

EXECUTIVE SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT-

Guwahati Gateway Ghat Ferry Terminal

Assam Inland Water Transport Project

July, 2021

1. Background

Government of Assam intends to upgrade the existing cross river ferry transport system in the state to modernize and transform the Inland Water Transport (IWT) sector with financial assistance from the World Bank. The phase-wise project development includes upgradation of ferry Infrastructure, last mile connectivity, fleet modernization, and institutional capacity development.

The Assam Inland Water Transport Project (AIWTP) has four components collectively intended to tackle the regulatory, operational and infrastructure challenges of the sector including one component supporting project management. These include the following:

1. Institutional, Regulatory and Safety Strengthening
2. Fleet Safety Improvements and Modernization
3. Improvement in Terminal Infrastructure
4. Project Management

The total cost of the project is estimated at US\$107 million, of which the IBRD financing is US\$85 million. The civil intervention works during project development may interface with various physical, social and biological components of the environment, i.e. water quality, aquatic and terrestrial flora and fauna, air quality, noise levels, soil, persons, cultural and historical monuments etc. All these anticipated environmental & social components may get affected due to development and operation of the terminals. An Environmental Impact Assessment (EIA) is therefore undertaken for the proposed development in accordance with the requirements in line with World Bank Operational Policies, World Bank EHS Guidelines for Ports, Harbours and Terminals, IFC General Guidelines for EHS, MoEF&CC EIA Guidelines for ports & harbours and as stipulated in the feasibility report of the project.

EIA for the project was undertaken by Arkitechno Consultants India Pvt. Limited. The EIA consultants prepared an EIA outline, proposed approach to the EIA, conducted the screening and scoping studies including stakeholders' consultation at the initial stages, baseline evaluation and impact assessment. The EIA report was subsequently reviewed by Technical Specialists at the Project Management Unit and the World Bank and recommendations were incorporated.

Studies on the sustainable conservation of endangered Gangetic dolphins that was commissioned by the World Bank during 2021 was referred and the summary of the findings is incorporated in the EIA report. The draft EIA report initially for three (3) Terminals was submitted to the project in December, 2019 and further revised by the PMU in August, 2021 considering the proposed development activities in only one out of the three terminals i.e. the Construction of Ferry Terminal and Riverine Infrastructure at Guwahati Gateway Ghat (GGG) under the project component "Improvement in Terminal Infrastructure". Apart from GGG, there has been consideration for inclusion of 12 smaller terminals, three (3) slipways and construction of a Crew Training Centre (CTC) as part of the revised project scope. ESIA for the future investments will be conducted subsequently by the Consultants engaged.

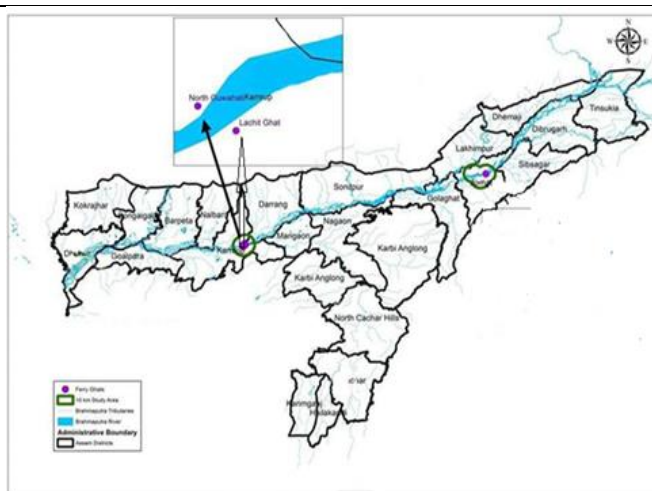
As discussed above, the proposed project involves:

- i. Development & modernization of terminal infrastructure initially at one (1) location i.e. Gateway Guwahati Ghat (GGG).
- ii. Procurement of 20 vessels (10 numbers of 100-pax & 10 numbers of 50-pax vessels), with all modern amenities to meet safety, security & environmental standards.
- iii. Upgradation of 'Crew Training Centre (CTC)' which is under the IWT Assam as well as to introduce an incentivization scheme named 'Jibondinga' for private boat owners & operators to purchase new vessels and to upgrade existing vessels by certifying those vessels by IRS are also part of the project.

However, this EIA Report is focused on point no. 1 mentioned above.

2. Project Need and Location

IWT is a competitive alternative to road and rail transport offering an economical, sustainable and environment friendly mode of transport, though investments in IWT has always lagged railways and roadways. Expansion of IWT results in potentially lower environmental impacts than expansion of rail and highways. Land acquirement for such projects are much smaller compared to new highways and rail corridors, which in turn results in lower magnitude impacts on people and the environment.



The proposed ferry terminal in Guwahati Gateway is on the south bank of Brahmaputra River. The river width is about 1.5 km. IWA terminal at Pandu is about 5.8 km downstream of the proposed terminal. The upcoming new road bridge across the river is about 300 m on the right bank side (26011'4.59" N & 91043'7.97" E) and about 1000 m on the left bank side (26010'30.46" N & 91043'49.18" E) downstream of the terminal locations. Construction of Terminal and Riverine Infrastructure at Guwahati Gateway will support the increasing traffic volume by more systematic and timely operation, improve connectivity and better infrastructure for public conveyance.

Fig: Proposed Location of Guwahati Gateway Terminal



Source: TRACTEBEL Engineering Pvt. Ltd (Design Consultant)

3. Objective of the EIA Study

The objectives of the study include:

- Identification of potential environmental relating to the Project through Environmental Management Framework (EMF)
- Assessment of possible environmental impact during stages of implementation of the project (construction and operation phase) through Environmental Impact Assessment(EIA)
- Mitigation measures suggested in accordance with World Bank's operational policies, WB Guideline, MoEF&CC Notification & Guidelines
- Environmental Management Plan (EMP) as per EMF followed by effective implementation.

- Incorporate environmental consideration during design

The EMF has been prepared also considering the 12 smaller terminals planned under AIWTP. This EIA report is prepared for Phase I location which include the Gateway Guwahati Ghat (GGG) on South Bank at about 100m upstream of the existing GG Ghat of the Brahmaputra River at Kamrup (Metro) district.

4. Administrative and Legal (Regulatory) Framework

The national environmental legislations are broadly discussed. The MoEF&CC, Central Pollution Control Board (CPCB), Dept. of Environment& Forest, GoA and State Pollution Control Board, Assam (SPCB) together forms the regulatory authorities for implementation of provisions of environmental legislations. World Bank has also defined its Environmental and Social Safeguard Operational Policies. MOEF&CC, GOI has notified standards under EP Act, 1986 for disposal of effluents, National Ambient Air Quality Standard (NAAQS) and surface water body, which would be complied with.

