

Environmental Monitoring Report

Monthly Report
September 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 31 August 2010)

Currency unit	–	dong (D)
D1.00	=	\$0.000051
\$1.00	=	D19,490

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.

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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 Ho Chi Minh City - Long Thanh - Dau Giay Expressway Project Management Unit (EPMU-HLD).

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 (No4) and packages 1b, 2, 3 (No 4), on dated 7, 8, 9 September 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.

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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 Ho Chi Minh City - Long Thanh - Dau Giay Expressway Project Management Unit (EPMU-HLD).

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:*

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Table 1. Plan for implementation

Date Work	7/9 to 9/9/2010	10/9/2010 to 27/9/2010	4/10/2010	10/10/2010
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
7th Sep, 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	-	1a	-	WW1-1; WW 1-2; WW1-3
8th Sep					
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 residential area)	2	11+300	V2

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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
		Song Tac bridge	1b	10+400 (up stream)	SW2-1; SW2-2
		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
7	Waste water	-	1b	-	W2-1; W2-2; W2-3;
		-	2	-	W3-1; W3-2; W3-3;
9 st Sep					
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
7	Waste water	-	3	-	W4-1; W4-2;

					W4-3.
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2.2. Status of the project

In the package 1a: Temporary road construction, precast Yard construction, embankment, super T girder fabrication and preparation works of pile cap.

In the packages 1b: Construction of temporary road and temporary bored, construction of working bored piles.

In the packages 2: Bored piles construction (D1200 and D2000), construction service road, ececuting super T girder casting yard; mobilizing equipment for concrete batching plant at Dong Nai site.

In the packages 3: Site office construction, clearing and grubbing from Km18+000 to 22+600, preparation work for soft soil treatment with deep mixing method (DMM) and vacuum consolidation method (VCM) at Km18+725 to Km18+900.

2.3. Previous and trend of environmental conditions

*** Previous conditions:**

According to the thirdth Environmnetal Monitoring (June 2010) as below:

a). Package 1a

- *Air quality:* The content of dust is higher the allowable values in QCVN05:2009 (0.03 mg/m³) this cause by vehicles transporting building materials at the construction site.

- *Noise and vibration* are meeting the allowable levels. However, the vibration result this monitoring is higher than monitoring before about 12 dBA, causing by high density of heavy loading trucks for building material transportation.

- *Surface water:*

+ At the sites SW1-1; SW1-2: DO did not meet allowable value. (Permit standard \geq 4mg/l).

+ At the sites SW1-3; SW1-4: DO and COD did not meet allowable value.

Both of high temperature in water (31⁰C) and high chemical oxygen demand (COD) make the DO content lower than allowable value.

- *Underground water:* pH, Fecal coliform at 3 underground water did not meet allowable value according to QCVN09:2008. pH level is defined to 4.63 from 4.80

- *Soil:* 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.

- *Waste water*: All parameters are meeting the column B, QCVN24:2009.

b). Package 1b

- *Surface water*:

+ At the sites SW2-1; SW2-2; SW2-3; SW2-4: DO did not meet allowable value, DO level is defined to 2,26 from 2,49mg/l.

+ Vĩ trí SW2-2; SW2-4: SS is higher than allowable value (1.5 - 1.84 times). The reason is flood tide making higher content of turbidity and suspended solid in water.

+ Vĩ trí SW2-3: Coliform is higher than allowable value (1.5 times).

- *Underground water*:

+ Underground water samples GW2-1; GW2-2; GW2-3: Cl⁻ is higher allowable value (2.5 - 4.76 times). The high Cl⁻ concentration is possibly caused by natural impacts (for salt intrusion, acidic water and high conductivity). If this water will be used as fresh water, it is necessary to check the organic compounds in water because this redundant chlorine will combine with organic matter producing a very poisonous chemicals.

+ Underground water samples GW2-2 và GW2-3: Fe is higher allowable value (At water sample GW2-3 is higher allowable value about 2.08 times).

+ Underground water samples GW2-1 và GW2-3: Fe is higher allowable value (1.78 – 2.16 times).

To reduce the content of Mn and Fe in fresh water, the simple way of treatment is to expose water in the air and to oxidize these elements then filtration water by sand or grave.

+ Water samples in three locations are contaminated by Fecal Coliform .

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

- *Waste water*: All parameters are meeting the column B, QCVN24:2009.

c). Package 2

- *Air, Noise and Vibration*: All parameters are meeting the allowable value, because there are many trees and far away from road, distance to the construction about 500m.

- *Surface water*: DO did not meeting allowable value all the site.

- *Soil*: As content in soil of sample S2-2 (14.8mg/kg) is higher than allowable value (12mg/kg).

As is very poisonous chemical, 5 – 10% of As content in soil will dissolve in underground water and causing As contamination in water. As content in soil at this location need to be checked in the next monitoring

- *Waste water*: All parameters are meeting the column B, QCVN24:2009.

d). Package 3

- *Air and Vibration*: All parameters are meeting the allowable value.

- *Noise*: The noise level is approximate allowable value in daytime and in nighttime is higher allowable value about 2.6dBA.

Vehicles are increased in the night time because all of heavy loading trucks are allowed to operate after 8 PM (route Vung Tau – TP.HCM).

- *Surface water*:

+ At the site SW4-1: DO, SS did not meet allowable value (SS is higher allowable value 2.58 times).

+ At the site SW4-2: SS (56.4 mg/l) is higher allowable value

+ At the site SW4-3: DO, SS and Coliform did not meet allowable value

+ At the site SW4-4: COD (34.9 mg/l) is higher allowable value

The high content of suspended solid (SS) in water is one of reason making low DO content by reducing the sunlight in the water for photosynthesis of aquatic plants.

- *Undeground water*:

+ Cl^- value at GW3-1 và GW3 - 2 is higher allowable value to 1.3 from 2.9 times.

+ There is a signal of contamination of Fecal Coliform in 03 underground water samples, except GW3-3 sample that has been contaminated by *Coliform*

+ NO_3^- value at GW3-3 is higher allowable value 6.58 times, that may cause by various reasons such as redundant pesticide, chemical substance, litter,... that will soak into soil and underground water.

+ pH value at GW3-1 and GW3-3 is not allowable value (making acidic water)

- *Soil and Waste water*: All parameters are meeting allowable value.

*** Trend of environmental:**

The monitoring comparison of invernmental status between the second and third times are showed in the bellow diagram.

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

** 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 (shown in table 6)*

3.5. Waste water

** 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 24:2009/BTNMT (National technical regulation on Industrial Wastewater).

** Parameters for monitoring:*

Temp, pH, BOD₅, COD, DO, SS, NH₄⁺, ΣN, ΣP, oil and grease, Coliform

** Frequency:*

The monitoring will be conducted in a day, taking 3 samples a day

** Equipment for monitoring:*

- Equipments: All of parameters such as pH, temp, DO will be measured at sites by the equipment of YSI, USA. Other parameters such as Coli form, grease, ΣN, ΣP....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

3.7. 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⁻, SO₄^{□-}, Cu, Zn, Cd, Pb, Hg, As, Fe.

** Frequency:*

The monitoring will be conducted in a day, taking 3 samples a day

** Analysisic 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

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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: September, 7th 2010.
- Positions: N 10⁰47'43,4" ; E 106⁰48'17,7"
- Climate condition: Sunny.
- Other conditions: There were much participated vehicles.
- Result monitoring (average):

Table 8. Measurement results on micro climate at projected area

No	Time	Temperature ⁰ C	Moisture content %	Wind speed m/s	Pressure mB	Wind direction
1	A1 (6h-22h)	31.1	67.0	0.2 - 2.5	1005.3	E, S, SE

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	None MLOD =0.03	0.024	None MLOD =1.0	0.25	3.31
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 contents of NO₂, CO and dust: from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009.

+ The contents of SO₂ and HC: The analyzed values of samples is rare.

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
		L_{eq}	L_{max}	L_{50}	
	Day	71.6	87.9	68.3	75
	Night	71.0	87.8	68.8	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) 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). However, this noise level is relative high.

The noise in night time (71dBA) is higher allowable value (70dBA).

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

The noise is high causing by high density of heavy loading trucks for building material transportation in this area.

*** Vibration:**

Table 11: Vibration monitored results

Average	Time	Result monitoring		Standard: TCVN 7210:2002
		Leq	Lveq	
	Day	54.5	40.8	From 6h to 22h: 70dBA
	Night	50.1	37.2	

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.

4.1.3. Surface water quality

- Location monitoring:	Ong Nhieu river (Ong Nhieu bridge) - Intersection Nguyen Duy Trinh str with HLD expressway
- Position:	SW1-1: N 10°47'40,0" ; E 106°48'49,7" (10h – 11h) SW1-2: N 10°47'30" ; E 106°48'49,7" (15h00 - 16h) SW1-3: N 10°47'29,6" ; E 106°48'52,2" (10h - 11h00) SW1-4: N 10°47'29,6" ; E 106°48'52,2" (15h - 16h)
Time:	Sep, 7 th 2010

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

* Comments:

- Applied column B1, QCVN08:2008 : Used for irrigation or other purposes such as water carriage

- Some parameters is not allowable value in SW1-1; SW1-2; SW1-3; SW1-4:

+ DO did not meet QCVN08:2008 ($\leq 4\text{mg/l}$).

+ COD is higher allowable value according to QCVN08:2008 from 1.35 to 1.68 times (except SW1-2).

+ SS is higher allowable value according to QCVN08:2008 from 1.32 to 2.0 times (except SW1-2).

Sampling time was in the raining season making high level of SS leading to high concentration of COD exceeding allowable value (COD means chemical oxygen demand).

4.1.4. Underground water quality

- Location monitoring:	Number home 51B ; 52/1 ; 75 Bung Ong Thoan Street - Tan Dien Hamlet - Phu Huu - District 9
- Position:	GW1-1 (51B): N 10°47'46,8" ; E 106°47'47,3" GW1-2 (52/1): N 10°47'47,9" ; E 106°47'56,8" GW1-3 (75) : N 10°47'50,0" ; E 106°47'53,2"

- 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 4.62 from 5.14)

- There is a signal of contamination of Coliform and Fecal Coliform in GW1-3 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)
- Position:	S1-1: N 10°47'54,3" ; E 106°47'16,9" S1-2: N 10°47'51,1" ; E 106°47'17,5" S1-3: N 10°47'54,5" ; E 106°47'18,2"

- 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:	Km4+350; Km4+980; Km5+480
- Position:	W1 - 1 : N 10°47'51,6" ; E 106°47'22,8" W1 - 2 : N 10°47'49,7" ; E 106°47'40,9" W1 - 3 : N 10°47'42,8" ; E 106°48'15,9"

- Results on measuring, monitoring the waste water (Shown in appendix)

* Comments:

The analyzed wastewater sample values will be compared to QCVN24:2009 (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving waterbodies not using for domestic water supply).

- SS in WW1-1 is higher allowable value according to QCVN24:2009 to 1.6 times.
- All others parameters are meeting the QCVN24:2009.

4.2. Package 1b

4.2.1. Surface water

- Location monitoring:	Tac bridge
- Position:	SW2-1: N 10°47'28,1" ; E 106°48'52,2" (10h - 11h) SW2-2: N 10°47'28,1" ; E 106°48'52,2" (15h - 16h00) SW2-3: N 10°47'22,2" ; E 106°50'43,0" (10h55 - 10h55) SW2-4: N 10°47'22,2" ; E 106°50'43,0" (16h - 17h00)
Time:	8 th , Sep 2010
Climate condition:	Sunny, light wind

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

*** Comments:**

Applied column B1, QCVN08:2008 : Used for irrigation or other purposes such as water carriage

- Some parameters is not allowable value in SW1-1; SW1-2; SW1-3; SW1-4:
- + DO did not meet QCVN08:2008 ($\leq 4\text{mg/}$).
- + SS is higher allowable value according to QCVN08:2008 from 1.3 to 1.76 times.
- COD is higher allowable value according to QCVN08:2008 to 1.5 times (at sites: SW2-1; SW2-3).

Sampling time was in the raining season making high level of SS leading to high concentration of COD exceeding allowable value (COD means chemical oxygen demand) and to low DO in the water.

4.2.2. Underground water

- Location monitoring:	Long Phuoc ward (near Dong Nai river)
- Position:	GW2-1 : N 10°47'28,3" ; E 106°51'03,5" GW2-2 : N 10°47'32,3" ; E 106°49'14,8"

	GW2-3 : N 10°47'30,2" ; E 106°49'13,5"
--	---

- Results on measuring, monitoring the underground water (Shown in appendix)

* Comments:

- Underground water samples GW2-1; GW2-2; GW2-3: Cl⁻ is higher allowable value (2.78 - 4.2 times). The high Cl⁻ concentration is possibly caused by natural impacts (for salt intrusion, acidic water and high conductivity).

