

Item	Mitigation measure
	<ul style="list-style-type: none"> <li>- Respond to monitoring results which show higher noise than projected by the EIA;</li> <li>- Regular maintenance on road to keep good road surface condition.</li> </ul>
d) Dangerous material accident	<ul style="list-style-type: none"> <li>- Emergency leading group will be established;</li> <li>- "Three licenses" system will be enforced to the trucks transporting dangerous material;</li> <li>- The trucks transporting dangerous material will be marked</li> <li>- Special lane and parking lots will be designated for the trucks transporting dangerous material.</li> </ul>

b) Objectives of the Environmental Management Program (EMP)

JBIC Guideline for Confirmation of Environmental and Social Considerations (April 2002) requires to confirm the progress of the activities related to environment management as following.

- + It is desirable that, after a project begins, the project proponents monitor: (i) whether any situations that were unforeseeable before the project began have arisen, (ii) the implementation situation and the effectiveness of the mitigation measures prepared in advance, and that they then take appropriate measures based on the results of such monitoring;
- + In cases where sufficient monitoring is deemed essential for the achievement of appropriate environmental and social considerations, such as the projects for which mitigation measures should be implemented while monitoring their effectiveness, project proponents must ensure that project plans include monitoring plans which are feasible;
- + It is desirable that project proponents make the results of the monitoring process available to project stakeholders; and
- + When third parties point out, in concrete terms, that environmental and social considerations are not being fully undertaken, it is desirable that a forum for discussion and examination of countermeasures be established based on sufficient information disclosure and include the participation of stakeholders in the relevant project. It is also desirable that an agreement be reached on procedures to be adopted with a view to resolving the problem.

To respond to the above-mentioned requirements, the Preparatory Survey Team recommends to prepare an Environmental Management Program (EMP) with the following components in the D/D stage.

The recommended EMP which includes an Environmental Monitoring Plan, is considered as a tool to ensure the environmental commitments made at the EIA study are implemented in an efficient and effective manner. The policy, objective and target of the EMP are recommended as followings.

Table 3.4-7 Recommended Policy, Objective and Target of EMP

Policy	Objective	Target
Foster sound environmental management program to oversee the environmental performance of the Project	Set up Environmental Management Program (including an Environmental Monitoring Plan) for design, construction, operation stages to follow up implementation of EIA requirements	Carry out routine monitoring and data analysis to avoid adverse impact; audit and review environmental performance and implement mitigation measures in accordance with the Environmental Management Program

Major items to be included in the EMP are as follows:

- + Institutional arrangement for environmental management,
- + Method for environmental management (covering design phase, construction phase and operation phase, including project information disseminations, public consultations, and environmental impacts mitigation measures, such as traffic management plan, resettlement action plan, etc.),
- + Required budget and source of budget,
- + Time schedule for environmental management activities,
- + Basic criteria to be referred for environmental management activities,
- + Environmental Monitoring Plan
  - Monitoring items,
  - Monitoring method,
  - Frequency, duration of monitoring activities,
  - Implementation body for monitoring activities,
  - Required budget and source of budget,
  - Recording / public information system for monitoring results

c) Contents of the EMP

**Design Phase EMP**

\* Objectives

The Design Phase EMP is designed to ensure and assure the environmental protection, and pollution prevention and control designs are able to comply with the approved EIA report's recommendations, DONRE's requirements and conditions, as well as endorsed public comments on the Project. The Design Phase EMP will outline, *inter alia*, its objectives and the means to achieve these objectives as:

- (a) Management framework of the Design Phase EMP;
- (b) Project organization for the design activities, including the designation of responsibility for each design function and level;
- (c) Works program for the design and the deliverables arising from the translation of EIA, DONRE and other requirements/commitments into the project design;
- (d) Systematic design protocols; to increase efficiency in use of resources (i.e. materials and energy); minimize pollution from chosen materials/form of design; reduce

- impacts associated with the disposal of materials; encourage the recovery, reuse and recycling of materials; as well as minimize potential nuisances, such as, noise, smell and vibration, etc;
- (e) Scope and content of design environmental monitoring and audit, and duty of the design engineer;
  - (f) Design audit procedure and duty of the Environmental Supervision Consultant (ESC);
  - (g) Systematic protocols to ensure all requirements are translated from the EIA process to design, contract and subsequent tendering documentation, with the aim to ensure the implementation of all the project's environmental requirements, in a coherent, consistent and timely manner;
  - (h) Protocol/procedures to deal with any environmental design changes and the necessary actions to achieve the required or enhanced project environmental performance, including the implementation of the ESC's recommendations.