4.1 World Bank Policies & Requirements

The World Bank has published a number of Safeguard Policies and Guidelines to ensure that all possible impacts are taken care of by implementing the mitigation measures in the proposed project. The applicable WB safeguard policies are described below in the following table:

Table: Environmental Safeguards Policies relevant for AIWT Project

Name	Key Requirements	Project Applicability	Remarks	Management Plans
OP 4.01 Environmental Assessment	Ensures sustainability and environmental feasibility of the project. Projects are classified into A, B & C category depending on the nature and extent of the impact.	Applicable	Project classified as Category A considering nature of activities and impacts	Environment Management Plans including guidelines and management plans for tree plantation, waste management, Emergency response and budgetary provision for development of EHS management system and Responsible carrier Programme.
OP 4.04 Natural habitats	Ensures conservation of natural habitats and discourages disturbance of natural habitat due to project development by recommending adoption of alternative method/route/approach or adopting management measures	Applicable	Triggered for Gangetic dolphins, Tortoise habitat.	Environment Management Plan
OP 4.36 Forests	Ensures that project activities do not	May be triggered for	Forest area is not identified in the	--do -

Name	Key Requirements	Project Applicability	Remarks	Management Plans
	disturbs/interfere with the forest, forest dwellers activities, fauna and flora of the forest. Prevents and discourages deforestation and impacts on rights of forest dependent people.	Forest Triggers for tree cutting	reconnaissance visits. All the sites are confirmed for the forest areas from the relevant sources like forest departments in the respective districts. Tree cutting is not involved.	
WBG Environmental, Health and Safety (EHS) Guidelines (general)	The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment	Applicable	This guideline applies to facilities or projects that generate emissions to air at any stage of the project life-cycle	Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, prevent or minimize impacts
WBG sector-specific EHS guidelines for Jetty, Harbours and Terminals.	The EHS Guidelines for ports, Harbours, and Terminals are applicable to marine and freshwater jetties, harbours, and terminals for cargo and passengers.	Applicable	The following section provides a summary of EHS issues primarily associated with jetty and terminal construction and operations, along with recommendations for their management as part of a comprehensive environmental management system for a given project	Jetties and terminals to be selected through a systematic, documented environmental assessment process that includes rigorous consideration of siting and alternatives, their direct and indirect environmental impacts

5. Description of Works

The proposed ferry terminal at Guwahati Gateway Ghat (GGG) will cater to the passenger and two-wheeler traffic traveling to and from North Guwahati ghat and other nearby terminal locations. The riverine and landside infrastructure proposed for the ferry terminal are robust structures and provide floating but permanent boarding/deboarding locations for passenger and vehicles. This also ensures a greater sense of safety among the passengers especially during high flood season when the currents are extreme. The boarding/deboarding location is accessible for all passengers and ample waiting areas are also provided for convenience of passengers. The terminal utilities and services are provided for ease of operation and maintenance during any water levels.

Based on the traffic analysis and forecast, the terminal building area and infrastructure facilities are finalized. The total land required for the terminal construction at Gateway Guwahati is 2770 sq.m of

which 341.58 sq.m government land need to be acquired from Dept. of Land & Revenue. The entire stretch of land is government land and only NOC form the concerned revenue department is required. No relocation and resettlement is anticipated. The proposed development will not affect the livelihood of any person, however after the development of the Terminal there may be opportunities for various small time businesses that would cater to the passengers' needs. In Guwahati Gateway, terminal function requirement of terminal building is sub-divided into two parts- Landside Terminal and facilities at the floating Pontoon. Following facilities are proposed as per the design of the landside terminal:

- a) Parking Areas for Bikers and 4-wheelers
- b) Ticketing Booth
- c) Public Amenities
- d) Infrastructure services
- e) Security Areas
- f) Control Room
- g) Staff Room
- h) Passenger Waiting Areas

Proposed pontoon side facilities are as follows:

- a) Passenger Waiting Areas
- b) Bio-Toilets
- c) Bikers Waiting Area

For last mile connectivity land side terminal building will be connected to the existing road by ramps for convenient entry and exit of passengers and exit of passengers and vehicles.

6. Project Implementation Schedule and Costs

The time schedule for construction activities of the project as detailed in the DPR is eighteen (18) months from the time of award of the procurement and construction contract. No-construction period for construction activities in the water part will be maintained from Mid-March to Mid-June as suggested in the Dolphin survey report. Overall cost of the GGG Terminal is estimated at Rs. 115.99crores.

7. Environmental Safeguards Screening

As part of environmental and social assessment process, environmental and social safeguards screening exercises have been conducted. The screening exercise has identified the following potential impacts from the project activities:

Positive Impacts:

- Improvement in IWT and north south connectivity in Assam
- Protection of human lives
- Well-being of children
- Improvement in income and living standards.
- Protection of vulnerable groups from disasters
- Improvement in local environmental and social conditions.
- Public health and safety will be enhanced by providing better travel conditions for the sick and ailing to avail the health care facilities located in the main The proposed project at GGG shall contribute to increase employment opportunities for local people during and after the project implementation.

Negative Impacts:

- Water pollution
- Leakages of chemicals etc.
- Land pollution may happen when solid waste material, camp site area, stonestacking area and removed vegetative cover is left unattended
- Noise and vibration due to use of machinery and movement of vessels
- Air pollution due to smoke and dust
- Traffic and public nuisance
- Removal of vegetation (mostly herbs and shrubs) during site clearance
- Land use change
- Health and safety issues of subprojects professional staff/labour and communities residing near project areas

- Risk hazard
- Terrestrial and aquatic ecology

The potential impacts along with their mitigation measures are discussed in the Table below. This is summarised from Table 9.1 of the Chapter 9 of the EIA report

Table- Potential Impact and Mitigation Measures

S. No.	Component	Potential Impacts	Mitigation Measure
CONSTRUCTION PHASE: Environmental Impacts			
1.	Site Preparation		
1.1	Levelling of Terminal site and Construction of Labour & Camps	<p>Loss of top soil. Loss of natural resource (Earth/soil)</p> <ul style="list-style-type: none"> Dust Generation due to construction activities and material handling. Emission from machinery, DG and vehicular movement. 	<ul style="list-style-type: none"> Top soil (15 cm) would be stripped and kept separately in stockpiles for use in landscaping. Excavated materials would be preferably used for site filling/low lying area filling and the surplus material would be disposed as per norms. Green belt/landscaping would be developed at the site and as per the Green Belt management Plan. Survival rate of tree would be regularly monitored. It should be minimum of 70%. Sedimentation tanks shall be provided for storm water drain to arrest the sediments and these sediments shall be removed and stored with remaining excavated soil. Shore protection works like stone pitching along the bank shall be undertaken. No crushers or Batching plants will be located at the sites. Ready mix concrete will be used. These considerably reduce the emission. Low sulphur diesel would be used for operating DG sets and construction equipment. Periodic monitoring of air quality for PM₁₀, PM_{2.5}, SO_x, NO_x, and CO shall be carried out quarterly at construction site Regular water sprinkling/fogging to suppress the dust generated at site, approach road & haulage roads. Proper servicing and maintenance of earth moving vehicles and other machinery to minimize the emission generation Vehicles transporting the loose and fine materials like sand and aggregates shall be covered. Masks and other PPE shall be provided to workers in high dust generation area Loading and unloading of construction materials shall be made at designated locations with provisions of water sprinkling. Construction vehicle, machinery & equipment shall be regularly serviced and maintained and would have valid PUC certificate Monitoring of air quality shall be carried out on quarterly basis to check the level of pollutants and effectiveness of mitigative measures

