

# Environmental Monitoring Report

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Project Number: 38412  
Bi-Annual Report  
Reporting Period: July to December 2016

## IND: Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program —Project 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**

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

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

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**Reporting Period – July 2016 to December 2016**

Submitted by Executing Agency



**Flood and River Erosion Management Agency of Assam (FREMAA)**

Prepared for FREMAA by Project Management Consultancy (PMC-FREMAA)

This report has been submitted to ADB by the Flood and River Erosion Management Agency of Assam (FREMAA) and is made publicly available in accordance with ADB's public communications policy (2011). It does not necessarily reflect the views of ADB.

**Bi-Annual Report on Implementation of Environmental Management Plan  
July 2016 to December 2016**

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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 Closing Date 30 September 2017

## 1. Introduction :

Effective environmental management is critical to sustainable development and poverty reduction in Asia. Without committed efforts to safeguard the environment, pressure will continue to build on the region's land, forests, water systems, wetlands, marine ecosystems, and other natural resources—on which many of the poor depend on for their livelihoods.

The nations of South and East Asia have been experiencing the world's most dynamic economics for the last few years. The pace of change is astonishing; investment in infrastructure to support economic growth. This growing human footprint, however, compromises Asia's biologically diverse natural ecosystem. ADB's environmental safeguards aim to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process.

ADB's environmental and social safeguards are cornerstone of its support to inclusive economic growth and environmental sustainability. The objectives of the Safeguard Policy Statement (2009) is to avoid, or when avoidance is not possible, to minimize and mitigate adverse project impacts on the environment and affected people.

The ADBs Safeguard Policy Statement (SPS), requires borrowers to identify project impacts and assess their significance; examine alternatives; and prepare, implement, and monitor environmental management plans.

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.

The Flood and River Erosion Management Agency of Assam (FREMAA) under the state Government of Assam is responsible for the implementation of ADB-financed Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program (AIFRERMIP), as agreed jointly between the SGOA, Government of India and ADB, and in accordance with government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by FREMAA of their obligations and responsibilities for program implementation in accordance with ADB's policies and procedures. Country safeguard systems (CSS) refer to the existing

laws, regulations, rules, and procedures on the policy areas of environment prevailing in India and Assam.

The project under the program come under **Category A**, as 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. 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 destroyed. Nevertheless, close monitoring were operationalized so that any unforeseen impact can be detected and mitigation measures provided. Possible negative impacts include those associated with construction, which are temporary and can be mitigated through prescribed mitigation measures under the environmental monitoring and management plan to be operationalized under the Project, with the necessary capacity building of the executing agency and outsourcing. This will help in maintaining environmental sustainability along with inclusive economic growth. 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.

#### **Provisions for compliance:**

The FREMAA also aims to integrate key Environmental Safeguards at all the levels of planning and implementation so that critical natural ecosystem and the resources are not destroyed in this biodiversity hotspot. There is 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 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 are made in the contract.

The Contractor shall employ one fulltime inspector for supervising compliance with the environmental management plan. The environmental inspector shall keep one set of current environmental standards and regulations at the site at all times, available for consultation.

The environmental inspector shall submit an Environmental Management Plan and a monthly environmental report. The report shall be written in English language in a format acceptable to the Engineer.

Measures for monitoring and preventing pollution of air, water, noise, vehicle, waste. No part of the work shall be started before environmental and safety inspectors and first aid nurse are present at the site.

Other measures like, Borrow pit management, maintenance of access road, compensatory afforestation, emergency response plan, etc are also under the preview of the environmental safeguard measures under the project.

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

**Palasbari Sub Project:**  
**Palasbari Reach**

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**

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**

- (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

**(Kaziranga Sub Project–** shifted to Tranche-2)

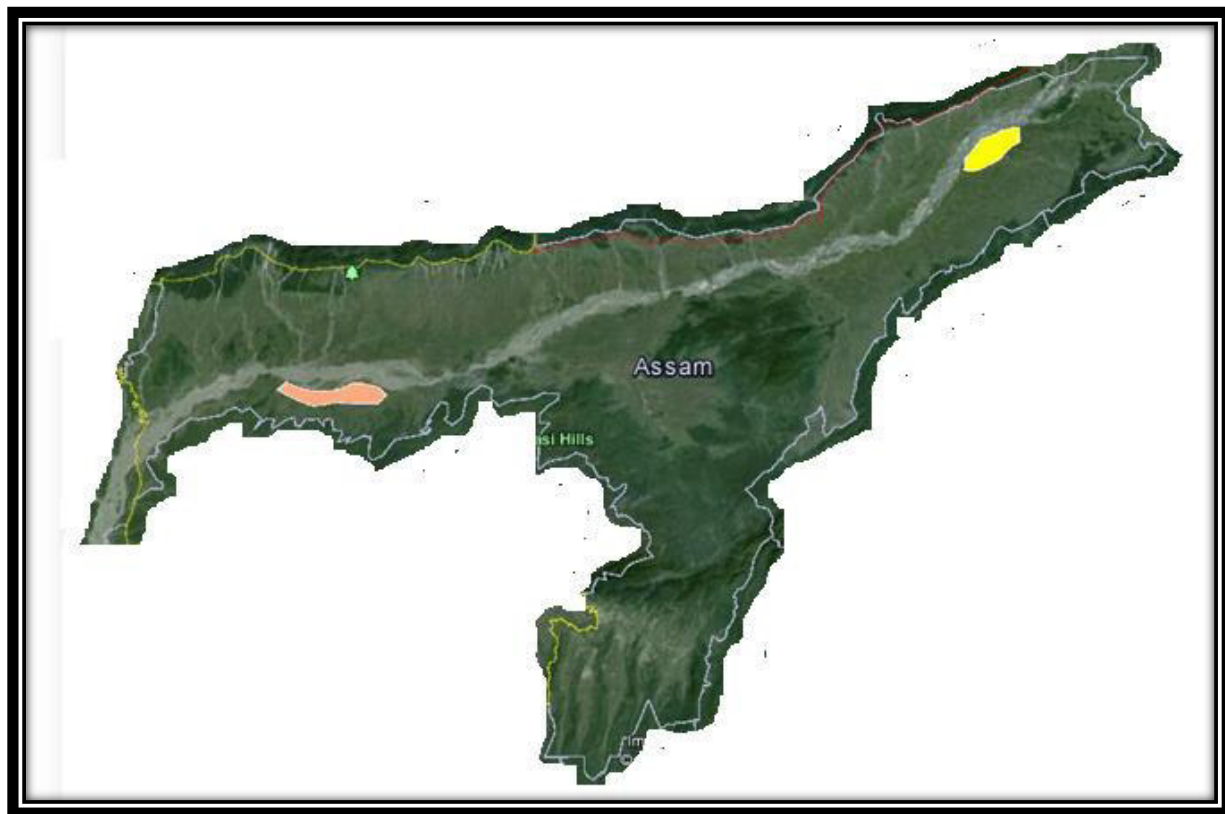
**1.1. Report Purpose :**

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 ADB's Safeguard Policy Statement, 2009 and Ministry of Environment, Forest and Climate Change (GOI) and Government of Assam guidelines so as to ensure that all environmental monitoring measures and when ever applicable Environmental mitigation measures as given in Environmental Impact Assessment and subsequent Environmental Management Plans incorporating all the Environmental concerns of the project.

The principle objectives of the report are to :

- To ensure environmentally compatible project implementation by avoiding and mitigation of negative impacts that arise from the project during the period July to December, 2016.
- To ensure that EIA recommendations are adequately followed in EMP and EMoP to meet the Environmental Compliances of statutory requirements of MoEF&CC, GOI.



Dibrugarh sub project



Palasbari Sub Project



### **Project sites in Assam along the river Brahmaputra**

The Bi Annual Report on the implementation of Environmental Management Plan ending December, 2016 delineates :-



- Environmental Monitoring of the project from July, 2016 to December, 2016 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.

## **1.2. Project Implementation Progress :**

Although the effectiveness of the loan started from December, 2010 and January 2011, consideration of the environment safeguard of the project started in the early part of 2013. Construction works started in February-2012 in both the subprojects of Dibrugarh and Palasbari and Gumi. Kaziranga subproject could not be started as required environmental clearance from the standing committee for National Board of Wildlife, MoEF&CC, GOI in 3<sup>rd</sup> quarter of 2014 and hence, the work shifted to tranche-2. Several meetings, trainings and workshops were conducted jointly by PMC and FREMAA with the contractors and SIO's in the month of April, 2013, May, 2014 and in subsequent months at the respective SIO office and in the site offices of the contractor for generating the awareness about the environmental safeguard and stipulations of the contract document on environment.

### **1.2.1. Provisions for compliance :**

The FREMAA aims to integrate key Environmental Safeguards at all the levels of planning and implementation so that critical natural ecosystem and the resources are not destroyed in this biodiversity hotspot. There is 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 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 are made in the contract.

- The Contractor shall employ one fulltime inspector for supervising compliance with the environmental management plan. The environmental inspector shall keep one set of current environmental standards and regulations at the site at all times, available for consultation. The environmental inspector shall submit an Environmental Management Plan and a monthly environmental report. The report shall be written in English language in a format acceptable to the Engineer.
- Measures for monitoring and preventing pollution of air, water, noise, vehicle, waste.
- No part of the work shall be started before environmental and safety inspectors and first aid nurse are present at the site.

- Other measures like, Borrow pit management, maintenance of access road, compensatory afforestation, emergency response plan, etc are also under the preview of the environmental safeguard measures under the project.

## **2. Incorporation of Environmental Requirements into Project Contractual Agreements**

*Manner by which EMP requirements are incorporated into contractual arrangements, such as with contractors or other parties.*

Each project requires a suite of environmental safeguards defined by impact mitigations and environmental monitoring requirements that are specific to the project type, scale, activities, and location.

The key design considerations and elements of environmental monitoring are incorporated in the contract agreement enabling with ADB's Safeguard Policies 2009 and with environmental compliances of statutory requirements of MoEF&CC, GOI.

### **FIDIC-BASED BID DOCUMENTS**

#### **GC 4.18 Protection of the Environment**

Contractor shall protect the environment on and off site and limit damage/nuisance to public from water/soil/air pollution, noise and other adverse impacts.

#### **Section 6, Clause 2.1 - Environment**

Contractor must submit EMP for approval, employ full time environmental inspector, and submit monthly reports to Engineer and monitor impacts and the success of mitigation measures.

#### **Section 6, Clause 2.3 – Safety Precautions & Medical Attendance**

Contractor shall employ a full time safety inspector, provide safety and first aid equipment, access to nurse and doctor, etc

In terms of allowable pollutant values and occupational health and safety, the laws, standards and regulations in force in India will be the references to be adhered to by the Contractor.

Following the above clause of the ADB contract document were prepared.

### **• Environmental Management Plan (EMP) Compliance as per Bid Document**

#### **Procurement of Works, Section 6 - Employers Requirements, Subsection 2**

#### **2A. Components of Environmental Safeguards:**

To look after the safeguard issues FREMAA and PMC has one unit comprising of Environmental expert, Land acquisition expert, resettlement expert and Social safeguard expert. Environmental Safeguards are against the work packages executed under the project. These are as mentioned below.

➤ **Compliance to Environmental Management and Environmental Monitoring**

Under each packages of works, contract documents were prepared to safeguard the environment under subsection 2 of the Section 6.

- **Environmental Management Plan and Environmental Inspector:** In that section the Contractor have to appoint one fulltime Environmental Inspector for supervising compliance with the environmental management plan. The environmental inspector have to keep one set of current environmental standards and regulations at the site at all times, available for consultation. The environmental inspector has to submit an ***Environmental Management Plan*** including the Monitoring Plan and a ***Monthly environmental report***. The report should be acceptable to the Engineer in Charge.
- Provisions were also made in the contract document that, the Contractor shall remedy any damages resulting from non-compliance of stipulations of this Sub-section 2 at his own cost. All work shall be stopped until compliance is assured.
- **Monitor Pollution and measures for prevention :** To monitor the effect of the civil work on the local environment following provisions were kept in the contract.
  - Prevention of spills of oil and lubricants from vehicles, engines, etc at work sites are required. Used engine oil must be removed in an environmentally acceptable manner in accordance with current legislation of India. In the event of any spoil, debris, waste or any deleterious substance from the Site being deposited on any adjacent land, the Contractor shall immediately remove all such material and restore the affected area to its original state to the satisfaction of the Engineer.

- **Measures for prevention of Air Pollution**

The Contractor shall devise and arrange methods of working to minimize dust, gaseous or other air-borne emissions and carry out the Works in such a manner as to minimize adverse impacts on air quality.

The Contractor shall utilize effective water sprays during delivery manufacture, processing and handling of materials when dust is likely to be created, and to dampen stored materials during dry and windy weather. Stockpiles of friable materials shall be covered with clean tarpaulins, with application of sprayed water during dry and windy weather. Stockpiles of material or debris shall be dampened prior to their movement, except where this is contrary to the Specification.

