Volume 1B: Environmental Management Plan
Construction of the Bac Son – Nam Hai
East West Arterial Road (Updated)
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### ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>Biochemical oxygen demand</td>
</tr>
<tr>
<td>CEMP</td>
<td>Construction Environmental Management Plan</td>
</tr>
<tr>
<td>COD</td>
<td>Chemical oxygen demand</td>
</tr>
<tr>
<td>CPC</td>
<td>Commune People Committee</td>
</tr>
<tr>
<td>CST</td>
<td>Construction Supervision Team</td>
</tr>
<tr>
<td>DO</td>
<td>Dissolved Oxygen</td>
</tr>
<tr>
<td>DONRE</td>
<td>Department of Natural Resources and Environment</td>
</tr>
<tr>
<td>DOT</td>
<td>Department of Transport</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management Section within PMURTW</td>
</tr>
<tr>
<td>ESO</td>
<td>Environment and Safety Officer</td>
</tr>
<tr>
<td>FO</td>
<td>Fuel oil</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>HPUTDP</td>
<td>Haiphong Urban Transport Development Project</td>
</tr>
<tr>
<td>HSET</td>
<td>Health for Community (Health); Site Safety (Safety); Environmental Sanitation (Environment) and Transport Management (Transportation)</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Company</td>
</tr>
<tr>
<td>IMC</td>
<td>Independent Monitoring Consultant</td>
</tr>
<tr>
<td>km</td>
<td>kilometer</td>
</tr>
<tr>
<td>MONRE</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>PC</td>
<td>People Committee</td>
</tr>
<tr>
<td>$\text{PM}_{10}$</td>
<td>Dust with diameter ≤ 10 micron</td>
</tr>
<tr>
<td>PMURTW</td>
<td>Project Management Unit of Regional Transport Works, Hai Phong</td>
</tr>
<tr>
<td>RAP</td>
<td>Resettlement Action Plan</td>
</tr>
<tr>
<td>RMB</td>
<td>Road Management Board</td>
</tr>
<tr>
<td>SES</td>
<td>Safety and Environment Supervisor</td>
</tr>
<tr>
<td>SEO</td>
<td>Contractor’s Safety and Environment Officer</td>
</tr>
<tr>
<td>SS</td>
<td>Suspended solids</td>
</tr>
<tr>
<td>T</td>
<td>Ton</td>
</tr>
<tr>
<td>THC</td>
<td>Total hydrocarbons</td>
</tr>
<tr>
<td>T.N</td>
<td>Total nitrogen</td>
</tr>
<tr>
<td>TOR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>T.P</td>
<td>Total phosphorus</td>
</tr>
<tr>
<td>TS</td>
<td>Total solids</td>
</tr>
<tr>
<td>TSP</td>
<td>Total suspended particulates</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>UXO</td>
<td>Unexploded Ordinances</td>
</tr>
<tr>
<td>VND</td>
<td>Vietnam Dong</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile Organic Compounds</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

1.1 PURPOSES OF THE ENVIRONMENTAL MANAGEMENT PLAN

1. The purpose of this Environmental Management Plan (EMP) is to establish a set of mitigation and monitoring measures to help minimize or reduce to acceptable levels the adverse environmental and social impacts that can occur during the construction and operation of the Bac Son - Nam Hai East - West Arterial Road (the Project), located in the city of Hai Phong (Haiphong), Viet Nam (Vietnam). The Bac Son - Nam Hai East-West Link Road is a sub-component of the Hai Phong Urban Development Transport Project (HPUTDP) that will be jointly financed by a loan from the World Bank (WB) and the city’s counterpart fund.

2. The EMP addresses all issues identified in the Environmental Impact Assessment (EIA):
   (i) Organizes all measures to mitigate environmental impacts during the construction and operation phases;
   (ii) Establishes an organizational structure, procedures, institutional responsibilities for implementation;
   (iii) A budget and source of financing for each activity.

3. The EMP will also assist different stakeholders in managing the environmental issues of the project including:
   (a) The Project Management Unit (PMURTW) and relevant agencies -- to make it better able to manage the implementation of the EMP;
   (b) Supervisors – to ensure that the EMP is properly implemented;
   (c) Environmental engineers – to assist working with the Contractors implementing the EMP;
   (d) Contractors – to properly implement the project-specific management plans.

4. In addition to the project-specific mitigation measures included in the EIA and EMP, design and construction of the road is also subject to a wide range of laws, technical regulations, technical guidelines of the Socialist Republic of Viet Nam and the World Bank Safeguard Policies. Annex 1 presents the most relevant Vietnam laws, decrees, technical regulations related to environmental protection.

1.2. EMP ORGANIZATION AND STRUCTURE

5. The EMP contains a summary of the main environmental impacts, mitigation measures, environmental monitoring plan and procedures for communication, reporting, training, and plan review, to which all staff, consultants, supervisors, contractors and sub-contractors are required to comply with throughout the pre-construction, constructions and operation phases of the Project.

6. The EMP is structured as follows:

   **Overview of Environmental and Social Issues:**

7. This section summarizes the project description and main environmental and social impacts, the approach for identification of environmental issues along the road alignment and summarizes the main mitigation measures.
Roles and Responsibilities for Environmental Management during Construction:

8. This section defines the roles and responsibilities for environmental management for all stakeholders involved in the project, and the control and reporting

Compliance Framework:

9. This section describes the environmental duties of the contractor(s), and the environmental compliance framework that will be put in place, the environmental standards for all mitigation measures, the environmental supervision of civil works, and the independent monitoring consultant.

EMP Implementation Plan:

10. This section describes the requirements and staffing needs for initiation of the works, for the contractors and supervision team. It also includes the capacity building and training programs that will need to be implemented for all stakeholders involved in the environmental management of the project.

Monitoring Program:

11. This section proposes an environmental monitoring framework for the project, indentified the parameters, frequency, and responsibilities for environmental monitoring during the project construction and operation phases.

Budget:

12. In this Section budget estimates for the implementation of the EMP are presented. A series of annexes provides details for the main components of the EMP:

- **Annex 1**: presents relevant Vietnamese legal documents on environmental protection environmental standards/technical regulations that are applicable to the Project.
- **Annex 2**: presents the sections/sites sensitive to environmental impacts, maps of the sections with specific impacts and proposed mitigation measures along the alignment of the road. These maps are also useful instruments for supervising the implementation of the EMP during the road construction.
- **Annex 3**: presents the environmental and social specifications for contractors. These specifications are to be included in all biding documents and contracts.
- **Annex 4**: presents the terms of reference (TOR) for the environmental supervision of all construction activities. This environmental supervision will be included in the overall technical supervision of road construction.
- **Annex 5**: presents the TOR for the Independent Monitoring Consultant (IMC) to be appointed by the Department of Transport (DOT) of Haiphong city who will be responsible for carrying out environmental monitoring, on all environmental issues related to the contractor’s works.
- **Annex 6**: presents some assessments on training demands in environmental management as well as proposals for a training program.
- **Annex 7**: presents detailed costs estimated for the EMP implementation

13. The EIA reports for the HPUTDP are organized as follows:

- **Volume 1A**: Environmental Impact Assessment of the Bac Son – Nam Hai East West Arterial Road
- Volume 1B: Environmental Management Plan of the Bac Son – Nam Hai East West Arterial Road, prepared in 2010 and revised in March 2012.
- Volume 2: Environmental Impact Assessment and Environmental Management Plan for the Public Transport Improvement Component
- Volume 3: Environmental Impact Assessment and Environmental Management Plan for Resettlement Sites
- Volume 4: Executive Summary
2. OVERVIEW OF ENVIRONMENTAL AND SOCIAL ISSUES

2.1. PROJECT LOCATION AND JUSTIFICATION

14. Hai Phong (Haiphong) City is located 102 km East to Ha Noi (Hanoi). It is the third largest urban and commercial center in Viet Nam (Vietnam). Haiphong seaport, the largest seaport system in the Northern Region, connects the northern and southern regions of Viet Nam and facilitates international trade and commerce. An increase in the volume of imports and exports in recent years has resulted in significant increases in traffic flow into and out of Haiphong port. Currently, traffic into and from the port crosses through the center of the city using Nguyen Van Linh – Nguyen Binh Khiem corridor. This corridor has become one of the most urbanized roads in Hai Phong in the last decade, and the roads have been overloaded with light and heavy traffic causing not only serious traffic accidents and traffic safety issues, but also environmental pollution due to dust and exhaust emissions.

2.2. MAIN OBJECTIVES OF BAC SON – NAM HAI EAST-WEST ARTERIAL ROAD

15. The main objectives of the road are:

   (i) Reduce traffic congestion, traffic accidents, and environmental pollution in the Nguyen Van Linh – Nguyen Binh Khiem corridor by diverting the heavy-vehicle traffic generated by port activities and segregating it from urban traffic.

   (ii) Promote the city’s economic development by satisfying the increased transport demand in and out of Haiphong port from major economic regions in Northern Viet Nam as well as the areas within Hai Phong city.

2.3. COMPONENTS OF THE PROJECT

16. The main components of the road are: construction of a 20 km long arterial road from the intersection with National Highway 10 in Bac Son commune in the Western side of the city to Nam Hai commune in the Eastern side of the city. The Project will be constructed along a new alignment corridor, in and around both densely populated urban areas as well as agricultural land, including aquaculture. The road has an overall cross section width of 50.5 m which provides sufficient width for eventual dual 3 lane main carriageways flanked on either side by 2 lane service/frontage roads. However, in this project, based on the initial forecasts of traffic flow, only dual 2 lane main carriageways are to be constructed, with space to add extra lanes included in the central median. The Project is divided into two main sections (i) Bac Son to Quan Tru and (ii) Quan Tru to Nam Hai:

   A1(a) Bac Son – Quan Tru link (Western section):

17. This section starts at Bac Son (km 0), where the project road intersects with NH10, and ends at km 9+200 at the approach to the Dong Khe bridge over the Lach Tray river. This section comprises a main dual 2 lane carriageway with a cross-section of 27.5m which corresponds to the central part of the full scale cross-section. This section of the road crosses An Duong district which currently is largely a peri-urban agricultural area, but which is scheduled to be urbanized over the next 10 years in the Master Plan of Haiphong city.

   A1(b) Quan Tru – Nam Hai link:

18. This section runs from the approach to the Dong Khe bridge at km 9+200 to Nam Hai at km 20+000 with length of 10.8 km, after which the link enters the new port complex of Chua Ve – Doan Xa. The overall width is 50.5 m, and this section of road is to be
constructed with dual 2 lane main carriageways and 2 lane side/frontage roads, and 5 meters footpaths on either side. This section crosses the districts of Hai An, Le Chan and to lesser extent Ngo Quyen and Kien An – all of them are urban districts.

19. Main civil works along the road include:

- Construction of two major bridges over the Lach Tray river: Dong Khe bridge (also called Dong Hoa bridge) at km 9+463; and Niem 2 bridge at km 11+150, both 30 m in width and 534 m in length.
- Construction of one small bridge and one large culvert: Re bridge with a length of 87.8 m over the Re river at km 0+683, and An Kim Hai culvert with a length of 35.1 m over An Kim Hai canal at km 4+795.
- Relocation of 1.285 km of the left-side dyke of Lach Tray river and construction of Rao underpass.

20. The selected alignment for the Bac Son – Nam Hai Road is presented in Figure 1.

![Figure 1: Alignment of the Bac Son – Nam Hai Road](image)

2.4. MAIN ENVIRONMENTAL AND SOCIAL IMPACTS

21. The Project is expected to have positive environmental and social outcomes. Through the proposed improvements, the Project will create direct economic benefits to Haiphong City in general, and the communes, wards and districts in the vicinity of the Project areas, in particular. The planned Bac Son - Nam Hai East-West Arterial Road is expected to relieve residents along the existing section of the corridor of heavy traffic.

22. The EIA Report identified two main issues from the Project:

Resettlement impacts:

23. The project will result in significant resettlement impacts due to the required land acquisition. Additional land acquisition would be necessary for development of resettlement sites to relocate households displaced by the project. According to the preliminary survey results, the project will affect a total of 2,835 households, included 11,586 persons in 15
communes/wards of five urban/rural districts, of which, 1,728 households would need to be relocated. HPUTDP-PMURTW, in coordination with the ward and commune authorities has identified 12 potential resettlement sites covering an area of about 37.3 ha. HPUTDP-PMURTW has prepared a draft Resettlement Action Plan (RAP) for the Project. Resettlement cost, including the cost of development of resettlement sites, is estimated at US $96 million. A RAP has been prepared according to the Involuntary Resettlement Policy of the World Bank (OP 4.12). The RAP includes programs for replacement of houses and land and relocation of cemeteries, and other community assets.

**Construction Impacts:**

24. Building the road in urban and peri-urban communities, and along intensively cultivate lands will require careful planning and management of impacts from construction. Potential impacts include: pollution of rivers, irrigation canals and cultivated lands; increased dust, noise and other nuisances on local communities; increased traffic on local roads; impacts caused by presence of a large workforce in and near local communities; disposal of construction wastes.

25. Therefore, the management of impacts during construction constitutes the main element of the proposed EMP. Table 1 summarizes the potential environmental and social impacts generated from construction-related activities.

**Table 1: Potential Environmental and Social Impacts during the Construction**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Workforce</td>
<td>- Increased demand for infrastructure and utilities</td>
</tr>
<tr>
<td></td>
<td>- Tensions between outside workers and local communities</td>
</tr>
<tr>
<td></td>
<td>- Increase of theft, drug and alcohol abuse</td>
</tr>
<tr>
<td></td>
<td>- Affected living standard and income of local residents due to occupation of agricultural and public land</td>
</tr>
<tr>
<td></td>
<td>- Market distortion due to temporary inputs to local economy</td>
</tr>
<tr>
<td></td>
<td>- Transfer of epidemic disease</td>
</tr>
<tr>
<td></td>
<td>- Disruption to livelihoods, cultural activities, and well being of local residents.</td>
</tr>
<tr>
<td></td>
<td>- Unsafe sex conduct by workers could bring HIV/AID risk to the local communities.</td>
</tr>
<tr>
<td>Worker’s Camp and Site Installation</td>
<td>- Generation of significant volumes of domestic wastewater, solid waste and wastes from machine repair sites.</td>
</tr>
<tr>
<td></td>
<td>- Stockpiling of wastes and illegal dumping</td>
</tr>
<tr>
<td></td>
<td>- Contamination of land, surface water and groundwater caused by spillage and leakage from storage of hazardous materials including fuel, lubricants, chemicals, hazardous substances or hazardous wastes</td>
</tr>
<tr>
<td></td>
<td>- Water courses and agricultural land can be contaminated by wastewater and solid wastes</td>
</tr>
<tr>
<td>Activity</td>
<td>Potential Impacts</td>
</tr>
<tr>
<td>----------</td>
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</tr>
</tbody>
</table>
| **Earthworks, Fill Slopes, Cuts, Borrow Pits, Disposal sites, Stockpiles** | 1. Increased erosion and sedimentations caused by destroyed surface vegetation and increased soil erosion  
2. River/canal erosion because of leakage of eroded soils  
3. Air pollution caused by:  
  - Fugitive dust emissions due to exposure of slope surface, uncovered stockpiling area, earth moving and excavation activities;  
  - Wind blow during transportation of material by vehicles and when transporting on unpaved access roads;  
  - Gases emissions from batching plants and concrete mixing stations;  
  - Air pollutant emissions from exhaust of construction equipment and vehicles.  
4. Disturbances to livelihoods, damage agriculture, aquaculture, public health, damage natural habitats and damage public structures caused by:  
  - Operation of various equipment during construction (air compressor, concrete mixers, trucks, bulldozers, excavators, etc);  
  - Vehicles transporting materials within construction site and beyond the construction boundary;  
  - Piling activities during construction of foundations/piers;  
  - Loss of topsoil affecting productive land.  
  - Land instability from exceeded earth removal or unstable deposition of spoil, leading to landslides or erosion.  
  - Discharge of construction wastes, muddy materials into watercourses, rice fields, and irrigation canals.  
  - Erosion of riverbanks, slopes, and productive land  
  - Noise and vibration generated by construction equipment and vehicle operation.  
  - Dust emissions generated by construction equipment and vehicle operation.  
  - Disturbances or damage to physical cultural resources.  
  - Damage to agricultural land and terrestrial and aquatic ecosystems. |
| **Disposal of domestic, construction wastes and muddy materials** | 1. Landscape impact, contamination of water environment, land pollution by improper disposition of domestic and construction wastes.  
2. Air pollution by decaying domestic waste  
3. Transmission of epidemic diseases |
| **Clearance of Construction Areas** | 1. Soil erosion and visual impact;  
2. Loss of productive plots/trees affecting agriculture, aquaculture and natural habitats.  
3. Discharging vegetation waste into water courses affecting aquatic ecosystem.  
4. Discharging surplus soil, muddy and vegetation materials into rice field, rivers, and irrigation canals, impacting on water quality, aquaculture agriculture and irrigation. |
<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improper Re-Vegetation Planting and Site Restoration</td>
<td>1. Lack of appropriate compensatory planting at the end of construction or non-native species 2. Planting of species visually incompatible to the background environment; 3. Lack of proper maintenance/watering of newly planted vegetation during the post-construction period. 4. Lack of proper restoration of cleared areas, such as borrow pits, stockpiles and disposal areas, construction camp areas, areas under bridges, and any areas occupied temporarily.</td>
</tr>
<tr>
<td>Discharge of Wastewater</td>
<td>The following sources of wastewaters may be discharged into the environment causing potential environmental mental and social impact 1. Wastewater from bored piling locations. Re-suspension of bottom sediment and mud caused by cut-trench river crossings and construction of bridge foundation within rivers; 2. Soil erosion / flush away from uncovered stockpiling locations, uncovered excavation site and unprotected slope surface during adverse weather conditions; 3. Uncontrolled wastewater and run-off water carrying high suspended solids, turbidity is discharged directly into natural water bodies such as rivers, canals, fish ponds, causing water pollution.</td>
</tr>
<tr>
<td>Disposal of Solid Waste and Hazardous</td>
<td>The following source of solid, hazardous wastes may be disposed to the environment causing environmental and social impacts: 1. Surplus excavated materials, muddy material requiring disposal due to earth moving activities and slope cutting; 2. Disposal of used wooden boards for trenching works, scaffolding steel material, site hoarding, packaging materials, containers of fuel, lubricant and paint; 3. Waste generated by demolition of existing houses / buildings affected by the project or breaking of existing concrete surface; 4. Domestic solid waste generated by construction workers, kitchen, toilets, 5. Improper disposition of hazardous wastes such as oily waste, waste lubricant, and oily contaminated materials resulting from leakage of oil and fuel. 6. Improper handling and storage of hazardous and chemical substances and construction materials.</td>
</tr>
<tr>
<td>Activity</td>
<td>Potential Impacts</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Improper Construction Site Safety</td>
<td>- Risk of falling objects and unstable working platforms;</td>
</tr>
<tr>
<td></td>
<td>- Risk associated with equipment and traffic movements, on and off the construction sites.</td>
</tr>
<tr>
<td></td>
<td>- Impacting traffic safety and access.</td>
</tr>
<tr>
<td></td>
<td>- Impacting pedestrian safety.</td>
</tr>
<tr>
<td>Improper Community Relations</td>
<td>Lack of communication and consultation with local communities can lead to an opposition to a road project, delays in the construction process, increased costs and unsatisfactory solutions.</td>
</tr>
</tbody>
</table>

2.5. SUMMARY OF MITIGATION MEASURES

26. The project shall implement the following integrated approach to minimize the above predicted environmental and social impacts:

- **Avoidance**: Alternative analysis has been regarded as one of the most important mitigation measures to minimize potential adverse environmental and social impacts. Minimizing land acquisition and resettlement to the extent possible has also been a key criterion for alignment selection during the feasibility and EA studies.

- **Sound engineering for design and construction**: The project has been designed and will be implemented with state-of-the-art engineering.

- **Comprehensive mitigation plans**: Detailed environmental management plan has been prepared.

- **Compliance framework**: Strict supervision and monitoring on implementation of mitigation measures during the construction phase.

27. A detailed assessment of mitigation measures has been carried out along the alignment of the road. These measures are either:

(i) incorporated in project design and hence included in the bill of quantities;

(ii) included in the environmental specifications for contractors.

28. In addition, site specific measures were identified for all sensitive areas along the road. The types of measures include: special culverts for irrigation canal crossings, lining of canals during construction, special crossings for community connectivity, pedestrian crossings (flyovers), relocation of pumping stations for irrigation, shifting of irrigation canals.

29. Table 2 summarizes the sensitive areas and activities and the mitigation measures during the pre-construction and construction stages for specific sections of the road. These measures shall be incorporated in the environmental specifications for contractors and will be supervised by environmental supervision teams as part of the technical supervision of construction.

Table 2: Site Specific Mitigation Measures along the Bac Son – Nam Hai Road

<table>
<thead>
<tr>
<th>Section (Km to Km)</th>
<th>Sensitive Area or Activity</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 1+400</td>
<td>Construction location of bridges crossing the Re river</td>
<td>- Establish storage, machinery repair and maintenance facilities at least 100m away from the river - Build ditches for collecting waste water from the site;</td>
</tr>
<tr>
<td>Section (from Km to Km)</td>
<td>Sensitive Area or Activity</td>
<td>Mitigation Measures</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
|                        | Construction of the road  | - excavate filled accumulated holes, etc.  
|                        |                            | - Air and noise pollution control at dense populated areas  
|                        |                            | - Discharging wastewater and solid waste into the river is prohibited. |
| Rice fields, orchards and vegetable field areas | | - Determine important periods (especially harvest time) to establish alternative temporary roads.  
| | | - Limit the operation of transport vehicles during the indicated period.  
| | | - Conduct surveys, dialogues and provide compensation for resulting effects on households (based on agreement with affected households). |
| 1+400 – 5+200 | Near An Kim Hai canal | - Discharging wastes into the canal is prohibited  
| | Extra care is required in flower planting areas | - Intensify dust control measures at flower planting areas  
| | | - Properly control and manage waste collection system |
| The route near administrative areas (including schools, buildings of People Committees) | | - Install fencing and signage system.  
| | | - Heavy construction vehicles should be operated within short time frame and their use must be informed to the local authority prior to construction commencement.  
| | | - Limit the travelling of transport vehicles at rush/peak hours.  
| | | - Waste management  
| | | - Proper dust, noise pollution control at dense populated areas. |
| Rice fields and tree planting areas | | - Determine important periods (especially harvest time) to establish alternative temporary roads.  
| | | - Limit the operation of transport vehicles during this period.  
| | | - Conduct surveys, dialogues and provide compensation for resulting effects on households (based on agreement with affected households). |
| 5+200 – 9+500 | Position near Hoang Mai pagoda | - Special attention should be given to noise and dust prevention and mitigation measures  
| | Position near dykes before crossing rivers | - Pay attention to labour safety, especially in rainy and stormy weather  
| | | - Frequently check the current situation of the dyke routes and make improvements and rectifications on cracks and other necessary places.  
| | Rice fields, orchard and vegetable areas | - Proper waste and soil erosion management  
| | | - Conduct surveys, dialogues and provide personb
<table>
<thead>
<tr>
<th>Section (from Km to Km)</th>
<th>Sensitive Area or Activity</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation for negative effects on households (based on agreement with affected households)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 9+500 –11+150 Crossing point at Truong Chinh Road | - Propose traffic control  
- Publicize construction time, install alternative temporary roads and bypasses, etc.  
- Signage system must be maintained and ensure adequate staff in charge of traffic control and presence of traffic police at construction times.  
| Near the planned construction area of schools | When the construction site is being built and during construction, it is required to implement the following works:  
- Proper noise prevention  
- Properly apply safety methods and install fences, signs.  
- Limit construction at rush/peak hours.  
- Establish temporary roads and bypasses.  
| 11+150 – 14+00 Near river embankment | Proper soil erosion and sedimentation control  
| Near urban areas (resettlement area – Urban Upgrading Project) which are being constructed | - Apply construction methods in urban areas to avoid construction at rush/peak hours, and provide sufficient warning signs.  
- Regularly check transport safety and emergency solving measures.  
| 14+00 – 15+550) Dyke improvement position | - Pay attention to waterways safety management  
- Publicize construction time, alternatives of temporary roads and bypasses, etc.  
- Proper labour safety management (especially in stormy weather)  
- Regulate the stability of the dyke and immediately implement rectification methods for any cracks and arising damages.  
| 15+550 –18+00 Location near Cat Bi Stabilization Reservoir | - Implement mitigation measures for surface water pollution (including river water and water of stabilization reservoir: do not discharge washing water of machinery and vehicles into the ditches/canals, establish waste water collection systems and build accumulation holes).  
| Route next to residential areas T3, T4 in Thanh Ward | - Apply proper construction methods in urban areas avoiding construction at rush/peak hours, providing enough warning signs.  
- Proper noise and air pollution control  
- Proper waste management  
| 18+200 - Position near flower | - Proper dust control on flower planting areas  

Prepared by Infra-Thang Long (Dec. 2010), Updated by SMEC (Nov 2012)
<table>
<thead>
<tr>
<th>Section (from Km to Km)</th>
<th>Sensitive Area or Activity</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>19+870</td>
<td>planting areas</td>
<td>- Properly install and and manage waste collection systems.</td>
</tr>
<tr>
<td></td>
<td>Location near Kim Quang Tu Pagoda</td>
<td>- Special attention should be given to noise and dust control and suspension of construction activities during festival time.</td>
</tr>
<tr>
<td></td>
<td>Location near planned residential areas</td>
<td>In case construction of these residential areas are completed and put into use before the completion of the road, it would be necessary to apply the same mitigation measures as in urban construction, including: installation of fences along the route, proper noise and dust control, establishing waste water collection system, frequently collect and treat waste and rubbish, and not to keep or store them near residential areas.</td>
</tr>
</tbody>
</table>

30. The above table is complemented by requirements for construction and operation included in environmental and social maps. These maps constitute a valuable tool for supervision of construction activities and will be referenced in all bidding documents and contracts. The maps are presented in Appendix 2.

2.6. NOISE AND AIR POLLUTION SENSITIVE RECEPTORS

The following table summarizes the noise sensitive receptors, required intensive mitigation measures during the construction of the road.

**Table 3: List of Noise-sensitive Receptors along the alignment**

<table>
<thead>
<tr>
<th>N</th>
<th>Noise Sensitive Receptors</th>
<th>Section (at Km)</th>
<th>Measured Noise level (dB)</th>
<th>Distance from road centerline (m)</th>
<th>Existing protection</th>
<th>Present picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Village temple (Pham Tu Nghí) – Dang Cuong commune (area in front of temple may be affected)</td>
<td>3+900</td>
<td>77.21</td>
<td>32</td>
<td>Not fenced</td>
<td><img src="image-url" alt="Present Picture" /></td>
</tr>
<tr>
<td>N</td>
<td>Noise Sensitive Receptors</td>
<td>Section (at Km)</td>
<td>Measured Noise level (dB)</td>
<td>Distance from road centerline (m)</td>
<td>Existing protection</td>
<td>Present picture</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------</td>
<td>-----------------</td>
<td>---------------------------</td>
<td>----------------------------------</td>
<td>---------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>2</td>
<td>Kim Quang Tu pagoda (the South of pagoda may be affected)</td>
<td>19+000</td>
<td>74.86</td>
<td>33</td>
<td>1 tree row of 4 m width</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
</tr>
<tr>
<td>3</td>
<td>Lam Khe pagoda (the South of pagoda may be affected)</td>
<td>9+700</td>
<td>74.86</td>
<td>38</td>
<td>1 tree row of 2 m width</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
</tr>
<tr>
<td>4</td>
<td>Le Loi Primary School (1 housing row in the West)</td>
<td>1+300</td>
<td>77.21</td>
<td>96</td>
<td>1 wall of 1.2 m width</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
</tr>
<tr>
<td>5</td>
<td>Dang Cuong Secondary School</td>
<td>3+500</td>
<td>77.21</td>
<td>125</td>
<td>Only the 1st floor is covered; 2nd and 3rd floors are not covered</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
</tr>
</tbody>
</table>
### Noise Sensitive Receptors

<table>
<thead>
<tr>
<th>No</th>
<th>Section (at Km)</th>
<th>Measured Noise level (dB)</th>
<th>Distance from road centerline (m)</th>
<th>Existing protection</th>
<th>Present picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Hoang Mai pagoda (the South of pagoda may be affected)</td>
<td>7.950</td>
<td>77.21</td>
<td>140</td>
<td>3 tree rows of 25 m width</td>
</tr>
<tr>
<td>7</td>
<td>Te Chu pagoda (the South of pagoda may be affected)</td>
<td>6+900</td>
<td>77.21</td>
<td>217</td>
<td>7 rows of trees of 70 m width</td>
</tr>
<tr>
<td>8</td>
<td>Kien Phong pagoda (the South of pagoda may be affected)</td>
<td>5+600</td>
<td>77.21</td>
<td>314</td>
<td>5 tree row of 20 m width</td>
</tr>
</tbody>
</table>

31. Mitigation measures selected will include:
   - Tree planting
   - Design and installation of a noise barrier
   - Proper control of air, noise, vibration pollution and proper waste management

32. During detailed design, extensive studies were carried out along the alignment to determine the most appropriate form of protection. The mitigation methods selected are shown in the table below. These are incorporated in the drawings and bill of quantities.
### Table 4: Proposed Noise Mitigation Protection Measures

<table>
<thead>
<tr>
<th>#</th>
<th>From</th>
<th>To</th>
<th>Side</th>
<th>Noise Sensitive Receptor</th>
<th>Distance from CL</th>
<th>Mitigation measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01+280</td>
<td>01+400</td>
<td>left</td>
<td>Le Loi Primary School</td>
<td>96 m</td>
<td>Plant Trees</td>
</tr>
<tr>
<td>2</td>
<td>03+350</td>
<td>03+600</td>
<td>right</td>
<td>Dang Cuong Secondary School</td>
<td>125 m</td>
<td>Plant Trees</td>
</tr>
<tr>
<td>3</td>
<td>03+940</td>
<td>04+000</td>
<td>left</td>
<td>Pham Tu Nghie Temple</td>
<td>32 m</td>
<td>Noise Wall</td>
</tr>
<tr>
<td>4</td>
<td>05+500</td>
<td>05+750</td>
<td>left</td>
<td>Lien Phong Pagoda</td>
<td>314 m</td>
<td>Plant Trees</td>
</tr>
<tr>
<td>5</td>
<td>06+800</td>
<td>07+000</td>
<td>left</td>
<td>Te Chu Pagoda</td>
<td>217 m</td>
<td>Plant Trees</td>
</tr>
<tr>
<td>6</td>
<td>07+900</td>
<td>08+100</td>
<td>left</td>
<td>Hoang Mai Pagoda</td>
<td>140 m</td>
<td>Plant Trees</td>
</tr>
<tr>
<td>7</td>
<td>09+700</td>
<td>09+780</td>
<td>left</td>
<td>Lam Khe Pagoda</td>
<td>38 m</td>
<td>Noise Wall</td>
</tr>
<tr>
<td>8</td>
<td>18+950</td>
<td>19+050</td>
<td>left</td>
<td>Kim Quang Tu Pagoda</td>
<td>38 m</td>
<td>Plant Trees</td>
</tr>
</tbody>
</table>

#### 2.7. DISPOSAL AND BORROW SITES

33. The design consultant has identified potential borrow and disposal sites for the main construction contracts. It is recommended that the contractors use these borrow pits and disposal sites. In case these sites cease to be available, the contractor corporate with the PMURTW to identify alternatives sites, assess associated environmental and social impacts, propose mitigation measures, incorporate these issues into the detailed design of the sites, and mitigate the impacts during implementation. The location of all identified sites is included on the following page of this plan.

