

BIDDING DOCUMENTS

Issued on: _____

for

Procurement of

**North-South Expressway Construction Project
Danang-Quang Ngai Section
Civil Works Contract Package 2
(KM008+000 - KM016+880)**

PART 2-WORKS REQUIREMENTS

Section VI - Works Requirements

Volume 2.1 - Specification (2/2)

Chapter IV

Employer: Vietnam Expressway Corporation

Country: The Socialist Republic of Vietnam

August 2013

North South Expressway Construction Project
(Danang - Quang Ngai Section)
Civil Works Contract Package 2

CONTENTS OF BIDDING DOCUMENTS

Part	Section	Description
1	I II III IV V	BIDDING PROCEDURES Instructions to Bidders Bid Data Sheet Evaluation and Qualification Criteria Bidding Forms List of Eligible Countries
2	VI	WORKS REQUIREMENTS Works Requirements <u>Volume 2.1 - Specification</u> Volume 2.2 - Drawings Volume 2.3 - Bill of Quantities
3	VII VIII IX	CONDITIONS OF CONTRACT AND CONTRACT FORMS General Conditions Particular Conditions Annex to the Particular Conditions – Contract Forms

CHAPTER IV. FINAL UPDATED ENVIRONMENTAL MANAGEMENT PLAN

Table of Contents

Table of Contents

List of Figures

List of Tables

Abbreviations

Chapter 1	Introduction.....	1-1
1.1	Background.....	1-1
1.2	Purpose of the Environmental Management Plan.....	1-2
1.3	Summary of the Environmental Management Plan	1-3
Chapter 2	Description of the Project	2-1
Chapter 3	Environmental Legislative Framework	3-1
3.1	World Bank Safeguard Policies	3-1
3.2	National Laws and Regulations of Vietnam	3-2
3.3	Applicable National Technical Regulations on Environment.....	3-3
Chapter 4	Majors Impacts and Mitigation Measures.....	4-1
4.1	Checklist of Environmental Impacts	4-1
4.2	Major Impacts and Mitigation Measures	4-2
4.2.1	Air Pollution and Mitigation Measures	4-2
4.2.2	Surface Water Pollution and Mitigation Measures.....	4-4
4.2.3	Impact of Spoil/Waste Soils and Mitigation Measures	4-5
4.2.4	Excessive Noise and Mitigation Measures	4-6
4.2.5	Impacts on Terrestrial Ecosystem and Mitigation Measures.....	4-8
4.2.6	Impacts on Hydrological System and Mitigation Measures	4-9
4.2.7	Impacts on Topography, Soil Erosion and Mitigation Measures	4-9
4.2.8	Impacts to Archaeological Properties and Mitigation Measures	4-11
4.2.9	Impacts to Local Communities (Traffic Congestion, Accidences) and Mitigation Measures	4-12
4.2.10	Impacts of Split of Communities and Mitigation Measures	4-14
4.2.11	Hazard and Mitigation Measures.....	4-14
4.2.12	Impacts of Construction Materials Exploitation and Transportation (Access Roads) and Mitigation Measures	4-15
4.2.13	Wastes from Construction Worker Camps	4-17
Chapter 5	Implementing Organizations	5-1
5.1	Organization Structures.....	5-1
5.2	Environmental responsibilities.....	5-2
5.2.1	Department of Natural Resources and Environment (DONRE)	5-2
5.2.2	Project Owner – VEC and Representatives – PMU1 and PMU85.....	5-2
5.2.3	Environmental Control Officers (ECO)	5-3
5.2.4	Independent Environmental Monitoring Consultant (EMC).....	5-4
5.2.5	Environmental Supervisors (ES).....	5-4
5.2.6	Contractors	5-5
Chapter 6	EMP Implementation	6-1
6.1	General Consideration.....	6-1
6.2	Project Initiation and Staffing	6-1
6.3	Training.....	6-1

6.4	Site Inspection	6-2
6.5	Reporting.....	6-2
6.5.1	Contractor's Site Environmental Management Plans	6-2
6.5.2	Report made by PMUs and VEC.....	6-5
6.5.3	Report made by the Environmental Supervisor (ES)	6-6
6.5.4	Report made by the Independent Environmental Monitoring Consultant (EMC)	6-6
6.5.5	Data Keeping	6-6
Chapter 7	Environmental Monitoring	7-1
7.1	Independent Environmental Monitoring	7-1
7.2	Contractor's Environmental Monitoring	7-1
7.3	Recommended Environmental Monitoring Program for EMC.....	7-1
Chapter 8	Environmental Compliance Framework	8-1
8.1	Minimum Environmental and Social Standards.....	8-1
8.2	Contractor's Site Environmental Management Plans	8-5
8.3	Contractor's Environmental Management	8-6
8.4	Compliance with Legal and Contractual Requirements.....	8-7
8.5	Process Supervision of Contractor(s) Compliance.....	8-8
8.6	Regulation on Penalties, Remedies for Contractor(s)	8-9
8.7	Regulation on Management of Disposal Sites and Access Roads	8-9
Annex 1	Terms of Reference of Independent Environmental Monitoring Consultant (EMC)	
Annex 2	Terms of Reference of Environmental Supervisor	
Annex 3	Recommended Major Contents of the Contractor's Site Environmental Management Plans	
Annex 4	Cultural Relics	
Annex 5	Phu Ninh Natural Reserve	
Annex 6	Site-Specific Environmental Mitigation Measures	
Annex 7	Do's and Don'ts of the EMP	
Annex 8	Recommended Environmental Monitoring Sites Location Map for EMC	

List of Figures

Figure 2-1	Project Location Map	2-1
Figure 2-2	Project Implementation Structure	2-2
Figure 4-1	Location of Champa Ruins, F/S and D/D Alignments	4-11
Figure 5-1	Organization Structure for EMP Implementation and Supervision (in Construction Phase)	5-1

List of Tables

Table 2-1	Three Project Components	2-2
Table 2-2	Main Features of Expressway Construction	2-3
Table 3-1	World Bank Safeguard Policies	3-1
Table 4-1	Major Impacts Caused by the Project	4-1
Table 4-2	Selected Entrance Access Roads	4-15
Table 7-1	Recommended Locations of Monitoring Sites for EMC	7-1
Table 7-2	Recommended Parameters, Timing for Environmental Monitoring by EMC	7-3
Table 7-3	General Schedule of Monitoring by EMC	7-5
Table 7-4	Detailed Schedule of Monitoring by EMC	7-5
Table 8-1	Minimum Environmental and Social Standards for the Construction of the Expressway	8-1
Table 8-2	Fine for Environmental Non-Compliances	8-9

Abbreviations

CSC	: Construction Supervision Consultant
CPC	: City People's Committee
C/S	: Construction Supervision
DEO	: Contractor's on-site Environmental Officer
DONRE	: Department of Natural Resources and Environment
DOT	: Department of Transport
DQEP	: Da Nang – Quang Ngai Expressway Project
D/D	: Detailed Engineering Design
DP	: Displaced Person
ECO	: Environmental Control Officer
EIA	: Environmental Impact Assessment
EMP	: Environmental Management Plan
EMC	: Independent Environmental Monitoring Consultant
ES	: Environmental Supervisor
F/S	: Feasibility Study
GOV	: Government of Vietnam
HIV/AIDS	: Human Immunodeficiency virus/Acquired Immunodeficiency Syndrome
JBIC	: Japan Bank for International Cooperation
JICA	: Japan International Cooperation Agency
JETRO	: Japan External Trade Organization
MONRE	: Ministry of Natural Resources and Environment
MOT	: Ministry of Transport
PC	: People's Committee
PMU	: Project Management Unit
PPC	: Provincial People's Committee
RAP	: Resettlement Action Plan
TEDI	: Transport Engineering Design Incorporated
TOR	: Terms of Reference
USD	: United States Dollars
VEC	: Vietnam Expressway Corporation
VND	: Vietnamese Dong
WB	: The World Bank

Chapter 1 Introduction

1.1 Background

The Da Nang – Quang Ngai expressway is of international importance to the Government of Vietnam. The recently developed East – West Economic Corridor, a 1,500 km corridor, connecting Da Nang with the Andaman Sea in Myanmar, through Laos and Thailand, promoted Da Nang's location as a gateway to the international market. The expressway development will stimulate the development of Da Nang as an exporting center. Construction of this expressway section is essential for the socio-economic development and growth of the central of Vietnam.

During the FS stage, Environmental Management Plan (EMP) for the Da Nang – Quang Ngai Expressway Project was prepared following the study results of the project's Environmental Impact Assessment (EIA). The EMP is intended to ensure the effective and appropriate environmental management of the proposed project. The EIA report, including EMP, was approved by Decision 2046/BTNMT dated October 29, 2010 of Ministry of Natural Resources and Environment (MONRE).

During the detailed design stage, detailed surveys and assessment have been conducted, resulting in some changes in the alignment of the expressway. Subsequently, the EMP has been updated to reflect new findings in terms of environmental impacts and mitigation measures.

1.2 Purpose of the EMP

Environmental Management Plan (EMP) is a practical and achievable tool to ensure that any negative environmental impacts are minimized and any possible environmental, safety and efficiency benefits are maximized during the construction and operation phases of a development. This EMP therefore provides practical guidelines for environmental management to ensure all works undertaken by the developer, engineers, and contractors have minimal impact on the environment, and are in accordance with all relevant laws, regulations, technical guidelines and codes of practice of the Socialist Republic of Vietnam, and the World Bank's operational policies.

The EMP addresses all issues identified in the EIA by: (i) organizing all measures to mitigate environmental impacts during the phases of construction and operation; (ii) establishing an organizational structure, procedures, and institutional responsibilities for implementation; and (iii) identifying the monitoring requirements needed for the successful implementation of the suggested mitigation measures, and a budget and source of financing for each activity.

The EMP will also assist different stakeholders in managing the environmental issues of the Project: (a) The Project's executing authority - to make it better able to manage the implementation of the EMP; (b); supervisors – to ensure that the EMP is properly implemented; (c) environmental engineers – to assist them to work with the Contractors to implement the EMP; and (d) Contractors – to help them in developing the Site EMPs.

Simultaneously, the EMP is the summary of commitments by the project owner presented in the EIA and the related implementation process. The EMP will enable VEC, the World Bank and other relevant authorities in Da Nang City, Quang Nam and Quang Ngai Provinces to supervise the application of mitigation measures and compliance of commitments by the Contractors.

1.3 EMP Organization and Structure

The EMP contains guiding environmental principles and procedures for communication, reporting, training, monitoring and plan review to which all staff, engineers, consultants, supervisors, Contractors and sub-Contractors are required to comply with throughout the pre- construction, and constructions stages of the project.

The EMP is structured as follows:

Project Description: summarizes the DQEP description, its justification and its main components

Environmental Legislative Framework: Outlines the major laws, regulations, national standards and technical guidelines, The World Bank Policies and the relevant clearance documents that may affect the Environmental Impact Assessment (EIA) process of the project.

Roles and Responsibilities for Environmental Management during Construction: defines the roles and responsibilities for environmental management for all actors involved in the project. It also gives a detailed description of the environmental duties of the actors directly involved in the project: PMUs, the Environmental Control Officer (ECO), the Environmental Monitoring Consultant (EMC), the Construction Supervision Consultant (CSC) and his Environmental Supervisor (ES), The Contractors, sub-contractors and the Contractor's on-site Environmental Officer (EO).

Overview of Environmental and Social Issues: summarizes the main environmental and social impacts identified in the EIA, the approach for identification of environmental issues along the Expressway alignment, and the mitigation measures needed to reduce or minimize negative impacts.

Environmental Compliance Framework: describes the minimum environmental and social issues that should be put into place, describes the content of the Contractor's Site EMPs, the management of Contractors, the compliance with legal and contractual requirements, the compliance framework procedures and the penalties that shall be imposed for not compliance with the EMP.

Environmental Monitoring Requirements: describes the monitoring program that shall be carried out by the Contractor's on-site Environmental Officer (EO) and the environmental monitoring consultant (EMC). It also describes how site inspections shall be carried out.

Environmental Training for Site Personnel: describes the training programs and methodologies that will need to be implemented for all actors involved in the environmental management of the project

Implementation Schedule: presents the general schedule for EMP implementation and the requirements and staffing needs for initiation of the works.

Reporting: describes the different reports that have to be prepared by Contractors, ECO, ES and EMC during the project construction.

A series of annexes provides details for the main components of the EMP:

Annex 1: presents the Terms of Reference for the Independent Environmental Monitoring Consultant (EMC) to be appointed by VEC who will be responsible for carrying out environmental sampling and monitoring.

Annex 2: presents the Terms of Reference for the Environmental Supervisor (ES) which will be included in the overall technical supervision of the Expressway construction.

Annex 3: presents the recommended contents of the Contractor's Site Environmental Management Plans.

Annex 4: Cultural Relics.

Annex 5: Phu Ninh Natural Reserve.

Annex 6: presents site-specific environmental impacts and proposed mitigation measures along the alignment of the Expressway. This table is also an useful instrument for supervising the implementation of the EMP during construction.

Annex 7: presents the “do's and don'ts” of the EMP to be followed by all personnel involved in the implementation of the DQEP and the basis for a the Code of Conduct established for the project.

Annex 8: presents the location maps of environmental monitoring sites recommended for EMC.

Chapter 2 Description of the Project

The Danang – Quang Ngai Expressway is a part of the North-South Expressway located in parallel with the existing NH1A and North-South Railway and passing through Danang City, Quang Nam Province and Quang Ngai Province in the Central Region of Vietnam. The Expressway starts at the intersection of the Danang Bypass and NH14B in Danang City and ends at the connecting point with the planned Quang Ngai City Ring Road. The major socio-economic developments along the expressway are Chu Lai Open Economic Zone in Quang Nam Province, and Dung Quat Industrial Zone in Quang Ngai Province. Besides, along the Expressway, there are Hoi An Ancient Town and My Son Sanctuary which are recognized by UNESCO as the world cultural heritage.

The Da Nang-Quang Ngai Expressway is about 139.5 kilometers long, including 131.5 kilometers of expressway and 8.02 kilometers of connection way to National Highway No. 1A. This link would connect Da Nang with Quang Ngai on a new alignment bisecting 20 major national and provincial highways. The expressway runs entirely on the western side of NH1A and the north-south railway. The expressway runs entirely to the west of NH1A and Northsouth railway. The specific geographic location of the expressway section is shown in Figure 2-1.

The main objectives of the Project are to enhance travel efficiency and safety by constructing an expressway from Danang to Quang Ngai, and contributing to economic growth in the central region.

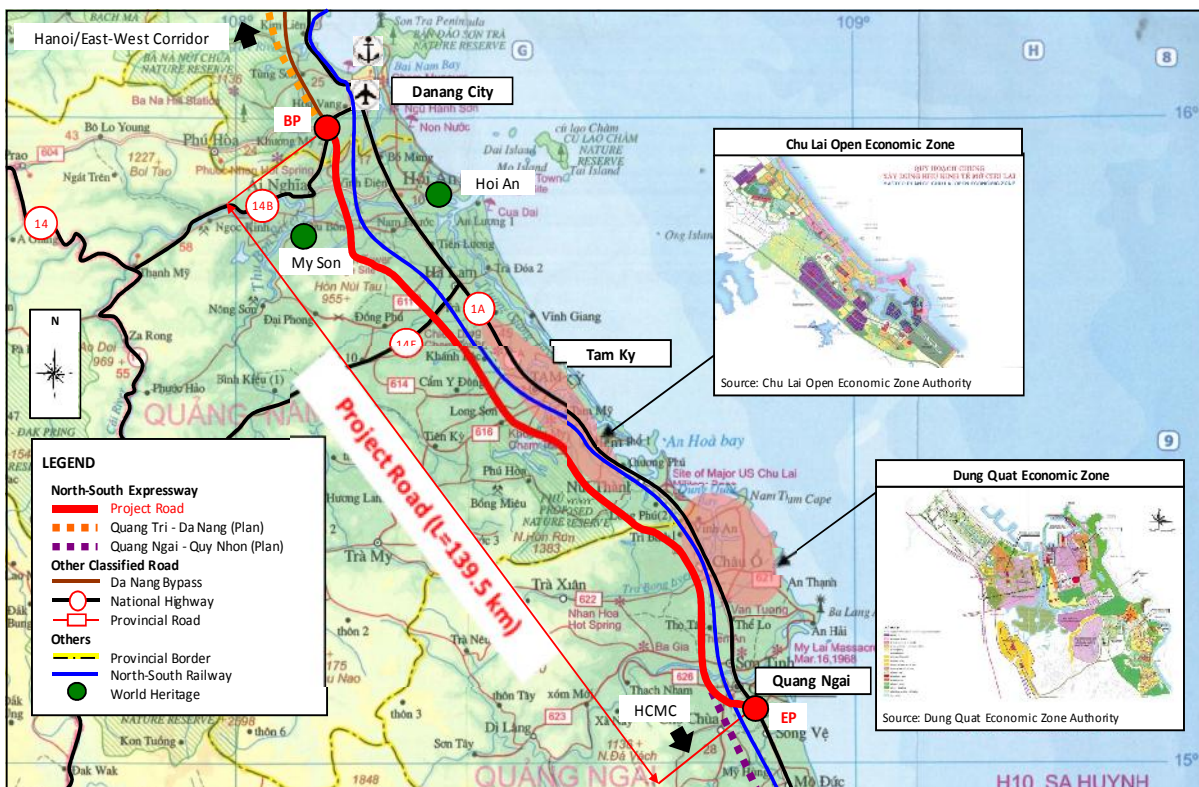
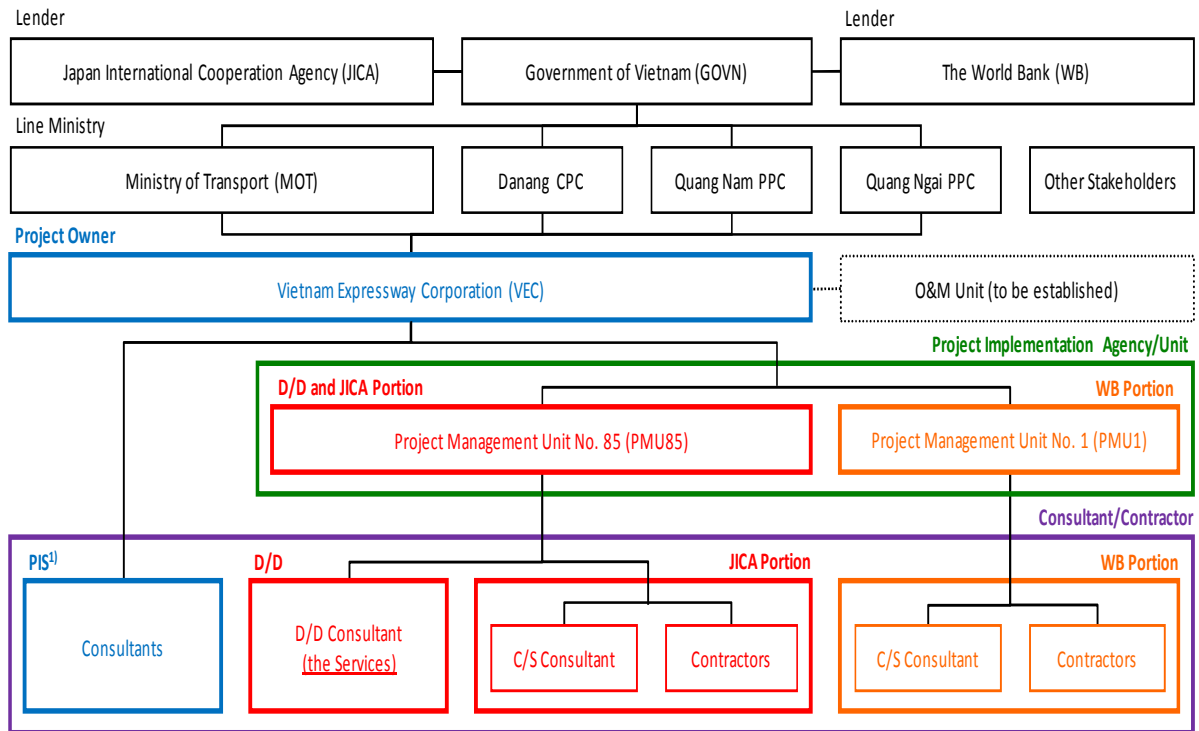


Figure 2-1: Project Location Map

Ministry of Transport (MOT) of Vietnam designated Vietnam Expressway Corporation (VEC) as the Project Owner in Decision No. 220/QD-BGTVT dated January 22, 2010 and also appointed PMU85 as the Project Implementation Agency for the D/D stage in Decision No. 2149/QD-BGTVT dated September 19, 2011. As for the construction stage, MOT approved that PMU85 for JICA financed portion and PMU1 for WB financed portion are Project Implementation Agencies, by signing the principle contracts with VEC in Decision No. 2656/QD-BGTVT dated September 10, 2011. Project implementation structure is shown in Figure 2-2.



Note 1) PIS: Project Implementation Support for VEC

Figure 2-2 Project Implementation Structure

The Project consists of the following three (3) components as shown in Table 2-1.

Table 2-1 Three Project Components

No.	Component	Description
01	Component A Civil Works	Construction of four-lane dual carriageway road (with capacity for eventual widening to six lanes) and 131.5 km for expressway and 8.02 km for linking road
02	Component B ITS (Intelligent Transport Systems)	Provision of traffic management and toll collection facilities
03	Component C Expressway Operation and Maintenance (O&M)	Planning an institution to operate and maintain the expressway and identifying facilities and equipment that it will need.

Source: TOR

Main features of expressway construction and O&M provision are shown in Table 2-2. This table is made based on result of the Basic Design.

Table 2-2 Main Features of Expressway Construction

No.	Items	Main Features	Ref. in TOR
01	Road Length	139.5 km <u>By Road Class</u> : Expressway section: 131.5 km, Linking road section: 8.02 km <u>By Jurisdiction</u> : Danang city: 8.0 km, Quang Nam province: 92.0 km, Quang Ngai province: 39.52 km <u>Beginning Point (BP)</u> : Intersection of the existing Danang bypass and NH14B in Danang city <u>Ending Point (EP)</u> : Connecting point with the planned city ring road at the existing NH1A (KM1063+700) in Quang Ngai province	Component A (TOR 1(1))
02	Road Classification	Expressway: Type A, Class 120, Linking Road: Class III, Delta	
03	Design Speed	Expressway: 120 km/hr (Tunnel section: 100 km/hr), Linking Road: 80 km/hr	
04	Nos. of Lane	4 lanes (Ultimate stage: Widened to 6 lanes)	
05	Road Width	Expressway: 25.5m (4 lanes) and 33.0m (6 lanes) Bridge sections: 25.5 m and 26.0m Tunnel section: 2x12.80m Linking Road: 12.0 m	
06	Design Hydrological Frequency	Expressway: 1 %, Linking Road: 4 %	
07	Major River Bridge	4 bridges (L=2,535.2 m in total) Ky Lam Bridge (L=1,028.8 m), Chiem Son Bridge (L=439.1 m), Tra Bong Bridge (L=438.5 m), Tra Khuc Bridge (L=728.8 m)	
08	Other Bridges	114 bridges (L=9702 m in total)	
09	Tunnel	1 tunnel (KM022+900, L=2@540 m)	
10	Culvert	833 culverts <u>Culvert Box</u> : 399 culvert boxes (138 roadway culverts and 261 waterway culverts), <u>Culvert Pipe</u> : 434 culvert pipes	
11	Soft ground	Approximately 3.6 km	
12	Interchange	9 interchanges	
13	Frontage Road	Approximately 38.8 km	
14	Electrical Facilities	Power supply, lighting, tunnel ventilation and safety facilities	Component B (TOR 1(2))
15	ITS	Traffic management, toll collection and communication systems	
17	O&M Buildings	Traffic Management Center (TMC); Expressway Operation Office (EOO); Toll Plaza Offices (TPO); Toll Barriers (TB); Toll Gates (TG), Service Areas (SA); Parking Areas (PA).	Component C (TOR 1(3))
18	O&M Equipment	O&M vehicles, spare parts, maintenance equipment and consumables	

Source: Basic Design Report (December 2012).

Chapter 3 Environmental Legislative Framework

The major laws, regulations, national standards and technical guidelines of the Socialist Republic of Vietnam, the World Bank Safeguard Policies and the relevant clearance documents that may affect the Environmental Impact Assessment (EIA) process of the proposed project, are outlined below as general guidance for preparing this EMP.

3.1 World Bank Safeguard Policies

A full Environmental Assessment (EA) was carried out following the Vietnamese environmental protection laws/regulations as well as the World Bank safeguards policies. Among the World Bank safeguards policies, the following ones are applicable: (1) Environmental Assessment; (2) Involuntary Resettlement; and (3) Physical Cultural Resources. Regarding Natural Habitats (OP4.04, 2001), the project will not involve critical natural habitats as identified in OP4.04. However, the project goes through some wildlife habitats, thus the general principle of this policy will be applied to the EIA.

Table 3.1 lists up the World Bank's safeguard policies, and of which, the policies which are applied in the Project. In addition, the Project is also planned in full compliance with Viet Nam's environmental policies, regulations and technical guidelines.

Table 3.1 Project Compliance Policies and Actions

Safeguard Policy	Actions
Environmental Assessment (OP/BP 4.01)	Category A project Full EIA and EMP prepared for Component A
Natural Habitats (OP/BP 4.04)	This policy is not triggered. The project will not cause impacts to protected area, or important/endangered flora, or fauna species, or areas with high biodiversity value, and will not cause degradation or transformation of natural habitats. No action is required under the policy.
Pest Management (OP 4.09)	This policy is not triggered. The project will not raise potential pest management issues, and will not cause increase in use of toxic pesticide materials. No action is required under the policy.
Physical Cultural Resources (OP/BP 4.11)	Cultural property survey along the whole line has been conducted with involvement of local relic's management authority. Chance-find procedure will be strictly followed.
Indigenous Peoples (OP/BP4.10)	This policy is not triggered. Indigenous peoples were not identified in the project area.
Safety of Dams (OP/BP 4.37)	This policy is not triggered. The project area does not include any dams.
Involuntary Resettlement (OP/BP 4.12)	Resettlement Action Plan (in F/S) and Updated Resettlement Action Plans (in D/D) are prepared.
Projects on International Waters (OP/BP 7.50)	This policy is not triggered. The project area does not include any international waters.
Forestry (OP/BP 4.36)	This policy is not triggered. The project will not induce activities that would cause significant conversion or degradation of natural forests or natural habitats as defined under the policy. No action is required under this policy.
Projects in Disputed Areas (OP/BP 7.60)	This policy is not triggered. The project area does not include any disputed areas.

3.2 National Laws and Regulations of Vietnam

- **Construction Law No. 16/2003/QH11 dated November 26, 2003**
- **The Law on Environmental Protection of Vietnam, 2005;**
- Decree No. 140/2006/ND-CP of the Government, dated 22 November 2006 Providing for environmental protection in the formulation, appraisal, approval and implementation of development strategies, planning, plans, programs and projects;
- Decree No. 59/2007/ND-CP dated April 9, 2007 of GOV on Solid Waste Management (including poisonous wastes);
- Decree 174/2007/ND-CP dated November 29, 2007 of GOV on environmental protection charges for solid wastes;
- Decree No. 117/2009/ND-CP dated December 31, 2009 on sanction of violations in the field of environmental protection;
- Decree No. 29/2011/ND-CP of the Government, dated 18 April 2011 providing regulations on strategic environmental assessment, environmental impact assessment, environmental protection commitment;
- Circular No. 26/2011/TT-BTNMT dated July 7, 2006 by MONRE on Detailed regulations of some articles of Decree No. 29/2011/ND-CP dated 18 April 2011 of the Government regulations on strategic environmental impact assessment, environmental impact assessment, and environmental protection commitments;
- Circular No. 10/2007/TT-BTNMT of the Ministry of Natural Resources and Environment, dated 22 October 2007 on user quality assurance and quality control in environmental monitoring;
- Circular No. 12/2006/TT-BTNMT dated December 26, 2006 of MONRE: Guiding the practice conditions, procedures for compilation of dossiers, registration and licensing of practice and hazardous waste management identification numbers;
- Circulars No. 16/TT-BTNMT dated October 7, 2009 and 25/2009/TT-BTNMT of MONRE on promulgating the National Technical specifications on Environment;
- Decision 23/2006/QD-BTNMT dated December 26, 2006 of MONRE on promulgation of hazardous wastes list;
- Decision No. 1678/GT-VT-KHCN dated March 20, 2008 of Ministry of Transport on selection of consultant for EIA preparation of Da Nang – Quang Ngai Expressway Project;
- **Law on road traffic, 2008;**
- **Land Law 2003 dated November 26, 2003;**
- **Water Resource Law dated May 20, 1998;**
- Decree No. 179/1999/ND-CP dated December 30/12/1999 of the Government specifies and instructs implementation of Water Resource Law;
- Decree No 149/2004/ND-CP dated July 27, 2004 of Government: Regulation on licensing of water resources exploitation, extraction and utilization and waste water discharge in water sector;
- Circular 02/2005/TT-BTNMT dated June 24, 2005 of Ministry of Natural Resources & Environment: Guiding the implementation of the Government Decree No. 149/2004/ND-CP on licensing of water resources exploration, exploitation, utilization

- and waste water discharge into water resources;
- **The Law of Cultural Heritage promulgated on June 29, with some amendment in 2009 by the National Assembly (No. 32/2009/QH12);**
 - The Decree No. 92/2002/ND-CP promulgated on November 11, 2002 by the Government with detailed regulations on implementing several law articles of the Cultural Heritage Law;
 - Decree No. 98/2010/ND-CP of the Government dated 21 September 2010 on detailing the implementation of some articles of the Law on Cultural Heritage and the Law amending and supplementing some articles of Law on cultural heritage;
 - **Law on Fire Prevention and Fighting, 2001;**
 - **Mineral Law, 2010 (replacing the 1996 Mineral Law);**
 - **Law on electricity No. 28/2004/QH11 dated 3rd December 2004;**
 - **Labor law No. 35-L/CTN dated 23rd Jun 1994, with some amendment under Document No. 84/2007/QH11 by the National Assembly.**

3.3 Applicable National Technical Regulations on Environment

The main National Technical Regulations used in the EIA and EMP includes the followings:

- QCVN 05 - 2009/BTNMT: National technical regulation on ambient air quality;
- QCVN 08 - 2008/BTNMT: National technical regulation on surface water quality;
- QCVN 26:2010/BTNMT: National technical regulation on maximum noise limit in public and residential areas;
- QCVN 27:2010/BTNMT: National technical regulation on vibration;
- QCVN 09-2008/BTNMT: National technical regulation on groundwater quality;
- QCVN 14-2008/BTNMT: National technical regulation on domestic wastewater;
- QCVN 40:2011/BTNMT: National technical regulations on industrial wastewater;
- QCVN 03:2008/BTNMT: National technical regulation on permissible limits of heavy metals in soils; and

Other relevant sector technical regulation and standards.

Chapter 4 Majors Impacts and Mitigation Measures

4.1 Checklist of Environmental Impacts

Table 4-1 summarizes major impacts that may be caused by the Project during pre-construction phase, construction phase, and operation phase. Significant negative impacts (which are marked by “▲”) and the associated mitigation measures are described in detail in the next following sections. Measures to mitigate impacts of land acquisition, resettlement, and impacts on living and livelihood are described in the Updated Resettlement Action Plans.

Table 4-1 Major impacts caused by the Project

Environmental items	Pre-construction phase	Construction phase	Operation phase
Pollution			
Air pollution	-	▲	○
Surface water pollution	-	▲	○
Groundwater pollution	-	○	-
Spoil, waste	-	▲	○
Soil contamination	-	○	○
Vibration	-	○	○
Noise	-	▲	▲
Natural Environment			
Protected area	-	-	-
Terrestrial ecosystem	○	○	○
Hydrological situation	-	▲	▲
Topography and soil erosion	-	▲	○
Social Environment			
Land acquisition and Resettlement	▲	○	-
Living and livelihood (including economic activities)	▲	▲	○
Heritage, Cultural / Archaeological Properties	-	▲	○
Landscape (aesthetics and visual effects)	-	○	○
Traffic (congestion and accident) and public safety	-	▲	○
Split of community	-	▲	▲
Public health condition	-	○	○
Hazard	-	▲	▲
Religious consideration	○	○	○
Ethnic minorities and indigenous peoples	-	-	-
Unexplored bombs and mines	○	○	-

Note ▲ significant negative impact is expected

○ negative impact is expected in some extent

- limited impact / negligible impact

4.2 Major Impacts and Mitigation Measures

The Project has intended to minimize these impacts through careful selection of the route alignment in consultation with the public, and completion of impact assessments compliant with Vietnam and World Bank regulations. Descriptions of anticipated impacts and corresponding mitigation measures (mainly in construction phase) are described in the subsequent sections.

4.2.1. Air Pollution and Mitigation Measures

During construction phase, main sources of air pollution are:

- Temporary dust emissions due to exposure of slope surface, uncovered stockpiling area and excavation activities;
- Dust emission due to blasting;
- Dust from vehicles and unpaved access roads;
- Gases emissions from batching plants and concrete mixing stations;
- Gases emissions during payment of road surface by asphalt plant; and
- Exhaust fumes from construction plant and vehicles.

