

# Environmental Management Plan

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January 2014

Socialist Republic of Viet Nam: Greater Mekong  
Subregion Tourism Infrastructure for Inclusive  
Growth Project

Phu Tu Environmental Improvements & Da Dung Cave  
Access Improvements Subprojects

Prepared by the Ministry of Culture, Sports and Tourism, Socialist Republic of Viet Nam, for the  
Asian Development Bank

## ABBREVIATIONS

ABR	-	Anaerobic Baffled Reactor
ADB	-	Asian Development Bank
PAH	-	project affected household
BOD	-	biological oxygen demand
CCW	-	chief of construction work
COD	-	chemical oxygen demand
CSC	-	construction supervision consultant
DoC	-	Department of Construction
DoF	-	Department of Finance
DoH	-	Department of Health
DoNRE	-	Department of Natural Resources & Environment
DCST	-	Department of Culture, Sports and Tourism
DoT	-	Department of Transport
DPI	-	Department of Planning and Investment
EA	-	executing agency
ECC	-	environmental compliance certificate
EMDP	-	Ethnic Minority Development Plan
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EERT	-	external emergency response team
EO	-	environmental officer
ERT	-	emergency response team
ERTL	-	emergency response team leader
ESU	-	environmental and social unit
GMS	-	Greater Mekong Sub-Region
GoV	-	Government of Viet Nam
IEE	-	Initial Environmental Examination
MCST	-	Ministry of Culture, Sports and Tourism
NGO	-	nongovernment organization
O&M	-	operation and maintenance
PCU	-	project coordinating unit
PIU	-	project implementation unit
PMDC	-	project management & design consultant
PPC	-	Provincial Peoples Committee
SO	-	safeguards officer
UXO	-	unexploded ordnance

## WEIGHTS AND MEASURES

km	kilometre
kg	kilogram
ha	hectare
mm	millimeter

## NOTES

In this report, "\$" refers to US dollars.

This environmental management plan forms part of the initial environmental examination. It is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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## I. INTRODUCTION

1. The environmental management plan (EMP) has been prepared for the two subprojects of the GMS Tourism Infrastructure for Inclusive Growth Project (the project) in Kien Giang province, namely: a) the Phu Tu Environmental Improvement; and b) Da Dung Cave Access Improvements. The project's other EMPs address subprojects in the provinces of Dien Bien, Ha Tinh, Lao Cai and Tay Ninh. The separate EMPs are comprehensive and have been developed as stand-alone management tools.

2. A single Initial Environmental Evaluation (IEE) of all subprojects in Viet Nam has been prepared under separate cover. A description of the project and subprojects can be found in the parent IEE.

### A. Overview of Subprojects

#### 1. Phu Tu Environmental Improvement

3. The Phu Tu Environmental Improvement subproject consists of upgrades to the facilities at the tourist site such as upgrading of access roads, construction of a new tourist reception centre, improved seaside walkways, installation of toilet blocks and improved wastewater collection and treatment, solid waste management, and rehabilitation of the passenger pier. Table 1 reproduces the subproject activities from the IEE.

**Table 1. Components of Phu Tu Environmental Improvement**

Activity	General Specifications
Upgrade main access road	<ul style="list-style-type: none"> <li>• 700m X 6.0 m carriageway</li> <li>• DBST standard surface</li> <li>• roadside drainage and lighting</li> </ul>
Upgrade secondary access road	<ul style="list-style-type: none"> <li>• 3.5 km X 6 m</li> <li>• DBST surface</li> <li>• lighting &amp; roadside drainage</li> </ul>
Construct two car parks	<ul style="list-style-type: none"> <li>• 5,000 m<sup>2</sup> and 2,000 m<sup>2</sup></li> </ul>
Upgrade seaside footpaths	
Upgrade public open spaces, and existing public rest pavilions	
Construct a visitor information/reception center	<ul style="list-style-type: none"> <li>• with ticket office with associated facilities</li> </ul>
Construct a public market	<ul style="list-style-type: none"> <li>• 60 single-storey concrete-frame stalls of variable sizes to accommodate relocation of small shops from the beach front and main access road to include improved sanitation and drainage and that is better organized for tourist circulation and beach access</li> </ul>
Upgrade existing public toilet facilities blocks to include showers and changing rooms	
Construct three new toilets blocks	<ul style="list-style-type: none"> <li>• including showers and changing rooms</li> </ul>

Activity	General Specifications
Upgrade existing passenger pier	<ul style="list-style-type: none"> <li>rehabilitate concrete pilings and deck with enhanced safety features, following original dimensions and footprint</li> </ul>
install the full range of supporting infrastructure and utilities, and maintenance equipment	<ul style="list-style-type: none"> <li>including improved water and electricity supply</li> <li></li> </ul>
Solid waste management systems	<ul style="list-style-type: none"> <li>waste bins &amp; organized collection</li> </ul>
Upgraded wastewater treatment system	<ul style="list-style-type: none"> <li>ABR septic system (1,000 m<sup>2</sup>/day capacity)</li> <li>maintenance equipment</li> </ul>
Installation of directional and information signage	

## 2. Da Dung Cave Access Improvements

4. The Da Dung Cave Access Improvements subproject consists of improvements to tourist facilities at the cave such as upgrading of the access road and parking, installation of toilet blocks and wastewater treatment, development of a tourist reception area, and improvements to cave stairs and walkways. Table 2 reproduces the subproject activities from the IEE.

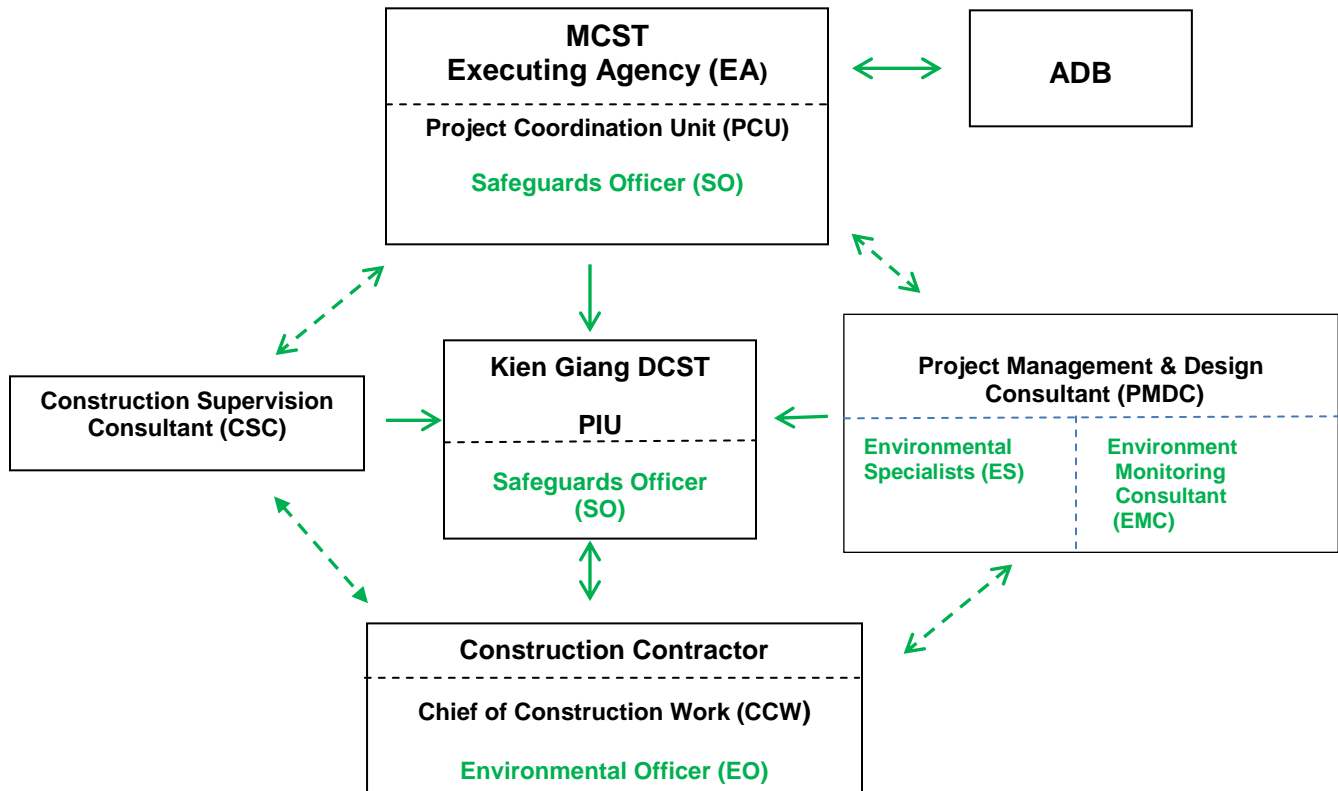
**Table 2. Components of Da Dung Cave Access Improvement**

Activity	General Specifications
Upgrade existing access road	<ul style="list-style-type: none"> <li>2 km X 6m carriageway</li> <li>DBST surface</li> </ul>
Improve steps and footpaths to the caves	<ul style="list-style-type: none"> <li>installation of safety barriers and handrails</li> </ul>
Construct a tourist reception and information center	<ul style="list-style-type: none"> <li>food court</li> <li>handicraft and souvenir kiosks</li> <li>public market</li> <li>landscaped green space</li> </ul>
Construction of parking area	<ul style="list-style-type: none"> <li>2,500 m<sup>2</sup></li> </ul>
Install public toilets blocks	
Improve wastewater management system	<ul style="list-style-type: none"> <li>install ABR septic system</li> </ul>
Improve solid waste management system	<ul style="list-style-type: none"> <li>rubbish bins</li> </ul>
Upgrade water supply	<ul style="list-style-type: none"> <li>including new water main from main road to the site</li> </ul>
Improve electricity supply	<ul style="list-style-type: none"> <li>lighting of access road and public areas</li> </ul>
Install signage and information boards at the site	

## II. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

5. At the feasibility stage the primary management framework<sup>1</sup> for the implementation of the environmental management plan (EMP) for the two subprojects in Kien Giang province is summarized in Figure 1.

