

## **SPECIFICATION SECTION 01700**

### **ENVIRONMENTAL CONTROL AND PROTECTION**

#### **TABLE OF CONTENTS**

1.	DESCRIPTION .....	3
2.	REQUIREMENTS .....	3
2.1	Regulations and Reference Standards.....	3
2.2	General.....	6
2.3	Environmental Control Plan.....	8
2.4	Environmental Officer .....	10
2.5	Environmental Management and Compliance .....	11
2.5.1	General.....	11
2.5.2	Contractor's Site Environmental Management Plans .....	11
2.5.3	Environmental Compliance Framework .....	47
3.	MEASUREMENT AND PAYMENT .....	52
3.1	Method of Measurement .....	52
3.2	Basis of Payment .....	53



## **SECTION 01700 - ENVIRONMENTAL CONTROL AND PROTECTION**

### **1. DESCRIPTION**

This Specification Section prescribes the requirements for planning, implementing and monitoring the necessary measures that the Contractor shall perform to maintain, control and protect the environment in, adjacent to, or related to the Works during the execution of the Works.

The following definitions shall be referred to for proper interpretation of this Specification Section:

Environmental Control Plan (ECP):	The plan shall consist of a complete plan for implementation and monitoring of the necessary measures that the Contractor shall perform to control and protect the environment in the Site, and any other area that is affected by the execution of the Works.
Program and the Schedule:	As defined in Specification Section 01300 Program of Work
Safety Plan:	As defined in Specification Section 01500 Project Safety
Traffic Control Plan:	As defined in Specification Section 01600 Maintenance and Protection of Traffic

### **2. REQUIREMENTS**

#### **2.1 Regulations and Reference Standards**

The following latest edition of the following Regulations and Standards shall apply to works covered by this Specification Section.

a) Regulations:

“National Law of Environmental Protection” (NLEP) issued in 2005 based on the document issued by the National Assembly on November 29<sup>th</sup>, 2005, amended in July 1<sup>st</sup>, 2006;

“Decree No. 80/2006/ND-CP” dated 9th August 2006 of Government on Providing guidance for implementation of the NLEP 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. 81/2006/ND-CP dated August 9, 2006 of the Government: Decree on sanction of administrative violations in the domain of environmental protection;

Decree No. 21/2008/ND-CP dated February 28th, 2008 on amendment and supplement of Decree 80/2006/ND-CP;

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. 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 18th July 2011 of MONRE on the “Guidance for setting-up and appraising SEA/EIA reports and environmental commitment”;

Circular No. 28/2011/TT-BTNMT of the Ministry of Natural Resources and Environment, dated 1st August, 2011 Providing the technical procedure for monitoring of ambient air environment and noise;

Circular No. 29/2011/TT-BTNMT of the Ministry of Natural Resources and Environment, dated 1st August, 2011 Providing the technical procedure for monitoring of the quality of surface water environment;

Circular No. 30/2011/TT-BTNMT of the Ministry of Natural Resources and Environment, dated 1st August 2011 Providing the technical procedure for monitoring of the quality of underground water environment;

b) National Technical and Standards for Air Quality:

QCVN 05 - 2009/BTNMT: National technical regulation on ambient air quality;

TCVN 5978:1995 (ISO 4221:1980): Ambient air - Determination of mass concentration of sulphur dioxide in ambient air. Thorin spectrophotometric method;

TCVN 5971:1995 (ISO 6767:1990): Ambient air - Determination of the mass concentration of sulfur dioxide - Tetrachloromercurate (TCM)/pararosaniline;

TCVN 7726:2007 (ISO 10498:2004) Ambient air. Determination of sulfur dioxide. Ultraviolet fluorescence method;

TCVN 5972:1995 (ISO 8186:1989): Ambient air - Determination of the mass concentration of carbon monoxide, Gas chromatographic method;

TCVN 7725:2007 (ISO 4224:2000): Ambient air - Determination of carbon monoxide - Non-dispersive infrared spectrometric method;

TCVN 5067:1995: Air quality - Weigh method for determination of suspended dusts content;

