	Once in a year	TOR developed. The study will be initiated after flood water recedes.
Dibrugarh and Gumi; and Palasbari	Cropping Pattern	Survey of existing cropping pattern and effect of change in cropping pattern in the impacted areas	Once in a year	Monthly monitoring done. BME captured in their report.
Dibrugarh and Gumi; and Palasbari	Air Quality	SPM, RSPM, SO ₂ , NO _x , CO, Pb	Once during construction and once after six months of completion of project	Test carried out between July to December, 2019.
Dibrugarh and Gumi; and Palasbari	Surface Water Quality	pH, BOD, COD, TDS, TSS, DO, Oil & Grease	Once during the dry season.	Test carried out between July to December, 2019.
Dibrugarh and Gumi; and Palasbari	Ground water and Drinking Water Quality	pH, BOD, DO, total coliform, As, Cd, Mn and water levels		Test carried out between July to December, 2019.
Dibrugarh and Gumi; and	Noise			Test carried out between July to

Location	Environmental Component	Parameter	Frequency	Remark
Palasbari				December, 2019.
Dibrugarh and Gumi; and Palasbari	Soil Erosion (inland erosion) and siltation		Once during operation of 1 st year	Monthly checking done by SIOs regularly.
Dibrugarh and Gumi; and Palasbari	Drainage Congestion	Visual check	After one year of construction.	Monthly checking done by SIOs regularly.
Dibrugarh and Gumi; and Palasbari	River Hydrology, Morphology and Sediment Transport	Scientific techniques applicable to the monitoring of these components	Regular	Bathymetric survey done by ISC and SIOs monitor the results.
Dibrugarh and Gumi; and Palasbari	Tree Plantation	Scientific techniques applicable to the monitoring of these components	Regular	Monitored by Forest Department.
Palasbari	Hydrology	Water level, discharge, river cross sections	As per CWC guidelines	SIO's do it regularly.
Palasbari	Morphology	Bank line profiles, Sediment transport, velocity, float tracking	As per CWC guidelines	SIO's do it regularly.

3.2.3. Assessment

Table-16. Comparison of ambient Air, Surface water, Ground water and Noise at the site with the baseline data and National Standards.

Ambient Air

Parameter	Limits	DTP Dyke & Mothola Oakland (4 th December 2019)	Palasbari Apron, & Palasbari Embankment, (19 th November)	Gumi (30 th July 2019)
PM 2.5	60	31.9	57	48
PM10	100	72.4	84	82.9
NO2	80	6.2	10	17.7
SO2	80	ND	<5	7.4
CO	2	ND	<1	ND
Pb	1	ND	<0.01	ND

Noise

Parameter	Category of the Area / Zone Limit in dB(A) Leq		Dibrugarh DTP Dyke & Mothola Oakland 27 th November, 2019	Palasbari Embankment & Apron 19 th November, 2019	Gumi Near Geo-bag filling 5 th August, 2019
Noise levels on dB (A) scale Day Time	Industrial Area	75	59	68.8	69.3
	Commercial area	65			
	Residential area	55			
	Silence Zone	50			
Noise levels on dB (A) scale Night Time	Industrial Area	70	41	45.6	ND
	Commercial area	55			
	Residential area	45			
	Silence Zone	40			

Surface water quality

		Limits	Gumi	Dibrugarh	Palasbari
		IS:2296			
Parameters	Unit	(Class C)	30/07.2019	27/11/2019	19/11/2019
			Brahmaputra River Down Stream of the work	Brahmaputra River, DTP Dyke Up stream	Brahmaputra River
Temp	°C				23.8
BOD	mg/l	<3		Nil	<2
Chloride as Cl	mg/l	600	17.5	5	9
Colour	Hazen	300			6
Cu	mg/l	1.5			<0.05
Cr	mg/l	0.05			<0.01
CN	mg/l	0.05			<0.05
DDT	mg/l				BDL
Detergents	mg/l	1			<1
Dissolved Oxygen	mg/l	4	5.8	7.8	6.2
Fe	mg/l	0.5			<0.06
Floride	mg/l	1.5			<0.1
Pb	mg/l	0.1			<0.1
Oil & Grease	mg/l			Nil	<5
pH		6-9	7.45	7.3	7.9
Phenols	mg/l	0.005			<0.005
Se	mg/l	0.05			<0.05
Sulphates as SO ₄	mg/l	400	16.4		96
TDS	mg/l	1500	162.5	175	135
Total Coliform	MNP/100ml	5000			Present
Total suspended solid	mg/l	100		71.9	

