

Environmental Monitoring Report

Semi-Annual Report
July–December 2012

VIE: Ho Chi Minh–Long Thanh–Dau Giay Expressway Project

Prepared by Viet Nam Expressway Corporation, Nippon Koei Co., Ltd, and TEDI South for
the Ministry of Transport of Vietnam, and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 31 December 2012)

Currency unit	–	dong (D)
D1.00	=	\$0.000048
\$1.00	=	D20,820

ABBREVIATIONS

ADB	–	Asian Development Bank
CSC	–	construction supervision consultant
DONRE	–	Department of Natural Resources and Environment
EIA	–	environmental impact assessment
EMP	–	environmental management plan
HCMC	–	Ho Chi Minh City
HLD	–	HCMC–Long Thanh–Dau Giay
JBIC	–	Japan Bank for International Cooperation
JICA	–	Japan International Cooperation Agency
MONRE	–	Ministry of Natural Resources and Environment
VEC	–	Vietnam Expressway Corporation

NOTE

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

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THE SOCIALIST REPUBLIC OF VIET NAM
MINISTRY OF TRANSPORT
VIETNAM EXPRESSWAY CORPORATION
HOCHIMINH – LONG THANH – DAU GIAY EXPRESSWAY
PROJECT MANAGEMENT UNIT (HLD EPMU)



North-South Expressway Construction Project
Hồ Chí Minh City - Dầu Giây Section (CS)

LOAN NO. VNXV-1



SEMI-ANNUAL ENVIRONMENTAL SUPERVISION REPORT
(July 2012 – December 2012)

February 2013

Consortium of
Nippon Koei Co., Ltd
TEDI South

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1. INTRODUCTION

1.1. *Report purpose*

In the surrounding area of Ho Chi Minh City (HCMC), the traffic volume has long been over the capacity of road. It is foreseen that the demand of traffic in HCMC and Dong Nai area where industrial development has been recently significant with the planned development of industrial zones and the international airport will increase significantly. The Government of Vietnam (GOV) has decided to construct the HCMC – Long Thanh – Dau Giay Expressway (HLD Expressway) with the assistance from Asian Development Bank (ADB) and Japan Bank for International Cooperation (JBIC), which was currently named as Japan International Cooperation Agency (JICA) by integrating with previous JICA. The express way was divided into two portions such as HCMC – Long Thanh funded by JICA and Long Thanh – Dau Giay funded by ADB.

Ho Chi Minh –Long Thanh –Dau Giay Expressway crosses thinly population density areas such as agricultural land and some high population density areas. EIA has been implemented for environmental and social consideration according to the Vietnamese environmental law and regulations and JBIC and ADB guidelines for Environmental and Social Considerations and Regulations.

Implementation of Environmental Management Plan (EMP) during construction and post-construction stages is necessary for sustainable development as well as to ensure the environmental protection in the road construction project.

The main purpose of the environmental supervision report (July 2012 – December 2012) is to summarize the environmental supervision activities by Contractors and Construction Supervision Consultants (CS Consultants) during the period of July 2012 – December 2012 to support VEC to prepare environmental supervision reports to JICA (previous JBIC), ADB as well as to prepare them to other agencies.

The main objectives of this environmental supervision report are follows;

- Grasp the general environmental condition
- Identify the environmental impacts during the construction period and propose mitigation measures
- Summarize the result of environment inspection during construction period.

- Implementation of environmental monitoring in pre-construction and during construction stages.

1.2. Project Implementation Progress and Change in Project Scope

1.2.1. Implementation Progress

The construction progress of each package as of December 2012 is described as follows

a. Package 1a:

▪ Temporary Works

Temporary Road:

- All the temporary roads have been completed;

Batching plant:

- The batching plant was normally operated and regularly maintained.

Site Laboratory:

- Carried out related tests for test section of embankment.
- Carried out the 07-day and 28-day strength tests for bored piles and ST girders.
- Sampled the mobilized construction materials and carried out the regular tests on the samples.

▪ Site clearance

- All site clearing works of this project has been completed.

▪ Road Work

- Finished Base course from Km4+180-Km4+230 in this month; All Base course was completed.

▪ Bridge Substructure

Bored Pile:

- Bored Pile construction was completed in January, 2012

Substructure:

- Pier construction was completed in May, 2012

▪ Bridge Superstructure

SPT, Crossbeam, Deck slab, Link Slab

- Super T girders fabrication was completed in May 2012.
- Super T girders erection was completed in June 2012.

- The crossbeam construction was completed in July 2012.
- The deck slab construction was completed in August 2012.
- The link slab construction was completed in August 2012.

External /Internal parapet

- Construction of external/internal parapet was completed in October 2012.

▪ **Lighting and electrical Works**

- Transformer sub-station was installed in this month; All of lighting system was completed.

▪ **Drainage pipe installation**

- Drainage pipe installation was completed in October 2012.

▪ **Waterproofing Layer**

- Waterproofing for bridge deck was completed in November 2012.

▪ **Expansion Joint**

- All of Remaining 05 nos have been completed in December 2012.

▪ **Asphalt Work**

- All of asphalt surface have been completed in December 2012.

▪ **Road Furniture**

- All road furniture work were completed

b. Package 1b:

▪ **Temporary Works**

Temporary road and temporary berth, temporary bridges and Truong Luu road

- Service road and bridge: Maintenance for service road and bridges.
- Truong Luu road: Maintenance for Truong Luu road.

Batching plant:

- Batching plant was operated for supplement of concrete for project.

Site laboratory:

Site laboratory was operated with approved equipment. The following tests have been doing at site laboratory:

- Concrete aggregate and sample compression
- Earth work and compaction

- Steel reinforcement

Casting Yard:

- Casting yard No.1 (at pier T100): No activities
- Casting yard No.2 (at Tac river): No activities

▪ **Site Clearance:**

- The works of site clearing on handed over land have been completed 100%.

▪ **Earth Work and Soft Soil Improvement.**

- In this month, capping layer was completed.
- The Contractor continues to carry out for sub-base layer. Equipment for this layer such as paver, roller, grader were mobilized to site also.

▪ **Bridge Substructure.**

- At T158R: Casting concrete for K6 & K7 segments.
- At T159R: Casting concrete for K2, K3 & K4 segments.
- At T160L: Casting concrete for side closure segment.
- The contractor has mobilized 02 construction teams for sub-structure works on site. The completed quantity in December as followings:
 - + Pier T107: Completing cross head T107R
 - + Pier T131: Mobilized manpower and equipment for cross head construction

▪ **Bridge Superstructure**

- In this month, Super T girder fabrication was suspended due to full storage yard. Up to now, 717 girders were fabricated.
- Girder erection work was re-carried out, 29 girders were erected in December.
- Construction works for precast-plank, diaphragm, execute and external parapet are going on. For internal parapet, completed 108m.

▪ **Lighting and electrical Works**

All of material for lighting system has been approved by Consultant, the Contractor plans to completed testing procedure in next month.

c. Package 2:

▪ **Works at site**

- Construct bored pile D1200 at P46, P47 and A2

- Construct pile cap, column, K segments for P21, 22, 25 of the main bridge
- Construct service bridge at Dong Nai side
- Continue to repair and maintain service road at Dong Nai side and HCM side
- **Earth Works and Soft Soil Improvement**
 - Continue settlement monitoring at approach road to abutment A1.
 - Finished embankment H2
- **Bridge Substructure**
 - Continue construction of pile cap, column, head stock from P26 to P36.
- **Bridge Superstructure**
 - Finish concreting for deck slab S1 to S15 at HCM side.
- **Lighting and Electronics Works**
 - No activity done yet.

d. Package 3:

- **Temporary Works:**
 - Carry out maintenance of service road on site
- **Survey works :**
 - For Topography survey work : have been finished
- **Site clearance:**
 - Site clearing on site all most finished (Except not yet handed over areas)
- **Earth Work and Soft Soil Improvement**
 - Carry out installation of PVD material on site is 100.00% completed (alternative DMM section and original section)
 - Surcharge works was completed
 - Termination of vacuum pump at Km14+901.3 to Km15+462.1, Km16+900 to Km18+285.1, Km19+251.0 to Km20+988.9 and Km21+631.18 to Km21+860.00
 - Construction of surcharge removal on site is ongoing
 - Construction of embankment layer on site is ongoing
 - Construction of capping layer on site is ongoing
 - Production of aggregate material for sub-base and base course
 - Construction of sub-base layer on site is ongoing
 - Construction of base course layer on site is ongoing
 - Construction of comprehensive slope is ongoing

- Drainage construction on site is ongoing
- Sand cement stabilized mat construction was completed
- DMM work was completed (including soil cement column transition)

▪ **Bridge Substructure**

- Ruot Ngua bridge:
 - + Driving RC pile for pile slab are on going
 - + Casting concrete for pile cap of Abutment A1R, P2R, P2L, and P3R have been completed
 - + Casting concrete for pier column P2L has been completed
 - + Casting concrete for head stock P1R, P2L, and P3R have been completed.
- Rach Vuon bridge:
 - + Driving test RC pile (45cmx45cm) for Abutment A1L and A2R have been completed
 - + Driving RC pile (30cmx30cm) for pile slab are on going
- Nuoc Trong bridge: Substructure works are completed
- Ngon Cung bridge: Substructure works are completed
- Hang Dieu Bridge:
 - + Substructure works are completed
 - + Driving RC pile for pile slab are on going
- Dong Mon bridge:
 - + Substructure works are completed
 - + Driving RC pile for pile slab are completed
- IPR 25A: Construction of bored pile are on going
- Long Thanh flyover: Substructure works was completed

▪ **Bridge Superstructure**

- Ruot Ngua bridge:
 - + Super T girder production is in progress
 - + Launching super T girder for span P5L - P6L, span P6L - P7L, span P5R - P6R, span P6R - P7R have been completed
 - + Casting concrete for deck slab span P7L – P8L, span P8L - Abutment A2L, span P7R - P8R have been completed
- Nuoc Trong bridge: Installation parapet is ongoing

- Ngoc Cung bridge: Installation parapet is ongoing
- Hang Dieu bridge: Installation parapet is ongoing
- Dong Mon bridge: Installation parapet has been completed
- Long Thanh fly-over:
 - + Launching T-girder has been completed
 - + Casting concrete for deck slab span P9L-P10L, span P10L-P11L, span P9R-P10R, span P10R-P11R have been completed
 - + Installation parapet is ongoing
- **Lighting and electrical Works**
 - Studying shop drawing and method statement
- **Miscellaneous Works**
 - Casting concrete for precast beam, moveable barrier, concrete brick and concrete curb on site are ongoing.

