Date: 8th Aprilp 2015

Ref: MJTD/O/15-04-153

His Excellency Mr.Set Aung

Chairman, Thilawa SEZ Management Committee

Submission of Environmental Monitoring Report for Construction Phase (Report No.4)

Your Excellency,

Referring to the Environmental Impact Assessment (EIA) Report, Appendix 1, Environmental Monitoring Plan (Construction Phase) submitted on October 2013, we would like to submit Thilawa SEZ Zone A Development Project- Phase 1 Environmental Monitoring Report for Construction Phase (4th time) enclosed herewith this cover letter and six copies of attached documents:

- Environmental Monitoring Report for Construction Phase
- Air, Water and Waste water Monitoring Reports (February 2015)
- Noise and Vibration Monitoring Report (February 2015)
- Monthly Progress Reports (January 2015) Thilawa SEZ (Zones A) Development Project-Phase 1
- Monthly Progress Reports (February 2015) Thilawa SEZ (Zones A) Development Project-Phase 1

Yours Truly,

Takashi Yanai

President and CEO

Myanmar Japan Thilawa Development Limited

MJTD

Thilawa Special Economic Zone (ZONE A) Development

Environmental Monitoring Report (Construction Phase)

Myanmar Japan Thilawa Development Limited.

March 2015

CONTENTS

Appendix

1. Executive Summary

The environmental inspection and compliance monitoring program will be implemented under the direction of Ministry of Environmental Conservation and Forestry with oversight by Thilawa SEZ Management Committee.

The monitoring record according to the Environment Monitoring Plan is submitted in conformity with the provision of Chapter 9.1, Table 9.1-2 and 9.2, Table 9.2-2 Content of the EIA Report of Thilawa SEZ Development Project (Zone A).

2. Summary of Monitoring Activities

a) **Progress made to date on the implementation of the EMP against the submitted implementation schedule;**
EMP for Pre-construction Phase was submitted on March 2014. EMP for Construction Phase First Report was submitted at June 2015, Second Report at September 2014 and Third Report at March 2015. The fourth implementation report during Construction Period is submitted this day. Subsequent reports will be submitted on a quarterly base.

b) **Difficulties encountered in implementing of the EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties;**
None

c) **Number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation;**
None

d) **Accidents or incidents relating to the occupational and community health and safety, and the environment:**
Neither accidents nor incidents happen during this monitoring period.

e) **Monitoring data on environmental parameters and conditions as committed in the EMP or otherwise required.**
Please refer to the attached Environmental Monitoring Form.

3. Construction Progress

Thilawa SEZ Zone A Development Project, Phase 1 construction activities is submitted enclosed with monthly progress reports from contractor in Appendix A to C.

- Monthly Progress Report for January, 2015
- Monthly Progress Report for February, 2015

4. Monitoring Result

Environmental Monitoring plan report for Construction Phase implemented according to the following table, reference on Table 4.2-2, Chapter 4, EIA report.

Monitoring Plan (Construction Phase)

Category	Item	Location	Frequency	Remark
Air Quality	No2, So2, Co, TSP, PM10	Construction site (1point)	Once/ 3month	February 2015, Monitoring Report
Water Quality	Water temperature, PH, SS, DO, BOD, COD, coliform count, oil and grease, chromium	Construction site (1point) Well in the Monastery (1 point)	Once/2 month	February 2015 Monitoring Report
Waste	Amount of solid waste Management of solid waste of construction	Construction site	Once/3month	Monthly progress reports (January, February) 2015
Noise and Vibration	Noise and vibration level of construction	Preservation area such as residence around the proposed construction site (2 points)	Once/3moth (peak period)	Noise and Vibration monitoring report February 2015
		Preservation site such as residence along the route for on-site vehicles (2points)	Once(peak period)	
Ground Subsidence	Ground elevation Consumption of ground water amount	Representative (1 point)	Every week	Monthly progress reports (January, February) 2015
Hydrology				
Risk for infectious disease such as AIDS/HIV	Status of measures of infectious disease	Construction site	Once/month	Monthly progress reports (January, February) 2015
Working conditions (including occupational safety)	Prehension of condition of occupational safety and health Prehension of infectious disease	Construction site	Once/ month	
Accident	Existence of accident	Construction site	As occasion arise	

Thilawa Special Economic Zone (ZONE A)
Development Project –Phase 1

5. Environment Monitoring Form

Environment Monitoring Form

The latest results of the below monitoring items shall be submitted to Authorities on once at Pre-construction phase and on quarterly basis at Construction Phase, and on bi-annually base at Operation Phase. The items, standards to be applied, measurement points, and frequency for each monitoring parameter are established based on the EIA Report for Thilawa Special Economic Zone Development Project (Zone A). Should there be any changes to the original plan, such change shall be reviewed and evaluated by environmental expert.

(1) General

1) Phase of the Project

- Please mark the current phase.

□ Pre-Construction Phase ☑Construction Phase □ Operation Phase

2) Obtainment of Environmental Permits (Not Applicable)

Name of permits	Expected issuance date	Actual issuance date	Concerned authority	Remarks (Conditions, etc.)
Attached approval letter:				

3) Response/Actions to Comments and Guidance from Government Authorities and the Public (Not Applicable)

Monitoring Item	Monitoring Results during Report Period	Duration of Report Period	Frequency
Number and contents of formal comments made by the public		Same timing of submission of Monitoring Report	Upon receipt of comments/complaints
Number and contents of responses from Government agencies			

(2) Monitoring Results

1) Ambient Air Quality - February 2015

NO_2, SO_2, CO, TSP, PM10

Location	Item	Unit	Measured Value (Mean)	Measured Value (Min~Max.)	Country's Standard	Target value to be applied	*Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
Construction Area Near Gate 2	NO_2	ppm	0.04	0.03-0.07	N/A	N/A	0.06	Once in three months	HAZSCANNER, EPAS	
	SO_2	ppm	0.01	0.01-0.02	N/A	N/A	0.04	Once in three months	HAZSCANNER, EPAS	
	CO	ppm	0.43	0.38-0.69	N/A	N/A	30	Once in three months	HAZSCANNER, EPAS	
	TSP	ppm	0.19	0.14-0.28	N/A	N/A	0.33	Once in three months	HAZSCANNER, EPAS	
	PM10	ppm	0.07	0.06-0.08	N/A	N/A	0.12	Once in three months	HAZSCANNER, EPAS	

*Remark: Referred to the Japan and Thailand Standard (EIA Report, Table 6.4-1)

Complains from Residents

- Are there any complains from residents regarding air quality in this monitoring period? □ Yes, ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Complains from Residents	Countermeasures

2) Water Quality – February 2015

Measurement Point: Effluent of Wastewater

- Are there any effluents to water body in this monitoring period? ☐ Yes, ☑No

If yes, please attach "Analysis Record" and fill in the items not to comply with Refereed International Standard.

Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-2	pH	mg/l	8.75	N/A	5.0-9.0		Once in two month	pH meter,HI7609829-1 pH Sensor	
	SS	mg/l	55*		Max.50			Gravimetric method	
	DO	mg/l	12.09		-	>=4		HI7609829-2,(D.O) Sensor	
	COD	mg/l	12.8		Max.60			Dichromate method	
	BOD	mg/l	5.2		Max.30-60			Direct inoculation method	
	Oil and Grease	mg/l	0.2		Max.5			APHA-AWWA-WEF Method	
	Cr	mg/l	0.000[illegible]		Max.0.5			APHA-AWWA-WEF Method	
	Total coliforms	cfu/100ml	13000*'		-	7.5×10³		AOAC Petrifilm Method	
SW-3	pH	mg/l	8.48	N/A	5.0-9.0		Once in two month	pH meter,HI7609829-1 pH Sensor	
	SS	mg/l	3100*		Max.50			Gravimetric method	
	DO	mg/l	10.81		-	>=4		HI7609829-2,(D.O) Sensor	
	COD	mg/l	47.9		Max.60			Dichromate method	
	BOD	mg/l	19.5		Max.30-60			Direct inoculation method	
	Oil and Grease	mg/l	0.5		Max.5			APHA-AWWA-WEF Method	
	Cr	mg/l	0.000		Max.0.5			APHA-AWWA-WEF Method	
	Total coliforms	cfu/100ml	14000*'		-	7.5×10³		AOAC Petrifilm Method	

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Location	Item	Unit	Measured Value	Country's Standard	Target value to be applied	*Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
SW-4	pH	mg/l	8.33	N/A	5.0-9.0		Once in two month	pH meter,HI7609829-1 pH Sensor	
	SS	mg/l	451*		Max.50			Gravimetric method	
	DO	mg/l	13.81		-	>=4		HI7609829-2,(D.O) Sensor	
	COD	mg/l	29.5		Max.60			Dichromate method	
	BOD	mg/l	11.8		Max.30-60			Direct inoculation method	
	Oil and Grease	mg/l	0.2		Max.5			APHA-AWWA-WEF Method	
	Cr	mg/l	0.000		Max.0.5			APHA-AWWA-WEF Method	
	Total coliforms	cfu/100ml	1700		-	7.5×10³		AOAC Petrifilm Method	
GW-1	pH	mg/l	8.27	N/A	N/A	5.5-9.0	Once in two month	pH meter,HI7609829-1 pH Sensor	
	SS	mg/l	10*			80		Gravimetric method	
	DO	mg/l	4.88			>=4		HI7609829-2,(D.O) Sensor	
	COD	mg/l	12.2			30		Dichromate method	
	BOD	mg/l	4.9			15		Direct inoculation method	
	Oil and Grease	mg/l	ND			0.1		APHA-AWWA-WEF Method	
	Cr	mg/l	0.000			0.04		APHA-AWWA-WEF Method	
	Total coliforms	cfu/100ml	22			7.5×10³		AOAC Petrifilm Method	

*Remark: Referred to the Vietnam Standard (EIA Report), Reference to the Monitoring Report, February 2015.