Ground water quality

		Limits		
Parameters	Unit	IS:2296 (Class C)	Gumi 30/07/2019	Dibrugarh 27/11/2019
Location			Tube well	Tube well
Colour	Hazen	300	20	1
Odour			Un objectionable	Odourless
Temperature	°C		18.2	
Turbidity	NTU		3	0.08
pH		6-9	7.64	7.1
TDS	mg/l	1500	130	234
Oil & Grease	mg/l		<5	
Caco3	mg/l		47	96
Chloride as Cl	mg/l	600		16
Sulphates as SO ₄	mg/l	400		
Phenols	mg/l			
BOD	mg/l	3	3.9	
Lead Pb	mg/l	0.1	0.001	ND
Arsenic as As	mg/l	0.2	<0.01	ND
Iron as Fe	mg/l	0.5	0.291	0.11
Phosphates	mg/l		-	
Sulphates	mg/l			31
Copper	mg/l		0.057	ND
Calcium	mg/l			39
Floride	mg/l		0.4	<0.01
Magnasium	mg/l			5.1
Zinc	mg/l		0.282	ND
Nitrate	mg/l			ND
Total Coliforms	MNP/100ml	5000	Absent	
E Coli	MNP/100ml		Absent	
Total Hardness				33
COD			20.3	

Explanatory comments

Ambient Environment condition	Good	<ul style="list-style-type: none"> • Operation phase monitoring performed in the month of July, 2019 to December, 2019. • Noise level was within the prescribed limit for Residential areas under Dibrugarh Palasbari and Gumi. • Surface Water quality of the river bank in Dibrugarh, Palasbari and Gumi area were found within the limit. As the surface water at the site contains grease and oils less than 5 mg/l, it indicates that the users following the environmental norms prescribed to reduce water pollution. • Ground Water quality of the river bank in Dibrugarh and Gumi was found within the limit, DO is slightly more. • Air quality was within the prescribed standards of CPCB in all the sites • Operation phase monitoring of the ambient air, water and noise initiated. Tests carried out in the month of July to December, 2019. • For those site where the tests are being conducted in operation phase, the results are within the prescribed limits of the Central Pollution Control Board, MoEF&CC, GOI. • Other monitoring Hydrology, sediment flow, drain congestion, fish diversity, cropping pattern were monitored on regular basis.
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4. Key Environmental Issues

4.1. Key Issues Identified

- Checking the PUC of the vehicles plying on the embankment were not possible as implementing agency (DTO) is different.
- Monitoring by SIO's has improved on safeguard issues but still they need training on ADB's safeguard procedures.

4.2. Action Taken

- Meetings were organized to make the SIOs aware on the environmental safeguard of ADB (strategy and directions), stipulations of the operation phase EMP, testing of selected environmental parameters, national environmental standards, acts and rules of MoEF&CC, GOI and Government of Assam.
- Plan developed for plantation against dead saplings after flood.
- Check list prepared for the SIOs to check the drainage status, rehabilitation of the camp sites.
- SIO's were aware of the tests to be conducted during operation phase to determine the quality of ambient air, surface water and groundwater, and noise levels as well.
- SIO's started operation phase's monitoring of the completed works regular and quarterly reviewing the EMP stipulations.
- Operation phase monitoring continued for:
 - Terrestrial and aquatic fauna status
 - River Hydrology, Morphology and Sediment Transport
 - Visual check on Drainage Congestion
 - Fish productivity
 - Cropping pattern
 - Soil erosion and siltation

4.3. Additional Action Required

- Constant monitoring and providing suggestions on the implementation of the operation phase EMP by FREMAA and PMC.
- Awareness on environmental safeguards –SIO and local residents / fringe communities
- Initiate study on Terrestrial and aquatic fauna status, Cropping pattern, Soil erosion and siltation.
- Complete the fish productivity study to compare the impact of the interventions on the fish production after flood.

-
- Plantation in the gaps against dead saplings. Protection of the planted saplings.

5. Conclusion

5.1. Overall Progress of implementation of Environmental Management Measures

Good:

- SIO's become aware about the importance of the environmental safeguards during operation phase.
- The SIO's started monitoring of operation phase EMPs like Terrestrial and aquatic fauna status, Cropping pattern, Soil erosion and siltation, Visual check on Drainage congestion, etc under FREMAA.
- Operation phase monitoring of implementation of EMP during operation phase was initiated in all the Tranche 1 sites. Test of ambient environment done in the month of July to December 2019 near the tranche 1 sites.
- Monitoring of the drainages throughout the year along the Tranche 1 sites done.
- Test of ambient environment initiated as per EMP during operation phase.
- Camp sites were restored as per SIO's satisfaction.
- Borrow area were rehabilitated as per the plan.
- Awareness carried out for safe use of oil by the boatman.
- Discharge data recorded and maintained.

5.2. Problems Identified and Actions Recommended

Problems

- Awareness about the importance of environmental safeguards monitoring during operation phase, to be strengthened.
- Local people have less knowledge on the environmental issues, safeguards; so no grievances reported or registered so far.
- Awareness of the people on lodging complaints of environmental pollution if any was not adequate during construction and operation phase.
- Documentation and reporting on environment safeguard were still to be improved.
- Plantation was done by district administration and (District Rural Development Agency) DRDA in designated sites not under the jurisdiction of WRD. So, maintenance and monitoring of the survival rates as per EMP was difficult for WRD.