- Underground water samples GW2-2 and GW2-3: Fe is higher allowable value (6.14 - 9.34 times).

- Underground water samples GW2-1; GW2-2 and GW2-3: Mn is higher allowable value (1.38 – 2.18 times).

To reduce the content of Mn and Fe in fresh water, the simple way of treatment is to expose water in the air and to oxidize these elements then filtration water by sand or grave.

- Water samples in three locations are contaminated by Fecal Coliform .

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

4.2.3. Waste water

- Location monitoring:	Km7+900; Km10+300; Km10+500
- Position:	W2 - 1 : N 10°47'22,2" ; E 106°50'43,0" W2 - 2 : N 10°47'16,2" ; E 106°50'41,7" W2 - 3 : N 10°47'36,0" ; E 106°49'03,1"

- Results on measuring, monitoring the waste water (Shown in appendix)

* Comments:

The analyzed wastewater sample values will be compared to QCVN24:2009 (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving waterbodies not using for domestic water supply).

All parameters are meeting the QCVN24:2009.

4.3. Package 2

4.3.1. Air quality

- Location monitoring: Truong Khanh Temple (near residential area)

- Time: From 6h to 22h. Date: Sep, 8th 2010.

- Positions: N 10⁰47'13,9" ; E 106⁰51'05,7"
- Climate condition: Sunny
- Other conditions: Quiet 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)	31.3	64.6	0.1 - 2.5	1006.9	SE, SW, E, S

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	None MLOD = 0.03	0.028 (*)	None MLOD =1.0	0.155	2.6
	18h-22h	-	None MLOD =0.01	-	-	-
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

- (): NO₂ is defined at 6am – 6pm*

- Comment:

+ The contents of SO₂, NO₂, CO and dust: 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	54.5	69.9	52.0	75
	Night	56.3	67.4	55.2	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	40.8	30.8	From 6h to 22h: 70dBA
	Night	33.9	25.3	

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
- Position:	SW3-1: N 10°47'00,1" ; E 106°51'40,3" (10h – 11h) SW3-2: N 10°47'00,1" ; E 106°51'40,3" (15h - 16h) SW3-3: N 10°47'20,1" ; E 106°51'38,5" (10h - 11h) SW3-4: N 10°47'20,1" ; E 106°51'38,3" (16h - 17h)
- Time:	8 th Sep 2010
- Climate condition:	Sunny

- 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: DO did not meet allowable value.
- COD is higher allowable value according to QCVN08:2008 to 1.3 times at SW3-4.
- SS is higher allowable value to 1.1 from 1.35 times at SW3-1 and SW3-3
- Others parameters is under 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
- Position:	S2-1: N 10°47'13,7" ; E 106°51'06,0" S2-2: N 10°47'14,0" ; E 106°51'07,7" S2-3: N 10°47'15,3" ; E 106°51'08,7"

- 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.

4.3.5. Waste water

- Location monitoring:	Km11+500; Km12+300; Km12+900
- Position:	W3 - 1 : N 10°47'11,8" ; E 106°51'43,4" W3 - 2 : N 10°47'16,6" ; E 106°51'36,1" W3 - 3 : N 10°47'19,2" ; E 106°51'23,5"

- Results on measuring, monitoring the waste water (Shown in appendix)

* Comments:

The analyzed wastewater sample values will be compared to QCVN24:2009 (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving waterbodies not using for domestic water supply).

All parameters are meeting the QCVN24:2009.

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: Sep, 9th 2010.
- Positions: N 10⁰46'01,9" ; E 106⁰57'26,8"
- Climate condition: Sunny.
- Other conditions: There are many rollers, cranes and trucks and the use of air horn.

Result monitoring (average):

Table 16. Measurement results on micro climate at projected area

No	Time ⁰ C	Temperature %	Moisture content m/s	Wind speed mB	Pressure
A3 (6h-22h)	29.3	67.2	0.1 - 2.0	1007	SE, NW, S

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	0.082 (*)	0.038	None MLOD = 1.0	0.52	4.38
	6h - 8h; 20 - 22h	None MLOD = 0.03	-	-	-	-
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
 - (*): SO₂ is defined at 8am – 8pm

- Comments:

+ The content of dust is higher allowable value about 0.22 mg/m^3 . The causing may be the monitoring location is near National Highway No.51 where there are many vehicles transporting goods from Vung Tau to industrial parks and on the contrary.

+ The contents of SO_2 , NO_2 , 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
		L_{eq}	L_{max}	L_{50}	
	Day	75.9	91.4	73.7	75
	Night	75.5	94.0	72.6	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 higher allowable value about 0.9 to 5.5dBA.

Vehicles are increased in the night time because all of heavy loading trucks are allowed to operate after 8 PM (route Vung Tau – TP.HCM).

*** Vibration:**

Table 19: Vibration monitored results

Average	Time	Result monitoring		Standard: TCVN 7210:2002
		Leq	Lveq	
	Day	48.0	41.3	From 6h to 22h: 70dBA
	Night	47.0	39.4	

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
- Position:	SW4-1: N 10°46'16,3" ; E 106°56'22,0" (10h - 11h) SW4-2: N 10°46'16,3" ; E 106°56'22,0" (16h - 17h) SW4-3: N 10°46'07,1" ; E 106°56'24,3" (10h - 11h) SW4-4: N 10°46'07,1" ; E 106°56'24,3" (16h - 17h)
Time:	9 th Sep, 2010

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

* Comments:

- At the sites: SW4-1; SW4-2; SW4-3; SW4-4: DO did not meet allowable value ($\leq 4\text{mg/l}$)

- COD is higher allowable value according to QCVN08:2008 to 1.14 from 1.5 times at SW4-1; SW4-3; SW4-4.

- SS is higher allowable value to 1.28 from 1.92 times at SW4-2; SW4-3; SW4-4.

- At the site SW4-1: Coliform is higher allowable value about 32 times.

- Others parameters is under according to QCVN08:2008 (Applied column B1: Used for irrigation or other purposes such as water carriage).

The high content of suspended solid (SS) in water is one of reason making low DO content by reducing the sunlight in the water for photosynthesis of aquatic plants and increasing chemical oxygen demand in the water.

4.4.4. Underground water

- Location monitoring:	Long Thanh residential area
- Position:	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°45'57,2" ; E 106°57'19,7"

- Results on measuring, monitoring the underground water (Shown in appendix)

*** Comments:**

- Cl^- value at *GW3-1* và *GW3 - 2* is higher allowable value to 1.3 from 1.6 times.
- NO_3^- value at *GW3-3* is higher allowable value 12.2 times, that may cause by various reasons such as redundant pesticide, chemical substance, litter,... that will soak into soil and underground water.
- pH value at *GW3-1* and *GW3-2* is not allowable value (making acidic water)

4.4.5. Soil

- Location monitoring:	Long Thanh town
- Position:	S3 - 1: N 10°45'59,2" ; E 106°57'22,3" S3 - 2: N 10°45'58,3" ; E 106°57'20,9" S3 - 3: N 10°45'57,2" ; E 106°57'19,7"

- 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.

4.4.6. Waste water

- Location monitoring:	Km18+300; Km19+100; Km21+350
- Position:	W4 - 1 : N 10°46'13,4" ; E 106°56'22,7" W4 - 2 : N 10°46'39,5" ; E 106°55'14,8" W4 - 3 : N 10°46'47,5" ; E 106°54'55,6"

- Results on measuring, monitoring the waste water (Shown in appendix)

*** Comments:**

The analyzed wastewater sample values will be compared to QCVN24:2009 (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving waterbodies not using for domestic water supply).

- SS value at *WW4-1* is higher allowable value about 2.8 times
- All others parameters are meeting the QCVN24:2009.

4.5. Comparison of environmental trend between two monitoring times 3 & 4.

4.5.1. Air quality.

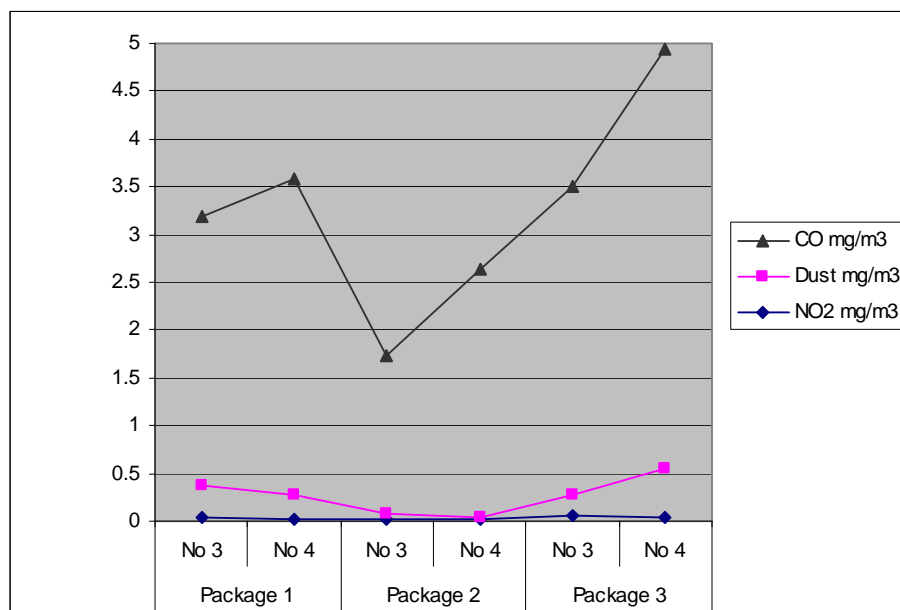
The environmental quality of the two monitoring times are showed in the bellow table:

Package	No	SO ₂	NO ₂	HC	Dust	CO
		mg/m ³	mg/m ³	mg/m ³	mg/m ³	mg/m ³
Package 1a	No 3	Not detected	0.036	Not detected	0.33	2.83
	No 4	Not detected	0.024	Not detected	0.25	3.31
Package 2	No 3	Not detected	0.029	Not detected	0.055	1.65
	No 4	Not detected	0.028	Not detected	0.016	2.6
Package 3	No 3	Not detected	0.06	Not detected	0.21	3.23
	No 4	0.082	0.038	Not detected	0.52	4.38
QCVN05:2009		0.35	0.2	-	0.3	30
TCVN5938:2005				5		

* Comment:

- Package 1a and 2: The dust and NO₂ content reduces to third time of monitoring. The CO content increase to third time of monitoring.

- Package 3: The dust content increase to 2.47 times to third time of monitoring (higher than allowable value).



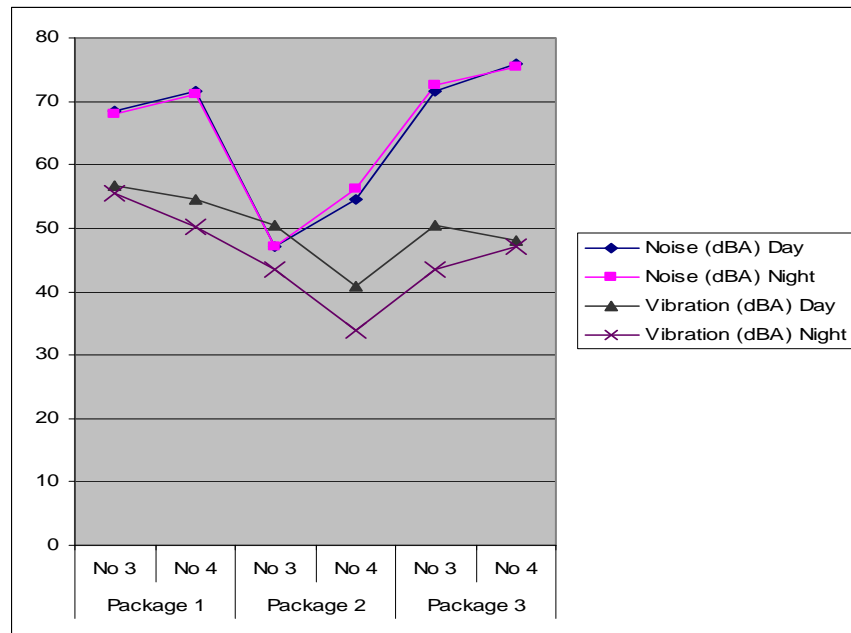
4.5.2. Noise and vibration.

Noise and vibration of the two monitoring times are showed in the bellow table:

Package	No	Noise (dBA)		Vibration (dBA)	
		Day	Night	Day	Night
Package 1a	No 3	68.5	68.1	56.6	55.6
	No 4	71.6	71.0	54.5	50.1
Package 2	No 3	47.2	47.2	50.4	43.5
	No 4	54.5	56.3	40.8	33.9
Package 3	No 3	71.5	72.6	50.4	43.5
	No 4	75.9	75.5	48.0	47.0
TCVN 5949 - 1998		75	70		
TCVN 7210:2002				70	

* Comment:

- The noise level in three packages in the fourth times of monitoring is higher than the third time of monitoring. The noise level is approximate value in daytime and in nighttime.
- The noise level in the Package 1a and 3 are higher than allowable value.
- Vibration level: Vibration level in the fourth time are lower than the third time in three packages. (except in the package 3 in night time: Vibration level is higher than third time of monitoring).