**Figure 1: Management Framework for Implementation of EMP**



6. The Ministry of Culture Sport and Tourism (MCST) is the executing agency (EA) for the project and will take overall responsibility for the successful implementation of the EMP. The EA will establish a Ha Noi-based Project Coordination Unit (PCU) within the Department of Planning and Finance which, *inter alia*, will provide a PCU Safeguards Officer (PCU-SO) to coordinate EMPs in all project provinces. The PCU-SO will provide operational guidance to the PIU for implementation of the EMP, and will liaise with the ADB on the submission of consolidated environmental safeguards reports.

7. The Kien Giang provincial Department of Culture Sport and Tourism (DCST) will establish a project implementation unit (PIU), to oversee day to day implementation of the project, including EMP implementation and reporting to the PCU and provincial authorities. The

<sup>1</sup> Adapted from Aide Memoire of Interim Workshop, and PAM 11/13

PIU will consist of staff with expertise in infrastructure and tourism development. The PIU Director will appoint a PIU *Safeguards Officer* (PIU-SO) who will supervise implementation of the EMP. The PIU-SO will also oversee implementation of the Contractor Environmental Management Plans (CEMP)<sup>2</sup> for the particular construction packages in Ha Tinh Province. Expertise from the Department of Transportation (DOT)/Department of Construction (DOC) will be cross appointed to the PIU when necessary.

8. The civil works contractor's Chief of Construction (CCW) will be responsible for all construction activities at the construction sites, including compliance with the EMP. The CCW will assign an *Environmental Officer* (EO) to ensure the contractor's responsibilities for the EMP are met, to be monitored by the Construction Supervision Consultant (CSC).

9. External support to the PIU for EMP updating, capacity building, and monitoring will be provided by the *International and National Environment Specialists* (ES) of the Project Management and Design Consultant<sup>3</sup> firm (PMDC). The PMDC will have a provisional sum to engage an *Environmental Monitoring Consultant* (EMC) to conduct field sampling and laboratory analyses of field samples (e.g., water quality, air quality) as required.

10. The responsibilities of the different agencies involved in the management framework outlined in Figure 1 are listed in Appendix A. Provided below is a summary of key responsibilities for implementation of the EMP.

11. The responsibilities of the EA as supported by PCU include:

1. Coordinate environmental and social safeguards implementation and monitoring undertaken by the PIU;
2. Liaise with ADB on the implementation of the EMP; and
3. Coordinate resolution with PIU, and ADB if necessary with issues arising from the implementation of EMP.

12. The responsibilities of the PIU Safeguards Officer include

1. Assist PMDC with updating the EMP to meet final detailed subproject designs;
2. Notify DCST to verify GoV approvals of project are met, and that EMP is compliant with requirements of the Law on Environmental Protection (LEP) 2005 as implemented by Decree 29/2011/ND-CP, and Circular 26/2011/TT-BTNMT.
3. Assist PMDC with inclusion of CEMP requirements in contractor bid documents including bid evaluations based on updated EMP;
4. Undertake day to day management of EMP implementation activities;
5. Work with EMC on implementation of monitoring plan of EMP;
6. Ensuring compliance with loan covenants and assurances in respect of all subprojects, including EMPs (as well as EMDPs, GAPs, resettlement plans);
7. Lead follow-up meetings with all affected stakeholders;
8. Prepare and submit quarterly reports on EMP implementation to PCU;
9. Oversee implementation of CEMP by contractor;
10. Coordinate with ES of PMDC for EMP implementation;

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<sup>2</sup> Contractor Environmental Management Plan prepared by contractor as part of bid documents based on updated EMP

<sup>3</sup> PMDC based in PCU.

11. Undertake regular construction site inspections to ensure contractor implements CEMP properly; and
  12. Ensure EO/CCW of contractor submits monthly reports on construction mitigations and monitoring.
13. The responsibilities of the environment specialists (international and national) of the PMDC are detailed in the Terms of Reference for the two positions, as set out in Appendix B. The consultant's key responsibilities for the EMP are:
1. Update the EMP to meet final detailed designs of subprojects;
  2. Provide technical direction and support to PIU/SO for implementation of EMP;
  3. Oversee design and delivery of capacity development and training of PIU-SO and EO of contractor(s);
  4. Provide advice and support to EMC with their monitoring activities;
  5. Review all environmental reports prepared by PIU and EMC for PCU and ADB; and
  6. Review location of any possible contaminated sites near subprojects.
14. The responsibilities of Environmental Monitoring Consultant (EMC) include:
1. Implement the environmental sampling required for monitoring plan of EMP that cannot be conducted by the contractor and PIU.
  2. Perform required laboratory analyses for monitoring program detailed in EMP; and
  3. Prepare and submit quarterly reports to PIU on monitoring activities.
15. The responsibility of the contractor's Chief of Construction Work (CCW) with assistance from the contractor's Environmental Officer (EO) includes:
1. Ensure implementation of the CEMP during the construction phase; and
  2. Prepare and submit monthly reports on mitigation and monitoring activities of CEMP and any environmental issues at construction sites.
16. The responsibility of Construction Supervision Consultant (CSC) is to supervise all construction activities and oversee implementation of CEMP in close coordination with the PIU-SO.
17. The Department of Natural Resources and Environment (DoNRE) oversees environmental management of the Kien Giang province. The DoNRE with district staff provide direction and support for environmental protection-related matters including application of the Law on Environmental Protection (2005) as implemented by Decree 29/2011/ND-CP, and Circular 26/2011/TT-BTNMT, and national environmental standards and criteria. The environmental standards and criteria for Viet Nam are listed in Appendix C. See the IEE for the complete legal and regulatory framework for environmental management in Viet Nam.
18. The ADB provides guidance to EA/PCU with any issues related to EMP, and reviews biannual reports on EMP activities compiled and submitted by PCU.

#### **A. Worker and Community Health and Safety**

19. MoLISA, and counterpart provincial Department of Labour, Invalids and Social Assistance (DoLISA) prescribes regulations and guidelines governing worker and public safety



in the workplace<sup>4</sup>. The directives of M/DoLISA must be followed throughout the construction and operational phases of the subprojects. To supplement the M/DoLISA the IFC/World Bank Environment, Health, and Safety Guidelines (2007) should be consulted when necessary.

### III. SUMMARY OF POTENTIAL IMPACTS

20. The potential impacts of the construction and operation of the two subprojects in Kien Giang, detailed in the IEE, are summarized in Table 3. The potential impacts primarily concern the civil works during the construction phase. The short-term disturbances of the construction of the access road upgrades and tourist facilities, concern noise, dust, reduced access, increased traffic and risk of traffic accidents, worker and public safety, and local soil erosion and sedimentation, and solid and liquid waste. These short-term impacts can be managed and mitigated.

**Table 3. Summary of Potential Environmental Impacts of Subprojects in Kien Giang**

<b>Pre-construction Phase</b>
<p>Phu Tu Environmental Improvement.</p> <ul style="list-style-type: none"> <li>• Reorganization of 51 small shops and stalls from the beach front and main access road into a market area with improved sanitation and drainage that is better organized for tourist circulation and beach access.</li> </ul>
<p>Da Dung Cave Access Improvement</p> <ul style="list-style-type: none"> <li>• No impacts</li> </ul>
<b>Construction Phase</b>
<p>Phu Tu Environmental Improvement</p> <p style="padding-left: 20px;"><u>Access Road &amp; Car Park, Public Toilets, New Market Buildings/Kiosks</u></p> <ul style="list-style-type: none"> <li>• Disturbances from civil works such as dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution from NOx, SOx, &amp; CO caused by increased truck traffic and heavy equipment use, soil and surface water pollution caused by equipment operation and maintenance, public and worker accidents, disruption of traffic, increased traffic accidents, land erosion, drainage and flooding problems, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers.</li> <li>• Potential encroachment into southern adjacent forested headland which may support rare and endangered wildlife as part of Kien Giang Nature Reserve</li> <li>• Sedimentation and pollution of coastal waters near passenger pier.</li> </ul>

<sup>4</sup>Example, Decree 110/2002/ND-CP, supplementing some Articles of Decree 06/1995 on Labor Code of Occupational Safety and Health, Decree 06/1995, Elaborating Provisions of Labor Code on Occupational Safety and Health.

