

Environmental Monitoring Report

Monthly Report
March 2010

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

Prepared by Vietnam Expressway Corporation for the Ministry of Transport and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 28 February 2010)

Currency unit	–	dong (D)
D1.00	=	\$0.000052
\$1.00	=	D19,075

ABBREVIATIONS

ADB	–	Asian Development Bank
BOD	–	biological oxygen demand
CASE	–	Center for Analytical Services and Experimentation of Ho Chi Minh City
CEPT	–	center for environmental protection in transportation
COD	–	chemical oxygen demand
JICA	–	Japan International Cooperation Agency
km	–	kilometer
m	–	meter
m ³	–	cubic meter
mg	–	milligram
MONRE	–	Ministry of Natural Resources and Environment
SS	–	suspended solids
VEC	–	Vietnam Expressway Corporation

NOTE

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

This environmental monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

PREFACE

Highway 1A length of Ho Chi Minh City - Dong Nai Province and Highway 51 is one of the most important centre lines in region. From 1997 to 2000, highway 1A from Ho Chi Minh City to Bien Hoa Province was recovered, improved and widened with scale of 4 to 6 traffic lanes. Highway 51 was upgraded into four traffic lanes. However, according to statistic, traffic survey to 2005, highway 1 will be overload, no-responses inter-regional traffic demand, effects to regional development. To build new express highways to serve future traffic demand in compass of priority economic region is very necessary.

The express highway of Ho Chi Minh city - Long Thanh - Dau Giay was approved Pre-feasibility Research Report in June 2002 by The Government, Prime Minister approved project's contents by document No 56/TTg-CN issued in 10, January 2007 and Ministry of Communications made a decision No 334/QD – BGTVT in 13, February 2007 for ratifying project investment. This express highway will recover only way position and share transport flow of highway 1A and 51. The route has important meaning in promoting development and stability of Southern priority economic region, especially three-cornered economic region of Ho chi Minh city-Dong Nai- Ba Ria Vung Tau.

The way run through regions having sparse population density, essential floristic composition along roadside are fruit-trees planted in garden and some industrial crops such as coffee tree, rubber and flood rice in depression areas. Some dense residential quarter concentrates in the townships, towns and big interchanges such as An Phu, Long Thanh, Dau Giay, line research almost run through spacious area, sparse population density area and non-important project area. The most geologic of the way lies on weak area. Some rivers and canals break the flat terrain.

Vietnam Expressway Corporation (VEC) has been established as state enterprise belonging to Ministry of Transport. In this HLD expressway project, VEC is responsible for conducting the project and official connection with related Ministries and local authorities as well as ADB and JICA. VEC will authorize the rights of project's management to the Southern Expressway Project Management Unit (SEPMU).

Scientific technological center for environmental protection in transportation (CEPT) in co-operation with Center of analytical services and experimentation of. Ho Chi Minh city (CASE) to conduct the environmental monitoring for construction phase for package 1a (No2) and packages 1b, 2, 3, on dated to 23 from 25 March 2010. These works were conducted to evaluate the environmental quality when the project is in the construction phase then to specify whether the construction activities may affect the local environment or not.

CONTENTS

	<i>Page</i>
PREFACE	
CONTENT	
CHAPTER I: INTRODUCTION	2
<i>1.1. Introduction</i>	<i>2</i>
<i>1.2. Scope of work</i>	<i>2</i>
<i>1.3. Work plan</i>	<i>2</i>
CHAPTER II: BACKGROUND CONDITIONS	4
<i>2.1. Site and location of the project</i>	<i>4</i>
<i>2.2. Status of the project</i>	<i>5</i>
<i>2.3. Previous and trend of environmental conditions</i>	<i>5</i>
CHAPTER III: METHODOLOGY OF ENVIRONMENTAL MONITORING	8
<i>3.1. Air quality</i>	<i>8</i>
<i>3.2. Noise</i>	<i>8</i>
<i>3.3. Vibration</i>	<i>9</i>
<i>3.4. Surface water quality</i>	<i>9</i>
<i>3.5. Underground water quality</i>	<i>10</i>
<i>3.6. Soil quality</i>	<i>11</i>
CHAPTER IV: RESULT OF ENVIRONMENTAL MONITORING	14
<i>4.1. Package 1a</i>	<i>14</i>
<i>4.2. Package 1b</i>	<i>17</i>
<i>4.3. Package 2</i>	<i>17</i>
<i>4.4. Package 3</i>	<i>21</i>
CHAPTER V: CONCLUSION AND RECOMMENDATION	24
APPENDIX	27
PREFACE	

CHAPTER 1: INTRODUCTION

1.1. Introduction

In the surrounding areas of Ho Chi Minh City, the traffic density has been increased more than circulation capacity of roads. There is a prediction that the circulation demand in Ho Chi Minh City and Dong Nai province, where the industrial development recently becomes very important in accordance with the development planning of industrial parks and international airports, will be noticeably increased.

Vietnam government has decided to conduct an expressway construction project Ho Chi Minh City - Long Thanh - Dau Giay (HLD Expressway) with the financial supports from Asia Development Bank (ADB) and Japanese International Corporation Agency (JICA).

VEC is responsible for conducting the project HLD. VEC will authorize the rights of project's management to the Southern Expressway Project Management Unit (SEPMU).

The project building expressway Ho Chi Minh - Long Thanh - Dau Giay with total length of 51km, is divided into 2 parts:

- Part 1: From Ring Road 2 intersection (beginning point of Package 1a; Km4+000) to the National Highway No.51 (end point of Package 3; Km 23+900). This section is designed in accordance with expressway standards of TCVN5729-97, grade A, designed speed of 120km/h with 4 lanes. Long Thanh bridge is partly designed to allow a speed up to 100km/h.

- Part 2: From the National Highway No.51 interchange (ending point of Package 3/ beginning point of Package 5; Km23+900) to Dau Giay interchange (ending point of Package 6; Km54+982).

1.2. Scope of work

- To conduct environmental monitoring: Air quality, noise, vibration, surface water quality, underground water quality, waste water and soil.

- Scope of work: The specified sites of package 1a, 1b, 2 and 3 belonging the project.

1.3. Work plan.

- * *Execution agent:* Scientific technological center for environmental protection in transportation (CEPT) and Center of analytical services and experimentation of Ho Chi Minh city (CASE)

- * *Plan for implementation:*

Table 1. Plan for implementation

<div style="text-align: center;">Date</div> <div style="text-align: left;">Work</div>	To 23 from 25 March 2010	To 29 March from 15 April	19 April	23 April
Monitoring and sampling at sites	X			
Analyzing		X		
Draft reports			X	
Completed reports				X

CHAPTER II: BACKGROUND CONDITIONS

2.1. Site and location of the project.

- Location of the project: the beginning of Package - 1a (Km. 4+00) to the end of Package - 3 (Km. 23 + 900, the National Highway intersection) in which the construction cost is financed by JICA.

- Distance: 19.9Km.

Table 2. Detailed plan for sampling

No	Detailed contents	Site	Package	Location	Sign
23rd March, 2010					
1	Air quality	Intersection Nguyen Duy Trinh str with HLD expressway	1a	6+150	A ₁
2	Noise	Intersection Nguyen Duy Trinh str with HLD expressway	1a	6+150	N ₁
3	Vibration	Intersection Nguyen Duy Trinh str with HLD expressway	1a	6+150	V ₁
4	Surface water	Ong Nhieu river (Ong Nhieu bridge)	1a	7+100 (up stream)	SW1-1; SW1-2
		Ong Nhieu river (Ong Nhieu bridge)	1a	7+100 (down stream)	SW1-3; SW1-4
5	Underground water	Tan Dien A Hamlet, Phu Huu (District 9)	1a	5+250	GW1-1; GW1-2; GW1-3
6	Soil quality	Phu Huu Ward, District 9 (Land bank)	1a	4+200	S1-1; S1-2; S1-3
7	Waste water	CRBS building, Phu Huu (District 9)	1a	-	WW1-1; WW 1-2; WW1-3
24th March					
1	Air quality	Truong Khanh Temple (near residential area)	2	11+300	A2
2	Noise	Truong Khanh Temple (near residential area)	2	11+300	N2
3	Vibration	Truong Khanh Temple (near	2	11+300	V2

		residential area)			
4	Surface water	Long Thanh bridge	2	12+600 (up stream)	SW3-1; SW3-2
		Long Thanh bridge	2	12+600 (down stream)	SW3-3; SW3-4
		Tac river (Song Tac bridge)	1b	10+400 (up stream)	SW2-1; SW2-2
		Tac river (Song Tac bridge)	1b	10+400 (down stream)	SW2-3; SW2-4
5	Underground water	Long Phuoc ward (near Dong Nai river	1b	10+400	GW2-1; GW2-2; GW2-3
6	Soil quality	Truong Khanh temple	2	11+300	S2-1; S2-2; S2-3
25th March					
1	Air quality	Long Thanh town, near the national highway No.51.	3	23+300	A3
2	Noise	Long Thanh town, near the national highway No.51.	3	23+300	A3
3	Vibration	Long Thanh town, near the national highway No.51.	3	23+300	A3
4	Surface water	Dong Mon bridge	3	21+350 (up stream)	SW4-1; SW4-2
		Dong Mon bridge	3	21+350 (down stream)	SW4-3; SW4-4
5	Underground water	Long Thanh town	3	23+300	GW3-1; GW3-2; GW3-3
6	Soil quality	Long Thanh town	3	23+300	S3-1; S3-2; S3-3

2.2. Status of the project

Recently, In the package 1a have been testing for static loading of bored pile (non-working pile, d = 1.2m). And in the packages 1b, 2, 3 are only preparation activities for construction. In the sampled sites, the environment is not still affected by construction activities.

2.3. Previous and trend of environmental conditions

*** Previous conditions:**

According to Updated Environmental Impact Assessment and EMP reported by ADB, there are some environmental parameters needed to be measured during pre-construction phase as below:

a. Air quality

The project area is mostly agricultural land with fairly good background air quality, except Long Thanh interchange with the National Highway No 51, the concentration of total suspended particulates exceeds the permitted levels.

Table 3. Air quality

Location	Concentration (mg/m³)				
	<i>SO₂</i>	<i>NO₂</i>	<i>CO</i>	<i>TSP</i>	<i>HC</i>
Intersection with the Ring Road No 2	0.047	0.032	2.15	0.08	1.55
Intersection with the NH51	0.109	0.099	7.10	0.36	3.0
Intersection with the NH1	0.079	0.081	5.33	0.14	1.62
TCVN 5937:2005	0.35	0.2	30	0.3	-

Source: Environmental Impact Assessment Report by ADB (issued by VEC in August, 2007)

b. Noise and vibration

The measurements show that the existing noise levels at the project area are generally below the Vietnamese Standard (TCVN5949:1998), which is 60dBA for residential areas in day time. However, noise levels exceed the limit in the interchanges with National Highway 51 and NH1 due to the heavy traffic on highways.

Table 4. Noise level

Location	Noise level Leq (dBA)
Intersection with the Ring Road No 2	43.7
Long Thanh Intersection	80.6
Intersection with the NH1	79.8
TCVN5949:1998	60

Source: Environmental Impact Assessment Report by ADB (issued by VEC in August, 2007)

c. Surface water quality

The surface water quality analyses show that water quality in the project area is quite good, although the levels of biological oxygen demand (BOD), chemical oxygen demand (COD), dissolved oxygen (DO) and suspended soils (SS) exceed the allowed levels for

domestic use in some locations. This is probably due to run-off from surrounding areas during the rainy season when the samples were taken. Other substances in surface water such as: heavy metals, sulphur and nitrate,...are all lower than the acceptable limit (TCVN5942:1995).

- According to the analysis results presented in the EAI report by CEPT in August 2007, at Ong Nhieu bridge of lot 1a, all measured parameters were below the standard limits. (TCVN5942:1995)

d. Underground water quality

Groundwater monitoring shows that the water quality is generally good, except for high levels of coli forms in some samples. This is caused by contamination from domestic activities to drilled wells, which over 95% of households use as water source. Also the earlier monitoring by CEPT showed high levels (TCVN5944: 1995) of coliforms in some samples. Major reason is that many household wells do not have consistent and throughout treatment system

- According to the analysis results presented in the EAI report by CEPT in August 2007, at Phu Huu, district 9, all measured parameters were below the standard limits, except coliform components in these samples higher than Vietnam Standard from 0.5 times. (TCVN5944:1995)

e. Soil quality

Soil environment in the area is usually humid with high groundwater level in rainy season; therefore the salty clay roads are easily soaked, weakening the pavement. On the contrary, during dry season, the strength of road pavement is improved. However, the groundwater level in the pavement is high, the pavement surface is usually wet. Therefore, the proposed filling to the pavement is not a normal procedure.

CEPT's monitoring results in EIA report from 2006 on soil quality show that it is generally good in the area, with all parameters remaining below the Vietnamese standard. (TCVN7209:2002 - for agricultural land).

*** Trend of environmental:**

It is expected that there will be an increase in air pollution, noise pollution and vibration. Because this area is under urbanization so the traffic participants will be increased. Besides, the construction activities of the project are also the cause of air pollution, noise pollution and vibration.

Besides, water and soil quality are also decreased caused by various reasons such as salinitization or pollution caused by disposal,...