4.5.3. Surface water quality.

We compare only some main parameters between the two monitoring times that are showed in the bellow table:

Package		Parameters											
		No 3						No 4					
		pH	DO	BOD5	COD	SS	Coliform	pH	DO	BOD5	COD	SS	Coliform
			mg/l	mg/l	mg/l	mg/l	MPN/100ml		mg/l	mg/l	mg/l	mg/l	MPN/100 ml
Pack age 1a	SW1-1	6,72	2,03	10,1	< 30	26,4	9,3x10 ¹	6,67	2,87	11,3	50,4	102,4	5,4x10 ²
	SW1-2	6,81	2,61	9,5	< 30	39,2	4,6x10 ²	6,61	2,67	7,3	<30	50,0	2,4x10 ²
	SW1-3	6,84	2,43	11,8	33,0	35,0	2,1x10 ²	6,66	2,74	9,6	43,4	82,4	3,5x10 ²
	SW1-4	6,86	2,49	10,8	32,2	43,6	2,4x10 ²	6,62	2,44	9,0	40,6	66,4	4,6x10 ²
Pack age 1b	SW2-1	6,78	2,49	10,7	< 30	22,2	2,4x10 ³	6,62	3,67	8,5	<30	66,8	2,4x10 ²
	SW2-2	6,77	2,26	11,2	< 30	75,8	4,8x10 ²	6,64	3,16	8,5	44,3	85,2	2,4x10 ²
	SW2-3	6,76	2,91	11,2	< 30	23,0	1,1x10 ⁴	6,64	3,63	6,2	<30	75,2	3,5x10 ²
	SW2-4	6,75	2,29	11,5	< 30	91,8	9,3x10 ²	6,61	3,01	5,1	45,5	88,4	2,4x10 ²
Pack age 2	SW3-1	6,80	2,47	10,7	< 30	26,4	2,4x10 ²	6,67	3,95	5,7	<30	67,6	3,5x10 ²
	SW3-2	6,79	2,59	7,6	< 30	18,6	2,4x10 ²	6,62	3,36	5,7	<30	35,6	9,4x10 ¹
	SW3-3	6,88	3,00	11,8	< 30	16,6	1,5x10 ²	6,68	3,92	5,7	<30	54,4	3,5x10 ²
	SW3-4	6,71	2,60	9,5	< 30	31,4	1,1x10 ³	6,18	3,25	3,4	39,5	50,4	2,4x10 ³
Pack age 3	SW4-1	6,22	2,96	14,0	< 30	129,2	4,6x10 ²	6,18	2,67	11,3	45,7	30,0	2,4x10 ⁵
	SW4-2	6,21	5,16	13,5	< 30	56,4	2,4x10 ²	6,41	3,26	7,9	< 30	64,0	2,4x10 ³
	SW4-3	6,28	3,09	12,6	< 30	52,4	2,4x10 ⁴	6,10	2,73	11,9	34,2	89,6	3,5x10 ³
	SW4-4	6,16	4,64	14,6	34,9	47,8	2,4x10 ²	6,38	3,07	6,8	40,6	96,0	7,0x10 ²
QCVN 08:2008		5,5 - 9	≥ 4	15	30	50	7500	5,5 - 9	≥ 4	15	30	50	7500

* Comment:

For package 1a, 1b, 2 and 3: The concentration of SS and COD are various that may be caused by raining season made high content of SS in the water.

4.5.4. Underground water quality.

We compare only some main parameters between the two monitoring times that are showed in the bellow table:

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

Package		Parameters									
		No 3					No 4				
		<i>pH</i>	<i>Cl</i>	<i>Fe</i>	<i>Mn</i>	<i>Fecal coliform</i>	<i>pH</i>	<i>Cl</i>	<i>Fe</i>	<i>Mn</i>	<i>Fecal coliform</i>
			<i>mg/l</i>	<i>mg/l</i>	<i>mg/l</i>	<i>MPN/100ml</i>		<i>mg/l</i>	<i>mg/l</i>	<i>mg/l</i>	<i>MPN/100ml</i>
Package 1a	GW1-1	4,64	118,4	0,20	0,049	< 03	5.14	122.8	0.60	0.050	0
	GW1-2	4,63	96,4	0,13	0,071	< 03	4.62	98.0	0.72	0.061	0
	GW1-3	4,80	92,2	1,27	0,092	< 03	4.80	98.0	0.75	0.045	08
Package 1b	GW2-1	7,22	629,6	0,12	0,89	< 03	7.21	695.8	0.13	0.83	< 01
	GW2-2	6,62	1191	10,4	0,48	< 03	6.62	1050.8	30.7	0.69	< 01
	GW2-3	5,95	950,1	5,26	1,08	< 03	5.90	979.8	46.7	1.09	< 01
Package 3	GW3-1	5,40	323,5	3,90	0,14	< 03	5.40	326.6	0.49	0.059	0
	GW3-2	5,62	716,1	12,7	0,14	< 03	5.41	397.6	2.57	0.063	0
	GW3-3	5,84	112,7	0,43	0,19	< 03	5.56	127.8	0.085	0.044	0
QCVN09:2008		5.5 – 8.5	250	5	0.5	None	5.5 – 8.5	250	5	0.5	None

* Comment:

- The content of Cl⁻ and Fe at 3 packages are in high level (some location exceeding allowable value).

- At package 3, there is no available of Fecal coliform in the analyses result of underground water of period 4.

4.5.5. Soil

We compare only some main parameters between the two monitoring times that are showed in the bellow table:

Package		Parameters									
		No 3					No 4				
		<i>Organic</i>	<i>SO₄²⁻</i>	<i>As</i>	<i>Fe</i>	<i>Pb</i>	<i>Organic</i>	<i>SO₄²⁻</i>	<i>As</i>	<i>Fe</i>	<i>Pb</i>
		%	%	<i>mg/kg</i>	<i>mg/kg</i>	<i>mg/kg</i>	%	%	<i>mg/kg</i>	<i>mg/kg</i>	<i>mg/kg</i>
Package 1a	S1-1	1,53	0,009	5,72	2.9	12,5	9.08	0.090	13.4	4.4	15.9
	S1-2	5,95	0,083	7,32	4.73	19,5	6.00	0.055	8,29	5.3	23.3
	S1-3	4,86	0,130	14,3	4.86	29,2	10.0	0.055	10,2	3.6	22.6
Package 1b	S2-1	17,3	0.12	9,18	1.94	17,5	14.8	0.038	6.05	1.6	13.5
	S2-2	13,4	0.2	14,8	4.44	18,2	9.78	0.020	4.35	2.2	16.4

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Dau Giay)

	S2-3	6,99	0.025	6,33	3.06	13,9	9.89	0.007	5.10	3.0	19.1
Package 3	S3-1	0,53	0,004	9,55	0,68	7,87	0.43	0.001	None	0.61	8.54
	S3-2	0,54	0,004	4,43	0,76	9,08	0.45	0.001	None	0.45	5.70
	S3-3	0,75	0,004	6,68	0,47	3,98	0.51	0.001	None	0.38	10.4
QCVN03:2008		-	-	12	-	120	-	-	12	-	120

* Comment:

- The above soil analyzed figures have no significant fluctuation and they are under the allowable values in the both monitoring times.

CHAPTER V. CONCLUSION AND RECOMMENDATION

1. Conclusion

a). Package 1a

- *Air quality:* The contents of NO₂, CO, SO₂, HC and dust: from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009.

- *Noise and vibration* The noise in night time is higher allowable value (1dBA) causing by high density of heavy loading trucks for building material transportation.

- *Surface water:* Some parameters is not allowable value in SW1-1; SW1-2; SW1-3; SW1-4:

+ DO did not meet QCVN08:2008 ($\leq 4\text{mg/l}$).

+ COD is higher allowable value according to QCVN08:2008 from 1.35 to 1.68 times (except SW1-2).

+ SS is higher allowable value according to QCVN08:2008 from 1.32 to 2.0 times (except SW1-2).

Sampling time was in the raining season making high level of SS leading to high concentration of COD exceeding allowable value (COD means chemical oxygen demand).

- *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 4.62 from 5.14)

+ There is a signal of contamination of Coliform and Fecal Coliform in GW1-3 samples.

- *Soil:* 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.

- *Waste water:* SS in WW1-1 is higher allowable value according to QCVN24:2009 to 1.6 times.

b). Package 1b

- *Surface water:*

- Some parameters is not allowable value in SW1-1; SW1-2; SW1-3; SW1-4:

+ DO did not meet QCVN08:2008 ($\leq 4\text{mg/l}$).

+ SS is higher allowable value according to QCVN08:2008 from 1.3 to 1.76 times.

- COD is higher allowable value according to QCVN08:2008 to 1.5 times (at sites: SW2-1; SW2-3).

- *Underground water:*

- Underground water samples GW2-1; GW2-2; GW2-3: Cl^- is higher allowable value (2.78 - 4.2 times). The high Cl^- concentration is possibly caused by natural impacts (for salt intrusion, acidic water and high conductivity).

- Underground water samples GW2-2 and GW2-3: Fe is higher allowable value (6.14 - 9.34 times).

- Underground water samples GW2-1; GW2-2 and GW2-3: Mn is higher allowable value (1.38 – 2.18 times).

To reduce the content of Mn and Fe in fresh water, the simple way of treatment is to expose water in the air and to oxidize these elements then filtration water by sand or grave.

- Water samples in three locations are contaminated by Fecal Coliform .

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

- *Waste water:* All parameters are meeting the column B, QCVN24:2009.

c). Package 2

- *Air, Noise and Vibration:* All parameters are meeting the allowable value, because there are many trees and far away from road, distance to the construction about 500m.

- *Surface water:*

- At the sites: SW3-1; SW3-2; SW3-3; SW3-4: DO did not meet allowable value.

- COD is higher allowable value according to QCVN08:2008 to 1.3 times at SW3-4.

- SS is higher allowable value to 1.1 from 1.35 times at SW3-1 and SW3-3

- *Soil and Waste water:* All parameters are meeting allowable value.

d). Package 3

- *Air quality:* The content of dust is higher allowable value about 0.22 mg/m^3 . The causing may be the monitoring location is near National Highway No.51 where there are many vehicles transporting goods from Vung Tau to industrial parks and on the contrary.

- *Noise*: The noise level is higher allowable value about 0.9 to 5.5dBA in day time and night time.

Vehicles are increased in the night time because all of heavy loading trucks are allowed to operate after 8 PM (route Vung Tau – TP.HCM). There were some vehicles that used horn so the noise level in the monitoring.

- *Vibration*: All parameters are meeting the allowable value.

- *Surface water*:

- At the sites: SW4-1; SW4-2; SW4-3; SW4-4: DO did not meet allowable value ($\leq 4\text{mg/l}$)

- COD is higher allowable value according to QCVN08:2008 to 1.14 from 1.5 times at SW4-1; SW4-3; SW4-4.

- SS is higher allowable value to 1.28 from 1.92 times at SW4-2; SW4-3; SW4-4.

- At the site SW4-1: Coliform is higher allowable value about 32 times.

The high content of suspended solid (SS) in water is one of reason making low DO content by reducing the sunlight in the water for photosynthesis of aquatic plants and increasing chemical oxygen demand in the water.

- *Underground water*:

- Cl^- value at GW3-1 và GW3 - 2 is higher allowable value to 1.3 from 1.6 times.

- NO_3^- value at GW3-3 is higher allowable value 12.2 times, that may cause by various reasons such as redundant pesticide, chemical substance, litter,... that will soak into soil and underground water.

- pH value at GW3-1 and GW3-2 is not allowable value (making acidic water)

- *Soil*: All parameters are meeting allowable value.

- *Waste water*: SS value at WW4-1 is higher allowable value about 2.8 times

2. Recommendation

Through the three times of monitoring, we have some recommendations as below:

- *Package 1a*: The noise level are rather high (increasing from one monitoring time to others), so it is necessary to obey noise reducing methods that are suggested in EMP (covering by corrugated iron at sensitive sites, regular machinery maintaining, do not operate all machinery simultaneously, do not operate in the night time....).

- *Package 1b*: Most of underground water samples are contaminated by chlorine, Fe, Mn and Coliform... so it is necessary to recommend the workers not to use this water resource for domestic using.

- *Package 2:* It is necessary to pay attention about As content in the next monitoring times (because there is high content of As more than allowable value in period 3, but this figure is decreased in the period 4).