1.2.2. Scope of project

HLD Expressway construction project with total length of about 55km, is divided into 2 parts;

- Part 1: From An Phu Intersection (beginning point) to Ring Road 2 intersection (Km4+000) will be constructed as urban road. This section is funded by HoChiMinh City People Committee;
- Part 2: From Ring Road 2 intersection (Km4+000) to Dau Giay Intersection (ending point). The Project scope is summarized in following table.

Table 1. Project Scope

Section	Distance (Km)
Ring Road 2 intersection to NH-51 interchange (JICA portion); KM.4+000 to KM.23+900	19.900 km
NH-51 interchange to Dau Giay interchange (ADB portion); KM.23+900 to KM.54+982	31.082 km
Total	50.982 km

2. INCORPORATION OF ENVIRONMENTAL REQUIREMENTS INTO PROJECT CONTRACTUAL ARRANGEMENTS

Environmental requirements were incorporated into Volume 3. General Specification of contract document. Which requires the construction contractors comply with environmental regulations and protection as summarized below:

- The Contractor shall submit an Environmental Management Plan detailing how he intends to comply with applicable local laws and regulations concerning protection of the environment and the attached specification for environmental monitoring.
- The contractor shall implement environmental monitoring program which shall be implemented in two phases: prior to the start of construction and during construction. The first phase is required to provide baseline data on environmental quality in the Project area, in particular for houses adjacent to areas of the works. Monitoring programs in the construction phase are required to collect data and evaluate the impact of the Project and the effectiveness of the Contractor's mitigation measures.
- The Contractor shall strictly comply with Vietnamese Laws and Standards regarding the environment on all works associated with the Contract.
- The Contractor shall be responsible for implementing and managing mitigation measures during the construction of the Works. The recommended mitigation measures including measure for air quality, noise and vibration, water environment, waste management, impacts on traffic.

Implementation arrangement of EMP

The EMP including the explanation of baseline condition at pre-construction and potential impacts and mitigation measures at construction stage and operation stage

EMP has been prepared to monitor the environmental impacts and implement the appropriate mitigation measures during construction and operation stages as required in the EIA. The frameworks of management are described in the following figure.

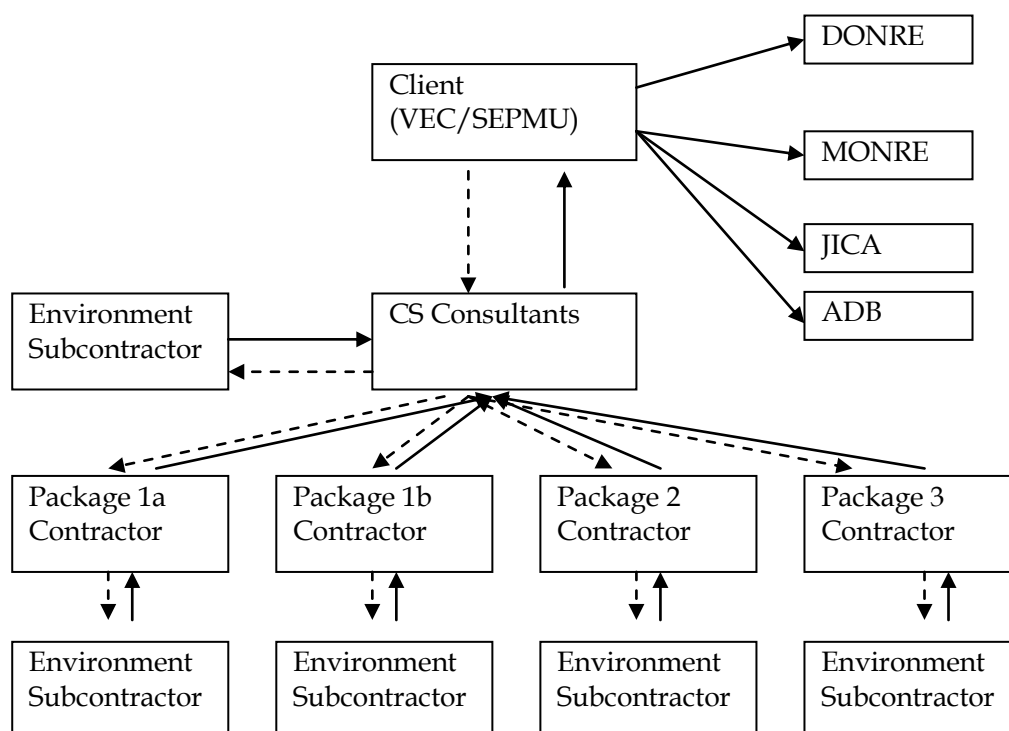


Figure 1. Framework of organizations regarding environmental management

3. SUMMARY OF ENVIRONMENTAL MITIGATIONS AND COMPLIANCE WITH EMP

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
I.	Over-all	Good		
	Prepare and implement a site-specific EMP			
II.	Air quality			
2.1	Construction activities			
	<ul style="list-style-type: none"> No burning of debris or other materials will occur on the site. Dust suppression measures will also be used, including covering and wetting loads, limiting the speed for vehicles transporting construction materials, and watering roads and other open areas regularly. In residential areas, 3m high fences of iron sheets or fiberboards are used around construction sites to minimize dust. <p>Dust suppression measures including but not limited to the following will be implemented:</p> <ul style="list-style-type: none"> Stockpiles of sand and aggregate greater than 20 cubic meters for use in concrete manufacture shall be enclosed on three sides, with walls extending above the pile and two (2) meters beyond the front of the piles. Locations should 	Good	Concentration of dust measured of Package 3 was slightly higher than the standard.	The contractor improved dust control especially in dry season by spray water regularly

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>be indicated by the accompanying site plan(s).</p> <ul style="list-style-type: none"> - Effective water sprays shall be used during the delivery and handling of all raw sand and aggregate, and other similar materials, when dust is likely to be created and to dampen all stored materials during dry and windy weather. - Conveyor belts shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. - All conveyors carrying materials that have the potential to create dust shall be totally enclosed and fitted with belt cleaners. Locations should be indicated by the accompanying site plan(s). - Areas of reclamation shall be completed, including final compaction, as quickly as possible consistent with good practice to limit the creation of blown wind dust. - Construction walls will be provided in all locations where strong winds could blow dust and debris. In residential areas, such as An Phu and Long Than towns, build 3m high fences with fiberboards and iron sheets to minimize dust. 			
2.2	Vehicle operation			
	<ul style="list-style-type: none"> - All roads within the construction areas of the site shall be watered at least twice each day, and more if necessary to control dust to the satisfaction of the ESO. - Areas within the site where there is a regular movement of vehicles shall have an acceptable hard surface and be kept clear of loose surface material. Locations should be indicated by the accompanying site plan(s). - Ensure that vehicles and machinery are used and maintained properly to meet applicable emission standards. Fuel-efficient vehicles shall be preferred. - All vehicles, while parked on the site, will be required to have their engines turned off. - Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards. - Ensure that employees are trained on the proper use and maintenance of machinery and vehicles. Use dust suppression measures: cover and wet loads, limit the speed for vehicles transporting construction materials, select suitable transport routes and vehicles, and water roads and other 	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>open areas regularly. Limit traffic congestion through planning of transportations in coordination with local officials.</p> <ul style="list-style-type: none"> - Conduct regular site inspections to ensure the use of best practices and report any complaints from local people. 			
2.3	Crushing, concrete and asphalt plant operation			
	<ul style="list-style-type: none"> - Dust nuisance as a result of its activities will be avoided. An air pollution control system shall be installed and shall be operated whenever the plant is in operation. - Install a three-sided roofed enclosure with a flexible curtain across the entry where dusty materials are being discharged to vehicles from a conveying system at a fixed transfer point. Install exhaust fans for this enclosure and vented to a suitable fabric filter system. - Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin in good condition. - The concrete batching plant and crushing plant sites and ancillary areas will be frequently cleaned and watered to minimize any dust emissions. The plants shall not be located within 1000 m of settlements, schools, health facilities and other sensitive sites. Provide VEC and PSC a map on the location of plants prior to the beginning of construction works for approval. Dust suppression and other air pollution control measures shall be used in the plants to minimize emission levels - Dry mix batching shall be carried out in a totally enclosed area with exhaust to suitable fabric filters. - All equipment and machinery on the site will be checked at least weekly and all necessary corrections and or repairs made to ensure compliance with safety and air pollution requirements. 	Good		
III.	Water quality			
	<ul style="list-style-type: none"> - Wastewater from mixing materials will be drained to a separate collecting system, and processed by sediment traps before release to the public drainage system. - Mud from drilling will be collected and processed to avoid pollution of surface water. - Drilling solutions for performing the abutment will be processed in a closed system, especially for abutments at the riverbed. 	Fair	Treated wastewater of package 1a, 1b and 3 (September 2012) and package 3 (December 2012) contained	Contractors cleaned floor and drainage system to avoid contamination of coliform