**\* EIA Recommendations/DONRE Requirements**

All environmental protection conditions, recommendations stated in the EIA report, DONRE's requirements and any endorsed public comments related to the design phase of the development project will be clearly identified in the Design Phase EMP, in a tabulated format for easy reference.

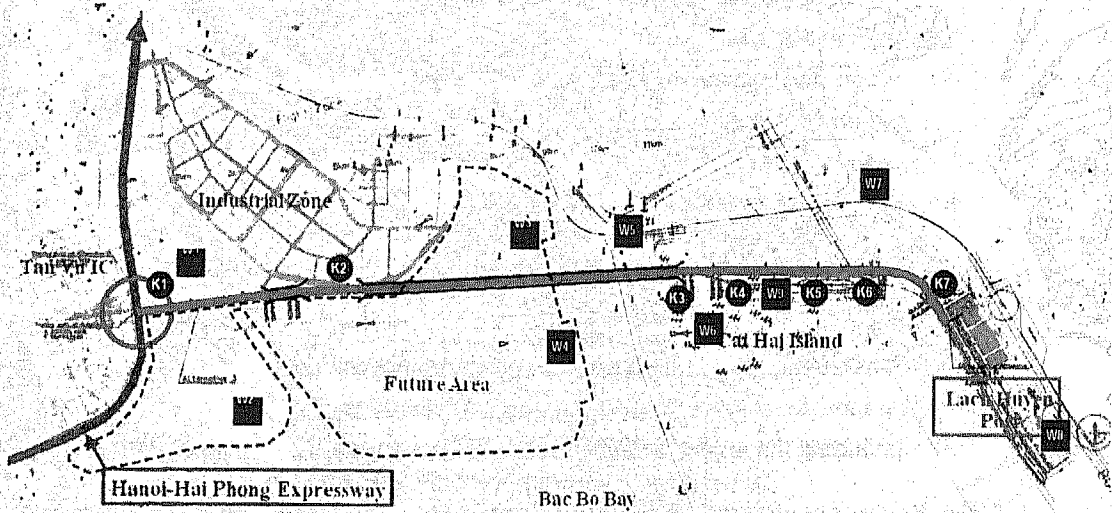
**\* Environmental Monitoring**

The Design Phase EMP will require a self-monitoring and audit approach for the design engineer to certify completed environmental design elements. Such an audit will ensure compliance with the requirements resulting from application of the EIA process.

In addition, as described in the following Table 3.4.7, a number of specified social and environmental items will be monitored, with corresponding indicators, frequency, and sites (see Figure 3.4.2 for locations of sampling sites). These monitored data will be used as baseline data for assessment of environmental status during the next coming phases of the Project. Contents of this table will be reviewed and revised during the D/D stage.

**Table 3.4-8 Environmental Monitoring - Pre-construction Phase**

Items	Indicators	Frequency	Sites
1 Resettlement	Conformation that explanatory meetings were held, Confirmation that comments were collected from local residents	Once	-
2 Air Quality	SPM, CO, NO2, SO2, Carbohydrates, microclimate parameters	Once	7 sites
3 Noise	Leq, L10, L90	Once	7 sites
4 Water Quality	Temperature, pH, Turbidity, EC, BOD, COD, DO, Total-P, Total-N, Oil-grease, Coliform	Once	9 sites
5 Health Education Activities	State of health education plan preparation by the contractor (as described in the HIV/AIDS Prevention Plan)	Once	-



**Figure 3.4-2** Locations of sampling sites of ambient air, noise, and surface water

Table 3.4.8 shows coordinates of locations of sampling sites of ambient air and surface water:

