

Environmental Monitoring Report

Bi-Annual Report
January 2011

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

Prepared by Consortium of Nippon Koei Co., Ltd. TEDI South for the Ministry of Transport and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 31 December 2010)

Currency unit	–	dong (D)
D1.00	=	\$0.000051
\$1.00	=	D19,495

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
CSC	–	construction supervision consultants
DONRE	–	Department of Natural Resources and Environment
EIA	–	environmental impact assessment
EMP	–	environmental management plan
GOV	–	Government of Vietnam
HCMC	–	Ho Chi Minh City
JBIC	–	Japan Bank for International Cooperation
JICA	–	Japan International Cooperation Agency
MONRE	–	Ministry of Natural Resources and Environment
NTP	–	notice to proceed
SS	–	suspended solids
VEC	–	Vietnam Expressway Corporation

NOTE

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

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



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

LOAN No. VNXV-1



**ENVIRONMENTAL SUPERVISION REPORT
(June 2010 – December 2010)**

January 2011

**Consortium of
Nippon Koei Co., Ltd
TEDI South**



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CHAPTER 1: INTRODUCTION

1.1 Background and objectives

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

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

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

The main purpose of the environmental supervision report (June 2010 – December 2010) is to summarize the environmental supervision activities by Construction Supervision Consultants (CS Consultants) during the period of June 2010 – December 2010 to support VEC to prepare environmental supervision reports to JICA (previous JBIC) as well as to prepare them to other agencies.

The main objectives of this environmental supervision report are follows;

- Grasp the general environmental condition
- Identify the environmental impacts during the construction period
- Summarize the result of environment inspection during construction period.
- Implementation of environmental monitoring in pre-construction during construction and operation stages

HLD Expressway construction project with total length of about 55km, is divided into 2 parts; Part 1: From An Phu Intersection (beginning point) to Ring Road 2 intersection (Km4+000) will be constructed as urban road. This section is funded by Hochiminh City People Committee; Part 2: From Ring Road 2 intersection (Km4+000) to Dau Giay Intersection (ending point). The Project scope is summarized in following table.

Table 1. Project Scope

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

CHAPTER 2: Briefing of Environmental Management Plan (HCMC – Long Thanh)

2.1 Implementation arrangement of EMP

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

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

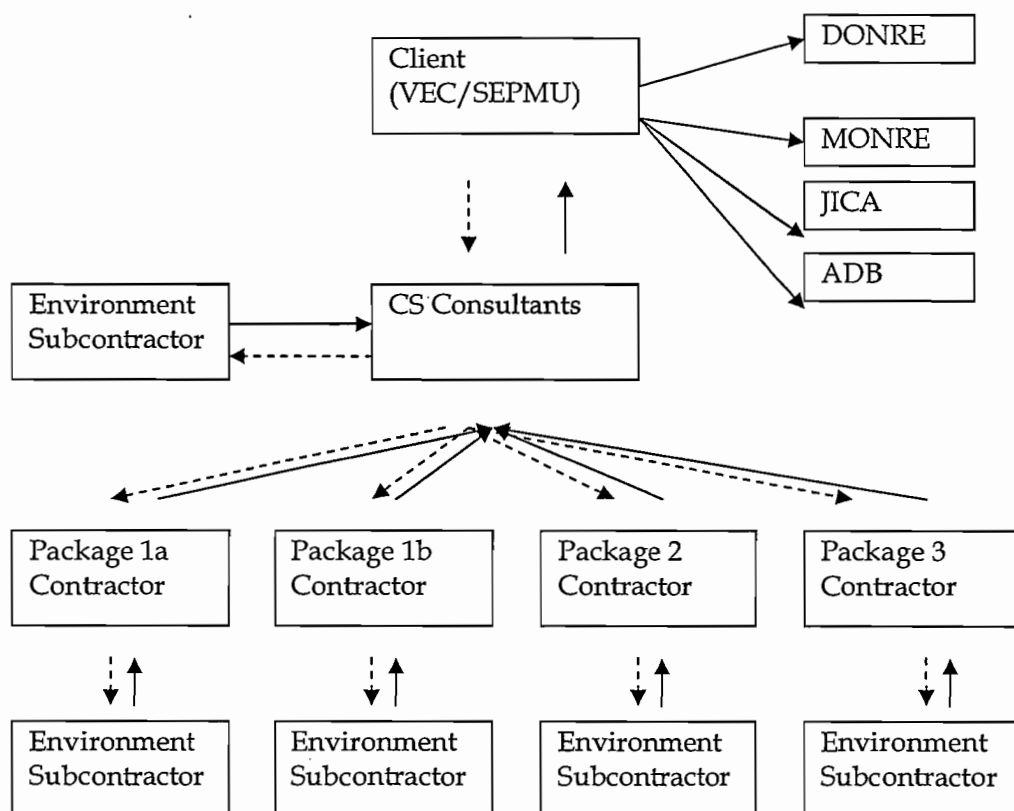


Figure 1. Framework of organizations regarding environmental management

2.2 Environmental Management

2.2.3 Environmental Monitoring by Contractors

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

Table 2. Environmental monitoring plan of contractors

No	Item	Pk1a	Pk1b	Pk2	Pk3
1	Air (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
2	Noise (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
3	Vibration (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
4	Surface water quality (2 samples/point)	3 points: Km 4+440 Km 5+480 Km 7+100	3 points: Km 8+350 Km 9+300 Km 10+450	1 point: Km 12+600	5 points: Km 14+600 Km 16+100 Km 18+300 Km 19+200 Km 21+250
5	Ground water quality (1 sample/point)	1 point: Km 6+200	1 point: Km 7+800	1 point: Km 11+800	1 point: Km 23+150
6	Soil quality (1 sample/point)	1 point: Km 4+450	1 point: Km 8+000	1 point: Km 11+800	1 point: Km 23+150
7	Excavated soil (1 sample/point)	1 point	1 point	1 point	1 point