The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities, and shall implement the measures to control air pollution that shall include, but not be limited to the followings:

- 1) Construction materials shall be supplied only from the quarries that have exploitation license and operated under a good environmental management.
- 2) Earth, rock or debris shall not be deposited on public or private right of way as a result of Contractor's operations, including any deposits arising from the movement of construction plant or vehicles.
- 3) Provide water spray vehicles to water the unpaved ground, storage piles and other areas where airborne dust may originate. The water spray operation should be carried out in dry and windy day, at least twice a day (morning and afternoon).
- 4) Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin in good condition. The tarpaulin shall be properly secured and shall extend at least 300 millimeters over the edges of the side and tailboards.
- 5) Trucks transporting construction materials should meet allowable exhaust gas emission standards (stated in Decision 249/2005/QĐ-TTg on October 1, 2005), and should be carefully covered.
- 6) Site for stockpiling soils and sand should be located far more than 300m from the populous residential areas.
- 7) All soils excavated from the land surface during the works to construct road foundation shall be transported as soon as possible to the sites for reuse or disposal.
- 8) Concentration of construction machinery and vehicles near the populous residential areas should be avoided.

g) Measures to control air pollution at construction yards:

- a) Debris, construction wastes, vegetation or other materials shall be not burned on the site.
- b) Conveyor belts shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. All conveyors carrying materials that have the potential to create dust shall be totally enclosed and fitted with belt cleaners.
- c) Where dusty materials are being discharged to vehicles from a conveying system at a fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust fans shall be provided for this enclosure and vented to a suitable fabric filter system.

10) Measures to control air pollution at concrete batching plant, asphalt melting stations, etc.

- a) Concrete batching plants, crushing plant sites and their ancillary areas shall be frequently cleaned and watered to minimize any dust emissions.
- b) Dry mix batching shall be carried out in a totally enclosed area with exhaust to suitable fabric filters.
- c) A suitable air pollution control system shall be installed and operated whenever the batching plant is in operation.
- d) All stockpiles of sand and aggregate within the batching plant site shall be enclosed on three sides with geo-textile sheets (if they are greater than 20m³), and shall be enclosed on three sides with walls extending above the stockpile and 2000 mm beyond the front of the stockpile (if they are greater than 50m³).
- e) The asphalt melting station should be equipped with flue gas control device, operation of asphalt melting will be in enclosed mode; cement and concrete will be mixed within an enclosed structure.
- f) Cement and other such fine-grained materials delivered in bulk shall be stored in closed silos fitted with a high-level alarm indicator. The high level alarm indicators shall be interlocked with the filling line such that in the event of the hopper approaching an overfill condition, an audible alarm will operate, and the pneumatic line to the filling tanker will close.
- g) All air vents on cement silos shall be fitted with suitable fabric filters provided with either shaking or pulse-air cleaning mechanisms. The fabric filter area shall be determined using an air-cloth ratio (filtering velocity) of 0.01 - 0.03 m/s.

11) Measures to control air pollution at construction site:

- a) Use temporary barriers to control dust around the construction sites near the populous residential areas.
- b) All vehicles shall have their engine turned off while parked on the site.
- c) Construction machinery should be located as far as possible from the construction site boundary.
- d) Areas within the construction site where there is a regular movement of vehicles shall have a hard surface and be kept clear of loose surface material to the satisfaction of the Engineer.
- e) Construction roads should be paved with gravel or asphalt to reduce generation

of air-borne dust, and mitigate impacts to residential areas.

- f) All roads within the construction sites and roads leading to the sites shall be sprayed by using water bowers with spray bars, hose pipes etc. to control dust to the satisfaction of the Engineer.
- g) Wheel washing facilities shall be provided at the exit of all construction sites to prevent dusty material from being carried off-site on vehicles and deposited on public roads. Wash-water shall have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of wheel wash operations.
- h) On site vehicle speeds shall be restricted to a maximum of 15km/hour to reduce dust re-suspension and dispersion by traffic within sites.
- i) Heights from which excavated materials are dropped shall be controlled to the minimum practical to limit the fugitive dust generation from unloading.
- j) Areas of reclamation shall be completed, including final compaction, as quickly as possible consistent with good practice to limit the creation of wind blown dust.
- k) To minimize dust emissions, the amount of spoil exposed and the dust generation potential shall be kept as low as possible, this can be accomplished by surface compaction, temporary fabric covers, minimizing the extent of exposed soil and the prompt re-vegetation of completed earthworks.
- l) During breaking/crushing or demolition works watering shall be implemented to control dust. Water sprays shall be used during the handling of excavated material and at active cuts, excavation and fill sites. Excessive watering should be avoided.

4.2.2. Surface Water Pollution and Mitigation Measures

During construction phase, the following issues on water pollution are anticipated:

- Wastewater generated from construction equipment (e.g. uncontrolled release of bentonite from boring machine);
- Wastewater from bored piling locations. Re-suspension of bottom sediment and mud caused by construction of bridge foundation within water courses;
- Soil erosion / flush away from uncovered stockpiling locations, uncovered excavation site and unprotected slope surface during adverse weather conditions;
- Uncontrolled surface water run-off carrying sediment laden discharges directly into natural water bodies such as river estuaries and local irrigation channels;
- Domestic sewage generated by construction workers, such as kitchen, shower, etc.

The Contractor shall undertake at all times to prevent water pollution as a result of his activities, and shall implement the measures to control water pollution that shall include, but not be limited to the followings:

- 1) The Contractor shall comply with the Vietnamese legislation and other regulations currently applied in Vietnam insofar as they relate to water pollution control.
- 2) Protection of the water environment shall be recognized as a key constraint for any construction work. The Contractor shall devise and arrange methods of working to minimize water quality impacts to the satisfaction of the Engineer.
- 3) The Contractor shall at all times ensure that all existing water courses and drains

- within, and adjacent to, the Site are kept safe and free from any debris and any excavated materials arising from the Works.
- 4) For construction of the bridge piers bundled site boundaries shall be established to prevent any wastewater discharging directly to the water body environment.
 - 5) The earthwork sites where exposed land surface is vulnerable to runoff, etc. shall be consolidated and/or covered;
 - 6) The Contractor shall ensure that rain run-off from the construction sites is not deposited directly into any watercourse or the marine environment.
 - 7) All drainage facilities and erosion and sediment control structures shall be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms.
 - 8) Wastewater shall be collected, re-used and/or disposed of off-site after oil/grease removal and settlement of suspended solids. Sediment tanks of sufficient capacity, constructed from pre-formed individual cells of approximately 6-8m³ capacity shall be used at all sites for settling waste-waters prior to disposal.
 - 9) Construction wastes shall be collected and re-used wherever possible. Otherwise should be disposed in the small deposit area invulnerable to surface run-off, along with soil erosion prevention measures.
 - 10) The material stockpile sites shall be located far away from water bodies and areas prone to surface run-off. If some must be placed near bridge construction sites, the stockpiles should be surrounded by interception ditches or retaining structures to prevent the erosion and materials into the water bodies. The loose materials should be bagged and covered.
 - 11) The fuel storage and equipment maintenance yard should have weather/rain protection and should be on concrete pads to prevent dripping and leaking oils from entering the water bodies via surface runoff. All spoil soil disposal sites should only be allowed in the dedicated areas where will be erosion control measures and landscaping plan following the disposal operations.
 - 12) For construction for bridges, there should be strict waste control plan to restrict discharge or dumping of any directly discharge of wastewater, slurry, waste, fuels and waste oil into the water. All these materials should be collected and disposed at the banks. The slurry and sediment should be pumped to the banks for disposal and should not be allowed to discharge to the rivers directly.
 - 13) Drainage from vehicle maintenance areas, plant servicing areas and vehicle wash bays shall be passed via a petrol interceptor prior to discharge.
 - 14) The Contractor shall ensure that no tools or machinery are washed in any water source or areas that drain into an existing watercourse or to the marine environment.
 - 15) The Contractor shall weekly check all equipment for prevention of oil and or lubrication leaks and ensure that all equipment oil and lubrication replacements are performed only in bounded maintenance and repair areas.

4.2.3. Impacts of Spoil/Waste Soils and Mitigation Measures

It is estimated that about 3.4 million m³ of excavated soil would be generated from the road foundation construction work (removal of about 0.5m of thickness of the upper soil from the

existing land surface), of which 2.2 million m³ may be reused in filling the low areas along the Expressway or filling the opened areas around interchanges, or utilized by the third parties. The estimated volume of waste soils remaining after being reused is about 1.2 million m³. These residual soils should be disposed somewhere in a proper manner.

The criteria for selecting the locations for soil deposit pits and spoil disposal sites should include the requirement of the project, topographical and geological conditions, as well as the requirements for environmental protection and soil conservation. During the D/D Study, attempts were made to maximize the reuse of waste soils in filling the areas within the land acquisition demarcation lines (GPMB lines) along both sides of the Expressway where tree planting is possible to mitigate impacts of air pollution and noise. Reuse of waste soils was also taken into consideration in the design of the interchanges with aim to use waste soils to fill the areas around the interchanges for tree planting and grassing. The D/D Study Team had also carried out a survey on the candidate sites for disposing residual waste soils. The selection and use of these sites were agreed by the relevant commune PCs and district PCs. Details about these waste soil disposal sites are described in the Final Updated EIA.

During the construction phase, in order to mitigate impacts of waste soils, the Contractor should be obligated to:

- The Contractor should use the waste soil disposal sites recommended in D/D for disposing waste soils. If the Contractor intends to use the sites other than the recommended ones, he should obtain approval from the Environmental Supervisor (ES) and agreements in written from relevant local commune PCs and district PCs.
- The Contractor should negotiate and pay proper compensation to the users (owners) of the lands to be used for disposing waste soils.
- The waste soil disposal sites should be adequately planned. The design (based on the 1/5000 topographic maps) should include a retaining wall with enough strength, slope protection; drainage facility, and access road.
- Agreement upon the use of the waste soil disposal sites should be confirmed in written from relevant local commune PCs and district PCs.
- For the waste soil disposal site near the river, the retaining wall should be built and the waste soil should be piled up from coarse soil in the bottom and fine soil to the top;
- For the site located near a creek or a ditch, structures such as pipe culvert, etc. should be used to prevent wash out of the spoil during rainstorm;
- Structures such as mortar rubble masonry pavement and grouted rubble toe protection form should be used to ensure the stability of the site.
- Drainage ditch should be built around the site.
- For the site near the residential area, transportation of waste soil at night should be prohibited, and the access roads should be frequently watered on the dry days to control dust flying.

4.2.4. Excessive Noise and Mitigation Measures

There will be a wide range of noise causing by construction activities during project construction works (e.g. concrete mixers, backhoes, bulldozers, cranes, lorries, air compressors, batching plant, generators, earth work, piling, transportation, construction

vehicle movement, etc.). The EIA have identified the following noise sources:

- Operation of the various equipments during construction (air compressor, powered mechanical equipment, bulldozers, excavators, etc);
- Materials from vehicle transporting within construction site and beyond the construction boundary; and
- Piling/boring activities during construction of foundations / piers.

During construction phase, the Contractor shall undertake at all times to prevent noise and vibration generated by his activities, and shall implement the measures to control noise and vibration that shall include, but not be limited to the followings:

- 1) The Contractor shall abide by the provisions of the Conditions of Contract regarding environmental protection and Vietnam's Law on Environmental Protection, as well as other relevant legislations.
- 2) The Contractor shall at its own expense take all appropriate measures to ensure that work carried out (including works by sub-contractors), whether on or off the site, will not cause any unnecessary or excessive noise.
- 3) Construction activity near residential areas should be scheduled in daytime only, and the noisy equipment should be prohibited from night operation. During construction in daytime, the construction site should be fenced.
- 4) The Contractor shall select, use and maintain his plant and equipment, and adopt such methods for construction that the maximum vibration levels, measures on any building or structure outside or within the site limits, do not exceed the permitted levels specified in TCVN 6962-2001.

The above are limits for transient vibrations. For continuous or sustained periods of vibrations, the permissible peak particle velocity shall be equal to two thirds (2/3) of the value given above.

- 5) The Contractor shall be responsible for repairing any damage caused as a result of vibrations generated from or by the use of his equipment, plant.
- 6) Although construction shall be banned in night time, some may still occur for technical and other reasons (e.g., bridge piles required continued, around clock concrete pouring). If the work is occurred in the night time and near villages and other residential areas, which would result in particularly significant impacts, the Contractor shall submit to the Engineer a noise statement including full and comprehensive details of all powered mechanical equipment proposed for use during night time hours 22:00 to 06:00 hours and the proposed working methods and noise level reduction measures. The noise statement shall include detailed noise calculations to demonstrate the anticipated noise generation. Special measures (such as use of noise barriers) shall be proposed if excessive noise and vibration is anticipated. The noise statement shall be submitted to the Engineer at least seven days before the planned start of any works. No work shall be carried out until the Engineer has notified the Contractor in writing of his consent based on the noise statement submitted in relation to such work. Such consent of the Engineer shall not in any event relieve the Contractor of its obligations under the Contract or Vietnamese law.
- 7) Restriction of rock drilling to the shortest period possible.
- 8) Blasting works shall be restricted to a defined hour i.e. mid day, and all affected

residents shall be prewired of the blasting schedule.

- 9) All powered mechanical equipment used in the works shall be effectively sound reduced using the most modern techniques available in Viet Nam. Equipment shall be selected with due consideration for having lowest noise levels, and ensuring that these equipment are regularly maintained to keep such levels during its operation.
- 10) All equipment, engines and motors shall be equipped with proper silencers or mufflers during construction.
- 11) Positioning air compressors for various construction plant / caisson foundations on rubber sheets.
- 12) Construction equipment should be well maintained to keep it in a best operating conditions and lowest noise levels.
- 13) The Contractor shall ensure that all equipment engines and motors are equipped with proper mufflers.
- 14) Restrict long heavy vehicles and speed near the populous residential areas.
- 15) Transportation of construction equipment and materials on existing roads shall be carefully designed to minimize adverse impact on residents, as well as traffic on the existing road. The transportation vehicles should be required to slow down and banned from honking when passing populous residential areas.
- 16) Notice boards will be erected at all construction sites providing information about the project, as well as contact information about the site managers, environmental staff, telephone number and other contact information so that any affected people can have the channel to voice their concerns and suggestions.
- 17) The use of temporary noise barriers, or acoustic screens or enclosures shall be properly examined at the road sections close to the populous residential houses to shield residences from road traffic noise.
- 18) After completion of road construction, trees which can be grown well in infertile areas (such as white eucalyptus, red eucalyptus, cajuput, acacia, aneura, pine, etc.) shall be planted along sections of road near the populous residential areas to mitigate impact of traffic noise to residents living along the road.
- 19) For workers who must work with excessive noisy machines such as piling, explosion, mixing, etc., ear pieces should be provided for noise control and workers protection.

4.2.5. Impacts on Terrestrial Ecosystem and Mitigation Measures

Permanent occupation of land by the planned Expressway would lead to the loss of vegetation cover in a large area. The vegetation composition along these road sections consists of paddy, fruit trees, pepper, peanut, sesame, cassava, watermelon, sweet potato trees.... According to the EIA Report, a total of about 23,251 fruit and timber trees; and 835,729 industrial trees shall be cut off, thus impacting both economic activities and tree biomass in local areas.

In addition, during the construction phase, particularly at the construction sites of bridge and tunnel, considerable flow of workers and trucks would be introduced, leading to reduction of vegetation cover, if the construction is not well managed.

Presence of trucks hauling loose materials which generates air-borne dust would pose a detrimental effect on the growth of plants near the proposed road. The dust accumulating on

the leave surface of plants would prevent the photosynthetic function.

The lime and cement would produce hardpan soil if they are dumped to the soil. Although these impacts are short term, a certain period of time is required to restore the vegetation cover after the works are completed.

However, the impacts of land acquisition and construction on the vegetation cover are considered insignificant, because the biodiversity values of the trees and vegetation to be cut down are low, and the quantity of affected trees and vegetation are relatively low. The affected trees and vegetation may be recovered when after the Expressway is constructed.

4.2.6. Impacts on Hydrological Situation and Mitigation Measures

The planned Expressway will cross 5 large river basins of Vu Gia, Thu Bon, Tam Ky, Tra Bong and Tra Khuc. The catchment areas of these rivers are 5,793 km² (Vu Gia River), 3,588 km² (Thu Bon River), 267 km² (Tam Ky River), 577 km² (Tra Bong River) and 2,928 km² (Tra Khuc River). Other small river basins which are crossed by the planned Expressway are Tuy Loan, Yen, Ly Ly, etc. Details on the hydrological characteristics of these river basins are described in the Hydrological Analysis Report prepared by the D/D Study Team in February 2012. Many areas in the project area are prone to flood every year. During flood season, the Expressway with high road embankment may act as a dyke that hinders the flow of flood water from the upstream of the river basins.

During the D/D Study, results of the hydrological analysis mentioned above and comments of local residents had been taken into consideration for the design of culverts, underpasses, and bridges along the Expressway. Location, type and technical specifications of these structures had been designed so as it can maximize the flow of flood water and thus mitigate impacts of inundation.

4.2.7. Impacts on Topography, Soil Erosion and Mitigation Measures

Rainfall is often considered to be one of the triggering elements for soil erosion at gravity which include water erosion, collapse and landslide. As the project is located in an area with adequate rainfall which often concentrates in a certain period, proper measures such as well scheduled construction and improvement of drainage system might considerably reduce the soil erosion that would occur due to land disturbance by road construction.

During construction phase, the Contractor shall undertake at all times to prevent soil erosion, and shall implement the measures to control soil erosion that shall include, but not be limited to the followings:

- 1) The Contractor is required to reuse the excavated soil as much as possible unless the soil is considered not suitable for filling. Fertile soil (or surface soil) shall be distributed free to local people who need it for their own purpose. The residuals shall be reused to form the ground around the interchanges, the areas along the Expressway within the acquired land, or recover the vegetation in some affected areas due to the Expressway project (such as: borrow pit, temporary sites...)
- 2) The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable.

- 3) Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor. Particular attention shall be paid to the control of surface runoff during storm events, especially for sites located near steep slopes.
- 4) In rainy season, prior to construction of roadbed, culverts will be completed with drainage system. The storm water interception and drainage system should be constructed before construction of side slopes.
- 5) Riprap or rock material should be used to embed the surface of the road side slopes. Planting at the surface of the road side slopes is also recommended. Retaining structures such as gabions, cribs, or other types of green barricades and grid work should be used to batter back against the cutting slopes.
- 6) At the sections involving high filling, the construction of road should be scheduled to avoid rainy season. If can not, drainage system will be improved to ensure that storm water be drained smoothly and quickly, and the working surface will be covered.
- 7) The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows.
- 8) The earthwork sites where exposed land surface is vulnerable to runoff, etc. shall be consolidated and/or covered.
- 9) The material stockpile sites shall be far away from surface water bodies and areas prone to surface run-off. Loose materials shall be bagged and covered. Open ditch shall be built around the stockpile sites to intercept wastewater. If necessary, retarding basins shall be constructed to remove sands and other solids in storm water before it reaches the downstream rivers.
- 10) Open stockpiles of construction materials (e.g. aggregates, sand and fill material) of more than 50m³ shall be covered with tarpaulin or similar fabric during rainstorms. Measures shall be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.
- 11) At the start of site establishment, perimeter cut-off drains to direct off-site water around the site shall be constructed and internal temporary drainage works and erosion and sediment control facilities shall be implemented.
- 12) Cut-off drains should be built near sensitive areas to catch rainwater before it reaches the critical areas, and diverging drains should be built to avoid excessive concentration of rainwater flow. Concrete dissipation structures should be built to slow down storm water in drains, and hence reduce its downstream erosive potential.
- 13) Channels, earth bunds, netting, tarpaulin and or sand bag barriers shall be used on site to manage surface water runoff and minimize erosion.
- 14) All exposed earth areas shall be completed and re-vegetated as soon as possible after earthworks have been completed. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces shall be protected by temporary drainage measures.
- 15) The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows.

4.2.8. Impacts to Archaeological Properties and Mitigation Measures

An archaeological investigation was carried out by the Institute of Archaeology of the Vietnamese Academy of Social Sciences in 2010 (refer to the “Report of the Archaeological Investigation (Stage 1) Along the Da Nang - Quang Ngai Expressway, May 2010”).

According to this investigation, there is a group of Champa architectural ruins that may be affected directly or indirectly by the Project. These ruins are located in Chiem Son Tay Valley of Chiem Son Hamlet, Duy Trinh Commune, Duy Xuyen District, at section Km 21+800 - Km22+450 of the planned Expressway (Figure 4-1). These ruins (namely Go Gach, Go Loi, Trien Tranh and Chua Vua) have been recognized and ranked as provincial-level archaeological sites under Decision No. 754/QĐ UB on March 13, 2006 of Quang Nam Province Committee.

The ruins of Go Gach and Trien Tranh would be encroached seriously by the road alignment proposed in F/S. However, in D/D, the alignment had been modified and consequently the encroachment to Go Gach ruin is avoided. A part of the Trien Tranh hill remains to be encroached by the alignment proposed in D/D, but the designated conservation area of Trien Tranh Ruin would not be affected by the D/D alignment.

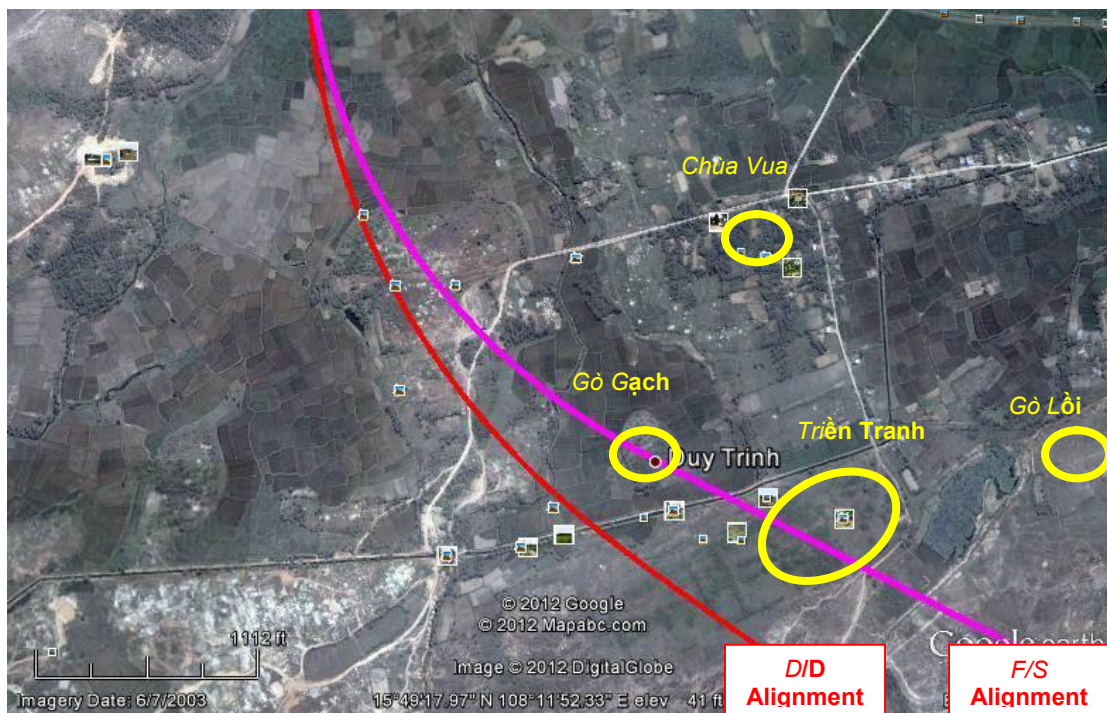


Figure 4-1 Location of Champa ruins, F/S and D/D alignments.

The Trien Tranh Ruin lies in the western residential area of Chiêm Sơn Hamlet, belonging to the Úc Đạp mountain foot (the Eo mountain foot) in the Southeast of Chiêm Sơn Tây Valley. The hill is about 10m high over the paddy field, and has relatively steep slope currently-covered by the eucalyptus trees and high dense shrubs. There are several large deep holes on the mound those were dug by people looking for gold and ancient relics. On the mound surface, it can observe a large number of bricks which are usually used for Champa architecture. The carefully whittled sandstones, similar to the stone used to make other Champa tower bases, are frequently found. According to result of the site observation, it

suggests that there may be a collapsed Champa tower here, and the tower foundation might still be buried deeply in the ground.

The planned Expressway will pass through the western part of Trien Tranh Ruin from Km 21+800 to Km 22+150. Measures to avoid/mitigate impact to this site should be carefully examined before and during construction phase.

Besides, several significant archaeological artifacts of the ancient “My Thien Pottery Kiln” have been found scattered on the bank of Tra Bong River in Binh Trung Commune, Binh Son District, Quang Ngai Province (Km 108+400 ~ Km 108+600). They have been collected and stored in the local museum or in local residents’ houses as private collections.

According to recommendation of the Institute of Archaeology, the test excavation is necessary to evaluate the size of the site and its distribution under the ground, and the influence intensity of the construction on the archaeological site. After the test excavation, a meeting between relevant agencies would be organized to discuss about result of the test excavation, and decide whether an official excavation prior to the commencement of construction works at this road section should be done or not. However, PMU85 has reported this matter to Quang Nam PC and proposed test excavation would be conducted in construction stage in case relicts are found in compliance with the chance finding procedures in the approved EIA, and the Quang Nam PC agreed with the above proposal.

During construction phase, some archaeologically-valuable artifacts or sites would be unearthed in chance. According to the regulations of the Law of Cultural Heritage, a Physical Cultural Property Chance-Finds Procedures should be prepared before hand to minimize impacts to these artifacts or sites. If any relics are discovered, the local related departments should be notified immediately. The excavation should be stopped until the authorized department identifies the relics.

4.2.9. Impacts to Local Communities (Traffic Congestion, Accidents) and Mitigation Measures

In addition to impacts of loss of residential land and production land, resettlement, interruption of production activities, interruption of schooling, split of communities, etc., health and well-being of local communities may be affected by:

- Spread of disease due to poor house keeping and accumulation of domestic waste within the construction site;
- Stagnant water may result in mosquitoes breeding;
- Threats of spreading HIV/AIDS, as there will be a large construction force in the relatively remote areas during construction for a significant period time. This force is highly mobile and unsafe sex conduct could bring the HIV/AIDS risk to the local communities;
- Affected living standard and income of local residents due to occupation of lands for cultivation, aquaculture, etc.;
- Traffic congestion, traffic safety.

Since the affected communities may have not experienced about large-scaled project near the locality in the past, they would be prone to the impacts caused by the Project. The following

measures should be taken to mitigate impacts to health and well-being of local communities.

During the construction phase

- In order to minimize impacts of an influx of new people into the local community, wherever possible, suitable local companies and organizations should be involved. For unskilled manual labor, men and women in the locality should be employed.
- Should there be a large influx of new people, then they are likely to be housed on the site. Adequate living standards with suitable services (water supply, sanitation and power supplies) should be provided for these temporary housing areas. Effluents discharged from these premises should be treated properly before discharged to the surrounding water bodies.
- Opportunities to use local services (e.g. for food supplies etc) should also be encouraged so that the local population benefits from an influx of new people.
- Temporary obstruction of traffic should be avoided or minimized by:
 - + Carefully preparing the construction plan in order to minimize the area and period of road occupation/ closure, and avoid concentration of construction vehicles;
 - + Providing prior notices to local residents on the road occupation / closure through sign boards and mass media;
 - + Specifying road occupation sites, construction sites, etc. to avoid vehicles mistakenly enter the sites;
 - + Allocating personnel at place vulnerable to traffic congestion to instruct detour.
- After completion of construction, the land used for temporary purposes should be reclaimed for agricultural development;

Mitigation Measures Regarding Impacts on Community Health

Based on the HIV/AIDS Prevention Program, the project should address the needs for better dissemination of information about HIV/AIDS and other risks such as drug abuse and human trafficking. The Program should contain awareness campaigns at the construction sites and in the communities, as well as developing peer educators and community monitoring combined with the prevention of human trafficking, awareness on safe migration, and community monitoring.

Infectious diseases should be prevented or controlled by the following measures:

- + Obligate Contractor to duly implement the HIV/AIDS Prevention Program during construction stage;
- + Obligate Contractor to prepare and execute the health education plan for construction workers;
- + Obligate Contractor to periodically report about the health education activities carried out by the Contractor;
- + Health education activities carried out by the Contractor should be monitored by the environmental supervision consultant;
- + Contractor should submit periodical reports about health education activities to local health authorities.

Traffic Accident Management and Prevention

Traffic volume in the interchanges with NH14B, NH14E, PR 605, PR 610, PR 616, PR617, PR623, PR602, and other local roads shall be increased due to the involvement of construction materials transportation vehicles resulting to potential traffic accidents, especially for children and students. To minimize risks, the road safety awareness program should be included in the Project.

4.2.10. Impacts of Split of Communities and Mitigation Measures

The planned Expressway with about 140km of extension will split a number of communes. The D/D Study had identified 84 villages/residential areas which would be split by the planned Expressway. The split of these communities and the split of cultivated lands would cause significant impacts to local residents' daily life and production activities. In many cases, the planned Expressway also hinder local residents in accessing from their house to the paddy field, schools, hospitals, markets, authority offices, churches, pagodas, temples, cemetery, etc.

In D/D, attempts were made to adjust the Expressway alignment in order to avoid the split of residential areas as much as possible. In addition, the underpass, flyovers, road under the bridge/viaduct were designed at about 188 road sections where the Expressway crosses the existing road or where there is requested by local residents. Side roads (collector road) were also designed with aim to improve accessibility of local residents. Important road such as province road, district road, main road of commune, and main road of village, road to the dam, to the forest and to military camp should be keep clearance for trucks and fire truck can pass in emergency cases, especially if that road is an only road to the area. The list of these cross structures is shown in the detailed design report of each package.

Besides, relocation of school, hospital, pagoda, etc. is recommended where it is split from the village by the planned Expressway. The Tinh Ha Primary School located on the provincial road 623B near Km124+000 of the planned Expressway is an example. This school is not affected directly by the planned Expressway, but pupils going to this school would be hindered by the planned Expressway and the Quang Ngai North Interchange. Therefore, the relocation of this school is considered as the optimum option, and the school relocation plan is being discussed by local authorities and local residents.

4.2.11. Hazard and Mitigation Measures

During operation phase, among traffic accidents occurred on the Expressway, accidents involving vehicles transporting hazardous materials or chemicals are particularly dangerous because it would significantly pollute the river water and affect a large number of people living in the basin downstream of the river when it occurs accident on the bridge. Among the rivers crossed by the planned Expressway, the followings are particularly important, because they supply water for domestic use and irrigation to the populous residential areas in downstream of the river:

- Yen, Tuy Loan and Vu Gia rivers: supplies water for Da Nang city

- Tam Ky river : supplies water for Tam Ky city
- Ky Lam and Chiem Son rivers : supplies water for Hoi An city
- Tra Bong river : supplies water for Chau O town
- Tra Khuc river : supplies water for Quang Ngai City.

To mitigate this impact, the bridges over these rivers should be specially designed with two tanks installed at two ends of the bridge to temporarily collect the spilled hazardous materials when accident happens. However, to prevent the hazardous materials flushing into the river from these tanks during raining day, it suggests that a monitoring and quick-response system should be installed at these large bridges. In short term, each of these bridges should be regularly guarded by one or two staff of the Expressway Management Company. When accident occurs, these staff would promptly take proper actions to prevent hazardous materials flushing into the river. In long term, these bridges would be guarded by the remote-control monitoring and response systems to enable quick response to accidents occurred on the bridge.

4.2.12 Impacts of Construction Materials Exploitation and Transportation (Access Roads) and Mitigation Measures

There are more than 50 locations of borrow pits, sand pits and quarries. The criteria for selecting the locations for material exploitation sites were confirmed in approved EIA report. During the D/D Study, as the updated work, the D/D Study Team had also carried out a survey on the candidate material exploitation sites to confirm the validity of these pits/quarries (i.e. quality of the materials, supply capacity, legal exploitation license, environmental protection commitment, etc.). The selection and use of these sites was agreed by the relevant commune PCs.

Total extension of entrance access roads to and from the site is estimated to be 131 km. The following principles are applied in selecting the entrance access roads:

- First basis of selection
 - + It should be public road. (national road, provincial road)
 - + The road pavement width is more than 6 m desirably.
 - + The areas along the road are low density residential areas.
- Second basis of selection (if there is no road which satisfies the first basis)
 - + It should be public road. (district road)
 - + As for a road lot, not less than 8 m is desirable.
- Third basis of selection (If there is no road which satisfies the first basis and second basis)
 - + Rural road or forest road
 - + Widening of road width is feasible.

During construction phase, a significant number of trucks transporting construction materials would use these roads, and cause degradation of local residents' living conditions by increase in air pollution, noise, traffic jam, traffic accidents, etc. In particular, increase in traffic accident is anticipated at the road sections near the schools. Dust generated by the

trucks transporting construction materials would be the main cause of damage to the surrounding plants, vegetation, etc. and degradation of water quality of the surrounding water-bodies. For the roads which need widening, local residents would be affected due to the land acquisition, loss of cultivated lands, etc.

To mitigate impacts to residents living along the entrance access roads during construction phase, these roads should be properly used and managed as follows:

- The entrance access roads selected and described in the construction plan prepared by the D/D Study Team should be firstly used. Widening of existing roads, and development of new access road should be avoided to the extent possible.
- If the Contractor proposes new access roads, these will be checked/approved by the Da Nang City PC, or Quang Nam Province PC, or Quang Ngai Province PC, and agreed by the commune PCs. The new road should be designed so as large volume excavations is avoided, and the width of the road is strictly controlled.
- Compensation to farmers should be done efficiently and fairly if land acquisition is required for the newly-built access road.
- All newly built and improved access roads should be designed with the proper drainage system, road slope retaining structures, etc.
- Warning signs, speed bumps should be placed at the road sections near the sensitive receptors such as schools, hospitals, pagodas, markets, etc. to reduce risk of traffic accident.
- Contractors should formulate proper construction materials transportation plans to mitigate impacts to local residents and environment.
- Nocturnal transportation and construction activities are prohibited at the road sections near the residential areas.
- For unpaved access roads, contractors shall spray water on the roads 2 – 3 times a day during the dry season.
- Pavement of linking roads must be regularly maintained during construction phase to reduce impacts of dust, noise, and risk of traffic accident.