- *Package 3:* Because the project location is near the National highway so the noise levels always be high in both night time and day time. So it is necessary to obey noise reducing methods that are suggested in EMP (covering by corrugated iron at sensitive sites, regular machinery maintaining, do not operate all machinery simultaneously, do not operate in the night time....).

The most important matter for the 4 packages are the quality of underground water and some main parameters in surface water such as DO, COD and SS. All of construction activities in the water surface must be strictly complied with minimizing methods that have been suggested by the consultant and in the EMP to reduce impacts on water environment.

APPENDIX

APPENDIX 1: MANPOWER MOBILLIZED AT SITE

APPENDIX 2: RESULTS MONITORING AND ANALYSIS

APPENDIX 3: PICTURES AT SAMPLING SITES

APPENDIX 4: CHECKING EQUIPMENT AND PERSONNEL SITE

APPENDIX 5: MAP OF MONITORING LOCATIONS

CONSORTIUM OF
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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 10⁰47'43,4" ; E 106⁰48'17,7"

Time of monitoring: **07/09/2010(06h - 22h)**

Surrounding conditions: Sunny ;There are many means transportation.

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

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10091358	N1-1.1(6h-7h)	68.2	76.2	67.1
02	mm10091359	N1-1.2(6h-7h)	74.1	93.1	68.8
03	mm10091360	N1-1.3(6h-7h)	70.2	81.0	69.0
04	mm10091361	N1-2.1(7h-8h)	69.9	79.6	69.0
05	mm10091362	N1-2.2(7h-8h)	72.9	90.0	67.7
06	mm10091363	N1-2.3(7h-8h)	70.7	85.5	69.1
07	mm10091364	N1-3.1(8h-9h)	69.4	86.8	67.1
08	mm10091365	N1-3.2(8h-9h)	69.9	82.3	68.1
09	mm10091366	N1-3.3(8h-9h)	70.7	86.8	67.9
10	mm10091367	N1-4.1(9h-10h)	70.2	84.9	67.8
11	mm10091368	N1-4.2(9h-10h)	72.0	91.7	69.1
12	mm10091369	N1-4.3(9h-10h)	70.4	80.4	67.7
13	mm10091370	N1-5.1(10h-11h)	69.7	87.4	67.2
14	mm10091371	N1-5.2(10h-11h)	70.1	82.2	67.4
15	mm10091372	N1-5.3(10h-11h)	70.3	91.6	67.8
16	mm10091373	N1-6.1(11h-12h)	73.7	93.7	68.1
17	mm10091374	N1-6.2(11h-12h)	68.8	81.1	66.5
18	mm10091375	N1-6.3(11h-12h)	77.3	97.5	69.4
19	mm10091376	N1-7.1(12h-13h)	70.6	87.1	65.9
20	mm10091377	N1-7.2(12h-13h)	71.4	92.9	64.1
21	mm10091378	N1-7.3(12h-13h)	69.7	89.3	66.0
22	mm10091379	N1-8.1(13h-14h)	70.5	88.6	66.5
23	mm10091380	N1-8.2(13h-14h)	71.6	93.5	67.2

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24	mm10091381	N1-8.3(13h-14h)	72.0	91.6	65.8
25	mm10091382	N1-9.1(14h-15h)	71.2	87.1	68.2
26	mm10091383	N1-9.2(14h-15h)	72.0	85.8	70.7
27	mm10091384	N1-9.3(14h-15h)	69.7	85.6	66.9
28	mm10091385	N1-10.1(15h-16h)	68.9	82.1	66.5
29	mm10091386	N1-10.2(15h-16h)	71.1	92.1	66.6
30	mm10091387	N1-10.3(15h-16h)	75.7	95.5	68.2
31	mm10091388	N1-11.1(16h-17h)	72.9	90.9	70.2
32	mm10091389	N1-11.2(16h-17h)	74.1	89.8	72.2
33	mm10091390	N1-11.3(16h-17h)	73.2	84.5	71.6
34	mm10091391	N1-12.1(17h-18h)	73.9	90.0	72.1
35	mm10091392	N1-12.2(17h-18h)	75.3	91.6	73.8
36	mm10091393	N1-12.3(17h-18h)	74.5	93.5	70.2
37	mm10091394	N1-13.1(18h-19h)	72.8	88.7	69.9
38	mm10091395	N1-13.2(18h-19h)	71.8	85.9	70.1
39	mm10091396	N1-13.3(18h-19h)	70.1	87.0	68.4
40	mm10091397	N1-14.1(19h-20h)	71.3	95.3	68.0
41	mm10091398	N1-14.2(19h-20h)	71.6	92.2	68.0
42	mm10091399	N1-14.3(19h-20h)	69.7	84.8	68.4
43	mm10091400	N1-15.1(20h-21h)	72.9	87.5	70.6
44	mm10091401	N1-15.2(20h-21h)	68.7	89.2	66.6
45	mm10091402	N1-15.3(20h-21h)	71.6	91.5	68.5
46	mm10091403	N1-16.1(21h-22h)	67.6	85.2	65.7
47	mm10091404	N1-16.2(21h-22h)	71.6	81.5	70.6
48	mm10091405	N1-16.3(21h-22h)	72.2	84.9	70.2

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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 10⁰47'43,4" ; E 106⁰48'17,7"

Time of monitoring: **07/09/2010 (06h - 22h)**

Surrounding conditions: Sunny ;There are many means transportation.

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

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10091406	V1-1.1(6h-7h)	48.2	39.1
02	mm10091407	V1-1.2(6h-7h)	55.2	41.0
03	mm10091408	V1-1.3(6h-7h)	48.9	40.8
04	mm10091409	V1-2.1(7h-8h)	56.1	37.9
05	mm10091410	V1-2.2(7h-8h)	58.7	40.4
06	mm10091411	V1-2.3(7h-8h)	54.6	40.6
07	mm10091412	V1-3.1(8h-9h)	57.4	38.4
08	mm10091413	V1-3.2(8h-9h)	54.0	39.9
09	mm10091414	V1-3.3(8h-9h)	54.9	39.8
10	mm10091415	V1-4.1(9h-10h)	50.6	37.9
11	mm10091416	V1-4.2(9h-10h)	56.5	40.7
12	mm10091417	V1-4.3(9h-10h)	50.2	38.5
13	mm10091418	V1-5.1(10h-11h)	54.2	37.0
14	mm10091419	V1-5.2(10h-11h)	56.8	39.2
15	mm10091420	V1-5.3(10h-11h)	55.0	39.1
16	mm10091421	V1-6.1(11h-12h)	55.9	41.5
17	mm10091422	V1-6.2(11h-12h)	53.3	38.3
18	mm10091423	V1-6.3(11h-12h)	52.4	41.8
19	mm10091424	V1-7.1(12h-13h)	53.4	38.3
20	mm10091425	V1-7.2(12h-13h)	55.7	35.5
21	mm10091426	V1-7.3(12h-13h)	52.4	38.9
22	mm10091427	V1-8.1(13h-14h)	57.1	39.8
23	mm10091428	V1-8.2(13h-14h)	55.6	39.9
24	mm10091429	V1-8.3(13h-14h)	55.7	34.1

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25	mm10091430	V1-9.1(14h-15h)	57.1	38.0
26	mm10091431	V1-9.2(14h-15h)	55.2	36.7
27	mm10091432	V1-9.3(14h-15h)	56.0	38.7
28	mm10091433	V1-10.1(15h-16h)	51.6	36.1
29	mm10091434	V1-10.2(15h-16h)	51.2	39.5
30	mm10091435	V1-10.3(15h-16h)	54.2	40.1
31	mm10091436	V1-11.1(16h-17h)	58.7	55.2
32	mm10091437	V1-11.2(16h-17h)	55.8	53.9
33	mm10091438	V1-11.3(16h-17h)	59.1	54.3
34	mm10091439	V1-12.1(17h-18h)	56.7	51.9
35	mm10091440	V1-12.2(17h-18h)	52.0	44.7
36	mm10091441	V1-12.3(17h-18h)	51.7	41.0
37	mm10091442	V1-13.1(18h-19h)	55.2	40.7
38	mm10091443	V1-13.2(18h-19h)	54.5	40.5
39	mm10091444	V1-13.3(18h-19h)	54.1	39.4
40	mm10091445	V1-14.1(19h-20h)	55.2	40.9
41	mm10091446	V1-14.2(19h-20h)	54.0	40.4
42	mm10091447	V1-14.3(19h-20h)	50.9	37.4
43	mm10091448	V1-15.1(20h-21h)	53.5	37.5
44	mm10091449	V1-15.2(20h-21h)	51.6	37.5
45	mm10091450	V1-15.3(20h-21h)	52.6	34.7
46	mm10091451	V1-16.1(21h-22h)	41.4	34.3
47	mm10091452	V1-16.2(21h-22h)	50.1	35.5
48	mm10091453	V1-16.3(21h-22h)	28.2	27.8

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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 10⁰47'43,4" ; E 106⁰48'17,7"
Time of monitoring: **07/09/2010 (06h - 22h)**
Surrounding conditions: Sunny ;There are many means transportation.
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	mm10091646	A1-1 (06h-08h)	27.2	85.0	0.2 - 0.7	1006.5	E
2	mm10091647	A1-2 (08h-10h)	30.0	73.5	0.3 - 0.9	1007.1	SW
3	mm10091648	A1- 3 (10h-12h)	32.3	61.5	0.4 - 1.0	1007.3	W
4	mm10091649	A1-4 (12h-14h)	33.8	53.0	0.4 - 2.5	1005.3	SE
5	mm10091650	A1-5 (14h-16h)	33.6	53.4	0.5 - 2.0	1003.4	S
6	mm10091651	A1-6 (16h-18h)	32.9	57.8	0.3 - 1.2	1002.8	S
7	mm10091652	A1-7 (18h-20h)	29.7	75.5	0.3 - 1.5	1004.8	SE
8	mm10091653	A1-8 (20h-22h)	29.2	76.5	0.4 - 0.9	1005.5	S

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2. Measurement results on air environmental quality:

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	mm10091646	A1-1 (06h-08h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.14	2.1
2	mm10091647	A1-2 (08h-10h)	Not detected MLOD = 0.03	0.03	Not detected MLOD = 1.0	0.19	3.7
3	mm10091648	A1-3 (10h-12h)	Not detected MLOD = 0.03	0.03	Not detected MLOD = 1.0	0.11	4.4
4	mm10091649	A1-4 (12h-14h)	Not detected MLOD = 0.03	0.03	Not detected MLOD = 1.0	0.16	4.3
5	mm10091650	A1-5 (14h-16h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.25	3.9
6	mm10091651	A1-6 (16h-18h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.17	3.4
7	mm10091652	A1-7 (18h-20h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.58	2.7
8	mm10091653	A1-8 (20h-22h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.42	2.0

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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°47'40,0" ; E 106°48'49,7" (10h – 11h)
SW1-2: N 10°47'30" ; E 106°48'49,7" (15h00 - 16h)
SW1-3: N 10°47'29,6" ; E 106°48'52,2" (10h - 11h00)
SW1-4: N 10°47'29,6" ; E 106°48'52,2" (15h - 16h)

Time of monitoring: **07/9/2010 (08h - 16h)**

Weather condition: Sunny ; light wind

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 mm10091679	SW1-2 mm10091680	Column A2	Column B1
1	pH	-	6.67	6.61	6 - 8.5	5.5 - 9
2	Temp.	oC	29.3	30.4	-	-
3	TDS	NTU	129	40.4	-	-
4	Conductivity	μS/cm(25 ⁰ C)	768.3	714.6	-	-
5	DO	mg/l	2.87	2.67	≥ 5	≥ 4
6	BOD ₅	mg/l	11.3	7.3	6	15
7	COD	mg/l	50.4	<30	15	30
8	SS	mg/l	102.4	50.0	30	50
9	T-N	mg/l	1.19	1.09	-	-
10	T-P	mg/l	0.26	0.21	-	-
11	As	mg/l	0.001	0.0007	0.02	0.05
12	Cd	mg/l	Not detected, MLOD = 0.0006	Not detected, MLOD = 0.0006	0.005	0.01
13	CN ⁻	mg/l	Not detected MLOD= 0.007	Not detected MLOD= 0.007	0.01	0.02
14	Cu	mg/l	0.006	0.003	0.2	0.5

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-1 mm10091679	SW1-2 mm10091680	Column A2	Column B1
15	Hg	mg/l	Not detected, MLOD = 0,0005	Not detected, MLOD = 0.0005	0.001	0.001
16	Pb	mg/l	Not detected, MLOD = 0.006	Not detected, MLOD = 0.006	0.02	0.05
17	Zn	mg/l	0.016	0.12	1.0	1.5
18	NO ₃ ⁻	mg/l	4.18	2.95	5	10
19	Oil and grease	mg/l	Not detected, MLOD=0.04	Not detected, MLOD=0.04	0.02	0.1
20	Coliform	MPN/100ml	5,4x10 ²	2,4x10 ²	5000	7500