The monitoring of construction contractors is carried out every three months as shown in table 3. This semi-annual report summarizes monitoring results from June to October 2010 as results of monitoring in December 2010 and January 2011 are under preparation.

Table 3. Environmental monitoring plan of contractors

Monitoring	Pk1a	Pk1b	Pk2	Pk3
1 st monitoring (initial monitoring)	03/2010	06/2010	07/2010	07/2010
2 nd monitoring	6/2010	09/2010	10/2010	10/2010
3 rd monitoring	9/2010	12/2010	01/2011	01/2011
4 th monitoring	12/2010	-	-	-

2.2.2 Environmental Monitoring by CSC

(1) Monitoring Items

Monitoring items include air quality, noise, vibration, surface water quality, groundwater quality, soil and wastewater (The detail is described in section 5.1 Environmental Monitoring).

(2) Environmental reference standards

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

Table 4. Environmental standards

No	Environmental component	Environmental standard
1	Air quality	QCVN 05:2009/BTNMT “ National Technical Regulation on ambient air quality” QCVN 06:2009/BTNMT “ National Technical Regulation on hazardous substances in ambient air”
2	Noise	TCVN 5949-1998 “ Acoustic – Noise In Public And Residential Areas- Maximum Permitted Noise Level”
3	Vibration	TCVN 6962:2001 Vibration and shock – Vibration emitted by construction works and factories – maximum permitted levels in the environment of public and residential areas TCVN 7210:2002 Vibration and shock – vibration emitted by roads traffic-maximum limits in the environment of public and residential areas
4	Surface water	QCVN 08:2008/BTNMT “ National Technical Regulation on surface water quality”
5	Ground water	QCVN 09:2008/BTNMT “ National Technical Regulation on groundwater quality”
6	Soil	QCVN 03:2008/BTNMT “ National Technical Regulation on soil quality”
7	Wastewater	QCVN 14:2008/BTNMT “National Technical Regulation on domestic waste water” QCVN 44:2009/BTNMT “National Technical Regulation on industrial waste water”

(3) Monitoring Locations

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

Table 5. Monitoring location


Location	Sample No	Pk1a	Pk1b	Pk2	Pk3
Air, Noise, Vibration					
1. Intersection Nguyen Duy Trinh Str with HLD Expressway	A1	6+150			
2. Truong Khanh Shrine (Near Residential Area)	A2			11+300	
3. Long Thanh town near NH51	A3				23+300
Surface Water					
1. Ong Nhieu river (Ong Nhieu bridge)	SW1-1, SW1-2	7+100			
2. Tac river (Song Tac bridge)	SW2-1, SW2-2		10+400		
3.					
4. Dong Nai river (Long Thanh bridge)	SW3-1, SW3-2			12+600	
5. Dong Mon bridge (Dong Mon river)	SW4-1, SW4-2				21+350
Groundwater					
1. Tan Dien A Hamlet – Phu Huu (District 9)	GW1-1, GW1-2, GW1-3	5+250			
2. Long Phuoc Ward, near Dong Nai river	GW2-1, GW2-2, GW2-3		10+400		
3. Long Thanh Town	GW3-1, GW3-2, GW3-3				23+300
Soil					
1. Phu Huu Ward, District 9, HCMC (Land bank)	S1-1, S-2, S1-3	4+200			
2. Truong Khanh ward, district 9	S2-1, S2-2, S2-3			11+300	
3. Long Thanh Town	S3-1, S3-2, S3-3				23+300
Wastewater	WW1-1, WW1-2, WW1-3	-	-	-	-
	WW2-1, WW2-2, WW2-3	-	-	-	-
	WW3-1, WW3-2, WW3-3	-	-	-	-
	WW4-1, WW4-2, WW4-3	-	-	-	-


(4) Monitoring Schedule

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

Table 6. Monitoring schedule

Year	Month	Package 1a	Package 1b	Package 2	Package 3
2009	12	X/1 (Initial Survey)			
2010	3	X/2	X /1 (Initial Survey)	X /1 (Initial Survey)	X /1 (Initial Survey)
	6	X/3	X/2	X/2	X/2
	9	X/4	X/3	X/3	X/3
	12	X/5	X/4	X/4	X/4
2011	3	X/6	X/5	X/5	X/5
	6	X/7	X/6	X/6	X/6
	9	X/8	X/7	X/7	X/7
	12	X/9	X/8	X/8	X/8
2012	3	X/10	X/9	X/9	X/9
	6	X/11	X/10	X/10	X/10
	9	X/12	X/11	X/11	X/11
	12			X/12	X/12
2013	3	X/13	X/12	X/13	X/13
	9	X/14	X/13	X/14	X/14
2014	3	X/15	X/14	X/15	X/15
	9		X/15	X/16	X/16
2015	3			X/17	X/17

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

 : Operation period (Defect liability Period=24 months)

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

2.2.3 Environmental Supervision

In the EMP, mitigation measures are proposed. The CS consultants are required to monitor, supervise whether the contractor apply the appropriate mitigation measures and implement environment protection by utilizing environmental protection equipment and/or facilities or not during the construction activities activity to protect the surrounding environment. The main mitigation measures described in the EMP to be supervised are briefly summarized as following table.