*Remark: Total suspended solid has been exceeding the reference standard since before construction phase as reported in the result of EIA Monitoring report (Sep 2013).

*' Remark: Total coliforms has exceeded the reference standard in SW-2 and SW-3. It may be because contamination from human or animal waste nearby the creek outside of Thilawa SEZ. Refer to the Monitoring Report, February 2015.

3) Soil Contamination (only operation phase)

Situations environmental report from tenants

- Are there any serious issues regarding soil contamination in this monitoring period? ☐Yes ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Issues on Soil Contamination	Countermeasures

4) Noise -February 2015

Noise Level (Along the Thilawa Development Road)

Location	Item	Unit	Measured Value (Mean)	Measured Value (Min-Max)	Country's Standard	Target value to be applied	*Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
TNV-1	Leq(day)	dB(A)	55	47-61	N/A	N/A	75	One (peak period)	Sound Level Meter	
	Leq(ave)	dB(A)	50	46-55			70			

*Remark: Referred to the Japan Standard (EIA Report), Reference to the Noise and Vibration Report February 2015.

Noise Level (Living Environment-Near Monastery)

Location	Item	Unit	Measured Value (Mean)	Measured Value (Min-Max)	Country's Standard	Target value to be applied	*Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
TNV-2	Leq(day)	dB(A)	55	46-59	N/A	75	Singapore	One in 3 months	Sound Level Meter	
	Leq(ave)	dB(A)	50	37-59		60				
	Leq(night)	dB(A)	45	43-48		55				

TNV-3	Leq(day)	dB(A)	50	47-55	N/A	75	Singapore	One in 3 months	Sound level Meter	
	Leq(ave)	dB(A)	46	46-51		60				
	Leq(night)	dB(A)	43	39-46		55				

*Remark: Referred to the Singapore Target Noise Standard (EIA Report), Reference to the Noise and Vibration Report February 2015.

Complains from Residents

- Are there any complains from residents regarding noise in this monitoring period? ☐Yes ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Complains from Residents	Countermeasures

5) Solid Waste

Measurement Point: Construction Site (Construction Phase), Storage for Sludge (Operation Phase)

- Are there any wastes of sludge in this monitoring period? ☐Yes ☑No

If yes, please report the amount of sludge and fill in the results of solid waste management Activities.

No.	Date	Description	No. of Loads	Remarks
1.	24-Jan-15	Waste Disposal	02	YCDC
2.	27-Jan-15	Waste Disposal	01	YCDC
3.	24-Feb-15	Waste Disposal (Sewage)	01	YCDC

*Remark: Reference to the Monthly Progress Report (January and February) 2015.

6) (a)Ground Subsidence and Hydrology-January 2015

Duration (Week)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
1-Jan-2015	117	m3/week	+7.015	m	Once a week	
8-Jan-2015	140	m3/week	+7.017	m		
15-Jan-2015	168	m3/week	+7.015	m		
22-Jan-2015	172	m3/week	+7.018	m		
29-Jan-2015	181	m3/week	+7.015	m		

*Reference to the Monthly Progress Report January 2015.

(b) Ground Subsidence and Hydrology-February 2015

Duration (Week)	Water Consumption		Ground Level		Frequency	Note
	Quantity	Unit	Quantity	Unit		
5-Feb-2015	169	m3/week	+7.008	m	Once a week	
12-Feb-2015	250	m3/week	+7.004	m		
19-Feb-2015	193	m3/week	+7.004	m		
26-Feb-2015	222	m3/week	+7.005	m		

*Reference to the Monthly Progress Report February 2015.

7) Offensive Odor (only operation phase) Not Applicable at Construction Phase Report

Complains from Residents

- Are there any complains from residents regarding offensive odor in this monitoring period? □Yes ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Complains from Residents	Countermeasures

7

Situations environmental report from tenants Not Applicable at Construction Phase Report

- Are there any serious issues regarding offensive odor in this monitoring period? □Yes □No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Issues on Soil Contamination	Countermeasures

8) Infectious disease, Working Environment, Accident

Information from contractor (construction phase) or tenants (operation phase)

- Are there any incidents regarding Infectious disease, Working Environment, Accident in this monitoring period? □Yes ☑No

If yes, please describe the contents of complains and its countermeasures to fill in below the table.

Contents of Incidents	Countermeasures

Note: If emergency incidents are occured, the information shall be reported to the relevant organizations and authorities immediately.

End of Document

8

Thilawa Special Economic Zone (ZONE A) Development Project –Phase 1

Appendix

Air, Water and Waste Water Monitoring Report

February, 2015

MJTD MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED

MONITORING REPORT

FOR

WATER AND AIR QUALITY

THILAWA SPECIAL ECONOMIC ZONE (ZONE A)

(FEBRUARY 2015)

Resource & Environment Myanmar Ltd.
B-702/401 Delta Plaza Building, Shwegondaing Rd., Bahan, Yangon. MYANMAR
Tel: (959) 7301 3448; Fax: (951) 552901

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RESULT OF AIR AND WATER QUALITY MONITORING

1. Introduction

This is the fifth report (February 2015) for Air and water quality monitoring at Thilawa Special Economic Zone (TSEZ). This report sets out the environmental monitoring required throughout the construction of the Thilawa Special Economic Zone (Zone A). The terms of reference for monitoring are shown in Table 1. The location of air and water monitoring points are shown in Figure 1 and Table 1.

Terms of Reference for Monitoring

Table 1 Terms of reference for air and water quality monitoring at TSEZ.

Description	Items	Frequency	Location
Air Quality	TSP / PM10	1 time / 3months	At construction site (1point)
Waste water quality	pH, SS, DO, BOD, COD, Coliform count, oil and grease, chromium	1time / 2months	At the creek upstream and downstream which is crossed the car road (3 points)
Underground water	pH, SS, DO, BOD, COD, Coliform count, oil and grease, chromium	1time /2months	Tube well inside of Moegyoswan Monastery (1 point)

Monitoring Instrument for Air and water

No.	Instrument	Brand & Model	Measurement/ Parameter	
1.	Environmental Perimeter Air Monitoring System	HAZ-SCANNER EPAS	CO, NO_2, NO, SO_2, PM (2.5), PM (10), VOCS, Relative Humidity, Temperature, Wind Speed, Wind Direction	

So far, there is no environmental standard for ambient air quality in Republic of Myanmar, the survey result was evaluated by comparing with the standards in neighboring country like Thailand, Vietnam, Japan and IFC (Table 2). The consultant will apply the air quality standard in Thailand, Vietnam, Japan and IFC as shown in Table 1.As for TSP and PM10, the standards in Thailand were applied and the others were compared with the standards in Japan.

Table 2 Ambient Air Quality Standard in Southeast Asia

Item	Averaging period	Japan	Thailand	Vietnam	IFC
SO_2	10 min	-	-	-	0.5mg/m^3
	1hour	0.1ppm	0.3ppm	0.35mg/m^3	0.125mg/m^3(InterimTarget-1) 0.05mg/m^3(InterimTarget-2) 0.02mg/m^3(Guideline)
	24hours	0.04ppm	0.12ppm	0.125 mg/m^3	-
	1 year	-		0.05mg/m^3	-
NO_2	1hour	-	0.17ppm	-	0.2mg/m^3
	24hours	0.04-0.06ppm	-	-	-
	1 year	-	0.03ppm	-	0.04mg/m^3
NOx	1hour	-	-	0.2mg/m^3	
	24hours	-	-	0.04mg/m^3	
CO	1hour	--	30ppm	30mg/m^3	-
	8hours	20ppm	-	10mg/m^3	-
	24hours	10ppm	9ppm	-	-
TSP	1hour	-	-	0.3mg/m^3	-
	24hours	-	0.33mg/m^3	0.2mg/m^3	-
	1 year		0.10mg/m^3	0.14mg/m^3	-
PM_{10}	24hours	-	0.12mg/m^3	0.15mg/m^3	0.15mg/m^3(InterimTarget-1) 0.10mg/m^3(InterimTarget-2) 0.07mg/m^3(InterimTarget-3)
	1 year	-	0.05mg/m^3	0.05mg/m^3	0.07mg/m^3(InterimTarget-1) 0.05mg/m^3(InterimTarget-2) 0.03mg/m^3(InterimTarget-3)
SPM	1hour	0.2mg/m^3	-	-	-
	24hours	0.1mg/m^3	-	-	-
$PM_{2.5}$	24hours	0.035mg/m^3	0.05mg/m^3	-	0.075mg/m^3(InterimTarget-1) 0.05mg/m^3(InterimTarget-2) 0.0375mg/m^3(InterimTarget-3)
	1 year	0.015mg/m^3	0.025mg/m^3	-	0.035mg/m^3(InterimTarget-1) 0.025mg/m^3(InterimTarget-2) 0.015mg/m^3(InterimTarget-3)
Ozone	1hour	-	0.10ppm	0.3mg/m^3	-
	8hourdaily maximum	-	0.07ppm	0.2mg/m^3	0.16mg/m^3(InterimTarget-1) 0.1mg/m^3(Guideline)
	1 year	-	0.04ppm	0.14mg/m^3	-
Ox	1hour	0.06ppm	-	-	-
Pb	24hours	-	-	0.0015mg/m^3	
	1 month	-	0.0015mg/m^3	-	
	1 year	-	-	0.0005mg/m^3	

Source: National Air Quality Standard in Japan (CircularNo.25,1973, originally),Ministry of Environment, Japan
NotificationsofNationalEnvironmentalBoardNo.10, 24,28,33, and 36, Ministry of Natural Resources and Environment, Thailand
National Ambient Air Quality Standard (TCVN5973:2005), Ministry of Science and Technology in Vietnam
Environmental, Health, and Safety Guidelines, General EHS Guidelines, IFC, 2007

Figure 1 **Location of air and water monitoring points**

2. Description of the air quality monitoring station

Survey Period

Air quality survey was conducted once per 3 months as per specification provided by the client. The monitoring period was about 7 consecutive days. The sampling duration for each day is as shown in Table 3. Air quality monitoring location is shown in Figure 2.