34. The approach followed on this project for the management of the disposal and borrow sites is addressed extensively in the technical specification in three separate locations as follows:

   - Section 01700 – Environmental Management
   - Section 02400 - Protection of Existing roads and Streets
   - Section 03300 – Borrow Material

These specifications are shown in Appendix 3. The process adopted is to ensure that the contractor must comply with the legal requirements of Vietnam as well as additional requirements identified by the design consultant.
3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT DURING THE CONSTRUCTION PHASE

35. Proper environmental management during construction requires involvement of several stakeholders, each with different roles and responsibilities to ensure that adverse impacts are minimized. Environmental management responsibilities are defined as follows.

36. Environmental management during construction involves the PMURTW of the Department of Transport (DOT), the Environmental Management Section (EMS) in the PMURTW, contractors, and Safety and Environment Supervisor (SES) as part of the Construction Supervision Team (CST) and the Independent Environmental Monitoring Consultant (IMC). Figure 2 presents the relationships between all stakeholders for the environmental management of the construction of the Bac Son – Nam Hai road.

![Figure 2: Control and Reporting Lines for the Management of Environment during the Construction phase](image)

37. Detailed responsibilities for all stakeholders involved are presented in Table 5.

Table 5: Responsibilities for Environmental Management in the Construction Phase

<table>
<thead>
<tr>
<th>No.</th>
<th>Company/Unit</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DOT/ PMURTW</td>
<td>DOT will be responsible for overseeing project implementation. The PMURTW will be the executing agency responsible for day to day supervision and management, including procurement and the signing of contracts on behalf of DOT. The PMURTW will have the final responsibility for environmental performance of the project during both the construction and operational phases. PMURTW will closely coordinate with local authorities in the participation of the community during project preparation and...</td>
</tr>
<tr>
<td>No.</td>
<td>Company/Unit</td>
<td>Responsibilities</td>
</tr>
<tr>
<td>-----</td>
<td>--------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>implementation. PMURTW will be also in charge of reporting the EMP implementation to the World Bank and DONRE. In order to get effectiveness in the implementation process, PMURTW will arrange an environmental management system of the project and this system will be incorporated into the diagram titled Environmental Management – PMURTW.</td>
</tr>
<tr>
<td>2</td>
<td>Environmental Management Section (EMS) under PMURTW</td>
<td>EMS established within PMURTW will share responsibility in environmental management. This Section will include a Vice Director and some functional staff in different departments/divisions of the PMURTW, and be responsible for monitoring the implementation of WB’s Safeguard Policies in all stages of the project. These policies will be applied to all project items, including bidding, signing construction contracts, consultant contracts, assessment of documents and reports, extraordinary site checks, appointing departments, dealing with incidents related to environmental management, etc. EMS will advise PMURTW’s leaders on environmental issues to ensure that the project implementation meets all requirements of WB’s environmental safeguard policies.</td>
</tr>
<tr>
<td>3</td>
<td>Construction Supervision Team (CST)</td>
<td>The Construction Supervision Team (CST) will be responsible for supervising and monitoring all construction activities and for ensuring that Contractors comply with the requirements of the contracts and the EMP. The CST shall engage sufficient number of qualified staff with adequate knowledge on environmental protection and construction management to perform the required duties and to supervise the Contractor’s performance. The CST environmental group shall be led by a <strong>Workplace Safety and Environment Supervisor (SES)</strong> who shall have extensive experience (at least 5 years experience is required) in environmental management, supervision and monitoring on construction projects and be familiar with Viet Nam environmental legislatives requirements. Terms of Reference for the CST shall be clearly stipulated in the contract signed between CST and PMURTW.</td>
</tr>
<tr>
<td>4</td>
<td>Contractor</td>
<td>Based on an approved EMP, the Contractor shall be responsible for establishing a site EMP for each construction site area, submit the plan and receive opinions of relevant agencies, complete reports for approval and implementation. In addition, it is required that the Contractor get all permissions for construction (traffic control and diversion, excavation, labor safety, etc) following current regulations. The contractor shall be required to appoint a competent individual as the contractor’s on-site <strong>Safety and Environment Officer (SEO)</strong> who will be responsible for monitoring the contractor’s compliance with the EMP requirements and the environmental specifications. Approved specific EMP and relevant papers will be the basis for management and supervision in the future.</td>
</tr>
<tr>
<td>5</td>
<td>Local authority and</td>
<td>Local authority (commune/ ward PCs: CPCs), which undertakes administrative management in the area -- shall create favorable</td>
</tr>
<tr>
<td>No.</td>
<td>Company/ Unit</td>
<td>Responsibilities</td>
</tr>
<tr>
<td>-----</td>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>6</td>
<td>Independent Environmental Monitoring Consultant (IMC)</td>
<td>IMC shall be a professional and experienced unit in environmental management. IMC will, under the contract scope, provide support to PMURTW to establish and operate environmental management systems, offers suggestions for adjusting and building capacity for relevant agencies during the implementation period and monitor the Contractor's EMP implementation plan in both construction and operation stages. IMC will also be responsible to support PMURTW to prepare monitoring reports on EMP implementation and submit these reports to DONRE for approval. The IMC shall have extensive knowledge and experience in environmental monitoring and auditing to provide independent, objective and professional advice on the environmental performance of the project. In order to minimize conflict of interests, the IMC shall not be working in the same organization performing the EMP work, be part of the DOT, PMURTW, EMS or the CST.</td>
</tr>
<tr>
<td>7</td>
<td>Department of Natural Resources and Environment (DONRE) of Haiphong City</td>
<td>With the role of management in the environmental sector, DONRE will be responsible for receiving and reviewing environmental monitoring reports, submitted by PMURTW. Inspection Division DONRE will be responsible for environmental inspection for the project, proposal of penalty in case of violations of National laws and technical regulations/ standards. In case of environmental problems, DONRE will require the PMURTW to properly settle all problems and minimize damages which are generated from project implementation process.</td>
</tr>
<tr>
<td>8</td>
<td>Ministry of Transport</td>
<td>Coordinate with DONRE to regularly check Contractor's performance in accordance to current regulations, especially matters related to arrangement of fences and signs whether they are following regulations, cleaning works outside fences, excavation, travelling of construction vehicles, etc.</td>
</tr>
<tr>
<td>9</td>
<td>Section of Natural Resource and Environment (SONRE) in project districts (An Duong, Kien An, Le Chan, Ngo Quyen, Hai An)</td>
<td>Monitor and check activities on environmental safety in the project district. Check and penalize violations. Periodically report to DONRE on environmental problems. Coordinate with relevant agencies, participate in investigations and help resolve environmental incidents.</td>
</tr>
<tr>
<td>10</td>
<td>Hai Phong Environment Inspection Bureau</td>
<td>Coordinate with relevant departments/agencies, and responsible for monitoring and penalizing violations of environmental law. Especially, this bureau will be responsible to deal with serious affairs and investigate responsibilities of relevant agencies as well as participate in dealing with serious environmental incidents.</td>
</tr>
<tr>
<td>10</td>
<td>Public utilities</td>
<td>Coordinate with PMURTW and Contractor in relocating public works</td>
</tr>
<tr>
<td>No.</td>
<td>Company/Unit</td>
<td>Responsibilities</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td><em>(power, water supply, drainage and telecommunication)</em></td>
<td>and implementing temporary connections at places which are crossed by proposed routes in order to ensure the continuous provision of basic services.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Handle related incidents (electric cable fire, broken communication cables, broken water pipes, etc.)</td>
</tr>
</tbody>
</table>
4. ENVIRONMENTAL COMPLIANCE FRAMEWORK

4.1. ENVIRONMENTAL AND SOCIAL REQUIREMENTS

38. The contractor must comply with the requirements of mitigation of environmental and social impacts as indicated in the following table. The measures and procedures detailed in the EMP implemented by the contractors must be sufficient to meet these minimum requirements.

**Table 6: Minimum Environmental and Social Requirements for the Construction of the Road – At Worker’s Camps**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply for worker camps may affect village water supply.</td>
<td>The contractor provides its own water supply that does not affect village water supply.</td>
<td>Any water supply sources should not adversely affect the villages’ water supply.</td>
</tr>
<tr>
<td>Wastewater discharges affecting water quality</td>
<td>Wastewater to be properly treated prior to discharge.</td>
<td>Sewerage disposal systems should be designed and installed to comply with the Vietnamese standards</td>
</tr>
<tr>
<td>Domestics solid waste polluting the environment and causing health hazards</td>
<td>Proper collection, segregation and treatment of solid wastes</td>
<td>All solid and hazardous wastes shall be collected, segregated, transported from site and disposed of at a municipal landfill area. Hazardous waste shall be managed in accordance with Circular 12/2011/TT-BTNMT and shall not be discharged to a municipal landfill.</td>
</tr>
<tr>
<td>Camps using local services and resources, at the expense of villagers.</td>
<td>Refer to the village impacts table below.</td>
<td>Refer to the villager impacts table below.</td>
</tr>
<tr>
<td>Relation between construction workers and local residents: impacts on local traditional cultural values.</td>
<td>Refer to the village impacts table below.</td>
<td>Refer to the villager impacts table below.</td>
</tr>
</tbody>
</table>

**Table 7: Minimum Environmental and Social Requirements for the Construction of the Road – General Construction Issues**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise generated by construction machines and trucks</td>
<td>Noise must not affect life of local residents.</td>
<td>All noise generating machinery operations to occur only during designated hours (to be confirmed by contractor in agreement with</td>
</tr>
<tr>
<td>Issue</td>
<td>Key Principle / Mitigation Standard</td>
<td>Minimum Mitigation Measures</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dust generation from construction activities</td>
<td>Dust must not cause a hazard or nuisance to village life. Watering roads, construction areas closed to residential sites in dry days</td>
<td>• Use of complaints register and procedures to address issues as they arise. Concrete batching plants and other noisy equipment to be located as far as over 300 m from dense populated sites.</td>
</tr>
<tr>
<td>Vibration generation from construction activities</td>
<td>Vibration must not cause a hazard or nuisance to village life</td>
<td>• Operation of heavy vibration generation to occur only during designated hours (to be confirmed by contractor in agreement with CPCs). Use of complaints register and procedures to address issues as they arise.</td>
</tr>
<tr>
<td>Increased of traffic associated with construction activities</td>
<td>There should be no increased traffic risk to local road from increased vehicle movement traffic associated with the new road construction.</td>
<td>• Upgrade roads, including signage. Train vehicle drivers on the traffic risks along the roads through villages. Proper organization of traffic management at the roads used for material transportation. Use of complaints register and procedures to address issues as they arise.</td>
</tr>
<tr>
<td>Environmental pollution occurring on construction and surrounding areas</td>
<td>- Appropriate storage, segregation and transport of domestic, construction wastes. There shall be no solid or liquid waste disposal directly or indirectly to any rivers, canals, cultivation fields, residential areas. - Waste and ambient environment monitoring shall be undertaken to ensure villager’s</td>
<td>• Keeps a current list of all potentially contaminating materials used on site. Develop and implement appropriate measures for storage, segregation, transport and use to comply with the Vietnamese National Technical Regulations.</td>
</tr>
</tbody>
</table>
### Table 8: Minimum Environmental and Social Requirements for the Construction of the Road – Soil Erosion and Leakage of Eroded Materials to the Surrounding

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measure</th>
</tr>
</thead>
</table>
| Generation of suspended solids and turbidity from soil erosion and runoff water into watercourses | Construction activities should not rise soil erosion  
Reduction suspended solids and turbidity in run – off water to acceptable levels | - No discharge of runoff water containing high turbidity without treatment.  
- Land clearance should be minimised  
- Properly prevent soil erosion. Storm water should be diverted around exposed areas.  
- Stockpiling should occur at least 10 m from a water course.  
- Re-vegetation planting exposed areas as soon as possible.  
- Store storm water at ponds, reservoir, wherever possible, to allow solid settlement. |
| Introduction of invasive species                                      | Use of invasive plant species for re-vegetation are erosion control are prohibited                   | Use native plant species for re-vegetation are erosion control as needed.                                                                                   |
| Disturbance of natural habitats by improper disposal of spoil material. | Surplus soils, excavated muddy material should be reused where possible to reduce the need for spoil disposal sites. | Proper storage and reuse surplus soils before excavating new soils.  
Proper reuse of muddy materials for agriculture and proper disposal of surplus muddy material into designated area. |
| Low efficiency of pollution control measures over time               | Pollution control measures should be continuously implemented throughout the construction period.     | Earthworks control measures should be inspected and maintained in efficient operating condition over the construction period. |
Table 9: Minimum Environmental and Social Requirements for the Construction of the Project - Operation of Heavy Construction Machines

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise generated by operation of heavy construction machines</td>
<td>Noise level must not exceed the permissible limit in the Vietnam National Technical Regulation (QCVN26:2010/BTNMT).</td>
<td>Heavy machinery operations to occur only during designated hours (to be confirmed by contractor in agreement with CPCs).</td>
</tr>
<tr>
<td>Vibration generated by operation of heavy construction machines</td>
<td>Vibration level must not exceed the permissible limit in the Vietnam National Technical Regulation (QCVN27:2010/BTNMT)</td>
<td>Heavy machinery operation to occur only during designated hours (to be confirmed by contractor in agreement with CPCs).</td>
</tr>
</tbody>
</table>

Table 10: Minimum Environmental and Social Requirements for the Construction of the Road - Construction Material Storage

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage of solids (SS) from uncovered surplus soil storage sites</td>
<td>Properly prevent storm water flowing through uncovered soil/construction material storage sites</td>
<td>• No direct discharge of run-off water containing high SS without treatment.</td>
</tr>
<tr>
<td></td>
<td>Properly control run-off water to reduce SS and turbidity to acceptable levels</td>
<td>• Stockpiles should be compacted as much as possible and covered, if possible to avoid exposure for extended periods.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Surplus soil/muddy material should be reused as soon as possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Storm water should be diverted around soil stockpiles.</td>
</tr>
<tr>
<td>Dust generation from soil storage sites</td>
<td>Dust must not cause air pollution or nuisance to local residents.</td>
<td>• Soil stockpiles should be compacted as much as possible and covered to avoid exposure for extended periods.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Soil stockpiles should be reused as soon as practicable.</td>
</tr>
</tbody>
</table>

Table 11: Minimum Environmental and Social Requirements for the Construction of the Road - Concrete Manufacture

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effluent discharged from</td>
<td>No direct discharge of effluent</td>
<td>Setting settlement ponds for settle of</td>
</tr>
</tbody>
</table>
Table 1: Minimum Mitigation Measures for Concrete Manufacturing

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>concrete manufacturing, containing high alkalinity and SS</td>
<td>from concrete batching plants to water course and/or cultivation, aquaculture land Proper treatment of effluent to reduce SS and alkalinity reduction.</td>
<td>SS and neutralization of alkalinity in the effluent before discharge. Wastewater to be reused where Possible in the concrete manufacture process. Properly handling wet cement to avoid leakage.</td>
</tr>
</tbody>
</table>

Table 12: Minimum Environmental Requirements for the Fuel Storage Areas

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution and fire risk associated with the storage and use of fuels for vehicles and construction machines</td>
<td>No oil, lubricants, fuels or containers should be drained or dumped to land or water courses. Oil spills shall be minimised, Proper procedures to clean up the environmental damage by oil spill. Strict prevention of fire during fuel storage and use.</td>
<td>• Setting up Safety Data Sheet of all hazardous materials used on site. • Develop appropriate measures for storage, transport and use of fuel to avoid fire risk. • Diesel to be stored in specific tankers or to a maximum of 5,000 litres/construction site. • Tankers containing diesel or other liquid fuels to be stored in stations with concrete roof walls, grounds, and 100 m from a river/ canal. Install sign “No Fire” and fire control equipment. • Concrete dikes to capture 100% of fuel must be placed around fuel storage areas. • All refuelling of vehicles or machines to be done on flat ground. • All significant vehicle or machines maintenance shall be undertaken in a site, equipped with waste oil collector • Oil spill emergency procedures should set up and staff trained. • There shall be no discharge of oil, diesel, or other hazardous materials to the surrounding land and water course.</td>
</tr>
</tbody>
</table>
### Table 13: Minimum Environmental and Social Requirements for the Construction of the Road - Works at Bridge Construction Sites

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Measures</th>
</tr>
</thead>
</table>
| - Spoil disposal, discharge of oily wastes, waste bentonite from bridge construction site causing river sedimentation and pollution. - Disturbance of waterway transport at the rivers, especially at the rivers Niem and Rao. | - No canal/river pollution caused by bridge construction. - No causing congestion of local waterway transport - No causing accidents for bridge and ships/barges moving on the rivers. | - Proper collection and treatment of bridge construction wastes  
- Proper managements of material transport by waterway for bridge construction to avoid congestion of local waterway transport.  
- Proper management of bridge construction to avoid clash between ships/barges and bridge pillars. |

### Table 14: Minimum Environmental and Social Requirements for the Construction of the Road - Social Impacts

<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Method</th>
</tr>
</thead>
</table>
| Deterioration of current quality of life and traditional livelihoods | Local residents have the ability to communicate issues to EMS, SES and Contractors. Local residents have the expectation that issues will be addressed and resolved by negotiation. Local residents are not to be adversely affected by the influx of construction workers. | - Set up a communication network for discussing issues between EMS, ESO, Contractors and local residents.  
- EMS to manage a grievance mechanism, and have staff on site at all times to manage grievances.  
- The Health Program included in the Contractor’s Construction and Workers Camp Management Plan shall be made available to the communities  
- Guidelines on relation of workers and local residents  
- Education and orientation of outside workers to local culture and social norms before the start of work.  
- Camps to be self-sufficient in resources and services. |
| Health and safety risks from such activities as increased traffic, heavy machinery operation | Health and safety risks to local residents are minimised. | - Local residents shall be adequately informed of all potential hazards to health and safety.  
- Local residents have the expectation that issues will be addressed and resolved by negotiation.  
- Contractors shall be responsible for first aid and treatment for persons injured by construction activities. |
<table>
<thead>
<tr>
<th>Issue</th>
<th>Key Principle / Mitigation Standard</th>
<th>Minimum Mitigation Method</th>
</tr>
</thead>
</table>
| Nuisance issues such as noise, dust and vibration                     | Nuisances shall be minimised. Villagers have the expectation that issues will be addressed and resolved by negotiation. | • Refer to the sections above discussing on noise, dust, vibration pollution.  
• Villagers have the expectation that issues will be addressed and resolved by negotiation. |
| Traffic causing safety risks to road users                            | Material transport for the project shall be managed to minimise the impact on existing road users. | • Signal boards to be installed to identify places where accidents may be happened  
• EMS, SES and Contractors to discuss major traffic issues with village representatives.  
• Heavy traffic do not operate at the hours when school children going to and from school. |
| Sedimentation and water pollution affecting river water quality, cultivation and aquaculture.  | Construction waste discharges to the river shall be prohibited                                     | Refer to the sections above discussing water pollution, erosion and sediment control.                                                                      |

### 4.2. ENVIRONMENTAL RESPONSIBILITIES OF THE CONTRACTORS

39. The Contractors, its sub-contractors shall minimize the impact caused by the construction activities by implementation of the mitigation measures set down in this EMP to prevent adverse impacts on local environment and communities.

40. Duties of the Contractor and Sub-Contractors include but are not be limited to:

(i) Compliance with Vietnamese relevant legislative requirements on the environment, public health and safety;
(ii) Work within the scope of contractual requirements;
(iii) Organize representatives of the construction team to participate in the joint site inspections undertaken by the SES;
(iv) Carry out corrective actions instructed by the EMS or the SES;
(v) Provide and update information to the EMS regarding works activities which may contribute, or be continuing to the generation of adverse environmental impacts;
(vi) In case of non-compliances, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to minimize environmental impact;
(vii) Stop construction activities which generate adverse impacts upon receiving instructions from the EMS or the SES. Propose and carry out corrective actions and implement alternative construction method, if required, in order to minimize the environmental impacts; major non-compliance by the Contractors will be cause for suspension of works and other penalties until the non-compliance has been resolved to the satisfaction of the EMS.

41. Comply fully with Environmental Specifications. Detailed Environmental Specifications for Contractors are included in Appendix 3.
4.3. RESPONSIBILITIES OF CONTRACTORS' SAFETY AND ENVIRONMENT OFFICER (SEO)

42. The Contractor shall be required to appoint a Contractor's on-site Safety and Environment Officer (SEO). The SEO must be appropriately trained in environmental management and must possess the skills necessary to transfer environmental management knowledge to all personnel involved in the contract. The SEO will be responsible for monitoring the Contractor's compliance with the EMP requirements and the environmental specifications.

43. Duties of the SEO shall include but not be limited to the following:

- Carry out environmental site inspections to assess and audit the Contractors' site practice, its equipment and work methodologies in terms of pollution control and adequacy of environmental mitigation measures;
- Monitor compliance with environmental protection measures, pollution prevention and control measures in the approved EIA report and in this EMP;
- Prepare reports for the environmental monitoring and site environmental conditions;
- Investigate complaints and recommend any required corrective measures;
- Advise the Contractors on environment improvement, awareness and pollution prevention measures;
- Follow the procedures in the EMP and recommend suitable mitigation measures to the Contractors in the case of non-compliance. Carry out additional monitoring of noncompliance within the specified timeframe instructed by the EMS;
- Liaison with the Contractors and EMS on all environmental performance matters; and Contractor's submission of EMP Implementation Plan reports to the EMS, SES, and relevant administrative authorities, if required;
- Keep detailed records of all site activities that may adversely affect to the environment.

4.4. ENVIRONMENTAL SUPERVISION DURING THE CONSTRUCTION PHASE

44. During the construction phase, environmental supervision shall be carried out by a qualified Construction Supervision Team (CST) employed by the PMURTW. The CST is responsible for inspecting, and supervising all construction activities to ensure that mitigation measures adopted in the EMP are properly implemented, and that the negative environmental impacts of the project are minimized. The CST shall engage sufficient number of qualified staff (e.g. environmental supervision engineers) with adequate knowledge on environmental protection and construction project management to perform the required duties and to supervise the Contractor’s performance.

45. The environmental engineers shall be led by a Workplace Safety and Environment Supervisor (SES) who shall have adequate knowledge and experience (at least 5 years experience is required) in environmental management, supervision and monitoring on construction projects to provide and professional advice to the Contractors on the environmental performance of the project. The SES shall be familiar with the Vietnamese laws, standards, national technical regulations and other requirements related to environmental protection. Depending on the project requirements, the SES may be required to work full-time on-site.

46. The SES shall:
- Review and assess on behalf of the PMURTW whether the construction design meets the requirements of the mitigation and management measures of the EIA and EMP,
- Supervise the preparation and implementation of Construction Environmental Management Plan (CEMP) of Contractors including their performance, experience and handling of site environmental issues, and provide corrective instructions;
- Review the measures in the EMP implemented by the Contractors and Sub-Contractors, verify and confirm environmental supervision procedures, parameters, monitoring locations, equipment and results;
- Report EMP implementation status to the PMURTW and prepare the environmental supervision statement during the construction period.

Terms of reference for the SES are included in Appendix 4.

4.5. INDEPENDENT MONITORING CONSULTANT (IMC)

47. In order to evaluate the environmental impacts during construction of the Project, the PMURTW shall ensure that Project-specific monitoring programs requirements are established and will be implemented. The environmental monitoring program shall be carried out by an Independent Environmental Monitoring Consultant (IMC) appointed by Haiphong DOT.

48. In the construction phase, as requirement by MONRE, IMC shall be responsible for carrying out environmental monitoring (survey, sampling, analysis and reporting with 4 (four) occasions per a year (quarterly), on all environmental-related issues in the Contractor’s works. IMC will check, review, verify and validate the overall environmental performance of the project through regular inspections and review. This review will provide confirmation that the relevant mitigation measures and monitoring program provided in the Project EMP are fully complied or not complied with. The IMC will also assist PMURTW and EMS in environmental management of the project.

49. Terms of reference for the IMC are included in Appendix 5.

4.6. COMPLIANCE WITH LEGAL AND CONTRACTUAL REQUIREMENTS

50. The constructions activities shall comply with the Vietnam laws, Governmental decrees, National technical regulations, standards related with environmental protection, pollution control and biodiversity conservation. The most relevant legal documents are listed in Appendix 1.

51. All the works method statements submitted by the Contractors to the EMS of the PMURTW for approval shall also be sent to the SES to evaluate whether sufficient environmental protection and pollution control measures have been included.

52. The SES shall also review the progress and program of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented.

53. The Contractor(s) shall regularly copy relevant documents to the SEO and the SES. The document shall at least include the updated Work Progress Reports, the updated Works Program, and the application letters for different license/permits under the environmental protection laws, and all the valid license/permit. The SES and the SEO shall also have access, upon request, to the Site Log-Book.
54. After reviewing the documents, the SEO or the SES shall advise the EMS and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control to take follow-up actions. If the SEO or the SES concludes that the current status on license/permit application and any environmental protection and pollution control preparation works may not comply with the works program or may result in potential violation of environmental protection and pollution control requirements by the works in due course, they shall advise the Contractor and the EMS accordingly.

4.7. NON COMPLAINECE RECTIFICATION SYSTEM

55. A compliance framework, based on the environmental requirements established by the EMP and Environmental Specifications included in bidding documents, will be strictly enforced by the CST. Minor and major infringements will be determined according to the following categorization table (Table 14).

Table 15: Categorization of Non Compliance Infringement Levels

<table>
<thead>
<tr>
<th>Category of Infringement</th>
<th>Definition</th>
<th>Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor Infringement</td>
<td>Incident which causes temporary but reversible damage to the environment, community property, people.</td>
<td>Minor restoration activities. Adjustments/eliminations to construction practices. Compliance with the EMP</td>
</tr>
<tr>
<td>Major Infringement</td>
<td>Incident where there is long-term or irreversible damage to the environment, community property, and people</td>
<td>Major clean up operations Major restoration requiring engineering measures. Major restoration of community property. Compensation to affected communities or persons.</td>
</tr>
</tbody>
</table>

56. For minor infringements - an incident which causes temporary but reversible damage - the contractor will be given a reasonable period of time to remediate the problem and to restore the environment. If restoration is done satisfactorily during this period, no further actions will be taken. If it is not done during this period, the PMURTW will immediately arrange for another contractor to do the restoration, and deduct the cost from the offending contractor’s next payment. For major infringements - an incident where there is long-term or irreversible damage - the contractor will be prosecuted under the Vietnamese environmental laws with possible severe financial penalties in addition to the cost for restoration activities. To minimize the damage, the restoration activities will be implemented without delay.

57. The compliance framework will be applied as follows:

(i) The SES will identify or be notified of an infringement (community member, local government)

(ii) The SES in consultation with the Construction Supervision Engineer (CSE) will assess whether it is a minor or major infringement.

(iii) For minor infringements:
- The CSE will establish the required mitigation measures, and the time period, which is a maximum of five days to remedy the situation.
- The CSE will review the recommendation and confirm (i) the level of infringement (minor/major); (ii) the mitigation measures; and (iii) the mitigation time period. If they do not agree, they will work with the PMURTW to reach mutually acceptable recommendations.
- The Contractor will be informed of the infringement, the required mitigation measures, and time period for resolution.
- The Contractor shall remedy the infringement in accordance with the recommendations within the agreed time period.
- The SES shall confirm the infringement is satisfactory remedied in the time period, and inform the CSE who will independently confirm this.
- If the infringement is not remedied satisfactorily in the time period the SES shall inform the CSE and the PMURTW. The Engineer shall immediately arrange for a separate contractor to undertake the necessary works and the cost of this shall be deducted from the next payment to the offending contractor.

(iv) For major infringements:
- The SES shall immediately inform the PMURTW, CSE of the incident
- The PMURTW shall inform the appropriate provincial authorities if appropriate
- The PMURTW, in consultation with the Contractor, CSE, SES and other provincial authorities as appropriate, shall agree upon mitigation and clean up measures to be undertaken immediately by the contractor or by specialists to be procured at the contractor’s expense. To minimize the environmental impacts the restoration activities should be completed as soon as possible.
- The Government agencies may apply a financial penalty, for each major infringement, in addition to any costs associated with the rectification of the infringement.

58. Any conflicts between the Contractor, CSE and SES shall be resolved by the Engineer and Employer. During training, the SES shall make clear how the compliance framework will be applied.
5. EMP IMPLEMENTATION PLAN

5.1. CONTRACTOR'S CONSTRUCTION ENVIRONMENT MANAGEMENT PLAN (CEMP)

59. Prior to commencement of construction, the Contractor will be required to submit a CEMP to the PMURTW based on the requirement in the Specification of Bidding Document. The CEMP shall demonstrate compliance with Vietnamese environmental technical regulations/standards, the mitigation measures set down in the specifications and the World Bank Safeguard Policies. The content of the CEMP shall be in line with the project specific EMP and shall be enhanced by the Contractor’s works practices, implementation procedures and program. The Plan shall be certified by the SEO and verified by the IMC in accordance with the project and the EIA requirements and, approved by the PMURTW.

5.2. PROJECT INITIATION AND STAFFING

60. It is necessary that the SES will be mobilized one month before the start of the construction activities. The one month start up time will be utilized by the SES to review and familiarize itself with the project, the project design, the technical specifications, contract documents, the EIA, EMP and RAP reports and other project relevant documents. Following the review, the SES will prepare a brief report on the potential issues and challenges arising from the implementation of the EMP and the condition of contracts and make recommendations to the PMURTW about how to improve the implementation of the EMP. The SES is expected to be mobilized at the beginning of the contract to prepare the necessary guidelines, documentation, training, etc.