CHAPTER 3: METHODOLOGY OF ENVIRONMENTAL MONITORING

3.1. Air quality

* Methodology: According to the requirements of the control equipments and standard methods of MONRE for air sampling, sample analyzing and writing report under the adjustment of National Environmental Monitoring System (NEMS), application of ambient air quality standards (QCVN 05 : 2009 and QCVN 06 : 2009).

* Parameters for monitoring :

- TSP, HC, CO, SO₂, NO₂ and microclimate conditions (temp., air pressure, wind velocity, wind direction, humidity).

* Frequency:

The monitoring will be conducted in one day, making 8 measurements in one position within 16 hours (from 6 am to 10 pm).

* Equipment for monitoring:

Equipment: DustScan Scout Aerosol Monitor, USA.

* Methods for analyzing:

Table 5. Methods for analyzing

No	Parameters	Methodology
1	Air temp.	Microclimate machine (3733 /2002/QĐ-BYT)
2	Humidity	
3	Air pressure	
4	Wind direction	
5	Wind velocity	
6	SO ₂	TCVN 5971-1995 (ISO 6767:1990)
7	NO ₂	TCVN 6137-96 (ISO 6768:1985)
8	HC	Ref. TCVN 7558-1:2005
9	Dust	MicroDust_Pro-880nm, (Casella)
10	CO	Ref. TCVN 7242:2003

3.2. Noise

* Methodology: The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS .

- Standards for reference: TCVN 5949:1998 (Acoustics - Noise in public and residential areas).

* Parameters for monitoring :

- Leq, Lmax, L50

* Frequency: The monitoring will be conducted in one day, making 3 measurements per hour within 16 hours (from 6 am to 10 pm) for one position.

* Equipment for monitoring:

Noise meter Rion NL-21, Japan.

3.3. Vibration

* Methodology:

- The sampling and analyzing sample shall be carried out based on the standard method for sampling according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS.

- Standards for reference: TCVN 6962: 2001 (Vibrations and seismic - Vibrations caused by construction and industrial production activities - Permitted maximum levels for the environment of public places and populated areas).

* Parameters for monitoring:

- Lveq and Leq

* Frequency:

The monitoring will be conducted in one day, making 3 measurements per hour within 16 hours (from 6 am to 10 pm) for one position.

* Equipment for monitoring:

- Japanese Rionvibro model VM53 RION. The product is calibrated before using.

3.4. Surface water quality

* Methodology:

- The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS.
- Standard for reference: QCVN 08:2008/BTNMT- B1: (National technical regulation on surface water quality).

** Parameters for monitoring:*

- pH, temp., turbidity, conductivity, DO, BOD, COD, SS, T-N, T-P, Cu, Zn, Pb, As, Hg, Cd, grease, lubricant, NO_3^- , CN^- , coliform.

** Frequency:*

The monitoring will be conducted in a day, taking 2 samples a day (in the morning and in the afternoon) for each position.

** Equipment for monitoring:*

- All of parameters such as pH, temp., conductivity, DO will be measured at sites by the equipment of YSI, USA.

- Other parameters such as SS, BOD5, Coli form, grease, Cu, Fe... will be sampled, stored and analyzed in lab. All of these equipments are also calibrated before measuring.

** Analysis methods (shown in table 6)*

3.5. Underground water quality monitoring

** Methodology:*

- The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS.

- Standard for reference: QCVN 09:2008/BTNMT (National technical regulation on underground water quality).

Parameters for monitoring:

- Temp., pH, color, odor, conductivity, turbidity, hardness, Mn, Fe, coli form, NO_3^- , Cl^- , SO_4^{2-} , Cd, Pb, Zn as well as underground water levels and dynamic of flows.

** Frequency:*

The monitoring will be conducted in a day, taking 3 samples a day (in the morning and in the afternoon) for each position.

** Equipment for monitoring:*

- Equipments: All of parameters such as pH, temp., conductivity, DO will be measured at sites by the equipment of YSI, USA. Other parameters such as SS, Coli form, grease, Cu, Fe... will be sampled, stored and analyzed in lab. All of these equipments are also calibrated before measuring.

* *Analysis methods*

Table 6. Analysis methods

No	Parameters	Methodology
1	As	TCVN 6626-2000
2	Cd, Fe, Mn, Pb, Zn, Cu	EPA-Method 200.7
3	CN ⁻	TCVN 6181-96
4	Hg	Varian AA-38
5	Coliforms	ISO 9308-2:1990
6	pH	AOAC 973.41
7	Temp	TCVN 4557-88
8	Dust	TCVN 6184-96 (ISO 7027:1990)
9	Conductivity	Ref. AOAC 973.40
10	Cl ⁻	TCVN 6194-1996 (ISO 9297:1989 E)
11	SO ₄ ²⁻	ASTM D516-90
12	NO ₃ ⁻	TCVN 6180-96 (ISO 7890-3:1988 E)
13	DO	TCVN 7325: 2004 (ISO 5814-1990)
14	BOD	SMEWW 5210.D
15	COD	TCVN 6491-99 (ISO 6060:1989)
16	SS	TCVN 6625-2000 (ISO 11923:1997)
17	T-N	TCVN 6624-2:2000 (ISO 11905-2:1997)
18	T-P	TCVN 6202: 2008 (ISO 6878-1:2004)
19	Color	TCVN 6185-96.(ISO 7887: 1985 (E))
20	Odor	Ref.TCVN 2653-78
21	Hardness	AOAC 973.52
22	NH ₄ ⁺	TCVN 6179-1: 1996 (ISO)
23	Fecal Coliform	Ref. ISO 9308-1:2000

3.6. Soil

** Methodology:*

- The sampling will be carried out at site and analyzed in lab with the calibrated equipments.
- Sampling position will be marked by GPS.
- The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE). The thickness of sampling will be from 20 to 30 cm from the ground.

- Standard for reference: QCVN 03:2008/BTNMT (National technical regulation on permitted concentration of heavy metals in soil) and QCVN 15:2008/BTNMT (National technical regulation on the pesticide residues in the soil).

* Parameters for monitoring:

- pH, organic compounds, Total N, Total P, Cl^- , SO_4^{2-} , Cu, Zn, Cd, Pb, Hg, As, Fe.

* Frequency:

The monitoring will be conducted in a day, taking 3 samples a day (in the morning and in the afternoon) for each position.

* Analysis methods

Table 7. Analysis methods

No	Parameters	Methodology
1	pH	TCVN 5979: 95
2	TOC	TCVN 6642-2000 (ISO 10694:1995)
3	Total N	Ref. AOAC 993.13, 2002
4	Total P	Ref. AOAC 990.08
5	Cl^-	Ref. TCVN 6194: 96
6	SO_4^{2-}	Ref. TCVN 6656 : 2000
7	As	AOAC 990.08
8	Cd	AOAC 990.08
9	Cu	AOAC 990.08
10	Fe	AOAC 990.08
11	Hg	Varian AA-72
12	Pb	AOAC 990.08
13	Zn	AOAC 990.08

CHAPTER IV: RESULT OF ENVIRONMENTAL MONITORING

4.1. Package 1a

4.1.1. Air quality

- Location monitoring: Intersection Nguyen Duy Trinh str with HLD expressway (Km6+150) - Lot 1a.
- Time: From 6h to 22h. Date: March, 23/2010.
- Positions: N 10°47'43,1" ; E 106°48'18,1"
- Climate condition: Sunny, light wind
- Other conditions: In the package 1a have been testing for static loading of bored pile (non-working pile, d = 1.2m). There were much participated vehicles.
- Result monitoring (average):

Table 8. Measurement results on micro climate at projected area

No	Time	Temperature °C	Moisture content %	Wind speed m/s	Pressure mB	Wind direction
1	A1 (6h-22h)	28.4 - 35.8	41.6 - 73.7	0.3 - 1.7	1006.3	SE, SW

Note: Please refer the detail information of the survey, analysis in appendix section

Table 9: Measurement results on air environmental quality

Standard	Time	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
Average (6h - 22h):	6h - 10h; 12h - 14h; 18h - 22h	No MLOD = 0.03	0.138	No MLOD = 1.0	1.12	3.61
	10h - 12h; 14h - 18h	0.666				
QCVN05:2009	Average 1h	0.35	0.2	-	0.3	30
	Average 24h	0.125	0.1	-	0.2	5
TCVN5938:2005				5		

Note: - Please refer the detail information of the survey, analysis in appendix section
- The measured values are in average per 1 hour

- Comments:

+ The content of SO₂ at 10h - 12h and 14h - 18h is higher the allowable values in QCVN05:2009 (1.91 times).

+ The content of dust is higher the allowable values in QCVN05:2009 (3.74 times).

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

+ The contents of HC: Because this content of HC is not specified in QCVN05:2009 so we use TCVN5938:2005 to compare. The analyzed result is under the allowable value.

4.1.2. Noise and vibration

- Location, time and position monitoring as the same air quality.

Table 10: Noise monitored results

Average	Time	Result monitoring			Standard: TCVN 5949 - 1998
		<i>L_{eq}</i>	<i>L_{max}</i>	<i>L₅₀</i>	
	Day	69.3	88.6	64.4	75
	Night	69.7	87.0	67.0	70

Note: Please refer the detail information of the survey, analysis in appendix section

- Comments:

According to the average value in daytime (from 6am to 6pm) and in nighttime (from 6pm to 10pm), the noise level is under allowable value according to TCVN 5949-1998 (column 3: Applied for Maximum limits in the environment of public and residential areas).

In the monitoring time, the construction have been testing for static loading of bored pile, however the noise level was lower.

There were some vehicles that used horn so the noise level is sometimes higher at partial time.

*** Vibration:**

Table 11: Vibration monitored results

Average	Time	Result monitoring		Standard: TCVN 7210:2002
		Leq	Lveq	
	Day	44.2	40.2	From 6h to 22h:

	Time	Result monitoring		Standard: TCVN 7210:2002 70dBA
		Leq	Lveq	
	Night	42.9	39.9	

Note: Please refer the detail information of the survey, analysis in appendix section

* Comments: The vibration result shows that, recent vibration level is under allowable value according to TCVN 7210:2002 - Maximum limits in the environment of public and residential areas.

4.1.3. Surface water quality

- Location monitoring: Ong Nhieu river (Ong Nhieu bridge) - Intersection Nguyen Duy Trinh str with HLD expressway
SW1-1: N 10°47'40,1" ; E 106°48'49,4" (10h35 - 10h45)
SW1-2: N 10°47'30" ; E 106°48'52,2" (15h00 - 15h05)
- Position: **SW1-3**: N 10°47'30,1" ; E 106°48'52,2" (10h50 - 11h00)
SW1-4: N 10°47'27,5" ; E 106°48'48,0" (15h09 - 15h15)
- Time: March, 23th 2010
- Results on measuring, monitoring the surface water at upstream and downstream (Shown in appendix)

* Comments:

At the sites: **SW1-1; SW1-2; SW1-3; SW1-4**: All parameters is under allowable value according to QCVN08:2008 (Applied column B1: Used for irrigation or other purposes such as water carriage).

4.1.4. Underground water quality

- Location monitoring: Number home 51B ; 55 ; 75 Bung Ong Thoan Street - Tan Dien Hamlet - Phu Huu - District 9
GW1-1 (51B) : N 10°47'47" ; E 106°47'47,3"
- Position: **GW1-2 (55)** : N 10°47'44,7" ; E 106°47'48,3"
GW1-3 (75) : N 10°47'49,9" ; E 106°47'53,1"
- Time: March, 23th 2010
- Results on measuring, monitoring the underground water (Shown in appendix)

* Comments:

- pH level at 3 underground water samples did not meet QCVN09:2008 that is from 5.5 to 8.5. (pH level is defined to 4.54 from 4.70)
- There is a signal of contamination of Fecal Coliform in 03 underground water samples.
- All of other parameters are meeting the allowable levels according to QCVN09:2008

4.1.5. Soil

- Location monitoring: Lot 1a, Phu Huu - District 9 (behind of consultant office)
S1-1: N 10°47'48" ; E 106°47'24"
- Position: S1-2: N 10°47'45" ; E 106°47'24"
S1-3: N 10°47'50" ; E 106°47'14,6"
- Time: April, 23th 2010
- Results on measuring, monitoring the underground water (Shown in appendix)

*** Comments:**

- The area for soil sampling was a swamp previously so it is not possible to cultivate. This area now is filled up by sand and leveled for municipal areas, so we apply the QCVN03:2008
- For land of people's livelihood.
- The analyzed results of environmental parameters are meeting the QCVN03:2008.

4.1.6. Waste water

- Location monitoring: CRBC building - P. Phú Hữu - Quận 9
WW1 - 1 : N 10°47'49,8" ; E 106°47'04,7"
- Position: WW1 - 2 : N 10°47'50,6" ; E 106°47'05,2"
WW1 - 3 : N 10°47'48,5" ; E 106°47'03,8"
- Time: 23/03/2010
- Results on measuring, monitoring the waste water (Shown in appendix)

*** Comments:**

The analyzed wastewater sample values will be compared to QCVN14:2008 (column B - The maximum allowable value of contaminants in domestic wastewater when the receiving waterbodies not using for domestic water supply).

- BOD₅ values at WW1-1 is higher than allowable value according to QCVN14:2008 (3.16 times)

- Coliform at 3 waste water samples is higher than allowable value according to QCVN14:2008 (to 9.6 from 1860 times). Coliform value is defined at WW1-3 is $9.3.10^6$.

