

Figure 13.3: Advertisement for PDM at Ghorasal, Polash, Narsingdi



Figure 13.4: Photographs of participants in the PDM

682. The participants of the PDM included the Upazila Chairman of Polash Upazila, Mayor, Ghorashal Pourashava, Councillor of respective Ward, General Manager Polash Urea Fertilizer Factory Ltd, concerned government officials, Journalists, NGO representatives, environmentalists and activists, local stakeholders, representatives of CEGIS. A total of 49 participants attended the public disclosure meeting as given in Appendix 13.1.

683. The attendees of the meeting expressed their views regarding the new and old fertilizer plant and its impacts and benefits. The participants, in general, supported the development of the Project. However, they raised some concerns regarding issues related to environmental pollution and the monitoring of the proposed EMPs. Issues raised in the meeting, responses and actions points are discussed below in **Table 13.4**.

**Table 13.4: Comments and responses of Public Disclosure Meeting**

Comments of the participants	Responses of CEGIS	Action points
Mr. Syed Zabed Hossain, Upazila Chairman, Polash Upazila, Narsingdi thanked to the Govt. and BCIC for taking the initiative of constructing such a high capacity new fertilizer plant within the existing boundary. He also expressed that the Proponent will consider a modern ETP system, which will resolve the present odor and environmental problem. It will also improve the socio-economic condition of the local community. He committed to be with the BCIC authority in every situation during the project implementation as and when necessary.	The study has already covered these issues with due care at different places of the EIA report. Kindly refer Chapter 4, Chapter 5, Chapter 7 and Chapter 9.	No further action is needed.
Mr. Md. Shariful Haque, Mayor, Ghorasal Pourashava expressed his full support for the project. He also requested the Project Authority for engaging local community into the project activities at its different phases based on their skills.	The Project will involve 400 manpowers in Demolition Phase, 600 in Site Preparation, 4,000 in Construction and 1000 in Operation Phase. The study has already suggested to engage preferably local people based on their skills. Kindly refer Chapter 5, Chapter 7 and Chapter 9.	No further action is needed.
Ms. Roksana Rakhi, Social Worker and local Women Representative has raised question about the present situation of NH <sub>3</sub> emission and release process of NH <sub>3</sub> in the open lagoon. It has been creating stinky odor and causing breathing problem to local people. What about the new plant regarding ammonia gas release issue?	The State-of-Art technology has been considered in the Project along with Waste Water Treatment System (WWTS)/ Effluent Treatment Plant (ETP) for treating liquid waste, highly efficient machinery of will	No further action is needed.
Mr. Md. Delwar Hossain, Community Leader asked for employment facility in the new factory for the land losers who loss their land for construction of existing Polash Fertilizer Factory Ltd.	The study has already suggested to engage Project Affected Peoples (PAPs) based on their skills at different phases of the Project. Kindly refer Chapter 7 and Chapter 9.	No further action is needed.

Comments of the participants	Responses of CEGIS	Action points
Mr. Md. Sazzad Ali, Businessman, asked about the existing road between the Polash factory and the colony as they are using the road for their communication. They want the provision of wide access road to the bazar beside the boundary wall of factory for the community people.	The study has already suggested to widen the road pass beside the PUFFL Colony for easy communication of local people. Kindly refer Chapter 7.	No further action is needed.
Mr. Tushar Khan opined that, at present there is no access road to the river for the community people. It will be helpful for the local people if there is a access road to go to the Shitalakhya river.	The Colony will be built in the present Ghorasal Fertilizer Factory Ltd. For the new plant. Through the Colony an access road up to the Shitalakhya River could be constructed. Kindly refer Chapter 7.	No further action is needed.
Mr. Mamun Bhuiyan, Businessman, raised the question of excess use of ground water causes a great scarcity of water during the dry period. Due to heavy extraction of ground water, depletion of water layer occurs very fast. Local people asked proper management of ground water.	The EIA study has discouraged the Proponent and EPC Contractor to use ground water in any phase of the Project. Kindly refer Chapter 7.	No further action is needed.
Mr. Md. Idris Ali, Imam of Balia Kazi Bari Jame Masque has suggested to involve local people with the project activity and provision of existing access road for the local people.	Responded earlier	No further action is needed.
Ms. Shahida Akter, Teacher has raised a issue of large number of valuable tree will be cut within the project component area. Therefore, wildlife and local birds will lose their habitat. In this regards, local people suggested to plant sufficient trees within the project area.	The Proponent has a provision of plantation program. The study has suggested to development of green belt in line with the aspiration of the Govt. Kindly refer Chapter 7 and Chapter 9.	No further action is needed.

### 13.7 Grievance Redress Mechanism

684. Grievances are actual or perceived problems that might give grounds for complaints. As a general policy, Project Implementation Unit (PIU) in association with EHSU Circle will work proactively towards preventing grievances through the implementation of impact mitigation measures and community liaison activities that anticipate and address potential issues before they become grievances. Minor issues will be resolved by the Contractor in consultation with Owner's Engineer.

685. The project will establish a grievance redress mechanism (GRM) for addressing grievances and complaints received from the project-affected persons. The claims and complaints will need to be brought to the attention of the Ward Councilor. They will then forward grievances to the higher levels of authorities as desired. The Grievance Redress Mechanism is shown in Figure 13.5. The fundamental objective of GRM will be to resolve any project-related grievances locally in consultation with the aggrieved party to facilitate smooth implementation of the environmental management plans. Another important objective is to democratize the development process at the local level and to establish accountability to the

affected people. The procedures will however not a person’s right to go to the courts of law for resolving the disputed issue.

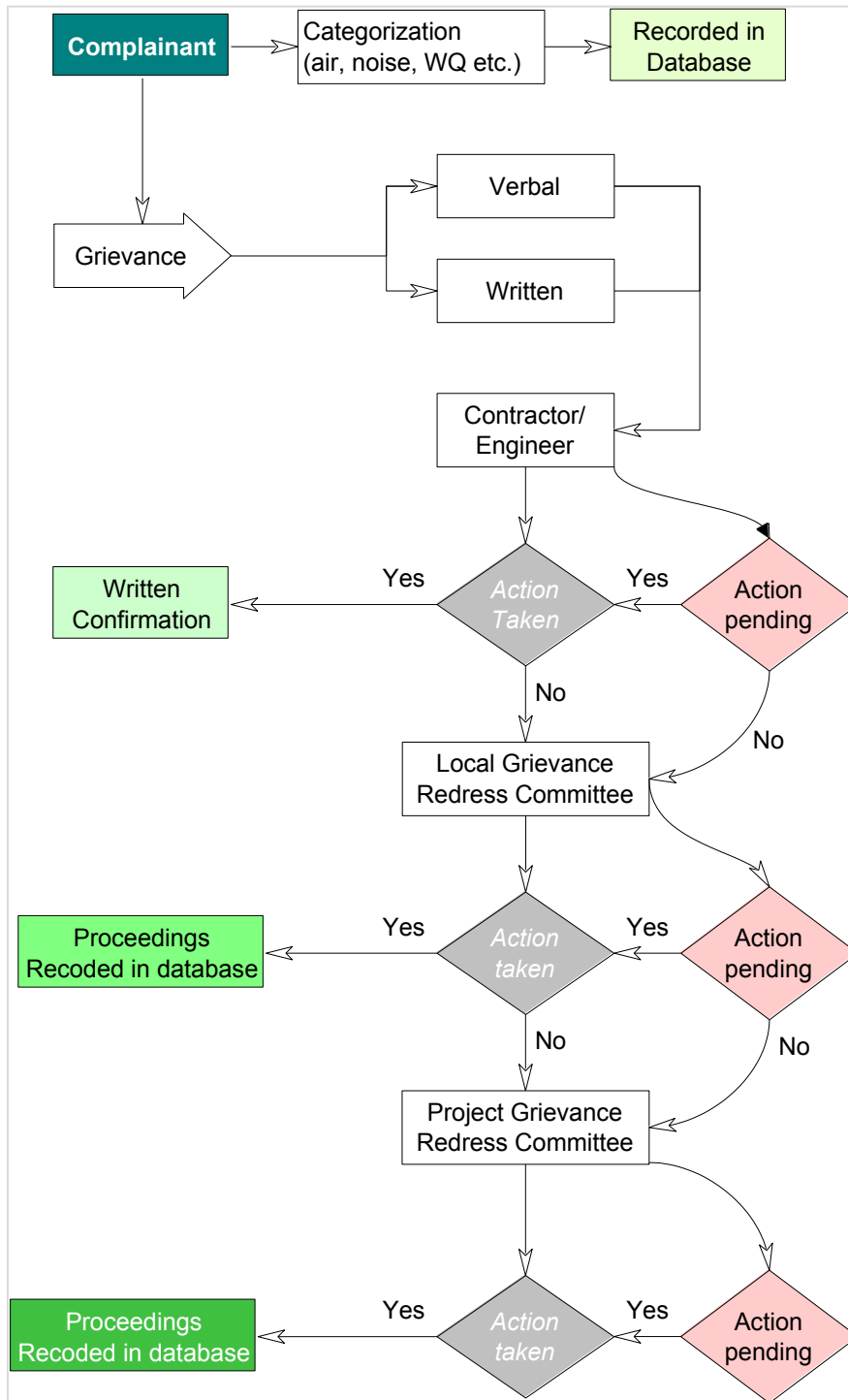


Figure 13.5: Grievance Redress Mechanism

686. Under the GRM, two grievance redress committees (GRCs) will be formed: local grievance redress committee (LGRC); and project grievance redress committee (PGRC). Most of the grievances would be resolved at LGRC within 7 days of receipt of complainant, while a few might be forwarded to PGRC, which will take two weeks to resolve the complaint. These GRCs are described below.

### **13.7.1 Local Grievance Redress Committee**

687. The following LGRC composition has been proposed for the project:

- Deputy Manager/Executive Engineer (Environment)– EHSU Circle, BCIC: Convener
- Ward Councilor: Member Secretary
- Environmental Specialist, Owner's Engineer: Member
- Community Representative(s)<sup>25</sup>: Members
- Representative of Women affected persons (APs): Member
- Contractors Representative: Member

688. LGRC meetings will be held in the convener's office in the project impact area or other location(s) as agreed by the Committee members. If needed, LGRC members may undertake field visits to verify and review the issues, including mistakes related to temporary disturbance due to construction works, unauthorized disposal of solid and hazardous wastes, noise and vibration due to the use of heavy equipment, access restrictions, etc.

### **13.7.2 Project Grievance Redress Committee**

689. The grievances that are not resolved at the LGRC will be forwarded to the PGRC. The PGRC will be empowered to take a decision, which would be binding on BCIC but it will require approval of the Project Director for implementation of the decision. The Project Director will head the PGRC. The composition of the PGRC will be as follows:

- Project Director: Chair Person
- Manager EHSU, BCIC: Member Secretary (Environmental Specialist of Owner's Engineer will assist the Member Secretary in grievance redress mechanism).
- Representative of Civil Society: Member (nominated by Project Director with the help of Owner's Engineer).

690. The Secretary of PGRC with the help of Environmental Specialist of Owner's Engineer will provide necessary knowledge and information regarding relevant project policies and agreements with the development partner. The provision of PGRC will further establish fairness and transparency in the resolution of grievances of the project-affected persons. In case of technical nature of environmental issues, or any legal matters, Environmental Specialist of Owner's Engineer will advise the PGRC. In specific cases, external legal and or technical advice may also be sought, if required.

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<sup>25</sup> This may be, for example, any community member representing project affected persons and one woman.



## 14. Conclusions and Recommendations

### 14.1 Conclusions

691. The project is indispensable to meet the objectives of the nation's urea fertilizer requirements. Present domestic production covers only about 31% of the total demand of Urea (about 2.44 million MT). It is quite evident that fertilizer shortage is compensated by imported urea. The installed capacity of existing six urea fertilizer factories under BCIC is about 2.80 million MT. But due to shortage of gas, aging, prolonged operation, sharp rising in down time, usage ratio and maintenance frequency these factories cannot sustain the installed capacity and gradually the production is decreasing. The present annual production of Urea is only about 0.76 million MT whereas the deficit is more than 1.98 million MT [including the production (0.3 million MT) that would be lost due to shut down of Urea Fertilizer Factory Ltd. (UFFL) and Polash Urea Fertilizer Factory Ltd. (PUFFL)].

692. Realizing the importance of sustainable agriculture and meeting up the increasing demand, Government of Bangladesh (GoB) is going to establish a new modern, energy efficient Urea Fertilizer factory under the caption mentioned above with higher capacity of Urea 2,800 TPD, which annually stands about 0.924 million MT. With this new production, the deficit of urea fertilizer will be reduced to about 1.05 million MT, which indicates the need of construction of more urea fertilizer factory.

693. The plant is going to be one of most cost effective investments in the urea fertilizer sector delivering urea at near lowest price in the country. Such economic benefits will be substantial in industry, business, employment generation, tax revenue and other sectors. Because of increased energy efficiency of the plant, there will be considerable emission reduction of CO<sub>2</sub>. Moreover, CO<sub>2</sub> will be recovered in the primary reformer at above 90% efficiency and will keep role in reducing GHG emission.

694. This EIA process was designed to ensure that all potentially significant environmental impacts are identified and assessed. The EIA for the plant includes assessment of the topic areas: air quality, water quality and quantity, the aquatic environment, terrestrial ecology, ground conditions and flood risk, noise, transport, cultural heritage, landscape and visual impacts and socio-economic impacts. The ESIA process included a wide ranging consultation program to inform the local communities and other stakeholders of the proposed development. The feedback and comments received have been taken into account during the drafting of the EIA document where appropriate. The assessment of environmental impacts have been done using mostly secondary data available in view of the time constraint. However, the essential conclusions from current assessment are unlikely to be impacted when more data are available.