Table 7. Summary of mitigation measure

Item	Contents
Air quality	Dust suppression measures such as water spray and proper storage, etc
Water quality	Erosion control, Proper treatment of wastewater from facilities such as batching plan, installation of septic tank or other suitable procedure, etc
Noise and vibration	Install of permanent noise barrier, construction of temporary noise barriers
Waste disposal	Licensed waste transporter and/or disposal site for unsuitable soil, utilization of recycled waste, solid waste collection and disposal, proper handle of hazardous waste, etc
Wastewater	Wastewater collection and treatment, etc
Social aspect	Regular consultation with surrounding residents or community, construction camp management, etc
Traffic management	Proper material transportation routes and schedule, etc
Safety provision	Safety management plan, etc

CHAPTER 3: Construction Activity during Reporting Period

VEC issued NTP (notice to proceed) to packages (Pk) 1a, 1b, 2, and 3. The construction activity so far is carried out in all packages. The following table presents construction progress as of December 2010.

Table 8. Summary of construction activities

No	Item	Pk1a	Pk1b	Pk2	Pk3
1	NTP	1 st Dec. 2009	1 st Jan. 2010	4 th May 2010	4 th May 2010
2	Environmental management plan	Approved	Approved	Approved	Approved
3	Site laboratory	under operation	under operation	under operation	Under construction
4	Batching plant	under operation	Completed. The contractor plan to complete and operate this batching plant in January 2011	Under construction	Under construction
5	Casting yard	under operation	under construction	Under construction	Under construction
6	Bored pile and Bridge construction	Constructed 55 girders and 506 bored piles, 8 pile caps, 3 pier column	Constructed 280 bored piles, 7 pile caps, 6 pier column	Constructed 141 bored piles, 1 pile caps.	No activity
7	Temporary Road Construction	Sand backfilling: 97%, Embankment: 87%.	Sand backfilling: 100%, Embankment: 70%	Finish the temporary road at Hochiminh side. No activity in Dong Nai side	Temporary access road and Temporary bridges for Dong Mon and Hang Dieu are under construction
8	Earth work and soft soil improvement	The work of filling with sand (05th layer Km4+000 to Km4+210 and 06th Km4+050 to Km4+210) has been completed for the left side of section	Carrying out compaction and acceptance Installing geo-textile and preparing PVD installation	Pumping sand to make platform layer for approach road at HCMC side Be mobilizing construction unit for PVD installation	Removal, excavation of unsuitable material, Clearing and grubbing work are in progress on the approx. 80% of the package VCM trial section: Installation PVD-membrane -less: Finished 100%; Installation PVD-membrane: Finished 100%; Vacuum Application: 50% DMM trial section: Pull out and Static load test, coring test, compressing test were completed.

CHAPTER 4: Summary of Contractor's Environmental Monitoring Reports

Center of Environment and Applied Ecology (CEEEO) conducted all monitoring of contractors package 1a, 1b, 2, and 3. Monitoring result of each package is presented as follows:

4.1 Monitoring of package 1a:

The monitoring result in June 2010 and September 2010 is summarized as follows:

- Air quality: Concentrations of TSP, SO₂, NO₂, CO, Pb monitored in three sampling points were lower than limited value of QCVN 05:2009/BTNMT.
- Noise level: Noise level from 22h00 to 23h00 ranged from 49.9 dB to 61.5 dB, higher than limited value 50 dB of TCVN 5949-1998.
- Vibration level: All the measured values were from 35.1 to 57.2 dB which was much lower than allowable value of 70-75 dB in the Vietnamese standard TCVN 6962-2001 and TCVN 7210:2002.
- Surface water quality: Do concentration from 2.3 – 3.8 mg/L which did not satisfy the limited value of 4 mg/L. BOD value ranged from 14 to 37 mg/L, higher than the limited value of 15 mg/L. Concentration of oil and grease at low tide in June 2010 were 0.46 to 0.72 mg/L, higher than limited value of 0.1 mg/L. However in September the concentration was still higher than the limited value but lower than the baseline value. Other measured parameters meet the allowable standards.
- Ground water quality: except that Fe concentration was slightly higher than the limited values of QCVN 09:2008/BTNMT, all other analyzed parameters meet allowable values.
- Soil quality: concentrations of all measured parameters of the soil sample were under limited values of QCVN 03:2008/BTNMT.
- Excavated soil quality: concentrations of all measured parameters of the soil sample were under limited values of QCVN 03:2008/BTNMT.