5.3. CAPACITY BUILDING AND ENVIRONMENTAL MANAGEMENT TRAINING

61. Actual implementation of projects shows that coordination in environmental management is not always effective because of the following reasons:

- Lack of a unified coordination regime which should be established in the beginning of project among PMURTW, relevant agencies, local authorities at project wards/communes;
- Local staff do not master loans borrowing process of project but carry out practices involving and following those of domestic projects with limited participation;
- The community does not have obvious awareness on their rights and obligations on environmental protection or in spite of understanding, there is a lack of regime to provide feedback;
- Relevant agencies were not always ready for coordinating works during project implementation. Some agencies assigned their functional staff to coordinate with the project but this assignment is only temporary and appointed staff do not master the coordination method as well as necessary procedures for discussion and contact with PMURTW.

62. In order to overcome these matters, it is necessary to analyze and assess the capability and demands of relevant departments/divisions in environmental management and analyze actual demands for project implementation. Accordingly, a capacity building and training program will be established to increase the effective operation of environmental management systems in the future. Some assessments on training demands in environmental management as well as proposals for a training program are presented in Appendix 6.
6. MONITORING PROGRAM

6.1. MONITORING OBJECTIVES

63. It is essential to design the monitoring program and monitoring frequency appropriately to be able to demonstrate both the overall performance of the project works as well as the short-term impact due to peak construction activities. More specifically, as the integral and critical part of the EMP, the environment monitoring program should comply with the guidelines in EIA issued by MONRE (2011) in objectives and contents the following objectives:

   a. To ensure protect components are conducted in compliance with the Vietnam’ Laws and regulations/ standards.
   b. To measure the success of proposed mitigation measures in minimizing potential impacts.
   c. To continuously monitor change in baseline environmental and social condition during construction activities.
   d. To implement corrective actions or new adaptive management programs, as required if proposed mitigation measure are unable to reduce/ or minimize potential impact.

6.2. MONITORING FRAMEWORK

64. In order to achieve the above objectives, the following Environmental Monitoring Program shall be implemented during the construction and operation phases of the project.

   a. Project performance monitoring is conducted to evaluate compliance with waste emission standards and requirements in environmental mitigation given in the EMP.
   b. Environmental effects monitoring (ambient environmental quality monitoring) is conducted to estimate the impacts of project activities on the ambient environment.

6.3. PROJECT PERFORMANCE MONITORING

65. In the framework of Performance Monitoring there are two parts relating to environmental management:

   (i) Monitoring on compliance of the project owner/its contractors with the Vietnam and the WB requirements in implementation of the measures in the Mitigation Plan of the EMP.
   (ii) Monitoring on compliance of the project owner/its contractors with the Vietnam and the WB requirements in waste management and treatment

Guidelines for the two above parts of performance monitoring are described below.

6.3.1. Monitoring on Compliance with Requirements

66. Organization, methodology and responsibilities in this type of performance monitoring on compliance are guided in Table 15.

<table>
<thead>
<tr>
<th>No</th>
<th>Aspects/Parameter to be monitored</th>
<th>Location</th>
<th>Means of monitoring</th>
<th>Monitoring frequency</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pre-Construction and Construction Phases

1 | Completion of                    | Review   | One time, Design    | HPUTDP'             |

Prepared by Infra-Thang Long (Dec. 2010), Updated by SMEC (Nov 2012)
<table>
<thead>
<tr>
<th>No</th>
<th>Aspects/Parameter to be monitored</th>
<th>Location</th>
<th>Means of monitoring</th>
<th>Monitoring frequency</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>detailed design in accordance with EMP requirements</td>
<td></td>
<td>documents</td>
<td>prior to approval of detailed design</td>
<td>Consultant PMURTW (PMURTW)</td>
</tr>
<tr>
<td>2</td>
<td>Inclusion of EMP in tender and contract documents for civil works.</td>
<td></td>
<td>Review documents</td>
<td>Prior to issuance of tender documents and during review of bids</td>
<td>PMURTW EMS within PMURTW (hereafter: PMURTW/EMS)</td>
</tr>
<tr>
<td>3</td>
<td>Preparation of CEMP by contractors</td>
<td></td>
<td>Review CEMP</td>
<td>One time, prior to commencement of project construction</td>
<td>Construction Contractors - PMURTW/EMS - IMC</td>
</tr>
<tr>
<td>4</td>
<td>Thorough implementation of the Resettlement Action Plan (RAP)</td>
<td>Throughout project site</td>
<td>Methods suggested in RAP</td>
<td>During RAP implementation</td>
<td>- PMURTW - Resettlement Committees PMURTW - City PC - Local Public associations</td>
</tr>
<tr>
<td>5</td>
<td>Evidence of marking of work site boundaries</td>
<td>Throughout project site</td>
<td>Observation</td>
<td>Random check</td>
<td>Construction Contractors - PMURTW/EMS/SES - IMC</td>
</tr>
<tr>
<td>6</td>
<td>No cutting of trees outside the project area</td>
<td>Project site</td>
<td>Observation</td>
<td>Random check</td>
<td>Construction contractors - PMURTW/EMS/SES/SES - IMC</td>
</tr>
<tr>
<td>7</td>
<td>No dumping of all kinds of wastes and cut trees in rivers, streams, ponds and field</td>
<td>Project site</td>
<td>Observation</td>
<td>Random check</td>
<td>Construction contractors - PMURTW/EMS/SES - IMC - District SONRE</td>
</tr>
<tr>
<td>8</td>
<td>General site condition and cleanliness</td>
<td>Project site</td>
<td>Observation</td>
<td>Random check</td>
<td>Construction contractors - PMURTW/EMS/SES - IMC - District SONRE</td>
</tr>
<tr>
<td>9</td>
<td>Covering of all trucks moving to and from site</td>
<td>Project site</td>
<td>Observation</td>
<td>Random check</td>
<td>Construction contractors - PMURTW/EMS/SES - IMC - City/ District DONRE/SONRE</td>
</tr>
<tr>
<td>10</td>
<td>Watering of access roads and construction sites on</td>
<td>Project site</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractors - PMURTW/EMS/SES/SES - IMC</td>
</tr>
</tbody>
</table>

Prepared by Infra-Thang Long (Dec. 2010), Updated by SMEC (Nov 2012)
<table>
<thead>
<tr>
<th>No</th>
<th>Aspects/Parameter to be monitored</th>
<th>Location</th>
<th>Means of monitoring</th>
<th>Monitoring frequency</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Rainless days</td>
<td>Project site</td>
<td>Observation</td>
<td>Random check</td>
<td>Construction contractors - PMURTW - City Policy</td>
</tr>
<tr>
<td>12</td>
<td>Installation of temporary waste storage areas at each construction site including segregation of hazardous and non-hazardous wastes.</td>
<td>Waste storage areas</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractors - PMURTW/EMS/SES/IMC</td>
</tr>
<tr>
<td>13</td>
<td>Sanitation conditions at construction worker camps, including sewage treatment facilities (toilets), domestic solid wastes management etc.</td>
<td>Project site</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractors - PMURTW/EMS/SES/IMC</td>
</tr>
<tr>
<td>14</td>
<td>Availability of clean and safe food and water supply, clean eating and rest / housing facilities at the worker camps.</td>
<td>Observation / laboratory analysis of water supply (as necessary)</td>
<td>Monthly</td>
<td>Construction contractors PMURTW/EMS/SES IMC</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Compliance to requirements for disposal of vegetation wastes (cut trees, shrubs, etc.).</td>
<td>Project site</td>
<td>Observation</td>
<td>Random check</td>
<td>Construction contractors PMURTW/EMS/SES IMC</td>
</tr>
<tr>
<td>16</td>
<td>Proper organization of material transport to minimize environmental pollution and community</td>
<td>Project site</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractors - PMURTW/EMS/SES IMC - City/ District DONRE/SONRE</td>
</tr>
<tr>
<td>No</td>
<td>Aspects/Parameter to be monitored</td>
<td>Location</td>
<td>Means of monitoring</td>
<td>Monitoring frequency</td>
<td>Responsibilities</td>
</tr>
<tr>
<td>----</td>
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<td>----------</td>
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<td>---------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>disturbance</td>
<td>Project site</td>
<td>Observation</td>
<td>Monthly</td>
<td>NRE</td>
</tr>
<tr>
<td>17</td>
<td>Condition and effectiveness of erosion controls</td>
<td>Project site</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractors</td>
</tr>
<tr>
<td>18</td>
<td>Condition and effectiveness of construction waste and hazardous waste management</td>
<td>Project site</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractor</td>
</tr>
<tr>
<td>19</td>
<td>Evidence of storm water turbidity due to soil erosion from construction site to surrounding field, water courses</td>
<td>Project site</td>
<td>Turbidity measurement</td>
<td>Random check</td>
<td>Construction contractors</td>
</tr>
<tr>
<td>20</td>
<td>Evidence of direct or indirect disturbance of vegetation outside defined worksite boundaries</td>
<td>Project site and surrounding areas</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractors</td>
</tr>
<tr>
<td>21</td>
<td>Stabilization, rehabilitation and landscaping of all land surfaces affected by construction activities</td>
<td>Project site</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractors</td>
</tr>
<tr>
<td>22</td>
<td>Installation of noise and dust control barriers</td>
<td>At construction site close to sensitive receptors</td>
<td></td>
<td>Monthly</td>
<td>Construction contractors</td>
</tr>
<tr>
<td>23</td>
<td>Dust generation during windy conditions</td>
<td>Exposed areas throughout project site</td>
<td>Observation</td>
<td>Monthly</td>
<td>Construction contractors</td>
</tr>
<tr>
<td>No</td>
<td>Aspects/Parameter to be monitored</td>
<td>Location</td>
<td>Means of monitoring</td>
<td>Monitoring frequency</td>
<td>Responsibilities</td>
</tr>
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</tr>
<tr>
<td>24</td>
<td>Number and type of community complaints on environmental issues received</td>
<td>Project communes</td>
<td>Review of complaints</td>
<td>Monthly</td>
<td>Construction contractors</td>
</tr>
<tr>
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<td>PMURTW/EMS/SES</td>
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<td>- PMURTW EMS</td>
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<td>- CPCs</td>
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<td></td>
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<td>- City DONRE</td>
</tr>
<tr>
<td>25</td>
<td>Filling up natural water courses during construction activity</td>
<td>Project site</td>
<td>Observation</td>
<td>Random check</td>
<td>Construction contractors</td>
</tr>
<tr>
<td></td>
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<td>- PMURTW EMS</td>
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<td>- Provincial DONRE</td>
</tr>
<tr>
<td>26</td>
<td>Evidence of water inundation caused by construction of road ground</td>
<td>Project site and communes surrounding</td>
<td>Observation</td>
<td>Random check in the rainy season</td>
<td>Construction contractors</td>
</tr>
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<td>- PMURTW EMS</td>
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<td>- Provincial DONRE</td>
</tr>
<tr>
<td>27</td>
<td>Construction, operation of water drainage system to avoid water inundation,</td>
<td>Project site</td>
<td>Observation</td>
<td>Random check in the rainy season</td>
<td>Construction contractors</td>
</tr>
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<td>- PMURTW EMS</td>
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<td>- City DONRE</td>
</tr>
<tr>
<td>28</td>
<td>Fuel leakage from fuel storage sites, causing land pollution and mitigation measure</td>
<td>Fuel storage sites</td>
<td>Observation</td>
<td>Random check</td>
<td>Monthly</td>
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<td>PMURTW/EMS/SES</td>
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<td>- City DONRE</td>
</tr>
<tr>
<td>29</td>
<td>Condition of fire prevention at fuel storage sites</td>
<td>Fuel storage sites</td>
<td>Observation</td>
<td>Random check</td>
<td>Monthly</td>
</tr>
<tr>
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<td>- CPCs</td>
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<td>- City DONRE</td>
</tr>
<tr>
<td>30</td>
<td>Evidence of accidents caused by construction activities</td>
<td>Project site</td>
<td>Check at contractor’ offices and local medical stations</td>
<td>Random check</td>
<td>Six months/occasion</td>
</tr>
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<td>- PMURTW/EMS/SES</td>
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<td>- IMC</td>
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<td>- CPCs</td>
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<td>- City DONRE</td>
</tr>
<tr>
<td><strong>Operation Phase</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>31</td>
<td>Noise and vibration levels, generated by vehicles operating on road</td>
<td>Project site, near sensitive receptors</td>
<td>Analytical methods in Vietnam standards (see next section for detail)</td>
<td>Quarterly</td>
<td>Road Management Board (RMB) – if formed</td>
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<td></td>
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<td></td>
<td>- City DOT</td>
</tr>
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<td>- IMC</td>
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<td></td>
<td></td>
<td>- City DONRE</td>
</tr>
</tbody>
</table>
67. Being an Environmental Category A project, the PMURTW shall engage and retain qualified and experienced external expert(s) to be officers of the Environmental Management Section (EMS) within PMURTW to verify, on an annual basis, the monitoring information submitted to the WB and Haiphong DONRE.

6.3.2. Monitoring on compliance with waste emission standards

6.3.2.1. In the construction phase

**Air emissions monitoring**

68. Air emission monitoring in this phase includes the following components:

(i) Air emissions of construction machines

Monitoring parameters: total suspended particles, SO₂, NO₂, and VOC


Monitoring sites: at 2 selected sites

Monitoring frequency: 4 occasions/year (quarterly).

(ii) Air emissions from concrete mixing stations

- Monitoring parameters: total suspended particles, PM10, SO2, NO2, CO
- Monitoring frequency: 4 occasions /year (quarterly)
- Monitoring sites: at all concrete mixer stations (at present, the locations of concrete mixer stations are not indicated yet, therefore it is impossible to show up those monitoring sites in the map).

**Wastewater monitoring**
69. In this phase waste water monitoring include the following contents.

(i) Wastewater from workers’ camps
- Selected parameters: pH, SS, turbidity, BOD, NH4+, total N, total P, grease and oil, T. Coliform bacteria.
- Monitoring frequency: 4 occasions/year (quarterly)
- Monitoring sites: at 2 selected worker camps
- Comparative Standard: Evaluation on compliance is based on the National Technical Regulation for Domestic Wastewater (QCVN 14:2008/BTNMT)

(ii) Wastewater from repair workshops, and fuel store sites
- Selected parameters: pH, SS, turbidity, grease and oil
- Monitoring frequency: 4 occasions/years (quarterly).

(iii) Storm-water from construction sites
Selected parameters: pH, SS, turbidity, grease and oil, Total Coliform bacteria.
Monitoring frequency: 4 occasions/year in the rainy days.
Comparative standard: National Technical Regulation on Industrial Wastewater (QCVN 40:2011/BTNMT)

**Monitoring of solid waste and hazardous wastes**

70. In this phase solid and hazardous wastes monitoring includes the following contents:
- Selected parameters:
  - Waste compositions: decomposable organic matters, resins, plastic, metals, inorganic components, hazardous components (grease and oil, paints, heavy metals etc.)
  - Volume of solid waste
    - Monitoring frequency: 4 occasions/year (quarterly)
    - Monitoring sites: 2 selected solid waste temporary storage sites.

6.3.2.2. In the Operation Phase
71. Waste monitoring in the road operation phase is not necessary.

6.4. ENVIRONMENTAL EFFECT MONITORING

6.4.1. Environmental Effect Monitoring in the Construction Phase
72. The objectives of environmental monitoring in this phase include:

(i) Assessment on the environmental quality and pollution in the project site when the road is under construction.
(ii) Providing data for environmental management and prediction of changes, particularly in environmental quality due to construction activities;
(iii) Assessment on contractor’s and the project owner’ compliance with Vietnamese environmental standards.
**Air quality monitoring**

**Objectives**

73. The objective of air quality monitoring in this phase is to determine the air quality at typical monitoring sites, and to assess whether the increased air pollution exceeds the National Technical Standard.

**Monitoring sites**

74. In the construction phase, air monitoring will be carried out at the same 24 sites where air quality monitoring were implemented in the pre-construction phase.

<table>
<thead>
<tr>
<th>CW1A Lot 1</th>
<th>CW1A Lot 2</th>
<th>CW2A Lot 1</th>
<th>CW2A Lot 2</th>
<th>CW3A</th>
<th>CW4A</th>
<th>CW5A</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 sites</td>
<td>4 sites</td>
<td>4 sites</td>
<td>4 sites</td>
<td>3 sites</td>
<td>3 sites</td>
<td>2 sites</td>
</tr>
</tbody>
</table>

**Monitoring frequency**

75. The monitoring frequency in this phase is one occasion every 3 months (quarterly), throughout the construction period (inclusive of any delay).

**Monitoring parameters**

76. The following parameters shall be monitored.

- **Air temperature, humidity, and wind speed**
- **Dust (total suspended particles)**
- **PM10**
- **Sulfur dioxide (SO2)**
- **Nitrogen dioxide (NO2)**
- **Carbon monoxide (CO)**
- **VOC**

**Monitoring method**

77. The Vietnam’s standard method for noise measurement is required.

**Comparative standard (Standard to meet):**


**Noise monitoring**

**Objectives**

79. Noise monitoring in the construction phase is aimed at evaluating the compliance by the contractors with the standard of noise applicable to sensitive subjects near the construction site.

**Monitoring sites**

80. 24 monitoring sites will be determined during construction activity. They are located at sensitive points (pagodas, schools, residential areas) within 100 m from the noise sources. They are the same as the air pollution monitoring sites.
Monitoring frequency

Noise will be monitored for 24 hours continuously with the frequency depending on the nature of construction activities. The monitoring frequency is once every month (monthly).

Monitoring parameters

Noise is determined by:

- LAmin: Minimum noise level
- LAeq: Medium noise level
- LAmax: Maximum noise level
- LCpeak: Peak noise

81. Noise levels are continuously measured in 24 hours, which are divided in 2 periods:
   - Daytime and evening time: 06:00 – 21:00
   - Nighttime: 21:00 - 06:00

Measuring method

82. Noise measurement follows the Vietnam’ standard.

Comparative standard


Surface and groundwater quality monitoring

Objectives

84. Assessing changes in water quality and impacts of the airport construction on water quality of the rivers/canals receiving storm water and wastewaters from the construction sites.

85. Wastewater and runoff from construction sites can pollute rivers, canals and fields nearby.

86. Main pollutants include suspended solids, turbidity, organic matters, nutrients, grease and oils from construction activities.

Groundwater in use by households near construction sites and workers’ camps can be polluted by wastes from construction activities.

Monitoring sites

Location of 6 monitoring sites for ground water and 18 monitoring sites for surface water quality shall be determined before commencement of the construction.
Monitoring frequency
87. Once every 3 months (quarterly) throughout the construction phase.

Monitoring parameters
88. 14 parameters to be monitored are: pH, SS, turbidity, DO, BOD, COD, NH4, NO3, total N, total P, oil, T. Coliform, E.Coli.

Sampling and analyzing methods
89. The procedures of sampling, storing, transporting and analyzing of water samples are followed the Vietnamese Standards.

Comparative Standard
90. The National Technical Regulation for Surface Water Quality (QCVN 08:2008/BTNMT) shall be used for assessing the water quality of rivers and streams.

The National Technical Standard for Ground water quality (QCVN 09:2008/BTNMT) shall be used for assessing water pollution of drilled wells inside and around the project site.

6.4.2. Environmental Effect Monitoring in the Operation Phase
91. In the operation phase of the West-East Arterial Road, environmental quality at is surroundings can be affected by traffic activities, included wastes generated by from passengers.

92. In order to assess the changes in quality of environmental components and the ability to meet Vietnamese standards, an Environmental Monitoring Plan for the operation phase of the Project is designed and will be executed with contents as follows.

Air quality monitoring
Objectives
93. Air quality monitoring in the operation is aimed at evaluating the change in the air quality in the zones inside and around the road. It will focus on air pollution caused by road traffic, vehicle emission and other sources of air pollution at the area.

Monitoring sites
24 air quality monitoring at areas surrounding the road and residential areas will be determined before commencement of the monitoring plan for the operation phase.

<table>
<thead>
<tr>
<th>CW1A Lot 1</th>
<th>CW1A Lot 2</th>
<th>CW2A Lot 1</th>
<th>CW2A Lot 2</th>
<th>CW3A</th>
<th>CW4A</th>
<th>CW5A</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 sites</td>
<td>4 sites</td>
<td>4 sites</td>
<td>4 sites</td>
<td>3 sites</td>
<td>3 sites</td>
<td>2 sites</td>
</tr>
</tbody>
</table>

Monitoring frequency
94. The air quality monitoring frequency is once for every 6 months throughout 3 first years of the operation phase.

Monitoring parameters
95. The air quality monitoring parameters include:
• Air temperature, humidity, wind speed
• Total suspended particles (TSP – 1-hour average)
• PM10 (24-hour average)
• SO2
• NO2
• CO
• VOC

Monitoring method

96. The Vietnam’ and WHO’ standard methods for air sampling, storage and analysis shall be used.

Comparative standards


Noise monitoring

Monitoring sites

98. 24 noise monitoring sites, whose locations are the same with the 24 air quality monitoring sites in the construction phase.

<table>
<thead>
<tr>
<th>CW1A Lot 1</th>
<th>CW1A Lot 2</th>
<th>CW2A Lot 1</th>
<th>CW2A Lot 2</th>
<th>CW3A</th>
<th>CW4A</th>
<th>CW5A</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 sites</td>
<td>4 sites</td>
<td>4 sites</td>
<td>4 sites</td>
<td>3 sites</td>
<td>3 sites</td>
<td>2 sites</td>
</tr>
</tbody>
</table>

Monitoring frequency

99. The monitoring frequency is once for every 6 months with continuous measurement for 24 hours.

Noise parameters

100. Noise levels are determined based on: $L_{\text{Amin}}$, $L_{\text{Aeq}}$, $L_{\text{Amax}}$, $L_{\text{cpeak}}$ in day and evening time (6:00 - 21:00) and nighttime (21:00 - 06:00).

Monitoring method

101. The methods guided in noise meters shall be used.

Water quality monitoring

102. Surface and groundwater quality monitoring in the road operation phase is not necessary.

6.5. MONITORING REPORTING

103. In order to exchange information effectively, maintain a database for monitoring the implementation of mitigation measures and ensure an effective implementation of EMP, it is essential to adopt a system of standard reporting at all levels of management as shown in the table below.
### Table 17: System of Environmental Monitoring Report

<table>
<thead>
<tr>
<th>No.</th>
<th>Issues to be reported</th>
<th>Monitoring at 1st level</th>
<th>Monitoring at 2nd level</th>
<th>Monitoring at 3rd level</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
<td>(One duplicate must be sent to DONRE)</td>
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<tr>
<td></td>
<td></td>
<td>Implementation by: Contractor</td>
<td>Implemented by: PMU</td>
<td>Implemented by: PMU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency of report submission: Monthly</td>
<td>Frequency of report submission: once every six months</td>
<td>Frequency of report submission: once every six months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Report sent to: PMU</td>
<td>Report sent to: Project Management Board</td>
<td>Report sent to: WB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Implementation Unit: Construction Supervision Team (CST)</td>
<td>Implemented by: PMU</td>
<td>Implemented by: PMU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency of report submission: Monthly – Quarterly</td>
<td>Frequency of report submission: once every six months</td>
<td>Frequency of report submission: once every six months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Report sent to: PMU</td>
<td>Report sent to: DONRE</td>
<td>Report sent to: WB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Implemented by: Community Monitoring Group</td>
<td>Implemented by: Local authority</td>
<td>Implemented by: IMC - SIMC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency of report submission: Monthly</td>
<td>Frequency of report submission: In cases of reflection/complaints.</td>
<td>Frequency of report submission: once every six months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Send report to: Local authority</td>
<td>Report sent to: PMU</td>
<td>Report sent to: WB, PMU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Implementation by: Community Monitoring Group</td>
<td>Implemented by: IMC - SIMC</td>
<td>Implemented by: Functional department of Department of Transport</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency of report submission: Monthly</td>
<td>Frequency of report submission: In cases of reflection/complaints.</td>
<td>Frequency of report submission: once a year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Send report to: Local authority</td>
<td>Report sent to: PMU</td>
<td>Report sent to: Department of Transport, City’s PC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Implementation by: Local authority</td>
<td>Frequency of report submission: once every six months</td>
<td>Frequency of report submission: once a year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Report sent to: District PC</td>
<td>Report sent to: Department of Transport, City’s PC</td>
<td>Report sent to: Department of Transport, City’s PC</td>
</tr>
</tbody>
</table>

#### Construction stage

1. **Implement mitigation measures on site**

   - **Implementation Unit:** Contractor
   - **Frequency of report submission:** Monthly
   - **Report sent to:** PMU, DONRE

2. **Monitoring Health, Safety, Environment and Traffic (HSET)**

   - **Implementation Unit:** Construction Supervision Team (CST)
   - **Frequency of report submission:** Monthly – Quarterly
   - **Report sent to:** PMU, DONRE

#### Operation stage

1. **Environment and Traffic Monitoring**

   - **Implementation by:** Urban management staff – Wards/Communes PC
   - **Frequency of report submission:** once per month
   - **Report sent to:** Local leaders (wards/communes)

2. **Traffic safety monitoring**

   - **Implementation by:** Functional department of Department of Transport
   - **Frequency of report submission:** once a year
   - **Report sent to:** Department of Transport, City’s PC

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Prepared by Infra-Thang Long (Dec. 2010), Updated by SMEC (Nov 2012)
6.6. PROJECT COMPLETION INDICATORS

104. A system of monitoring indicators are proposed to assess implementation of some project stages. These monitoring indicators which represent characteristics of sub-project activities can be collected easily based on experiences obtained from similar WB funded infrastructure investment projects in Vietnam. Based on initial objectives, the following activities will be established, including socio-economic effect, environment, and sustainable development.

105. These indicators will be stated in the manuals which provides guidance on project implementation. The main environmental indicators related to project investment effect includes but not be limited by the following matters:

- Decrease in the level of pollution load on Nguyen Van Linh route and related axis roads.
- Decrease in the level of accidents on Nguyen Van Linh route and related axis roads.

106. This monitoring will be implemented after road completion. PMURT will be responsible for collecting the information necessary to prepare periodical reports on project completion indicators with the help of a technical consultant.

7. BUDGET

7.1. COST FOR IMPLEMENTATION OF THE EMP

107. Following regulations of Vietnamese Laws, the Contractors must abide with the following four HSET criteria: Health for Community (Health); Site Safety (Safety); Environmental Sanitation (Environment) and Transport Management (Transportation).

108. The cost for organization, training, dissemination, procurement, operation of equipment, and manpower for implementation of mitigation measures in and out of the site in accordance with HSET requirements are integrated in the construction package. Contractors will be responsible to study, prepare alternatives and offer cost estimation for these activities. It is considered as one of the criteria for assessing the capability of the Contractors in the future and compliance level of the Contractors.

109. In case of violations, the Client can hire another unit to participate in solving arising problems.

7.2. COST ESTIMATION

110. The cost for implementation of the EMP requirements is shown in Table 15.

Table 18: Total Cost for the Environmental Management Plan

<table>
<thead>
<tr>
<th>Contents</th>
<th>Cost (VND)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost for operation of community monitoring system</td>
<td>108,000,000</td>
</tr>
<tr>
<td>Cost for Independent Monitoring Consultant</td>
<td>1,200,000,000</td>
</tr>
<tr>
<td>Cost for monitoring program implementation</td>
<td>1,806,040,000</td>
</tr>
<tr>
<td>Cost for capability building and training</td>
<td>155,000,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,269,040,000</strong></td>
</tr>
</tbody>
</table>

Note: The above cost rate is estimated based on current unit price and Consultant’s experiences. Because the project will be implemented over many years, price fluctuation will be unavoidable. A
contingency amount should be prepared for any unavoidable price or cost increase during project implementation. This is not included in this estimate but the overall project estimate.

115. Note 2: The total cost shown in this table does not include:
- the cost of design mitigation measures incorporated into engineering design.
- the cost of mitigation measures implemented by the contractor during construction phase, estimated at 2% of total project costs.
- the cost of environmental supervision which will be required as part of construction engineering supervision

116. Detailed costs are presented in Appendix 7.
APPENDICES
APPENDIX 1: VIETNAMESE LEGAL DOCUMENTS APPLIED FOR THIS PROJECT

During implementation of the HPUTDP the main following Vietnamese Laws, Guidelines, National Technical Regulations, Standards related to the environment shall be followed.

1. Laws:
   2. Law on Forest Protection and Development, passed by the 6th National Assembly on 03rd December 2004
   3. Law on Biodiversity, passed by the National Assembly on 16th September 2008
   4. Law on Water Resources, passed by the National Assembly on 20th May 1998.
   6. Land Law, passed by the National Assembly of Vietnam on 26th November 2003
   7. Law on Technical Standards and Regulations, passed by the National Assembly of Vietnam on 29 June 2006.
   9. Law on Road Traffic, passed by the National Assembly on 17 November 2008.

2. Decrees and Circulars

3. Standards, Technical Regulations Applied for this Project

During implementation of the HPUTDP, the following Vietnamese Environmental Standards/National Technical Regulations, which are officially and legally applied in the territory of Vietnam, are applied. According to Vietnam’ Law on Technical Regulations and Standards, issued in 2006, national regulations (QCVN) are compulsorily applied but national standards (QCVN) are only used as references.

   1. National Technical Regulation on Ambient Air Quality (QCVN 05:2009/BTNMT)
5. National Technical Regulation for Surface Water Quality (QCVN 08:2008/BTNMT)
8. National Technical Regulation for Domestic Wastewater (QCVN 14:2008/BTNMT)

Various guidelines and standards of the World Bank/International Finance Company (WB/IFC) and World Health Organization (WHO) for environmental quality shall be also referred to for this project.
APPENDIX 2: SECTIONS AND SITES SENSITIVE TO ENVIRONMENTAL IMPACTS AND PROPOSED MEASURES FOR MITIGATION

2.1. SENSITIVE SITES TO NOISE, VIBRATION AND AIR POLLUTION ALONG THE PROJECT ALIGNMENT

Based on the satellite map combining with field survey the following sections sensitive to air, noise, vibration pollution during the construction stage have been identified.