4.2.13 Wastes from Construction Worker Camps

Solid waste generated from construction camps includes mostly waste from office activities like paper, plastic, and ink. Most of the office equipment needs to be collected and reused.

Solid waste generated from construction sites may include: oily rags, chemicals, metal scrap, metal dust, lubricants, oil, solvents, paints, tires, wood, soil, and other mineral construction waste or recyclable material. Notably, most of the waste at construction sites is classified as hazardous waste.

Poorly designed waste and hazardous waste management plans may cause contamination of the environment and risks to the health and safety. Therefore, wastes generated from construction camps and in working sites should be adequately and regularly collected and transported to the waste disposal site.

Chapter 5 Implementing Organizations

5.1 Organizational Structures

A successful EMP requires active involvement from all parties involved in the process of environmental management: (1) those responsible for organizing or implementing the EMP, and (2) those enforce the standards, laws and regulations relevant to the project, supervise the EMP and the overall environmental performance during the construction and operation of the project.

The organizational structure for the EMP implementation and supervision during construction phase is shown in Figure 5-1.

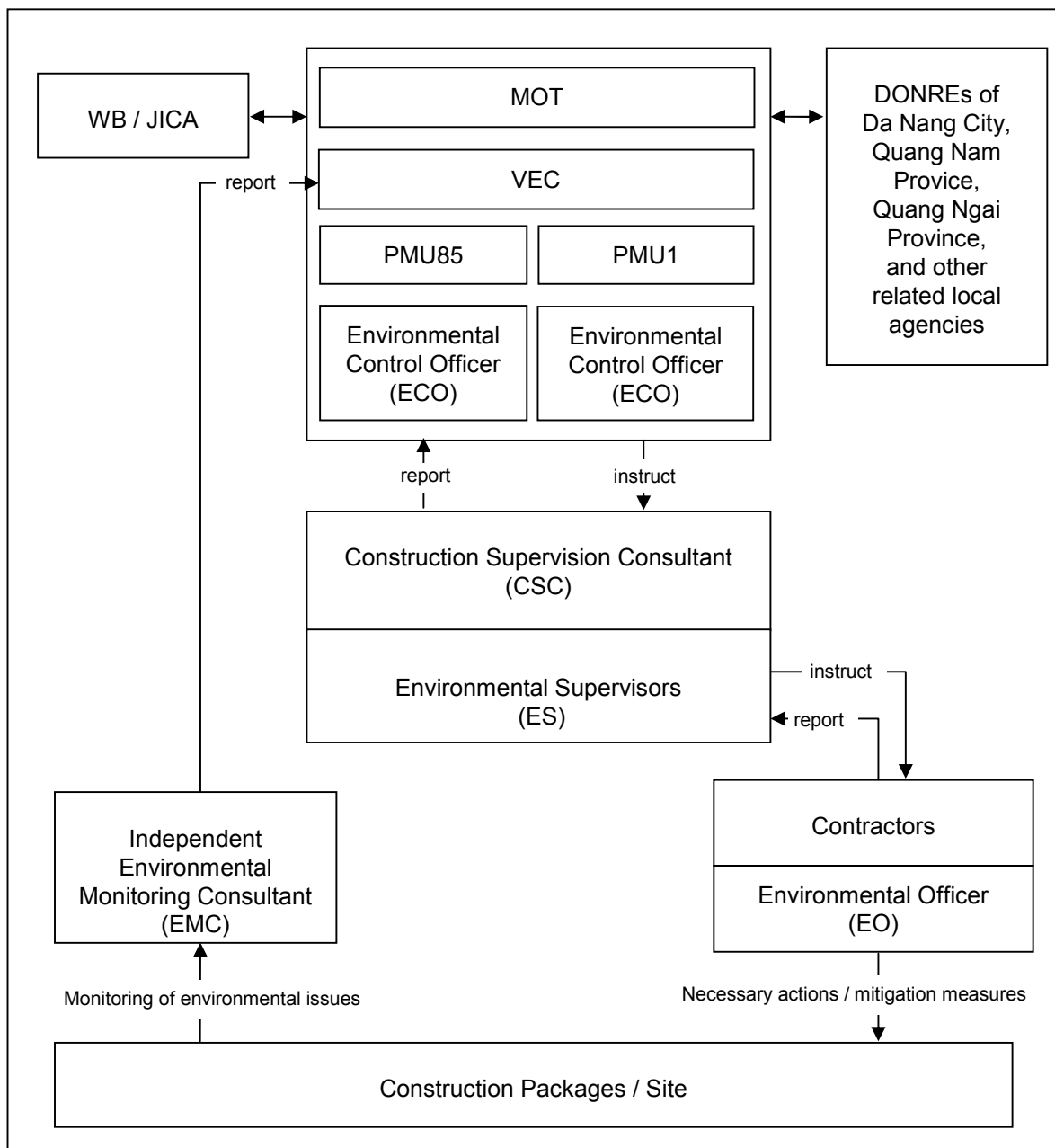


Figure 5-1: Organization Structure for EMP implementation and supervision (in construction phase)

5.2 Environmental Responsibilities

For the DQEP, the following agencies/organizations will be involved in the implementation and supervision of the EMP.

- Department of Natural Resources and Environment (DONRE) of Da Nang City, Quang Nam Province, and Quang Ngai Province, and other related local agencies
- The Vietnam Expressway Corporation (VEC), Project Management Units (PMU85 and PMU1)
- The Environmental Control Officer (ECO)
- The Independent Environmental Monitoring Consultant (EMC)
- The Construction Supervision Consultant (CSC) and its Environmental Supervisors (ESs)
- The Contractors and its Environmental Officer (EO)
- The Ministry of Transportation (MOT)
- WB and JICA

The roles and responsibilities of these parties and the line of communication with respect to environmental protection works are described in detail in the below sections.

5.2.1 Department of Natural Resources and Environment (DONRE)

The Department of Natural Resources and Environment (DONREs) of Da Nang City, Quang Nam Province and Quang Ngai Province are state Environmental Management Agencies which are in charge of making the environmental regulations, policies, and guidelines for the construction and operation activities of the Project. They are also responsible for the enforcement of the laws, regulations, standards and environmental practices of all organizations within their respective jurisdictions. In the DQEP these agencies are the project environmental supervisors and administrator. Their roles and responsibilities are:

- Enforce applicable laws, regulations and standards;
- Coordinate the environmental protection effort among departments concerned;
- Check and supervise construction, completion and operation of environment facilities.

5.2.2 Project Owner - VEC and Representatives - PMU1 & PMU85

Vietnam Expressway Corporation (VEC) as the owner of the Project, PMU1, PMU85 as project implementation agencies shall take overall responsibility for the implementation of the Project.

Under Vietnam environmental legislation, the Project owner is accountable for the potential impacts caused by their activities, and is responsible for managing these impacts. VEC therefore has overall responsibility to ensure that the implementation of this EMP complies with the relevant legislation.

This is a day to day management organization for management of all aspects of project preparation and construction. As such, it will also responsible for environmental management with, but not limited to, the following specific responsibilities:

- Prepare EIA for project development and appraisal, including supporting and

supervising environmental assessment team to complete EIA and EMP to meet the regulatory and World Bank safeguard requirements and receive approval from the regulatory agency for the project and clearance of the safeguard documents from the World Bank.

- Ensure the interactions between the environmental assessment team and project planners and engineers for integrating mitigation measures and other environmental considerations and programs and requirements into project design with the necessary budgetary support as may be needed.
- Ultimately supervise for mitigation and other environmental protection measures during project construction, including incorporation of environmental requirements into construction contracts, organizing training for the contractors, enforce other environmental management programs and conducting periodical inspection of the construction sites.
- Engage and supervise environmental monitoring programs, receive and review monitoring reports from the monitoring consultant as well as from contractors on their regular reports for environmental performance.
- Consult and/or communicate to the local communities, project affected people, regulatory agencies, World Bank, JICA, and other stakeholders during the project preparation and construction to ensure them the full knowledge of 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.

VEC will have full time professional staff in the field of environment and resettlement to directly lead the supervision and management effort for environmental management of the project preparation and construction.

5.2.3 Environmental Control Officers (ECO)

The Environmental Control Officers (ECO) are the persons responsible for the monitoring of the implementation of the EMP. These persons will be appointed directly by PMUs, and must have adequate knowledge of the principles of Integrated Environmental Management as well as environmental legislative knowledge to understand and implement this management plan. The ECO should ideally report to PMUs.

The ECO has the authority to stop works in his/her opinion if there is/may be a serious threat to or impact on the environment caused directly by the construction operations. This authority is to be limited to emergency situations where consultation with the Construction Supervision Consultant (CSC) is not immediately possible. In all such work stoppage situations the ECO is to inform the CSC on the reasons for the stoppage within 24 hours.

Upon failure by the Contractor or his employees to show adequate consideration to the environmental aspects of this EMP, the ECO may recommend to the CSC to have the Contractor's representative or any employee(s) removed from the site, or work suspended until the matter is remedied. No extension of time will be granted in the case of such suspensions and all costs will be borne by the Contractor. The ECO's duties will include the following:

- Assisting the VEC and PMUs in ensuring that the necessary environmental

- authorizations and permits have been obtained.
- Maintaining open and direct lines of communication between VEC and PMUs, and Contractors with regard to environmental matters.
 - Monthly reporting on environmental issues at construction sites to PMUs.
 - Reviewing and approving the Contractor's construction method statements.
 - Regular site inspections of all construction areas with regard to compliance with the EMP.
 - Monitoring and verifying adherence to the EMP at all times, monitoring and verifying that environmental impacts are kept to a minimum.
 - Taking appropriate action if the specifications are not followed.
 - Assisting the Contractors in finding environmentally responsible solutions to problems.

5.2.4 Independent Environmental Monitoring Consultant (EMC)

In order to minimize the environmental impacts during construction of the Project, VEC/PMUs shall ensure that Project-specific monitoring and audit requirements are established for the Project. The monitoring and audit shall be carried out by an independent Environmental Monitoring Consultant (EMC) appointed by VEC. This monitoring will be part of an Integrated Project Performance Review and Monitoring Package which will also include design review, quality control of technical, social, and procurement as well as environmental issues.

The EMC must perform the following duties:

- Familiarize himself with the Project works through review of the reports, including the Project EMP;
- Review and audit in an independent, objective and professional manner all aspects of the EMP;
- Validate and confirm the accuracy of monitoring results, monitoring equipment, monitoring locations, monitoring procedures and locations of sensitive receivers;
- Carry out random sample check and audit on monitoring data and sampling procedures, etc;
- Conduct random site inspection;
- Audit the EIA recommendations and requirement against the status of implementation of environmental protection measures;
- Review the effectiveness of environmental mitigation measures and project environmental performance;
- Verify the investigation results of any non-compliance of the environmental quality performance and the effectiveness of corrective measures; and
- Submit audit results to VEC.

Recommended terms of reference for the EMC are included in Annex 1.

5.2.5 Environmental Supervisors (ES)

Environmental Supervisors (ES) are generally included in the Construction Supervision Consultant (CSC) and are responsible for overseeing the construction works of the project and monitor other works and activities undertaken by the Contractor(s) for ensuring

compliance with the specification and contractual requirements. The responsibilities of the ES include:

- 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 ES is satisfied with the environmental arrangement;
- Provide assistance to the ECO 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 ES considers that 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 ES determined timeframe;
- Supervise the Contractor's activities and ensure that the requirements in the EMP and contract specifications are fully complied with;
- Instruct the Contractor(s) to take actions to reduce impacts and follow the required EMP procedures in case of non-compliance / discrepancies identified;
- If the contractor discovered cultural relics by chance, the ES will order site protection and report to the relevant authorities and VEC;
- Monitor Contractor's task of cutting trees in accordance with the pre-determined area, numbers, species, etc.; and
- Adhere to the procedures for carrying out complaint investigation.

5.2.6 Contractors

Environmental management is a part of Contractor's on-site quality management.

Prior to the execution of the construction, the Contractor shall prepare the Site Environmental Management Plans to manage environmental protection issues during the construction process.

In the Site Environmental Management Plan, the Contractor shall propose measures to minimize environmental impacts during the construction process, and submit them to the ES for consideration. It will be reviewed if there are changes in legal aspect or adjustments to suit specific on-site cases.

In case of significant impact on the environment is observed, the Contractor will promptly inform the ES to get instructions and then take next steps.

The Contractor will appoint a competent individual as the Contractor's on-site Environmental Officer (EO). The EO must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management to all personnel involved in the contract.

The EO will be responsible for overseeing the Contractor's internal compliance with the EMP requirements and ensuring that the environmental specifications are adhered to.

The duties of the Contractor(s) and EO include but not limit to:

- Daily site inspections. Prepared and kept Environmental Site Log-book (EO's log-book).
- Supervision of work where environmental management is a key aspect (e.g. in sensitive areas, with high environmental risk, etc.).
- Strengthening the coordination with the ES and ECO.
- Providing and update information to the ECO and ES regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
- Completing start-up, weekly, monthly and site-closure checklists
- Keeping a photographic record of progress on site from an environmental perspective.
- Keeping a register of complaints in the site office and recording and dealing with any community comments or issues.
- Keeping a record of on-site incidents and accidents and how these were dealt with.
- Working within the scope of contractual requirements and other tender conditions;
- In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact;
- Stopping construction activities which generate adverse impacts upon receiving instructions from ES or ECO. Propose and carry out corrective actions and implement alternative construction method, if required, in order to minimize the environmental impacts.

Chapter 6 EMP Implementation

6.1 General Consideration

Major anticipated environmental issues (mainly in construction phase) and correspondent impact mitigation measures were presented in Chapter 4. A number of impacts would be avoided/mitigated by modification of alignment, design of roads, bridges, viaducts, under-passes, over-passes, drainage culverts, etc. in the F/S and D/D stages. Results of the design are described in the bidding documents for contractors. In construction phase, some mitigation measures such as training for Contractors' staff, etc. should be implemented during the early stage prior to the commencement of construction. The Contractor shall be requested to prepare the draft Site Environmental Management Plans prior to the execution of construction, and submit to the Project Owner and the Construction Supervision Consultant (CSC) for review, comments, and approval. This request will be included in the Contractor tendering document.

6.2 Project Initiation and Staffing

The ES shall be mobilized at least one month before the start of the construction phase. During this start up time, the ES will review and familiarize themselves with the project, the project design, the technical specification, contract documents, the EIA, EMP and RAP reports and other project relevant documents and reports.

The ECO shall be also mobilized prior to the commencement of construction phase, to prepare the necessary guidelines, documentation, training, etc.

6.3 Training

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

- The Contractor shall distribute to the key staff, including newly joined key staff members, (1) the Contractor's Environmental Policy; and (2) Copies of relevant extracts from environmental laws, standards and regulations.
- The Contractor is responsible for providing appropriate training to all staff according to their level of responsibility for environmental matters. Managerial staff shall receive additional training.
- All Contractor's employees shall be required to comply with environmental protection procedures and they shall be able to provide evidence that they attended the training sessions detailed in the Plan;
- Training materials and methods -- which shall include formal training sessions, posters, data in newsletters, signs in construction and camp areas and 'tool box' meetings -- shall be reviewed by the ES.
- The Plan shall educate all construction workers on the following issues but not limited to them: fire arm possession, traffic regulations, illegal logging and collection

of non-timber forestry products, non disturbance of resettlement communities, hunting and fishing restrictions, waste management, protection of surface water, erosion control, health and safety issues, all prohibited activities, the Code of Conduct requirements and disciplinary procedures, general information on the environment in which they will be working and living; and establishment of penalties for those who violate the rules;

- Periodic training shall be provided when necessary.
- Records shall be maintained (e.g. attendance records for environmental awareness training, topics covered) and submitted to the ECO/ES upon request..

6.4 Site Inspection

The ECO and ES shall closely audit the construction activities through regular site inspections accomplished through daily site visits, walks and visual inspections to identify areas of potential environmental problems and concerns. The area of inspection should cover both the construction areas and the environment outside the site area that could be affected, directly or indirectly, by the Contractor's activities.

Inspections of ECO and ES should be done independently of the Contractor. It is expected that the ECO shall have his own hand held and portable monitoring equipment (for noise, air, water quality, etc.), transport and other resources. Where definitive monitoring is necessary to resolve contentious issues or to impose penalties, the EMC and/or ES may be requested by PMU to assist ECO to carry out specific monitoring at the locations under review.

Where there is infringement of technical specifications, or condition of contractors non-compliance with the EMP, the ES shall immediately inform ECO, and the compliance framework shall be applied. The ECO shall also report all infringements to PMU as a part of the monthly reporting.

Regular joint environmental site inspections (e.g monthly) should be organized by the ECO and ES, with participation from the Contractor's environmental and construction team.

EO's log-book shall be kept readily available for inspection by all persons assisting in project management.

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

6.5 Reporting

6.5.1 Contractor's Site Environmental Management Plans

The Contractor shall prepare the following draft Site Environmental Management Plans and submit them to the Owner and the CSC for review, comments, and approval prior to the construction commencement date.

- 1) Workforce and Site Installation Management Plan
 - Workforce

- Workers' camp and site installation requirements
 - Sanitary facilities
 - Medical facilities
 - Code of conduct
 - Security
 - Prohibitions
 - Environmental training for construction workers
- 2) Construction Impact Management Plan
- Erosion and sedimentation
 - Emissions and dust
 - Noise and vibration
 - Earthworks, cuts and fill slopes
 - Stockpiles, quarries and borrow pits
 - Spoil disposal sites
 - Disposal of debris
 - Demolition of existing infrastructures
 - Bridges, overpasses, interchanges and viaducts
 - Construction of tunnel
 - New access roads
- 3) Clearing, Re-vegetation and Restoration Management Plan
- Clearing of construction areas
 - Re-vegetation and site restoration
- 4) Waste Management Plan
- Drainage system
 - Wastewater
 - Solid waste
 - Domestic waste
 - Hazardous and chemical waste
- 5) Material Handling, Use and Storage Management Plan
- Transportation
 - Hazardous and chemical substances
 - Surfacing materials
 - Cement and concrete batching
 - Maintenance of construction equipment
- 6) Ecological Management Plan
- Protection of natural vegetation
 - Protection of fauna
 - Temporary land occupation
 - Work in watercourses
- 7) Safety Management Plan

- Construction site safety
 - Measures on blasting
 - Fire control
 - Measures on hazardous gas
 - Residual unexploded ordnances
 - Traffic management
 - Environmental emergency procedures
- 8) Physical Cultural Property Chance-Finds Procedures
- Establishing the organizational structure
 - Training courses
 - Chance-find procedures
 - Objects with no significant value
 - Cultural sites or relics with significant value
 - Chance-find report
 - Legal binding force
- 9) Community Relations and Health Management Plan
- Community relations
 - Health management plan

All plans shall include a summary of the proposed methodology to develop and implement the plan and shall outline the proposed actions for all the requirements given in this supplement to the Contract, including the requirements for sub plans for implementing protection and mitigation measures, throughout the execution of the Works, compliance by the Contractor and the Subcontractors and other agents with the environmental requirements stated in the bidding documents and elsewhere in the Contract. The draft Site Environmental Management Plan shall contain sufficient details to enable the Owner and the CSC to review and comment on it.

The Contractor's Site Environmental Management Plan shall establish an environmental management system that specifies how the Contractor proposes to meet the Owner's environmental requirements stated in the bidding documents. The Contractor's Site Environmental Management Plan shall comply with ISO 14001:2004 - Environmental Management System and shall include the following as minimum:

- (i) A statement of policy, providing a definition of the Contractor's environmental policy and an indication of commitment to the execution of its Site Environmental Management Plan.
- (ii) The environmental planning process, setting out the principal steps in the Contractor's Site Environmental Management Plan, including:
 - a. Identify environmental aspects of the Contractor's work and evaluation of associated environmental impacts;
 - b. Specify other environmental mitigations for which the Contractor is responsible under the Contract;
 - c. Identify Applicable Laws associated with the requirements of these Owner's

- environmental requirements stated in the bidding documents and the Contractor's Site Environmental Management Plan, and identify the Contractor licenses, permits and approval associated with the Contractor's Site Environmental Management Plan.
- d. Nominate the Contractor's performance criteria in accordance with the Owner's Environmental requirements stated in the bidding documents.
 - e. Issue environmental plans and management programs.
- (iii) The implementation procedures that specify the capabilities, support mechanisms and resources necessary to achieve the objectives and targets of the environmental policy. Responsible personnel with appropriate knowledge, skills and training for specific tasks shall be identified. In addition, the Site Environmental Management Plan shall define communication and reporting responsibilities.
 - (iv) The proposed quality assurance plan, including summary of methodology, equipments, staffing, organization, etc. for the Site Environmental Management Plan.
 - (v) An overview of the impacts on physical, biological and social environment that would be caused by the Contractor's construction works within the scope of the Contract.
 - (vi) The detailed sub-plans to be included in the Site Environmental Management Plan.
 - (vii) A formal certification from the Contractor that the Site Environmental Management Plan:
 - a. Has been prepared by duly qualified consultants or specialists;
 - b. Complies with the undertaking specified Environmental Requirements which stated at Bidding documents; and
 - c. Complies with the Conditions of the Contract, including applicable Laws, Regulations, Standards, National Technical Regulations which relate to the Site Environmental Management Plan.

The Contractor shall be responsible for updating and signing-off the Site Environmental Management Plans as necessary, to ensure they continue to meet the requirements of the EMP, relevant environmental legislation and regulations, and best management practices. The Contractor shall notify the Owner in advance of any modifications to the work methods, and/or amendments to the Site Environmental Management Plans.

The recommended main contents of the Contractor's Site Environmental Management Plans are described in Annex 3.

6.5.2 Reports made by PMUs and VEC

During construction phase, PMUs shall construct and submit the following reports to VEC. VEC will review the reports and submit to WB/JICA, MOT, and other authorities in concern (refer to Minutes of Discussions on North-South Expressway Construction Project {Da Nang – Quang Ngai Section} between JICA and GOV on October 21, 2010):

- a) Monthly report, the latest is 10 days after ending of month;

- b) Quarterly report, the latest is 15 days after ending of quarter, in the form of the Aligned Monitoring Tool (AMT);
- c) Yearly report, the latest is on 31 December of the earlier year;
- d) Project completion report, the latest is 6 months after finishing project implementation, in the form of Project Status Report (PSR);
- e) Report on changes (if any) in comparison with the contents of the signed particular Agreement on the Project.

6.5.3 Reports made by the Environmental Supervisor (ES)

As a minimum the ES shall prepare the following written reports:

- Monthly report of key issues and findings from supervision activities
- Report of non-compliance issues (if any)
- Consolidated summary report from contractor's monthly report

At the end of the project, the ES shall prepare a final report summarizing the key findings from their work, the number of infringements, resolutions, etc. as well as advice and guidance for how such assignments should be conducted in the future.

6.5.4 Reports made by the Environmental Monitoring Consultant (EMC)

The selected EMC will conduct monitoring and make reports of the monitoring results to VEC on a quarterly basis during construction phase and twice a year in operation phase.

6.5.5 Data Keeping

All documentation shall be filed in a traceable and systematically manner. Site document, such as monitoring field records, laboratory analysis records, meeting minutes, correspondences, videos, photos, etc. shall be cross-referenced by the ES and be ready for inspection upon request.

The monitoring data will also be recorded electronically if possible, and the software copy can be available upon request. All the documents and data will be kept throughout the project construction and maintenance periods, and will be made available to the Project Proponent upon request within one year after the completion of the project.

Chapter 7 Environmental Monitoring

7.1 Independent Environmental Monitoring

During construction phase and operation phase, the Independent Environmental Monitoring Consultant (EMC) entrusted by VEC will carry out the regular monitoring on environmental quality parameters at the designated monitoring locations. Besides, during the peak construction period or at the request from VEC/PMUs, the EMC will also carry out additional measurements using hand-held equipment in order to monitor short-term impact. Once non-compliance with environmental quality performance criteria is identified, additional monitoring will be carried out.

The environmental monitoring program to be carried out by EMC is described in the contract documents signed between VEC and EMC.

7.2 Contractor's Environmental Monitoring

In addition to the regular monitoring carried out by EMC, the Contractor will also carry out the monitoring on physical environmental quality (ambient air quality, noise, surface water quality, groundwater quality, and wastewater) with parameters, frequencies, locations, etc. stated in the technical specifications specified for each construction package.

The monitoring results will be included in formal written reports separately and submitted for review by CSC on monthly basis. In case of unexpected impact occurs, the Contractor may report immediately to PMUs.

7.3 Recommended Environmental Monitoring Program for EMC

a. Locations of monitoring sites for EMC

The Environment Monitoring Program would be implemented by EMC in 3 phases, namely: Pre-construction or preparation phase (baseline environment); construction phase (expected to last in 40 months); and operation phase (initial year of commercial operation). Recommended locations of monitoring sites for EMC are showed in Table 7.1 and Annex 8.

Table 7.1 Recommended locations of monitoring sites for EMC

No.	Location	Package
<i>I</i>	<i>Air Quality and Noise</i>	
1	Beginning point (Tuy Loan interchange)	PKG1
2	My Son interchange (PR609)	PKG2
3	Commune road at the (Km19+223)	PKG3A
4	Commune road at the (Km24+220)	PKG4
5	Ha Lam interchange	PKG5

No.	Location	Package
6	Tam Ky interchange (PR616)	PKG7
7	PR617 (Km89+100)	PKGA2
8	Left Dike of the Tra Bong river	PKGA3
9	PR622 – Binh Son interchange	PKGA4
10	PR623 – Quang Ngai interchange	PKGA4
11	PR623B (Km128+610)	PKGA5
12	NH1 intersection (ending point)	PKGA5
II	<i>Surface Water Quality</i>	
1	Tuy Loan river	PKG1
2	Yen river	PKG1
3	La Tho river	PKG2
4	Thu Bon river	PKG3A
5	Ba Ren river	PKG3B
6	Ly Ly river	PKG5
7	Tam Ky river	PKGA1
8	Tra Bong river	PKGA3
9	Tra Khuc river	PKGA5
III	<i>Underground Water Quality</i>	
1	The residential area near Yen bridge	PKG1
2	The residential area near Ky Lam bridge	PKG3A
3	The residential area near Chiem Son bridge	PKG3B
4	The residential area near Tam Ky bridge	PKGA1
5	The residential area near Tra Bong bridge	PKGA3
6	The residential area near Tra Khuc bridge	PKGA5
IV	<i>Wastewater Quality</i>	
1	Construction site of North tunnel	PKG4
2	Construction site of South tunnel	PKG4
V	<i>Soil Quality</i>	
1	The paddy field at Km5+800	PKG1
2	The paddy field at Km47+800	PKG6
3	The paddy field at Km132 – Km133	PKGA5

b. Parameters and timing of environmental monitoring by EMC

Recommended monitoring parameters, timing etc. for the EMP to be carried out by EMC are shown in Table 7.2.

Table 7.2 Recommended parameters, timing for environmental monitoring by EMC

No.	Item	Baseline	Construction phase	Operation phase
I	<i>Air quality monitoring</i>			
	1. Monitoring parameter	TSP, PM10, CO, SO ₂ , NO ₂ , temperature, Humidity, wind velocity, wind direction	TSP, PM10, CO, SO ₂ , NO ₂ , temperature, Humidity, wind velocity, wind direction	TSP, PM10, CO, SO ₂ , NO ₂ , temperature, Humidity, wind velocity, wind direction
	2. Monitoring frequency	Measuring one (1) time before starting construction, 4 samples at 1 location, during 6:00 to 18:00. Each sampling last at least 1 hour	Measuring once time a quarter, 4 samples at 1 location/period, during 6:00 to 18:00. Each sampling last at least 1 hour	Measuring once time 3 months for one (1) year in operation phase, 4 samples at 1 location/period, during 6:00 to 18:00. Each sampling last at least 1 hour
II	<i>Noise monitoring</i>			
	1. Monitoring parameter	Leq, L10, L90	Leq, L10, L90	Leq, L10, L90
	2. Monitoring frequency	Measuring one (1) time before starting construction, 4 samples at 1 location, during 6:00 to 18:00. Measuring 3 times/sample	Measuring once time a quarter, 4 samples at 1 location/period, during 6:00 to 18:00. Measuring 3 times/sample	Measuring once time 3 months for one (1) year in operation phase, 4 samples at 1 location/period, during 6:00 to 18:00. Measuring 3 times/sample
III	<i>Surface water quality monitoring</i>			
	1. Monitoring parameter 2. Monitoring frequency	pH, TSS, BOD, COD, oil, turbidity Measuring one (1) time before starting construction at 200m of upstream cross-section and from 150-200m downstream cross-section. - For the Tuy Loan, Yen, La Tho, Ly Ly, Tam Ky rivers: 1 sample (surface level) at upstream cross-section, 1 sample (surface level) at downstream cross-section	pH, TSS, BOD, COD, oil, turbidity Measuring once time a quarter at 200m of upstream cross-section and from 150-200m downstream cross-section. - For the Tuy Loan, Yen, La Tho, Ly Ly rivers: 1 sample (surface level) at upstream cross-section, 1 sample (surface level) at downstream cross-section	pH, TSS, BOD, COD, oil, turbidity Measuring once time 3 months for one (1) year in operation phase at 200m of upstream cross-section and from 150-200m downstream cross-section. - For the Tuy Loan, Yen, La Tho, Ly Ly rivers: 1 sample (surface level) at upstream cross-section, 1 sample (surface level) at downstream cross-section

		- For the Thu Bon, Ba Ren, Tra Khuc, Tra Bong rivers: 3 samples (surface level) at upstream cross-section, 3 sample (surface level) at downstream cross-section	- For the Thu Bon, Ba Ren rivers: 3 samples (surface level) at upstream cross-section, 3 sample (surface level) at downstream cross-section	- For the Thu Bon, Ba Ren rivers: 3 samples (surface level) at upstream cross-section, 3 sample (surface level) at downstream cross-section
IV	Underground water quality monitoring			
	1. Monitoring parameter	pH, SS, Nitrates, E.Coli	pH, SS, Nitrates, E.Coli	pH, SS, Nitrates, E.Coli
	2. Monitoring frequency	Measuring one (1) time before starting construction, 1 sample/location	Measuring once time a quarter, 1 sample/location	Measuring once time 3 months for one (1) year in operation phase, 1 sample/location
V	Wastewater quality monitoring			
	1. Monitoring parameter		pH, TSS, Pb, Zn, COD, BOD, oil, coliform, turbidity	
	2. Monitoring frequency		Measuring once time a quarter, 1 sample/location	
VI	Soil quality monitoring			
	1. Monitoring parameter	Cu, Zn, Pb, Cd	Cu, Zn, Pb, Cd	Cu, Zn, Pb, Cd
	2. Monitoring frequency	Measuring one (1) time before starting construction, 1 sample/location	Measuring once time a quarter, 1 sample/location	Measuring once time 3 months for one (1) year in operation phase, 1 sample/location

c. Implementation Schedule for monitoring by EMC

The baseline survey shall be carried out in preparatory phase. The field monitoring activity survey for noise shall be undertaken simultaneously and shall be completed within one month. In like manner, the water quality monitoring survey shall be conducted and accomplished within one month.

In addition, the schedule for the monitoring and observation activities for the construction phase shall be conducted every 3 months (quarter) for 39 months while activities for the operation phases of the project shall be conducted quarterly for the first year of operation only. The schedules for these activities are shown in Table 7.3 and 7.4.

Table 7.3 General schedule of Monitoring by EMC

Stage	Months																																																		
	1	2	3	4	5	6	7	...	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52																									
Baseline	B1																																																		
Construction Stage				C1			C2				C12			C13		F1																																			
Operation Stage																	O1			O2				O3																					O4						
	B1	Baseline 1																																																	
	C3	Construction 3																																																	
	F1	Final Report of Construction Stage (without monitoring)																																																	
	O2	Operation 2																																																	

Table 7.4 Detailed schedule of Monitoring by EMC

Procedure	Weeks			
	1	2	3	4
Preparation and Mobilization				
Field Survey				
Laboratory Test				
Data Analysis and Reporting				

Chapter 8 Environmental Compliance Framework

8.1 Minimum Environmental and Social Standards

The contractor must comply with the minimum environmental and social standards presented in Table 8-1 which is based on the Environmental, Health and Safety (EHS) performance standards of the International Finance Corporation (IFC). The methods and procedures detailed in the Contractor's Site Environmental Management Plans must be sufficient to meet these minimum standards.