- Disrupted passenger ferry activities, and vendor business in market area

Da Dung Cave Access Improvement

Access Road & Car Park, Public Toilets, Kiosks

- Disturbances from civil works such as dust, noise, reduced and/or blocked public access, disrupted business and recreation, noise, dust and air pollution from NOx, SOx, & CO caused by increased truck traffic and heavy equipment use, soil and surface water pollution caused by equipment operation and maintenance, public and worker accidents, disruption of traffic, increased traffic accidents, land erosion, drainage and flooding problems, solid and domestic waste from worker camps, social issues and community problems caused by migrant workers.
- Civil works in and around caves could result in bat and other wildlife populations vacating caves
- Disruption of tourist access to caves, and business of vendors

**Operation Phase**

Phu Tu Environmental Improvement.

- Solid waste and litter from inadequate garbage collection and disposal
- Local pollution from improperly maintained toilet blocks and ABR septic system
- Increased boat traffic along shoreline leading to:
  - (i) increased water pollution and boat accidents; and
  - (ii) destruction or damage to seagrass, and mangrove forests along shoreline of forested headland
- Increased vehicle on access road leading to increased traffic congestion, accidents & air pollution.

Da Dung Cave Access Improvement

- Solid waste litter from inadequate garbage collection and disposal
- Local pollution from improperly maintained toilet blocks and ABR septic system
- Increased vehicle on access road leading to increased traffic congestion, accidents & air pollution.

## **A. Public Consultation**

21. The stakeholder consultation strategy that was developed for the IEE will be continued with the start of the pre-construction phase of both subprojects. The first step will be to disclose the draft IEE to the affected stakeholders that were consulted to obtain their views and comment.

### **1. Follow-up Consultation**

22. As indicated in the IEE, a concern of the public and stakeholders of the subproject were disturbances during construction of the upgrades to roads and tourist facilities, and the effect of the upgraded road on increased traffic, and traffic accidents. These issues plus any others will be reviewed during follow-up consultations throughout the pre-construction, construction, and operation of the completed subproject components. The APs consulted along both access roads must be contacted during detailed design of the works and before and during the construction phase.

## **IV. MITIGATION PLAN**

23. The impact mitigation measures of the EMP are presented in a comprehensive mitigation plan for the subproject in Table 4. Similar to IEE the mitigation plan is structured by the three development phases of the subproject defined by the pre-construction; construction; and post construction operational phase. Where possible the mitigation plan addresses the environmental issues and concerns raised at the stakeholder meetings.

24. The mitigation plan combines construction phase impacts common to both subprojects for which single mitigation measures are prescribed. In this way common mitigation measures are not re-stated numerous times. However, impacts and required mitigations specific to subproject component are also identified. Or, common mitigations that are particularly important for a subproject component are underscored.

25. The mitigation plan identifies potential impacts, required mitigations, responsible parties, location, timing, and indicative costs. The mitigation plan by design is comprehensive in order for the plan to be updated easily to meet the final detailed designs of the subproject.

**Table 4. Environmental Impact Mitigation Plan**

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost <sup>5</sup> (USD)	Responsibility	
							Supervision	Implementation
<b><i>Pre-Construction, Detailed Design Phase</i></b>								
Confirmation of required resettlement, relocations, & compensation	No negative environmental impacts	1. Affected persons well informed well ahead of subproject implementation.	All affected persons in subproject areas	Before project implemented	See resettlement plans	See resettlement plan	PCU/PIU/SO	Resettlement/ compensation committees
Establish schedule for most disruptive subproject activities	Prevent or minimize disruption to tourism and commerce at Phu Tu	2. A formal meeting among affected vendors/restaurant operators, PIU, and KGBSR to be held to identify most optimal and feasible schedule for most disruptive subproject activities	All affected commercial enterprises in subproject area	Before project implemented	Once, for all parties	No marginal cost <sup>6</sup>	PMDC/PIU/ KGBSR	PIU/KGBSR/ stakeholders
Disclosure, & engagement of community	No community impacts	3. Initiate Information Disclosure and Grievance process of IEE	For all construction sites.	Beginning of project	Quarterly	No marginal cost	PIU/SO	PIU
Implement CITES with Output 2 and Output 3 of subproject	Prevention of illegal trade of wildlife	4. Integrate mitigation measures and activities from Output 2 and Output 3 that support CITES and the prevention of illegal wildlife harvesting and trade	Entire subproject area	Beginning of project	Once	No marginal cost	PIU/SO	PIU
GoV approvals	No negative impact	5. Notify DoNRE of subproject initiation to complete EA requirements, and obtain required project permits and certificates.	Entire subproject	Before construction	As required	No marginal cost	PIU/DoNRE	DoNRE

<sup>5</sup> Costs will need to be updated during detailed design phase.

<sup>6</sup>No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractors

Detailed designs of subproject	Minimize negative environmental impacts	<p>6. Work with PMDC<sup>7</sup> to complete detailed designs of the upgraded access roads &amp; cave tourist facilities. Ensure the following measures are included:</p> <p>a) identification of spill management prevention plans, and emergency response plans for all construction sites;</p> <p>b) no disturbance or damage to culture property and values;</p> <p>c) minimal acquisition of agriculture and forested lands, no cutting of trees in protected forest;</p> <p>d) source aggregate borrow pits, and rock supply areas outside Hon Chong nature reserve (Fig. 20 IEE), and away from human settlements with fencing and access barriers;</p> <p>e) no, or minimal disruption to village water supplies along access roads, utilities, and electricity with contingency plans for unavoidable disruptions;</p> <p>f) no, or minimal disruption to normal pedestrian and vehicle traffic along all road segments with contingency alternate routes;</p> <p>g) for village areas include specific plan to notify &amp; provide residents and merchants of construction activities &amp; schedule to minimize disruption to normal commercial and residential activities.</p>	Final siting	Before construction initiated	Once with detailed designs documents	No marginal cost	PMDC	EA/PIU
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<sup>7</sup>PMDC is project management and design consultant to be determined

Update EMP	Positive environmental impacts	<p>7. Review finalized RoW of access road to confirm absence of valued ecological or cultural resources.</p> <p>8. Re-clarify with DoNRE that no known rare or endangered species inhabit the subproject areas</p> <p>9. Identify any new potential impacts of subproject and include in EMP with special attention to Phu Tu and forested headland area of Hon Chong HR</p> <p>10. Confirm ABR drainage field location, and septage disposal site with DoNRE</p> <p>11. Update mitigation measures and monitoring requirements of EMP where necessary to meet detailed designs, and to protect affected environments.</p> <p>12. Submit updated EMP with new potential impacts to ADB to review.</p> <p>13. Develop individual management sub-plans for CEMP:  a) Construction drainage; b) Erosion; c) Noise and Dust; d) Contaminated Spoil Disposal; e) Solid and Liquid Waste Disposal; f) Construction &amp; Urban Traffic; g) Utility and Power Disruption; h) Worker and Public Safety; i) Tree and Vegetation Removal and Site Restoration; j) Construction Materials Acquisition, Transport, &amp; Storage, and k) Cultural chance finds.</p>	All sites	Before construction initiated	Once with detailed designs documents		PMDC	EA/PIU
Update EMP	Positive environmental impacts	<p>14. Document water quality &amp; presence of aquatic biota at shoreline, and at access road stream crossings</p>	All streams crossed by access roads, and at nearshore of Phu Tu	Before construction initiated	Once with updated EMP	See Monitoring Plan below	PMDC	PMDC/SO
Confirm GoV approved construction waste disposal sites	No negative impact	<p>15. Notify DoNRE to confirm locations of sites for borrow pits and disposal areas for construction and hazardous waste for subprojects, and obtain required permits. Locate all disposal sites outside Kieng Giang nature reserve</p>	Entire subproject	Before construction	As required	No marginal cost	PIU/DoNRE	PIU
UXO survey, & removal	Injured worker or public	<p>16. Ensure GoV military is consulted and clears areas where necessary</p>	All construction sites.	Beginning of subproject	Once	See Monitoring Plan below	EA/PIU	GoV military