4.2 Monitoring of package 1b:

The monitoring result in June 2010 (baseline monitoring) and in September 2010 is summarized as follows:

- Air quality: Except that concentration of TSP at km 8+000 were 0.377 – 0.358 mg/m³, slightly higher than limited value of 0.300 mg/m³. All other analyzed concentrations of TSP, SO₂, NO₂, CO, Pb were lower than limited value of QCVN 05:2009/BTNMT.
- Noise level: Noise level (22h00-23h00) ranged from 49.6 dB to 64.4 dB which was higher than limited value of 50 dB of TCVN 5949-1998.
- Vibration level: All the measured values were from 32.5 to 55.7 dB which was much lower than allowable value of 70-75 dB in the Vietnamese standard TCVN

6962-2001 and TCVN 7210:2002.

- Surface water quality: BOD value ranged from 13 to 26 mg/L, many values were slightly higher than the limited value of 15 mg/L. Other measured parameters meet the allowable standards.
- Ground water quality: Coliform concentration in both baseline and second monitoring was slightly higher than the limited value. All other analyzed parameters meet allowable values of QCVN 09:2008/BTNMT.
- Soil quality: concentrations of all measured parameters of the soil sample were under limited values of QCVN 03:2008/BTNMT.
- Excavated soil quality: concentrations of all measured parameters of the soil sample were under limited values of QCVN 03:2008/BTNMT.

4.3 Monitoring of package 2:

The monitoring result in July 2010 (baseline monitoring) and October 2010 is summarized as follows:

- Air quality: Concentrations of TSP, SO₂, NO₂, CO, Pb monitored in two sampling points were lower than limited value of QCVN 05:2009/BTNMT.
- Noise level: Noise level from 22h00 to 23h00 in the baseline and second monitoring were from 57.5 – 59.3 dB, slightly higher than limited value of 50 dB of TCVN 5949-1998.
- Vibration level: All the measured values were from 39.1 to 56.3 dB which was much lower than allowable value of 70-75 dB in the Vietnamese standard TCVN 6962-2001 and TCVN 7210:2002.
- Surface water quality: Except that coliform in both baseline and second monitoring from 24×10^3 - 4×10^3 MPN/100mL which was higher than limited value of 7500 MPN/100mL (QCVN 08:2009/BTNMT). All other analyzed parameters meet allowable values
- Ground water quality: Fe and Cl⁻ concentrations in both baseline and second monitoring were higher than value of QCVN 09:2008/BTNMT, all other analyzed parameters meet allowable values.
- Soil quality: concentrations of all measured parameters of the soil sample were under limited values of QCVN 03:2008/BTNMT.
- Excavated soil quality: concentrations of all measured parameters of the soil sample were under limited values of QCVN 03:2008/BTNMT.

4.4 Monitoring of package 3:

The monitoring result in July 2010 (baseline monitoring) and October 2010 is summarized as follows:

- Air quality: Except one value of TSP at km 23+300 in 10/2010 was 0.317 mg/m³,

slightly higher than limited value of 0.300 mg/m³. All other analyzed concentrations of TSP, SO₂, NO₂, CO, Pb were lower than limited value of QCVN 05:2009/BTNMT.

- Noise level: All the measured values were lower than allowable value of the Vietnamese standard TCVN 6962-2001 of TCVN 5949-1998.
- Vibration level: All the measured values were from 38.6 to 55.2 dB which was much lower than allowable value of 70-75 dB in the Vietnamese standard TCVN 6962-2001 and TCVN 7210:2002.
- Surface water quality: DO concentration from 2.1 – 3.6 mg/L which did not satisfy the limited value of 4 mg/L. SS value from 28 – 89 mg/L, most of SS value were higher than the limited value of 50 mg/L. Some BOD values were slightly higher than the limited value of 15 mg/L. Other measured parameters meet the allowable standards.
- Ground water quality: Coliform in both baseline and second monitoring was slightly higher than the limited value. All other analyzed parameters meet allowable values.
- Soil quality: concentrations of all measured parameters of the soil sample were under limited values of QCVN 03:2008/BTNMT.
- Excavated soil quality: concentrations of all measured parameters of the soil sample were under limited values of QCVN 03:2008/BTNMT.

CHAPTER 5: Environmental Monitoring and Supervision by CS Consultants

5.1 Environmental monitoring

Joint Venture of Scientific Technological Center for Environmental Protection in Transportation (CEPT) and Center for Analysis and Experimentation Services (CASE) was selected as the sub-consultant for the environmental monitoring work. The sub-consultant has conducted two monitorings under the supervision of CS Consultants.

Result of the two monitoring (in June and September 2010) is presented in the following sections (refer to monitoring reports for more details).