Any vehicle with an open load-carrying area used for transporting potentially dust producing material shall have properly fitting side and tail boards. Materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards, and shall be covered with a clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend at least 300 mm over the edges of the side and tail boards. In the event that the Contractor is permitted to use gravel or earth roads for haulage, he shall provide suitable measures for dust palliation, if these are, in the opinion of the Engineer, necessary. Such measures may include spraying the road surface with water

at regular intervals.

- **Measures for prevention of Noise Pollution**

The Contractor shall: consider noise as an environmental constraint in his planning and execution of the Works.

The Contractor shall take all necessary measures so that the operation of all mechanical equipment and construction processes on and off the Site shall not cause any unnecessary or excessive noise, taking into account applicable environment requirements. The Contractor shall use all necessary measures and shall maintain all plant and silencing equipment in good condition so as to minimise the noise emission during construction works.

The Contractor shall avoid unnecessary noise, especially at night.

- **Measures for prevention of Water Pollution**

The Contractor shall prevent any interference with the supply to or abstraction from, and prevent any pollution of, water resources (including underground percolating water) as a result of the execution of the Works.

Areas where water is regularly or repetitively used for dust suppression purposes shall be laid to fall to specially-constructed settlement tanks to permit sedimentation of particulate matter. After settlement, the water may be re-used for dust suppression and rinsing.

All water and other liquid waste products arising on the Site shall be collected and disposed of at a location on or off the Site and in a manner that shall not cause either nuisance or pollution.

The Contractor shall not discharge or deposit any matter arising from the execution of the Works into any waters except with the permission of the Engineer and the regulatory authorities concerned.

The Contractor shall at all times ensure that all existing stream courses and drains within, and adjacent to, the Site are kept safe and free from any debris and any materials arising from the Works.

The Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes and the like from pollution as a result of the execution of the Works.

- **Measures to prevent Vehicular Pollution**

The Contractor shall regulate vehicle emission and noise in accordance with current legislation of India.

- **Control of Wastes**

The Contractor shall control the disposal of all forms of waste generated by the construction operations and in all associated activities. No uncontrolled deposit ion or dumping shall be permitted. Wastes to be so controlled shall include, but shall not be limited to, all forms of fuel and engine oils, all types of bitumen, cement, surplus aggregates, gravels, bituminous mixtures etc. The Contractor shall make specific provision for the proper disposal of these and any other waste products, conforming to local regulations and acceptable to the Engineer.

- **Land Use**

The Contractor shall remove and store topsoil for replacement after construction. The Contractor shall restore the surface vegetation in his work areas to the level found before the start of work. This includes the replacement of topsoil removed before construction.

- **Disruption of Agricultural Activities**

The Contractor shall minimize the disruption of any agricultural activities within the flood embankments. To the extent possible, land outside the flood embankments used for construction purposes shall consist of WRD property. Any disruption of private agricultural land used shall be compensated by the Contractor at the current market value.

- **Access Routes**

Roads -The Contractor shall inspect all access roads for their appropriateness for moving construction equipment or materials. Roads found inappropriate shall be strengthened by the Contractor. If the access road degrades, by more than expected normal use, due to the Contractor's activities, it will be repaired by the Contractor at his own cost.

- **Site Installations**

The Contractor must provide and maintain reasonable sanitary facilities, proper lighting and adequate protection of the Site against accidents and the like. The Contractor shall organize the disposal of wastes in an environmentally acceptable manner, in accordance with environmental standards and regulations of India.

- **Excavation and Filling of Earth for Raising and Strengthening works**

Earth excavation and filling activities shall take place after the area has been surveyed and inspected by the Engineer. The Contractor shall submit a map indicating the areas of planned earth excavation and filling activities; together with cross-sections showing earth cut and fill areas, based on the results of the baseline survey, within one week of survey completion. These earth excavation and fill volumes must be confirmed and revised during the subsequent pre-work survey, before actual excavation and filling work can proceed.

- **Borrow materials :**

Where the materials are to be obtained from designated borrow areas, the location, size and shape of these areas shall be as indicated by the Engineer and the same shall not be opened without his written permission. Where specific borrow areas are not designated by the Employer/the Engineer, arrangement for locating the source of supply of material for embankment and subgrade as well as compliance to environmental requirements in respect of excavation and borrow areas as stipulated, from time to time by the Ministry of Environment Forests and Climate Change, Government of India and the local bodies, as applicable, shall be the sole responsibility of the Contractor. Borrow pits along the road shall be discouraged. If permitted by the Engineer, these shall not be dug continuously. Ridges of not less than 8 m width should be left at intervals not exceeding 300 m. Small drains shall be cut through the ridges to facilitate drainage. The depth of the pits shall be so regulated that their bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from the edge of the final section of the bank, the maximum depth in any case being limited-to 1.5 m. Also, no pit shall be dug within the offset width from the toe of the embankment required as per the consideration of stability with a minimum width of 10 m. Haulage of material to embankments or other areas of fill shall proceed only when sufficient spreading and compaction plant is operating at the place of deposition. No excavated acceptable material other than surplus to requirements of the Contract shall be removed-from the site. Should the Contractor be permitted to remove acceptable material from the site to suit his operational procedure, then he shall make good any consequent deficit of material arising there from. Where the excavation reveals a combination of acceptable and unacceptable materials, the Contractor shall, unless

otherwise agreed by the Engineer, carry out the excavation in such a manner that the acceptable materials are excavated separately for use in the permanent works without contamination by the unacceptable materials. The acceptable materials shall be stockpiled separately. The Contractor shall ensure that he does not adversely affect the stability of excavation or fills by the methods of stockpiling materials, use of plants or siting of temporary buildings or structures. The Contractor shall obtain representative samples from each of the identified borrow areas and have these tested at the site laboratory following a testing programme approved by the Engineer. It shall be ensured that the subgrade material when compacted to the density requirements shall yield the design CBR value of the subgrade.

- **Emergency Response**

The Contractor shall plan and provide for remedial measures to be implemented in the event of occurrence of emergencies such as spillages of oil or bitumen or chemicals.

The Contractor shall, provide the Engineer with a statement of the measures he intends to implement in the event of such an emergency which shall include a statement of how he intends to provide personnel adequately trained to implement such measures.

- **Measurement and Payment**

Protecting the Environment

The Bill of Quantities contains a separate line item to include all costs for protecting the environment. Cost for complying with all requirements related to construction of labour camps/ancillary sites, strengthening and/or repair of roads, rehabilitation of ancillary sites etc. are deemed to be included in the bill of quantities. Cost for specific activities related to the work, such as stripping and replacing top soils (agricultural soil), dust suppression, water supply, sanitation facilities, camp site waste disposal, control of pollution from leakage and spill of oils and lubricants, safety and warning signs/signals etc., should be included in this line item in the bill of quantities.

## **2B. Monitoring Contractors activities**

The activities that may have environmental impact are to be checked periodically or by recurrent spot checks. Contractor's activities are looked after by one Environmental Inspector for each site. In all the field visits the following activities of the contractors were checked by FREMAA officers PMC experts and by the SIOs:

- a. Sprinkling of water during movement of trucks
- b. The vehicles used during the work has due pollution control certificate
- c. Solid waste management in the labour camps
- d. Quality checks for drinking water in the camps
- e. Sanitary toilets in the camps
- f. Use of LPG gas for preparing food in the labour camps,
- g. Burrow pit areas
- h. Oil and grease spilling
- i. Test to check the ambient environment

## **2C. Tests to check the ambient environment**

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

For Air Quality : SPM, RSPM, SO<sub>2</sub>, NO<sub>x</sub>, CO, Pb - With in 100 m of Hot mix plant, construction camp, crusher and near sensitive locations/ settlement –Continuous 24-hourly, twice a week, for two weeks once every year (summer).

For Dust & Smoke- Details of water sprinkling and frequency of sprinkling per day  
 Vehicular pollution - Emission records of vehicular pollution of all the vehicles used (updated PUC)  
 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, - Once at the start of construction  
 Noise - Noise Level in dB (A) – Near the construction sites and sensitive locations close to embankment – One day hourly measurement, once in six months

## 2.D Environmental Clearances required during Construction Stage

(this list excludes clearance from MOEF&CC for forest land diversion and areas falling under critical habitats)

Sl. No	Description	Approval from Assam Forest Department	Approval from SIO, WRD	Approval from Pollution Control Board, Assam	Responsibility
1	Camp Site	X	√	X	Contractor
2	Borrow area for soil	√	√	√	Contractor
3	Stone from Quarry	√	X	√	Contractor
4	Borrow area for sand	√	√	X	Contractor
5	Top soil monitoring	X	√	X	Contractor
6	DG set noise and oil spill monitoring	X	X	√	Contractor
7	PUC certificate for Vehicles	X	X	√	Contractor
8	Loss of agricultural land	X	√	X	Contractor
9	Environment Monitoring	√	√	√	Contractor, SIO, FREMAA

Required √

Not Required X

## 2.E Compliance with Environmental Management Plan. (Provisions in the Bid document)

2.5.1: “The Contractor shall work in strict compliance with the principles of the Environmental Management Plan. No part of the work shall be started before environmental and safety inspectors and first aid nurse are present at the site. No part of the work shall be started, or if defects are found later, continued or restarted before complying with all conditions of Sub-section 2 in this Section.”

2.5.2 “The Contractor shall remedy any damages resulting from non-compliance of stipulations of this Sub-section 2 at his own cost. All work shall be stopped until compliance is assured.”

2.5.3 “If the Contractor is not able or unwilling to start remedial work within five working days after detection of any defect or omission, the Engineer can order remedial works through third parties. The cost for third-party services are to be borne by the Contractor and shall be deducted from the Contractor’s invoices or from the Retention Money.”

## 2.6 Measurement and Payment.

### 2.6.1 Protecting the Environment:

*“The Bill of Quantities contains a separate line item to include all costs for protecting the environment. Cost for complying with all requirements related to construction of labour camps/ancillary sites, strengthening and/or repair of roads, rehabilitation of ancillary sites etc. are deemed to be included in the bill of quantities. Cost for specific activities related to the work, such as stripping and replacing top soil (agricultural soil), dust suppression, water supply, sanitation facilities, camp site waste disposal, control of pollution from leakage and spill of oils and lubricants, safety and warning signs/signals etc., should be included in this line item in the bill of quantities. Payments will be made on the basis of available market rates and prevailing schedule of rates of Government of Assam.”*

## 3. Summary of Environmental Mitigation and Compensation Measures Implemented

*Based on EMP, may include measures related to air quality, water quality, noise quality, pollution prevention, biodiversity and natural resources, health and safety, physical cultural resources, capacity building and others.*

### 3.1. Preparation of site specific EMPs :

Following the contract stipulations Environmental Inspectors prepared the site specific EMPs following the EIA and the EMPs on DTP Dyke works, Mothola Oakland works, Porcupine liot-IV under Dibrugarh subproject, Palasbari and Gumi work packages, Palasbari embankment and was approved by the concerned SIO. The approved EMP was followed by the contractors during July to December, 2016.

### 3.2. Measures taken to reduce pollution:

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

- **Air**
  - Spray water on dry surface to reduce dust in the air
  - Use tarpaulins to cover sand and other loose materials where transported by vehicles
  - Clean wheels and undercarriage of vehicles while leaving the site
  - Certificates on Vehicular Emission of all the vehicles used in the site
  - Checked air quality by PCB approved lab
- **Noise**
  - Plan activities in consultation with SIO, community to reduce noise level
  - Provide information to public about work schedule
  - Horns not used, unless essential
  - Minimize the noise by silencers
  - Do not allow workers to an exposure of 80 dBA or above without ear plug



- Use of heavy vehicles during specified period of day
- Use of Generators during specified period of day
- Checked Noise level by PCB approved lab
- **Surface water quality**
  - Avoid stockpiling of earth fill, especially during monsoon unless covered by tarpaulin or plastic sheets
  - Install temporary silt traps or sedimentation basins along the drainage leading to water bodies
  - Store fuel and lubricants away from the drains
  - Checked surface water quality by PCB approved lab
- **Pollution**
  - Spills of oils on the site and on river regularly checked
  - Specific measures taken to remove the Used engine oils
  - Surface discharges monitored
- **Site Installations**
  - Protection of trees for their preservation
  - temporary roads were constructed
  - environmental friendly waste disposal system properly monitored and executed in the work sites
- **Labour Camps**
  - Minimize the removal of vegetation and donot allow cutting of trees
  - Provide safe drinking water to the camp inhabitants
  - Sanitation facility to the camp inhabitants
  - Solid waste management practiced in the camps
  - before vacating the camp after the work, SIO and fringe community inspect the labour camp sites

### 3.3. Status of the mechanisms present for the Implementation of EMP

**Table :1 . Status of implementation of EMP as on 31.12.2016**

Following the contract stipulations Compliance Inspectors in the form of Environmental Inspector were deployed by all the contractors and Safety Inspectors are also recruitment by all the contractors.