Develop bid documents	No negative environmental impact	17. Ensure updated EMP is included in contractor tender documents, and that tender documents specify requirements of EMP must be budgeted. 18. Specify in bid documents that contractor must have experience with implementing EMPs, or provide staff with the experience.	All subproject areas	Before construction begins	Once for all tenders	No marginal cost	PMDC	PIU
Create awareness of physical cultural resources in area	No negative environmental impact	19. DCST to review potential locations of physical resources, and explain possible PCR to contractors and PMDC	All subproject areas	Before construction begins	Once	No marginal cost	DCST	DCST
Obtain & activate permits and licenses	Prevent or minimize impacts	20. Contractors to comply with all statutory requirements set out by GoV for use of construction equipment, and operation construction plants such as concrete batching.	For all construction sites	Beginning of construction	Once	No marginal cost	PMDC	PIU & contractors
Capacity development	No negative environmental impact	21. Develop and schedule training plan for PIU/SO/EO to be able to fully implement EMP, and to manage implementation of mitigation measures by contractors. 22. Create awareness and training plan for contractors whom will implement mitigation measures.	All subproject areas	Before construction begins	Initially, refresher later if needed	No marginal cost	PMDC	PMDC
Recruitment of workers	Spread of sexually transmitted disease	23. Use local workers as much as possible thereby reducing #s of migrant worker	All work forces.	Throughout construction phase	Worker hiring stages	No marginal cost	EA/PIU	Contractor's bid documents
<b>Construction Phase of Both Subproject Components</b>								
Initiate EMP & sub-plans	Prevent or minimize impacts	24. Initiate updated EMP & CEMP including individual management sub-plans for different potential impact areas that are completed in pre-construction phase (see sub-plan guidance below).	For all construction sites	Beginning of construction	Once	No marginal cost	PMDC	PIU& contractors

Worker camps	Pollution and social problems	<p>25. Locate worker camps away from human settlements.</p> <p>26. Ensure adequate housing and waste disposal facilities including pit latrines and garbage cans.</p> <p>27. A solid waste collection program must be established and implemented that maintains a clean worker camps</p> <p>28. Locate separate pit latrines for male and female workers away from worker living and eating areas.</p> <p>29. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times.</p> <p>30. Worker camps must have adequate drainage.</p> <p>31. Local food should be provided to worker camps. Guns and weapons not allowed in camps.</p> <p>32. Transient workers should not be allowed to interact with the local community. HIV Aids education should be given to workers.</p> <p>33. Camp areas must be restored to original condition after construction completed.</p>	All worker camps	Throughout construction phase	Monthly	No marginal cost	PMDC/PIU	contractor
Training & capacity	Prevent of impacts through education	34. Implement training and awareness plan for PIU/SO/EO and contractors.	PIU office, construction sites	Beginning of construction	After each event	No marginal cost	PMDC	PMDC/PIU



<p>Implement construction materials acquisition, transport, and storage sub-plan</p>	<p>Pollution, injury, increased traffic, disrupted access</p>	<p>35. All borrow pits and quarries should be approved by DoNRE, and located outside Kieng Giang nature reserve.</p> <p>36. Select pits and quarries in areas with low gradient and as close as possible to construction sites.</p> <p>37. Required aggregate volumes must be carefully calculated prior to extraction to prevent wastage.</p> <p>38. Pits and quarries should not be located near surface waters, forested areas, critical habitat for wildlife, or cultural property or values.</p> <p>39. If aggregate mining from fluvial environments is required small streams and rivers should be used, and dry alluvial plains preferred.</p> <p>40. All topsoil and overburden removed should be stockpiled for later restoration.</p> <p>41. All borrow pits and quarries should have a fence perimeter with signage to keep public away.</p> <p>42. After use pits and quarries should be dewatered and permanent fences installed with signage to keep public out, and restored as much as possible using original overburden and topsoil.</p> <p>43. Unstable slope conditions in/adjacent to the quarry or pit caused by the extractions should be rectified with tree planting.</p> <p>44. Define &amp; schedule how materials are extracted from borrow pits and rock quarries, transported, and handled &amp; stored at sites.</p> <p>45. Define and schedule how fabricated materials such as steel, wood structures, and scaffolding will transported and handled.</p> <p>46. All aggregate loads on trucks should be covered.</p>	<p>For all construction areas.</p>	<p>Throughout construction phase</p>	<p>Monthly</p>	<p>No marginal cost</p>	<p>PMDC/PIU</p>	<p>contractor</p>
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<p>DBST production, and application</p>	<p>Air pollution, land and water contamination, and traffic &amp; access problems,</p>	<p>47. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non- traffic areas</p> <p>48. Stored DBST materials well away from all human activity and settlements, and cultural (e.g., schools, hospitals), and ecological receptors. Bitumen production and handling areas should be isolated.</p> <p>49. Contractors must be well trained and experienced with the production, handling, and application of bitumen.</p> <p>50. All spills should be cleaned immediately and handled as per hazardous waste management plan, and according to GoV regulations.</p> <p>51. Bitumen should only be spread on designated road beds, not on other land, near or in any surface waters, or near any human activities.</p> <p>52. Bitumen should not be used as a fuel.</p>	<p>For all construction areas.</p>	<p>Throughout construction phase</p>	<p>Monthly</p>	<p>No marginal cost</p>	<p>PMDC &amp; PIU</p>	<p>contractor</p>
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Implement spoil management sub-plan	Contamination of land and surface waters from excavated spoil, and construction waste	<p>53. Uncontaminated spoil to be disposed of in GoV-designated sites, which must never be in or adjacent surface waters or coastal shoreline. Designated sites must be clearly marked and identified.</p> <p>54. Spoil must not be disposed of on sloped land, near cultural property or values, ecologically important areas, or on/near any other culturally or ecologically sensitive feature.</p> <p>55. Where possible spoil should be used at other construction sites, or disposed in spent quarries or borrow pits.</p> <p>56. A record of type, estimated volume, and source of disposed spoil must be recorded.</p> <p>57. Contaminated spoil disposal must follow GoV regulations including handling, transport, treatment (if necessary), and disposal.</p> <p>58. Suspected contaminated soil must be tested, and disposed of in designated sites identified as per GoV regulations.</p> <p>59. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity.</p>	All excavation areas	Throughout construction phase	Monthly	See Monitoring Plan for contaminated soil analyses	PMDC & PIU & DoNRE	contractor
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Implement solid and liquid construction waste sub-plan	Contamination of land and surface waters from construction waste	<p>60. Management of general solid and liquid waste of construction will follow GoV regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force.</p> <p>61. Areas of disposal of solid and liquid waste to be determined by GoV.</p> <p>62. Disposed of waste should be catalogued for type, estimated weigh, and source.</p> <p>63. Construction sites should have large garbage bins.</p> <p>64. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible.</p> <p>65. Solid waste should be separated and recyclables sold to buyers in community.</p> <p><u>Hazardous Waste</u></p> <p>66. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow GoV regulations.</p> <p>67. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents)</p> <p>68. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors.</p> <p>69. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.</p>	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	PMDC & PIU & DoNRE	contractor
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Implement Noise and dust sub-plan	Dust Noise	<p>70. Regularly apply wetting agents to exposed soil and construction roads.</p> <p>71. Cover or keep moist all stockpiles of construction aggregates, and all truck loads of aggregates.</p> <p>72. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work completed.</p> <p>73. As much as possible restrict working time between 07:00 and 17:00. In particular are activities such as pile driving.</p> <p>74. Maintain equipment in proper working order</p> <p>75. Replace unnecessarily noisy vehicles and machinery.</p> <p>76. Vehicles and machinery to be turned off when not in use.</p> <p>77. Construct temporary noise barriers around excessively noisy activity areas where possible.</p>	All construction sites.	Fulltime	Monthly	No marginal cost	PMDC& PIU	contractor
Implement utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity	<p>78. Develop carefully a plan of days and locations where outages in utilities and services will occur, or are expected.</p> <p>79. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages.</p> <p>80. Contact affected community to inform them of planned outages.</p> <p>81. Try to schedule all outages during low use time such between 24:00 and 06:00.</p>	All construction sites.	Fulltime	Monthly	No marginal cost	PMDC& PIU & Utility company	contractor

Implement tree and vegetation removal, and site restoration sub-plan	Damage or loss of trees, vegetation, and landscape	<p>82. Contact DARD for advice on how to minimize damage to trees and vegetation.</p> <p>83. Restrict tree and vegetation removal to within RoW.</p> <p>84. Within RoW minimize removals, and install protective physical barriers around trees that do not need to be removed.</p> <p>85. All RoW to be re-vegetated and landscaped after construction completed. Consult DARD to determine the most successful restoration strategy and techniques. Aim to replant three trees for each tree removed.</p>	All construction sites.	Beginning and end of subproject	Monthly	No marginal cost	PMDC& PIU	contractor
Implement erosion control sub-plan	Land erosion	<p>86. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas.</p> <p>87. Earthworks should be conducted during dry periods.</p> <p>88. Maintain a stockpile of topsoil for immediate site restoration following backfilling.</p> <p>89. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready.</p> <p>90. Re-vegetate all soil exposure areas immediately after work completed.</p>	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMDC& PIU	contractor