Table 3 Sampling Duration for Air Quality Survey

Day	Fifth Survey 17th- 24th February
Day 1	Feb. 17th – 18th
Day 2	Feb. 18th – 19th
Day 3	Feb. 19th – 20th
Day 4	Feb. 20th – 21st
Day 5	Feb. 21st – 22nd
Day 6	Feb. 22nd – 23rd
Day 7	Feb.23rd – 24th

Source: Source: Resource &Environment Myanmar Co., Ltd.

Survey Method

Sampling and analysis of ambient air pollutants was conducted by referring to the recommendation of United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect Ambient Air Monitoring data. The characteristics of the instrument are:

- Portable direct reading
- Configure up to 14 simultaneous air measurements including U.S. EPA criteria air pollutants

The basic specifications of the instrument are as follow.

Instrument	Brand	Model	Measurement/ Parameter
Environmental Perimeter Air Monitoring System	HAZ-SCANNER	EPAS	CO, NO_2, NO, SO_2, PM (2.5), PM (10), VOCS, Relative Humidity, Temperature, Wind Speed, Wind Direction

Figure 2 Location and site condition of air quality monitoring station.

Table 4. Sampling and Analysis Method for Air Quality

No.	Parameter	Analysis Method
1	Sulfur dioxide (SO_2)	On site reading
2	Carbon monoxide (CO)	On site reading
3	Nitrogen dioxides (NO_2)	On site reading
4	Total suspended particle (TSP)	On site reading
5	Particle matter 10 (PM10)	On site reading

Source: Resource &Environment Myanmar Co., Ltd.

Target Ambient Air Quality Level

Parameters	Averaging Period	Value
SO_2	24 hours	0.12 ppm[1]
CO	24 hours	9 ppm[1]
NO_2	24 hours	0.04 – 0.06 ppm[2]
TSP	24 hours	0.33 mg/m3[1]
PM10	24 hours	0.12g/m3[1]

1 Thailand Standard
2 Japan Standard

Survey Result

One day average concentration of CO, NO_2, TSP, PM 10 and SO_2 are shown in Table 5. Hourly average data are presented in Appendix -1.

Table 5. One day average concentration of CO, NO_2, TSP, PM10 and SO2

	Date	Time	CO	NO2	TSP	PM10	SO2
	D.M.Y	hours	ppm	ppm	mg/m3	mg/m3	ppm
1	17th – 18th Feb, 2015	24	0.44	0.07	0.18	0.07	0.01
2	18th -19th Feb, 2015	24	0.41	0.05	0.18	0.08	0.02
3	19th – 20th Feb, 2015	24	0.49	0.04	0.17	0.07	0.02
4	20th – 21st Feb, 2015	24	0.39	0.04	0.28	0.07	0.02
5	21st – 22nd Feb, 2015	24	0.41	0.02	0.18	0.08	0.01
6	22nd – 23rd Feb, 2015	24	0.33	0.04	0.14	0.06	0.01
7	23rd – 24th Feb, 2015	24	0.40	0.05	0.21	0.07	0.01
Maximum		24	0.49	0.07	0.28	0.08	0.02
Average		24	0.41	0.04	0.19	0.07	0.01
Minimum		24	0.33	0.02	0.14	0.06	0.01
Target Value		24	10	<0.06	<0.33	<0.12	<0.04
			Japan	Japan	Thailand	Thailand	Japan

Source: Resource & Environment Myanmar Co., Ltd

Concentration levels of all parameters are within the standard in this month.

3. Water Quality Monitoring

Methodology

Sampling and preservation method

Water samples were taken by Alpha horizontal water sampler and collected in sterilized sample containers. All sampling was in strict accordance with recognized standard procedures. The parameters pH, temperature, dissolved oxygen (DO), electrical conductivity (EC), were measured at each site concurrently with sample collection. All samples were kept in iced boxes and were transported to the laboratory and stored at 2-4 °C refrigerators.

Table 7 Field Equipment for Water Quality Survey

No.	Equipment	Manufacturer	Originate Country	Model
1	pH meter	HANNA	USA	HI7609829-1 pH Sensor
2	DO meter	HANNA	USA	HI7609829-2
3	Digital Water Velocity Meter	Global Water Flow Probe	USA	FP 211
4	Alpha Bottle (Water Sampler)	Wildlife Supply Company®	Indonesia	-

Table 8 Container and Preservation Method for Water Samples

No	Parameter	Container	Preservation
1	Oil and Grease	1000 ml glass bottle	Sulfuric acid, Refrigerate
2	COD	500 ml plastic bottle	Sulfuric acid, Refrigerate
3	BOD_5	1,800 ml plastic bottle	Refrigerate
4	Heavy metals	500 ml plastic bottle	HNO_3 Refrigerate
5	Bacteria	200 ml glass bottle (Sterilize)	Refrigerate
6	Others	1,800 ml polyethylene bottle	Refrigerate

Test method

The following table provides the test method for water quality.

No	Item	Analysis method
1	pH	HI7609829-1 pH Sensor
2	Suspended Solids	Gravimetric method
3	Dissolved Oxygen (DO)	HI7609829-2 Galvanic dissolved oxygen (D.O) sensor
4	Chemical oxygen demand(COD)	Dichromate method
5	Biochemical oxygen demand(BOD_5)	Direct inoculation method
6	Oil & Grease	APHA-AWWA-WEF Method
7	Chromium (Cr) (mg/l)	APHA-AWWA-WEF Method
8	E. coliform, Fecal coliforms, total coliforms	AOAC Petrifilm Method

Monitoring Result (February 2015)

No	Item	GW-1	SW-2	SW- 3	SW- 4	Standard	Unit
1	pH	8.27	8.76	8.48	8.35	5-9	-
2	Suspended Solids	87	337	5189	451	Max. 200	mg/l
3	Dissolved Oxygen (DO)	6.88	12.09	10.81	13.81	-	mg/l
4	Chemical oxygen demand(COD)	12.2	12.8	47.9	29.5	Max. 300	mg/l
5	Biochemical oxygen demand(BOD_5)	4.9	5.2	19.5	11.8	Max. 200	mg/l
6	Oil & Grease	ND	0.2	0.5	0.2	Max. 5	mg/l
7	Chromium (Cr) (mg/l)	0.000000	0.000446	0.000000	0.000000	Max. 0.5	mg/l
8	E. coliform	<1.1	>23	>23	>23	-	MPN/100ml
	Fecal coliforms	<1.1	13000	4600	1700	-	MPN/100ml
	Total coliforms	12	13000	14000	1700	Max.400	MPN/100ml

Remark: ND is Not Detected.

Result of the Water Quality Monitoring (February 2015)

Totally 4 locations of sampling in surface and underground water were collected for February in 2015. According to the result of this time, the suspended solids of all sampling locations except GW-1 were still higher compared to the MOI standard as previous times. Total coliforms of SW-2, SW-3 and SW-4 were high. Location of SW-2 is upstream area of the creek and any discharge from Thilawa SEZ is not included in the water quality. Moreover, as of February 2015, Thilawa SEZ is not discharging to the water body including SW-3 and SW-4. Thus, case of high total coliform level is not due to any discharge from Thilawa SEZ. The rest parameters were lower than the standard.

Noticeably the conditions of oil and grease content in all location were lower than the MOI standard.

Detailed of laboratory result and hourly air quality data are provided in appendix.

Appendix 1

Hourly Air Quality Result

Resource & environment Myanmar Co., Ltd.

Client: Myanmar Japan Thilawa Development Ltd.

Issued Date : 17.02.2015

Analysis Report

Project Name : Thilawa Special Economic Zone (TSEZ)
Sample Designated as : Ambient Air Quality Analysis
Sampling Location : AQM 1 (February 2015 _TSEZ)

Date	Time	CO	NO2	TSP	PM (10)	SO2
D.M.Y	H.M.S	ppb	ppb	ug/m3	ug/m3	ppb
17.02.2015	12:00-13:00	299.43	257.36	91.21	19.86	1.00
17.02.2015	13:00 -14:00	135.53	426.73	81.80	7.70	1.02
17.02.2015	14:00 -15:00	162.32	93.82	95.43	40.38	1.20
17.02.2015	15:00 -16:00	216.97	76.17	90.23	33.23	1.00
17.02.2015	16:00 -17:00	508.57	56.65	205.77	69.50	1.00
17.02.2015	17:00 -18:00	618.90	43.62	131.82	51.07	1.33
17.02.2015	18:00 -19:00	679.08	47.67	128.70	52.18	1.42
17.02.2015	19:00 -20:00	633.28	53.82	174.42	61.77	1.43
17.02.2015	20:00 -21:00	725.82	61.73	255.98	95.60	1.43
17.02.2015	21:00 -22:00	635.25	56.48	207.70	69.30	1.93
17.02.2015	22:00 -23:00	516.77	51.58	185.00	62.25	1.00
17.02.2015	23:00 -00:00	347.88	43.75	108.18	29.55	1.00
18.02.2015	00:00 -01:00	393.42	42.15	141.83	59.70	2.13
18.02.2015	01:00 -02:00	378.93	51.07	142.44	65.31	3.51
18.02.2015	02:00 -03:00	379.71	50.85	138.09	64.68	4.32
18.02.2015	03:00 -04:00	245.18	65.13	218.61	107.84	1.08
18.02.2015	04:00 -05:00	262.78	46.80	185.70	109.47	1.00
18.02.2015	05:00 -06:00	293.27	46.42	254.75	134.65	1.13
18.02.2015	06:00 -07:00	603.15	55.48	414.55	229.68	35.42
18.02.2015	07:00 -08:00	786.67	54.17	434.07	162.82	8.57
18.02.2015	08:00 - 09:00	615.68	13.25	239.00	89.57	10.13
18.02.2015	09:00 - 10:00	556.00	14.00	195.00	85.00	16.00
18.02.2015	10:00-11:00	526.00	5.86	184.86	78.43	9.00
18.02.2015	11:00-12:00	0.00	5.37	70.95	5.21	61.11
MAX	24hours	786.67	426.73	434.07	229.68	61.11
MIN	24hours	0.00	5.37	70.95	5.21	1.00
Average	24hours	438.36	71.66	182.34	74.36	7.01

		ppm	ppm	mg/m3	mg/m3	ppm
MAX	24hours	0.7867	0.4267	0.4341	0.2297	0.0611
MIN	24hours	0.0000	0.0054	0.0709	0.0052	0.0010
Average	24hours	0.4384	0.0717	0.1823	0.0744	0.0070