5.1.1 Monitoring of Package 1a

a). Monitoring result in June 2010

- Air quality: The content of dust was higher the allowable values in QCVN05:2009 (0.03 mg/m^3) this was due to vehicles transporting materials of local construction activities.
- Noise and vibration meet the allowable levels. However, the vibration result this monitoring was higher than previous monitoring about 12 dBA, which was caused by high density of heavy loading trucks for material transportation of the local construction activities
- Surface water: At the sites SW1-1 and SW1-2: DO did not meet allowable value. (Permit standard $\geq 4\text{mg/l}$); At the sites SW1-3 and SW1-4: DO and COD did not meet allowable value. Both of high temperature in water (31°C) and high chemical oxygen demand (COD) made the DO content lower than allowable value.
- Underground water: pH, Fecal coliform at 3 underground sampling points did not meet allowable value according to QCVN09:2008.
- Soil: The analyzed results of environmental parameters meet the standards QCVN03:2008.
- Waste water: All parameters satisfied column B of QCVN14:2008.

b). Monitoring result in September 2010

- Air quality: The contents of NO_2 , CO, SO_2 , HC and dust: from 6am to 10pm were under the allowable values in QCVN05:2009.
- Noise and vibration The noise in night time was higher allowable value (1dBA) this was attributed to high density of heavy loading trucks for material transportation.
- Surface water: SW1-1; SW1-2; SW1-3; SW1-4: DO did not meet QCVN08:2008 ($\leq 4\text{mg/l}$). COD was higher allowable value according to QCVN08:2008 from 1.35

to 1.68 times (except SW1-2). SS was 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.

- Underground water: pH level at 3 underground water samples from 4.62 to 5.14, did not meet QCVN09:2008 (from 5.5 to 8.5). There was a signal of contamination of Coliform and Fecal Coliform in GW1-3 samples.
- Soil: The analyzed results of environmental parameters meet the standards QCVN03:2008
- Waste water: SS in WW1-1 was 1.6 times higher allowable value according to QCVN24:2009.

5.1.1 Monitoring of Package 1b

a). Monitoring result in June 2010

- Surface water: At the sites SW2-1; SW2-2; SW2-3; SW2-4: DO from 2.26 to 2.49mg/l, did not meet allowable value. At SW2-2; SW2-4: SS was 1.5 - 1.84 times higher than allowable value. The reason was due to heavy rains making higher content of turbidity and suspended solid in water. At SW2-3: Coliform was 1.5 times higher than allowable value.
- Underground water: Underground water samples GW2-1; GW2-2; GW2-3: Cl^- was 2.5 - 4.76 times higher allowable value. The high Cl^- concentration was possibly caused by natural impacts (for salt intrusion, acidic water and high conductivity). Underground water samples at GW2-2 and GW2-3: Fe was higher allowable value.

Water samples in three locations were 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 meet the column B, QCVN14:2008.

b). Monitoring result in September 2010

- Surface water: SW1-1; SW1-2; SW1-3; SW1-4: DO did not meet QCVN08:2008 ($\leq 4\text{mg/l}$). SS was 1.3 to 1.76 times higher allowable value according to QCVN08:2008. At SW2-1; SW2-3: COD was 1.5 times higher allowable value according to QCVN08:2008.
- Underground water: GW2-1; GW2-2; GW2-3: Cl^- was 2.78 - 4.2 times higher allowable value. At GW2-2 and GW2-3: Fe was 6.14 - 9.34 times higher allowable value. GW2-1, GW2-2 and GW2-3: Mn was 1.38 - 2.18 times higher allowable

value.

Water samples in three locations were 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 meet the column B, QCVN14:2008.

5.1.1 Monitoring of Package 2

a). Monitoring result in June 2010

- Air, Noise and Vibration: All parameters met the allowable values.
- Surface water: DO of all samples did not meet allowable value.
- Soil: As content in soil of sample S2-2 (14.8mg/kg) was higher than allowable value (12mg/kg). As content in soil at this location need to be checked in the next monitoring
- Waste water: All parameters meet the column B, QCVN14:2008

b). Monitoring result in September 2010

- Air, Noise and Vibration: All parameters met the allowable values.
- Surface water: SW3-1; SW3-2; SW3-3; SW3-4: DO did not meet allowable value. SW3-1 and SW3-3: SS was slightly higher allowable value
- Soil and Waste water: All parameters met allowable values.

5.1.1 Monitoring of Package 3

a). Monitoring result in June 2010

- Air and Vibration: All parameters met the allowable value.
- Noise: The noise level in nighttime was about 2.6dBA higher allowable value. 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 was 2.58 times higher allowable value). At the site SW4-2: SS (56.4 mg/l) ss 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) was higher allowable value.

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

- Underground water: Cl^- value at GW3-1 và GW3-2 was 1.3 to 2.9 times higher allowable value to. There ws a signal of contamination of Fecal Coliform in 03 underground water samples. NO_3^- value at GW3-3 is higher allowable value 6.58

times, that possibly was caused by various reasons such as redundant pesticide, chemical substance, litter, etc. pH value at GW3-1 and GW3-3 was not in allowable range.