Km 0+000: Starting point: Small interchange at Nam Ha village, Le Loi commune
Km 0+100 - 200: Residential area at Luong Quy village, Le Loi commune, low population density.
Km 1+300: Le Loi primary school, Le Loi commune
Km 1 + 600 – 700: Dense populated area, Le Loi Commune
Km 3+500 – 900: Residential area, high population density at Dang Cuong commune
Km 3+500: Dang Cuong secondary school.
Km 3+900: Temple Pham Tu Nhi, Dang Cuong commune.
Km 4 + 400 – 700: Residential area, Hoa Nhat village, Dang Cuong commune.
Km 5+600: Kien Phong Pagoda, 200 m from the alignment.
Km 7+900 -- 8+000: Dong Thai Pagoda, Hoang Mai cemetery, Hoang Mai commune, 100-200 m from the alignment.
Km 9 +500 – 600: Residential area, high population density, Truong Chinh road, Kien An district
Km 9 + 700 – 10+000: Interchange, residential area, high population density. Lam Khe Pagoda
Km 10+000: Residential area, cemetery, Dong Khe village, Dong Hoa commune.
Km 11+100 – 12+100: Bridge, large river, right side: wetland. Dong Hoa commune, Kien An district. Low population density.
Km 12+300: Across a corner of a cemetery
Km 12+500 – 600: Residential area, high population density.
Km 13+200 – 400: Interchange to a small road, residential area, high density
Km 14+300 – 900: Riverside, left side: residential area, high population density; right side: river bank, closed to Rao bridge
Km 15+000 – 500: Residential area at riverside, high population density, closed to Rao bridge
Km 16+200 – 17+000: Right side; wetland/field; left side: residential area
Km 17+800 – 18+700: Residential area, low density. Military camp, 100 m from the alignment. Hai An district.
Km19+000: Residential area. Kim Chung Tu Pagoda, 200 m from the alignment.
Km 19+400 – 600 Residential area. Cemetery Vuon Dua, 100 m from the alignment. m.
APPENDIX 2.2: SECTION WISE REVIEW IMPACTS AND MITIGATION

The project has been divided into a number of sections as shown below. Impacts and mitigation measures are described in the following 18 site specific mitigation plans.

<table>
<thead>
<tr>
<th>No</th>
<th>From (Km N)</th>
<th>To (Km No)</th>
<th>Communes</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Bac Son – Le Loi</td>
</tr>
<tr>
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<td>Le Loi</td>
</tr>
<tr>
<td></td>
<td>1+780</td>
<td>2+920</td>
<td>Le Loi – Dang Cuong</td>
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<tr>
<td></td>
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<td>4+60</td>
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<tr>
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<td>Dang Cuong</td>
</tr>
<tr>
<td></td>
<td>5+220</td>
<td>6+365</td>
<td>Dang Cuong – Hong Thai – Dong Thai</td>
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<td>7+455</td>
<td>Hong Thai – Dong Thai</td>
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<tr>
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<td>8+565</td>
<td>Hong Thai – Dong Thai</td>
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<td>18+790</td>
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<td>18+790</td>
<td>19+800 (end of the road)</td>
<td>Dang Hai – Nam Hai</td>
</tr>
</tbody>
</table>
CURRENT SITUATION

The route cuts through a canal section which services its surrounding cultivation area, which will be added to the design. There are some residential areas which are located close to the route. Re river water which is of good quality supplies irrigation systems of this area. There are no waterway or aquiculture activities.

ATTENTION & NOTES DURING CONSTRUCTION

Establish construction methods in consideration of agriculture/cultivation conditions to reduce effects on crops. It is necessary to consider the harvest time and coordinate with the locality to set up a temporary water transfer alternative to ensure the smooth irrigation activities. When constructing Re bridge, it is necessary to establish a site waste water collection system. It is prohibited to directly discharge/throw rubbish or wastes into the river.

ATTENTION & NOTES DURING OPERATION

For some households whose land will not be acquired but be affected by air pollution and noise, it is necessary to provide mitigation methods to mitigate the effects on these houses.

Road section from Km 0 to Km 0+800

SITE SPECIFIC MITIGATION PLAN – N1

Canal will be cut, culverts will be built for replacement.
SITE SPECIFIC MITIGATION PLAN – N2

ATTENTION & NOTES DURING CONSTRUCTION ON CULTIVATION AREA:
Should consider harvest time and discuss with locality on water transfer plans during construction. Priority should be given to implementation of water transfer and supply works. Maintain temporary road at the place bordering with chicken farm so that residents can do cultivation activities at the northern part of the route.

ATTENTION & NOTES DURING CONSTRUCTION AT THE CROSSING POINT WITH ROADS
Part of this section is a high population density in this area; therefore, attention should be paid to traffic safety methods, arrangement of sufficient traffic signs and signals. It is necessary to establish a temporary road detouring traffic through the crossing point. Limit activities of machinery at peak hours (as not to cause affects/impacts on schools and commune administrative areas nearby).

ATTENTION & NOTES DURING OPERATION
The crossroads is near a densely populated area; therefore, it is necessary to arrange warning signs at peak hours. Le Loi Primary School will be affected by noise and it is advisable to plant trees with big canopy for protection within the school grounds and to also arrange dust suppression methods. Deposit tanks should be placed at ends of road-crossing culverts, reducing the culvert congestion and difficulties in culvert operation and maintenance.

Road section from Km 0+800 to Km 1+780

Le Loi Primary School

Separated canal should be replaced with box culverts
CURRENT SITUATION
The route section will mainly cut cultivation area where is sparsely populated (primarily at the beginning of route section). The route cuts some canals and local roads; therefore, it is necessary to study replacement alternative during design.

ATTENTION & NOTES DURING CONSTRUCTION
Prepare construction plans to coordinate with harvest time of the locality and ensure a temporary flow of irrigation water. Establish a temporary road for residents living in the north of the route who will have affected access to their properties. Implement waste/rubbish management procedures at site and prohibit discharge/throwing of rubbish/wastes into canal.

ATTENTION & NOTES DURING OPERATION
Ensure signaling system at the crossing point with local road. Establish dust suppression systems.

SITE SPECIFIC MITIGATION PLAN – N3

Road section from Km 1+780 to Km 2+920

The canal which will be cut by the route. It is necessary to design culvert and improve the existing ditch.
CURRENT SITUATION
The route mainly runs through cultivation area, but cuts 2 important local roads. Near the end of this section, the route cuts an inter-commune road and runs near the commune administrative area.

ATTENTION & NOTES DURING CONSTRUCTION:
The Contractor shall not only ensure the smooth operation of irrigation system runs through cultivation areas but also establish detailed mitigation measures when implementing construction at commune administrative areas e.g. avoid implementing construction at peak hour, implement dust suppression methods, erect barrier system and warning signs surrounding the site and near resident road.

Get opinions of local residents on how to avoid conflict at festival time of Duc Thanh Niem temple (adjacent to the project route).

ATTENTION & NOTES DURING OPERATION
Ensure the system of signs and signals at the crossing point with commune administrative areas is maintained.
Implement communication programs on traffic safety in the communes and schools.
Implement dust suppression systems.
The route will run through residential areas and cut the local road. 

**ATTENTION & NOTES DURING CONSTRUCTION:**

- Arrange sufficient staff for traffic control and diversion.
- At intersections, establish temporary roads, and provide dust suppression.

The route will cut An Kim Hai canal and a ditch which is perpendicular with Road No. 351, and run under the high-voltage electric line.

**ATTENTION & NOTES DURING CONSTRUCTION:**

- It is necessary to ensure the operation of irrigation system is maintained and it is prohibited to directly discharge/throw rubbish/wastes into this canal.
- Deflection of HV wire is only about 10 m from the ground surface.
- Contractor to check EMF (Electromagnetic Field) in order to ensure adequate elevation under the high-voltage electric line.

**ATTENTION & NOTES DURING OPERATION**

- Constantly check the crossing point between the electric line and the route, to prevent potential risks in rain.

The route will cut Road No. 351 where there is high traffic density.

**ATTENTION & NOTES DURING CONSTRUCTION:**

- Arrange warning signs in accordance with regulations.
- Limit using Road No. 351 as a construction road.
- Establish signs, warning lamps and traffic signals at this place.

The routes will cut Road No. 351 where there is high traffic density.
**ATTENTION & NOTES DURING CONSTRUCTION**

Intensify mitigation measures and limit construction activities out of administrative time (break of residents) near residential areas. Noise and exhaust fume dispersion might have affects on nearby cultivation plots; therefore, the Contractor should pay attention to implement inventory and compensation for these damages and affects.

**CURRENT SITUATION**

The route will runs through the outer corner of residential area and some households (which will be affected by construction but be isolated by the route).

The cultivation area is quite small; some areas of existing ditch will be cut by the route and should be replaced by road-crossing culverts as designed.

**SITE SPECIFIC MITIGATION PLAN – N6**

**ATTENTION & NOTES DURING OPERATION**

Prepare construction plans to coordinate with harvest time of the locality and ensure a temporary flow of irrigation water.

Study the solution for local roads for remaining households or intersection or local roads which are connected with road No.351 or An Kim Hai canal

Establish row of trees for reducing noise and air pollution for residential areas (in Hy Tai village) and following the direction of Kien Phong pagoda.

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**CURRENT SITUATION**

The route mainly runs through cultivation area. It is far away from residential areas and nearly overlaps the administrative border between Dong Thai and Hong Tai communes.

At the ending section of the route, the route cuts the local road of Xich Tho village.

Some households (which shall not be relocated) will be only 20 cm far away from the road edge.

Te Chu pagoda is located near the route will be likely affected by the noise.

**The beginning section of the ditch is separated**

**Separated ditch**

**Road section from Km 5+220 to Km 6+365**
Road section from Km 6+365 to Km 7+455

**CURRENT SITUATION**
- The route mainly runs through cultivation area. It is far away from residential areas and nearly overlap the administrative borders between Dong Thai and Hong Tai communes.
- The road cuts the local road of Xich Tho village at the ending of the road.
- Some households (which shall not be relocated) will be nearly 15m far away from the road edge.
- To Chu pagoda is located near the road will be likely affected by the noise.

**ATTENTION & NOTES DURING CONSTRUCTION PHASE**
- During implementing construction activities on cultivation area, it is necessary to follow mitigation measures, pay attention to factors like harvest time, maintain temporary drainage system, ensure smooth irrigation and drainage as well as quickly implement compensation for arising problems (for example, compensation for losses due to rice damage caused by dust, noise and waste water from the site).
- Minimize using service road and utilize the project road as service road in construction phase. Priority is also given to waterway along Lac Tho river.

**ATTENTION & NOTES DURING OPERATION PHASE**
- Establish rows of trees to ensure that the noise level meets the limit of the standard which is applied for residential areas near the road and To Chu.
- Arrange warning signs at intersection with local road.

The beginning section of the ditch is separated

For ditches which are no longer used for irrigation, there is no need to place culvert at this place

Typical cross section of drainage ditch along the road

Crossing road designed with full traffic sign
ATTENTION & NOTES DURING CONSTRUCTION
Implement main mitigation measures when implementing construction activities on cultivation area: implementing temporary water transfer for irrigating at separated positions, arranging construction plan in suitability with harvest time,
Priority should be given to construction at this place and local road for serving preceding route sections (N5-N7).

CURRENT SITUATION
The route will mainly cut through cultivation area and be far away from residential areas. There are only some households close to the road.
At the ending section, the route runs close to the river, near Hoang Mai pagoda where is potentially affected by noise after the route is put into operation.

ATTENTION & NOTES DURING OPERATION
Establish rows of trees for reducing dust and noise for the route section near Hoang Mai pagoda and Tan De residential area which is going to be under planning.
Cultivation area at dyke footing (at route end), the productivity is not high, the remaining area is too small; therefore, it is necessary to soon prepare an alternative on changing using target (with reference to opinions of community).
CURRENT SITUATION
The entire route which runs along the left river bank is cultivation area which close to the dyke footing. At section where the bridge crosses Truong Chinh road, there is high population density and many difficulties will be encountered during construction. Waterway traffic density is rather high on this Lach Tray river section.

ATTENTION & NOTES DURING CONSTRUCTION
The route will cut the cultivation area; creating many favorable conditions for construction space. During construction, it is necessary to implement collecting waste water from the site and dust covering methods at areas near aquaculture areas (close to dyke footing). Attention should be paid to waterway traffic safety during bridge construction.
Control surface water pollution
Check safely for overhead construction, especially electric safety at the section where the 110kV electric line is cut by the route.
Implement traffic control and arrange staff in charge of traffic diversion (coordination of traffic police will be required at this section), in order to ensure the safety during construction.
Priority should be given to establish reasonable storages, especially gasoline storage; workshop for maintaining construction vehicles should be 100m far away from the river.

ATTENTION & NOTES DURING OPERATION
Constantly check the deflection of 110kV electric line where the route runs by and limit arising risks in stormy weather.
Implement planning and changing land using target for the cultivation plot close to dyke footing (with small area) for reducing cost.
Consider space under the bridge. It is advisable to establish flower garden and public vehicle keeping place to prevent land occupation for business and selling purposes.
CURRENT SITUATION
The route section is located at residential area in Dong Hoa ward, Hang Hai college and cultivation area.

ATTENTION & NOTES DURING CONSTRUCTION
Implement mitigation measures to reduce affects of dust, noise and traffic jam on residential area, schools near the route;
Ensure the water supply for trees in cultivation areas;
Install warning signs at site and safety signs at intersections;

ATTENTION & NOTES DURING OPERATION
Return the canal system, road-crossing culvert to ensure the smooth irrigation for agriculture activities; Install signs and traffic signals at crossing point with local roads;
It is necessary to implement anti-noise methods for school, Lam Khe church;

SITE SPECIFIC MITIGATION PLAN – N10

Attention should be made to the following matters
Irrigation system which serves agriculture activities;
Crossing points with inter-village roads;

Inter-village road
Irrigation canal
Irrigation canal
Inter-village road

Prepared by Infra-Thang Long (Dec. 2010), Updated by SMEC (Nov. 2012)
Road section from Km 10+980 to Km 11+965

SITE SPECIFIC MITIGATION PLAN – N11

Attention should be made to the following matters:
- Water supply system of aquaculture pond will be cut;
- Dust and noise will be generated from construction of the route section which cuts residential area No. 5, Dong Hoa ward;
- Transport routes: following the dyke or waterway and local road system;
- Vegetable layers and green space of the cultivation area at river embankment will be affected.

ATTENTION & NOTES DURING OPERATION
- Traffic safety sign system is installed at intersections of roads and dyke at river banks;
- Arrange trees at road edges to minimize effects of dust and noise on adjacent residential areas, ponds and trees surrounding the river embankment;
- Arrange road-crossing culverts and ensure water supply for ponds and trees at river embankment;
- The route will cut through residential area No. 5, Dong Hoa ward, Lach Tray river embankment (by Niem bridge No. 2, pond and fruit garden and wood tree);

ATTENTION & NOTES DURING CONSTRUCTION
- For material transport by waterway, it is necessary to strictly follow methods on waterway safety and avoid any crash. Warning signs and other safety devices should be arranged at parking and anchoring places;
- Transport vehicles should be checked in aspects of loading capacity to avoid causing damages to the existing dyke structure during travelling along the dyke;
- Ensure the water supply for cultivation areas and aquaculture ponds;
- Implement sound methods to minimize effects of noise and dust on residential areas;
- Wastes and debris which is generated from construction should be controlled as not to cause pollution and effects on ponds of residents living near the route and Lach Tray river;

CURRENT SITUATION
The route is located through residential areas, Lach Tray river embankment, pond and fruit garden (banana, coconut and wood trees)
The route will cut through residential area No. 5, Dong Hoa ward, Lach Tray river embankment (by Niem bridge No. 2, pond and fruit garden and wood tree);
The route is located at aquaculture pond, fruit garden and some residential areas surrounding river dyke; The route will run through planned routes which have not been constructed, cut the path which serves irrigation, sub-station, Goc Gang cemetery and empty land area with only grass;

For material transport by waterway, it is necessary to strictly follow methods on waterway safety and avoid accidents. Warning signs and other safety devices should be arranged at parking and anchoring places; Ensure continuity of water supply for ponds and cultivation area; Avoid traffic jam when cutting local roads; Relocation of some tombs at Goc Gang cemetery should be undertaken prior to construction commencement so local culture and customs to be respected; Wastes and polluted land should be controlled and collected at regulated dumping yards of the city;
CURRENT SITUATION
The route is located in residential areas, ponds and on an army bases

ATTENTION & NOTES DURING CONSTRUCTION
For material transport by waterway, it is necessary to strictly follow methods on waterway safety and avoid accidents. Warning signs and other safety devices should be arranged at parking and anchoring places.
Attention should be paid to the water level increases due to tide regime and heavy rainfall during construction to avoid effects of flooding such as damages to works and equipment. It is necessary to ensure the canal at Km 14+500 is operational at all times;

ATTENTION & NOTES DURING OPERATION
Local authority should have management methods for rubbish from residential areas and enterprises at river banks and from other social activities;
For contractors’ material storage and work yards, it is necessary to develop methods to protect the environment and strictly manage generated rubbish to avoid effects on adjacent areas such as filling of canals and ditches;
It is necessary to arrange traffic safety signs at intersections;
It is necessary to use water carts on the construction site to minimize effects of dust and noise on sensitive places;

Crossing point with constructed road

Regulated canal and culvert

The route cuts pond and fruit garden
CURRENT SITUATION
- The route will run along existing dyke of Lach Tray river.
- The route is located between residential area and river embankment.

ATTENTION & NOTES DURING CONSTRUCTION
For material transport by waterway, it is necessary to strictly follow waterway safety rules and avoid accidents. Warnings and other safety devices should be arranged at parking and anchoring places.
- It is necessary to have fencing walls to separate construction and residential areas adjacent to existing dyke and harmonization reservoirs; to ensure construction safety at site, traffic safety; and minimize dust and noise on residential areas.
- Waste water generated from construction should be strictly managed to avoid affects on harmonization reservoir and Lach Tray river.
- Transport routes is not overlapped with the route for which consideration of loading capacity should be made to avoid damages to existing structures.
- Attention should be paid to the water level increase due to tide regime during construction to avoid affects caused by flooding situation such as damages to works and equipment.

SITE SPECIFIC MITIGATION PLAN – N14

Attention should be made to the following matters:
- Change the existing dyke of Lach Tray river;
- Dust, noise, traffic safety and construction safety at residential areas by the dyke;
- The route will run through Rao bridge footing;
- The route and dyke might have effects on transport activities of material exploitation and storage yards as well as production areas of enterprises at river banks;

ATTENTION & NOTES DURING OPERATION
Local authority should have management methods for rubbish from residential areas and enterprises at river banks and from other social activities;
- For material storage and exploitation yards of enterprises, it is necessary to methods to protect water environment and strictly manage generated rubbish to avoid effects on adjacent areas such as filling soil of canals and ditches;
- It is necessary to arrange signs along the dyke and curved sections;
- It is necessary to arrange traffic safety signs at intersections;

Safety solutions during design stage
- Dyke structure is consolidated by reinforcement steel with narrowed cross-section and re-aligned route, increasing drainage capacity and reducing erosion;
- The route is arranged under the road; therefore; it will not affect traffic on the bridge;
CURRENT SITUATION
- The route runs along the existing dyke of Lach Tray river, residential area near the dyke and Hai An harmonization reservoir (Cat Bi), aquiculture pond and apartment blocks on Road No. 7-3, the section between aquiculture pond and Cat Bi road.

ATTENTION & NOTES DURING CONSTRUCTION
- It is necessary to have methods for reducing effects of dust and noise on residential areas, especially residential areas at the edge of the dyke; it is proposed to use barriers to separate the construction site from residential area and construction site from reservoir;
- For temporary roads, it is necessary to ensure traffic safety and reduce effects of dust and noise due to material transport;
- It should ensure water supply for aquiculture ponds and lakes;
- Install warning signs at site and traffic signs at crossing points with inter-village road;
- Labour safety must be considered for workers at river dyke, especially during flood-tide at night.

ATTENTION & NOTES DURING OPERATION
- Install road-crossing culverts, ensuring supplying water for ponds and lakes;
- Plant trees at road edge, dyke sections and houses near dyke edge, harmonization reservoir and residential areas at the end of route section to reduce dust and noise of vehicles running on road;
- Arrange traffic safety signs at intersections at reservoir sides;

Attention should be paid to the following matters:
Change the centerline of dyke of Lach Tray river;
Dust, noise, traffic safety and construction safety in residential areas near dyke and at road sides;
Aquiculture ponds and lakes that are cut;
The risk of pond water quality degradation during construction;
CURRENT SITUATION
The project route is adjacent to the apartment block at Thanh To ward, residential area and army base;
The route cuts Cat Bi and Nguyen Van Hoi; and 2 adjacent roads in Dang Lam resettlement area;
The routes cuts cultivation and aquiculture areas and the canal.

Attention should be paid to the following matters:
The risk of traffic congestion at existing roads like Nguyen Van Hoi, Cat Bi;
Dust, noise, construction safety and traffic safety during construction and material transport, having effects on residents living near the route; Canals and ditches are cut, affecting water supply and aquiculture ponds.

ATTENTION & NOTES DURING CONSTRUCTION
Coordinate with road authority in implementing sound traffic control/diversion methods by arranging signs and site partitions to avoid traffic jams;
Strictly follow regulations on traffic safety during transport of materials and methods on construction safety at site;
Ensure the continuity of water supply and irrigation and drainage for cultivation area;

ATTENTION & NOTES DURING OPERATION
Install traffic signs at project intersections – Nguyen Van Hoi Cat Bi, intersections at Dang Lam road;
Re-align the canal and construct road-crossing culvert at Sta.Km17+390, ensure water demands for cultivation and aquiculture areas
Ensure army base is consulted during construction
Road section from Km 17+600 to Km 18+790

**CURRENT SITUATION**
- The route will run through residential areas; Le Hong Phong – Ngo Gia Tu intersection; cultivation area, path system and Dang Hai road.

Attention should be paid to the following matters:
- High risk of traffic congestion at existing roads like Le Hong Phong, Ngo Gia Tu, Dang Hai;
- Ensure that if irrigation canals and ditches are cut, alternative supplies can be provided to ensure continuity of supply;
- Dust, noise and safety during construction and material transport.

**ATTENTION & NOTES DURING CONSTRUCTION**
- Coordinate with road authority in implementing sound traffic control/diversion methods by arranging signs and site partitions to avoid traffic jams;
- Strictly follow traffic laws and regulations on construction safety at site;
- Ensure the demands can be satisfied for water supply and irrigation and drainage for cultivation area.

**ATTENTION & NOTES DURING OPERATION**
- Arrange sufficient safety signs at intersections;
- Pedestrian bridges at the crossing point with Le Hong Phong road should be delayed until such time as traffic warrants the bridges;
- Re-align the irrigation canal at cultivation area where is cut by the route; arrange road-crossing culverts at Km18+330;
Hai Phong Urban Transport Development Project
Environmental Management Plan (Updated)

Prepared by Infra-Thang Long (Dec. 2010), Updated by SMEC (Nov 2012)

Road section from Km 18+790 to Km 19+917 (at route end)

CURRENT SITUATION
The route runs through residential areas and cultivation areas (where fruits and trees are planted).

Attention should be paid to the following matters:
- Shifting the pumping station;
- The road running close to Kim Quang Tu Pagoda;
- The route cutting inter-village road;
- Dust, noise and safety during construction and material transport.

ATTENTION & NOTES DURING CONSTRUCTION
Ensure water supply during construction for cultivation and aquiculture areas;
Implement traffic safety methods, site safety (signing system) and methods for minimizing dust and noise for residents living at road edges;

ATTENTION & NOTES DURING OPERATION
Build noise fencing wall for affected temples and pagodas like Kim Quang Tu, Dinh Sam Bo to minimize impacts of noise;
It is necessary to study reasonable solutions for water supply for cultivation and aquiculture areas where connections are cut;
Install traffic safety signs at crossing point between the inter-village road and the project route;

Pumping station need to be relocated

Kim Quang Tu Pagoda

Inter-village road cuts the project route
APPENDIX 3: SPECIFICATIONS FOR CONTRACTORS IN ENVIRONMENTAL AND SOCIAL MANAGEMENT

1500 PROJECT SAFETY
1600 MAINTENANCE AND PROTECTION OF TRAFFIC
1700 ENVIRONMENTAL MANAGEMENT
2400 PROTECTION OF EXISTING ROADS AND STREETS
3300 BORROW MATERIALS
01500 - PROJECT SAFETY

1. GENERAL
These requirements are additional to the requirements listed in the General Conditions of Contract. The Contractor shall, as a priority in all its activities, undertakings and endeavors, ensure the continued and continuous safety measures of the public and all persons directly or indirectly associated with the Works.

2. COMPLIANCE WITH LEGISLATION
The Contractor shall comply with all relevant safety and industrial health legislation including the Rules and Regulation of the Socialist Republic of Vietnam and the authorities having jurisdiction.

3. PUBLIC SAFETY
The Contractor will be responsible for the safety of the public passing through the site. All excavations, plant or items of potential danger to the public must be barricaded and sign-posted to the satisfaction of the Engineer. The Contractor must provide sufficient watchmen to ensure the safety of the public at all times. All existing pedestrian routes shall be maintained in a safe condition unless an alternative route is provided to the satisfaction of the Engineer.

4. AVAILABILITY OF SAFETY-RELATED DOCUMENTS
The Contractor shall comply with the Engineer’s requirements insofar as displaying in each of its site offices, workshops and canteens a copy of such safety and industry health posters and keeping on the Site copies of safety and industrial health regulations and documents. All regulations and documents shall be translated into languages that are understood by the operators engaged by the Contractor or subcontractors and such translations shall be displayed or kept alongside those in Vietnamese and English languages.

5. SAFETY MANAGEMENT PLAN
The Contractor shall prepare and submit to the Engineer for review and approval no later than 28 days after the Notification of Award, a Safety Plan, as part of the Contractor’s Environmental Management Plan (CEMP) as described in Specification Section 1700 “Environmental Management” which shall contain, without limitation, the following details:

(a) Safety control staff organizational structure, which should identify the personnel to be engaged solely for safety assurance (including the Contractor’s Environment/Safety Officer (ESO) who will be responsible for all safety on the Site), the responsibilities of the participants and the subdivision of the project safety assurance tasks into elements which can be effectively controlled, technically and managerially.

(b) Names, addresses, telephone and facsimile numbers of all participants shall be listed where known;

(c) Criteria for appointment of principal staff;

(d) Proposed interaction and communication procedures between the Contractor’s construction personnel and safety assurance staff, including proposals for radio communication facilities. In particular, the establishment of a regular communication and reporting system;

(e) An undertaking signed by the managing director of the Contractor to the effect that the Contractor will ensure that safety and industrial health are given the highest priority in all aspects of the Works and in discharging his contractual obligations;

(f) Frequency, coverage and intent of site safety meetings together with the rational for attendance;

(g) Frequency, coverage and intent of regular site safety reports;

(h) Methods of promoting an awareness of site safety and industrial health amongst all persons directly or indirectly associated with the Works. This shall include proposals for on site publicity, training courses for all workmen on the Site and at all levels of supervision and management, incentive schemes for the promotion of compliance with safety measures and other similar measures. The frequency, coverage and application of training courses shall be included together with the means of attaining the objective that all workmen shall be required to attend a safety induction course within their first week on Site and thereafter at times...
appropriate to their prospective duties and at intervals of not more than six (6) months;

(i) A hazardous materials statement which shall cover, but not be limited to, the following items:

♦ Storage of liquid materials and toxic materials,
♦ Waste control and management;
♦ Controls related to the use of explosives.

(j) Understanding of and means of ensuring due compliance with the statutory regulations relating to construction work in the Socialist Republic of Vietnam;

(k) The powers vested in the Safety staff which would enable them to take urgent and appropriate and direct action to make safe the Site and prevent unsafe working practices, undue disruption to the environment, correct improper or inadequate traffic control measures or other infringements of the Safety Plan or statutory regulations;

(l) The means by which Safety and industrial health matters and requirements will be communicated to Subcontractors of all tiers and their due compliance with the Safety Plan and all relevant statutory regulations is ensured;

(m) Method by which the Safety Plan procedures and practices proposed by subcontractors will be reviewed for compliance with the Site Safety Plan and statutory regulations;

(n) The safety equipment, rescue apparatus and protective clothing which will be required for the Works, including the quantity, sourcing, standards of manufacture, storage provisions and means of ensuring proper utilization by all workmen and staff employed directly or indirectly by the Contractor and repair to or replacement of damaged equipment. Such equipment shall include, but not be limited to, goggles and other eye protectors, hearing protectors, safety harnesses, safety equipment for working underground and in the confined spaces (e.g. sewers, drains etc), rescue equipment, fire extinguishers, first aid equipment, lanyards, hard hats and, where appropriate, associated shock absorbers, chest harnesses;

(o) The means by which safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing, and guarding equipment shall be inspected, tested and maintained and the standards below on which items will be removed from the Site and replaced;

(p) Operation and equipment of the specified first aid base;

(q) Emergency and rescue procedures and associated equipment;

(r) Protection of authorized and unauthorized visitors to the site;

(s) Emergency Response Plan. An emergency response plan to deal with accidents and emergencies, including environmental/public health emergencies associated with hazardous material spills and similar events, shall be prepared for the approval of the Engineer and ESO;

(t) The means by which the Safety systems will be supervised, monitored and audited by the ESO to ensure due compliance with the principles and objectives of the Safety Plan at all levels of construction. Procedures for updating the Safety Plan;

(u) Records to be prepared and maintained by the ESO and the Safety staff and communication procedures to be adopted by the ESO such that the, Engineer and others associated with the Works (e.g. Subcontractor) are kept fully informed on matters relating to site safety and industrial health regulations throughout the period of the Contract;

(v) Proposals for statistical measurement and monitoring of the safety and health performance of the Contractor and Subcontractors of all tiers and how such proposals reflect responsible practice in the construction industry. The means by which the site safety and industrial health performance of the Contractor and Subcontractors of all tiers can be compared with local and international norms shall be given together with the suggested rationale for establishing such norms;

(w) An appreciation of the industrial health hazards likely to be associated with the Works and proposals for minimization of the risks associated with such hazards. The means of minimization of the effects of climatic exposure (heat, wind and moisture) and an exposure to noxious substances;

(x) Proposals to ensure that construction methods do not compromise the Contractor’s commitment to the Safety Plan or his compliance with statutory regulations.

(y) The means by which all hazards associated with working on, adjacent to and above tidal water shall be accommodated including but not limited to details of proposed rescue boats,
safety nets, warning signs, warning and navigation lights, search procedures, life saving equipment, watching for persons entering the water and any other appropriate equipment or procedure.

6. SAFETY OFFICER

The requirements for the Environmental/Safety Officer (ESO) are shown in Specification 01700 – Environmental Management.

6.1. SAFETY OFFICERS LINES OF COMMUNICATION

The Contractor's Staff Organization Plan shall show direct lines of communication and reporting between the ESO and the Contractor's Representative or Project Manager and between the ESO and the Contractor's Director responsible for the Contract. The Contractor shall instruct and require the Contractor's Representative or Project Manager and the Director responsible to be directly accountable in all matters concerning site safety and proper traffic control. The term Contractor's Representative or Project Manager describe the person nominated by the Contractor to act on its behalf for this Contract.

7. SAFETY REPORTS

The Contractor shall submit regular site safety reports to the Engineer as a requirement of the Safety Plan. A summary report shall be submitted as part of the Monthly Progress Report. Prior to submission, the Contractor's Representative or Project Manager or shall endorse the Report. Site safety reports shall comprehensively address all relevant aspects of site safety and industrial health regulations and, in particular, report on all site safety audits undertaken during the period covered by the report.