**Table 3.4-9** Coordination of location of sampling sites of ambient air and surface water

Sampling sites of surface water			Sampling sites of ambient air		
Location	Coordinates		Location	Coordinates	
W1	20°48'25.56"N	106°46'28.33"E	K1(A1)	20°48'13.09"N	106°44'48.78"E
W2	20°47'26.02"N	106°46'23.17"E	K2	(to be identified)	(to be identified)
W3	20°49'4.60"N	106°48'50.27"E	K3(A2)	20°48'36.89"N	106°50'51.76"E
W4	20°47'51.63"N	106°48'21.03"E	(A3)	20°48'0.59"N	106°51'10.64"E
W5	20°48'44.65"N	106°50'26.22"E	K4	(to be identified)	(to be identified)
W6	20°48'6.84"N	106°50'38.56"E	K5(A4)	20°47'56.32"N	106°53'31.48"E
W7	20°48'51.35"N	106°52'57.39"E	K6	(to be identified)	(to be identified)
W8	20°47'58.23"N	106°54'12.09"E	K7	(to be identified)	(to be identified)
W9	(to be identified)	(to be identified)			

**\* Environmental Auditing**

The Design Phase EMP will be audited by Environmental Experts of General Consultant to validate compliance with the environmental protection conditions, and EIA process recommendations and requirements. The audit is required to confirm that no resultant secondary or unforeseen or cumulative impacts arising due to the design or design changes, etc. have been introduced into the project implementation process.

**\* Documentation Requirement**

The reporting requirement and the frequency of reporting will be stated in the EMP. A Design Phase EMP report will be produced to conclude the environmental design work at the end of

each audit period. The audit period will be documented in the Design Phase EMP and agreed with DONRE and JICA.

### **Construction Phase EMP**

#### **\* Objectives**

The purpose of the Construction Phase EMP is to guide the environmental management during the project's construction phase to ensure compliance with the environmental protection conditions, EIA study recommendations, relevant environmental protection, and pollution prevention and control legislation. The Construction Phase EMP will be used to assess the effectiveness of, inter alia, the implementation of the recommended environmental impact mitigation measures and to identify the need for any additional mitigation measures or remedial action.

The Construction Phase EMP will contain the following:

- (a) Further clarification of duties of the Environmental Experts of General Consultant, the Environmental Supervision Consultant (ESC), Environmental Team of Contractors, in relation to the Project's environmental monitoring and audit requirements during construction;
- (b) Information on the project organization and programming of construction activities;
- (c) The project construction schedule and the necessary environmental monitoring and audit program to track the environmental impacts;
- (d) Requirements for the review of pollution sources and working procedures in the event of non-compliance of the project's environmental performance criteria;
- (e) Environmental monitoring protocols and their technical requirements;
- (f) Environmental auditing procedures;
- (g) Requirements for the documentation of environmental monitoring and audit data, and appropriate reporting procedures; and
- (h) Complaint resolution procedures.

#### **\* EIA Recommendations and EMP Requirements**

All environmental protection conditions, EIA study recommendations and requirements, DONRE's requirements, and any endorsed public comments related to construction phase of the development project, will be included in the Construction Phase EMP, in a tabulated format for easy reference (i.e. Implementation Schedule)

#### **\* Implementation Organization**

Arrangement of persons in charge of EMP implementation is recommended in Figure 3.4.2

#### **\* Technical Requirements for Monitoring: Location, Sampling, Frequency and Laboratory Analysis**

The Construction Phase EMP will cover the project's requirements for environmental monitoring and audit stated in the approved EIA Report. Following issues will be taken into account.

- (a) All sources of environmental impacts due to the activities of the development will be identified and quantified and documented in the EMP reports;

- (b) All environmentally sensitive areas as a result of the development project will be identified and documented in the EMP reports;
- (c) A systematic collection of data for (i) Baseline Monitoring; (ii) Impact Monitoring; and (iii) Compliance Monitoring, will be designed.

The following Table 3.4.9 describes items to be monitored, as well as its indicators, frequency, and sites. However, contents of this table will be reviewed and revised during the detail design phase.