TCVN 6138:1996 (ISO 7996:1985): Ambient air. Determination of mass concentration of nitrogen oxides. Chemical methods of optical

c) National Technical and Standards for Noise Quality:

QCVN 26 - 2010/BTNMT: National technical regulation on noise;

TCVN 7878-1:2008 (ISO1996-1:2003): Part 1 - The basic quantities and assessment methods;

TCVN 7878-2:2008 (ISO1996-2:2003): Part 2 - Determination of sound pressure level.

d) National Technical and Standards for Surface Water Quality:

QCVN 08 - 2008/BTNMT: National technical regulation on surface water quality;

TCVN 5992-1995 (ISO 5667-2:1991): Sampling, Guidance on sampling techniques;

TCVN 5993-1995 (ISO 5667-3:1985): Sampling, Guidance on the preservation and handling of samples;

TCVN 5994-1995 (ISO 5667-4:1987): Sampling, Guidance on sampling from natural lakes and man-made lakes;

TCVN 5996-1995 (ISO 5667-6:1990): Water quality. Sampling. Guidance on sampling of rivers and streams;

TCVN 6492-1999 (ISO 10523-1994): Water quality - Determination of pH

TCVN 6625-2000 (ISO 11923-1997): Water quality - Determination of suspended solids by filtration through glass-fiber filters;

TCVN 6001-1995 (ISO 5815-1989): Water quality - Determination of biochemical oxygen demand after 5 days (BOD 5) - Dilution and seeding method;

TCVN 6491-1999 (ISO 6060-1989): Water quality - Determination of the chemical oxygen demand;

TCVN 5070-1995 (ISO 9696-1992): Water quality - Measurement of gross alpha activity in non-saline water - Thick source method.

e) National Technical and Standards for Underground Water Quality:

QCVN 09-2008/BTNMT: National technical regulation on groundwater quality;

TCVN 5992-1995 (ISO 5667-2:1991): Sampling, Guidance on sampling techniques;

TCVN 5993-1995 (ISO 5667-3:1985): Sampling, Guidance on the preservation and handling of samples;

TCVN 6000-1995 (ISO 5667-11:1992): Water quality - Sampling - Guidance on sampling of underground water;

TCVN 6492-1999 (ISO 10523-1994): Water quality - Determination of pH

TCVN 6180-1996 (ISO 7890-3-1988): Water quality - Determination of nitrate - Spectrometric method using sulfosalicylic acid;

TCVN 6187-1-1996 (ISO 9308-1-1990): Water quality - Detection and enumeration of coliform organisms, thermotolerant coliform organisms and presumptive *Escherichia coli* - Part 1: Membrane filtration method;

f) National Technical and Standards for Waste Water Quality:

QCVN 14-2008/BTNMT: National technical regulation on domestic wastewater;  
QCVN 40:2011/BTNMT: National technical regulations on industrial wastewater;  
TCVN 6663-1:2011 (ISO 5667-1:2006): Water quality - Sampling - Part 1: Guidance on the design of sampling programs and sampling techniques  
TCVN 6663-3:2008 (ISO 5667-3: 2003): Water quality - Sampling : Guidance on the preservation and handling of water samples  
TCVN 5999:1995 (ISO 5667 -10: 1992): Water quality - Sampling, Guidance on sampling wastewater;  
TCVN 6492:2011 (ISO 10523:2008): Water quality -Determination of pH;  
TCVN 6625:2000 (ISO 11923:1997): Water quality - Determination of suspended solids by filtration through glass-fiber filters  
TCVN 6001-1:2008 (ISO 5815-1:2003): Water quality - Determination of biochemical oxygen demand after n days (BODn) -- Part 1: Dilution and seeding method with allylthiourea addition;  
TCVN 6001-2:2008 (ISO 5815-2:2003): Water quality - Determination of biochemical oxygen demand after n days (BODn) - Part 2: Method for undiluted samples;  
TCVN 6193:1996: Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead. Spectrometric method of flame atomic absorption  
TCVN 5070-1995 (ISO 9696-1992): Water quality - Measurement of gross alpha activity in non-saline water - Thick source method;  
TCVN 8775:2011: Water quality - Determination of coliform total, Membrane filtration method;  
TCVN 6187-1-1996 (ISO 9308-1-1990): Water quality - Detection and enumeration of coliform organisms, thermotolerant coliform organisms and presumptive Escherichia coli - Part 1: Membrane filtration method.