Table 8-1: Minimum Environmental and Social Standards for the Construction of the Expressway

1. Worker's Camp		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Water supply affecting ecology or village water supply	Camp to provide its own water supply that does not affect village water supply	<ul style="list-style-type: none"> Any water supply sources should be located so that it does not adversely affect the villages supply The intake of water from streams for water supplies should leave residual flows in the watercourses. Storage tanks should be used to buffer water supplies.
Wastewater discharges affecting water quality	Wastewater to be treated prior to discharge.	Sewerage disposal methods should be designed to the standards outlined by the Vietnamese government
Solid waste polluting the environment and causing health hazards.	No waste to be burnt or buried on site.	All solid wastes shall be removed from site and disposed of at a municipal landfill.
2. General construction issues		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Noise of machinery associated with construction activities	Noise must not unreasonably intrude on traditional village life.	<ul style="list-style-type: none"> Keeps a current list of all noise producing machinery and noisy activities Machinery operation to occur only during designated hours (to be confirmed by Contractor in agreement with villagers). Use of complaints register and procedures to address issues as they arise. Work to be carried out in daylight, in typical working hours. Concrete batching plants and other noisy equipment to be located as far as practical from villages.
Dust generation from construction activities	Dust must not cause a hazard or nuisance to village life.	<ul style="list-style-type: none"> Dusty operations to occur only during designated hours (to be confirmed by contractor in agreement with villagers). Use of complaints register and procedures to address issues as they arise. Concrete batching plants and other dusty equipment to be located as far as practical from villages.
Vibration disturbance from construction activities	Vibration must not unreasonably intrude on traditional village life.	<ul style="list-style-type: none"> Keeps a current list of all vibration producing machinery and activities causing vibration. This machinery operation to occur only during

		<p>designated hours (to be confirmed by contractor in agreement with villages).</p> <ul style="list-style-type: none"> ▪ Use of complaints register and procedures to address issues as they arise.
Increased utilization of roads by traffic associated with construction activities	There should be no significant increased risk to local populations from traffic associated with the development.	<ul style="list-style-type: none"> ▪ Road upgrades, including signage, speed humps, re-grading. ▪ Training of locals regarding the hazards of traffic. ▪ Training of vehicle drivers regarding the driving risks through villages and along remote roads. ▪ Use of complaints register and procedures to address issues as they arise.
Pollution risk activities occur ring on site	Develop appropriate storage, transport and use practices for storage and handling of mixed classes of dangerous goods in packages and intermediate bulk containers. There shall be no solid or liquid waste disposal directly or indirectly to any water course (whether flowing or not).	<ul style="list-style-type: none"> ▪ Keeps a current list of all potentially contaminating materials used on site. ▪ Develop and implement appropriate storage, transport and use practices to recognized standards. ▪ Solid waste disposal shall be taken off site.
Monitoring	Monitoring shall be undertaken to ensure villager's concerns are recorded and addressed.	A complaints record shall be kept of all issues raised by villagers in response to construction activities. The record shall include responses by the contractor.
3. Tunnel dewatering and tunnel portal construction		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Contaminants in water discharged from tunnels during construction	No direct discharges of tunnels water to any water course. Provide treatment prior to discharge to achieve 75% reduction in suspended solids.	<ul style="list-style-type: none"> ▪ Settlement ponds and /or sediment infiltration devices ▪ Monitoring immediately upstream and 50m downstream of the discharge with a clarity tube to estimate any effects on clarity; for nutrients to detect explosives residue and for pH. ▪ Any discharges to watercourses should occur during high flow and / or discharged as close to the outfall as possible to maximize mixing. ▪ Spill kits and emergency procedures should be used for spills of chemicals, fuels and oils and staff trained.
4. Excavation and Blasting		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Noise disturbance of local populations	Noise must not unreasonably intrude on traditional village life.	<ul style="list-style-type: none"> ▪ Keep a current list of all noise producing equipment. ▪ This machinery operation to occur only during designated hours (to be confirmed by contractor in agreement with villages). ▪ Blasting to occur at the same time each day, and/or a warning siren should sound prior to blasting.
Vibration disturbance of local populations	Vibration must not unreasonably intrude on traditional village life.	<ul style="list-style-type: none"> ▪ Keep a current list of all vibration producing machinery ▪ This machinery operation to occur only during designated hours (to be confirmed by contractor in agreement with villages).

		<ul style="list-style-type: none"> ▪ Blasting to occur at the same time each day, and/or a warning siren should sound prior to blasting.
5. Material stockpiling		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Runoff of suspended sediments from stockpiles	Stockpiling activities should not give rise to storm water containing elevated suspended solids. Provide treatment to achieve 75% reduction in suspended solids.	<ul style="list-style-type: none"> ▪ No direct discharge of sediment laden water without treatment. ▪ Stockpiles should be compacted as much as practical and not be exposed for extended periods. ▪ Stockpiles should be reused as soon as practicable. ▪ Storm water should be diverted around stockpiles.
Dust generation from stockpiles	Dust must not cause a hazard or nuisance to village life.	<ul style="list-style-type: none"> ▪ Stockpiles should be compacted and not exposed for extended periods. ▪ Stockpiles should be reused as soon as practicable.
6. Soil/ Overburden Removal and Placement, Alluvial mining		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Generation of suspended solids from bare ground and runoff into watercourses	Development activities should not give rise to storm water containing elevated suspended solids. Provide treatment to achieve 75% reduction in suspended solids.	<ul style="list-style-type: none"> ▪ No direct discharge of sediment laden water without treatment. ▪ Earthworks and land clearance should be minimized and phased. ▪ Storm water should be diverted around exposed areas. ▪ Any discharges to watercourses should occur during high flow and / or discharged as close to the outfall as possible to maximize mixing. ▪ Stockpiling should occur at least 10m from a water course. ▪ Re-vegetation of exposed areas as soon as practicable.
Introduction of invasive species	Fill material should not contain invasive species.	<ul style="list-style-type: none"> ▪ The use of imported fill shall be minimized. ▪ Machinery should be cleaned prior to working on site to reduce the opportunity of the spread of weed seeds.
Disturbance of natural habitats for spoil / alluvial material.	Soils should be reused where possible in the development – to reduce the need for spoil sites and the need to import fill.	<ul style="list-style-type: none"> ▪ Stockpile and reuse soils before excavating new soils / alluvium.
Efficiency of control measures over time	Control measures should continue to work appropriately throughout the construction period.	<ul style="list-style-type: none"> ▪ Earthworks control measures should be inspected and maintained in efficient operating condition over the construction period.
7. Concrete Manufacture		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Contaminants in water discharged from concrete manufacturing, including a rise in pH.	No direct discharges of concrete batching water to any water course. Provide treatment prior to discharge to achieve 75% reduction in suspended	<ul style="list-style-type: none"> ▪ Settlement ponds and/or sediment infiltration gallery. ▪ Monitoring immediately upstream and 50m downstream of the discharge with a clarity tube to estimate any effects on clarity; for pH to detect alkali discharges.

	solids.	<ul style="list-style-type: none"> Any storm water discharges to watercourses should occur during high flow and/or discharged as close to the Outfall as possible to maximize mixing. Water to be reused where possible in the process. Procedures for handling of un-hydrated cement material and wet cement to avoid spills.
Community nuisances.	Noise and dust must not unreasonably intrude on traditional village life.	<ul style="list-style-type: none"> Concrete batching plants and other noisy/dusty equipment to be located as far as practical from villages.
8. Fuel storage and use		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Pollution risk associated with the storage and use of fuels for all plant, generators and vehicles	<p>No oil, lubricants, fuels or containers should be drained or dumped to ground or waterways.</p> <p>Accidental spills shall be minimized, and procedures put in place to clean up the environmental damage.</p>	<ul style="list-style-type: none"> Keep a current list of all fuels stored on site. Keep the Safety Data Sheet of all hazardous materials used on site. Develop appropriate storage, transport and use practices to recognized standards. Diesel to be stored in truck tankers or in over head tanks to a maximum of 5000 liters. Diesel to be stored on flat ground, and 100m from a waterway. Dikes to capture 100% of fuel must be placed around fuel storage areas. All refueling of vehicles and plant to be done on flat ground. All significant vehicle and plant maintenance shall be undertaken offsite where possible. Spill kits and emergency procedures should be used and staff trained. There shall be no deliberate discharge of oil, diesel, petrol or other hazardous materials to the surrounding soils and waterways.
9. Works in and near rivers		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Sediment discharges arising from working in and near the river. For blasting in or near the river, refer to the blasting issues, above.	Work in the wetted area of the riverbed should be minimized, and only in relation to the construction of the power house, weir and intake structure or to insert culverts for stream crossings.	<ul style="list-style-type: none"> Stabilize works at the end of each working day and prior to storm events. Do the work during low flow periods. Works shall be minimized. Diversion of the river around the work area where possible. Culverts shall be placed in access tracks where they cross streams more than 3 meters wide and 0.5m deep.
10. Archaeological and cultural site disturbance		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Finding and disturbance of previously unknown sites.	No sites shall be disturbed once identified.	<ul style="list-style-type: none"> Follow the 'chance find' procedure.

11. Village impacts		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Deterioration of current quality of life and traditional livelihoods	<p>Villagers have the ability to communicate issues to ECO, ES and contractors.</p> <p>Villagers have the expectation that issues will be addressed and resolved by negotiation.</p> <p>Villagers are not disadvantaged by the influx of temporary workers.</p>	<ul style="list-style-type: none"> ▪ Set up a communication network for discussing issues between ECO, ES, Contractors and the villagers. ▪ ECO to manage a grievance ▪ Mechanism, and have staff on site at all times to manage grievances. ▪ The Health Program included in the Contractor's Construction and ▪ Workers Camp Management Plan shall be made available to the communities ▪ Have a Workers' Code of Conduct Developing village protocol that could serve as a guideline for outside workers. ▪ Education and orientation of outside workers to local culture and social norms before the start of work. ▪ Observe days of rest ▪ Camps to be secure and discourage visitors and workers leaving the camp. ▪ Camps to be self sufficient in resources and services. (refer to the workers camp table below)
Health and safety risks from such activities as increased traffic, blasting, heavy machinery operating	<p>Health and safety risks to villagers are minimized.</p> <p>Villagers shall be adequately informed of all potential hazards to health and safety.</p> <p>Villagers have the expectation that issues will be addressed and resolved by negotiation.</p>	<ul style="list-style-type: none"> ▪ Refer to the sections above discussing impacts from traffic hazards and blasting hazards.
Nuisance issues such as noise, dust and vibration	<p>Nuisances shall be minimized.</p> <p>Villagers have the expectation that issues will be addressed and resolved by negotiation.</p>	<ul style="list-style-type: none"> ▪ Refer to the sections above discussing nuisance effects.
Traffic causing safety risks to road users	<p>Construction traffic will be managed to minimize the impact on existing road users.</p>	<ul style="list-style-type: none"> ▪ Signals to be used to identify current risks to road users. ▪ ECO and Contractors to discuss major traffic issues with village representatives prior to the event to discuss course of action. ▪ Heavy traffic to avoid the hours when school children walk to and from school.
Sediment affecting river water uses.	<p>Sediment discharges to the river shall be minimized.</p>	<ul style="list-style-type: none"> ▪ Refer to the sections above discussing erosion and sediment control.
12. Cemetery		
Issue	Key Principle / Mitigation Standard	Minimum Mitigation Method
Traditional spirit life Nuisance issues	<p>Villagers have the ability to communicate issues to ECO, ES and contractors.</p>	<ul style="list-style-type: none"> ▪ Set up a communication network for discussing issues between ECO, ES, Contractors and the villagers.

	<p>Nuisances shall be minimized.</p> <p>Villagers have the expectation that issues will be addressed and resolved by negotiation.</p>	<ul style="list-style-type: none"> ▪ ECO to manage a grievance ▪ Mechanism, and have staff on site at all times to manage grievances. ▪ The Health Program included in the Contractor's Construction and ▪ Workers Camp Management Plan shall be made available to the communities ▪ Have a Workers' Code of Conduct Developing village protocol that could serve as a guideline for outside workers. ▪ Education and orientation of outside workers to local culture and social norms before the start of work. ▪ Observe days of rest ▪ Camps to be secure and discourage visitors and workers leaving the camp. ▪ Camps to be self sufficient in resources and services. (refer to the workers camp table below) ▪ Refer to the sections above discussing nuisance effects.
--	---	--

8.2 Contractor's Site Environmental Management Plan

Prior to commencement of construction, the Contractor shall prepare the Site Environmental Management Plans to manage environmental protection issues during the construction process.

The Contractor's Site Environmental Management Plans shall demonstrate compliance with Vietnamese environmental requirements, the mitigation measures set down in the specifications for Contractors (see Annex 3) and the World Bank environmental policies. The content of the Contractor's Site EMPs shall be in line with the project specific EMP and shall be enhanced by the Contractor's works practices, implementation procedures and program. The Plans shall be certified by the EO and verified by the ES in accordance with the project and the EIA requirements and approved by PMU/ECO.

The Contractor's Site EMPs shall provide details such as commitment to environmental protection by the Contractor's Project Management Team; methodology of implementing the project EMP; detailed designs and installation of pollution control facilities (e.g. drainage channel, settling tank, temporary noise barrier, etc); environmental control mechanism; detailed earthworks management plans and site operation plans outlining the measures that are proposed to minimize, mitigate and manage the effects, for the duration of the construction works; and environmental monitoring program during different stages of construction period.

8.3 Contractor's Environment Management

It is recognized that Contractors working on the project will be a key component in environmental management, pollution control and impact mitigation during construction. A number of measures will be taken to ensure that the contractors will be aware of their responsibilities and obligations in environmental protection. These measures include:

- The technical specification on environmental control and protection (Section 01700) will be included in the tendering documents for Contractors as qualification and selection criteria and eventually in the construction contracts so that they will be the contractual requirements for Contractors working on the project. Contractors will be required to monitor their environmental activities and provide a dairy on environmental performance on a daily or weekly basis. These records will be subject to supervision and review by PMUs, ECO, ES and EMC;
- All Contractors will be required to provide at least one dedicated full time environmental staff on each section of the Project. In environmental sensitive sections, the Contractors will supply two full time environmental staff. In order to be qualified for the job, the environmental staff will receive an environmental training program first. No contracts will be deemed effective and started prior to completion of the environmental training.
- The Contractors will be required to communicate and consult with the communities near the construction work site. A visible public notice board shall be erected in each road section to notify the public of the main construction activities and their duration. The board shall also provide contact names and telephone numbers to the public to express their concerns and complaints about the construction activities;
- All contractors will be required to participate in a mandatory environmental training program (carried out by contractors) prior to the start of construction onsite. The contents of the environmental training program shall cover:
 - + National and local environmental regulations and standard;
 - + Technical guideline on environmental protection;
 - + The EA documentation;
 - + Environmental monitoring method and requirement, as well as the reporting procedure;
 - + Mitigation measures;
 - + Regulations for evaluation and protection of cultural heritage;
 - + Emergency measures;
 - + Long-term public consultation and response;
 - + Obligation of the contractor to environmental protection.

In addition, the CSC is also responsible for the implementation of the mitigation measures. The requirements for the CSC in the environmental management will be included in the bidding document, thus the contract for the supervisory company. At least one full-time staff from the CSC is required to participate together in the training in environmental management for contractors.

8.4 Compliance with Legal and Contractual Requirements

There are contractual environmental protection and pollution control requirements as well as

environmental protection laws in Vietnam which the construction activities are required to comply with.

All the works method statements submitted by the Contractor(s) to the CSC for approval will also be sent to the ECO for vetting to see whether sufficient environmental protection and pollution control measures have been included. The ECO will review the progress and program of the works to check that relevant environmental laws have not been broken, and that any foreseeable potential for breaking the laws can be prevented.

The Contractor(s) will regularly copy relevant documents to the ECO so that the checking work can be carried out. The document will at least include the updated Work Progress Reports, the updated Works Program, and the application letters for different license/permits under the environmental protection laws, and all the valid license/permit. The site diary will also be available for the ECO's inspection upon his/her request.

After reviewing the document, the ECO will advise the CSC and the Contractor(s) of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ECO's review concludes that the current status on license/permit application and any environmental protection and pollution control preparation works may not cope with the works program or may result in potential violation of environmental protection and pollution control requirements by the works in due course, he/she will advise the Contractor(s) and the CSE accordingly.

Upon receipt of the advice, the Contractor(s) will undertake immediate action to remedy the situation. The ES will follow up to ensure that appropriate action has been taken by the Contractor(s) in order that the environmental protection and pollution control requirements are fulfilled.

8.5 Process supervision of contractor(s) compliance

The Contractor shall comply with the technical specifications on environmental control and protection, requirements on an on-going basis, and any failure on his part to do so will entitle PMU to impose a penalty. The DONRE and the World Bank jointly devised a compliance framework for the DQEP designed to motivate contractors to comply with the EMP. This compliance framework will be strictly enforced. For minor infringements - an incident which causes temporary but reversible damage-the contractor will be given a reasonable period of time to remediate the problem and to restore the environment.

If restoration is done satisfactorily during this period, no further actions will be taken. If it is not done during this period, PMU will immediately arrange for another contractor to do the restoration, and deduct the cost from the offending contractor's next payment. For major infringements - an incident where there is long-term or irreversible damage - there will be a financial penalty in addition to the cost for restoration activities. To minimize the damage, the restoration activities will be implemented without delay.

In the event of non-compliance the following recommended process shall be followed:

- PMU shall issue a notice of non-compliance to the Contractor, stating the nature and

magnitude of the contravention. A copy shall be provided to the ES.

- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor shall provide PMU with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ES.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, PMU shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, PMU shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to specialists for determination.
- ECO shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

8.6 Regulation on penalties, remedies for contractor(s)

Any inexcusable non-compliance with the conditions of the EMP shall be considered sufficient ground for the imposition of a penalty. A system of penalties for offences in terms of this EMP is proposed as a guideline to be use on site. The ECO may, after consultation with the CSC, adjust these fine values, based on the severity, actual or potential impact and environmental risk involved at the time of the offence.

Table 8-2 Fine for environmental non-compliances

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

PMU will retain about 1% of the contract value signed with the Contractors. In case that the Contractors fail to compensate and remediate environmental impacts, then PMU will have full right to subtract the fine from that 1% value. The fine shall be used for environmental remediation. Otherwise, this retained amount will not only be fully reimbursed to the Contractors, but they may also receive from PMU an award of VND 20 millions for their environmental protection activities. This award could be taken from the project's contingency fund.

8.7 Regulation on management of disposal sites and access roads

1. Disposal sites

The criteria for selecting the locations for deposit pits include the requirement of the project, topographical and geological conditions, as well as the requirements for environmental protection and soil conservation. These deposit pits are generally in small valleys near the road, with small catchment area and without detrimental effect on flood discharge. These pits are mainly covered with shrubs, and in some pits are sparse woods and small farmlands. At road sections where deposits are located and used for, the pits will be immediately reclaimed for vegetative establishment, so as to reduce the soil erosion and hence environmental impact. It is therefore concluded that the location of these pits is considered to be justifiable. All plans of site selection will be agreed by the villages and relevant local commune PCs and district PCs. The Contractor(s) will present their proposed sites and mitigation plans for approval by the environmental supervision before any materials are disposed in any site.

Mitigation measures

- The Contractor should use the waste soil disposal sites recommended in D/D for disposing waste soils. If the Contractor intends to use the sites other than the recommended ones, he should obtained approval from the Environmental Supervisor (ES) and agreements in written from relevant local commune PCs and district PCs;
- The Contractor should negotiate and pay proper compensation to the users (owners) of the lands to be used for disposing waste soils;
- The waste soil disposal sites should be adequately planned. The design (based on the 1/5000 topographic maps) should include a retaining wall with enough strength, slope protection; drainage facility, and access road;
- Agreement upon the use of the waste soil disposal sites should be confirmed in written from relevant local commune PCs and district PCs;
- For the waste soil disposal site near the river, the retaining wall should be built and the waste soil should be piled up from coarse soil in the bottom and fine soil to the top;
- For the site located near a creek or a ditch, structures such as pipe culvert, etc. should be used to prevent wash out of the spoil during rainstorm;
- Structures such as mortar rubble masonry pavement and grouted rubble toe protection form should be used to ensure the stability of the site;
- Drainage ditch should be built around the site;
- For the site near the residential area, transportation of waste soil at night should be prohibited, and the access roads should be frequently watered on the dry days to control dust flying.

2. Access Roads

Access road for construction shall optimally use existing roads, farm tracks (widened and reconstructed) and newly built access roads. The number of newly built access roads should be minimized. Given the wide distribution of existing roads that link the proposed expressway alignment with the existing highway, it is not envisioned that many new access roads will be constructed.

However, if the contractor proposes new access roads, these will be checked and approved by Da Nang City PC, or Quang Nam Province PC, or Quang Ngai Province PC, and agreed by the commune PCs. Measures to mitigate impacts caused by the access roads shall include:

- The new access roads should be properly designed, and finished on the 1:5000 topographic map. The design will follow the landform, avoid large volume excavations, and strictly control the width of the road. For areas in poor condition, the width will be controlled to 3.5m, and set the vehicle platform. The final design and mitigation measures will be approved by the Environmental Supervisor (ES).
- Compensation to farmers should be done efficiently and fairly if land acquisition is required for the newly-built access road.
- All newly built and improved access roads should be designed with the proper drainage system, road slope retaining structures, etc.
- Warning signs, speed bumps should be placed at the road sections near the sensitive receptors such as schools, hospitals, pagodas, markets, etc. to reduce risk of traffic accident.
- Contractors should formulate proper construction materials transportation plans to mitigate impacts to local residents and environment.
- Nocturnal transportation and construction activities are prohibited at the road sections near the residential areas.
- For unpaved access roads, contractors shall spray water on the roads 2 – 3 times a day during the dry season.
- Pavement of linking roads must be regularly maintained during construction phase to reduce impacts of dust, noise, and risk of traffic accident.
- All access roads will be returned to the government or recovered for farmland or plantation.

**Annex 1: Terms of Reference of
ENVIRONMENTAL MONITORING CONSULTANT
(EMC)
for the Da Nang – Quang Ngai Expressway Project**

(to be obtained from VEC)

Annex 2: Terms of Reference of Environmental Supervisors (ES)

General

In order to prevent harm and nuisances on local communities, and to minimize the impacts on the environment during the construction and operation of the Da Nang – Quang Ngai Expressway Project (DQEP), the following documents have been prepared which should be adhered to by all Contractors and his employees:

- The Updated Environmental Impact Assessment (EIA) for DQEP;
- The Updated Environmental Management Plan (EMP) for DQEP;
- The mitigation measures included in project design and bill of quantities;
- The specifications, procedures, and best practices included in the EMP. These specifications complement any technical specifications included in the work quantities and the requirements of any Vietnamese regulations and standards;
- The Updated Resettlement Action Plans (RAPs) for the Project.

Objective of the Assignment

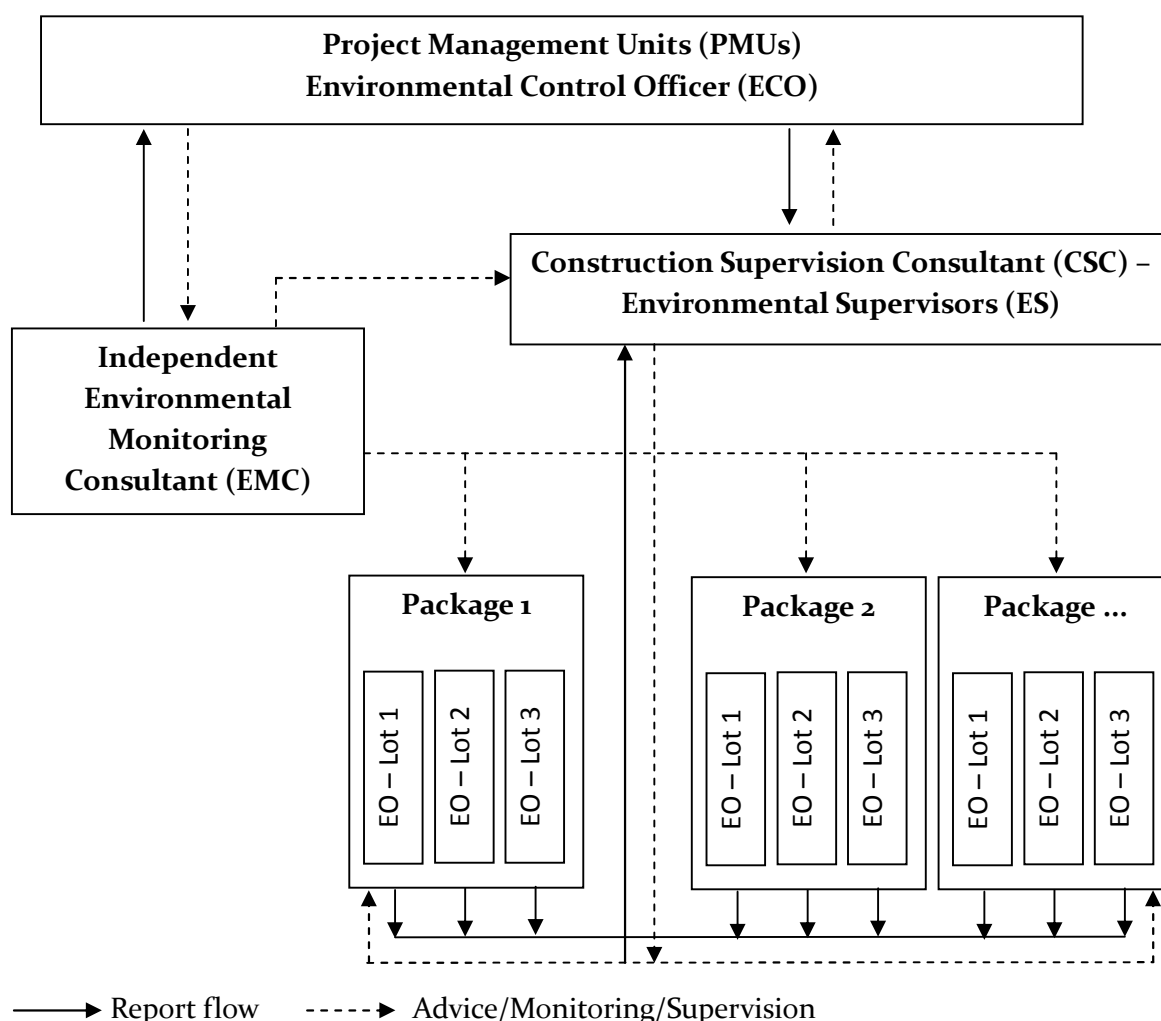
The Consultant is to provide professional technical services (“the Services”) to help ensure effective implementation of the Environmental Management Plan (EMP).

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

- 1) The ***Environmental Control Officer (ECO)*** is the person responsible for overall coordination of EPM implementation. This person will be appointed directly by PMU.
- 2) The ***Contractor’s Environmental Officer (EO)*** responsible for implementing the EMP and other construction related environmental and safety issues.
- 3) The ***Construction Supervision Consultant (CSC)*** who is responsible for supervising and monitoring all construction activities and for ensuring that contractors comply with the requirements of the contracts and the EMP. The CSC will include the ***Environmental Supervisors (ES)***.
- 4) The Independent ***Environmental Monitoring Consultant (EMC)***, who works under a contract with VEC to carrying out environmental sampling and monitoring activities.

The organizational structure for the supervision of environmental issues during the construction of DQEP is presented below.

Organizational Structure for Environmental Management of the Da Nang – Quang Ngai Expressway Project



This Terms of Reference is for the **Environmental Supervisors (ES)** to be part of the Construction Supervision Consultant (CSC).

Scope of Services

The general services to be provided by the ES are to inspect, monitor and audit the construction activities¹ to ensure that mitigation measures adopted in the EMP are properly implemented, and that the negative environmental impacts of the project are minimized.

The Contractor has the responsibility for ensuring compliance with the project EMP and contract conditions while undertaking the works. This is overseen by the ES. The ES is

¹ The term ‘construction activities’ in this TOR pertains to all aspects related to the Da Nang – Quang Ngai Expressway Project (DQEP) during the construction phase including, but not limited to, all construction sites, permanent and temporary camps, off-site activities (disposal sites, borrow pits), all associated facilities (crushing plants, asphalt plants, maintenance yards), access roads, traffic and disturbances (dust, noise) in local roads, and areas of impact away from the project site. The EIA and EMP of the project contain a full description of these activities.

therefore to be an independent monitor to ensure compliance with the EMP and to ensure adequate performance of the Contractors on environmental issues.

The ES will inspect, monitor and carry out environmental review of all road and bridge contracts packages and lots. The ES shall have extensive knowledge and experience in environmental supervision, monitoring and auditing to provide independent, objective and professional advice to the client on the environmental performance of the project. The ES team leader shall be familiar with the project works through review of the relevant reports, including the EIA, EMP as well as project technical specifications and contract documents.

As part of the CSC, the ES is expected to perform the following duties:

Phase I: Preparation

The objective of Phase I is to lay the groundwork for the successful execution of the project. In this phase, the ES shall:

- (i) review the EIA, EMP, project designs and technical specifications and confirm that there have been no major omissions of mitigation measures;
- (ii) prepared guides for contractors on implementing the EMP; and,
- (iii) develop and execute a training program for all construction workers, staff, etc. involved in construction activities.

The main tasks in this phase are:

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

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

Log-Book: The ES shall keep a log-book of each and every circumstance or change of circumstances which may affect the environmental impact assessment and non-compliance with the recommendations made by the ES to remediate the non-compliance. The log-book shall be kept readily available for inspection by all persons assisting in the supervision of the implementation of the recommendations of the EIA and Contract.

Environmental Training: The ES shall design and execute a comprehensive training program for all actors: Supervision Engineers, ECO, Contractor's EOs (and workers as part of the trainings given to the EO), on the environmental requirements of the project, and how they will be supervised, monitored and audited, giving particular attention to:

- *EMP:* The requirements of the EMP, the agreed environmental monitoring checklist, the environmental monitoring form, how non-compliance with the EMP will be handled, and all other key issues shall be covered. Particular attention will be paid to the specific provisions in each contract's technical specifications indicating how the EMP is to be complied with;

- *Health and Safety:* The health and safety requirements of the project shall be clearly identified and communicated with the Contractors and ECO (included in environmental specifications for contractors).

At the conclusion of the training Contractors will also sign a statement acknowledging their awareness of the environmental regulations, the EMP, the compliance framework, and health and safety obligations. The CSC shall sign a similar statement confirming their understanding of the supervision responsibilities. This shall be provided to VEC and the World Bank/JICA.

Phase II: Supervision of Construction Activities

On behalf of the ECO and the Chief Supervision Engineer, the ES will:

- Review, and inspect in an independent, objective and professional manner in all aspects of the implementation of the EMP;
- Carry out random monitoring checks, and review on records prepared by the Contractor's EO;
- Conduct regular site inspections;
- Review the status of implementation of environmental protection measures against the EMP and contract documents;
- Review the effectiveness of environmental mitigation measures and project environmental performance;
- As needed, review the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions. Where necessary, the ES shall seek and recommend the least environmental impact alternative in consultation with the designer, the Contractor(s), and PMU;
- Verify the investigation results of any non-compliance of the environmental quality performance and the effectiveness of corrective measures; and
- Provide regular feedback audit results to ECO and CSC according to the procedures of non-compliance in the EMP;
- Provide training programs at minimum six monthly intervals and every time there are new workers or new Contractors coming into the site, including CSC and PMU staff, to appraise them of issues identified and how to improve environmental compliance;
- Instruct the Contractor(s) to take remedial actions within a specified timeframe, and carry out additional monitoring, if required, according to the contractual requirements and procedures in the event of non-compliances or complaints;
- Instruct the Contractor(s) to take actions to reduce impacts and follow the required EMP procedures in case of non-compliance / discrepancies identified;
- Instruct the Contractor(s) to stop activities which generate significant and continuous adverse impacts, and/or when the Contractor(s) fails to implement the EMP requirements / remedial actions instructed by the ES or the EMC.

Review of Contractor's Site Environmental Management Plans (Site EMPs): To ensure consistency across the project, the ES shall review and approve the Site EMPs presented by the Contractors. Where these plans are found not to comply with the EMP, EIA or RAP, the ES shall work with the CSC and Contractor to establish a suitable solution.

Health and Safety: To ensure consistency across the project, the ES shall provide the final

review and recommend clearance of all Contractors' Safety Management Plans.

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

Site Inspections: The ES shall closely audit the construction activities through regular site inspections accomplished through daily site visits, walks and visual inspections to identify areas of potential environmental problems and concerns. As noted in footnote 1 of this TOR, the area of inspection should cover both the construction areas and the environment outside the site area that could be affected, directly or indirectly, by the contractor's activities.

Inspections should be done independently from the Contractor's staff. It is expected that the ES shall have their own hand held and portable monitoring equipment such as cameras, transport and other resources. Where definitive monitoring is necessary to resolve contentious issues or to impose penalties, the ES may contract third parties to carry out specific monitoring at the locations under review.

Where there is infringement of technical specifications, or condition of contracts, or non compliance with the EMP, the ES shall be immediately inform Contractor's Chief Engineer, Supervision Chief Engineer and ECO. The ES shall also report all infringements to the PMU as part of the monthly reporting.

Regular joint environmental site inspections (e.g. weekly) should be organized by the ES and CSC, with participation from the Contractor's Environmental Officer (EO). These should be used as an opportunity for the ES to further train the EO and other Contractor's staff.

ES field engineer's log-book shall be kept readily available for inspection by all persons assisting in project management, including the independent monitoring consultant.

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

Complaints: Complaints will be received by the Contractor's Site Office from local residents with regard to environmental infractions such as noise, dust, traffic safety, etc. The Contractor's Chief Engineer or his deputy, and the EO shall be responsible for processing, addressing or reaching solutions for complaints brought to them. The ES shall be provided with a copy of these complaints and shall confirm that they are properly addressed by the Contractors in the same manner as incidents identified during site inspections.

Unforeseen Impacts: In the event that an incident arises which was not foreseen in the EMP or EIA, the ES shall work closely with the CSC, the Contractors, and the ECO to confirm satisfactory resolution to the incident. The ES shall then update the EMP and the implementation guidelines, training the Contractors' staff accordingly.

Monthly Payments: The ES shall confirm the monthly payments for environmentally related activities as recommended by the ES to the client.

Site Restoration and Landscaping: The ES shall closely monitor all activities with regard

to site restoration and landscaping in areas such as borrow pits, quarries, camps, crushing plants, etc. to ensure that the activities are done to an appropriate and acceptable standard.