- Soil and Waste water: All parameters met allowable values.

b). Monitoring result in September 2010

- Air quality: The content of dust was 0.22 mg/m³ higher allowable value. The reason was that the monitoring location was near National Highway No.51 where there were many vehicles transporting goods from Vung Tau to industrial parks and vice versa.
- Noise: The noise level was slightly higher allowable value in day time and night time. Vehicles increased in the night time because all of heavy loading trucks are allowed to operate after 8 PM (route Vung Tau – TP.HCM). Some vehicles used horn increasing noise level in the monitoring.
- Vibration: met the allowable value.
- Surface water: At the sites: SW4-1, SW4-2, SW4-3, SW4-4: DO did not meet allowable value ($\leq 4\text{mg/l}$). At SW4-1; SW4-3; SW4-4: COD was 1.14 from 1.5 times higher allowable value according to QCVN08:2008. At SW4-2; SW4-3; SW4-4: SS was 1.28 from 1.92 times higher allowable value. At the site SW4-1: Coliform was 32 times higher allowable value.
- Underground water: Cl^- value at GW3-1 và GW3 - 2 was 1.3 to 1.6 times higher allowable value. NO_3^- value at GW3-3 was 12.2 times higher allowable value. pH value at GW3-1 and GW3-2 was not in the allowable range
- Soil: All parameters met allowable values.
- Waste water: SS value at WW4-1 was higher allowable value about 2.8 times

5.2 Inspection of contractor's activities

Contractor has carried out construction works including site office, temporary road, batching plant, site laboratory, bored pile construction, etc. Assessment of potential impacts of these construction and site inspection has been implemented.

Construction temporary road can increase the TSP concentration in the ambient air and contractor frequently has been spraying water on the road to reduce the dust.

Site office: this building generate small amount of domestic wastewater and the discharge wastewater contained high coliform. The contractor was requested to implement necessary actions including frequently cleaning discharge system and prohibiting throw of garbage into the system.

Batching plant: operation of the plant will produce wastewater containing high concentration of alkaline and other pollutants. The contractor was requested to provide a wastewater treatment facility. The wastewater facility of Pk1a and Pk1b are

under operation.

Excavated soil: excavated soil may contain contents of hazardous material through construction activities or natural origin. The contractor was requested to examine the excavated soil before disposal.

Site laboratory: the laboratory probably uses hazardous chemicals. Therefore, the contractor was requested to comply with Decree No. 68/2005/ND-CP of the Vietnamese Government on Chemical Safety and other relevant regulations. Necessary prevention measures include as follows;

- Properly store and handle chemicals;
- Sufficiently provide Personal Protective Equipment (PPE);
- Provide warning notice and Material Safety Data Sheet (MSDS) for the chemicals.

Bored pile construction: this activity has the most potential impact to environment as it can emit bentonite mud into the environment especially into surface water bodies. Contractors were requested to build embankment at construction site of bored pile to avoid the overflow of bentonite mud.

CHAPTER 6: Conclusion and Recommendation

6.1 Conclusion

- The environmental monitoring result shows that most of the parameters for air, noise, vibration and surface water, groundwater are under the current Vietnamese standards, except TSP and the noise level in night time at intersections, some surface water parameters (DO, SS, BOD).
- The monitoring result showed that the environment is under certain impacts especially noise and TSP levels in the ambient air. At sampling points located at intersection with urban roads (at intersection Nguyen Duy Trinh Str with HLD Expressway and at Long Thanh Town) noise level and TSP were higher than the allowable value mainly due to impacts of vehicles (from construction and transportation activities). In rainy season, the run-off water made surface water bodies high concentration of SS, BOD and low DO concentration.
- CS Consultants inspected implementation condition of mitigation measures during construction period and instructed the countermeasures to mitigate the environmental impacts regarding construction and operation of site office, batching plant, excavated soil, site laboratory, etc through the environmental inspection.

6.2 Recommendation

- In this moment, there is no significant environmental impact. However, it is important to monitor environment periodically and historical data shall be monitored to identify the trend of the baseline environment (under the condition without only this project).
- Attention shall be paid to the construction of bored piles on canals or rivers as this construction may release concrete mud into surface water, affecting water quality and aquatic organism.
- Although the TSP and noise level (night time) at intersection are mainly attributed to increase in circulation of vehicles in the area, contractors shall frequently implement water spray to control dust and minimize noise of vehicles or machine during construction in night time.
- There are other construction projects such as the construction of Ring Road 2, widening highway 51 or other development projects. Therefore, it is important to check the impacts of surrounding construction projects as well as of this project through the regular inspection activities.

Appendix 2. Photos of Environmental Monitoring and Supervision

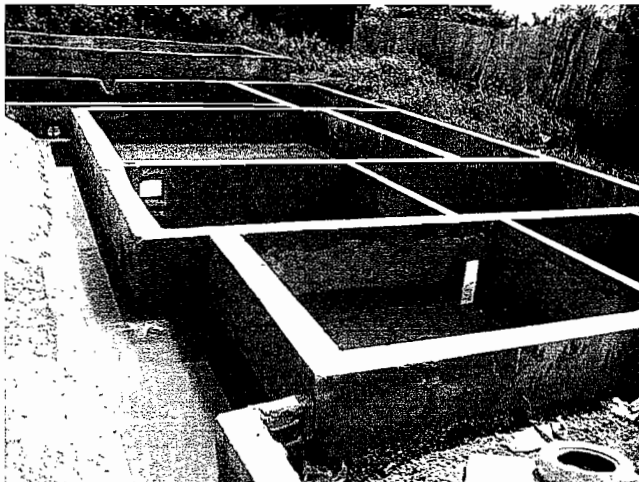
Environmental monitoring by CS Consultant