4.2. Package 1b

4.2.1. Surface water

- Location monitoring: Tac bridge
SW2-1: N 10°47'28,1" ; E 106°50'49,4" (10h05 - 10h15)
SW2-2: N 10°47'28,1" ; E 106°50'49,4" (15h15 - 15h20)
- Position: **SW2-3:** N 10°47'22,2" ; E 106°50'43,0" (09h55 - 10h00)
SW2-4: N 10°47'22,2" ; E 106°50'43,0" (15h25 - 15h30)
- Time: 24/03/2010
- Climate condition: Sunny, light wind
- Results on measuring, monitoring the surface water at upstream and downstream (Shown in appendix)

* Comments:

At the sites: **SW2-1; SW2-2; SW2-3; SW2-4:** All parameters is under than allowable value according to QCVN08:2008 (Applied column B1: Used for irrigation or other purposes such as water carriage).

4.2.2. Underground water

- Location monitoring: Long Phuoc ward (near Dong Nai river)
- Position: **GW2-1 :** N 10°47'14,9" ; E 106°51'23,5"
GW2-2 : N 10°47'22,8" ; E 106°51'10,0"
- Time: 24/03/2010
- Results on measuring, monitoring the underground water (Shown in appendix)

* Comments:

- Underground water sample **GW2-2:** There is a light smell because of Cl⁻ concentration in the sample higher than allowable value. Addition, Fe and Mn are higher allowable value according to QCVN09:2008 (Fe is 12.6 times; Mn is 1.04 times)

- There is a signal of contamination of Fecal Coliform in 02 underground water samples.

- All of other parameters are meeting the allowable levels according to QCVN09:2008

4.3. Package 2

4.3.1. Air quality

- Location monitoring: Truong Khanh Temple (near residential area)
- Time: From 6h to 22h. Date: March, 24/2010.
- Positions: N 10°47'13,9" ; E 106°51'05,7"
- Climate condition: Sunny, light wind
- Other conditions: Quiter area, there is not many means of transportation
- *Result monitoring (average):*

Table 12. Measurement results on micro climate at projected area

No	Time <i>°C</i>	Temperature <i>%</i>	Moisture content <i>m/s</i>	Wind speed <i>mB</i>	Pressure
A2 (6h-22h)	27.6 - 35.8	45.4 - 82.8	0.2 - 1.3	1006.6	SE, SW

Note: Please refer the detail information of the survey, analysis in appendix section

Table 13: Measurement results on air environmental quality

Standard	Time	SO₂ <i>mg/m³</i>	NO₂ <i>mg/m³</i>	HC <i>mg/m³</i>	Dust <i>mg/m³</i>	CO <i>mg/m³</i>
Average	6h - 22h	No MLOD = 0.03	0.041	No MLOD =1.0	0.603	2.83
QCVN05:2009	Average 1h	0.35	0.2	-	0.3	30
	Average 24h	0.125	0.1	-	0.2	5
TCVN5938:2005				5		

Note: - Please refer the detail information of the survey, analysis in appendix section

- The measured values are in average per 1 hour

- Comment:

- + The content of dust is higher the allowable values in QCVN05:2009 (2 times).
- + The contents of SO₂, NO₂, CO: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009.
- + The contents of HC: Because this content of HC is not specified in QCVN05:2009 so we use TCVN5938:2005 to compare. The analyzed result is under the allowable value.

4.3.2. Noise and vibration

- Location, time and position monitoring as the same air quality.

Table 14: Noise monitored results

Average	Time	Result monitoring			Standard: TCVN 5949 – 1998
		L_{eq}	L_{max}	L_{50}	
	Day	50.2	67.3	46.1	75
	Night	53.0	69.4	48.2	70

Note: Please refer the detail information of the survey, analysis in appendix section

- Comment:

According to the average value in daytime (from 6am to 6pm) and in nighttime (from 6pm to 10pm), the noise level is under allowable value according to TCVN 5949-1998 (column 3: Applied for Maximum limits in the environment of public and residential areas).

*** Vibration:**

Table 15: Vibration monitored results

Average	Time	Result monitoring		Standard: TCVN 7210:2002
		Leq	Lveq	
	Day	37.0	32.3	From 6h to 22h: 70dBA
	Night	34.2	27.2	

Note: Please refer the detail information of the survey, analysis in appendix section

* Comments: The vibration result shows that, recent vibration level is under allowable value according to TCVN 7210:2002 - Maximum limits in the environment of public and residential areas.

4.3.3. Surface water quality

- Location monitoring: Long Thanh bridge

SW3-1: N 10°46'58,4" ; E 106°51'46,9" (10h43 - 10h48)

SW3-2: N 10°46'58,4" ; E 106°51'46,9" (15h54 - 16h00)

- Position:

SW3-3: N 10°47'14,3" ; E 106°51'46,0" (10h55 - 10h55)

SW3-4: N 10°47'14,3" ; E 106°51'46,0" (16h03 - 16h08)

- Time:

24/3/2010

- Climate condition: Sunny, light wind.
- Results on measuring, monitoring the surface water at upstream and downstream (Shown in appendix)

* Comments:

At the sites: **SW3-1; SW3-2; SW3-3; SW3-4:** All parameters is under allowable value according to QCVN08:2008 (Applied column B1: Used for irrigation or other purposes such as water carriage).

4.3.4. Soil

- Location monitoring: Truong Khanh Temple
S2-1: N 10⁰47'13,7" ; E 106⁰51'06,0"
- Position: **S2-2:** N 10⁰47'14,0" ; E 106⁰51'07,7"
S2-3: N 10⁰47'15,3" ; E 106⁰51'08,7"
- Time: 24/3/2010
- Results on measuring, monitoring the underground water (Shown in appendix)

* Comments:

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

4.4. Package 3

4.4.1. Air quality

- Location monitoring: Long Thanh town (Near the National Highway No 51)
- Time: From 6h to 22h. Date: March, 25/2009.
- Positions: N 10⁰46'03,2" ; E 106⁰57'44,7"
- Climate condition: Sunny, light wind
- Other conditions: There are many rollers, cranes and trucks and the use of air horm.

Result monitoring (average):

Table 16. Measurement results on micro climate at projected area

No	Time ^o C	Temperature %	Moisture content m/s	Wind speed mB	Pressure
----	------------------------	------------------	----------------------------	------------------	----------

Environmental Monitoring Report
North - South Expressway Constructtion Project (Ho Chi Minh city -
Dau Giay)

A3 (6h-22h)	28.6 - 34.8	49 - 79.6	0.4 - 5.4	1005.9	SE
-------------	-------------	-----------	-----------	--------	----

Note: Please refer the detail information of the survey, analysis in appendix section

Table 17: Measurement results on air environmental quality

Standard	Time	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
Average (6h - 22h):	6h - 8h; 20h - 22h;	No MLOD = 0.03	0.091	No MLOD = 1.0	1.45	4.49
	8h - 20h;	0.081				
QCVN05:2009	Average 1h	0.35	0.2	-	0.3	30
	Average 24h	0.125	0.1	-	0.2	5
TCVN5938:2005				5		

Note: - Please refer the detail information of the survey, analysis in appendix section

- The measured values are in average per 1 hour

- Comments:

+ The content of dust is higher the allowable values in QCVN05:2009 (4.84 times).

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

+ The contents of HC: Because this content of HC is not specified in QCVN05:2009 so we use TCVN5938:2005 to compare. The analyzed result is under allowable value.

4.4.2. Noise and vibration

- Location, time and position monitoring as the same air quality.

Table 18 : Noise monitored results

Average	Time	Result monitoring			Standard: TCVN 5949 – 1998
		<i>L_{eq}</i>	<i>L_{max}</i>	<i>L₅₀</i>	
	Day	74.8	90.7	71.7	75
	Night	74.9	92.3	72.2	70

Note: Please refer the detail information of the survey, analysis in appendix section

- Comments:

The average value in daytime (from 6am to 6pm) and in nighttime (from 6pm to 10pm) according to TCVN 5949-1998 (column 3: Applied for Maximum limits in the

environment of public and residential areas): The noise level is approximate allowable value in daytime and in nighttime is higher allowable value about 5dBA.

There were some vehicles that used horn so the noise level is higher at the monitoring time.

*** Vibration:**

Table 19: Vibration monitored results

Average	Time	Result monitoring		Standard: TCVN 7210:2002
		Leq	Lveq	
	Day	35.1	39.6	From 6h to 22h: 70dBA
	Night	28.6	35.9	

Note: Please refer the detail information of the survey, analysis in appendix section

* Comments: The vibration result shows that, recent vibration level is under allowable value according to TCVN 7210:2002 - Maximum limits in the environment of public and residential areas.

4.4.3. Surface water quality

- Location monitoring: Dong Mon bridge

SW4-1: N 10°46'06,9" ; E 106°56'41,1" (10h15 - 10h25)

SW4-2: N 10°46'06,9" ; E 106°56'41,1" (16h30 - 16h45)

- Position:

SW4-3: N 10°46'07,1" ; E 106°52'24,3" (10h40 - 10h50)

SW4-4: N 10°46'07,1" ; E 106°52'24,3" (16h10 - 15h25)

Time: 25/3/2010

- Results on measuring, monitoring the surface water at upstream and downstream (Shown in appendix)

* Comments:

- **SW4-3** (downstream morning): There are some parameters that did not meet the QCVN08:2008 are: DO, SS. (Applied column B1: Used for irrigation or other purposes such as water carriage).

+ NH_4^+ at (SW4-1, SW4-2, SW4-3, SW4-4) is higher allowable value

+ All of other parameters are meeting the allowable levels according to QCVN09:2008

4.4.4. Underground water

- Location monitoring: Long Thanh residential area
GW3 - 1 : N 10°45'59,2" ; E 106°57'22,3"
- Position: **GW3 - 2** : N 10°45'58,3" ; E 106°57'20,9"
GW3 - 3 : N 10°46'00,9" ; E 106°57'20,3"
- Results on measuring, monitoring the underground water (Shown in appendix)

* Comments:

- + pH value at *GW3-1* and *GW3* is not allowable value.
- + Cl⁻ value at *GW3-1* và *GW3 - 2* is higher allowable value to 1.3 from 1.45 times.
- + There is a slight smell and signal of contamination of Fecal Coliform in 03 underground water samples.
- All of other parameters are meeting the allowable levels according to QCVN09:2008

4.4.5. Soil

- Location monitoring: Long Thanh town
S3 - 1: N 10°45'59,3" ; E 106°57'22,3"
- Position: **S3 - 2**: N 10°45'58,3" ; E 106°57'20,8"
S3 - 3: N 10°45'01,0" ; E 106°57'20,5"
- Time: 25/3/2010
- Results on measuring, monitoring the underground water (Shown in appendix)

* Comments:

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

CHAPTER V. CONCLUSION AND RECOMMENDATION

1. Conclusion

a). Package 1a

- Air quality:

+ The content of SO₂ at 10h - 12h and 14h - 18h is higher the allowable values in QCVN05:2009 (1.91 times).

+ The content of dust is higher the allowable values in QCVN05:2009 (3.74 times).

+ The contents of NO₂, CO and HC: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values.

Causing of high concentration of TSP and SO₂ in some periods of time: There were many vehicles, especially trucks for waste and construction materials transportation (because the area is being enlarged so the urbanization speed is so high). The temperature at the sampling time was high, in addition the high speed of wind (0.3 - 1.7m/s) make the high content of dust).

- Noise and vibration are meeting the allowable levels.

- Surface water:

All parameters are meeting the allowable levels according to QCVN08:2008

- Underground water:

+ pH level at 3 underground water samples did not meet QCVN09:2008 that is from 5.5 to 8.5. (pH level is defined to 4.54 from 4.70)

+ There is a signal of contamination of Fecal Coliform in 03 underground water samples.

Causing: Water in the area has a slight signal of contamination of acide and microorganisms. Almost of wells in the area are drilled by households so there is no suitable treatment for these wells.

- Soil: The analyzed results of environmental parameters are meeting the QCVN03:2008.

- Waste water:

+ BOD₅ values at *WWI-1* is higher than allowable value (3.16 times)

+ The content of Coliform in the 3 samples are from 9.6 to 1860 times higher than allowable value (the content of coliform in sample *WWI-3* is $9.3.10^6$).

Cause: The high content of coliform is caused by dead water (caused by sand and nylon bags logging water flows). The wastewater is not much but the dead water makes lack of DO and this condition is suitable for coliform to develop, the highest content of coliform is the sample taking from this dead water. So it is very important for the constructor to clean the duct to reduce this dead water area.

b). Package 1b

- Surface water:

All parameters are meeting the allowable levels according to QCVN08:2008

- Underground water:

+ The underground water sample GW2-2: There was a light smell caused by high content of Cl⁻ in the sample. In addition, the content of Fe is 12.6 times higher than allowable value; 1.04 times higher for Mn. These bored wells are not to be treated before using.

+ There is a signal of contamination of Fecal Coliform in 02 underground water samples.

c). Package 2

- Air quality:

+ The content of dust is higher the allowable values in QCVN05:2009 (2 times).

+ The contents of NO₂, CO and HC: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values.

There were not households and vehicles in the area but vacant lands causing wind that sweep dust making high content of TSP in this area.