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Date	Time	CO	NO2	TSP	PM (10)	SO2
D.M.Y	H.M.S	ppb	ppb	ug/m3	ug/m3	ppb
18.02.2015	12:00-13:00	0.00	9.72	64.03	23.58	92.55
18.02.2015	13:00 -14:00	0.00	40.77	82.43	36.73	5.05
18.02.2015	14:00 -15:00	0.00	130.08	143.27	54.18	1.00
18.02.2015	15:00 -16:00	81.67	101.32	283.12	116.58	1.00
18.02.2015	16:00 -17:00	362.53	66.08	208.88	86.03	1.00
18.02.2015	17:00 -18:00	551.93	49.45	127.55	50.83	1.00
18.02.2015	18:00 -19:00	732.13	43.50	170.12	71.73	4.92
18.02.2015	19:00 -20:00	715.52	57.12	190.45	80.70	1.00
18.02.2015	20:00 -21:00	777.12	63.83	263.88	116.77	1.78
18.02.2015	21:00 -22:00	672.58	61.87	268.77	119.68	6.53
18.02.2015	22:00 -23:00	587.58	59.87	243.38	132.00	14.35
18.02.2015	23:00 -00:00	524.00	53.87	208.70	93.42	1.08
19.02.2015	00:00 -01:00	404.30	52.00	183.58	89.82	4.90
19.02.2015	01:00 -02:00	329.35	43.95	129.27	55.63	5.68
19.02.2015	02:00 -03:00	300.12	45.95	117.28	54.90	1.00
19.02.2015	03:00 -04:00	334.22	45.93	126.37	63.07	3.97
19.02.2015	04:00 -05:00	344.50	45.88	142.00	67.55	1.52
19.02.2015	05:00 -06:00	792.72	49.25	229.92	107.82	20.95
19.02.2015	06:00 -07:00	798.58	50.20	335.72	164.93	15.55
19.02.2015	07:00 -08:00	898.52	57.55	317.12	116.45	15.50
19.02.2015	08:00 - 09:00	367.63	8.02	232.13	60.15	14.92
19.02.2015	09:00 - 10:00	92.23	2.00	97.23	36.85	82.62
19.02.2015	10:00-11:00	20.37	26.90	102.32	39.20	94.75
19.02.2015	11:00-12:00	64.82	32.77	161.38	55.75	9.82
MAX	24hours	898.52	130.08	335.72	164.93	94.75
MIN	24hours	0.00	2.00	64.03	23.58	1.00
Average	24hours	406.35	49.91	184.54	78.93	16.77

		ppm	ppm	mg/m3	mg/m3	ppm
MAX	24hours	0.8985	0.1301	0.3357	0.1649	0.0948
MIN	24hours	0.0000	0.0020	0.0640	0.0236	0.0010
Average	24hours	0.4064	0.0499	0.1845	0.0789	0.0168

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Date	Time	CO	NO2	TSP	PM (10)	SO2
D.M.Y	H.M.S	ppb	ppb	ug/m3	ug/m3	ppb
19.02.2015	12:00-13:00	267.53	56.07	104.43	29.45	1.00
19.02.2015	13:00 -14:00	251.05	44.28	196.52	58.58	3.93
19.02.2015	14:00 -15:00	347.52	41.70	152.17	56.17	1.03
19.02.2015	15:00 -16:00	333.13	50.13	143.57	57.40	1.00
19.02.2015	16:00 -17:00	373.78	57.77	133.43	59.77	1.00
19.02.2015	17:00 -18:00	512.13	25.77	119.67	48.17	1.00
19.02.2015	18:00 -19:00	550.62	28.57	111.97	52.52	6.03
19.02.2015	19:00 -20:00	692.83	46.56	161.11	68.39	1.00
19.02.2015	20:00 -21:00	643.91	48.73	178.82	72.91	1.00
19.02.2015	21:00 -22:00	889.11	72.56	260.78	84.56	2.56
19.02.2015	22:00 -23:00	534.25	61.75	177.58	56.47	1.08
19.02.2015	23:00 -00:00	446.13	61.93	159.42	56.38	1.68
20.02.2015	00:00 -01:00	361.77	50.83	100.95	44.60	1.33
20.02.2015	01:00 -02:00	370.34	48.27	133.46	74.78	1.20
20.02.2015	02:00 -03:00	371.25	33.52	135.68	45.47	1.38
20.02.2015	03:00 -04:00	409.08	50.57	207.02	73.47	1.78
20.02.2015	04:00 -05:00	547.53	43.27	189.32	77.25	22.33
20.02.2015	05:00 -06:00	1207.67	39.12	333.68	200.87	86.97
20.02.2015	06:00 -07:00	1164.58	42.87	275.80	134.10	109.13
20.02.2015	07:00 -08:00	552.66	45.10	247.21	104.24	1.00
20.02.2015	08:00 - 09:00	564.80	17.59	227.73	70.67	14.82
20.02.2015	09:00 - 10:00	254.05	2.02	128.77	47.67	38.25
20.02.2015	10:00-11:00	153.14	2.14	94.00	47.29	46.86
20.02.2015	11:00-12:00	9.60	39.12	102.47	37.98	67.38
MAX	24hours	1207.67	72.56	333.68	200.87	109.13
MIN	24hours	9.60	2.02	94.00	29.45	1.00
Average	24hours	492.02	42.09	169.81	69.13	17.28

		ppm	ppm	mg/m3	mg/m3	ppm
MAX	24hours	1.2077	0.0726	0.3337	0.2009	0.1091
MIN	24hours	0.0096	0.0020	0.0940	0.0295	0.0010
Average	24hours	0.4920	0.0421	0.1698	0.0691	0.0173

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Date	Time	CO	NO2	TSP	PM (10)	SO2
D.M.Y	H.M.S	ppb	ppb	ug/m3	ug/m3	ppb
20.02.2015	12:00-13:00	56.27	38.68	93.37	24.15	1.92
20.02.2015	13:00 -14:00	39.78	71.50	109.97	24.27	33.33
20.02.2015	14:00 -15:00	241.85	57.92	123.20	33.82	41.83
20.02.2015	15:00 -16:00	315.45	46.40	184.05	57.52	1.27
20.02.2015	16:00 -17:00	441.85	20.63	131.95	48.58	2.62
20.02.2015	17:00 -18:00	517.10	31.17	146.55	55.40	1.02
20.02.2015	18:00 -19:00	669.37	31.88	141.72	50.77	13.83
20.02.2015	19:00 -20:00	591.75	38.40	119.77	45.37	3.12
20.02.2015	20:00 -21:00	923.22	53.82	256.12	114.05	12.23
20.02.2015	21:00 -22:00	541.30	44.12	260.32	62.93	1.00
20.02.2015	22:00 -23:00	530.15	40.62	194.73	68.17	1.02
20.02.2015	23:00 -00:00	396.70	37.40	132.00	46.55	3.30
21.02.2015	00:00 -01:00	347.57	56.77	124.70	47.02	3.50
21.02.2015	01:00 -02:00	335.28	56.40	145.48	52.45	2.78
21.02.2015	02:00 -03:00	300.90	53.90	134.70	55.48	5.83
21.02.2015	03:00 -04:00	327.52	46.77	199.27	84.72	10.55
21.02.2015	04:00 -05:00	308.87	47.47	199.57	82.83	4.72
21.02.2015	05:00 -06:00	287.05	48.30	866.40	86.97	5.68
21.02.2015	06:00 -07:00	313.02	45.80	1229.07	103.07	1.93
21.02.2015	07:00 -08:00	687.78	39.25	1120.47	166.07	57.22
21.02.2015	08:00 - 09:00	612.83	17.68	424.75	101.83	29.55
21.02.2015	09:00 - 10:00	464.10	9.47	195.85	81.45	37.90
21.02.2015	10:00-11:00	115.98	3.12	91.07	37.65	90.20
21.02.2015	11:00-12:00	0.00	7.07	63.02	33.78	63.80
MAX	24hours	923.22	71.50	1229.07	166.07	90.20
MIN	24hours	0.00	3.12	63.02	24.15	1.00
Average	24hours	390.24	39.35	278.67	65.20	17.92

		ppm	ppm	mg/m3	mg/m3	ppm
MAX	24hours	0.9232	0.0715	1.2291	0.1661	0.0902
MIN	24hours	0.0000	0.0031	0.0630	0.0242	0.0010
Average	24hours	0.3902	0.0394	0.2787	0.0652	0.0179