Implement worker and public safety sub-plan	Public and worker injury, and health	<p>91. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites.</p> <p>92. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites.</p> <p>93. Worker and public safety guidelines GoV should be followed (DoLISA regulations &amp; guidelines).</p> <p>94. Population near possible blast areas should be notified 24 hrs ahead, and evacuated well before operation. Accepted GoV blast procedures and safety measures implemented.</p> <p>95. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all roads used by construction vehicles.</p> <p>96. Standing water suitable for disease vector breeding should be filled in.</p> <p>97. Worker education and awareness seminars for construction hazards should be given at beginning of construction phase, and at ideal frequency of monthly. A construction site safety program should be developed and distributed to workers.</p> <p>98. Appropriate safety clothing and footwear should be mandatory for all construction workers.</p> <p>99. Adequate medical services must be on site or nearby all construction sites.</p> <p>100. Drinking water must be provided at all construction sites.</p> <p>101. Sufficient lighting be used during necessary night work.</p> <p>102. All construction sites should be examined daily to ensure unsafe conditions are removed.</p>	All construction sites.	Fulltime	Monthly	No marginal cost	PMDC & PIU	contractor
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Civil works	Degradation of water quality & aquatic resources	<p>103. Protective coffer dams, berms, plastic sheet fencing, or silt curtains should be placed between all earthworks and surface waters including coastal zone.</p> <p>104. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion.</p> <p>105. Earthworks should be conducted during dry periods.</p> <p>106. All construction fluids such as oils, and fuels should be stored and handled well away from surface waters and ocean.</p> <p>107. No waste of any kind is to be thrown in surface waters or in ocean.</p> <p>108. No washing or repair of machinery near surface waters and ocean.</p> <p>109. Pit latrines to be located well away from surface waters and ocean.</p> <p>110. No unnecessary earthworks in or adjacent to water courses and ocean.</p> <p>111. No aggregate mining from rivers, lakes, or ocean.</p> <p>112. All irrigation canals and channels to be protected the same way as rivers, streams, and lakes</p>	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMDC& PIU	contractor
Civil works	Degradation of terrestrial resources	<p>113. All construction sites should be located away forested or all plantation areas as much as possible.</p> <p>114. No unnecessary cutting of trees.</p> <p>115. All construction fluids such as oils, and fuels should be stored and handled well away from forested and plantation areas.</p> <p>116. No waste of any kind is to be discarded on land or in forests/plantations.</p>	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMDC& PIU	contractor



Implement construction and urban traffic sub-plan	Traffic disruption, accidents, public injury	<p>117. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage &amp; warning lights.</p> <p>118. Post speed limits, and create dedicated construction vehicle roads or lanes.</p> <p>119. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads.</p> <p>120. Demarcate additional locations where pedestrians can develop road crossings away from construction areas.</p> <p>121. Increase road and walkway lighting.</p>	All construction sites	Fulltime	Monthly	No marginal cost	PMDC& PIU	contractor
Implement construction drainage sub-plan	Loss of drainage & flood storage	<p>122. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding.</p> <p>123. Manage to not allow borrow pits and quarries to fill with water. Pump periodically to land infiltration or nearby water courses.</p> <p>124. Install temporary storm drains or ditches for construction sites</p> <p>125. Ensure connections among surface waters (ponds, streams) are maintained or enhanced to sustain existing storm water storage capacity.</p> <p>126. Protect surface waters from silt and eroded soil.</p>	All areas with surface waters	Design & construction phases	Monthly	No marginal cost	PMDC& PIU	contractor
Civil works & Chance finds sub-plan	Damage to cultural property or values, and chance finds	<p>127. As per detailed designs all civil works should be located away from all cultural property and values. DCST identified potential sites and types of PCR in pre-con phase.</p> <p>128. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds.</p> <p>129. Upon a chance find all work stops immediately, find left untouched, and PIU notified to determine if find is valuable. Culture section of DCST notified by telephone if valuable.</p> <p>130. Work at find site will remain stopped until DCST allows work to continue.</p>	All construction sites	At the start , and throughout construction phase	Monthly	No marginal cost	PMDC& PIU	contractor

<b>Construction Phase of Phu Tu Environmental Improvement Subproject</b>							
All civil works	Encroachment into forested headland of Hon Chong NR Damage to mangrove forests	131. No civil works are to occur near or inside forested area. No access to headland should be allowed by anyone. 132. No civil works are to occur near mangrove forests along shoreline of headland	Forested headland south of Phu Tu tourist area	Fulltime	No marginal cost	PIU	contractor  Monthly
<b>Post-construction Operation of Improvements at Phu Tu Tourist Site</b>							
Operation of upgraded road	Increased risk of accident or injury.	133. Enforce well marked speed limits, and educate District on new road safety in Phu Tu tourist area.	Upgraded road	Fulltime	Biannual	O&M	DoT
	Increased air & water pollution, & noise	134. Ensure local vehicles maintained in proper working condition		Periodic checks			
Operation of upgraded passenger pier	Increased risk of accident or injury.	135. Enforce well marked boat speed limits and ferry boat lanes in nearshore area, and educate ferry boat operators on navigation in Phu Tu tourist area.	Passenger pier, and nearshore areas	Fulltime	Biannual	O&M	DoT
	Destruction of mangroves, & pollution from boat activity	136. Place well marked signage along shore identifying mangrove areas, and enforce good working order of all passenger boats					
Operation of toilet blocks & ABR septic system, and solid waste management	Local pollution	137. Institute formal management plan for septage removal from ABR, and toilet block maintenance, as well as solid waste collection and disposal in DoNRE approved locations (Ha Tien or Rach Gia landfill)	Entire Phu Tu Site	Fulltime	Biannual	O&M	DCST
<b>Post-construction Operation of Improved Access to Da Dung Cave</b>							
Operation of public toilets, and garbage collection	Solid and domestic waste pollution	138. Ensure ABR waste system is maintained with septage removed regularly and disposed in DoNRE- approved areas. Garbage bins must be emptied and garbage removed regularly, and disposed in DoNRE- approved Ha Tien landfill.	Entire Da Dung Cave Site	Fulltime	Biannual	O&M	DCST

## **V. MONITORING PLAN**

26. The environmental monitoring plan for the EMP is provided in Table 5. The monitoring plan focuses on all three phases (pre-construction, construction, post-construction operation) of the subproject and consists of environmental indicators, the sampling locations and frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected positive or negative environmental impacts of the subprojects.

### **A. Environmental Quality Standards for Subproject Components**

27. Environmental quality standards and criteria for Viet Nam are listed in Appendix C. The environmental standards provided by the Environmental, Health and Safety Guidelines of the IFC/World Bank (2007) should be consulted to supplement standards that are not provided by the GoV.

28. An independent environmental monitoring consultant (EMC) will be required to implement the environmental monitoring program. The EMC will be responsible for the sampling of environmental parameters that must be analyzed in a laboratory. The SO and EO will coordinate with the EMC. The PMDC/PIU will provide logistical support to the EMC where necessary for the implementation of environmental monitoring plan.

29. After construction is completed and the upgraded access roads and improved tourist facilities at Phu Tu Tourist Site and Da Dung cave are in operation the impact the road upgrades on traffic patterns and frequency of accidents should be monitored by the DoT as well as boat traffic and accidents at Phu Tu. The natural environment of both subproject areas should be monitored by the DCST with assistance from DoNRE when necessary. Monitoring of the success of any minor resettlement/compensation will be undertaken as part of the separate RP prepared for the subproject.

#### **1. Performance Monitoring**

30. Performance monitoring is required to assess the overall performance of the EMP. A performance monitoring system will be developed by the EA for the entire subproject. Select indicators of major components of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 6.

#### **2. Reporting**

31. Regular reporting on the implementation of mitigation measures and on monitoring activities during construction phase of the subproject is required. Reporting is the responsibility of the PIU and should be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. The mitigation and monitoring plans (Tables 4 and 5) summarize proposed timing of reporting.

32. A report on environmental monitoring and implementation of EMP for both subprojects will be prepared quarterly for the EA/PCU by the PIU. The PIU report will compile monthly reports provided by the EO of contractor, the reports of the EMC on monitoring, and input from the ES of the PMDC. The PIU report will be sent to DoNRE and consolidated by the PCU for transmission to ADB. The reports will table all indicators in the monitoring plan of the EMP including performance monitoring indicators (Table 5) and will include relevant GoV environmental quality standards.

**Table 5: Environmental Monitoring Plan**

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD)
					Supervision / Implementation		
					Supervision	Implementation	
<b>Pre-construction Phase – Update Environmental Baseline Conditions for both Subprojects</b>							
Update baseline on sensitive receptors (e.g., cultural property & values, rare/endangered species, critical habitat), and aquatic resources at stream crossings.	A) Final RoW for access road upgrades,	Original field work, community consultations	Once	Once	EA/PIU	Environmental Monitoring Consultant	\$3,000.
A) Air quality: dust, CO, NOx, SOx, noise, wind, temperature, and vibration levels B) Affected surface water quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD <sub>5</sub> , temperature, TDS, NH <sub>3</sub> , NH <sub>4</sub> , other nutrient forms of N&P	A): In residential areas & on site B): At stream crossings and at pier site	Using field and analytical methods approved by DoNRE.	One day and one night measurement during rainy & dry seasons.	One baseline supplement report before construction phase starts	PIU	Environmental Monitoring Consultant	A) \$4,000. B) \$5,000.
Inventory of present and past land uses that could cause contaminated soil.	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoNRE.	Once	Once	PIU	Environmental Monitoring Consultant	\$500.
<b>Construction Phase of Phu Tu Environmental Improvements and Da Dung Access Improvements</b>							
Analysis of soil quality (heavy metals (As, Cd, Pb, oil & grease, hydrocarbons).	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoNRE.	Once if needed	Once	PIU	Environmental Monitoring Consultant	\$4,000.