- Noise and vibration are meeting the allowable levels.

- Surface water:

All parameters are meeting the allowable levels according to QCVN08:2008

- Soil: The analyzed results of environmental parameters are meeting the QCVN03:2008.

d). Package 3

- Air quality:

+ The content of dust is higher the allowable values in QCVN05:2009 (4.84 times).

+ The contents of NO₂, CO and HC: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values.

The cause of high content of TSP exceeding the allowable value: There were many circulated vehicles in this area, especially trucks, containers for goods transportation and materials from Vung Tau to Ho Chi Minh city and conversely.

- Noise and vibration:

- + Vibration is meeting the allowable levels.
- + The noise levels from 6pm - 10pm: are 5dBA higher than allowable values caused by high density of vehicle circulation in this area in night-time and the use of air horn.

- Surface water:

- + SW4-3: There are some parameters that did not meet the QCVN08:2008 are: DO, SS.
- + NH_4^+ at (SW4-1, SW4-2, SW4-3, SW4-4) is higher allowable value

The cause of high content of amonie may be from domestic wastewater, breeding wastewater or agricultural fertilizers of the nearby households. The surface water contains some contaminants so the DO level does not meet the allowable value.

- Underground water:

- + pH value at GW3-1 and GW3 is not allowable value.
- + Cl^- value at GW3-1 và GW3 - 2 is higher allowable value to 1.3 from 1.45 times.
- + There is a slight smell and signal of contamination of Fecal Coliform in 03 underground water samples.

Causing: Water in the area has a slight signal of contamination of acide and microorganisms. Almost of wells in the area are drilled by households so there is no suitable treatment for these wells.

- *Soil:* The analyzed results of environmental parameters are meeting the QCVN03:2008.

2. Recommendation

The project is in beginning so the effects on the natural components are not noticeable. There are some samples of air quality at lot 1a, 2 and 3 that have high concentration of TSP acceding the allowable values, so it is very important to sprinkle water during the construction (according to the EMP of the project that have been suggested). So, it is necessary to conduct next monitoring activities and have suitable mitigation measurements according to the real conditions.

APPENDIX

APPENDIX 1: MANPOWER MOBILIZED AT SITE

APPENDIX 2: RESULTS MONITORING AND ANALYSIS

APPENDIX 3: PICTURES AT SAMPLING SITES

APPENDIX 4: CHECKING EQUIPMENT AND PERSONNEL SITE

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF NOISE MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring site: **PACKAGE 1A, - INTERSECTION NGUYEN DUY TRINH WITH HLD EXPRESS**

Co-ordinate: N 10°47'43,1" ; E 106°48'18,1"

Time of monitoring: **23/03/2010 (06h - 22h)**

Surrounding conditions: There are many means transportation. Static loading test of bored pile (non-working pile).

Staff: Q.T.Thanh Mai - Tran.T.Kim Vui - Doan Thi Boi Hanh

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10035162	N1-1.1(6h-7h)	67.9	87.4	63.6
02	mm10035163	N1-1.2(6h-7h)	68.7	81.8	66.9
03	mm10035164	N1-1.3(6h-7h)	69.2	81.8	66.9
04	mm10035165	N1-2.1(7h-8h)	72.5	97.3	69.0
05	mm10035166	N1-2.2(7h-8h)	70.5	96.7	65.6
06	mm10035167	N1-2.3(7h-8h)	67.2	80.7	64.3
07	mm10035168	N1-3.1(8h-9h)	70.6	92.8	66.3
08	mm10035169	N1-3.2(8h-9h)	67.1	81.4	63.4
09	mm10035170	N1-3.3(8h-9h)	68.1	83.2	64.2
10	mm10035171	N1-4.1(9h-10h)	68.9	87.1	63.8
11	mm10035172	N1-4.2(9h-10h)	69.8	83.8	64.8
12	mm10035173	N1-4.3(9h-10h)	69.6	85.7	64.1
13	mm10035174	N1-5.1(10h-11h)	72.8	97.9	64.5
14	mm10035175	N1-5.2(10h-11h)	72.3	99.7	63.8
15	mm10035176	N1-5.3(10h-11h)	68.4	84.1	63.7
16	mm10035177	N1-6.1(11h-12h)	69.7	85.1	66.1
17	mm10035178	N1-6.2(11h-12h)	69.1	88.4	63.3
18	mm10035179	N1-6.3(11h-12h)	70.6	93.3	64.1
19	mm10035180	N1-7.1(12h-13h)	67.8	85.8	63.5
20	mm10035181	N1-7.2(12h-13h)	70.5	94.0	63.9
21	mm10035182	N1-7.3(12h-13h)	66.4	82.4	62.3
22	mm10035183	N1-8.1(13h-14h)	70.9	87.4	65.1

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

23	mm10035184	N1-8.2(13h-14h)	69.3	93.1	63.8
24	mm10035185	N1-8.3(13h-14h)	67.3	84.1	63.2
25	mm10035186	N1-9.1(14h-15h)	70.3	95.4	64.4
26	mm10035187	N1-9.2(14h-15h)	65.4	84.3	62.1
27	mm10035188	N1-9.3(14h-15h)	66.7	87.3	63.1
28	mm10035189	N1-10.1(15h-16h)	66.6	86.6	61.9
29	mm10035190	N1-10.2(15h-16h)	71.1	94.9	62.2
30	mm10035191	N1-10.3(15h-16h)	70.0	94.6	62.1
31	mm10035192	N1-11.1(16h-17h)	67.6	86.1	64.2
32	mm10035193	N1-11.2(16h-17h)	69.1	86.0	64.8
33	mm10035194	N1-11.3(16h-17h)	68.9	88.4	65.3
34	mm10035195	N1-12.1(17h-18h)	72.5	93.3	66.3
35	mm10035196	N1-12.2(17h-18h)	68.6	81.8	64.9
36	mm10035197	N1-12.3(17h-18h)	73.3	95.6	65.6
37	mm10035198	N1-13.1(18h-19h)	70.6	87.9	67.2
38	mm10035199	N1-13.2(18h-19h)	71.2	96.4	66.8
39	mm10035200	N1-13.3(18h-19h)	70.8	91.8	67.7
40	mm10035201	N1-14.1(19h-20h)	69.5	87.8	66.5
41	mm10035202	N1-14.2(19h-20h)	68.7	85.6	66.6
42	mm10035203	N1-14.3(19h-20h)	69.4	86.5	67.9
43	mm10035204	N1-15.1(20h-21h)	69.6	83.0	68.2
44	mm10035205	N1-15.2(20h-21h)	69.4	82.4	67.5
45	mm10035206	N1-15.3(20h-21h)	69.4	81.8	67.6
46	mm10035207	N1-16.1(21h-22h)	71.1	94.0	66.9
47	mm10035208	N1-16.2(21h-22h)	69.0	85.7	65.9
48	mm10035209	N1-16.3(21h-22h)	67.3	81.6	65.5

Monitored by

Checked by

Center of analytical services
and experimentation of Ho Chi
Minh city (CASE)

cONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF VIBRATION MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring site: **PACKAGE 1A, - INTERSECTION NGUYEN DUY TRINH WITH HLD EXPRESS**

Co-ordinate: N 10⁰47'43,1" ; E 106⁰48'18,1"

Time of monitoring: **23/03/2010 (06h - 22h)**

Surrounding conditions: There are many means transportation. Static loading test of bored pile (non-working pile).

Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Đoàn Thi Boi Hanh

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10035210	V1-1.1(6h-7h)	51.2	47.7
02	mm10035211	V1-1.2(6h-7h)	37.9	27.8
03	mm10035212	V1-1.3(6h-7h)	38.3	29.8
04	mm10035213	V1-2.1(7h-8h)	44.4	41.7
05	mm10035214	V1-2.2(7h-8h)	46.9	42.7
06	mm10035215	V1-2.3(7h-8h)	43.6	41.4
07	mm10035216	V1-3.1(8h-9h)	42.3	34.4
08	mm10035217	V1-3.2(8h-9h)	44.0	41.5
09	mm10035218	V1-3.3(8h-9h)	46.1	42.3
10	mm10035219	V1-4.1(9h-10h)	47.3	43.0
11	mm10035220	V1-4.2(9h-10h)	46.5	42.6
12	mm10035221	V1-4.3(9h-10h)	46.2	42.8
13	mm10035222	V1-5.1(10h-11h)	47.7	43.2
14	mm10035223	V1-5.2(10h-11h)	44.7	37.3
15	mm10035224	V1-5.3(10h-11h)	42.8	39.2
16	mm10035225	V1-6.1(11h-12h)	44.8	42.1
17	mm10035226	V1-6.2(11h-12h)	41.5	40.7
18	mm10035227	V1-6.3(11h-12h)	41.9	40.8
19	mm10035228	V1-7.1(12h-13h)	38.9	39.7
20	mm10035229	V1-7.2(12h-13h)	46.0	42.7
21	mm10035230	V1-7.3(12h-13h)	42.9	41.3
22	mm10035231	V1-8.1(13h-14h)	44.9	42.0
23	mm10035232	V1-8.2(13h-14h)	40.9	37.4

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

24	mm10035233	V1-8.3(13h-14h)	41.0	33.6
25	mm10035234	V1-9.1(14h-15h)	42.8	35.2
26	mm10035235	V1-9.2(14h-15h)	41.0	40.5
27	mm10035236	V1-9.3(14h-15h)	43.7	43.2
28	mm10035237	V1-10.1(15h-16h)	43.6	41.5
29	mm10035238	V1-10.2(15h-16h)	45.6	37.4
30	mm10035239	V1-10.3(15h-16h)	44.9	41.9
31	mm10035240	V1-11.1(16h-17h)	44.2	36.5
32	mm10035241	V1-11.2(16h-17h)	46.7	42.9
33	mm10035242	V1-11.3(16h-17h)	46.6	42.7
34	mm10035243	V1-12.1(17h-18h)	46.4	42.8
35	mm10035244	V1-12.2(17h-18h)	47.1	43.0
36	mm10035245	V1-12.3(17h-18h)	45.7	42.3
37	mm10035246	V1-13.1(18h-19h)	46.0	42.7
38	mm10035247	V1-13.2(18h-19h)	46.2	42.6
39	mm10035248	V1-13.3(18h-19h)	45.2	42.1
40	mm10035249	V1-14.1(19h-20h)	42.1	40.8
41	mm10035250	V1-14.2(19h-20h)	44.3	41.8
42	mm10035251	V1-14.3(19h-20h)	43.9	41.6
43	mm10035252	V1-15.1(20h-21h)	39.6	40.1
44	mm10035253	V1-15.2(20h-21h)	40.4	40.0
45	mm10035254	V1-15.3(20h-21h)	43.8	41.8
46	mm10035255	V1-16.1(21h-22h)	46.0	42.5
47	mm10035256	V1-16.2(21h-22h)	38.6	32.5
48	mm10035257	V1-16.3(21h-22h)	39.1	30.5

Monitored by

Checked by

Center of analytical services
and experimentation of Ho Chi
Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF AIR QUALITY MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring site: **PACKAGE 1A, - INTERSECTION NGUYEN DUY TRINH WITH
HLD EXPRESS**

Co-ordinate: N 10⁰47'43,1" ; E 106⁰48'18,1"

Time of monitoring: **23/03/2010 (06h - 22h)**

Surrounding conditions: There are many means transportation. Static loading test of bored pile
(non-working pile).

Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Đoàn Thi Bôi Hanh

1. Results of microclimate parameters:

No	Code	Sign	Temp °C	Humidity %	Wind velocity m/s	Pressure mB	Wind direction
1	mm10035486	A1-1 (06h-08h)	28.9	64.1	0.6 - 1.7	1008.4	SE
2	mm10035487	A1-2 (08h-10h)	28.4	73.7	0.5 - 1.2	1006.4	SW
3	mm10035488	A1- 3 (10h-12h)	33.4	45.7	0.4 - 1.5	1007.4	SE
4	mm10035489	A1-4 (12h-14h)	35.8	41.6	0.4 - 0.8	1006.2	SW
5	mm10035490	A1-5 (14h-16h)	34.7	45.5	0.5 - 1.2	1004.5	SW
6	mm10035491	A1-6 (16h-18h)	32.1	54.0	0.4 - 1.6	1003.9	SE
7	mm10035492	A1-7 (18h-20h)	29.6	66.0	0.3 - 0.8	1005.3	SE
8	mm10035493	A1-8 (20h-22h)	29.9	62.6	0.4 - 1.4	1008.1	SE

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

2. Kết quả phân tích Thông số chất lượng không khí:

No	Code	Sign	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
1	MM09123324	A1-1 (06h-08h)	NONE MLOD = 0.03	0.09	NONE MLOD = 1.0	0.26	2.0
2	MM09123325	A1-2 (08h-10h)	NONE MLOD = 0.03	0.15	NONE MLOD = 1.0	1.27	3.9
3	MM09123326	A1- 3 (10h-12h)	0.07	0.25	NONE MLOD = 1.0	1.64	4.6
4	MM09123327	A1-4 (12h-14h)	NONE MLOD = 0.03	0.13	NONE MLOD = 1.0	1.69	5.0
5	MM09123328	A1-5 (14h-16h)	0.08	0.13	NONE MLOD = 1.0	0.36	5.2
6	MM09123329	A1-6 (16h-18h)	0.05	0.13	NONE MLOD = 1.0	1.87	3.4
7	MM09123330	A1-7 (18h-20h)	NONE MLOD = 0.03	0.12	NONE MLOD = 1.0	0.68	2.7
8	MM09123331	A1-8 (20h-22h)	NONE MLOD = 0.03	0.11	NONE MLOD = 1.0	1.21	2.1

Monitored by

Checked by

Center of analytical services
and experimentation of Ho Chi
Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF SURFACE WATER MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway

Monitoring site: Package 1A, Ong Nhieu river (Ong Nhieu bidge) – intersection Nguyen Duy Trinh with HLD express

Co-ordinate: **SW1-1:** N 10°47'40,1" ; E 106°48'49,4" (10h35 - 10h45)
SW1-2: N 10°47'30" ; E 106°48'52,2" (15h00 - 15h05)
SW1-3: N 10°47'30,1" ; E 106°48'52,2" (10h50 - 11h00)
SW1-4: N 10°47'27,5" ; E 106°48'48,0" (15h09 - 15h15)

Time of monitoring: **23/03/2010**

Weather condition: Sunny, breeze

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

1. Results on measuring, monitoring the surface water at upstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-1 mm10035450	SW1-2 mm10035451	Column A2	Column B1
1	pH	-	6.86	6.89	6 - 8.5	5.5 - 9
2	Temp.	oC	30.7	31.3	-	-
3	TDS	NTU	40.9	24.0	-	-
4	Conductivity	μS/cm(25 ⁰ C)	780.0	696.0	-	-
5	DO	mg/l	4.41	4.92	≥ 5	≥ 4
6	BOD ₅	mg/l	4.2	5.3	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	36.2	18.6	30	50
9	T-N	mg/l	1.03	0.83	-	-
10	T-P	mg/l	0.11	0.06	-	-
11	As	mg/l	None, MLOD= 0,0002	None, MLOD= 0,0002	0.02	0.05
12	Cd	mg/l	None, MLOD = 0,0006	None, MLOD = 0,0006	0.005	0.01
13	CN ⁻	mg/l	None, MLOD= 0,007	None, MLOD= 0,007	0.01	0.02

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-1 mm10035450	SW1-2 mm10035451	Column A2	Column B1
14	Cu	mg/l	None, MLOD = 0,002	0.004	0.2	0.5
15	Hg	mg/l	None, MLOD = 0,0005	None, MLOD = 0,0005	0.001	0.001
16	Pb	mg/l	None, MLOD = 0,006	None, MLOD = 0,006	0.02	0.05
17	Zn	mg/l	0,006	0,007	1.0	1.5
18	NO ₃ ⁻	mg/l	1.47	1.03	5	10
19	Oil and grease	mg/l	None, MLOD = 0,04	None, MLOD = 0,04	0.02	0.1
20	Coliform	MPN/100ml	2,8x10 ³	7,5x10 ²	5000	7500
21	NH ₄ ⁺	mg/l	0.06	0.08	0.2	0.5

2. Result on measuring, monitoring the surface water at downstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-3 mm10035452	SW1-4 mm10035453	Column A2	Column B1
1	pH	-	6.90	6.90	6 - 8.5	5.5 - 9
2	Temp.	oC	30.4	31.7	-	-
3	TDS	NTU	28.7	24.7	-	-
4	Conductivity	μS/cm(25 ⁰ C)	800	711	-	-
5	DO	mg/l	4.43	4.43	≥ 5	≥ 4
6	BOD ₅	mg/l	3.9	4.2	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	23.2	20.6	30	50
9	T-N	mg/l	0.99	0.85	-	-
10	T-P	mg/l	0.06	0.06	-	-

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-3 mm10035452	SW1-4 mm10035453	Column A2	Column B1
11	As	mg/l	None, MLOD= 0,0002	None, MLOD= 0,0002	0.02	0.05
12	Cd	mg/l	None, MLOD = 0,0006	None, MLOD = 0,0006	0.005	0.01
13	CN ⁻	mg/l	None, MLOD= 0,007	None, MLOD= 0,007	0.01	0.02
14	Cu	mg/l	None, MLOD = 0,002	None, MLOD = 0,002	0.2	0.5
15	Hg	mg/l	None, MLOD = 0,0005	None, MLOD = 0,0005	0.001	0.001
16	Pb	mg/l	None,MLOD = 0,006	None, MLOD = 0,006	0.02	0.05
17	Zn	mg/l	0,008	0,005	1.0	1.5
18	NO ₃ ⁻	mg/l	1.44	1.10	5	10
19	Oil and grease	mg/l	None, MLOD = 0,04	None, MLOD = 0,04	0.02	0.1
20	Coliform	MPN/100ml	9,3x10 ¹	9,3x10 ²	5000	7500
21	NH ₄ ⁺	mg/l	0.05	0.06	0.2	0.5

Monitored by

Checked by

**Center of analytical services
and experimentation of Ho Chi
Minh city (CASE)**

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF UNDERGROUND WATER MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
 Monitoring site: 51B ; 55 ; 75 Bung Ong Thoan- Tan Dien- Phu Huu- 9 district
 Co-ordinate: **GW1-1 (51B) : N 10°47'47" ; E 106°47'47,3"**
GW1-2 (55) : N 10°47'44,7" ; E 106°47'48,3"
GW1-3 (75) : N 10°47'49,9" ; E 106°47'53,1"
 Time of monitoring: **23/03/2010**
 Weather condition: Sunny
 Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis criteria	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW1-1 mm10035466	GW1-2 mm10035467	GW1-3 mm10035468	
1	pH		4.54	4.70	4.61	5.5 – 8.5
2	Temp.	°C	29.6	29.7	29.8	-
3	TDS	NTU	2.81	2.53	5.53	-
4	Conductivity	μS/cm(25°C)	59.9	87.0	46.2	-
5	Colour	Pt/Co	5	5	5	-
6	Odor	mg/l	0	0	0	-
7	Hardness level	mgCaCO ₃ /l	9.9	23.8	11.4	500
8	Cl ⁻	mg/l	115.7	159.8	88.8	250
9	SO ₄ ²⁻	mg/l	47.9	83.9	41.5	400
10	NO ₃ ⁻	mg/l	None MLOD = 0.05	none, MLOD = 0.05	None, MLOD = 0.05	15
11	Cd	mg/l	None, MLOD= 0,0006	None, MLOD= 0,0006	None, MLOD= 0,0006	0.005
12	Fe	mg/l	0,29	0,41	0,48	5
13	Mn	mg/l	0,045	0,053	0,042	0.5
14	Pb	mg/l	None, MLOD= 0,006	None, MLOD= 0,006	None, MLOD= 0,006	0.01
15	Zn	mg/l	0,023	0,022	0,018	3.0
16	Coliform	MPN/100ml	< 0.1	< 0.1	< 0.1	3

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			<i>GW1-1</i> mm10035466	<i>GW1-2</i> mm10035467	<i>GW1-3</i> mm10035468	
17	As	mg/l	None, MLOD= 0,0002	None, MLOD= 0,0002	None, MLOD= 0,0002	-
18	CN ⁻	mg/l	None, MLOD= 0,007	None, MLOD= 0,007	None, MLOD= 0,007	0.01
19	Fecal coliform	MPN/100ml	< 0.1	< 0.1	< 0.1	None

Monitored by

Checked by

Center of analytical services
and experimentation of Ho Chi
Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF SOIL MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway

Monitoring site: Package 1A, - Phu Huu – dis. 9

Co-ordinate: **S1-1:** N 10⁰47'48" ; E 106⁰47'24"
S1-2: N 10⁰47'45" ; E 106⁰47'24"
S1-3: N 10⁰47'50" ; E 106⁰47'14,6"

Time of monitoring: **23/03/2010**

Weather condition: Sunny

Staff: Nguyen Le Phuong-Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 03:2008/BTN MT
			<i>S1-1</i> <i>mm10035477</i>	<i>S1-2</i> <i>mm10035478</i>	<i>S1-3</i> <i>mm10035479</i>	
1	pH	-	6.97	4.42	4.43	-
2	Organic	%	2.83	5.97	9.52	-
3	Total N	%	0.06	0.09	0.09	-
4	Total P	mg/kg	334.9	236.1	101.1	-
5	Cl ⁻	mg/kg	45.2	1698.0	264.7	-
6	SO ₄ ²⁻	%	46.4	440.1	465.6	-
7	As	mg/kg	9,8	6,0	5,1	12
8	Cd	mg/kg	None MLOD = 0,15	None, MLOD = 0,15	None, MLOD = 0,15	5
9	Cu	mg/kg	22,6	27,1	29,1	70
10	Fe	mg/kg	3,8	4,1	1,6	-
11	Hg	mg/kg	Mark (0,08), MLOQ = 0,09	Mark (0,088), MLOQ = 0,09	Mark (0,06), MLOQ = 0,09	-
12	Pb	mg/kg	20,3	18,7	12,2	120
13	Zn	mg/kg	49,2	41,2	12,4	-

Monitored by

Checked by

Center of analytical services
and experimentation of Ho Chi
Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF ANALYSIS WASTE WATER

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring sites: PACKAGE 1A - CRBC BUILDING- PHU HUU- 9 DISTRICT

Co-ordinate: **WW1 - 1** : N 10⁰47'49,8" ; E 106⁰47'04,7"
WW1 - 2 : N 10⁰47'50,6" ; E 106⁰47'05,2"
WW1 - 3 : N 10⁰47'48,5" ; E 106⁰47'03,8"

Time of monitoring: 23/03/2010

Weather conditions: Sunny

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

TT	Analysis criteria	Unit	Result analysis			QCVN14: 2008/BTNMT
			WW1-1 mm10035474	WW1-2 mm10035475	WW1-3 mm10035476	
1	pH	-	6,26	7,56	7,03	5-9
2	Temp.	°C	26,2	26,2	25,8	-
3	BOD ₅	mg/l	158,0	29,6	32,4	50
4	COD	mg/l	545,0	74,4	76,8	-
5	DO	mg/l	4,64	5,18	4,88	-
6	SS	mg/l	68,8	59,2	46,0	1000
7	NH ₄ ⁺	mg/l	2,53	42,4	1,40	10
8	TN	mg/l	9,39	49,7	3,43	50
9	TP	mg/l	1,89	6,13	1,76	10
10	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	NONE MLOD=0,04	20
11	Coliform	MPN/100ml	2,1x10 ⁶	9,3x10 ⁶	4,8x10 ⁴	5.000

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)
TEL: 08.39100827 fax: 08.38293087

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF SURFACE WATER MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: PACKAGE 1B – SONG TAC BIDGE
Co-ordinate: **SW2-1:** N 10°47'28,1" ; E 106°50'49,4" (10h05 - 10h15)
SW2-2: N 10°47'28,1" ; E 106°50'49,4" (15h15 - 15h20)
SW2-3: N 10°47'22,2" ; E 106°50'43,0" (09h55 - 10h00)
SW2-4: N 10°47'22,2" ; E 106°50'43,0" (15h25 - 15h30)
Time of monitoring: 24/03/2010
Weather condition: Sunny, breeze
Staff: Nguyen Le Phuong – Nguyen Tuan Vu

1. Results on measuring, monitoring the surface water at upstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-1 mm10035454	SW2-2 mm10035455	Column A2	Column B1
1	pH	-	6,83	6,83	6 - 8.5	5.5 - 9
2	Temp.	oC	30,0	30,9	-	-
3	TDS	NTU	46,3	27,8	-	-
4	Conductivity	μS/cm(25 ⁰ C)	545,0	442,0	-	-
5	DO	mg/l	4,46	4,71	≥ 5	≥ 4
6	BOD ₅	mg/l	3,9	3,9	6	15
7	COD	mg/l	<30	<30	15	30
8	SS	mg/l	39,0	20,0	30	50
9	T-N	mg/l	0,76	0,75	-	-

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-1 mm10035454	SW2-2 mm10035455	Column A2	Column B1
10	T-P	mg/l	0,11	0,08	-	-
11	As	mg/l	NONE MLOD = 0,0002	NONE MLOD = 0,0002	0.02	0.05
12	Cd	mg/l	NONE MLOD = 0,0006	NONE MLOD = 0,0006	0.005	0.01
13	CN ⁻	mg/l	NONE MLOD = 0,007	NONE MLOD = 0,007	0.01	0.02
14	Cu	mg/l	NONE MLOD = 0,002	NONE MLOD = 0,002	0.2	0.5
15	Hg	mg/l	NONE MLOD = 0,0005	NONE MLOD = 0,0005	0.001	0.001
16	Pb	mg/l	NONE MLOD = 0,006	NONE MLOD = 0,006	0.02	0.05
17	Zn	mg/l	0.006	0.006	1.0	1.5
18	NO ₃ ⁻	mg/l	1,08	1.07	5	10
19	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	0.02	0.1
20	Coliform	MPN/100ml	0,5	1,2x10 ¹	5000	7500
21	NH ₄ ⁺	mg/l	0,08	0,10	0.2	0.5