**Table 3.4-10 Environmental Monitoring Program - Construction Phase**

Items	Indicators	Frequency	Sites
1 Resettlement	Conformation that resettlement activities are done in compliance to the RAP	Once	-
2 Air quality	SPM, CO, NO2, SO2, Carbohydrates, microclimate parameters	6 months/ time	7 sites
3 Noise	Leq, L10, L90	6 months/ time	7 sites
4 Water quality	Temperature, pH, Turbidity, EC, BOD, COD, DO, Total-P, Total-N, Oil-grease, Coliform	6 months/ time	9 sites
5 Soil (waste disposal)	PH, Total-organic, Total-P, Total-N, acidity, CL-, SO4-, Cu, Zn, Pb, Hg, fertilizer, Report from contractor on treatment / dumping of the soil	Once for each site	6 sites (will be revised in D/D stage)
6 Health education activities	Execution of health education activities (in coordination with the body in charge of implementation of HIV/AIDS Prevention Plan)	2 times / year during construction	-

**\* Site Surveillance**

Site surveillance provides a direct means to assess and ensure the project's environmental protection and pollution control measures are in compliance with the contract specifications. Site surveillance will be undertaken regularly and routinely by the ESC to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are implemented in accordance with EIA recommendations.

The ESC is responsible for formulation of the environmental site inspection, deficiency and remedial action reporting system, and for carrying out the site inspection works. He shall in consultation with the Environmental Experts of GC, prepare a procedure for the site inspection, deficiency and remedial action reporting requirements.

Regular site inspections shall be carried out at least once per week for all works areas.

The inspections shall cover the environmental situation, pollution control and mitigation measures within the Site; they shall also review the environmental situation outside the Site area which is likely to be affected, directly or indirectly, by the site

activities.

The Contractor shall update the ESC with all relevant information of the construction contract for him to carry out the site inspections. The inspection report results and its recommendations for any necessary improvements in the project's environmental performance shall be submitted, in a site inspection proforma, to the Environmental Experts of GC and to the Contractor within 24 hours, for reference and the taking of immediate remedial action. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and remedial action reporting system (formulated by the ESC) to report on any remedial measures subsequent to the site inspections.

*Ad hoc* site inspections shall also be carried out by the ESC or Environmental Experts of GC if major unacceptable or unforeseen environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the detailed action plan for environmental monitoring and audit.

#### \* Complaint Procedure

Complaints will be referred to the ESC for carrying out complaint investigation procedures. The ESC will undertake the following procedures up on receipt of the complaints:

- a) Log complaint and date of receipt onto the complaint database and inform the Environmental Experts of GC immediately;
- b) Investigate the complaint to determine its validity, and to assess whether the source of the problem is due to project works;
- c) If a complaint is valid and due to project works, identify mitigation measures in consultation with the Environmental Experts of GC;
- d) If mitigation measures are required, advise the Contractor accordingly;
- e) Review the Contractor's implementation of the identified and required mitigation measures, and the current situation;
- f) Undertake additional monitoring and audit to verify the complaint if necessary, and ensure that any valid reason for complaint does not recur through proposed amendments to work methods, procedures, machines and/or equipment, etc.;
- h) Report the investigation results and the subsequent actions to the complainant; and
- i) Log a record of the complaint, investigation, the subsequent actions and the results in the monthly EMP reports.

#### \* Documentation

All documentation shall be filed in a traceable and systematically manner. Site document, such as, monitoring field records, laboratory analysis records, meeting minutes, correspondences etc., shall be cross-referenced by the ESC's leader and be ready for inspection upon request. All Construction Phase EMP results and findings shall be documented in the Construction Phase EMP reports prepared by the ESC and endorsed by Environmental Experts of GC prior to disseminate to the PMU2 and JICA.

The content and frequency of the EMP reporting shall be determined in the detail design stage.

**Operation Phase EMP**

\* Objective

There is often a considerable span of time between the preparation stages of a development project and its operational stage. Changes adopted during the course of a project's implementation might ultimately affect the predicted environmental performance of the project. An Operation Phase EMP is required to ensure the long-term impacts (such as ground subsidence, groundwater movement, noise/vibration, resettlement, etc.) are monitored, and appropriate mitigation measures are duly implemented.

\* Operation Phase EMP Requirements

The environmental protection conditions, including, all statutory limits for project operation, all EIA study recommendations and requirements, DONRE's comments and any endorsed public comments related to the operation phase of the development project shall be clearly defined in the Operation Phase EMP. The various measures for implementation by the road management authority shall be in a tabulated format for easy reference

\* Methodology

(a) Pursuance of an Environmental Management System

For long-term environmental monitoring, it needs to pursue a structured environmental management system (EMS) integrated with the day-to-day management of the operation of the development project. The EMS shall be a systematic, independent evaluation of the operational environmental impacts and shall verify compliance with statutory limits, any relevant standards and criteria, and the EIA study recommendations and requirements.