The ES will agree with the Contractor on a site decommissioning and restoration plan to be implemented before the completion of the construction of the access road and bridges.

Project Initiation and Staffing: The CSC and the ES shall be mobilized at least one month before the start of the construction activities. The one month start up time will be utilized by the ES to review and familiarize itself with the project, the project design, the technical specifications, contract documents, the EIA, EMP and RAP reports and other project relevant documents and reports. Following the review, the ES will prepare a brief report on the potential issues and challenges arising from the implementation of the EMP and the condition of contracts and make recommendations to the PMU about how best to improve the implementation of the EMP.

Reporting: As a minimum the ES shall prepare the following written reports:

- Summary monthly report covering key issues and findings from reviewing and supervision activities
- Consolidated summary report from contractor's monthly report

In addition, the ES shall also collect data and make report as requested by the PMU/ECO.

At the end of the project the ES shall prepare a final report summarizing the key findings from their work, the number of infringements, resolutions, etc. as well as advice and guidance for how such assignments should be conducted in the future.

During the course of the project the ES shall provide briefings as requested by the PMU, environmental agencies, the World Bank/JICA, DONRE, and VEC on the project progress, incidents, and other issues associated with environmental management and supervision. As a minimum these are expected to be at six-monthly intervals.

Annex 3

Recommended Major Contents of the Contractor's Site Environmental Management Plans

General

The Contractor shall prepare the draft Site Environmental Management Plans with associated detailed cost estimates and submit them to the Owner and the Construction Supervision Consultant (CSC) for review, comments, and approval no later than one (1) month prior to the construction commencement date. No civil works will be permitted until the first draft Site Environmental Management Plans is approved by the Owner and the Engineer.

All plans shall include a summary of the proposed methodology to develop and implement the plan and shall outline the proposed actions for all the requirements given in this supplement to the Contract, including the requirements for sub plans for implementing protection and mitigation measures, throughout the execution of the Works, compliance by the Contractor and the Subcontractors and other agents with the environmental requirements stated in the bidding documents and elsewhere in the Contract. The draft Site Environmental Management Plans shall contain sufficient details to enable the Owner and the Engineer to review and comment on it.

The Contractor's Site Environmental Management Plans shall establish an environmental management system that specifies how the Contractor proposes to meet the Owner's environmental requirements stated in the bidding documents. The Contractor's Site Environmental Management Plans shall comply with ISO 14001:2004 - Environmental Management System and shall include the following as minimum:

- (i) A statement of policy, providing a definition of the Contractor's environmental policy and an indication of commitment to the execution of its Site Environmental Management Plan.
- (ii) The environmental planning process, setting out the principal steps in the Contractor's Site Environmental Management Plan, including:
 - a. Identify environmental aspects of the Contractor's work and evaluation of associated environmental impacts;
 - b. Specify other environmental mitigations for which the Contractor is responsible under the Contract;
 - c. Identify Applicable Laws associated with the requirements of these Owner's environmental requirements stated in the bidding documents and the Contractor's Site Environmental Management Plan, and identify the Contractor licenses, permits and approval associated with the Contractor's Site Environmental Management Plan.

- d. Nominate the Contractor's performance criteria in accordance with the Owner's Environmental requirements stated in the bidding documents.
- e. Issue environmental plans and management programs.
- (iii) The implementation procedures that specify the capabilities, support mechanisms and resources necessary to achieve the objectives and targets of the environmental policy. Responsible personnel with appropriate knowledge, skills and training for specific tasks shall be identified. In addition, the Site Environmental Management Plan shall define communication and reporting responsibilities.
- (iv) The proposed quality assurance plan, including summary of methodology, equipment, staffing, organization, etc. for the Site Environmental Management Plan.
- (v) An overview of the impacts that the construction work will have on the physical, biological and social environment.
- (vi) The detailed sub-plans to be included in the Site Environmental Management Plan.
- (vii) A formal certification from the Contractor that the Site Environmental Management Plan:
 - a. Has been prepared by duly qualified consultants or specialists;
 - b. Complies with the undertaking specified environmental requirements which stated at bidding documents; and
 - c. Complies with the Conditions of the Contract, including applicable Laws, Regulations, Standards, National Technical Regulations which relate to the Site Environmental Management Plan.

The Owner reserves the right to require the Contractor to submit, revise, and resubmit these Site Environmental Management Plans prior to the commencement of construction activities if, in the opinion of the Owner, the plans as submitted are inadequate to ensure compliance with the legislative and regulatory requirements related to the work activities.

The Site Environmental Management Plans may need to be revised in response to such things as, but not limited to, changes to design, construction procedures and methods, schedule, terms and conditions of permits and approvals, mitigation measures, and to other Owner's requirements.

These plans will be revised if and whenever any of the above conditions occur during the construction of the Works. All revisions and changes will be submitted by the Contractor for review and approval by the Owner and by all applicable Vietnamese agencies having jurisdiction.

The Contractor shall be responsible for updating and signing-off the Site Environmental Management Plans as necessary, to ensure they continue to meet the requirements of the EMP, relevant environmental legislation and regulations, and best management practices. The Contractor shall notify the Owner in advance of any modifications to the work methods, and/or amendments to the Site Environmental Management Plans.

The Contractor shall translate into Vietnamese (and other languages as necessary) the final version of the Contractor's Site Environmental Management Plan. Such translation shall be made available to the Owner for information.

The followings are the Site Environmental Management Plans that shall be submitted by the Contractor(s):

1) Workforce and Site Installation Management Plan

Workforce

Workforce includes all personnel hire by the Contractors to work in the constructions, rehabilitation or improvement of roads. The workers shall, whenever possible, rent houses nearby. Otherwise, suitable accommodations shall be provided for the workforce. Workers' camps will be located at appropriate areas away from villages, schools and hospitals as well as rivers course to minimize the impact of river blocking.

The Contractors shall:

- Give priority to hire local labor for the works;
- Announce for the position that local labor could participate in the works to every villages along the Expressway;
- Engineers and workers shall register their temporary residence with the local authority;
- Provide work safety training to those local labors upon their hiring;
- The construction workers and staff shall need to have appropriate certificates as required (for example, health checks, labor contracts, insurance, occupational safety training, etc.);
- Provide education classes on HIV and sexually transmitted diseases;
- Ensure adequate use of resources and proper waste management.

Workers' Camp and Site Installation Requirements

Construction camp sites will have to be approved by local authorities. The Contractor shall present the design of the camps including details of all buildings, facilities and services for approval no later than 1 month before initiation of any camp construction work. Approvals and permits shall be obtained in accordance with applicable laws, applicable standards and environmental requirements for the building and infrastructure work for each camp area.

The location of construction camps and construction sites will be selected following the criteria below:

- Construction sites, including concrete mixing stations and asphalt stations as well as construction camps will minimize the land occupation by setting them at the interchange areas where relatively large areas of land will be needed eventually.
- Site offices, camps, depots, asphalt plants, mixing stations, stone grinding stations, and workshops shall be located in appropriate areas as agreed by local authorities and approved by ECO/ES and not within 500 meters of existing residential settlements and not within 1,000 meters for asphalt plants. Camp facilities should not be located in steep slopes;
- Site offices, camps, depots and particularly storage areas for diesel fuel and bitumen and asphalt plants shall not be located within 100 meters of watercourses, and be operated so that no pollutants enter watercourses. Camp areas shall be located to allow effective natural drainage;
- All construction camps shall be zoned according to their use. For example, workers' camp zone, canteen, sanitary facilities, offices, etc.
- The workforce shall be provided with safe, suitable and comfortable accommodations.

- They have to be maintained in clean and sanitary conditions;
- In every site adequate and suitable facilities for washing clothes and utensils shall be provided and maintained for the use of contract labor employed therein;
- The Contractor shall provide safe potable water for food preparation, drinking and bathing compliant with the relevant national technical regulations issued by the Ministry of Health, and other applicable Laws.
- Drainage, wastewater treatment and solid waste disposal of the construction site shall follow national regulations and the mitigation measures presented in the Contractor's Waste Management Plan.

Sanitary Facilities

- In every camp site, separate and adequate lavatory facilities (toilets and washing areas) shall be provided for the use of male and female workers. Toilet facilities should also be provided with adequate clean water, soap, and toilet paper. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic conditions;
- Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men Only" or "For Women Only" as the case may be;
- Sanitary arrangements, latrines and urinals shall be provided in every work place on the following scale: Where female workers are employed, there shall be at least one latrine for every 25 females or part thereof; Where males are employed, there shall be at least one latrine for every 25 males or part thereof;
- At every construction camp, there must be at least one septic tank. The wastewater from the tank shall not be discharged into any watercourses. The wastewater shall be periodically transported away by a water tank to the nearest treatment plant;
- Sewage tanks shall be designed and installed by the Contractor(s) in accordance with the National Design Code for construction of camps.

Medical Facilities

A medical and first aid facilities shall be provided at each camp area. First aid box shall be provided at every construction campsite and under the charge of a responsible person who shall always be readily available during working hours of the work place. He/she shall be adequately trained in administering first aid-treatment. If there is no an ambulance on site, formal arrangement shall be prescribed to make motor transport available to carry injured person or person suddenly taken ill to the nearest hospital. All consumables as the first aid equipment, cleaning equipment for maintaining hygiene and sanitation should be recouped immediately.

Code of Conduct

A major concern during a construction of a project is the potentially negative impacts of the workforce interactions with the local communities. For that reason, a Code of Conduct shall be established to outline the importance of appropriate behavior, drug and alcohol abuse, and compliance with relevant laws and regulations. Each employee shall be informed of The Code of Conduct and bound by it while in the employment of the Client or its Contractors.

The Code of Conduct shall be available to local communities at the project information centers or other place easily accessible to the communities. The Code of Conduct shall address the following measures (but not limited to them):

- All of the workforce shall abide by the laws and regulations of the Socialist Republic of Vietnam;
- Illegal substances, weapons and firearms shall be prohibited;
- Pornographic material and gambling shall be prohibited;
- Fighting (physical or verbal) shall be prohibited;
- Creating nuisances and disturbances in or near communities shall be prohibited;
- Disrespecting local customs and traditions shall be prohibited;
- Smoking shall only be allowed in designated areas;
- Maintenance of appropriate standards of dress and personal hygiene;
- Maintenance of appropriate standards hygiene in their accommodation quarters;
- Residing camp workforce visiting the local communities shall behave in a manner consistent with the Code of Conduct; and Failure to comply with the Code of Conduct, or the rules, regulations, and procedures implemented at the construction camp will result in disciplinary actions.

Security

Some security measures shall be put into place to ensure the safe and secure running of the camp and its residents. Some of these security measures include:

- Adequate, day-time night-time lighting shall be provided;
- Control of camp access. Access to the camp shall be limited to the residing workforce, construction camp employees, and those visiting personnel on business purposes;
- Prior approval from the construction camp manager for visitor's access to the construction camp;
- A perimeter security fence at least 2m in height constructed from appropriate materials;
- Provision and installation in all buildings of firefighting equipment and portable fires extinguishers.

Prohibitions

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

- Cutting of trees for any reason outside the approved construction area;
- Hunting, fishing, wildlife capture, or plant collection;
- Buying of wild animals for food;
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.;
- Disturbance to anything with architectural or historical value;
- Building of fires;
- Use of firearms (except authorized security guards);
- Use of alcohol by workers in office hours;
- Washing cars or machinery in streams or creeks;
- Doing maintenance (change of oils and filters) of cars and equipment outside authorized areas;

- Disposing trash in unauthorized places;
- Driving in an unsafe manner in local roads;
- Having caged wild animals (especially birds) in camps;
- Working without safety equipment (including boots and helmets);
- Creating nuisances and disturbances in or near communities;
- The use of rivers and streams for washing clothes;
- Indiscriminate disposal of rubbish or construction wastes or rubble;
- Littering the site;
- Spillage of potential pollutants, such as petroleum products;
- Collection of firewood;
- Poaching of any description;
- Explosive and chemical fishing;
- Latrine outside the designated facilities; and
- Burning of wastes and/or cleared vegetation.

Any construction worker, office staff, Contractor's employees, or any other person related to the project found violating these prohibitions will be subject to disciplinary actions that can range from a simple reprimand to termination of his/her employment depending on the seriousness of the violation.

Environmental Training for Construction Workers

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

- The Contractor shall distribute to the key staff, including newly joined key staff members, (1) the Contractor's Environmental Policy; and (2) Copies of relevant extracts from environmental laws, standards and regulations.
- The Contractor is responsible for providing appropriate training to all staff according to their level of responsibility for environmental matters. Managerial staff shall receive additional training.
- All Contractor's employees shall be required to comply with environmental protection procedures and they shall be able to provide evidence that they attended the training sessions detailed in the Plan;
- Training materials and methods -- which shall include formal training sessions, posters, data in newsletters, signs in construction and camp areas and 'tool box' meetings -- shall be reviewed by the ES.
- The Plan shall educate all construction workers on the following issues but not limited to them: fire arm possession, traffic regulations, illegal logging and collection of non-timber forestry products, non disturbance of resettlement communities, hunting and fishing restrictions, waste management, protection of surface water, erosion control, health and safety issues, all prohibited activities, the Code of Conduct requirements and disciplinary procedures, general information on the environment in which they will be working and living; and establishment of penalties for those who violate the rules;
- Periodic training shall be provided when necessary.

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

2) Construction Impact Management Plan

Erosion and Sedimentation

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

- The Contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc.
- Areas of the site not disturbed by construction activities shall be maintained in their existing conditions;
- Disturb as little ground area as possible, stabilize that area as quickly as possible, control drainage through the area, and trap sediment onsite. Erect erosion control barriers around perimeter of cuts, disposal pits, and roadways;
- Reduce water speed and volume by increasing the number of drainage culverts and selecting proper places for culvert placement to avoid erosion effects;
- Conserve topsoil with its leaf litter and organic matter, and reapply this material to local disturbed areas to promote the growth of local native vegetation;
- Apply local, native grass seed and mulch to barren erosive soil areas or closed construction surfaces;
- Apply erosion control measures before the rainy season begins preferably immediately following construction. Install erosion control measures soon after the construction site is completed;
- Install sediment control structures where needed to slow or redirect runoff and trap sediment until vegetation is established. Sediment control structures include windrows of logging slash, rock beams, sediment catchment basins, straw bales, brush fences, and silt;
- In areas where construction activities have been completed and where no further disturbance would take place, re-vegetation should commence as soon as possible;
- Spray water as needed on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion;
- Traffic and movement over stabilized areas shall be restricted and controlled, and damage to stabilized areas shall be repaired and maintained to the satisfaction of the ECO/ES;
- Slope works and earth moving/excavation shall be conducted in order to minimize exposure of soil surface both in terms of area and duration. Temporary soil erosion control and slope protection works shall be carried out in sequence to the construction;
- Ground surface at the site offices shall be concreted paved in order to minimize soil erosion;
- Exposed soil and material stockpiles shall be protected against wind erosion and the

location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors;

- Larger changes in the landscape from quarries, tunnel spoil tips, etc. should be landscaped and replanted, both to reduce erosion problems and to reduce the visual impact of the construction.

Emissions and Dust

In order to ensure that the generation of dust due to the constructions activities is minimized, the following activities should be put into place:

- The Contractor shall be responsible for compliance with relevant Vietnamese legislation with respect to ambient air quality;
- The Contractor shall ensure that the generation of dust is minimized and shall implement a dust control program to maintain a safe working environment, minimize nuisance for surrounding residential areas / dwellings, and vulnerable people (children, elders) and protect damage to natural vegetation, crops, etc.;
- The Contractor shall implement dust suppression measures (e.g. water spray vehicles, covering of material stockpiles, etc.) if and when required, and place dust screens around construction areas, paying particular attention to areas close to local communities;
- The water spray operation shall be carried out in dry and windy days, at least twice a day (morning and afternoon). The frequency of water spray near local communities shall be increased as may be needed;
- It is encouraged to use vehicles and machinery which would cause less pollution like gasoline without lead. Limit the use of materials which may have high risk of pollution such as coal and black oil;
- Construction plant/vehicles that generate serious air pollution and those which are poorly maintained shall not be allowed;
- Trucks transporting loose materials such as cement, sand, and lime shall be properly covered and secured during transportation to prevent the scattering of soil, sand, materials or dust;
- The exhaust gases from construction machinery and vehicles shall be controlled. The engines shall be inspected and adjusted as required to minimize pollution levels;
- Prior to a blasting event, water shall be sprayed on the surface of the blast area to increase its moisture content, wire mesh gunny sacks and sandbags shall be used on top of the blast area at each shot to prevent flying rocks and dust. Blasting shall not be carried out under adverse weather conditions;
- The dust from the tunnel construction shall be managed appropriately. A wet boring machine shall be used to minimize the production of dust. A dry boring machine could be used in case there is a lack of water in the area or the character of the soil prevents the use of the wet boring machine. However, the use of the dry boring should be prohibited if the dust emission exceeds the standards;
- The construction of the boring and the tunnel spoil transfer shall follow the measures below: (i) spray water during windy days to reduce dust in the air; (ii) spray water after blasting; (iii) the tunnel spoil and the rock wall shall be drenched before the tunnel

- spoil is transferred; (iv) workers shall use dustproof veils to protect them from dust;
- Provide adequate ventilation system and other measures to control concentration of air pollutants within tunnels;
- Air quality in the tunnel shall be monitored and included in the environmental monitoring plan and the monitoring data shall be reported in time.

Noise and Vibration

To minimize noise and vibration during construction, the following measures shall be put into place:

- The Contractor shall be responsible for compliance with the relevant Vietnamese legislation with respect to noise;
- If there are schools near the construction area or existing roads, high-noise construction equipment should be used preferably after school classes. If such an arrangement is not feasible, the use of such equipment shall be kept to a minimum, and the contractors shall be required to provide advanced warning to the schools or develop other possible solutions;
- In sensitive areas (including residential neighborhoods, hospitals, rest homes, etc.), the construction activity shall be scheduled in daytime only, and the noisy equipment shall be prohibited from night operation. During the construction in daytime, the construction site shall be fenced;
- Linking roads shall be regularly maintained during construction to reduce noise and dust;
- Concreted mixers, power generated and other stationary equipment shall be carefully placed as far away from local communities to reduce noise impacts from these machines. Where possible, municipal power supply shall be utilized in construction including night time construction as diesel generators are extremely noisy and avoiding their use is the best mitigation possible;
- Equipment with lower noise levels shall be used for concrete pouring operations, which may require 24 hours non-stop operation;
- Noise monitoring shall be conducted in sensitive areas and schools near construction sites. If the monitored value exceeds the allowed standard, the Contractor shall be required to take noise reduction measures;
- Temporary noise barriers at the appropriate places shall be erected to reduce the noise impacts at night time
- The transportation schedule shall be carefully designed to minimize the adverse impact on residents and students as well as the traffic on the existing road. The transportation vehicles will be required to slow down when passing townships and nearby schools and pagodas. Transportation during peak hours should be minimized;
- Since the transportation route is yet to be decided, the Contractors shall be required to provide the transportation route in advance to the local government, ECO/ES for approval;
- The construction equipment shall be well maintained to keep it best operating conditions and lowest noise levels possible. Properly designed silencers, mufflers, acoustically dampened panels and acoustic sheds or shields, etc. shall be used during

construction. Mufflers and other noise control devices shall be repaired or replaced if defective;

- Ear pieces shall be provided for workers who must work with highly noisy machines such as piling, explosion, mixing, etc., for noise control and workers protection. The work health standard shall be followed to control construction workers' working hours;
- No blasting shall be allowed during nighttime unless prior approval is obtained from the government authority and the ECO/ES;
- In order to supervise and protect residents' economic activities and daily life, and school environment, acoustic environmental monitoring shall be carried out during the construction phase. The ES shall be required to monitor through sampling the construction site within 100m of any larger residential areas or schools. Based on monitored results, corresponding noise prevention measures shall be adopted, for instance: limit working time, change transportation route, adopt temporary sound barrier, etc.

Earthworks, Cuts and Fill Slopes

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

- All earthworks shall be properly controlled, especially during the rainy season.
- The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the works.
- The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.
- In order to protect any cut or fill slopes from erosion, in accordance with the drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains should be provided above high cuts to minimize water runoff and slope erosion.
- The Contractor shall use the excavated material from tunnels and other areas of the project for filling unless the ECO/ES consider the material unsuitable for filling;
- Any excavated cut or unsuitable material shall be disposed of in designated disposal areas as agreed to by the ECO/ES;

Stockpiles, Quarries and Borrow Pits

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

- Locations of stockpiles, quarries and borrow pits shall be identified and demarcated, ensuring that they are far away from critical areas such as steep slopes, erosion-prone soils, cultivated lands, and areas that drain directly into water bodies. Locations of stockpiles, quarries and borrow pits shall be in non-productive land to the maximum extent possible and be approved at least by DONRE;
- Location of stockpiles, quarries, and borrow pits shall avoid sensitive areas such as nature reserves, scenic spots, forest parks, water source protection areas, etc.;

- An open ditch shall be built around the stockpile site to intercept wastewater;
- Limit extraction of material to approved and demarcated quarries and borrow pits;
- Stockpile topsoil when first opening the borrow pit. After all usable borrow has been removed, the previously stockpiled topsoil should be spread back over the borrow area and graded to a smooth, uniform surface, sloped to drain. On steep slopes, benches or terraces may have to be specified to help control erosion;
- Excess overburden should be stabilized and re-vegetated. Where appropriate, organic debris and overburden should be spread over the disturbed site to promote re-vegetation. Natural re-vegetation is preferred to the extent practicable;
- Existing drainage channels in areas affected by the operation should be kept free of overburden;
- Prior to the initiation of construction, the materials stockpiles shall be constructed with peripheral storm water drains and interception ditches to divert storm water into rivers downstream, in order to avoid direct erosive impact from storm water. If necessary, sedimentation ponds will also be constructed to remove sands and other solids in storm water before it reaches the rivers downstream.
- The Contractor shall ensure that all borrow pits used are left in a trim and tidy condition with stable side slopes, re-establishment of vegetation, restoration of natural water courses, avoidance of flooding of the excavated areas wherever possible so no stagnant water bodies are created which could breed mosquitoes;
- When the borrow pits cannot be refilled or reasonably drained, the Contractor shall consult with the local community to determine their preference for reuse such as fish farming or other community purposes;
- No foreign material generated/ deposited during construction shall remain on site;
- Areas affected by stockpiling shall be reinstated to the satisfaction of the ECO/ES.

Spoil Disposal Sites

The selection and use of spoil disposal sites shall follow strictly regulation:

- All disposal sites shall be designed by the design institute in consultation with the ES team and finished on a 1:5,000 scale topographic map. The design shall include a retaining wall where needed with enough strength, slope protection, drainage facility and service road for construction, if needed;
- The Contractor shall use the designed disposal sites only, no random places;
- If the Contractor proposes any new sites as disposal sites during the construction of the Expressway, they have to be approved by DONRE and local district/commune PCs. The contractor should ensure that these sites (a) are not located within designated forest or cultivated areas, or any other properties; (b) do not impact natural drainage courses; and (c) where they can not cause future slides, (d) do not impact endangered/rare flora. Under no circumstances shall the contractor dispose of any material in environmentally sensitive areas.
- If disposal sites are to be located on river beds, they have to be approved by the hydrology management authority;
- The final use of the disposal site shall be approved by the local government. Besides the requirements for the location of spoil disposal sites, the following actions shall be put

into place:

- Land owners shall be compensated if farmland is occupied for disposal sites;
- Before the commencement of the disposal operation, 30 cm of natural soil from the surface shall be first removed and stored at the site. This material will be reserved and used at the end of the disposal operation as cover material for the rehabilitation of the disposal site.
- If the disposal site would be located near a river or water course, a retaining wall and/or interception ditch or settling ponds shall be built prior to the initiation of the construction activities. The surface runoff shall be retained and settled first before allowed discharge into the receiving water;
- To ensure the stability of the spoil disposal site, the mortar rubble masonry pavement and grouted rubble toe protection shall be adopted to prevent erosion and maintain stability.
- A drainage ditch shall be built around the disposal site to control surface runoff;
- The construction of disposal sites and transportation of spoils at night is strictly prohibited near residential areas. The sites shall be watered for dust suppression during their operation;
- The disposal sites will be fully rehabilitated as soon as the disposal operation is completed. The rehabilitation shall include a complete cover of the site with native soil and fully landscaped (see the re-vegetation and restoration management plan). The stability of the sites will be inspected and measures such as retaining walls shall be constructed as needed;
- Disposal sites close to patches of natural vegetation will be limited in size to avoid cutting vegetation and disturbing any existing wildlife;
- Access roads, if needed, conducting to the disposal areas shall be handled in the same manner as the construction of new access roads (See “New Access Roads” below).

Disposal of Debris

The Contractor shall carry out the following activities:

- Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for debris;
- Debris generated due to the dismantling of existing structures shall be suitably reused, to the extent feasible, in the proposed construction program (e.g. as fill materials for embankments). The disposal of debris shall be carried out only at sites already identified and approved by DONRE and local district/commune PCs (see “Spoil Disposal Sites” above);
- In the event any debris or silt from the sites is deposited on adjacent land, the Contractor shall immediately remove such, debris or silt and restore the affected area to its original state to the satisfaction of the ECO/ES;
- The construction solid waste arising from pier construction will be collected and conveyed to a designated place for safe disposal in a timely matter. The solid waste shall be used as material for road construction wherever possible;
- All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary, will be considered

incidental to the work and should be planned and implemented by the contractor as approved and directed by the ECO/ES;

- Water courses shall be cleared of debris and drains and culverts checked for clear flow paths;
- Assess risk of any potential impact regarding leaching of spoil material on surface water;
- Once the job is completed, all construction -generated debris should be removed from the site;

Demolition of Existing Infrastructures

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

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

Bridges, Overpasses, Interchanges and Viaducts

- The Contractor shall submit a bridge, overpass, interchange or viaduct construction method statement to the ECO/ES for approval, detailing the location of the temporary bypasses, spill prevention measures, and sedimentation control measures, surface water flow diversion, reinstatement, etc.;
- The bridge works shall be scheduled to avoid the high flow season;
- The environmental supervision shall be enhanced during the construction of the large bridges;
- For any in-water-construction for bridges, there shall be strict waste control plan to restrict discharge or dumping of any directly discharge of wastewater, slurry, waste, fuels and waste oil into the water. All these materials must be collected and disposed at the banks. The slurry and sediment shall also pump to the banks for disposal and shall not be allowed to discharge to the rivers directly;
- Reinstatement of watercourse crossings shall be carried out, including generic methods for all watercourse crossings and site-specific methods statements for significant or sensitive watercourse crossings;
- After bridge construction, the works area, stream diversion, settlement pond areas and temporary bypasses shall be reinstated to the satisfaction of the ECO/ES.

Construction of Tunnel

- Before the construction of the tunnel begins, the Contractor shall determine the proper sites for stockpiling/disposing the tunnel's waste, so as to minimize the land occupation and make full use of wasteland. These sites shall be approved by DONRE and local district/commune PCs. Slope protections like retaining walls and green works are to be used to mitigate the environment impact;

- The wastewater produced in the construction of the tunnel shall be discharged into settling tanks to remove solids. The sediments shall be transported in a timely manner and the supernatant recycled into the process of construction. Surface water without beneficial use or functions can be used to receive the discharge of the supernatant, but it is forbidden to discharge it into the river without any treatment. Any wastewater produced shall not be directly discharged into the water body without treatment.
- The Contractor shall, to the extent possible, utilize the excavated material from the tunnel for filling of embankments in order to balance borrowing and filling;
- The Contractor shall adopt small dosage blasting materials and pre-cracking blasting methods. Noise insulation cover will be used if necessary. Proper blasting time will be arranged with the approval of the ECO/ES, and night time blasting is forbidden. Construction worker are required to wear masks and earmuffs.
- Proper ventilation system is required to satisfy the requirements for adequate air quality during tunnel construction. The EO (Environmental Officer employed by the Contractor) shall monitor the density and amount of hazardous gases inside the tunnel.
- The Contractor shall develop an emergency plan for unexpected accidents and hazardous gases inside the tunnel
- Traffic signs and temporary traffic regulations should be applied in the tunnel. The movement for workers, trucks, bulldozers, etc. shall be directed by trained personnel;
- The Contractor shall install a tunnel management station to be in charge of the daily maintenance, repair to guarantee the normal functioning of the ventilation and lighting systems, signal lamps, equipment, etc. The station shall also be in charge of fire reporting, fire control, closed-circuit TV, emergency calls, and emergency rescue procedures so as to guarantee the safety of construction workers;
- The Contractor shall train tunnel management staff in order to improve their ability and management level to handle accidents. Training on safety and personal security shall also be provided to the tunnel workers and administration staffs. This training shall be incorporated into the training plan provided by Contractors to their staff;

New Access Roads

- To the extent possible, the Contractor shall try to use the existing local roads, and the new reconstructed town and village roads to reduce the construction of a new access road;
- In case the Contractor proposes a new road, DONRE, PMUs and ECO have to give their no objection. PMUs have to corroborate that the proposed access road is properly designed;
- The Contractor has to present a 1:5000 relief map of the new road;
- The design of the new access road shall follow the landform and avoid alignments that require large volumes of excavation. In areas with steep slopes, the width of the road cannot exceed 3.5 m.
- The new access road shall include a drainage ditch and all unstable slopes shall include retaining walls or other appropriate structures to control erosion and landslides;
- Once the construction of the DQEP is finished, all access roads will be either given back to local governments or decommissioned and the area recovered for use in agriculture;
- It is strictly prohibited that construction activities are carried out at night near sensitive

- receptors such as residential areas, hospitals, rest homes, etc.;
- The Contractor shall set all necessary warning signs, and speed bumps near sensitive receptors to reduce speed and increase traffic safety;
- For unpaved access roads, the Contractor shall spray water 2-3 times a day during the dry season to reduce the production of dust.

3) Clearing, Re-Vegetation and Restoration Management Plan

The contractor shall prepare a Clearing, Re-Vegetation and Restoration Management Plan for approval. The Plan shall identify procedures and mitigation measures for clearing, re-vegetation and restoration of construction areas.

Clearing of Construction Areas

- Areas proposed for clearing shall be included in the Plan. Only those proposed areas shall be cleared in accordance with the Plan and approved by ECO/ES. The Vegetation Clearing Plan shall consider the existing usage of the project land to allow its existing usage to continue as long as is practicable, without interference with the Contractor's activities. Vegetation shall not be disturbed in those areas not submitted with the Plan for non objection;
- Large or significant trees in camp areas and access roads should be preserved wherever possible;
- Before vegetation clearing takes place in any construction area, search and rescue and seed collection shall be undertaken;
- Before clearing of vegetation, the Contractor shall ensure that all litter and non-organic material is removed from the area to be cleared;
- Vegetation clearing shall take place in a phase manner in order to retain vegetation cover for as long as possible and prevent large areas from becoming exposed to wind;
- All indigenous plant material removed from cleared areas shall be stockpiled for mulching. All remaining vegetation shall be removed and disposed of at an approved landfill site.
- The Contractor shall remove topsoil from all areas where topsoil will be impacted on by construction activities, including temporary activities such as storage and stockpiling, etc.;
- Stripped topsoil shall be stockpiled in areas agreed with the ECO/ES for later use in re-vegetation and shall be adequately protected;
- The application of chemicals for vegetation clearing shall be minimized. To the extent possible, non-residual chemicals shall be selected and with negligible adverse effects on human health;
- Herbicides use in the project shall be shown to be effective against the target vegetation species, have minimum effect on the natural environment, and be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well for personnel applying them. The use of herbicides shall be approved by ECO/ES.

Re-Vegetation and Site Restoration

- Re-vegetation shall start at the earliest opportunity. Appropriate local native species of

vegetation shall be selected for the compensatory planting and restoration of the natural landforms;

- Ventiver grass should be planted in high embankment slopes to recover vegetable cover and protect from erosion;
- The Contractor shall plant trees along the Expressway especially in the 80 affected populous residential areas along the project alignment. The Contractor shall establish green tree parks at service locations and several locations along the Project route. Green trees play an important role in improving the ambient air quality because they function as air-cleaners, dust-retainers, and dust-filters. They also keep the soil humidity;
- Types of tree recommended for planting are white eucalyptus and red eucalyptus, cajuput acacia aneura, pine, which can be grown well in impoverished areas along the project route. The Contractor shall also consider the planting of Dicranopteris linearis which can grow well in dry areas and will provide ecological and economic results. This type of tree not only helps reduce erosion and prevents evaporation during the dry season, but also can be used for fire wood;
- Restoration of cleared areas such as borrow pits no longer in use, disposal areas, site facilities, workers' camps, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works shall be accomplished using landscaping, adequate drainage and re-vegetation;
- Spoil heaps and excavated slopes shall be re-profiled to stable batters, and grassed to prevent erosion;
- Restoration and re-vegetation shall be carried out timely for the exposed slopes/soils and finished areas shall be reinstated in order to achieve the stability of slopes and maintain soil integrity;
- All affected areas shall be landscaped and any necessary remedial works shall be undertaken without delay, including grassing and reforestation;
- Vegetative covers will be extensively planted on the land used for road construction;
- At the section of the DQEP with high embankment slopes particularly where the large bridges cross the main rivers tree protection shall be implemented where the land is exposed (easily eroded). It is recommended to plant trees from the Pean family to protect such slopes;
- Soil contaminated with chemicals or hazardous substances shall be removed and transported and buried in waste disposal areas;
- All affected areas should be landscaped and any necessary remedial works should be undertaken without delay, including grassing and reforestation;
- Use the existing roads as access roads if possible to minimize the need for new access roads which lead to damage the existing landforms and/or greens. If new access roads should be built, they should avoid major scenery zones and used as village roads once the construction is completed;
- Water courses and sites should be cleared of debris and drains and culverts checked for clear flow paths. Debris and all excess material shall be properly disposed.