## 2.2 General

- a) The Environmental Control Plan shall be considered as one of the key parts of the Program described in Specification Section 01300 Program of Work.
- b) The requirements established in this Specification Section are intended to be read in conjunction with and mutually explanatory with the requirements and provisions stated in the following subclauses of the Conditions of Contract:

Subclause 4.18, Protection of the Environment,

Subclause 4.23, Contractor's Operation on Site,

Subclause 4.24, Fossils,

Subclause 11.1, Completion of Outstanding Work and Remedying Defects,

Subclause 11.11, Clearance of Site.

- c) The requirements established in this Specification Section shall also supplement the requirements and provisions stated in the following Sections of the General Specifications:

Specification Section 01500 Project Safety and

Specification Section 01600 Maintenance and Protection of Traffic.

- d) Failure by the Contractor to comply with the requirements of this Specification Section shall be considered as a serious default in meeting his contractual obligations under clause 4.1 of the Conditions of Contract. Should this situation arise the Engineer will adjust the value of the work in the Interim Payment Certificate(s) as foreseen in subclause 14.6(b) of the Conditions of Contract.
- e) In the event the Contractor fails to comply with the requirements of this Specification Section the Engineer shall issue an instruction to the Contractor (1) to identify the non compliance, (2) to immediately comply with this Specification Section, (3) to specify the remedial measures required and (4) to immediately and without further delay commence and carry out the remedial measures instructed. In the event the Contractor does not fully and immediately comply with this instruction then the Employer, will be entitled to carry out such works as he deems necessary and seek recovery of the full cost thereof plus respective incidental and administrative costs in accordance with the provisions of subclauses 2.5 and 3.5 of the Conditions of Contract.
- f) The requirements and standards shown in subsection 2.1 of this Specification Section shall be applied. Moreover, other standards that may be recommended by the Engineer as applicable shall also be used.
- g) Before the application of the measures for environmental protection contained in the Environmental Control Plan described below, the Contractor shall investigate and clarify sufficiently the details and regulations established by Local Authorities and pertinent divisions of the Vietnam Ministry of Natural Resources and Environment (MONRE), and shall also obtain their acceptance for the plan.
- h) The Contractor shall be solely responsible for taking the remedial or mitigation measure(s) required to deal with the environment related effects of any of his construction or construction related activities.
- i) When and if an environmental problem arises (such as environmental damage to property and natural resources, ground subsidence, interruption of groundwater flow, surface/ground water contamination, complaints or legal actions by third parties, etc.), the Contractor shall first immediately notify the Engineer thereof and then, based on the approved Environmental Control Plan, he shall prepare the countermeasures that shall be applied to solve or mitigate the problem, and shall submit them to the Engineer's approval or review as appropriate.

## 2.3 Environmental Control Plan

- a) The Contractor shall prepare and submit to the Engineer for review and approval, the Environmental Control Plan that shall be implemented during the work execution, and shall be monitored on a daily basis. This Plan shall supplement the Safety Plan and the Traffic Control Plan and be incorporated in the Program.
- b) The Environmental Control Plan shall include but not be limited to, the following:
- (i) Monitoring Program: Parameter, frequency and locations for environmental monitoring are:

### - Monitoring on the Air Quality

Parameters	Frequency	Monitoring Locations
TSP, PM10, CO, SO <sub>2</sub> , NO <sub>2</sub> ,	4 samples x 4 locations x 4 times/year	Km9+700; Km10+800; Km14+100; Km16+100.  During construction period, the monitoring locations may be change as specified by ECO/ES to meet the construction schedule.

### - Monitoring on the Noise

Parameters	Frequency	Locations
Leq, L10, L90	4 samples x 4 locations x 4 times/year	Km9+700; Km10+800; Km14+100; Km16+100.  During construction period, the monitoring locations may be change as specified by ECO/ES to meet the construction schedule.

