THILAWA SPECIAL ECONOMIC ZONE

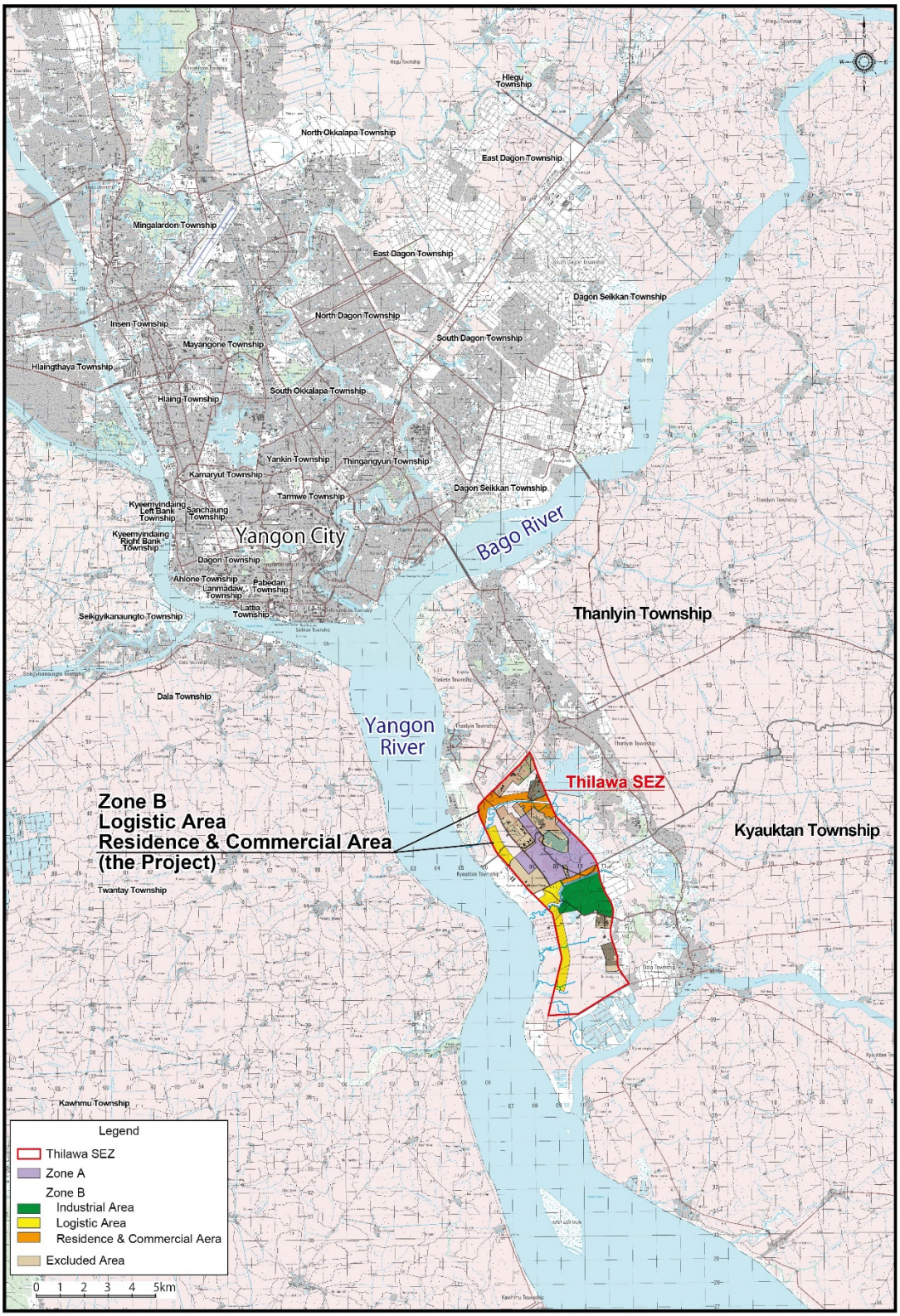
DEVELOPMENT PROJECT (ZONE B)

ENVIRONMENTAL IMPACT ASSESSMENT FOR LOGISTIC, RESIDENCE AND COMMERCIAL AREAS OF ZONE B

(Draft Report)

March 2016

MYANMAR JAPAN THILAWA DEVELOPMENT LTD.
THILAWA PROPERTY DEVELOPMENT LTD.



Location Map of Thilawa Special Economic Zone (SEZ) and Zone B Area

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AIDS	Acquired Immune Deficiency Syndrome
CLP	Closing Phase
CO	Construction Phase
DMS	Detailed Measurement Survey
ECD	Environmental Conservation Department, MOECAF
ECL	Environmental Conservation Law
ECRs	Environmental Conservation Rules
EHS	Environmental Health, and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
F/S	Feasibility Study
GHG	Greenhouse Gas
HIV	Human Immunodeficiency Virus
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IR-A	Internal Regulations of Zone A
IRPISC	Income Restoration Program Implementation Sub-Committee
JCM	Joint Crediting Mechanism
IUCN	International Union for Conservation of Nature and Natural Resource
JICA	Japan International Cooperation Agency
MITT	Myanmar International Terminals Thilawa
MJTD	Myanmar Japan Thilawa Development Ltd.
MOECAF	Ministry of Environmental Conservation and Forestry
MOI	Ministry of Industry
MoC	Memorandum of the Cooperation
MMST	MMS Thilawa Development Company
MTSH	Myanmar Thilawa SEZ Holdings Public Limited
NEQG	National Environmental Quality (Emission) Guidelines
NGO	Non-Governmental Organization
ODA	Official Development Assistance
OP	Operation Phase
OSSC	One Stop Service Center
PAH	Project-Affected Household
PAP	Project-Affected People
PC	Pre-Construction Phase
RISC	Relocation Implementation Sub-Committee
RWP	Resettlement Work Plan
SEZ	Special Economic Zone
TOR	Terms of Reference
TPD	Thilawa Property Development Ltd.
TSMC	Thilawa Special Economic Zone Management Committee
US.EPA	U.S. Environmental Protection Agency
WB	World Bank
WHO	World Health Organization
WPP	Water Purification Plant
YCDC	Yangon City Development Committee
YRG	Yangon Regional Government

EXECUTIVE SUMMARY

1. Project Proponent

1) Project Proponent: Thilawa Property Development Ltd.

2) Address: 11th Floor, UMFCCI Tower, No 29, Min Ye Kywa Street, Lanmadaw Township, Myanmar

The developer of the Thilawa Special Economic Zone (SEZ), as defined under the Myanmar Special Economic Zone Law (2014), will be the Myanmar Japan Thilawa Development Limited (MJTD) and the project proponent will be the Thilawa Property Development Ltd. (TPD), who will lease the project site. Currently, it is planned either the land lease agreement will be signed between the Thilawa SEZ Management Committee (TSMC) and MJTD and the sublease agreement will be entered into between TPD and MJTD; or the land lease agreement will be signed among the three parties, namely: TSMC, MJTD, and MTSH (TPD). TPD will develop, operate, and manage the Project and will also be responsible for the environmental impact assessment (EIA) as well as the environmental management of the Project.

2. Type of Project and Initial Environmental Examiniation/ Enviromental Impact Assessment (IEE/EIA) Requirement

1) Type of Project: Construction and Development of Industrial Zone

2) IEE/EIA Requirement: EIA is required in accordance with the Environmental Impact Assessment Procedure (No.616/2015).

3. Implementation Organizations for EIA Study

The organizations in-charge of the implementation of the EIA study are presented in Table 1.

Table 1: Organizations In-charge of EIA Study

	Organization	Responsibility
International Lead Consultant	Nippon Koei Co., Ltd., Tokyo, Japan (NK)	Overall management and technical aspect of EIA
Local Consultant	Myanmar Koei International Co., Ltd. (MKI)	Field survey
	Resource and Environment Myanmar Ltd. (REM)	Field survey and public consultation meeting

Source: EIA Study Team

4. Implementation Schedule of EIA Study

The Environmental Impact Assessment Procedure (No.616/2015) (hereinafter referred to as "EIA Procedure"), which was issued by the Ministry of Environmental Conservation and Forestry (MOECAF) on 29 December 2015 defines the detailed legal process regarding EIA procedures including preparation of EIA/IEE report, environmental management plan (EMP), public involvement, approval of EIA/IEE report by MOECAF, and monitoring process in accordance with the EIA report. In this EIA Procedure, "Industrial Zone Construction and Development (all sizes)" projects are requested to conduct full EIA study.

On the other hand, Presidential Decree No.49/2015 was enacted and this defines the transfer of power related to administrative procedures in SEZ. According to Thilawa SEZ Management Committee (TSMC), TSMC and MOECAF have been developing a procedure related to environmental management for investors as well as zone development in Thilawa SEZ based on the Decree since October 2015. In February 2016, TSMC finalized a procedure of appraisal of EIA for zone development and issued the approval letters of the Scoping Reports to the Project Proponents on 26th February 2016. For the appraisal of the EIA study for Zone B development, a mobile review team, which is composed of staff from MOECAF, Ministry of Industry, Ministry of Health, and Ministry of Labor, was established in January 2016 to review the draft EIA report. TSMC together with the mobile review team will make comments on the draft EIA Report through EIA Review Committee to be organized in April 2016. After issuing comments on the draft EIA Report, TSMC will apprise the final EIA Report

Considering the above situation, the Project Proponent has conducted EIA based on the EIA Procedure and the appraisal procedures of EIA for zone development in the Thilawa SEZ, and will submit the EIA Report to TSMC for approval.

EIA schedule of the Project is as shown in Table 2.

Table 2: EIA Schedule of the Project (as of March 2016)

Item	2015			2016			
	September/ October	November	December	January	February	March	April
1. Examination of the Project Plan							
2. Scoping							
Preparation of the Draft Scoping Report							
Public Consultation Meeting/ Public Disclosure			▲				
Submission of the Final Scoping Report					▲		
Approval of Final Scoping Report by TSMC					▲		
3. Field Survey							
Field Survey during the Rainy Season							
Field Survey during the Dry Season							
4. EIA							
Preparation of the Draft EIA Report							
Public Consultation Meeting/ Public Disclosure							▲

Source: EIA Study Team

5. Background of the Project

The Myanmar government has placed high priority on foreign direct investment as a key factor for the development of the nation. In particular, the government expects the Thilawa Special Economic Zone (SEZ), located in the outskirts of Yangon, to play an important role in economic development. Under this circumstance, the Myanmar government and the Japanese government signed a Memorandum of the Cooperation (MOC) for the development of Thilawa SEZ in December 2012.

In January 2014, the Myanmar Japan Thilawa Development Limited (MJTD) was established as a joint venture among MMS Thilawa Development Company (MMST), Thilawa SEZ Management

Committee (TSMC), and Myanmar Thilawa SEZ Holdings Public Limited (MTSH) to do business as operator and developer of the Thilawa SEZ Zone A, which is an early development area that covers 396 ha of the Thilawa SEZ[1].

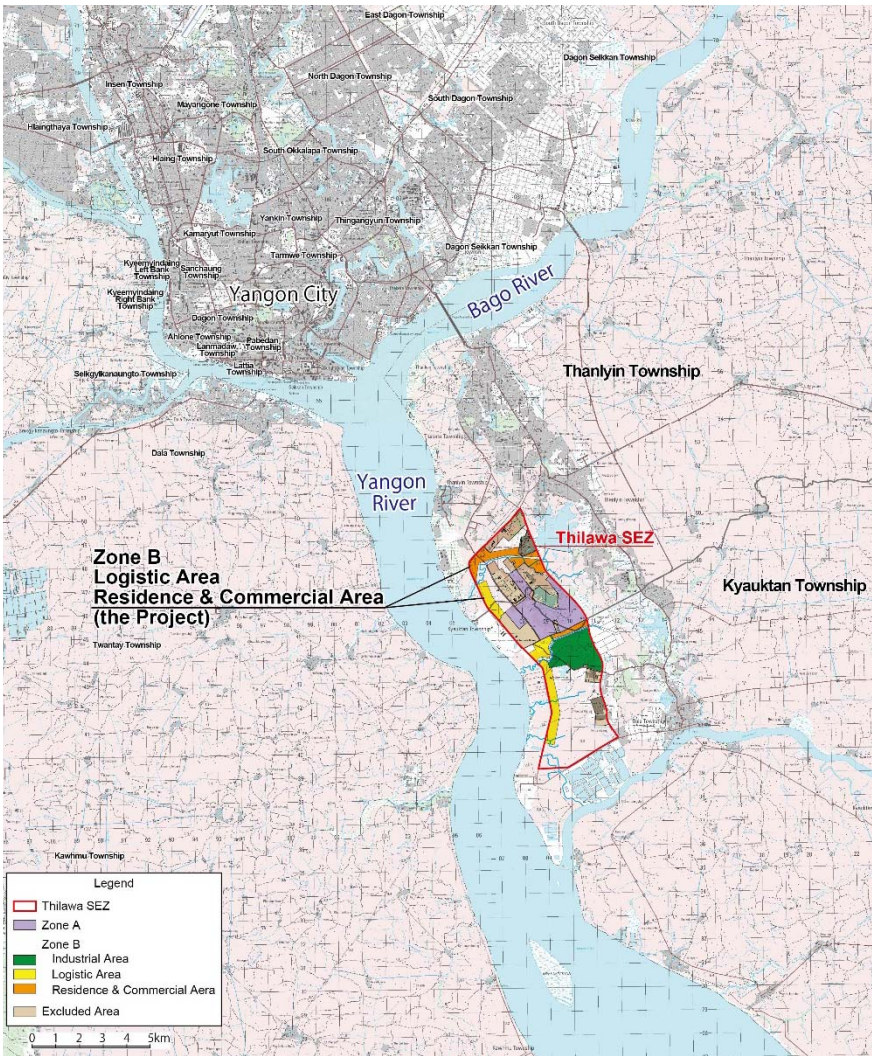
The construction of Zone A started in January 2014 after the completion of the feasibility study (F/S) and approval of the environmental impact assessment (EIA) report by TSMC. Its operation started in August 2015. In addition, MJTD has started to plan the development of another 700 ha in Thilawa SEZ together with MTSH as "Zone B", which includes about 262 ha of industrial area, 267 ha of logistic area, and 169 ha of residence and commercial areas.
In response to this, the EIA study started in parallel to evaluate the environmental and social impacts caused by the development of Zone B, and consider the mitigation measures and environmental management plan. Since each of the three areas have different project proponents, the EIA process is going to be done separately by each project proponent. This EIA report targets the development project of the logistic area (approximately 267 ha) and the residence and commercial area (approximately 169 ha) (hereinafter referred to as "the Project" as a whole) of which the project proponent is the Thilawa Property Development Ltd. (TPD) that was established jointly by MTSH and TSMC[2].