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD)
					Supervision / Implementation		
					Supervision	Implementation	
<p>A) Air quality: dust, CO, NOx, SOx, noise, wind, temperature, and vibration levels</p> <p>B) Affected surface water quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD<sub>5</sub>, temperature, TDS, NH<sub>3</sub>, NH<sub>4</sub>, other nutrient forms of N&amp;P</p> <p>C) Analysis of soil quality (heavy metals (As, Cd, Pb, Hg, Mn), hydrocarbons.</p> <p>D) Domestic (worker) and construction solid waste inside &amp; outside construction sites including worker camps.</p> <p>E) Public comments and complaints</p> <p>F) Incidence of worker or public accident or injury</p>	<p>A &amp; B): Baseline sites of pre-construction phase.</p> <p>C) At sites where contaminated soil is suspected.</p> <p>D) All construction sites and worker camps</p> <p>E) Using hotline number placed at construction areas</p> <p>F) At all construction areas</p>	<p>A – C : Using field and analytical methods approved by DoNRE.</p> <p>Include visual observations of dust and noise from contractor &amp; public reports .</p> <p>D) Visual observation</p> <p>E) Information transferred by telephone hotline number posted at all construction sites.</p> <p>F) regular reporting by contractors/PIU</p>	<p>(A – B): Quarterly during construction periods</p> <p>Daily visual records</p> <p>C) Once at start of excavations</p> <p>D) Monthly</p> <p>E) Continuous public input</p> <p>F) Continuous</p>	Monthly	(A - D):		
					PIU	Monitoring Consultant	A & B: \$15,000./yr C: \$4,000./yr D:\$0.0
					(E & F) & daily observations:		
					EA/PIU	contractor	E: \$1,500./yr F: \$0.0
<b>Operation of Improvements at Phu Tu Tourist Site</b>							
Vehicle and boat accidents	Upgraded access road and near pier.	Regular record keeping.	Continuously	For each event	DoT		\$0.0
Incidence of garbage and litter	Entire Phu Tu Site	Visual inspection	Weekly	Quarterly	MCST		O&M
Pollution caused by toilets and septic ABR: odor, fecal coliform bacteria, NH <sub>3</sub> , NH <sub>4</sub> , other nutrient forms of N&P	Near toilet blocks and infiltration field	Smell, & adjacent stream sampling	Biannually	Biannually	MCST/DoNRE		\$2000./yr

<b>ENVIRONMENTAL EFFECTS MONITORING</b>							
<b>Environmental Indicators</b>	<b>Location</b>	<b>Means of Monitoring</b>	<b>Frequency</b>	<b>Reporting</b>	<b>Responsibility</b>		<b>Estimated Cost (USD)</b>
					Supervision / Implementation		
					<b>Supervision</b>	<b>Implementation</b>	
<b>Operation of Improved Access to Da Dung Cave</b>							
Incidence of garbage and litter	Entire Da Dung cave area	Visual inspection	Weekly	Quarterly	MCST		O&M
Pollution caused by toilets and septic ABR: odor, fecal coliform bacteria, NH <sub>3</sub> , NH <sub>4</sub> , other nutrient forms of N&P	Near toilet blocks and infiltration field	Smell, & adjacent stream sampling	Biannually	Biannually	MCST/DoNRE		\$2000./yr

**Table 6: Performance Monitoring Indicators for Subproject**

Major Environmental Component	Key Indicator	Performance Objective	Data Source
<b>Pre-construction Phase</b>			
Public Consultation and Disclosure	Number of consultations with affected stakeholders	Meetings with stakeholders contacted during IEE& new stakeholders convened for follow-up consultation& to introduce grievance mechanism	Minutes of meeting, and participants list
EMP	EMP Updated	All stakeholders contacted during IEE re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of EMP (CEMP <sup>8</sup> ) met	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
Training of DCST/PIU	Training course(s) held and on schedule	By end of preconstruction phase, required course(s) that will be delivered are designed and scheduled	Course(s) outline, participants, and schedule
<b>Construction Phase</b>			
All subproject areas	Critical habitat, rare or endangered species <b><i>if present</i></b>	All <i>present</i> critical habitat and R & E species if unchanged, and unharmed	Monitoring by EMC <sup>9</sup>
Affected water quality	TSS, DO, BOD, COD, pH, oil & grease, nutrient forms of T & N, metals (Pb, Fe, As) within allowable range <sup>10</sup>	GoV environmental standards & criteria met	Monitoring by EMC
Air quality	SOx, NOx, dust, CO, noise, vibration within allowable range	Levels never exceed pre-construction baseline levels	EMC& contractor monitoring reports,
Soil quality	Solid and liquid waste managed properly	Rigorous program of procedures & rules to collect and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Hazardous materials & waste	Oil, gasoline, grease, alum, chlorine, soda managed properly	Rigorous program of procedures to manage and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Public & worker safety	Frequency of injuries	Adherence to GoV OHS regulations/policy to prevent accidents <sup>11</sup>	Contractor reports
Cultural property	Incidence of damage, or complaints	No valued cultural property, or unearthed valuable relic is	Public input, contractor reports,

<sup>8</sup> Contractor Environmental Management Plan developed from EMP in contractor bidding document

<sup>9</sup> Environmental Monitoring Consultant hired to assist implementation of Environmental Monitoring Plan

<sup>10</sup> See Appendix C for list of available environmental quality standards

<sup>11</sup> MoLISA GoV Regulations and Policy

Major Environmental Component	Key Indicator	Performance Objective	Data Source
		harmed in any way	public input, EMC reports
Traffic	Frequency of disruptions and blocked roadways/near shore boat traffic	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports, EMC reports
<b>Operation of Upgraded Roads</b>			
Traffic/boat safety	Frequency of accidents	No increase in pre-construction frequency	DoT
Air quality	SOx, NOx, dust, , CO, noise along upgraded roads	Levels never exceed pre-construction baseline levels	DoNRE,
<b>Operation of Public Toilets in Phu Tu and Da Dung Cave Sites</b>			
Aesthetics, solid waste,	Presence of odor, uncontained garbage	Clean with no aesthetic issues	DCST

## VI. ESTIMATED COST OF IMPLEMENTING THE EMP

33. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents. From Table 5 the preliminary costs for the implementation of the EMP for the subproject are summarized in Table 7. A margin of safety has been added to account for uncertainty for the total EMP cost.

34. An estimated budget of USD \$15,000 is required for capacity building and training for environmental management in conjunction with other capacity development activities of the project such as occurring under outputs 3 and 4. The costs will need to be updated by the PMDC in conjunction with the PIU during the pre-construction phase.

**Table 7: Estimated Costs for Environmental Monitoring Plan**

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors	\$3,000
environmental quality	\$9,500
Construction Phase	
environmental quality	\$46,000
public consultation	\$3,000
Post-construction Operation Phase	
environmental quality	\$20,000
public input	--
<b>Total</b>	<b>\$81,500.00</b>



**VII. EMERGENCY RESPONSE PLAN**

35. The Contractor must develop emergency or incident response procedures during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase should ensure:

- i) Emergency Response Team (ERT) of the Contractor as initial responder;
- ii) District fire and police departments, emergency medical service, the Department of Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

36. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

**Table 8. Roles and Responsibilities in Emergency Incident Response**

Entity	Responsibilities
Contractor Team (ERT)	<ul style="list-style-type: none"> <li>- Communicates / alerts the EERT.</li> <li>- Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site.</li> <li>- When necessary &amp; requested by the EERT, lends support / provides assistance during EERT’s response operations.</li> </ul>
External Emergency Response Team (EERT)	<ul style="list-style-type: none"> <li>- Solves the emergency/incident</li> </ul>
Contractor Resources	<ul style="list-style-type: none"> <li>- Provide and sustain the people, equipment, tools &amp; funds necessary to ensure Subproject’s quick response to emergency situations.</li> <li>- Maintain good communication lines with the EERT to ensure prompt help response &amp; adequate protection, by keeping them informed of Subproject progress.</li> </ul>

37. The ERT will be led by the senior Contractor engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

38. The Contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

39. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the PCU/PIU, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

- i) Subproject sites;
- ii) construction time frame and phasing;
- iii) any special construction techniques and equipment that will be used;

- iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
- v) the Contractor's Emergency Management Plan
- vi) names and contact details of the ERT members

40. The objective of this meeting is to provide the ultimate response institutions the context for:

- i) their comments on the adequacy of the respective Emergency Management Plans
- ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
- iii) the arrangements for coordination and collaboration.

41. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

- i) set up the ERT;
- ii) set up all support equipment and facilities in working condition
- iii) made arrangements with the EERT;
- iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force;
- v) v) conduct orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and
- vi) vi) conduct drills for different possible situations.