### - Monitoring on the Surface Water

Parameters	Frequency	Locations
pH, TSS, BOD, COD, oil, turbidity	6 samples x 4 locations x 4 times/year	La Tho River; River Km12+700; River Km14+000; Canal Km15+600.  During construction period, the monitoring locations may be change as specified by ECO/ES to meet the construction schedule.

### - Monitoring on the Underground Water

Parameters	Frequency	Locations
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pH, SS, Nitrates, E. Coli	01 samples x 2 locations x 4 times/year	Km9+700; Km16+100.  During construction period, the monitoring locations may be change as specified by ECO/ES to meet the construction schedule.
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- Monitoring on the Waste Water

Parameters	Frequency	Locations
pH, TSS, Pb, Zn, COD, BOD, oil, coliform, turbidity	01 samples x 2 locations x 4 times/year	Km9+700; Km16+100.  During construction period, the monitoring locations may be change as specified by ECO/ES to meet the construction schedule.

- (ii) Environmental Control Organizational Structure: The organization classified into subdivisions that can be technically and effectively managed and described in an Environmental Control Organizational Chart identifying the subdivisions, responsibilities and tasks of the personnel and supporting staff, all of them engaged solely and specifically for environmental control issues (including the Contractor's environmental officer (CO), who shall be responsible for all environmental issues in the Site). Moreover, the criteria for appointment of the principal staff shall also be described.
- (iii) Lines of Communication: The organizational structure shall show direct lines of communication and reporting between the environmental officer, Contractor's project manager and the Contractor's director responsible for the Contract.
- (iv) Interaction and Communication Procedures: Communication between the Contractor's construction personnel working in areas where the environment will be or is being affected and the environmental control staff, including regular communication and reporting system. Moreover, the procedures shall also specify the frequency, coverage and intent of site meetings for coordination.
- (v) Subcontractors' Environmental Control Plan: The means by which the Environmental Control Plan will be communicated to Subcontractors (if any), including also the procedure for reviewing the plan for environmental control proposed by Subcontractors, and the method to incorporate the Subcontractors' environmental control plans into the Contractor's Environmental Control Plan.
- (vi) Inventory of Environmental Impacts: A detailed inventory of the identified environmental impacts that will be caused by executing the Works in accordance with the construction Program prepared by the Contractor.
- (vii) Methods, Equipment and Supporting Staff for Environmental Control: A detailed and consistent description of the methods to be applied and the

equipment and supporting staff to be provided for environmental control, including details for each stage considered during the construction of the Works. The methodology described in the Environmental Control Plan shall cover all the items herein specified, and all applicable requirements of the Vietnamese Standards or the like regarding environmental control.

- (viii) Environmental Control Schedules: Time schedules in bar chart format prepared for each case of environmental control necessity identified in the above mentioned inventory, including a description of all the main activities for environmental control, dates for commencement and completion of each activity, critical items of the schedule, etc.
- (ix) Environmental Control Inspections: The procedure and schedule for inspections of the environmental control equipment, the compliance of methods, and the performance of the supporting staff.
- (x) Supervision and Auditing: The means by which the established environmental control system will be supervised, monitored and audited by the environmental officer to ensure due compliance with the principles and objectives of the Environmental Control Plan. This shall also include the procedure for updating the Environmental Control Plan.
- (xi) Records: To be prepared and maintained by the environmental officer and the staff for environmental control and the communication procedures to be adopted by the environmental control officer (ECO) and/or the construction supervision consultant's environmental supervisor (ES) and others associated with the Works, to keep them fully informed throughout the period of the Contract on matters relating to environmental control.
- (xii) The Contractor's Site Environmental Management Plans

## **2.4 Environmental Officer**

- g) The Contractor shall appoint an environmental officer whose duties throughout the period of the Contract shall be entirely connected with the environmental control activities on the Site.
- h) The environmental officer shall be bilingual (Vietnamese/English) and shall be a suitably qualified and experienced person who shall prepare, supervise and monitor the Environmental Control Plan and shall, in particular but without limitation, carry out auditing of the operation of the Environmental Control Plan in accordance with a rolling program to be submitted, from time to time, to the Engineer for his consent.
- i) The appointment and designation of the environmental officer shall be subject to the Engineer's approval.