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D.M.Y	H.M.S	ppb	ppb	ug/m3	ug/m3	ppb
21.02.2015	12:00-13:00	12.10	25.20	107.58	52.02	32.52
21.02.2015	13:00 -14:00	103.10	24.20	183.25	48.60	1.00
21.02.2015	14:00 -15:00	157.92	8.30	98.28	23.43	1.77
21.02.2015	15:00 -16:00	243.03	19.63	143.53	52.58	6.17
21.02.2015	16:00 -17:00	328.63	18.70	124.63	52.93	1.40
21.02.2015	17:00 -18:00	515.88	20.67	138.22	61.02	5.60
21.02.2015	18:00 -19:00	763.73	22.02	147.78	64.75	4.87
21.02.2015	19:00 -20:00	602.22	18.50	145.82	59.93	2.23
21.02.2015	20:00 -21:00	711.87	22.74	230.39	129.63	25.74
21.02.2015	21:00 -22:00	751.07	22.93	261.66	150.69	32.79
21.02.2015	22:00 -23:00	750.57	9.78	274.08	86.60	7.38
21.02.2015	23:00 -00:00	514.82	22.98	158.50	50.37	1.00
22.02.2015	00:00 -01:00	521.87	31.58	164.07	75.10	1.92
22.02.2015	01:00 -02:00	526.63	30.50	216.47	92.27	1.13
22.02.2015	02:00 -03:00	492.10	24.45	232.40	100.62	3.53
22.02.2015	03:00 -04:00	466.85	24.93	243.98	105.80	2.83
22.02.2015	04:00 -05:00	446.35	23.58	277.32	107.25	3.18
22.02.2015	05:00 -06:00	422.05	28.93	275.30	114.95	2.67
22.02.2015	06:00 -07:00	389.67	24.75	266.53	119.63	1.28
22.02.2015	07:00 -08:00	677.43	12.78	225.03	89.05	35.28
22.02.2015	08:00 - 09:00	256.17	14.10	134.95	57.46	8.32
22.02.2015	09:00 - 10:00	145.20	11.03	103.44	44.61	47.10
22.02.2015	10:00-11:00	21.87	12.88	104.87	38.03	70.85
22.02.2015	11:00-12:00	1.53	42.92	92.63	41.20	29.20
MAX	24hours	763.73	42.92	277.32	150.69	70.85
MIN	24hours	1.53	8.30	92.63	23.43	1.00
Average	24hours	409.28	21.59	181.28	75.77	13.74

		ppm	ppm	mg/m3	mg/m3	ppm
MAX	24hours	0.7637	0.0429	0.2773	0.1507	0.0709
MIN	24hours	0.0015	0.0083	0.0926	0.0234	0.0010
Average	24hours	0.4093	0.0216	0.1813	0.0758	0.0137

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Date	Time	CO	NO2	TSP	PM (10)	SO2
D.M.Y	H.M.S	ppb	ppb	ug/m3	ug/m3	ppb
22.02.2015	12:00-13:00	114.28	14.80	118.97	37.90	17.58
22.02.2015	13:00 -14:00	208.62	28.33	148.37	54.13	1.00
22.02.2015	14:00 -15:00	190.03	36.78	108.67	38.12	16.43
22.02.2015	15:00 -16:00	263.77	34.00	230.30	95.00	23.15
22.02.2015	16:00 -17:00	269.83	54.90	102.18	38.27	1.07
22.02.2015	17:00 -18:00	277.88	54.90	77.62	40.00	1.98
22.02.2015	18:00 -19:00	395.55	33.67	73.45	33.95	2.35
22.02.2015	19:00 -20:00	753.18	11.92	114.77	64.22	2.78
22.02.2015	20:00 -21:00	754.08	34.30	139.30	73.72	4.95
22.02.2015	21:00 -22:00	692.88	45.65	171.05	94.57	8.30
22.02.2015	22:00 -23:00	538.40	54.55	152.02	66.87	6.10
22.02.2015	23:00 -00:00	455.82	57.78	153.12	72.78	1.08
23.02.2015	00:00 -01:00	318.88	57.68	111.73	48.28	1.00
23.02.2015	01:00 -02:00	261.53	43.02	79.58	31.22	22.60
23.02.2015	02:00 -03:00	253.32	49.25	87.72	39.05	1.03
23.02.2015	03:00 -04:00	266.10	52.15	94.23	48.32	1.12
23.02.2015	04:00 -05:00	270.92	51.30	115.83	60.25	1.15
23.02.2015	05:00 -06:00	424.25	44.63	182.77	87.65	7.57
23.02.2015	06:00 -07:00	265.00	39.08	275.43	117.82	25.22
23.02.2015	07:00 -08:00	437.53	43.08	254.88	95.17	1.47
23.02.2015	08:00 - 09:00	257.35	23.12	144.90	55.67	15.17
23.02.2015	09:00 - 10:00	144.87	5.83	140.77	55.30	32.53
23.02.2015	10:00-11:00	58.38	52.32	110.85	48.43	56.68
23.02.2015	11:00-12:00	81.60	32.58	69.90	33.80	4.45
MAX	24hours	754.08	57.78	275.43	117.82	56.68
MIN	24hours	58.38	5.83	69.90	31.22	1.00
Average	24hours	331.42	39.82	135.77	59.60	10.70

		ppm	ppm	mg/m3	mg/m3	ppm
MAX	24hours	0.7541	0.0578	0.2754	0.1178	0.0567
MIN	24hours	0.0584	0.0058	0.0699	0.0312	0.0010
Average	24hours	0.3314	0.0398	0.1358	0.0596	0.0107

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Date	Time	CO	NO2	TSP	PM (10)	SO2
D.M.Y	H.M.S	ppb	ppb	ug/m3	ug/m3	ppb
23.02.2015	12:00-13:00	9.53	72.63	60.42	12.18	18.38
23.02.2015	13:00 -14:00	255.42	63.13	91.92	28.47	1.00
23.02.2015	14:00 -15:00	360.02	94.02	122.75	40.70	1.40
23.02.2015	15:00 -16:00	432.10	38.25	171.95	68.25	3.12
23.02.2015	16:00 -17:00	432.08	26.73	176.03	66.93	1.00
23.02.2015	17:00 -18:00	419.63	36.38	111.90	56.05	1.00
23.02.2015	18:00 -19:00	523.60	22.68	108.05	46.25	1.03
23.02.2015	19:00 -20:00	511.53	27.37	105.45	41.03	2.17
23.02.2015	20:00 -21:00	515.37	50.72	135.23	63.33	1.33
23.02.2015	21:00 -22:00	585.77	54.05	164.17	94.67	2.03
23.02.2015	22:00 -23:00	507.17	61.40	199.64	92.90	5.79
23.02.2015	23:00 -00:00	395.53	62.12	149.10	72.73	1.30
24.02.2015	00:00 -01:00	368.47	55.60	153.57	74.28	1.00
24.02.2015	01:00 -02:00	304.83	55.83	172.17	71.55	1.00
24.02.2015	02:00 -03:00	281.40	56.85	162.45	71.83	2.62
24.02.2015	03:00 -04:00	274.57	52.28	137.42	71.67	1.15
24.02.2015	04:00 -05:00	321.20	57.17	223.58	106.37	1.03
24.02.2015	05:00 -06:00	723.00	52.78	330.05	162.37	22.08
24.02.2015	06:00 -07:00	549.02	52.95	936.17	145.07	6.65
24.02.2015	07:00 -08:00	1223.90	90.03	817.97	164.82	31.17
24.02.2015	08:00 - 09:00	330.53	13.50	210.43	64.33	21.90
24.02.2015	09:00 - 10:00	239.40	2.00	129.42	53.63	44.18
24.02.2015	10:00-11:00	39.42	5.98	78.48	30.13	31.38
24.02.2015	11:00-12:00	7.85	42.77	53.40	32.02	14.42
MAX	24hours	1223.90	94.02	936.17	164.82	44.18
MIN	24hours	7.85	2.00	53.40	12.18	1.00
Average	24hours	400.47	47.80	208.40	72.15	9.09

		ppm	ppm	mg/m3	mg/m3	ppm
MAX	24hours	1.2239	0.0940	0.9362	0.1648	0.0442
MIN	24hours	0.0079	0.0020	0.0534	0.0122	0.0010
Average	24hours	0.4005	0.0478	0.2084	0.0721	0.0091

Resource & environment Myanmar Co., Ltd.

Client: Myanmar Japan Thilawa Development Ltd.

Issued Date : 17.02.2015

Analysis Report

Project Name : Thilawa Special Economic Zone (TSEZ)
Sample Designated as : Ambient Air Quality Analysis
Sampling Location : AQM 1 (February 2015 _TSEZ)

	Date	Time	CO	NO2	TSP	PM (10)	SO2
	D.M.Y	Hours	ppm	ppm	mg/m3	mg/m3	ppm
1	17th -18th Feb, 2015	24	0.4384	0.0717	0.1823	0.0744	0.0070
2	18th-19th Feb, 2015	24	0.4064	0.0499	0.1845	0.0789	0.0168
3	19th-20th Feb, 2015	24	0.4920	0.0421	0.1698	0.0691	0.0173
4	20th-21st Feb, 2015	24	0.3902	0.0394	0.2787	0.0652	0.0179
5	21st-22nd Feb, 2015	24	0.4093	0.0216	0.1813	0.0758	0.0137
6	22nd-23rd Feb, 2015	24	0.3314	0.0398	0.1358	0.0596	0.0107
7	23rd-24th Feb, 2015	24	0.4005	0.0478	0.2084	0.0721	0.0091

	Date	Time	CO	NO2	TSP	PM (10)	SO2
	D.M.Y	Hours	ppm	ppm	mg/m3	mg/m3	ppm
1	17th -18th Feb, 2015	24	0.44	0.07	0.18	0.07	0.01
2	18th-19th Feb, 2015	24	0.41	0.05	0.18	0.08	0.02
3	19th-20th Feb, 2015	24	0.49	0.04	0.17	0.07	0.02
4	20th-21st Feb, 2015	24	0.39	0.04	0.28	0.07	0.02
5	21st-22nd Feb, 2015	24	0.41	0.02	0.18	0.08	0.01
6	22nd-23rd Feb, 2015	24	0.33	0.04	0.14	0.06	0.01
7	23rd-24th Feb, 2015	24	0.40	0.05	0.21	0.07	0.01
Maximum		24	0.49	0.07	0.28	0.08	0.02
Average		24	0.41	0.04	0.19	0.07	0.01
Minimum		24	0.33	0.02	0.14	0.06	0.01
Target Value		24	10	<0.06	<0.33	<0.12	<0.04