	Sub Projects according to the contract packages	Environmental Inspector appointed	EMP prepared	EMP approved by SIO	EMoP	Safety Inspector appointed	Monthly Environmental report	First aid Nurse engaged
1	Palasbari Apron	√	√- Submitted to SIO	√	√- Submitted to SIO	√	√- Prepared & submitted to SIO till December, 2016	√ - Agreement has been made with the local Pharmacy

2	Gumi (Project completed)	√	√- submitted to SIO	√	√- submitted to SIO	X	√- submitted	√- Agreement has been made with the local Pharmacy
3	Palasbari Embankment	√- Same Inspector for Palasbari and Gumi as the work is done by same contractor.	initiated	√	initiated	√	√- submitted till December, 2016	√- Agreement has been made with the local Pharmacy
4	DTP Dyke	√ – Appointed	√- EMP submitted to SIO	√	√- submitted to SIO	√	√- submitted. till December, 2016	√- Agreement with local nursing home
5	Mothola Oakland (Project completed)	√ – Appointed	√- EMP submitted to SIO	√	√- submitted to SIO	√	√- submitted.	Agreement with local nursing home
6	Porcupine Lot-4	Not required	√- submitted to SIO	√	√- submitted to SIO	Not required	√- Tests performed. One consolidated report submitted to SIO	Not required

# Report on Environmental Safeguard

**Fabrication and supply of pre stressed concrete porcupines at Oakland area for use in establishment of anti erosion measures in critical sections of the river Brahmaputra in Dibrugarh district.**

**Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program  
Dibrugarh Sub Project**

Contract Agreement No **AFRERM(P)/PROJ/23-2010/Pt-IV/13**  
dated Guwahati, 16<sup>th</sup> May, 2014.

September, 2016



-: Prepared By :-

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Mobile No- 9435103043

**Final Report on Environmental Safeguard submitted by contractor of Porcupine Lot-IV under Dibrugarh subproject (Report in Appendix 1 and 3)**

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

- Several meetings and training were organized (detail in QPRs and Bi annual reports) to aware the contractors on the environmental safeguard of ADB (Strategy and directions), stipulations of the contract document, testing of selected environmental parameters, national environmental standards, acts and rules of MoEF&CC, GOI and Government of Assam.
  - Helped in the preparation of EMP and EMoP,
  - Assisted in preparation of monthly environmental Reports
  - In the training workshop and in all the meetings with contractors and 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 has been made so that that the contractors adheres to the EMP norms.

Most of the contractors has employed Environmental Inspectors and they have submitted the Environmental Management Plans to the respective Engineers in Charge. In most of the cases the compliance were now net but are in different level of compliance (Package wise details in table-2).

**Table -2: Environmental Clearances during Construction Stage**

Sl. No	Description	Approval from Assam Forest Department	Approval from SIO, WRD	Approval from Pollution Control Board, Assam	Responsibility	Status
1	Camp Site	X	√	X	Contractor	Obtained
2	Borrow area for soil	√	√	√	Contractor	Obtained, by DTP dyke
3	Stone from Quarry	√	X	√	Contractor	Obtained
4	Borrow area for sand	√	√	X	Contractor	Obtained
5	Top soil monitoring	X	√	X	Contractor	Obtained
6	DG set noise and oil spill monitoring	X	X	√	Contractor	Obtained
7	PUC certificate for Vehicles	X	X	√	Contractor	Obtained
8	Loss of agricultural land	X	√	X	Contractor	Monitored
9	Environment Monitoring	√	√	√	Contractor, SIO, FREMAA	Obtained

Required      √                                      Not Required      X

#### 4. Summary of Environmental Monitoring

##### 4.1. Compliance Inspectors (if relevant)

Following the contract stipulations Compliance Inspectors in the form of Environmental Inspector were deployed by all contractors and Safety Inspectors were also recruited by all the contractors (detail in Table-1).

##### 4.1.1. Summary of Inspection Activities

Environmental Inspectors monitors the day to day environmental safeguards at the site and reports to the SIO. Moreover, FREMAA along with PMC also monitors the implementation of the EMP (Table- 3).

**Table 3. Showing the site inspections by FREMAA and PMC during July, 2016 to December, 2016.**

##### **List of Meetings Attended (Period July to December 2016)**

No.	Date	Meetings
1	7.11.16	Meeting with FREMAA on implementation of Environment Safeguards and preparation of tranche 2 documents
2	09.11.16	Meetings with ADB, FREMAA , SIO at Kaziranga of finalization of EIA
3	10.11.16	Meeting with SIO Palasbari, FREMAA for finalization of EIA.
4	15.11.16	Meeting with FREMAA on implementation of Environment Safeguards and preparation of tranche 2 documents

##### **Field visit carried out by the experts of PMC, during July to December 2016.**

No.	Date	Place of visit	Participants in visit:	Meeting with	Purpose of Visit
1	09.11.16	Kaziranga	Mr. S.K. Jain, ADB consultant Jayanta Das of PMC,	Meeting with WRD, Forest Department, Villagers, SIO, FREMAA, PMC	Finalization of EIA for Tranche 2. Public consultation
2	10.11.16	Palasbari	Mr. S.K. Jain, ADB consultant; Jayanta Das of PMC,	Meeting with WRD, Villager, FREMAA, SIO, PMC	Finalization of EIA-Tr.2. Public consultation.



## List of Discussion and Meeting with Contractors (Period July to December 2016)

No.	Date	Meetings
1	9.8.2016	Discussed with Contractor's Environmental Inspector of DTP dyke on Monthly Environmental Report and on Environmental Monitoring (test of ambient environment)
2	10.11.2016	Discussed with Contractor's Environmental Inspector of Palasbari Apron on Monthly Environmental Report and on Environmental Monitoring (test of ambient environment)
3	10.11.2016	Discussed with Contractor's Environmental Inspector of Palasbari Embankment on Monthly Environmental Report and on Environmental Monitoring (test of ambient environment)



Consultation on Kaziranga 9.11.16



Kaziranga



Consultation with Forest department Kaziranga



Consultation in Palasbari 10.11.16



Palasbari



Palasbari

Inspection activities on Environmental Safeguards are done in several stages :

- Monthly Environmental Reporting Formats were developed at PMC to check the compliance. These reports are to be complied by the Environmental Inspector and to be submitted to the SIO for his approval (Form-1).
- Site Engineers of PMC also monitor the Environmental Safeguards (Form-2).
- SIO also monitor the implementation of EMP during their inspection (Form-3)

## Form-1

Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program	
Tranche-1	Sub Project :
Contractor :	Project No : 38412
Date of Agreement :	Contract Period :
Target Date of Completion :	Extended upto :
Name of the Environmental Inspector :	Month : Year:

Monthly Environmental Report			
		Status	Remarks
	<b>Environment</b>		
1	<b>Sources of materials</b>		
1.a	Use quarry sites and sources permitted by Government		
1.b	Verify suitability and approval by SIO		
1.c	Submission of monthly documentation of all material sources		
2	<b>Air</b>		
2.a	Spray water on dry surface to reduce dust in the air		
2.b	Use tarpaulins to cover sand and other loose materials where transported by vehicles		
2.c	Clean wheels and undercarriage of vehicles while leaving the site		
2.d	Certificates on Vehicular Emission of all the vehicles used in the site		
2.e	Checked air quality by PCB approved lab		
3	<b>Noise</b>		
3.a	Plan activities in consultation with SIO, community to reduce noise level		
3.b	Provide information to public about work schedule		
3.c	Horns not used, unless essential		
3.d	Minimize the noise by silencers		
3.e	Do not allow workers to an exposure of 80 dBA or above without ear plug		
3.f	Use of heavy vehicles from to		
3.g	Use of Generators KV from to		
3.h	Checked Noise level by PCB approved lab		
4	<b>Surface water quality</b>		
4.a	Avoid stockpiling of earth fill, especially during monsoon unless covered by tarpaulin or plastic sheets		
4.b	Install temporary silt traps or sedimentation basins along the drainage leading to water bodies		
4.c	Store fuel and lubricants away from the drains		
4.d	Checked surface water quality by PCB approved lab		
5	<b>Land Use</b>		
5.a	Has the contractor preserved the top soil for replacement after construction		
5.b	Status of the surface vegetation on the construction site prior to the initiation of the work (Detail report with number of trees cut and initial photographs of the area)		
5.c	Borrow pit – Rehabilitation of the borrow pit was done		
6	<b>Pollution</b>		
6.a	Spills of oils on the site and on river regularly checked		
6.b	Necessary measures taken to stop it		
6.c	What measures taken to remove the Used engine oils		
6.d	Surface discharges monitored		
7	<b>Disruption of Agricultural activities</b>		
7.a	Any agricultural activity in the flood embankment		
7.b	Any measures taken to minimize the impact on agricultural activity in the flood embankment		
7.c	Land used outside the flood embankment belongs to WRD or private		
7.d	If private agricultural land is used proper compensation is made by the Contractor at current market value		
	<b>Access routes (River)</b>		
a	Whether the Navigation routs are blocked ?		
b	How interference with the riverine traffic is minimized ?		
c	All the floating equipments following navigation standards applicable in India.		



d	All the floating equipments following safety standards applicable in India.		
e	Any dredging operation done ?		
	<b>Road</b>		
a	All the access roads inspected for their appropriateness for moving construction equipments		
b	If found inappropriate, strengthened by Contractor		
c	Due to the movement of the heavy vehicles, the access road is degraded more than normal use		
d	Contractor repaired the degraded access road		
e	Access road for the fringe community is used / blocked and alternate route provided		
f	Conduct the work during light traffic		
	<b>Excavation and filling of Earth in Slope Protection</b>		
a	Whether the area has been surveyed, inspected and approved by the SIO after the identification of excavation and filling site.		
b	Whether contractor has submitted a map indicating the area of earth excavation and filling activities showing the earth cut and fill areas, based on the baseline survey.		
	<b>Sand Excavation</b>		
	Whether the sand excavation area was approved by the SIO in writing.		
b	Whether contractor has submitted a map indicating the area of planned sand excavation		
c	Whether the sand excavation area is close to the work site or to char inhabitants		
	<b>Site Installations</b>		
a	Protection of trees for their preservation		
b	Whether temporary roads were constructed ?		
c	Whether environmental friendly waste disposal system properly monitored and executed in the work sites ?		
	<b>Labour Camps</b>		
a	Consult SIO and fringe community for establishing the temporary office shed, camp and plant		
b	Minimize the removal of vegetation and donot allow cutting of trees		
c	Provide safe drinking water to the camp inhabitants		
d	Sanitation facility to the camp inhabitants		
e	Solid waste management practiced in the camps		
f	Report SIO and fringe community before vacating the camp after the work		
	<b>Agricultural Land and Crop Loss</b>		
a	Any loss or damage of agricultural land and crops due to project construction activities		
	<b>Homestead Loss</b>		
a	Any home stead loss (including loss of trees, ponds, shifting of any other installations)		Addressed by RAP
	<b>Drainage from Adjacent Area</b>		
a	Natural drainage system blocked or disrupted.		
	<b>Wildlife</b>		
a	Sighting of Dolphin (National Aquatic Animal)		
	<b>Fish productivity</b>		
a	Fish productivity increased or decreased (survey in the boat ghats)		
b	Landing facility- Change of Boat Ghats		
	<b>Display Materials</b>		
a	Signs like "Only Staff", "Restricted Area" displayed in relevant area		
b	Safety (including traffic signs), notice board is available		
	<b>Health and Safety</b>		
a	Provision of First Aid and medical service available		
<i>Provide GPS coordinates for most of the descriptions so that map can be prepared.</i>			
5	Additional comments or actions required :		
	Signature by Environmental Inspector	Accepted/ Approved by SIO	
	Date :	Date :	
	Contact Details :	Contact Details :	

## Form-2

### Environmental Safeguards : Monitoring at site

Location : \_\_\_\_\_ Month : \_\_\_\_\_

(Give √ as applicable)

	Item	Yes	No	Remarks
1	Environmental Inspector present in all the works carried out at site			
2	EMP			
3	EMoP			
4	Baseline information of environment are present at site office			
5	Relevant Acts and Rules are available at site camps			
6	Air, water and Noise standards present at site			
7a	Air water and noise test results are kept in the site office			
7b	If Yes, Name the company performing the test			
7c	Test conducted			
8	Vehicles are checked in the camp before the work			
9	Oil seepage are checked for generators and motors of boats daily			
10	Oils are stored safely (to avoid soil & water contamination)			
11	Solid waste management practiced at the site			
12	Measures taken to reduce the dust pollution			
13	Access roads and navigation routes obstructed			
14	Access road maintained by the contractor			
15	Sand collected from the chars which are not inhabited			
16	Borrow pit rehabilitation done			
17	Loss of agricultural area if any			
18	Sanitation facility at campus is adequate			
19	Quality of drinking water tested			
20	Quantity of drinking water is sufficient.			
21	Record kept for cutting of trees			
22	Sitting of dolphin, If yes give dates and mention site			
23	Register checked weekly (attendance of Environmental Inspector, PUC certificate of all the vehicles used at site)			
24	Meeting related to awareness on environmental safeguards carried out during the month			
25	Any grievances lodged / discussed during the meeting related to Environment			
26	Monthly environmental report submitted to SIO . If submitted give the date.			