Actions Recommended

- Regular awareness Training on Environmental Safeguards required for the SIOs for implementation of construction and operation phase EMP.
- Regular reporting to FREMAA on implementation of EMP during operation phase to be strengthened.
- In future projects following can be thought of:
 - Afforestation sites to be monitored and maintained by Forest Department for next 5 years.
 - Exposure of the environment and safety officers (SIO office) to the best sites (on Implementation of EMP) of the nearby project within the state.

Annexure 1 : Laboratory results of Air, Water, Noise.

envirocon
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Report No. : ENV/BNG/DBG/AAQ/2019-20/01

Date : 04/12/2019

M/S. B. N. GARODIA
Jyoti Nagar; Jalannagar
Dist.- Dibrugarh
Assam- 786005

AMBIENT AIR QUALITY TEST RESULTS

Location Code:

A 1: Near Site Office (River Bank Protection Works Along DTP Dyke, 1.05 KM, Panchali, Dibrugarh, Assam)

LOCATION ↓	Date of Sampling	PM 2.5 ($\mu\text{g}/\text{m}^3$)	PM 10 ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)
LIMITS →	--	60	100	80	80
A1	27.11.2019	31.9	72.4	6.2	ND

ND: Not Detected

Analysis Protocol: IS 5182



Checked By: Mr. Pankaj Baroi, ENVIROCON

- NOTE:
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 2. Results refer only to the particular parameters tested.
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Associate Services: Certification by Competent Person (CIF), NDT, Hydraulic Testing, Chartered Engineer Services etc.

Report No. : ENV/BNG/DBG/AAQ/2019-20/01
 Date : 04/12/2019

M/S. B. N. GARODIA
 Jyoti Nagar; Jalannagar
 Dist.- Dibrugarh
 Assam- 786005

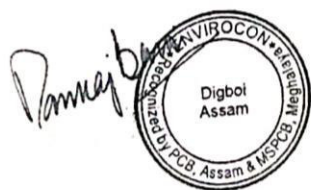
AMBIENT NOISE LEVEL MEASUREMENT RESULTS

Location Code:

A 1: Near Site Office (River Bank Protection Works Along DTP Dyke, 1.05 KM, Panchali, Dibrugarh, Assam)

Date of Measurement: 27.11.2019

Sl. No.	Locations	Day Time				Night Time			
		Max. (dB-A)	Min. (dB-A)	Leq (dB-A)	Limit (dB-A)	Max. (dB-A)	Min. (dB-A)	Leq (dB-A)	Limit (dB-A)
1	A1	64	55	59	75	48	36	41	70



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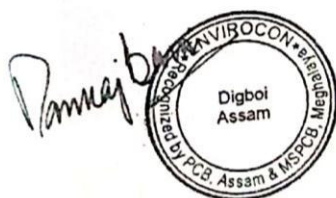
M/S. B. N. GARODIA
 Jyoti Nagar; Jalannagar
 Dist.- Dibrugarh
 Assam- 786005

SURFACE WATER ANALYSIS RESULTS

Sample Ref. No. : ENV/BNG/WW/2019/11-01
 Sample Type : Surface Water
 Sample Source : River Bank Protection Works Along DTP Dyke, 1.05 KM, Panchali, Dibrugarh, Assam (Up Stream)
 Collected On : 27.11.2019
 Received On : 27.11.2019
 Collected By : Jointly by Representative of ENVIROCON & B. N. Garodia

Sl. No.	Parameters	Results	Limits
1.	Taste	Agreeable	None
2.	Odour	Odourless	Unobjectionable
3.	Colour (Hazen Unit), max	5	10
4.	pH	7.3	6.5 - 8.5
5.	DO, mg/l, min	7.8	6
6.	BOD (3 days @25°C), mg/l, max	Nil	2
7.	Total Dissolved Solids, mg/l, max	175	500
8.	Total Suspended Solids, mg/l	71.9	--
9.	Oil & Grease, mg/l	Nil	--

Analysis Protocol: IS 3025



Checked By: Mr. Pankaj Baroi, ENVIROCON

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Associate Services: Certification by Competent Person (CIF), NDT, Hydraulic Testing, Chartered Engineer Services etc.

Report No. : ENV/BNG/DBG/AAQ/2019-20/01
Date : 04/12/2019

M/S. B. N. GARODIA
Jyoti Nagar, Jalannagar
Dist.- Dibrugarh
Assam- 786005

SURFACE WATER ANALYSIS RESULTS

Sample Ref. No. : ENV/BNG/SW/2019/11-02
Sample Type : Surface Water
Sample Source : River Bank Protection Works Along DTP Dyke, 1.05 KM, Panchali, Dibrugarh, Assam (Down Stream)
Collected On : 27.11.2019
Received On : 27.11.2019
Collected By : Jointly by Representative of ENVIROCON & B. N. Garodia

Sl. No.	Parameters	Results	Limits
1.	Taste	Agreeable	None
2.	Odour	Odourless	Unobjectionable
3.	Colour (Hazen Unit), max	5	10
4.	pH	7.3	6.5 - 8.5
5.	DO, mg/l, min	7.7	6
6.	BOD (3 days @25°C), mg/l, max	Nil	2
7.	Total Dissolved Solids, mg/l, max	179	500
8.	Total Suspended Solids, mg/l	75.9	..
9.	Oil & Grease, mg/l	Nil	..