- j) Unless specifically agreed in writing by the Engineer the Contractor shall not undertake any work on the Site, which may affect the environment, until the environmental officer has commenced duties on Site and the Environmental Control Plan has been approved by the Engineer.
- k) The Contractor shall not remove the environmental officer from the Site without the express written permission of the Engineer. Within fourteen (14) days of any such removal or notice of intent of removal, the Contractor shall nominate a replacement environmental officer for the Engineer's approval.
- l) The Contractor shall provide the environmental officer with sufficient supporting staff in accordance with the staffing levels set out in the Environmental Control Plan. The supporting staff shall include at least one (1) deputy environmental officer whose appointment shall be subject to the Engineer's approval. The deputy environmental officer shall be capable of assuming the duties and functions of the environmental officer as contained in the Environmental Control Plan whenever necessary.
- m) The Contractor shall ensure that the environmental officer maintains a daily Site diary comprehensively recording all relevant matters concerning Site safety inspections and audits, related incidents and the like. The Site diary shall be available at all times for inspection by the Engineer.

## **2.5 Environmental Management and Compliance**

### **2.5.1 General**

The Contractor shall comply with the Final Updated Environmental Management Plan (EMP) Subsections. 2.5.2 and 2.5.3 of this Specification Section comprise Chapter 8 and Annex 3 of Final Updated Environmental Management Plan, which set out the detailed obligations which the Employer is requiring the Contractor to undertake and which are the Contractor's responsibility and show how the Employer's construction related environmental and social management requirements will be addressed. The Contractor will employ sufficient numbers of qualified environmental staff to ensure environmental compliance. The Contractor shall be deemed to have made due allowance for the detailed requirements in the EMP in the Accepted Contract Amount.

The Contractor shall address those DQEP impacts occurring within the Site and in the environs of the Site arising as a direct consequence of the execution of the Works by the Contractor.

Subsections 2.5.1 to 2.5.3 of this Specification Section are intended to be read in conjunction with and mutually explanatory with the various other Specification Sections pertaining to this subject. In case there is an ambiguity or discrepancy between the above mentioned Subsections and other Specification Sections then the requirements of subsection 2.5.1 to 2.5.3 of this Specification Section shall prevail.

### **2.5.2 Contractor's Site Environmental Management Plans**

The Contractor shall prepare the draft Site Environmental Management Plans with associated detailed cost estimates showing the amounts included in the Accepted Contract Amount and submit them to the Employer and the Engineer for review,

comments and approval no later than one (1) month prior to the commencement date of the construction of the Permanent Works. No construction activities pertaining to the Permanent Works will be permitted until the first draft Site Environmental Management Plan is approved by the Employer 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 Specification Section, 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 Employer and the Engineer 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 Employer's environmental requirements stated in this Specification Section. The Contractor's Site Environmental Management Plan shall comply with ISO 14001:2004 - Environmental Management System and shall include the following as minimum:

- (a) 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.
- (b) The environmental planning process, setting out the principal steps in the Contractor's Site Environmental Management Plan, including:
  - (i) Identify environmental aspects of the Contractor's work and evaluation of associated environmental impacts;
  - (ii) Specify other environmental mitigations for which the Contractor is responsible under the Contract;
  - (iii) Identify applicable Laws associated with the requirements of these Employer'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.
  - (iv) Nominate the Contractor's performance criteria in accordance with the Employer's Environmental requirements stated in the bidding documents.
  - (v) Issue environmental plans and management programs.
- (c) 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.
- (d) The proposed quality assurance plan, including summary of methodology, equipment, staffing, organization, etc. for the Site Environmental Management Plan.

- (e) An overview of the impacts that the construction work, within the scope of the Contract and that does not include activities for which the Employer is responsible will have on the physical, biological and social environment.
- (f) The detailed subplans to be included in the Site Environmental Management Plan.
- (g) A formal certification from the Contractor that the Site Environmental Management Plan:
  - (i) Has been prepared by duly qualified consultants or specialists;
  - (ii) Complies with the undertaking specified Environmental Requirements in this Specification Section and
  - (iii) Complies with the Conditions of the Contract, including applicable Laws, Regulations, Standards, National Technical Regulations which relate to the Site Environmental Management Plan.