S. No.	Component	Potential Impacts	Mitigation Measure
		Impact on terrestrial ecology	<ul style="list-style-type: none"> • Caution sign shall be placed to prohibit hunting of animals • Construction activities shall be restricted to 6:00 Am-10:00 Pm especially noise generating activities. • Workers should not use any timber or firewood as fuel for any purpose. LPG should be made available to workers in construction camp. • No hazardous material or waste shall be disposed in the other land or nearby area as it may harm the animals, if consumed accidentally.
		Contamination of land and water resources from waste generation.	<ul style="list-style-type: none"> • Labour camps would be located close to the construction sites to the extent possible. • Excavated materials would be preferably used for site filling/low lying area filling and the surplus material would be disposed as per norms.
		Unhygienic and unsafe living and working condition.	<ul style="list-style-type: none"> • Hygiene in the camps would be maintained by providing good sanitation and cleaning facilities. • Camp would be well ventilated with adequate provision for illumination, kitchen and safe drinking water. Proper drainage to be maintained around the sites to avoid water logging. • Proper sanitation with toilet and bathing facilities would be provided at the sites and labour camps. Wastewater generated from these facilities would be disposed through septic tanks and soak pit • Preventive medical care to be provided to workers • Segregated solid waste would be disposed of at municipal solid waste disposal location. If municipal solid waste site not available then waste should be land fill following local regulations. • LPG will be used for cooking in construction camps • Provision would be made for day crèche for children • First aid facilities, with room, personnel and ambulance would be available at the site. Also, tie-up with local hospitals would be done to handle emergency case, if any • Rest area would be provided at the site where workers can rest after lunch and should not lie on site anywhere • Working hours of labourers would not exceed than standard norms as per Factory Act • Wastewater from construction site would not be allowed to be accumulated as it may lead to breeding of mosquitoes. Septic tanks/soak pits would be provided for its disposal

S. No.	Component	Potential Impacts	Mitigation Measure
			<ul style="list-style-type: none"> • Temporary storm water drainage system would also be provided at camp site so that no water logging takes place
		Generation of solid, liquid and hazardous waste	<ul style="list-style-type: none"> • Arrangement should be made for segregation of waste into recyclable and non-recyclable waste • Non-recyclable waste generated should be disposed regularly through authorized agency. Recyclable waste should be sold to authorized vendors. • Construction waste generated should be segregated at site into recyclable, reusable & rejected fraction. Recyclable should be sold to authorized vendor, reusable waste should be stored at site for usage and rejected fraction should be disposed at designated sites of the municipal authority • If no debris or waste disposal site exists in the area then a site would be identified with approval of AIWTDS and would be used & manage for the same as per the Debris Management Plan. • Any waste oil generated from construction machinery, should be stored on concrete platform and disposed off to authorized recyclers.
		<ul style="list-style-type: none"> • Noise generation from construction activity. • Noise generation from operation of vehicle, equipment and machinery. 	<ul style="list-style-type: none"> • Protection devices (earplugs or ear muffs) shall be provided to the workers operating near high noise generating machines. • Barricading (Temporary noise barrier) around the construction site to minimize the noise level • Restriction of high noise generating activity between 10:00 PM to 6 AM. • Restriction on Honking at the project site • Job rotations systems for workers, working in high noise level areas • Periodic monitoring of noise levels to check the level of pollutants and effectiveness of proposed EMP
		<ul style="list-style-type: none"> • Surface water pollution and Depletion of Groundwater due to abstraction for construction purpose. • Siltation due to construction of terminal and contamination due to disposal of domestic waste 	<ul style="list-style-type: none"> • Preference would be given to use river water for construction with permission from concerned authorities • In case of use of ground water, permission will be obtained from CGWA/CGWB • Water monitoring to be carried out as per monitoring plan. • Natural Drainage pattern of area shall be maintained by making a proper drainage network in project site. • Washing of vehicle and equipment shall not be carried out in river or nearby place. • Storage of debris and raw materials would be in designated area clearly demarcated. • Site would be regularly cleaned • Septic tank/soak pit shall be provided for the toilets at both construction site as

S. No.	Component	Potential Impacts	Mitigation Measure
			<p>well as workers camp. Adequate toilets & bathrooms shall be provided to prevent open defecation. Use of mobile toilets with anaerobic digestion facility would be explored. No domestic wastewater shall be allowed to be discharged to river.</p> <ul style="list-style-type: none"> • Fuel shall be stored in leak proof containers and containers shall be placed on paved surface under shed. • The piling work in river shall be undertaken during low flow period. • Turbidity traps/curtains/ Geo-Textile synthetic sheet curtain would be placed around piling and construction area to prevent movement of sediments and construction waste. • Sedimentation tanks shall be provided for treating run-off from site before discharging into the river. • Proper collection, management and disposal of construction and municipal waste from site shall be made to prevent mixing of the waste in run-off and entering the water bodies • Monitoring of surface water quality shall be carried out on quarterly basis to check the level of pollutants and effectiveness of proposed EMP.
		<p>Accident and Incident risk from construction activities and safety of workers Impact on Social life.</p>	<ul style="list-style-type: none"> • Local labour would preferably be employed for construction. • Site would be barricaded and would have security guards. • Resister would be maintained for entry to the construction sites. No unauthorized person would be allowed to enter the site. • A board in local language at entrance of site would display name of project, area and hazards associated for public awareness • Adequate illumination would be provided at site during evening and night time till the work is being carried out • Rest area for workers would be provided. • Personal protective equipment like helmet, gum boots, safety shoes, safety jackets, ear plugs, gloves etc to be provided to workers. Fines would be levied if they are found not using PPE • Noise level in the work zone would be maintained and followed as per OSHAS norms • Contractors would adopt and maintain safe working practices. SOPs would be prepared and followed for all activities under supervision of site engineer • Training would be given to workers to handle the heavy equipment so as to prevent accidents • Complete medical check-up would be done for workers prior to joining and after