6. Project Description

6.1 Location

The Thilawa SEZ is located in Southern District, Yangon Region and about 23 km southeast of Yangon City as shown in Figure 1.

[1] Japan International Cooperation Agency (JICA) participated in this joint venture later.
[2] Other development area of Zone B, the industrial area, will be developed, operated and managed by MJTD.



Source: EIA Study Team

Figure 1: Location of Thilawa SEZ (Zone A and Zone B)

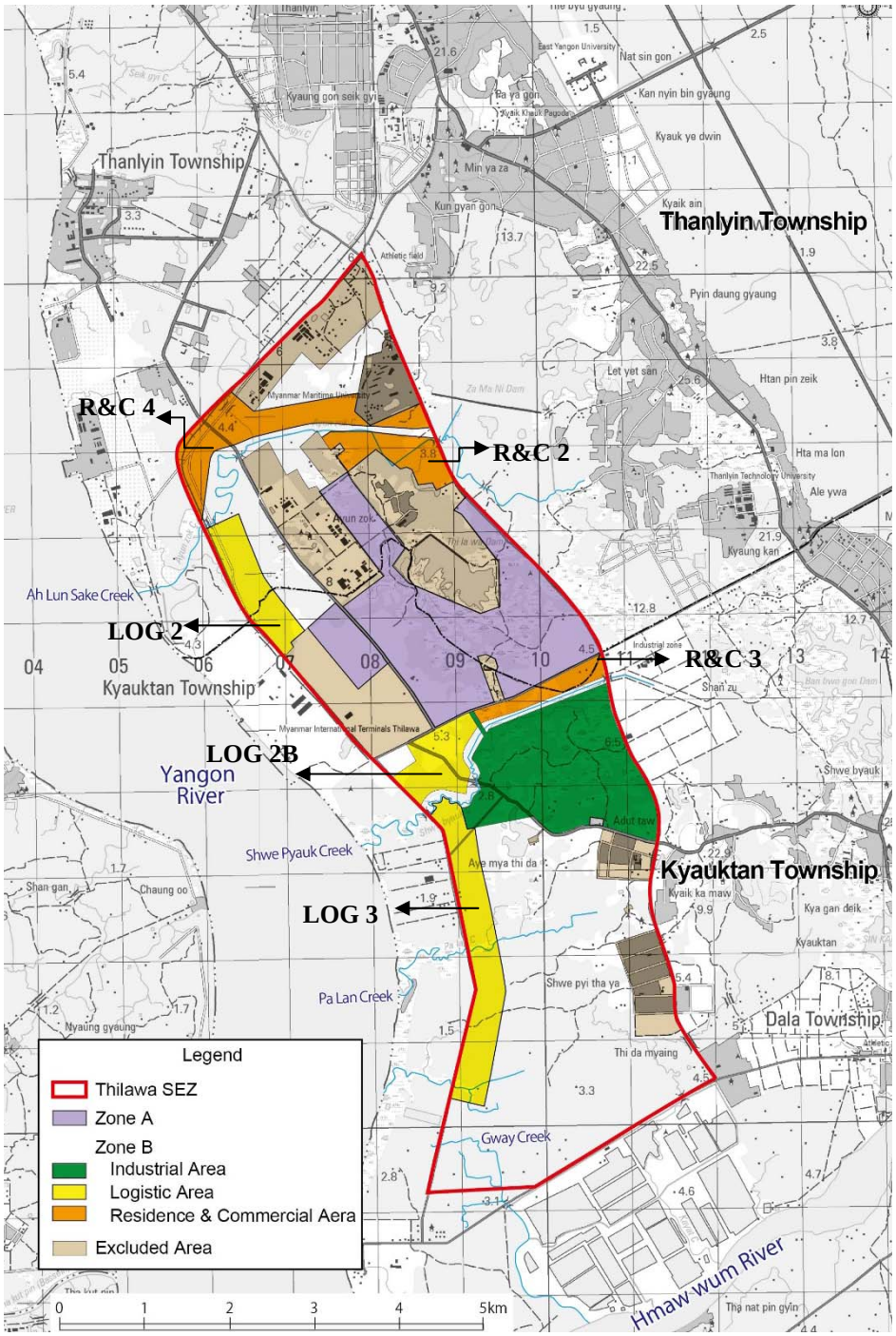
6.2 Land Use Plan of Zone B

The land use plan of Zone B is shown in Figure 2. Zone B will be developed by dividing the three areas, namely: industrial area, logistic area, and the residence and commercial areas. The project proponent of each area is shown in Table 3.

Table 3: Land Use Plan of Zone B

Land Use	Area (ha)	Project Proponent
Industrial Area	Approx. 262	MJTD
Logistic Area	Approx.267	TPD
Residence and Commercial Areas	Approx.169	TPD
Total	Approx.700	

Note: Above figures may be changed in the later stage.
Source: EIA Study Team



Source: Prepared by the EIA Study Team based on the information from the project proponent

Figure 2: Land Use Plan of Zone B

6.2 Infrastructure Development Plan

Table 4 shows the infrastructure development plan of the logistic area and the residence and commercial areas.

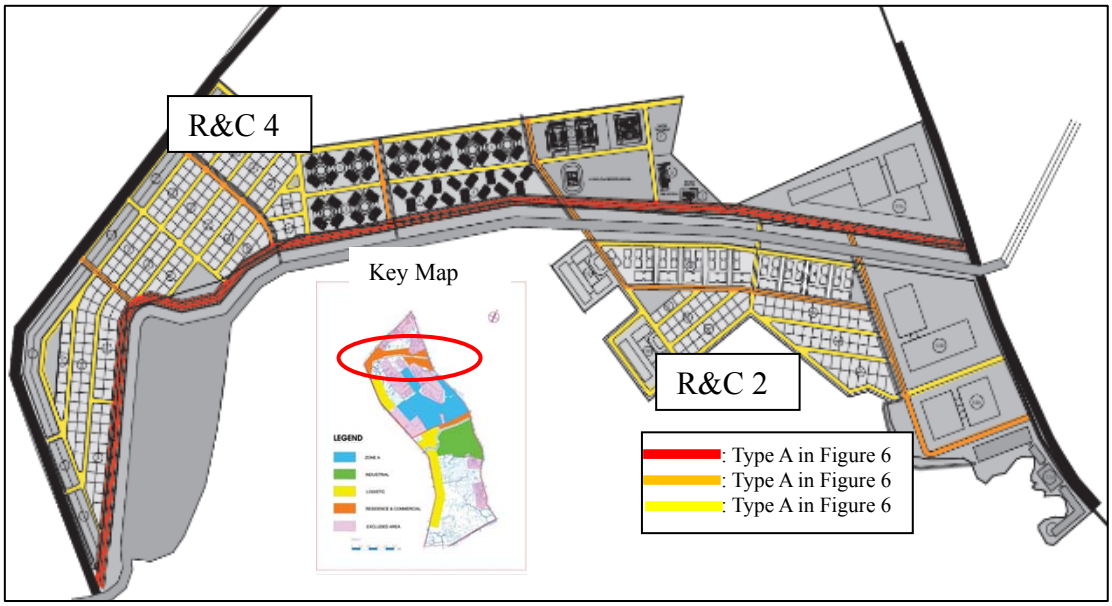
Table 4: Infrastructure Development Plan of the Logistic Area and the Residence and Commercial Areas

	Plan/ Contents
Land Reclamation Plan	Dyke around the area boundary: EL+ over 5.0 m

	Plan/ Contents
Road System	The main road will go through the project area from the outer road in the east side to the outer road in the west side. Sub-road will divide each plot and access road to each block. (Road plan in R&C 2, 3, and 4 are shown in Figure 3 and 4.)
Drainage System	The drainage water from the project area will be discharged directly to the existing canals as shown in Figure 5.
Water Supply System	(Before 2019[1]) The distribution of water to each tenant from the water purification plant (WPP) (Q=6,000 m^3/day) in Zone A will be through pipes by pumping. (After 2019) In addition, the project area will be connected to the public water supply pipe from the Lagunbyin Reservoir (42,000 m^3/day) established by Japanese official development assistance (ODA) loan project.
Sewage System	In the residence and commercial area, wastewater is planned to be treated by the wastewater treatment tank (Joka-sou) to meet the related regulation. This method make anaerobic microbe eat wastes in water and so that wastewater is separated into sludge and clean water. After that, clean water will be discharged to the canal. In the logistic area, all of industrial and domestic wastewater will be treated by each tenant or the project proponent. Before discharging the industrial and domestic wastewater, each tenant will be installed own sewage treatment plant (STP) if their wastewater quality is not adapted to the related regulation.
Power Supply Plan	Necessary capacity of power in the project area is estimated at 133 MVA. Power will be supplied from Thanlyin Substation to Thilawa Substation by a 230 kV transmission line. At Thilawa Substation, power voltage is transformed from 230 kV to 33 kV, and the 33 kV will be distributed to Zone B.
Solid Waste Management	Industrial waste and business related waste generated from the logistic area and commercial area will be re-used or recycled as much as possible by collecting the waste separately. The waste which cannot be re-used or recycled, will be managed by the waste treatment firm in Zone A or public service such as Pollution Control and Cleansing Department of YCDC. Domestic waste generated from the residence area will be disposed to the dumping site operated by Thanlyin Township.
Greening Plan	Different kinds of trees will be planted in the sidewalk and retention canal along the main road will be covered by sodding. Bushes will be planted in the sidewalk along road. Open public space with trees and lawns will be planned.

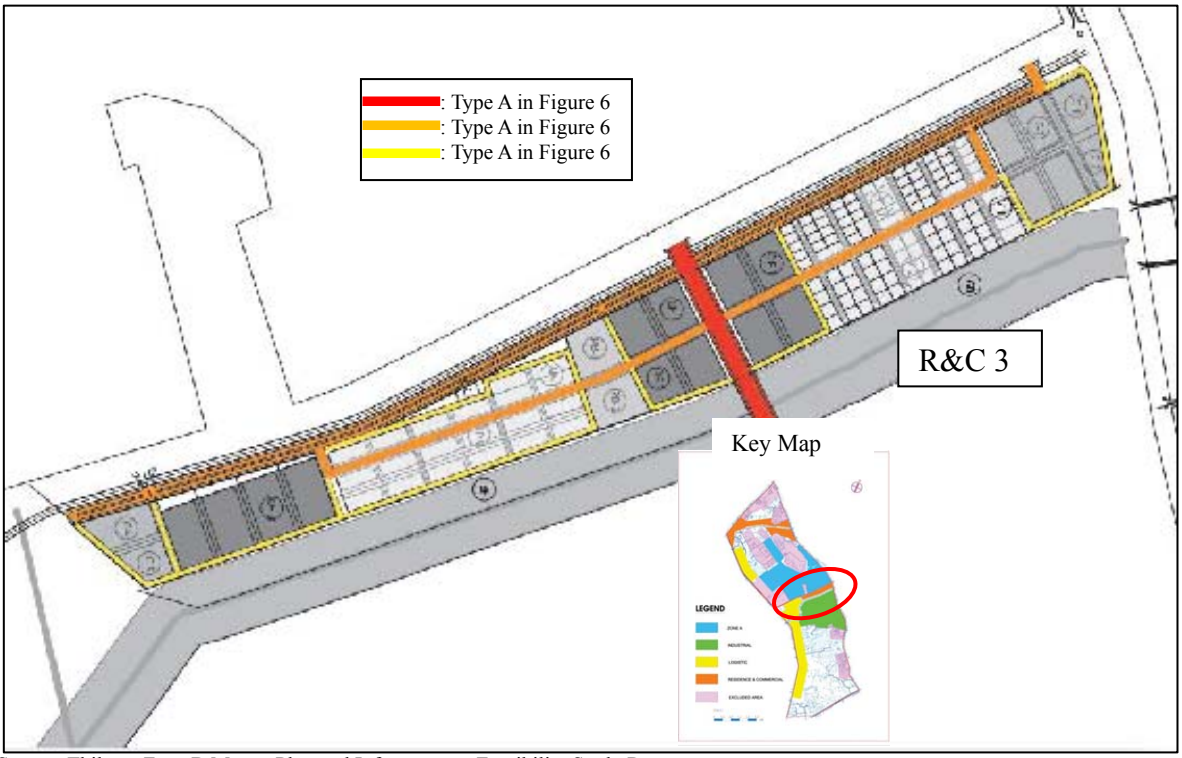
Note 1: It depends on when the installation work of public water supply pipe is completed.