The Employer reserves the right to require the Contractor to submit, revise and resubmit these Site Environmental Management Plans prior to the commencement of construction activities for the Permanent Works if, in the opinion of the Employer, 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 Employer'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 Employer 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 Employer 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 Employer for information.

The following Site Environmental Management Plans shall be submitted by the Contractor:

- (a) Workforce and Site Installation Management Plan
  - (i) Workforce

Workforce includes all personnel hired by the Contractor for the Works, rehabilitation or improvement of roads. The workers shall, whenever possible, rent houses nearby. Otherwise, suitable accommodation 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 Contractor shall comply with the following:

Give priority to hire local labor for the works;

Announce that employment opportunities are available in the Works to every village 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.

(ii) 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 one (1) month before initiation of the Permanent Works. 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 and the Engineer and not within 500 meters of existing residential settlements and not within 1,000 meters for asphalt plants. Camp facilities should not be located on steep slopes. In case insufficient space exists on Site to satisfy these requirements then the Contractor shall acquire additional lands. All costs are to the account of the Contractor;

Site offices, camps, depots and particularly storage areas for diesel fuel and bitumen and asphalt plants shall be located more than 100 meters from 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.

(iii) 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 or holding tank. The wastewater from the holding 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.

(iv) 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.

(v) 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 Contractor. The code of conduct shall be available to local communities at the DQEP 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.

(vi) 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, daytime nighttime 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.

(vii) Prohibitions

The following activities are prohibited on or near the 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 Works found violating these prohibitions will be subject to disciplinary actions that can range from a simple reprimand to removal of the offender from Site by the Employer; depending on the seriousness of the violation.

(viii) 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 Engineer.

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 and the Engineer upon request.

(b) Construction Impact Management Plan

(i) 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 Site area from the Temporary Works or borrow pits owned by the Contractor, 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 as each 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, revegetation 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 and the Engineer;

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.

(ii) 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 /

dwelling and vulnerable people (children and 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 equipment that generates 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.

### (iii) 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 and the Engineer 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 and the Engineer;

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 Independent Environmental Monitoring Consultant 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..

(iv) Earthworks, Cuts and Fill Slopes

Earthworks, cuts and fill slopes, comprising the Temporary Works or borrow pits owned by the Contractor 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 and the Engineer 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 and the Engineer;

(v) Stockpiles, Quarries and Borrow Pits

The construction of the Expressway will use existing borrow pits or quarries located near the Site. However, in case that new borrow pits and quarries, owned by the Contractor, 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 the Department of Natural Resources and Environment (herein referred to as “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 and the Engineer.

(vi) Spoil Disposal Sites

The selection and use of spoil disposal sites, owned by the Contractor, shall follow strictly regulation:

All disposal sites shall be designed by the Independent Environmental Monitoring Consultant in consultation with the Engineer 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 run-off 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 run-off;

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).

(vii) Disposal of Debris

The Contractor shall carry out the following activities:

Establish and enforce daily site cleanup procedures, including maintenance of adequate disposal facilities for debris;

Debris generated due to the dismantling of existing structures shall be suitably reused, subject to the agreement of the Employer and 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’s 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 and the Engineer;

The construction solid waste arising from pier construction, subject to the agreement of the Employer and 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, subject to the agreement of the Employer;

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 and the Engineer;

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 subject to the agreement of the Employer;

(viii) 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.

(ix) Bridges, Overpasses, Interchanges and Viaducts

The Contractor shall submit a bridge, overpass, interchange or viaduct construction method statement to the ECO and the Engineer 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 in so far as this is feasible and compatible with the Program;

The environmental supervision shall be enhanced during the construction of the large bridges;

For any construction for bridges under water 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 and the Engineer.

(x) 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's 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 to 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 and the Engineer 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 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, close 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;

(xi) 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.