Analysis Protocol: IS 3025



Checked By: Mr. Pankaj Baroi, ENVIROCON

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Services: Environmental Monitoring & Data Generation, EIA & EMP, Environmental Audit & Allied Environmental Management jobs
Associate Services: Certification by Competent Person (CIF), NDT, Hydraulic Testing, Chartered Engineer Services etc.

Report No. : ENV/BNG/DBG/RW/2019-20/01
Date : 04/12/2019

M/S. B. N. GARODIA
Jyoti Nagar, Jalannagar
Dist.- Dibrugarh
Assam- 786005

RAW WATER ANALYSIS RESULTS

Sample Ref. No. : BNG/RW/19-20/11-01 Sample Source : Tube Well/A2* Sample Type : Raw Water
Collected On : 27-11-2019 Received On : 27-11-2019 Collected By : ENVIROCON Representative

Sl. No.	Parameters	Results	Desirable Limit (IS: 10500:2012)
1.	Colour, Hazen Units, Max	1	5
2.	Odour	Odourless	Agreeable
3.	Taste	Acceptable	Agreeable
4.	Turbidity, NTU, Max	0.08	1.0
5.	pH	7.1	6.5 - 8.5
6.	Total Dissolved Solids, mg/l, Max	234	500
7.	Calcium (as Ca), mg/l, Max	39	75
8.	Chloride (as Cl), mg/l, Max	16	250
9.	Copper (as Cu), mg/l, Max	ND	0.05
10.	Fluorides (as F), mg/l, Max	<0.01	1.0
11.	Free Residual Chlorine, mg/l, Min	ND	0.2
12.	Iron (as Fe), mg/l, Max	0.11	0.3
13.	Magnesium (as Mg), mg/l, Max	5.1	30
14.	Zinc (as Zn), mg/l, Max	ND	5.0
15.	Nitrate (as NO ₃), mg/l, Max	ND	45
16.	Sulfate (as SO ₄), mg/l, Max	31	200
17.	Total Alkalinity (as CaCO ₃), mg/l, Max	96	200
18.	Total Hardness, (as CaCO ₃), mg/l, Max	33	200
19.	Lead (as Pb), mg/l, Max	ND	0.01
20.	Total Arsenic (as As), mg/l, Max	ND	0.01

Analysis Protocol: IS 3025

ND: Not Detected

*A 2: Near Site Office (River Bank Protection Works Along DTP Dyke, Panchali, Dibrugarh, Assam)



Checked By: Mr. Pankaj Baroi, ENVIROCON

- NOTE
1. Results reported are valid at the time of and under the prevailing conditions of measurement.
 2. Results refer only to the particular parameters tested.
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Core Services: Environmental Monitoring & Data Generation, EIA & EMP, Environmental Audit & Allied Environmental Management jobs
Associate Services: Certification by Competent Person (CIF), NDT, Hydraulic Testing, Chartered Engineer Services etc.



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Certificate No. TC-7669

Recognized by Pollution Control Board, Assam

TESTREPORT

AMBIENT AIR ANALYSIS REPORT

Rep.No. AAR_1409037_01_305
Sample ID No.: EETNE/JULY/15/19

Date: 05/08/2019

Issued to : M/s. Gautam Construction, Bank Protection at Gumi (Tapar Pathar) Area 5000m,
Dist: Kamrup(R) under Palasbari Gumi Sub Project, FREMAA/GUMI/WEST/G2 of 2017,
P.S. Jorsimali Outpost, Pin: 781137, Assam.

Sample Drawn By : BHISMA JYOTI CHUTIA
Sampling Plan & Procedure : EETNE/SOP/01
Analysis Duration : 30/07/2019 TO 03/08/2019
Sampling Instrument Used : AIR SAMPLER/RDS
Pollution Control Device, if any : NO
Ambient Temperature : 33°C

SL. NO.	DATE OF SAMPLING	LOCATION/SOURCE	WEATHER	PARAMETERS			
				PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)
i)	30/07/19	Near Parking Area	Clear	82.9	48.0	17.7	7.4
ii)		Near Geo bag Filling		76.1	43.2	14.5	6.8

Remarks: - a) Parameters are within the permissible limit.
b) Sampling done within 24 hours.

NATIONAL AMBIENT AIR QUALITY STANDARDS:

Sl. No.	Pollutant	Test Method	Time Weighted Average	Concentration in Ambient Air Industrial, Residential, Rural and Other Area
1	Sulphur Dioxide (SO ₂), µg/m ³	IS:5182 Part-II/ CPCB	Annual 24 hours	50 80
2	Nitrogen Dioxide (NO ₂), µg/m ³	IS:5182 Part-VI/ CPCB	Annual 24 hours	40 80
3	Particulate Matter (PM ₁₀), µg/m ³	IS:5182 Part-XXIII/ CPCB	Annual 24 hours	60 100
4	Particulate Matter (PM _{2.5}), µg/m ³	EETNE/SOP/01/2017	Annual 24 hours	40 60