Source: Prepared by the EIA Study Team based on the information from the project proponent



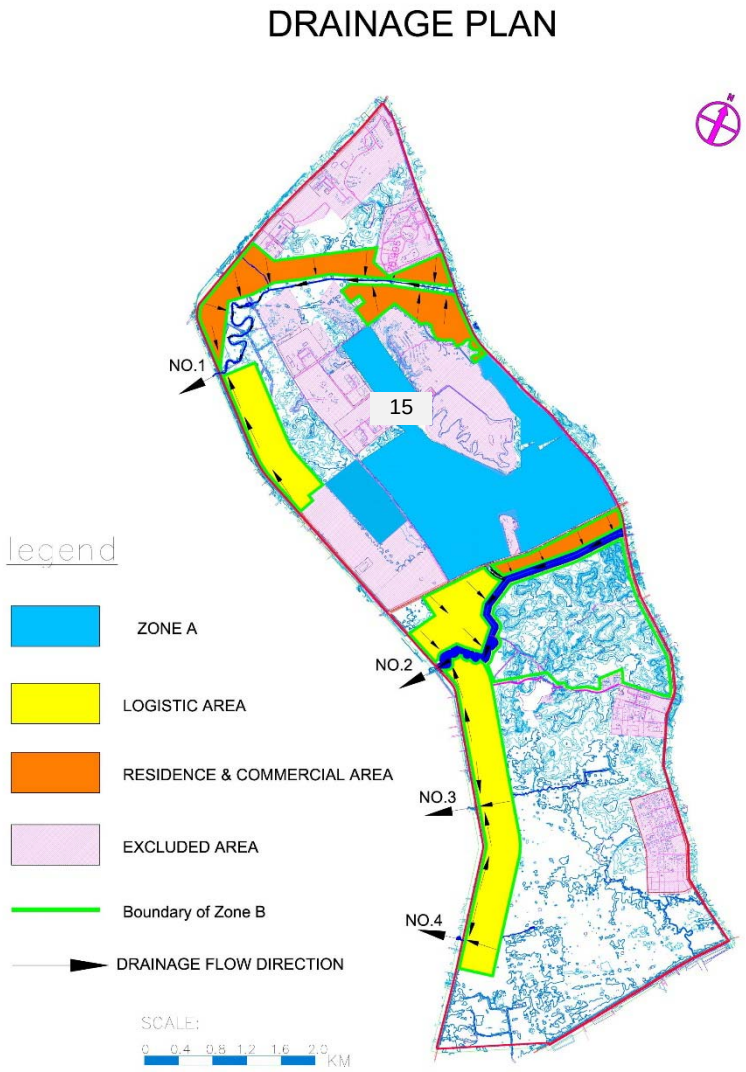
Source: Thilawa Zone B Master Plan and Infrastructure Feasibility Study Report

Figure 3: Road Plan in R&C 2 and 4



Source: Thilawa Zone B Master Plan and Infrastructure Feasibility Study Report

Figure 4: Road Plan in R&C 3



Source: Prepared by the EIA Study Team based on the information from the project proponent

Figure 5: Drainage Plan in R&C 2 and R&C 4

7. Baseline Study

The current environmental and social conditions in and around the project area are shown in Table 5. Field survey of air quality, water quality, soil quality, noise and vibration, traffic volume, flora and fauna, cultural assets and hydrology (topography) were conducted in or near the project site. The other information on natural and social environment was collected through the literature survey and/or reconnaissance survey.

Table 5: Current Environmental and Social Conditions in/around the Project Area

Item	Description
I. Living Environment (Pollution Status)	
1) Air Quality	The monitoring survey of CO, NO_2, NO, SO_2, $PM_{2.5}$, and PM_{10} for the ambient air quality was conducted in the Project site for continuous seven days in each of the rainy and dry seasons. Along the road, $PM_{2.5}$ measured for seven days and PM_{10} for one weekend at one survey point in the dry season exceeded the target value. NO_2 for one day at the other survey point in the rainy season also exceeded the target value. On the other hand, NO_2 and $PM_{2.5}$ measured for six days and PM_{10} for four days exceeded the applied standard at one survey point in the paddy field.

Item	Description
2) Water Quality	The surface water sample and the groundwater sample were collected at five survey points of the creeks and at two survey points of the tube well, respectively, in Thilawa SEZ in each of the rainy and dry seasons. Most of the measured parameters of surface water complied with the applicable standards of Vietnam in both the rainy and dry seasons at all water sampling sites, except for oil and grease. On the other hand, most of the measured parameters of groundwater complied with the standards in both the rainy and dry seasons at all water sampling sites, except for COD, ammonium, nitrate, nitrate nitrogen, hardness, and manganese.
3) Soil Quality	The surface soil survey in Zone B confirmed that the Project site was not originally contaminated by heavy metals as compared with the environmental standards in Vietnam and Thailand.
4) Noise and Vibration Level	According to the results of the traffic noise and vibration survey conducted at two points along the road around Thilawa SEZ in the dry season, all measured noise level and vibration level were lower than the request limit in Japan. As for the environmental noise survey conducted at three points in and around Thilawa SEZ in the dry season, all of the noise levels except for one case were lower than the target level. Noise level recorded on Friday evening at one survey point was slightly higher than the target level.
II. Natural Environment	
1) Flora, Fauna, and Biodiversity	According to the field survey result, there are 146 flora species, 73 kinds of butterfly, 4 kinds of dragonfly, 69 kinds of bird, 7 kinds of mammals, 12 kinds of reptilian and amphibian species, and 22 kinds of fish in and around the Thilawa SEZ Zone B area. Among them, one vulnerable species (reptiles) and 5 Near Threaten Species (2 birds and 3 fishes) classified in accordance with the IUCN Red List of Threatened Species (2015-4 version 3.1) were found.
2) Meteorology/ Temperature and Rainfall	Greater Yangon has a tropical monsoon climate characterized by altering rainy season (from May to October) and dry season (from November to April). According to the data observed in the Kaba-aye Meteorological Station from 1981 to 2010, the mean monthly temperature is highest in April at 30.7 °C and lowest in January at 25.0 °C. Except in December and January, the monthly temperatures are above 25.0 °C. The southwest monsoon wind is the main source of rain, and the Yangon area receives rain during the period from May to October. The average annual amount of rainfall is 2,787 mm. Rainfall sharply decreases from November and continues to be less than 10 mm from December to February.
3) Hydrology/ Topography	The topography of Thilawa SEZ area is generally characterized as flat terrain with somewhat changes in elevation of the area from 3 m to 21 m. Higher areas in Thilawa SEZ is found in the middle and the east while low-elevation land is located in the west and south. Surface water flow in the main area of Thilawa SEZ mostly runs from east to west and the surface water flow in the southern part of the SEZ runs from north to south. There are four creeks, running from east to west and discharging into the Yangon River, including Ah Lun Soke, Shwe Pyauk, and Bay Bauk (Pa Lan) creeks, and another creek. There are two creeks, flowing from north to south and discharging into Hmaw Wunn Chaung, including Gway and Kayat creeks. Surface water runoff in the adjacent areas of a creek flows in different directions such as east-west, north-south, and south-north, but directs to the creek. The watershed area of each creek has a span of less than 2 km, implying 1 km of length in each side from the creek.
4) Geographical Features	Regional geomorphic features of the entire area includes ridges and deltaic lands lying in the south of the Pegu Yoma between the Sittaung River in the east and the Irrawaddy River in the west. This area is in a north-south trending sedimentary basin containing thick sedimentary deposits from the Tertiary to Quaternary periods.
5) Soil Erosion	The main types of soil are Ferrosols, Gleysols, Solovechaks, and Arenesols. Ferrosols (plinthic) or lateritic soils are found on low hills along Thanlyin-Kyauktan. About 90% of these soils are composed of silt and clay, but humus content varies from place to place. These soils are favorable for paddy cultivation. The main problem, however, is poor drainage and water logged conditions. In the rainy season, they are covered with flood water. Because of the high content of clay, these soils become very dry and crack in the dry season. Solonchaks (gleyic) or saline swampy gluey soils are found along the coastal area. These soils develop from sediments transported and deposited on the estuaries of the Yangon River.
III. Social Environment	
1) Population	In 2014, the population in Myanmar was estimated at 51.5 million. Approximately, 70% of the population resides in the rural areas while 30% in the urban areas. Yangon Region, where Thilawa SEZ is located, has the largest population (7.36 million) and the highest density (716 per km^2). In 2015, there are about 268,000 in Thanlyin Township and 133,000 in Kyauktan Township. The percentage of urban population is about 32% in both townships.
2) Ethnicity	Most of the people who live in Thanlyin and Kyauktan townships are Bamar, followed by Kayin, Rakhine, and Indian people. A small number of Pakistani and Bangladeshi live in Thanlyin Township.
3) Religion	More than 90% of the people living in Thanlyin and Kyauktan townships are Buddhists. There are more Hindus and Muslims living in Kyauktan Township than in Thanlyin Township.

Item	Description
4) Land Use	Thanlyin and Kyauktan townships mainly use its land as agricultural land followed by water area. In Thanlyin Township, settlement land covers 10.6% (3,936 ha), which is comparatively large. It is considered that Thanlyin Township is a kind of bed-town for laborers who go to Yangon to work.
5) Water Source/ Usage	More than 60% of households in Thanlyin Township are using water for drinking and non-drinking purpose; for wells most of which are located outside of Thilawa SEZ followed by pool/pond/lake. On the other hand, about 70% of households are using water from pool/pond/lake in Kyauktan Township. There are three major water reservoirs in and around SEZ: Zarmani Reservoir, Bant Bwaykone Reservoir, and Thilawa Reservoir. Zarmani Reservoir and Bant Bwaykone Reservoir managed by the Ministry of Agriculture and Irrigation (MOAI) mainly provide water to the agricultural field. On the other hand, Thilawa Reservoir belongs to the Ministry of Industry (MOI) and Ministry of Construction (MOC) and its water is supplied to nearby factories, irrigation, and port.
6) Local Economy and Livelihood	The main sources of livelihood in the two townships are agriculture, fishing, and official employment in the government. In Thanlyin Township, other sources of earning are livestock breeding, fish farming, casual labor, and betel leaf and coconut plantations as well as small-to-medium-size businesses. In Kyauktan Township, other livelihood activities include livestock breeding, fish farming, and betel leaf and coconut plantations. Most of the casual laborers are employed in the agricultural sector.
7) Access Road	Main access roads connected between Yangon City and Thilawa SEZ are as follows: the road that passes through Thanlyin Bridge and the other road that passes through Dagon Bridge. The peripheral road of Thilawa SEZ is paved with concrete while the road between Thanlyin Bridge and Thilawa SEZ is paved with asphalt. On the other hand, most of the roads connected into villages are still unpaved. Currently, the road expansion of connection road from Thanlyin Bridge to Thilawa SEZ has been planned supported by JICA (Infrastructure Development Project in Thilawa Area Phase 2 (Yen Credit)).
8) Waste Management	Solid wastes generated in wards of townships are collected by each township development groups. In Thanlyin Township, the Sanitary Department is in-charge of waste management and collects waste from all wards. On the other hand, the Sanitary Section of Administration Department is in charge of waste management in Kyauktan Township. Each of two townships has operated its own final disposal site as open dumping. In Zone A of Thilawa SEZ, a solid waste management company entered and has started its operation of management of industrial and business waste. The expected volume of waste is approximately 22,700 t/year, which is about 60% hazardous waste and 40% non-hazardous waste. In terms of waste weight for each treatment process, approximately, 6,100 t/year for sorting, 6,600 t/year for incineration, 4,100 t/year for fuel conversion, 2,700 t/year for landfilling, 2,600 t/year for stabilization, and tens of t/year for wastewater treatment are planned at this stage.
9) Electricity	Three substations, namely: Thanlyin Substation, Thaketa Substation, and Kamarnat Substation are located in the surrounding area of Thilawa SEZ. Among them, the Thanlyin Substation is the closest one from Thilawa SEZ, about 10 km to the north. Main source of lighting in Thanlyin and Kyauktan townships comes from electricity (47.7% and 33.1% of households) followed by battery (26.0% and 24.9%) in 2014.
10) Cultural Heritage /Asset	There is no cultural heritage site designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) or the Myanmar government in Thilawa SEZ. There are two cemeteries, one is found in the industrial area of Zone B in Kyauktan Township and the other one is found in the logistic area of Zone B in Thanlyin Township. There is also a small Hindu temple found in the residence and commercial areas of Zone B in Thanlyin Township.
11) Landscape	No specific landscape located in the project was identified during the field visit in the region. The project site and its surrounding area is composed of flat plains and typical rural landscapes of urban neighborhood.
12) Emergency Risk	Flood, cyclone, and earthquake are identified as notable natural hazards around the project area.