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 mm10091681	SW1-4 mm10091682	Column A2	Column B1
1	pH	-	6.66	6.62	6 - 8.5	5.5 - 9
2	Temp.	oC	29.3	30.1	-	-
3	TDS	NTU	44.9	74.6	-	-
4	Conductivity	μS/cm(25 ⁰ C)	770.1	998.3	-	-
5	DO	mg/l	2.74	2.44	≥ 5	≥ 4
6	BOD ₅	mg/l	9.6	9.0	6	15
7	COD	mg/l	43.4	40.6	15	30
8	SS	mg/l	82.4	66.4	30	50
9	T-N	mg/l	1.04	1.08	-	-
10	T-P	mg/l	0.78	0.20	-	-
11	As	mg/l	0.001	0.0007	0.02	0.05
12	Cd	mg/l	Not detected, MLOD = 0.0006	Not detected, MLOD = 0.0006	0.005	0.01

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-3 mm10091681	SW1-4 mm10091682	Column A2	Column B1
13	CN ⁻	mg/l	Not detected MLOD= 0.007	Not detected MLOD= 0.007	0.01	0.02
14	Cu	mg/l	0.004	0.003	0.2	0.5
15	Hg	mg/l	Not detected, MLOD = 0.0005	Not detected, MLOD = 0.0005	0.001	0.001
16	Pb	mg/l	Not detected, MLOD = 0.006	Not detected, MLOD = 0.006	0.02	0.05
17	Zn	mg/l	0.016	0.012	1.0	1.5
18	NO ₃ ⁻	mg/l	3.28	3.30	5	10
19	Oil and grease	mg/l	Not detected, MLOD=0.04	Not detected, MLOD=0.04	0.02	0.1
20	Coliform	MPN/100ml	3.5x10 ²	4.6x10 ²	5000	7500

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RESULT OF GROUNDWATER 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°47'46,8" ; E 106°47'47,3"
GW1-2 (52/1): N 10°47'47,9" ; E 106°47'56,8"
GW1-3 (75) : N 10°47'50,0" ; E 106°47'53,2"
Time of monitoring: **07/09/2010(08h - 15h)**
Weather condition: Sunny ; light wind
Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW1-1 mm10091695	GW1-2 mm10091696	GW1-3 mm10091697	
1	pH		5.14	4.62	4.80	5.5 – 8.5
2	Temp.	°C	31.2	30.4	30.8	-
3	Turbidity	NTU	4.49	4.81	4.17	-
4	Conductivity	μS/cm(25°C)	519.6	464.3	411.3	-
5	Colour	Pt/Co	0	0	0	-
6	Odor	mg/l	0	0	0	-
7	Hardness level	mgCaCO ₃ /l	10.5	19.0	11.5	500
8	Cl ⁻	mg/l	122.8	98.0	98.0	250
9	SO ₄ ²⁻	mg/l	65.8	56.3	38.1	400
10	NO ₃ ⁻	mg/l	Not detected, MLOD =0.05	Not detected, MLOD =0.05	Not detected, MLOD =0.05	15
11	As	mg/l	Not detected, MLOD =0.0002	Not detected, MLOD =0.0002	Not detected, MLOD =0.0002	0.005
12	Cd	mg/l	Not detected, MLOD =0.0006	Not detected, MLOD =0.0006	Not detected, MLOD =0.0006	5
13	CN ⁻	mg/l	Not detected MLOD= 0.007	Not detected MLOD= 0.007	Not detected MLOD= 0.007	0.5
14	Fe	mg/l	0.60	0.72	0.75	0.01
15	Mn	mg/l	0.050	0.061	0.045	3.0

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No	Analysis criteria	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW1-1 mm10091695	GW1-2 mm10091696	GW1-3 mm10091697	
16	Pb	mg/l	Not detected, MLOD = 0.006	Not detected, MLOD = 0.006	Not detected, MLOD = 0.006	3
17	Zn	mg/l	0.013	0.018	0.017	-
18	Coliform	MPN/100ml	0	0	2,4x10 ²	0.01
19	Fecal coliform	MPN/100ml	0	0	08	None

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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 10⁰47'54,3" ; E 106⁰47'16,9"

S1-2: N 10⁰47'51,1" ; E 106⁰47'17,5"

S1-3: N 10⁰47'54,5" ; E 106⁰47'18,2"

Time of monitoring: **07/09/2010(08h - 15h)**

Weather condition: Sunny ; light wind

Staff: Nguyen Le Phuong-Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 03:2008/BTN MT
			<i>SI-1</i> mm10091670	<i>SI-2</i> mm10091671	<i>SI-3</i> mm10091672	
1	pH	-	5.56	6.33	3.77	-
2	Organic	%	9.08	6.00	10.0	-
3	Total N	%	0.16	0.19	0.31	-
4	Total P	mg/kg	500	700	700	-
5	Cl ⁻	mg/kg	525	186	167	-
6	SO ₄ ²⁻	%	0.09	0.055	0.055	-
7	As	mg/kg	13.4	8,29	10,2	12
8	Cd	mg/kg	Not detected, MLOD = 0.15	Not detected, MLOD = 0.15	Not detected, MLOD = 0.15	5
9	Cu	mg/kg	18.3	27.5	24.0	70
10	Fe	%	4.4	5.3	3.6	-
11	Hg	mg/kg	Trace (0.04), MLOQ=0.09	Trace (0.07), MLOQ=0.09	Trace (0.06), MLOQ=0.09	-
12	Pb	mg/kg	15.9	23.3	22.6	120
13	Zn	mg/kg	65.7	46.4	44.2	-

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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: **W1 - 1** : N 10°47'51,6" ; E 106°47'22,8"
W1 - 2 : N 10°47'49,7" ; E 106°47'40,9"
W1 - 3 : N 10°47'42,8" ; E 106°48'15,9"

Time of monitoring: **07/09/2010(08h - 15h)**

Weather conditions: Sunny

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

TT	Analysis critetia	Unit	Result analysis			QCVN24: 2009/BTNMT
			WWI-1 mm10091704	WWI-2 mm10091705	WWI-3 mm10091706	
1	pH	-	6.85	6.84	6.57	5.5-9
2	Temp.	°C	31.9	31.6	30.8	40
3	BOD ₅	mg/l	11.9	9.0	10.2	50
4	COD	mg/l	84.5	63.6	99.0	100
5	DO	mg/l	4.83	2.62	2.07	-
6	SS	mg/l	161.2	41.6	44.4	100
7	NH ₄ ⁺	mg/l	0.97	0.92	0.64	10
8	ΣN	mg/l	1.32	1.12	1.06	30
9	ΣP	mg/l	0.50	0.44	0.25	6
10	Oil and grease	mg/l	Not detected, MLOD=0.04	Not detected, MLOD=0.04	Not detected, MLOD=0.04	5
11	Coliform	MPN/100ml	5.4x10 ²	5.4x10 ²	3.5x10 ²	5.000

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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°48'52,2" (10h - 11h)
SW2-2: N 10°47'28,1" ; E 106°48'52,2" (15h - 16h00)
SW2-3: N 10°47'22,2" ; E 106°50'43,0" (10h55 - 10h55)
SW2-4: N 10°47'22,2" ; E 106°50'43,0" (16h - 17h0)
Time of monitoring: **08/09/2010(08h - 17h)**
Weather condition: Sunny
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 mm10091683	SW2-2 mm10091684	Column A2	Column B1
1	pH	-	6.62	6.64	6 - 8.5	5.5 - 9
2	Temp.	oC	29.8	30.2	-	-
3	Turbidity	NTU	70.0	88.9	-	-
4	Conductivity	μS/cm(25 ⁰ C)	95.8	293.0	-	-
5	DO	mg/l	3.67	3.16	≥ 5	≥ 4
6	BOD ₅	mg/l	8.5	8.5	6	15
7	COD	mg/l	<30	44.3	15	30
8	SS	mg/l	66.8	85.2	30	50
9	T-N	mg/l	0.88	0.96	-	-
10	T-P	mg/l	0.25	0.30	-	-
11	As	mg/l	0.001	0.0007	0.02	0.05
12	Cd	mg/l	Not detected, MLOD =0.0006	Not detected, MLOD =0.0006	0.005	0.01
13	CN ⁻	mg/l	Not detected, MLOD= 0.007	Not detected, MLOD= 0.007	0.01	0.02

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-1 mm10091683	SW2-2 mm10091684	Column A2	Column B1
14	Cu	mg/l	0.005	0.005	0.2	0.5
15	Hg	mg/l	Not detected, MLOD =0.0005	Not detected, MLOD =0.0005	0.001	0.001
16	Pb	mg/l	Not detected, MLOD= 0.006	Not detected, MLOD= 0.006	0.02	0.05
17	Zn	mg/l	0.014	0.015	1.0	1.5
18	NO ₃ ⁻	mg/l	2.42	1.90	5	10
19	Oil and grease	mg/l	Not detected, MLOD = 0.04	Not detected, MLOD = 0.04	0.02	0.1
20	Coliform	MPN/100ml	2.4x10 ²	2.4x10 ²	5000	7500

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

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-3 mm10091685	SW2-4 mm10091686	Column A2	Column B1
1	pH	-	6.64	6.61	6 - 8.5	5.5 - 9
2	Temp.	oC	29.7	30.0	-	-
3	Turbidity	NTU	98.6	68.5	-	-
4	Conductivity	μS/cm(25 ⁰ C)	93.2	431.0	-	-
5	DO	mg/l	3.63	3.01	≥ 5	≥ 4
6	BOD ₅	mg/l	6.2	5.1	6	15
7	COD	mg/l	<30	45.5	15	30
8	SS	mg/l	75.2	88.4	30	50
9	T-N	mg/l	0.86	0.95	-	-
10	T-P	mg/l	0.29	0.28	-	-

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-3 mm10091685	SW2-4 mm10091686	Column A2	Column B1
11	As	mg/l	0.001	0.0007	0.02	0.05
12	Cd	mg/l	Not detected, MLOD=0.0006	Not detected, MLOD=0.0006	0.005	0.01
13	CN ⁻	mg/l	Not detected, MLOD= 0.007	Not detected, MLOD= 0.007	0.01	0.02
14	Cu	mg/l	0.005	0.005	0.2	0.5
15	Hg	mg/l	Not detected, MLOD=0.0005	Not detected, MLOD=0.0005	0.001	0.001
16	Pb	mg/l	Not detected, MLOD=0.006	Not detected, MLOD=0.006	0.02	0.05
17	Zn	mg/l	0.013	0.013	1.0	1.5
18	NO ₃ ⁻	mg/l	2.62	4.27	5	10
19	Oil and grease	mg/l	Not detected, MLOD = 0.04	Not detected, MLOD = 0.04	0.02	0.1
20	Coliform	MPN/100ml	3.5x10 ²	2.4x10 ²	5000	7500

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RESULT OF GROUNDWATER 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 10⁰47'28,3" ; E 106⁰51'03,5"
GW2-2 : N 10⁰47'32,3" ; E 106⁰49'14,8"
GW2-3 : N 10⁰47'30,2" ; E 106⁰49'13,5"
Time of monitoring: **08/09/2010(08h - 18h)**
Weather condition: Cool
Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis criteria	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW2-1 mm10091698	GW2-2 mm10091699	GW2-3 mm10091700	
1	pH	-	29.9	28.8	28.8	5.5 – 8.5
2	Temp.	°C	7.21	6.62	5.90	-
3	Turbidity	NTU	0.93	97.9	91.8	-
4	Conductivity	μS/cm (25°C)	2380	3280	2890	-
5	Colour	Pt/Co	0	15	5	-
6	Odor	mg/l	0	0	0	-
7	Hardness level	mgCaCO ₃ /l	448	242	241	500
8	Cl ⁻	mg/l	695.8	1050.8	979.8	250
9	SO ₄ ²⁻	mg/l	18.6	22.9	34.3	400
10	NO ₃ ⁻	mg/l	1.77	1.23	11.9	15
11	As	mg/l	Not detected, MLOD = 0.0002	0.005	0.006	-

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No	Analysis criteria	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW2-1 mm10091698	GW2-2 mm10091699	GW2-3 mm10091700	
12	Cd	mg/l	Not detected, MLO D = 0.0006	Not detected, MLO D = 0.0006	Not detected, MLO D = 0.0006	0.005
13	CN ⁻	mg/l	Not detected, MLO D = 0.007	Not detected, MLO D = 0.007	Not detected, MLO D = 0.007	0.01
14	Fe	mg/l	0.13	30.7	46.7	5
15	Mn	mg/l	0.83	0.69	1.09	0.5
16	Pb	mg/l	Not detected, MLO D = 0.006	0.008	0.007	0.01
17	Zn	mg/l	0.003	0.029	0.010	3.0
18	Coliform	MPN/100ml	< 01	< 01	< 01	3
19	Fecal coliform	MPN/100ml	< 01	< 01	< 01	None

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RESULT OF WASTE WATER MONITORING

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

Monitoring site: PACKAGE 1B – LONG PHUOC DISTRICT RESIDENTIAL AREA

Co-ordinate: W2 - 1 : N 10°47'22,2" ; E 106°50'43,0"

W2 - 2 : N 10°47'16,2" ; E 106°50'41,7"

W2 - 3 : N 10°47'36,0" ; E 106°49'03,1"

Time of monitoring: 08/09/2010(08h - 15h)

Weather condition Sunny

Staff: Nguyen Le Phuong - Nguyen Tuan Vu.