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

2. Result on measuring, monitoring the surface water at downstream (morning & afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-3 mm10035456	SW2-4 mm10035457	Column A2	Column B1
1	pH	-	6,81	6,88	6 - 8.5	5.5 - 9
2	Temp.	oC	30,1	30,7	-	-
3	TDS	NTU	80,5	24,4	-	-
4	Conductivity	$\mu\text{S/cm}(25^{\circ}\text{C})$	548,0	439,0	-	-
5	DO	mg/l	4,49	4,93	≥ 5	≥ 4
6	BOD ₅	mg/l	4,2	5,9	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	65,4	17,2	30	50
9	T-N	mg/l	0,84	0,76	-	-
10	T-P	mg/l	0,13	0,08	-	-
11	As	mg/l	NONE MLOD = 0,0002	NONE MLOD = 0,0002	0.02	0.05
12	Cd	mg/l	NONE MLOD = 0,0006	NONE MLOD = 0,0006	0.005	0.01
13	CN ⁻	mg/l	NONE MLOD = 0,007	NONE MLOD = 0,007	0.01	0.02
14	Cu	mg/l	NONE MLOD = 0,002	NONE MLOD = 0,002	0.2	0.5
15	Hg	mg/l	NONE MLOD = 0,0005	NONE MLOD = 0,0005	0.001	0.001

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-3 mm10035456	SW2-4 mm10035457	Column A2	Column B1
16	Pb	mg/l	NONE MLOD = 0,006	NONE MLOD = 0,006	0.02	0.05
17	Zn	mg/l	0.011	0.008	1.0	1.5
18	NO ₃ ⁻	mg/l	1,08	1,17	5	10
19	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	0.02	0.1
20	Coliform	MPN/100ml	09	1,7x10 ¹	5000	7500
21	NH ₄ ⁺	mg/l	0,04	0,08	0.2	0.5

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF UNDERGROUND WATER MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: PACKAGE 1B – LONG PHUOC DISTRICT RESIDENTIAL AREA
Co-ordinate: **GW2-1** : N 10°47'14,9" ; E 106°51'23,5"
GW2-2 : N 10°47'22,8" ; E 106°51'10,0"
Time of monitoring: 24/03/2010
Weather condition: Cool
Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW2-1 mm10035469	GW2-2 mm10035470	-	
1	pH	-	7,49	6,23	-	5.5 – 8.5
2	Temp.	°C	30,5	29,0	-	-
3	TDS	NTU	0,50	837	-	-
4	Conductivity	μS/cm(25 ⁰ C)	148,3	142,4	-	-
5	Colour	Pt/Co	5	5	-	-
6	Odor	mg/l	0	light smell	-	-
7	Hardness level	mgCaCO ₃ /l	136,6	105,0	-	500
8	Cl ⁻	mg/l	199,5	330,2	-	250
9	SO ₄ ²⁻	mg/l	24,2	4,4	-	400

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW2-1 mm10035469	GW2-2 mm10035470	-	
10	NO ₃ ⁻	mg/l	0,27	0,97	-	15
11	Cd	mg/l	NONE MLOD = 0.0006	NONE MLOD = 0.0006	-	0.005
12	Fe	mg/l	0,044	63,2	-	5
13	Mn	mg/l	0,063	0,52	-	0.5
14	Pb	mg/l	NONE MLOD = 0.006	NONE MLOD = 0.006	-	0.01
15	Zn	mg/l	NONE MLOD = 0.002	NONE MLOD = 0.002	-	3.0
16	Coliform	MPN/100ml	< 01	< 01	-	3
17	Turbidity	mg/l	-	-	-	-
18	As	mg/l	0,002	0,001	-	-
19	CN ⁻	mg/l	NONE MLOD = 0.007	NONE MLOD = 0.007	-	0.01
20	Fecal coliform	MPN/100ml	< 01	< 01	-	None

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF NOISE MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
 Monitoring site: PACKAGE 2 – TRUONG KHANH PAGODA
 Co-ordinate: N 10⁰47'13,9" ; E 106⁰51'05,7"
 Time of monitoring: 24/03/2010 (06h - 22h)
 Surrounding conditions: Quite area
 Staff: Q.T.Thanh Mai – Tran.T.Kim Vui – Doan Thi Boi Hanh

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10035258	N2-1.1(6h-7h)	57.3	77.0	52.5
02	mm10035259	N2-1.2(6h-7h)	52.6	69.3	51.3
03	mm10035260	N2-1.3(6h-7h)	56.6	75.5	46.9
04	mm10035261	N2-2.1(7h-8h)	53.4	75.2	46.1
05	mm10035262	N2-2.2(7h-8h)	52.6	66.4	49.6
06	mm10035263	N2-2.3(7h-8h)	52.2	76.4	46.9
07	mm10035264	N2-3.1(8h-9h)	54.8	77.9	46.8
08	mm10035265	N2-3.2(8h-9h)	48.2	66.3	45.3
09	mm10035266	N2-3.3(8h-9h)	51.2	71.5	46.5
10	mm10035267	N2-4.1(9h-10h)	48.5	61.7	45.4
11	mm10035268	N2-4.2(9h-10h)	48.6	66.5	45.6
12	mm10035269	N2-4.3(9h-10h)	49.0	62.0	46.7
13	mm10035270	N2-5.1(10h-11h)	58.1	74.1	52.3
14	mm10035271	N2-5.2(10h-11h)	50.5	74.8	44.9
15	mm10035272	N2-5.3(10h-11h)	45.9	56.2	43.9
16	mm10035273	N2-6.1(11h-12h)	42.8	54.7	41.5
17	mm10035274	N2-6.2(11h-12h)	45.9	67.1	44.4
18	mm10035275	N2-6.3(11h-12h)	49.7	73.4	42.9
19	mm10035276	N2-7.1(12h-13h)	44.6	61.2	42.0
20	mm10035277	N2-7.2(12h-13h)	54.3	74.4	48.8
21	mm10035278	N2-7.3(12h-13h)	49.1	69.2	44.8
22	mm10035279	N2-8.1(13h-14h)	49.4	66.1	46.9
23	mm10035280	N2-8.2(13h-14h)	49.1	61.5	47.5
24	mm10035281	N2-8.3(13h-14h)	51.4	67.7	50.1

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

25	mm10035282	N2-9.1(14h-15h)	45.5	55.5	44.2
26	mm10035283	N2-9.2(14h-15h)	46.2	64.5	43.7
27	mm10035284	N2-9.3(14h-15h)	43.9	56.0	42.6
28	mm10035285	N2-10.1(15h-16h)	53.1	78.7	44.9
29	mm10035286	N2-10.2(15h-16h)	45.5	57.6	43.8
30	mm10035287	N2-10.3(15h-16h)	45.7	60.4	45.0
31	mm10035288	N2-11.1(16h-17h)	54.8	68.6	49.6
32	mm10035289	N2-11.2(16h-17h)	47.3	59.0	45.8
33	mm10035290	N2-11.3(16h-17h)	62.2	82.5	43.6
34	mm10035291	N2-12.1(17h-18h)	45.8	60.3	44.2
35	mm10035292	N2-12.2(17h-18h)	55.3	75.5	46.9
36	mm10035293	N2-12.3(17h-18h)	46.8	57.8	45.7
37	mm10035294	N2-13.1(18h-19h)	53.5	75.0	46.6
38	mm10035295	N2-13.2(18h-19h)	54.7	73.6	47.1
39	mm10035296	N2-13.3(18h-19h)	51.0	69.6	46.7
40	mm10035297	N2-14.1(19h-20h)	48.9	59.3	46.9
41	mm10035298	N2-14.2(19h-20h)	50.7	71.8	45.5
42	mm10035299	N2-14.3(19h-20h)	51.6	63.7	48.6
43	mm10035300	N2-15.1(20h-21h)	61.0	83.4	49.4
44	mm10035301	N2-15.2(20h-21h)	58.8	76.7	51.0
45	mm10035302	N2-15.3(20h-21h)	52.0	66.1	48.4
46	mm10035303	N2-16.1(21h-22h)	53.0	63.3	50.9
47	mm10035304	N2-16.2(21h-22h)	49.4	64.8	47.9
48	mm10035305	N2-16.3(21h-22h)	51.3	65.4	49.1

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF VIBRATION MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
 Monitoring site: PACKAGE 2 – TRUONG KHANH PAGODA
 Co-ordinate: N 10⁰47'13,9" ; E 106⁰51'05,7"
 Time of monitoring: 24/03/2010 (06h - 22h)
 Surrounding conditions: Quite area
 Staff: Q.T.Thanh Mai – Tran.T.Kim Vui – Doan Thi Boi Hanh

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10035306	V2-1.1(6h-7h)	38.0	27.9
02	mm10035307	V2-1.2(6h-7h)	40.3	39.1
03	mm10035308	V2-1.3(6h-7h)	39.1	29.0
04	mm10035309	V2-2.1(7h-8h)	35.0	26.2
05	mm10035310	V2-2.2(7h-8h)	29.3	27.8
06	mm10035311	V2-2.3(7h-8h)	37.9	34.7
07	mm10035312	V2-3.1(8h-9h)	36.0	26.9
08	mm10035313	V2-3.2(8h-9h)	40.3	37.8
09	mm10035314	V2-3.3(8h-9h)	40.3	38.6
10	mm10035315	V24.1(9h-10h)	41.6	40.2
11	mm10035316	V2-4.2(9h-10h)	32.7	24.5
12	mm10035317	V2-4.3(9h-10h)	32.0	23.8
13	mm10035318	V2-5.1(10h-11h)	36.3	27.1
14	mm10035319	V2-5.2(10h-11h)	40.4	38.4
15	mm10035320	V2-5.3(10h-11h)	29.1	21.5
16	mm10035321	V2-6.1(11h-12h)	40.2	37.7
17	mm10035322	V2-6.2(11h-12h)	40.2	37.7
18	mm10035323	V2-6.3(11h-12h)	40.2	38.3
19	mm10035324	V2-7.1(12h-13h)	40.1	37.9
20	mm10035325	V2-7.2(12h-13h)	40.9	40.4
21	mm10035326	V2-7.3(12h-13h)	37.1	27.2
22	mm10035327	V2-8.1(13h-14h)	40.1	38.5
23	mm10035328	V2-8.2(13h-14h)	30.4	22.5
24	mm10035329	V2-8.3(13h-14h)	25.8	20.0

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

25	mm10035330	V2-9.1(14h-15h)	40.0	37.5
26	mm10035331	V2-9.2(14h-15h)	43.2	40.8
27	mm10035332	V2-9.3(14h-15h)	40.1	37.6
28	mm10035333	V2-10.1(15h-16h)	40.1	38.4
29	mm10035334	V2-10.2(15h-16h)	33.4	28.8
30	mm10035335	V2-10.3(15h-16h)	34.5	25.5
31	mm10035336	V2-11.1(16h-17h)	40.0	37.7
32	mm10035337	V2-11.2(16h-17h)	32.7	25.6
33	mm10035338	V2-11.3(16h-17h)	34.8	26.4
34	mm10035339	V2-12.1(17h-18h)	40.2	38.9
35	mm10035340	V2-12.2(17h-18h)	40.2	39.5
36	mm10035341	V2-12.3(17h-18h)	28.1	22.3
37	mm10035342	V2-13.1(18h-19h)	40.3	38.4
38	mm10035343	V2-13.2(18h-19h)	30.4	23.6
39	mm10035344	V2-13.3(18h-19h)	33.9	25.1
40	mm10035345	V2-14.1(19h-20h)	27.6	21.3
41	mm10035346	V2-14.2(19h-20h)	30.7	22.7
42	mm10035347	V2-14.3(19h-20h)	33.0	24.0
43	mm10035348	V2-15.1(20h-21h)	40.2	30.6
44	mm10035349	V2-15.2(20h-21h)	37.0	36.8
45	mm10035350	V2-15.3(20h-21h)	32.0	24.2
46	mm10035351	V2-16.1(21h-22h)	32.5	24.6
47	mm10035352	V2-16.2(21h-22h)	33.1	25.1
48	mm10035353	V2-16.3(21h-22h)	39.6	29.4

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF AIR QUALITY MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: PACKAGE 2 – TRUONG KHANH PAGODA
Co-ordinate: N 10⁰47'13,9" ; E 106⁰51'05,7"
Time of monitoring: 24/03/2010 (06h - 22h)
Surrounding conditions: Quite area
Staff: Q.T.Thanh Mai – Tran.T.Kim Vui – Doan Thi Boi Hanh

1. Results of microclimate parameters:

No	Code	Sign	Temp °C	Humidity %	Wind velocity m/s	Pressure mB	Wind direction
1	mm10035494	A2-1 (06h-08h)	27.6	82.8	0.2 - 0.5	1008.4	SW
2	mm10035495	A2-2 (08h-10h)	29.7	67.7	0.4 - 1.3	1009.4	SW
3	mm10035496	A2- 3 (10h-12h)	33.7	53.4	0.2 - 0.5	1008.9	SW
4	mm10035497	A2-4 (12h-14h)	35.8	45.4	0.3 - 0.5	1008.5	SE
5	mm10035498	A2-5 (14h-16h)	34.2	52.9	0.3 - 0.5	1004.0	SE
6	mm10035499	A2-6 (16h-18h)	32.6	56.2	0.3 - 1.3	1004.2	SE
7	mm10035500	A2-7 (18h-20h)	30.9	58.3	0.4 - 0.8	1004.6	SE
8	mm10035501	A2-8 (20h-22h)	29.3	70.9	0.4 - 0.6	1005.2	SE

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

2. Result of air quality parameters:

No	Code	Sign	SO₂ mg/m ³	NO₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
1	mm10035494	A2-1 (06h-08h)	NONE MLOD = 0.03	0.05	NONE MLOD = 1.0	0.35	2.2
2	mm10035495	A2-2 (08h-10h)	NONE MLOD = 0.03	0.04	NONE MLOD = 1.0	0.42	2.3
3	mm10035496	A2-3 (10h-12h)	NONE MLOD = 0.03	0.05	NONE MLOD = 1.0	0.16	3.2
4	mm10035497	A2-4 (12h-14h)	NONE MLOD = 0.03	0.05	NONE MLOD = 1.0	0.25	3.3
5	mm10035498	A2-5 (14h-16h)	NONE MLOD = 0.03	0.04	NONE MLOD = 1.0	1.30	3.2
6	mm10035499	A2-6 (16h-18h)	NONE MLOD = 0.03	0.04	NONE MLOD = 1.0	0.42	3.2
7	mm10035500	A2-7 (18h-20h)	NONE MLOD = 0.03	0.03	NONE MLOD = 1.0	1.40	3.1
8	mm10035501	A2-8 (20h-22h)	NONE MLOD = 0.03	0.03	NONE MLOD = 1.0	0.53	2.2

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

Result of surface water monitoring

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: PACKAGE 2 – LONG THANH BIDGE
Co-ordinate: **SW3-1:** N 10°46'58,4" ; E 106°51'46,9" (10h43 - 10h48)
SW3-2: N 10°46'58,4" ; E 106°51'46,9" (15h54 - 16h00)
SW3-3: N 10°47'14,3" ; E 106°51'46,0" (10h55 - 10h55)
SW3-4: N 10°47'14,3" ; E 106°51'46,0" (16h03 - 16h08)
Time of monitoring: 24/03/2010
Weather condition: Sunny, breeze
Staff: Nguyen Le Phuong - Nguyen Tuan Vu.