Source: EIA Study Team

8. Summary of Environmental and Social Impacts Assessments

Environmental and social impacts on the Project are predicted and evaluated based on the project description, results of baseline survey, and set target level. Table 6 shows the summary of assessments on the Project during the pre-construction phase (PC), the construction phase (CO), the operation phase (OP), and the closing phase (CLP). The impacts of pollution, natural environment and social environment, health and safety, emergency risk were classified as A to D in accordance with the following criteria, assuming no specific measures toward the impacts are taken:

A-: Significant negative impact
B-: Some negative impact
C: Impacts are not clear, need more investigation
D: No Impacts or impacts are negligible, no further study required
A+: Significant positive impact
B+: Some positive impact

Table 6: Results of the Environmental and Social Impacts Assessments (Logistic, Residence and Commercial Areas of Zone B)

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
Pollution	Air Quality	B-	B-	B-	B-	B-	B-	**CO/CLP:** Impact on air quality is expected to be limited because dust and emission gases from construction works will be within the narrow area near the construction site. In addition, emission gas effect from construction vehicles travelling around the area will be little, comparatively limited vehicles are operating. **OP:** Impact on air quality is expected to be little, because roadside air quality is predicted to comply with the target level. In addition, emission gas effect from the tenants is expected to be limited because the large emitter will be required to submit an EIA or IEE report with EMP including mitigation measures on air pollution to MOECAF.
	Water Quality	B-	B-	B-	B-	B-	B-	**CO/CLP:** Impact on wastewater quality caused by construction/demolition work is expected to be limited because discharging muddy water from bare land of construction site will be temporary and wastewater from a construction camp will be treated by the septic tanks. **OP:** Impact on water quality is expected to be limited because water discharge from residential and commercial areas will be treated onsite thorough the septic tank. Discharged water from tenants will also be well treated by treatment plant to comply with the industrial wastewater effluent guideline values stipulated by MOI and MOECAF and the proposed internal regulation.
	Waste	B-	B-	B-	B-	B-	B-	**CO/CLP:** The impact of the construction waste is expected to be limited because construction waste will be utilized to embankment work and scrap material generated from removal of structure will also be utilized as recyclable materials as much as possible. The rest of the waste will be treated by outsourcing to the private waste treatment firm in Thilawa SEZ which has functions of recycling, intermediate treatment, and the controlled landfill site or other proper waste treatment facilities outside of Thilawa SEZ. **OP:** Impact of industrial and business-related waste generated from the logistic and the commercial area in addition to the industrial area of Zone A and Zone B is expected to be limited because solid waste management facilities in Zone A which have functions of recycling, intermediate treatment, and the controlled landfill site and enough capacity of receiving waste from all of the industrial waste and business-related waste in Zone A and Zone B. Impact of waste generated from the residence area is limited because the project proponent will reduce waste as much as possible through recycling and collect toxic wastes and bring the waste to the waste treatment facilities in Zone A. The project proponent will also prepare waste collection and transportation trucks by themselves as necessary.
	Soil Contamination	B-	B-	B-	D	B-	D	**CO:** In the construction phase, all excavated soil would be backfilled into Zone B area as embankment soils. Excavated soil would not cause any soil contamination inside the industrial area and the surrounding area because the soil quality of Zone B was observed complying with the relevant environmental standards. **OP:** Soil contamination caused by the tenants is estimated to be limited because tenants will be prohibited to infiltrate liquid waste into the soil based on the

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								proposed internal regulation. **CLP**: Demolition work in the project area and domestic activities during the period would not be expected to cause any pollution to the soil environment.
	Noise and Vibration	B-	B-	B-	B-	B-	B-	**CO/CLP:** Impacts of noise and vibration from construction machineries are expected to be limited because noise and vibration caused by construction works are site specific and temporary events. Impact of noise and vibration from construction vehicles is expected to be limited because the construction vehicular traffic volume is estimated to be little compared with the present traffic volume. **OP:** Impacts of noise and vibration by tenants are expected to be limited because mitigation measures such as soundproof wall will be installed as necessary. Impacts of noise and vibration from traveling vehicles are expected to be limited because noise and vibration levels are forecasted to be less than the target values.
	Ground Subsidence	D	D	D	D	D	D	**CO:** Groundwater will be used during the construction phase; however, no impact is expected because there is no change in ground elevation as monitored by Zone A Project and the same kind of construction work will be conducted in the project area. **OP/CLP:** No activities are planned that will cause ground subsidence.
	Offensive Odor	D	B-	D	D	B-	D	**CO/CLP:** There is no factor to cause offensive odor **OP:** Odor caused by tenants is estimated to be limited because offensive odor shall be controlled and minimized by tenants in accordance with the proposed internal regulation.
	Bottom Sediment	D	B-	D	D	B-	D	**CO/CLP:** No construction works are planned that will cause impact on bottom sediment. **OP:** Impact on bottom sediment is expected to be limited because water discharge from the tenants will be treated at the treatment plant to comply with the industrial wastewater effluent guideline value stipulated by MOI and MOECAF and the proposed internal regulation. Domestic wastewater would be treated in septic tanks.
Natural Environment	Protected Areas	D	D	D	D	D	D	Since no natural preservation area and national parks exist in and around Zone B, impact on the protected areas is not expected.
	Flora/Fauna and Ecosystem	C	C	C	B-	B-	B-	Based on the field survey, it was observed that biodiversity in the project area is not rich because of the fact that the area has been inhabited and cultivated by local people for a long time. In addition, the area, located near Yangon City, has been recently urbanized and strongly industrialized with the presence of industrial areas and deep terminals. The project area is not a special area in terms of biodiversity and ecosystem. Similar ecosystem and equivalent level of biodiversity would be found in nearby areas. Besides, the loss of some important species would not occur during the project development. Therefore, the development of the project would not cause any significant impact on biodiversity and ecosystem of the region, although there will be a change of vegetation due to the construction work in the industrial area.
	Hydrology	B-	B-	B-	B-	B-	B-	**PC/CO**: Impact on hydrology is expected to be limited because the amount of water consumption used in the construction work will be minimal; only in the case of washing machines and sprinkling. **OP**: Impact on hydrology is limited because stormwater flow to the river will be equalized through retention ponds and minimized making changes to the water current and riverbed.
	Topography and geology	D	D	D	D	D	D	**CO/CLP:** Since there are no unique topography and geology in this area, no impact from construction is expected. **OP:** No activities are planned that will cause impact on topography and geology.
	Soil Erosion	B-	B-	B-	B-	B-	B-	**CO/CLP:** Soil erosion in the bare area/bank would occur as a result of rainwater.

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								OP: Impact of erosion on the creek is limited because stormwater flow to the river will be controlled by natural retention function along existing canals.
Social environment	Involuntary Resettlement	A-	A-	D	A-	A-	B-	**PC:** Land acquisition will be required partially and the involuntary resettlement of 254 households is expected through the project (logistic area: 82, residence and commercial areas: 172). However, the impact will be minimized by providing compensation for the loss of assets/income source and livelihood/relocation based on the Framework for 2,000 ha by TSMC. In addition, the relocation of the households currently living in the proposed relocation site is anticipated because of the development of the relocation site. TSMC will organize an adequate consultation with the households in a timely manner. **OP:** Among the 254 households to be affected by the Project, 226 households are required to relocate. The impact on the livelihood of relocated household is expected due to the changes in their situation. However, the impact will be minimized due to the implementation of an Income Restoration Program (IRP) based on the Framework for 2,000 ha by TSMC. **CLP:** It is expected that certain scale of workers will be required to move to other place due to the closure of operations at the project area. However, the displacement will be planned and residents will be informed under the contract agreement, and will be implemented with the understanding of residents.
	Living and Livelihood	A-/ B+	A-/ B+	C	A-/B-/ B+	A-/B- /B+	B-/B+	**PC/ CO/ OP:** *Impact to PAHs by Land Reclamation (A-)* Among the entire project affected households, approximately 25 % have land-based income source and 5 % has non land- based income source. They might lose their income source or face the decrease in income due to resettlement. However, the impact will be minimized by providing assistance package and IRP based on the Framework for 2,000 ha by TSMC. In addition, TSMC will provide IRP activities such as job matching and facilitation of job opportunity for some PAHs who would spend some time to restore their living after their resettlement. **CO/ OP/ CLP:** *Impact to Surrounding Community (B-)* Unexpected impact on living and livelihood of the surrounding community would be arisen due to the construction work and the operation. The project proponent will consider implementing social contribution activities as necessary under their approach of CSR in order to mitigate the impact on living and livelihood. In closing phase, it is expected that some people would lose their income source belong to the Project. However, the general procedure of dismissal will be applied to people based on their respective contract agreement with each tenant in accordance with the laws/regulations in Myanmar. Moreover, facilitation of job opportunity will be arranged by the government to assist workers to find alternative livelihood. **CO/ OP/ CLP:** *Impact on Improvement of Local Economy (B+)* There will be the improvement of local economy due to the increase of job opportunity with the start of the construction/ demolished work and the operation by the Project.
	Vulnerable Group	A-/ B+	A-/ B+	D	A-/B-/ B+	A-/B- /B+	D	**PC/ CO/ OP:** *Impact to Vulnerable PAHs by Land Reclamation (A-)* Among the project affected households, 70 households are defined as vulnerable people in the Project (logistic area: 26, residence and commercial area: 44). They are easily affected by the Project. In order to mitigate the impact, special attention will be given to them by providing additional assistance based on the Framework for 2,000 ha by TSMC. **CO/ OP:** *Impact to Surrounding community (B-)* Unexpected impact on living and livelihood of the

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								surrounding community would be arisen due to the construction work and the operation. The project proponent will consider implementing social contribution activities as necessary under their approach of CSR in order to mitigate the impact on vulnerable group. **CO/ OP:** *Impact on Improvement of Local Economy (B+)* There will be the improvement of local economy due to the increase of job opportunity with the start of the construction/ demolished work and the operation by the Project.
	Local Conflict of Interests	A-	A-	D	B-	B-	D	**PC/CO/OP:** It is expected that local conflict of interests would happen due to the implementation of the Project, since inequality between relocated PAHs and host community, between PAHs for Zone A and Zone B, or between construction workers and local people might happen. These conflicts would be mitigated by IRP activity for community harmonization, the design of assistance package, environmental and safety education training to workers by contractor.
	Misdistribution of Benefit and Damage	B-	B-	D	B-	B-	D	**PC/CO/OP:** Inequality among the stakeholders is expected, since some would receive a benefit from the Project while others would be affected negatively by the Project. However, the impact is minimized by implementing IRP by TSMC. Also, complaint or claim from local people due to the construction work/operation work will be dealt by the contractor or the project proponent/ TSMC.
	Children's Right	B-	B-/ B+	D	B-	B-/ B+	D	**PC:** Since there are a total of 250 school children among the relocated PAHs, children's education would be temporarily disrupted due to relocation. On the other hand, children would be indirectly influenced by the improvement of social infrastructure in the region caused by the Project. **CO/OP/CLP:** It is expected that the increase in traffic volume might affect the safety of children in commuting to school. Therefore, the contractor/proponent shall design the mitigation measures for security of schoolchildren.
	Existing Social Infrastructures and Services	B-/ B+	B-/ B+	D	B-/ B+	B-/ B+	D	**CO:** Traffic congestion due to the increase in number of construction vehicles is expected. Accessibility of PAHs to school, hospital, and shops would be affected. On the other hand, the social infrastructure is expected to be improved in and around the project area. **OP:** For relocated PAHs, the impact on the accessibility to social infrastructure is unavoidable after relocation. Therefore TSMC will arrange the resettlement site including basic social infrastructures. For local people, the accessibility would be changed because of the construction /operation work. On the other hand, the basic infrastructures such as the existing road and power supply will be improved due to the infrastructure development projects around Thilawa SEZ.
	Water Usage	C	C	D	B-	B-	D	**CO:** Some paddy farmers would be affected by the development of the project area because of the rice cultivation for not only monsoon paddy but also summer paddy fields by utilizing the irrigated water from the existing water source. However, the loss of income source for these farmers will be appropriately compensated by providing the assistance package based on the Resettlement Framework for 2000ha by TSMC. In addition, adequate amount of water to be used for the construction work would be secured from the outside or groundwater inside the Project area by the project proponent/contractor in order to minimize the impact on local water usage. **OP:** It is planned to use local water source for the Project, however the impact of water usage is expected to be negligible because the amount of water consumption will be well controlled based on the project plan.
	Cultural Heritage	B-	D	D	B-	D	D	**PC:** One Hindu temple and one cemetery will be affected by the Project in the project area. However, it will be

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
	/Asset							considered to keep this utility in the community with the providing several options to local people.
	Landscape	D	B-/ B+	D	D	B-/ B+	D	**OP:** Impact on landscape is not expected because there are no important landscapes and viewpoints to be considered around the project area even though the landscape would be changed by the semi-urbanization of the project area and its surrounding area.
Health and Safety	Risks for Infectious Disease such as AIDS/HIV	B-	B-	B-	B-	B-	B-	**CO/CLP:** Risks for infectious disease are expected due to the influx of construction workers into the project area, however, it will be very limited because it is temporary and typical work. In order to minimize the impact, preventive measures against infectious disease shall be considered. **OP:** Risks for infectious disease are expected because of the influx of workers of the tenants and semi-urbanization of the project area and its surrounding.
	Occupational Health and Safety	B-	B-	B-	B-	B-	B-	**CO/OP/CLP:** Minor negative impacts on occupational health and safety (OHS) are inevitable to some extent. To minimize the negative impacts, the contractor/the project proponent shall take mitigation measures stipulated in the Environment, Health, and Safety (EHS) Guidelines of the International Finance Corporation (IFC).
	Community Health and Safety	B-	B-	B-	B-	B-	B-	**CO/CLP/OP:** Minor negative impacts on community health and safety (CHS) are inevitable to some extent. To minimize the negative impacts, the contractor/the project proponent shall take mitigation measures stipulated in the EHS Guidelines of the IFC.
Emergency Risk	Usage of Chemicals	D	B-	D	D	B-	D	**OP:** During the operation phase, some tenants would use chemical materials to be managed under specific condition. Risk of chemical material is expected to be limited because the tenants will be required to prepare proper chemical substances management plan.
	Flood Risk	B-	B-	B-	B-	B-	B-	**CO/OP/CLP:** Flood risks such as heavy rain, cyclone, and high tide are expected to be limited because land reclamation plan is prepared considering EL+over 5.0 m, which is higher than EL +4.24 m, the highest water level recorded at Myanmar International Terminals Thilawa (MITT) of Thilawa Port.
	Risk of Fire	B-	B-	B-	B-	B-	B-	**CO/CLP:** Risk of fire is expected to be limited because the fire safety plan and equipment will be prepared by the project proponent to comply with the Building Construction and Fire Safety Rule regulated by TSMC. **OP**: Risk of fire is expected to be limited because the tenants shall install and maintain an effective fire alarm system and firefighting system for each building in the plot with reference to the TSMC rules and the proposed internal regulation.
	Earthquake	B-	B-	B-	B-	B-	B-	**CO/CLP:** There is a possibility of occurrence of earthquake. However, the contractor for construction and demolition work will prepare disaster prevention activities to minimize the damage. Therefore, the negative impact of the earthquake would be limited. **OP**: There is a possibility of occurrence of earthquake. However, each tenant would design and construct properly to meet the required standard such as quake-resistance standard. Therefore, the negative impact of anon earthquake would be limited.
Other	Global Warming	B-	B-	B-/ B+	B-	B-	B-	**CO:** Emission of greenhouse gases (GHGs) would be generated from construction machineries and vehicular traffic caused by the Project. **OP:** Emissions of GHGs would be generated from vehicular traffic in the Project and operation of the tenants. **CLP:** Emission of GHGs would be generated from construction machineries and vehicular traffic caused by the Project. On the other hand, emissions of GHGs from operation activities would be reduced.