No	Analysis critetia	Unit	Result analysis			QCVN24: 2009/BTNMT
			WW2-1 mm10091707	WW2-2 mm10091708	WW2-3 mm10091708	
1	pH	-	6.62	6.62	6.98	5.5-9
2	Temp.	°C	30.1	29.9	32.9	40
3	BOD ₅	mg/l	4.2	5.6	4.2	50
4	COD	mg/l	73.6	71.9	80.6	100
5	DO	mg/l	3.23	3.51	6.09	-
6	SS	mg/l	76.8	68.0	87.2	100
7	NH ₄ ⁺	mg/l	0.45	0.48	0.13	10
8	TN	mg/l	0.95	0.90	0.92	30
9	TP	mg/l	0.31	0.23	0.35	6
10	Oil & grease	mg/l	Not detected,MLOD = 0.04	Not detected,MLOD = 0.04	Not detected,MLOD = 0.04	5
11	Coliform	MPN/100ml	2.4x10 ²	5.4x10 ²	2.4x10 ²	5.000

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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 10⁰47'13,5" ; E 106⁰51'05,7"
 Time of monitoring: **08/09/2010(06h - 22h)**
 Surrounding conditions: Sunny
 Staff: Q.T.Thanh Mai – Tran.T.Kim Vui – Doan Thi Boi Hanh

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10091454	N2-1.1(6h-7h)	61.7	82.4	50.9
02	mm10091455	N2-1.2(6h-7h)	51.0	66.9	49.8
03	mm10091456	N2-1.3(6h-7h)	51.3	61.2	50.3
04	mm10091457	N2-2.1(7h-8h)	55.8	81.9	49.7
05	mm10091458	N2-2.2(7h-8h)	56.3	77.6	49.6
06	mm10091459	N2-2.3(7h-8h)	49.6	62.7	49.1
07	mm10091460	N2-3.1(8h-9h)	52.2	62.5	51.0
08	mm10091461	N2-3.2(8h-9h)	49.4	57.9	48.9
09	mm10091462	N2-3.3(8h-9h)	54.0	68.1	51.7
10	mm10091463	N2-4.1(9h-10h)	52.6	69.8	49.8
11	mm10091464	N2-4.2(9h-10h)	51.8	67.1	49.0
12	mm10091465	N2-4.3(9h-10h)	51.5	67.0	48.5
13	mm10091466	N2-5.1(10h-11h)	50.6	71.9	48.1
14	mm10091467	N2-5.2(10h-11h)	46.2	61.9	44.2
15	mm10091468	N2-5.3(10h-11h)	46.3	61.1	45.2
16	mm10091469	N2-6.1(11h-12h)	48.6	67.8	47.3
17	mm10091470	N2-6.2(11h-12h)	50.0	59.9	49.0
18	mm10091471	N2-6.3(11h-12h)	52.2	72.0	49.3
19	mm10091472	N2-7.1(12h-13h)	56.3	62.2	56.1
20	mm10091473	N2-7.2(12h-13h)	56.8	72.8	52.1
21	mm10091474	N2-7.3(12h-13h)	56.9	81.7	53.4
22	mm10091475	N2-8.1(13h-14h)	57.5	69.3	56.5
23	mm10091476	N2-8.2(13h-14h)	58.2	74.6	56.4

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24	mm10091477	N2-8.3(13h-14h)	54.9	70.2	52.9
25	mm10091478	N2-9.1(14h-15h)	59.3	74.6	57.8
26	mm10091479	N2-9.2(14h-15h)	60.4	78.3	57.7
27	mm10091480	N2-9.3(14h-15h)	60.9	75.0	59.0
28	mm10091481	N2-10.1(15h-16h)	58.0	76.4	50.8
29	mm10091482	N2-10.2(15h-16h)	56.1	73.0	53.3
30	mm10091483	N2-10.3(15h-16h)	51.7	64.7	49.7
31	mm10091484	N2-11.1(16h-17h)	59.4	72.6	57.5
32	mm10091485	N2-11.2(16h-17h)	59.3	78.6	58.3
33	mm10091486	N2-11.3(16h-17h)	57.9	70.3	57.6
34	mm10091487	N2-12.1(17h-18h)	57.6	60.9	57.5
35	mm10091488	N2-12.2(17h-18h)	59.2	69.6	58.4
36	mm10091489	N2-12.3(17h-18h)	51.0	73.2	44.4
37	mm10091490	N2-13.1(18h-19h)	55.4	63.3	55.8
38	mm10091491	N2-13.2(18h-19h)	56.2	68.7	55.7
39	mm10091492	N2-13.3(18h-19h)	56.7	68.2	56.2
40	mm10091493	N2-14.1(19h-20h)	56.2	62.9	55.8
41	mm10091494	N2-14.2(19h-20h)	55.8	64.4	55.7
42	mm10091495	N2-14.3(19h-20h)	62.1	77.8	57.1
43	mm10091496	N2-15.1(20h-21h)	55.9	71.8	54.0
44	mm10091497	N2-15.2(20h-21h)	54.2	62.4	53.4
45	mm10091498	N2-15.3(20h-21h)	55.1	63.7	54.1
46	mm10091499	N2-16.1(21h-22h)	56.4	70.7	54.5
47	mm10091500	N2-16.2(21h-22h)	55.5	65.7	54.7
48	mm10091501	N2-16.3(21h-22h)	56.3	69.7	55.4

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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 10⁰47'13,5" ; E 106⁰51'05,7"
Time of monitoring: **08/09/2010(06h - 22h)**
Surrounding conditions: Sunny
Staff: Q.T.Thanh Mai – Tran.T.Kim Vui – Doan Thi Boi Hanh

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10091502	V2-1.1(6h-7h)	49.8	34.1
02	mm10091503	V2-1.2(6h-7h)	38.3	32.5
03	mm10091504	V2-1.3(6h-7h)	37.4	29.7
04	mm10091505	V2-2.1(7h-8h)	46.1	36.2
05	mm10091506	V2-2.2(7h-8h)	48.6	35.1
06	mm10091507	V2-2.3(7h-8h)	35.8	33.2
07	mm10091508	V2-3.1(8h-9h)	38.3	34.1
08	mm10091509	V2-3.2(8h-9h)	50.0	33.8
09	mm10091510	V2-3.3(8h-9h)	43.1	37.3
10	mm10091511	V24.1(9h-10h)	35.8	30.8
11	mm10091512	V2-4.2(9h-10h)	42.5	32.0
12	mm10091513	V2-4.3(9h-10h)	42.5	31.5
13	mm10091514	V2-5.1(10h-11h)	54.5	26.8
14	mm10091515	V2-5.2(10h-11h)	37.1	24.5
15	mm10091516	V2-5.3(10h-11h)	34.4	28.0
16	mm10091517	V2-6.1(11h-12h)	49.9	27.3
17	mm10091518	V2-6.2(11h-12h)	35.5	30.2
18	mm10091519	V2-6.3(11h-12h)	36.2	30.2
19	mm10091520	V2-7.1(12h-13h)	36.1	31.8
20	mm10091521	V2-7.2(12h-13h)	34.3	28.5
21	mm10091522	V2-7.3(12h-13h)	44.3	36.0
22	mm10091523	V2-8.1(13h-14h)	43.1	35.8
23	mm10091524	V2-8.2(13h-14h)	57.0	32.7
24	mm10091525	V2-8.3(13h-14h)	41.6	31.8

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25	mm10091526	V2-9.1(14h-15h)	36.8	33.3
26	mm10091527	V2-9.2(14h-15h)	43.7	28.7
27	mm10091528	V2-9.3(14h-15h)	44.5	36.9
28	mm10091529	V2-10.1(15h-16h)	37.3	27.2
29	mm10091530	V2-10.2(15h-16h)	43.5	31.0
30	mm10091531	V2-10.3(15h-16h)	34.2	26.3
31	mm10091532	V2-11.1(16h-17h)	44.4	25.7
32	mm10091533	V2-11.2(16h-17h)	33.4	25.6
33	mm10091534	V2-11.3(16h-17h)	33.3	26.7
34	mm10091535	V2-12.1(17h-18h)	37.9	24.5
35	mm10091536	V2-12.2(17h-18h)	37.9	35.9
36	mm10091537	V2-12.3(17h-18h)	28.4	22.8
37	mm10091538	V2-13.1(18h-19h)	33.5	22.3
38	mm10091539	V2-13.2(18h-19h)	31.2	23.1
39	mm10091540	V2-13.3(18h-19h)	30.1	24.9
40	mm10091541	V2-14.1(19h-20h)	28.3	23.3
41	mm10091542	V2-14.2(19h-20h)	27.4	23.7
42	mm10091543	V2-14.3(19h-20h)	38.7	31.8
43	mm10091544	V2-15.1(20h-21h)	37.7	28.1
44	mm10091545	V2-15.2(20h-21h)	45.1	21.1
45	mm10091546	V2-15.3(20h-21h)	28.8	27.6
46	mm10091547	V2-16.1(21h-22h)	39.9	27.9
47	mm10091548	V2-16.2(21h-22h)	28.2	24.1
48	mm10091549	V2-16.3(21h-22h)	37.8	25.7

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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 10⁰47'13,5" ; E 106⁰51'05,7"
Time of monitoring: **08/09/2010(06h - 22h)**
Surrounding conditions: Sunny
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	mm10091654	A2-1 (06h-08h)	28.1	82.5	0.5 - 1.5	1007.2	E
2	mm10091655	A2-2 (08h-10h)	32.8	68.9	0.5 - 0.9	1007.7	S
3	mm10091656	A2- 3 (10h-12h)	34.5	47.8	0.5 - 1.0	1008.2	E
4	mm10091657	A2-4 (12h-14h)	33.8	50.5	0.4 - 1.1	1006.9	SE
5	mm10091658	A2-5 (14h-16h)	31.7	62.7	0.4 - 1.0	1006.2	SE
6	mm10091659	A2-6 (16h-18h)	31.2	60.7	0.6 - 2.5	1005.2	E
7	mm10091660	A2-7 (18h-20h)	29.8	67.4	0.1 - 0.6	1006.9	SE
8	mm10091661	A2-8 (20h-22h)	28.8	76.0	0.3 - 0.5	1007.1	W

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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	mm10091654	A2-1 (06h-08h)	Not detected MLOD = 0.03	0.04	Not detected MLOD = 1.0	0.09	2.0
2	mm10091655	A2-2 (08h-10h)	Not detected MLOD = 0.03	0.04	Not detected MLOD = 1.0	0.31	2.3
3	mm10091656	A2-3 (10h-12h)	Not detected MLOD = 0.03	0.03	Not detected MLOD = 1.0	0.10	3.2
4	mm10091657	A2-4 (12h-14h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.07	2.8
5	mm10091658	A2-5 (14h-16h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.10	3.1
6	mm10091659	A2-6 (16h-18h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.15	3.1
7	mm10091660	A2-7 (18h-20h)	Not detected MLOD = 0.03	Not detected MLOD = 0.01	Not detected MLOD = 1.0	0.17	2.2
8	mm10091661	A2-8 (20h-22h)	Not detected MLOD = 0.03	Not detected MLOD = 0.01	Not detected MLOD = 1.0	0.25	2.1

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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°47'00,1" ; E 106°51'40,3" (10h – 11h)
SW3-2: N 10°47'00,1" ; E 106°51'40,3" (15h - 16h)
SW3-3: N 10°47'20,1" ; E 106°51'38,5" (10h - 11h)
SW3-4: N 10°47'20,1" ; E 106°51'38,3" (16h - 17h)
 Time of monitoring: **08/09/2010(08h - 18h)**
 Weather condition: Sunny
 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 mm10091687	SW3-2 mm10091688	Column A2	Column B1
1	pH	-	6.67	6.62	6 - 8.5	5.5 - 9
2	Temp.	oC	29.9	30.0	-	-
3	Turbidity	NTU	56.0	49.3	-	-
4	Conductivity	μS/cm(25 ⁰ C)	93.0	266.3	-	-
5	DO	mg/l	3.95	3.36	≥ 5	≥ 4
6	BOD ₅	mg/l	5.7	5.7	6	15
7	COD	mg/l	<30	<30	15	30
8	SS	mg/l	67.6	35.6	30	50
9	T-N	mg/l	0.83	0.96	-	-
10	T-P	mg/l	0.28	0.22	-	-
11	As	mg/l	0,0006	0,0007	0.02	0.05
12	Cd	mg/l	Not detected,MLO D = 0.0006	Not detected,MLO D = 0.0006	0.005	0.01