S. No.	Component	Potential Impacts	Mitigation Measure
			<p>six months of joining</p> <ul style="list-style-type: none"> • Emergency telephone nos.of hospitals, ambulance and doctors would be displayed in first aid room. • Working hours of labour should not exceed norms as per state factory law • Speed limit of vehicles would be restricted at site to prevent any accidents and fines would be imposed for violation. All construction vehicles would follow the designated routes & timings. • Arrangement of fire-fighting would be made at site and workers would be trained on their use. • Maintenance and repair of any local village road used for the project activities should be carried out both before and end of construction by contractor.
2.	Piling Activity		
2.1	Installation of Piles	Impacts on Aquatic ecology due to underwater noise Generation	<ul style="list-style-type: none"> • The area in which the piling is planned, advisable to carefully determine drop sites before anchor placement to ensure that Dolphin and fish communities are not there. • Before starting piling allow some time to aquatic fauna to displace from the piling area. • Adequate measures such as- maintainng the ecological flow, downscaling the vessel traffic, and modification in propeller for reduction in cavitation noise, shall be taken to minimise the impact of underwater noise. • Impact of piling during the construction period will be managed by adoption of vibratory piling and usage of bubble curtain to disperse the fauna and reduce noise level. • Construction activities shall be restricted to 6:00 Am-10:00 Pm especially noise generating activities.
		Loss of Aquatic Fauna and macrophytes.	<ul style="list-style-type: none"> • Caution sign shall be placed to prevent hunting of animals • No hazardous material or waste shall be disposed in the land or nearby area as it may harm the animals, if consumed accidentally • Site should be barricaded to prevent entry of the animal in the site • Illumination at the night time should be reduced (if no activity is going on) as it may disturb the nocturnal animals • Workers should not use any timber or firewood as fuel for any purpose

S. No.	Component	Potential Impacts	Mitigation Measure
			<ul style="list-style-type: none"> • The river area in which the piling is planned, advisable to carefully determine drop sites before anchor placement to ensure that Dolphin and fish communities that could locally still be present in the area are not unnecessarily damaged. • Before starting piling allow some time to aquatic fauna to displace from the piling area. • Impact of piling during the construction period will be managed by adoption of vibratory piling and usage of bubble curtain to disperse the fauna and reduce noise level. • The piling activities must be carried out in shortest possible timeframe. • All the debris should be disposed away from river course. • Noise reducing devices like mufflers, enclosures shall be fitted with the equipment as much as feasible. • Fish exclusion devices shall be installed in water column around the pile driving area to prevent fish access • Geo Textile synthetic sheet curtain & turbidity traps shall be placed around piling and construction area to prevent movement of sediments and construction waste • Piling should be stopped for some time, if any dolphin/turtle/RET species is sighted in activity area • Aquatic ecology monitoring should be carried out prior to start of construction and after completion of construction to assess the impact of construction activities on aquatic life. • No-construction Period : It is recommended to stop the construction activities in water part between Mid-March to Mid-June
		Impact due to release of sediments Piling and other construction	<ul style="list-style-type: none"> • Silt screens will be placed to avoid the construction debris, wash or blown into the water the area. • Equipment shall be maintained in good condition to prevent noise, leaks or spills of potentially hazardous materials like hydraulic fluid, diesel, gasoline and other petroleum products • Piling shall not be carried out during breeding and spawning season means during rainy season. It will be carried out in low water season, i.e. pre-monsoon.

S. No.	Component	Potential Impacts	Mitigation Measure
		Impacts on Dolphins	<ul style="list-style-type: none"> Adequate measures such as- maintaining the ecological flow, downscaling the vessel traffic, and modification in propeller for reduction in cavitation noise, shall be taken, so that the impacts on river dolphins can be mitigated effectively. The movement of vessels shall be on pre-designated routes and as per the designated path which will be monitored using the appropriate technology.
3.			
4.			
OPERATION PHASE: Environmental Impacts			
1.	Influx of passengers and vessel maintenance activities	Water Pollution	<ul style="list-style-type: none"> Sewage from the public convenience facilities will be treated in septic tank/STP constructed at the terminal. Wastewater from vessels will be evacuated through flexible pipes and treated in STP and under no circumstances, it will be allowed to discharge directly to river. Treated wastewater will be used for plantation, gardening, toilet flushing etc Used oil and waste oil will be collected through spill proof system and collected & stored separately so that it does not get discharged to river. Wash water generated from repairing shops shall be treated adequately in STP.
		Air emissions	<ul style="list-style-type: none"> Vehicles only with PUC will be allowed High efficient combustion engine for vessels will be selected so that the emission will be minimum. DG with CPCB emission norm and acoustic enclosures Plantation along the terminals for reducing the effect
		Noise Generation	<ul style="list-style-type: none"> DG will be with acoustic enclosures Vessels will be designed for acceptable noise Plantation around the site for further reduction of impact Under Jibondinga scheme, proposed by AIWTDS for the procurement and replacement of vessels, boats will be certified by IRS and will be designed with acceptable noise level.
		Terrestrial Ecology	<ul style="list-style-type: none"> Proper aftercare and monitoring of the green belt & avenue plantation Maintaining survival rate of plantation to minimum 70% Regular watering and cleaning of the leaves to remove the accumulated dust on the leaves.
		Aquatic Ecology	<ul style="list-style-type: none"> No wastewater or waste should be disposed in river from terminal site or from

S. No.	Component	Potential Impacts	Mitigation Measure
			<p>vessel into the water. Penalty should be imposed on the vessels reported of disposing waste/wastewater in the river</p> <ul style="list-style-type: none"> • Surface run-off from site should be collected separately in dump pond, retained and then clear water should be re-used at site for dust suppression and greenbelt development. • Instruction should be given to all vessels and all employee and staff that no dolphin or any other endangered species should be harmed due to any reason. • Instruction should be given to vessel operator that in case any accident with dolphin occurs that should be reported immediately to terminal authority. • Waiting time of vessel should be reduced at the terminal by providing the adequate loading and unloading equipment and vehicles. • Vessel should be instructed for not using sharp lights and sounds as they may disturb aquatic organisms • Impacts of underwater noise and risk of ship strikes can be mitigated by routing ship traffic away from critical dolphin habitats and implementing speed regulations and technology.
		Solid Waste Generation	<ul style="list-style-type: none"> • Separate storage containers for this purpose will be provided both for bio-degradable and non-biodegradable wastes. • Garbage containers will be covered with lids and will be washed at frequent intervals.
1.			

8. Stakeholder Consultation

Key findings from the public consultations held during the EMF and screening, scoping stage for GGG terminal were mostly on improvement and extension of terminals, safety and security of passengers, impact on livelihood, dredging, river ecology and environmental issues including management of dredged materials. All the stakeholders and community overall appreciated the project. Stakeholders also expressed their concern on ecology of river, safety of passengers, special facilities for women & senior citizen at terminals & ferries, facilities for differently-abled passengers. The stakeholders also suggested ensuring selection of sub-projects on the basis of community needs, regular consultations, participation, communication, access to information, grievance redressal of project affected and beneficiary communities and other stakeholders. Important suggestions with regard to environment and social as suggested in these public consultations are now addressed in the revised EIA and also incorporated in the DPR of GGG Terminal Project.