For Envision Enviro Technologies North East, Guwahati

BHISMA JYOTI CHUTIA
(Environmental Chemist)

DR. PRANITA CHAKRABORTY
(Quality Manager)
(Authorized Signatory)

Note: i) The results relate only to the parameters tested
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Page 1 of 1

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Phone : +91 8811096201 ♦ e-mail : envisionghy@gmail.com

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AMBIENT NOISE LEVEL MEASUREMENT REPORT

Rep.No. 190805_1409037_06A_306

Date: 05/08/2019

Name & Address:

M/s. Gautam Construction,
Bank Protection at Gumi (Tapar Pathar)
Area 5000m, Dist: Kamrup(R) under
Palasbari Gumi Sub Project,
FREMAA/GUMI/WEST/G2 of 2017,
P.S. Jorsimali Outpost, Pin: 781137, Assam.

SL. NO.	DATE OF SAMPLING	LOCATION /SOURCE	NOISE LEVEL in dB(A)Leq Day Time (6:00 am to 10:00 pm)
i)	30/07/19	Near Parking Area	69.3
ii)		Near Geo Bag Filling	67.5

Remarks: Noise level is carried out during 75% of the Day Time.

Method of analysis : CPCB July 2015

Sampling Instrument Used : ENVIROTECH SLM 100, HTC SL 1350

Ambient Noise Standards:

Area Code	Category of area	Limits in dB(A) Leq	
		Day (6:00 am to 10:00 pm)	Night (10:00 pm to 6:00 am)
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

FOR ENVISION ENVIRO TECHNOLOGIES NORTH EAST, GUWAHATI

Bhisma Jyoti Chutia
(Environmental Chemist)

Dr. Pranita Chakraborty
(Quality Manager)
(Authorized Signatory)

Note: i) The results relate only to the parameters tested

ii) The test report shall not be reproduced except in full, without written approval of laboratory.

NABL ACCREDITED LABORATORY

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2nd Floor, Shri Ram Complex, Nr. Kargil Chowk, Piplod, Surat-7, Gujarat ♦ Phone : 261 2223003 ♦ e-mail : info@en-vision.in



NABL ACCREDITED

Certificate No. TC-7669

Recognized by Pollution Control Board, Assam

TEST REPORT:

Report No: 190808_1502075_0

ULR No: TC7669190000000098p

Sample ID No: EETNE/July/03/19/D

Test Starting Date: 31/07/19

Date of Report: 08/08/19

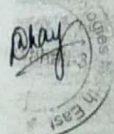
Date of sample receipt: 30/07/19

Test completion Date: 07/08/19

Name & Address of Client		M/s. Gautam Construction, Bank Protection at Gumi (Tapar Pathar) Area 5000m, Dist: Kamrup® under Palasbari Gumi Sub Project, FREMAA/GUMI/WEST/G2 of 2017, P.S. Jorsimali Outpost, Pin: 781137, Assam.			
Sample Description		Type: Surface Water (Downstream)		Source: Brahmaputra River	
Sample collected by		M/s. En-vision Enviro Technologies North East			
Sample Collection Particulars		Date 30/07/2019	Time 12:30 P.M	Temperature 31.5°C	Quantity Drawn:4L Sampling Method: EETNE/SOP/02

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500: 2012	
					Acceptable limit	Permissible limit
1	pH	---	7.45	APHA 23 rd Edition, 4500 H ⁺ , Page: 4-95	6.5-8.5	No relaxation
2	Turbidity	NTU	0.3	APHA 23 rd Edition, 2130, Page: 2-13	1.0	5.0
3	TDS	mg/L	162.5	APHA 23 rd Edition, 2540 C, Page: 2-69	500	2000
4	*Dissolved Oxygen	mg/L	5.8	APHA 23 rd Edition, 4500-O C, Page: 4-146	--	--
5	*Total hardness	mg/L	122	APHA 23 rd Edition, 2340 B, Page: 2-48	200	600
6	Calcium	mg/L	35.3	APHA 23 rd Edition, 3500-Ca B, Page: 3-69	75	200
7	*Magnesium	mg/L	21.06	APHA 23 rd Edition, 3500-Mg B, Page: 3-86	30	100
8	Total Alkalinity	mg/L	140	APHA 23 rd Edition, 2320, Page: 2-37	200	600
9	*Chloride	mg/L	17.5	APHA 23 rd Edition, 4500-Cl ⁻ B, Page: 4-75	250	1000
10	*Sulphate	mg/L	16.4	APHA 23 rd Edition, 4500-SO ₄ ²⁻ E, Page: 4-199	200	400
11	*Nitrates	mg/L	3.6	APHA 23 rd Edition, 4500-NO ₃ ⁻ B, Page: 4-127	45	No relaxation
12	*Residual Chlorine	mg/L	BDL	APHA 23 rd Edition, 4500-Cl ⁻ B, Page: 4-63	0.2	1.0

Page 1 of 2



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NABL ACCREDITED
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Report No: 190808_1502075_0
ULR No: TC7669190000000098P
Sample ID No: EETNE/July/03/19/D