Note: PC: Pre-construction Phase, CO: Construction Phase, OP: Operation Phase, CLP: Closing Phase
Evaluation: A-: Significant Negative Impact A+: Significant Positive Impact
B-: Some Negative Impact B+: Some Positive Impact
C: Impacts are not clear, need more investigation
D: No impacts or impacts are negligible, no further study required Source: EIA Study Team

9. Environmental Mitigation/Management and Monitoring Plan

(1) Environmental Mitigation and Management Plan

The categories evaluated as A^- or B^- in accordance with the results of the impact assessment, mitigation of its measures for each of the three phases separately pre-construction phase, construction/closing phase and operation phase are shown in Tables 7 to 9.

The implementing resettlement works, including income restoration program activities, of Thilawa SEZ will be conducted by TSMC supported by two committees namely: Relocation Implementation Committee (RIC) and the Income Restoration Program Implementation Committee (IRPIC). These organizations will be in-charge of the actual relocation and resettlement works in Thilawa SEZ.

Table 7: Environmental Mitigation and Management Plan (Pre-construction Phase)

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of Expenditure
Social Environment	Involuntary Resettlement	- Change of livelihood of relocated households - Social impact to the host community/household in the resettlement site	- Implementation of the Income Restoration Program for PAHs - Preliminary discussion with the host community/household - Provision of adequate compensation and assistance for land owners/former residents in the resettlement site	TSMC	TSMC	Cost for assistance package defined by the Resettlement Work Plan (Assistance Package)
	Living and Livelihood	- Impact of loss of livelihood opportunity, especially land-based livelihood such as paddy field and/or vegetable field	- Full implementation of the income restoration program	TSMC	TSMC	
	Vulnerable Group	- Change the living condition	- Additional assistance based on the resettlement framework for 2000 ha	TSMC	TSMC	
	Cultural Heritage/ Asset	- Impact on common asset	- Discussion with relevant community	TSMC	TSMC	

Source: EIA Study Team

Table 8: Environmental Mitigation and Management Plan (Construction/Closing Phase)

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
Pollution	Air Quality	- Impact of air pollution, dust/emission gases by construction work	- Sprinkle water around the project site and roads. - Avoidance of intensive operation of construction machineries	Contractor	Project Proponent	- Water and car running cost for sprinkling water
	Water Quality	- Discharging muddy water from bare land - Wastewater from construction camps	- Installation of settling ponds or simple turbid water treatment - Installation of septic tank - Preparation of the discharge water treatment plan	Contractor	Project Proponent	- Equipment Installation Cost

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
	Waste	- Construction waste by cut earthwork	- Reuse the residual soil generated in cutting work for filling work in the site - Preparation and implementation of the waste management program	Contractor	Project Proponent	-Included in construction cost
	Noise and Vibration	- Impacts of noise and vibration by construction machineries and vehicles	- Installation of sound-proofing sheet, - Avoidance of construction at nighttime, - Advanced notice for construction work time near the monastery and residential area - Avoidance of intensive operation of construction machineries - Speed limit for drivers	Contractor	Project Proponent	- Facility installation cost - Education cost - Miscellaneous expenses
Natural Environment	Flora, Fauna, and Biodiversity	- Clearance of existing vegetation	- Clear marking of boundary of the project site to prevent the contractor from clearing the vegetation outside of the project site	Contractor	Project Proponent	-Miscellaneous expenses
	Hydrology	- Impact on hydrology due to water consumption used in the construction work	- Limited and short term usage of groundwater - Preparation of tentative retention pond	Contractor	Project Proponent	- Construction cost for tentative retention pond
	Soil Erosion	- Soil erosion of the bank	- Provision of temporary drainage and/or sandbag to minimize soil erosion of the bank due to rainy water	Contractor	Project Proponent	-Miscellaneous expenses
Social Environment	Living and livelihood	- Impact on the living and livelihood by construction works	- Implementation of the income restoration program	TSMC	TSMC	- Assistance Package
			- Advanced notice for construction work time - Avoidance of intensive operation of construction vehicle	Contractor	Project Proponent	-Miscellaneous expenses
	Local Conflict	- The conflict between construction workers and local people	- Education training to workers to avoid the conflict with local people	Contractor	Project Proponent	- Education cost
	Misdistribution Benefit and Damage	- Misdistribution benefit and damage between PAHs and non-PAHs	- Livelihood restoration activities for PAHs by Assistance Package	TSMC	TSMC	-Assistance Package
			- Establishment of the community relation department	Project Proponent	Project Proponent	-Operation cost
	Children's right	- Spend more time /money to coming school	- Assistance for coming school	TSMC	TSMC	-Assistance Package
		- Illegal child labor	- Compliance with the relevant regulations	Contractor	Project Proponent	
	Existing Infrastructures and Services	- Accessibility to social infrastructure would be relocated PHHs	- Assistance for arrange of basic social infrastructure	TSMC	TSMC	-Assistance Package

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
	Water Usage	- Impact on the daily water use of local people by well of lake near project site	- Assistance for daily water use as necessary	TSMC	TSMC	-Assistance Package
Health and Safety	Risks for infectious diseases such as AIDS/HIV	- Risks for infectious disease by inflow of construction workers	- Training and awareness rising for workers	Contractor	Project Proponent	- Education cost
	Occupational Health and Safety	- Accidents in the operation of construction machinery and increase of traffic volume during construction	- Conducting training activities for construction workers based on OHS training stipulated in the international guidelines such as EHS Guidelines of IFC - Arrange the accident-prevention measures	Contractor	Project Proponent	- Education cost - Cost for installation of safety facilities - Equipment purchase cost
	Community Health and Safety	- Accidents of residents by construction vehicles - Dust and noise due to the construction activities	- Speed limit for drivers - Sprinkle water around the project site and roads. - Avoidance of intensive operation of construction machineries	Contractor	Project Proponent	- Education cost - Water and car running cost for sprinkling water
Emergency	Flood Risk	- Increase of the impact of flood in and around the projects site	- Preparation of the disaster prevention equipment and management manual	Contractor	Project Proponent	- Education cost - Equipment purchase cost
	Risk of Fire	- Impact on the community around the project site by increasing of risk of fire	- Compliance with the TSMC's regulation for building construction and fire safety	Contractor	Project Proponent	- Education cost - Equipment purchase cost
	Earthquake	- Increasing of the damage of the earthquake in and around the projects site	- Preparation of the disaster prevention equipment and management manual	Contractor	Project Proponent	-Education cost -Equipment purchase cost
Others	Global Warming	- Emission of greenhouse gases (GHGs) construction machineries and vehicles	- Control of GHGs emission in the construction work	Contractor	Project Proponent	- Miscellaneous expenses

Source: EIA Study Team

Table 9: Environmental Mitigation and Management Plan (Operation Phase)

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
Pollution	Air Quality	- Impact of air pollution caused by the tenants	- Provision of commuter bus - Speed limit for drivers in the project area	Tenants including Project Proponent	Tenants including Project Proponent	- Bus Operation cost
	Water Quality	- Effluent water from tenants and offices in logistic area, and residence and commercial area	- Operation and maintenance of wastewater treatment	Tenants	Tenants	- Installation cost - O&M cost

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
	Waste	- Impact of waste generated from factories and offices.	- Management of non-hazardous waste from tenants and utility area of themselves	Tenants	Tenants	- Disposal cost
			- Management of hazardous waste by tenants	Tenants	Tenants	- Treatment cost - Disposal cost
	Soil Contamination	- Soil contamination is caused by the tenants and offices	- Control of solid and liquid waste which causes soil contamination	Tenants	Tenants	- Treatment cost
	Noise and Vibration	- Noise and vibration from tenants	- Preparation of the sound barrier as necessary	Tenants	Tenants	-Installation cost
	Offensive Odor	- Odor caused by the tenants.	- Control of emission gas and waste which causes offensive odor, as necessary	Tenants	Tenants	- Treatment cost
	Bottom Sediment	- Impact on bottom sediment by discharge water	- Operation and maintenance of the centralized wastewater treatment system	Project Proponent	Project Proponent	- Installation cost - O&M cost
Natural Environment	Flora, Fauna, and Biodiversity	- Impact of changing the vegetation	- Planting trees, vegetation, sodding of public spaces such as road, and other open space of each tenant	Tenants and Project Proponent	Tenants and Project Proponent	- Maintenance cost
	Hydrological	- Impact on hydrology due to the change in land use.	- Maintenance of existing canal condition to keep its natural retention function	Project Proponent	Project Proponent	- Maintenance cost
	Soil Erosion	- Impact on existing canal by discharge water	- Maintenance of existing canal condition to keep its natural retention function	Project Proponent	Project Proponent	- Maintenance cost
Social Environment	Living and Livelihood	- Impact on the living and livelihood for PAHs due to involuntary resettlement and for local communities	- Implementation of the income restoration program	TSMC	TSMC	-Assistance Package
	Water Usage	- Impact on the daily water use of local people by well of lake near project site	- Management of drainage ditch and maintenance existing creek crossing the Zone B logistic, residence and commercial areas	Project Proponent	Project Proponent	- Installation cost - O&M cost
	Landscape	- Impact on the landscape	- Following the rule of landscape in accordance with proposed internal regulation for residence and commercial proposed internal regulations	Tenants including Project Proponent	Tenants including Project Proponent	- Design and construction cost
Health and Safety	Risks for Infectious Diseases such as AIDS/HIV	- Risks for infectious diseases by inflow of workers.	- Training and awareness rising for workers	Tenants including Project Proponent	Tenants including Project Proponent	-Education cost
	Occupational Health and Safety	- Accidents of tenant's workers. - Working conditions and safety of the operation phase	- Conduct training activities for workers based on OHS training stipulated in the international guidelines such as EHS Guidelines of IFC - Accident-prevention measures	Tenants	Tenants	- Education cost - Cost for installation of safety facilities

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
	Community Health and Safety	- Accidents of residents by operation vehicles - Emission and noise due to the operation activities	- Speed limit for drivers - Avoidance of intensive operation of the tenants' machineries	Tenants	Tenants	- Education cost - Cost for installation of safety facilities
Emergency	Usage of Chemical	- Risk of chemical material	- Training of safety usage and preparation of the emergency response plans - Implementation of the proper storage and record of usage.	Tenants	Tenants	-Education cost - Equipment purchase cost
	Flood Risk	- Increasing of the impact of flood in and around the projects site	- Preparation of the disaster prevention equipment and management manual	Tenants including Project Proponent	Tenants including Project Proponent	-Education cost - Equipment purchase cost
	Risk of Fire	- Impact on the community around the project site by increasing of risk of fire	- Installation of the fire hydrants along the road - Implementation of emergency drill	Tenants including Project Proponent	Tenants including Project Proponent	-Education cost - Equipment purchase cost
	Earthquake	- Increasing of the damage of the earthquake in and around the projects site	- Compliance with the TSMC's Standard Operational Procedure for (SOP) for building construction - Preparation of the disaster prevention plan such as emergency contact list	Tenants including Project Proponent	Tenants including Project Proponent	-Education cost - Equipment purchase cost
Others	Global Warming	- Impact in the increase of GHGs by vehicle traffic operation of tenants in the operation phase.	- Control of GHGs emission by the tenants - Provision of commuter bus	Tenants	Tenants	- Installation cost - O&M cost - Bus operation cost

Source: EIA Study Team

(2) Environmental Monitoring Plan

Environmental monitoring plan including monitoring items, location, frequency and responsible organization at the pre-construction phase, construction phase, and operation phase are shown in Table 10 to Table 12. Responsible organizations are in charge of monitoring and preparation of its results. The project proponent will submit the monitoring report at the pre-construction phase and construction phase to MOECAF. The Operation Department will submit the monitoring report at the operation phase to TSMC.