Appendix 2

Laboratory Result

Report No. : 2015-00220 / 002 (Page 1 of 1) Issued date : March 6, 2015

CLIENT : **RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.**
CONTACT : Ms. Toe Toe Hlaing
ADDRESS : B702 Delta Plaza, Shwegondaing Rd., Bahan, Yangon, Myanmar
Tel. +959-73013448 Fax. +951-552901
E-mail : toetoehlainggeo@gmail.com

Analysis Report

PROJECT NAME : Water Quality Monitoring in Thilawa SEZ **SAMPLING DATE** : February 17, 2015
SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING BY** : Client
SAMPLING LOCATION : Thilawa, Myanmar

Parameters	Units	LOQ	GW-1
Total Coliform Bacteria	MPN/100mL	-	12
Fecal Coliform Bacteria	MPN/100mL	-	<1.1
Escherichia Coli (*E.Coli*)	MPN/100mL	-	<1.1

Remarks : - Analysis Methods followed to the Standard Methods for the Examination of Water and Wastewater endorsed by American Public Health Association (APHA), American Water Works Association (AWWA) and Water Environment Federation (WEF).
- LOQ = Limit of Quantitation

(Siripom Imwilaiwan)
Environmental Monitoring Manager

(Thepson Yommana)
Technical Manager

SGS (THAILAND) LIMITED

TY/Client/PPT/CJ

Report No. : 2015-00220 / 001 (Page 1 of 1) Issued date : March 6, 2015

CLIENT : **RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.**
CONTACT : Ms. Toe Toe Hlaing
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Tel. +959-73013448 Fax. +951-552901
E-mail : toetoehlainggeo@gmail.com

Analysis Report

PROJECT NAME : Water Quality Monitoring in Thilawa SEZ **SAMPLING DATE** : February 17, 2015
SAMPLE DESIGNATED AS : Surface Water Quality **SAMPLING BY** : Client
SAMPLING LOCATION : Thilawa, Myanmar

Parameters	Units	LOQ	Results		
			SW-2	SW-3	SW-4
Total Coliform Bacteria	MPN/100mL	-	13,000	14,000	1,700
Fecal Coliform Bacteria	MPN/100mL	-	13,000	4,600	1,700
Escherichia Coli (E.Coli)	MPN/100mL	-	>23	>23	>23

Remarks : - Analysis Methods followed to the Standard Methods for the Examination of Water and Wastewater endorsed by American Public Health Association (APHA), American Water Works Association (AWWA)and Water Environment Federation (WEF).
- LOQ = Limit of Quantitation

(Siriporn Imwilaiwan)
Environmental Monitoring Manager

(Thepson Yommana)
Technical Manager

SGS (THAILAND) LIMITED

TY/Client/PPT/CJ

The Government of the Republic of the Union of Myanmar
Ministry of Agriculture and Irrigation
Irrigation Department
Survey and Investigation Branch
Soil Survey Section
Soil and Water Analytical Laboratory

ANALYTICAL DATA FOR WATER SAMPLE

PROJECT NAME; Monitoring in Thilawa SEZ

SAMPLING DATE; 17.2.2015
ISSUED DATE ; 6.3.2015

SAMPLE DESIGNATED AS; Water Quality

SAMPLING LOCATION; Near Thanlyin &Thilawa

Sr No	Station	Results (mg/l)		
		BOD_5	COD	Cr
1	GW-1 Thilawa SEZ 17.2.2015	4.9	12.2	0.000000
2	SW-2 Thilawa SEZ 17.2.2015	5.2	12.8	0.000446
3	SW-3 Thilawa SEZ 17.2.2015	19.5	47.9	0.000000
4	SW-4 Thilawa SEZ 17.2.2015	11.8	29.5	0.000000
Drinking Water Standard (WHO)	Highest desirable level	6mg/l	10mg/l	-
	Maximum permissible level	Concentration at maximum permissible pollution		0.01mg/l

(May Aye Lwin)
Staff Officer (Lab) 6
Soil Survey Section
Survey and Investigation Branch
Irrigation Department
Yangon

ANALYSIS REPORT

ORIGINAL

Job Ref: 1088/2015
Date : 21.02.2015

Client Name	:	**RESOURCE AND ENVIRONMENT MYANMAR CO., LTD** B-702 Della Plaza, Shwegondaing Rd, Bahan Township, Yangon, Myanmar
Project Name	:	Water Quality Monitoring in Thilawa SEZ (Near Thanlyin & Thilawa)
Sample Brought By	:	Client
Sample Received Date	:	18.02.2015
Analysed Date	:	19.02.2015

Stations	Commodity Name	Lab Code	Results (mg/l)	
			Total Suspended Solid	Oil & Grease
Method	-	-	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 2540 D	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B
GW-1 (17.2.2015)	Ground Water	007/15	87	Not Detected
SW-2 (17.2.2015)	Surface Water	008/15	377	0.2
SW-3 (17.2.2015)	Surface Water	009/15	5189	0.5
SW-4 (17.2.2015)	Surface Water	010/15	451	0.2
Detection Limit			2	0.2

End Of Report

SGS (Myanmar) Limited

(Nu Nu Yi)
Manager

Thilawa Special Economic Zone (ZONE A) Development Project –Phase 1

Appendix

Noise and Vibration Monitoring Report

February, 2015

NOISE AND VIBRATION MONITORING

IN

THILAWA SEZ CLASS A DEVELOPMENT

FEBRUARY, 2015

Resource and Environment Myanmar Ltd., B 702 Delta Plaza Building, Shwegondaing Rd., Bahan, Yangon, Myanmar. Tel: (959) 73013448; Fax: (951) 552901, mailto: admin@enviromyanmar.net

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Noise and Vibration Monitoring Report

1. Introduction

The monitoring points are located in the Thilawa SEZ class A area. The site location is shown in Figure 1. Thilawa SEZ is located beside the Thanlyin and Kyauktan towns, about 20 km southeast side of Yangon city as shown in Figure 3.1-1. Project area with 400ha is center of Thilawa SEZ with an area of about 2,400 ha. Thilawa SEZ is surrounded by ring road and accompanied with the container ports along the Yangon River.

There are 2 ways to access to Thilawa SEZ from Yangon city, which are the route passing through Thanlyin Bridge and the route passing through Dagon Bridge.

Figure 1 Location map of the Thilawa Special Economic Zone.

2. Environmental Standard

2.1 Noise

(1) Construction Phase

There is no noise standard of construction activities to receptors in Myanmar and International Organization's standards such as WHO and Environmental, Health, and Safety (EHS) Guidelines prepared by International Fiancé Cooperation (IFC) in a group member of World Bank, therefore the target noise level at construction stage is set based on the standard in the other foreign countries.

In the south-east Asia countries, only Singapore has the noise standard of construction activities to receptors categorized area to be quiet, residential area, and the other areas. On the basis of the above information, target noise level is set as following concept.

- Residential houses and monastery located less than 150m from the construction site comply with the middle range of the Singapore standard (categorized as "Residential buildings located less than 150m"), or
- Residential houses and monastery located more than 150m from the construction site, office, commercial facilities, and factories shall comply with the moderate range of standard Singapore standard (categorized as "Other buildings") or

This target noise level is shown in Table 1 and is not so much difference comparing with noise standard at construction stage in the other countries as shown in Table 2.

Table 1 Target Noise Level in Construction Phase

Category	Day time (Leq) (7am-7pm)	Evening Time (Leq) (7pm-10pm)	Night time (Leq) (10pm-7am)
Residential houses and monastery located less than 150m	75 dB	60 dB	55 dB
Residential houses and monastery located more than 150m from the construction site, office, commercial facilities, and factories	75 dB	65 dB	65 dB

Note) Evaluation point is at boundary of building

Table 2 Noise Standard at Construction Stage in the Various Countries

Items		Day time (Leq)	Night time (Leq)
Japan	Using heavy equipments with high noise level (piling, excavating etc.)	85 dB (Maximum)	-
Singapore	Hospitals, schools, institutions of higher learning, homes for the aged sick, etc.	60 dB (7am – 7pm, 12hrs)	50 dB (7pm – 7am, 12hrs)
	Residential buildings located less than 150m from the construction site where the noise is being emitted	75 dB (7am – 7pm, 12hrs)	60 dB (7pm – 10pm, 3hr) 55 dB (10pm – 7am, 9hr)
	Other Buildings	75 dB (7am – 7pm, 12hrs)	65 dB (7pm – 7am, 12hrs)
UK	In rural, suburban and urban areas away from main road traffic and industrial noise.	70 dB (8:00-18:00)	-
	Urban areas near main roads	72 dB (8:00-18:00)	-
USA	Residential	80 dB (8hrs)	70 dB (8hrs)
	Commercial	85 dB (8hrs)	85 dB (8hrs)
	Urban Area with high ambient noise level (>65 dB)	Ambient Noise Level +10dB	

Source: Noise Regulation Act, Japan (Law No.98, 1968, Amended No.33, 2006)
Environmental Protection and Management Act in Singapore (Chap.94A, Section 77, revised in 2008)
British Standard 5228: 1997 "Noise and vibration control on open and construction sites"
Transit Noise and Vibration Impact Assessment, U.S. Department of Transportation in USA, 1995

(2) Operation Phase

There is no ambient noise standard to receptors in Myanmar. However, most of the countries in south-east Asia have the ambient noise standard to receptors categorized land use or requirement of quiet as well as in Japan. International standard is also available in the EHS Guidelines prepared by IFC. On

the basis of the above information, target noise level is set as following concept and target ambient noise level.