Date of Report: 08/08/19
Date of sample receipt: 30/07/19

S. No.	Parameters	Unit	Result	Reference Method	IS 10500: 2012	
					Acceptable limit	Permissible limit
13	*Fluoride	mg/L	0.4	APHA 23 rd Edition, 4500-F- D, Page: 4-90	1.0	1.5
14	*Copper	mg/L	0.037	APHA 23 rd Edition, 3111 B, Page: 3-20	0.05	1.5
15	*Iron(as Fe)	mg/L	0.291	APHA 23 rd Edition, 3500-Fe B, Page: 3-80	0.3	No relaxation
16	*Cadmium	mg/L	0.002	APHA 23 rd Edition, 3111 B, Page: 3-20	0.003	No relaxation
17	*Lead	mg/L	0.001	APHA 23 rd Edition, 3111 B, Page: 3-20	0.01	No relaxation
18	*Zinc	mg/L	0.282	APHA 23 rd Edition, 3111 B, Page: 3-20	5	15
19	*Total Chromium	mg/L	0.031	APHA 23 rd Edition, 3111 B, Page: 3-20	0.05	No relaxation
20	*Manganese	mg/L	0.039	APHA 23 rd Edition, 3111 B, Page: 3-20	0.1	0.3
21	*Selenium	mg/L	BDL	APHA 23 rd Edition, 3114A, Page: 3-36	0.01	No relaxation
22	BOD	mg/L	3.9	APHA 23 rd Edition, 5210B, Page: 5-6	--	--
23	COD	mg/L	20.3	APHA 23 rd Edition, 5220 b, Page: 5-18	--	--

Comments: All the tested parameters are within the acceptable limit.

For Envision Enviro Technologies North East, Guwahati

(Padmalochan Saha)
Environmental Chemist
Test Done By

(Dr. Pranita Chakraborty)
Quality Manager
Authorized Signatory

- Note: i) The results relate only to the parameters tested.
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iii) The test marked with an (*) are not accredited by NABL.
iv) Parameter no.13 to 21 are analyzed by Department of Chemistry, B. Borooah College as per our MOU.

End of report

Page 2 of 2

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NABL ACCREDITED

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TEST REPORT:

Report No: 190808_1502075_0
ULR No: TC7669190000000099P
Sample ID No: EETNE/July/04/19/D
Test Starting Date: 31/07/19

Date of Report: 08/08/19
Date of sample receipt: 30/07/19
Test completion Date: 07/08/19

Name & Address of Client		M/s. Gautam Construction, Bank Protection at Gumi (Tapar Pathar) Area 5000m, Dist: Kamrup@ under Palasbari Gumi Sub Project, FREMAA/GUMI/WEST/G2 of 2017, P.S. Jorsimali Outpost, Pin: 781137, Assam.			
Sample Description		Type: Surface Water (upstream)		Source: Brahmaputra River	
Sample collected by		M/s. En-vision Enviro Technologies North East			
Sample Collection Particulars	Date 30/07/2019	Time 12:15 P.M	Temperature 30°C	Quantity Drawn:4L	Sampling Method: EETNE/SOP/02

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500: 2012	
					Acceptable limit	Permissible limit
1	p ^H	---	7.31	APHA 23 rd Edition, 4500 H ⁺ , Page: 4-95	6.5-8.5	No relaxation
2	Turbidity	NTU	0.2	APHA 23 rd Edition, 2130, Page: 2-13	1.0	5.0
3	TDS	mg/L	132	APHA 23 rd Edition, 2540 C, Page: 2-69	500	2000
4	*Dissolved Oxygen	mg/L	5.2	APHA 23 rd Edition, 4500-O C, Page: 4-146	--	--
5	*Total hardness	mg/L	116	APHA 23 rd Edition, 2340 B, Page: 2-48	200	600
6	Calcium	mg/L	31.2	APHA 23 rd Edition, 3500-Ca B, Page: 3-69	75	200
7	*Magnesium	mg/L	20.6	APHA 23 rd Edition, 3500-Mg B, Page: 3-86	30	100
8	Total Alkalinity	mg/L	120	APHA 23 rd Edition, 2320, Page: 2-37	200	600
9	*Chloride	mg/L	19.9	APHA 23 rd Edition, 4500-Cl B, Page: 4-75	250	1000
10	*Sulphate	mg/L	13.2	APHA 23 rd Edition, 4500-SO ₄ ²⁻ E, Page: 4-199	200	400
11	*Nitrates	mg/L	3.2	APHA 23 rd Edition, 4500-NO ₃ B, Page: 4-127	45	No relaxation
12	*Residual Chlorine	mg/L	BDL	APHA 23 rd Edition, 4500-Cl B, Page: 4-63	0.2	1.0

Page 1 of 2



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Report No: 190808_1502075_0
ULR No: TC766919000000099p
Sample ID No: EETNE/July/04/19/D