Table 10: Environmental Monitoring Plan (Pre-construction Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Checking and revising the Environmental Mitigation and Management Plan by reviewing the final detailed design of the Project - Checking the Environmental Monitoring Plan during Construction prepared by Contractor	Project Site	Once	Contractor
Social Environment	- Monitoring of the implementation status of the Assistance Package for involuntary resettlement, living and livelihood, vulnerable group and cultural heritage/ asset	Project Site and Relocation Site	Once	TSMC
Existing social infra-structures and services	- Securing of community accessibility	Around Project Site	Once	Contractor

Source: EIA Study Team

Table 11: Environmental Monitoring Plan (Construction Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	Each location	Once/month	Contractor
Air Quality	- NO_2, SO_2, CO, $PM_{2.5}$, PM_{10}	Construction site (1 point)*	1 week/3 months	Contractor
Water Quality	- Water temperature, pH, SS, DO, BOD_5, COD, coliforms, oil and grease, chromium	- Outflow of construction site to the creek (at least 3 sampling points/mixing point: i) discharge water, ii) upstream water, and iii) downstream water) ** - Well near the construction site (1 point)	Once/2 months	Contractor
Waste	- Amount and kind of solid waste	Construction site	Once/3 months	Contractor
Noise and Vibration	- Noise and vibration level - Traffic count	Preservation area such as residence around the proposed construction site (at least 1 point)	Once (24 hours)/3 months	Contractor
		preservation site such as residence along the route for on-site vehicles (2 points)	Once (24 hours)/3 months	Contractor
Hydrology	- Groundwater level - Ground elevation level - Consumption of groundwater amount	Well near the construction site	Once/ months	Contractor
Risks for Infectious Disease such as AIDS/HIV	- Awareness of infectious diseases	Construction site	Once/month	Contractor
Occupational Health and Safety	- Record of accidents and infectious diseases	Construction site	Once/month	Contractor
Community Health and Safety	- Record of accidents and infectious diseases related to the community	Around construction site	Once/month	Contractor

Note: *Air quality monitoring site in the construction area should be selected in consideration of keeping the same location during construction phase.
** Water quality monitoring location should be selected at least three points for one discharge point to confirm the impact of the effluent water from the project site to the existing canal.
Source: EIA Study Team

Table 12: Environmental Monitoring Plan (Operation Phase)

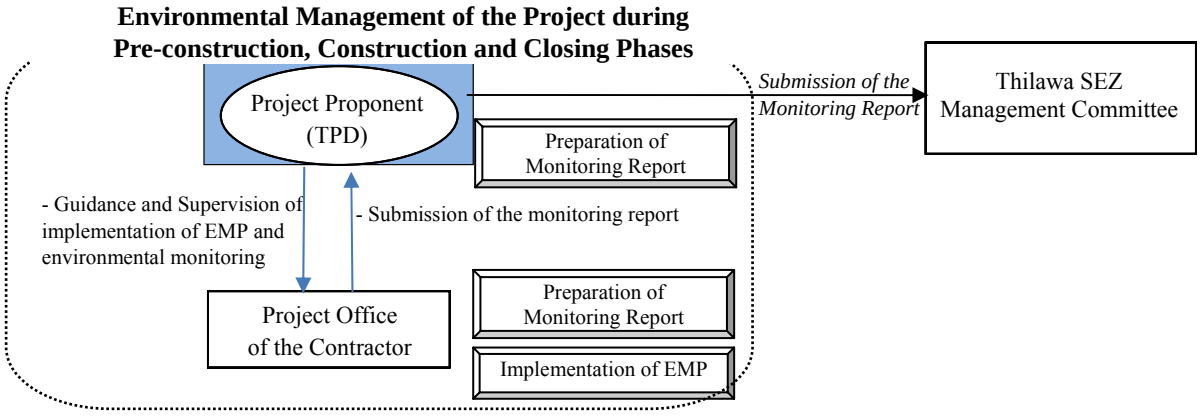
Survey Item	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	Project site	Quarterly (3 years after operation) Yearly (after 3 years operation)	Project Proponent
Air Quality	- NO_2, SO_2, CO, $PM_{2.5}$, PM_{10}	Representative point inside the project area	1 week each in the dry and rainy seasons (first 3 years after starting of the operation stage)	Project Proponent
Water Quality	- Water temperature, pH, SS, DO, BOD_5, COD, color and odor, Total Nitrogen, Total Phosphorus, Sulphide, HCN, Oil, Grease, Formaldehyde, Phenols, Free chlorine, Zinc, Chromium, Arsenic, Copper, Mercury, Cadmium, Barium, Selenium, Lead, and Nickel	- Discharge water from each area to the creeks (Logistic, residential and commercial) , (at least 3 sampling points/mixing point: discharge water, upstream water, and downstream water)	Every 2 month: Water temperature, pH, SS, DO, BOD_5, COD, color and odor, Every 6 month :all parameters	Project Proponent
Waste	- Amount of non-hazardous waste management - Amount of hazardous waste management	Each tenant	Twice/year (submission of the environmental report by the tenants)	Tenants
Soil Contamination	- Status of control of solid and liquid waste which causes soil contamination	Each tenant	Twice/year (submission of the environmental report by the tenants)	Tenants

Survey Item	Item	Location	Frequency	Responsible Organizations
Noise and Vibration	- Noise level at the monastery and residences -Traffic count	Tenants including Project Proponent	One time each in the dry and rainy seasons (first 3 years after starting the operation stage)	Tenants including Project Proponent
Offensive Odor	- Status offensive odor control by the tenants	Each tenant	Twice/year (submission of the environmental report by tenants)	Tenants
Bottom Sediment	- Water quality monitoring (as indicator of the pollution of the bottom sediment)	Same as the water quality monitoring	- Additional analysis on the bottom sediment of creek, in case of finding continuous high concentration	Project Proponent
Hydrological Situation	- Checking the function of existing creek at heavy rain.	Existing creek crossing the project site	When the heavy rain	Project Proponent
Risks for Infectious Disease such as AIDS/HIV	- Status of measures against infectious diseases	Each tenant	Twice/year (Submission of the environmental report by the tenants)	Tenants
Occupational Health and Safety	- R Record of accidents and infectious diseases	Work site and office	Twice/year (Submission of the environmental report by the tenants)	Tenants including Project Proponent
Community Health and Safety	- Record of accidents and infectious diseases related to the community	Around the project site	Twice/year (Submission of the environmental report by the tenants)	Project Proponent

Source: EIA Study Team

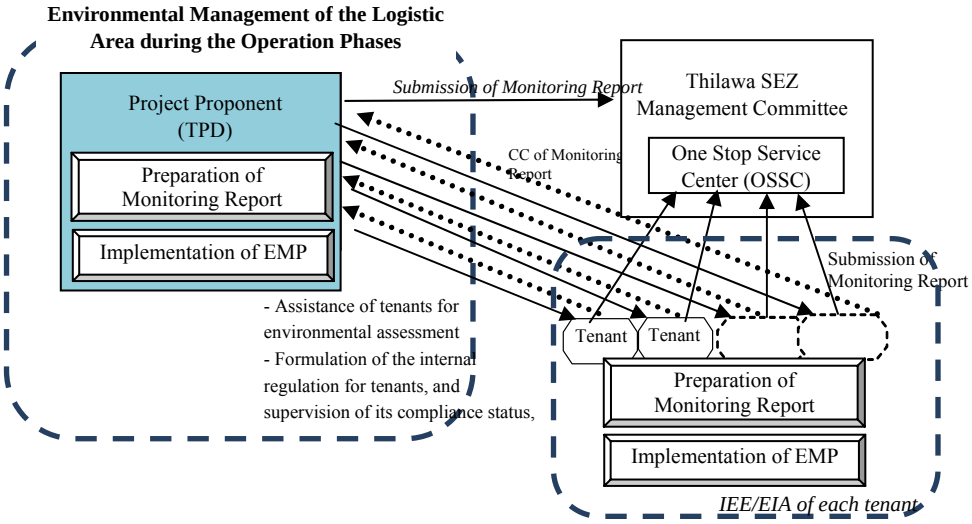
10. Institutional Arrangement

The organization structures for environmental management during the pre-construction and construction phases of the Project, the operation phase of the logistic area and the residence and commercial areas are proposed as shown in Figure 6, 7 and 8.



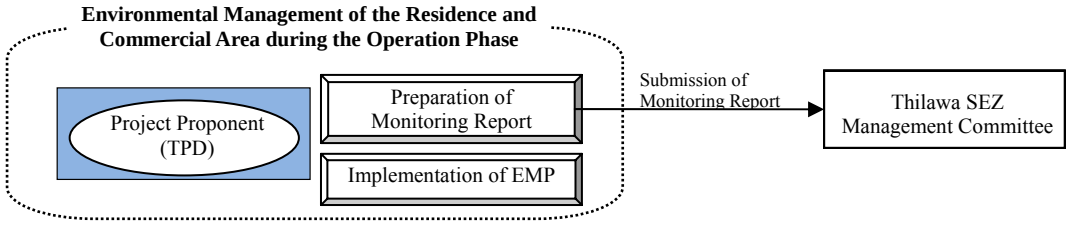
Source: EIA Study Team

Figure 6: Prposed Organization Structure for Environmental Manamement of the Project during the Pre-constructoin and Construction Phases



Source: EIA Study Team

Figure 7: Proposed Organizational Structure for Environmental Management of the Logistic Area during the Operation Phase



Source: EIA Study Team

Figure 8: Proposed Organization Structure for Environmental Management of the Residence and Commercial Areas during the Operation Phase

11. Public Consultation and Public Disclosure

(1) Scoping Stage

In the scoping stage, three sessions of public consultation meeting (PCM) and public disclosure (PD) were conducted as shown in Table 13.

Table 13: Summary of Public Consultation Meeting for EIA at the Scoping Stage

Item	Description
Time and Date	(1) Saturday, 19 December 2015 1st session: 9:30AM to 10:45AM (2) Tuesday, 22 December 2015 2nd session: 9:30AM to 10:45AM, 3rd session: 3:00PM to 4:15PM
Venue	Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Thanlyin Township near Thilawa SEZ
Invitees	- Director, Environmental Conservation Department in Yangon Division, MOECAF - Deputy Commissioner, General Administration Dept., Yangon Southern District - Officers, General Administration Dept. in Thanlyin and Kyauktan townships - Officers, Housing Department, Ministry of Construction, Thanlyin Township - Township officers, Municipal Dept. and Rural Development Dept., Dept. of Health in Thanlyin Township and Kyauktan Township - Officers, Myanmar Port Authority, Ministry of Transportation - Relevant companies/factories in Thilawa SEZ - Local residents in and around Thilawa SEZ area - Project Proponent/developer and related government organizations (e.g., TSMC, MJTD) - Other organizations and individuals who are interested in the project
Attendee	1st session:347 people (men: 234, women: 113)

Item	Description
	2nd session: 35 people (men: 30, women: 5) 3rd session: 48 people (men: 34, women: 14)
Agenda	- Brief explanation on the past EIA-related studies - Project brief on the industrial area, residential and commercial area and logistic area planned in Zone B area - Major positive and negative findings on the draft scoping results, scope of the EIA study - Further schedule of EIA
Language used	In local language, Myanmar language
Q & A session	In total, eight questions were raised from the participants and discussed with the Project Proponent and coordinating organization. 1) Request for clarification on the impact of the development of Zone B area on the road condition in this EIA study 2) Inquiry regarding the places where to submit the suggestions or comments of the public 3) Request for clarification on the impacts on air and soil due to the disposal of wastes by migrated workers 4) Request for additional distribution of the summary of the scoping report 5) Inquiry regarding the area where the EIA study is implemented whether it is 700 ha or the entire area in Thilawa SEZ 6) Inquiry regarding the project plans for power supply and water supply in Thilawa SEZ area 7) Request for the arrangement of other resettlement site 8) Inquiry regarding the impact on the health issue of local community by the development of Zone B area in this EIA study
Feedback sheet	In total, 18 comments in the three PCM sessions were submitted. Major comments and opinions are summarized below. 1) Request for assessing the impact on social environment adequately including indirect impacts to the local people 2) Clarification on the environmental mitigation measures and request for conducting appropriate environmental management 3) Request for taking the comments and opinions of the local residents into consideration in the whole process of project 4) Request for explaining the situation on natural environment periodically in the project 5) Request for establishing a mutual understanding by direct discussions between the project developer and local people. 6) Appreciation for the increase in job opportunity caused by the Project.

Source: EIA Study Team

Source: EIA Study Team

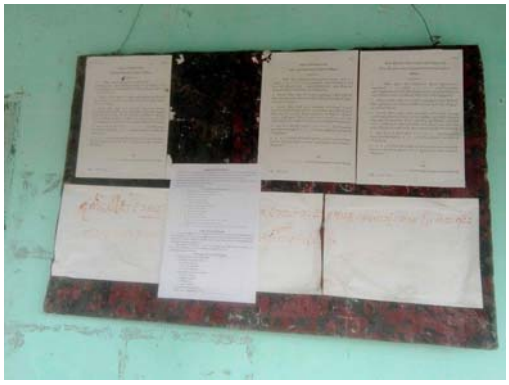
Figure 9: Pictures of PCM at Scoping Stage

Table 14: Summary of Public Disclosure for EIA at Scoping Stage

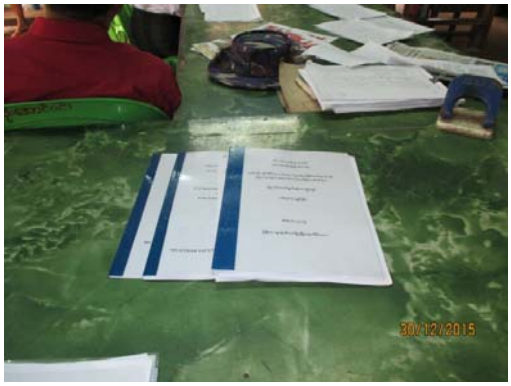
Item	Description
1.Disclosure period (Ten working days)	Monday, 18th January 2016 to Thursday, 29th January, 2016 (10 working days)
2.Disclosure place	A total of 12 places
3.Comment submission method	Comments can be submitted by using the comment form provided at the disclosure places or by e-mail either in Myanmar language or in English.
4.Language used	In local language, Myanmar language and in English

5.Comments	One letter was received from the public. Main comment and opinions are summarized as below. ・ Request for the arrangement of disclosure periods for draft scoping report as 2 week at least. ・ Request for preparing the full version of the scoping report in Myanmar. ・ Request for disclosing draft EIA report as 1 month at least. ・ Inquiry that whether the draft EIA report will be prepared separately for "Industrial Area" and "Logistic, Residence & Commercial Area" or prepared as the combined one. ・ Request for distributing the copies of the draft EIA reports to more places additionally ・ Request for disclosing the draft EIA report 2 weeks before PCM ・ Inquiry for clarifying the information on Hindu temple under the scoping item "Cultural Heritage" ・ Request for clarifying the difference in the evaluation levels at closing Stage between "Living and Livelihood" and "Vulnerable Group" ・ Request for describing the draft EIA report clearly with Myanmar language for better understanding of local people

Source: EIA Study Team



Announcement Letter Displayed at
Ah Lun Soke Village Tract Office



Draft Scoping Report Distributed at
Let Yet San Village Tract Office

Source: EIA Study Team

Figure 10: Pictures of Announcement Letter and the Draft Scoping Report Distributed at the Village Tract Office

(2) Draft EIA Stage

In the draft EIA stage, another PCM and PD will be conducted at the time of the draft EIA report preparation as follows:

Table 15: Public Consultation and Public Disclosure Plan for the Draft EIA

Stage	Methodology and Special Considerations
Public Consultation	【Method and Number of Meetings】 same as the scoping stage 【Venue】 same as the scoping stage 【Agenda】 ・ Draft final plan on the industrial area, residential and commercial area, and logistic area ・ Baseline survey result and impact assessment results ・ Proposed mitigation measures and monitoring plan ・ Further EIA study schedule 【Expected Participants】 same as the scoping stage 【Language】 same as the scoping stage 【Special Considerations to Socially Vulnerable Groups】 same as the scoping stage
Public Disclosure	【Announcement Method】 ・ Public disclosure will be announced in the public consultation meetings. ・ Disclosure period, comment submission method will be described in the disclosure places. ・ The draft report will be available on the official website. 【Disclosure Place】 ・ Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Thanlyin Township near Thilawa SEZ (planned) ・ General Administration Office, Thanlyin Township ・ General Administration Office ,Kyauktan Township ・ Village Tract Office/Ward Office in the Thilawa SEZ area 【Disclosure Period】 ・ One month ・ Public disclosure will be organized in advance of the public consultation meetings. 【Comment Submission Method】 ・ Comments can be submitted by using the comment form provided at the disclosure places or by e-mail either in Myanmar language or in English.