The following Table 3.4.10 describes items to be monitored, as well as its indicators, frequency, and sites. However, contents of this table will be reviewed and revised during the detail design phase.

**Table 3.4-11 Environmental Monitoring Program - Operation Phase**

Items	Indicators	Frequency	Sites
1 Resettlement	Collection of comments from residents resettled	Once	-
2 Air quality	SPM, CO, NO2, SO2, Carbohydrates, microclimate parameters	Once	7 sites
3 Noise	Leq, L10, L90	Once	7 sites
4 Water quality	Temperature, pH, Turbidity, EC, BOD, COD, DO, Total-P, Total-N, Oil-grease, Coliform	Once	9 sites

(b) Clarification of an Environmental Policy

The Operation Phase EMP shall include an Environmental Policy statement represents a commitment by the road management authority to carry out project activities, either directly or indirectly under his control, in a sustainable manner and with the aim of protecting the environment.



\* Planning and Management

The formulation of environmental objectives represents the translation of a project's policy into action and paves the way to achieve a project's environmental targets. The following issues will be clarified in the Operation Phase EMP:

(a) Environmental organization

It is recommended that an Environmental Team (ET) should be established in the organization structure of Highway Operation and Management Authority (HOMA), and be integrated into the normal management system and the routine production/operation of the HOMA. The environmental manager leading the ET should report directly to senior management, such as, CEO or GM of the HOMA.

In the ET, there should be at least one expert in charge of environmental management, monitoring and landscape conservation. He should have basic knowledge on environmental legislation and technique, and should understand clearly about major issues described in the EIA Report. His responsibility is to ensure that all requirements described in the EIA Reports and in the relevant legal documents are duly implemented. In addition, the ET should have a task unit in charge of cleaning up the road, taking care the trees, and improving landscape along the road, etc., under the environmental expert's instruction and supervision.

(b) Resource arrangements

The quality and training of ET staff; provision of appropriate and effective instrumentation and equipment, transportation; laboratory analyses, and comprehensive equipment and instrument calibration and maintenance contracts are important elements for the successful performance of an Operation Phase EMP. A resource allocation schedule will be recommended for timely and effective implementation of the Operation Phase EMP.

(c) Empowered authority and responsibility

Necessary and sufficient empowerment is an efficient and effective management mechanism to enable the Environmental Team to prevent, correct and stop any unfavorable or unforeseen environmental impacts.

(d) Conflict resolution

Mechanism proactive environmental review of all project operational activities is the optimum means to reduce "end-of-pipe" environmental problems. The Environmental Team should establish close communication channels with all of the project's components or facilities; and through routine environmental meetings, seek mutual understanding and the resolution of environmental problems. In addition promote environmental awareness amongst all staff.

\* Documentation

The documentation and reporting requirements as well as the frequency of reporting shall be stated in the Operation Phase EMP. A generic outline for Operation Phase EMP reports is proposed as following:

- a) Project Background
- b) Project Proponent/Operator Particulars
- c) Environmental Policy
- d) Environmental Objective
- e) Description of Operation Process (Uses of raw materials resources, output of the

- process, by products and the associated environmental impacts.)
- f) Organization Structure (option for an EMS within the management structure; Flowchart to show the hierarchy of the environmental team and the inter-relationships with other department of the facility)
  - g) Operation Phase EMP Requirements
  - h) Duty of Environmental Team and Independent Auditing (if necessary)
  - i) Technical Requirement for Monitoring
  - j) Compliance Requirements
  - k) Complaint Procedure
  - l) Environmental Training and Awareness Program

#### Appendices

- i) Location Plan and Facility Process Flowchart
- ii) Location of Sensitive Receivers
- iii) Monitoring Locations
- iv) Implementation Schedule
- v) Environmental Monitoring Technical Summary
- vi) Process Audit Proforma
- vii) Listing of relevant Regulations

In addition, following reports shall also be prepared and submitted in accordance with the commitments stated in the Operation Phase EMP:

- (a) Baseline EMP Report (submit 1 month prior to the commissioning of project operation)
- (b) Operation Phase EMP Reports (Monthly, quarterly and annually reports will be prepared and submitted within 10 working days subsequent to the reporting period.)