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<ul style="list-style-type: none"> - Inner-lined drill holes will be used during piling. - Proper drainage systems will be provided at all construction, material exploitation, and storage sites. All existing stream courses and drains within, and adjacent to, the site will be kept safe and free from any debris and any excavated materials arising from the works. Chemicals, sanitary wastewater, spoil, waste oil and concrete agitator washings will not be deposited in the watercourses - All water and waste products arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance. The Contractor will ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities. - Hygiene bathrooms will be set up at all construction camp sites and septic tanks will be used to treat wastewater. Proper drainage will be provided to avoid creation of stagnant water bodies. - Extraction of sand and gravel in river beds will be prohibited except (i) where there is no technically and economically feasible alternative, and (ii) provided specific mitigation measures are implemented to minimize impacts on river morphology, water quality (e.g. turbidity), and ecosystems (e.g. reduced extraction during fish spawning period). - Equipment and vehicle maintenance area will be provided with adequate drainage facility as well as oil and grease separator to avoid discharge of oil-laden water into the surrounding soil and water courses. - Drainage works will be constructed, maintained, removed and reinstated as necessary and all other precautions taken, as necessary, for the avoidance of damage by flooding and silt washed down from the works. Adequate precautions will be taken to ensure that no spoil or debris of any kind is allowed to be pushed, washed down, fallen or be deposited on land adjacent to the site. Stockpiles will not be located near rivers and streams. Dumping of spoils and obstruction of flows along rivers and streams will be avoided. 		<p>high amount of coliform. This problem was mainly due to drainage system was dirty</p> <p>Package 3: From June to October 2012: Service road surface was muddy</p>	<p>The service road was cleaned up in November 2012 by Contractor</p>

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<ul style="list-style-type: none"> - Downstream slopes will be stabilized, where warranted, with concrete, rock gabions or walls to avoid erosion. - Prepare emergency response plan in case of fuel and chemical spills 			
IV.	Loss of water resources			
	<ul style="list-style-type: none"> - Any source of water (potable or otherwise) for the community, such as wells, ponds or tube wells, accidentally lost will be replaced immediately. - The location and sitting of the replaced source of water will be as per design or as directed by the engineer. In general, there should be only lateral displacement (of the new site from the old); the replacement will be ready prior to demolition/dismantling of the existing source. 	Very good		
V.	Noise and vibration			
	<ul style="list-style-type: none"> - Vehicles and machinery must be used, maintained and equipped so as to avoid unnecessary noise and vibration. - Plants must be located away from sensitive areas and noisy construction work, such as crushing, concrete mixing and batching must be done during daylight hours. - Use of machines causing loud noise and vibration (drill, excavator etc.) is prohibited between 23 pm and 5 am. If night-time construction is necessary, the contractor will apply for a permit from local authorities and inform residents about coming works beforehand. - At residential areas, temporary noise walls or boards will be used to minimize noise impacts from construction activities near schools, temples, clinics etc. The contractor will specify the locations and type of temporary noise walls before beginning of construction. - Ensure that local authorities and residents are notified in advance about disturbing activities, such as blasting operations. The effectiveness of mitigation activities will be monitored regularly through noise level measuring. - Be responsible for repairing any damage caused as the result of vibrations generated from or by the use of his equipment, plant, and machinery. - Erect temporary noise barriers where schools and other potentially sensitive receptors (as identified during consultation with local residents) are within 50 meters of construction activities. Temporary barriers of sufficient 	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>height with skid footings and a cantilevered upper portion will be erected within a short distance from stationary plants, and at practicable distances from mobile plants.</p> <ul style="list-style-type: none"> - The minimum effective height of the noise barriers should be as such that no part of the noise sources associated with the operation of construction machinery should be visible from the target receptors to be protected. The locations of the temporary noise barriers shall be adjusted where and when necessary taking into consideration the locations and type of receptor involved and the machinery intended to be protected. Use of the proposed noise barriers, as other construction site equipment, should take into account the following standard requirements: - A minimum of 4.5 meter wide thoroughfare with not less than 4.5 meter vertical clearance to be maintained at all times for the free passage of fire appliances; - The barrier shall not be located where it prevents access to community facilities, residential areas, and places of work or access routes. - Ensure that the use of noise sources (i.e., aggregate crushers, operators, etc.) will be avoided as much as possible near sensitive receptors. Non-vibratory rollers (for compaction) will be used near sensitive receptors such as schools and cultural resources. - Ensure that all exhaust systems will be maintained in good working order; properly designed engine enclosures and intake silencers will be employed; and regular equipment maintenance will be undertaken. - Ensure that stationary equipment will be placed as far from sensitive land uses as practical; selected to minimize objectionable noise impacts; and provided with shielding mechanisms where possible. 			
VI.	Waste			
	<ul style="list-style-type: none"> - Waste from construction activities, including the demolishing of structures before the construction itself begins, must be collected and recycled when possible. - The contractor will establish hygienic groups to collect waste from construction camp sites and to ensure the cleanliness of the whole 	Good	Garbage by the workers living in camps at Km 6+150 on 31st August 2012.	Garbage was cleaned by contractor on 5th December 2012.

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>construction area. The contractor will also co-operate with local authorities or companies to organize the waste collection and specify the measures in the site-specific EMP.</p> <ul style="list-style-type: none"> - The EMP will be updated during detailed design and will require that contractors be responsible for spoil disposal in a manner consistent with a site-specific EMP that they will be required to prepare prior to any construction work. Spoils from the works will only be disposed of in selected locations to avoid any adverse impacts to water or soil quality. The locations will be specified by the contractor in the site-specific EMP before the beginning of construction activities. The contractor shall also obtain permission from the authorities to dispose any surplus material or other spoils from the works. 			
VII.	Handling of hazardous and toxic materials			
	<ul style="list-style-type: none"> - During the construction, fuels, oil, and other dangerous chemical substances will be transported, stored and handled at the site. If adequate mitigation measures are not used, there is a risk of spills into the surrounding area. The contractor will apply for appropriate permits for the transport and handling of hazardous materials and prepare an emergency and contingency plan for fuel and oil spillage. Fuel storage sites will be located away from water bodies on a cement pavement with a surrounding canal leading to an oil and grease separator to facilitate the capture and removal of spilled oil. The contractor also ensures that employees are trained on handling hazardous materials. - Fuel storage sites will be located away from water bodies on a cement pavement with embankment. A canal leading to an oil and grease separator will be installed to facilitate the capture and removal of spilled oil. - Use and maintain vehicles and machinery properly to avoid accidental spills. 	Good		
VIII.	Contamination of soil			
	<ul style="list-style-type: none"> - Use good housekeeping practices to avoid any contamination of soil from solid wastes, wastewater and hazardous materials. All wastes shall be disposed in designated disposal sites approved by local authorities. 	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<ul style="list-style-type: none"> - Ensure all workers are aware of the importance of careful handling of hazardous and dangerous materials. Prepare emergency plans for accidents. 			
IX.	Spoils disposal			
	<ul style="list-style-type: none"> - Waste from construction activities, including the demolishing of structures before the construction itself begins, must be collected and recycled when possible. - Establish hygienic groups to collect waste from construction camp sites and to ensure the cleanliness of the whole construction area. - Spoils from the works will only be disposed of in selected locations approved by local authorities. - Disposal shall not cause adverse impacts to water and soil quality as well as land use. - The locations of spoils disposal sites will be specified by the contractor in the site-specific EMP before the beginning of construction activities. 	Good	On the site of package 1a still have a little bit garbage at some locations	The contractor will clean all garbage and sent request to consultant check before taking over certificate.
X.	Erosion			
	<ul style="list-style-type: none"> - Provide temporary or permanent drainage to protect sites susceptible to erosion. - Stabilize downstream slopes on rivers and streams prone to erosion problems. - Protect sensitive surface/erosion prone sites with vegetation and replace removed trees to ensure interception of rainwater and deceleration of surface runoff as soon as possible after construction works. - On streams, downstream slopes can be stabilized with concrete, rock gabions or walls as seen necessary. - Careful stockpiling of topsoil in suitable locations to prevent these from being washed away. - Specify the erosion protection measures to be used in the site-specific EMP. 	Good		
XI.	Loss of vegetation cover			
	<ul style="list-style-type: none"> - Minimize the clearing of vegetation for construction activities and borrow areas. - Re-vegetate embankment slopes and road cuts. - Landscape road verges and plant vegetation to contribute to aesthetic value. - Where roadside trees are lost as a result of construction activities, the Contractor shall replant trees as a ratio of one-to-one. - Where trees cannot be replaced at the roadside due to a lack of roadside space, the Contractor 	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>shall consult with affected residents to determine an appropriate alternative planting location and schedule.</p> <ul style="list-style-type: none"> - The Contractor will be responsible for all works associated with tree planting including maintenance of the trees for a one-year period after planting. 			
XII.	Changes in Hydrological Situation and Irrigation systems			
	<ul style="list-style-type: none"> - Temporary drainage will be established along the expressway to avoid inundation during construction. The contractor shall ensure that activities shall not cause disruption of irrigation into surrounding croplands and that damaged irrigation facilities shall be repaired immediately. - The Contractor shall ensure irrigation channels diverted during the construction phase will be returned to their original status. Where this is not possible, or where channels are irrevocably altered, consultation will be held with landowners to ensure that an adequate redesign is undertaken to ensure that irrigation channels are returned as closely as possible to their former layout. The Contractor will undertake all necessary works to achieve this status, including provision of labor. 	Good		
XIII.	Traffic conditions and use of waterways			
	<ul style="list-style-type: none"> - Contractor to formulate and implement a traffic management plan minimizing the disturbance caused by construction activities. The plan shall explain the means and methods to be taken for proper and adequate control of traffic during the course of the Works. This plan shall include but not be limited to the traffic control equipment the Contractor proposes to use for the Works; traffic control signage including location and sign descriptions; how and when the Contractor proposes to use traffic control flag men; traffic control means during no-working periods; and traffic control means and devices for night and off-hour periods. - The contractor shall also ensure implementation of the following measures: that the traffic management plan shall comply with the traffic control provisions with regard to: <ul style="list-style-type: none"> a. General traffic management requirements b. Temporary road works c. Traffic control d. Number of lanes for traffic control 	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<ul style="list-style-type: none"> e. Half-width construction f. Extraordinary traffic g. Vertical clearance h. Materials for traffic control devices - In order to facilitate traffic through or around the Works, or wherever ordered by the ESC, the Contractor shall erect and maintain at prescribed points on the Works and at the approaches to the Works, traffic signs, lights, flares, barricades, rubber cones with traffic lamps, temporary signaling stations on river, and other facilities as necessary or required by the ESC for the proper direction and control of traffic. - As necessary for proper control of traffic or when/ where directed by the ESC, the Contractor shall furnish and station competent flagmen whose sole duties shall consist of directing the movement of traffic through or around the Works. - Furnish and erect, within or in the vicinity of the project area, such warning and guide signs as may be necessary or ordered by the ESC. - In order to minimize disruption to traffic flows the Contractor shall enclose the site with temporary fence to provide a visual barrier between his work and adjacent traffic. The temporary fence shall be two meters high and the movement of men, materials and plant into and out of the barrier area shall be controlled by flagmen - Organize temporary means of access to avoid such short-term negative impacts. Maintain local roads and bridges used by construction vehicles. 			
XIV.	Historic and Cultural Resources			
	<ul style="list-style-type: none"> - Protect sites of known antiquities, historic and cultural resources by the placement of suitable fencing and barriers. - Not locate construction camps within 500 meters from cultural resources. - Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Vietnam. - In the event of unanticipated discoveries of cultural or historic artifacts (movable or immovable) in the course of the work, the Contractor shall take all necessary measures to protect the findings and shall notify the ESC / ESO and concerned provincial-level and central government level representatives. If 	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	continuation of the work would endanger the discovery, work shall be suspended until a solution for preservation of the artifacts is agreed upon.			
XV.	Utilities			
	<ul style="list-style-type: none"> - Ascertain and take into account, in the method of working, the presence of utility services on and in the vicinity of the site. - Take into account the periods required to locate, access, protect, support and divert all utility services, including any periods of notice required to affect such work in consultation with authorities operating such services. - Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the project site. - Exercise the greatest care at all times to avoid damage to or interference with services. - The contractor shall assume responsibility for any damage and/or interference caused by them, their agents, directly or indirectly, arising from actions taken or a failure to take action, and for full restoration of the damage. - Wherever existing ground surfaces are to be disturbed for construction of the works, carry out full and adequate preliminary investigations to locate all services in the area by means of hand-dug trial holes and trenches in combination with electronic and electro-mechanical devices, where appropriate. Each service thus exposed shall be identified. Every service at risk shall be fully exposed and adequately protected and supported in situ or diverted to the satisfaction of the appropriate authority prior to the commencement of such construction. - When working in the vicinity of overhead power cables, ascertain and satisfy safety requirements about the safe clearances to be maintained from the power cables in consultation with the authority operating the power line. Where existing overhead power lines, communications cables or other major utilities require relocation, the Contractor will use the services of specialist enterprises with the necessary skills and technology to carry out the work. - The Contractor will consult with Provincial Departments of Transportation (PDOTs) to determine the proposed schedule for future 			