14. BREACHES OF SITE SAFETY PLAN

Any breaches of the Safety Plan or the statutory regulations or disregard for the safety of any persons may be the reason for the Engineer or Employer to exercise his authority to require the Contractor's employee, Subcontractor's employee and or the Contractor's Representative's or Project Manager removal from the Site.

8. SUB-CONTRACTOR'S SAFETY PLAN

(a) The Contractor shall provide his Subcontractors with copies of the Safety Plan and shall incorporate into all sub-contract documentation provisions to ensure the compliance with such plan at all tiers of the sub-contracting.

(b) The Contractor shall, unless the Engineer's approval in writing is given, require all subcontractors to appoint a safety representative who shall be available on the Site throughout the operational period of the respective sub-contract. In the event of the Engineer's approval being given, the ESO or safety staff, without prejudice to their other duties and responsibilities, shall ensure, as far as is practically possible, that employees of subcontractors of all tiers are conversant with appropriate parts of the Safety Plan and the statutory regulations.

9. SAFETY MEETINGS

The Contractor shall convene regular safety meetings in accordance with the Safety Plan and shall require attendance by the ESO and safety representatives of Subcontractors unless otherwise agreed by the Engineer. All safety meetings shall be notified in advance to the Engineer who may attend in person or by representative at his discretion. The minutes of all safety meetings shall be taken and sent to the Engineer within seven (7) days of the meeting.

10. SAFETY EQUIPMENT AND CLOTHING

The Contractor shall ensure that safety equipment and protective clothing as described in the Safety Plan are available on the site at all practical times and that measures for the effective enforcement of proper utilization and necessary replacement of such equipment and clothing is incorporated into the Site Safety Plan.

The Contractor shall provide all persons legitimately on the Site with protective clothing, such
clothing as a minimum shall be as follows;

- Protective headgear (hard hat or similar),
- A reflective jacket,
- Safety boots (with steel toe caps and steel sole plate)
- Other items such as safety glasses, gloves, life vests, Wellington boots etc. as appropriate to the operation being undertaken.

11. SAFETY INSPECTIONS
The Contractor shall regularly inspect, test and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment. Lights and signs shall be kept clear of obstructions and legible to read. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, shall be repaired or replaced immediately.

12. FIRST AID BASE
The Contractor shall establish, maintain and fully equip at least one first aid base.

(a) The first aid base shall be located at the Contractor’s principal works area and shall consist of a treatment room fitted with a hand wash basin two treatment couches and sterilizing equipment and lockable cupboards to contain sufficient medical supplies for the Contractor’s workforce, the Engineer’s site supervisory staff and any visitors to the Site. In addition, six stretchers shall be stored, available for instant use. The first aid base shall contain a recovery room that shall be furnished with six chairs and six footrests. The First Aid post shall be air-conditioned, with cooling capability sufficient to maintain the temperature of the inside of the building at 20 degrees C.

(b) A qualified nurse and nurses aid shall be in attendance at the first aid base during all times when work is being undertaken on the Site, including work by any Subcontractor and periods when only emergency activities are being undertaken, such as during periods of inclement weather.

13. SAFETY INFORMATION AND TRAINING

(a) Initial Safety Induction Course. All workmen shall be required to attend a safety induction course within their first week on Site.

(b) Periodic Safety Training Courses. Periodic safety course shall be conducted not less than once every six months. All Subcontractor employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the subcontract works. Training courses for all workmen on the Site and at all levels of supervision and management.

(c) Safety Meetings. Regular safety meetings will be conducted on a monthly basis and shall require attendance by the ESO and safety representatives of Subcontractors unless otherwise agreed by the Engineer. The Engineer will be notified of all safety meetings in advance. The Engineer may attend in person or by representative at his discretion. The minutes of all safety meetings will be taken and sent to the Engineer within seven (7) days of the meeting.

14. PLANT & EQUIPMENT
All Construction Plant and equipment used on or around the Site shall be fitted with appropriate safety devices. These shall include but not be limited to:

(a) Effective safety catches for crane hooks and other lifting devices,
(b) Functioning automatic warning devices and, where applicable, an up-to-date test certificate, for cranes and hoists.

15. QUALIFIED PERSONNEL
Suitably qualified personnel shall operate all Construction Plant and equipment used on or around the Site.

16. NOTIFICATION OF ACCIDENTS
The Contractor shall notify the Engineer immediately when any accidents occur whether on-site or off-site in which the Contractor, his personnel or Construction plant, or those of his Subcontractors are directly or indirectly involved and which result in any injuries to any persons. Such initial notification may be verbal and shall be followed by a written comprehensive report within 24 hours of the accident.

17. HIV/AIDS PREVENTION

This clause is provided to supplement the requirements provided in the General Conditions of Contract. While mobilized for work the Contractor shall conduct an HIV/AIDS Information, Education and Consultation Communication (IEC) campaigns via an approved service provider, and shall undertake such other measures as specified in this Contract to reduce the risk of transfer of the HIV virus between and among the Contractors Personnel and the local community, to promote early diagnosis and to assist affected individuals. The Contractor shall not discriminate against people found to have HIV/AIDS as part of the campaign.

The Employer shall provide to the Contractor a list of approved service providers which shall include recognized local health providers which shall and/or recognized local health departments. From the list the Contractor shall contract one service provider to undertake the HIV/AIDS IEC campaign.

The IEC campaign shall be conducted while the Contractor is mobilized at least every 2 months, addressed to all the Site staff and labor (including all the Contractor's employees, all Sub-Contractors and Consultants' employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to of Sexually Transmitted Diseases (STD) or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.

At the time of first mobilization, the approved service provider shall prepare the HIV/AIDS Prevention Program which will be submitted to the employer for approval. This will clearly indicate the (i) the types of education activities to be done; (ii) whether condoms shall be provided; (iii) whether STI/HIV/AIDS screening, diagnosis counseling and referral to a dedicated national STI and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor should be provided.

The IEC campaign shall use readily available information for the project. No specific new information shall be produced unless instructed by the Engineer.

The Contractor shall include in the program to be submitted for the execution of the Works under Sub-Clause 8.3 an alleviation program for Site staff and labour and their families in respect of STI and STD including HIV/AIDS. The STI, STD and HIV/AIDS alleviation program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation.

18. ASSISTANCE TO THE ENGINEER

The Contractor shall provide full co-operation and assistance in all safety surveillance carried out by the Engineer or the Employer.

19. PAYMENT

Project Safety including the HIV-AIDs Prevention Programme will not be measured for separate payment. The cost of meeting the requirements under this Specification section shall be included in other pay items of the Bill of Quantities.
01600 - MAINTENANCE AND PROTECTION OF TRAFFIC

1. GENERAL REQUIREMENTS

(a) The Contractor shall keep open to traffic existing roads during the performance of the Works, provided that when approved by the Engineer the Contractor may bypass traffic over a detour. The Contractor shall at all time keep roads and footpaths, affected by his operations, free from soil and material spillage.

(b) The Contractor shall keep the length of the project construction areas in such condition that traffic will be accommodated safely. Traffic control devices and services shall be provided and maintained both inside and outside the project limits as needed to facilitate traffic guidance.

(c) Prior to the start of construction operations, the Contractor shall erect such signs, barricades, and other traffic control devices as may be required by the plans, specifications or directed by the Engineer. Traffic control devices shall be operated only when they are needed and only those devices that apply to conditions actually in existence shall be operable.

(d) Temporary fence shall be placed to provide a visual barrier between the work area and adjacent traffic or buildings and at locations directed by the Engineer.

(e) Any devices provided under this Clause that are lost, stolen, destroyed, or deemed unacceptable while their use is required on the project shall be replaced by the Contractor without additional compensation.

(f) During non-working hours and following completion of a particular construction operation, all warning signs, except those necessary for the safety of the public, shall be removed or entirely covered with either metal or plywood sheeting so that the sign panel will not be visible.

(g) Retro-reflective sheeting on signs, barricades, and other devices shall be kept clean. The Contractor shall promptly correct rips, tears, and any public need for the safety of the public, shall be removed or entirely covered with either metal or plywood sheeting so that the sign panel will not be visible.

(h) Nighttime operations shall be illuminated by a lighting system approved by the Engineer. The lighting system shall be positioned and operated to preclude glare. Incandescent lights will not be permitted.

(i) The Contractor shall take necessary care at all times during the execution of the works to ensure the existing convenience and safety of residents along and adjacent to the road, and any public highway or port facility that may be affected by the Works. Street lighting shall be relocated as necessary to maintain the same standard of lighting during the course of the works until new lighting facilities are brought into operation.

(j) The Contractor shall thoroughly study the existing traffic conditions and understand the importance of maintaining traffic safety. The Contractor shall co-operate with the pertinent agencies regarding traffic control and develop all planning details subject to approval by the pertinent authorities. The Contractor shall be responsible for obtaining all necessary approvals and permits from the pertinent traffic authorities in order to implement the traffic control plan. In addition, the Contractor shall be responsible for maintaining the coordination with the relevant authorities throughout the construction period for any additional approvals and permits. The costs of such cooperation, approvals, and any permits, shall be deemed considered included in the payment, as stipulated in Subsection 10.2(b) of this specification section.

(k) The Contractor shall be responsible for investigating and establishing the requirements for traffic control and safety at each bridge site and shall submit such details in his Traffic Control Plan as required by sub-section 2 of this Specification section.

(l) The Contractor's requirements shall include, but not be limited to, construction of detours, temporary bridge approach roads, of traffic control devices and services for the control and protection of traffic (road, waterway and airway) through areas of construction.

(m) Any failure of the Contractor to meet these requirements will entitle the Engineer to carry out such works as he deems to be necessary and to charge the Contractor with the full cost thereof plus ten percent of such cost, which sum will be deducted from any money due or which may become due to the Contractor under the Contract.
(n) The word “traffic” where used in the Contract documents shall, where appropriate, be deemed to mean land, air and waterborne traffic. All of the requirements of the Contract documents and all obligations stated or reasonably implied shall equally apply to all land, air and waterborne traffic.

2. **TRAFFIC MANAGEMENT PLAN**

The Traffic Management Plan is part of the Traffic and Safety Management Plan. The Contractor shall submit not later than 28 days after the Commencement Date, a Traffic Management Plan, as part of the Contractor’s Environmental Management Plan as specified in Section 1700 – Environmental Management, which shall cover the means and methods the Contractor intends to take for proper and adequate control of traffic during the course of the Works. This Plan shall include but not be limited to:

- The traffic control equipment the Contractor proposes to use for the Works;
- Traffic control signage including location and sign descriptions;
- how and when the Contractor proposes to use traffic control flag men;
- Traffic control means during no-working periods;
- Traffic control means and devices for night and off-hour periods.

The Contractor shall coordinate the development of this plan with the relevant traffic authorities and obtain all necessary approvals and permits.

3. **TEMPORARY ROAD WORKS**

The Contractor shall furnish, maintain, and remove on completion of the work for which they are required, all temporary roads and road works such as sleeper tracks and staging over roads, access and service roads, temporary crossings or bridges over streams or unstable ground, and shall make them suitable in every respect for carrying Constructional Plant required for the work, for providing access for traffic for himself or others, or for any other purpose. Such temporary road works shall be constructed to the satisfaction of the Engineer, but the Contractor shall nevertheless be responsible for any damage done to or caused by such temporary road works.

(a) Before constructing temporary road works, the Contractor shall make all necessary arrangements, including payment if required, with the public authorities or landowners concerned, for the use of the land and he shall obtain the approval of the Engineer. Such approval will be dependent on the Engineer being satisfied with the Contractor’s proposals for items such as signing, lighting and riding quality of the temporary road together with the proposed maintenance arrangements. Such approval will not, however, relieve the Contractor of his responsibilities under the Contract. Upon completion of the works the Contractor shall clean up and restore the land to the satisfaction of the Engineer.

(b) The Contractor, when required by the Engineer, shall submit for the Engineer’s approval drawings giving full details of temporary roads. Such details shall include alignment, profile, pavement construction, signing, lighting and the duration of the temporary road.

(c) The Contractor shall make all arrangements necessary to permit the passage along the road section relating to this Contract of the Constructional Plant, materials and employees belonging to other Contractors engaged in the construction of contiguous stretches of road. For this purpose the Contractor and the Contractors concerned in the construction of the stretches contiguous to those through which they must pass shall, when necessary and with at least 15 days’ notice, request the Engineer for permission to pass and submit a schedule for such passage. After the Engineer has granted such permission and approved the schedule submitted, both the Contractors permitting the passage and those requesting it shall undertake to observe the schedule approved by the Engineer for the passage along the site without having any right to extra payment in consequence of the restrictions on passage or the necessary temporary suspension of works due to the aforesaid schedule.

4. **TEMPORARY TRAFFIC RAMPS**

In cases where it is necessary or required by the Engineer, the Contractor shall construct and maintain temporary traffic ramps, and furnish all the labor and materials required therefore.

5. **TRAFFIC CONTROL**
The traffic control systems to be employed at each conflict between the public and the site Works shall require a separate Traffic Management Plan. The contractor shall enhance the plans included with the drawings and develop new plans where those plans are not appropriate. Aspects to be covered in these plans are described below.

(a) In order to facilitate traffic through or around the Works, or wherever ordered by the Engineer, the Contractor shall erect and maintain at prescribed points on the work and at the approaches to the work, traffic signs, lights, flares, barricades, rubber cones with traffic lamps and other facilities as necessary or required by the Engineer for the proper direction and control of traffic.

(b) As necessary for proper control of traffic or when/where directed by the Engineer, the Contractor shall furnish and station competent flagmen whose sole duties shall consist of directing the movement of traffic through or around the work.

(c) The Contractor shall furnish and erect, within or in the vicinity of the project area, such warning and guide signs as may be necessary or ordered by the Engineer.

(d) In order to minimize disruption to traffic flows the Contractor shall enclose the Site with temporary fence to provide a visual barrier between his work and adjacent traffic. The temporary fence shall be of 2.0-m height and the movement of men, materials and plant into and out of the barriered area shall be controlled by flagmen.

6. **NUMBER OF LANES FOR TRAFFIC CONTROL**

The existing number of traffic lanes on roads at the project site must be maintained at all times during the work and if diversions are provided these must be of the same traffic capacity as the original road. Notwithstanding the above, the Engineer may give approval to reductions in traffic capacity if the Contractor can show that these will not cause excessive delay to traffic. If such approval is given, the Engineer may specify the hours during the day when the reduction in capacity may be applied and it should be anticipated that these hours may not include the peak period for the traffic movement under consideration.

The Contractor shall cooperate with the pertinent agencies regarding traffic control and all details will be subject to the Engineer’s approval.

7. **HALF-WIDTH CONSTRUCTION**

Where, in the opinion of the Engineer, a detour is not feasible, construction on existing public roads shall be undertaken only over half of the full width of the roadway. The length of such half-width construction shall be kept as short as possible.

(a) Where half-width construction is necessary, work on culverts commenced in the dry season must be completed and the embankments adjacent to them must be reinstated so that at least half the full width shall be available for use by the public throughout the next rainy season.

(b) Where single-lane traffic becomes necessary over a particular length of the works or over the approaches thereto, the Contractor, in maintaining through traffic, shall provide a single lane at least three and a half meters wide on the roadway or embankment to be kept open to traffic.

(c) The Contractor shall so conduct his operations as to offer the least possible obstruction, inconvenience, and delay to traffic and shall be responsible for the adequate control of the traffic using such lengths of single lane.

8. **EXTRAORDINARY TRAFFIC**

The Contractor is responsible for carrying out any necessary investigations and the obtaining of approvals, licenses, escorts and any other necessary facilities in order to enable extraordinary traffic to be moved on the roads in the project area.

Where transport of Contractor’s Equipment or Temporary Works necessitates the strengthening, altering, protecting and/or improving any bridge, culvert or road, the Contractor shall provide to the Engineer full details of the Contractor’s intended procedure. Such details shall include but not be limited to the following.
Details of Constructional Plant, Plant and/or Temporary Works to be moved including the total weight of load;
(a) The proposed date and times of such movement;
(b) The starting location and destination;
(c) The proposed route;
(d) The bridge(s), culvert (s) and/or road(s) which requires strengthening, altering, protecting and/or improving;
(e) Full details of any such strengthening, altering, protecting and/or improving, including any and all necessary design calculations;
(f) Traffic safety measures while the load is in transit and
(g) Evidence that the Contractor has liaised with and obtained all necessary permissions, permits and the like from all appropriate authorities.

9. VERTICAL CLEARANCE
In general any temporary works placed over roads or diversions used by public traffic should maintain a vertical clearance of at least 4.5 meters. Where required by the Engineer the Contractor shall erect and maintain suitable approved check-gates, fitted with warning signs indicating the vertical clearance.

10. MATERIALS FOR TRAFFIC CONTROL DEVICES
Materials for traffic control devices shall conform to the requirements set forth below and as specified in the contract. 
(a) Retro-reflective Material: Unless otherwise specified in the contract, sign panels, barricades, cones, vertical panels, and flagger paddles shall have retro-reflective sheeting meeting the minimum requirements for retro-reflective material noted in Specification Section 8400 "Road Signs".
(b) Sign Panels: Sign panels shall conform to the requirements of Specification section 8400 "Road Signs" and shall be orange with black legend unless otherwise required.
(c) Sign Posts: Signposts shall be fabricated from untreated softwood, metal, or other materials acceptable to the Engineer. Signs shall be capable of remaining in position during normal traffic flow and wind conditions.
(d) Barricades: Barricades shall be constructed of wood, metal or plastic.
(e) Cones:
   ♦ Cones shall be a minimum of 75 cm in height with a broadened base and shall be capable of withstanding impact without damage to the cones or vehicles. All cones shall be orange/white colored and highly visible both in daylight and darkness.
   ♦ Cones shall be capable of remaining bright and in position during normal traffic flow and wind conditions in the area where they are used. Lamps for cones shall be suitable for purpose.
(f) Temporary Fence: Temporary fence shall be fabricated in panels with timber framework and galvanized metal panels. The panel face towards the traffic shall be painted.
(g) Vertical Panels: Vertical panels shall be constructed of wood, metal or plastic.
(h) Warning Lights (flashing or steady): Warning lights shall be Type A (low intensity flashing), Type B (high intensity flashing), or Type C (steady burn) as approved by the Engineer.

11. MANAGEMENT OF WATER TRAFFIC
Navigation of ships and barges in waterways within the Site and adjacent areas will continue throughout the execution of the Contract.

The Contractor at all times shall not allow his fixed or floating equipment to interfere in any way with navigation in the waterways without the prior written approval of the relevant authorities. The Contractor shall comply with all orders and directions given to him from time to time by the relevant authorities or the Engineer in respect of navigation and shall conform in every way to their
requirements in respect of mooring, marking, lighting and watching any structure, craft or equipment which may be used in the construction of the Works.

The Contractor shall indemnify the Employer from and against all actions, suits, claims, demands, damages, costs, charges and expenses arising out of or in consequence of any operations of the Contractor or of any Sub-contractor which obstruct or interfere with navigation or affect waterways within the Site and adjacent areas.

The Contractor shall expeditiously raise and remove any plant (floating or otherwise) belonging to him or to any Sub-contractor or to any person employed by him which may be sunk in the course of the execution of the Contract or otherwise deal with the same as the Engineer may direct. Until the same shall be raised and removed the Contractor shall set such buoys and display at night such lights and do all such things for the safety of navigation as may be required by the relevant authorities or the Engineer. In the event of the Contractor not carrying out the obligations imposed on him by this Clause, the Engineer or the relevant authorities, may set such buoys and lights to mark out such sunken plant and raise and remove the same (without prejudice to the right of the Employer to hold the Contractor liable) and the Contractor shall refund to the Employer all costs in connection therewith. The fact that the sunken vessel, craft or plant is insured or has been declared a total loss shall not absolve the Contractor from his obligation under this Sub-Clause to raise or remove the same.

12. MEASUREMENT AND PAYMENT FOR TRAFFIC MANAGEMENT

The maintenance and protection of river and vehicular traffic and/or traffic control will not be measured for separate payment. The cost of meeting requirements under this Specification section shall be included in other pay items of the Bill of Quantities.
01700 - ENVIRONMENTAL MANAGEMENT
(Environmental Specifications for the Contractor)

1. GENERAL PROVISIONS

The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the Works and all associated operations on the Work Sites or off-site are carried out in conformity with statutory and regulatory environmental requirements of the Government of Vietnam.

The Contractor must conform to "Environmental Management Plan", which was prepared by the Employer exclusively for this Contract. The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of Project activities. This shall, wherever possible, be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated.

The Contractor shall also be required to compensate for any damage, loss, spoilage, or disturbance of the properties and health of the Project affected people during construction. Contractors are encouraged to recruit local skilled and unskilled labour to increase direct benefits in the Project area and to minimize potential environmental issues related to construction camps, disease transmission and cultural disputes. Specific requirements in this regard are noted below. In conformance with the Contract specifications of which this environmental specification is a part, the Engineer may withhold payments and/or stop construction in the event of serious or repeated violations of the conditions stipulated herein.

2. STANDARDS AND REQUIRED EQUIPMENT

The Contractor shall comply with the prevailing standards and regulations of the Government of Vietnam including those shown below. Where these have been superceded by updated versions, the most recent version shall apply.

2.1. WATER QUALITY STANDARDS

♦ National Technical Regulation for Surface Water Quality (QCVN 08:2008/BTNMT)
♦ National Technical Regulation for Domestic Wastewater (QCVN 14:2008/BTNMT)
♦ National Technical Regulation for Industrial Wastewater (QCVN 40:2011/BTNMT)
♦ National Technical Regulation for Groundwater Quality (QCVN 09:2008/BTNMT)

2.2. AIR QUALITY, NOISE AND VIBRATION STANDARDS

♦ National Technical Regulation for Noise (QCVN 26:2010/BTNMT)
♦ National Technical Regulation for Vibration (QCVN 27:2010/BTNMT)
♦ National Technical Regulation for Ambient Air Quality (QCVN 05:2009/BTNMT)
♦ National Technical Regulation for Toxic Pollutants in Air Emission (QCVN 06:2009/BTNMT)

2.3. SOIL QUALITY STANDARDS

♦ National Technical Regulation for Heavy Metal Contamination in Soils (QCVN 03:2008/BTNMT)

2.4. OCCUPATIONAL HEALTH STANDARDS

♦ Decision N3733/2002/QD-BYT, issued on 10th October 2002 by Ministry of Health guiding application of 21 occupational health standards

2.5. CONSTRUCTION SAFETY STANDARDS

2.6. STANDARDS FOR DISPOSAL OF SOLID WASTES AND HAZARDOUS WASTES

- National Technical Regulation on Hazardous Waste Threshold (QCVN 07:2009/BTNMT)
- National Technical Regulation on Wastewater at Solid Waste Landfill Sites (QCVN 25:2009/BTNMT)

In instances in which the requirements of this Specification and those of the Government of Vietnam differ, the Vietnam standards or technical regulations shall take precedence.

Should these standards and regulations not be achieved and the cause is due to the activities of the Contactor, appropriate action shall be taken by the Contractor to rectify the cause to ensure compliance.

3. MANAGEMENT ACKNOWLEDGEMENTS

3.1. CERTIFICATION AND COMMITMENT

The Contractor shall produce a Contractor’s Environmental Management Plan (CEMP) as described below. The CEMP shall include a signed statement from the Contractor’s managing directors attesting to a commitment that all environmental protection, safety, and industrial health aspects of the Project will be given highest priority in the discharge of contractual obligations and certifying a commitment to the provisions specified by the CEMP as approved by the Engineer.

3.2. STATUTORY UNDERSTANDING AND COMPLIANCE

The CEMP shall provide a statement attesting the firm’s understanding of, and means of ensuring due compliance with, the statutory regulations relating to construction work in the Government of Vietnam, specifically in regard to compliance with all safety and industrial health legislation including, without limitation, the rules and regulation of the Government of Vietnam and the authorities having jurisdiction.

3.3. AVAILABILITY OF DOCUMENTS

The CEMP shall state where copies of environmental, safety and industrial health regulations and documents will be available on the Site and the Contractor verify that all regulations and documents have been or will be available and displayed or kept alongside each other in both the Vietnamese and English languages.

3.4. MANAGEMENT OF SUBCONTRACTORS

The CEMP shall provide a commitment that the Contractor shall:

- Provide subcontractors with copies of the CEMP and will incorporate provisions into all subcontract documentation to ensure the compliance with the Plan at all tiers of the subcontracting.
- Require all subcontractors to appoint a safety representative who shall be available on the Site throughout the operational period of the respective subcontract;
- Ensure, as far as is practically possible, that employees of subcontractors of all tiers are conversant with appropriate parts of the CEMP and the statutory regulations.

4. CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

No later than 28 days after Commencement Date, the Contractor shall prepare and submit a Construction Environmental Management Plan (CEMP) to the Engineer for review and approval. The CEMP shall describe clearly how the Contractor will manage the environmental, social and safety impacts on the Site during construction. The Contractor shall translate into Vietnamese (and other languages as necessary) the final version of the Contraction Environmental...
Management Plan. Such translation shall be made available to the project Owner for information.

The CEMP shall be organized in six sections as follows:

- Management Acknowledgements;
- Organization & Staffing;
- Communications And Reporting;
- Environmental Management Provisions;
- Monitoring;
- Public Consultation and Dispute Resolution;
- Organising and Staffing.

The environmental and management provisions shall consist of a number of individual plans as follows:

- Site Plans;
- Workforce and Site Management Plan;
- Construction Management Plan;
- Clearance, Re-Vegetation Planting and Restoration Management Plan;
- Waste Management Plan;
- Material Handling, Use and Storage Management Plan;
- Ecological Management Plan;
- Traffic and Safety Management Plan;
- Physical, Cultural Property Protection Plan;
- Community Relation and Health Management Plan;
- Utilities Management Plan;
- Unexploded Ordnances (UXO).

The requirements for each of these plans are described below.

The CEMP will be provided to the Engineer for approval following the receipt of all necessary information and documentation. Approval may be conditional as specified by the Engineer. The Contractor shall not commence any site activities until the Engineer has approved the CEMP. The Engineer shall also require periodic reviews, updating and supplements to the CEMP in the course of the work. As well as submission of the CEMP by the Contractor and approval by the Engineer, there are also a number of other activities that will need to be implemented before the Contractor can commence work on Site. These include the following:

- Appointment and approval of an Environment/Safety Officer (ESO). The person nominated as the ESO shall be subject to the Engineer’s approval. The Contractor shall not undertake any works on the Site until the ESO has commenced duties unless specifically agreed in writing by the Engineer;
- Environmental baseline surveys are required prior to occupation of the Site;
- Initial safety induction courses are required for all workmen on the Site prior to their commencement of work.

4.1. SITE PLANS

The CEMP shall include Site Plans for each construction location including workshops, maintenance, batching plant, storage areas and staging areas indicating the locations and arrangements of all equipment, buildings and construction activities that may result in environmental impacts. At a minimum, the Site Plans must provide at a scale of 1:1,000.

Areas within the Site where there is a regular movement of vehicles shall have an acceptable hard surface and be kept clear of loose surface material and shall be so indicated on the required Site Plan.
4.2. WORKFORCE AND SITE MANAGEMENT PLAN

The Contractor shall develop a Workforce and Site Management Plan that addresses the requirements described below.

4.2.1. WORKERS’ CAMP AND SITE INSTALLATION

In order to minimize adverse environmental impacts due to construction and location of areas/facilities for the completion of the Project, the following measures should be put into place:

- To the extent possible, the Project shall utilize the existing mixing stations and asphalt plants of Hai Phong city;
- Site offices, camps, depots, asphalt plants, mixing stations, stone grinding stations, and workshops shall be located in appropriate areas as agreed by local authorities and approved by the Engineer and not within 200 m of existing residential settlements except for asphalt mixing stations which shall not be within 300 m of existing residential settlements.
- Site offices, camps, depots and particularly storage areas for diesel fuel and bitumen and asphalt plants shall not be located within 100 m of watercourses, and be operated so that no pollutants enter watercourses. Camp areas shall be located to allow effective natural drainage;
- The workforce shall be provided with safe, suitable and comfortable accommodations. They have to be maintained in clean and sanitary conditions;
- Potable water safe for human consumption shall be provided for at camps, site offices, and other areas;
- A method shall be established for storing and disposing of all solid wastes generated by the work camps and/or stockpiles.
- Separate and adequate lavatory facilities (toilets and washing areas) shall be provided for the use of male and female workers. Mobile toilets must be provided at all construction camp areas where there will be a concentration of labour. A temporary waste containing pits shall be installed for the disposal of domestic wastes;
- A medical and first aid facilities and first aid boxes shall be provided in each construction camp site;
- If kitchens are provided, they must have good ventilation, a refrigeration system and pest-resistance fences. Adequate refuse bins shall be provided in each eating area;
- Security measures shall be put into place in the construction area such as adequate, day-time night-time lighting. A perimeter security fence shall be constructed at least 2 m in height and firefighting equipment and portable fires extinguishers provided at fuel storage sites and offices.

4.2.2. PROHIBITIONS

The following activities are prohibited on or near the Project site:

- Cutting of trees for any reason outside the approved construction area;
- Hunting, wildlife capture;
- Consumption of wild animals for food;
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.;
- Disturbance to anything with architectural or historical value;
- Use of firearms (except authorized security guards);
- Use of alcohol by workers in working hours;
- Washing cars or machinery in canals or rivers;
- Doing maintenance on cars and equipment outside authorized areas;
- Disposing wastes in unauthorized places;
- Driving in an unsafe manner in local roads;
- Working without safety equipment (including boots and helmets);
- Creating nuisances and disturbances in or near communities.
4.2.3. ENVIRONMENTAL TRAINING FOR CONSTRUCTION WORKERS

The Contractor shall prepare and implement an Environmental Training Plan for all construction workers and staff to ensure that all concerned staff is aware of the relevant environmental requirements as stipulated in the Vietnamese environmental legislation and the Contract specifications. The Plan shall be submitted to the Engineer for approval prior to its implementation.

The Contractor shall distribute to the key staff, including newly joined key staff members, (1) the Contractor’s Environmental Policy; and (2) copies of relevant extracts from environmental laws, standards and regulations.

The Contractor is responsible for providing appropriate training to all staff according to their level of responsibility for environmental matters. Managerial staff shall receive additional training.

All Contractors’ employees shall be required to comply with environmental protection procedures and they shall be able to provide evidence that they attended the training sessions detailed in the Plan;

Training materials and methods which shall include formal training sessions, posters, data in newsletters, signs in construction and camp areas and meetings shall be submitted to the Engineer for approval prior to issue.

The Training Plan shall be developed for all construction workers for the following issues: fire arm possession, traffic regulations, illegal logging and collection of non-timber forestry products, non disturbance of resettlement communities, hunting and fishing restrictions, waste management, erosion control, health and safety issues, all prohibited activities, the code of conduct requirements and disciplinary procedures, general information on the environment in which they will be working and living and establishment of penalties for those who violate the rules;

Periodic training shall be provided when necessary but every employee must receive training prior to commencing activities on Site and every 12 months thereafter.