695. It will be the obligation of the EPC contractor to submit their Environmental Management Action Plan (EMAP) before commencement of work since they will be responsible for the implementation of the EMP during civil structures demolition, plant construction and operation. The EMP implementation during the project implementation is included in the bidding document and its cost will be included in the project cost. The EMP will take care of all the EHS issues in compliance with WBG guidelines and advisory.

Demolition/demolition plan has been prepared as part of the EIA. Implementation of demolition plan should be included in the EPC contract.

696. The plant is located in an Airshed degraded in respect of particulate matter i.e., both PM<sub>10</sub> and PM<sub>2.5</sub>. The Airshed is compliant in NAAQS (National Ambient Air Quality Standards) in respect of other criteria pollutants NO<sub>2</sub>, SO<sub>2</sub>, and CO. However, because of the use of sulfur free natural gas and advance combustion technology, the emission levels of the plant are low for all pollutants including PM. Cumulative impact assessment shows that the contribution of the plant to PM emission in the Airshed is almost negligible. With the implementation of this project there is a significant reduction in emissions from the baseline to operation phase of the GPUFP. Thus, with the implementation of this project the air quality in the airshed will be brought closer to compliance with national ambient air quality standards and WHO Guidelines. Ambient air quality will be monitored at the maximum ground level concentration locations during the operation phase to keep track of air quality change with time.

697. The new plant, like the old one, will withdraw water from the river Shitalakhya. So, the quantity and quality of water that may be available have been carefully evaluated over a 20 years' time horizon, which is the expected life of the Project. Water requirement would be the same as the existing UFFL and PUFFL combined and thus environment flow of the river would be sustained. The specific-relative requirement of water for GPUFP would be less compared to existing consumption. Recycle of cooling water of the plant will reduce the water requirement for the plant significantly from the source. The essential water quality data will be generated during the operation phase as part of the environment monitoring plan to monitor the river water quality.

698. The demolition of the existing civil structures will produce considerable amount of asbestos containing material from the asbestos cement sheet. Asbestos being a hazardous material will be handled and disposed as per WBG's Good Practice note on Asbestos (2009) and other international best practice documents as required to ensure health and safety of both workers and the general public. An on-site concrete lined secured asbestos facility will be constructed within the GPUFP premises to dispose and isolate the debris.

699. The Project will use hydrazine as oxygen scavenger for boiler feed water treatment, which is largely used in Urea Fertilizer Industries worldwide. Nevertheless, it is suggested to use alternative of hydrazine, which is safer and more environment friendly.

700. Noise level has been identified as a significant potential impact of the proposed urea plant during both the construction and operation phases as ammonia plant, urea plant, granulation plant, RMS, gas pipes, and steam turbine which are the major components of the plant generate significant noise. However, noise would not impact major receptors such as schools, residential areas because of the distance. The EMP has suggested measures to minimize this impact of noise during construction and operation phases of the plant.

701. An emergency response plan (ERP) for the plant has been prepared for effective response to deal effectively and efficiently with any emergency, major accident or natural disaster.

702. A management structure for EMP implementation has been proposed in the EIA document. During the construction period overall responsibility for implementation of EHS provision will be the responsibility of EPC Contractor as specified in the contract document. The EPC contractor will be supervised by owner's engineer and the environment team of the PIU. During operation EMP implementation will be the responsibility of the BCIC, i.e., project



management. Technical Assistance for capacity building for EMP implementation is included in the project.

703. Overall, it is expected that the new urea fertilizer factory will be more environmentally friendly compared to the current old one as discussed above. In addition, the plant will substantially reduce greenhouse gas emissions during its entire lifetime.

## **14.2 Recommendations**

704. Based on the findings of this assessment, CEGIS is of the opinion that the EIA of the proposed fertilizer factory can be approved and an ECC is to be issued in favor of the project on the basis of the mitigations and monitoring for potential environmental and socio-economic impacts as outlined in the EIA Report and EMP being implemented.

705. The implementation of the mitigation measures listed in the EMP, including monitoring plan, will provide a basis for ensuring that the potential positive and negative impacts associated with the establishment of the Project are respectively enhanced and mitigated to a level which is deemed adequate for the Project to proceed.

706. Based on the results of the EIA study, some necessary recommendations can be highlighted as follows:

1. The project shall, under all conditions, strictly enforce the implementation of the proposed environmental measures designed for the construction and operation phases in order to avoid or minimize both environmental and social impacts on the surrounding communities and general public.
2. The project shall always conduct an environmental study for any modification of the project design and/or the environmental action plan to find out the environmental feasibility before making the decision.
3. The public participations are the ongoing activities throughout the project implementation. The comments, concerns and suggestions from concerned stakeholders shall be considered and incorporated into the project environmental management plan as appropriate.
4. Local administration and representatives shall be involved during implementation of project activities.
5. In addition, a grievance redressal mechanism including a complaint register to be ensured at project site office for immediate response from the project implementing authority and issues to be resolved accordingly.



## References

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- ECR 97, Schedule 12 (A) Fertilizer Plant, Phosphatic.
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- SRDI (Soil Resource and Development Institute), 1997. Guideline for Land and Soil Resources Utilization. Thana Nirdeshika, Farmgate, Dhaka-1212
- ECR, 2017 (Draft Version). Table 'A' - Inland Surface Water, Row-'D', Water usable by fisheries, Department of Environment (DoE).
- ECR, 1997. Table 'A' - Inland Surface Water, Row-'D', Water usable by fisheries. Department of Environment (DoE).
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## Appendices



# Appendix 1.1: Approved Terms of Reference (ToR) for EIA study of "Ghorasal Polash Urea Fertilizer Factory Project"

Government of the People's Republic of Bangladesh  
**Department of Environment**  
Head Office, E-16 Agargaon  
Sher-e-Bangla Nagar, Dhaka-1207  
www.doe.gov.bd

Memo No: 22.02.0000.18.72.143.18. 1136

Date: 06/12/2018

**Subject: Approval of Terms of Reference (TOR) for Environmental Impact Assessment (EIA) in favor of Ghorasal Polash Urea Fertilizer Factory Project (GPUFP) at Polash, Narshingdi.**

Ref: Your Application received on 27/11/2018.

With reference to your letter received on 27/11/2018 for the subject mentioned above, the Department of Environment hereby gives Approval of Terms of Reference (TOR) for Environmental Impact Assessment (EIA) in favor of Ghorasal Polash Urea Fertilizer Factory Project (GPUFP) at Polash, Narshingdi subject to fulfilling the following terms and conditions:

- I. The project authority shall submit a comprehensive Environmental Impact Assessment (EIA) considering the overall activity of the said project in accordance with the TOR submitted to the Department of Environment (DOE) and additional suggestions provided herein.
- II. The EIA report should be prepared in accordance with following indicative outlines:
  - (a) Executive summary
  - (b) Introduction: (Background, brief description, scope of study, methodology, limitation, EIA team, references)
  - (c) Legislative, regulatory and policy considerations (covering relevant legal, administrative, planning and policy framework within which the EIA will be prepared)
  - (d) Project activities: A list of the main project activities to be undertaken during site clearing, construction as well as operation
  - (e) Project schedule: The phase and timing for development of the project
  - (f) Resources and utilities demand: Resources required to develop the project, such as soil and construction material and demand for utilities (water, electricity, sewerage, waste disposal and others), as well as infrastructure (road, drains, and others) to support the project
  - (g) Map and survey information  
Location map, Cadastral map showing land plots (project and adjacent area)
  - (h) Baseline Environmental Condition should include, inter alia, following:
    - Physical Environment : Geology, Topology, Geomorphology, Soils, Meteorology and Hydrology.
    - Biological Environment : Habitats, Aquatic life and fisheries, Terrestrial Habitats and Flora and Fauna
    - Environmental Quality : Air, Water, Soil and Sediment Quality.
  - (i) Socio-economic environment should include, inter alia, following:
    - Settlement and housing
    - Traffic and transport
    - Public utilities: water supply, sanitation and solid waste
    - Economy and employment
    - Fishing activities, fishing communities, fishing resources, commercial factors.
  - (j) Identification, Prediction and Evaluation of Potential Impacts (identification, prediction and assessment of positive and negative impacts likely to result from the proposed project).



1

## (k) Management Plan/Procedures:

For each significant major impact, proposed mitigation measures will be set out for incorporation into project design or procedures, impacts, which are not capable of mitigation, will be identified as residual impacts Both technical and financial plans shall be incorporated for proposed mitigation measures..

An outline of the Environmental Management Plan shall be developed for the project.

In Environmental Monitoring Plan, a detail technical and financial proposal shall be included for developing an in-house environmental monitoring system to be operated by the proponent's own resources (equipments and expertise).

## (l) Consultation with Stakeholders/Public Consultation (ensures that consultation with interested parties and the general public will take place and their views taken into account in the planning and execution of the project)

Beneficial Impacts (summarize the benefits of the project to the Bangladesh nation, people and local community and the enhancement potentials)

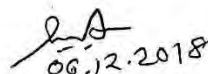
## (m) Emergency Response Plan &amp; disaster Impact Assessment

## (n) Conclusion and Recommendations

III. Without approval of EIA report by the Department of Environment, the project authority shall not be able to open L/C in favor of importable machineries.

IV. Without obtaining Environmental Clearance, the project authority shall not be able to start the physical activity of the project.

V. The project authority shall submit the EIA along with a filled-in application for Environmental Clearance in prescribed form, the applicable fee in a treasury Chalan, the applicable VAT on clearance fee in a separate treasury Chalan, the No Objection Certificates (NOC) from local authority, NOC from forest department (if it is required in case of cutting any forested plant, private or public) and NOCs from other relevant agencies for operational activity etc. to the Narshingdi District Office of DOE at Narshingdi with a copy to the Head Office of DOE in Dhaka.

  
06.12.2018

(Syed Nazmul Ahsan)  
Director (Environment Clearance)  
Phone # 02-8181673

**Project Director**

Ghorasal Polash Urea Fertilizer Project  
BCIC Bhaban (15<sup>th</sup> floor)  
30-31 Dilkusha C/A, Dhaka.

**Copy Forwarded to :**

- 1) PS to Secretary, Ministry of Environment, Forest and Climate Change, Bangladesh Secretariat, Dhaka.
- 2) Director, Department of Environment, Dhaka Regional Office, Dhaka.
- 3) Deputy Director/ Office In-charge, Department of Environment, Narshingdi District Office, Narshingdi.
- 4) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.



## Appendix 1.2: Attributes of UFFL and PUFFL

<b>Issues</b>	<b>UFFL</b>	<b>PUFFL</b>
Year of Construction	1970 (COD- 1972)	1985 (COD- 1986)
Installed Capacity of Urea	0.34 Million T/Year	95,000 T/Year
Renovated Capacity of Urea	0.47 Million T/Year	-
Operational Efficiency	80%	DD
Installed Capacity of NH <sub>3</sub>	660 T/Day	56,000 T/Year
Designed Fuel Consumption (N. Gas)	32.4 MCF/MT of Urea	49.8 MCF/MT of Urea
Gas Supply Agreement	48 MMCFD (Max. 52)	16.7 MMCFD (Max. 18)
Economic Life	20 years	15 Years
Actual Life	43 years	28 Years
Equipment/Machineries	Deteriorated	Deteriorated
Economic viability	Very low	Very low



## Appendix 4.1: NOC for GPUFP



# মোঃ কবির হোসেন

## কাউন্সিলর, ০১ নং ওয়ার্ড

### ঘোড়াশাল পৌরসভা

#### পলাশ, নরসিংদী।

সূত্র :

তারিখ : ০৬/০২/২০২১খ্রি:

অবস্থানগত / পরিবেশ ছাড়পত্রের জন্য স্থানীয় কর্তৃপক্ষ কর্তৃক প্রদেয় অনাপত্তি পত্র

১. আবেদনকারীর নাম : প্রকল্প পরিচালক  
ঘোড়াশাল পলাশ ইউরিয়া ফার্টিলাইজার প্রজেক্ট, বিসিআইসি, ঢাকা।
২. পিতা/স্বামী/স্বামীর নাম : প্রযোজ্য নয়।
৩. আবেদনকারীর বর্তমান : বিসিআইসি ভবন (১৬ তল)  
দিলকুশা বা/এ, ঢাকা- ১০০০।
৪. কারখানা / প্রকল্পের অবস্থানগত ঠিকানা : মৌজা: খানেপুর, ওয়ার্ড নং: ০১,  
পৌরসভা : ঘোড়াশাল, উপজেলা: পলাশ, জেলা: নরসিংদী।
৫. কারখানা / প্রকল্পের তফসিল :

জেলা/নাম	থানার নাম	মৌজার নাম	দাগনং	জমির ধরণ	মোট জমির পরিমাণ
নরসিংদী	পলাশ	খানেপুর জেএল ৬৭		শিল্প এলাকা	১১০ একর

৪. কারখানা / প্রকল্পের উৎপাদিত বা পণ্যের নাম : ইউরিয়া ফার্টিলাইজার (গ্র্যানুলার)  
উপরোক্ত তথ্যাদির আলোকে ঘোড়াশাল পলাশ ইউরিয়া ফার্টিলাইজার প্রজেক্ট কে নিম্নবর্ণিত শর্ত সাপেক্ষে অনাপত্তি পত্র প্রদান করা হলো।

শর্তাবলী :