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	utilities works on the Project Road. If such works, i.e. cable laying, is proposed in the near future the Contractor should propose an appropriate works schedule to synchronize such activities and reduce potential disruption.			
XVI.	Safety			
	<ul style="list-style-type: none"> - Ensure that safety, rescue and industrial health matters are given a high degree of publicity to all persons who are regularly or occasionally on the site. Posters, in both Vietnamese and English, drawing attention to site safety, rescue and industrial health regulation shall be made or obtained from the appropriate sources and shall be displayed prominently in relevant areas of the site. - Basic medical care shall be provided at camp sites. A fully equipped first aid base shall be set up. Arrangements for emergency medical services shall be made to the satisfaction of the ESC and ESO..Workers shall be provided with potable water supply and appropriate protective equipment. Work camps shall be provided with facilities to ensure the safety of workers, e.g., fire-fighting equipment, adequate storage for hazardous materials, and contingency measures in case of accidents. - Borrow pits shall be constructed with proper drainage to prevent the creation of mosquito-breeding sites. Upon completion of extraction activities, the contractor will restore borrow pits through dewatering and installation of fences, as appropriate, to minimize health and safety risks. Borrow pits will be left in a tidy state with stable side slopes and proper drainage in order to avoid creation of stagnant water bodies. - Contractors shall ensure that blasting activities shall not cause damage to lives and properties by making sure that the area is clear, adequately warning people using sirens and other appropriate means, and stopping at a safe distance in case blasting is near the road. - Implement a Safety Training Program consisting of: <ul style="list-style-type: none"> a. Initial Safety Induction Course b. Periodic Safety Training Courses c. Safety Meetings d. Safety Inspections e. (e) Safety Equipment and Clothing 	Fair	<p>- Package 1b on 03rd October at Pier T142: two workers of construction team belong to Sub-contractor (CiencoLan Company) died.</p> <p>The reason of accident: at 11:30AM when crane was moving at pier T142 the chain of crane is broken, driver stopped the machine for checking. However, during checking and repairing, the operator could not be controlled the lifting system of crane therefore the rod was risen to high place and falling backward. At that time, after crane there are four workers of Ciencoland</p>	<p>- The Contract or deal with accident on site: Local police investigated and confirmed reason of the accident</p> <p>Safety management of the construction team was checked meeting and training on reason of accident and preventives measures were held.</p>

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
			<p>company were preparing plan at pier T142. The rod fell down and hit to 01 workers. The contractor took 2 workers to hospital for first aid. At 01:00PM, hospital notified that, they are dead. The first reason was determined: the driver is careless when controlling the situation causing this unfortunate case.</p> <p>- Package 1b: 9:30AM on 07th December 2012: Occurred violent accident to Consultant's inspector on construction site of Pk1a: there were four outsiders attacked him and he was injured on his face.</p>	<p>- The method violent accident control: Security system improved, professional security guards mobilized to stay at entrance to control people come in to the site. Workers on site had ID card and enough PPEs. Safety officers were increase for checking working condition and security condition to protect</p>

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
				people during working period.
XVII.	Social impacts Consultation and Complaints Procedures			
	<ul style="list-style-type: none"> - Provide local community information on upcoming construction related activities and issues related to traffic safety. - Record any complaints received and respond to them promptly. - Co-operate with local authorities to prevent and solve problems related to environmental issues. 	Good		

Note:

1. Very good: mitigations are fully effective
2. Good: mitigations are generally effective
3. Fair: mitigations are partially affective
4. Poor: mitigations are generally ineffective
5. Very poor: mitigations are completely ineffective

4. SUMMARY OF ENVIRONMENTAL MONITORING

4.1. Environmental Monitoring by CSC

4.1.1. Monitoring program

a. *Monitoring Items:*

Monitoring items include air quality, noise, vibration, surface water quality, groundwater quality, soil and wastewater.

b. *Environmental reference standards:*

The environmental standards to be referred were updated in line with recent Vietnamese standards from the EMP as follows.

Table 2. Environmental standards

No	Environmental component	Environmental standard
1	Air quality	QCVN 05:2009/BTNMT “ National Technical Regulation on ambient air quality” QCVN 06:2009/BTNMT “ National Technical Regulation on hazardous substances in ambient air”
2	Noise	QCVN 26:2010/BTNMT – National technical regulation on noise
3	Vibration	QCVN 27:2010/BTNMT – National technical regulation on vibration
4	Surface water	QCVN 08:2008/BTNMT “ National Technical Regulation on surface water quality”
5	Ground water	QCVN 09:2008/BTNMT “ National Technical Regulation on groundwater quality”
6	Soil	QCVN 03:2008/BTNMT “ National Technical Regulation on soil quality”
7	Industrial Wastewater	QCVN 40:2011/BTNMT “National Technical Regulation on industrial waste water”
8	Domestic wastewater	QCVN 14:2008/BTNMT “National Technical Regulation on domestic waste water”

c. Monitoring Locations

Monitoring locations of air, noise, vibration, surface water, groundwater and soil are selected for most affected areas during construction and operation stages. The monitoring of wastewater will be carried out during only construction stages for affected area. The monitoring locations are summarized as following table. Map of sampling location is presented in the Appendix 1.

Table 3. Monitoring locations

No.	Location	Sample No	Pk1a	Pk1b	Pk2	Pk3
I.	Air, Noise, Vibration					

No.	Location	Sample No	Pk1a	Pk1b	Pk2	Pk3
1	Intersection Nguyen Duy Trinh Street with HLD Expressway	A1	6+150			
2	Truong Khanh Shrine (Near Residential Area)	A2			11+300	
3	Long Thanh town near NH51	A3				23+300
II.	Surface Water					
1	Ong Nhieu river (Ong Nhieu bridge)	SW1-1, SW1-2	7+100			
2	Tac river (Song Tac bridge)	SW2-1, SW2-2		10+400		
3	Dong Nai river (Long Thanh bridge)	SW3-1, SW3-2			12+600	
4	Dong Mon bridge (Dong Mon river)	SW4-1, SW4-2				21+350
III.	Groundwater					
1	Tan Dien A Hamlet – Phu Huu (District 9)	GW1-1, GW1-2, GW1-3	5+250			
2	Long Phuoc Ward, near Dong Nai river	GW2-1, GW2-2, GW2-3		10+400		
3	Long Thanh Town	GW3-1, GW3-2, GW3-3				23+300
IV.	Soil					
1	Phu Huu Ward, District 9, HCMC (Land bank)	S1-1, S-2, S1-3	4+200			
2	Truong Khanh ward, district 9	S2-1, S2-2, S2-3			11+300	
3	Long Thanh Town	S3-1, S3-2, S3-3				23+300
V.	Wastewater					
		WW1-1, WW1-2, WW1-3	4+350, 4+980	-	-	-

No.	Location	Sample No	Pk1a	Pk1b	Pk2	Pk3
			5+480			
		WW2-1, WW2-2, WW2-3	-	7+900 10+300 10+500	-	-
		WW3-1, WW3-2, WW3-3	-	-	11+500 12+300 12+900	-
		WW4-1, WW4-2, WW4-3	-	-	-	18+300 19+100 21+350

d. Monitoring Schedule

The environmental monitoring is quarterly carried out during the construction stage and semiannually during the defect liability period of operation stage. The environmental monitoring schedule described in the EMP is summarized as follows.