Records shall be maintained (e.g. attendance records for environmental awareness training, topics covered) and submitted to the Engineer upon request.

4.3. CONSTRUCTION MANAGEMENT PLAN

The Contractor shall develop a Construction Management Plan that addresses the issues described below.

4.3.1. WATER QUALITY

Water quality regulations shall be strictly observed particularly in aquaculture areas. The Contractor shall ensure:

• All existing stream courses and drains within, and adjacent to, the Site will be kept safe and free from any debris and any excavated materials arising from the Works. chemicals, sanitary wastewater, spoil, waste oil and concrete agitator washings will not be deposited
in the watercourses.

- All water and waste products arising on the Site will be collected, removed from the Site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance.
- Drainage works will be constructed, maintained, removed and reinstated as necessary and all other precautions necessary for the avoidance of damage by flooding and silt washed down from the Works will be taken. Adequate precautions will be taken to ensure that no spoil or debris of any kind are allowed to be pushed, washed down, fallen or be deposited on land adjacent to the Site.
- In the event of any spoil or debris from construction works being deposited on adjacent land or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Engineer.
- The Contractor shall ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities.

4.3.2. EROSION AND SEDIMENTATION

There is the potential for site erosion and sedimentation of nearby land and waterways if the Site activities are not carefully managed. In order to avoid negative impacts in the Project area, the Contractor shall carry out the following activities:

- Protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc;
- Areas of the site not disturbed by rehabilitation activities shall be maintained in their existing conditions;
- Reduce water speed and volume by increasing the number of drainage culverts and selecting proper places for culvert placement to avoid erosion effects;
- Stockpile topsoil and reapply this material to local disturbed areas to promote the growth of local native vegetation;
- Apply local, native grass seed and mulch to barren erosive soil areas or closed construction surfaces;
- Apply erosion control measures before the rainy season begins preferably immediately following construction;
- Install sediment control structures where needed to slow or redirect runoff and trap sediment until vegetation is established. Sediment control structures include windrows of logging slash, rock berms, sediment catchment basins, straw bales, brush fences, and silt;
- In areas where rehabilitation activities have been completed and where no further disturbance would take place, re-vegetation should commence as soon as possible;
- Spray water as needed on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion;
- Traffic and movement over stabilized areas shall be restricted and controlled, and damage to stabilized areas shall be repaired and maintained to the satisfaction of the Engineer.

4.3.3. EMISSIONS AND DUST

No furnaces, boilers or other similar plant or equipment using any fuel that may produce air pollutants will be installed without prior written consent of the Engineer. No burning of debris or other materials shall occur on the Site.

Dust suppression measures including but not limited to the following shall be implemented:

- Stockpiles of sand and aggregate greater than 20 cubic meters for use in concrete manufacture shall be enclosed on three sides, with walls extending above the pile and two m beyond the front of the piles. Locations should be indicated on the Site Plan(s). - Effective water sprays shall be used during the delivery and handling of all raw sand and aggregate, and other similar materials, when dust is likely to be created and to dampen all stored
materials during dry and windy weather;

- Areas within the Site where there is a regular movement of vehicles shall have an acceptable hard surface and be kept clear of loose surface material. Locations should be indicated on the Site Plan(s). Conveyor belts shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. All conveyors carrying materials that have the potential to create dust shall be totally enclosed and fitted with belt cleaners. Locations should be indicated on the Site Plan(s);

- Cement and other such fine-grained materials delivered in bulk shall be stored in closed silos fitted with a high-level alarm indicator. The high-level alarm indicators shall be interlocked with the filling line such that in the event of the hopper approaching an overfull condition, an audible alarm will operate, and the pneumatic line to the filling tanker will close. Locations should be indicated by the accompanying Site Plan(s).

- Cement manufactured from dredging of off-shore coral reef resources shall not be used in the Project;

- All air vents on cement silos shall be fitted with suitable fabric filters provided with either shaking or pulse-air cleaning mechanisms;

- Weigh hoppers shall be vented to a suitable filter;

- The filter bags in the cement silo dust collector must be thoroughly shaken after cement is blown into the silo to ensure adequate dust collection for subsequent loading;

- Provide adequate dust suppression plant including water browsers with spray bars;

- Areas of reclamation shall be completed, including final compaction, as quickly as possible consistent with good practice to prevent suspension of dust by wind;

- All roads within the construction areas of the Site shall be sprayed at least twice each day;

- All vehicles, while parked on the Site, shall be required to have their engines turned off;

- All equipment and machinery on the Site shall be checked at least weekly and make all necessary corrections and or repairs to ensure compliance with safety and air pollution requirements;

- All vehicles shall be properly cleaned (bodies and tires are free of sand and mud) prior to leaving the Site areas. The Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from the Sites. The Contractor shall provide necessary cleaning facilities on Site and ensure that no water or debris from such cleaning operations is deposited off-site. The locations of these facilities shall be clearly illustrated on the Site Plans;

- The necessary cleaning facilities shall be provided on Site to ensure that no water or debris from such cleaning operations is deposited off-site. Locations should be indicated on the Site Plan(s);

- All trucks used for transporting materials to and from the Site shall be covered with canvas tarpaulins, or other acceptable type cover (which shall be properly secured) to prevent debris and/or materials from falling from or being blown off the vehicle(s). The tarpaulin shall be properly secured and shall extend at least 300 millimeters over the edges of the side and tailboards;

- Construction walls shall be provided in all locations where strong winds could cause the blowing of dust and debris;

- At any concrete batching plant or crushing plant being operated on the Site the following additional conditions shall be complied with:

- An air pollution control system shall be installed and shall be operated whenever the plant is in operation;

- Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin in good condition;

- The concrete batching plant and crushing plant sites and ancillary areas shall be frequently cleaned and watered to minimize any dust emissions. - Dry mix batching shall be carried out in a totally enclosed area with exhaust to suitable fabric filters.
4.3.4. NOISE AND VIBRATION

To avoid potential adverse noise and vibration impacts, the Contractor shall:

- Be responsible for repairing any damage caused as the result of vibrations generated from or by the use of his equipment, plant, and machinery.
- Erect temporary noise barriers where schools and other potentially sensitive receptors (as identified during consultation with local residents) are within 50 m of construction activities or material haulage routes. Temporary barriers of sufficient height with skid footing and a cantilevered upper portion shall be erected within a short distance from stationary plants, and at practicable distance from mobile plants. The minimum effective height of the noise barriers should be as such that no part of the noise sources associated with the operation of construction machinery should be audible from the target receptors to be protected. Barriers should have no openings or gaps, and preferably have a superficial surface density of at least ten kilograms per square meter (kg/m2). The locations of the temporary noise barriers shall be adjusted where and when necessary taking into consideration the locations and type of receptor involved and the machinery intended to be protected. Use of the proposed noise barriers, as other construction site equipment, should take into account the following standard requirements:
  - A minimum of 4.5-meter wide thoroughfare with not less than 4.5-meter vertical clearance to be maintained at all times for the free passage of fire appliances;
  - The barrier shall not be located where it prevents access to community facilities, residential areas, and places of work or access routes.
  - Provide public notification of construction operations prior to construction works.
  - Ensure that sensitive receptors shall be avoided as possible from aggregate crushers, operators, etc. Non vibratory rollers (for compaction) shall be used near sensitive receptors such as schools and cultural resources.
  - Ensure that all exhaust systems shall be maintained in good working order; properly designed engine enclosures and intake silencers shall be employed; and regular equipment maintenance shall be undertaken.
  - Ensure that stationary equipment shall be placed as far from sensitive land uses as practical; selected to minimize objectionable noise impacts; and provided with shielding mechanisms where possible.
  - Schedule operations to coincide with periods when people would least likely be affected; work hours and work days shall be limited to less noise-sensitive times. Hours-of-work will have due regard for possible noise disturbance to the local residents or other activities.
  - Adopt the necessary and appropriate measures to minimize noise associated with pile driving.
  - Construction activities will be strictly prohibited between 6 PM and 6 AM in the residential areas.

4.3.5. LOCATIONS OF LIQUID AND TOXIC MATERIAL STORAGE AREAS:

The CEMP Site Plans shall specify the locations for the storage of liquid materials and toxic materials. The following conditions to avoid adverse impacts due to improper fuel and chemical storage:

- All fuel and chemical storage (if any) shall be sited on an impervious base within a bund and secured by fencing. The storage area shall be located away from any watercourse or wetlands. The base and bund walls shall be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks.
- Filling and refuelling shall be strictly controlled and subject to formal procedures and will take place within a bounded area to contain spills / leaks of potentially contaminating liquids.
- All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. - The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any drain or watercourses.
4.3.6. **EARTHWORKS, CUT AND FILL SLOPES**

Earthworks, cuts and fill slopes shall be carefully managed to minimize negative impacts on the environment.

The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the works.

The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.

In order to protect any cut or fill slopes from erosion, in accordance with the drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains should be provided above high cuts to minimize water runoff and slope erosion.

Any excavated cut or unsuitable material shall be disposed of in designated disposal areas as approved by the Engineer. Disposal sites should not be located where they can cause future slides, interfere with agricultural land or any other properties, or cause soil from the dump to be washed into any watercourse. Drains may need to be dug within and around the tips, as directed by the Engineer.

4.3.7. **STOCKPILES AND BORROW PITS**

The construction of the road will use existing borrow pits or quarries. However, in case that new borrow pits and quarries are needed, the Contractor shall carry out the following activities:

- Locations of stockpiles, quarries and borrow pits shall be identified and demarcated, ensuring that they are a minimum of 25 m from critical areas such as steep slopes, erosion-prone soils, cultivated lands, and areas that drain directly into water bodies. Locations of stockpiles, quarries and borrow pits shall be in non-productive land to the maximum extent possible and be approved by the Engineer;
- Location of stockpiles, quarries, and borrow pits shall avoid sensitive areas such as nature reserves, scenic spots, forest parks, water source protection areas, etc;
- Limit extraction of material to approved and demarcated quarries and borrow pits;
- Stockpile topsoil when first opening the borrow pit. After all usable borrow has been removed, the previously stockpiled topsoil should be spread back over the borrow area and graded to a smooth, uniform surface, sloped to drain. On steep slopes, benches or terraces may have to be specified to help control erosion;
- Excess overburden should be stabilized and re-vegetated. Where appropriate, organic debris and overburden should be spread over the disturbed site to promote re-vegetation. Natural re-vegetation is preferred to the extent practicable;
- Existing drainage channels in areas affected by the operation should be kept free of overburden;
- The Contractor shall ensure that all borrow pits used are left in a trim and tidy condition with stable side slopes, re-establishment of vegetation, restoration of natural water courses, avoidance of flooding of the excavated areas wherever possible so no stagnant water bodies are created which could breed mosquitoes;
- When the borrow pits cannot be refilled or reasonably drained, the Contractor shall consult with the local community to determine their preference for reuse such as fish farming or other community purposes;
- No foreign material generated/ deposited during construction shall remain on site;
- Areas affected by stockpiling shall be reinstated to the satisfaction of the Engineer.

Disposal of lubricating oil onto the ground or water bodies will be prohibited.

Should any accidental spills occur immediate clean up will be undertaken and all cleanup materials stored in a secure area for disposal to a Site authorized to dispose of hazardous waste.
4.3.8. **DISPOSAL OF DEBRIS**

The Contractor shall carry out the following activities:

- Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for debris;
- Debris generated due to the dismantling of existing structures shall be suitably reused, to the extent feasible, in the proposed rehabilitation program (e.g. as fill materials for embankments). The disposal of remaining debris shall be carried out only at sites identified and approved by the Engineer. The Contractor should ensure that these sites (a) are not located within designated forest or cultivated areas; (b) do not impact natural drainage courses; and (c) do not impact endangered/rare flora. Under no circumstances shall the Contractor dispose of any material in environmentally sensitive areas;
- In the event any debris or silt from the sites is deposited on adjacent land, the Contractor shall immediately remove such, debris or silt and restore the affected area to its original state to the satisfaction of the Engineer;
- Water courses shall be cleared of debris and drains and culverts checked for clear flow paths;
- Include provisions for incorporating the most appropriate stabilization techniques for each disposal site and determine that the selected spoil disposal sites do not cause unwanted surface drainage;
- Assess risk of any potential impact regarding leaching of spoil material on surface water;
- Once the job is completed, all rehabilitation-generated debris should be removed from the site.

4.3.9. **DEMOLITION OF EXISTING INFRASTRUCTURES**

The following measures shall be implemented in order to protect workers and the public from falling debris and flying objects:

- Set aside a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels;
- Conduct sawing, cutting, grinding, sanding, chipping or chiselling with proper guards and anchoring as applicable;
- Maintain clear traffic ways to avoid driving of heavy equipment over loose scrap;
- Provide all workers with safety glasses with side shields, face shields, hard hats, and safety shoes.

4.3.10. **BRIDGES, OVERPASSES, INTERCHANGES AND VIADUCTS**

The Contractor shall submit a bridge, overpass, interchange or viaduct construction method statement to the Engineer for approval, detailing the location of the temporary bypasses, spill prevention measures, and sedimentation control measures, surface water flow diversion, reinstatement, etc;

After bridge construction, the works area, stream diversion, settlement pond areas and temporary bypasses shall be reinstated to the satisfaction of the Engineer.

4.4. **CLEARANCE, RE-VEGETATION PLANTING AND RESTORATION MANAGEMENT PLAN**

The Contractor shall prepare a Clearing, Re-Vegetation Planting and Restoration Management Plan for approval of the Engineer. No work can be commenced until this approval is given. The Plan shall identify procedures and mitigation measures for clearing, re-vegetation and restoration of construction areas.

4.4.1. **CLEARING OF CONSTRUCTION AREAS**

The Contractor shall ensure the following provisions are included in its Plan:
Allow the existing usage of the Site to continue as long as is practicable, without interference with the Contractor’s activities. Vegetation shall not be disturbed in those areas not described in the Plan for non objection;

Large or significant trees in camp areas and access roads should be preserved wherever possible;

Before vegetation clearing takes place in any rehabilitation area, search and rescue and seed collection shall be undertaken;

Before clearing of vegetation, the Contractor shall ensure that all litter and non-organic material is removed from the area to be cleared;

Vegetation clearing shall take place in a phase manner in order to retain vegetation cover for as long as possible;

All indigenous plant material removed from cleared areas shall be stockpiled for mulching. All remaining vegetation shall be removed and disposed of at an approved landfill site.

The Contractor shall remove topsoil from all areas where topsoil will be impacted on by rehabilitation activities, including temporary activities such as storage and stockpiling, etc;

Stripped topsoil shall be stockpiled in areas approved by the Engineer for later use in re-vegetation and shall be adequately protected.

The application of chemicals for vegetation clearing shall be minimized. To the extent possible, non-residual chemicals shall be selected and with negligible adverse effects on human health;

Herbicides use in the Project shall be shown to be effective against the target vegetation species, have minimum effect on the natural environment, and be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well for personnel applying them. The use of herbicides shall be approved by the Engineer.

4.4.2. RE-VEGETATION PLANTING AND SITE RESTORATION

The Contractor shall ensure the following provisions are included in its Plan:

Re-vegetation shall start at the earliest opportunity. Appropriate local native species of vegetation shall be selected for the compensatory planting and restoration of the natural landforms;

Restoration of cleared areas such as borrow pits no longer in use, disposal areas, site facilities, workers’ camps, stockpiles areas, working platforms and any areas temporarily occupied during construction of the Project works shall be accomplished using landscaping, adequate drainage and re-vegetation;

Spoil heaps and excavated slopes shall be re-profiled to stable batters, and grassed to prevent erosion;

Restoration and re-vegetation shall be carried out timely for the exposed slopes/soils and finished areas shall be reinstated in order to achieve the stability of slopes and maintain soil integrity;

All affected areas shall be landscaped and any necessary remedial works shall be undertaken without delay, including grassing and reforestation;

Trees shall be planted at exposed land and on slopes to prevent or reduce land collapse and keep stability of slopes;

Soil contaminated with chemicals or hazardous substances shall be removed and transported and buried in waste disposal areas;

All affected areas should be landscaped and any necessary remedial works should be undertaken without delay, including grassing and reforestation;

Water courses should be cleared of debris and drains and culverts checked for clear flow paths;

All sites should be cleaned of debris and all excess materials properly disposed;
4.5. WASTE MANAGEMENT PLAN

The Contractor shall develop a Waste Management Plan that addresses the issues described below.

4.5.1. LIQUID WASTE DISPOSAL

The Waste Management Plan address the following requirements:

- The design of temporary drainage systems, sanitary facilities (toilets) at worker camps and at the construction sites and the proposed disposal site;
- Describe the measures for proper collection and treatment of wash water from equipment maintenance;
- There shall be no direct discharge of wastewater, wash water, chemicals, spoils, waste oil, muddy materials or solid waste to the rivers and canals;
- Indicate the system proposed and the locations of related facilities on site, including mobile toilets and temporary latrines, wastewater storage areas, retention ponds etc;
- Disposal of lubricating oil and similar materials, onto the ground or into water bodies is prohibited.
- Liquid material containment areas shall not drain directly to surface water.
- Liquid material storage containment areas shall be equipped with drains regulated by valve system and the valve shall be maintained locked in the closed position with supervisory control of the key.
- Lubricating and fuel oil spills shall be cleaned up immediately and spill clean-up materials shall be transported and disposed by an authorized firm (via a contract with the Contractor) to an approved landfill or disposal sites of Hai Phong City.
- Ensure that run-off from the construction sites is not deposited directly into any watercourse and shall indicate the system proposed, including the locations of retention ponds and other facilities.

4.5.2. SOLID WASTE DISPOSAL:

The Waste Management Plan address the following requirements:

- Management of domestic wastes generated at worker camps and offices with provisions for temporary holding, recycling and hauling and disposal of residual wastes by a licensed waste contractor.
- Management of industrial wastes, construction wastes, spoils and muddy materials. The plan should identify disposal sites for spoils and muddy materials. The disposal site for muddy materials shall comply with the following criteria: it is not located within 200 m from residential areas, schools, aquaculture farms and within 500 m from water intake points for domestic use and historic, religious sites with proper design of bottom and walls to avoid leakage of effluent into surrounding areas
- Management of hazardous materials should comply with the national technical regulations and requirements.
- There shall be no burning of oily wastes and /or vegetation wastes.

4.5.3. WASTE WATER DISPOSAL

All water and waste products arising on the Site shall be collected, removed from the Site via a suitable and properly designed temporary drainage system and disposed of at locations and in manners that will cause neither pollution nor nuisance The Site Plan shall indicate the system proposed and the locations of related facilities on the Site, including latrines, holding areas, etc. There shall be no direct discharge of sanitary or wash water to surface water. Disposal such as, but not limited to, lubricating oil and similar materials, onto the ground or into water bodies shall be prohibited. Liquid material storage containment areas shall not drain directly to surface water. Liquid material storage containment areas equipped with drains shall be valved and the valve shall be maintained locked in the closed position with supervisory control of the key. Lubricating and
fuel oil spills shall be cleaned up immediately and spill clean-up materials shall be maintained at the storage area. Spill clean-up materials shall be disposed in approved landfill or disposal sites.

4.5.4. **SOLID WASTES**

The Contractor shall submit a method statement detailing a solid waste control system (storage, provision of bins, site clean-up schedule, bin clean-out schedule, etc.) to the Engineer for approval. This plan shall address the following:

- All facilities are maintained in a neat and tidy condition and the site shall be kept free of litter;
- Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work, the Contractor shall provide litter bins, containers and refuse collection facilities for later disposal;
- Solid waste may be temporarily stored on site in a designated area approved by the Engineer for collection and disposal through a licensed waste collector;
- Waste storage containers shall be covered, tip-proof, weatherproof and scavenger proof. The waste storage area shall be fenced off to prevent wind-blown litter;
- No burning, on-site burying or dumping of waste shall occur;
- All solid waste shall be disposed of offsite at an approved disposal site. The Contractor shall supply the Engineer with certificates of disposal;
- Random disposal of solid waste in scenery areas shall be strictly prohibited;
- The Contractor shall identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each;
- Recyclable materials such as wooden plates for trench works, steel, scaffolding material, site holding, packaging material, etc. shall be collected and separated on-site from other waste sources. Collected recyclable material shall be re-used for other projects or sold to a waste collector for recycling.

4.5.5. **DOMESTIC WASTE**

The Contractor shall provide refuse bins, all with lids, for all worker camps and construction sites. Refuse shall be collected and removed from all facilities at least twice per week. Domestic waste shall be transported to the approved refuse disposal site in covered containers or trucks. Collection and disposal of domestic waste shall be coordinated with local authorities.

4.5.6. **HAZARDOUS AND CHEMICAL WASTES**

The waste management plan shall address the following:

- All hazardous and chemical waste (including waste bitumen, etc.) shall be disposed of at an approved hazardous landfill site and in accordance with legislative requirements. The Contractor shall provide disposal certificates to the Engineer;
- The removal of asbestos-containing materials or other toxic substances shall be performed and disposed of by specially trained workers;
- Used oil and grease shall be removed from site and sold to an approved used oil recycling company;
- Under no circumstances shall the spoiling of tar or bituminous products be allowed on the site, over embankments, in borrow pits or any burying;
- Unused or rejected tar or bituminous products shall be returned to the supplier’s production plant;
- Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company for disposal at an approved hazardous waste site;
- Informing the Engineer of any accidental spill or incident;
- Initiate a remedial action following any spill or incident;
4.6. MATERIAL HANDLING, USE AND STORAGE MANAGEMENT PLAN

The Contractor shall ensure the following provisions are included in its Plan:

4.6.1. TRANSPORTATION

The Material Handling, Use and Storage Management Plan shall address the following:

- The Contractor shall ensure that all suppliers and their delivery drivers are aware of procedures and restrictions (e.g. restricted areas);
- Material shall be appropriately secured to ensure safe passage between destinations during transportation;
- Loads shall have appropriate cover to prevent them spilling from the vehicle during transit;
- The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

4.6.2. HAZARDOUS AND CHEMICAL SUBSTANCES

The Contractor shall provide a method statement detailing the hazardous substances / material that are to be used during construction, as well as the storage, handling, and disposal procedures for each substance / material and emergency procedures in the event of misuse or spillage that might negatively affect the environment. In general terms, the following activities shall be carried out:

- All hazardous material / substances (e.g. petrochemicals, oils, etc.) shall be stored on site only under controlled conditions;
- All hazardous material / substances shall be stored in a secured, appointed area that is fenced and has restricted entry. All storage shall take place using suitable containers to the approval of the EMS;
- Hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure;
- Fuel shall be stored in a steel tank supplied and maintained by the fuel suppliers. The tank shall be located in a secure, demarcated area.

4.6.3. ACID SULPHATE SOILS (ASS)

Disturbance of the acid sulphate soil will generate a series of environmental impacts. Exposure of the ASS to air will cause oxidation of the sulphide bearing minerals, leading to production of H2SO4 (sulphuric acid). Leaching of the oxidized products by rainwater will cause acidic surface run-off. This run-off can cause lowering of pH of the receiving body of water. The lowering of acidity can be accompanied by the increased solubility of metallic elements such as iron and aluminum and such water quality condition is harmful to aquatic organisms and plants. Considering that the overall land uses of the Project alignment are agriculture and aquaculture, the potential impacts of the disturbance of acid sulphate soil can be significant if not properly managed.

The extent of treatment is unknown until the excavated embankment material has been tested. As such, a Provisional Sum has been included to allow for the treatment of soils should this be discovered during construction. Method of treatment will depend on the level of risk. Payment through the Provisional Sum will be in accordance with the General Conditions of Contract.

4.6.4. SURFACING MATERIALS

The Material Handling, Use And Storage Management Plan shall address the following:

- Over spray of bitumen products outside of the road surface and onto roadside vegetation shall be prevented using a method approved by the SES;
- When heating of bitumen products, the Contractor shall take appropriate fire control
measures; Stone chip / gravel excess shall not be left on road / paved area verges. This shall be swept/raked into piles and removed to an area approved by the SES;

- Water quality from runoff from any fresh bitumen surfaces shall be monitored by the SES and remedial actions taken where necessary.

4.6.5. CEMENT AND CONCRETE BATCHING

The Material Handling, Use And Storage Management Plan shall address the following:

- Concrete mixing directly on the ground shall not be allowed and shall take place on impermeable surfaces to the satisfaction of the SES;
- All runoff from batching areas shall be strictly controlled, and cement-contaminated water shall be collected, stored and disposed of at a site approved by the SES;
- Unused cement bags shall be stored out of the rain where runoff won't affect it;
- Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent windblown cement dust and water contamination. Used cement bags shall not be used for any other purpose and shall be disposed of on a regular basis via the solid waste management system (see Waste Management Plan);
- All excess concrete shall be removed from site on completion of concrete works and disposed of. Washing of the excess into the ground is not allowed. All excess aggregate shall also be removed.

4.7. ECOLOGICAL MANAGEMENT PLAN

The Contractor shall ensure the following provisions are included in its Plan:

4.7.1. BIODIVERSITY CONSERVATION

Where trees located outside the Work Site are lost as a result of construction activities, the Contractor will be required to replant trees as a ratio of one-to-one. Where trees cannot be replaced at the roadside due to a lack of roadside space, the Contractor shall consult with affected residents to determine an appropriate alternative planting location and schedule. The Contractor will be responsible for all works associated with tree planting including maintenance of the trees for a one-year period after planting.

4.7.2. PROTECTION OF NATURAL HABITATS

The road Project will traverse productive farm lands such as orchards, rice fields, tree plantations and fishponds. To protect livelihood and maintain harmonious relationship with the local communities, the Contractor shall implement the various measures mentioned above to protect the producing farmlands and aquaculture ponds from ill effects of construction. The Contractor shall be responsible for compensating damages caused to farms and aquaculture ponds due to negligence.

4.7.3. PROTECTION OF IRRIGATION SYSTEMS

The Contractor shall ensure irrigation channels diverted during the construction phase will be returned to their original status. Where this is not possible, or where channels are irrevocably altered, consultation will be held with landowners and Engineer to ensure that an adequate redesign is undertaken to ensure that irrigation channels are returned as closely as possible to their former layout.

4.7.4. PROTECTION OF WILD ANIMALS

The Contractor shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any wild animal takes place, especially at clustered bird areas and at the alluvial river of Vinh Niem Ward. The feeding of any wild animals shall be prohibited. No domestic pets or livestock shall be permitted on site.
4.7.5. **PROTECTION OF WATERCOURSES**

The Ecological Management Plan shall address the following:

- All watercourses shall be protected from erosion and direct or indirect spills of pollutants, e.g. sediment, refuse, sewage, cement, oils, fuels, chemicals, wastewater, bituminous products, etc;
- In the event of a spill, the Contractor shall take prompt action to clear polluted areas and prevent spreading of the pollutants. The Contractor shall be liable to arrange for professional service providers to clear affected areas, if required;
- Any work requiring the fording of watercourses by machinery and vehicles shall be undertaken at slow speed and with clean vehicles (no leaks, etc.) and along a single track;
- Temporary embankments shall be built to protect riverbanks and ponds from erosion;
- Drip trays shall be used for all pumps, generators, etc. in order to prevent water contamination as a result of fuel spills or leaks.

4.8. **TRAFFIC AND SAFETY MANAGEMENT PLAN**

The requirements of the Safety Management Plan are described in Specification 01500 – Project Safety

4.8.1. **FIRE CONTROL**

The Contractor shall submit a fire control and fire emergency measure statement to the Engineer for approval. The method statement shall detail the procedures to be followed in the event of fire including the following:

- The Contractor shall take all reasonable steps to avoid increasing the risk of fire through activities on site;
- The Contractor shall ensure that basic fire-fighting equipment is available at all camp areas and facilities;
- The Contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire;
- The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire;
- Any work that requires the use of fire may only take place at a designated area approved by the EMS and must be supervised at all times. Fire-fighting equipment shall be available.

4.8.2. **TRAFFIC MANAGEMENT**

Construction operations will be conducted in a manner to minimize their impact on land communications in and around the areas of construction. Measures to accomplish this requirement shall include but not be limited to the following:

- The loading of all trucks used for transporting materials and equipment and shall not exceed the legal limits as stipulated by the Government of Vietnam
- The speed for all trucks used for transporting materials and equipment shall not exceed 60 kilometers per hour on highways;
- The transportation of materials and equipment and shall be in accordance with the all relevant requirements and regulations;
- The avoidance of loading and transportation of materials and equipment during rush hours to avoid aggravating conditions on road in the construction area;
- The installation of proper and sufficient traffic signs;
- The proper supervision of drivers to ensure awareness and adherence to regulations;
- The control of drivers to prevent the use of alcohol and drugs. The Contractor shall stipulate that such usage shall be grounds for termination of employment on the Works.

The Contractor will be responsible for all road damage that may occur from the transporting of materials and equipment to and from the Works and will be responsible for coordinating with all
concerned agencies for implementing all necessary repairs and/or restorations. The Contractor shall be required to repair any damage to the satisfaction of the Engineer and at no cost to the Employer.

Full details of the requirements for traffic management are described in Specification 01600 – Maintenance and Protection of Traffic

4.8.3. MANAGEMENT OF IMPACTS OF CONSTRUCTION ON CANAL AND RIVER NAVIGATION

The Project will entail the construction of bridges across a number of canals and a river used for navigation. Canals and rivers shall be kept safe and navigable through, but not limited to the following measures:

- The local community should be properly informed prior to the construction of the bridge;
- The canals and rivers shall be kept free of construction debris, floating and submerged;
- Signs shall be posted at sufficient distance upstream and downstream approaches to warn boaters they are approaching construction site;
- The construction site shall be illuminated in such a way that temporary support columns are visible to boaters at night;
- Passage underneath the construction should be halted when heavy lifting or other activities that will expose boaters to grave danger are in progress;
- The Contractor shall clear the construction site of all temporary structures upon completion and shall ensure that all submerged construction debris are removed from the canals and rivers.

4.8.4. ENVIRONMENTAL EMERGENCY PROCEDURES

Environmental emergency procedures are unforeseen events that can occur during the construction or rehabilitation of a road. The Contractor shall be prepared to take any necessary measures to solve such emergencies on a case-by-case basis. Events related to adverse weather conditions shall be addressed as part of the Contractor’s Safety Management Plan which forms part of the CEMP.