- প্রকল্প / কারখানা স্থাপন ও পরিচালনার ক্ষেত্রে পরিবেশ সংরক্ষণ আইন ও বিধি যথাযথ অনুসরণ করতে হবে।
- পরিবেশ অধিদপ্তর থেকে বিধি দ্বারা নির্ধারিত পদ্ধতিতে ছাড়পত্র গ্রহণ করতে হবে।
- কর্মরত শ্রমিকের পেশাগত স্বাস্থ্য ও নিরাপত্তা নিশ্চিত করতে হবে।
- উপযুক্ত অগ্নি-নির্বাপক ব্যবস্থা রাখতে হবে এবং অগ্নিকাণ্ড কিংবা অন্য কোন দুর্ঘটনার সময় জরুরী নির্গমন ব্যবস্থা থাকতে হবে।
- বাষ্প ও শব্দ দূষণ করা যাবে না।
- কারখানা / প্রকল্পসৃষ্ট তরল বর্জ্য অপরিশোধিত অবস্থায় বাইরে নির্গমন করা যাবে না।

উল্লিখিত যে কোন শর্ত লঙ্ঘন করলে কর্তৃপক্ষ কর্তৃক কারখানা / প্রকল্পের বিরুদ্ধে আইনানুগ ব্যবস্থা নেওয়া যাবে।

সংযুক্তিঃ ২ (দুই প্রস্ত)।

তারিখ:

*(স্বাক্ষর)*  
মোঃ কবির হোসেন  
কাউন্সিলর, ০১ নং ওয়ার্ড  
ঘোড়াশাল পৌরসভা  
পলাশ, নরসিংদী।

কর্তৃপক্ষের স্বাক্ষর



## Appendix 5.1: Gas Supply Confirmation

জাতীয় সম্পদ গ্যাসের অপচয় রোধ করে জাতীয় দায়িত্ব পালন করুন।

## তুলসিপি

বিদ্যুৎ ও জ্বালানী নিরাপত্তা সর্বোচ্চ অগ্রাধিকার।

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### বাংলাদেশ তৈল, গ্যাস ও খনিজ সম্পদ করপোরেশন (পেট্রোবাংলা)

### Bangladesh Oil, Gas & Mineral Corporation (Petrobangla)

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উৎপাদন ও বিপণন বিভাগ  
 অপারেশন ও মাইন্স পরিদপ্তর

নং-২৮.০২.০০০০.০৩৬.০১.০১৫.১৩/ ৭ ১)

সচিব  
জ্বালানী ও খনিজ সম্পদ বিভাগ  
বিদ্যুৎ, জ্বালানী ও খনিজ সম্পদ মন্ত্রণালয়  
বাংলাদেশ সচিবালয়  
ঢাকা।

বিষয়ঃ “নর্থ ওয়েস্ট ফার্টলাইজার প্রজেক্ট (এনডব্লিউএফপি)” শীর্ষক প্রকল্পে গ্যাস সরবরাহ।

সূত্রঃ ১। জ্বালানী ও খনিজ সম্পদ বিভাগের স্মারক নং ২৮.০০.০০০০.০১৬.৩১.০০৩.০৯(অংশ-১)-৯৫২, তারিখ ১৮/১২/২০১৪।  
২। জ্বালানী ও খনিজ সম্পদ বিভাগের স্মারক নং ২৮.০০.০০০০.০২৮.১০.০৩৭.১৪.৩৬৪ তারিখ ২৮/১২/২০১৪।

মহোদয়,

উপর্যুক্ত বিষয়ে সদয় অবগতির জন্য জানানো যাচ্ছে যে, শিল্প মন্ত্রণালয়ের ৯/১১/২০১৪ তারিখের পত্র সংযুক্ত করে জ্বালানী ও খনিজ সম্পদ বিভাগ হতে প্রেরিত ১নং সূত্রোক্ত পত্রের মাধ্যমে বিষয়োক্ত প্রকল্পে গ্যাস সরবরাহ বিষয়ে পেট্রোবাংলার মতামত চাওয়া হয়েছে।

২। পেট্রোবাংলা হতে বাংলাদেশ কেমিক্যাল ইন্ডাস্ট্রিজ করপোরেশন (বিসিআইসি) বরাবর ২৩/১০/২০০৮ এবং ০১/১২/২০১৩ তারিখ প্রেরিত দু’টি পত্র এসঙ্গে সংযুক্ত করে আপনার সদয় দৃষ্টি আকর্ষণ করছি। পেট্রোবাংলার ২৩/১০/২০০৮ তারিখের পত্রে বিষয়োল্লিখিত সার কারখানায় দীর্ঘমেয়াদী গ্যাস সরবরাহের নিশ্চয়তা ব্যতিরেকে ২০১৩ সাল নাগাদ এই প্রকল্পে গ্যাস সরবরাহের বিষয়ে আশাবাদ ব্যক্ত করা হয় (সংযুক্তি-১)। অপরদিকে ০১/১২/২০১৩ তারিখ প্রেরিত পত্রে সেই সময়ের পরিস্থিতি বিবেচনায় আরও ৪/৫ বছর পর পুরাতন ও অদক্ষ সার কারখানা প্রতিস্থাপনপূর্বক প্রাপ্যতা সাপেক্ষে প্রস্তাবিত নর্থ-ওয়েস্ট ফার্টলাইজার ফ্যাক্টরীতে গ্যাস সরবরাহ করা যেতে পারে মর্মে বিসিআইসি-কে জানানো হয় (সংযুক্তি-২)।

৩। বিগত বছরগুলোতে গ্যাস উৎপাদন যথাসম্ভব বৃদ্ধি করা হলেও গ্যাস চাহিদা ক্রমাগতভাবে বৃদ্ধির কারণে গ্যাস ঘাটতি সম্পূর্ণভাবে পূরণ সম্ভব হচ্ছে না। বর্তমানে এই ঘাটতি দৈনিক ৫০০ মিলিয়ন ঘনফুটের অধিক। ফলে, বাস গ্রাহক বিদ্যুৎ ও সার খাতের মধ্যে গ্যাস সরবরাহ হ্রাস করে উৎপাদন ও চাহিদা সমন্বয় করা হয়। সাধারণভাবে প্রয়োজনীয়তার নিরিখে সেচ ও গ্রীষ্ম মৌসুমের সময় সার খাতে গ্যাস সরবরাহ হ্রাস করে বিদ্যুৎ খাতে বর্ধিত গ্যাস সরবরাহ করা হয়। অন্যদিকে, শীত মৌসুমে বিদ্যুৎ খাতে গ্যাসের চাহিদা কমে যাওয়ায় সার খাতে অগ্রাধিকার ভিত্তিতে চাহিদা অনুযায়ী গ্যাস সরবরাহ করা হয়। এছাড়া আগামী ৫ বছরে ২৩টি নতুন বিদ্যুৎ কেন্দ্রসহ ৩টি বিদ্যুৎ কেন্দ্রের ক্ষমতা বৃদ্ধির জন্য ১,০৪০ এমএমসিএফডি গ্যাস সরবরাহের প্রতিশ্রুতি ইতোমধ্যে প্রদান করা হয়েছে। বিদ্যুৎ, সার ও অন্যান্য খাতসহ আগামী ৫ (পাঁচ) বছর দেশে গ্যাসের চাহিদা দৈনিক ৪,০০০ মিলিয়ন ঘনফুট অতিক্রম করবে। গ্যাস উৎপাদন বৃদ্ধির চলমান/গৃহীত কার্যক্রমসমূহ সফলভাবে সম্পন্ন করা এবং প্রথম ধাপে ২০১৭ সাল নাগাদ দৈনিক ৫০০ মিলিয়ন ঘনফুট গ্যাসের সমপরিমাণ হারে আমদানীকৃত এলএনজি যোগ হওয়ার পরও চাহিদার তুলনায় ঘাটতি সম্পূর্ণরূপে মেটানো সম্ভব হবে না।

তারিখঃ ১০/১২/২০১৫ ১৩৬

০৬/০২/১৫

মনোমুহুর্ত  
 সচিব

সচিব

সচিবালয়  
 ২৪৩৮  
 ০৯/০২/১৫

সচিবালয়  
 ২৪৩৮  
 ০৯/০২/১৫

সচিবালয়  
 ২৪৩৮  
 ০৯/০২/১৫

PETROCENTRE, 3 Kawran Bazar C/A, Dhaka-1215, GPO Box 849, Ca ble : Petrobangla PABX : 9121010-16,  
 9121035-41, Fax : 88-02-9120224, website: www.petrobangla.org.bd, E-mail : petchair@petrobangla.org.bd

Ministry Letter (NA)/PC-3

জাতীয় সম্পদ গ্যাসের অপচয় রোধ করে  
জাতীয় দায়িত্ব পালন করুন।

বিদ্যুৎ ও জ্বালানী নিরাপত্তা সর্বোচ্চ অগ্রাধিকার।



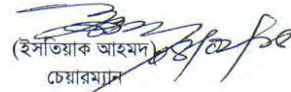
## বাংলাদেশ তৈল, গ্যাস ও খনিজ সম্পদ করপোরেশন (পেট্রোবাংলা) Bangladesh Oil, Gas & Mineral Corporation (Petrobangla)

৪। দেশে সরকারী খাতে বিদ্যমান সার কারখানাগুলোর অধিকাংশই গ্যাস সাশ্রয়ী নয়। ফলে সার খাতের বর্তমান গ্যাস চাহিদার সমপরিমাণ গ্যাস আধুনিক প্রযুক্তিসম্পন্ন দক্ষ ও জ্বালানী সাশ্রয়ী কারখানায় ব্যবহার করা হলে অতিরিক্ত সার উৎপাদন করা সম্ভব। মাননীয় প্রধানমন্ত্রী ২৪/৮/২০১৪ তারিখ শিল্প মন্ত্রণালয় পরিদর্শনকালে প্রদত্ত অনুশাসনগুলোর মধ্যে ৯নং অনুশাসনে বিসিআইসি'র বিদ্যমান পুরাতন সার কারখানা প্রতিস্থাপনের মাধ্যমে আধুনিক প্রযুক্তি ও জ্বালানী সাশ্রয়ী সার কারখানা নির্মাণ এবং পলাশ ও ঘোড়াশাল সার কারখানার পুরাতন যন্ত্রপাতির পরিবর্তে নতুন যন্ত্রপাতি স্থাপন করে সার কারখানার উৎপাদনশীলতা বৃদ্ধির নির্দেশনা প্রদান করেছেন (সংযুক্তি-৩)।

৫। বর্ধিত প্রেক্ষাপটে “নর্থ ওয়েস্ট ফার্টলাইজার প্রজেক্ট (এনডব্লিউএফপি)” শীর্ষক প্রকল্পে বিরাজমান বাস্তবতায় গ্যাস সরবরাহের প্রতিশ্রুতি প্রদান সম্ভব নয়। তবে সার খাতের বর্তমান গ্যাস চাহিদার মধ্যে গ্যাসের দক্ষ ব্যবহারের নিশ্চিতকরণের লক্ষ্যে বিসিআইসি বিদ্যমান পুরাতন সার কারখানা প্রতিস্থাপনের মাধ্যমে সমপরিমাণ গ্যাস লোড ব্যবহার করে এ প্রকল্প বাস্তবায়ন করলে সংশ্লিষ্ট এলাকায় গ্যাস প্রাপ্তি সাপেক্ষে গ্যাস সরবরাহ করা যেতে পারে।

সংযুক্তিঃ বর্ণনামত।

আপনার বিশ্বস্ত,

  
(ইসতিয়াক আহমদ)  
চেয়ারম্যান

অনুলিপিঃ

- ১। চেয়ারম্যান, বিসিআইসি।
- ২। ব্যবস্থাপনা পরিচালক, পিজিসিএল।
- ৩। অফিস কপি।

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9121035-41, Fax : 88-02-9120224, website: www.petrobangla.org.bd, E-mail : petchair@petrobangla.org.bd

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## Appendix 6.1: List of terrestrial and aquatic flora and fauna of the study site

### a. List of flora of the study area

English Name	Scientific Name	Family	Plant Type	Ecosystem Type	IUCN Red list Status
Palmyra Palm	<i>Borassus flabellifer</i>	Arecaceae	T	Terrestrial	EN
Jackfruit	<i>Artocarpus heterophyllus</i>	Moraceae	T	Terrestrial	-
Coconut	<i>Cocos nucifera</i>	Arecaceae	T	Terrestrial	-
Papaya	<i>Carica papaya</i>	Caricaceae	S	Terrestrial	-
Mango	<i>Mangifera indica</i>	Anacardiaceae	T	Terrestrial	-
Queen's crepe-myrtle	<i>Lagerstroemia speciosa</i>	Lythraceae	T	Terrestrial	-
Raintree	<i>Albizia saman</i>	Fabaceae	T	Terrestrial	-
Papuan wattle	<i>Acacia auriculiformis</i>	Fabaceae	T	Terrestrial	LC
Eucalyptus	<i>Eucalyptus citriodora</i>	Myrtaceae	T	Terrestrial	-
Bamboo	<i>Bambusa tulda</i>	Poaceae	G	Terrestrial	-
Mahogany	<i>Swietenia mahagoni</i>	Meliaceae	T	Terrestrial	EN
Goraneem	<i>Melia azadirachta</i>	Meliaceae	T	Terrestrial	LC
Sil Koroï	<i>Albizia procera</i>	Mimosaceae	T	Terrestrial	-
Sisu	<i>Dalbergia sissoo</i>	Fabaceae	T	Terrestrial	-
Sal	<i>Shorea robusta</i>	Dipterocarpaceae	T	Terrestrial	LC
Bohera	<i>Terminalia belerica</i>	Combretaceae	T	Terrestrial	-
Horitaki	<i>Terminalia chebula</i>	Combretaceae	T	Terrestrial	-
Kanchan	<i>Bauhinia acuminata</i>	Fabaceae	T	Terrestrial	LC
Polash	<i>Butea monosperma</i>	Fabaceae	T	Terrestrial	-
Lily	<i>Nymphaea nouchali</i>	Nymphaeaceae	W	Aquatic	LC
Lotus	<i>Nelumbo nucifera</i>	Nelumbonaceae	H	Aquatic	-
Water Hyacinth	<i>Eichhornia crassipes</i>	Pontederiaceae	W	Aquatic	-
Water spinach	<i>Ipomoea aquatica</i>	Convolvulaceae	W	Aquatic	LC
Creeping primrose-willow	<i>Ludwigia repens</i>	Onagraceae	W	Aquatic	-
Water lettuce	<i>Pistia stratiotes</i>	Araceae	W	Aquatic	LC
Floating fern	<i>Salvinia natans</i>	Salviniaceae	W	Aquatic	LC
Water velvet	<i>Azolla pinnata</i>	Salviniaceae	W	Aquatic	LC