1. Results on measuring, monitoring the surface water at upstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-1 mm10035458	SW3-2 mm10035459	Column A2	Column B1
1	pH	-	6,80	6,83	6 - 8.5	5.5 - 9
2	Temp.	oC	30,6	30,8	-	-
3	TDS	NTU	25,9	23,0	-	-
4	Conductivity	μS/cm(25 ⁰ C)	410,0	334,0	-	-
5	DO	mg/l	4.64	5,18	≥ 5	≥ 4
6	BOD ₅	mg/l	3,4	5,1	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	17,2	12,6	30	50
9	T-N	mg/l	0,70	0,68	-	-
10	T-P	mg/l	0,06	0,06	-	-
11	As	mg/l	NONE MLOD = 0,0002	NONE MLOD = 0,0002	0.02	0.05
12	Cd	mg/l	NONE MLOD = 0,0006	NONE MLOD = 0,0006	0.005	0.01

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-1 mm10035458	SW3-2 mm10035459	Column A2	Column B1
13	CN ⁻	mg/l	NONE MLOD = 0,007	NONE MLOD = 0,007	0.01	0.02
14	Cu	mg/l	NONE MLOD = 0,002	NONE MLOD = 0,002	0.2	0.5
15	Hg	mg/l	NONE MLOD = 0,0005	NONE MLOD = 0,0005	0.001	0.001
16	Pb	mg/l	NONE MLOD = 0,006	NONE MLOD = 0,006	0.02	0.05
17	Zn	mg/l	0.007	0.008	1.0	1.5
18	NO ₃ ⁻	mg/l	1,06	0,97	5	10
19	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	0.02	0.1
20	Coliform	MPN/100ml	1,4x10 ¹	9,3x10 ¹	5000	7500
21	NH ₄ ⁺	mg/l	0,28	0,25	0.2	0.5

2. Results on measuring, monitoring the surface water at downstream (morning& afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-3 mm10035460	SW3-4 mm10035461	Column A2	Column B1
1	pH	-	6,81	6,85	6 - 8.5	5.5 - 9
2	Temp.	oC	31,3	30,8	-	-
3	TDS	NTU	23,4	22,6	-	-
4	Conductivity	μS/cm(25 ⁰ C)	350,0	314,0	-	-
5	DO	mg/l	4,88	5,19	≥ 5	≥ 4
6	BOD ₅	mg/l	5,3	7,9	6	15
7	COD	mg/l	< 30	< 30	15	30

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-3 mm10035460	SW3-4 mm10035461	Column A2	Column B1
8	SS	mg/l	15,4	16,4	30	50
9	T-N	mg/l	0,67	0,63	-	-
10	T-P	mg/l	0,06	0,06	-	-
11	As	mg/l	NONE MLOD = 0,0002	NONE MLOD = 0,0002	0.02	0.05
12	Cd	mg/l	NONE MLOD = 0,0006	NONE MLOD = 0,0006	0.005	0.01
13	CN ⁻	mg/l	NONE MLOD = 0,007	NONE MLOD = 0,007	0.01	0.02
14	Cu	mg/l	NONE MLOD = 0,002	NONE MLOD = 0,002	0.2	0.5
15	Hg	mg/l	NONE MLOD = 0,0005	NONE MLOD = 0,0005	0.001	0.001
16	Pb	mg/l	NONE MLOD = 0,006	NONE MLOD = 0,006	0.02	0.05
17	Zn	mg/l	0.007	0.008	1.0	1.5
18	NO ₃ ⁻	mg/l	0,94	0,94	5	10
19	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	0.02	0.1
20	Coliform	MPN/100ml	1,1x10 ¹	2,1x10 ¹	5000	7500
21	NH ₄ ⁺	mg/l	0,29	0,33	0.2	0.5

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)
TEL: 08.39100827 fax: 08.38293087

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF SOIL MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway

Monitoring site: PACKAGE 2 – TRUONG KHANH PAGODA

Co-ordinate: **S2-1:** N 10⁰47'13,7" ; E 106⁰51'06,0"

S2-2: N 10⁰47'14,0" ; E 106⁰51'07,7"

S2-3: N 10⁰47'15,3" ; E 106⁰51'08,7"

Time of monitoring: 24/03/2010

Weather condition: Sunny

Staff: Nguyen Le Phuong-Nguyen Tuan Vu

No	Analysis criteria	Unit	Result analysis			QCVN 03:2008/BTN MT
			S2-1 mm10035480	S2-2 mm10035481	S2-3 mm10035482	
1	pH	-	3,79	4,02	5,13	-
2	Organic	%	16,0	12,0	8,13	-
3	Total N	%	0,11	0,11	0,12	-
4	Total P	mg/kg	94,4	89,8	53,7	-
5	Cl ⁻	mg/kg	1098	382,3	562,7	-
6	SO ₄ ²⁻	%	567,6	416,2	135,2	-
7	As	mg/kg	6,0	6,9	NONE MLOD = 2,5	12
8	Cd	mg/kg	NONE MLOD = 0.15	NONE MLOD = 0.15	NONE MLOD = 0.15	5
9	Cu	mg/kg	28,4	20,5	35,5	70
10	Fe	mg/kg %	1,8	3,2	2,7	-
11	Hg	mg/kg	Mark (0,08) MLOQ = 0.09	Mark (0,06) MLOQ = 0.09	Mark (0,05) MLOQ = 0.09	-
12	Pb	mg/kg	14,1	15,0	13,9	120
13	Zn	mg/kg	22,1	16,8	47,9	-

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF NOISE MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
Monitoring site: Package 3 – Long Thanh town (Near point NR51)
Co-ordinate: N 10°46'03,2" ; E 106°57'44,7"
Time of monitoring: 25/03/2010 (06h - 22h)
Surrounding conditions: There are many means transportation and the use of air horn
Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Đoàn Thi Boi Hanh

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10035354	N3-1.1(6h-7h)	72.3	88.7	70.2
02	mm10035355	N3-1.2(6h-7h)	70.5	82.3	68.8
03	mm10035356	N3-1.3(6h-7h)	78.7	102.3	72.7
04	mm10035357	N3-2.1(7h-8h)	73.8	82.4	71.2
05	mm10035358	N3-2.2(7h-8h)	71.7	84.8	69.7
06	mm10035359	N3-2.3(7h-8h)	73.6	86.8	70.4
07	mm10035360	N3-3.1(8h-9h)	73.1	86.7	70.0
08	mm10035361	N3-3.2(8h-9h)	73.7	102.1	69.8
09	mm10035362	N3-3.3(8h-9h)	73.0	86.6	70.8
10	mm10035363	N3-4.1(9h-10h)	76.1	93.4	72.2
11	mm10035364	N3-4.2(9h-10h)	74.4	88.6	71.8
12	mm10035365	N3-4.3(9h-10h)	74.1	90.5	71.2
13	mm10035366	N3-5.1(10h-11h)	74.6	88.8	71.3
14	mm10035367	N3-5.2(10h-11h)	76.5	93.3	72.1
15	mm10035368	N3-5.3(10h-11h)	75.1	88.4	72.6
16	mm10035369	N3-6.1(11h-12h)	76.2	89.3	73.2
17	mm10035370	N3-6.2(11h-12h)	75.7	86.8	73.3
18	mm10035371	N3-6.3(11h-12h)	75.9	93.0	72.8
19	mm10035372	N3-7.1(12h-13h)	75.2	95.5	73.0
20	mm10035373	N3-7.2(12h-13h)	76.3	84.4	72.2
21	mm10035374	N3-7.3(12h-13h)	75.8	86.8	72.1
22	mm10035375	N3-8.1(13h-14h)	77.2	100.1	70.9
23	mm10035376	N3-8.2(13h-14h)	72.7	84.6	70.0
24	mm10035377	N3-8.3(13h-14h)	73.4	88.0	70.6

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

25	mm10035378	N3-9.1(14h-15h)	78.7	105.3	72.1
26	mm10035379	N3-9.2(14h-15h)	72.9	91.3	71.3
27	mm10035380	N3-9.3(14h-15h)	73.7	92.2	71.2
28	mm10035381	N3-10.1(15h-16h)	79.8	104.0	72.8
29	mm10035382	N3-10.2(15h-16h)	74.2	87.6	72.3
30	mm10035383	N3-10.3(15h-16h)	77.7	101.8	73.5
31	mm10035384	N3-11.1(16h-17h)	74.4	84.4	72.6
32	mm10035385	N3-11.2(16h-17h)	74.4	87.8	72.2
33	mm10035386	N3-11.3(16h-17h)	74.5	89.6	73.0
34	mm10035387	N3-12.1(17h-18h)	76.1	94.0	72.6
35	mm10035388	N3-12.2(17h-18h)	73.7	86.5	71.3
36	mm10035389	N3-12.3(17h-18h)	74.2	85.8	72.1
37	mm10035390	N3-13.1(18h-19h)	75.0	88.0	72.1
38	mm10035391	N3-13.2(18h-19h)	75.8	85.8	73.4
39	mm10035392	N3-13.3(18h-19h)	74.4	92.5	71.9
40	mm10035393	N3-14.1(19h-20h)	74.5	96.4	71.2
41	mm10035394	N3-14.2(19h-20h)	75.3	91.5	73.0
42	mm10035395	N3-14.3(19h-20h)	74.0	83.5	72.8
43	mm10035396	N3-15.1(20h-21h)	75.9	100.6	72.7
44	mm10035397	N3-15.2(20h-21h)	75.7	96.3	71.9
45	mm10035398	N3-15.3(20h-21h)	74.3	89.7	72.1
46	mm10035399	N3-16.1(21h-22h)	74.9	95.4	71.7
47	mm10035400	N3-16.2(21h-22h)	74.5	87.0	72.2
48	mm10035401	N3-16.3(21h-22h)	74.6	100.5	70.8

Monitored by

Checked by

**Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)**

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF VIBRATION MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
Monitoring site: Package 3 – Long Thanh town (near point NR51)
Co-ordinate: N 10⁰46'03,2" ; E 106⁰57'44,7"
Time of monitoring: 25/03/2010 (06h - 22h)
Surrounding conditions: There are many means transportation
Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Doan Thi Boi Hanh

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10035402	V3-1.1(6h-7h)	28.1	37.1
02	mm10035403	V3-1.2(6h-7h)	29.3	33.4
03	mm10035404	V3-1.3(6h-7h)	26.8	34.6
04	mm10035405	V3-2.1(7h-8h)	25.2	32.8
05	mm10035406	V3-2.2(7h-8h)	41.3	43.2
06	mm10035407	V3-2.3(7h-8h)	41.3	43.1
07	mm10035408	V3-3.1(8h-9h)	41.2	43.1
08	mm10035409	V3-3.2(8h-9h)	25.2	32.9
09	mm10035410	V3-3.3(8h-9h)	41.3	43.3
10	mm10035411	V34.1(9h-10h)	28.7	36.7
11	mm10035412	V3-4.2(9h-10h)	27.0	35.1
12	mm10035413	V3-4.3(9h-10h)	26.4	34.1
13	mm10035414	V3-5.1(10h-11h)	41.2	43.2
14	mm10035415	V3-5.2(10h-11h)	41.1	43.1
15	mm10035416	V3-5.3(10h-11h)	41.3	43.5
16	mm10035417	V3-6.1(11h-12h)	41.3	43.4
17	mm10035418	V3-6.2(11h-12h)	41.2	43.3
18	mm10035419	V3-6.3(11h-12h)	41.2	43.3
19	mm10035420	V3-7.1(12h-13h)	41.2	43.4
20	mm10035421	V3-7.2(12h-13h)	41.7	44.0
21	mm10035422	V3-7.3(12h-13h)	41.1	43.2
22	mm10035423	V3-8.1(13h-14h)	38.7	40.5
23	mm10035424	V3-8.2(13h-14h)	41.1	43.0
24	mm10035425	V3-8.3(13h-14h)	26.6	33.8