(c) Clearing, Revegetation and Restoration Management Plan

The Contractor shall prepare a clearing, vegetation and restoration management plan covering the Temporary Works on the Site and the borrow areas owned by the Contractor for the approval of the Engineer. The plan shall identify procedures and mitigation measures for clearing, revegetation and restoration of construction areas.

(i) 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 and the Engineer. The vegetation clearing plan shall consider the existing usage of the Site 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 foreseen by the plan;

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 nonorganic 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 and the Engineer for later use in revegetation and shall be adequately protected;

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

Herbicide 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 and the Engineer.

(ii) Revegetation and Site Restoration

Revegetation 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 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 maintain 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 DQEP. 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 revegetation;

Spoil heaps and excavated slopes shall be reprofiled to stable batters, and grassed to prevent erosion;

Restoration and revegetation 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.

(d) Waste Management Plan

During the construction stage, the Contractor shall prepare a waste management plan before commencement of the Works. The Plan shall include the following sub-plans:

(i) 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 run off 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 road bed 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.

(ii) 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 and the Engineer 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 waste water 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;

Waste water from mixing stations, material washing and tunnel construction shall be collected into a settling tank;

Waste water 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;

Run off 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 and the Engineer;

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.

(iii) 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 and the Engineer 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 and the Engineer. 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 and the Engineer or the Local Authorities. Burning solid waste in open air is strictly prohibited;

All solid waste shall be disposed of off Site at an approved disposal site. The Contractor shall supply the ECO and the Engineer with certificates of disposal;

Random disposal of solid waste in scenery areas shall be strictly prohibited;

The Contractor shall identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each;

Recyclable materials such as wooden plates for trench works, steel, scaffolding material, packaging material, etc. shall be collected and separated on Site from other waste sources. Collected recyclable material shall be reused for other projects or sold to waste collector for recycling.

(iv) Domestic waste

The Contractor shall provide refuse bins 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.

(v) 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 and the Engineer;

The removal of asbestos containing materials or other toxic substances shall be performed and disposed of by specially trained workers;

Used oil and grease shall be removed from Site and sold to an approved used oil recycling company 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.

(e) 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.

(i) 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.

(ii) 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 and the Engineer;

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 and the Engineer 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 and the Engineer for no objection.

(iii) Surfacing Materials

Over spray of bitumen products outside of the road surface and on to roadside vegetation shall be prevented using a method approved by the ECO and the Engineer;

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 and the Engineer;

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

(iv) 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 and the Engineer;

All run off 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 and the Engineer;

Unused cement bags shall be stored out of the rain where run off 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.

(v) 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 and the Engineer;

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 and the Engineer;

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.

(f) Ecological Management Plan

(i) 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 Works 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 and the Engineer are prohibited;

The use of herbicides is approved by ECO and the Engineer;

Regularly check the 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.

(ii) 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 to penalize the people who transgress.

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 and the Engineer;

The use of pesticides is prohibited.

(iii) Temporary Land Occupation

Successful land reclamation and recultivation 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 recultivate 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 recultivation 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 Works 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.

(iv) 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.

(g) Safety Management Plan

(i) 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, safety shoes/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 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;

Provide temporary fences around 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.

(ii) 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 night-time unless prior approval is obtained from the government authority and the ECO and the Engineer;

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 and the Engineer. 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.

(iii) Fire Control

The Contractor shall submit a fire control and fire emergency method statement to the ECO and the Engineer 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 Engineer and ECO. Fire fighting equipment shall be available.

(iv) 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 restart 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.

(v) Residual Unexploded Ordnance

Da Nang - Quang Ngai areas have been burdened with significant amount of weaponry since the Vietnam War, notably bombs and mines. Workers may be injured (even die) 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, the Employer 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.

(vi) 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 and the Engineer;

Use selected routes to the Site, as agreed with the ECO and the Engineer 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 and the Engineer;

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 and the Engineer;

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.

(vii) 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 (herein referred to as PASP) as part of the Contractor's safety management plan, which will be submitted to the Engineer before commencement of 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 and the Engineer;

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 Engineer immediately 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 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 Engineer, ECO for review and record. The incident report will also be submitted to DONRE, if required.

Most important of all the Contractor 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.

(h) 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 the Employer 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.

(i) 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.