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-1 mm10091687	SW3-2 mm10091688	Column A2	Column B1
13	CN ⁻	mg/l	Not detected,MLO D= 0.007	Not detected,MLO D= 0.007	0.01	0.02
14	Cu	mg/l	0.005	0.004	0.2	0.5
15	Hg	mg/l	Not detected,MLO D = 0.0005	Not detected,MLO D = 0.0005	0.001	0.001
16	Pb	mg/l	Not detected,MLO D = 0.006	Not detected,MLO D = 0.006	0.02	0.05
17	Zn	mg/l	0.010	0.013	1.0	1.5
18	NO ₃ ⁻	mg/l	3.32	4.46	5	10
19	Oil and grease	mg/l	Not detected,MLO D = 0.04	Not detected,MLO D = 0.04	0.02	0.1
20	Coliform	MPN/100ml	3.5x10 ²	9.4x10 ¹	5000	7500

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

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-3 mm10091689	SW3-4 mm10091690	Column A2	Column B1
1	pH	-	6.68	6.18	6 - 8.5	5.5 - 9
2	Temp.	oC	29.7	29.9	-	-
3	Turbidity	NTU	74.9	52.5	-	-
4	Conductivity	μS/cm(25 ⁰ C)	92.7	270.3	-	-
5	DO	mg/l	3.92	3.25	≥ 5	≥ 4
6	BOD ₅	mg/l	5.7	3.4	6	15
7	COD	mg/l	<30	39.5	15	30

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-3 mm10091689	SW3-4 mm10091690	Column A2	Column B1
8	SS	mg/l	54.4	50.4	30	50
9	T-N	mg/l	0.89	1.07	-	-
10	T-P	mg/l	0.19	0.21	-	-
11	As	mg/l	0.0005	0.0007	0.02	0.05
12	Cd	mg/l	Not detected,MLOD = 0.0006	Not detected,MLOD = 0.0006	0.005	0.01
13	CN ⁻	mg/l	Not detected,MLOD = 0.007	Not detected,MLOD = 0.007	0.01	0.02
14	Cu	mg/l	0.004	0.004	0.2	0.5
15	Hg	mg/l	Not detected,MLOD = 0.0005	Not detected,MLOD = 0.0005	0.001	0.001
16	Pb	mg/l	Not detected,MLOD = 0.006	Not detected,MLOD = 0.006	0.02	0.05
17	Zn	mg/l	0.010	0.013	1.0	1.5
18	NO ₃ ⁻	mg/l	4.11	4.32	5	10
19	Oil and grease	mg/l	Not detected,MLOD = 0.04	Not detected,MLOD = 0.04	0.02	0.1
20	Coliform	MPN/100ml	3.5x10 ²	2.4x10 ³	5000	7500

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RESULT OF WASTE WATER MONITORING

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

Monitoring site: PACKAGE 2 – LONG THANH BIDGE

Co-ordinate: **W3 - 1** : N 10°47'11,8" ; E 106°51'43,4"

W3 - 2 : N 10°47'16,6" ; E 106°51'36,1"

W3 - 3 : N 10°47'19,2" ; E 106°51'23,5"

Time of monitoring: **08/09/2010(08h - 18h)**

Weather condition: Sunny

Staff: Nguyen Le Phuong - Nguyen Tuan Vu.

No	Analysis critetia	Unit	Result analysis			QCVN24: 2009/BTNMT
			WW3-1 mm10091710	WW3-2 mm10091711	WW3-3 Mm10091712	
1	pH	-	6.63	6.66	6.72	5.5-9
2	Temp.	°C	30.0	33.6	32.0	40
3	BOD ₅	mg/l	3.34	3.66	4.73	50
4	COD	mg/l	73.6	60.0	158	100
5	DO	mg/l	3.34	3.66	4.73	-
6	SS	mg/l	62.8	118.0	37.6	100
7	NH ₄ ⁺	mg/l	0.52	0.55	0.68	10
8	TN	mg/l	0.96	0.83	0.88	30
9	TP	mg/l	0.25	0.39	0.17	6
10	Oil & grease	mg/l	Not detected,MLO D = 0.04	Not detected,MLO D = 0.04	Not detected,MLO D = 0.04	5
11	Coliform	MPN/100ml	3.5x10 ³	3.5x10 ²	3.3x10 ¹	5.000

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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 10°47'13,7" ; E 106°51'06,0"

S2-2: N 10°47'14,0" ; E 106°51'07,7"

S2-3: N 10°47'15,3" ; E 106°51'08,7"

Time of monitoring: **08/09/2010(08h - 18h)**

Weather condition: Sunny

Staff: Nguyen Le Phuong-Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 03:2008/BTN MT
			S2-1 mm10091673	S2-2 mm10091674	S2-3 mm10091675	
1	pH	-	3.84	3.52	4.81	-
2	Organic	%	14.8	9.78	9.89	-
3	Total N	%	0.21	0.19	0.16	-
4	Total P	mg/kg	600	600	800	-
5	Cl ⁻	mg/kg	955	444	592	-
6	SO ₄ ²⁻	%	0.038	0.020	0.007	-
7	As	mg/kg	6.05	4.35	5.10	12
8	Cd	mg/kg	Not detected, MLOD = 0.15	Not detected, MLOD = 0.15	Not detected, MLOD = 0.15	5
9	Cu	mg/kg	17.5	26.4	35.1	70
10	Fe	%	1.6	2.2	3.0	-
11	Hg	mg/kg	Trace (0.07), MLOQ=0.09	Trace (0.05), MLOQ=0.09	Trace (0.06), MLOQ=0.09	-
12	Pb	mg/kg	13.5	16.4	19.1	120
13	Zn	mg/kg	19.2	17.6	43.4	-

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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 10⁰46'01,9" ; E 106⁰57'26,8"
 Time of monitoring: **09/09/2010(06h - 22h)**
 Surrounding conditions: Sunny ;There are many means transportation.
 Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Doan Thi Boi Hanh

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10091502	N3-1.1(6h-7h)	74.3	90.9	72.5
02	mm10091503	N3-1.2(6h-7h)	73.8	94.5	71.5
03	mm10091504	N3-1.3(6h-7h)	73.1	81.8	71.6
04	mm10091505	N3-2.1(7h-8h)	73.2	90.0	71.3
05	mm10091506	N3-2.2(7h-8h)	73.9	88.7	71.8
06	mm10091507	N3-2.3(7h-8h)	75.0	90.4	72.0
07	mm10091508	N3-3.1(8h-9h)	77.9	101.8	75.0
08	mm10091509	N3-3.2(8h-9h)	75.6	89.4	73.7
09	mm10091510	N3-3.3(8h-9h)	76.3	98.1	73.0
10	mm10091511	N3-4.1(9h-10h)	79.9	104.5	73.9
11	mm10091512	N3-4.2(9h-10h)	76.0	94.6	73.9
12	mm10091513	N3-4.3(9h-10h)	75.3	88.8	72.9
13	mm10091514	N3-5.1(10h-11h)	80.8	97.0	80.6
14	mm10091515	N3-5.2(10h-11h)	79.2	96.7	78.7
15	mm10091516	N3-5.3(10h-11h)	80.8	88.2	80.0
16	mm10091517	N3-6.1(11h-12h)	79.0	87.8	78.5
17	mm10091518	N3-6.2(11h-12h)	78.9	87.3	78.0
18	mm10091519	N3-6.3(11h-12h)	74.0	83.4	71.4
19	mm10091520	N3-7.1(12h-13h)	73.1	86.0	70.6
20	mm10091521	N3-7.2(12h-13h)	75.1	96.9	71.5
21	mm10091522	N3-7.3(12h-13h)	74.2	88.3	72.3
22	mm10091523	N3-8.1(13h-14h)	76.3	95.9	72.5
23	mm10091524	N3-8.2(13h-14h)	74.8	88.1	72.2
24	mm10091525	N3-8.3(13h-14h)	73.2	92.8	70.2

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25	mm10091526	N3-9.1(14h-15h)	77.6	85.3	76.8
26	mm10091527	N3-9.2(14h-15h)	78.7	88.7	77.6
27	mm10091528	N3-9.3(14h-15h)	78.3	91.1	77.6
28	mm10091529	N3-10.1(15h-16h)	75.7	86.6	75.0
29	mm10091530	N3-10.2(15h-16h)	74.2	89.7	71.7
30	mm10091531	N3-10.3(15h-16h)	76.1	92.8	73.9
31	mm10091532	N3-11.1(16h-17h)	75.7	98.0	72.0
32	mm10091533	N3-11.2(16h-17h)	73.4	87.5	70.9
33	mm10091534	N3-11.3(16h-17h)	75.5	94.3	72.3
34	mm10091535	N3-12.1(17h-18h)	74.8	87.2	72.9
35	mm10091536	N3-12.2(17h-18h)	75.8	99.1	71.8
36	mm10091537	N3-12.3(17h-18h)	74.0	87.3	71.8
37	mm10091538	N3-13.1(18h-19h)	74.7	90.0	71.7
38	mm10091539	N3-13.2(18h-19h)	74.6	95.9	72.1
39	mm10091540	N3-13.3(18h-19h)	75.0	95.0	72.1
40	mm10091541	N3-14.1(19h-20h)	75.1	99.9	72.1
41	mm10091542	N3-14.2(19h-20h)	74.4	87.5	71.9
42	mm10091543	N3-14.3(19h-20h)	74.0	89.0	71.6
43	mm10091544	N3-15.1(20h-21h)	79.2	107.0	73.1
44	mm10091545	N3-15.2(20h-21h)	75.0	92.5	72.3
45	mm10091546	N3-15.3(20h-21h)	76.3	96.7	73.3
46	mm10091547	N3-16,1(21h-22h)	76.5	92.3	74.6
47	mm10091548	N3-16,2(21h-22h)	74.9	86.5	72.5
48	mm10091549	N3-16,3(21h-22h)	76.4	95.3	73.4

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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 10⁰46'01,9" ; E 106⁰57'26,8"
 Time of monitoring: **09/09/2010(06h - 22h)**
 Surrounding conditions: Sunny ;There are many means transportation.
 Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Đoàn Thi Boi Hanh

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10091550	V3-1.1(6h-7h)	44.9	42.4
02	mm10091551	V3-1.2(6h-7h)	46.8	40.5
03	mm10091552	V3-1.3(6h-7h)	41.7	40.0
04	mm10091553	V3-2.1(7h-8h)	42.4	41.4
05	mm10091554	V3-2.2(7h-8h)	50.9	39.5
06	mm10091555	V3-2.3(7h-8h)	55.1	40.5
07	mm10091556	V3-3.1(8h-9h)	45.2	42.3
08	mm10091557	V3-3.2(8h-9h)	51.4	42.5
09	mm10091558	V3-3.3(8h-9h)	49.8	42.0
10	mm10091559	V34.1(9h-10h)	50.1	39.9
11	mm10091560	V3-4.2(9h-10h)	44.2	39.8
12	mm10091561	V3-4.3(9h-10h)	40.7	39.3
13	mm10091562	V3-5.1(10h-11h)	48.8	47.9
14	mm10091563	V3-5.2(10h-11h)	48.0	47.9
15	mm10091564	V3-5.3(10h-11h)	51.4	46.6
16	mm10091565	V3-6.1(11h-12h)	52.5	49.7
17	mm10091566	V3-6.2(11h-12h)	52.7	50.4
18	mm10091567	V3-6.3(11h-12h)	45.1	39.4
19	mm10091568	V3-7.1(12h-13h)	43.3	38.5
20	mm10091569	V3-7.2(12h-13h)	50.5	38.6
21	mm10091570	V3-7.3(12h-13h)	50.5	38.5
22	mm10091571	V3-8.1(13h-14h)	42.3	39.3
23	mm10091572	V3-8.2(13h-14h)	46.1	37.8
24	mm10091573	V3-8.3(13h-14h)	48.4	36.3