42. To sustain effective emergency response throughout Subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

#### **A. Alert Procedures**

43. Means of communicating, reporting and alerting an emergency situation may be any combination of the following: (i) audible alarm (siren, bell or gong); (ii) visual alarm (blinking/rotating red light or orange safety flag); (iii) telephone (landline); (iv) mobile phone; (v) two-way radio; and (vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

- (i) Whoever detects an emergency situation first shall immediately :
  - call the attention of other people in the emergency site,
  - sound the nearest alarm, and/or
  - report/communicate the emergency situation to the ERT.
- (ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.
- (iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: (i) the type of emergency situation; (ii) correct location of the emergency; (ii) estimated magnitude of the situation; (iii) estimated persons harmed; (iv) time it happened; (v) in case of a spill, which hazardous substance spilled; and

(vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions.

44. For an effective reporting/alerting of an emergency situation:

- (i) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:
  - Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
  - EERT institutions/organizations
  - Concerned village authority/ies
  - PIU Office, SO
- (ii) All Subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.
- (iii) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

**B. Emergency Response Situations**

45. The following tables suggest general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the Contractor.

**Table 9: Evacuation Procedure**

<b>Procedure</b>	<b>Remarks</b>
<ul style="list-style-type: none"> <li>▪ Move out as quickly as possible as a group, but avoid panic.</li> </ul>	<ul style="list-style-type: none"> <li>▪ All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Evacuate through the directed evacuation route.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL &amp; immediately communicated to ERT members.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Keep moving until everyone is safely away from the emergency site and its influence area.</li> </ul>	<ul style="list-style-type: none"> <li>▪ A restricted area must be established outside the emergency site, all to stay beyond the restricted area.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Once outside, conduct head counts.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Report missing persons to EERT immediately.</li> </ul>	<ul style="list-style-type: none"> <li>▪ ERTL/Deputy ERTL to communicate with the EERT.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Assist the injured in evacuation &amp; hand them over to the ERT first-aiders or EERT medical group</li> </ul>	<ul style="list-style-type: none"> <li>▪ ERT to manage injured persons to ensure proper handling.</li> </ul>
<ul style="list-style-type: none"> <li>▪ If injury warrants special care, DO NOT MOVE them, unless necessary &amp; instructed/directed by the EERT.</li> </ul>	<ul style="list-style-type: none"> <li>▪ ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.</li> </ul>

**Table 10: Response Procedure during Medical Emergency**

<b>Procedure</b>	<b>Remarks</b>
<ul style="list-style-type: none"> <li>▪ Administer First Aid regardless of severity immediately.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fundamentals when giving First Aid is safety first of both the rescuer and the victim.</li> <li>▪ Do not move an injured person unless:                             <ul style="list-style-type: none"> <li>-victim is exposed to more danger when left where they are, e.g., during fire, chemical spill</li> <li>-it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure</li> <li>-Instructed or directed by the EERT.</li> </ul> </li> <li>▪ First AID to be conducted only by a person who has been properly trained in giving First Aid.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Call the EERT emergency medical services &amp;/or nearest hospital.</li> </ul>	<ul style="list-style-type: none"> <li>▪ ERTL/Deputy ERTL or authorized on-site emergency communicator</li> </ul>
<ul style="list-style-type: none"> <li>▪ Facilitate leading the EERT to the emergency site.</li> </ul>	<ul style="list-style-type: none"> <li>▪ ERTL/Deputy ERTL to instruct:                             <ul style="list-style-type: none"> <li>-an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention &amp; lead them to site.</li> <li>- Other ERT members to clear access road for smooth passage of the EERT.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ If applicable, vacate site &amp; influence area at once, restrict site, suspend work until further notice.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Follow evacuation procedure.</li> </ul>

**Table 9: Response Procedure in Case of Fire**

<b>Procedure</b>	<b>Remarks</b>
<ul style="list-style-type: none"> <li>▪ Alert a fire situation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Whoever detects the fire shall immediately:                             <ul style="list-style-type: none"> <li>-call the attention of other people in the site,</li> <li>-sound the nearest alarm, and/or foreman or any ERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department)</li> <li>-report/communicate the emergency situation to the ERTL/Deputy ERTL.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ Stop all activities/operations and evacuate.</li> </ul>	<ul style="list-style-type: none"> <li>▪ All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Activate ERT to contain fire/control fire from spreading.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Guided by the training they undertook, ERT members assigned to mitigate the</li> </ul>

Procedure	Remarks
	fire shall assess their own safety situation first before attempting to control fire spread.
<ul style="list-style-type: none"> <li>▪ Call the nearest fire &amp; police stations and if applicable, emergency medical services.</li> </ul>	<ul style="list-style-type: none"> <li>▪ When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Facilitate leading the EERT to the emergency site.</li> </ul>	<ul style="list-style-type: none"> <li>▪ ERTL/Deputy ERTL to instruct: <ul style="list-style-type: none"> <li>-an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site.</li> <li>-some ERT members to stop traffic in, &amp; clear, the access road to facilitate passage of the EERT.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ ERT to vacate the site as soon as their safety is assessed as in danger.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Follow appropriate evacuation procedure.</li> </ul>

### VIII. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

44. Currently there is little experience and capacity for environmental assessment and management amongst national counterparts responsible for the implementation of the EMP. i.e., DCST/PIU in Kien Giang province. No dedicated environmental staff exist in the DCST and thus the PIU. The PMDC with assistance from the designated SO/PIU will develop and deliver training courses to the DCST/PIU staff responsible for the implementation of the subproject. The purpose of the course(s) is to strengthen the ability of the PIU/SO to oversee implementation of the EMP by construction contractors, and EMC

45. The SO who is a full-time environmental member of the PIU as well as the EO of the contractor should attend training courses as required. Costs for training should be included with costs for implementation of the EMP.

46. Training on the implementation of an EMP should address two thematic areas. The first area should be principles environmental management focused on the potential impacts of subproject activities on the natural and social environment. The second area should be environmental safeguard requirements of the ADB and GoV with specific reference to the EMP.

## APPENDIX A: INDICATIVE RESPONSIBILITIES OF KEY MANAGEMENT UNITS OF EMP

### *Modified from Project Administration manual*

EMP implementation organizations	Roles and Responsibilities
Executing agency (EA) (MCST)	<ul style="list-style-type: none"> <li>➤ Overall responsibility for the execution of the project</li> <li>➤ Reviews the project implementation progress</li> <li>➤ Reviews and endorses any proposed change in the project scope or implementation arrangements</li> <li>➤ Supervises compliance with loan covenants</li> </ul>
Project Coordination Unit (PCU)	<ul style="list-style-type: none"> <li>➤ Project preparation, including the setting up of financial and management systems and procedures, and the procuring of PCU office equipment</li> <li>➤ Consultant recruitment and supervision</li> <li>➤ Review and approval of goods and civil works contracts, including bid documents</li> <li>➤ Coordination between the concerned agencies at the national and provincial levels</li> <li>➤ Coordination of activities of the PIUs and the inputs of concerned stakeholders</li> <li>➤ Coordination of all reporting aspects of the project</li> <li>➤ Coordination of institutional strengthening measures</li> <li>➤ Ensuring compliance with ADB Loan covenants, assurances and safeguard requirements, as well as with national and provincial policies and regulations</li> <li>➤ Provision of administrative and technical support to the PIUs</li> <li>➤ Preparation of consolidated Project accounts to be forwarded to ADB</li> <li>➤ Advice to PIUs on revenue-enhancing activities related to the recovery of costs of constructing, operating, and maintaining Project facilities and equipment;</li> <li>➤ Coordination of project audits</li> <li>➤ All specified monitoring, evaluation and reporting activities</li> <li>➤ Communication of Project's outcomes, outputs, and activities to all stakeholders</li> <li>➤ Provide coordination for safeguards and monitoring for PIU</li> </ul>
Provincial Project Steering Committee (PPSC)	<ul style="list-style-type: none"> <li>➤ Ensuring that concerns of all stakeholders are adequately reflected in the Project</li> <li>➤ Coordination of project implementation between the concerned agencies</li> <li>➤ Confirming compliance with local regulations and provincial policies</li> <li>➤ Overseeing budgeting and disbursement of counterpart funds</li> <li>➤ Overseeing implementation of resettlement plans, compensation schemes and all other project safeguard procedures</li> </ul>
Project Implementation Units (PIU) inside DCST	<ul style="list-style-type: none"> <li>➤ Coordination and supervision of consultants' inputs on the appraisal of feasibility studies, and conceptual and detailed designs construction</li> <li>➤ Procurement of goods and civil works contracts, including the preparation of bid documents and bid evaluations</li> <li>➤ Approving payments to contractors and maintaining disbursement records</li> <li>➤ Ensuring that institutional-strengthening and capacity-building initiatives involving DMOs, private partners, SMEs and CBTOs are implemented in line with agreed Project designs, schedules and budgets</li> <li>➤ Ensuring compliance with loan covenants and assurances in respect of all sub projects, including updating of IEEs, EMPs, IPPs, GAPs,</li> </ul>