Table 4. Monitoring schedule

Year	Month	Package 1a	Package 1b	Package 2	Package 3
2009	12	X/1 (Initial Survey)			
2010	3	X/2	X /1 (Initial Survey)	X /1 (Initial Survey)	X /1 (Initial Survey)
	6	X/3	X/2	X/2	X/2
	9	X/4	X/3	X/3	X/3
	12	X/5	X/4	X/4	X/4
2011	3	X/6	X/5	X/5	X/5
	6	X/7	X/6	X/6	X/6
	9	X/8	X/7	X/7	X/7
	12	X/9	X/8	X/8	X/8
2012	3	X/10	X/9	X/9	X/9
	6	X/11	X/10	X/10	X/10
	9	X/12	X/11	X/11	X/11
	12			X/12	X/12

2013	3	X/13	X/12	X/13	X/13
	9	X/14	X/13	X/14	X/14
2014	3	X/15	X/14	X/15	X/15
	9		X/15	X/16	X/16
2015	3			x/17	x/17



: Construction period (PK-1a & 1b=32 months, PK-2 & 3= 36 months)



: Operation period (Defect liability Period=24 months)

X/No : The month when the environmental monitoring will be conducted.

4.1.2. Monitoring Result

According to the schedule, in December 2012, the environmental monitoring work in construction stage for Pk1a and Pk1b completes. And only the monitoring work for Pk2 and 3 is still ongoing.

a. Package 1a

▪ Result of monitoring in September 2012

* Air quality

- The net result of analyses shows that: the value of CO, SO₂ and HC: from 6am to 10pm, in average per 1 hour, were under the allowable values in QCVN05:2009/BTNMT and QCVN06:2009/BTNMT.
- The NO₂ content both 6-18h and 18-22h are 0.22, higher than allowable value (0.2) according to QCVN05:2009/BTNMT. This value was 1.1 times. The cause may be that it was sunny in the time of monitoring and there were many heavy trucks transporting construction materials.

* Noise

- According to the QCVN26:2010/BTNMT: From 6h to 21h: Noise level was higher than allowable value (2.78dBA) was 1.04 times. From 21h to 22h: Noise level was higher than allowable value (17.57dBA) was 1.32 times.
- In the night time, although the site was not working but the noise level was also high. The noise was high causing by high density of heavy loading

trucks for building material transportation in this area. Private houses living near the road (at distance of 15m) so it was possible for them to have a significant effect of noise.

*** Vibration**

- From 6h to 21h and 21h to 22h: Vibration level was lower than allowable value following QCVN27:2010/BTNMT.

*** Surface water**

- SS value at both 4 positions (SW1-1, SW1-2, SW1-3, SW1-4) was together higher than allowable value according to QCVN08:2008/BTNMT was 1,4 times, 1,6 times, 1,3 times and 2,1 times. In these positions, the SS contents often are higher than allowable value.
- Coliform value at both 2 positions (SW1-3 and SW1-4) together higher than allowable value according to QCVN08:2008/BTNMT were 1,47 times and 2,8 times.
- All of others parameters met the allowable levels.

*** Underground water quality**

The results of analyses for three underground water samples have shown that:

- pH level at two underground water samples GW1-1 and GW1-2 did not meet QCVN09:2008/BTNMT that was from 4.92 to 5.01 lower than allowable value about 0,5 and 0,38.
- Coliform value at GW1-1, GW1-2 and GW1-3 position was higher than allowable value according to QCVN09:2008/BTNMT were 31 times, 16 times and 153 times. There was a sign of underground water that was contaminated by Fecal Coliform in all three samples.
- The parameters of pH, Coliform and Fecal Coliform in underground water samples in the region are often out of allowable ranges. However, this underground water was used by the local residents.
- All of other parameters met the allowable levels according to QCVN09:2008/BTNMT.

*** Soil quality**

- All of other parameters met the QCVN03:2008/BTNMT.

*** Waste water**

- Coliform value in W1-3 position higher than allowable in QCVN40:2011/BTNMT column B was 15 times. The cause from this sampling location next sewer of breed pigs and poultry, may be these was the source cause increase Coliform content.
- All of other parameters met the QCVN40:2011/BTNMT.

b. Package 1b

▪ Result of monitoring in September 2012

*** Surface water quality**

- Compare with QCVN08:2008/BTNMT Column B1 show that most of parameters were analyzed meet regulation, except:
- Coliform value at SW2-1 was 2.4×10^4 higher than allowable value 3.2 times
- TSS value at SW2-3 was 54 higher than allowable value 1.01 times.

*** Underground water**

- The content of Cl⁻ in GW2-1; GW2-2; GW2-3 samplings was higher allowable value from 2, 2 times, 3,4 times and 3.6 times. The high Cl⁻ concentration was possibly caused by natural impacts (for salt intrusion and high conductivity).
- Underground water samples GW2-3: Fe was 14,6 mg/l, higher allowable value 2,92 times.
- Underground water samples GW2-1, GW2-2 and GW2-3: Mn was higher allowable value are 1,3 time, 1.1times and 2,06 times.
- Analyzed results of underground water in package 1b show that the concentrations of Cl⁻, Fe, Mn are always higher than allowable values. The cause may be from natural resources of the underground water in this area.
- Coliform at GW2-1 was 23, higher than allowable value from 5,8 times and at GW2-2 was 460 higher allowable value from 153 times, underground water samples in three locations were contaminated by Fecal Coliform.

- However, the above fresh water resource was not used for domestic using but only for watering the plants and for washing vehicles...

- * **Waste water**

- The analyzed wastewater sample values compared to QCVN40:2011/BTNMT show that most of results met the regulation, except Coliform value at W2-3 were higher than allowable limit 2,2 times.

c. Package 2

- **Result of monitoring in September 2012**

- * **Air quality**

- The contents of dust, NO₂, SO₂, CO and HC: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009/BTNMT and QCVN06:2009/BTNMT.

- * **Noise**

- From 6h to 21h and 21h to 22h: Noise level was lower than allowable value of QCVN26:2010/BTNMT.

- * **Vibration**

According QCVN27:2010/BTNMT (applied for a normal area):.

- 6h to 21h: Vibration level is lower than allowable value.
- 21h to 22h: Vibration level was lower her than allowable value but higher than initial level measured on Mar, 2010 (due to the initial level measured on Mar, 2010 is very low).
- The monitoring location now had little means of transportation at a distance of within 500m. However, it now was not still to be affected by the project's activities. The noise and vibration levels were depended by the time of monitoring and number of motorcycles in the area.

- * **Surface water quality**

- According to QCVN08:2008/BTNMT (Applied column B1: Used for irrigation or other purposes such as water carriage):
- All of others parameters was under according to QCVN08:2008/BTNMT.

- * **Soil quality**

- The analyzed results of environmental parameters met the QCVN03:2008/BTNMT - For land of people's livelihood.

- * **Waste water**

- The most of parameters were meeting the QCVN40:2011/BTNMT

- **Result of monitoring in December 2012**

- * **Air quality**

- The contents of dust, NO₂, SO₂ and CO: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009/BTNMT.

- * **Noise**

- According to the National technical regulation on noise QCVN26:2010/BTNMT (applied for normal areas): from 6:00AM to 21:00 and 21:00 to 22:00: Noise level is lower than allowable value.

- * **Vibration**

- According QCVN27:2010/BTNMT (applied for a normal area):
 - + From 6:00AM to 21:00: Vibration level is lower than allowable value.
 - + From 21:00 to 22:00: Vibration level is lower her than allowable value but higher than initial level measured on Mar, 2010 (due to the initial level measured on Mar, 2010 is very low).

- * **Surface water**

- According to QCVN08:2008/BTNMT (Applied column B1: Used for irrigation or other purposes such as water carriage):
 - + Coliform value at SW3-1 and SW3-1 were 1,5x10⁴, 4,6x10⁵MPN/100ml that higher than allowable limit 2 times and 61 times.
 - + DO value at SW3-1, SW3-2, SW3-3, SW3-4 were 3,77mg/l, 3,69 mg/l, 3,62mg/l, 3,79mg/l that not meet allowable limit.
- Most of others parameters are under according to QCVN08:2008/BTNMT.

- * **Soil quality**

The analyzed results of environmental parameters are meeting the QCVN03:2008/BTNMT - For land of people's livelihood.

*** Waste water**

- The analyzed wastewater sample values have been compared with QCVN40:2011/BTNMT (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving water body not using for domestic water supply) show that most of parameters are meet the QCVN40:2011/BTNMT.

d. Package 3

▪ Result of monitoring in September 2012

*** Air quality**

- The content of dust was higher allowable value about 2 times. This dust content was lower than the dust content in initial environment.
- The causing may be the monitoring location is near National Highway No.51 where there are a lot of transportation.
- The content of NO₂ higher allowable value about 1.2 times
- The contents of SO₂, CO and HC : The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009/BTNMT and QCVN06:2009/BTNMT.

*** Noise**

- According to the National technical regulation on noise 26-2010 (applied for a normal area):
- 6h to 21h: Noise level was lower allowable value
- 21-22h: Noise level was 68.9 higher than allowable value (55), about 1.27 times.
- The monitoring result has no much change compared to the previous time. This was caused by many means of transportation on the route.