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25	mm10091574	V3-9.1(14h-15h)	50.9	43.5
26	mm10091575	V3-9.2(14h-15h)	51.3	45.3
27	mm10091576	V3-9.3(14h-15h)	51.1	43.6
28	mm10091577	V3-10.1(15h-16h)	42.9	41.3
29	mm10091578	V3-10.2(15h-16h)	42.5	39.9
30	mm10091579	V3-10.3(15h-16h)	50.6	40.5
31	mm10091580	V3-11.1(16h-17h)	50.8	38.9
32	mm10091581	V3-11.2(16h-17h)	52.4	37.6
33	mm10091582	V3-11.3(16h-17h)	50.3	39.7
34	mm10091583	V3-12.1(17h-18h)	50.8	39.4
35	mm10091584	V3-12.2(17h-18h)	42.3	38.5
36	mm10091585	V3-12.3(17h-18h)	50.5	38.1
37	mm10091586	V3-13.1(18h-19h)	41.2	39.3
38	mm10091587	V3-13.2(18h-19h)	49.4	39.7
39	mm10091588	V3-13.3(18h-19h)	41.6	38.2
40	mm10091589	V3-14.1(19h-20h)	41.2	39.0
41	mm10091590	V3-14.2(19h-20h)	51.1	38.5
42	mm10091591	V3-14.3(19h-20h)	41.5	38.6
43	mm10091592	V3-15.1(20h-21h)	41.9	39.5
44	mm10091593	V3-15.2(20h-21h)	82.0	43.7
45	mm10091594	V3-15.3(20h-21h)	39.1	37.0
46	mm10091595	V3-16.1(21h-22h)	50.5	39.8
47	mm10091596	V3-16.2(21h-22h)	43.6	40.4
48	mm10091597	V3-16.3(21h-22h)	41.1	38.9

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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 10⁰46'01,9" ; E 106⁰57'26,8"
 Time of monitoring: **09/09/2010(06h - 22h)**
 Surrounding conditions: Sunny ;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	mm10091662	A3-1 (06h-08h)	25.6	86.4	0.3 - 0.5	1008.5	NW
2	mm10091663	A3-2 (08h-10h)	28.3	71.4	0.9 - 2.0	1008.8	NW
3	mm10091664	A3- 3 (10h-12h)	31.2	60.4	0.3 - 1.5	1008.6	S
4	mm10091665	A3-4 (12h-14h)	32.9	48.8	0.4 - 1.1	1007.6	SE
5	mm10091666	A3-5 (14h-16h)	33.4	46.1	0.8 - 1.6	1004.6	SE
6	mm10091667	A3-6 (16h-18h)	29.5	64.9	0.4 - 0.8	1005.0	S
7	mm10091668	A3-7 (18h-20h)	26.6	80.5	0.1- 0.5	1005.6	SE
8	mm10091669	A3-8 (20h-22h)	27.2	78.8	0.1 - 0.7	1006.1	S

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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	mm10091662	A3-1 (06h-08h)	Not detected MLOD = 0.03	0.02	Not detected MLOD = 1.0	0.39	3.3
2	mm10091663	A3-2 (08h-10h)	0.05	0.04	Not detected MLOD = 1.0	0.42	4.8
3	mm10091664	A3- 3 (10h-12h)	0.09	0.05	1.3	0.84	5.1
4	mm10091665	A3-4 (12h-14h)	0.07	0.04	Not detected MLOD = 1.0	0.92	5.6
5	mm10091666	A3-5 (14h-16h)	0.13	0.04	1.6	0.42	4.2
6	mm10091667	A3-6 (16h-18h)	0.10	0.04	Not detected MLOD = 1.0	0.34	3.5
7	mm10091668	A3-7 (18h-20h)	0.05	0.03	Not detected MLOD = 1.0	0.31	4.3
8	mm10091669	A3-8 (20h-22h)	Not detected MLOD = 0.03	0.04	Not detected MLOD = 1.0	0.49	4.2

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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°46'16,3" ; E 106°56'22,0" (10h - 11h)
SW4-2: N 10°46'16,3" ; E 106°56'22,0" (16h - 17h)
SW4-3: N 10°46'07,1" ; E 106°56'24,3" (10h - 11h)
SW4-4: N 10°46'07,1" ; E 106°56'24,3" (16h - 17h)

Time of monitoring: **09/09/2010(08h - 18h)**

Weather condition: Sunny

Staff: Nguyen Le Phuong - Nguyen Tuan Vu

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

TT	Analysis criteria	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-1 mm10091691	SW4-2 mm10091692	Column A2	Column B1
1	pH	-	6.18	6.41	6 - 8.5	5.5 - 9
2	Temp.	oC	32.8	30.6	-	-
3	Turbidity	NTU	31.9	58.7	-	-
4	Conductivity	μS/cm(25 ⁰ C)	104.4	122.1	-	-
5	DO	mg/l	2.67	3.26	≥ 5	≥ 4
6	BOD ₅	mg/l	11.3	7.9	6	15
7	COD	mg/l	137.0	< 30	15	30
8	SS	mg/l	30.0	64.0	30	50
9	T-N	mg/l	2.44	1.44	-	-
10	T-P	mg/l	0.39	0.33	-	-
11	As	mg/l	0.0007	0.001	0.02	0.05
12	Cd	mg/l	Not detected,MLO D = 0.0006	Not detected,MLOD = 0.0006	0.005	0.01

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TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-1 mm10091691	SW4-2 mm10091692	Column A2	Column B1
13	CN ⁻	mg/l	Not detected,MLOD= 0.007	Not detected,MLOD= 0.007	0.01	0.02
14	Cu	mg/l	0.011	0.005	0.2	0.5
15	Hg	mg/l	Not detected,MLOD = 0.0005	Not detected,MLOD = 0.0005	0.001	0.001
16	Pb	mg/l	Not detected,MLOD = 0.006	Not detected,MLOD = 0.006	0.02	0.05
17	Zn	mg/l	0.023	0.015	1.0	1.5
18	NO ₃ ⁻	mg/l	2.71	1.20	5	10
19	Oil and grease	mg/l	Not detected, MLOD=0.04	Not detected, MLOD=0.04	0.02	0.1
20	Coliform	MPN/100ml	2.4x10 ⁵	2.4x10 ³	5000	7500

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 mm10091693	SW4-4 mm10091694	Column A2	Column B1
1	pH	-	6.10	6.38	6 - 8.5	5.5 - 9
2	Temp.	oC	30.4	30.2	-	-
3	Turbidity	NTU	17.1	69.5	-	-
4	Conductivity	μS/cm (25°C)	109.3	129.1	-	-
5	DO	mg/l	2.73	3.07	≥ 5	≥ 4
6	BOD ₅	mg/l	11.9	6.8	6	15

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TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-3 mm10091693	SW4-4 mm10091694	Column A2	Column B1
7	COD	mg/l	34.2	40.6	15	30
8	SS	mg/l	89.6	96.0	30	50
9	T-N	mg/l	2.79	1.28	-	-
10	T-P	mg/l	0.33	0.38	-	-
11	As	mg/l	0.0005	0.001	0.02	0.05
12	Cd	mg/l	Not detected,MLOD = 0.0006	Not detected,MLOD = 0.0006	0.005	0.01
13	CN ⁻	mg/l	Not detected,MLOD = 0.007	Not detected,MLOD = 0.007	0.01	0.02
14	Cu	mg/l	0,008	0,005	0.2	0.5
15	Hg	mg/l	Not detected,MLOD = 0.0005	Not detected,MLOD = 0.0005	0.001	0.001
16	Pb	mg/l	Not detected,MLOD = 0.006	Not detected,MLOD = 0.006	0.02	0.05
17	Zn	mg/l	0.033	0.016	1.0	1.5
18	NO ₃ ⁻	mg/l	3.62	1.65	5	10
19	Oil and grease	mg/l	Not detected, MLOD=0.04	Not detected, MLOD=0.04	0.02	0.1
20	Coliform	MPN/100ml	3.5x10 ³	7.0x10 ²	5000	7500

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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°45'57,2" ; E 106°57'19,7"
 Time of monitoring: **09/09/2010(08h - 18h)**
 Weather condition: Sunny
 Staff: Nguyen Le Phuong - Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW3-1 mm10091701	GW3-2 mm10091702	GW3-3 mm10091703	
1	pH	-	5.40	5.41	5.56	5.5 – 8.5
2	Temp.	°C	30.3	29.7	29.2	-
3	Turbidity	NTU	2.71	12.2	1.40	-
4	Conductivity	μS/cm(25 ⁰ C)	992.3	1181	982.0	-
5	Colour	Pt/Co	0	0	0	-
6	Odor		0	0	0	-
7	Hardness level	mgCaCO ₃ /l	24.5	17.0	114	500
8	Cl ⁻	mg/l	326.6	397.6	127.8	250
9	SO ₄ ²⁻	mg/l	10.4	10.6	21.4	400
10	NO ₃ ⁻	mg/l	15.1	5.69	184.4	15

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No	Analysis criteria	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW3-1 mm10091701	GW3-2 mm10091702	GW3-3 mm10091703	
11	As	mg/l	Không phát hiện, MLOD = 0.0002	Không phát hiện, MLOD = 0.0002	Không phát hiện, MLOD = 0.0002	-
12	Cd	mg/l	Not detected, MLOD = 0.0006	Not detected, MLOD = 0.0006	Not detected, MLOD = 0.0006	0.005
13	CN ⁻	mg/l	Not detected MLOD = 0.007	Not detected MLOD = 0.007	Not detected MLOD = 0.007	0.01
14	Fe	mg/l	0.49	2.57	0.085	5
15	Mn	mg/l	0.059	0.063	0.044	0.5
16	Pb	MPN/100ml	Not detected, MLOD = 0.006	Not detected, MLOD = 0.006	Not detected, MLOD = 0.006	0.01
17	Zn	mg/l	0.012	0.064	0.18	3.0
19	Coliform	MPN/100ml	0	0	1.5x10 ¹	3
20	Fecal coliform	MPN/100ml	0	0	0	0

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RESULT OF WASTE WATER MONITORING

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

Monitoring site: PACKAGE 2 – LONG THANH BIDGE

Co-ordinate: **W4 - 1** : N 10°46'13,4" ; E 106°56'22,7"

W4 - 2 : N 10°46'39,5" ; E 106°55'14,8"

W4 - 3 : N 10°46'47,5" ; E 106°54'55,6"

Time of monitoring: **09/09/2010(08h - 18h)**

Weather condition Sunny

Staff: Nguyen Le Phuong - Nguyen Tuan Vu.

No	Analysis critetia	Unit	Result analysis			QCVN24: 2009/BTNMT
			WW4-1 mm10091713	WW4-2 mm10091714	WW4-3 mm10091715	
1	pH	-	6.08	6.27	6.19	5.5-9
2	Temp.	°C	30.6	30.6	30.3	40
3	BOD ₅	mg/l	22.5	24.0	18.3	50
4	COD	mg/l	70.4	96.7	58.3	100
5	DO	mg/l	2.62	1.30	3.06	-
6	SS	mg/l	278.4	85.6	76.8	100
7	NH ₄ ⁺	mg/l	1.88	0.22	0.23	10
8	ΣN	mg/l	2.44	0.84	0.91	30
9	ΣP	mg/l	1.12	0.36	0.21	6
10	Oil & grease	mg/l	Not detected, MLOD=0.04	Not detected, MLOD=0.04	Not detected, MLOD=0.04	5
11	Coliform	MPN/100ml	5.4x10 ²	2.4x10 ²	2.3x10 ¹	5.000

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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 10⁰45'59,2" ; E 106⁰57'22,3"

S3 - 2: N 10⁰45'58,3" ; E 106⁰57'20,9"

S3 - 3: N 10⁰45'57,2" ; E 106⁰57'19,7"

Time of monitoring: 09/09/2010 (06h - 22h)

Weather condition: Sunny

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis criteria	Unit	Result analysis			QCVN 03: 2008/BTNMT
			S3-1 mm10091676	S3-2 mm10091677	S3-3 mm10091678	
1	pH	-	6.00	6.75	5.28	-
2	Organic	%	0.43	0.45	0.51	-
3	Total N	%	0.12	0.06	0.05	-
4	Total P	mg/kg	700	600	800	-
5	Cl ⁻	mg/kg	457	19.9	18.8	-
6	SO ₄ ²⁻	%	0.001	0.001	0.001	-
7	As	mg/kg	Not detected, MLOD = 2.5	Not detected,ML OD = 2.5	Not detected, MLOD = 2.5	12
8	Cd	mg/kg	Not detected, MLOD = 0.15	Not detected, MLOD = 0.15	Not detected, MLOD = 0.15	5
9	Cu	mg/kg	3.81	2.89	6.16	70
10	Fe	%	0.61	0.45	0.38	-
11	Hg	mg/kg	Trace (0.04), MLOQ=0.09	Trace (0.04), MLOQ=0.09	Trace (0.08), MLOQ=0.09	-
12	Pb	mg/kg	8.54	5.70	10.4	120
13	Zn	mg/kg	3.39	3.15	10.3	-

Monitored by

Checked by

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