Note: T-Tree, S-Shrub, G-Grass, LC-Least Concern, VU-Vulnerable, EN-Endangered, W-Weed

## b. List of wildlife of the study area

English Name	Scientific Name	Family	IUCN Red list Status
Asian Common Toad	<i>Duttaphrynus melanostictus</i>	Bufoidea	LC
Checkered keel back	<i>Xenochrophis piscator</i>	Colubridae	LC
Bengal Monitor	<i>Varanus bengalensis</i>	Varanidae	LC
Bullfrog	<i>Hoplobatrachus tigerinus</i>	Dicroglossidae	LC
Common mongoose	<i>Herpestes edwardsii</i>	Herpestidae	LC
Garden Lizard	<i>Calotes versicolor</i>	Agamidae	LC
Common skunk	<i>Eutropis carinata</i>	Scincidae	LC
Buff-striped Keelback	<i>Amphiesma stolata</i>	Colubridae	-
Rhesus macaque	<i>Macaca mulatta</i>	Cercopithecidae	LC
Barking deer	<i>Muntiacus muntjac</i>	Cervidae	-
Common Langur	<i>Semnopithecus entellus</i>	Cercopithecidae	LC
Fishing cat	<i>Prionailurus viverrinus</i>	Felidae	VU
Irrawaddy Squirrel	<i>Callosciurus pygerythrus</i>	Sciuridae	LC
Indian Pipistrelle	<i>Pipistrellus coromandra</i>	Vespertilionidae	LC
Bengal Fox	<i>Vulpes bengalensis</i>	Canidae	VU
Large Indian Civet	<i>Viverra zibetha</i>	Viverridae	Near Threatened
Asian Palm Civet	<i>Paradoxurus hermaphroditus</i>	Viverridae	LC (Decreasing)
Gangetic River Dolphin	<i>Platanista gangetica</i>	Platanistidae	EN

Note: LC-Least Concern, V-Vulnerable, EN-Endangered

## c. List of birds of the study area

English Name	Scientific Name	Family	IUCN Red list Status
Little egret	<i>Egretta garzetta</i>	Ardeidae	LC
Pond heron	<i>Ardeola grayii</i>	Ardeidae	LC
Large egret	<i>Ardea alba</i>	Ardeidae	LC
White ibis	<i>Threskiornis aethiopicus</i>	Threskiornithidae	LC
Spotted Dove	<i>Streptopelia chinensis</i>	Columbidae	LC
House sparrow	<i>Passer domesticus</i>	Passeridae	LC
House Crow	<i>Corvus splendens</i>	Corvidae	LC
Black drongo	<i>Dicrurus macrocercus</i>	Dicruridae	LC
Munia	<i>Lonchura punctulata</i>	Estrildidae	LC



English Name	Scientific Name	Family	IUCN Red list Status
*Larks	<i>Alaudala spp</i>	Alaudidae	LC
Flycatchers	<i>Myiarchus crinitus</i>	<i>Tyrannidae</i>	LC
Cape starling	<i>Lamprotornis nitens</i>	Sturnidae	LC
Dove	<i>Zenaida macroura</i>	Columbidae	LC
Domestic pigeon	<i>Columba livia domestica</i>	Columbidae	-
Spotted dove	<i>Spilopelia chinensis</i>	Columbidae	LC
Shalik	<i>Acridotheres tristis</i>	Sturnidae	LC
White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	<i>Alcedinidae</i>	LC
Brown Fish Owl	<i>Ketupa zeylonensis</i>	<i>Strigidae</i>	LC

Note: LC- Least Concern, \*no specific species were identified



## Appendix 9.1: Environmental Code of Practices

### Introduction

The objective of the Environmental Code of Practices (ECPs) is to address all potential and general implementation related impacts during demolition, site preparation, jetty construction, and erection of plants (Ammonia, Urea Melt and Granulation Urea). The ECPs will provide guidelines for best operating practices and environmental management guidelines to be followed by the contractors for sustainable management of all environmental issues. These ECPs shall be annexed to the general conditions of all the contracts, including subcontracts, carried out under the Project.

The list of ECPs prepared for the Project is given below:

- ECP 1: Waste Management**
- ECP 2: Fuels and Hazardous Goods Management**
- ECP 3: Water Resources Management**
- ECP 4: Drainage Management**
- ECP 5: Soil Quality Management**
- ECP 6: Erosion and Sediment Control**
- ECP 7: Protection of Flora**
- ECP 8: Protection of Fauna**
- ECP 9: Protection of Fisheries**
- ECP 10: Traffic Management (Road and Inland Navigation)**
- ECP 11: Construction Camp Management**
- ECP 12: Cultural and Religious Issues**
- ECP 13: Workers Health and Safety**
- ECP 14: Construction and Operation Phase Security**

Contractors will prepare site specific management plans, namely Construction Environmental Action Plan (CEAP), in compliance with the Environmental Conservation Rules, 1997 of Bangladesh (amended in 2005), World Bank Group Guidelines, and IFC Performance Standards and based on the guidance given in the ECPs. The CEAP will form the part of the contract documents and will be used as monitoring tool for compliance. It is mandatory for the contractors procured directly by the Project to include these ECPs in their sub-contracts. Violation of these requirements will be treated as non-compliance leading to the corrections or otherwise issuance of non-compliance certificates to the contractors.

**ECP 1: Waste Management**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction/ demolition sites.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Develop site specific waste management plan for various waste streams (e.g., reusable waste, flammable waste, demolition debris, construction debris, food waste etc.) prior to commencing of construction and submit to supervision consultant for approval.</li> <li>• Organize disposal of all wastes generated during demolition and construction in the designated disposal sites approved by the Project authority.</li> <li>• Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach.</li> <li>• Segregate all wastes, wherever practical.</li> <li>• Vehicles transporting solid waste shall be totally confined within an enclosed vehicle or is fully covered with a tarp to prevent spilling waste along the route.</li> <li>• Tarp must be undamaged (not torn or frayed) properly secured to the body of the vehicle or trailer with ropes, chains, straps, or cords so that no waste is exposed. The edges of the tarps shall extend 12 inches over the permanent sides and back of the open top vehicle or trailer and must be secured to the permanent vehicle. All loads must be tarped from the point of origin of the waste to the tipping area of the final disposal/landfill.</li> <li>• Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process.</li> <li>• Provide refuse containers at each worksite.</li> <li>• Request suppliers to minimize packaging where practicable.</li> <li>• Place a high emphasis on good housekeeping practices.</li> <li>• Maintain all construction sites clean, tidy and safe and provide and maintain appropriate facilities as temporary storage of all wastes before transporting to final disposal.</li> <li>• Potable water should be supplied in bulk containers to reduce the quantity of plastic waste (plastic bins). Plastic bag use should be avoided.</li> </ul>
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Collect chemical wastes in 200 liter drums (or similar sealed container), appropriately labeled for safe transport to an approved chemical waste depot.</li> <li>• Store, transport and handle all chemicals avoiding potential environmental pollution.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• Store all hazardous wastes appropriately in bunded areas away from water courses.</li> <li>• Make available all Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction.</li> <li>• Collect hydrocarbon wastes, including lube oils, for safer transport off-site to reuse, recycle, treatment or disposal at approved locations.</li> <li>• Construct concrete or other impermeable hardstand to prevent seepage in case of spills.</li> <li>• Keep sufficient stock of absorbents for generally used chemicals or for petrochemicals (e.g., dirt, sawdust, etc.) within the storage area to contain accidental spills.</li> </ul>

**ECP 2: Fuels and Hazardous Goods Management**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
<p>Fuels and hazardous goods.</p>	<p>Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals, hazardous goods/materials on-site, wash down of plant and equipment, and potential spills may harm the environment or health of construction workers.</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Prepare spill control procedures and submit them for supervision consultant for approval.</li> <li>• Train the relevant construction personnel in handling of fuels and spill control procedures.</li> <li>• Refueling shall occur only within bunded areas.</li> <li>• Store dangerous goods in bunded areas on top of a sealed plastic sheet away from watercourses. Store all liquid fuels in fully bunded storage containers, with appropriate volumes, a roof, a collection point and appropriate filling/decanting point.</li> <li>• Store and use fuels in accordance with material safety data sheets (MSDS). Make available MSDS for chemicals and dangerous goods on-site.</li> <li>• Store hazardous materials at above storm surge level, determined for construction.</li> <li>• Make sure all containers, drums, and tanks that are used for storage are in good condition and are clearly labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur.</li> <li>• Set containers and drums in temporary storages in clearly marked areas, where they will not be run-over by vehicles or heavy machinery. The area shall preferably drain to a safe collection area in the event of a spill.</li> <li>• Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• All machineries are to be stored and away from any water body, drainage inlets or natural drainage area, where practical. Environmental control measures such as appropriate barriers (i.e. bunding, sediment fence, etc.) will be considered and/or implemented to control runoff away from the machinery and prevent any washout in to adjacent water body, drainage inlets or natural drainage area.</li> <li>• Transport waste of dangerous goods, which cannot be recycled, to an approved waste disposal facility. Safe transport of fuel or other hazardous liquids to and from the storage container will be facilitated through the provision detailed within the Material Safety Data Sheets (MSDS).</li> <li>• Wash down of jetty platform and equipment and vehicle servicing will be performed only in isolated impervious areas away from drainage inlets, connecting the drainage with an oil interceptor. Pits/bunds located away from waterways will be provided for concrete wash near construction areas. The contractor's environmental officer with assistance from supervisors is to ensure that pits/bunds are available, maintained at capacity and drivers instructed regarding the location and required procedures.</li> <li>• Keep stock of absorbent and containment material (e.g., absorbent matting, dirt, sawdust, etc.) where hazardous material are used and stored; and ensure staffs are trained in their correct use.</li> <li>• Oil and chemical spills and washouts shall be cleaned up and collected immediately, where safety permits. Disposal of remediated / cleanup/ washout materials shall be to an approved waste disposal facility. Materials shall be transported by an approved / licensed transporter. Contaminated Material to be removed from site as soon as reasonably practical after the incident.</li> <li>• Provide appropriate personal protective equipment (protective clothing, safety boots, helmets, masks, gloves, goggles, etc.) to the construction personnel, depending on the materials handled.</li> <li>• Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials.</li> <li>• Siting of fuel and hazardous material storage sites, including refuelling facilities, batching plants and construction yards are to be located inside the embankments and at least 500 m away from any residential area.</li> <li>• Preparing inventories of chemicals that will be used, or have the potential to be used onsite. Inventories</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<p>should include anticipated volumes and types of materials and MSDS.</p> <ul style="list-style-type: none"> <li>• Outdoor storage will be secured when unmanned, and storage of hazardous or potentially hazardous materials will ideally be arranged so that stored products are away from vegetated areas and there is <math>\geq 6</math> m between stored products, uncontrolled grasses or weeds, and fuel dispensers.</li> <li>• Personnel will avoid mixing chemicals unless specified by the manufacturer, and will use chemicals as specified on labels, in well ventilated areas.</li> <li>• Corrosive materials will be stored away from flammables.</li> <li>• Re-useable or recycled degreasers will be used where possible or appropriate to machinery and equipment.</li> <li>• Exposed stockpiles of materials will be covered with tarpaulin or impervious sheets before rainstorm occurs.</li> </ul>