*** Vibration**

- According to the National technical regulation on vibration QCVN27-

2010//BTNMT (applied for a normal area):

- 6h to 21h: Vibration level was lower than allowable value..
- 21h to 22h: Vibration level was higher than allowable value but higher than initial level measured about 1.53 and 1.57 times. (due to the initial level measured on Mar, 2010 was very low)

*** Surface water quality**

- According to QCVN08:2008/BTNMT (Applied column B1: Used for irrigation or other purposes such as water carriage):
- DO parameter of value at SW4-4 are 3.92 was not met allowable limit.
- All of others parameters was under according to QCVN08:2008/BTNMT

*** Underground water**

- pH value at GW3 – 2 (5.43) weren't in allowable limit (5.5-8)
- Cl- value at GW3 – 1 and GW 3-2 was higher allowable value to 1.39 and 2.2 times.
- The content of NO2 at GW3-2 sample was higher allowable value 19.3/15 about 1.29 times.
- The Coliform value was higher than allowable value many times in three samples.
- The Fecal coilorm value in these three underground samples were rather high, from <3MNP/100ml to 4800MNP/100ml (the allowable value stated in QCVN09:2008/BTNMT is 0MNP/100ml)
- The underground water samples contaminated by Coliform and Fecal Coliform. It is harmful for health if using this water for domestic activities. It is recommended for local residents and project's staffs to treat this water before using.

*** Soil quality**

- The analyzed results of environmental parameters met the QCVN03:2008/BTNMT - For land of people's livelihood

*** Waste water**

The analyzed wastewater sample values compared with QCVN40:2011/BTNMT (column B - The maximum allowable value of

contaminants in Industrial wastewater when the receiving water body not using for domestic water supply) show that:

- SS value at W4-1 was higher allowable limit 1.61 times.
- All of others parameters was under according to the QCVN40:2011/BTNMT

▪ **Result of monitoring in December 2012**

* **Air quality**

The analysis results compared with QCVN05:2009/BTNMT showed that:

- The content of dust was higher allowable value about 1,07 times. This dust content was lower than the dust content in initial environment.
- The causing may be the monitoring location was near National Highway No.51 where there were many vehicles transporting goods from Vung Tau to industrial parks and on the contrary, in addition, the hot sun and low humidity conditions make more dust in the air environment.
- The content of NO₂ higher allowable value about 1,2 times
- The contents of SO₂, CO: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009/BTNMT.

* **Noise**

According to the QCVN26:2010/BTNMT (applied for a normal area):

- From 6:00AM to 21:00: Noise level was lower allowable value.
- From 21:00 to 22:00: Noise level was 70,4(dBA) higher than allowable value (55dBA), about 1,28 times. But, initial level measured (74,67dBA) was higher than this time.

The monitoring result has no much change compared to the previous time. This was caused by many means of transportation on the route, mainly heavy trucks (route Vung Tau – TP.HCM).

* **Vibration**

According to the National technical regulation on vibration QCVN27:2010/BTNMT (applied for a normal area):

- From 6:00AM to 21:00: Vibration level was 43,3 lower than allowable value (75dB). But, initial level measured (33,9 dB) was lower than this time.
- From 21:00 to 22:00: Vibration level was 26,37 dB higher than allowable value 28,6 but higher than initial level measured.

*** Surface water**

According to QCVN08:2008/BTNMT (Applied column B1: Used for irrigation or other purposes such as water carriage):

- TSS value at SW4-1, SW4-2, SW4-3 were 51,2mg/l, 67,4 mg/l and 72,4 mg/l higher than allowable limit 1,02 times, 1,344 times and 1,448 times.
- Coliform value at SW4-1, SW4-2, SW4-3 were 7,5x10⁴, 1,1 x 10⁴ and 9,3x10⁴MPN/100ml higher than allowable limit 10 times, 1,47 times and 12,4 times.
- DO value at both SW4-1,SW4-4 were 3,97not in allowable limit, this value was very small.
- All of others parameters is under according to QCVN08:2008/BTNMT.

*** Underground water**

- pH value at GW3-1 (5.34) was not in allowable limit (5.5-8)
- Cl- value at GW3-1 (432,5mg/l) and GW3-2(391,8mg/l) were higher allowable value from 1.73 to 1,57 times.
- Coliform value in all of three underground samples is always higher than allowable value.
- Fecal coilorm value in these three underground samples was quite high, from <3MNP/100ml to 4800MNP/100ml (the allowable value stated in QCVN09:2008/BTNMT is 0MNP/100ml)

Underground water samples contaminated Coliform and Fecal Coliform. This groundwater shall be treated before using.

*** Soil quality**

- The analyzed results of environmental parameters meet the QCVN03:2008/BTNMT - For land of people's livelihood.

*** Waste water**

The analyzed wastewater sample values compared to QCVN40:2011/BTNMT

(column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving water body not using for domestic water supply) show that:

- SS value at W4-1, W4-2,W4-3 was higher allowable limit 1,73, 1,86 and 15times.
- Coliform value at W4-1, W4-2,W4-3 were $7,5 \times 10^4$, $9,3 \times 10^3$ and $7,5 \times 10^4$ MPN/100ml. These values were higher allowable limit 1,73 times, 1,86 times and 15 times.
- All of others parameters is under according to the QCVN40:2011/BTNMT

4.2. Environmental Monitoring by Contractors

4.2.1. Monitoring Program

According to the Clause 2 - Environmental Monitoring - Section 01300 – Volume 3 of Tender Document, the contractor shall implement environmental monitoring work in two phases: prior to the start of construction and during construction.

Table 5. Environmental monitoring plan of contractors

TT	Item	Pk1a	Pk1b	Pk2	Pk3
1	Air (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
2	Noise (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
3	Vibration (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
4	Surface water quality (2 samples/point)	3 points: Km 4+440 Km 5+480 Km 7+100	3 points: Km 8+350 Km 9+300 Km 10+450	1 point: Km 12+600	5 points: Km 14+600 Km 16+100 Km 18+300

TT	Item	Pk1a	Pk1b	Pk2	Pk3
					Km 19+200 Km 21+250
5	Ground water quality (1 sample/point)	1 point: Km 6+200	1 point: Km 7+800	1 point: Km 11+800	1 point: Km 23+150
6	Soil quality (1 sample/point)	1 point: Km 4+450	1 point: Km 8+000	1 point: Km 11+800	1 point: Km 23+150
7	Excavated soil (1 sample/point)	1 point	1 point	1 point	1 point

The monitoring of construction contractors is carried out every three months as shown in table 6.

Table 6. Environmental monitoring schedule of contractors

Monitoring	Pk1a	Pk1b	Pk2	Pk3
1 st monitoring (Baseline monitoring)	03/2010	06/2010	07/2010	07/2010
2 nd monitoring	06/2010	09/2010	10/2010	10/2010
3 rd monitoring	09/2010	12/2010	01/2011	01/2011
4 th monitoring	12/2010	03/2011	04/2011	04/2011
5 th monitoring	03/2011	06/2011	07/2011	07/2011
6 th monitoring	06/2011	09/2011	10/2011	10/2011
7 th monitoring	09/2011	12/2011	01/2012	01/2012
8 th monitoring	12/2011	03/2012	04/2012	04/2012
9 th monitoring	03/2012	06/2012	07/2012	07/2012
10 th monitoring	06/2012	09/2012	10/2012	10/2012
11 th monitoring	09/2012	12/2012	01/2013	01/2013

4.2.2. Monitoring Result

a. Monitoring results of package 1a

Package 1a was completed construction work therefore the results of monitoring in September 2012 was the last time of monitoring in construction stage. The monitoring results in September 2012 are summarized as follows:

* **Air quality**

The concentrations of parameters to assess the pollution such as: CO, SO₂, NO₂ monitored at three sampling locations in three times in construction phase in Sep/2012 were a little higher than the results measured in the pre-construction phase but fully satisfy the limited values in National technical regulation on ambient air quality QCVN 05:2009/BTNMT.

* **Noise**

The changes in noise level in 3 monitoring locations in three times (working hours, rush hours, resting time) all these average results lower than the average result in the pre-construction phase and meet the National technical regulation QCVN 26:2010/BTNMT.

* **Vibration**

The vibration results measured in three monitoring locations A-1, A-2 and A-3 in construction phase in working hours, rush hours, resting time in Sep/2012. These values were higher than the range of baseline value measured in pre-construction phase. However, all values in this month were lower the limited value in the National technical regulation QCVN 27:2010/BTNMT.

* **Surface water**

In conclusion, surface water quality at project area in Sep/2012 had signs of micro pollutants slightly. Most of values to assess of pollution parameters such as COD, BOD, Coliform at monitoring locations in both tide periods were consistent with the limitation value of QCVN 08:2008/BTNMT-level B1. In comparison with the baseline values in pre-construction phase, water quality in Sep/2012 was much better because monitoring results of organic matter DO, BOD, COD, nutrient pollution in Sep/2012 were lower than baseline values.

* **Underground water**

Groundwater quality at project area measured in construction phase in Sep/2012 was rather good. Most of parameters met the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except parameter Cl⁻, Mn and pH.

* **Soil quality]**

Heavy metal concentrations of soil were low but some value higher than the baseline value (Cu, Zn, Fe). The results of analysis of pollution indicators in Sep/2012 were satisfy the limited values in the Regulation QCVN 03:2008/BTNMT.

b. Monitoring results of package 1b

▪ The monitoring result in September 2012 is summarized as follows:

*** Air quality**

In general, air environment quality in project area was rather good. The concentrations of pollution parameters such as TSP, SO₂, NO₂, CO monitored at two sampling positions in three times in September 2012 still fully satisfy the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.

*** Noise**

The results of noise at 2 locations in three times (from 15:00 to 16:00PM, from 17:30 to 18:30PM and from 22:00 to 23:00PM) in September 2012 showed that most values measured lower than the limited level of QCVN26:2010/BTNMT.