(ii) Training Courses

All Contractors, PMUs, Engineer, 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.

(iii) 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, the Engineer, or ECO immediately;

Construction activities shall stop immediately;

The Contractor shall notify the Engineer 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 Engineer and ECO shall delineate the discovered site or area;

The Engineer 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.

(iv) 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 the Engineer. The survey concerning the discovery shall be performed in 48 hours.

(v) 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, the Employer 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\*:

Small scale (<50m<sup>2</sup>): 15 days

Large scale (>50m<sup>2</sup>): more than 15 days

\*Salvage steps include: excavation, research and removal

Expenses for salvage shall be included in the budget allocated for the research of cultural heritage provided by the Employer. 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 Works 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 work could resume only after permission is granted from the responsible Local Authorities concerning safeguard of the heritage.

(vi) Chance Find Report

The Contractor shall, at the request of the Engineer 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 Engineer 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.

(i) Community Relations and Health Management Plan

(i) Community Relations

Discussion and public consultation shall be a continued effort throughout the construction period of the Works, 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 Works 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 Works 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;

The Contractor will be required to hold public meetings at the villages near the Site 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 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.

(ii) Health Management Plan

The Contractor shall prepare and enforce a Health Management Plan to address matters regarding the health and wellbeing of construction workers, staff and invite the participation of 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 Site 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.

### 2.5.3 Environmental Compliance Framework

#### a) 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 Specification Section 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 Engineer 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; methodology of implementing the Works 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.

#### b) Contractor's Environment Management

It is recognized that Contractor 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:

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;

The Contractor will be required to provide at least one dedicated full time environmental staff. 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 Contractor 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;

The contractor will be required to participate in a mandatory environmental training program prior to the start of construction on site. 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 Engineer is also responsible for the implementation of the mitigation measures. The requirements for the Engineer in the environmental management will be included in the bidding document. At least one full-time staff from the Engineer is required to participate together in the training in environmental management for contractors.

c) 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 to the Engineer 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 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 Engineer and the Contractor 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 Engineer accordingly.

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

d) Process Supervision of Contractor's Compliance

The Contractor shall comply with subsections 2.5.1 to 2.5.3 inclusive of this Specification Section 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 and if not resolved to the Conditions of Contract.

ECO, through the Engineer, 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.

#### e) Regulations On Penalties, Remedies for Application on the Contractor

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 Engineer, adjust these fine values, based on the severity, actual or potential impact and environmental risk involved at the time of the offence.

Table 2 Fines for Environmental Noncompliance

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.

#### f) Regulation on Management of Disposal Sites and Access Roads

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.

**g) 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.

### **3. MEASUREMENT AND PAYMENT**

#### **3.1 Method of Measurement**

Environmental Control and Protection work shall be measured for payment as a lump sum.

The Environmental Control and Protection provisions and requirements identified in this Specification Section shall be measured for payment in pay item 01700-01.

Any Environmental Control and Protection Works not specifically identified in this Specification Section but which are necessary for the performance of the Works shall be deemed to be included in pay item 01700-01.

### 3.2 Basis of Payment

- a) The work under this Specification Section for Environmental Control and Protection shall be paid for in accordance with the applicable unit prices as indicated in the Bill of Quantities and given below. Payment shall constitute full compensation for performing the requirements of the Contract for the item of work specified including furnishing all necessary labor, materials, tools, equipment, instruments, tests, incidentals, submittals and updates.
- b) All environmental control devices provided by the Contractor shall remain the property of the Contractor and shall be removed from the Site upon the issue of the Taking-Over Certificate.
- c) Payment shall be made as follows:  
  
**100%** (one hundred percent) over the duration of the Contract construction period (up to the issue of the Taking-Over Certificate) pro rated to the progress of the Works expressed in financial terms through the Interim Payment Certificates, upon the Engineer's certification of the Contractor's compliance with the requirements of this Specification Section and providing no delays in the submittals were reported by the Engineer.

<u>Pay Item</u>	<u>Description</u>	<u>Unit</u>
<b>01700</b>	<b>Environmental Control and Protection</b>	
01700-01	Environmental Control and Protection	LS