Remarks:

\*Take photographs of the important events with date and location,

\*\*Mention any other measures taken to protect the environment and the people.

Date :

Signature

## Form-3

### SIO CHECKLIST FOR ENVIRONMENTAL SUPERVISION AND MONITORING DURING CONSTRUCTION

Contractor's Name : \_\_\_\_\_

Month : \_\_\_\_\_ Dates of Inspection : \_\_\_\_\_

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

1. Is the Environmental Management Plan being implemented during the construction phase of the river bank protection work ? Yes No
2. Environmental Inspector present during the construction work ? Yes No
3. Are there sufficient measures incorporated in the subproject to prevent water pollution of nearby water bodies ? Yes No
4. Are there adequate erosion control measures to prevent erosion and sedimentation during the riverbank protection works ? Yes No
5. Is the project taking adequate measures to control dust and noise pollution ? Yes No
6. Is the project providing adequate alternative traffic routes (diversion/temporary access roads, etc) during the riverbank protection work ? Yes No
7. Is the subproject avoiding mining of sand from locations adjacent to inhabited char land areas, where applicable ? Yes No
8. Has the contractor used permitted sites for collection of materials (Boulders, Soil, etc) Yes No
9. Has the project resolved issues related to land accusation and compensation under the RAP ? Yes No
10. Have the Labour Camps and project Site Office and storage areas been constructed with sufficient sanitation and water supply facilities and other environmental and social associates with the construction ? Yes No
11. Is the sub project taking adequate measures to avoid spills of oil/lubricants smoke and noise pollution ? Yes No
12. Is the composite generated waste / garbage being disposed in an environmentally acceptable manner ? Yes No
13. Is there sufficient safety looked after by Safety Inspector at the work place and health care facilities (First Aid Nurse, and regular visit by Physician ) or clinic close by to composites ? Yes No
14. Is the construction contractor adequately prepared to handle emergency situations like accidents and illness ? Yes No
15. Is the contractor keeping the records of the trees destroyed during the construction work ? Yes No
16. Is the subproject taking adequate measures to preserve the topsoil for later replacement ? Yes No
17. Are there adequate measures to avoid disturbances to the habitat of fish and other aquatic fauna and flora ? Yes No
18. Do the vehicles used in the site has valid PUC certificates ? Yes No
19. Is there any complaints lodged by the local community on environmental issues ? Yes No
20. **Major observations, Conclusion, Recommendations :**

\_\_\_\_\_  
Contractor or his representative

\_\_\_\_\_  
Name and Signature of the Supervisor

Designation \_\_\_\_\_

Date \_\_\_\_\_

#### **4.1.2. Mitigation Compliance :**

Following measures were taken to meet the compliance.

##### **Construction Site Set-Up**

- Contractor comply with Section 6, Clause 2.4 – Site installations for construction camp, and all working and storage areas
- Safe drinking water and adequate sanitation facilities to be provided.

##### **Waste Materials**

- solid waste were either reused or recycled when practical,
- waste lubricant oils and spent oils will be stored in proper containers in a designated area until recycled or properly disposed offsite.
- general waste (metal, paper, cardboard, plastics, etc) are stored in bins and removed to suitable disposal site
- no hazardous wastes are anticipated to be generated from the site.

##### **Noise**

- Major construction activities were scheduled during normal daylight working hours and consistent with applicable standards.
- Contractor use equipment that is operated with appropriate noise muffling devices resulting in the least possible noise.

##### **Air Quality and Emissions Management**

- Most of all transport vehicles moving soil, granular material and rock to and from the site were covered
- The Contractor implement dust control measures at the source of emissions. The standard method is to wet dry surfaces, over which traffic passes; and encouraged natural re-vegetation or replant as early as practical after the completion of construction
- suitable emission controls and exhaust systems for all equipment will be maintained, and regular inspection and maintenance of trucks were conducted to control pollutants from exhaust fumes

## Spills Prevention

- specific sites with barrier protection and impervious pads for fuelling and servicing were established at sites
- fuel, lubricants and chemical products were kept in special, water tight area, without drainage exit to the river; material to be kept in drums or safe tanks as per practicable
- appropriate pumps and nozzles for refueling were used. Disconnected hoses were placed in containers to prevent spills of residual fuel
- off-site spent lubricants mostly collected and safely disposed
- storm water that collects in secondary containment areas were inspected before release

		Explanatory comments
Overall Compliance	<b>Good</b>	<ol style="list-style-type: none"> <li>1. Sanitary toilets are installed in all the site camps. As most of the labours are local, sanitary toilets are not present at the temporary labour camps.</li> <li>2. Safe drinking water used in all the site camps.</li> <li>3. Awareness meeting has been carried out on solid waste management in all the camps</li> <li>4. Generators are used during the daylight hours</li> <li>5. Contractors use dust control measures</li> <li>6. Soil and granular materials are mostly covered by tarpaulin during transport</li> <li>7. Fuel and lubricants are kept far away from river</li> <li>8. Oil checks of the vehicles and generators are done regularly</li> <li>9. The environmental standards (Central Pollution Control Board, MoEF&amp;CC, GOI) applicable for the sites are kept at the site for reference.</li> <li>10. Suggestion made on - Ambient test frequency and test parameters to be at par EMP</li> </ol>

#### 4.1.3. 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
- Results of the ambient environmental tests were within the permissible limit of Central Pollution Control Board, MoEF&CC, GOI.
- Frequency of monitoring (particularly the Test frequency) were not as per the EMP schedule.

To monitor the mitigation effectiveness the following parameters were monitored.

**Table-4 :Mitigation Effectiveness during July to December, 2016**

	Palashbari– Embankment (Test done October-2015)	Gumi (Test done October- 2015)	Palashbari– Apron (Test done July-2016)	Dibrugarh – DTP Dyke (Test done November, 2016)	Dibrugarh – Mothola Oakland (Test Carried out April, 2016)	Porcupine (Lot-4) (completed) Test done June, 2016)
Ambient Air quality	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit
Surface Water Quality	Within the permissible limit	Within the permissible limit	Within the permissible limit	Not carried out this time	Within the permissible limit	Within the permissible limit
Ground Water Quality	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit
Noise level	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit	Within the permissible limit
Pollution level of the vehicles used at site	PUC certificates present	PUC certificates present	PUC certificates present	PUC certificates present	PUC certificates present	PUC certificates present
Complain lodged by the local residents on Environmental pollution by the construction activity. July to Dec, 2016	No complaints lodged	No complaints lodged	No complaints lodged	No complaints lodged	No complaints lodged	No complaints lodged

		Explanatory comments
Mitigation Effectiveness	<b>Good</b>	<ul style="list-style-type: none"> <li>No complaints were lodged to SIO on environmental pollution by any of the fringe villagers, NGO's or other institutions</li> <li>Results of the ambient environmental tests were within the permissible limit of Central Pollution Control Board, MoEF&amp;CC, GOI.</li> <li>Monthly environmental Report submitted by contractors till December, 2016</li> <li>Test frequency in Palasbari Embankment and Gumi works were not as per EMP, But test reports done earlier were within the permissible limit.</li> </ul>

#### 4.2. Emission Discharge (Source) Monitoring Program (if Relevant)

Not relevant to this project..

#### 4.3. Ambient Monitoring Program (if Relevant)

To monitor the ambient environment the following parameters are to be monitored with the frequencies described in the SEIA. All the tests were performed from the Pollution Control Board, Assam and its approved labs..

- **For Air Quality :**  
SPM, RSPM, SO<sub>2</sub>, NO<sub>x</sub>, CO, Pb - With in 100 m of Hot mix plant, construction camp, crusher and near sensitive locations/ settlement – Continuous 24- hourly, once every year (summer).
- **For Dust & Smoke :**  
Details of water sprinkling and frequency of sprinkling per day
- **Vehicular pollution :**  
Emission records of vehicular pollution of all the vehicles used
- **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, - Once at the start of construction

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

#### 4.3.1. Summary of Monitoring

**Table-5 : Ambient Environment Monitoring Plan**

Attribute	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implement ation
Air	SO <sub>2</sub> , NO <sub>x</sub> , 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	Six times	24 hours Sampling	Along the river bank area	Contract or
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	Two times including baseline	Grab Sampling	Along the Surface water sources	Contract or
Ground Water	pH, BOD, DO, Total Coliform, As, Cd, Mn			Two times including baseline			Contract or
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 construction area.	MoEF Noise Rules, 2000	One time including baseline	Leq in dB(A) of day time and night time	Along the river bank	Contract or



#### 4.3.3. Results

Results of the specific tests on the selected parameters (during June 2016 to December, 2016) (+ not reported in earlier Bi annual report) 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-6. Quality of ambient Air at the site during June to December, 2016**

Parameter	Dibrugarh- Porcupine Lot IV (Site-1)	Dibrugarh- Porcupine Lot IV (Site-2)	Dibrugarh- Porcupine Lot IV (Site-3)	Dibrugarh- Porcupine Lot IV (Site-4)	Dibrugarh Porcupine Lot IV (Manufacturing site- Tinsukia)	Dibrugarh DTP Dyke (at chainage 5000m )	Dibrugarh DTP Dyke (at chainage 5300m)	Paslsbari –Apron (ch 1200m)
	Test done June, 2016					Test done of Nov, 2016		Test July,2016
<b>PM 2.5</b>	19.8	22.6	27.9	25.3		24.9	22.6	31.9
<b>PM10</b>	49.8	52.6	58.2	54.7	40.2	72.7	66.4	59.6
<b>NO2</b>	14.2	16.6	10.3	9.4		9.3	10.2	10.8
<b>SO2</b>	6.2	6.4	<1	<1		ND	ND	6.2
<b>CO</b>	ND	ND	ND	ND		ND	ND	
<b>Weather</b>	clear	clear	clear	clear	clear			

(Ref: Appendix-1)

**Table-7. Quality of Ground Water at the site during June- December, 2016**

Parameter	Dibrugarh- Porcupine Lot IV (Site-1) (Date 02.06.2016)
<b>Hazen unit</b>	<2
<b>Turbidity</b>	0.59
<b>pH</b>	6.7
<b>TDS mg/l</b>	213
<b>Ca</b>	43
<b>Cl</b>	52
<b>Fluorides</b>	0.27
<b>Fe</b>	0.23
<b>Mg</b>	4.8
<b>NO<sub>3</sub></b>	5.1
<b>SO<sub>2</sub></b>	46
<b>Total alkalinity CaCO<sub>3</sub></b>	78
<b>Total Hardness</b>	96
<b>Total Colliform</b>	Nil

(Ref: Appendix-1)

**Table-8. Quality of Surface Water at the site during July- December, 2016**

Parameters	Units	Dibrugarh DTP Dyke, Test 15.11.2016	Palasbari Apron (Upstream) (Test- 15.06.2016)	Palasbari Apron (Downstream) (15.06.16)
<b>pH</b>		6.9	6.9	8.1
<b>Temperature</b>	°C		26	26.5
<b>Dissolved Oxygen</b>	mg/l	5.1	8.7	5.5
<b>Biological Oxygen Demand</b>	mg/l	4	4.2	6.2
<b>Chemical oxygen Demand</b>	mg/l	31	43.6	78.4
<b>Total suspended solid</b>	mg/l	81	355.8	329.7
<b>Total dissolved solid</b>	mg/l	342	178.5	256.8
<b>Oil and Grease</b>	mg/l	<0.05	0.5	1.2

(Ref: Appendix-1)

**Table-9. Quality of Noise at the site during June- December, 2016**

Parameter	Dibrugarh- Porcupine Lot IV (Site-1) (test-June 2016)	Day Time (dB-A)	Night Time (dB-A)
<b>Noise levels on dB (A) scale</b>	Day-1	67	43
	Day-2	69	41
	Day-3	61	45
	Day-4	48	44
<b>Noise levels on dB (A) scale</b>	DTP Dyke (test date 15.11.2016)	Day Time (dB-A)	Night Time (dB-A)
	Ch 0.07 km	63	45
	Ch 1.85 km	60	46
	Ch 5.3 km	58	42
	Ch 7.2 km	61	44
<b>Noise levels on dB (A) scale</b>	Palasbari Apron (Test 18.06.16)	Day Time (dB-A)	
	Palasbari Apron	48.2	
	Palasbari Apron Near DG set 15 KVA	67.4	

		Explanatory comments
Ambient Environment condition	<b>Good</b>	<ul style="list-style-type: none"> <li>For those site where the tests are being conducted, the results are within the</li> </ul>