*** Vibration**

15:00-16:00: The vibration results measured in two monitoring positions A4 and A5 in construction phase in September 2012 were in range of 51.7 to 52.8dB (from 15:00PM to 16:00PM), range of 47.4 to 50.3 dB (from 17:30 to 18:30PM) and range of 41.5 to 47.6 dB (from 22:00-23:00PM). They changed insignificantly in comparison with the baseline values and lower than QCVN 27:2010/BTNMT.

*** Surface water**

In conclusion, surface water quality at project area in September 2012 has sign of micro-organism pollution. Some of these measurements as DO, SS, BOD, lubricant satisfy the limited values but some location of COD little higher than the limited values of QCVN 08:2008/BTNMT-level B1. The main reason was due to the impact of storm water runoff. But comparison with the values in

pre-construction phase water quality in September 2012 still relatively good. Result of BOD, COD, SS in September 2012 were lower than result baseline.

*** Underground water**

Groundwater quality at project area measured in construction phase in September 2012 was quite good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except Cl-(754.2 mg/L) and Mn (0.894 mg/L).

*** Soil quality**

Heavy metal concentrations of soil are low. All these results were within the limited values in the Regulation QCVN 03:2008/BTNMT. In comparison with the survey results in the pre-construction phase most of the results in September 2012 change insignificantly.

■ The monitoring result in December 2012 is summarized as follows:

*** Air quality**

In general, air environment quality in project area was rather good. The concentrations of pollution parameters such as TSP, SO₂, NO₂, CO monitored at two sampling positions in three times in December 2012 still fully satisfy the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.

*** Noise**

Most of the noise level (L_{EQ}) were higher than baseline value at this time (September 2012) but still lower than the National technical regulation QCVN26:2010/BTNMT (70dBA).

*** Vibration**

The vibration results measured in two monitoring positions A4 and A5 in construction phase in December 2012 as follows:

- From **15:00 to 16:00**: The vibration results vary from 48.5 to 49.5 dB
- From **17:30-18:30**: The vibration results vary from 46.3 to 48.7 dB
- From **22:00-23:00**: The vibration results vary from 42.1 to 42.5dB

They are higher than the baseline date. However, these values are lower than the limited value (75 dB) in the National technical regulation QCVN 27:2010/BTNMT.

*** Surface water**

Surface water quality at project area in December 2012 has sign of micro-organism pollution. Some of these measurements as CO, DO, SS, BOD, lubricant satisfy the limited values of QCVN 08:2008/BTNMT-Column B1. Surface water quality were still relatively good in December 2012 when comparison with the values in pre-construction phase. Result of DO, BOD, COD, SS in December 2012 are lower than result baseline.

*** Underground water**

Groundwater quality at project area measured in construction phase in December 2012 was rather good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except for Cl⁻ (968.7mg/L) and Mn (0.763 mg/L).

*** Soil quality**

Heavy metal concentrations of soil were low. All these results were within the limited values in the Regulation QCVN 03:2008/BTNMT. Comparison with the survey results in the pre-construction phase most of the results in December 2012 change insignificantly.

c. Monitoring results of package 2

▪ **The monitoring result in July 2012 is summarized as follows:**

*** Air quality**

Air environment quality in project area is rather good. The concentrations of indicators pollution parameters such as TSP, SO₂, NO₂, CO monitored at two sampling positions in three times in construction phase still fully satisfy the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.

*** Noise**

The results of noise at 2 points (A-6, A-7) in 3 different times as follows:

- A-6: $L_{EQ} = 60,2$ dBA (15:00-16:00); $L_{EQ} = 55,1$ dBA (17:30-18:30); $L_{EQ} = 49,3$ dBA (22:00-23:00).
- A-7: $L_{EQ} = 57,3$ dBA (15:00-16:00); $L_{EQ} = 55,7$ dBA (17:30-18:30); $L_{EQ} = 56,3$ dBA (22:00-23:00).

Most of these values were higher than baseline dates on construction stage. But these results meet Vietnamese Regulation QCVN 26:2010/BTNMT.

* **Vibration**

The vibration results measured at two monitoring positions A-6 and A-7 in construction phase in July 2012 as follows:

- From 15:00 to 16:00: vibration level varies within 46,2 to 54,3 dB.
- From 17:30 to 18:30: vibration level varies within 42,8 dB to 52,8 dB
- From 22:00 to 23:00: vibration level varies within 38,5 to 45,6 dB

These results were higher than baseline date. However, these values are lower than the limited values in Vietnamese Regulation QCVN 27:2010/BTNMT.

* **Surface water**

Monitoring results show that surface water quality of Dong Nai River at project area did not meet a part of domestic water supplying purpose. Some monitoring results of BOD, COD, NO_3^- and Coliform were over the limited values of QCVN 08:2008/BTNMT-Column A2. The cause of such mutations on the results was due the weather conditions, the rains lead to many organic substances, and time of monitoring in the construction is operating at position W8, together with the high tide. These demonstrate the operation of the project activity did not significantly affect to the air environment surrounding the project.

* **Underground water**

Groundwater quality at project area was quite good. All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.

* **Soil quality**

All these results of soil monitoring in construction phase are lower than the limited values in the Regulation QCVN 03:2008/BTNMT.

▪ **The monitoring result in October 2012 is summarized as follows:**

* **Air quality**

Air environment quality in project area was rather good. The concentrations of indicators pollution parameters such as TSP, SO₂, NO₂, CO monitored at two sampling positions in three times in construction phase still fully satisfy the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.

* **Noise**

The results of noise monitoring at 2 locations (A6 and A7) in three time (working hours, rush hours and resting time) however at certain times there were some results higher than baseline data but they were lower than Vietnamese Regulation QCVN 26:2010/BTNMT.

* **Vibration**

The vibration results measured at two monitoring positions A-6 and A-7 in construction phase in October 2012 are showed as follows:

- From 15:00-16:00PM: range of 44.6 to 51.7 dB. These values are although higher than the baseline value measured in pre-construction phase (44.1 to 46.2 dB) but they were still lower than the Vietnamese Regulation QCVN 27:2010/BTNMT.
- From 17:30-18:30PM and from 22:00- 23:00PM: The results measured at two monitoring positions A-6 and A-7 in construction phase in October 2012 were higher than the baseline value (48.5 dB). However, these values were below the limited in the Vietnamese Regulation QCVN 27:2010/BTNMT.

* **Surface water**

Monitoring results showed that surface water quality of Dong Nai River at project area did not meet a part of domestic water supplying purpose. Some monitoring results of BOD, COD, NO₂- and Coliform were over the limited values of QCVN 08:2008/BTNMT-Column A2.

* **Underground water**

Groundwater quality at project area was quite good. All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.

*** Soil quality**

All these results of soil monitoring in construction phase were lower than the limited values in the Regulation QCVN 03:2008/BTNMT.

d. Monitoring result of package 3

▪ **The monitoring result in July 2012 is summarized as follows:**

*** Air quality**

Collectively, the concentrations of some pollution parameters such as TSP, SO₂, NO₂, ... monitored at three positions in six times in July 2012 were higher than results in pre – construction phase but they are lower than that in April 2012. It shows that the ambient air was not impacted by operation of project. However, all of values meet Vietnamese Regulation QCVN 05:2009/BTNMT applied for ambient air and QCVN 06:2009/BTNMT applied for hazardous gases.

*** Noise**

LEQ values recorded at three monitoring locations in construction phase in July 2012 in 6 times were lower than the limitation value (70 dBA) in the National Technical Regulation on noise QCVN 26:2010/BTNMT.

*** Vibration**

The results of vibration level at 3 monitoring location (NVA-1, NVA-2, NVA-3) in 6 times in July 2012 were in range of 35.7 – 58.1 dB. They fully meet the limited value 75dB of the National Technical Regulation on vibration QCVN 27:2010/BTNMT

*** Surface water**

Surface water quality at project area in July 2012 has a pollution sign of organic and micro-organism. Some of parameters (such as DO, COD, BOD, SS and coliform) not meet the limited values of QCVN 08:2008/BTNMT-level B1. In

comparison with the baseline values in July 2012 these values have change (Surface water quality at project area is little good).

* **Underground water**

All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.

* **Soil quality**

Results of soil monitoring in July 2012 are quite good. All of these results meet the limited values in the Regulation QCVN 03:2008/BTNMT. In comparison with the survey results in the pre-construction phase, most of the results in this period were change insignificantly. This shows that soil quality in the project area is not affected by the activities of the project.

▪ **The monitoring result in October 2012 is summarized as follows:**

* **Air quality**

Collectively, the concentrations of some pollution parameters such as TSP, SO₂, NO₂,... monitored at three sampling positions in six times in October 2012 were higher than results in pre – construction phase and they were higher than that in July 2012. It showed that the operation of the project was affect to the surrounding air environmental. However, all of values meet with the limited values in the Vietnamese Regulation QCVN 05:2009/BTNMT applied for ambient air environment quality and QCVN 06:2009/BTNMT applied for hazardous gases.

* **Noise**

L_{EQ} values recorded at three monitoring locations in construction phase in October 2012 were showed as follows:

- Time 1 (08:00 – 10:00AM): range within 54.2 – 67.4 dBA.
- Time 2 (10:00 – 12:00AM): range within 54.7 – 65.5 dBA.
- Time 3 (12:00 – 14:00PM): range within 53.6 – 69.1 dBA.
- Time 4 (14:00 – 16:00PM): range within 52.3 – 67.3 dBA
- Time 5 (16:00 – 18:00PM): range within 53.8 – 67.3 dBA.

- Time 6 (18:00 – 20:00PM): range within 53.6 – 60.1 dBA.

All values were lower than the limitation value in the National Technical Regulation on noise QCVN 26:2010/BTNMT.

* **Vibration**

The results of vibration level at 3 monitoring location (NVA-1, NVA-2, NVA-3) in 6 times in October 2012 were in range of 34.2 – 56.4 dB. They fully meet the limited value 75dB of the National Technical Regulation on vibration QCVN 27:2010/BTNMT.