- According to baseline survey in the Project, ambient noise levels in the monastery in Thilawa SEZ (Class A) are 54-57 dB in the daytime (6:00-22:00) and 47-51 dB in the nighttime (22:00-6:00).
- Ambient noise standard for sensitive areas of Japan and International Organization, relatively high in comparison with the results of baseline survey especially during nighttime.
- Thus, the target ambient noise level for sensitive and residential area is set in accordance with the noise standard in Singapore which is similar to the ambient noise level of the baseline survey.

The target noise level is shown in Table 3 and the target noise level is not so much difference comparing with ambient noise standard as shown in Table 4.

Table 3 Target Ambient Noise Level in Operation Phase

Category	Day Time (Leq) (7am-7pm)	Evening Time (Leq) (7pm-10pm)	Night Time (Leq) (10pm-7am)
Sensitive area such as Monastery	60 dB	55 dB	50 dB
Residential houses	65 dB	60 dB	55 dB
Commercial and Industrial Areas	70 dB	65 dB	60 dB

Note) Evaluation point is at boundary of building

Table 4 Ambient Noise Standard at Operation Stage in South-East Countries

Items		Day time (Leq)	Night time (Leq)
Indonesia	Noise standard for sensitive areas such as residences, hospitals, schools, places of religious worships	55 dB	
	Noise standard for office and commercial	65 dB	
	Noise standard for commercial and service	70 dB	
Malaysia	Sensitive Areas/ Low Density Residential Areas	55 dB (7am – 10pm, 15hrs)	50 dB (10pm – 7am, 9hrs)
	Sub Urban Residential	60 dB (7am – 10pm, 15hrs)	55 dB (10pm – 7am, 9hrs)
	Urban Residential	65 dB (7am – 10pm, 15hrs)	60 dB (10pm – 7am, 9hrs)
	Commercial and Business	70 dB (7am – 10pm, 15hrs)	60 dB (10pm – 7am, 9hrs)
Singapore	Sensitive Areas	60 dB (7am – 7pm, 12hrs)	55 dB (7pm – 10pm, 3hr) 50 dB (10pm – 7am, 9hr)
	Residential Areas	65 dB (7am – 7pm, 12hrs)	60 dB (7pm – 10pm, 3hr) 55 dB (10pm – 7am, 9hr)
	Commercial Areas	70 dB (7am – 7pm, 12hrs)	65 dB (7pm – 10pm, 3hr) 60 dB (10pm – 7am, 9hr)
Thailand	Noise standard	70 dB (24hrs)	
Japan	Sensitive Area (Class AA)	50 dB (6am – 10pm, 16hrs)	40 dB (10pm – 6pm, 8hrs)
	Residential Area (Class A and Class B)	55 dB (6am – 10pm, 16hrs)	45 dB (10pm – 6pm, 8hrs)
	Commercial and Industrial Area (Class C)	60 dB (6am – 10pm, 16hrs)	50 dB (10pm – 6pm, 8hrs)
IFC	Residential; institutional, educational	55 dB (7am – 10pm, 15hrs)	45 dB (10pm – 7am, 9hrs)
	Industrial; commercial	70 dB (7am – 10pm, 15hrs)	70 dB (10pm – 7am, 9hrs)

Source: Nose Standard in Indonesia (KEP-48/MENLH/11/1996)
Effect of Traffic Noise on Sleep: A Case Study in Serdang Raya, Selangor, Malaysia, Environment Asia, 2010
Environmental Protection and Management Act in Singapore (Chap.94A, Section 77, revised in 2008)
Notification of Environmental Board No. 15 B.E.2540(1997) under the Conservation and Enhancement of National Environmental Quality Act B.E.2535 (1992) dated March 12, B.E.2540 (1997) and Notification of Pollution Control Department ; Subject: Calculation of Noise Level Dated August 11, B.E. 2540 (1997) in Thailand

2.2 Vibration

(3) Construction Phase

There is no vibration standard of construction activity to receptors in Myanmar as well as south-east Asia and International Organizations such as WHO and IFC. Thus, the target vibration level at

construction phase shall be set based on the standards in some foreign countries. Accordingly the target level of vibration in construction phase is set based on the following policies.

- Monastery and residential house where are necessary to keep quiet and sleep shall comply with the Japanese standard for residential area,
- Office, commercial facilities, and factories areas shall comply with the Japanese standard for mixed areas including residential and commercial and industrial areas, and
- The category of times divided into three types in a manner consistency with target noise level for construction.

3. Monitoring Result

Noise Level

Survey Item

Parameter for noise level survey was determined by referring the environmental quality standards in Japan as shown in Table 5.

As there are no environmental standards for noise level in Republic of Myanmar, the survey result was evaluated by comparing with the environmental standards and request limit for road noise in Japan.

Table 5 Survey Parameters for Noise Level

No.	Parameter	Unit		Environmental Standard	Request limit for road noise
				Japan	
				Living Environment	Along Road
1	A-weighted loudness equivalent (LAeq)	dB	Daytime (6:00-22:00)	55	75
			Nighttime (22:00-6:00)	45	70

Note) Environmental Quality Standard for Noise (Category B, Residential Area) in Japan

Survey Location

Forth Time Monitoring (20th – 23rd November, 2014)

Summary of sampling points

The locations of noise level points and vibration monitoring points are shown in Table 6. The detail of each sampling points are described below.

Table 6 Location of Noise and Vibration Monitoring Station

Sampling Point	Coordinates	Description of Sampling Point
TNV-1	16°42'15.8"N, 96°16'00.5"E	In front of Myanmar Maritime University; about 2 m east of car road
TNV-2	16°40'15.5"N, 96°16'34.0"E	In the Moekyoswan Monastery Compound; about 140 m away from main car road
TNV-3	16°40'20.2"N, 96°16'35.5"E	In the Moekyoswan Monastery Compound; about 250 m away from main car road

TNV-1

The TNV-1 location was an open area in front of Myanmar Maritime University with about 2m from car road. The road was paved with low traffic volume and moderate speed. The nearest house is 20 meter away and no obstruction from trees. Dominant source of noise was vehicular traffic nearby the site. There was not any other noise source around the house. The location of TNV-1 is shown in Figure 2.

Figure 2 Location of TNV-1.

TNV-2

TNV-2 was sited at Moegyoswun Monastery Compound. The location was an open area beside monk houses with about 250m from the car road. The road was paved with low traffic. Dominant sources of noise were alarm song in the compound that ring thrice a day. There was not any other noise source around the monastery compound. The location of TNV-2 is shown in Figure 3.

Figure 3 Location of TNV-2.

TNV-3

TNV-3 was sited in front of Moegyoswun Monastery. The location was an open area beside the road with about 260 m from the car road. The road was paved with low traffic. Dominant sources of noise were alarm song in the compound that ring thrice a day and vehicular traffic. The location of TNV-3 is shown in Figure 4.

Figure 4 Location of TNV-3.

Survey Period

Sampling and monitoring of surrounding sound and vibration level at TNV-1, TNV-2 and TNV-3 were conducted during 17th -20th February 2015.

Sampling Point	Survey Period
TNV-1	19th – 20th February, 2015 (24 hours)
TNV-2	17th – 18th February, 2015 (24 hours)
TNV-3	18th – 19th February, 2015 (24 hours)

Survey Method

Sampling and monitoring of surrounding sound and vibration level were conducted by using following instrument for 24 hours/1 day measurement.

Instrument	Brand	Model	Measurement unit
Sound Level Meter	Lutron	SL-0423SD	dB
Vibration Meter	Lutron	VB-8206SD	mm/s, cm/s

a) Noise Survey

Frequency

- One time (24 hours monitoring in weekday)

Total Sample

- Three samples

Record Interval

- One record for 10 minute interval

b) Vibration Survey

Frequency

- One time (24 hours monitoring in weekday)

Total Sample

- Three samples

Record Interval

- One record for 5 seconds interval for 10 minutes during an hour

Survey Result

Noise levels (L_{Aeq}) of the monitoring points were presented in Table 7. One day L_{Aeq} was calculated by using the following array formula in the excel sheet. This formula is firstly used for hourly L_{Aeq} and then for the 24 hours L_{Aeq}.

10*LOG10(AVERGAE(10^((RANGE)/10)))

By means of the calculated results, all of the noise levels found lower than the environmental standard (1-day) in Thailand. Noise level (LAeq) in present monitoring period was presented in Table 7 and Table 8. Table of observed hourly noise level in three monitoring stations is shown in Appendix 1.

Table 7 Hourly LAeq value in noise monitoring stations.

Unit: dBA

Time	TNV-1	TNV-2	TNV-3
	19th - 20th February	17th -18th February	18th - 19th February
6:00-7:00	51	50	50
7:00-8:00	56	55	51
8:00:9:00	59	59	51
9:00-10:00	61	53	52
10:00-11:00	51	51	48
11:00-12:00	51	48	47
12:00-13:00	47	50	47
13:00-14:00	48	56	49
14:00-15:00	50	51	50
15:00-16:00	54	52	49
16:00-17:00	52	54	52
17:00-18:00	53	54	55
18:00-19:00	50	57	54
Day L_{Aeq}	53	53	50
19:00-20:00	53	58	49
20:00-21:00	51	59	51
21:00-22:00	48	57	48
Evening L_{Aeq}	50	58	49
22:00-23:00	45	47	45
23:00-24:00	45	44	46
24:00-1:00	41	43	44
1:00-2:00	39	43	42
2:00-3:00	39	43	42
3:00-4:00	39	43	40
4:00-5:00	40	46	39
5:00-6:00	42	48	44
Night L_{Aeq}	41	45	43

Table 8 A-weighted Loudness Equivalent (LAeq) Level

Unit: dB(A)

Date	TNV-1 19th – 20th February 2015			TNV-2 17th – 18th February 2015			TNV-3 18th – 19th February 2015		
	Day Time	Evening Time	Night Time	Day Time	Evening Time	Night Time	Day Time	Evening Time	Night Time
	53	50	41	53	58	45	50	49	43
Target Noise Level	75	65	65	75	60	55	75	60	55

Vibration

Vibration can be defined as regularly repeated movement of a physical object about a fixed point. The parameter normally used to assess the ground vibration is the peak particle velocity (ppv) expressed in millimeters per second (mm/s).