**ECP 3: Water Resources Management**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Follow the management guidelines proposed in ECP 1 and ECP 2: Fuels and Hazardous Goods Management.</li> <li>• Minimize the generation of spoils, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways or storm water systems.</li> </ul>
Discharge from construction sites	Construction activities, sewerages from construction sites and work camps may affect the surface water quality. The construction works will modify groundcover and topography, changing the surface water drainage patterns of the area. These changes in hydrological regime lead to increased rate of runoff, increase in sediment and	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Develop temporary drainage networks (channels and check dams) in areas where sediment and erosion control is required for protecting storage areas for construction materials.</li> <li>• Install temporary sediment lagoons, where appropriate, to capture sediment-laden run-off from work site.</li> <li>• Divert runoff from undisturbed areas around the construction site.</li> <li>• Stockpile materials away from drainage lines.</li> <li>• Prevent all solid and liquid wastes entering waterways by collecting spoils, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to an approved waste disposal site or recycling depot.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	contaminant loading, increased flooding, and affect habitat of fish and other aquatic biology.	<ul style="list-style-type: none"> <li>Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off site or into approved banded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done in every exit of each construction vehicle to ensure the local roads are kept clean.</li> </ul>
Soil erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion.</li> <li>Ensure that roads used by construction vehicles are swept regularly to remove dust and sediment.</li> <li>Water the loose material stockpiles, access roads and bare soils on an as needed basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).</li> </ul>
Construction activities in water bodies	<p>Dredging/ excavation activities associated with construction of pipelines, bulkheads and river training works, and buildings for a facility can cause turbidity and sedimentation in nearby waters, degraded water quality, and substrate alterations.</p> <p>Under water noise from the piling and other sources may compel dolphin, fish and other aquatic organisms leaving the area; sound pressure waves may also adversely affect riverine organisms including vocalization and behavior of fish, dolphins and other animals.</p>	<p>The Contractor Shall</p> <ul style="list-style-type: none"> <li>Dewater sites by pumping water to a sediment basin prior to release off site – do not pump directly off site.</li> <li>Monitor the water quality in the runoff from the site or areas affected by dredge/excavation plumes, and improve work practices as necessary.</li> <li>Protect water bodies from sediment loads by silt screen or other barriers.</li> <li>Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways or storm water systems.</li> <li>Do not discharge cement and water curing used for cement concrete directly into water courses and drainage inlets.</li> <li>Set a large bubble curtain consists of a hose with drilled holes, supplied with compressed air. The hose is placed on the river bed and the air escaping from the holes forms the bubble screen.</li> <li>Conduct pile driving during low tides in intertidal and shallow in subtidal areas.</li> </ul>
	Highly motile adult and juvenile life stages of most fishes could flee when construction is	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>Avoid dredged material disposal activities in areas containing sensitive or unique benthic habitats (e.g., spawning and feeding sites).</li> </ul>



Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	ongoing, however, egg and larval stages as well as non-motile benthic organisms will likely not be able to avoid impacts. As a general rule, the severity of adverse effects tends to be greatest for early life stages and for adults of some highly sensitive species.	<ul style="list-style-type: none"> <li>• Restrict construction during December-February and May-July when appropriate to avoid temporary impacts to habitat during critical life history stages (e.g., spawning, egg and embryo development, and juvenile growth).</li> <li>• Control of sediment flow from the construction activities</li> <li>• Silt curtains along river training works and/or other industry good practice management controls will be used to restrict the spread of sediment released during construction of Terminal/Jetty/Materials Offloading Facility earthen causeway.</li> <li>• Minimize and restrict clearing of river slope and river bank vegetation as much as possible.</li> </ul>
Drinking water	Untreated surface water is not suitable for drinking purposes due to presence of suspended solids and E. coli.	<p>The Contractor Shall</p> <ul style="list-style-type: none"> <li>• Provide drinking water that meets National and WHO Drinking Water standards. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time.</li> </ul>

#### ECP 4: Drainage Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Excavation and earth works, and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Prepare drainage management procedures and submit them for supervision consultant for approval.</li> <li>• Prepare a program to prevent/avoid standing waters, which supervision consultant will verify in advance and confirm during implementation.</li> <li>• Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line.</li> <li>• Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there.</li> <li>• Rehabilitate road drainage structures immediately if damaged by contractors' road transports.</li> <li>• Build new drainage lines as appropriate and required for wastewater from construction yards connecting to the available nearby recipient water bodies. Ensure wastewater quality conforms to National Standards, before it is being discharged into the recipient water bodies.</li> <li>• Ensure that there will be no water stagnation at the construction sites and camps.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• Provide appropriate silt collector and silt screen at the inlet and manholes and periodically clean the drainage system to avoid drainage congestion.</li> <li>• Protect natural slopes of drainage channels to ensure adequate storm water drains.</li> <li>• Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem.</li> </ul>
Ponding of water	Health hazards due to mosquito breeding	<ul style="list-style-type: none"> <li>• Do not allow ponding of water especially near the waste storage areas and construction camps.</li> <li>• Discard all the storage containers that are capable of storing of water, after use or store them in inverted position.</li> </ul>

### ECP 5: Soil Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Strictly maintain the wastes management plans proposed in ECP-1 and storage of materials and ECP-2: Fuels and Hazardous Goods Management.</li> <li>• Construct appropriate spill containment facilities for all fuel storage areas.</li> <li>• Establish and maintain a hazardous material register detailing the location and quantities of hazardous substances including the storage, and their disposals.</li> <li>• Train personnel and implement safe work practices for minimizing the risk of spillage.</li> <li>• Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site.</li> <li>• Remediate the contaminated land using the most appropriate available method.</li> <li>• Confine the contaminants immediately after such accidental spillage.</li> <li>• Collect contaminated soils and washouts containing petroleum products treat and dispose them in environment friendly manner.</li> <li>• All areas intended for storage of hazardous materials to be quarantined and provided with adequate facilities to combat emergency situations complying all the applicable statutory stipulation.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor shall <ul style="list-style-type: none"> <li>• Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds.</li> </ul>
Impact on top soil	Earthworks will impact the fertile top soils that are enriched with nutrients required for plant growth	The contractor shall <ul style="list-style-type: none"> <li>• Strip the top soil to a depth of 35 cm and store in stock piles of height not exceeding 2m.</li> <li>• Remove unwanted materials from top soil like grass, roots of trees and others.</li> <li>• Spread the topsoil to maintain the physico-chemical and biological activity of the soil. The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites.</li> </ul>

### ECP 6: Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Clearing of construction sites	Cleared areas and slopes are susceptible for erosion of top soils, which affects the growth of vegetation and causes ecological imbalance.	The Contractor shall <ul style="list-style-type: none"> <li>• Prepare site specific erosion and sediment control measures and submit them for supervision consultant for approval.</li> <li>• Reinstatement and protect cleared areas as soon as possible.</li> <li>• Cover unused area of disturbed or exposed surfaces immediately with mulch/grass turf/tree plantations.</li> </ul>
Construction activities and material stockpiles	The impact of soil erosion are (i) Increased run off and sedimentation causing a greater flood hazard to the downstream and silt accumulation and (ii) destruction of aquatic environment by erosion and/or deposition of sediment damaging the spawning grounds of fish	The Contractor shall <ul style="list-style-type: none"> <li>• Locate stockpiles away from drainage lines.</li> <li>• Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds.</li> <li>• Remove debris from drainage paths and sediment control structures.</li> <li>• Cover the loose sediments of construction material and water them if required.</li> <li>• Divert natural runoff around construction areas prior to any site disturbance.</li> <li>• Install protective measures on site prior to construction, for example, sediment traps.</li> <li>• Install 'cut off drains' on large cut/fill batter slopes to control water runoff speed and hence erosion.</li> <li>• Observe the performance of drainage structures and erosion controls during rain and modify as required.</li> <li>• Restrict construction during December-February and May-July in the river when appropriate to avoid temporary impacts to</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		habitat during critical life history stages (e.g., spawning, egg and embryo development, and juvenile growth).
Soil erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion.</li> <li>• Ensure that roads used by construction vehicles are swept regularly to remove sediment.</li> <li>• Water the material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).</li> </ul>
Erosion and sedimentation from dredging	Dredging in combination with erosion and sedimentation caused by the wakes of modest vessels, will adversely affect priority habitat for freshwater dolphins and other aquatic species, such as fishes.	<p>The contractor shall</p> <ul style="list-style-type: none"> <li>• Use seasonal restrictions when appropriate to avoid temporary impacts to habitat during critical life history stages.</li> <li>• Dredging will be restricted during breeding and spawning season to avoid hindrance or blockage of fish, Dolphin and other aquatic species breeding and spawning.</li> <li>• Measures indicated earlier will be implemented</li> </ul>

**ECP 7: Protection of Flora**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Local flora is important habitats for birds, provide fruit harvest, timber/fire wood, protect soil from erosion and overall keep the natural balance for human-living. As such damage to flora has wide range of adverse environmental impacts.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Prepare a plan to protect flora and submit the plan for supervision consultant's approval.</li> <li>• Minimize disturbance to surrounding vegetation.</li> <li>• Use appropriate type and minimum size of machine to avoid disturbance to adjacent vegetation.</li> <li>• Get approval from supervision consultant for clearance of vegetation.</li> <li>• Make selective and careful pruning of trees where possible to reduce need of tree removal.</li> <li>• Control noxious weeds by disposing of at designated dumping site or burn on site.</li> <li>• Clear only the vegetation that needs to be cleared in accordance with the engineering plans and designs. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill, etc.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• Not burn off cleared vegetation – where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary waterman and valve access or landscaping. Mulch provides a seed source, can limit embankment erosion, retains soil moisture and nutrients, and encourages re-growth and protection from weeds.</li> <li>• Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same location from where it came from.</li> <li>• Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil.</li> <li>• Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible.</li> <li>• Ensure excavation works occur progressively and re-vegetation done at the earliest.</li> <li>• Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction</li> <li>• Supply appropriate fuel in the work camps to prevent fuel wood collection.</li> <li>• Include environmental management and awareness as part of training for employees during construction.</li> <li>• Avoid felling of tree species of conservation significance and those that are protected, even those that act as nesting and breeding sites.</li> <li>• Tree planation will be carried out in and other suitable areas near the river training works of the plant jetty at a ratio of 5 new trees per each tree felt.</li> </ul>

**ECP 8: Protection of Fauna**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities	The location of construction activities can result in the loss of wild life habitat and habitat quality.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Prepare a plan for protection of fauna and submit the plan for supervision consultant approval.</li> <li>• Limit the construction works within the designated sites allocated to the contractors.</li> <li>• Check the site (especially trenches) for trapped animals, and rescue them by the help of a qualified person.</li> <li>• Provide temporary access to the animals to cross the trenches.</li> <li>• Use of existing access road and limit the width of new access roads.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	Impact on local and migratory birds, their habitats and active nests	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Not be permitted to destruct active nests or eggs of birds.</li> <li>• Minimize the tree removal during the bird breeding season. If works must be continued during the bird breeding season, a nest survey will be conducted by a qualified biologist prior to commence of works to identify and locate active nests.</li> <li>• If bird nests are located/ detected within the right-of-way and roadside embankments then those areas should be avoided.</li> <li>• Petroleum products should not come in contact with the natural and sensitive ecosystems. Contractor must minimize the release of oil, oil wastes or any other substances harmful to migratory birds' habitats, to any waters, wetlands or any areas frequented by migratory birds.</li> </ul>
	Loss of temporary breeding pools and pans due to refilling of such pools by construction soil or gravel.	<p>he contractor shall</p> <ul style="list-style-type: none"> <li>• Schedule construction during dry season to reduce impact since the amphibian populations will be low during non-breeding season</li> <li>• Fence off the trenches with nets to prevent amphibians falling into the trap.</li> </ul>
	Movement of dredgers, dredging operation, discharge pipelines, and dredged material disposal may have a negative impact on the surrounding homestead Ecosystem (including, terrestrial wildlife and aquatic fauna).	<p>The contractor shall</p> <ul style="list-style-type: none"> <li>• Ensure enforcement of ECA, 1995 (as amended in 2010) and ECR, 1997 (as amended in 2005)</li> <li>• Forest Protection Act, and other rules, regulation and treaties for conserving the Ecological Critical Areas</li> <li>• Ensure zero disposal of ballast water, zero oil spillage, zero discharge of waste water</li> <li>• Restrict outside lighting of the dredgers during navigation and dredging operation</li> <li>• Restrict the beaming of searchlight</li> </ul>
	Above water noise and vibration can create nuisance to local community, disturb birds	<p>The contractor shall</p> <ul style="list-style-type: none"> <li>• Reduce the dredger noise at source by isolation of exhaust systems, by keeping engine room doors shut and by additional measures such as shielding.</li> <li>• Equip the dredger with efficient and effective silencer for limiting the generation of noise.</li> <li>• Limit the noisy dredging activity to daylight hours, where possible, rather than at sunrise or sunset (significant for wildlife). Where unavoidable, the contractor should ramp up the levels of engines or other noise producing sources, so that the noise slowly increases. This will encourage riverine and terrestrial fauna to</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<p>move away from the source area prior to significant noise emissions.</p> <ul style="list-style-type: none"> <li>• Inspect and maintain equipment in good working condition.</li> </ul>
	<p>Excavation works will impact on the loss of habitats especially the terrestrial invertebrates that live in the ground.</p>	<p>The contractor shall</p> <ul style="list-style-type: none"> <li>• Avoid construction during rainy season</li> <li>• Minimize digging of trenches and vegetation clearance to minimum required level.</li> </ul>
Vegetation clearance	<p>Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Restrict the tree removal to the minimum numbers required.</li> <li>• Relocate hollows, where appropriate.</li> <li>• Fell the hollow bearing trees in a manner which reduces the potential for fauna mortality. Felled trees will be inspected after felling for fauna and if identified and readily accessible will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition. Care should be taken to make sure bird habitats are not destroyed. If there is no option available, rehabilitate them in other neighboring trees. Also protect and rehabilitate injured or orphaned birds.</li> </ul>
Night time lighting	<p>Lighting from construction sites and construction camps may affect the visibility of night time migratory birds that use the moon and stars for navigation during their migrations.</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Use lower weightage flat lens fixtures that direct light down and reduce glare, thus reducing light pollution,</li> <li>• Avoid flood lights unless they are absolutely required.</li> <li>• Use motion sensitive lighting to minimize unneeded lighting.</li> <li>• Use, if possible, green lights that are considered as bird's friendly lighting instead of white or red colored lights.</li> <li>• Install light shades or plan the direction of lights to reduce light spilling outside the construction area.</li> </ul>
Construction camps	<p>Illegal poaching</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Provide adequate knowledge to the workers regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching.</li> <li>• Ensure that staff and Subcontractors are trained and empowered to identify, address and report potential environmental problems.</li> <li>• Provide sufficient food allowance to the workers so that they don't engage in illegal poaching or hunting.</li> </ul>