The Stakeholder Consultation for draft EIA stage of GGG Terminal was conducted virtually and in the premises of the AIWTD Society office on 15th July, 2021. Some key persons visited the office and participated in the discussion. Important issues highlighted by the members includes measures to be taken for preventing water pollution during the construction period as devotees mainly visit the Sukreshwar Temple during the auspicious Hindu festival, Ashokastami which falls between March and April. Issues related to the water pollution and preventive measures to be taken during the construction and operation of the project were the main concerns highlighted by the participants.

AIWTDS appraised the participants that the current design of the project is more environmental friendly as there will be no dredging due to the modular designs and the linkspan built into the river. Further there will be no felling of trees in the project area and all the issues pertaining to prevention of water pollution during the construction as well as operation phase of the project will be taken care of by the project with measures already listed in the EMP.

9. Grievance Redress Mechanism (GRM)

An integrated grievance mechanism has been created to handle any complaints related project performance on environmental aspects, along with social aspects. Complaints can be registered through multiple grievance uptake channels, such as a dedicated helpline, email, by letter to the GRCs (a divisional level or upper level GRC) or walk-ins and registering a complaint on grievance logbook to be provided at each project site/ghat or suggestion box. No grievance is registered on GRM till date as the civil works construction contract is yet to be awarded. Labour Grievance Redressal Mechanism will be established once the civil contract for GGG is awarded.

10. Current Environmental Scenario

11. Project interventions at GGG will have three (3) major phases- design/pre-construction, construction and operation phases. Activities during these phases will have interaction with the various components of the environment which may have associated impacts that may affect the environment if not addressed or mitigation measures are not taken. In order to understand the anticipated impacts during different phases of interventions for construction of Ferry Terminal at GGG, baseline environment conditions around 10 km radius was studied for all environment attributes like soil quality, air quality, noise level, terrestrial and aquatic ecology and socio economic and cultural aspects. For the activities identified for execution until now, detailed EIA had been completed.

12. Current Social Scenario

12.1 Land Requirement for the Project

Land requirement for GGG for the implementation of the project is shown below:

Name of/ type of sub-project	Amount of land required (in m ²)	Type of Land (private, government, community) m ²		
		Private	Government	Community
Gateway Guwahati Ghat	2770	Nil	341.58	Nil

No private land acquisition is envisaged in the GGG. The ownership of the land required for the terminal development is with the Govt. of Assam (GoA) and NoC for the same is been received from Revenue Dept. GoA.

SDE visited the site on 18th June 2021, and it is confirmed that there is no loss of livelihoods and the land is encumbrance free land.

11.2 Socio-Economic Profile of Project Influence Area

11.2.1 Demography of Project Influence Area

Table 11.1: Demographics of Guwahati city

Demographics	Female	Male	Total	National Avg.
Population	461990	495362	957352	1,210,193,422
Sex Ratio	933			940
Literacy Rate	370238 (80.13%)	423122 (85.41%)	793360 (82.87%)	74%
Sheduled Caste (SC) population			67014 (7%)	18.46%
Scheduled Tribe (ST)			38294 (4%)	10.97%
Others			852044 (89%)	70.56%
Religious Composition	Hindu	Muslim	Others	Hindus- 79.8% Muslims-14.2% Others-6%
	815499 (84.44%)	119825 (12.45%)	22028 (3.11%)	

The Table shows the demographic details of the Guwahati metropolitan city compared to National averages. Literacy rate, shows a better status compared to National average. SC and ST population percentage as low as 7% and 4% respectively. 85% of the population belong to Hindu religion. Further, Guwahati has 39% (about 1.7 lakh) population engaged in either main or marginal works. 59% male and 18% female population are working population. 53% of total male population are main (full time) workers and 5% are marginal (part time) workers. Among women, 13% of them are main workers and 5% are marginal workers.

Lachit Ghat, is in Ward No 02 of Guwahati Municipal Corporation. The total population of this Ward as per 2011 Census data is 16613 persons with 8780 (53%) men and 7833 (47%) women. Sex ratio is 892 and average Literacy rate is 91%. Literacy rate among women is 80.13%.

38% (6317) of the population are engaged in main or marginal works. Work participation rate of men in the ward is 55% and women is 19%. Among men 47% are engaged as main workers and 8% are marginal workers. Among women 14% are main workers and 5% are marginal workers.

11.2.2 Recommended Mitigating Measures

- The Project contractor to ensure equal payment for equal work and no discrimination in hiring based on gender, age, or ethnicity
- The most effective mitigation measure against labour influx is to reduce it. Unskilled workers are available in plenty, and many of them are migrating in search of employment. The contractor is responsible for recruitment of labourers for construction work. Specifications on employment of

local workforce including women should be reflected in the civil works bidding documents and subsequent contracts to ensure that the contractors fulfil these commitments. Locals including women may be screened further for skills, and adequate orientations can be provided to recruit for the work. The PMU (AIWTDS) can prepare a roster of interested workers and their skills. The lists can be provided to contractors at the pre-bid meetings for recruitment consideration.

- The project contractor needs to prepare a site-specific Labour Management Plan and/or a Workers' Camp Management Plan. This plan will include specific measures that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, grievance redressal, skills development, training programs and awareness generation on HIV/AIDS and gender-based violence (GBV) for the workers and host community. A Workers' Camp Management Plan will also address specific aspects of the establishment and operation of the workers' camps in compliance with relevant labour laws. The plan should include appropriate screening and monitoring mechanisms for addressing non-compliance.
- Adequate measures will be taken to ensure safety and security of women within the community and at the construction site. Security personnel will be deployed at the construction sites, and emergency nos. including contact details of local law enforcement officers, project's helpline no., existing state-run women helpline nos. will be prominently displayed at the site. The contractors will ensure that an Internal Complaints Committee (ICC) for each establishment is set-up to meet their corporate requirement and legal mandate under the Sexual Harassment at the Workplace Act, 2013.
- Health problems of the workers should be taken care of by providing basic health-care facilities through health centres temporarily set up for the construction camp. The health centre should have the requisite staff, free medicines and minimum medical facilities to tackle first-aid requirements or minor accidental cases, linkage with nearest higher order hospital to refer patients of major illnesses and critical cases.
- Awareness camps on HIV/AIDS for both, construction workers and neighbouring villages must be organised at regular intervals by NGOs empanelled with NACO.
- It is expected that among the women workers there will be mothers with infants and small children. The provision of a day care crèche as per the Building and Other Construction Workers (regulation of employment and conditions of service) act, 1996 is the contractor's responsibility. The crèche should be provided with trained women to look after the children.
- In case work schedule extends up till night, it should be ensured that women workers are exempted night shifts.
- Media/IEC Specialist at the PMU must prepare and disseminate IEC materials on labour welfare and compliance. Additionally, the supervision consultant and Project Implementing Unit (PIU) must monitor the labour standard compliance during the construction phase. The PIU with the support of the supervision consultant must document and furnish a monthly report on labour standard compliances including implementation of site-specific Labour Management Plan/Workers' Camp Management Plan and construction induced grievances to the PMU. The contractor is responsible for providing temporary residential accommodation and other necessary infrastructure facilities as per the Building and Other Construction Workers (regulation of employment and conditions of service) Act, 1996.
- The contractor is obligated to set up a GRM, especially to redress complaints relating to workers deployed for construction works under the project. The GRM will have due representation of PMU, Construction Supervision Consultant, Contractor, Workers and women (either from PMU/contractor/workers). The mandate for GRM, institutional arrangements, procedure for receiving complaints, time limits for redressal of complaints and escalation level for unresolved cases and resolution thereof will be finalised during the approval of C-ESMP by the Construction Supervision Consultant in consultation with the PMU. The GRM for the workers will be set up during mobilisation phase of the contractor.