Vibration can cause varying degrees of damage in buildings and affect vibration-sensitive machinery or equipment. Its effect on people may be to cause disturbance or annoyance or, at higher levels, to affect a person's ability to work.

Typical levels measured during construction activities are shown below:

Construction Activity	Typical Ground Vibration Level
Vibratory roller	Up to 1.5mms @ 25m
Hydraulic rock breakers	4.5 mm/s @ 5m, 0.4 @ 20m, 0.1 @ 50m
Compactor	20mm/s @ 5m, <0.3mm/s @30m
Pile driving	1-3mm/s @ 50m depending on soil conditions and piling technique
Bulldozer	1-2mm/s @ 5m, 0.1 @ 50m
Truck traffic (smooth surface) Truck traffic (rough surface)	<0.2mm/s @ 20m <2mm/s @ 20m

Survey location

- Three points (same location as noise survey)

Frequency

- One time (24 hours)

Methodology

- Vibration level (dB), Frequency, Velocity, Measurement of vibration level is conducted by International standard method.

Result

Vibration results were presented in Figure 5 to 7. Table of observed vibration level is presented in Appendix 2.

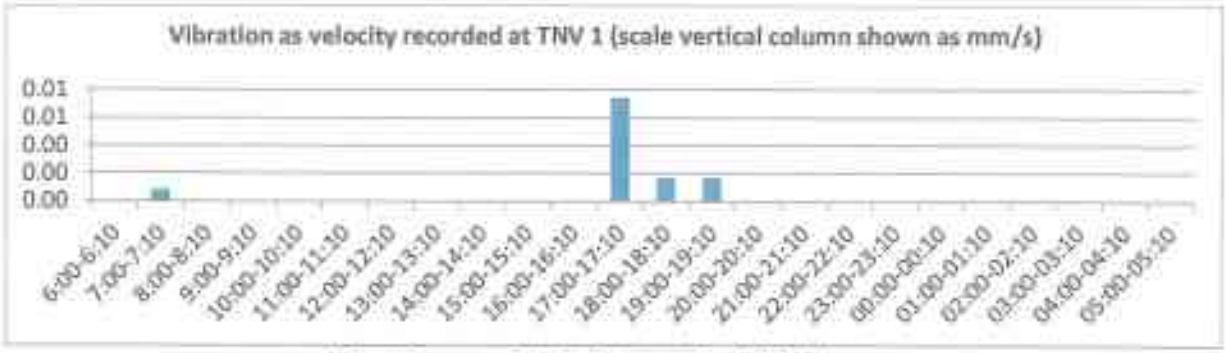

Figure 5 Vibration result of TNV 1.

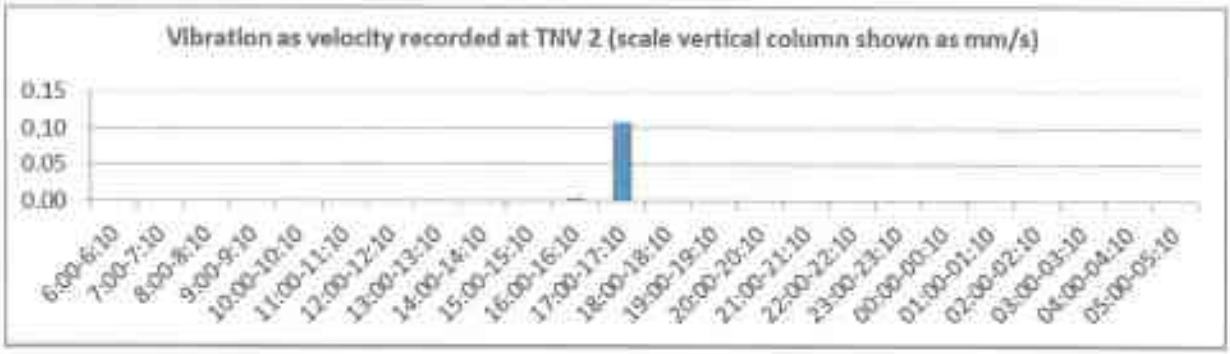

Figure 6 Vibration result of TNV 2.

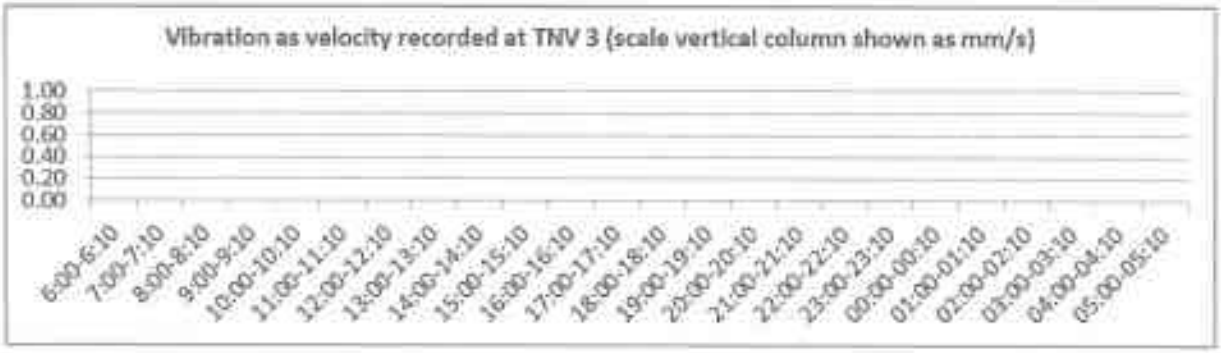

Figure 7 Vibration result of TNV 3.

4. Conclusion

The noise level monitoring results are compared with target noise level proposed in EIA report (See Table 1). Two noise receptors were designated in construction phase based on the baseline noise data.

There are:

1. Residential houses and monastery located less than 150m from the construction site comply with the middle range of the Singapore standard (categorized as "Residential buildings located less than 150m"), or

2. Residential houses and monastery located more than 150m from the construction site, office, commercial facilities, and factories shall comply with the moderate range of standard Singapore standard (categorized as "Other buildings")

The noise level monitoring at three sites in and near the project site are lower than the target noise level (See Table 8).

There is no standard relating to vibration during construction activities. Common practice in Myanmar has been to use guidance from internationally recognized standards. Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, the magnitude of vibration is expressed in terms of Peak Particle Velocity (PPV) in millimetres per second (mm/s).

In the case of nominally continuous sources of vibration such as traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration.

During the monitoring time there are no activity inside the Class A compound and only the loading and unloading raw materials by small vehicles. The main noise and vibration source are largely road traffic noise and vibration. The observed noise and vibration in all monitoring points are lower than the target level in pre – construction phase. (See Table 8, Figure 5 to 7 and Appendix).

Appendix 1 Observed Noise level in 3 Monitoring Stations

Unit: dBA

Time	TNV-1	TNV-2	TNV-3
	19th - 20th February	17th -18th February	18th - 19th February
6:00-7:00	51	50	50
7:00-8:00	56	55	51
8:00:9:00	59	59	51
9:00-10:00	61	53	52
10:00-11:00	51	51	48
11:00-12:00	51	48	47
12:00-13:00	47	50	47
13:00-14:00	48	56	49
14:00-15:00	50	51	50
15:00-16:00	54	52	49
16:00-17:00	52	54	52
17:00-18:00	53	54	55
18:00-19:00	50	57	54
Day L_{Aeq}	53	53	50
19:00-20:00	53	58	49
20:00-21:00	51	59	51
21:00-22:00	48	57	48
Evening L_{Aeq}	50	58	49
22:00-23:00	45	47	45
23:00-24:00	45	44	46
24:00-1:00	41	43	44
1:00-2:00	39	43	42
2:00-3:00	39	43	42
3:00-4:00	39	43	40
4:00-5:00	40	46	39
5:00-6:00	42	48	44
Night L_{Aeq}	41	45	43

Appendix-2 Observed vibration level in 3 monitoring stations

Vibration as Velocity (mm/s)

	TNV-1 (19-20 Feb)	TNV-2 (17-18 Feb)	TNV-3 (18-19 Feb)
Time	mm/s	mm/s	mm/s
6:00-6:10	0.00	0.00	0.00
7:00-7:10	0.00	0.00	0.00
8:00-8:10	0.00	0.00	0.00
9:00-9:10	0.00	0.00	0.00
10:00-10:10	0.00	0.00	0.00
11:00-11:10	0.00	0.00	0.00
12:00-12:10	0.00	0.00	0.00
13:00-13:10	0.00	0.00	0.00
14:00-14:10	0.00	0.00	0.00
15:00-15:10	0.00	0.00	0.00
16:00-16:10	0.00	0.00	0.00
17:00-17:10	0.01	0.11	0.00
18:00-18:10	0.00	0.00	0.00
19:00-19:10	0.00	0.00	0.00
20:00-20:10	0.00	0.00	0.00
21:00-21:10	0.00	0.00	0.00
22:00-22:10	0.00	0.00	0.00
23:00-23:10	0.00	0.00	0.00
00:00-00:10	0.00	0.00	0.00
01:00-01:10	0.00	0.00	0.00
02:00-02:10	0.00	0.00	0.00
03:00-03:10	0.00	0.00	0.00
04:00-04:10	0.00	0.00	0.00
05:00-05:10	0.00	0.00	0.00