Source: EIA Study Team

(3) Public Consultation Meeting and Public Disclosure for the Resettlement Work Plan (RWP)

A series of PCMs and PD is planned to be implemented based on the Framework of Resettlement Works for the 2000ha Development Area of Thilawa Special Economic Zone (SEZ) released by TSMC in February 2016. In the framework, the 2000ha development area is broadly divided into Area 1 to Area 6 and moreover, some RWP areas are divided into small parts in terms of the smooth implementation of resettlement works and the timing of the actual development. Logistic Area is composed of 6 RWP areas, and Residence and commercial area is composed of 2 RWP areas respectively. The public consultation meeting and public disclosure for the draft RWP is planned to be implemented area by area, as shown in Table 16 and Table 17.

Table 16: Public Consultation Meetings for the RWP (planned)

Methodology and Special Considerations
【Method and the Number of Meetings】 - Total 3 meetings at maximum in one day during weekend based on the number of expected participants (planned) - Local transportation will be provided from the major residential area in the project area to the meeting venue 【Venue】 Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Kyauk Tan Township near Thilawa SEZ (To be arranged another places based on the accessibility of participants) 【Agenda】 - Contents of assistance package for loss of assets, income source, relocation, etc. - Resettlement site - Contents of IRP (Income Restoration Program) - Further schedule (schedule of individual negotiation and relocation) 【Expected Participants & Invitation Method】 - Project Affected Households - The meeting will be informed through the invitation letters or the public notice posted in each village one week in advance. 【Language Used】 - The presentation and handout in Myanmar language. The explanation will be provided in Myanmar language. 【Special Considerations to Socially Vulnerable Groups】 - Feedback forms will be provided to the participants so that the people who hesitate to speak out in public can share their views and comments.

Source: EIA Study Team

Table 17: Public Disclosure for the RWP (planned)

Methodology and Special Considerations
【Announcement Method】 - Public disclosure will be announced in the public consultation meetings. - Disclosure period, comment submission method will be described in the disclosure places. - The draft RWP will be available on the official website. 【Disclosure Place】 - Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Kyauk Tan Township near Thilawa SEZ (planned) - General Administration Office, Thanlyin Township - General Administration Office ,Kyauktan Township - Village Tract Office/Ward Office in the Thilawa SEZ area - Other places based on the request from project affected people 【Disclosure Period】 - One Month 【Comment Submission Method】 - Comments can be submitted with the comment form provided at the disclosure places or by e-mail either in Myanmar or English language.

Source: EIA Study Team

12. Comments fromTSMC for the Scoping Report

TSMC issued an approval letter (Ref: TSEZ-EIA-004) of the Scoping Report on Environmental Impact Assessment for Development of Logistic Area, Residence and Commercial Areas of Zone B in the Thilawa Special Economic Zone on 26 February 2016 with terms and conditions. The project proponent prepared draft EIA report with corresponds to these terms and conditions as shown in Table 18.

Table 18: Correspondence to the Terms and Conditions from TSMC

No.	Terms and Condition from TSMC	Correspondence
(i)	You shall describe the contact address, profile, and relevant experience of the organization which has been conducting the EIA study as well as information on environmental, social, and health experts as key personnel including each person's experience in the field of environmental, social, and health impacts assessment, academic credentials, and relevant certificates and accreditations.	Information of the implementation organizations of EIA was described in Chapter 1 of the draft EIA report. CV of each experts of the EIA Study Team were attached in Annex.
(ii)	You shall describe international conventions, treaties and agreements related to your Project as the project's policy and legal framework.	Major international conventions, treaties and agreements that the Myanmar government has ratified related to the Project were described in Chapter 2 of the draft EIA report.
(iii)	You shall set project's target levels for environment taking into consideration the Myanmar National Environmental Quality (Emission) Guidelines issued by the Ministry of Environmental Conservation and Forestry on 29 December 2015 and conditions of surrounding area.	Taken into account the Myanmar National Environmental Quality (Emission) Guideline, the project's target levels were revised and described in Chapter 2 of the draft EIA report.
(iv)	You shall add project's target levels for effluent water quality for logistic area and residence and commercial areas separately.	Target levels for (i) effluent water quality of logistic area and (ii) effluent domestic wastewater that is for residence and commercial areas were set in Chapter 2 of draft EIA report.
(v)	You shall describe the institutional arrangement for environmental management by your organization including the organizational chart, a section in charge of environment, and its role and responsibility in construction stage and operation stage at least.	Institutional arrangements for environmental management for two stages; (i) pre-construction, construction and closing stages and (ii) operation stage were summarized in Chapter 2 of the draft EIA report.
(vi)	You shall describe the detailed project information in order to assess the environmental, social, and health impacts properly.	Detailed project information was presented in Chapter 3 of the draft EIA report.
(vii)	You shall include socio-economic components such as access to public services and natural resources in the ToR for the EIA investigation in order to assess social impacts properly.	Impact on accessibility to public services and natural resources was included in the TOR for the EIA investigation and assessment in Chapter 7 of the draft EIA report.
(viii)	You shall conduct scoping evaluation for impacts on soil erosion, usage of chemicals, and earthquakes, and shall conduct its impact assessment if needed.	Impacts on soil erosion, usage of chemicals, and earthquakes were considered for scoping and evaluated in Chapter 7 of the draft EIA report.
(ix)	You shall conduct scoping evaluation for residual impact in the stage of after project closure and conduct its impact assessment if needed.	Residual impacts in the stage after project closure were considered and described in Chapter 8 of the draft EIA report.
(x)	In addition to the impact assessment for the development of logistic area and residencece and commercial areas of Zone B, you shall assess cumulative impact including the development of Zone A and the development of the industrial area of Zone B.	Cumulative impacts of the development of Zone A were taken into consideration when impacts of the Project were assessed in Chapter 7 of the draft EIA report. Impacts which should be assessed cumulatively such as air and noise/vibration were evaluated in consideration of Zone B development including industrial area.
(xi)	You shall reflect all of the above comments to the draft EIA report.	The comments received from TSMC were considered to be reflected in the draft EIA report.

Source: EIA Study Team

13. Conclusion

As to the results of the EIA study for the logistic area, residence and commercial area of Thilawa SEZ project, the following items are found:

1) In terms of living environment, most of the impacts are controlled and limited in and around the project area. The key negative impacts such as emission gas and dust, deterioration of water quality, generation of noise and vibration are expected. However, implementation of appropriate mitigation and management plan, such as to spray water to bare areas for dust prevention and to avoid the incentive operation of the construction machinery for prevention of emission gas, noise and vibration during construction phase, and to provide the commuter bus by tenants and to comply with the tentative target value of effluent water flowing out of the wastewater treatment plant by tenant during operation phase, will minimize these impacts.

2) In terms of natural environment, the key negative impact is the clearance of existing vegetation during construction phase, though there is no sensitive ecological protection area. However, implementation of appropriate mitigation measures, such as planting trees, vegetation and sodding of public spaces as soon as possible and keeping the environmental conditions along the existing canal will minimize the impact on the ecosystem.

3) In terms of social environment, land acquisition and some scale of involuntary resettlement are expected. Impact on livelihood of the project-affected persons (PAPs) including vulnerable people and children is also expected during the pre-construction, construction and operation phase. Toward this issue, the resettlement framework of the Thilawa Special Economic Zone (SEZ) (2,000 ha) was prepared that includes compensation and assistance package and income restoration program for the PAPs and will be conducted by Thilawa SEZ Management Committee (TSMC), that will mitigate the impacts of the Project on social environment.
   On the other hand, some positive impacts of the Project such as increase in job opportunity and improvement of social infrastructure are also expected.

4) In terms of health and safety, some impacts on occupational/community health and safety and increase in number of accidents are expected. However, implementation of appropriate mitigation and management plan, such as to manage working conditions during the construction work and to provide security and maintain safety prevention measures during construction /operation phase will minimize these impacts.

5) In consideration of the result of the EIA study for the Project, the Environmental Management Plans (EMPs) including adequate mitigation measures to reduce the negative impacts and Environmental Monitoring Plan (EMP) are proposed for each phase of the Project: pre-construction phase, construction/closing phase, and operation phase.

This draft EIA report will be updated and finalized in accordance with the comments received during the public consultation meeting and public disclosure on the draft EIA, and the examination of TSMC.

CHAPTER 1: INTRODUCTION

1.1 Project Proponent

Project Proponent: Thilawa Property Development Ltd.

Address: 11th Floor, UMFCCI Tower, No. 29, Min Ye Kyaw Swar Street, Lanmadaw Township, Myanmar

The developer of the Thilawa Special Economic Zone (SEZ), as defined under the Myanmar Special Economic Zone Law (2014), will be the Myanmar Japan Thilawa Development Limited (MJTD) and the project proponent will be the Thilawa Property Development Ltd. (TPD), who will lease the project site. Currently, it is planned either the land lease agreement will be signed between the Thilawa SEZ Management Committee (TSMC) and MJTD and the sublease agreement will be entered into between TPD and MJTD; or the land lease agreement will be signed among the three parties, namely: TSMC, MJTD, and MTSH (TPD). TPD will develop, operate, and manage the Project and will also be responsible for the environmental impact assessment (EIA) as well as the environmental management of the Project.

1.2 Implementation Organization of the Environmental Impact Assessment

The organizations in-charge of the implementation of the environment impact assessment (EIA) (hereinafter referred to as the "EIA Study Team"), is presented in Table 1.2-1. The members of the EIA Study Team are listed in Table 1.2-2. The profile of each organization and the curriculum vitae of the key experts of the EIA Study Team are attached in Annex 1-1.

Table 1.2-1 Implementation Organization of EIA

	Organization	Responsibility
International Lead Consultant	Nippon Koei Co., Ltd., Tokyo, Japan (NK)	Overall management and technical aspect of EIA
Local Consultant	Myanmar Koei International Co., Ltd. (MKI)	Field survey
	Resource and Environment Myanmar Ltd. (REM)	Field survey and public consultation meeting

Source: EIA Study Team

Table 1.2-2 Members of the EIA Study Team

Name of Organization	Name	Position	Background	Years of Experience
Nippon Koei Co., Ltd.	Mr. Tomoaki Tanabe	Team Leader	B. Eng. (Civil & Environmental)	20 years
	Ms. Naoko Katashima	Sub-Team Leader Social and Health Expert,	M. Sc. (Environmental Science) B. Sc. (Public Affairs)	15.5 years
	Mr. Kensaku Kawai	Urban Planning Expert	B. Sc. (Agricultural Technology)	22 years
	Mr. Shinji Tanaka	EIA Expert (Air)	B. Eng. (Civil Engineering)	14 years
	Mr. Atsushi Minami	EIA Expert (Water)	M.Sc. (Human Environment) B. Sc. (Human Environment)	9 years
	Mr. Kengo Naganuma	EIA Expert (Waste)	M. Sc. (Environmental Management and Conservation for Soil and Water Resource) B. Sc. (Environmental Management and Conservation for Soil and Water Resource)	23 years
	Mr. Satoshi Miyaichi	EIA Expert (Noise and Vibration)	M. Eng. (Urban and Environmental Engineering) B. Eng. (Civil Engineering)	12 years

Name of Organization	Name	Position	Background	Years of Experience
Nippon Koei Co., Ltd.	Ms. Sachiko Sakurai	EIA Expert (Natural Environment)	M. Eng. (Social Engineering) B. Eng. (Social Engineering)	6 years
	Ms.Junko Masaki	Social Impact Assessment Expert	M. Sc. (Environmental Science) B. Sc. (Biological Resources Engineering)	12 years
	Ms. Maki Ikuse	Social Impact Assessment Expert	M. Sc. (Frontier Science) B. Agr. (Agriculture)	2 years
	Mr. Tung Xuan Bui	EIA Expert (Field Survey Analysis)	Ph.D. (Environmental Science and Engineering) M. Sc. (Environmental Science and Engineering) B. Sc. (Chemistry)	12 years
Myanmar Koei International Co., Ltd.	Mr. Htein Lin	Team Leader of Noise and Vibration Survey	M. Agr. (Agriculture) B. Agr. Sc. (Agriculture)	8 years
	Mr. Aung Thu	Coordinator/ Noise and Vibration Survey	B. A. (Economic)	9 years
Resource and Environment Myanmar Ltd.	U Zaw Naing Oo	Team Leader of Water, Soil, Air Quality Baseline Survey	M. Sc. (Geology) B. Sc. (Geology)	19 years
	U Thura Aung	Water Quality and Soil Quality Survey	M. Sc. (Geology) B. Sc. (Geology)	11 years
	U Soe Yu Tun	Air Quality Survey	B. Sc. (Geology)	5 years

Source: EIA Study Team

1.3 Overall Schedule of Environmental Impact Assessment

The Environmental Impact Assessment Procedure (No.616/2015) (hereinafter referred to as the "EIA Procedure"), which was issued by the Ministry of Environmental Conservation and Forestry (MOECAF) on 29 December 2015 defines the detailed legal process regarding EIA procedures including the preparation of EIA/IEE report, environmental management plan (EMP), public involvement, approval of EIA/IEE report by MOECAF, and monitoring process in accordance with the EIA report. In this EIA Procedure, "Industrial Zone Construction and Development (all sizes)" projects are requested to conduct full EIA study.