		<p>prescribed limits of the Central Pollution Control Board, MoEF&amp;CC, GOI.</p> <ul style="list-style-type: none"> <li>• All the works are limited within daylight hours.</li> <li>• As the surface water at the working site contains grease and oils below the detectable level, it indicates that the contractor is following the environmental norms prescribed to reduce water pollution.</li> </ul>
--	--	--

#### 4.3.3. Assessment

**Table-10.Comparison of ambient Air, Surface water, Ground water and Noise at the site with the baseline data and National Standards.**

	Parameter	National Standard	Dibrugarh – Porcupine Lot IV (highest values taken)	Dibrugarh DTP (highest values taken)	Palasbari Apron	
<b>Air</b>	PM10	100 µg/m <sup>3</sup>	58.2	72.7	59.6	
	NO <sub>2</sub>	80 µg/m <sup>3</sup>	16.6	10.2	10.8	
	SO <sub>2</sub>	80 µg/m <sup>3</sup>	6.4	ND	6.2	
	Pb	1.00 µg/m <sup>3</sup>	ND	ND		
	CO		ND	ND		
	Weather		clear			
<b>Ground water</b>	pH	6.5-8.5	6.7			
	Mg		4.8			
	Total alkalinity CaCO <sub>3</sub>		78			
	Total Hardness		96			
	TDS (IS 10500)		213			
	NO <sub>3</sub>		5.1			
	SO <sub>2</sub>		46		Upstream	Downstream
<b>Surface water</b>	pH			6.9	6.9	8.1
	Dissolved Oxygen			5.1	8.7	5.5
	Biological Oxygen Demand			4	4.2	6.2
	Chemical oxygen Demand			31	43.6	78.4
	Total suspended solid			81	355.8	329.7
	Total dissolved solid			342	178.5	256.8
	Oil and Grease			<0.05	0.5	1.2
<b>Noise on dB (A) scale</b>		75 Industrial area in daytime	69 Day 45 Night	60.5 Day 44.25 Day (Avg. taken)		
		55 residential area in daytime			48.2 Day	

ND- Not detected

		Explanatory comments
Ambient Environment condition	<b>Good</b>	<ul style="list-style-type: none"> <li>Noise pollution was within the prescribed limit for Industrial areas under Dibrugarh</li> <li>Ground Water quality of the river bank in Dibrugarh was found within the limit.</li> <li>Air quality was within the prescribed standards of industrial area.</li> </ul>

## 5. Key Environmental Issues

### 5.1.1. Key Issues Identified

- Environmental Inspector was not recruited by the contractor on time, there was delay in initiation of the EMP works. But after training they were reporting monthly.
- Preparation of EMP, EMoP, monthly environmental Reports were later taken up by the contractors
- Documentation of environmental safeguards was still poor.
- Contractors usually do not go through the environment section of the contract document thoroughly.
- Contractors were not aware of the tests to be conducted to know the ambient air quality, surface water quality ground water quality and noise levels.
- Frequency of the tests for ambient environment were not at per EMoP. All the parameters prescribed in EMoP were not tested.
- Contractors were also not aware of the solid waste management at worksite, Use of vehicles with PUC, etc.
- Monitoring by SIO's improved on safeguard issues, still they must be trained on ADB's safeguard procedures

### 5.1.2. Action Taken

- Several meetings and training were organized (Table-3) to aware the contractors on the environmental safeguard of ADB (Strategy and directions), stipulations of the contract document, testing of selected environmental parameters, national environmental standards, acts and rules of MoEF&CC, GOI and Government of Assam.
- PMC and FREMAA helped in the preparation of EMP and EMoP,
- Assisted in preparation of monthly environmental Reports
- Check list prepared for the SIOs to check the environmental safeguards followed or not during preparation of the bills by the contractors.

### 5.1.3. Additional Action Required

- Constant monitoring and providing suggestions on the implementation of the EMP by FREMAA and PMC.
- Frequency of the tests to be maintained as per EMP submitted by the contractors
- Awareness on environmental safeguards – contractor, SIO and local residents / fringe communities

## 6. Conclusion

### 6.1. Overall Progress of implementation of Environmental Management Measures

		Explanatory comments
Overall Project implementation measures	<b>Good</b>	<ul style="list-style-type: none"> <li>• After the training the contractors become aware about the importance of the environmental safeguards. Monthly environmental report submitted to SIOs.</li> <li>• The contractors after few trainings developed perceptions on the National Acts and Rules and standards.</li> <li>• All contractors prepared the EMP and followed most of the EMP specifications.</li> <li>• Monthly environmental reporting on the implementation of EMP has started. Monthly Environmental Reports are submitted regularly to SIO.</li> <li>• They also developed few mitigation measures like spraying or water, covering the sand and soil with tarpaulin while transport. Solid waste management at camp sites</li> <li>• Drinking water facility at work site or camp site</li> </ul>

### 6.2. Problems Identified and Actions Recommended

#### Problems

- Awareness about the importance of environmental safeguards in the construction works, particularly in this part of India is very poor
- Local people have less knowledge on the environmental issues and environmental standards.
- Awareness of the people on lodging complaints of environmental pollution if any was not adequate.

- Officials of Water Resource Department do not practice the Environmental Safeguards for the projects of the State or Central Government of India, so they are not trained for such implementation of the EMP prescribed measures. Hence the implementation of the EMP were not as per the schedule including the frequency of the tests to be performed, and the parameters of the tests by the contractors. But at the later stages they were aware of the procedures of EMP.
- Documentation and reporting on environment safeguard were still to be improved. After repeated training and instructions from PMC and FREMAA , this section still required improvement.

### **Actions Recommended**

- Regular awareness Training on Environmental Safeguards required for the contractors
- Awareness required for the implementing officers on the ADB's safeguard policy statements
- Awareness and training required to incorporate basic ideas on current environmental safety issues and relate it with the development and economy.
- Use of special enclosures and critical grade silencers to be used to reduce the noise level during geo bag damping.

### **Appendix 1 Ambient Monitoring Results**(Scanned copy of the reports) Air Quality – Porcupine launching site

Ref. No. : ENV/CDEKA/AAQ/Jun/2016/01

Date : 11/06/2016

**M/s CHANDAN DEKA**  
Basistha Charali, Amrit Nagar  
Guwahati- 29  
Assam

### AMBIENT AIR QUALITY TEST RESULTS

Locations ↓	Date of Sampling	PM 2.5 ( $\mu\text{g}/\text{m}^3$ )	PM 10 ( $\mu\text{g}/\text{m}^3$ )	NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	CO ( $\text{mg}/\text{m}^3$ )
Limits →	--	60	100	80	80	4.0 (1 hr. limit)
A1	02.06.2016	19.8	49.8	14.2	6.2	ND
A2	03.06.2016	22.6	52.6	16.6	6.4	ND
A3	06.06.2016	27.9	58.2	10.3	<1.0	ND
A4	07.06.2016	25.3	54.7	9.4	<1.0	ND

#### Location Codes:

A1: Near Office Area, Chota Hapjan, Tinsukia  
A2: Near Material Store, Chota Hapjan, Tinsukia  
A3: Gogitolia, Rohmorla, Dibrugarh  
A4: Oakland, Rohmorla, Dibrugarh

ND: Not Detected

Checked By: Pankaj Baroi, ENVIROCON

**NOTE:**

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

**Air Quality- Porcupine manufacturing site**

### AMBIENT AIR QUALITY TEST RESULTS

Report Ref. No.: ENV/CON/CB/TSK/AAQ/MAY/2016/01			Date: 10.05.2016
NAME & ADDRESS OF UNIT/INDUSTRY	M/s CONCRETECH Near Gurukul School No.2 Chotta Hapjan, NH-37 P.O: Tinsukia District: Tinsukia, Assam	Proprietor	Mr. Gurujit Bharadwaj
		Industry Type	Cement Block Manufacturing Industries

Sample ID: CON/CB/AAQ/MAY/2016/0405/01						
Sampling Location: Near Office Area				Instrument Used: PM 2.5 & PM 10 Combo Sampler Make : ECOTECH, Delhi		
Parameters	Date Of Sampling	Weather Conditions	Sampling Durations (Hrs)	Analysis Results ( $\mu\text{g}/\text{m}^3$ )	Analysis Method	Limit (As Per NAAQS) ( $\mu\text{g}/\text{m}^3$ )
PM 10	04.05.2016	Clear	24	40.2	Gravimetric	100

Sample ID: CON/CB/AAQ/MAY/2016/0405/02						
Sampling Location: Near Material Store				Instrument Used: PM 2.5 & PM 10 Combo Sampler Make : ECOTECH, Delhi		
Parameters	Date Of Sampling	Weather Conditions	Sampling Durations (Hrs)	Analysis Results ( $\mu\text{g}/\text{m}^3$ )	Analysis Method	Limit (As Per NAAQS) ( $\mu\text{g}/\text{m}^3$ )
PM 10	04.05.2016	Clear	24	32.9	Gravimetric	100



Verified By: Pankaj Baroi, ENVIROCON

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## Air Quality- DTP Dyke

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Website: www.envirocon.net.in

Report No. : ENV/JKM/DBR/Nov/AAQ/01/2016

Date : 21.11.2016

### JUGAL KISHORE MAHANTA

Usha Court  
R. G. B Road, Guwahati-21  
Assam

### AMBIENT AIR QUALITY TEST RESULTS

LOCATION ↓	Date of Sampling	PM 2.5 (µg/m³)	PM 10 (µg/m³)	NO <sub>2</sub> (µg/m³)	SO <sub>2</sub> (µg/m³)	CO (mg/m³)	Lead (µg/m³)
LIMITS →	--	60	100	80	80	4.0 (1 hr. limit)	1.0
A1	15.11.2016	24.9	72.7	9.3	ND	ND	ND
A2	15.11.2016	22.6	66.4	10.2	ND	ND	ND

ND: Not Detected

Analysis Protocol: IS 5182

#### Location Code:

A 1: At Chainage 5000 (Opp. Municipality Office)

A2: At Chainage 5300 (Opp. SP Office)



Checked By: Mr. Pankaj Baroi, ENVIROCON

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## Air Quality- Palasbari

Recognized by Pollution Control Board, Assam & MSME

### AMBIENT AIR ANALYSIS REPORT

Rep.No. 160618\_1409037\_01\_1301

Date: 18/06/16

#### Name & Address:

M/s. Brahmaputra Infrastructure Ltd.  
Palasbari, (Brahmaputra River Under  
Water Works), Vill: Sadilapur,  
Dist: Kamrup, Assam.

SL. NO.	DATE OF SAMPLING	LOCATION/SOURCE	WEATHER	PARAMETERS			
				PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>x</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )
i)	15/06/16	Palasbari, CH. No. - 1200	Clear	59.6	31.9	10.8	6.2

Remarks: - Parameters are within the permissible limit.

#### NATIONAL AMBIENT AIR QUALITY STANDARDS:

SL.No	Pollutant	Time Weighted Average	Concentration in Ambient Air	
			Industrial, Residential, Rural and Other Area	
1	Sulphur Dioxide (SO <sub>2</sub> ), $\mu\text{g}/\text{m}^3$	24 hours	80	
2	Nitrogen Dioxide (NO <sub>x</sub> ), $\mu\text{g}/\text{m}^3$	24 hours	100	
3	Particulate Matter (PM <sub>10</sub> ), $\mu\text{g}/\text{m}^3$	24 hours	60	
4	Particulate Matter (PM <sub>2.5</sub> ), $\mu\text{g}/\text{m}^3$	24 hours		

Envision Enviro Technologies North East, Guwahati

(Quality control Manager)

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## Quality of Noise- Dibrugarh Sub Project



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Ref. No. : ENV/CDEKA/NLM/Jun/2016/02

Date : 11/06/2016

M/s CHANDAN DEKA  
Basistha Charali, Amrit Nagar  
Guwahati, Assam

### NOISE LEVEL MEASUREMENT RESULTS

Locations	Date Of Measurement	Day Time			Night Time		
		Maximum (dB-A)	Minimum (dB-A)	Leq (dB-A)	Maximum (dB-A)	Minimum (dB-A)	Leq (dB-A)
A1	02.06.2016	69	62	67	48	39	43
A2	02.06.2016	71	67	69	46	36	41
A3	06.06.2016	66	54	61	49	39	45
A4	07.06.2016	62	50	57	48	37	44

**Location Codes:**

- A1: Near Office Area, Chota Hapjan, Tinsukia
- A2: Near Material Store, Chota Hapjan, Tinsukia
- A3: Gogitolia, Rohmorla, Dibrugarh
- A4: Oakland, Rohmorla, Dibrugarh

Checked By: Pankaj Baroi, ENVIROCON

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Report No. : ENV/JKM/DBR/Nov/NLM/01/2016

Date : 21.11.2016

### JUGAL KISHORE MAHANTA

Usha Court  
R. G. B Road, Guwahati-21  
Assam

## NOISE LEVEL MEASUREMENT RESULTS

Noise Levels in dB (A) during day time & Night time in a normal day Measured on 15.11.2016

Sl. No.	Location	Day Time			Night Time		
		Maximum (dB-A)	Minimum (dB-A)	L <sub>eq</sub> (dB-A)	Maximum (dB-A)	Minimum (dB-A)	L <sub>eq</sub> (dB-A)
1	Site Camp Ch 0.07 Km	68	58	63	51	38	45
2	Near Camp House at Ch 1.85 km	64	53	60	49	35	46
3	Near Camp House at Ch 5.3 km	63	52	58	48	37	42
4	Site Camp Ch 7.2 km	65	56	61	52	41	44



Checked By: Mr. Pankaj Baroi, ENVIROCON

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## Quality of Noise- Palasbari Sub Project

Recognized by Pollution Control Board, Assam

### AMBIENT NOISE LEVEL MEASUREMENT REPORT

Rep.No. 160618\_1409037\_06A\_1303

Date: 18/06/2016

#### Name & Address:

M/s. Brahmaputra Infrastructure Ltd.  
Palasbari, (Brahmaputra River Under  
Water Works), Vill: sadilapur,  
Dist: Kamrup, Assam.