#### d) Organization in charge of EMP implementation

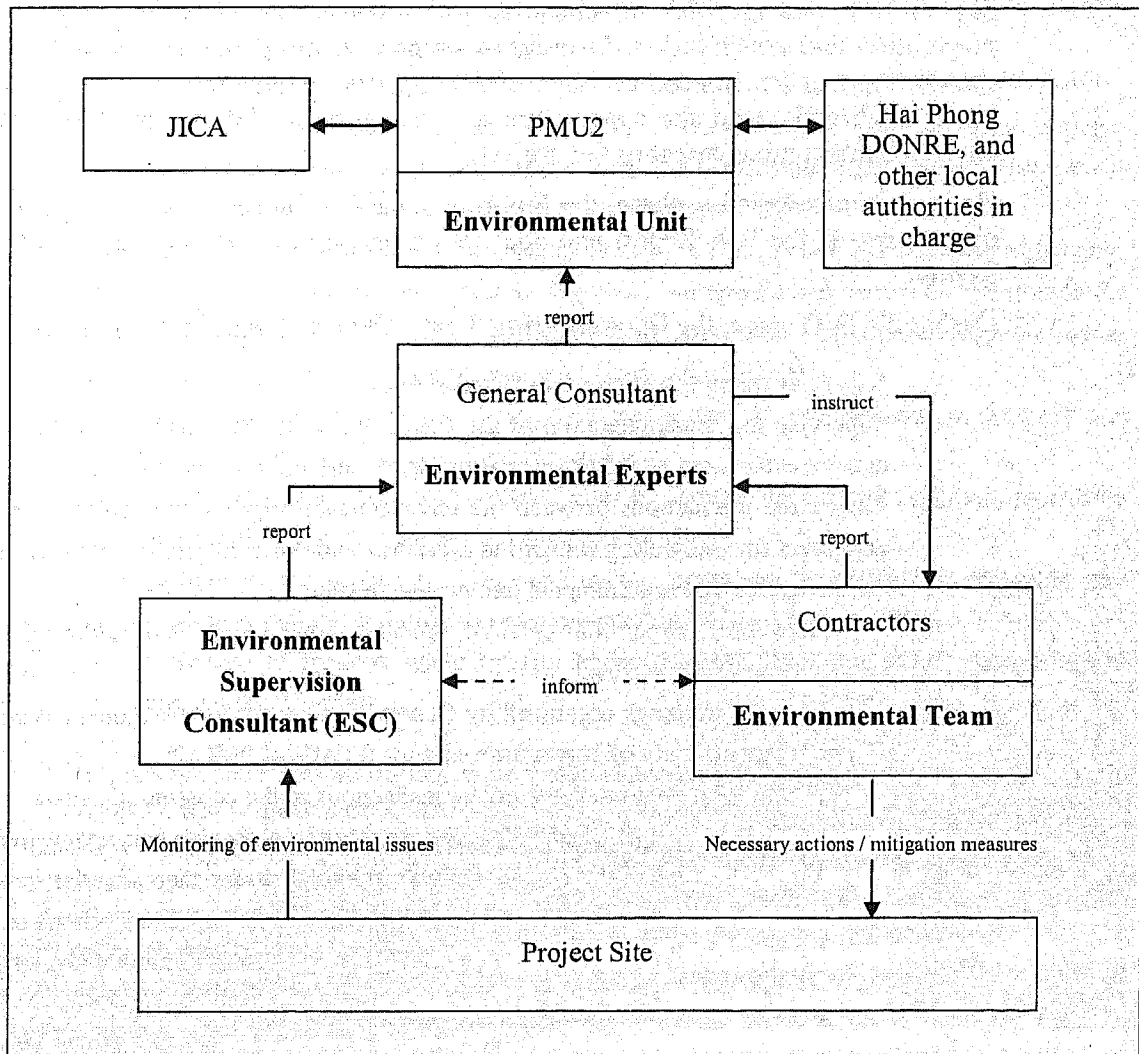
Based on experiences obtained from similar transportation infrastructure development projects in Viet Nam, in order to ensure that all activities planned in the EMP are efficiently and successfully carried out, it is recommended that the authorities, entities, etc. listed below should take part in the organization in charge of EMP implementation.