The following environmental emergency procedures shall be addressed in the CEMP and implemented by the Contractor during the construction of the road:

- Training shall be provided to all construction workers and site staff to ensure that they are fully aware of the various possible emergency situations in construction activities, the danger and potential damages caused by the emergency to the environment and the people, as well as the emergency response procedures to be followed;
- If explosive materials are detected during the clearing of construction areas, earthwork movements, or any other construction activity, the Contractor shall secure the area and inform the local authorities immediately, which in turn shall contact the local army unit for support;
- If a person identifies a leakage/spillage, she/he shall immediately check if anyone is injured and shall then inform the Contractor and Engineer;
- The Contractor shall ensure any injured persons are treated and assess what has been spilled/leaked;
- If the accidents/incidents generate serious environmental pollution or the SEO or the SES consider that the incident has the potential of resulting in serious environmental pollution problems (e.g. spillage/leakage of toxic or chemicals, large scale spillage/leakage, or spillage/leakage into the nearby water bodies which are used for irrigation/portable water), the SES or SEO shall inform the Engineer and Employer immediately;
- In such cases, the Contractor shall take immediate action to stop the spillage / leakage and divert the spilled / leaked liquid to a nearby non-sensitive areas;
- The Contractor shall arrange maintenance staff with appropriate protective clothing to clean up the chemicals/chemical waste. This may be achieved through soaking with sawdust (if the quantity of spillage/leakage is small), or sand bags (if the quantity is large); and/or using a
shovel to remove the topsoil (if the spillage/leakage occurs on bare ground);

- Depending on the nature and extent of the chemical spill, evacuation of the activity site may be necessary;
- Spilled chemicals must not be flushed to local surface drainage systems. Instead, sawdust or sandbags used for clean-up and removed contaminated soil shall be disposed of by following the procedures for chemical waste handling and disposal already described;
- The Contractor(s) shall prepare and present a report to the Engineer and Employer on the incident detailing the accident, clean-up actions taken, any pollution problems and suggested measures to prevent similar accidents from happening again in future.

4.9. PHYSICAL, CULTURAL PROPERTY PROTECTION PLAN

The following physical, cultural and property protection procedures shall be addressed in the CEMP and implemented by the Contractor during the construction of the road:

- Protect sites of known antiquities, historic and cultural resources by the placement of suitable fencing and barriers;
- Not locate construction camps within 500 m from cultural resources;
- Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Vietnam;
- In the event of unanticipated discoveries of cultural or historic artefacts (movable or immovable) in the course of the work, the Contractor shall take all necessary measures to protect the findings and shall notify the Engineer / ESO and concerned provincial-level and central government levels representatives of the Ministry of Culture and Information. If continuation of the work would endanger the finding, work shall be suspended until a solution for preservation of the artefacts is agreed upon.

4.10. COMMUNITY RELATION AND HEALTH MANAGEMENT PLAN

4.10.1. COMMUNITY RELATIONS

The following community relations procedures shall be addressed in the CEMP and implemented by the Contractor during the construction of the road.

- Maintain open communications between the local government and concerned communities;
- Have a mailing list to include agencies, organization, and residents that are interest in the Project;
- Disseminate project information to affected parties (for example local authority, enterprises and affected households, etc) through community meetings before construction commencement;
- Provide a community relations contact from whom interested parties can receive information on site activities, Project status and Project implementation results;
- Provide all information, especially technical findings, in a language that is understandable to the general public and in a form of useful to interested citizens and elected officials through the preparation of fact sheets and news release, when major findings become available during Project phase;
- Monitor community concerns and information requirements as the Project progresses;
- Respond to telephone inquiries and written correspondence in a timely and accurate manner;
- Inform local residents about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, blasting and demolition, as appropriate;
- Provide technical documents and drawings to PC’s community, especially a sketch of the construction area and the EMP of the construction site;
- Notification boards shall be erected at all construction sites providing information about the Project, as well as contact information about the site managers, environmental staff, health and safety staff, telephone numbers and other contact information so that any
affected people can have the channel to voice their concerns and suggestions;

- Limit construction activities at night. When necessary ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures;
- At least five days in advance of any service interruption (including water, electricity, telephone, and bus routes) the community must be advised through postings at the Project site, at bus stops, and in affected homes/businesses. A coordination system between the Contractor and local authorities shall be set up to solve problems and incidents incurred.

4.10.2. HEALTH MANAGEMENT

The Contractor shall prepare and implement a Health Management Plan to address matters regarding the health and wellbeing of construction workers, Project staff and nearby communities.

The following health management procedures shall be addressed in the CEMP and implemented by the Contractor during the construction of the road.

- Require screening of all workers on recruitment and annually;
- If employees show symptoms, implement a vaccination program including but not limited to vaccination against yellow fever, hepatitis A and B, tetanus, polio, etc;
- Provide periodical health check to construction workers to ensure their health and well being;
- Provide appropriate information and education to the workforce on basic personal hygiene, prevention of diseases, including respiratory diseases, vector-borne diseases such as malaria and dengue, water and food borne diseases such as diarrhoea, tuberculosis, etc;
- Implement a program for workers and local communities, via an approved service provider, for the prevention, detection, screening, and diagnosis of sexually transmitted diseases, especially with regard to HIV/AIDS;
- Distribute educational materials to all workers including brochures, and leaflets which provide information of Tuberculosis (TB), HIV/AIDS symptoms and counselling and treatment services.
- Implement preventive measures against malaria, if applicable.
- Provide basic first aid services to the workers as well as emergency facilities for emergencies for work related accidents including a medical equipment suitable for the personnel, type of operation, and the degree of treatment likely to be required prior to transportation to hospital;
- Include a Pest Management Program for the construction areas, including construction work camp areas, in the Health Management Plan. The use of pesticides shall follow procedures acceptable to the World Bank and the government of Viet Nam;
- Ensure correct maintenance of water and water treatment plants to prevent the breeding of mosquitoes.

4.11. UTILITIES MANAGEMENT PLAN

To avoid potential adverse impacts to utilities, the Contractor shall:

- Ascertain and take into account in his method of working the presence of utility services on and in the vicinity of the Site;
- Take into account the periods required to locate, access, protect, support and divert such services, including any periods of notice required to affect such work in consultation with authorities operating such services;
- Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the Site. The drawings provided to the Contractor showing services to be relocated need to be reconfirmed by the Contractor;
- Exercise the greatest care at all times to avoid damage to or interference with services.
- Assume responsibility for any damage and/or interference caused by him or his agents, directly or indirectly, arising from actions taken or a failure to take action, and for full restoration of the damage;
- Wherever existing ground surfaces are to be disturbed for construction of the Works, carry
out full and adequate preliminary investigations to locate all services in the area by means of hand-dug trial holes and trenches in combination with electronic and electro-mechanical devices, where appropriate. Each service thus exposed shall be identified. Every service at risk shall be fully exposed and adequately protected and supported in situ or diverted to the satisfaction of the appropriate authority prior to the commencement of such construction;

♦ When working in the vicinity of overhead power cables, ascertain and satisfy himself about the safe clearances to be maintained from the power cables in consultation with the authority operating the power line. Where existing overhead power lines, communications cables or other major utilities require relocation, the Contractor will use the services of specialist enterprises with the necessary skills and technology to carry out the work;

♦ The Contractor will consult with Provincial Departments of Transportation (PDOTs) to determine the proposed schedule for future utilities works on the Project Road. If such works, i.e. cable laying, is proposed in the near future the Contractor should propose an appropriate works schedule to synchronize such activities and reduce potential disruption.

4.12. UNEXPLODED ORDNANCES (UXO)

Prior to the commencement of construction, the Contractor shall contact the Defence Agency specializing in unexploded ordnances to ensure that the Site is clear of any unexploded ordnance. If there is any dander of these on the Site mine sweeping will be carried out surrounding the construction Site and confirmed for safety by the Defence Agency specializing in disarming of explosive ordnance;

5. MONITORING

The purpose of monitoring is to measure levels of pollution at fixed points along the alignment during construction. If the monitoring indicates a serious increase in the level of contamination, the Contractor shall take immediate actions to investigate the cause of the increase and report this to the Engineer. The Engineer shall determine whether a contamination incident is causes by the Contractor and the actions to be taken by the Contractor;

Monitoring sites are to situated as per the locations specified below. The sites are to be selected to provide a set of data representative of the pollution levels in the construction area and also the surroundings to evaluate the potential impacts on the environment caused by the Project construction. The location of the monitoring points shall be indicated in the CEMP and plotted in the Site Plan;

Results of all monitoring shall be submitted to the Engineer and the Employer within five working days of the completion of each monitoring surveys.

5.1. WASTE MONITORING

The CEMP shall clearly describe the procedure, schedule and locations for the monitoring of following:

♦ Air emission from asphalt and/or concrete mixers (composition and concentrations);

♦ Domestic wastewater, wash water, run-off water (discharge: m3/day and concentration of main pollutants);

♦ Domestic, construction solid wastes, spoils, muddy materials (m3 or ton and composition).

5.1.1. WASTE WATER

MONITORING (i) Wastewater from workers’ camps

♦ Selected parameters: pH, SS, turbidity, BOD, NH4+, total N, total P, grease and oil, T. Coliform bacteria.

♦ Monitoring frequency: 4 occasions/year (quarterly)

♦ Monitoring sites: at 2 selected worker camps
5.1.2. SOLID WASTE AND HAZARDOUS WASTES MONITORING

- **Selected parameters:** Waste compositions: decomposable organic matters, resins, plastic, metals, inorganic components, hazardous components (grease and oil, paints, heavy metals etc.), Volume of solid waste
- **Monitoring frequency:** 4 occasions/year (quarterly)
- Monitoring sites as indicated:

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5.2. AIR QUALITY MONITORING

The Contractor is required to undertake a baseline survey as well as monitoring throughout construction as described below.

5.2.1. AIR QUALITY BASELINE SURVEY

Air quality baseline monitoring shall be carried out within 30 days of the mobilisation of the Contractor and prior to occupation of the site.

The Plan shall indicate when the Contractor proposes to undertake the required baseline air quality survey and shall provide references to locations indicated on the Site Plans.

5.2.2. AIR QUALITY TESTING REQUIREMENTS

Air emission monitoring in this phase includes the following requirements:

(i) Air emissions of construction machines and construction activities

Monitoring parameters: total suspended particles, SO2, NO2, and VOC

Monitoring sites as indicated within 50 m of the works:

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Monitoring frequency: one survey as a baseline and then 4 occasions/year (quarterly).

(ii) Air emissions from concrete and asphalt mixing plants

Monitoring parameters: total suspended particles, PM10, SO2, NO2, CO


Monitoring frequency: one survey as a baseline and then 4 occasions /year (quarterly)

Monitoring sites: at all concrete and asphalt plants.

Sheltered air quality monitoring stations are required at each location for baseline air quality monitoring. The Contractor shall construct suitable access, hard standing and a galvanized wire fence and gate at each monitoring station. The exact location and direction of the monitoring equipment at each monitoring station shall be agreed with the Engineer and ESO. The locations proposed should be clearly illustrated by the Site Plans.

5.3. NOISE MONITORING

Noise monitoring shall measure weighted noise levels at the monitoring sites. Noise level monitoring shall be carried out monthly in the construction stage. Noise measurements are conducted by an integral noise meter.

Noise monitoring in the construction phase is required to evaluate the compliance by the contractors with the standard of noise applicable to sensitive subjects near the construction site.

Monitoring sites: monitoring sites will be determined during construction activity. They are located at sensitive points (pagodas, schools, residential areas) within 100 m from the noise sources. They are the same as the air pollution monitoring sites.

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Monitoring frequency: Baseline noise monitoring will be conducted over a period of two days at sensitive locations. Noise will be monitored for 24 hours continuously with the frequency depending on the nature of construction activities. The monitoring frequency is once every month (monthly).

Monitoring parameters: Noise is determined by:

- LAmi: Minimum noise level
- LAeq: Medium noise level
- LAmax: Maximum noise level
- LPeak: Peak noise

Noise levels are continuously measured in 24 hours, which are divided in 2 periods:

Daytime and evening time: 06:00 – 21:00
Nighttime: 21:00 - 06:00

Measuring method

Noise measurement follows the Vietnam’ standard.

Comparative standard

5.4. VIBRATION MONITORING

Vibration monitoring are in units of dB in calculated with respect to a reference acceleration of 1 x 10^-5m/s^2. Similar to air quality monitoring frequency of vibration monitoring is quarterly (4 occasions per year) during the period of the construction.

Baseline vibration monitoring will be conducted over a period of seven days at sensitive locations. All buildings adjoining the Site showing any structural damage shall be photographed as part of the baseline survey. Monitoring sites as indicated within 50 m of the works:

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5.5. WATER QUALITY MONITORING

The water quality parameters shall be monitored for surface water: pH, suspended solids (SS), turbidity, dissolved oxygen (DO), oils, biological oxygen demand (BOD), chemical oxygen demand (COD), ammonia (NH4), nitrate (NO3), total nitrogen (Total N), total phosphate (Total P), T.Coliiform; temperature. Parameters for groundwater are pH, SS, turbidity, oils, COD, NH4, NO3, Total N, Total P and E.Coli. The CEMP shall indicate in the Site map the monitoring locations for surface and groundwater.

Pre-construction water quality monitoring shall be carried to establish baseline conditions at locations determined in consultation with the Engineer and shall include locations likely to be subject to water quality impacts.

Water quality monitoring is required to assess changes in water quality and impacts of the road construction on water quality of the rivers/canals receiving storm water and wastewaters from the construction sites.

- **Monitoring sites:** Location of monitoring sites for ground water and the monitoring sites on surface water quality shall be determined before commencement of the construction in consultation with the Engineer

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- **Monitoring frequency:** As a baseline and once every 3 months (quarterly) throughout the construction phase.

- **Monitoring parameters:** 14 parameters to be monitored are: pH, SS, turbidity, DO, BOD, COD, NH4, NO3, total N, total P, oil, T. Coliform, E.Coli.

- **Sampling and analyzing methods:** The procedures of sampling, storing, transporting and analyzing of water samples are followed the Vietnamese Standards.

- **Comparative Standard:** The National Technical Regulation for Surface Water Quality (QCVN 08:2008/BTNMT) shall be used for assessing the water quality of rivers and streams.

5.6. EROSION AND SEDIMENT CONTROL MONITORING

Erosion control measure inspections shall be carried out on a regular basis with intervals not exceeding two weeks to ensure that there shall be no visible sedimentation from the construction area entering surface water. Results of the visual inspections shall be incorporated in progress reports and maintained on Site by the Contractor until Project completion. A site specific mitigation plan shall be prepared and approved by the Engineer. The monitoring shall report on the effectiveness of the monitoring measures. Pre-construction erosion and sediment control monitoring shall be carried to establish baseline conditions at locations determined in consultation with the Engineer and shall include locations likely to be subject significant runoff (bridge...
locations, construction camps, staging areas, etc.). Photographic records shall be kept to confirm the baseline conditions.

5.7. REPORTING OF MONITORING

Results of air, noise, vibration, water and erosion/sedimentation monitoring shall be submitted to the Engineer and the Employer within five working days of the completion of the monitoring period for analysis and review. Actions taken in response to the monitoring results shall also be required and may include periodic meetings between the Contractor, Engineer Supervising Engineer, and others.

6. PUBLIC CONSULTATIONS AND DISPUTE RESOLUTION

The CEMP shall indicate understanding of, and a commitment to, the requirements that:

♦ Public consultations shall be conducted as an on-going process as required by the procedures established for the Work. Prior to beginning construction and in concert with the Employer and other concerned organizations, the Contractor shall conduct consultations with local affected persons to familiarize them with the work to be done, the predicted impacts and mitigation to be used;

♦ Periodic meetings between the Contractor, Engineer, the Employer and other organizations shall be required as determined warranted to explain implementation plans, results of monitoring activities and actions taken in regard thereto, and/or other issues as determined warranted.

♦ Disputes in regard to issues of facts and compensation for damages, spoilage or disturbance of properties and/or the health of Project affected persons shall follow the procedures as established by the Project’s Policy Framework for Compensation, Resettlement and Rehabilitation of Project-Affected Persons, copies of which shall be made available to the Contractor.

6.1. PUBLIC CONSULTATION AND COMPLAINTS PROCEDURES

Prior to beginning construction at any road section, the Contractors will conduct consultations with the local affected people to familiarize them with the work to be done, the predicted impacts, and the mitigation measures to be used. Project Affected Persons (PAPs) will be identified by the ESO and a schedule will be set by the Engineer and the ESO for pre-construction consultation to be completed at least 28 days prior to start of construction. Information leaflets will be distributed by the Contractor detailing the procedure for registering complaints resulting from Project activities. The leaflets will state that all complaints should be registered, in writing, to the PMU in Hai Phong. The leaflet will also contain the ESO telephone number should emergencies arise on Site requiring immediate attention, such as major spills of hazardous liquids. In the event of serious complaints, the ESO will have the right to postpone construction activities until the complaint has been fully reviewed and a decision has been made by the ESO and Engineer to continue Project activities.

7. ORGANIZATION AND STAFFING

7.1. ORGANIZATION CHART

The CEMP shall include an organization chart identifying (by job title and by the name of the individual) the personnel to be engaged solely for environmental protection, safety, traffic control. The chart and the supporting text shall identify the designated ESO and at least one Deputy ESO, and identify other participants and their areas of responsibility.

♦ The CEMP shall provide a description of the responsibilities of the Environment/Safety Staff appearing on the Organization Chart.

♦ The CEMP shall indicate the name of the proposed ESO.

♦ The CEMP shall certify that:

♦ The ESO will be appointed and assigned duties throughout the period of the Contract entirely connected with the environmental, safety, and traffic control activities on the Site.

♦ The proposed ESO is bilingual (Vietnamese/English) and suitably qualified and experienced
to supervise and monitor compliance with the CEMP and will, in particular but without
limitation, carry out auditing of the operation of the CEMP in accordance with a rolling program to be submitted, from time to time, to the Engineer for his consent.

- The ESO will not be replaced or removed from the Site without the express written permission of the Engineer. Within fourteen (14) days of any notice of intent a replacement or removal of an ESO, a replacement ESO will be nominated for the Engineers approval.

- The ESO will be provided with supporting staff in accordance with the staffing levels set out in the Plan. The supporting staff shall include at least one (1) Deputy ESO whose appointment is also subject to the Engineers approval. The Deputy ESO is required to be capable of assuming the duties and functions of the ESO whenever necessary.

- The ESO and his staff will be empowered to instruct all employees of the Contractor or Subcontractors at any level to cease operations and take urgent and appropriate action to make safe the Site and prevent unsafe working practices or other infringements of the Plan or the statutory regulations.

- The ESO shall maintain a daily Site Diary comprehensively recording all relevant matters concerning Site environmental management, safety and traffic control, inspections and audits, related incidents and the like. The Site Diary shall be available at all times for inspection by the Engineer.

- Contact information for all ESO Staff shall be provided in the CEMP.

- Curriculum vitae (CVs) and other relevant information explaining the qualifications of the proposed staff and their abilities to perform the duties assigned shall be provided with the CEMP.

8. REPORTING PROCEDURES

8.1. RADIO COMMUNICATION & ROUTINE REPORTING PROCEDURES

The CEMP shall explain the proposed interaction and communication procedures between construction personnel and environmental protection, safety and traffic control staff, including:

- Radio communication facilities; and

- Routine communication and reporting systems.

8.2. ENVIRONMENTAL AND SAFETY REPORTS

The following environmental and safety reports shall be submitted:

- Initial Environmental Baseline Report: The required environmental baseline data is specified above. An Initial Environmental Baseline Report and shall be submitted.

- Weekly Environmental and Safety Reports: Documented safety and environmental audits shall be undertaken on weekly basis. Environmental and Safety Reports summarizing the results of the audits shall be submitted on a monthly basis.

- Incorporation of Summaries in the Project Monthly Report: Summaries of the Weekly Environmental and Safety Reports will be included in the Project’s Monthly Progress Report.

- Monitoring reports shall be submitted every three months.
8.3. NOTIFICATION OF ACCIDENTS

The CEMP shall verify that provisions have been made to ensure that:

- The Engineer will be notified immediately of any accidents which occur whether on-Site or off-site in which the Contractor, his personnel or construction plant, or those of any subcontractors are directly or indirectly involved and which result in any injuries to any persons.
- Such initial notification may be verbal and shall be followed by a written comprehensive report within 24 hours of the accident.

8.4. COMMUNICATION WITH SUB-CONTRACTORS

The CEMP shall specify:

- The means by which environmental, health and safety management, and traffic control and industrial health matters and requirements will be communicated to Subcontractors at all levels and their due compliance with the CEMP and all relevant statutory regulations is ensured. Subcontractors shall be supplied with copies of the CEMP. Additional activities may include attendance at training programs, circulation of newsletters and other means as specified by the Plan.
- The method by which the procedures and practices proposed by subcontractors will be reviewed for compliance with the CEMP and statutory regulations. This could include, for example, the inclusion of environmental and safety criteria as a part of daily and/or weekly Site inspections.

8.5. ENVIRONMENTAL COMPLIANCE FRAMEWORK.

This compliance framework to the EMP is in place for addressing non-compliance issues by contractors, and will be applied to the Contractor’s Contract. It is based on the environmental requirements established by the EMP and Environmental Specifications included in bidding documents and will be strictly enforced by the Engineer and monitored by the Owner. Whether an infringement is minor or major will be determined as set out in the table below.

The Contractor shall comply with the environmental specifications and requirements on an on-going basis and any failure on his part to do so will entitle PMU (Hai Phong DOT), the Owner to impose a penalty. This compliance framework will be strictly enforced.

8.5.1. DEFINITIONS OF MAJOR AND MINOR CATEGORY OF EMP INFRINGEMENTS

<table>
<thead>
<tr>
<th>Category of Infringement</th>
<th>Definition</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor Infringement</td>
<td>Incident which causes temporary but reversible damage to the environment, community property, people.</td>
<td>- Minor clean up operations - Minor restoration activities - Adjustments/eliminations to construction practices - Compliance with EMP</td>
</tr>
</tbody>
</table>
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| Major Infringement | Incident where there is long-term or irreversible damage to the environment, community property, and people. Some major Infringements are stipulated in Annex I but not limited to | - Major clean up operations  
- Major restoration requiring engineering measures  
- Major restoration of community property  
- Compensation to affected communities or persons. |

8.5.2. FINE FOR ENVIRONMENTAL NON-COMPLIANCEs

| Minimum fine for minor offences (e.g. littering, failure to use ablutions provided). | VND 5 Millions |
| Minimum fine applicable to moderate offences (e.g. Collection of firewood, small oil spills and any offence in an area declared as an ECO) | VND 20 Millions |
| Minimum fine applicable to serious offences (e.g. Large oil spills, any other offence related to the exclusion zones on site) | VND 50 Millions |
| Fine applicable for damage to significant features (e.g. Pollution of water resources) | 1% of the contract value |

For minor infringements - an incident which causes temporary but reversible damage - the Contractor will be given a reasonable period of time to remediate the problem and to restore the environment. If restoration is done satisfactorily during this period, no further actions will be taken. If it is not done during this period, the Chief Engineer, in consultation with the Owner, will immediately arrange for another contractor to do the restoration, and deduct the cost from the offending Contractor’s next payment. For major infringements - an incident where there is long-term or irreversible damage - there will be a financial penalty in addition to the cost for restoration activities. To minimize the damage, the restoration activities will be implemented without delay.

The compliance framework will be applied as follows:

- The Engineer will identify or be notified of an infringement (by a community member, local government, daily inspections).
- The Engineer in consultation with the Chief Engineer and the Owner will assess whether it is a minor or major infringement.

For minor infringements:

- The Engineer will establish the required mitigation measures, and the time period, which is a maximum of two days (this could be extended at the judgment of the Engineer), to remedy the situation.
- The Chief Engineer will review the recommendation and confirm (i) the level of infringement (minor/major); (ii) the mitigation measures; and (iii) the mitigation time period. If they do not agree, they will work with the Owner to reach mutually acceptable recommendations.
- The Contractor will be informed of the infringement, the required mitigation measures, and time period for resolution.
- The Contractor shall remedy the infringement in accordance with the

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recommendations within the agreed time period.

- The Engineer shall confirm the infringement is satisfactorily remedied in the time period, and inform the Chief Engineer who will independently confirm.

- If the infringement is not remedied satisfactorily in the time period the Engineer shall inform the Chief Engineer and the Owner. The Owner shall immediately arrange for a separate contractor to undertake the necessary works and the cost of this shall be deducted from the next payment to the offending contractor.

**For major infringements:**

- The Engineer shall immediately inform the Chief Engineer of the incident.

- The Chief Engineer shall inform the appropriate provincial authorities if appropriate.

- The Chief Engineer in consultation with the Owner and the Engineer and other provincial authorities as appropriate, shall agree upon mitigation and cleanup measures to be undertaken immediately by the Contractor or by specialists to be procured at the Contractor’s expense. To minimize the environmental impacts the restoration activities should be completed within seven days.

- The Chief Engineer shall apply a financial penalty, not to exceed 1% of the Contract value, for each major infringement, in addition to any costs associated with the infringement not borne by the Contractor.

In addition, for major infringements which cause long-term or irreversible damage, the contractor is liable for additional penalties related to the cost of environmental damage as may be decided by the competent authorities.

Any conflicts between the Contractor, Chief Engineer and Engineer will be resolved by the Owner. The Contractor will adhere to the Vietnam’s environmental legislation and World Bank’s safeguards policies and all related regulations, standards and good practice guidelines. In case of significant differences between WB policies and Vietnam’s environmental legislation, which are relevant to the conduct of the project, the Contractor will notify the Owner, who, after consultation with WB and relevant authorities, will inform the Contractor how to proceed.

Unscheduled inspections of all works and installations may be carried out by representatives from the Owner at any time. The country’s relevant authorities will have the right for unscheduled site inspections and compliance checks, as well as the leveling of fees and fines for non-compliance.

The Contractor will employ sufficient numbers of qualified environmental staff to ensure environmental compliance with EMP and EIA, perform day-to-day management and supervision of works, conduct dialogue with designer, construction management and authorities, and manage environmental monitoring and reporting. The CVs of key staff (environmental/EHS manager and deputy) will have to be approved by the Owner and the Engineer before staff may be mobilized to site.

9. **MEASUREMENT AND PAYMENT**

9.1. **MEASUREMENT**
Environmental Monitoring shall consist of the undertaking and reporting of all aspects as described above both at baseline and during the Project in accordance with this specification.

Environmental Management shall consist of implementing the CEMP fully in conformity with this Specification section.

It shall not be measured but shall be paid as a Lump Sum. To receive this payment, the Contractor shall ensure full compliance with all requirements of the CEMP. Payment will be made in installments as follows:

- 10% (ten percent) upon submission and approval of the CEMP;
- 65% (sixty five percent) paid on a monthly basis in equal installments. Payment will only commence after approval of the Construction Environmental Management Plan (CEMP). It shall be paid with the Monthly Certificates. If the Contractor has failed to implement the CEMP fully, this payment will be reduced according to the determination of the Engineer; and
- 25% (twenty-five percent) immediately after the issue of the Taking Over Certificate.

The Engineer may at any time withhold payments if (in the opinion of the Engineer) work rendered is not in compliance with the requirements and procedures of this Specification.

### 9.2. PAYMENT

The cost of meeting requirements under this Specification section shall be included in the pay items shown below.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>01700-1</td>
<td>Environmental Monitoring and management</td>
<td>Lump sum</td>
</tr>
</tbody>
</table>
02400 - PROTECTION OF EXISTING ROADS AND STREETS

GENERAL

The Contractor and his Subcontractors and suppliers will need to travel across roads outside the Site to deliver plant and materials to the site.

This work consists of the protection of all roads within the vicinity of the Site together with any other roads over which the contractor's plant and material is transported.

The Contractor shall obtain all the necessary approval and arrangements with the respective provincial authorities regarding work to be carried out and take all the necessary precautions to avoid damage.

2. SCOPE OF WORK

Contractor’s Vehicles carrying plant and material over government controlled roads and surface streets shall comply with the vehicle weight limit requirements set out in the Government legislation relating to vehicle weights, and with any other vehicle weight limit requirements imposed by duly constituted authorities on whose roads such vehicles operate.

The Contractor shall, prior to commencement of work on the Site, submit evidence to the Engineer that the approvals of the relevant Authorities have been obtained for the haulage of plant and materials over surface streets along nominated routes.

3. VEHICLES WITH EXCESS AXLE LOADS

The operation of vehicles with excess axle loads shall be limited to their use in association with the construction of sections of embankment. Such operations shall be limited to vehicles which are loaded within the Site only.

Vehicles with excess axle loads will not be permitted to travel along or across any existing pavement or over any concrete structure without the approval of the Engineer in writing. Caution shall be exercised in relation to the operation of such vehicles over drainage or other structures.

The operation of vehicles with excess axle loads on sections of road under construction shall cease when trimming of the subgrade is complete

4. RECTIFICATION OF DAMAGE CAUSED BY CONTRACTOR’S VEHICLES

Existing public roads and bridges which are used by the Contractor in the course of his transport and haulage operations in performing the Works, including existing bridges strengthened by the Contractor, temporary bridges constructed by the Contractor and quarry access roads subjected to additional heavy loading as a result of the Contractor’s activities, shall be fully maintained by the Contractor at his own expense throughout the duration of the Works and shall be left in a condition of serviceability, quality and amenity such is no worse than before the Contractor’s operations were commenced. Temporary bridges constructed by Contractor under this Section of Specification shall not be removed by the Contractor at the completion of the Works unless directed otherwise by the Engineer.

Each report of damage allegedly caused by the Contractor shall be investigated by the Contractor and Engineer jointly. If the Engineer then determines the road or structure damage was caused by the Contractor, he/she shall direct the Contractor to repair the road at the cost of the Contractor. The type of repair will be advised by the Engineer.

5. CONSTRUCTION OF TEMPORARY ROADS AND BRIDGES
All existing roads and bridges either adjacent to or leading to the site of the works that are traversed by the Contractor's construction plant and equipment must be kept open for traffic and are maintained in a safe and usable condition. In certain circumstances existing structures may need to be strengthened and temporary bridges and embankments may need to be constructed during the construction period to facilitate the transportation of the Contractor's plant and equipment, to and from the site of works.

When existing structures are required to be strengthened or temporary bridges and embankments are required to be constructed, the Contractor shall submit a detailed schedule of the temporary works required, details of the proposed execution methodology and the proposed start and finish dates for the strengthening or construction of each structure for the approval of the Engineer.

6. METHOD OF MEASUREMENT AND BASIS OF PAYMENT

No separate payment will be made for the maintenance of adjacent road and bridges executed in accordance with this Section of the Specifications. The cost of this work shall be included in the Unit Prices of all other Pay Items included in the Contract, which prices shall be deemed full compensation for furnishing all materials, labour, equipment, tools, and other incidentals necessary for the maintenance of roads and bridges adjacent to the Contract which are used by the Contractor in his haulage operations, including where required, strengthening of existing bridges, installation and maintenance of temporary bridges of other installations, and for traffic control during the performance of the haulage operations and the removal of any traffic controls upon completion of the Works.