**ECP 9: Protection of Fisheries**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities (dredging) in River	The main potential impacts to fisheries are dredging, dumping of dredged spoil, hydrocarbon spills and leaks from riverine transport, and disposal of wastes into the river.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Prepare procedures for protection of fish and submit them for supervision consultant approval.</li> <li>• Restrict dredging and piling in the intake area during fish breeding and spawning season (December-February) and May-July to avoid hindrance or blockage of fish breeding and spawning.</li> <li>• Ensure the construction equipment used in the river are well maintained and do not have oil leakage to contaminate river water.</li> <li>• Contain oil immediately on river in case of accidental spillage from equipment; make an emergency oil spill containment plan (under the Fuels and Hazardous Substances Management Plan) to be supported with enough equipment, materials and human resources.</li> <li>• Do not dump wastes, be it hazardous or non-hazardous into the nearby water bodies or in the river.</li> <li>• Control of sediment flow from the dredging activities.</li> <li>• Restrict dredging to design section only where required by avoiding sensitive areas (dolphin and fish spawning areas). No dredging will be carried out within one hundred meter of these sensitive areas.</li> <li>• During dry season no disposal of dredged materials in the scour holes. Scour holes are used as a refuge by some large fishes, dolphins and aquatic animals during dry season/winter.</li> <li>• Follow Biodiversity Management Plan.</li> <li>• Follow IFC's PS 6- Biodiversity Conservation and Sustainable Management of Living Natural Resources.</li> <li>• Implementation of ECPs, including ECP 1 Waste Management, ECP 2 Fuels and Hazardous Goods Management, and Noise Management Plan.</li> </ul>
	Underwater noise and vibration may disrupt fish and dolphins	<p>The contractor shall</p> <ul style="list-style-type: none"> <li>• Reduce the dredger noise at source by isolation of exhaust systems, by keeping engine room doors shut and by additional measures such as shielding.</li> <li>• Equip the dredger with efficient and effective silencer for limiting the generation of noise.</li> <li>• Limit the noisy dredging activity to daylight hours, where possible, rather than at sunrise or sunset (significant for wildlife). Where unavoidable, the contractor should ramp up the levels of engines or</li> </ul>



Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<p>other noise producing sources, so that the noise slowly increases. This will encourage riverine and terrestrial fauna to move away from the source area prior to significant noise emissions.</p> <ul style="list-style-type: none"> <li>Inspect and maintain equipment in good working condition.</li> </ul>
	Risk of collision of construction boats with dolphins and other wildlife	<p>The contractor shall</p> <ul style="list-style-type: none"> <li>Limit the motor boat speed to <math>\leq 15</math> km/h in accordance with the best international practices and to avoid any collision with dolphins.</li> </ul>
Construction activities on the land	The main potential impacts on river are increased suspended solids from earthworks erosion, sanitary discharge from work camps, and hydrocarbon spills	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>follow mitigation measures proposed</li> <li>ECP 3: Water Resources Management and</li> <li>ECP 4: Drainage Management.</li> </ul>

#### ECP 10: Traffic Management (Road and Inland)

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>Prepare a traffic management plan and submit the plan for supervision consultant approval.</li> <li>Strictly follow the Project's 'Traffic Management Plan' and work with close coordination with the Traffic Management Unit.</li> <li>Prepare and submit additional traffic plan, if any of his traffic routes are not covered in the Project's Traffic Management Plan, and requires traffic diversion and management.</li> <li>Include in the traffic plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges, temporary diversions, necessary barricades, warning signs / lights, road signs, construction schedule etc.</li> <li>Provide signs at strategic locations of the roads complying with the schedules of signs contained in the National Traffic Regulations.</li> </ul>
	Accidents and spillage of fuels and chemicals and damage to infrastructures and properties due to vibration	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>Restrict truck deliveries, where practicable, to day time working hours.</li> <li>Restrict the transport of oversize loads.</li> <li>Operate vehicles, if possible, to non-peak periods to minimize traffic disruptions.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• Enforce on-site speed limit, especially close to the sensitive receptors, schools, health centers, etc.</li> <li>• Inspect structures within the close proximity of construction site for damages.</li> </ul>

**ECP 11: Construction Camp Management**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and location of construction camps	Camp sites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Prepare a construction camp management plan and submit the plan to supervision consultant for approval.</li> <li>• Locate the construction camps within the designated sites or at areas which are acceptable from environmental, cultural or social point of view and approved by the supervision consultant or the Client.</li> <li>• Conduct consultation with communities including local government institutes bodies (Ward Councilor of Pourshava ) prior to set-up the camp.</li> <li>• Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities.</li> <li>• Submit to the supervision consultant for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of access roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the camps.</li> <li>• Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social, and security matters.</li> </ul>
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply, and sanitation facilities will increase pressure on the local services and generate substandard living	<p>Contractor shall provide the following facilities in the campsites</p> <ul style="list-style-type: none"> <li>• Adequate housing for all workers.</li> <li>• Follow IFC's Performance Standard PS2: Labor and Working Conditions for creating congenial environment for the labor's living.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	standards and health hazards.	<ul style="list-style-type: none"> <li>• Safe and reliable water supply, which should meet national/WHO standards. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time (WHO guideline).</li> <li>• Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by location. The minimum number of toilet facilities required is one toilet for every ten persons.</li> <li>• Treatment facilities for sewerage of toilet and domestic wastes.</li> <li>• Storm water drainage facilities.</li> <li>• Paved internal roads.</li> <li>• Provide child crèches for women working at construction site. The crèche should have facilities for dormitory, kitchen, indoor and outdoor play area. Schools should be attached to these crèches so that children are not deprived of education whose mothers are construction workers.</li> <li>• Provide in-house community/common entertainment facilities. Dependence of local entertainment outlets by the construction camps to be discouraged/prohibited to the extent possible.</li> </ul>
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Ensure proper collection and disposal of solid wastes within the construction camps.</li> <li>• Insist waste separation by source; organic wastes in one container and inorganic wastes in another container at household level.</li> <li>• Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed.</li> <li>• Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approved waste disposal sites.</li> </ul>
Fuel supplies for cooking purposes	Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or other biomass.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking.</li> <li>• Conduct awareness campaigns to educate workers on preserving the protection of biodiversity and wildlife of the project area, and relevant government regulations and punishments on wildlife protection.</li> </ul>
Health and Hygiene	<p>There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted infections and HIV/AIDS.</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Follow the IFC's Performance Standard PS4: Community Health, Safety, and Security</li> <li>• Provide adequate health care facilities within construction sites.</li> <li>• Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse.</li> <li>• Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals.</li> <li>• Initial health screening of the laborers coming from outside areas.</li> <li>• Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work.</li> <li>• Provide HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on regular basis.</li> <li>• Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellent sprays during rainy season in offices and construction camps and yards.</li> <li>• Not dispose food waste openly as that will attract rats and stray dogs.</li> <li>• Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camps containing messages on best hygiene practices.</li> </ul>
Security and Safety	<p>Inadequate security and safety provision in construction camps may create security and safety problems of workforces and assets and fire hazards. Security risks for workers and project staffs, especially</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Follow the IFC's Performance Standard PS4: Community Health, Safety, and Security</li> <li>• Provide appropriate security personnel (police or private security guards) and enclosures to prevent unauthorized entry in to the camp area.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	<p>from pirates and bandits who are known to roam the area and carry-out kidnappings for ransoms.</p>	<ul style="list-style-type: none"> <li>• Employ night watchman and security personnel from forest department for periods of dredging, significant on-site storage or when the area necessitates.</li> <li>• Consult with the local leaders and local community representatives on security matters.</li> <li>• Maintain register to keep a track on a head count of persons present in the camp at any given time.</li> <li>• Pre-employment screening investigations should be used to verify the applicants relating to their employment, education and criminal history background.</li> <li>• Issuance of Identification Cards to workers and checking them properly when get into the workplace.</li> <li>• Encourage use of flameproof material for the construction of labor housing / site office. Also, ensure that these houses/rooms are of sound construction and capable of withstanding wind storms/cyclones.</li> <li>• Provide appropriate type of firefighting equipment suitable for the construction camps.</li> <li>• All construction material storage should be sit a visible location secured with fence or solid walls with locks to avoid theft and vandalism.</li> <li>• Display emergency contact numbers clearly and prominently at strategic places in camps.</li> <li>• Communicate the roles and responsibilities of laborers in case of emergency in the monthly meetings with contractors.</li> </ul>
<p>Site Restoration</p>	<p>Restoration of the construction camps to original condition requires demolition of construction camps.</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work.</li> <li>• Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed.</li> <li>• Give prior notice to the laborers before demolishing their camps/units.</li> <li>• Maintain the noise levels within the national standards during demolition activities.</li> <li>• Different contractors should be hired to demolish different structures to promote recycling or reuse of demolished material.</li> <li>• Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• Handover the construction camps with all built facilities as it is if agreement between both parties (contactor and land-owner) has been made so.</li> <li>• Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner.</li> </ul>

**ECP 12: Cultural and Religious Issues**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
<p>Construction activities near religious and cultural sites</p>	<p>Disturbance from construction works to the cultural and religious sites, possible cultural conflicts between communities and workers and contractors lack of knowledge on cultural issues cause social disturbances.</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Communicate to the public through community consultation regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction.</li> <li>• Not block access to cultural and religious sites, wherever possible.</li> <li>• Restrict all construction activities within the foot prints of the construction sites.</li> <li>• Stop construction works that produce noise (particularly during prayer time) should there be any church/mosque/religious/educational institutions and health center close to the construction sites and users make objections.</li> <li>• Take special care and use appropriate equipment when working next to a cultural/religious center.</li> <li>• Stop work immediately and notify the site manager, if during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until 'approval to continue' is obtained by the archaeological authority.</li> <li>• It is imperative to develop a procedure for management of 'Chance Finds'. IFC's PS 8-Cultural Heritage should be followed by the Contractor.</li> <li>• Provide independent prayer facilities to the construction workers.</li> <li>• Show appropriate behavior with all construction workers especially women and elderly people.</li> <li>• Allow the workers to participate in praying during construction time, if there is a request.</li> <li>• Resolve cultural issues in consultation with local leaders and supervision consultants.</li> <li>• Conduct awareness campaign and develop Code of Conduct for workers on local cultural.</li> <li>• Develop and function the grievance redressal mechanism.</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• Develop and implement strong community participation plan.</li> <li>• Establish a mechanism that allows local people to raise grievances arising from the construction process.</li> <li>• Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social, and security matters.</li> </ul>

**ECP 13: Workers Health and Safety**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	<p>Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g., noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases, etc.), (ii) risk factors resulting from human behavior (e.g., STD, HIV/AIDS, etc.) and (iii) road accidents from construction traffic.</p>	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Prepare an Occupational Health and Safety plan and submit the plan for supervision consultant's approval.</li> <li>• Implement suitable safety standards for all workers and site visitors, with sufficient provisions to comply with international standards (e.g. International Labor Office guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guidelines') and contractor's own safety standards, in addition to complying with national standards.</li> <li>• Implement Emergency Preparedness Plan (EPP). Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas.</li> <li>• Provide personal protective equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing the damaged ones.</li> <li>• Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job.</li> <li>• Appoint an environment, health and safety manager to look after the health and safety of the workers.</li> <li>• Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and</li> </ul>

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		establishment of construction camps so as to maintain effective surveillance over public health, social and security matters.
	Child and pregnant labor	The Contractor shall <ul style="list-style-type: none"> <li>• Not hire children of less than 14 years of age and pregnant women or women who delivered a child within 8 preceding weeks.</li> </ul>
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	The Contractor shall <ul style="list-style-type: none"> <li>• Ensure health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work.</li> <li>• Document and report occupational accidents, diseases, and incidents.</li> <li>• Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards, in a manner consistent with good international industry practice.</li> <li>• Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures.</li> <li>• Provide awareness to the construction drivers to strictly follow the driving rules.</li> <li>• Provide adequate lighting in the construction area, inside the tunnels, inside the powerhouse cavern and along the roads.</li> <li>• Follow relevant IFC Performance Standard (PS) like PS-2 on Labor and Working Conditions; PS-3 on Resource Efficiency and Pollution Prevention and PS-4 on Community Health, Safety, and Security.</li> </ul>
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in ECP 11: Construction Camp Management: <ul style="list-style-type: none"> <li>• Adequate ventilation facilities</li> <li>• Safe and reliable water supply.</li> <li>• Hygienic sanitary facilities and sewerage system.</li> <li>• Treatment facilities for sewerage of toilet and domestic wastes</li> <li>• Storm water drainage facilities.</li> <li>• Recreational and social facilities</li> <li>• Safe storage facilities for petroleum and other chemicals in accordance with ECP 2</li> <li>• Solid waste collection and disposal system in accordance with ECP1.</li> </ul>



Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> <li>• Arrangement for trainings</li> <li>• Paved internal roads.</li> <li>• Security fence at least 2 m height and security guards at entrances and every corner of the facility.</li> <li>• Sick bay and first aid facilities</li> </ul>
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	<p>The contractor shall</p> <ul style="list-style-type: none"> <li>• Provide portable toilets at the construction sites with workforce size 25 people or more, work the whole day for a month. Location of portable facilities should be at least 6 m away from storm drain system and surface waters. These portable toilets should be cleaned once a day and all the sewerage should be pumped from the collection tank once a day and should be brought to the common septic tank for further treatment.</li> <li>• Provide safe drinking water facilities to the construction workers at all the construction sites.</li> </ul>
Other ECPs	Potential risks on health and hygiene of construction workers and general public	<p>The Contractor shall follow the following ECPs to reduce health risks to the construction workers and nearby community</p> <ul style="list-style-type: none"> <li>• ECP 2: Fuels and Hazardous Goods Management</li> <li>• ECP 4: Drainage Management</li> <li>• Air Quality Management Plan</li> <li>• Noise Management Plan</li> <li>• ECP 10: Traffic Management</li> </ul>
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	<p>The Contractor shall</p> <ul style="list-style-type: none"> <li>• Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria, transmission of sexually transmitted infections (STI), and HIV/AIDS).</li> <li>• Train all construction workers in general health and safety matters, and on the specific hazards of their work. Training should consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate.</li> <li>• Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled workforces, at the time of recruitment and thereafter pursued throughout the construction phase on ongoing and regular basis. This should be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.</li> </ul>

**ECP 14: Construction and Operation Phase Security**

Project Activity/ Impact Source	Impacts /Concerns	Mitigation Measures/ Management Guidelines
Construction Phase	<p>Inadequate construction site security poses a significant risk to assets, construction materials and property. Theft/vandalism of assets, materials and property would increase construction costs and cause delays in project completion.</p>	<p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>• Follow IFC’s Performance Standard PS4: Community Health, Safety, and Security</li> <li>• Provide appropriate security personnel (i.e. security guards) to prevent unauthorized entry into the camp area.</li> <li>• Employ night watchman for periods of significant on-site storage or when the area necessitates.</li> <li>• Ensure all assets (i.e., tools, equipment, etc.) and construction materials at construction site are identified, inventoried and tracked as closely as possible. All assets should be clearly labeled and marked. Keep records of tool serial numbers and check inventory on a regular basis.</li> <li>• All tools and equipment should have a check out/in system, if not in use should be secured and stored in a proper place to prevent theft or loss. Provide storage sheds for the secure storage of equipment and tools when not in use.</li> <li>• Ensure there is proper fencing around construction site perimeter. Fencing should be chain-link at least 2.5 m high and secured with a steel chain and lock. If possible the entire site should be fenced; if this is not possible, make sure construction trailer and any equipment storage areas are fenced.</li> <li>• Ensure construction site has controlled access points (one or two entry points at most), allowing for close monitoring of comings and goings from the site.</li> <li>• Workers should be easily identified and have credentials that indicate site access.</li> <li>• No trespassing signs should be posted in conspicuous areas throughout the job site.</li> <li>• List of employees who have after hour access to the property should be available to the BCIC PIU and local authorities.</li> <li>• Ensure work site is properly lighted at night. Well-lit areas should include any office trailers and equipment storage trailers. Floodlights operated by sensors should also be installed where appropriate.</li> <li>• Pre-employment screening investigations should be used to verify the applicants relating to their employment, education and criminal history background.</li> </ul>
	<p>Improper security measures may pose security risk for construction workers and especially foreign</p>	<p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>• Prepare site specific security plan.</li> <li>• Maintain register to keep track of number of persons present in the camp at any given time.</li> <li>• Provide appropriate security personnel at job sites as mentioned above.</li> </ul>

Project Activity/ Impact Source	Impacts /Concerns	Mitigation Measures/ Management Guidelines
	staff on construction sites.	<ul style="list-style-type: none"> <li>• Ensure proper fencing as mentioned above.</li> <li>• Ensure controlled access points to job site as mentioned above.</li> <li>• Ensure works have easily identified credentials as mentioned above.</li> <li>• Ensure work sites are properly lighted at night, as mentioned above.</li> </ul>
Operation Phase	Vandalism/damage (including use of explosives) of water transmission mains, transfer stations Plant, Gas Pipelines, RMS, control stations and storage reservoirs. Theft of infrastructure (i.e. metals and etc.) is also of concern.	<ul style="list-style-type: none"> <li>• Patrol Men and Pipeline Community Policing Forum shall routinely conduct patrols and inspections of transmission mains Plant area and facilities.</li> <li>• They shall monitor suspicious activity and notify local authorities and BCIC GPUFP along with VH/GVH/TA's in event of any such occurrence/incident.</li> <li>• Ensure strategic infrastructure sites such as reservoirs RMS, Gas Pipelines, and main Plant transfer stations are secure and fenced with controlled access points. Fencing should be chain-link at least 2.5 m high and secured with a steel chain and lock.</li> </ul>



## Appendix 9.2: Volume and Weight of Debris

Sl.	Name of Infrastructures	Area Measurement (in sq. ft.)	Volume of Debris* (Cubic Yards)	Weight on Construction debris (in tons)
1	Administrative office building area (Two storied)	17,026	378	666
2	Technical office building area (Two storied)	13,596	302	532
3	Canteen building area	2,040	45	80
4	General store building area	30,450	677	1191
5	General store semi-pucca asbestos sheet roof with M.S. tress	21,750	266	468
6	Security post (Two storied)	72	2	3
7	Factory out gate security office	364	8	14
8	Factory main gate security office	960	21	38
9	Receiving bay store office	1,200	27	47
10	Security office (Housing colony gate)	420	9	16
11	VIP Guest House building area	8,390	186	328
12	Medical Center (Three storied) and Porch	10,962	66	116
13	Officer's Club (Two storied), one storied and Porch	10,572	578	1018
14	Officer's Hostel (Five storied), Porch, Passage (Three storied)	26,021	578	1018
15	Employee's Hostel (Five storied), Passage, Porch	30,954	688	1211
16	Union Office (One storied)	2,592	58	101
17	Employee's Club (Two storied) and Porch	9,285	206	363
18	UFFL Lagoon pump house	750	17	29
<b>A</b>	<b>Sub-total building area=</b>	<b>1,87,404</b>		<b>7238</b>
<b>B</b>	<b>Sub-total semi-pucca tin-shed building area=</b>	<b>94,680</b>		
<b>C</b>	<b>Sub-total RCC (Brick chips) road area=</b>	<b>1,67,494</b>	6203	10918
<b>D</b>	<b>Sub-total RCC (Stone chips) road area=</b>	<b>1,680</b>	62	110
<b>E</b>	<b>Sub-total carpeting road area=</b>	<b>86,550</b>	3206	5642
<b>F</b>	<b>Sub-total boundary wall area=</b>	<b>44,343</b>	985	1734
<b>G</b>	<b>Sub-total tin-shed/asbestos/scrap yard/heavy vehicle area=</b>	<b>10,525</b>		15
<b>H</b>	<b>Sub-total Titas infrastructure area=</b>	<b>44,587</b>	991	1744
<b>I</b>	<b>Grand total demolished area=</b>	<b>6,37,263 sqft~59,204 sqm</b>		<b>27401</b>

\* General Building Debris Estimation Formula (Per FEMA, Debris Estimating Field Guide, FEMA Publication No 329, September 2010) - Length x Width x Height x 0.33 ( constant of 0.33 to account for the air space in the building is being changed AS 0.60 in respect of Bangladesh) /27 = CY

1 Cubic Yards (CY) = 1.76 tons



## Appendix 10.1: Scoring matrix and criteria for ecological risk assessment

Criteria	Low risk (Score: 1)	Medium risk (Score: 2)	High risk (Score: 3)	Description of criteria
<b>Exposure criteria</b>				
Spatial overlap	<10% of Habitat overlaps with stressor	10–30% of Habitat overlaps with stressor	>30% of Habitat overlaps with stressor	The approach uses maps of habitats and stressors associated with human activities to calculate the percentage of each habitat type that overlaps with each stressor and its zone of influence.
Intensity	Low	Medium	High	The intensity of the activity
Management effectiveness	Very effective	Somewhat effective	Poorly managed	Management can limit the negative impacts of human activities on habitats, thus reducing exposure even where and when the activities interact with habitats. For the detailed management plan please see the Ecosystem management section of this report.
<b>Consequence criteria—sensitivity</b>				
Change in area	Low loss in area (<20%)	Medium loss in area (20–50%)	High loss in area (50–100%)	The percent change in extent of a habitat when exposed to a given stressor. Habitats that lose a high percentage of their coverage area when exposed to a given stressor are highly sensitive, while those habitats that lose little area are less sensitive and more resistant.
Change in structure	Low loss in structure (<20% loss in density)	Medium loss in structure (20–50% loss in density)	High loss in structure (50–100% loss in density)	The percentage change in structural density of the habitat when exposed to a given stressor.
Frequency of disturbance	Less often	Several times a year	Daily to weekly	If a habitat is regularly disturbed, it may not be more resistant to additional stress.
<b>Consequence criteria—resilience</b>				
Mortality	Low mortality (<20%)	Moderate mortality (20–50%)	High mortality (80% or higher)	Habitats with high mortality rates due to a specific stressor may not be capable to recover properly.

Criteria	Low risk (Score: 1)	Medium risk (Score: 2)	High risk (Score: 3)	Description of criteria
Recruitment	Annually or more often	Every 1–2 years	Every 2+ years	Artificial/Natural recruitment (e.g. plantations and fishes) increases the chance to re-establish a population in a disturbed area if proper mitigation measures are adopted.
Recovery time	Less than 1 year	1–10 years	More than 10 years	Habitats that reach maturity earlier may be able to recover more quickly from disturbance if proper mitigation measures are adopted. Here we refer to maturity of the habitat as a whole rather than reproductive maturity of individuals.

*N.B. For non-living habitats, whose resilience cannot be captured through demographic rates, resilience is evaluated through estimates of recovery time to pre-disturbed conditions*



## Appendix 11.1: Terms of Reference of the Independent Monitoring Agency

### A. Background

Ghorasal is one of the major urea fertilizer production center of BCIC located on the left bank of the river Shitalakhya at Polash Upazilla of Narsingdi District. Currently, it has two units with gradually reducing production capacity of 900 TPD (UFFL- 600 TPD and PUFFL- 300 TPD) based on gas as raw material and fuel. The efficiency of the plants has been decreasing day by day due to usage ration, age of plants, etc. On the other hand, irregular supply of gas has expedited the loss of efficiency of the plants. Government has decided to replace two such age-old, inefficient plants of the Ghorashal area (UFFL and PUFFL). Accordingly the feasibility study and EIA has been conducted. The HSBC and JBIC Banks are financing the project whereas MIGA is functioning as grunter of such finance. As part of new plant, two steam turbines and a GEG will be installed.

The ECR 1997 of MoEF and EHS guideline of World Bank require detail environmental monitoring during pre-construction, construction and operation of the plant. The monitoring includes environmental compliance monitoring, impact monitoring and monitoring of environmental quality.

### B. Objectives

A detailed EMP has been prepared as part of the present EIA study. As one of the key elements of the EMP, a three-tier monitoring program has been proposed comprising compliance monitoring, impact monitoring, and Independent monitoring. The main purpose of the monitoring program is to ensure that the various tasks detailed in the EMP particularly the mitigation measures are implemented effectively and also to evaluate project's impacts on the key environment and social parameters.

The main purpose of the Independent monitoring- the third tier of the monitoring program - will be to ensure that all the key entities including EHSU, Owner and contractors are effectively and adequately fulfilling their designated role for EMP implementation, and that all the EMP requirements are being implemented in a timely and effectively. The primary objective for engaging an independent monitor is to review the efficacy of EMP implementation as well as internal monitoring, and conduct periodic third party monitoring and provide feedback to BCIC and Lenders on policy improvement and enhancement of implementation process. The Independent Monitoring Agency (IMA) as a Consultant will review implementation process as per set procedures and tasks given in the EMP and assess the achievement of overall environmental management objectives.

The IMA should have good experience in carrying out Environmental Monitoring including Environmental Compliance Monitoring of the Urea Plant. The Consulting Institute/Firm should have well equipped and certified laboratory for necessary analysis or should have arrangement with other laboratories which are certified by the relevant statutory body of the country.

### C. Scope of Work

The scope of work of the IMA will include the following specific tasks:

- To develop specific monitoring indicators, checklists, and questionnaires to undertake external monitoring (a preliminary list of monitoring indicators has been given in the EMP) in consultation with BCIC and Lenders.
- To review and verify the implementation progress of various EMP elements, particularly, mitigation plan, compliance and impact monitoring, environmental trainings, documentation, and grievance redress mechanism.
- To review and verify the functioning of the key entities– EHSU, Owner, and contractors - for environmental management.
- Identify the strengths and weaknesses of the design of EMP and its implementation, and also the entities tasked to undertake various tasks detailed in the EMP.
- Evaluate and assess the institutional arrangements established for the environmental management of the project. Evaluate and assess the effectiveness and appropriateness of the key personnel of EHSU, Owner, and contractors tasked to implement various aspects of the EMP.
- Evaluate and assess the adequacy of the mitigation measures proposed in the Mitigation Plan in addressing the potentially negative impacts of the project activities and propose changes as appropriate.
- Review results of internal monitoring (compliance and impact monitoring) and verify its effectiveness through community consultations, spot checks, and field observations.
- Review the process and outcome of environmental trainings conducted by different project entities in line with the training program given in the EMP.
- Review the process and outcome of the documentation and reporting being carried out by various project entities in line with the EMP requirements.
- Identify, quantify, and qualify the types of EMP-related conflicts and grievances reported and resolved and the consultation and participation procedures.
- Provide a summary of whether EMP is being effectively implemented.
- Describe any outstanding actions that are required to bring EMP implementation in line with the GoB and WBG's requirements as stated in the EIA. Describe further mitigation measures and or corrective actions needed to ensure that the project remains environmentally and socially acceptable. Provide a time table and define budget requirements for these supplementary mitigation measures / corrective actions.
- Describe any lessons learned that might be useful for environmental assessment and management of future projects.