- Department of Natural Resources and Environment of Hai Phong City (Hai Phong DONRE), and other local authorities in charge of environmental protection in Hải An District and Cát Hải District;
- Project Management Unit 2 under Ministry of Transportation (PMU2, who has an environmental team in charge of supervision of the EMP implementation, with the assistance of General Consultant);
- General Consultant (who is in charge of detailed design, preparation of bidding documents, and construction supervision of the project, including supervision of the EMP implementation, with the assistance of a sub-consultant taking role as the Environmental Supervision Consultant);
- Contractors (with several environmental staffs in charge of carrying out activities relating to environmental protection, management and monitoring described in the

EMP and in the contract).

e) Organization chart

Figure 3.4.3 shows organization chart for the EMP implementation in pre-construction phase and construction phase.



**Figure 3.4-3 Organization chart for EMP implementation (pre-construction phase and construction phase)**

f) Responsibilities of local environmental management authorities

Hai Phong DONRE and environmental management authorities of Hai An District and Cat Hai District are responsible for supervision of project activities which are described in the approved EIA Report as causes of impacts to environment within their territory. These environmental authorities will also supervise the realization of requirements which are described in the approval decision issued by MOT, and the environmental commitment submitted by project proponent to affected districts. Their roles and responsibilities are:

- Supervise the implementation of EMP;
- Enforce applicable laws, regulations and standards;

- Coordinate the environmental protection effort among departments concerned;
- Check and supervise construction, completion and operation of environment facilities within their jurisdiction scope;

g) Responsibilities of Project Management Unit 2 (PMU2)

On behalf of MOT, PMU2 has the ultimate responsibility for environmental performance of the project during both construction and operational phases. This is a day to day management organization for management of all aspects of project preparation and construction. In order to be able to fulfill this responsibility, PMU 2 should have an Environmental Unit which consists of full time professional staffs on board to directly lead the supervision and management efforts from the PMU2 for environmental management of the project.

During pre-construction phase, the Environmental Unit takes charge of supervising the preparation of the EIA Report and application procedures for the approval of the EIA Report.

During the D/D stage, the Environmental Unit will take charge for the following tasks

- Supervise the preparation of the detailed EMP;
- Supervise the implementation of the EMP; the additional surveys to collect baseline data on ecosystem, ambient air quality, noise, surface water quality, etc.
- Ensure the interactions between the environmental experts and project planners and engineers for integrating mitigation measures and other environmental considerations and programs and requirements into project design;
- Supervise the incorporation of environmental requirements into bidding documents, and construction contracts;
- Supervise the trainings organized by General Consultant to strengthen environmental management capacity of contractors, and local staffs of PMU 2;
- Supervise the conduction of periodical inspections of the construction sites;
- Engage and supervise environmental monitoring plans, receive and review monitoring reports from the ESC as well as from contractors on their regular reports for environmental performance and timely initiate necessary remedial actions as may be needed in response to the findings and/or recommendations, including any emergency, accidental situations and chance finds during construction;
- Consult and/or communicate to the local communities, project affected people, regulatory agencies, JICA and other stakeholders during the project preparation and construction to ensure them the full knowledge about the project progress, potential issues and mitigation actions, as well as to listen and respond to their concerns, suggestions and demands for environmental and community protection.

h) Responsibilities of General Consultant

On behalf of the project proponent, General Consultant will take charge of ultimate supervision of all activities relating to environmental management of the project. General Consultant will have at least two Environmental Teams (ET), one will be in charge of management of natural environment, and one will be in charge of management of socio-economic environment. Each team may have at least one foreign environmental expert and one local environmental expert. Besides, General Consultant will entrust an Environmental Supervision Consultant (ESC) through a sub-contract to take charge of direct supervision of the EMP implementation.

Environment-related responsibilities of General Consultant will be identified in detail in the contract for consultant services, and will cover at least the following tasks.