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

25	mm10035426	V3-9.1(14h-15h)	27.5	34.9
26	mm10035427	V3-9.2(14h-15h)	41.3	43.4
27	mm10035428	V3-9.3(14h-15h)	41.3	43.6
28	mm10035429	V3-10.1(15h-16h)	29.3	36.8
29	mm10035430	V3-10.2(15h-16h)	41.2	43.3
30	mm10035431	V3-10.3(15h-16h)	29.5	37.3
31	mm10035432	V3-11.1(16h-17h)	41.1	43.1
32	mm10035433	V3-11.2(16h-17h)	41.1	43.0
33	mm10035434	V3-11.3(16h-17h)	28.2	36.0
34	mm10035435	V3-12.1(17h-18h)	28.0	35.8
35	mm10035436	V3-12.2(17h-18h)	27.0	34.7
36	mm10035437	V3-12.3(17h-18h)	28.0	35.7
37	mm10035438	V3-13.1(18h-19h)	27.7	35.4
38	mm10035439	V3-13.2(18h-19h)	29.0	37.0
39	mm10035440	V3-13.3(18h-19h)	27.2	34.7
40	mm10035441	V3-14.1(19h-20h)	28.2	35.8
41	mm10035442	V3-14.2(19h-20h)	41.5	43.9
42	mm10035443	V3-14.3(19h-20h)	28.0	36.0
43	mm10035444	V3-15.1(20h-21h)	28.5	36.5
44	mm10035445	V3-15.2(20h-21h)	26.8	34.6
45	mm10035446	V3-15.3(20h-21h)	27.5	35.3
46	mm10035447	V3-16.1(21h-22h)	28.0	35.8
47	mm10035448	V3-16.2(21h-22h)	26.7	34.5
48	mm10035449	V3-16.3(21h-22h)	24.4	31.3

Monitored by

Checked by

**Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)**

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF AIR QUALITY MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
Monitoring site: Package 3 – Long Thanh town (Near point NR51)
Co-ordinate: N 10°46'03,2" ; E 106°57'44,7"
Time of monitoring: 25/03/2010 (06h - 22h)
Surrounding conditions: There are many means transportation
Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Đoàn Thi Boi Hanh

1. Result of Microclimate parameters:

No	Code	Sign	Temp °C	Humidity %	Wind velocity m/s	Pressure mB	Wind direction
1	mm10035502	A3-1 (06h-08h)	28.6	79.6	0.8 - 1.2	1008.3	SE
2	mm10035503	A3-2 (08h-10h)	30.6	64.9	0.4 - 0.7	1008.7	SE
3	mm10035504	A3- 3 (10h-12h)	34.8	49.0	0.5 - 1.9	1008.5	SE
4	mm10035505	A3-4 (12h-14h)	34.0	51.0	0.5 - 2.5	1005.0	SE
5	mm10035506	A3-5 (14h-16h)	32.5	55.3	1.0 - 4.5	1003.9	SE
6	mm10035507	A3-6 (16h-18h)	32.4	54.6	1.0 - 5.4	1003.6	SE
7	mm10035508	A3-7 (18h-20h)	31.1	61.1	0.8 - 1.8	1004.5	SE
8	mm10035509	A3-8 (20h-22h)	29.7	66.7	1.0 - 2.5	1005.2	SE

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

2. Result of air quality parameters:

No	Code	Sign	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
1	mm10035502	A3-1 (06h-08h)	none MLOD = 0.03	0.08	none MLOD = 1.0	1.14	3.4
2	mm10035503	A3-2 (08h-10h)	0.06	0.10	none MLOD = 1.0	1.09	4.9
3	mm10035504	A3- 3 (10h-12h)	0.07	0.14	None MLOD = 1.0	1.23	5.2
4	mm10035505	A3-4 (12h-14h)	0.10	0.11	none MLOD = 1.0	2.69	5.7
5	mm10035506	A3-5 (14h-16h)	0.13	0.07	none MLOD = 1.0	2.42	4.3
6	mm10035507	A3-6 (16h-18h)	0.08	0.14	none MLOD = 1.0	0.91	3.6
7	mm10035508	A3-7 (18h-20h)	0.05	0.05	none MLOD = 1.0	0.90	4.5
8	mm10035509	A3-8 (20h-22h)	None MLOD = 0.03	0.04	none MLOD = 1.0	1.25	4.3

Monitored by

Checked by

**Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)**

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF SURFACE WATER MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
Monitoring site: Package 3 – Dong Mon bridge
Co-ordinate: **SW4-1:** N 10°46'06,9" ; E 106°56'41,1" (10h15 - 10h25)
SW4-2: N 10°46'06,9" ; E 106°56'41,1" (16h30 - 16h45)
SW4-3: N 10°46'07,1" ; E 106°52'24,3" (10h40 - 10h50)
SW4-4: N 10°46'07,1" ; E 106°52'24,3" (16h10 - 15h25)
Time of monitoring: 25/03/2010
Weather condition: Sunny, breeze
Staff: Nguyen Le Phuong - Nguyen Tuan Vu

1. Results on measuring, monitoring the surface water at upstream (morning and afternoon):

TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-1 mm10035462	SW4-2 mm10035463	Column A2	Column B1
1	pH	-	6,17	6,18	6 - 8.5	5.5 - 9
2	Temp.	oC	30,4	30,9	-	-
3	TDS	NTU	64,4	24,8	-	-
4	Conductivity	µS/cm(25 ⁰ C)	172,2	244,0	-	-
5	DO	mg/l	4,41	4,38	≥ 5	≥ 4
6	BOD ₅	mg/l	11,8	5,9	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	39,2	18,2	30	50
9	T-N	mg/l	1,04	1,18	-	-
10	T-P	mg/l	0,26	0,12	-	-
11	As	mg/l	none MLOD = 0,0002	none MLOD = 0,0002	0.02	0.05
12	Cd	mg/l	none MLOD = 0,0006	none MLOD = 0,0006	0.005	0.01

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-1 mm10035462	SW4-2 mm10035463	Column A2	Column B1
13	CN ⁻	mg/l	none MLOD = 0,007	none MLOD = 0,007	0.01	0.02
14	Cu	mg/l	none MLOD = 0,002	none MLOD = 0,002	0.2	0.5
15	Hg	mg/l	none MLOD = 0,0005	none MLOD = 0,0005	0.001	0.001
16	Pb	mg/l	none MLOD = 0,006	none MLOD = 0,006	0.02	0.05
17	Zn	mg/l	0.014	0.009	1.0	1.5
18	NO ₃ ⁻	mg/l	1,16	0,83	5	10
19	Oil and grease	mg/l	none MLOD=0,04	none MLOD=0,04	0.02	0.1
20	Coliform	MPN/100ml	9,4x10 ²	9,2x10 ²	5000	7500
21	NH ₄ ⁺	mg/l	0,87	0,70	0.2	0.5

2. Result on measuring of monitoring surface water at the downstream (morning and afternoon):

TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-3 mm10035464	SW4-4 mm10035465	Column A2	Column B1
1	pH	-	6,07	6,26	6 - 8.5	5.5 - 9
2	Temp.	oC	30,2	30,2	-	-
3	TDS	NTU	108	21,5	-	-
4	Conductivity	μS/cm(25 ⁰ C)	156,3	562,0	-	-
5	DO	mg/l	3,2	5,0	≥ 5	≥ 4
6	BOD ₅	mg/l	10,9	7,9	6	15
7	COD	mg/l	< 30	< 30	15	30

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-3 mm10035464	SW4-4 mm10035465	Column A2	Column B1
8	SS	mg/l	91,6	20,0	30	50
9	T-N	mg/l	1,03	1,06	-	-
10	T-P	mg/l	0,37	0,08	-	-
11	As	mg/l	None MLOD = 0,0002	none MLOD = 0,0002	0.02	0.05
12	Cd	mg/l	none MLOD = 0,0006	none MLOD = 0,0006	0.005	0.01
13	CN ⁻	mg/l	none MLOD = 0,007	none MLOD = 0,007	0.01	0.02
14	Cu	mg/l	none MLOD = 0,002	none MLOD = 0,002	0.2	0.5
15	Hg	mg/l	none MLOD = 0,0005	none MLOD = 0,0005	0.001	0.001
16	Pb	mg/l	none MLOD = 0,006	none MLOD = 0,006	0.02	0.05
17	Zn	mg/l	0.014	0.008	1.0	1.5
18	NO ₃ ⁻	mg/l	1,28	0,82	5	10
19	Oil and grease	mg/l	none MLOD=0,04	none MLOD=0,04	0.02	0.1
20	Coliform	MPN/100ml	3,5x10 ²	5,4x10 ³	5000	7500
21	NH ₄ ⁺	mg/l	0,88	0,51	0.2	0.5

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF

**Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)**

TEL: 08.39100827

fax: 08.38293087

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT OF UNDERGROUND WATER MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
Monitoring site: PACKAGE 3 – **LONG THANH TOWN A**

Co-ordinate: **GW3 - 1** : N 10°45'59,2" ; E 106°57'22,3"
GW3 - 2 : N 10°45'58,3" ; E 106°57'20,9"
GW3 - 3 : N 10°46'00,9" ; E 106°57'20,3"
Time of monitoring: 25/05/2010
Weather condition: Sunny
Staff: Nguyen Le Phuong - Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW3-1 mm10035471	GW3-2 mm10035472	GW3-3 mm10035473	
1	pH	-	5,07	5,67	4,63	5.5 – 8.5
2	Temp.	°C	30,6	30,2	29,0	-
3	TDS	NTU	3,32	51,6	0,37	-
4	Conductivity	μS/cm(25°C)	124,9	146,9	16,45	-
5	Colour	Pt/Co	5	5	0	-
6	Odor	mg/l	light smell	light smell	light smell	-
7	Hardness level	mgCaCO ₃ /l	37,6	27,7	5,9	500
8	Cl ⁻	mg/l	325,2	362,8	24,9	250
9	SO ₄ ²⁻	mg/l	9,4	9,8	11,9	400
10	NO ₃ ⁻	mg/l	0,51	4,14	4,56	15

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

No	Analysis criteria	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW3-1 mm10035471	GW3-2 mm10035472	GW3-3 mm10035473	
11	Cd	mg/l	none MLOD = 0,0006	none MLOD = 0,0006	none MLOD = 0,0006	0.005
12	Fe	mg/l	0,24	3,09	0,04	5
13	Mn	mg/l	0,094	0,085	0,021	0.5
14	Pb	mg/l	none MLOD = 0,006	none MLOD = 0,006	none MLOD = 0,006	0.01
15	Zn	mg/l	0,014	0,052	0,012	3.0
16	Coliform	MPN/100ml	< 01	< 01	< 01	3
17	Turbidity	mg/l	-	-	-	-
18	As	mg/l	none MLOD = 0,0002	0,0006	none MLOD = 0,0002	-
19	CN ⁻	mg/l	none MLOD = 0,007	none MLOD = 0,007	none MLOD = 0,007	0.01
20	Fecal coliform	MPN/100ml	< 01	< 01	< 01	Không

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF
Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)

TEL: 08.39100827

fax: 08.38293087

RESULT ANALYSIS OF SOIL

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring site: PACKAGE 3 – LONG THANH TOWN

Co-ordinate: **S3 - 1:** N 10°45'59,3" ; E 106°57'22,3"

S3 - 2: N 10°45'58,3" ; E 106°57'20,8"

S3 - 3: N 10°45'01,0" ; E 106°57'20,5"

Time of monitoring: 25/03/2010

Weather condition: Sunny

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 03: 2008/BTNMT
			S3-1 mm10035483	S3-2 mm10035484	S3-3 mm10035485	
1	pH	-	6,40	6,76	4,84	-
2	Organic	%	0,44	1,08	0,63	-
3	Total N	%	0,03	0,03	0,03	-
4	Total P	mg/kg	175,8	246,6	218,2	-
5	Cl ⁻	mg/kg	110,7	52,9	21,1	-
6	SO ₄ ²⁻	%	none MLOD = 5,0	none MLOD = 5,0	none MLOD = 5,0	-
7	As	mg/kg	none MLOD = 2,5	none MLOD = 2,5	none MLOD = 2,5	12
8	Cd	mg/kg	none MLOD = 0,15	none MLOD = 0,15	none MLOD = 0,15	5
9	Cu	mg/kg	4,5	5,6	3,3	70
10	Fe	%	0,41	0,34	0,22	-
11	Hg	mg/kg	none MLOD = 0,03	little (0,04) MLOQ = 0,09	none MLOD = 0,03	-
12	Pb	mg/kg	4,9	5,6	7,7	120
13	Zn	mg/kg	25,1	14,9	3,3	-

Monitored by

Checked by

Center of analytical
services and
experimentation of Ho
Chi Minh city (CASE)

CONSORTIUM OF

**Scientific technological center for environmental protection in
transportation (CEPT) and Center of analytical services and
experimentation of Ho Chi Minh city (CASE)**

TEL: 08.39100827

fax: 08.38293087