Date of Report: 08/08/19
Date of sample receipt: 30/07/19

Sl No.	Parameters	Unit	Result	Reference Method	IS 10500: 2012	
					Acceptable limit	Permissible limit
13	*Fluoride	mg/L	0.28	APHA 23 rd Edition, 4500-F-D, Page: 4-90	1.0	1.5
14	*Copper	mg/L	0.032	APHA 23 rd Edition, 3111 B, Page: 3-20	0.05	1.5
15	*Iron(as Fe)	mg/L	0.198	APHA 23 rd Edition, 3500-Fe B, Page: 3-80	0.3	No relaxation
16	*Cadmium	mg/L	0.001	APHA 23 rd Edition, 3111 B, Page: 3-20	0.003	No relaxation
17	*Lead	mg/L	BDL	APHA 23 rd Edition, 3111 B, Page: 3-20	0.01	No relaxation
18	*Zinc	mg/L	0.326	APHA 23 rd Edition, 3111 B, Page: 3-20	5	15
19	*Total Chromium	mg/L	0.029	APHA 23 rd Edition, 3111 B, Page: 3-20	0.05	No relaxation
20	*Manganese	mg/L	0.0391	APHA 23 rd Edition, 3111 B, Page: 3-20	0.1	0.3
21	*Selenium	mg/L	BDL	APHA 23 rd Edition, 3114A, Page: 3-36	0.01	No relaxation
22	BOD	mg/L	4.1	APHA 23 rd Edition, 5210B, Page: 5-6	--	--
23	COD	mg/L	16.2	APHA 23 rd Edition, 5220 b, Page: 5-18	--	--

Comments: All the tested parameters are within the acceptable limit.

For Enviro Tech North East, Guwahati

(Padmalochan Saha)
Environmental Chemist
Test Done By

(Dr. Pranita Chakraborty)
Quality Manager
Authorized Signatory

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iv) Parameter no. 13 to 21 are analyzed by Department of Chemistry, B. Borooah College as per our MOU.

End of report

Page 2 of 2

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GREEN TECH ENVIRONMENTAL ENGINEER & CONSULTANTS

House No-11, Champaknagar, Narayan Path, Bhatapara, Guwahati-781026, www.greentecheeec.in
Telefax -0361 2300278 Mobile: 9435048677, 9954089052, E-mail: green_pranjal@hotmail.com, info@greentecheeec.in



TC- 5991

Format No.: GEEC/FW/48

TEST REPORT

ULR Number: TC599119000001739P			
Test Report No.:	GEEC/FL/22/2019/11/21	Date of Reporting:	04/12/2019
Customer Name & Address:	Brahmaputra Infrastructure Ltd 4th Floor, Royal Plaza Opp. Apollo Hospital, G.S.Road, Christian Basti, Guwahati-781005	Lab. ID No.:	GEEC/AA/2019/11/21
Project Name:	Bank Protection works from Guimara to Mokadhug in Palasbari Area (from Ch.3000 m to 6400 m) including Construction of Sluice on Kalbhog River under Palasbari Gumi sub Project. FREMAA/Palasbari/PGI/P2 of 2017	Date of Sampling:	19/11/2019
Sampling Location:	Camp Site P1 N 26°6'54.51152"E 91°30'4.44504"	Ambient Temperature:	Max. Min.
Weather Condition:	Calm and Clear		28.8°C 18.2°C
Sampling Condition:	In GF/A, PTFE Filter Paper & Plastic Bottle	Date of Sample Receipt:	20/11/2019
Monitored By:	Mr. Rohan Singh	Test Start Date:	20/11/2019
Equipments Details:	RDS & ADS PM Sampler	Test End Date:	23/11/2019

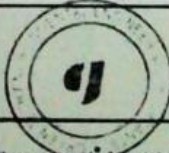
AMBIENT AIR QUALITY

Sampling and Analysis carried out as per GEEC/SOP/01

Sl. No.	Parameters	Unit	Results	Limits	Test Method
1	Particulate Matter (PM ₁₀)	µg/m ³	84	100	IS 5182(23)
2	Particulate Matter (PM _{2.5})	µg/m ³	57	60	GEEC/SOP/01 USEPA FRM 40 CFR
3	Sulphur Dioxide (SO ₂)	µg/m ³	< 5	80	IS 5182(2)
4	Nitrogen Dioxide (NO ₂)	µg/m ³	10	80	IS 5182(VI)
5*	Carbon Monoxide (CO)	mg/m ³	< 1	2	GASTEC TUBES
6	Lead (Pb)	µg/m ³	< 0.01	1	IS 5182(22)

***** End of report *****

Reviewed by:
Sanjib B Rajkhowa
Sanjib B Rajkhowa
Chemist



Authorised by:
Belinda Lahon
Dr. Belinda Lahon
Quality Manager

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House No-11, Champaknagar, Narayan Path, Bhetapara, Guwahati-781028. www.greentechec.in
Telefax -0361 2300278 Mobile: 9435046677, 9954089052, E-mail: green_pranjal@hotmail.com, info@greentechec.in