The following **Table no11.1**. Describes the cross-cutting mitigation measures related to labour influx to be adopted for GGG Terminal:

Table 11-1.Labour influx-cross-cutting issues		
Elements		Measures
Assess the magnitude of labour influx, relevant contextual factors, and related legal & institutional framework		<ul style="list-style-type: none">Unskilled workers are expected to be largely recruited locally in the project area. All these locally recruited will continue living in their homes, except where work sites are far away from their settlements, in which case they would reside in the labour camps, as would workers from outside the immediate alignment.
Contractually bind the Contractor to carry out social impact mitigation		<ul style="list-style-type: none">The Contractor is explicitly required under its contract to abide by the provisions of the site-specific SMP.Before work begins, the Contractor is required to obtain approval for its Contractor’s camp, including plan for implementation of social and environmental risks, including labour influx.The works contract specifies the sanctions that the Contractor will face if the contractor-related provisions of the site-specific SMP is not adhered to, including by sub-contractors.The Contractor is required to have specific and qualified key staff (Social expert) to manage social mitigation and implement the project’s safeguard instruments. The contractor safeguards expert will be responsible to verify compliance with and implementation of all mitigation measures. Physical works can only commence once these key staff are engaged.
Establish a mandatory Code of Conduct for workers		<ul style="list-style-type: none">The Contractor must establish and enforce the employees’ Code of Conduct (CoC), including prevention of HIV/AIDS/STCs, prohibition of gender-related violence, treatment of minors, and other behaviours affecting community residents. PMU will review and approve the CoC before physical works commence.The Contractor is required to implement the CoC.The Contractor’s social team is required to provide training to all workers on the CoC. The training will be applied to 100% of the workers. PMU will monitor compliance.
Reporting and auditing		<ul style="list-style-type: none">The PMU will prepare regular reports on the Contractor’s compliance with all social impact mitigation plans.
SOCIAL IMPACTS		
Potential Adverse Impacts	Mitigation Measures	
Aggravation or exploitation of social conflicts	The SIA of the pre-identified sites have carefully analysed and taken into account pre-existing cultural or social differences among groups in the project area.	
Increased burden on public service provision, increasing costs to or crowding out the local population	Labor camps will provide their own water supply, electricity, wastewater treatment, solid waste disposal, medical services and transportation services, with no negative impacts on the supply of such services to local residents.	

Resettlement, compensation related to labour camps	Sites for labour camps in project areas are most often on land leased for the duration of project execution, thereby avoiding any land acquisition.
Increased risk of communicable diseases	The Contractor's social team is required to provide training to all workers on HIV/AIDS/STD prevention, in coordination with the local health service and with additional support of specialized entities in the project area. The training will be applied to 100% of the workers. PMU monitoring agent will monitor compliance.
Gender-based violence and misconduct Illicit behaviour and crime affecting the local population	<p>The Contractor is required to fully enforce compliance by its workers with the Code of Conduct, GBV action plan, including application of sanctions.</p> <ul style="list-style-type: none"> • The Contractor is required to monitor the entry and exit of all personnel and visitors in and out of the labour camp. • PMU and the Contractor will maintain outreach to law enforcement and legal services for women, children and teenagers, to facilitate prompt and effective responses when needed. • The Grievance Redress Mechanism includes a specific mandate to address any kinds of gender-based violence.
Child labour and school dropout	<p>The works contract includes a clause prohibiting the economic exploitation of minors and employment that is deemed dangerous, which interferes with education and/or risks their health or physical mental, spiritual moral or social development. There would be some underwater works envisaged in this assignment and the same would be related to piling which are undertaken by equipment.</p> <ul style="list-style-type: none"> • However adequate care would be taken to avoid involvement of labours below 18 years in any sort of work.
Camp-related traffic and safety	<ul style="list-style-type: none"> • The Contractor in and around the camps, must provide signage, traffic control personnel, barriers, lighting, reflectors, proper pedestrian access, and public information on grievances. • In reviewing the terminal design, the PMU will undertake a safety audit. • Contractor will prepare a Traffic Management Plan which will require approval by the PIUs.
Labour conditions	<ul style="list-style-type: none"> • The Contractor will be required to prepare and obtain approval of an Occupational Safety and Health (OHS) plan for its workers at the work site and in the labour camps. • The Contractor must abide by the applicable labour laws of India and the norms for design, construction and management of labour camps per "Labour Accommodation: Processes and Standards", a Guidance Note by IFC and the EBRD, found at the following link: http://www.ebrd.com/downloads/about/sustainability/Workers_accommodation.pdf

Closure and site restoration	The work camps' closure and site restoration, including removal of buildings and ancillary facilities, rehabilitation of access ways, removal of all materials and equipment, restoration of the topography to its original state, and replanting of trees and other vegetation should be a part of the contractor's Workers' Camp Management Plan.
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Other measures for response to Covid-19 Pandemic

Considering the recent Covid-19 pandemic, the following are few measures to be taken by the contractor to prevent and protect the community and workers from a potential outbreak:

1. Contractor will prepare an **assessment of workforce employed at the site**. The assessment must include detailed profile on workforce such as breakdown of workers who reside at home (i.e. workers from the community), workers who lodge within the local community and workers in on-site accommodation. Where possible, it should also identify workers that may be more at risk from COVID-19, those with underlying health issues or who may be otherwise at risk.
2. Contractor will provide a detailed plan on Covid-19 Prevention and Response. These include -
 - Precaution taken to ensure that there is **minimal exposure** among workers and contact with the community
 - **Response mechanism** in case of potential breakout of Covid-19
 - Safeguards to ensure that all project workers are protected from exploitative work conditions. It would also be important to ensure that all **eligible workers are given BOCW registration**, to be able to avail of benefits which are either under existing welfare schemes or provided as a part of the Covid-19 relief package. The Contractor must also ensure **registration for contract labour and inter-state migrant workers as per the Contract Labour Act, 1970 and Inter-State Migrant Workmen Act, 1979**; including their registration for coverage under the Employee State Insurance Corporation (ESIC)/Employee Provident Fund Organisation (EPFO).
 - Strengthen the use of **project grievance mechanism by workers to report concerns relating to COVID-19** including concerns about the health of their co-workers and other staff.
3. Contractor and Supervision Consultant to **designate senior personnel as a focal point to deal with COVID-19 issues**. This person can be responsible for coordinating preparation of the site and making sure that the measures taken are communicated to the workers, those entering the site and the local community.