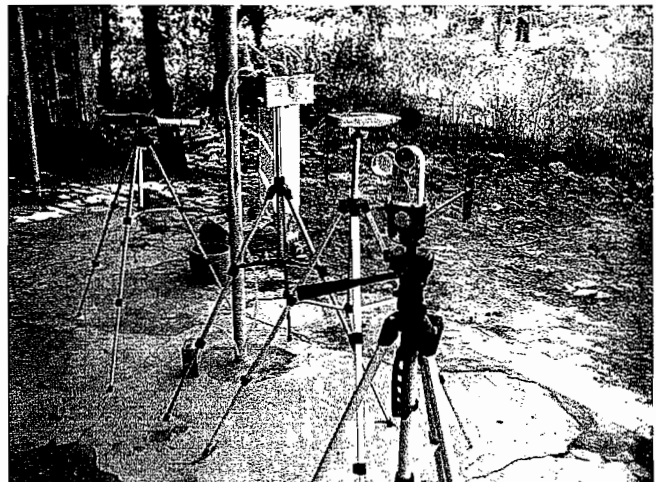
Soil sampling at Km4+200, Pk 1a



Spraying water to prevent dust, Pk 1a



Wastewater treatment facility, Pk1a



Air, noise and vibration monitoring at Truong Khanh shrine, Km11+300, Pk 2.

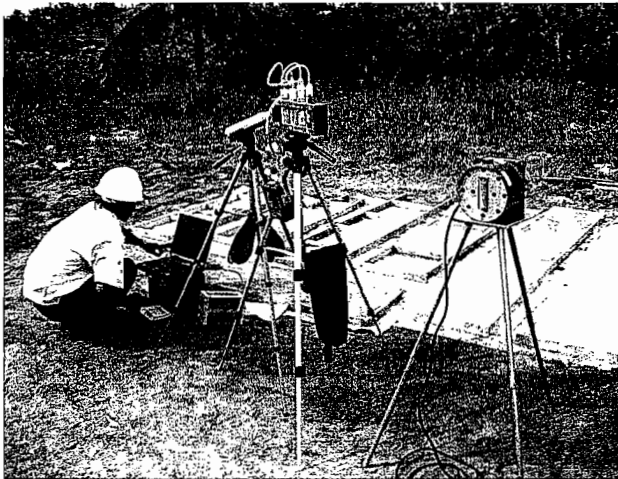


Surface water sampling at Km 12+600, Dong Nai River, Pk 2.

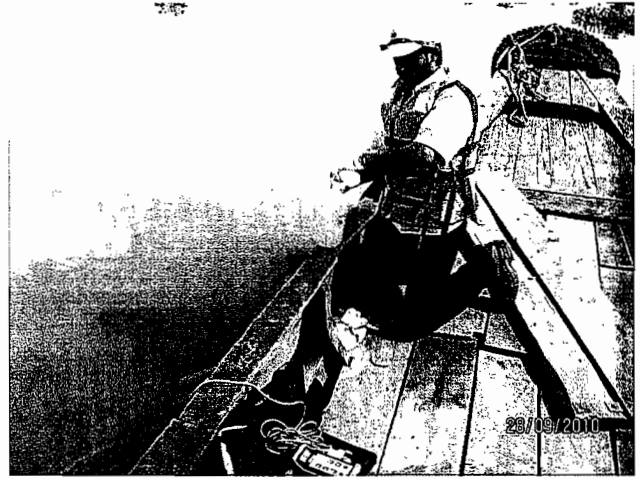


Ground water sampling
km 23+150, Pk 3

Environmental monitoring by contractors



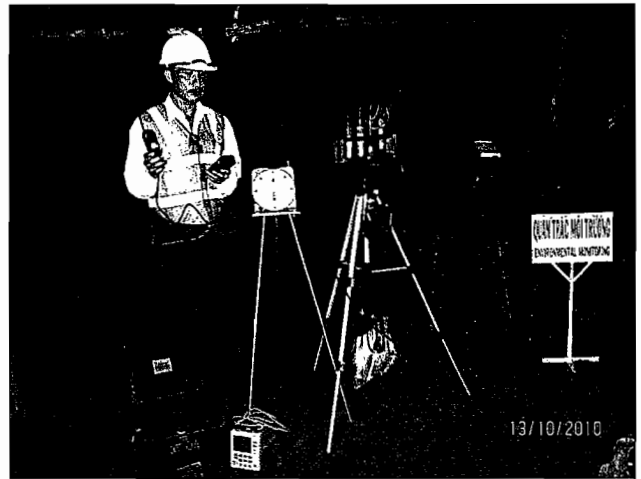
Air, noise and vibration monitoring
km 8+000, pk 1b.