SL. NO.	DATE OF SAMPLING	LOCATION /SOURCE	NOISE LEVEL in dB(A)Leq
i)	15/06/16	Palasbari, CH.No. - 1200	48.2

Remarks: Noise level is carried out during day time.

#### 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

Envision Enviro Technologies North East, Guwahati

(Quality Control Manager)

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

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## Noise level near DG set- Palasbari reach

Recognized by Pollution Control Board, Assam & MSME

### D.G. NOISE LEVEL MEASUREMENT REPORT

Rep.No. 160618\_1409037\_06A\_1302

Date: 18/06/16

#### Name & Address:

M/s. Brahmaputra Infrastructure Ltd.  
Palasbari, (Brahmaputra River Under  
Water Works), Vill: Sadilapur,  
Dist: Kamrup, Assam.

SL. NO.	DATE OF SAMPLING	LOCATION / SOURCE	NOISE LEVEL in dB(A)Leq
i)	15/06/16	DG set - 15 KVA	67.4

Remarks: Noise level is carried out during day time at a distance 1 metre from the enclosure surface.

#### DG Set Noise Standards:

Noise limit viz. 75 dB(A) at 1m distance.

Envision Enviro Technologies North East, Guwahati



(Quality Control Manager)

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## Quality of Ground Water :



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Ref. No. : ENV/CDEKA/GW/un/2016/03

Date : 11/06/2016

**M/s CHANDAN DEKA**  
Basistha Charali, Amrit Nagar  
Guwahati, Assam

### GROUND WATER ANALYSIS RESULTS

Sample Ref. No. : CDEKA/GW/un/2016/0206      Collected by : Jointly by Envirocon representative & Client  
Sample Type : Ground Water      Collected On : 02.06.2016  
Sample Source : Bore-well of Chota Hapjan, Tinsukia      Analysis Protocol : IS 3025

Sl. No.	Parameters	Results	Desirable Limit (IS: 10500)
1.	Colour, Hazen Units, Max	<2	5
2.	Odour	Odourless	Agreeable
3.	Taste	Acceptable	Agreeable
4.	Turbidity, NTU, Max	0.59	10
5.	pH	6.7	6.5 - 8.5
6.	Total Dissolved Solids, mg/l, Max	213	500
7.	Calcium (as Ca), mg/l, Max	43	75
8.	Chloride (as Cl), mg/l, Max	52	250
9.	Copper (as Cu), mg/l, Max	ND	0.05
10.	Fluorides (as F), mg/l, Max	0.27	1.0
11.	Free Residual Chlorine, mg/l, Min	ND	0.2
12.	Iron (as Fe), mg/l, Max	0.23	0.3
13.	Magnesium (as Mg), mg/l, Max	4.8	30
14.	Zinc (as Zn), mg/l, Max	ND	5.0
15.	Nitrate (as NO <sub>3</sub> ), mg/l, Max	5.1	45
16.	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	ND	0.001
17.	Sulfate (as SO <sub>4</sub> ), mg/l, Max	46	200
18.	Total Alkalinity (as CaCO <sub>3</sub> ), mg/l, Max	70	200
19.	Total Hardness, (as CaCO <sub>3</sub> ), mg/l, Max	96	200
20.	Lead (as Pb), mg/l, Max	ND	0.01
21.	Total Arsenic (as As), mg/l, Max	ND	0.01
22.	Total Coliforms/ 100 ml	NIL	10 Max
25.	E. Coli / 100 ml	NIL	Absent

ND: Not Detected

*Pankaj Baroi*  
  
Checked By: Pankaj Baroi, ENVIROCON

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

## Quality of Surface Water : Dibrugarh sub project



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Report No. : ENV/JKM/DBR/Nov/SW/01/2016

Date : 21.11.2016

**JUGAL KISHORE MAHANTA**

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### SURFACE WATER ANALYSIS RESULTS

Sample Type : Surface Water  
Sample Source : Sample Collected from Brahmaputra River (Dibrugarh Town Protection (DTP) DYKE Site)  
Collected By : Jointly by Client & Envirocon Representative  
Collected On : 15.11.2016  
Sample Received on : 15.11.2016

Sl. No.	Parameters	Units	Results
1	pH	--	6.9
2	Dissolved Oxygen	mg/l	5.1
3	Bio-chemical Oxygen Demand	mg/l	4
4	Chemical Oxygen Demand	mg/l	31
5	Total Suspended Solids	mg/l	81
6	Total Dissolved Solids	mg/l	342
7	Oil & Grease	mg/l	<0.05



Checked By: Mr. Pankaj Baroi, **ENVIROCON**

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## Quality of Surface water – Palasbari Sub project (Upstream)

Enviro Technologies North East

Recognized by Pollution Control Board, Assam.

### WATER ANALYSIS REPORT

Rep.No: 160623\_14080099\_0

Date: 23/06/16

Name & Address of Client	M/s. Brahmaputra Infrastructure Ltd, Palashbari, (Brahmaputra River Under Water Works), Vill-Sadilapur, Dist-Kamrup, Assam
Sample Description	Water collected from the Brahmaputra River upstream of Palashbari
Date of Sampling	15/06/16
Sample collected by	M/s. En-vision Enviro Technologies North East

SN	Parameters	Unit	Result	Method	Desirable limit
1	pH	--	6.9	Potentiometric	6.5-8.5
2	Temperature	°C	26	Thermometer	---
3	TDS	mg/L	178.5	Dried at 105°C	500
4	DO	mg/L	8.7	Azide Modification	---
5	BOD	mg/L	4.2	3 days Incubation at 27°C	---
6	COD	mg/L	43.6	Dichromate Reflux	---
7	TSS	mg/L	355.8	Gravimetric	---
8	Oil & Grease	mg/L	0.5	Gravimetric	---

NOTE: TSS Total Suspended Solids, BOD Biochemical Oxygen Demand, COD Chemical Oxygen Demand, DO Dissolved Oxygen, TDS Total Dissolved Solids

The desirable limits are for drinking water only as per IS 10500:2012(Second revision).

For En-vision Enviro Technologies North East, Guwahati



(Quality Control Manager)

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

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Phone : +91 8811096201 ♦ e-mail : [envisionghy@gmail.com](mailto:envisionghy@gmail.com) ♦ visit us at : [www.en-vision.in](http://www.en-vision.in)

## Quality of Surface water – Palasbari Sub project (Down stream)

Enviro Technologies North East

Technology North East

Recognized by Pollution Control Board, Assam.

### WATER ANALYSIS REPORT

Rep.No: 160623\_14080099\_0

Date: 23/06/16

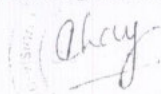
<b>Name &amp; Address of Client</b>	M/s. Brahmaputra Infrastructure Ltd, Palashbari, (Brahmaputra River Under Water Works), Vill-Sadilapur, Dist-Kamrup, Assam
<b>Sample Description</b>	Water collected from the Brahmaputra River downstream of Palashbari
<b>Date of Sampling</b>	15/06/16
<b>Sample collected by</b>	M/s. En-vision Enviro Technologies North East

SN	Parameters	Unit	Result	Method	Desirable limit
1	p <sup>H</sup>	--	8.1	Potentiometric	6.5-8.5
2	Temperature	°C	26.5	Thermometer	---
3	TDS	mg/L	256.8	Dried at 105°C	500
4	DO	mg/L	5.5	Azide Modification	---
5	BOD	mg/L	6.2	3 days Incubation at 27°C	---
6	COD	mg/L	78.4	Dichromate Reflux	---
7	TSS	mg/L	329.7	Gravimetric	---
8	Oil & Grease	mg/L	1.2	Gravimetric	---

NOTE: TSS Total Suspended Solids, BOD Biochemical Oxygen Demand, COD Chemical Oxygen Demand, DO Dissolved Oxygen, TDS Total Dissolved Solids

**The desirable limits are for drinking water only as per IS 10500:2012(Second revision).**

**For En-vision Enviro Technologies North East, Guwahati**





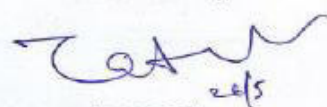
(Quality Control Manager)

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

Phone : +91 8811096201 ♦ e-mail : [envislonghy@gmail.com](mailto:envislonghy@gmail.com) ♦ visit us at : [www.en-vision.in](http://www.en-vision.in)

**Consent to Operate from Pollution Control Board, Assam : Porcupine Manufacturing plant**

<b>POLLUTION CONTROL BOARD, ASSAM</b>	
 PCBA	(Department of Environment & Forest:: Government of Assam) Regional Office- Dibrugarh, P.O & Dist- Dibrugarh. Phone No-0373-2325527 E-mail- <a href="mailto:apcbdibrugarh@gmail.com">apcbdibrugarh@gmail.com</a>
	
NO:RO/DBR/T-3793/11-12/63	Dated Dib, the 26 <sup>th</sup> May,,2016
To <span style="float: right;">347</span>	
M/S. Concrettech, P.O. Makum Jn., Dist:Tinsukia, Assam.	
Sub:-"Consent to Operate" for the period up to 31 <sup>st</sup> March,2017 under <del>Water (Prevention &amp; Control of- Pollution)Act,1974 &amp; Air(Prevention &amp; Control of Pollution)Act,1981.</del>	
Dear Sir,	
With reference to your application in the name and style as mentioned above, the Board is pleased to grant the"Consent to Operate" under the <del>Water Act/Air Act</del> for the period up to 31 <sup>st</sup> ,March,2017 from the date of issue of this letter under the terms and conditions as per <b>Appendix-A.</b>	
You are also requested to apply for "Consent to Operate" for the year 2017-2018 in two months in advance before the date of expiry of the consent validity period.	
	Yours faithfully,  (Z.AHMED) REGIONAL EXECUTIVE ENGINEER Dated Dib, the 26 <sup>th</sup> May, 2016
MEMO:NO:RO/DBR/ T-3793/11-12/63-A	
Copy to: 1. The Member Secretary, Pollution Control Board,Assam,Ghy-21 for favour of information. 2. The Dy.Commissioner,Dibrugarh/Tinsukia/Dhemaji for favour of information.	
	2 (Z.AHMED) REGIONAL EXECUTIVE ENGINEER DIBRUGARH
<hr/> Head Office:Bamunimaidam, Guwahati-781021,Assam:India. Phone:2652774& 2550258;Fax :0361-2550259; Gram:POLLUTION CONTROL E-mail:membersecretary@pcbassam.org;Website:www.pcbassam.org Regional Offices at:Dibrugarh,Golaghat,Sibsagar,Nawgaon,Tezpur,Guwahati,Bongaigaon& Silchar.	



## **Appendix 2: Monthly Environmental Report (Sample copy)**

<b>Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program</b>	
Tranche 1	Sub Project : Dibrugarh , DTP DYKE
Contractor: Jugal Kishore Mahanta	Project No:
Date of Agreement : 18 /10/ 2013	Contract Period : 18 Month
Target Date of Completion : -----	Extended upto:
Name of the Environmental Inspector : RupjyotiGoswami	Month and Year : December , 2016 .