#### D. Approach and Methodology

The general approach will include monitoring of EMP implementation activities and to identify any environmental impacts actually caused by the project. The IMA will conduct quarterly field visits for external monitoring. During the field visits, the IMA will carry out meetings with the key project entities including PIU, EHSU, Owner, and contractors; review reports and record of EMP implementation; conduct consultation meetings with key stakeholders particularly communities and local government officials; carry out field investigations including spot checks and visual observations, and identify need of any sampling and laboratory analysis.

The IMA will prepare checklists and questionnaires for the field investigations, comprising both qualitative and quantitative parameters. After each field visit, the IMA will prepare external

monitoring report comprising field observations and findings, assessment of EMP implementation, key gaps identified, conclusions, and recommendations for addressing the gaps.

#### E. Responsibility of BCIC

The BCIC through its PIU will ensure timely supply of background references, data and project options to the IMA. It will ensure uninterrupted access to work sites, relevant offices of the GoB and BCIC in particular. The IMA will participate in quarterly coordination meetings with the BCIC in presence of the Owner.

Recommendation based on the result of the external monitoring will be provided to BCIC to cover up the deficiencies identified by the IMA. BCIC will accept the recommendations of the IMA if they are within the scope of work and there is nothing incorrect in the report.

#### F. Responsibility of Owner

The Owner will provide appropriate protocol at site or at its Project Office for the field visit of the IMA. It will on behalf of BCIC ensure free access to work sites, impact areas and the database on EMP implementation. The Owner will ensure timely intimation of its works planning as and when made or updated during the construction period and keep the IMA informed.

#### G. Team Composition of the IMA

The tasks of the key members of the IMA are given below:

Position/expertise	Qualification and experience
1. Team Leader/ EMP Implementation Specialist	B.Sc. in environment engineering or environmental science, with M. Sc. in relevant field with 15 years (including 5 years of development bank funded project) experience in planning, implementation and monitoring of environmental management for large infrastructure projects. Experience in institutional capacity analysis, preparation and implementation of EMPs, monitoring reports, and knowledge of latest environmental safeguard policies of the international financial institutions are required.
2. Environment Specialist(s)	B.Sc. in environment engineering or environmental science with 10 years working experience in environmental impact assessment including field surveys, stakeholder consultations, and analyzing environmental impacts to identify mitigation measures in compliance with environmental safeguard policies of the international financing institutions and national legislations. Experience of preparing and implementing EMP for externally financed projects is essential.
3. Ecology and Fisheries Specialist	Masters in biological sciences (Zoology and Botany) with 10 years working experience in relevant fields. Thorough knowledge of ecological issues (natural vegetation, terrestrial as well as aquatic fauna, fish, and birds) and their implications for development projects; research and work experience relating to ecological issues; and knowledge of techniques for data collection and analysis.
4. Occupational Health and Safety Specialist	Masters in Occupational health and safety or relevant fields with 10 years of experience in IEE, EIA, EMP planning, environment monitoring, and occupational health and safety Issues.
5. Data Base Specialist	Graduate in relevant field with working experience and knowledge of software, those are commonly used in Bangladesh; demonstrated ability

Position/expertise	Qualification and experience
	to design and implement automated MIS for monitoring progress, comparing targets with achieved progress and the procedural steps.
6. Junior Environmental Monitoring Specialist (s)	B.Sc. in environment engineering or environmental science with minimum three (3) years of experience in Environmental monitoring, data collection and analysis, environmental analysis, or relevant environmental field.

#### H. Time Frame and Reporting

The IMA will be employed over a period of five years with intermittent inputs from the professional team to continue one year after completion of the Urea Fertilizer Plant Commissioning.

Quarterly and annual monitoring reports should be submitted to the BCIC with copies to the Lenders and DoE. An evaluation report at the end of the Project should be submitted to the BCIC and Lenders with critical analysis of the achievement of the programs and the environmental performance of GPUFP.

The IMA will provide monitoring and evaluation report covering the following aspects:

- Field observations, results of any field investigations and or laboratory analysis;
- Assessment of whether the EMP is being implemented as planned and budgeted;
- Assessment of the extent to which the specific EMP objectives and the expected outcomes/results have been achieved and the factors affecting their achievement or non-achievement;
- Major areas of improvement and key risk factors;
- Major lessons learnt; and
- Recommendations.

Formats for collection and presentation of monitoring data will be designed in consultation with BCIC.

#### I. Budget and Logistics

The budget should include all expenses such as staff salary, office accommodation, training, computer/software, transport, field expenses and other logistics necessary for field activities, data collection, processing and analysis for monitoring and evaluation work. Additional expense claims whatsoever outside the proposed and negotiated budget will not be entertained. VAT, Income Tax and other charges admissible will be deducted at source as per GoB rules and regulations.

Sl. No.	Item	Unit	Qty.	Rate, USD	Amount, USD
<b>Remuneration</b>					
1	Team Leader/EMP Specialist Implementation	man-month	18	5,500	99,000
2	Environmental Specialist	man-month	24	4,000	96,000
3	Fisheries Specialist	man-month	18	4,000	72,000

	Ecologist	man-month	12	4,000	48,000
4	Occupational Health and Safety Specialist	man-month	18	4,000	72,000
5	Database Specialist	man-month	18	3,000	54,000
6	Junior Environmental Monitoring Specialist(s)	man-month	54	1,500	81,000
	<i>Sub-Total=</i>				<i>522,000</i>
<b>Reimbursable Cost</b>					
1	Vehicle Rental	Months	24	800	19,200
2	Vehicle Fuel	LS			5,000
3	Logistics	LS			10,000
	<i>Sub-Total=</i>				<i>34,200</i>
	<i>Contingency (10%)=</i>				<i>55,620</i>
	<b>Grand Total=</b>				<b>611,820</b>



## Appendix 13.1: List of Participants of the Public Disclosure Meeting

ঘোড়াশালপলাশইউরিয়াফার্টিলাইজার প্রোজেক্ট, পলাশ, নরসিংদী  
ইআইএসমীক্ষারফলাফলপ্রকল্পএলাকারজনগোষ্ঠীকেঅবহিতকরণ ও মতামতগ্রহণসভায়  
অংশগ্রহণকারীদেরতালিকা

ভেনু: অতিথি ভবন, পলাশইউরিয়াফার্টিলাইজারফ্যাক্টরীলি.

তারিখ: ২৩ ফেব্রুয়ারী, ২০১৯ইং

ক্রম. নং	নাম	পেশা প্রতিষ্ঠান	মোবাইল ফোন নম্বর	স্বাক্ষর
১	মোঃ উম্মেদুল ইসলাম	চাকরি, কাপ প্রজেক্ট	০১৭৭৩৩৬৭৩	উম্মেদুল ইসলাম
২	মোঃ ইমদাদুল হক	ইউনিয়ন/কাপ প্রজেক্ট	০১৭২০৬৬৩০	ইমদাদুল হক
			-২৪/-	
৩	মোঃ বদরুজ্জামান	মোঃ সিকান্দার	০১৭২৬০৭৬০৭৩	বদরুজ্জামান
৪	মোঃ আমানুল হক	ইমাম বাড়ি	০১৭১৫০৩৩৭৭৭	আমানুল হক
৫	মোঃ হুমায়ুন কবীর	চাকরি, ডিএলসি	০১৭২৭৭১৭২৫	হুমায়ুন কবীর
৬	মোঃ হুমায়ুন কবীর	চাকরি, DCE(E) PUFF	০১৭১১০৬২৬৫	হুমায়ুন কবীর
৭	মোঃ হুমায়ুন কবীর	মহাসচিব, কাপ প্রজেক্ট	০১৭১১৪৭১৫১	হুমায়ুন কবীর
৮	মোঃ হুমায়ুন কবীর	সি.স-এ.বা	০১৭২০৫৪৭৭৬	হুমায়ুন কবীর
৯	মোঃ হুমায়ুন কবীর	DCE(AR) TIC1	০১৭১৫৪৭২৫৫৫	হুমায়ুন কবীর
১০	মোঃ হুমায়ুন কবীর	ACE(E), GUPFP	০১৭১৬৩০৭৫১২	হুমায়ুন কবীর
১১	মোঃ হুমায়ুন কবীর	Acc (Technical)	০১৭১২৭২৭১৬১	হুমায়ুন কবীর
১২	মোঃ হুমায়ুন কবীর	Acc (opt.)	০১৭১২৬৫৫৪৮১	হুমায়ুন কবীর
১৩	মোঃ হুমায়ুন কবীর	আইসিআই	০১৭২৭৫৫৭৭৬	হুমায়ুন কবীর
১৪	মোঃ হুমায়ুন কবীর	ACE(E) PUFF	০১৭১৫০৭০৫৭৬	হুমায়ুন কবীর
১৫	মোঃ হুমায়ুন কবীর	SAB(C) PUFF	০১৮১৪৭১১৪৫১	হুমায়ুন কবীর
১৬	মোঃ হুমায়ুন কবীর	কম্পা	০১৭১২৬৬৫৭৭৭	হুমায়ুন কবীর
১৭	মোঃ হুমায়ুন কবীর	অসহায়তা, ২ম কাজ	০১৭১৪৬৩৫৪৩৬	হুমায়ুন কবীর
১৮	মোঃ হুমায়ুন কবীর	আইসিআই	০১৭২০০৩১০১৫	হুমায়ুন কবীর
১৯	মোঃ হুমায়ুন কবীর	চাকরি	০১৭৭৩৩৭০৭৩	হুমায়ুন কবীর
২০	মোঃ হুমায়ুন কবীর	DCE. PUFF	০১৭২৫৪১৪১২০	হুমায়ুন কবীর
২১	মোঃ হুমায়ুন কবীর	অসহায়তা	০১৭২৬১৫৫৩৭০	হুমায়ুন কবীর
২২	মোঃ হুমায়ুন কবীর	অসহায়তা	০১৭৬৭৭১৩৭৭৪	হুমায়ুন কবীর
২৩	মোঃ হুমায়ুন কবীর	চাকরি	০১৭১১৫৫৭৩১১	হুমায়ুন কবীর
২৪	মোঃ হুমায়ুন কবীর	কম্পা	-	হুমায়ুন কবীর
২৫	মোঃ হুমায়ুন কবীর	কম্পা	-	হুমায়ুন কবীর
২৬	মোঃ হুমায়ুন কবীর	চাকরি	০১৭১২০১৭৫১২	হুমায়ুন কবীর

ক্রম. নং	নাম	পেশা ও ঠিকানা	মোবাইল ফোন নম্বর	স্বাক্ষর
১	শেখর হোসেন	উপাধায় (২০১৩)ন	০১৭১৬৫৩৭৬৬০	শেখর
২	শ্রীঃ করিমুল্লাহ	সিএম (২০১৩)ন	০১৭১১৬২৬৬১	শ্রীঃ
৩	সোহাগা রাসী	রসায়নবিদ, PUFFL	০১৭১২৭১৪৪৯	সোহাগা
৪	আফিয়া বেগম	জিও; প্রধান রসায়নবিদ	০১৭১৬৯২৩৫২৯	আফিয়া
৫	আব্দুল আজিজ	Head of Admin	০১৭১৬৬১১৫৭৩	আব্দুল
৬	সাইয়দুল আলী	DCC, UFFL	০১৭১৬৬০২০৩১	সাইয়দ
৭	আব্বাস আলতা	DCC, UFFL	০১৭১৬১৪২৭২১	আব্বাস
৮	সুমনা দত্ত	SO-২, PUFFL	০১৭৩৭৪০৭৭২০	সুমনা
৯	আদিয়া আফরাজ	MO, PUFFL	০১৬২২-৪১৪৬০২	আদিয়া
১০	আঃ মাসুদ	পরিচালক (মিডিয়াম) (সিএম)	০১৭১৬৪৩০৬২	আঃ
১১	সিদ্দিক আলম	(SAS) PUFFL	০১৭১৭-৬৭৯৯০৪	সিদ্দিক
১২	আঃ মোসাদ্দিক	আইসি, (মিডিয়াম)	০১৭১২৪৭৭৭২৬	আঃ
১৩	আঃ মাসুদ	পরিচালক	০১৭১১-১৪৭৬২১	আঃ
১৪	আঃ মোসাদ্দিক	পরিচালক	০১৭১১/১৫৭৯৩	আঃ
১৫	আঃ মোসাদ্দিক	পরিচালক	০১৭১৭৭৪৩৬৬	আঃ
১৬	আঃ মোসাদ্দিক	পরিচালক	০১৭১৬৩২৪৭৩৫০	আঃ
১৭	আঃ মোসাদ্দিক	D.C.C. (UFL)	০১৭১১৪৪২২৯৭	আঃ
১৮	আঃ মোসাদ্দিক	জিএম (সি)	০১৭১৬২০৩৭৭৪	আঃ
১৯	আঃ মোসাদ্দিক	সিএম	০১৭২০৬২৩৭৭১	আঃ
২০	আঃ মোসাদ্দিক	সিএম	সুমনা	আঃ
২১	আঃ মোসাদ্দিক	-	-	আঃ
২২	আব্দুল আজিজ	সিএম	০১৭১৭৬৭৭০৪	আব্দুল
২৩	আব্বাস আলতা	সিএম	০১৭১৬১৫০০৬৫৪	আব্বাস