Failure of the Contractor to repair roads damaged by the Contractor's vehicles, plant and equipment in the performance of these works will entitle the Engineer to carry out such work as he deems to be necessary and to charge the Contractor with the full cost plus 10% (ten percent) of such cost.
03300 - BORROW MATERIALS

1. DESCRIPTION
This Specification section describes requirements and procedures for the clearing of borrow area and the excavation and hauling of material. Borrow areas include the area legally obtained by the Contractor and approved by the Engineer. The Contractor shall use the suitable material from borrow pits for constructing embankment, backfill, subgrade, shoulders and other parts of the work as required by the Drawings or the Engineer. Borrow will be resorted to only when shown on the Drawings or directed by the Engineer, and then only from approved sources.

2. CONSTRUCTION REQUIREMENTS
(a) During construction, the drainage of the borrow area shall remain functional as far as is practicable.

(b) Unless otherwise directed by the Engineer, prior to starting of any clearing and excavation in borrow area, the Contractor shall submit and obtain the Engineer's approval of his plan of earthwork operation which shall include but not necessary be limited to:

- The approximate dimensions and depths of borrow pit excavations anticipated;
- Drainage details,
- Pit and slopes that will remain when the excavation has been completed;
- The excavation methods, limits, volume and depths for each stage,
- The construction of detours and temporary or permanent drainage facilities, retaining walls and soil-water conservation,
- The establishment of safety measures and the proposed progress of excavation,

(c) If the Engineer determines that the proposed pit operation will create an unsightly appearance or other damaging effect, the Contractor's plan and/or the borrow area may be rejected.

(d) During excavation and hauling, the Contractor shall dig temporary ditches for intercepting or draining out rainstorm water to avoid irregular flowing or flooding.

(e) Before any borrow is excavated, the Contractor shall clear the ground surface of the borrow area and notify the Engineer to jointly make an area survey of the topography.

(f) The excavation operation shall be performed from up to down in layers. Excavation of the toe of slopes will not be allowed. The depth of layer shall be 3 to 5 meters; and after the excavation of each stage has been completed, the pit slopes shall be shaped and vegetated to prevent the erosion.

(g) In the borrow operation, the excavation face of each layer shall at all times be kept at a proper downward slope and the temporary interception ditches shall be established to divert the surface runoff into the existing drainage ditches. Such measures shall be provided to prevent surface runoff from directly or irregularly flowing over the hill slope surfaces and causing the flowing of massive soil-stones that could endanger the safety of nearby public or private properties and lives.

(h) The Contractor shall take full responsibility and pay for compensation for any damages and losses caused by improper construction and inadequate safety and protection measures or by improper operation methods or mistakes.
(i) During borrow operations haul roads shall be maintained. Where necessary water spraying shall be provided to prevent the rising of dust. Haul road surfaces shall at all times be kept in a neat and clean condition.

(j) All construction plant, trucks and transportation facilities shall, before entering public paved roads, have the body and the tires washed and cleaned.

(k) Trucks used for hauling borrow materials and shall not be overloaded.

(l) Trucks used for hauling borrow materials shall be covered with canvas tarps to prevent hauled materials from being inadvertently blown or dropped.

(m) Anything related to the control of noise, pollution, dust and public nuisance, and to the environment protection and hygiene shall comply and conform to the laws or regulations issued by the competent governmental agencies concerned and appropriate requirements of Specification section 01700 “Environmental Control and Protection”.

(n) After the use of a borrow area is completed, the Contractor shall take the responsibility for the recovery of damaged facilities, landscape and ecology. No separate payment will be made for complying with this requirement.

(o) The Contractor shall not obtain borrow material from locations other than borrow areas.

(p) For sand material borrowed from the river by dredging method, the Contractor and his subcontractors and suppliers shall comply with all Government legislation regarding environmental protection of the river and its banks.

3. MEASUREMENT AND PAYMENT

The excavation and hauling of Borrow will not be paid separately but deemed to be included in the unit prices of the embankment as specified in Specification section 03400 “Embarkment Construction” or in the unit price of the surcharge as specified in Specification section 03970 “Soft Soil Improvement Measures” or any other pay items in which borrow materials are included.
APPENDIX 4: TERMS OF REFERENCE FOR SUPERVISION
CONSULTANT’S WORKPLACE SAFETY AND ENVIRONMENT SUPERVISOR

In order to prevent harm and nuisances on local communities, and to minimize the impacts on the environment during the construction and operation of the Bac Son - Nam Hai East-West Link road, the following shall be adhered to by all contractors and their employees:

- The Environmental Impact Assessment (EIA) for Bac Son – Nam Hai East-West Link road;
- The Environmental Management Plan (EMP) of the Bac Son – Nam Hai East-West Link road including site specific measures identified the EMP;
- The mitigation measures included in project design and bill of quantities;
- The specifications, procedures, and best practices included in the EMP. These specifications complement the technical specifications included in the civil works contracts;
- Applicable Vietnamese regulations and standards;
- The Resettlement Action Plan (RAP) for the project.

Objective of the Assignment

The Consultant is to provide professional technical services to help ensure effective implementation of the Environmental Management Plan (EMP) and the environmental specifications. The implementation of the EMP will involve three parties:

1. The Contractor’s Workplace Safety and Environment Officer (SEO) responsible for implementing the EMP and other construction related environmental and safety issues;
2. The Consultant’s Supervision Team (CST) who are responsible for supervising and monitoring all construction activities and for ensuring that contractors comply with the requirements of the contracts and the EMP. The CST will include environmental engineers led by a Workplace Safety and Environment Supervisor (SES);
3. A Client’s Independent Environmental Monitoring Consultant (IMC), who will carry out environmental monitoring twice a year on all environmental-related issues regarding the contractor’s works. The IMC will check, review, verify and validate the overall environmental performance of the project through regular inspections and review. This review will provide confirmation that the reported results are valid and that the relevant mitigation measures and monitoring program provided in the Project EMP are fully complied with. They will also supply specialized assistance to the client in environmental matters.
Scope of Services of Workplace Safety and Environment Supervisor (SES):

The general services to be provided by the SES is to inspect, monitor and audit the construction activities\(^1\) to ensure that mitigation measures adopted in the EMP are properly implemented, and that the negative environmental impacts of the project are minimized.

The contractor has the responsibility for ensuring compliance with the project EMP and contract conditions while undertaking the works. This is overseen by the SES. The SES is therefore to be an independent monitor to ensure compliance with the EMP and to ensure adequate performance of the contractors on environmental issues.

The SES shall have extensive knowledge and experience in environmental supervision, monitoring and auditing to provide independent, objective and professional advice to the client on the environmental performance of the project. The SES shall be familiar with the project works through review of the relevant reports, including the EIA, EMP as well as project technical specifications and contract documents.

The SES is expected to perform the following duties:

**Phase I: Preconstruction**

The objective of Phase I is to lay the groundwork for the successful execution of the project. In this phase, the SES shall: (i) review the EIA, EMP, project designs and technical specifications and confirm that there have been no major omissions of mitigation measures; (ii) prepare guides for contractors on implementing the EMP; and (iii) develop and execute a training program for all involved in construction activities.

The main tasks in this phase are:

**Review of Project Documents:** The SES shall review the EIA, EMP, RAP, project designs and technical specifications and confirm that there have been no major omissions of mitigation measures. If any issues are identified, the SES shall propose updates to the EMP and the design and technical specifications to address these issues. Once approved by PMURTW, the SES shall update the EMP.

**Environmental Supervision Checklist:** The SES shall establish a comprehensive checklist which will be used during the construction of the project to monitor the contractor’s performance. This shall cover major aspects of the project, required mitigation/control measures and their implementation schedule.

**Log-Book:** The SES shall keep a log-book of each and every circumstance or change of circumstances which may affect the environmental impact assessment and non-compliance with the recommendations made by the SES to remediate the non-compliance. The log-book shall

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\(^1\) The term ‘construction activities’ in this TOR pertains to all aspects related to the Bac Son - Nam Hai East-West Link Road during the construction phase including, but not limited to, all construction sites, permanent and temporary camps, off-site activities (disposal sites, borrow pits), all associated facilities (crushing plants, asphalt plants, maintenance yards), access roads, traffic and disturbances (dust, noise) in local roads, and areas of impact away from the project site. The EIA and EMP of the project contain a full description of these activities.
be kept readily available for inspection by all persons assisting in the supervision of the contracts. The IMC shall verify the log-book as part of his environmental audit.

**EMP:** The SES will pay particular attention to the specific provisions in each contract’s technical specifications ensuring they are understood and followed and the EMP is complied with.

**Health and Safety:** The health and safety requirements of the project shall be clearly identified and communicated to the Contractors and PMURTW. These are included in the technical specifications.

**Environmental Training:** The SES shall design and execute a comprehensive training program for:

- Supervision Engineers
- PMURTW staff

  Contractor’s staff (including workers) on the environmental requirements of the project, and how they will be supervised, monitored and audited.

  At the conclusion of the training, contractors will sign a statement acknowledging their awareness of the environmental regulations, the EMP, the compliance framework, and health and safety obligations. The CST shall sign a similar statement confirming their understanding of the supervision responsibilities. This shall be provided to PMURTW.

**Phase II: Supervision of Construction Activities**

The SES will:

- Review, and inspect in an independent, objective and professional manner all aspects of the implementation of the contractor’s EMP
- Carry out random monitoring checks, and review on records prepared by the Contractor’s SEO
- Conduct regular site inspections
- Review the status of implementation of environmental protection measures against the EMP and contract documents
- Review the effectiveness of environmental mitigation measures and project environmental performance
- As needed, review the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions. Where necessary, the SES shall seek and recommend the least environmental impact alternative in consultation with the Engineer and contractor(s); Verify the investigation results of any non-compliance of the environmental quality performance and the effectiveness of corrective measures
- Provide training programs at minimum six monthly intervals and every time there are new workers or new contractors coming into the site, including CST and PMURTW staff, appraise them of issues identified and how to improve environmental compliance
• Through the Engineer, instruct the contractor(s) to take remedial actions within a specified timeframe, and carry out additional monitoring, if required, according to the contractual requirements and procedures in the event of non-compliances or complaints.

• Through the Engineer, instruct the contractor(s) to take actions to reduce impacts and follow the required EMP procedures in case of non-compliance / discrepancies identified.

• Review of Site Plans: On behalf of the Engineer to ensure consistency across the project, the SES shall provide the final review and recommend clearance of all site plans which may affect the environment. These include, but are not limited to: borrow pit and disposal sites plans, worker's camp plans. Where these plans are found not to comply with the EMP, the SES shall work with the CST and contractor to establish a suitable solution.

• Health and Safety: On behalf of the Engineer to ensure consistency across the project, the SES shall provide the final review and recommend clearance of all contractors’ Safety Plans, and, based on these, with inputs from the CST, prepare an overall Project Safety Plan (PSP). The PSP shall include procedures such as management of explosions, safety during construction, the prevention of slope slide / soil erosion during the rainfall season, etc. These plans shall be reviewed on an annual basis and updated if necessary.

The SES shall ensure compliance with the requirements of the health and safety clauses in the contract documents. This shall include, but not be limited to: (i) construction activities; (ii) HIV/AIDS education campaign; (iii) compliance with Viet Nam’s labor laws; and (iv) road traffic safety. For HIV/AIDS the focus shall not only be on the construction sites themselves, but also on assisting the nearby communities.

• Site Inspections: The SES shall closely audit the construction activities through regular site inspections accomplished through daily site visits, walks and visual inspections to identify areas of potential environmental problems and concerns. Inspections should be done independently from the Contractor’s staff. It is expected that the SES shall have their own hand held and portable monitoring equipment such as cameras, transport and other resources.

• Where there is infringement of technical specifications, or condition of contracts, or non-compliance with the EMP, the SES shall be immediately inform the Engineer. The SES shall also report all infringements to the PMURT as part of the monthly reporting.

• SES field engineer’s log-book shall be kept readily available for inspection by all persons assisting in project management, including the Independent Monitoring Consultant.

• The SES shall also regularly review the records of the contractors to ensure that they are up to date, factual and meet the EMP reporting requirements (e.g. environmental complaint monitoring records).

• Complaints will be received by the contractor’s site office from local residents with regard to environmental infractions such as noise, dust, traffic safety, etc. The contractor shall be responsible for processing, addressing or reaching solutions for complaints brought to them. The SES shall confirm that they are properly addressed by the contractors in the same manner as incidents identified during site inspections.
• Unforeseen Impacts: In the event that an incident arises which was not foreseen in the EMP, the SES shall work closely with the Engineer, contractors and the PMURTW to confirm satisfactory resolution to the incident. The SES shall then update the EMP and the implementation guidelines, training the contractors’ staff accordingly.

• Monthly Payments: The SES shall confirm the monthly payments for environmentally related activities as recommended by the SES to the Engineer.

• Site Restoration and Landscaping: The SES shall closely monitor all activities with regard to site restoration and landscaping in areas such as borrow pits, quarries, camps, crushing plants, etc. to ensure that the activities are done to an appropriate and acceptable standard. The SES will agree with the contractor on a site decommissioning and restoration plan to be implemented before the completion of the construction of the access road and bridges.

**Project Initiation and Staffing:** It is anticipated that the SES will be mobilized one month before the start of the construction activities.

**Reporting:** As a minimum the SES shall prepare the following written reports:

• Weekly report of non-compliance issues
• Summary monthly report covering key issues and findings from reviewing and supervision activities
• Consolidated summary report from contractor’s monthly report
• Collect and report on data as requested by the PMURTW.
• At the end of the project the SES shall prepare a final report summarizing the key findings from his/her work, the number of infringements, resolutions, etc. as well as advice and guidance for how such assignments should be conducted in the future.
• During the course of the project the SES shall provide briefings as requested to the PMURTW, environmental agencies, the World Bank, IMC, DONRE, and others as requested by the PMURTW on the project progress, incidents, and other issues associated with environmental management and supervision. As a minimum these are expected to be at six-monthly intervals.
APPENDIX 5: INDEPENDENT ENVIRONMENTAL MONITORING CONSULTANT (IMC)

Objective of the assignment

The Independent Environmental Monitoring Consultant (IMC) will be contracted to provide professional services regarding environmental sampling, and reviewing compliance to the Environmental Management Plan (EMP) and the Environmental Specifications of the Project. IMC shall provide support to PMURT to establish and operate environmental management systems, offers suggestions for adjusting and building capacity for relevant agencies during the implementation period and monitor the Contractor’s EMP implementation plan in both construction and operation stages. IMC will also be responsible to support PMURT to prepare monitoring reports on EMP implementation and submit these reports to DONRE for approval.

Through this assignment, the effectiveness of the mitigation measures and reporting procedures will be verified, or recommendations shall be made regarding alteration of construction method or additional mitigation measures to make sure that the potential negative impacts related to the construction and operation of the proposed Bac Son - Nam Hai East-West Link Road (the Road) are minimized.

Institutional Arrangements for EMP implementation

In order to achieve the goal of minimizing the negative environmental impacts of the Project, the EMP has been integrated into the design of the Project road, and in the technical specifications and contract documents. It will need to be closely followed and implemented by the Contractors. The implementation of the EMP will therefore involve three parties:

The Contractor’s Workplace Safety and Environment Officer (SEO) responsible for implementing the EMP and other construction related environmental and safety issues.

The Construction Supervision Team (CST) who are responsible for supervising and monitoring all construction activities and for ensuring that contractors comply with the requirements of the contracts and the EMP. The CST will include a Workplace Safety and Environment Supervisor (SES); and,

A Client’s Independent Environmental Monitoring Consultant (IMC), who carry out environmental sampling and monitoring Activities specified in this TOR.

Scope of services

The IMC shall carry out monitoring twice a year, on all environmental-related issues regarding the contractor’s works. The IMC will carry out field sampling, monitoring and check, review, verify and validate the overall environmental performance of the project through regular inspections and review. This review will provide confirmation that the reported results are valid and that the relevant mitigation measures and monitoring program provided in the Project EMP are fully complied with. They will also supply specialized assistance to the client on environmental matters. IMC’s specific tasks will include, but not limited to, the followings:
**Task I: Environmental Sampling Monitoring**

The IMC shall carry out sampling and monitoring of the air and water quality with parameters at a frequency specified in Table 5 (see “Monitoring Indicators”)

**Task II: Review and Assess Compliance to EMP by PMURTW, CST, SES and the Contractor**

The IMC shall review and evaluate the environmental performance and compliance of EMP by PMURTW, CST, SES and the Contractor from design to construction phases. The IMC shall also assess the effectiveness of the mitigation measures to be implemented and the effectiveness of the reporting procedures. The review and evaluation should cover, but not limited to the followings:

- Desk Review: The IMC shall review the completeness of the environmental records, reports and documents prepared by the PMURTW, CST, SES and the Contractor related to:
  - Review the activities carried out and the records and documents created, updated, or maintained by the CST;
  - Allocation of staff to SES;
  - Written confirmation that there have been no major omissions of mitigation measures, or proposals on the updates to the EMP and the design and technical specifications to address these issues;
  - The checklist developed for use during the construction of the project to monitor the contractor’s performance;
  - A log-book of each and every circumstance or change of circumstances which may affect the environmental impact assessment and non-compliance with the recommendations made by the SES to remediate the non-compliance;
  - Records on the design and training program for Supervision Engineers, Contractors, PMURTW staff, and workers,
  - Records on day-to-day supervision carried out by the SES, such as:
    - Review and inspect all aspects of the implementation of the EMP;
    - random monitoring checks and review on records prepared by the Contractor’s SEO;
    - regular site inspections;
    - Review the status of implementation of environmental protection measures against the EMP and contract documents;
    - Review the effectiveness of environmental mitigation measures and project environmental performance;
    - Review the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions, if applicable;
Verification on the investigation results of any non-compliance of the environmental quality performance and the effectiveness of corrective measures;

Feedback review results to the PMURTW and CST according to the procedures of non-compliance in the EMP;

Review and recommendations for all site plans prepared by the Contractor;

Monitoring of all activities with regard to site restoration and landscaping;

Confirmation on proper address of complaints by the Contractor and/or PMURTW;

Proof of coordination between the SES and the CST, the Contractors, and the PMURTW to confirm satisfactory resolution to the unforeseen impacts

Review the activities carried out and the records and documents created, updated, or maintained by the Contractor or his SEO:

Records and documents prepared for training on environmental awareness for the contractor’s workers.

Site surveillance to investigate the Contractors’ site practice, equipment and work methodologies with respect to pollution control and adequacy of environmental mitigation implemented;

Monitor the implementation of environmental mitigation measures and the Contractor’s compliance with environmental protection, pollution prevention and control measures, and contractual requirements;

Advice to the Contractor(s) on environment improvement, awareness, proactive pollution prevention measures;

Investigation and proposals on mitigation measures to the Contractor(s) in the case of non-compliance / discrepancies, if applicable;

Proof of participation in the monitoring and implementation of remedial measures to reduce environmental impact;

Review the success of the EMP to cost-effectively confirm the adequacy of mitigation measures implemented;

Preparation and submission of Contractor’s Compliance Reports and inclusion of environmental mitigation measures into Contractor’s progress reports;

Complaint investigation, evaluation and identification of corrective measures;

additional monitoring works within the specified timeframe instructed by the Supervision Engineer and/or PMURTW; and

Review the activities carried out by PMURTW and records and environmental documents submitted to PMURTW by the CST and Contractor:

Allocation of staff responsible for environmental issues;
- SEO, SES’s recommendations, approval and follow up;
- Records on complaints received and solutions;
- Records of the mitigation measures implemented by PMURT as specified in the EMP.

**Random Site Inspections:**

As part of the monitoring process, the IMC shall carry out a random check at the site. The IMC shall visually look at the construction sites and make notes related to the following environmental issues, but not limited to:

- Compliance/violation to prohibitions to Contractor’s workers as specified in the Environmental Specifications;
- Application of mitigation measures for soil erosion along the road due to excavation and tree cutting;
- Waste management practices at worker’s camps, at the construction sites,
- Disruption of exiting services during construction;
- Status of construction workers’ camps and sanitation facilities for them;
- Water quality control facilities at and surrounding the workers’ camp;
- General clean up after construction works;
- Status of landscape rehabilitation, re-vegetation in the disturbed areas, particularly at borrow pits and quarries, and disposal site;
- Impacts of construction works (level of noise, dust) on surrounding residential areas, and damage to roads due to earthworks and transportation of building materials;
- Status of implementation of safety measures (signboards, restricted zone, fences, the use of protective equipment, etc.), particularly at the intersections and other traffic hotspots.

The IMC shall also conduct public consultation to:

- Assess the level of involvement by the local authorities in dealing with environmental issues (dust, noise, and damage to roads due to the transport of construction materials, tree cutting on public lands and protected areas);
- Identify any other environmental issues and record environmental complaints from the affected people;
- Report on responses (if any) from appropriate local authorities on environmental complaints or incompliance.

**Consultant Qualifications and staffing**

It is anticipated that the IMC will be mobilized four months after the start of the construction activities. The one month start up time will be utilized by the IMC to review and familiarize itself
with the project environmental monitoring program, Environmental Management Plan, preparing the inception report and plan for their first field trip.

The Consultant shall include the following key persons:

**Activity Leader/Senior Environmental Consultant**

The position will be a senior environmental specialist with at least a Master degree in environmental science or related discipline and have 10 year's experience working with the environmental aspects of construction. Priority is given to the person who has experience in assessing and monitoring environmental aspects related to roads and bridges. The Team leader should be familiar with the World Bank’s environmental and social impact guidelines and have a proven record of managerial capabilities. The Team Leader will be responsible for directing the environmental monitoring for the project.

He/she will lead the team during field visit on a six monthly basis to inspect the Contractor’s compliance with the EMP, check the implementation of mitigation measures, assess the effectiveness and adequacy of the mitigation measures proposed/implemented, and give advices on additional mitigation measures or corrective actions, if necessary. At the end of each visit and before leaving the sites, he/she will lead discussion and brief to PMURTW, SES and SEOs about their main findings and advise them on what need to be improved, evaluate compliance to EMP. He will take the lead in the preparation and quality control of the six monthly monitoring reports. Fluency in spoken and written English will be required.

**Field Environmental Inspection Officer(s)**

This position(s) will require at least 5 year’s experience and a good understanding of the environmental issues related to civil works, particularly roads and bridges, environmental impacts assessment and management processes. They will visit the project sites on a six monthly basis to inspect the Contractor’s compliance with the EMP and check the implementation of mitigation measures. He/she will also check relevant environmental documents and records prepared during construction phase. At the end of each visit and before leaving the sites, they will participate in discussions with PMURTW, SES and SEOs about their main findings and advise them on what need to be improved. Knowledge of English language is required.

**Environmental Monitoring Specialist(s)**

This position(s) will require at least 5 years experience in environmental analysis and monitoring activities. They will be responsible for conducting environmental monitoring activities, including sampling, analyzing results and writing monitoring reports. Knowledge of the English language is required.

**Reporting Requirements and Time Schedule**

For each report, 10 copies in Vietnamese and 3 copies in English shall submitted. In addition to hard copies, one digital electronic copy shall also be submitted. At the end of the contract, a digital copy of all documents relevant to the project shall be compiled in an orderly manner and submitted to the Client.
## APPENDIX 6: TRAINING DEMANDS AND PROPOSALS FOR A TRAINING PROGRAM

Table 6.1. Analysis and Determination of Training Demands

<table>
<thead>
<tr>
<th>No.</th>
<th>Subject</th>
<th>Preliminary assessment on capability/awareness</th>
<th>Capacity building/training on environmental management</th>
</tr>
</thead>
</table>
| 1   | Functional staff of relevant public utility companies | Have most staff with university/post university education. There are many WB funded projects executed in Hai Phong city. Companies are quite familiar with requirement and procedure of WB’s project. | - project information and operation regime of EMS, contact clues, and cooperation mechanism between relevant agencies.  
- Need to be provided with detailed requirements on roles/responsibilities of these companies during coordination process on environmental management and solving of arising environmental incidents. |
| 2   | Environment team PMURTW | Have most staff with university/post university education, thus it is easy to them to comprehend new contents  
Have working experiences in previous projects but have not gone into details of the environmental field.  
Have basic knowledge in information technology, thus, it will be convenient for data management and information process as well as cooperation with other agencies. | - environmental management process in project and implementation methods (from preparation stage of bidding documents, bid evaluation, contract signing, monitoring implementation and acceptance works, etc.).  
- Should have increase awareness on critical roles of EMS  
- Should be provided with more knowledge/legal regulations related to penalty for violations on the environment.  
- Should be provided with treatment solutions for arising problems on site. |
| 3   | Local leaders | Apart from some wards/communes like Vinh Niem, Dang Giang, Dang Hai which participated in many infrastructure projects, other wards/communes have not been informed sufficiently about the project process.  
Computer skills are still limited  
Awareness on community organization and monitoring is not clear. Community organization and monitoring have only been implemented for small projects which are invested by residents.  
Have no experiences in community monitoring on a large scale. | - Should be provided with preliminary knowledge on environmental laws and contents related to coordination in monitoring among ward/commune authorities in projects which are executed in the areas.  
- Should be trained on community monitoring.  
- Should have updated information on project progress and monitoring and information exchange regime.  
- Environmental management process should be made clear and comprehended before, during and after construction. |
| 4   | Community representatives | - Not been established in the local area, Thus participants have not been determined  
- Most project areas are rural ones with cultivation works. Education is limited and working style is primarily spontaneous. | - Should be provided with rights and responsibilities in environmental management (as well as legal regulations.)  
- Should be provided with clear simple methods which will be applied during project implementation process.  
- Increase the awareness of community on |
Based on an analysis of current capabilities, experiences and actual demands in project implementation, a capacity building and training program for relevant agencies is established as shown in the table below:

**Table 6.2 Proposed Programs on Capacity Building for Environmental Management**

<table>
<thead>
<tr>
<th>Training content</th>
<th>Subject to be trained</th>
<th>Number of trainees</th>
<th>Training time</th>
<th>Organization unit</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning on labor safety and environmental sanitation</strong></td>
<td>Contractor’s workers and technical staff</td>
<td>All workers and staff on site</td>
<td>Prior to construction and following legal regulations</td>
<td>Contractor in coordination with Institute of Labor, War invalids and Social Affairs</td>
<td>Paid by Contractor</td>
</tr>
<tr>
<td><strong>Learning on general environmental management process</strong></td>
<td>Staff of PMURTW and public utility companies</td>
<td>5 persons</td>
<td>Prior to construction</td>
<td>PMURTW in coordination with IMC</td>
<td>Paid by PMURTW or to be included in a package on training</td>
</tr>
<tr>
<td><strong>Learning on process of CEMP</strong></td>
<td>Environmental staff under ward PC in the project area</td>
<td>4 district staff and 2x13 ward staff</td>
<td>Prior to construction</td>
<td>Training consultant under Contract on capacity building and training for relevant agencies – Component 6.</td>
<td>Included in Contract on training consulting</td>
</tr>
<tr>
<td><strong>Learning on process of SEMP</strong></td>
<td>CST’s staff in charge of environmental sanitation</td>
<td>5 – 10 trainees</td>
<td>Prior to construction</td>
<td>PMURTW in coordination with IMC</td>
<td>IMC</td>
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</tbody>
</table>
APPENDIX 7: ESTIMATED COST FOR ENVIRONMENTAL MONITORING

1. Cost for community monitoring system

According to regulations of Vietnamese laws, community-based monitoring systems will be voluntary. However, community monitoring organizations will receive assistance from PMURTW through capacity building programs and provided with necessary documents, papers and forms to facilitate site supervision works. However, practical experiences show that it is difficult to maintain monitoring work over a long period at high intensity. In order to increase the effectiveness, the community monitoring team should be provided with a minimum of assistance compensation rate for their performance. The cost estimation for maintenance and operation of community monitoring system is presented below.

Table 7.1. Cost Estimation for Implementing Community Monitoring System

<table>
<thead>
<tr>
<th>Expected time</th>
<th>Number of supervisors</th>
<th>Number of community/village staff</th>
<th>Assistance rate(VND)/month</th>
<th>Total (VND)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 3 months</td>
<td>15 villages/route</td>
<td>3</td>
<td>200,000</td>
<td>27,000,000</td>
</tr>
<tr>
<td>Within 6 months</td>
<td>15 villages/route</td>
<td>3</td>
<td>200,000</td>
<td>54,000,000</td>
</tr>
<tr>
<td>Within 12 months</td>
<td>15 villages/route</td>
<td>3</td>
<td>200,000</td>
<td>108,000,000</td>
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</tbody>
</table>

The above estimated cost is not a big sum compared with the total investment amount of the project; however, it helps increase the effectiveness of the operation of community monitoring system. Therefore, this cost estimation deemed necessary is included for PMURTW review and approval.

2. Cost of Independent Monitoring Consultant (IMC)

PMURTW shall sign a contract with IMC for the duration of the construction stage of the project. IMC shall implement assignments of all project components according to the TOR.

The estimation cost for the IMC (excluding monitoring and training costs) during construction process will be VND 1,200,000,000 (One billion two hundred million Dong) for implementation within a 6 year period.

3. Implementation Cost of the Monitoring Program

Based on the Guidelines in Circulars 232/2009/TT-BTC issued by Ministry of Finance on 9th December 2009 on “Regulation for Receiving, Providing and Managing Fees in Prevention Health” and Circular 97/2010/TT-BTC issued by Ministry of Finance on 6th July 2010 about Regulation on Fees for Missions of Governmental Agencies…” the following costs for the environmental monitoring for HPUTDP are estimated.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>CW1A Lot 1 (4 locations)</th>
<th>CW1A Lot 2 (4 locations)</th>
<th>CW2A Lot 1 (3 locations)</th>
<th>CW2A Lot 2 (3 locations)</th>
<th>CW3A (3 locations)</th>
<th>CW4A (3 locations)</th>
<th>CW5A (2 locations)</th>
<th>Total (VNDx1000)</th>
<th>Grand Total</th>
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<tbody>
<tr>
<td>Surface Water Quality Monitoring</td>
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<td>Turbidity</td>
<td>100</td>
<td>48</td>
<td>48</td>
<td>36</td>
<td>36</td>
<td>30</td>
<td>30</td>
<td>16</td>
<td>244</td>
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<td>COD</td>
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<td>Groundwater Quality Monitoring</td>
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<td>Noise and Vibration Monitoring</td>
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<td>Microclimate</td>
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<tr>
<td>Total cost estimation for air, noise, vibration, water analysis in the pre-construction and construction stages</td>
<td>235,680</td>
<td>235,680</td>
<td>176,760</td>
<td>176,760</td>
<td>147,300</td>
<td>147,300</td>
<td>78,560</td>
<td>1,198,040</td>
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</tbody>
</table>

Prepared by Infra-Thang Long (Dec. 2010), Revised by SMEC (Nov 2012)