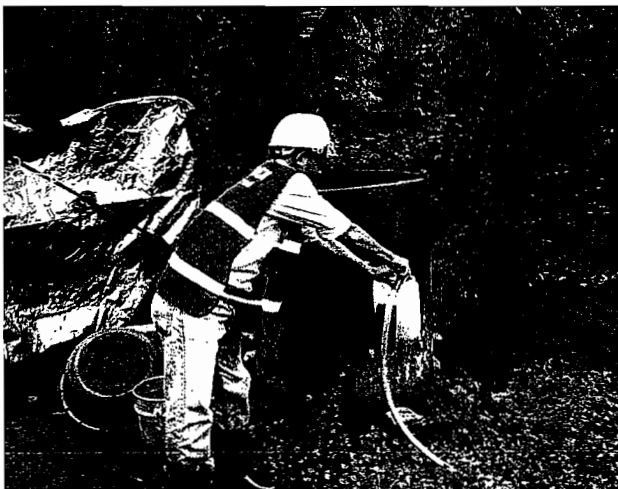
Surface water sampling
km10+450, Pk 1b



Excavated soil sampling, Pk 2



Air, noise and vibration monitoring
Km 12+000, Pk 2

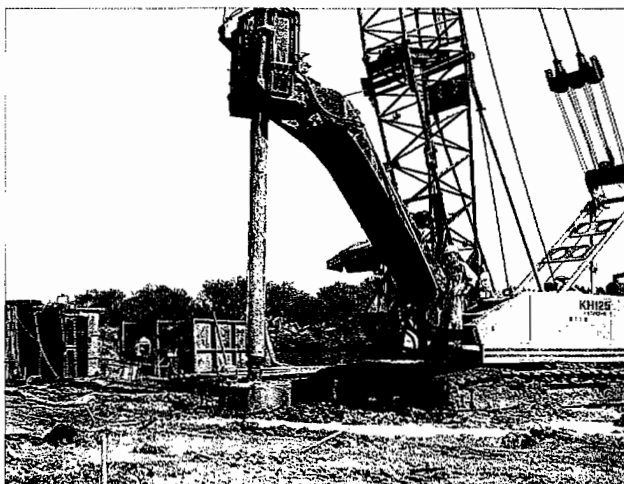


Ground water sampling
Km 23+150, Pk 3

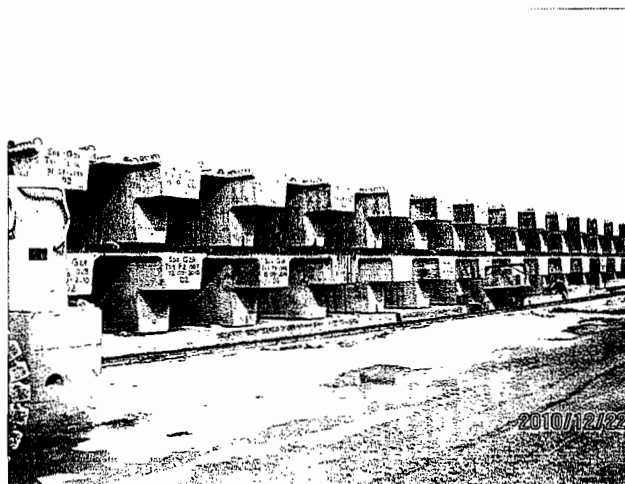


Surface water sampling
km 18+300, Pk 3

Construction activities



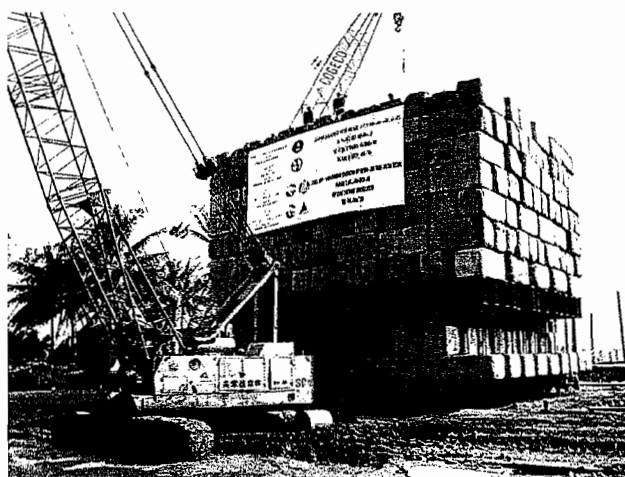
Bored pile construction, Pk 1a



Storage yard of girders, Pk 1a



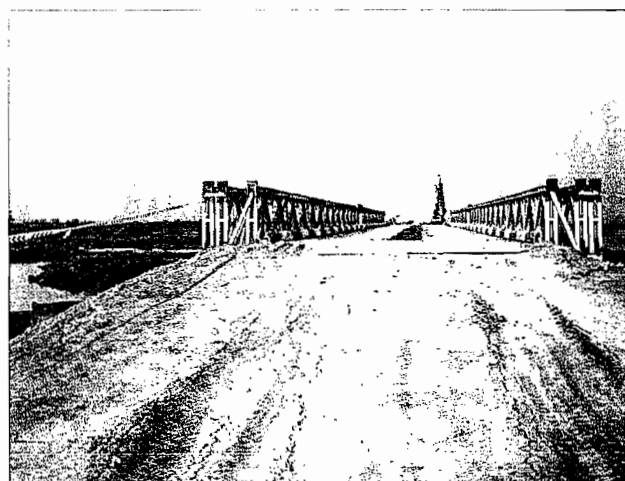
Construction of pier head, Pk 1b



Static loading test of D2000, Pk 2



Installation of airtight sheet for PVD works
Pk 3



Dong Mon temporary bridge, Pk 3