* **Surface water**

In conclusion, surface water quality at project area in October 2012 had a pollution sign of organic and micro-organism. Some of parameters (such as DO, COD, BOD, SS and coliform) not meet the limited values of QCVN 08:2008/BTNMT-level B1. In comparison with the baseline values in October 2012 these values had change (Surface water quality at project area were little good).

* **Underground water**

All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.

* **Soil quality**

Results of soil monitoring in October 2012 are quite good. All of these results met the limited values in the Regulation QCVN 03:2008/BTNMT. In comparison with the survey results in the pre-construction phase, most of the results in this period changed insignificantly. This proves the soil quality in the project area was not affected by the activities of the project.

4.3. Assessment of Monitoring Results

Through the monitoring of CS Consultant and contractors, there are finding as follows:

In general, the environmental condition measured in monitoring in the last six months did not changed considerably in comparison with previous monitoring.

- Air, noise and vibration: The noise level and dust content increased at intersection with public roads such as Nguyen Duy Trinh road (Pk1a), high way No.51 (Pk3). This is the common problem in Hochiminh City and Dong Nai province. The noise and dust (TSP) level measured at many place are much higher than standard. This is due to the increase in traffic in these big cities. At other sampling locations of project the analysis results always meet regulation. This shows that activity of project did not impact on environmental.
- Surface water: Some environmental parameters which did not meet permissible limits are TSS, DO and Coliform in all monitoring including baseline monitoring. This shows that they were not be impacted by activity of project.
- Groundwater: Most of underground water samples in package 1a, 1b, 2 and 3 were contaminated by Cl⁻, Fe, Mn and Coliform. It is not possible for workers and households to use this water directly. This may cause infectious disease if there is not treatment before using. If using this water for washing.
- Soil: The analysis results of soil in all monitoring always meet regulation.
- Waste water: Some environmental parameters which did not meet permissible limits are TSS and Coliform because sampling location near outlet of water of pigpen.
- Other monitoring parameters in general satisfied environmental regulation.

5. ENVIRONMENTAL AND TRAINING AND ORIENTATION

An Environmental Training Program is required and shall consist of:

- ***Initial Induction Course:*** All workmen shall be required to attend a induction course within their first week on site.
- ***Periodic Training Courses:*** Periodic safety course shall be conducted not less than once every six months. All employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the Works. Training courses shall be organized for all workmen on the site and at all levels of supervision and management. Regular environmental and safety meetings will be conducted on a monthly basis and shall require attendance by the ESO and safety representatives of Subcontractors.

Training program, schedule, participants and documents as follows:

- **Scope of training program:**
 - Requirements of environmental protection during construction
 - Measures to collect, dispose and treat wastes including fuel, oil, grout, concrete, living waste and spoils from equipment repair,...
 - Handling procedures in case of chemicals, hazardous substance spills,...
 - Occupational safety and health act matters
 - How to work in compliance with standard of safety
 - Other safety and health management.
- **Training schedule:** every month
- **Participants:** All staff and workers of contractors and subcontractors
- **Resources trainers/persons:** Environmental Specialist and Safety officers of the main Contractor.
- **Training document:** site environmental management plans and health and safety plans of contractors, environmental management plan updated June 2010.

Table 7: Number of workers participating in environmental and safety trainings

Time	Package 1a	Package 1b	Package 2	Package 3
	Regular training	Regular training	Regular training	Regular training
07/2012	-	-	69	266
08/2012	-	-	45	253
09/2012	-	-	75	257
10/2012	-	-	39	279
11/2012	-	124	20	305
12/2012	-	198	47	300

6. KEY ENVIRONMENTAL ISSUES

6.1. Key Issues Identified

The noise level and dust content increased at intersection with public roads and were higher than allowable values.

Surface water in the monitoring contained high amount of TSS and Coliform due to polluted from upper rivers.

Wastewater in the monitoring contained high amount of coliform. This is mainly due to improper hygiene of drainage system and sampling locations near outlet of water of pigpen.

From June to October 2012: the whole service road surface of package 3 was muddy and flooded.

6.2. Action Taken

Implementation of necessary measures to avoid environmental issues cited in previous report: spraying water to reduce dust, regular clean of batching plant, supply of garbage bins, training of workers on environment and safety, etc.

6.3. Additional Action Required

Although contractors have implemented mitigations, continuous and further actions shall be conducted as follows:

- Regular clean of batching plant and drainage system to avoid coliform contamination to treated wastewater.
- Regular spraying water and this practice shall be enhanced in dry day and strong wind
- Safety onsite was not properly implemented. Contractors shall strongly implement safety measures and the consultant shall more closely supervise the site to immediately stop violation of safety.

7. CONCLUSION AND RECOMMENDATION

The result of environmental monitoring results shows that most of the parameters for air, noise, vibration and surface water, groundwater are under the current Vietnamese standards, except TSP and the noise level at intersection with local roads and some surface water parameters (DO, SS, COD, BOD and Coliform).

Mitigation measures such as spraying water for reducing TSP especially at package 3 shall be effectively implemented as specified in updated site environmental management plans of contractors. In dry season, the concentration of dust is expected to increase, preventive measures shall be carried out properly.

Concentration of coliform in wastewater was high due to improper maintenance of drainage system. The drainage system shall be regularly checked and cleaned to avoid contamination of waste and run-off water.

There were safety problems due to carelessness and unawareness of workers as well as improper supervision. Training on environment and safety shall be implemented and supervised regularly and new construction workers are immediately trained before starting their works onsite. Problems or accidents shall be informed to all contractors as lessons learnt.

Appendix 1. Map of Sampling locations

Appendix 2. Photos of Environmental Monitoring and Supervision

Environmental monitoring by CS Consultant



Soil sampling at Pk 2



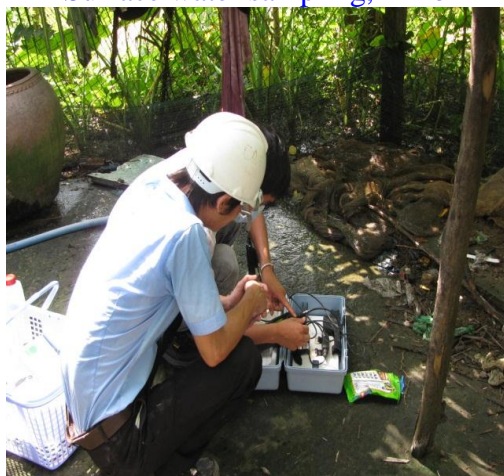
Surface water sampling on Dong Nai river, Pk2



Surface water sampling, Pk1b



Noise, air, vibration sampling, Pk 3



Surface water sampling, Pk 3



Soil sampling, Pk 3

Environmental monitoring by contractors



Air, noise and vibration sampling, Pk 1a



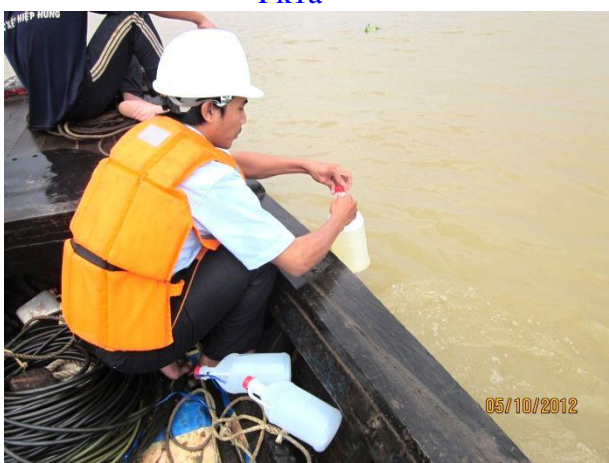
Noise, air and vibration sampling, pk 1b.



Surface water sampling on Ong Nhieu river, Pk1a



Surface water sampling on Ong Lan river, Pk1b



Surface water sampling on Dong Nai river, Pk2



Air, noise and vibration sampling, Pk 3

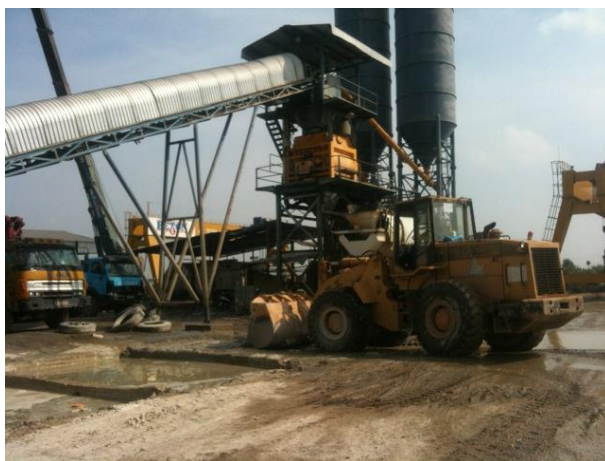
Supervision activities



Expressway of Pk1a has completed



Expressway of Pk1a has completed



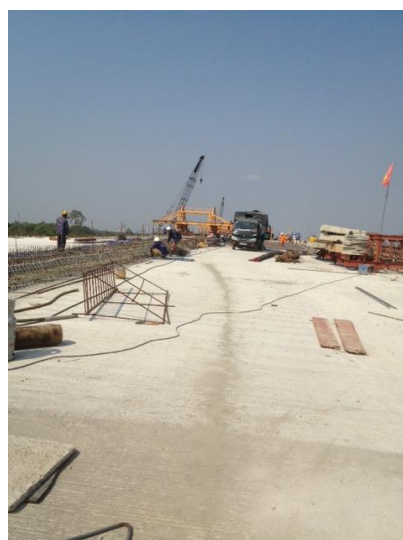
Dredged sludge at batching plant, Pk3



Spray water on the temporary road, Pk3



Using lifejacket when sailing on the river, Pk2



Construction site always keep clean, Pk1b