### **Monthly Environmental Report**

SL		Status	Remarks
<b>1</b>	<b>Environment</b>		
<b>1.1</b>	<b>Sources of Materials</b>		
1.1.a	Use quarry sites and sources permitted by Government	Yes.	Environmental clearance from Contingent Authority (SEIAA) (Submitted with Monthly Environmental Report, Letter no :JKM/RSR_DTP/2013-14/23)
1.1.b	Verify suitability and approval by SIO	Yes.	After joint verification with the Revenue circle office, Dib., District Forest office, Dib. And WR Division, Dib, the Borrow Pit sites are used. Copy of NOC for excavations of soil is submitted. (Monthly Environmental Report, Letter no :JKM/RSR_DTP/2013-14/23)
1.1.c	Submission of monthly documentation of all material sources.	Yes.	
<b>1.2</b>	<b>Air</b>		
1.2.a	Spray water on dry surface to reduce dust in air.	Yes.	
1.2.b	Use tarpaulins to cover sand and other loose materials where transported by vehicles.	Yes.	
1.2.c	Clean wheels and undercarriage of vehicles while leaving the site.	Yes.	
1.2.d	Certificates on Vehicular Emission of all the vehicles used in the site.	Yes.	PUC of vehicle submitted.
1.2.e	Checked air quality by PBC approved Lab.	Yes.	Copy of Test Report enclosed.
<b>1.3</b>	<b>Noise</b>		
1.3.a	Plan activities in consultation with SIO, community to reduce noise level.	Yes.	We try to minimize the noise level by using silencers.
1.3.b	Provide information to public about work schedule.	Yes.	
1.3.c	Horns not used, unless essential.	Yes.	
1.3.d	Minimize the noise by silencers.	Yes.	

1.3.f	Use of heavy vehicles from 01/12/2016 to 31/12/2016.	Yes.	05 no heavy vehicles like Dumper, JCB, Roller etc. are used in site this Month.
1.3.g	Use of Generators KV _____ from _____ to _____	----	No use of generator.
1.3.h	Checked Noise level by PBC approved lab.	Yes.	Copy of Test Report enclosed.
<b>1.4</b>	<b>Surface water quality</b>		
1.4.a	Avoid stockpiling of earth fill, especially during monsoon unless covered by tarpaulin or plastic sheets.	Yes.	Yes.
1.4.b	Install temporary silt traps or sedimentation basins along the drainage leading to water bodies.	Yes.	Yes.
1.4.c	Store fuel and lubricants away from the drains.	Yes.	
1.4.d	Checked surface water quality by PCB approved lab.	Yes.	Copy of Test Report enclosed.
<b>1.5</b>	<b>Land Use</b>		
1.5.a	Has the contractor preserved the top soil for replacement after construction?	No.	We use the top soil for leveling the low position of (country side) near embankment.
1.5.b	Status of the surface vegetation on the construction site prior to the initiation of the work (Detail report with number of trees cut and initial photographs of the area.	----	The trees falling on the chest and slope of the embankment are handed over to the forest Department.
1.5.c	Borrow pit – Rehabilitation of the borrow pit was done.	----	Borrow pit areas are private land. The owners of Land of borrow pit areas will use it for fishery purpose.
<b>1.6</b>	<b>Pollution</b>		
1.6.a	Spills of oils on the site and on river regularly checked.	Yes.	Copy of Register enclosed.
1.6.b	Necessary measures taken to stop it.	Yes.	Checked regularly.
1.6.c	What measures taken to remove the used engine oils?	----	Kept in storage(container with cover) place and send it to Contractor's special store room.
1.6.d	Surface discharges monitored.	Yes.	
<b>1.7</b>	<b>Disruption of Agricultural activities</b>		
1.7.a	Any agricultural activity in the flood embankment?	No.	No agricultural land is used for flood embankment. So it needs not any measures taken to minimize the impact on agricultural activity.
1.7.b	Any measures taken to minimize the impact on agricultural activity in the flood activity?	----	
1.7.c	Land used the flood embankment belongs to WRD or private.	----	
1.7.d	If private agricultural land is used proper compensation is made is made by the contractor at current market value.	----	
<b>2</b>	<b>Access routes (River)</b>		
2.a	Whether the Navigation routs are blocked?	----	Not Applicable
2.b	How interference with the riverine traffic is minimized?	----	Not Applicable



2.c	All the floating equipment's following navigation standards application in India.	-----	Not Applicable
2.d	All the floating equipment's following safety standards applicable in India.	-----	Not Applicable.
2.e	Any dredging operation done?	No.	
3	Road		
3.a	All the access roads inspected for their appropriateness for moving construction equipments.	Yes.	
3.b	If found inappropriate, strengthened by Contractor.	Yes.	
3.c	Due to the movement of the heavy vehicle, the access road is degraded more than normal use.	Yes.	Repaired the degraded access road regularly.
3.d	Contractor repaired the degraded access road.	Yes.	
3.e	Access road for the fringe community is used / blocked and alternate route provided.	-----	Not arise situation.
3.f	Conduct the work during light traffic.	Yes.	
4	Excavation and filling of Earth in Slope Protection		
4.a	Whether the area has been surveyed, inspected and approved by the SIO after the identification of excavation and filling site.	Yes.	
4.b	Whether the contractor has submitted a map indicating the area of earth excavation and filling activities showing the earth cut and fill areas, based on the baseline survey.	Yes.	Google map submitted. .(Monthly Environmental Report, Month- January Letter no :JKM/RSR_DTP/2013-14/23)
5	Sand Excavation		
5.a	Whether the sand excavation area was approved by the SIO in writing.	-----	Not Arise.
5.b	Whether contractor has submitted a map indicating the area of planned sand excavation.	-----	
5.c	Whether the sand excavation area is close to the work site or to char inhabitants.	-----	
6	Site Installations		
6.a	Protection of trees for their preservation.	Yes.	
6.b	Whether temporary roads were constructed?	No	
6.c	Whether environmental friendly waste disposal system properly monitored and executed in the work sites ?	Yes.	
7	Labour Camps		
7.a	Consult SIO and fringe community for establishing the temporary office shed, camp and plant.	Yes.	Most of the work done by Machinery and we use very small number of Labor in the worksite and they are Local so no Labor camp is required in the site.
7.b	Minimize the removal of vegetation and do not allow cutting of trees.	Yes.	

7.c	Provide safe drinking water to the camp inhabitants.	Yes.	
7.d	Sanitation facility to the camp inhabitants.	Yes.	
7.e	Solid waste management practiced in the camps.	Yes.	
7.f	Report SIO and fringe community before vacating the camp after the work.	-----	Not Arise.
<b>8</b>	<b>Agricultural Land and Crop Loss</b>		
8.a	Any loss or damage of agricultural land and crops due to project construction activities.	-----	Not Arise.
<b>9</b>	<b>Homestead Loss</b>		
9.a	Any home stead loss (including loss of trees, ponds, shifting of any other installations)	-----	Trees uprooted by Forest Department.
<b>10</b>	<b>Drainage from Adjacent Area</b>		
10.a	Natural drainage system blocked or disrupted.	No.	
<b>11</b>	<b>Wildlife</b>		
11.a	Sighting of Dolphin (National Aquatic Animal)	No.	
<b>12</b>	<b>Fish productivity</b>		
12.a	Fish productivity increased or decreased ( survey in the boat ghats)	----	Not affect any fish productivity.
12.b	Landing facility – Change of Boat Ghats	No	
<b>13</b>	<b>Display Materials</b>		
13.a	Sings like “ Only Staff ”, “Restricted Area ” displayed in relevant area.	Yes.	
13.b	Safety (including traffic sings) , notice board is available.	Yes.	
<b>14</b>	<b>Health and Safety</b>		
14.a	Provision of First Aid and medical service available.	Yes.	Enclosed copy of Medical service available
Provide GPS coordinates for most of the descriptions so that map can be prepared.			
<b>15</b>	<b>Additional comments or actions required:</b>		
Signature by Environmental Inspector <i>Rupiyoti Goswami</i> Environment Inspector For Jugal Kishore Mahanta Date: 08/01/2017 Contact Details: 9864897283		Accepted / Approved by SIO   Date: Contact Details:	

**Name of Work:** Raising, strengthening & up gradation and construction of Road Works for Dibrugarh  
Town Protection (DTP) Dyke along the Brahmaputra River in Dibrugarh.

**Name of Contractor:** Jugal Kishore Mahanta.

SUB: List of Vehicles with PUC (December ,2016)

Registration No, Vehicle type	Date of Registration	Date of Issue of last PUC	Due date	Remarks
Dumper AS01BC 9701	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9702	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9705	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9707	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9708	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9709	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9710	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9711	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9712	01-10-2009	17-08-2016	16-02-2017	
Dumper AS01BC 9713	01-10-2009	17-08-2016	16-02-2017	
Water Tanker AS23D 2501	29-09-2004	17-08-2016	16-02-2017	
Water Tanker AS23D 2503	29-09-2004	17-08-2016	16-02-2017	
Excavator AS23AC 5192	10-03-2011	17-08-2016	16-02-2017	
Excavator AS23AC 5193	10-03-2011	17-08-2016	16-02-2017	
Excavator AS23AC 5194	10-03-2011	17-08-2016	16-02-2017	
Excavator AS23AC 5195	10-03-2011	17-08-2016	16-02-2017	

*R. Goswami*  
Environment Inspector  
For Jugal Kishore Mahanta



**Name of Work:**Raising, strengthening & up gradation and construction of Road Works for Dibrugarh Town Protection (DTP) Dyke along the Brahmaputra River in Dibrugarh.

**Name of Contractor:** Jugal Kishore Mahanta

1. Environmental Inspector
2. Safety officer

Month and Year: December, 2016

Date		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Sign. Env. Inspector	At Site	At Site																														
	At office	At office																														
Sign. Safety Officer	At Site	At Site																														
	At office	At office																														
Environmental Inspector		At site(days)		At office(days)		Leave(days)		Holidays		Total(days)																						
Safety Officer		31		—		—		—		31																						

Amitabh Hazarika

Signature of Project Manager,

Name of Work:

Raising, strengthening & up gradation and construction of Road Works for Dibrugarh Town Protection (DTP) Dyke along the Brahmaputra River in Dibrugarh.

Name of Contractor:

Jugal Kishore Mahanta

Register for Leakage of fuel ,lubricants and Grease

Month and Year : December, 2016

Date Vehicle	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ROLLER 10 Ton	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AS23AC 5194 EXCAVATOR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AS23AC 5195 EXCAVATOR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Signature Environmental Inspector	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

*Amitabh Hazarika*

Signature of Project Manager

Name of Work:

Raising, strengthening & up gradation and construction of Road Works for Dibrugarh Town Protection (DTP) Dyke along the Brahmaputra River in Dibrugarh.

Name of Contractor:

Jugal Kishore Mahanta

Register for Leakage of fuel ,lubricants and Grease

Month and Year :December , 2016

Date Vehicle	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
AS01BC 9710 DUMPER	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AS01BC 9711 DUMPER	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AS01BC 9712 DUMPER	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AS01BC 9713 DUMPER	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AS23D 2503 WATER TANKER	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Signature Environmental Inspector	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

*Aritabha Hazarika*

Signature of Project Manager

**Name of Work:** Raising, strengthening & up gradation and construction of Road Works for Dibrugarh Town Protection (DTP) Dyke along the Brahmaputra River in Dibrugarh.

**Name of Contractor:** Jugal Kishore Mahanta.

**Water sprinkling Register**

Month and Year : December, 2016

Date		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Working Days	Morning																															
	Evening	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Raining Day		<hr/>																														
No work		<hr/>																														
Signature Environment Inspector		[Signature]																														

*Anitab Hazarika*

Signature of Project Manager



A REPORT ON

**Ambient Air Quality, Surface / Ground Water & Noise Level**

at

Up gradation & Construction of Road Works for Dibrugarh Town Protection (DTP) DYKE along the Brahmaputra River, Dibrugarh

Contractor

**JUGAL KISHORE MAHANTA**

Usha Court

R.G. B Road, Guwahati-21

Assam

Name of Work

Raising, Strengthening, Up Gradation & Construction of Road Works for Dibrugarh Town Protection (DTP) DYKE

(November - 2016)

Report Prepared By

**ENVIROCON**

Digboi Stores Building, AOD New Market

Digboi, Assam

**All Test reports attached above in reports section**

**Appendix 3:Environmental Safeguard Report submitted by contractor of  
Porcupine Lot IV under Dibrugarh Subproject**

## Report on Environmental Safeguard

**Fabrication and supply of pre stressed concrete porcupines at  
Oakland area for use in establishment of anti erosion measures in  
critical sections of the river Brahmaputra in Dibrugarh district.**

**Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program  
Dibrugarh Sub Project**

Contract Agreement No **AFRERM(P)/PROJ/23-2010/Pt-IV/13**  
dated Guwahati, 16<sup>th</sup> May, 2014.

September, 2016



**-: Prepared By :-**

Chandan Deka  
H/No-14, Amrit Nagar, Basistha Chariali, Ghy-781029  
Mobile No- 9435103043

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## Contents

### CHAPTERS

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## **1. Environmental Safeguard**

### **ADB's Safeguard Policy Statement, 2009**

The goal of the ADB's Safeguard Policy Statement (SPS) is to promote the environmental and social sustainability by protecting people and their environment from potential adverse impacts and enhancing the benefits provided.

The SPS requirements are, good environmental assessment and management enabling the continued improvement of environmental performance throughout the life of a project, leading to enhanced economic, financial, and social outcomes.