4) Waste Management Plan

During the construction stage, the Contractor shall prepare a Waste Management Plan

before commencement of project works. The Plan shall include the following Sub-Plans:

Drainage System

This Sub-Plan shall contain:

- A review of the preliminary site drainage design prepared during the detailed design;
- An update of the preliminary design based on the actual construction program and the site specific conditions (e.g. the geographical conditions, location of slopes and the nature of construction work);
- A detailed implementation program, approved by the local authorities/agencies in relation with the proposed drainage system;
- Detailed design including drawings, location maps, specifications of drainage collection channels, pumping systems, temporary water pipes, and wastewater treatment facilities;
- Proposed discharge locations and treatment standards;
- As part of the design of the site drainage system, surface runoff within the construction site shall be diverted in order to avoid flushing away soil material and the water is treated by device such as sediment trap before discharge;
- Storm water and wastewater systems shall be separated. The rainwater will be collected through a ditch and discharge into any adjacent body of water. The maximum flow velocity for a rainwater ditch shall be determined in accordance with the flood prevention measures.
- Where the soil texture on the slopes to be filled is too loose to resist erosive forces of storm water, a weir of 0.5 m width x 0.2 m height is suggested to be constructed along the edge of the roadbed to retain storm water from running down through the soils on side slopes. In addition, a temporary drainage ditch is to be constructed along the roadbed at an interval of 50 m to divert the excessive storm water. A sedimentation pool will be provided where necessary downstream of the drainage ditch in order to remove solids in the run-off before it reaches any watercourse.

Wastewater

- The Contractor shall be responsible for compliance with the relevant Vietnamese legislation relevant to wastewater discharges into watercourses;
- Sewers has to be designed and installed by the Contractor in accordance with the national design code of Vietnam;
- The Contractor shall submit a method statement to the ECO/ES detailing how wastewater would be collected from all wastewater generating areas, as well as storage and disposal methods. If the Contractor intends to carry out any on-site wastewater treatment, this should also be included;
- Water from kitchens, showers, laboratories, sinks, canteens, etc. shall be discharged into a conservancy tank for removal from the site, or pass through an oil screener before discharge;
- Wastewater from mixing stations, material washing and tunnel construction shall be collected into a settling tank;
- Wastewater from construction camps, even after the settling and oil/water separator treatment shall still not be allowed to be discharged into river systems directly. They can

be discharged into ditches, smaller creeks or irrigation channels before being disposed into the above rivers;

- Runoff from fuel depots / workshops / machinery washing areas and concrete batching areas shall be collected into a conservancy tank and disposed off at a site approved by the ECO/ES;
- Domestic sewage from site office and toilets shall either be collected by a licensed waste collector or treated by on-site treatment facilities. Discharge of treated wastewater must comply with the discharge limit according to the National Technical Regulation on Domestic Wastewater QCVN 14:2008/BTNMT;
- Chemical toilets can be provided on site for construction workers. Domestic sewage collected from the site office and chemical toilets shall be cleaned up on regular basis. Only licensed waste collectors shall be employed for this disposal;
- At completion of construction works, soak pits and septic tanks shall be covered and effectively sealed off.

Solid waste

- The Contractor shall submit a method statement detailing a solid waste control system (storage, provision of bins, site clean-up schedule, bin clean-out schedule, etc.) to the ECO/ES for approval.
- The Contractor shall ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter;
- Measures shall be taken to reduce the potential for litter and negligent behavior with regard to the disposal of all refuse. At all places of work, the Contractor shall provide litter bins, containers and refuse collection facilities for later disposal;
- Solid waste may be temporarily stored on site in a designated area approved by the ECO/ES. The storage area shall have a cover to avoid direct contact with surface runoff;
- The Contractors will be required to separate construction waste from municipal waste. Where possible, the construction waste will be recycled for land filling. Periodically, the municipal waste will be transported off site for disposal, by an environmental sanitary authority if possible or by a licensed waste collector;
- Waste storage containers shall be covered, tip-proof, weatherproof and scavenger proof. The waste storage area shall be fenced off to prevent wind-blown litter;
- In remote locations where collection of waste is not practical, the Contractors shall be required to bury the solid waste in a site selected and approved by ECO/ES or the local authorities. Burning solid waste in open air is strictly prohibited;
- All solid waste shall be disposed of offsite at an approved disposal site. The Contractor shall supply the ECO/ES with certificates of disposal;
- Random disposal of solid waste in scenery areas shall be strictly prohibited;
- The Contractor shall identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each;
- Recyclable materials such as wooden plates for trench works, steel, scaffolding material, site holding, packaging material, etc. shall be collected and separated on-site from other waste sources. Collected recyclable material shall be re-used for other projects or sold to waste collector for recycling.

Domestic waste

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

Hazardous and Chemical waste

- All hazardous and chemical waste (including bitumen, disposable lubricating oil, mineral oil, organic solvent, acid and alkali, oil paint etc.) shall be properly stored, handled and disposed of in accordance with the environmental standard, regulation and management policies of MONRE, and the producers of the chemicals;
- Hazardous waste shall be stored separately from other waste and warning signs shall be posted;
- The Contractor shall provide disposal certificates to the ECO/ES;
- The removal of asbestos-containing materials or other toxic substances shall be performed and disposed of by specially trained workers;
- Used oil and grease shall be removed from site and sold to an approved used-oil recycling company or disposed off at the approved disposal sites;
- Under no circumstances shall the spoiling of tar or bituminous products be allowed on the site, over embankments, in borrow pits or any burying;
- Unused or rejected tar or bituminous products shall be returned to the supplier's production plant;
- Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company for disposal at an approved hazardous waste site;
- Transportation of hazardous waste off the site should be done in cooperation with an approved and authorized partner. All this material shall be regularly collected, stored and transported to disposal or reuse in accordance to the regulations of Vietnam.

5) Material Handling, Use and Storage Management Plan

The Contractor shall submit a method statement detailing cement storage, concrete batching areas and methods, method of transport of cement and concrete, storage and disposal of used cement bags, etc. for each concrete batching operation.

Environmental considerations shall be taken into account in the location of any material storage areas.

Transportation

- The Contractor shall ensure that all suppliers and their delivery drivers are aware of procedures and restrictions (e.g. restricted areas);

- Material shall be appropriately secured to ensure safe passage between destinations during transportation;
- Loads shall have appropriate cover to prevent them spilling from the vehicle during transit;
- The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

Hazardous and Chemical Substances

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

- Prepare the Hazardous Waste Management Plan, which includes an Emergency Plan for Hazardous Materials, and make it available to all persons involved in operations and transport activities;
- All hazardous material / substances (e.g. petrochemicals, oils, etc.) shall be stored on site only under controlled conditions;
- All hazardous material / substances shall be stored in a secured, appointed area that is fenced and has restricted entry. All storage shall take place using suitable containers to the approval of the ECO/ES;
- Hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure;
- Fuel shall be stored in a steel tank supplied and maintained by the fuel suppliers. The tank shall be located in a secure, demarcated area.
- Inform the EOC/ES of any accidental spill or incident in accordance with the plan;
- Initiate a remedial action following any spill or incident;
- Provide a report explaining the reasons for the spill or incident, remedial action taken, consequences/damage from the spill, and proposed corrective actions. The Emergency Plan for Hazardous Materials shall be subsequently updated and submitted to the ECO/ES for no objection.

Surfacing Materials

- Over spray of bitumen products outside of the road surface and onto roadside vegetation shall be prevented using a method approved by the ECO/ES;
- When heating of bitumen products, the Contractor shall take appropriate fire control measures;
- Stone chip / gravel excess shall not be left on road / paved area verges. This shall be swept /raked into piles and removed to an area approved by the ECO/ES;
- Water quality of runoff from any fresh bitumen surfaces shall be monitored by the ES and remedial actions taken where necessary.

Cement and Concrete Batching

- Concrete mixing directly on the ground shall not be allowed and shall take place on

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

Maintenance of Construction Equipment

The Contractor shall:

- Identify and demarcate equipment maintenance areas (>15m from rivers, streams, lakes or wetlands). Fuel storage shall be located in proper areas and approved by the ECO/ES;
- Ensure that all instruments, machines, and construction equipment meet quality standards before they are put into use;
- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose spent oils on the ground, in water courses, drainage canals or in sewer systems.
- All spills and collected petroleum products shall be disposed of in accordance with standard environmental procedures/guidelines. Fuel storage and refilling areas shall be located at least 300m from all cross drainage structures and important water bodies or as directed by the ECO/ES;
- Cars and other transport equipment may only be maintained and washed at sites having impermeable protective layers and collection system for oils, lubricants, detergents, solvents. The use of solvents and detergents should be avoided to a minimum.

6) Ecological Management Plan

Protection of Natural Vegetation

- The Contractor shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation on or around the construction site as a result of their activities;
- The extent of site clearance formation and removal of vegetation during the beginning of the project shall be controlled through careful design and route selection to minimize the amount of plants/ animals affected by the project. Protected areas, key sensitive locations and areas for rare/endangered species shall be avoided;
- Sufficient trainings on ecological protection and mitigation measures shall be provided to construction workers and site management staff;
- Protection of sensitive areas which are inaccessible prior to the project shall be maintained through careful design and proper route selection process.
- Erect fences along the boundary of construction sites before the commencement of

works to prevent tipping, vehicle movements, and encroachment of personnel into adjacent areas, particularly streams, forest, and other ecologically sensitive location;

- Regularly check the work site boundaries to ensure that they are not exceeded and that no damage occurs to surrounding areas;
- Clearing of natural vegetation shall be kept to a minimum.
- The removal, damage and disturbance of natural vegetation without the written approval of ECO/ES are prohibited;
- The use of herbicides is approved by ECO/ES;
- Regularly check the work site boundaries to ensure that they are not exceeded and that no damage occurs to surrounding areas;
- Prohibit and prevent open fires during construction and provide temporary firefighting equipment in the work areas, particularly close to forest areas.

Protection of Fauna

- Prior to the construction, an education program shall be provided for Contractors and workers on the knowledge of wildlife and bio-diversity. Measures also shall be developed to encourage good practice of wildlife protection and penalty the people who violate the clauses of wildlife protection.
- The construction shall be carefully scheduled to reduce the construction period and the blasting operation, in order to minimize the disturbance to the wildlife.
- The Contractor shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place;
- The feeding of any wild animals shall be approved by ECO/ES;
- The use of pesticides is prohibited.

Temporary Land Occupation

- Successful land reclamation and re-cultivation of temporary used land are highly depended on reservation of top soil. If sufficient top soil is well kept throughout the construction phase, then it is half way to re-cultivate temporarily occupied sites after construction completion. Therefore, the Contractors need to remove sufficient top soil, keep them aside, and protect them from erosion before starting using the temporary acquired land. This top soil will be used for re-cultivation and reclamation;
- For new construction access roads, design shall consider minimizing excavation and filling;
- Erosion control measures shall be taken for soil and water conservation in and around the access road areas;
- Following the completion of the project, the access roads may be turned back to the local government and if desired, used as rural roads or wood land roads. If local governments elect not to use these access roads, the land can be used for farming or plantation;
- For temporary land occupation such as that used for construction camps, the Contractor shall be required to promptly reclaim the land and replant trees or shrubs as may be needed to restore the land to its original status. If the land was used for farming, the Contractor will be responsible to promptly restore the conditions suitable to restart agriculture on the site. All temporary facilities as well as waste materials will be

dismantled and removed from the site. Any damaged to occupied drainage, irrigation and other agricultural infrastructure will be restored.

Work in watercourses

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

7) Safety Management Plan

Construction Site Safety

The Contractor's responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all national and local safety requirements and any other measures necessary to avoid accidents, including the following:

- Conduct safety training for construction workers prior to start working;
- Provide construction workers with sufficient personal protective equipment and clothing such as goggles, gloves, respirators, dust masks, hard hats, earmuffs, steel-toed boots, etc., and enforce their use;
- During heavy rains, accidents, or emergencies of any kind, suspend all work;
- Brace electrical and mechanical equipment to withstand seismic events during the construction;
- Establish safe sight distance in both construction areas and construction camp sites;
- Limit the speed of vehicles moving within the construction site;
- Place signs around the construction areas to facilitate traffic movement, provide directions to various components of the works, and provide safety advice and warning. All signs shall be constructed according to Vietnamese specifications;
- Provide post Material Safety Data Sheets for each chemical present on the worksite;
- Require that all workers read, or are read, all Material Safety Data Sheets. Clearly explain the risks to them and their partners, especially when pregnant or planning to start a family. Encourage workers to share the information with their physicians, when relevant;

- Ensure that the removal of asbestos-containing materials or other toxic substances be performed and disposed of by specially trained workers;
- Provide seminar on safety issues for local inhabitants, particularly school students;
- Install warning signs if the potential dangers are present;
- Temporary fence some of the high risk areas, such as deep excavation, areas for blasts, etc. to control public access. Provide lighting at night in roads near the construction site if such roads are regularly used by locals.

Measures on blasting

In case that blasting is needed during construction, the following measures shall be put into place:

- Before blasting is carried out, a detailed survey shall be conducted at nearby communities to evaluate the degree of impacts due to the blasting activity (e.g. possible damage to structures or infrastructure due to vibration, effects on animals, local residents, etc.). No blasting shall be allowed during nighttime unless prior approval is obtained from the government authority and the ECO/ES;
- The Contractor shall take necessary precautions to prevent damage to special features and the general environment;
- The Contractor shall notify any occupants of surrounding land at least one week prior to blasting and shall address any concerns that they may have to the satisfaction of the ECO/ES. People shall be at least 200m away from the blasting point;
- For the transportation, storage, process, package on site, connect, blasting and the disposal of the blasting, the procedure shall be in accordance with the Vietnamese regulations on blasting;
- Except for detonation, all the power and the light shall be turned off;
- The excavation face shall be on the same level with the lining of surface. The distance is defined according to the factors of the intensity of the concrete and the character of the wall rock;
- The safety examination shall be fulfilled after the blasting, whose the procedure shall be performed according to the Vietnamese regulations on blasting;
- The quantity of blasting materials shall be carefully controlled according to the real situation.

Fire Control

- The Contractor shall submit a fire control and fire emergency method statement to the ECO/ES for approval. The method statement shall detail the procedures to be followed in the event of fire;
- The contractor shall take all reasonable steps to avoid increasing the risk of fire through activities on site;
- The contractor shall ensure that basic fire-fighting equipment is available at all camp areas and facilities;
- The contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire;
- The contractor shall ensure that all site personnel are aware of the procedure to be

followed in the event of a fire;

- Any work that requires the use of fire may only take place at a designated area approved by the ECO/ES. Fire-fighting equipment shall be available.

Measures on hazardous gas

- The Contractor shall establish a plan to guarantee the safety of all personnel working in the tunnel;
- If there is hazardous gas (such as coal gas) in the tunnel, all construction activities must stop immediately and construction workers shall withdraw from the tunnel immediately. The Contractor must take corrective action and the construction must not re-start until there is no longer a danger;
- The Contractor shall monitor, record, and report the situation of the hazardous gas in the tunnel to make sure that the hazardous gas emission has not exceeded the established standard;
- During construction of the tunnel, the Contractor shall install an on-line real-time gas monitoring system including analysis equipment, a security light and an alarm system to provide visual and auditory alerts of elevated concentrations.

Residual Unexploded Ordnance

Da Nang – Quang Ngai areas have been burden with significant amount of weapon since the Vietnam War, notably bombs and mines. Workers may be injured (even died) by unexploded ordnance in the project areas and in rivers. Clearance of unexploded ordnance shall be made before commencement of construction works to avoid dangerous situations.

To ensure the safety of people and equipment involving construction and operation of the project, VEC and PMU85 will be responsible for unexploded ordnance clearance, which is expected to be implemented at the same time of the land acquisition program. This is a special task which shall be done by the military agency only.

Traffic Management

The Contractor shall:

- Estimate maximum concentration of traffic (number of vehicles/hour);
- Construction vehicles shall comply with speed limits;
- Present details regarding maximum permissible vehicular speed on each section of the Expressway to ECO/ES;
- Use selected routes to the project site, as agreed with the ECO/ES, and appropriately sized vehicles suitable to the class of roads in the area, and restrict loads to prevent damage to local roads and bridges used for transportation purposes;
- Maintain adequate traffic control measures throughout the duration of the construction activities and such measures shall be subject to prior approval of the ECO/ES;
- Carefully and clearly mark pedestrian-safe access routes;
- Promote and disseminate traffic safety information to local residents;
- If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours;
- Ensure traffic safety at intersections, especially near sensitive areas (schools, markets,

- hospitals, and historical, cultural and religious places).
- Maintain a supply for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction;
- Use signs and flagmen for traffic control;
- Be held responsible for any damage caused to local roads and bridges due to the transportation of excessive loads, and be required to repair such damage to the approval of the ECO/ES;
- Maintain linking roads in good conditions to reduce dust and noise;
- Materials leaving or entering the construction site shall be transported during non-peak hours in order to minimize traffic noise due to the increase in traffic volume;
- Not use any vehicles, either on or off road with grossly excessive noise or exhaust emissions, producing bad odors, or overloaded. In any built up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor. Exhaust fumes shall comply with relevant Vietnamese Standard on fumes.

Environmental Emergency Procedures

Environmental emergency procedures relate primarily to the event of accidental leaks, spills, emissions and other unforeseen impacts or issues. Events related to adverse weather conditions will be addressed through the Project Activity Safety Plan (PASP) as part of the Contractor's Safety Management Plan, which will be submitted to the CSE before commencement of project construction works. The Safety Plan will be reviewed on regular basis and updated if necessary. The PASP will include procedures such as the prevention of slope slide / soil erosion during the rainfall season.

In the event that accidental leakage or spillage of diesel/chemicals/chemical wastes takes place, standard response procedures will be followed immediately by the Contractor(s) such as:

- The person who has been identified the leakage/spillage will immediately check if anyone is injured and will then inform the Contractor(s), ECO/ES;
- The Contractor(s) shall ensure any injured persons are treated and assess what has spilled/leaked;
- Whenever the accidents / incidents generate serious environmental pollution or potential risks resulting in serious environmental pollution problems (e.g. spillage / leakage of toxic or chemicals, large scale spillage / leakage, or spillage / leakage into the nearby water bodies which are used for irrigation / portable water), the CSE immediate inform DONRE;
- In such cases, the Contractor(s) will take immediate action to stop the spillage / leakage and divert the spilled / leaked liquid to a nearby non-sensitive areas;
- The Contractor(s) will arrange maintenance staff with appropriate protective clothing to clean up the chemicals/chemical waste. This may be achieved through soaking with sawdust (if the quantity of spillage/leakage is small), or sand bags (if the quantity is large); and/or using a shovel to remove the topsoil (if the spillage/leakage occurs on bare ground);
- Spilled chemicals must not be flushed to local surface drainage systems. Instead, proper

- clean-up and disposal procedures shall be carried out as described above;
- Depending on the nature and extent of the chemical spill, evacuation of the activity site may be necessary.
- The possibility exists for environmental emergencies of an unforeseen nature to occur during the course of the construction and operation phases of the project. By definition, the nature of such emergencies cannot be known. Therefore, the Contractor(s) will respond on a case-by-case basis to such emergencies and will initiate event-specific measures in terms of notifications and reactions.

The Contractor(s) will prepare a report on the incident detailing the accident, clean-up actions taken, any pollution problems and suggested measures to prevent similar accidents from happening again in future. The incident report will then be submitted to the CSC, ECO for review and keep in the records. The incident report will also be submitted to DONRE, if required.

Most important of all, the Contractor(s) and all their workers working on the construction sites will be provided full and relevant training so that they are fully aware of the various possible emergency situations in construction activities, the danger and potential damages caused by the emergency to the environment and the people, as well as the above emergency response procedures. If needed, drills will be conducted that the emergency procedures will be followed.

8) Physical Cultural Property Chance-Finds Procedures

Although excavation and relocation of the sites found on the DQEP route have already been proposed, some archeological sites, historical sites, remains and objects, including graveyards and/or individual graves could be discovered during excavation or construction. As such, a procedure for handling those sites and artifacts needs to be prepared at the outset in an attempt to minimize the cultural impact caused by the construction process. In any case, the Contractor shall be informed of any potential findings by VEC before commencement of the construction activities.

If archeological or historical sites and/or relics are discovered, the procedures for handling such discovery shall be carried out according to the regulations of the Law of Cultural Heritage. Therefore, this section aims to provide a detailed instruction of the steps to be followed when a site/relic is encountered during the route construction.

Establishing the Organizational Structure

PMUs shall establish a consultant group with experience in the field of culture and history that can operate immediately after the sites/relics is discovered. The consultative group may be composed of the following members: (i) representatives of the PMUs, (ii) the local Service for Culture, Sports and Tourism, and (iii) the Institute of Archaeology (as a research institution).

The expenses for the operation of the consultative group will be extracted from the funds for archaeological excavation and relocation. The best approach would be to establish the consultative group based on the excavation team of the Archaeological Institute or as a part of the contract with the Archaeological Institute.

Training Courses

All Contractors, PMUs/ECO, CSC, ES, EO, representatives of local authorities and construction workers shall be trained by the consultative group before the construction starts to understand the procedures and the basics on how to recognize a potential archaeological chance find.

Chance-Find Procedures

The following measures shall be put into place in case sites or artifacts are discovered during the construction process:

- Workers shall report the findings to the Contractors, the EO, ES, or ECO immediately;
- Construction activities shall stop immediately;
- The Contractor shall notify the ES and ECO, who in turn shall notify the PMUs, the Local Service for Culture, Sports and Tourism and the Institute of Archaeology (within 24 hours or less);
- The ES and ECO shall delineate the discovered site or area;
- ES and ECO shall be responsible for guiding the Contractor to maintain the site unchanged and notify to the consultative group on the field of culture and history and the Local Service for Culture, Sports and Tourism;
- In cases of removable antiquities or sensitive remains, the site shall be secured to prevent any damage or loss of removable objects and a night guard shall be arranged until the responsible local authorities, or Local Service for Culture, Sports and Tourism, or the Institute of Archaeology take place;
- Relevant local or national authorities shall arrive to the site within 48 hours and shall be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. The job of these authorities is: (i) describe the artifact or historical remain; (ii) define the scale of the site/object; (iii) perform a preliminary evaluation; (v) set up a plan to protect and handle the discovery; and, (vi) determine the significance of the discovery. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values.

Objects with no Significant Value

If the discovery is a single object or artifact, it shall be studied by the relevant authorities and then removed from the site. Construction activities can resume after permission is given by ECO and ES. The survey concerning the discovery shall be performed in 48 hours.

Cultural sites or relics with Significant Value

- If the cultural sites and/or relics are of high value and site preservation is recommended by the consultative group and required by the Law of Cultural Heritage, VEC will need to make necessary design changes to accommodate the request and preserve the site;
- If the finding is an artifact, base on the scale and nature of that artifact, the following time shall be allowed for salvage (salvage steps include: excavation, research and removal):
 - + Small scale (<50m²): 15 days

- + Large scale (>50m²): more than 15 days
- Expenses for salvage shall be included in the budget allocated for the research of cultural heritage provided by VEC. These expenses shall not cover damages which may occur to the contractor caused by suspension of works.
- The Contractor shall stop all work immediately at the location where cultural sites, artifacts or relics are found. To ensure that the project schedule is not affected, the construction activities shall continue in other areas;
- PMUs and the Contractor shall work together to reach an agreement regarding compensation for damages caused by suspension of construction activities;
- Construction works could resume only after permission is granted from the responsible local authorities concerning safeguard of the heritage.

Chance-Find Report

The Contractor shall, at the request of ES or ECO, and within a period of two working days, make a Chance-Find Report, recording:

- + Date and time of the discovery;
- + Location of the discovery;
- + Description of the discovery;
- + Estimated weight and dimensions
- + Temporary protection implemented.

The Chance -Find Report should be submitted to all related parties including the ES and ECO who in turn will submit it PMUs, Ministry of Culture, Sports and Tourism, the Bureau of Cultural Heritage, the Local Service for Culture, Sports and Tourism and the Institute of Archaeology.

9) Community Relations and Health Management Plan

Community Relations

Discussion and public consultation shall be a continued effort throughout the construction period of the project, through the following measures:

- The Contractor shall maintain open communications between the local government and concerned communities;
- The Contractors shall have a mailing list to include agencies, organization, and residents that are interest in the project;
- The Contractor shall disseminate project information to affected parties (for example local authority, enterprises and affected households, etc.) through community meetings before construction commencement;
- Visible public notice boards shall be erected at all construction sites providing information about the project including but not limited to: (i) brief project description, (ii) construction and work schedules, (iii) main construction activities, (iv) names, telephones and contact information about the project manager, chief construction supervisor as well as environmental staff, health and safety staff, so that any affected people can have the channel to voice their concerns;
- Each Contractor will be required to hold public meetings at the villages near their sites

at least twice a year. At the meetings, the site management will explain the construction activities and learn from the villagers about any concerns they may have and provide responses to their concerns;

- PMUs shall also have a full time safeguard staff whose partial responsibility would be to receive public complaints about project construction and operation. The PMUs staff's name and contact number shall be made available to the local communities through pamphlets and public meetings.
- He/she shall respond to telephone inquiries and written correspondence in a timely and accurate manner;
- The Contractor and ECO shall visit frequently key sensitive receptors such as schools and hospitals to understand any concerns they may have and how they feel about the impact of construction activities to the natural environments and their operations;
- All Contractors shall be required to conduct safety training programs to the local communities and local schools once a year.
- In preparation for special and high impact construction activities such as demolition, blasting, night time construction, etc., the Contractor shall be required to visit the potentially affected communities to explain the activities and their impacts (e.g., safety risk, high noise, etc.), listen to the communities and take appropriate and responsible measures to address their concerns;
- At least five days in advance of any service interruption (including water, electricity, telephone, and bus routes) the community must be advised through postings at the project site, at bus stops, and in affected homes/businesses. The postings shall also inform the community of any possible detour routes and provisional bus routes. A coordination system between the Contractor and local authorities shall be set up to solve problems and incidents incurred.

Health Management Plan

The Contractor shall prepare and enforce a Health Management Plan to address matters regarding the health and wellbeing of construction workers, project staff and nearby communities. The Contractor shall include in his proposal the outline of the Health Plan. The ECO will issue a certificate of compliance to the Contractor prior to the initiation of Construction. The Contractor shall:

- Require screening of all workers on recruitment and annually;
- Implement a vaccination program including but not limited to vaccination against yellow fever, hepatitis A and B, tetanus, polio, etc.
- Provide periodical health check to construction workers to ensure their health and well being.
- Provide appropriate information and education to the workforce on basic personal hygiene, prevention of diseases, including respiratory diseases, vector-borne diseases such as malaria and dengue, water and food borne diseases such as diarrhea, tuberculosis, etc.;
- Implement a program for workers and local communities, via an approved service provider, for the prevention, detection, screening, and diagnosis of sexually transmitted diseases (STD), especially with regard to HIV/AIDS. The program shall also include

information on alcohol abuse and human trafficking;

- The HIV/AIDS program should include awareness campaigns at the construction sites and in the communities, developing peer educators and community monitoring combined with the prevention of human trafficking, awareness on safe migration, and community monitoring;
- Distribute educational materials to all workers including brochures, and leaflets which provide information of Tuberculosis (TB), HIV/AIDs symptoms and counseling and treatment services.
- Provide basic first aid services to the workers as well as emergency facilities for emergencies for work related accidents including medical equipment suitable for the personnel, type of operation, an ambulance and the degree of treatment likely to be required prior to transportation to a hospital. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics;
- The Contractor shall send, to the ECO, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the ECO may reasonably require;
- Include a Pest Management Program for the construction areas, including construction work camp areas, in the Health Management Plan. The use of pesticides shall follow procedures acceptable to the World Bank and the government of Vietnam;

If applicable, to reduce the risk of workers contracting malaria, the following measures shall be followed:

- Education of workers about problems and preventive measures;
- Use of protective clothing;
- Repellents applied to clothing;
- Minimize containers full of water;
- Ensure correct maintenance of water and water treatment plants to prevent the breeding of Mosquitoes
- Keep storm water drains and borrow pits free of vegetation; and
- Use insecticides as a last control method and only after studies indicate the primary location of mosquitoes.

Annex 4 Cultural Relics

An archaeological investigation was carried out by the Institute of Archaeology of the Vietnamese Academy of Social Sciences in 2010 (refer to the “Report of the Archaeological Investigation (Stage 1) Along the Da Nang - Quang Ngai Expressway, May 2010”).

According to this investigation, there is a group of Champa architectural ruins that may be affected directly or indirectly by the Project. These ruins are located in Chiem Son Tay Valley of Chiem Son Hamlet, Duy Trinh Commune, Duy Xuyen District, at section Km 21+800 - Km22+450 of the planned Expressway (Figure 1). These ruins (namely Go Gach, Go Loi, Trien Tranh and Chua Vua) have been recognized and ranked as provincial-level archaeological sites under the Decision No. 754/QĐ UB on March 13, 2006 of Quang Nam Province Committee.

The ruins of Go Gach and Trien Tranh would be encroached seriously by the road alignment proposed in F/S (see Figure 2). However, in D/D, the alignment had been modified and consequently the encroachment to Go Gach ruin is avoided. A part of the Trien Tranh hill remains to be encroached by the alignment proposed in D/D, but the conservation area of the Trien Tranh ruin is avoided.

The Trien Tranh Ruin lies in the western residential area of Chiêm Sơn Hamlet, belonging to the Úc Đạp mountain foot (the Eo mountain foot) in the Southeast of Chiêm Sơn Tây Valley. The hill is about 10m high over the paddy field, and has relatively steep slope currently covered by the eucalyptus trees and high dense shrubs. There are several large deep holes on the mound those were dug by people looking for gold and ancient relics. On the mound surface, it can observe a large number of bricks which are usually used for Champa architecture. The carefully whittled sandstones, similar to the stone used to make other Champa tower bases, are frequently found. According to result of the site observation, it suggests that there may be a collapsed Champa tower here, and the tower foundation might still be buried deeply in the ground.

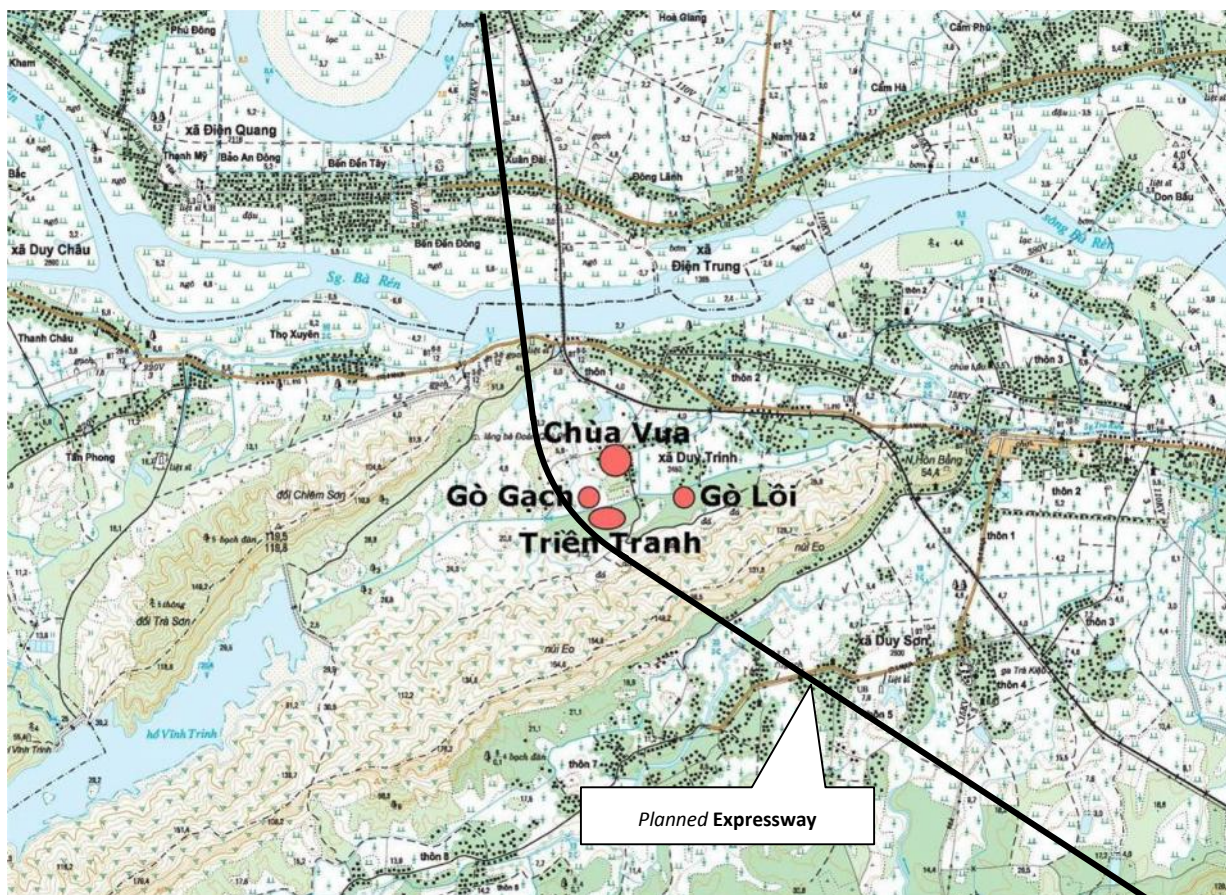


Figure 1 Distribution of Champa ruins in the valley of Chiêm Sơn Tây

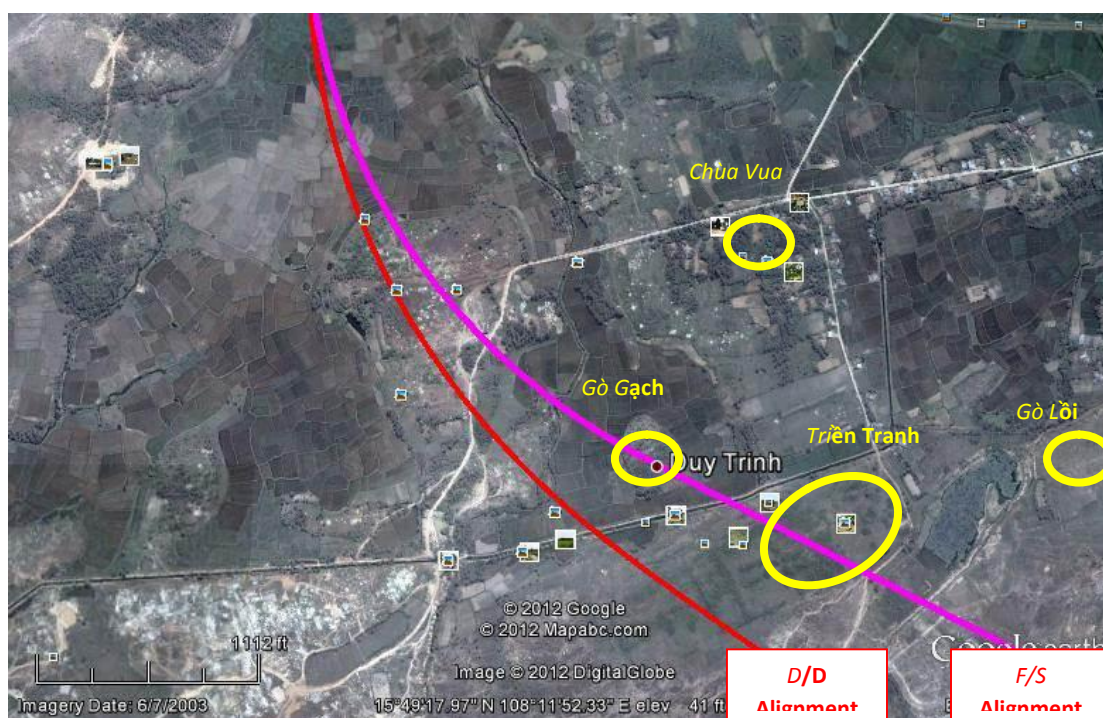


Figure 2 Location of Champa ruins, F/S and D/D alignments.