11.5 Impact on cultural properties and community assets

Kamakhya Temple, Umananda Temple, Sukhreswar Temple are some of the major cultural heritage and archaeological Sites near GGG. Umananda temple which is 500 m upstream is nearest to the GGG. One of the most important pilgrimage destination, the Kamakhya temple is located around 5 kms from the project site. The site for piling work shall be carefully selected to avoid any vibration related impact to the Umananda temple along the ghat. Night time construction shall be avoided and proper lighting shall be given in the construction areas as well as in the access route of the devotees during the evening/night time to avoid any accidents. However, the mentioned cultural-historic monuments/temples are far enough from the construction site to escape any major adverse impacts of civil works Legal and policy framework.

Relevant GoI and GoA rules and regulations and World Bank policies on social safeguard triggered under the project are listed below:

World Bank Policies on Social Safeguard	GoI & GoA Rules and Regulations
OP/BP 4.12: Involuntary Resettlement OP/BP 4.10: Indigenous People OP/BP 4.11: Physical Cultural Resources ESSE Note on Adverse impacts of labour influx	RFCTLAR&R Act, 2013. Assam Right to Fair Compensation and Transparent Land Acquisition and Rehabilitation and Resettlement (RFCTLAR&R) Rules 2015.

13. Environmental Impact & Mitigation Measures

This chapter describes the environmental impacts that are likely to result from the project activities. The interaction between various project components and environmental elements are being analysed to identify and evaluate impacts. Mitigation measures proposed to be taken to minimize environmental impacts are also discussed. EMF Guideline, public consultation and observations during field survey of the project sites were important inputs and incorporated in the mitigation measures. Impact during construction and operational phases are separately dealt. Dolphins in the river are endangered species and therefore special emphasis has been given for their conservation and least impact.

Major environmental factors, covered are as follows:

- Impact due to solid and liquid waste disposal
- Sanitation, health and safety facilities
- Impact on Ambient Air Quality due to emission during construction and operational phase
- Impact on river water quality due to proposed amenities
- Impact on aquatic flora and fauna
- Impact on noise level
- Impact on environmental aesthetics and cultural values
- Impact on Biological Environment
- Impact due to Climate Change
- Impact on Social Environment -Labour Influx, Gender Based Violence, Community Health & Safety.

All the project activities and relevant environmental parameters are covered in the study. It is concluded that the environmental impact during construction phase will be temporary and with the mitigation measures, it will be localised. The overall impact during this phase will be within the acceptable limit. Due to integration of environmental factors in the project, the environmental impact during operational phase will be negligible and overall environmental quality of the area will improve with better infrastructure and amenities.

14. Environmental Monitoring Programme

Environmental Monitoring Programme is to ensure that the intended environmental protection goals are achieved and result in desired benefits of the project. The monitoring programme on each environmental parameter with frequency of monitoring for individual project site has been worked out for both construction as well as operational phase. The same will be included in tender / bid document. This has been done as per CPCB guideline.

Additional Environmental Studies Flood Assessment and Erosion Control

Flooding in river Brahmaputra is observed almost every year. From 1953 -2003 the Flood Control Department of Assam has so far constructed 105.2 km. of embankments on the bank of the Brahmaputra, Kherkotia and Subansiri Rivers.

No substantial changes on the embankment cope line observed in Guwahati Gateway Ghat (GGG)

Risk Assessment

Hazard Identification: Following hazard potentials are identified and emergency response and preparedness plan suggested-

- Damage of Fuel tanks and oil leaks into the river.
- Fire hazard from Fuel Storage
- Emergency during ship manoeuvring
- Vessel or boat collision

The degree of damage depends on-

- Nature of hazardous substances (gas, liquid or vapour);
- Pathway of release (boat, vessel etc.);
- Dispersion of released gas or vapor in atmosphere or liquid in river water.

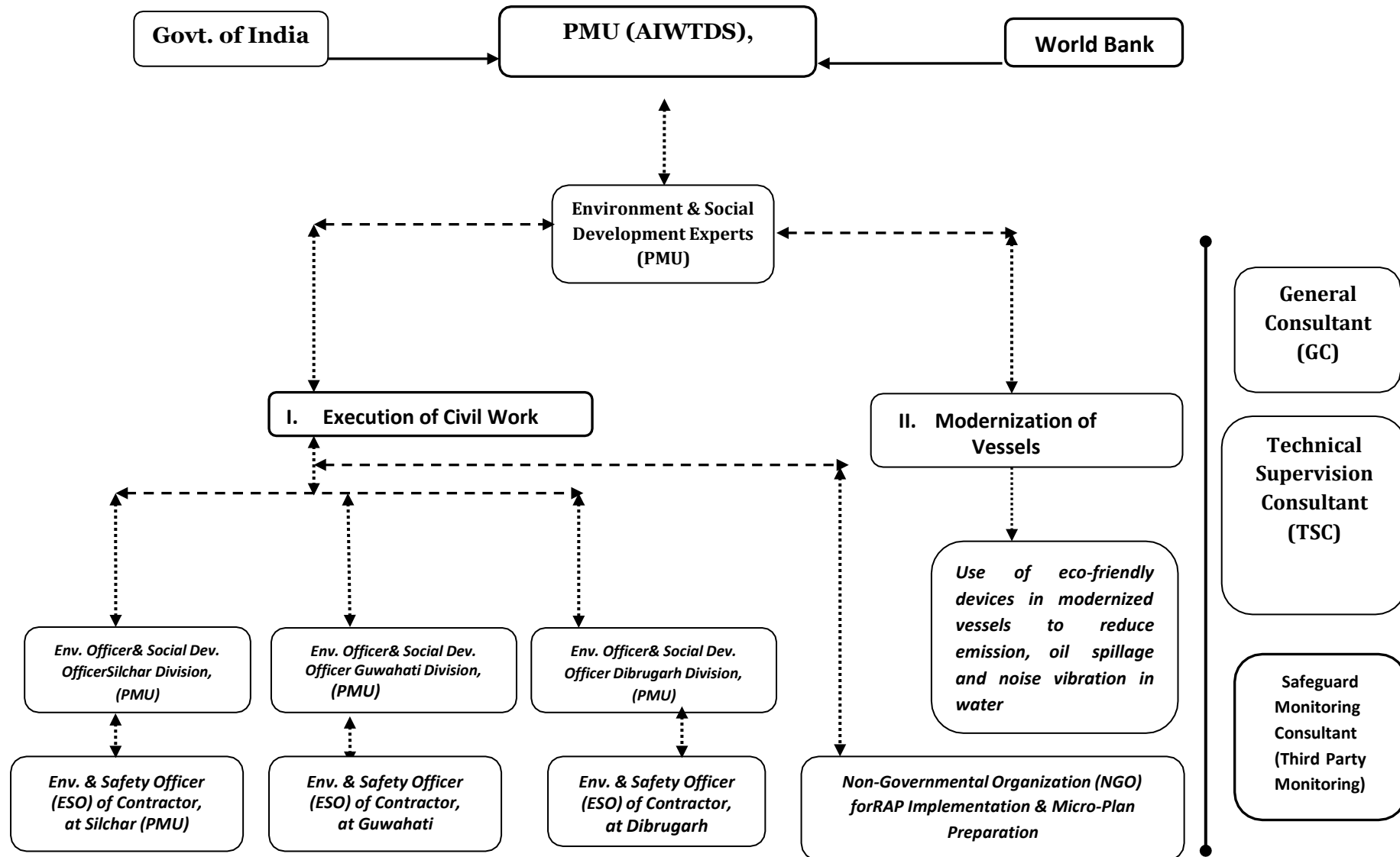
Oil spill disaster management due to vessel collision and/or accidental oil leakage has been discussed in greater detail. Coordination and control emergency have also been suggested. Safety standards are applied during all phase of project activities. The personnel would be periodically undergoing medical check to identify anybody suffering from occupational health hazard. Special emphasis has been given to Training and Awareness, which cover the following-