EMP implementation organizations	Roles and Responsibilities
	<ul style="list-style-type: none"> <li>resettlement plans</li> <li>➤ Oversee implementation of EMP by contractor-appointed EO, and EMC</li> <li>➤ Prepare quarterly reports on EMP implementation for PCU</li> <li>➤ Coordinate with PMDC to design and deliver capacity development &amp; training.</li> <li>➤ Coordinating the process of establishing appropriate cost-recovery mechanisms</li> <li>➤ Coordinating the implementation of identified Public-Private Partnership (PPP) initiatives;</li> <li>➤ Meetings with all concerned stakeholders</li> <li>➤ Quarterly progress and monitoring-and-evaluation reporting to the PCU</li> </ul>
Project Management & Design Consultant (PMDC)	<ul style="list-style-type: none"> <li>➤ Completes detailed designs of subprojects with PIU</li> <li>➤ Update EMP to meet final detailed designs of subprojects</li> <li>➤ Supervises and assists PIU with contractor management</li> <li>➤ Provides technical advice and support when needed to PIU and EMC</li> <li>➤ Designs and oversees delivery of all training and capacity development of PIU for construction and operation of completed subprojects including EMP.</li> <li>➤ Provides advisory role for implementation of EMP by PIU and EMC</li> </ul>
Environmental Monitoring Consultant (EMC)	<ul style="list-style-type: none"> <li>➤ Implements environmental sampling for EMP</li> <li>➤ Conducts laboratory analyses of environmental quality samples from field sampling</li> <li>➤ Prepares periodic monitoring reports for PIU</li> </ul>
Construction Supervision Consultant (CSC)	<ul style="list-style-type: none"> <li>➤ Oversees implementation of CEMP with assistance from CCW-appointed EO</li> </ul>
Environmental Officer (EO) appointed by CCW of Contractor	<ul style="list-style-type: none"> <li>➤ Implements the CEMP for the construction phase</li> <li>➤ Maintains a daily log of environmental issues at the construction sites</li> <li>➤ Prepares brief monthly summaries of mitigation activities and environmental issues at constructions site to PIU.</li> </ul>
ADB	<ul style="list-style-type: none"> <li>➤ Assists PCU through timely guidance at each stage of project implementation following agreed implementation arrangements</li> <li>➤ Review all documents that require ADB approval</li> <li>➤ Review of monitoring reports on EMP implementation to ensure EMP meets SPS (2009)</li> <li>➤ Approval of procurement activities</li> <li>➤ Periodic project review missions, a mid-term review and a completion mission for the project</li> <li>➤ Ensuring compliance of all loan covenants</li> <li>➤ Timely processing of withdrawal applications and release of eligible funds</li> <li>➤ Ensuring compliance of financial audit recommendations</li> <li>➤ Regularly updates project information disclosure on the ADB website</li> </ul>

## APPENDIX B: INDICATIVE TORS FOR ENVIRONMENTAL SPECIALISTS OF PMDC

**International Environmental Specialist.** With assistance from the national environmental specialist the international consultant will be responsible for updating the eight EMPs at detailed design, and assisting the PIU with overall environmental management of the implementation of the nine subprojects in Viet Nam. The consultant will: (i) update the eight environmental management plans (EMP) for the nine subprojects in the five provinces to ensure that EMPs address the detailed designs and engineering of subprojects. Updates to EMPs include mitigation and monitoring plans, budget, and capacity development needs of executing agency (EA/PCU) and PIUs (DCST); (ii) with national consultant design comprehensive training plan for safeguards officer/PIU and on principles of EIA, and the purpose, content, and roles and responsibilities for implementation of updated EMPs highlighting environmental issues of subprojects; (iii) ensure that all relevant safeguards of the EMPs are adequately addressed in the bidding documents (instruction to bidders), and in the evaluation criteria for awarding contracts; (iv) coordinate and work with the SO/PIUs to ensure that contractors finalize their respective site-specific CEMPs based on the updated EMPs and the actual site conditions; (v) oversee the implementation of all safeguards of the eight EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) coordinate with the five provincial Departments of Environment and Natural Resources (DoNRE) on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (viii) prepare ToR(s) for survey, detection, and removal of unexploded ordnance (UXO) at all civil works sites. Ensure that EA and/or PIUs consult GoV authorities to assist with ToR development and implementation; (ix) with SO/PIUs prepare ToRs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction; (x) prepare ToR(s) for external national environment monitoring consultant (EMC) for conducting water and air quality sampling, and laboratory analyses for the monitoring plans for the eight provincial EMPs; (xi) coordinate with PIU/DoTs when necessary to address vehicle traffic issues during road upgrades; (xii) advise SO/PIUs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (xiii) with SO/PIUs ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xiv) assist EA and SO/PIUs prepare a table of contents for regular reports PIU must submit to the EA on implementation of EMPs, environmental issues, and corrective actions; (xv) assist SO/PIUs prepare simple report template for construction contractors to report monthly on mitigation activities, and environmental issues that occur during construction phase; and (xvi) prepare a quarterly status report on implementation of all EMPs, environmental issues, and public safety protection to be submitted through the PIU and EA to the provincial DCSTs and ADB. The consultant should have at least 7 years experience implementing and managing environmental assessment of infrastructure projects in southeast Asia countries (preferably Viet Nam) including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with and supervising the activities of provincial and national environmental management agencies with environmental safeguards; and c) designing and delivering training and capacity development programs to provincial environment, project implementing units.



**National Environmental Specialist.** Provide assistance to the international environmental specialist including acquisition of information new information to update the eight EMPs at detailed design, and work with the PIU with overall environmental management of the implementation of the nine subprojects in the five provinces of Viet Nam. The national consultant will assist with: (i) updating all eight environmental management plans (EMP) for the nine subprojects in the five provinces to ensure that EMPs address the detailed designs and engineering of subprojects.; (ii) deliver initial training to M/DCST on the purpose, content, and roles and responsibilities for implementation of updated EMPs; (iii) ensure relevant safeguards of the EMPs are addressed in the bidding documents in paccurate local language and in evaluation criteria for awarding contracts; (iv) help SO/PIUs to ensure that contractors prepare their respective site-specific plans based on the updated EMPs and the actual site conditions; (v) help International ES consultant oversee the implementation of all safeguards of the eight EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) assist coordination with thefive provincial DoNREson all relevantenvironmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (vii) with SO/PIUs, prepare ToRs for the follow-up interviews and consultations with the same affected stakeholderand local residents contacted during the PPTA on issues and concerns arising during project construction. (viii) assist PIU/DoT when necessary to address vehicle traffic issues during road upgrades; (ix) with international ES consultant advise the SO/PIUs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (x) with SO/PIU ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xi) assist with all reporting for the EMP. The consultant should have at least 5 years with environmental assessment of infrastructure projects in Viet Nam including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with international consultants; and c) delivering training and capacity development programs to provincial project implementing units.

## **APPENDIX C: ENVIRONMENTAL STANDARDS AND CRITERIA FOR VIET NAM**

### **Environmental Standards and Regulations**

#### **Water quality:**

- QCVN 01:2008/BYT – National technical regulations on quality of drinking water
- QCVN 08:2008/BTNMT – National technical regulations on quality of surface water
- QCVN 09:2008/BTNMT – National technical regulations on quality of groundwater
- QCVN 10:2008/BTNMT–National technical regulations on quality of about coastal water
- QCVN 14:2008/BTNMT–National technical regulations on quality of domestic wastewater
- QCVN 24:2008/BTNMT– Industrial wastewater discharge standards
- QCVN 02:2009/BYT - National standard of domestic water supply
- TCVN 5502:2003 – Supplied water – Requirements for quality
- TCVN 6773:2000 – Water quality – Water quality for irrigational purposes
- TCVN 6774:2000 – Water quality – Water quality for aquaculture protection
- TCVN 7222:2002 – Water quality for concentrated domestic WWTP
- TCVN / QCVN - Standard methods for analyzing environmental quality

#### **Air Quality:**

- QCVN 05:2008 – Standards for ambient air quality
- QCVN 06:2008 – Maximum allowable concentration of hazardous substances in the ambient air
- TCVN 6438:2001 – Maximum permitted emission limits of exhausted gases from vehicles

#### **Solid Waste Management:**

- TCVN 6696:2009 – Solid waste – Sanitary landfill. General requirements for environmental protection.
- QCVN 07:2009– National technical regulations for classification of hazardous wastes
- QCVN 25:2009 – National technical regulations for wastewater of solid waste sites
- QCVN 15:2008/BTNMT: -National regulation on allowable pesticide residues in soil
- QCVN 03:2008/BTNMT: -National regulation heavy metals concentrations in soil

#### **Vibration and Noise:**

- QCVN 26:2010/BTNMT: national technical standard for noise
- TCVN 6962: 2001 Allowable vibration level for public and residential areas
- TCVN 6962:2001: - Allowable vibration and shock from construction activities

#### **International Guidelines**

- World Bank Group, 2007. Environmental Health and Safety Guidelines, Wash. DC.
- AWWA Standard Methods for Measurement & Analysis Environmental Quality