The planned Expressway will pass through the western part of Trien Tranh hill from Km 21+800 to Km 22+150. Measures to avoid/mitigate impact to this site should be carefully examined before and during construction phase.

The Vietnamese Government has issued the Law on Cultural Heritage and several regulations for preservation of the heritages. They prohibit a project proponent from changing original constituents of heritages by adding, moving/exchanging artifacts in monuments, or renovating/restoring, and taking other acts without permission from the Ministry of Culture and Information (MOCI). Besides, a project proponent is banned from changing surrounding environments and landscapes of heritages by illegally cutting trees, breaking stones, digging, excavating and constructing and other activities which negatively impact the relics. The Law on Cultural Heritage also requires a project proponent on construction at places affecting relics to coordinate with the MOCI and to create conditions for the MOCI to supervise the process of construction. If a project proponent realizes that there may be relics, antiques or national precious objects in the project areas, he/she must temporarily stop the construction works and promptly inform the MOCI.




Figure 3 A stone altar found at Trien Tranh site, one of the Champa ruins in Duy Trinh Commune.

Therefore, in order to avoid suspension of construction works which may cause severe delay of the project, it is recommended that a test excavation at Trien Tranh hill should be carried out prior to the commencement of construction. According to recommendation of the Institute of Archaeology, the test excavation is necessary to evaluate the size of the site and its distribution under the ground, and the influence intensity of the construction on the archaeological site.

After the test excavation, a meeting between relevant agencies would be organized to discuss about result of the test excavation, and decide whether an official excavation prior to the commencement of construction works at this road section should be done or not.

During construction phase, some archaeologically-valuable artifacts or sites would be unearthed in chance. According to the regulations of the Law of Cultural Heritage, a Physical Cultural Property Chance-Finds Procedures should be prepared before hand to minimize impacts to these artifacts or sites. If valuable or invaluable relics are discovered, the local related departments should be notified immediately. The excavation should be stopped until the authorized department identifies the relics.

Annex 5 Phu Ninh Natural Reserve

Information Box		Lake view
Location	Phú Ninh District, Quảng Nam Province	
Coordinates	15°29'07"N 108°27'26"E	
Lake type	Reservoir	
Surface area	3,433 ha	
Water volume	344,000,000 m ³	
Islands	30	
Settlements	Tam Kỳ	

Location

Lake Phu Ninh is 7 km from Tam Ky Town to the West, 70 km from Da Nang City and about 15 km from Chu Lai airport, Quang Nam Province. On its banks are villages belonging to Phú Ninh District and Núi Thành District.

Resource

Phu Ninh Lake water is the main source of water for living and planting of Tam Ky Town and other places in Phu Ninh and Nui Thanh districts. Lake Phu Ninh has a hot mineral spring water resource.

Hydroelectric power from Lake Phú Ninh contributes up to 3 million kwh per year. Annually, about 80 tons of fish are taken from Phu Ninh Lake.

Forest protection

The total protective area surrounding Phu Ninh Lake is 23,409 ha, belonging to Phu Ninh and Nui Thanh District. According to the Quang Nam Forestry Bureau (in 2000), the area included 15,768 ha of forest including 1,500 ha of plantation forest. There are 34 kinds of animal, 26 reptiles and 14 kinds of animal and plant which are recorded in Vietnam Red Book. It is the place to conserve hundred of plants and precious herbs with various zoology and plantation system. Phu Ninh Lake was recently awarded national historical heritage status.

Topography

The area is made up of low hills, average height 100 – 300m, but some are 500 – 700m above sea level. The average slope is 100m, sloping to the west, south west and north east to form a small valley. To the south are mountain ranges with Quang Ngai mountain with high peak, tilting hard (16-450) makes this area strongly separated. To the north and northwest are low mountains, small tilt (110-250) creates many flat and large valleys surrounding Phu Ninh Lake. The soil is mostly is yellow red feralite soil on sand stone (occupies 61.11%) which is easily eroded and not conducive to growing vegetables and crops. Red yellow feralite soil on igneous rock (occupies about 20%) is often covered by forest. Fertile soil (occupies 15-17%) exists in valleys along the springs where concentrate the residential area and field.

Climate

Phu Ninh Lake's climate belongs to the Middle South climate area. It is not cold in autumn. Daily and yearly temperatures are both relatively low for Vietnam. There are two seasons: rainy and dry in year.

Average readings taken at the Tam Ky weather station show the following characteristics:

- Yearly average temperature: 25.6°C
- Average temperature high: 29.7°C
- Monthly lowest average temperature: 22.7°C
- Monthly average temperature fluctuation: 7°C
- Monthly average approximate humidity 82%. From September to October, approximate humidity is 82%-88%. From April to September, monthly average approximate humidity is about 75%-81%
- Rainfall is concentrated from September to December
- Yearly average rainfall: 2,491 mm
- Highest rainfall: 3,307 mm
- Lowest rainfall: 1,111 mm
- Daily highest rainfall: 332 mm

Phu Ninh Lake has two main wind directions: East and Northeast. The east wind prevails from March to August. The northeast wind prevails from October to November

- Average wind speed: 2.9 m/s; highest wind speed: 40 m/s (in stormy weather).
- Strong wind speed is from 14 m/s to 28 m/s
- Storms occur from September to October. There are 0,5 direct storm yearly and 2-3 indirect storms and tropical pressure.
- Hot and dry West wind: Southwest wind happens in May. From May to August, there are 10 to 15 hot and dry days.

Terrain

- Regenerated forest and mountain
- Low mountain
- Lake and small islands
- Field and residential area

Basic ecosystem

- Natural forest (regenerated)
- Plantation
- Water areas
- Vacant land

Zoology and plantation system

1. Plant and forest: there are main kinds of plants as follows:

Plants on mountain includes thin forest (about 860 ha, cover to the South) and extremely thin forest (about 530 ha)

Bush, grass: total area is about 10,000 ha, covering everywhere. The soil is dry, low regenerated capability

Plantation: about 700 ha, mainly concentrate on the north boundary of the lake which is almost Eucalyptus.

In conclusion, forest surround the lake has the bad impact on environment due to the war effect left over and the consequence of exploitation nowadays.

2. Plants:

Phu Ninh forest has various plants, including about 369 kinds of plant among which are 10 plants recorded in Vietnam Red Book.

3. Plant resources value general estimation:

There are 250 worthy plants among which 211 medical plants, 85 wood plants, 66 ornamental and shading plants, 50 fruits and crops plants, 14 cotton and handicraft material plant, 22 rubber, oil, fragrant oil plants.

4. Animals: 3 main kinds of animal

Land vertebrate animal includes 4 main kinds: amphibians, reptile, bird, animal with 148 species, 69 families, 27 groups, 4 classes.

Aquatic animal:

- Kelp: 20 kinds, 8 families, 3 branches
- Floating animal: 13 kinds
- Fish: 14 kinds
- Seabed animal: 11 kinds (clams, snails)

Land invertebrate animal:

- Insect: 150 kinds, 11 groups which are tremendous and various. Some are colorful, attracting tourists.
- According to the research of Ministry of Agriculture and Rural Development (in 2003), Phu Ninh area has many precious animals such as:
 - + 11 kinds of mammal recorded in Red Book need to be protected: rhino, red monkey, yellow monkey, long tail monkey.
 - + 7 reptiles: python, cobra, egretta garzetta.

Animal resources estimation:

- The land animal in this area has the significant value. Although there are not many kinds of animal, the zoology system in Phu Ninh Lake is various and valuable.
- Precious animals include 14 kinds (e.g.: red face monkey, wolf, bear, chamois, rhino, ground-dragon, snake, bird...) other animals: brocket, boar, vagrant, cock, snake...
- Ornamental animals: attractive shape, colorful, beautiful voice..... They can be supplied for tourism activities and sightseeing

Current land use

1. North Lake area:

- Dams: Chinh dam, Tu Yen dam, Long Son dam, and Duong Lam dam
- Management office, Security office: lake management team, forest protect station
- Power station

- Chap Tra mountain is existing natural mountain in the North of the lake with small area and some precious animals such as red face monkey which can be supplied for sightseeing.
- Agriculture land, fish pond and agricultural channel
- Mineral water and security station

2. Island and peninsula:




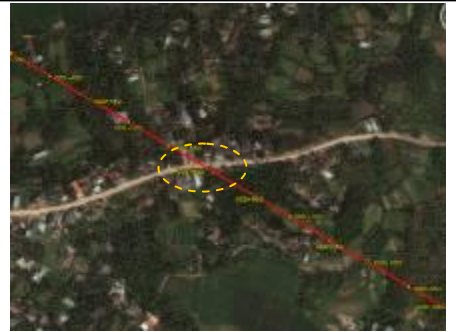

- Phu Ninh Lake has 15 small and big islands. Small islands often flood in rainy season. North and East islands do not have natural forest any longer. New plantation area includes pine, eucalyptus... The zoology system is poor with a little kind of small animal, reptiles and birds.
- Rua Island: natural forest, small animals, especially two small kinds of monkey: long tail monkey and red face monkey.
- So Island: the biggest island of Phu Ninh Lake. Natural forest is being recovered. There are many animals, birds, reptiles. The quantity is low but with developing potentiality.
- 61st Island: there are two-floor old house of the management lake team. Because most forest in this island are planted, so the landscape and the zoology system are poor and need to be improved.
- The South and West Islands and peninsulas (belonging to Tam Son and Tam Lanh commune): many wild animals living such as deer, brocket, reptile, bird.





Mineral water


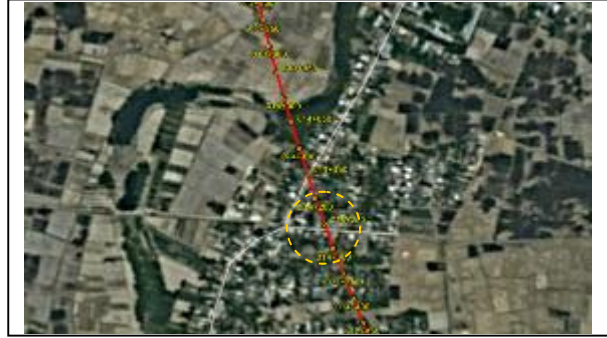


At the heart of the lake, near Chap Tra valley, there are many mineral water resources with useful elements for digestion and recovery treatment, health improvement.

The degree of Phu Ninh's mineral water is 90⁰C underground, 60⁰C-70⁰C when flowing out; flowing speed is 0,5l/s. Mineral water company in Tam Ky commune uses it to make products (designed output: 15 million bottles/year) However, they have not use this mineral water for treatment yet.


Annex 6 Site-Specific Environmental Mitigation Measures for the Da Nang – Quang Ngai Expressway Project


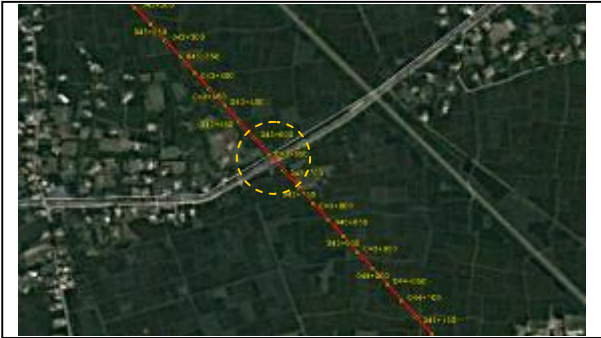


	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
I	Roads and railway crossed by the planned Expressway						
1	PKG1	Km0+000 (The flyover bridge at Tuy Loan interchange)	 	<ul style="list-style-type: none"> - The alignment cross the NH No.14B at Km0+000. - The flyover bridge near the households along the NH No. 14B and rice field 	<ul style="list-style-type: none"> - Affect traffic on PR14B during construction phase - Increase noise level and air pollution on the routes during construction and operation. 	- Tuy Loan interchange	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on National Highway No. 14B and install fence as appropriate at bridge Km0+000. - Build temporary dyke to prevent wastewater and bentonite from running into agricultural land at flyover bridge Km0+000, underpass bridges Km1+173 and Km3+655. - Direct traffic flow when required for flyover bridge Km0+000. - Pile driving late at night and early morning is not allowed at flyover bridges Km0+000 and Km0+573
2		Km0+580 - Km0+620	 	<ul style="list-style-type: none"> - Cross the exiting residential road at Km0+600 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation. 	Design flyover bridge at Km0+573 with 6.5m width and access road linking to exiting concrete road	
		Km1+173		<ul style="list-style-type: none"> - Cross the exiting residential road at Km1+173 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design underpass bridge at Km1+173 with 35.0m length	
		Km3+655		<ul style="list-style-type: none"> - Cross the exiting residential road at Km3+655 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design underpass bridge at Km3+655 with 38.0m length	
		Km4+272; Km4+940; Km5+244; Km5+737; Km7+367;		<ul style="list-style-type: none"> - Cross the exiting residential road at Km4+272; Km4+940; Km5+244; 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design underpass culvert box at Km4+272 with 4.5m width, 3.5m height; Km4+940 with 5.0m width, 3.5m height; Km5+244 with	






	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km7+929;		Km5+737; Km7+367; Km7+929.		4.0m width, 3.0m height; Km5+737 with 6.5m width, 4.5m height; Km7+367 with 5.0m width, 3.5m height; Km7+929 with 6.5m width, 4.5m height	
3	PKG2	Km9+361		- Cross the exiting residential road at Km9+361	- Affecting the local traffic. - Traffic safety issue.	Design underpass bridge at Km9+361 with 14.0m length	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on province road No. 605, PR No. 609 and install fence as appropriate at bridge Km9+620, Km13+540, Km9+361. - Direct traffic flow when required for flyover bridge Km9+620, Km13+540 - Pile driving late at night and early morning is not allowed at bridges: Km9+620, Km13+540.
		Km 9+620		- Cross provincial road No. 605 - The flyover bridge located next to households along the PR No. 605	- Disturb transportation on province road No. 605 during construction. - Increase noise level and air pollution on the routes during construction and operation.	Design flyover bridge	
		Km12+255		- Cross the exiting residential road at Km12+255	- Affecting the local traffic. - Traffic safety issue.	Design underpass bridge at Km12+255 with 11.0m length	
		Km13+031		- Cross the exiting residential road at Km13+031	- Affecting the local traffic. - Traffic safety issue.	Design underpass bridge at Km13+031 with 24.0m length	







	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
4		Km13+540		<ul style="list-style-type: none"> - Cross provincial road No. 609 - The flyover bridge located next to households along the PR No. 609 	<ul style="list-style-type: none"> - Disturb transportation on province road No. 605 during construction. - Increase noise level and air pollution on the routes during construction and operation. 	Design bridge with 22.0m length	
		Km14+269		<ul style="list-style-type: none"> - Cross the exiting residential road at Km14+269 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation. 	Design underpass bridge with 28.0m length	
		Km8+741; Km9+030; Km15+782; Km16+200; Km16+801		<ul style="list-style-type: none"> - Cross the exiting residential road at Km8+741; Km9+030; Km15+782; Km16+200; 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design underpass culvert box at Km8+741 with 5.0m width, 4.0m height; at Km9+030 with 5.0m width, 3.5m height; at Km15+782 with 5.0m width, 4.0m height; at Km16+200 with 4.0m width, 3.0m height.	
5	PKG3A	Km16+801		<ul style="list-style-type: none"> - Cut through the residential road of Ky Long hamlet 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation. 	Design the culvert box with 5.0m width and 3.5m height	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Pile driving late at night and early morning is not allowed
6	PKG3B	Km19+040		<ul style="list-style-type: none"> - Cross provincial road No. 610B (left dyke of Ba Ren river) - Cut through the residential area and agriculture land 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation. - Affecting soil quality. 	Design the bridge Km19+040 with 653m length	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Build temporary dyke to prevent wastewater and bentonite from running into agricultural land - Place warning signs and signboards on province road No.

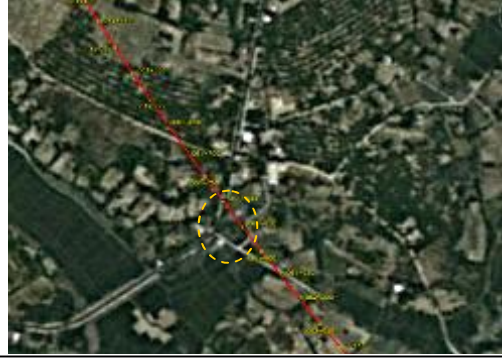


	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
7		Km20+203		- Cross provincial road No. 610B (right dyke of Ba Ren river) at Km20+400	- Affecting the local traffic. - Traffic safety issue	Design the bridge Km20+203 with 446m length	610B, PR No. 610 and install fence as appropriate at bridge Km19+040 and Km20+203 - Direct traffic flow when required - Pile driving late at night and early morning is not allowed at bridge Km19+040
		Km19+572; Km19+734		- Cross the exiting residential road at Km19+572 and Km19+734	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation.	Design underpass culvert box at Km19+572 with 6.5m width, 4.5m height; at Km19+734 with 4.0m width, 3.0m height.	
		Km20+735		- Cross the exiting residential road	- Affecting the local traffic. - Traffic safety issue	Design flyover bridge	
8	PKG4	Km24+229		- Cross communal road in Duy Xuyen commune	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation.	Design flyover bridge at Km24+229	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate at bridges and underpass culvert box - Pile driving late at night and early morning is not allowed at bridge Km24+229, Km24+790, Km28+909
9		Km28+909		- Cross communal road in Duy Trung commune	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation.	Design bridge at Km28+909	






	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km23+935; Km24+790; Km25+373; Km26+520; Km26+820		- Cross the exiting residential road	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation.	Design underpass bridge at Km23+935 with 36.0m length, at Km25+373 with 19.0m length, at Km28+909 with 11.0m length and flyover bridge at Km24+790, Km26+520, Km26+820	
		Km21+620; Km22+252; Km23+243; Km23+547; Km26+003; Km27+660; Km28+080; Km30+277; Km31+278; Km32+070; Km32+430		- Cross the exiting residential road	- Affecting the local traffic. - Traffic safety issue.	Design underpass culvert box at Km21+620, Km22+252, Km23+243, Km30+277, Km32+070 with 5.0m width, 3.5m height; at Km23+547, Km27+660, Km28+080, Km31+278 with 3.0m width, 3.0m height; at Km26+003 with 4.0m width, 3.0m height; at Km32+430 with 6.5m width, 4.5m height	
10	PKG5	Km35+488		Cross province road No. 611	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km35+488 with 19m length	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate
11		Km41+235		Cross National Highway No. 14E	- Affecting the local traffic. - Traffic safety issue.	Design Ha Lam interchange, including the bridge Km41+235 with 24.0m length	
		Km35+094; Km37+619; Km38+920; Km39+864;		Cross the exiting residential roads	- Affecting the local traffic. - Traffic safety issue.	Design underpass culvert box at Km35+094 with 3.0m width, 3.0m height; at Km37+619 with 5.0m width, 3.5m height; at Km38+920 with 6.5m width, 4.5m height; at Km39+864 with 3.0m width, 3.0m height	



	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
	PKG6	Km42+189		Cross the exiting residential road	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km42+189 with 24.0m length	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate
		Km42+724		Cross the exiting residential road	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km42+724 with 21.0m length	
		Km43+656		Cross the exiting residential road	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km43+656 with 24.0m length	
		Km45+540		Cross the exiting residential road	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km45+540 with 24.0m length	
12		Km46+174		Cross communal road of Binh Chanh commune	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km46+170 with 19m length	
		Km47+136		Cross the exiting residential road	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km45+540 with 19.0m length	


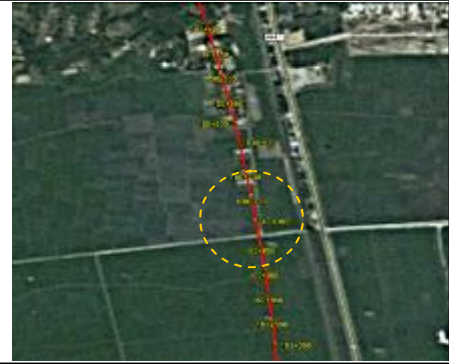



	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km51+269	 	Cross the exiting residential road	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design bridge Km51+269 with 21.0m length	
		Km42+400; Km43+312; Km44+175; Km44+740; Km45+260; Km46+440; Km47+586; Km48+767; Km49+040; Km49+399; Km50+413; Km50+718; Km51+121; Km51+577		Cross the exiting residential road	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design underpass culvert box at Km42+400, Km45+260, Km47+586, Km50+718 and Km51+121 with 4.0m width, 3.0m height; at Km43+312 and Km44+175 with 3.0m width, 3.0m height; at Km44+740, Km46+440 and Km51+577 with 4.0m width, 3.5m height; at Km48+767 with 4.0m width, 4.0m height; at Km49+040 with 5.5m width, 4.0m height; at Km49+399 and Km50+413 with 5.0m width, 3.5m height	
	PKG7	Km54+346		Cross the exiting residential road	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design bridge Km54+346 with 21.0m length	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Collect and treat construction wastewater before discharge at bridge Km57+496
		Km56+515	 	Cross the exiting residential road	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design bridge Km56+515 with 18.0m length	<ul style="list-style-type: none"> - Pile driving late at night and early morning is not allowed at bridges Km57+296 and Km63+787






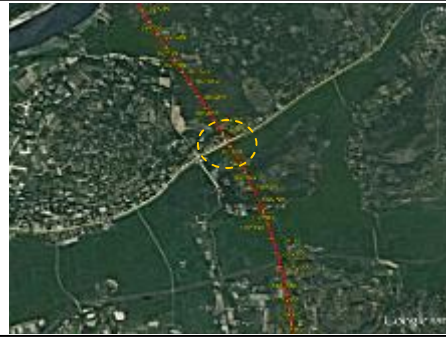
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km57+296	 	Cross the exiting residential road	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design bridge Km57+296 with 6.5m length	
13		Km57+496	 	Crossing Province Road No. 615 and irrigation ditch	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	- Design bridge Km57+496 with 40.0m length	
14		Km59+297		Cross local road of Trung Dinh hamlet	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design bridge Km59+297 with 18.0m length	
15		Km60+032		Cross Tran Phu road at Xuan Trung hamlets of Tam Dan Commune	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	- Design underpass bridge at Km60+032 with 9.0m length	

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km61+794					
16		Km63+787		Cross Province Road No. 616	<ul style="list-style-type: none"> - Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dust pollution on the route during construction and operation. 	- Design bridge Km63+787 with 33.0m length	
		Km52+018; Km52+610; Km52+990; Km53+358; Km53+742; Km54+798; Km55+058; Km55+482; Km55+980; Km57+866; Km58+747; Km62+735; Km62+959; Km63+670; Km64+620		Cross the exiting residential road	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design underpass culvert box at Km52+018, Km52+610, Km52+990, Km53+358, Km53+742, Km55+482, Km55+980 with 5.0m width, 3.5m height; at Km54+798, Km55+058, Km57+866 and Km58+747 with 4.0m width, 3.0m height; at Km62+735 with 3.0m width, 3.0m height; at Km62+959 and Km64+620 with 6.5m width, 4.5m height; at Km63+670 with 6.5m width, 5.5m height.	
17	PKGA1	Km66+463		- Cross asphalt road to Phu Ninh reservoir.	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design flyover bridge at Km66+463	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Collect and treat construction wastewater before discharge - Install of signage at construction sites near the school at culvert Km69+308. - Install fence to separate the





	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km69+308	 	<ul style="list-style-type: none"> - Cross concrete road linking Tam Ky city to Phu Ninh reservoir. - Ly Tu Trong primary school, Tam Ngoc commune, Tam Ky city is 50m from the alignment 	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. - Safety for students during construction. - Noise level increases at school. - Obstruct access to school of students. 	Design culvert box with 5.0m width and 3.5m height	school from construction area at culvert Km69+308.
		Km77+020	 	Cross the exiting residential road	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design flyover bridge at Km77+020	
		Km65+493; Km65+896; Km66+812; Km67+620; Km68+072; Km68+684; Km69+308; Km69+614; Km70+420; Km70+757; Km72+027; Km72+803; Km73+336; Km74+057; Km78+041; Km78+640		Cross the exiting residential road	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. 	Design underpass culvert box at Km65+493, Km68+684m Km69+614, Km72+027 and Km78+640 with 3.0m width, 3.0m height; at Km67+620, Km68+072, Km69+308 and Km73+366 with 5.0m width, 3.5m height; at Km72+803, Km74+057 and Km78+041 with 4.0m width, 3.5m height; at Km66+812 with 4.0m width, 3.0m height; at Km70+420 with 6.5m width, 4.5m height; at Km70+757 with 5.0m width, 4.5m height	
20	PKG A2	Km 81+360		Cross communal road and irrigation ditch of Xuan Ngoc hamlet 2, Tam Anh Bac Commune	<ul style="list-style-type: none"> - Affecting the local traffic. - Traffic safety issue. - Affect water quality in the irrigation ditch 	<ul style="list-style-type: none"> - Design underpass the Bridge Km81+360 with 40m length 	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Collect and treat construction wastewater before discharge at bridge Km81+360

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
21		Km83+129		Cross small road of Thai Xuan hamlet	- Affecting the local traffic. - Traffic safety issue.	- Design underpass culvert box at Km83+129 with 5m width, 3.5m length and access road	
22		Km85+735		- Cross Province Road No. 617. - No households nearby.	- Affecting the local traffic. - Traffic safety issue.	Design underpass bridge Km85+735 with 27.0m length	
23		Km 87+615		Cross residential road of Thai Xuan village	- Affecting the local traffic. - Traffic safety issue.	- Design underpass culvert box Km87+615	
24		Km89+180		Cross communal road. No resettlement required	- Affecting the local traffic. - Traffic safety issue.	- Design flyover bridge Km89+180	






	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km80+090; Km81+950; Km84+308; Km85+390; Km86+240; Km86+808; Km88+377; Km89+501; Km90+269; Km91+002; Km91+394; Km92+218; Km92+617; Km93+041; Km93+591; Km94+617; Km95+413; Km95+827; Km96+507; Km97+455; Km97+849; Km98+622		Cross communal road. No resettlement required	- Affecting the local traffic. - Traffic safety issue.	Design underpass culvert box at Km81+950, Km84+308, Km86+240, Km88+377 and Km97+849 with 4.0m width, 3.0m height; at Km80+090, Km92+218 and Km94+617 with 4.0m width, 3.5m height; at Km89+501, Km90+269, Km93+591, Km95+827, Km96+507, Km97+455 and Km98+622 with 5.0m width, 3.5m height; at Km85+390, Km91+002, Km91+394, Km92+617, Km93+04, and Km95+413 with 3.0m width, 3.0m height; at Km86+808 with 6.5m width, 4.5m height	
	PKG A3	Km99+544		- Cross communal roads.	- Affect traffic during construction and operation. - Traffic safety issue.	Design underpass bridge at Km99+544 with 14.0m length	
		Km100+845	 	- Cross communal roads.	- Affect traffic during construction and operation. - Traffic safety issue.	Design underpass bridge at Km100+845 with 20m length	
		Km102+894	 	- Cross communal roads.	- Affect traffic during construction and operation. - Traffic safety issue.	Design underpass bridge at Km102+894 with 10.0m length	

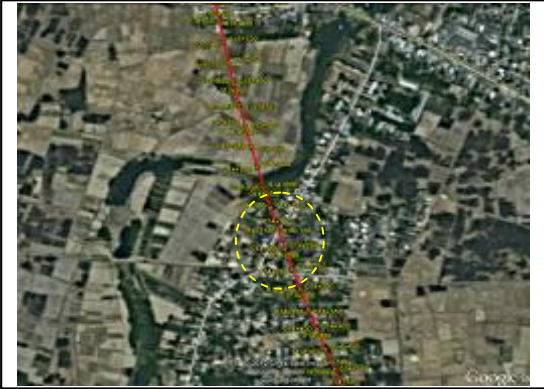



	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km104+889		- Cross communal roads.	- Affect traffic during construction and operation. - Traffic safety issue.	Design underpass bridge at Km104+889 with 33.0m length	
25		Km106+368		- Cross communal roads.	- Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dust pollution on the route during construction.	Design underpass bridge at Km106+368 with 12.0m length	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Collect and treat construction wastewater before discharge at bridge Km109+450
		Km108+102	 	- Cross communal roads. - Households nearby	- Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dust pollution on the route during construction.	Design underpass bridge at Km108+102 with 12.0m length	- Arrange transportation and storage of materials in ways that do not affect dike safety at bridge Km109+450. - Do not let construction machines, trucks run on the dike at bridge Km109+450.
26		Km109+810	 	Cross road of left Tra Bong dyke	- Affecting the local traffic. - Traffic safety issue. - Safety of dike.	- Design poles at locations in accordance with dyke safety requirements.	
		Km99+224; Km100+510; Km101+393; Km102+180; Km102+617; Km103+947; Km104+530; Km105+640; Km106+075; Km106+695; Km107+829; Km108+622; Km109+479; Km110+070		- Cross communal roads.	- Affect traffic during construction and operation. - Traffic safety issue.	Design underpass culvert box at Km100+510, Km104+530 with 3.0m width, 3.0m height; at Km99+224, Km102+180, Km103+947, Km106+075 and Km110+070 with 4.0m width, 3.0m height; at	



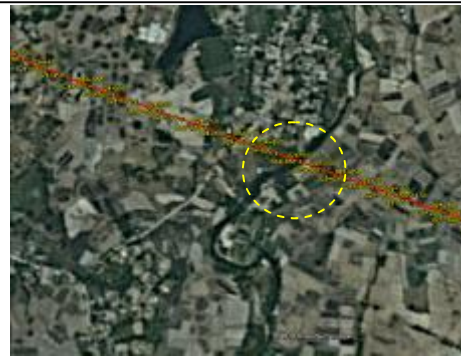

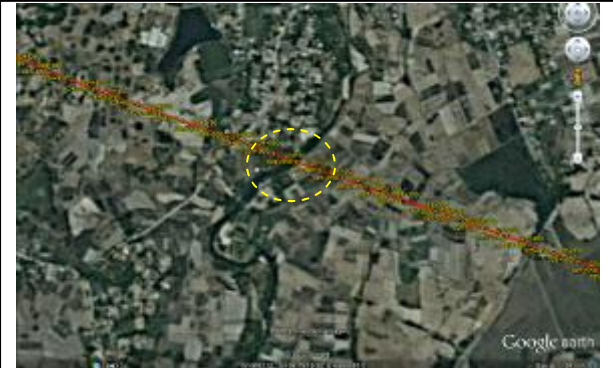
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
						Km101+393, Km102+617, Km105+640, Km106+695, Km107+829, Km108+622 and Km109+479 with 5.0m width, 3.5m height.	
27	PKG A4	Km111+400		- Cross communal roads.	- Affecting the local traffic. - Traffic safety issue.	Design flyover bridge at Km111+720	<ul style="list-style-type: none"> - Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Pile driving late at night and early morning is not allowed at bridge Km124+120
		Km116+570	 	- Cross communal roads.	- Affecting the local traffic. - Traffic safety issue.	Design flyover bridge at Km116+570	
28		Km119+170		Cross province roads No. 622C	- Affecting the local traffic. - Traffic safety issue.	Design flyover bridge Km119+170	
29		Km124+120	 	Cross province roads No. 623 The Households and primary school Son Tinh No. 1 nearby	- Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dust pollution on the route during construction.		