GEEC/FM/47/B

TEST REPORT

ULR NO.: TC599119000001743F					
Ref. No.:	GEEC/FL/32/2019/11/24		Date:	04/12/2019	
Name of the Industry	Brahmaputra Infrastructure Ltd,		Lab Id:	GEEC-SLM/2019/11/24	
Address	4th Floor, Royal Plaza, Opp. Apollo Hospital, G.S.Road, Christian Basti, Guwahati – 781 005				
Name of the Work:	Bank Protection works from Guimara to Mokadhug in Palasbari Area (from Ch.3000 m to 6400 m) including Construction of Sluice on Kalbhog River under Palasbari Gumi sub Project. FREMAA/Palasbari/PGI/P2 of 2017				
Noise Level Report					
Monitoring Location	Projet Site P2 N26°07'24" E 91°26'50"		Date of Monitoring	19/11/2019	
Weather /Wind	Calm		Sound Level Meter Model	SL4023 SD	
Measurement Results					
Sl.No.	Location	Time Duration	Sound Parameters (dBA)		
			Leq	Lmin	Lmax
1	Projet Site P2	Day Time	68.8	60.4	73.2
		Night Time	45.6	37.4	53.2
2	Jio Bag Storage	Day Time	64.4	59.4	68.4
		Night Time	41.3	37.3	50.2
3	500 m away from Camp	Day Time	58.3	54.5	67.3
		Night Time	39.5	37.0	43.2
4	working Area	Day Time	67.4	62.8	70.4
		Night Time	37.8	37.7	43.7
Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.)		Categories of Area/Zone	Limit in dB (A) Leq		
			Day Time	Night Time	
		Industrial Area	75	70	
		Commercial Area	65	55	
		Residential Area	55	45	
		Silence Zone	50	40	
Reviewed by Sanjib B. Rajkhowa Chemist			Authorised by: Dr. Belinda Lahon Quality Manager		

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Format No: GEEC/FM/50

TEST REPORT

ULR Number: TC599119000001741P

Ref. No.:	GEEC/FL/23/19/11/29	Date of Reporting:	04/12/2019
Customer Name & Address:	Brahmaputra Infrastructure Ltd, 4th Floor, Royal Plaza, Opp. Apollo Hospital, G.S.Road, Christian Basti, Guwahati - 05	Lab ID No.:	GEEC/WS/2019/11/29
		Date of Sampling:	19/11/2019
Project Name :	Bank Protection works from Guimara to Mokadhug in Palasbari Area (from Ch 3000 m to 6400 m) including Construction of Sluice on Kalbhog River under Palasbari Gumi sub		
Sampling Location:	Brahmaputra River P2 N26°07'24" E 91°26'50"	Sample Receipt Date:	19/11/2019
Sample Description:	Surface Water	Test Start Date:	19/11/2019
Sample Drawn By:	Mr.Rohan Singh	Test Completion Date:	26/11/2019
Sample Condition:	Sealed	Sampling Method :	GEEC/SOP/2

Sl. No.	PARAMETERS	METHODS	UNITS	RESULTS	LIMIT IS:2296 (Class C)
1	BOD	IS:3025 Part 44-1993(RA:2014)	mg/l	<2	<3
2	Chloride	IS:3025 Part 32-1988(RA:2014)	mg/l	9	600
3	Colour	IS:3025 Part 4-1983(RA:2017)	Hazen	6	300
4	Copper (Cu)	IS:3025 Part 42-1992(RA:2014)	mg/l	<0.05	1.5
5	Chromium (Cr ⁶⁺)	IS:3025 Part 52-2003(RA:2014)	mg/l	<0.01	0.05
6*	Cyanide (CN)	APHA 23rd EDITION, 2017	mg/l	<0.05	0.05
7*	DDT	APHA 23rd EDITION, 2017	mg/l	BDL	—
8*	Detergents	APHA 23rd EDITION, 2017	mg/l	<1	1
9	Dissolved Oxygen	IS:3025 Part 38-1989(RA:2019)	mg/l	6.2	4
10	Iron (Fe)	IS 3025 Part 53 2003(RA:2014)	mg/l	<0.06	0.5
11	Fluorides as (F)	IS 3025 Part 60 2008(RA:2013)	mg/l	<0.1	1.5
12	Lead	IS 3025 Part 47 2003(RA:2014)	mg/l	<0.1	0.1
13	Oil & Grease	IS 3025 Part 39 1991(RA:2014)	mg/l	<5	—
14	pH	IS 3025 Part 11 1983(RA:2017)	—	7.9	6.0 - 9.0
15*	Phenols	APHA 23rd EDITION, 2017	mg/l	<0.005	0.005
16*	Selenium (Se)	APHA 23rd EDITION, 2017	mg/l	<0.05	0.05
17	Sulphate	IS 3025 Part 24 1986(RA:2019)	mg/l	96	400
18*	Temperature	—	°C	23.8	—
19	Total Dissolved Solids	IS:3025 Part 16 1984(RA:2017)	mg/l	135	1500
20*	Total coliform	APHA 23rd EDITION, 2017	Present/Absent	Present	5000

***** End of Report *****

Reviewed by
Sanjib B Rajkhowa
Chemist

Authorised by:
Dr. Belinda Lahon
Quality Manager

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