- Review construction organization design to ensure compliance with project engineering design and the EMP with regard to environmental protection and impact mitigation. The construction may only be ordered to start after the review is completed and the ET in charge is satisfied with the environmental arrangement;
- Provide assistance to the ESC as necessary in the implementation of the environmental monitoring and supervising program;
- Regularly monitor the performance of the contractor's environment staff, verifying monitoring methodologies and results. In case the contractor's environment staff fails to discharge duties or fails to comply with the contractual requirements, instruct the contractor(s) to replace the contractor's environment staff;
- Instruct the contractors to take corrective actions within the ET determined timeframe. If there is breach of contract or strong public complaints on contractor environmental performance, the ET will order contractor to correct, change or stop the work, reporting to relevant agencies and the Client at the same time;
- Supervise the contractor's activities and ensure that the requirements in the EMP and contract specifications are fully complied with;
- If the contractor discovered cultural relics by chance, the ET will order site protection and report to the relevant authorities and PMU2;
- Adhere to the procedures for carrying out complaint investigation, receiving and settling complaints relating to environmental issues;
- Response to requests made by Hai Phong DONRE and other local environmental management authorities.

i) Responsibilities of Environmental Supervision Consultant (ESC)

Environmental Supervision Consultant (ESC) will be selected through a bid and work under a contract with General Consultant. ESC will have two main responsibilities: (1) supervise contractor's activities to ensure that they are complied with content of the EMP and the construction contract; (2) carry out monitoring of environmental changes, in order to be able to quickly discover unexpected accidents and work out appropriate measures to response to these accidents.

The ESC will send at least one supervisor for each construction package, in order to be able to visit any construction site at any time, and be easy to follow up contractor's daily activities and changes in environment at site. Major responsibilities of ESC are described as followings:

Phase I: Conduct trainings to strengthen environmental management capacity

The success of environmental management for the Project relies on the knowledge, and experience of the personnel involved in environmental management. As contemporary methodologies and approach towards environmental management for road construction and operation are still new to the agencies in the local department concerned, extensive training will be needed.

In the pre-construction phase, ESC will carry out the following tasks which aim to strengthen capacity in environmental management and supervision of relevant authorities and entities:

- Reviewing the EIA, EMP and the project design and technical specifications and

- confirm that there have been no major omissions of mitigation measures;
- Preparing a guide for contractors on implementing the EMP;
- Preparing a guide on how to undertake supervision, including monitoring of effectiveness;
- Preparing and executing a training program in support of the above two guides.

#### Phase II: Carry out supervision and monitoring

- Review, inspect and audit independently all aspects of the implementation of the EMP;
- Validate and confirm the adequacy and accuracy of monitoring data, equipment, locations, procedures and locations of sensitive receivers;
- Carry out random monitoring checks and audits on monitoring and supervision data, etc;
- Collect local residents' opinions on environmental issues around the construction sites, and feed back them in the measures to avoid / minimize adverse impacts to local environment;
- Conduct regular site inspections;
- Audit 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.
- Where necessary, seek and recommend the least environmental impact alternative in consultation to the designer, the contractor(s), and the relevant environmental management authorities;
- Verify the investigation results of any non-compliance of the environmental quality performance and the effectiveness of corrective measures;
- Provide regular feedback audit results for the ET of General Consultant;
- Provide training programs at a minimum of three month intervals for contractor's staff, and local staff of PMU 2, etc., to appraise issues and method to improve environmental compliance.

Relating to environmental monitoring, the ESC will have the following responsibilities.

- Carry out regular monitor of noise, air and surface water quality of the construction sites and provide the General Consultant with the monitoring reports ;
- The monitoring time will be consistent with the construction activities, and monitoring will be conducted during active construction;
- Upon request by the General Consultant, conduct monitoring during environmental pollution accident investigation and provide the General Consultant with the monitoring reports;
- Upon request by the General Consultant when necessary, conduct public complaint investigation and assessment.

j) Responsibilities of contractors

The duties of the contractors include but not limit to:

- Strictly implement the listed impact mitigation measures in EMP;
- Undertake self-check and self-rectify activities;
- Strengthen the coordination, information sharing, opinion exchange with the ESC, and General Consultant;
- Compliance with relevant environmental legislative requirements;
- Work within the scope of contractual requirements and other tender conditions;
- Each contractor will appoint 1~2 full time environmental personnel, working with the ESC for mitigation implementation, site inspection and any corrective actions instructed by the General Consultant;
- Provide and update information to the ESC regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
- In case of non-compliances / discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact;
- Stop construction activities which generate adverse impacts upon receiving instructions from the ESC / General Consultant. Propose and carry out corrective actions and implement alternative construction method, if required, in order to minimize the environmental impacts;
- Adhere to the procedures for carrying out complaint investigation;
- Take responsibility and strictly adhere to the guidelines of the EMP and complementary protocols developed by the project staff.