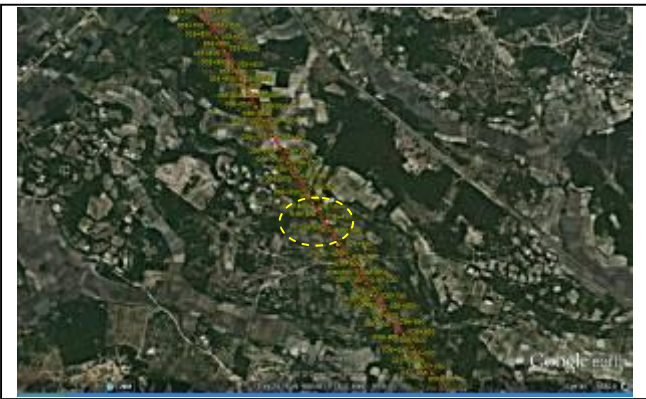

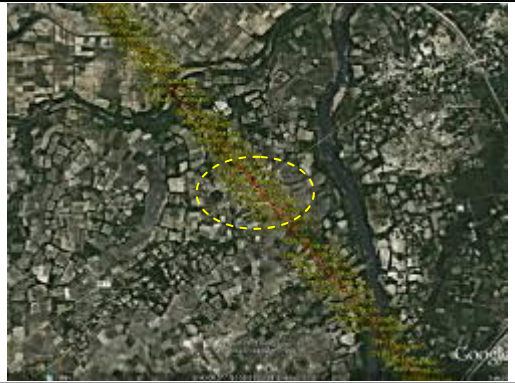

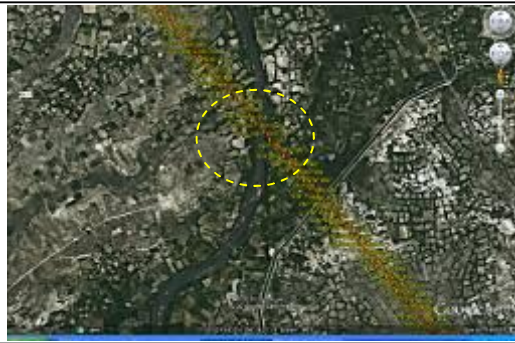


	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km114+407; Km117+900; Km120+020; Km120+530; Km121+489; Km122+236		- Cross communal roads.	- Affecting the local traffic. - Traffic safety issue.	Design underpass culvert box at Km117+900, Km120+020, Km121+489 and Km122+236 with 5.0m width, 3.5m height; at Km114+407, Km120+530 with 4.0m width, 3.0m height	
30	PKG A5	Km128+615		- Cross PR No.623B asphalt road. - Households nearby	- Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dusts during construction and operation.	Design underpass bridge Km128+615 with 21.0m length	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Inform construction schedule to local railway management unit for bridge Km134+970 - Connect the signal line to cut railway, road at bridge Km134+970
		KM129+726		- Cross communal roads.	- Affecting the local traffic. - Traffic safety issue.	Design underpass bridge at Km129+726 with 28.0m length	
31		Km134+970		Cross North – South railway	- Affect the operation of the railway during construction. - Safe on railway during construction phase of the expressway.	- Design underpass bridge Km134+970 with 460m length	
32		Km139+480		Cross National Highway No. 1A	- Affect traffic on National Highway No. 1A . - Traffic safety issue.	- Optimise design to minimize land acquisition	


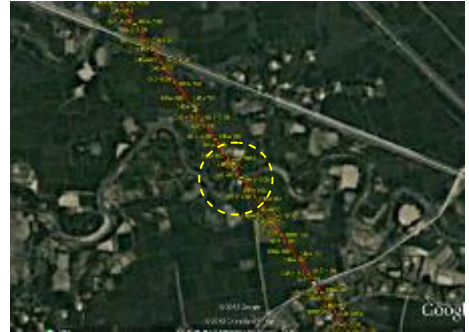

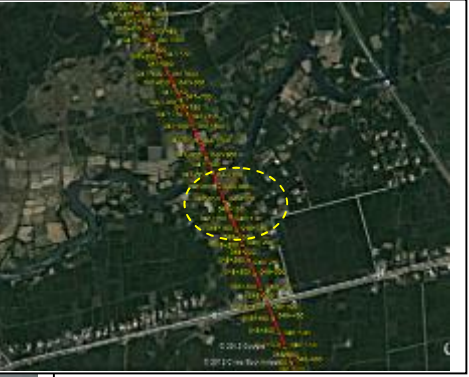


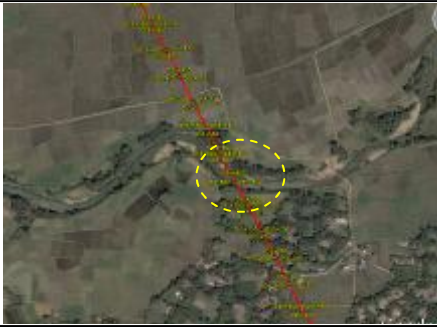
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km126+045; Km128+168; Km130+760		- Cross communal roads.	- Affecting the local traffic. - Traffic safety issue.	Design underpass culvert box at Km126+045 and Km128+168 with 4.0m width, 3.0m height; at Km130+760 with 6.5m width, 4.5m height	
II Rivers, streams crossed by the planned Expressway							
1	PKG1	Km 1+615	 	- Cross Tuy Loan river	- Modification of river's wet cross section that may cause localized erosion, sedimentation and/or affect flood discharge capacity of the river. - Affect waterway transportation. - Water pollution caused by construction.	- Design bridge with: 188.3m length, span arrangement 4x40m. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into agriculture land and water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards
2		Km2+510	 	- Cross Yen river	- Modification of river's wet cross section that may cause localized erosion, sedimentation and/or affect flood discharge capacity of the river. - Affect waterway transportation. - Water pollution caused by construction.	- Design bridge with: 249.8m length, span arrangement 7x33m. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction for bridges: Tuy Loan (Km1+615), Yen (Km2+510). - Place and maintain warning sign, signboards and lights at construction are on the river for bridges: Tuy Loan (Km1+615), Yen (Km2+510).
		Km5+640	 	- Cross the river	- Modification of river's wet cross section that may cause localized erosion, sedimentation and/or affect flood discharge capacity of the river. - Water pollution caused by construction.	- Design bridge with: 60m length. + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	


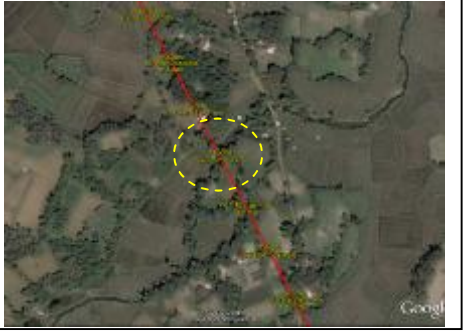





	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
3	PKG2	Km9+852	 	Cross La Tho river.	<ul style="list-style-type: none"> - Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect waterway transportation. - Affect water quality during construction. 	<ul style="list-style-type: none"> - Design bridge with: 176m length, span arrangement 5x33m. + Adequate vertical clearance for boat crossing. + Ensure adequate river cross-section for flood discharge. + Include measures to protect the locations where erosion potentials increase. 	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into agriculture land and water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards. - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction. - Place and maintain warning sign, signboards and lights at construction are on the river. - Washing of construction materials directly in rivers is forbidden.
		Km10+882		Cross branch of La Tho river.	<ul style="list-style-type: none"> - Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect waterway transportation. - Affect water quality during construction. 	<ul style="list-style-type: none"> - Design bridge with: 134m length, span arrangement 3x40m. + Adequate vertical clearance for boat crossing. + Ensure adequate river cross-section for flood discharge. + Include measures to protect the locations where erosion potentials increase. 	
		Km11+904		Cross the river at Km11+904.	<ul style="list-style-type: none"> - Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect water quality during construction. 	<ul style="list-style-type: none"> - Design bridge with: 90m length. + Ensure adequate river cross-section for flood discharge. + Include measures to protect the locations where erosion potentials increase. 	
		Km12+639		Cross the river at Km12+639.	<ul style="list-style-type: none"> - Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect water quality during construction. 	<ul style="list-style-type: none"> - Design bridge with: 90m length. + Ensure adequate river cross-section for flood discharge. + Include measures to protect the locations where erosion potentials increase. 	








	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km14+026		Cross the Phong Thu river.	<ul style="list-style-type: none"> - Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect water quality during construction. 	<ul style="list-style-type: none"> - Design bridge with: 97m length. + Ensure adequate river cross-section for flood discharge. + Include measures to protect the locations where erosion potentials increase. 	
	PKG 3A	Km17+495	 	Cross Thu Bon river, located between Dien Tho and Dien Quang Communes.	<ul style="list-style-type: none"> - Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect water quality during construction. - Environmental hazard during the operation such as oil trucks turn over on the bridge during operation phase. 	<ul style="list-style-type: none"> - Design bridge with: 1,030m length. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase + Strong handrails, barriers to prevent vehicles from falling into the river 	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards. - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction. - Place and maintain warning sign, signboards and lights at construction are on the river. - Washing of construction materials directly in rivers is forbidden.
	PKG 3B	Km20+203		Cross Ba Ren river (Chiem Son bridge)	<ul style="list-style-type: none"> - Affect waterway transport, increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction. Environmental hazard during the operation such as oil trucks turn over on the bridge during operation phase 	<ul style="list-style-type: none"> - Design bridge with: 446m length. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase + Strong handrails, barriers to prevent vehicles from falling into the river 	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction


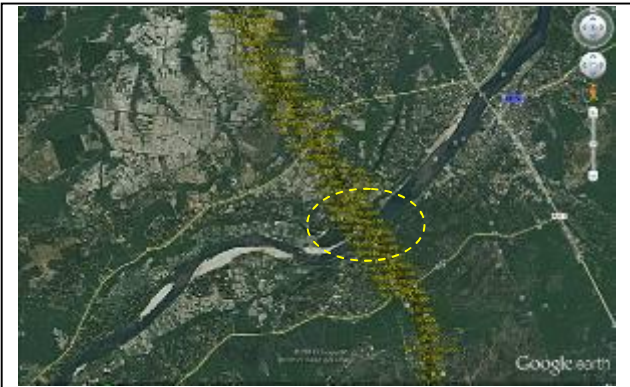


	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
							<p>sites by fences and signboards.</p> <ul style="list-style-type: none"> - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction. - Place and maintain warning sign, signboards and lights at construction are on the river. - Washing of construction materials directly in rivers is forbidden.
	PKG 4	Km23+395		Cross the Duy Loc river at Km23+395	<ul style="list-style-type: none"> - Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction. 	<ul style="list-style-type: none"> - Design bridge with: 70.0m length. + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Washing of construction materials directly in rivers is forbidden.
		Km24+918	 	Cross the Duy Son river at Km24+918	<ul style="list-style-type: none"> - Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction. 	<ul style="list-style-type: none"> - Design bridge with: 60.0m length. + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	
		Km29+555		Cross Dao Lao river	<ul style="list-style-type: none"> - Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction. 	<ul style="list-style-type: none"> - Design bridge with: 88.9m length, span arrangement 3x27m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	









	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
	PKG 5	Km36+427		Cross the stream at Km36+427	- Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction.	- Design bridge with: 49.7m length. + Ensure adequate river cross-section for flood discharge. + Include measures to protect the locations where erosion potentials increase.	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs.
		Km38+377	 	Cross the North branch of Ly Ly river	- Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction.	- Design bridge with: 170m length, span arrangement 4x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Washing of construction materials directly in rivers is forbidden.
		Km39+642	 	Cross the South branch of Ly Ly river	-Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction.	- Design bridge with: 330m length, span arrangement 7x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	
	PKG 6	Km44+435	 	Cross the Cat river	-Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 88.4m length, span arrangement 3x27m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs at the bridge Km44+435, Km47+925.



	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km45+889	 	Cross the stream at Km45+889	<ul style="list-style-type: none"> - Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction 	<ul style="list-style-type: none"> - Design bridge with: 50.0m length. + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	<ul style="list-style-type: none"> - Washing of construction materials directly in rivers is forbidden.
		Km47+925	 	Cross the Phu Xuan river	<ul style="list-style-type: none"> - Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction 	<ul style="list-style-type: none"> - Design bridge with: 164m length, span arrangement 5x30m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	
	PKG 7	Km54+915		Cross the stream at Km54+915	<ul style="list-style-type: none"> - Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction 	<ul style="list-style-type: none"> - Design bridge with: 40m length. + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river and agriculture land. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs.
		Km55+621	 	Cross Nha Ngo river	<ul style="list-style-type: none"> - Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction 	<ul style="list-style-type: none"> - Design bridge with: 191m length, span arrangement 5x33m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	<ul style="list-style-type: none"> - Washing of construction materials directly in rivers is forbidden.




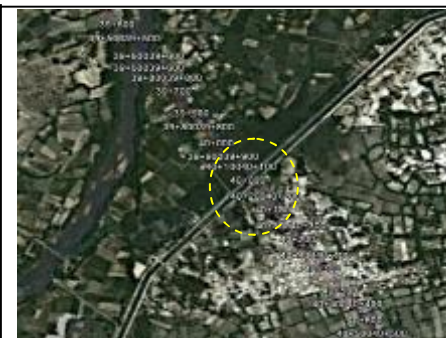


	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km57+087	 	Cross the stream at Km57+087	- Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 27.0m length. + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	
		Km58+235	 	Cross the stream at Km58+235	- Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 160m length, span arrangement 5x30m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	
		Km62+477		Cross a small stream of Tam Thái Commune.	- Affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 33m length, span arrangement 1x24m	
	PKG A1	Km68+461	 	Cross Tam Ky River	- Affect stability of river bed and river bank May affect flood drainage capacity. - Quality of water as source of drinking water for Tam Ky town may be affected during construction and operation	- Design bridge with: 360m length, span arrangement 9x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase + Wastewater collection system to prevent pollution of drinking water source in case of accident	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river and agriculture land. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Washing of construction

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km 75+189	 	Cross a river of Tam Xuan 2 and Tam Anh Bac Communes	<ul style="list-style-type: none"> - Affect water quality during construction. - Affect river capacity to drain flood water. 	<ul style="list-style-type: none"> - Design bridge with: 70.0m length, span arrangement 2x35m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	materials directly in rivers is forbidden.
	PKG A2	Km87+708	 	Cross river at Km87+708	<ul style="list-style-type: none"> - Affect water quality during construction. - Affect river capacity to drain flood water. 	<ul style="list-style-type: none"> - Design bridge with: 35m length, span arrangement 1x35m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	<ul style="list-style-type: none"> - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river and agriculture land. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Washing of construction materials directly in rivers is forbidden.
		Km87+989		Cross stream at Km87+989	<ul style="list-style-type: none"> - Affect river flood discharge flow. - Affect water quality during construction 	<ul style="list-style-type: none"> - Design bridge with: 132m length, span arrangement 4x33m 	
	PKG A3	Km101+451	 				




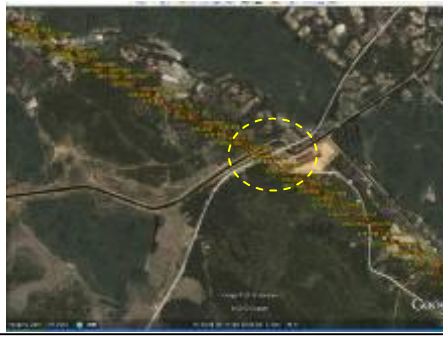


	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km109+001.8	 	Cross Tra Bong river at Tien Dao hamlet, Binh Trung Commune	<ul style="list-style-type: none"> - Affect waterway transport, increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction. Environmental hazard during the operation such as oil trucks turn over on the bridge during operation phase 	<ul style="list-style-type: none"> - Design bridge with: 455m length, span arrangement 11x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards. - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction. - Place and maintain warning sign, signboards and lights at construction are on the river. - Washing of construction materials directly in rivers is forbidden.
	PKG A5	Km124+900-Km125+700 and Km126+530 – Km127+210 and Km127+620 – Km127+900	 	Cross Tra Khuc river -	<ul style="list-style-type: none"> Affect river bank stability and draining of flood flow. Affect water quality as source of drinking water during construction. Affect water quality for the town of Chau O. Environmental accidents during the operation. 	<ul style="list-style-type: none"> - Design bridge with: 800m length from Km124+900 – Km125+700 and bridge with 680m length from Km126+530 – Km127+210 and bridge with 280m length from Km127+620 – Km127+900 + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase 	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river and agriculture land. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards. - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction. - Place and maintain warning sign, signboards and lights at construction are on the river. - Washing of construction materials directly in rivers is forbidden.

	Package	Location	Photo of the site		Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
III	Irrigation canals and ditches crossed by the planned Expressway							
	PKG 1	Km2+951 , Km3+515, Km4+930			Cross irrigation canal at Km2+951, Km3+515 and Km4+930.	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation.	Design the culvert box with 2.0x2.0m at Km2+951 ; 2(2.0x1.5)m at Km3+515 and 2(1.5x1.5)m at Km4+930.	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
	PKG 2	Km8+741			Cross irrigation canal (N2) at Km8+741.	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation.	Design the culvert box with 1.5x1.5m at Km8+741.	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km10+773			Cross irrigation canal (N2) at Km10+773.	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 1.5x1.5m at Km8+741.	
		Km11+280			Cross irrigation canal (N1) at Km11+280	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 2.0x1.5m at Km11+280	


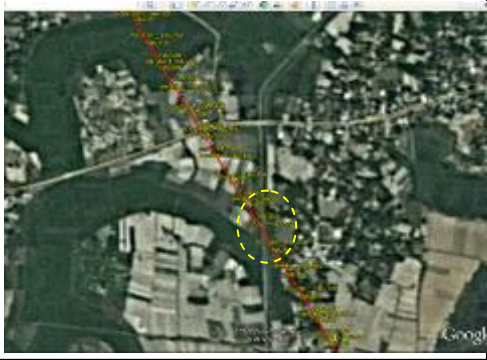

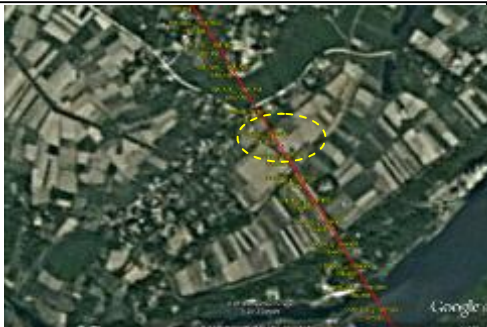

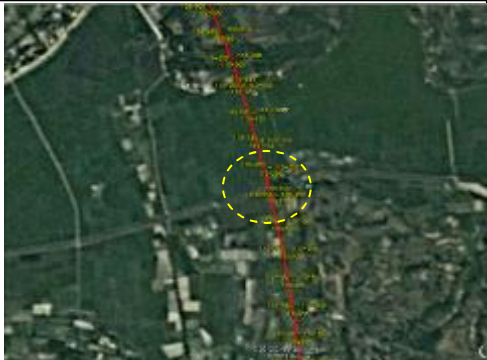


	Package	Location	Photo of the site		Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km13+205	 		Cross irrigation canal (N3) at Km13+031	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 2.0x1.5m at Km13+031	
		Km14+269	 		Cross irrigation canal (N3) and road residence at Km14+269	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge with 21m at Km14+269	
	PKG 4	Km21+847	 		Cross Vinh Trinh irrigation canal at Km2+847	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km2+847 with 28m length.	<ul style="list-style-type: none">- Inform local authorities and local community about construction schedule.- Collect waste and dump at approved place.- Washing of construction materials directly in canal is forbidden.- Select the time of construction does not coincide with peak irrigation demand.- Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km29+146	 		Cross irrigation canal at Km29+146	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 2.0x2.0m.	








	Package	Location	Photo of the site		Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
	PKG 5	Km34+149			Cross irrigation canal at Km34+149	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km34+150 with 33m.	<ul style="list-style-type: none">- Inform local authorities and local community about construction schedule.- Collect waste and dump at approved place.- Washing of construction materials directly in canal is forbidden.- Select the time of construction does not coincide with peak irrigation demand.- Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km40+110			Cross Phu Ninh irrigation canal at Km40+110	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km40+111 with 33m.	
	PKG 6	Km42+189			Cross N20 irrigation canal at Km42+189	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km42+189 with 24m.	<ul style="list-style-type: none">- Inform local authorities and local community about construction schedule.- Collect waste and dump at approved place.- Washing of construction materials directly in canal is forbidden.- Select the time of construction does not coincide with peak irrigation demand.- Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km43+656			Cross N18 irrigation canal at Km43+656	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km43+656 with 24m.	





	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km45+540	 	Cross N16 irrigation canal at Km45+540	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km45+540 with 24m.	
		Km48+394	 	Cross irrigation canal N14	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km45+540 with 27m.	
	PKG 7	Km52+077	 	Cross irrigation canal N14A	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design culvert box with 2.0x1.5m .	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal.
		Km54+114	 	Cross irrigation canal at Km54+114	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 2(2.0x2.0)m.	Provide temporary trench to maintain continuity of irrigation during construction.




	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km61+794		Cross irrigation canal (N6)	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge with 21.0m	
		Km63+670		Cross irrigation canal at Km63+670	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box	
	PKG A1	Km70+374	 	Cross irrigation canal at Km70+374	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 2(2.0x2.0)m.	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal.
		Km71+160	 	Cross irrigation canal (N2)	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km71+160 with 24.0m length and bypass canal	Provide temporary trench to maintain continuity of irrigation during construction.




	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km73+336		Cross irrigation canal (N2-6)	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design culvert box with (5.0x3.5)m	
		Km74+264		Cross irrigation canal (N2)	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km74+264 with span arrangement 1x24m	
	PKG A2	Km82+146 and Km82+494		Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design culvert box at Km82+146 and Km82+494 with 3(2.0x1.5)m and 3(3.0x2.5)m	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
	PKG A3	Km101+826		Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design bridge with 19.0m length, span arrangement 1x19m	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to




	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km106+611	 	Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design culvert box with 6.5x5.0m	maintain continuity of irrigation during construction.
		Km108+685	 	Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design culvert box with 2(2.0x2.0)m	
	PKG A4	Km110+253	 	Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design culvert box with 1(3.0x1.5)m	<ul style="list-style-type: none"> - Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km118+050	 	Cross Thach Nham irrigation canal	Interrupt water supply for irrigation during construction and operation. Affect water quality due to pollution from construction activities.	- Design bridge Km118+050 with 43.0m length, span arrangement 1x35m	

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
	PKG A5	Km133+380	 	Cross irrigation canal	Interrupt water supply for irrigation during construction and operation. Affect water quality due to pollution from construction activities.	- Design culvert box with 1(3.0x2.0)m	<ul style="list-style-type: none">- Inform local authorities and local community about construction schedule.- Collect waste and dump at approved place.- Washing of construction materials directly in canal is forbidden.- Select the time of construction does not coincide with peak irrigation demand.- Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
			 	Cross irrigation canal	Interrupt water supply for irrigation during construction and operation. Affect water quality due to pollution from construction activities.	- Design bridge Km138+283 with 48.0m length, span arrangement 1x40m	
IV	The alignment cross residential area						
1	PKG 1	Km0+120- Km0+220 Km0+320-Km0+760 Km3+000 – Km3+080 Km5+500 – Km5+740 Km7+380 – Km7+460	 	- Cross the households	<ul style="list-style-type: none">- Impact on the lives and incomes of affected households.- fragmentation of community- Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	<ul style="list-style-type: none">- Implement communication campaign to local people on the project and its benefits to the country- Provide compensation at reasonable cost.- Project owner Implement compensation and support the relocated households to stabilize their lives.- Spraying water periodically during the construction period.
	PKG 2	Km9+100 – Km9+600 Km10+700 – Km10+850 Km13+620 – Km13+750 Km14+060 – Km14+560		- Cross the residential area	<ul style="list-style-type: none">- Impact on the lives and incomes of affected households.- fragmentation of community- Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	<ul style="list-style-type: none">- Implement communication campaign to local people on the project and its benefits to the country- Provide compensation at reasonable cost.- Project owner Implement compensation and support the relocated households to stabilize their lives.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
	PKG 3A	Km16+760 – Km16+940 Km18+000 – Km18+080		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG 3B	Km19+100 – Km19+290 Km19+490 – Km19+600		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG 4	Km23+480 – Km23+540 Km24+000 – Km24+300 Km24+800 – Km24+850 Km28+850 – Km29+150		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG 5	Km35+460 – Km35+540 Km41+180 – Km41+720		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
	PKG 6	Km42+120 – Km42+180 Km42+620 – Km43+040 Km44+880 – Km45+240 Km46+180 – Km46+380 Km47+080 – Km47+180 Km47+400 – Km47+500 Km48+340 – Km48+400 Km48+640 – Km48+750 Km49+040 – Km49+300 Km50+300 – Km51+100		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG 7	Km53+160 – Km53+320 Km53+620 – Km53+740 Km54+040 – Km54+160 Km55+760 – Km56+080 Km56+500 – Km56+900 Km57+000 – Km57+280 Km57+500 – Km57+550 Km59+620 – Km60+250 Km61+700 – Km61+960 Km62+500 – Km62+750 Km63+240 – Km63+380 Km63+600 – Km65+000		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG A1	Km69+560 – Km69+740 Km71+040 – Km71+300 Km72+500 – Km72+800		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG A2	Km81+260 – Km81+400 Km84+660 – Km85+100 Km85+400 – Km85+800 Km87+500 – Km87+700 Km89+100 – Km89+860 Km93+380 – Km93+700		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
	PKG A3	Km100+400-Km100+800 Km105+580-Km106+070 Km106+650-Km106+900 Km107+650-Km107+830 Km108+070-Km108+600 Km109+460-Km110+100		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG A4	Km114+300-Km114+820 Km116+420-Km116+510 Km116+720-Km116+840 Km119+920-Km120+180 Km121+540-Km121+780 Km122+160-Km122+260 Km123+840-Km124+140		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG A5	Km124+900-Km125+000 Km125+740-Km126+060 Km127+960-Km128+820 Km130660 - Km130+820 Km131+440-Km132+220 Km133+620-Km133+980 Km136+060-Km136+140		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
V	Grave yards crossed by the planned Expressway						
	PKG 1	Km0+120- Km0+220 Km0+320-Km1+160 Km7+800 – Km8+000		Route cut through the graves	Impacts on spiritual life of local people when graves have to be moved.	PMU in coordination with local authorities to allocate land for grave relocation and associated worshipping procedures	- Implement communication campaigns to inform local people about the project and its benefits to the country - Provide compensation at reasonable cost.
	PKG 2	Km9+160-Km9+200 Km9+760 – Km9+800 Km10+700		Route cut through the graves.			
	PKG 3B	Km20+730		Route cut through the graves.			

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
	PKG 4	Km21+280 - Km21+950 Km23+420 – Km23+500 Km24+100 – Km24+300 Km24+550 – Km24+850 Km25+300 – Km25+400 Km25+700 – Km25+900 Km27+000 – Km27+240 Km27+650 – Km28+850 Km29+060 – Km29+800 Km30+040 – Km30+600 Km31+000 – Km31+500 Km32+000 – Km32+380		Route cut through the graves and cemetery			
	PKG 5	Km36+480 – Km36+800 Km37+740 – Km37+840 Km38+700 – Km39+150 Km40+100 – Km40+600		Route cut through the graves.	Impacts on spiritual life of local people when graves have to be moved.	PMU in coordination with local authorities to allocate land for grave relocation and associated worshipping procedures	- Implement communication campaigns to inform local people about the project and its benefits to the country - Provide compensation at reasonable cost.
	PKG 6	Km43+700 – Km43+780 Km46+200 – Km46+400 Km47+000 – Km47+100 Km50+000 – Km50+600 Km50+800 – Km51+100		Route cut through the graves.			
	PKG 7	Km52+000 – Km52+300 Km54+500 – Km54+800 Km56+500 – Km56+800 Km57+100 – Km57+300 Km57+500 – Km57+850 Km58+750 – Km59+100 Km59+600 – Km60+800 Km61+900 – Km62+150 Km62+500 – Km62+700 Km63+200 – Km63+650 Km63+870 - Km64+150 Km64+400 – Km65+000		Route cut through the graves along alignment, cross over Nguyen family cemetery including 25 graves			
	PKG A1	Km67+700 – Km68+300 Km70+740 – Km70+820 Km73+900 – Km74+100 Km74+300 – Km74+450		Route cut through the graves along alignment			
	PKG A2	Km86+240 – Km87+700 Km88+380 – Km88+600 Km88+800 - Km89+000 Km93+200 – Km93+450 Km93+850 – Km94+200 Km94+400 – Km94+500		Route cut through the graves along alignment			

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase ³
		Km95+200 – Km95+300 Km95+750 - Km95+800 Km96+160 – Km96+240					
	PKG A3	Km105+100 –Km105+500		Route cut through the graves along alignment			
	PKG A4	Km112+980 – Km113+600 Km113+900 – Km116+000 Km116+270 – Km117+780 Km118+360 – Km118+900 Km119+200 – Km119+820 Km121+740 – Km122+200 Km123+660 – Km123+800 Km124+500 – Km124+640		Route cut through the graves along alignment			
	PKG A5	Km125+900 – Km126+000 Km127+900 – Km128+000 Km128+280 – Km128+450 Km129+460 – Km129+540 Km130+800 – Km131+100 Km132+400 – Km132+500 Km135+400 – Km135+600		Route cut through the graves along alignment			

Annex 7

Do's and Dont's of the EMP and Code of Conduct

BASIC RULES OF CONDUCT

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

NOTE: ALL new site personnel must attend environmental induction training. Induction reports, which are signed by both the Contractor and Employee to indicate that the induction has been conducted, will be maintained on site. Induction forms for all contractor employees on site will be retained on site by the Contractor.

DO:

- ♦ USE THE TOILET FACILITIES PROVIDED – REPORT DIRTY OR FULL FACILITIES
- ♦ CLEAR YOUR WORK AREAS OF LITTER AND BUILDING RUBBISH AT THE END OF EACH DAY – use the waste bins provided and ensure that litter will not blow away.
- ♦ REPORT ALL FUEL OR OIL SPILLS IMMEDIATELY & STOP THE SPILL CONTINUING.
- ♦ SMOKE IN DESIGNED AREAS ONLY AND DISPOSE OF CIGARETTES AND MATCHES CAREFULLY. (Littering is an offence.)
- ♦ CONFINE WORK AND STORAGE OF EQUIPMENT TO WITHIN THE IMMEDIATE WORK AREA.
- ♦ USE ALL SAFETY EQUIPMENT AND COMPLY WITH ALL SAFETY PROCEDURES.
- ♦ PREVENT CONTAMINATION OR POLLUTION OF STREAMS AND CHANNELS.
- ♦ ENSURE A WORKING FIRE EXTINGUISHER IS IMMEDIATELY AT HAND IF ANY “HOT WORK” IS UNDERTAKEN e.g. welding, grinding, gas cutting etc.
- ♦ REPORT ANY INJURY OF WORKER OR ANIMAL.
- ♦ DRIVE ON DESIGNATED ROUTES ONLY.
- ♦ PREVENT EXCESSIVE DUST AND NOISE

DO NOT:

- ♦ REMOVE OR DAMAGE VEGETATION WITHOUT DIRECT INSTRUCTION.
- ♦ MAKE ANY FIRES.
- ♦ POACH, INJURE, TRAP, FEED OR HARM ANY ANIMALS – this includes birds, frogs, snakes, etc.
- ♦ ENTER ANY FENCED OFF OR MARKED AREA.
- ♦ ALLOW CEMENT OR CEMENT BAGS TO BLOW AROUND SPEED OR DRIVE RECKLESSLY
- ♦ ALLOW WASTE, LITTER, OILS OR FOREIGN MATERIALS INTO THE STREAM
- ♦ DISTURB ANYTHING WITH ARCHITECTURAL OR HISTORICAL VALUE
- ♦ BUY ANY WILD ANIMAL FOR FOOD
- ♦ WORK WITHOUT SAFETY EQUIPMENT
- ♦ DISPOSE TRASH IN UNAUTHORIZED PLACES
- ♦ COLLECT FIREWOOD
- ♦ BURN WASTES AND/OR CLEARED VEGETATION
- ♦ LITTER OR LEAVE FOOD LYING AROUND.

Notes: Construction and heavy machine operators must be particularly sensitive to staying within access routes and prevention of unnecessary damage. Dust and noise is also of particular concern. Ensure that vehicles and machinery do not leak fuel or oils. Refueling, maintenance, servicing or washing must be done within the designated area in the construction camp area only.

CODE OF CONDUCT

The Code of Conduct shall address the following measures (but not limited to them):

- All of the workforce shall abide by the laws and regulations of the Socialist Republic of Vietnam;
- Illegal substances, weapons and firearms shall be prohibited;
- Pornographic material and gambling shall be prohibited;
- Fighting (physical or verbal) shall be prohibited;
- Creating nuisances and disturbances in or near communities shall be prohibited;
- Disrespecting local customs and traditions shall be prohibited;
- Smoking shall only be allowed in designated areas;
- Maintenance of appropriate standards of dress and personal hygiene;
- Maintenance of appropriate standards hygiene in their accommodation quarters;

- Residing camp workforce visiting the local communities shall behave in a manner consistent with the Code of Conduct; and Failure to comply with the Code of Conduct, or the rules, regulations, and procedures implemented at the construction camp will result in disciplinary actions.

ANNEX 8 RECOMMENDED MONITORING SITES LOCATION MAP FOR EMC