#### **Safeguard Requirements.**

Safeguard policies involve a structured process of impact assessment, planning, and mitigation to address the adverse effects of projects throughout the project cycle. The safeguard policies require that (i) impacts are identified and assessed early in the project cycle; (ii) plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented; and (iii) affected people are informed and consulted during project preparation and implementation. The policies apply to all ADB-financed projects, including private sector operations, and to all project components.

### **Environment Safeguards under this project**

Facility Administrative Manual of FREMAA states that 'for each of the three subprojects included in the Investment Program, EIA was carried out, along with the summary EIA (SEIA). The EIAs cover the impacts of both tranches in the three subprojects. Under each Project, systematic monitoring will be carried out in accordance with the environmental management plan (EMP) and environmental monitoring plan as specified in the EIAs. Mitigation measures will be provided in case any unexpected effects caused by the subprojects are observed.'

### ***ADB's Environmental Categorization***

The project was initially considered as environmental category A by ADB. With the structural works focusing on the sustaining the functions of the existing flood embankment systems through renovation of deteriorated embankments, provision of inner secondary embankment and sluice gates, and provision of riverbank protection works, the EIA indicated that the subproject does not have significant adverse environmental impacts that are sensitive, diverse, or unprecedented, and affect an area broader than the sites or facilities subject to physical works.

## **National Acts and Rules :**

### **GOI Legislative Acts**

The Constitution of India directs the State protect and improve the environment and to safeguard the forest and wildlife of the country.

Article 51(g) of the constitution states: “*it shall be the duty of every citizen of India to protect and improve the national environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.*”

In addition to the Constitutional provisions, India has established a comprehensive set of laws for the management and protection of the environment. The Acts, Notifications, Rules and Amendments applicable to any type of development project include the following:

- Water (Prevention and Control of Pollution) Act, and Rules, 1974, 1975
- Air (Prevention and Control of Pollution) Act, Rules and Amendment, 1981, 1982, 1983, 1987
- Environment (Protection) Act of 1986 provides umbrella legislation for protection of the environment, with responsibility jointly entrusted to MOEF and the State Pollution Control Board, coordinated by the CPCB.
- Environmental Impact Assessment Act of 1994,
- The New Environmental Impact Assessment (EIA) Notification, 2006 for Prior Environmental Clearance
- The Biological Diversity Act. 2002
- Wildlife Protection Act of 1972, 1982, 1986, 1991, 1993, 2002, 2006, 2013.
- Forest (Conservation) Act, 1980
- The Environmental Standards Notification, 1993, 1996
- The Hazardous Waste Management and Handling Rules, 1989 and amendment rules 2000
- The Noise Pollution (Regulation and Control) Rules, 2000, 2002
- The Municipal Solid Wastes (Management and Handling) Rules 2000, 2002

### **Regulatory Requirements of the Government of India and Assam State**

The Government of India has framed various laws and regulation for protection and conservation of natural environment. These legislations with applicability to this project are summarized below. Only the Air and Water Acts are applicable to the IFRERM-Assam Dibrugarh subproject.

Legislation	Key Requirement	Applica bility	Remark	Granting Agency	Reporting Requirement	Monitoring Agency
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Air (prevention and control of pollution) Act, 1972 and rules there under	An Act to prevent and control of Air Pollution	Applicable	Applicable during construction stage for the operation of air polluting units	SPCB	Normally compliance monitoring report is to be submitted once in a year or as indicated in the consent letter	SPCB
Water (prevention and control of pollution) Act, 1972 and rules there under	An Act to Prevent and Control of Water Pollution	Applicable	Applicable during construction stage for discharge of waste from construction camps or maintenance of construction equipment	-do-	-do-	-do-
Environmental (Protection) Act, 1986 and rules there under including EIA Notification, 2006.	Requires prior environmental clearance for all River Valley projects for 25 MW hydroelectric power generation and 10,000 ha. of culturable command area	Not Applicable	The proposed project includes only activity related to existing river bank and embankment protection. No hydro power generation or new canal project having large culturable command area.	MoEF/ SEIAA	Once in six months	Regional Office of MoEF
Forest (conservation) Act, 1980 and rules there under	Restriction on the dereservation of forests or use of forest land for non-forest purpose	Not Applicable <sup>8</sup>	No diversion of forests land in the whole stretch	MoEF/ State Forest Department	Once in six months	Regional Office of MoEF/ State Forest Department
Wildlife (protection) Act, 2002 and rules there under	No person shall destroy, exploit or remove any wild life including forest produce from a sanctuary/National park or destroy or damage or divert the habitat of any wild animal by any act whatsoever or divert, stop or enhance the flow of water into or outside the sanctuary, except under and in accordance with a permit granted by the Chief Wild Life Warden	Not Applicable	No wild life sanctuary/ National Park exist in the project area.	Chief Wildlife Warden	As per the consent letter	Concerned protected area office/ Chief Wildlife Warden

## 2. Contract Stipulation

The contractor should have an approved Environmental Management Plan, which eventually contains environmental monitoring plan (Clause 63 of Section 7 GCC and clause 63.1 of Section 8 PCC) as per contract document. Contract stipulates the following :

<b>Section</b>	<b>Contract Stipulations</b>
7 : General Condition of Contract Clause 63 Protection of Environment	<p>The contractor shall take all reasonable measures to protect the environment (both on and off the site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operation.</p> <p>The contractor shall ensure that emissions, surface discharges and effluent from the contractor's activities shall not exceed the values in the specification or prescribed by applicable laws.</p> <p>The contractor shall comply with all applicable national, provincial and local environmental laws and regulations.</p>
8 : Particular Conditions of Contract Clause 63.1	<p>The Contractor in compliance and in addition to those mentioned shall carry out all of the monitoring and mitigation measures set forth in the Environment Management Plan</p>

### **3. Environmental Monitoring**

## **Safeguards Monitoring.**

Monitoring and reporting for social safeguards are described in the resettlement framework and indigenous peoples development framework for the planning of future works, whereas the concerned resettlement plans provide the arrangement for implementation monitoring including third party external auditing. As to environmental safeguards, the EIAs and SIEA provides the monitoring arrangements for main infrastructure works.

As a part of the EMP, an environmental monitoring plan (EMOP) has also been prepared to cover the various components of the environment that may be affected by the Program, including hydrology and morphology, drainage, wildlife, fisheries, cropping pattern, soil erosion, tree plantation and survivability, air quality, water quality, and noise and vibration. The EMOP is subject to change depending on the analysis results obtained.

The aim of environmental monitoring during the construction and operation phases is to compare the monitored data against the baseline condition collected during the study period to assess the effectiveness of the mitigation measures and the protection of the ambient environment based on national standards.

A monitoring schedule has been drawn up based on the environmental components that may be affected during the construction and operation of the project. Since project is likely to have impact on various components of environment, a comprehensive monitoring plan covering wildlife, fisheries, cropping pattern, soil erosion, drainage congestion, tree plantation, air quality, noise and vibration are provided. Monitoring Plan has been separately suggested for construction phase and operation phase. Monitoring points have been selected based on the sensitivity of the location with respect to sensitive receptors.

These stipulations are based on the ADB's Safeguard Policy Statement's (SPS, 2009) goal, 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.

## **ENVIRONMENTAL MONITORING PLAN (EMOP)**

The aim of the Environmental Management Plan (EMP) is to ensure that the various adverse impacts associated with the project are properly mitigated; either by preventing the impacts or by mitigating those to reduce the effect to an acceptable level by adopting the most suitable techno-economic option. The EMP also ensures that the positive impacts are conserved and enhanced. So an Environmental Monitoring Plan (EMoP) was required. EMoP was prepared for entire subproject work under Dibrugarh reach, so all the activities were not followed as per schedule. But, important ones were followed under this package of the work, as per schedule and as per ADB's safeguard policy and Acts and Rules on Environment of Govt. of India.

<b>Environmental Component</b>	<b>Project stage</b>	<b>Parameter</b>	<b>Standards</b>	<b>Location</b>	<b>Duration / Frequency</b>
Terrestrial and aquatic fauna	Construction Stage	Surveillance Audit for status of fish species, their movement and breeding grounds	None specific	Near the identified spawning and breeding grounds along the reach	Prior to breeding season and during the breeding season (During construction stage)
	Operation Stage	Terrestrial and aquatic fauna status Benefit assessment of the support during the project as a whole	None Specific	Fish landing sites, breeding grounds and near the core zone of the embankment	First two years of construction
Fisheries	Construction Stage	Fish productivity,	None Specific	Flood plains, beels, rivers and ponds	Once in a year through out the construction phase
	Operation Stage	Fish productivity	None Specific	Flood plains, beels, rivers and ponds	Once in a year
Cropping Pattern	Construction and Operation Stage	Survey of existing cropping pattern and effect of change in cropping pattern in the impacted areas	None Specific	Construction areas, service areas, rehabilitation sites	Once during construction and once after six months of completion of project

<b>Environmental Component</b>	<b>Project stage</b>	<b>Parameter</b>	<b>Standards</b>	<b>Location</b>	<b>Duration / Frequency</b>
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Soil Erosion ( inland erosion ) and siltation	Construction Phase	Visual check for Soil erosion and siltation	--	River bank and River training Structure	After first precipitation
	Operation Phase	Study of Soil erosion and siltation	--	River Training Structure, Up stream and Down Stream of the reach	Once during operation of 1 <sup>st</sup> year
Drainage Congestion	Construction Phase	Visual check	--	Project benefit area	After one year of construction.
	Operation Phase	Visual check	--	Project benefit area	Once during operation of 1 <sup>st</sup> year
River Hydrology, Morphology and Sediment Transport	Construction Phase	Scientific techniques applicable to the monitoring of these components	-	Entire Sub-project area	Regular
	Operation Phase	Scientific techniques applicable to the monitoring of these components	-	Entire Sub-project area	Regular
Tree Plantation	Construction Phase	Surveillance monitoring of trees felling	As laid out in the detailed design for project	Entire stretch of the project reach	During site clearance in construction phase
	Operation Phase	Survival rate of trees success of re-	The survival rate should be at least 70% below	Entire stretch of the project reach	Every year for 3 years

**The following parameters were checked :**

<b>Environmental Component</b>	<b>Project stage</b>	<b>Parameter</b>	<b>Standards</b>	<b>Location</b>	<b>Duration / Frequency</b>
Air Quality	Construction Phase	SPM, RSPM, SO <sub>2</sub> , NO <sub>x</sub> , CO, Pb	National Ambient Air Quality Standards	Within 100 m of Hot mix plant, construction camp, crusher and near sensitive locations/ settlement	Continuous 24-hourly, twice a week, for two weeks once every year (summer)
	Operation Phase	SPM, RSPM, SO <sub>2</sub> , NO <sub>x</sub> , CO, Pb	National Ambient Air Quality Standards	3 to 4 locations near the embankment sites	Continuous 24-hourly, twice a week, for one week, once in winter and Summer
Surface Water Quality	Construction Stage	pH, BOD, COD, TDS, TSS, DO, Oil and Grease	As per CPCB Water Quality Criteria	Brahmaputra River and wetlands/ ponds	Once during the dry season.
	Operation Phase	pH, BOD, COD, TDS, TSS, DO, Oil and Grease	As per CPCB Water Quality Criteria	Brahmaputra River and wetlands/ ponds	Once during the dry season.
Ground water and Drinking Water Quality	Construction Stage	pH, BOD, DO, total coliform, As, Cd, Mn and Ground Water levels	As per IS 10500:1991	Construction site, Rehabilitation site, service areas,	Once at the start of construction
	Operation Phase	pH, BOD, DO, total coliform, As, Cd, Mn and water levels	As per IS 10500:1991	Construction site, Rehabilitation site, service areas,	Once at the start of construction
Noise and Vibration	Construction Phase	Noise Level in dB (A)	As per National Standards for Noise	Near the construction sites and sensitive locations close to embankment	One day hourly measurement, once in six months
	Operation Phase	Noise Level in dB (A)	As per National Standards for Noise	Near the habitats close to embankment	One day hourly measurement at 3-4 locations once

## 4. Results



Results of the specific tests on the selected parameters, for Air Quality, noise, and ground water from Pollution Control Board approved labs provide some indicators to compare them with the baseline information and national permissible standards. The test results of the samples collected from the porcupine manufacturing plant and from the porcupine launching sites (sample collected on June, 2016), 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.

### **Test reports attached in the Appendix-1**

#### **A. Drinking water arrangement for the labour by the contractor at manufacturing unit.**



**B. Sanitary Toilet facility at the porcupine manufacturing site :**



**C. Safety of the labours :**



**D. Checking of oil spills from the boat engine :**





### **E. Medical Camps**

All together 1 health checkup camps were conducted in association with the local Govt. Hospitals. Doctor gave brief lecture on the following topics :

1. Basic of sanitation
2. About emergency contact numbers during emergency
3. AIDS awareness
4. Common STDs, etc.

### **F. Work execution**



**Test Carried out at Palasbari**