- Types of emergencies with potential threats, hazards, and protective actions
- Components of emergency preparedness and response plan
- Individual roles and responsibilities
- Relevant standards and Codes
- Notification, Warning, and Communications procedures
- Evacuation, Shelter, and Head Count procedures
- Location and use of common emergency equipment
- Mock Drill procedure and accounting for personnel
- Techniques of accident investigations

Implementation of Environmental Management Plan (EMP)

The proposed organogram for the implementation and monitoring of EMP is presented below:

Figure-1: Organization Structure for Implementation of EMP



15. Environmental Management Plan

The key components of EMP are summarized below and each of these components is explained in detail in the following subsections:

- Mitigation Measures
- Monitoring Measures
- Institutional Arrangement
- Reporting Requirements
- EMP Budget

Impact identification and EMF application for the development interventions are carried out to set the management framework

The Environmental Management Plan, covering project activities and relevant environmental components for proposed Terminal Project for both constructional and operational phase has been worked out and approximate timeframe and institutional responsibilities have been specified. The same has been presented in Tabular form.

A three-tier monitoring program has been proposed:

- Compliance monitoring,
- Effects monitoring, and
- External monitoring.

The main purpose of this monitoring program is to ensure that the various tasks detailed in the EMP are implemented in an effective manner, and also to evaluate program impacts on the key environment and social parameters.

16. Institutional Set-up for Effective EMP Implementation and its Monitoring

The Project implementation will be led by the Project Implementation Unit (PIU) that will be established within PMU (AIWTDS). The PIU will be responsible for engagement of consultants for carrying out the various studies related to EMP. The PIU will be headed by the Project Director. The PIU consists of an Environment and Social (E&S) Cell with environmental & social expert. E&S Cell will assist the PMU on issues related to environmental and social management and oversee the Construction Supervision Consultant (CSC) and contractors. Quarterly monitoring reports on EMP compliance is to be sent to the Project Director and also shared with the World Bank, throughout the construction period. The CSC will supervise and monitor the contractors for effective EMP implementation. The contractors in turn will also have HSE supervisors who will ensure EMP implementation during construction activities.

17. Environmental Codes of Practices and Performance Indicators

The contractor will be required to follow the environmental codes of practice (ECoP's) by preparing site-specific management plans. For evaluating the performance of the environmental management and monitoring plan, performance indicators are identified to evaluate the efficiency. The indicators are defined both for construction and operation phase.

18. Integrated Grievance Redressal Mechanism

A formal grievance redress process will be outlined in the project's operational manual and a protocol will be set up. The grievance submission mechanism should be online or through toll-free communication system. The GRM is based on four guiding principles of the company which

include: Transparency, Fairness, Response, Accountability

19. Capacity Building / Training and environmental awareness

Capacity building for effective implementation EMP is highly essential. Capacity building on environmental and social safeguard will be taken up for all levels stakeholders, including AIWTDS, E&S Cell of AIWTDS, supervisor, and contractors. At the construction site, supervisor will take the lead in capacity building plan. The contractors will also be responsible to conduct trainings for their own staff and workers. During the O&M phase of the project, these trainings will continue to be conducted by AIWTDS staff for all relevant O&M personnel and community.

It is vital that all personnel are adequately trained to efficiently perform their designated tasks. In addition to training, general environmental awareness must be fostered among the project's workforce and general public to encourage the environmentally sound practices.

20. Documentation and Record Keeping

A document handling system will be established to ensure updating of EMP documents, and availability of documents for the effective functioning of the EMP. The document handling system have been suggested.

Stakeholder Engagement

It is expected that the stakeholders would have opportunity to comment on the content of the EIA report.

21. Environmental Monitoring Plan & EMP Budget

Tentative Environment budget has been prepared for design, construction and operation phase of the project. The Environmental budget includes the cost of environmental structures like septic tank & soak pit, Air Pollution Control System at terminals, monitoring, enhancement measures, training and awareness and technical support for establishment, enhancement measures and environmental guidelines. The tentative budget for environment management and monitoring of Guwahati Gateway Terminal is estimated is Rs. 35,00,000.00.

Summary & Conclusion

The proposed development of GGG aims at developing ferry terminal on Brahmaputra river (National Waterway-2) in Assam. Environmental impact assessment is carried out pertaining to the up-gradation proposals of Ghats and other components of the project. The investigation is taken into account both national and international legal requirements (as per WB). The EIA is prepared based on field investigation, secondary data/information, environmental quality monitoring and feedback from the stakeholders.

Both positive and negative environmental impacts are evaluated. The positive environmental impacts of the Project are development of all-weather navigation routes for transportation of passengers and generation of employment opportunities during construction, operation and maintenance stages. The project will induce economic growth in the region. The negative environmental impacts are not significant. However, the positive impact of the project will improve the sanitary condition, proper waste management and overall aesthetics of the area.

EMP has been formulated to mitigate the negative impacts during various phases. The main monitoring parameters biological monitoring and enhancement, environmental quality monitoring (air, noise, surface water, river bed sediment), health and safety, etc. Most of the potential impacts are short-term that can be addressed by adopting mitigation measures and relevant ECoPs. To

keep the project influence area environmentally friendly, PMU (AIWTDS) should ensure that the Contractor prepare site specific EMPs including Emergency response plan, Oil Spill Contingency Plan and Workers Health and Safety plan and Environmental Pollution Abatement and Mitigation Measures Plan. Regular and effective monitoring of environmental quality parameters as indicated in this EIA report. AIWTDS will follow the EMP for improvement of navigation and environment quality of the area. It is expected that with the construction/improvement of terminal and other infrastructural facilities, the quantum of traffic is expected to increase and thus benefit the local economy as well vehicles crossing the river Brahmaputra.