On the other hand, Presidential Decree No.49/2015 was enacted and this defines the transfer of power related to administrative procedures in SEZ. According to Thilawa SEZ Management Committee (TSMC), TSMC and MOECAF have been developing a procedure related to environmental management for investors as well as zone development in Thilawa SEZ based on the Decree since October 2015. In February 2016, TSMC finalized a procedure of appraisal of EIA for zone development and issued the approval letters of the Scoping Reports to the Project Proponents on 26th February 2016. For the appraisal of the EIA study for Zone B development, a mobile review team, which is composed of staff from MOECAF, Ministry of Industry, Ministry of Health, and Ministry of Labor, was established in January 2016 to review the draft EIA report. TSMC together with the mobile review team will make comments on the draft EIA Report through EIA Review Committee to be organized in April 2016. After issuing comments on the draft EIA Report, TSMC will apprise the final EIA Report.

Considering the above situation, the Project Proponent has conducted EIA based on the EIA Procedure and the appraisal procedures of EIA for zone development in the Thilawa SEZ, and will submit the EIA Report to TSMC for approval.

EIA schedule of the Project is as shown in Table 1.3-1.

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Table 1.3-1 EIA Schedule of the Project (as of March 2016)

Item	2015			2016			
	September/ October	November	December	January	February	March	April
1. Examination of the Project Plan							
2. Scoping							
Preparation of the Draft Scoping Report							
Public Consultation Meeting/ Public Disclosure			▲				
Submission of the Final Scoping Report					▲		
Approval of Final Scoping Report by TSMC					▲		
3. Field Survey							
Field Survey during the Rainy Season							
Field Survey during the Dry Season							
4. EIA							
Preparation of the Draft EIA Report							
Public Consultation Meeting/ Public Disclosure							▲

Source: EIA Study Team

CHAPTER 2: POLICY OF ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

2.1 Myanmar Regulatory Framework

2.1.1 Institutional Setting of the National Level

Myanmar has 31 ministries under the Office of the President. The leading ministries in-charge of environmental and social considerations are the Environmental Conservation Department of the Ministry of Environmental Conservation and Forestry (MOECAF) that was established in September 2011.

2.1.2 Fundamental Laws and Regulations Related to Environmental and Social Considerations

The fundamental laws and regulations related to the environmental and social considerations in Myanmar are shown in Table 2.1-1. In addition, major international agreements and treaties that the Myanmar government has ratified related to the environmental and social considerations are shown in Table 2.1-2.

Table 2.1-1 Fundamental Laws and Regulations Related to Environmental and Social Considerations in Myanmar

No.	Laws and Regulations as of March 2016
1.	Land Acquisition Act (1894)
2.	Underground Water Act (1930)
3.	Public Health Law (1972)
4.	Territorial Sea and Maritime Zone Law (1977)
5.	Law on Aquaculture (1989)
6.	Marine Fisheries Law (1990)
7.	Freshwater Fisheries Law (1991)
8.	Forest Law (1992)
9.	Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law (1994)
10.	National Environment Policy (1994)
11.	Prevention of Hazard from Chemicals and Related Substances Law (2003)
12.	Conservation of Water Resources and Rivers Law (2006)
13.	Environmental Conservation Law (2012)
14.	Farmland Law (2012)
15.	Farmland Rules (2012)
16.	Conservation of Water Resources and River Rules (2013)
17.	Myanmar Investment Commission: Notification No. 1/2013 and No.50/2014 (Economic activities which require environmental impact assessment)
18.	Environmental Conservation Rules (2014)
19.	Myanmar Special Economic Zone Law (2014)
20.	Ministry of National Planning and Economic Development: Notification No. 81/2014 (for the issuance of permit on the application to invest in the Thilawa Special Economic Zone)
21.	Business for Ozone Depleting Substances: Notification No.37/2014
22.	Special Economic Zone Rules (2015)
23.	EIA Procedures (December 2015)
24.	National Environmental Quality (Emission) Guidelines (December 2015)
25.	Standard Operation Procedures for Investors in Thilawa SEZ (December 2015)
26.	TSEZMC Notice to Ensure the Responsible Investment in the Thilawa SEZ (August 2015)

Source: EIA Study Team

Table 2.1-2 Major International Agreements and Treaties that the Myanmar Government has Ratified Related to Environmental and Social Considerations

	International Agreements and Treaties	Date Ratified
1	Ramsar Convention (Convention on Wetlands of International Importance Especially as Waterfowl Habitat), 1971	2005
2	Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, D.C., 1973; and this convention as amended in Bonn, Germany, 1979	1997
3	London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London, 1990	1993
4	United Nations Framework Convention on Climate Change (UNFCCC), New York, 1992	1994
5	Convention on Biological Diversity, Rio de Janeiro, 1992	1994
6	Stockholm Convention on Persistent Organic Pollutants (POPs), 2001	2004 (Accession)
7	Basel Convention, 1989	2015

Source: The Republic of the Union of Myanmar, National Biodiversity Strategy and Action Plan (2011), Website of the Basel Convention (http://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/4499/Default.aspx) (As of March 2016)

The following are summaries of the key laws related to the natural and social environment in Myanmar that will likely be relevant to the Project.

Environmental Conservation Law (ECL) (2012) and Environmental Conservation Rules (ECRs) (2014)

The Environmental Conservation Law (ECL) was enacted in March 2012. This law is the fundamental law of environmental management and environmental conservation in Myanmar prepared by MOECAF. Subsequently, the Environmental Conservation Rules (ECRs) were enacted in June 2014 as the detailed enforcement regulations for ECL. ECL stipulates MOECAF's responsibility for environmental policy and administration, formulation of environmental management plan, implementation of environmental monitoring, setting of environmental standards, management of hazardous waste, and formulation and implementation of EIA, among others.
With regard to related special economic zone (SEZ) articles, Article 16 in ECL stipulates the responsibilities of the business owner of an industrial estate or business in SEZ on environmental conservation as follows:

- To be responsible to carry out by contributing the stipulated cash or kind in the relevant combined scheme for environmental conservation including the management and treatment of waste;
- To contribute the stipulated user's charges or management fees for the environmental conservation according to the relevant industrial estate, special economic zone, and business organization; and
- To comply with the directives issued for environmental conservation according to the relevant industrial estate, special economic zone, or business.

Moreover, ECRs stipulate the basic policy and concept of EIA application for the development of projects (Article 55).

- To prepare the environment impact assessment system and submit to the Ministry (Article 55 (a) in ECRs); and
- To implement and carry out environmental management plan within the time stipulated by the Ministry and submit the performance situation to the Ministry (Article 55 (b) in ECRs).

EIA Procedure (2015)
The EIA Procedure formulated by MOECAF in coordination with the Asian Development Bank (ADB) was enacted in December 2015. This EIA Procedure covers the following contents: screening of projects, qualification for conducting the initial environmental examination (IEE)/EIA, categorization of projects for IEE/EIA/environmental management plan (EMP), preparation of IEE/EIA report and EMP, public involvement, procedure on how to get the approval of IEE/EIA report

from the Environmental Conservation Department (ECD) under MOECAF, environmental compliance certificate (ECC), and monitoring process after getting the approval of the IEE/EIA report.

National Environmental Quality (Emission) Guidelines (2015)
MOECAF formulated the National Environmental Quality (Emission) Guidelines (NEQG) in coordination with ADB in December 2015. The NEQG determines the guideline values for general emission such as air emissions, wastewater, noise levels, odor, and those for sector-specific emission such as emission from forestry, agribusiness/food production, chemicals, oil and gas, infrastructure, general manufacturing, mining, and power.

Conservation of Water Resources and Rivers Law (2006)
The aims of this law are as follows: (a) to conserve and protect the water resources and river system for the beneficial utilization of the public; (b) to enable smooth and safe waterways navigation along rivers and creeks; (c) to contribute to the development of the state economy through improving water resources and river system; and (d) to protect environmental impact.

However, this law is under the jurisdiction of the Ministry of Transport, not MOECAF. This law focuses on transportation safety and its development. However, it lacks actual numerical criterion for natural environment.

Land Acquisition Act (1894)
The Land Acquisition Act (1894) serves as the fundamental law for land acquisition in Myanmar that sets out the procedure of land acquisition and compensation. The act further outlines relevant procedures, including notice periods, procedures for objections to acquisition (Article 5), method of valuation of land, process for taking possession of land (Article 16 and 17), court processes and appeals (Article 18 and 24), procedures for the temporary occupation of land (Article 35), and the acquisition of land for companies (Article 38). The act requires that compensation 'at market value' is provided to those from whom the land is acquired (Article 23).

Farmland Law and Rules (2012)
The law determines the land use rights of farmland and the granting of land use rights to eligible farmers. It allows the right to sell, mortgage, lease, exchange, and give either whole or part of the right to use the farmland. The law determines the formation as well as the roles/responsibilities of farmland administrative bodies at various levels. The Farmland Law and Rules determine procedures such as the application for farmland registration and obtaining land use certificates, application of transfer of farmlands for other purposes, and indemnities and compensation.

Myanmar Special Economic Zone Law (January 2014)
Myanmar Special Economic Zone Law, which was enacted in 2013 and revised in January 2014, provides the basis for the government’s establishment of SEZs to encourage economic growth and foreign investment through several incentives such as five-year tax exemption and 50% income tax relief on items exported overseas for five years. Article 35 of this law stipulates that investors shall abide by the environmental standards described in the Myanmar Environmental Conservation Law and international standards.

Standard Operation Procedures for Investors in Thilawa SEZ (Version No.2 in October 2015)
The Thilawa SEZ Management Committee (TSMC) has prepared the Standard Operation Procedures (SOPs) for investors in Thilawa SEZ to get certification, approval, permit for starting their business from TSMC and One Stop Service Center (OSSC) under TSMC in accordance with SEZ law and SEZ rules. The SOPs include procedures to obtain investment license, company registration, building permit, fire safety certificate, approval of environmental conservation and prevention plan (ECPP), tax registration, labor registration, and so on.

As for the environmental protection by investors, investors are required to obtain approval of ECPP before starting construction, and to obtain approval of EIA/IEE before commencement of commercial operation, if required as judged by TSMC. Investors are also required to receive environmental

inspection and submit monitoring report in accordance with their ECPP during the construction and operation phases.

TSEZMC Notice to Ensure the Responsible Investment in the Thilawa SEZ (August 2015)
TSMC issued a notice to ensure the responsible investment in the Thilawa SEZ in August 2015 (TSEZMC Notice No.4/2015). TSMC notifies businesses investing and doing business in the SEZ, to ensure the following eight responsibilities; 1. Respect human rights, 2. Engage with stakeholders, 3. Support the rights of workers, 4. Build human capital, 5. Ensure effective grievance mechanisms, 6. Be transparent, and 7. Create shared value, and 8. Support the communities in which they operate.

2.2 Tentative Target Values for Consideration of Surrounding Environment

According to Article 10 of the Environmental Conservation Law, MOECAF shall set the following environmental quality standards, with the approval of the Union Government and the Committee:

(a) Suitable surface water quality standards for the public usage of rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs, and other inland water sources of the public;
(b) Water quality standards for coastal and estuarine areas;
(c) Underground water quality standards;
(d) Atmospheric quality standards;
(e) Noise and vibration standards;
(f) Emissions standards;
(g) Effluent standards;
(h) Solid waste standards; and
(i) Other environmental quality standards stipulated by the Union Government.

As of March 2016, emission guideline and target values of air emission, wastewater, and noise levels were set in NEQG, while other standards have not been set yet by MOECAF. In the Project, the Project Proponent basically continues to apply quantitative target values that have already been set in the EIA report for Thilawa SEZ Development Project (Class A) (September 2013) (hereinafter referred to as "EIA report for Class A") and/or in the Internal Regulations of Zone A prepared by the Myanmar Japan Thilawa Development Limited (MJTD) on January 1, 2015 (hereinafter referred to as "IR-A"), while referring to the target values set in NEQG. The ones that are not set in the above documents have been set in this document. Each quantitative target value to be applied is described below.

2.2.1 Air Quality

(1) Tentative Target Value of Ambient Air Quality

Currently, there is no ambient air quality standard in Myanmar. Its target value was neither set in the EIA report for Class A nor in the IR-A. It is described in the IR-A that the tenant shall have its own arrangement to satisfy the standard stipulated by the regulation of the Republic of the Union of Myanmar and by the General Environmental, Health and Safety Guidelines (EHS Guideline) of the International Finance Corporation (IFC).

In consideration of the above situation, the tentative target value of ambient air quality for the Project in order to evaluate the impact caused by traveling vehicles is set with reference to the ambient quality

standard in Southeast Asia (e.g., Thailand, Vietnam), Japan, and World Health Organization (WHO), which the IFC-EHS Guideline applies, as shown in Table 2.2-1.

Table 2.2-1 Summary of Ambient Air Quality Standards from Other Countries and WHO

Item	Average Period	Japan	Thailand	Vietnam	WHO
SO_2	10 mins	-	-	-	0.5 mg/m^3
	1 hour	0.1 ppm	0.3 ppm	0.12 ppm	-
	24 hours	0.04 ppm	0.12 ppm	0.04 ppm	0.125 mg/m^3 (InterimTarget-1) 0.05 mg/m^3 (InterimTarget-2) 0.02 mg/m^3 (Guideline)
	1 year	-	0.04 ppm	0.02 ppm	-
NO_2	1 hour	-	0.17 ppm	0.10 ppm	0.2 mg/m^3
	24 hours	0.04-0.06 ppm	-	0.05 ppm	-
	1 year	-	0.03 ppm	0.02 ppm	0.04 mg/m^3
CO	1 hour	-	30 ppm	24 ppm	-
	8 hours	20 ppm	-	8 ppm	-
	24 hours	10 ppm	9 ppm	-	-
TSP	1 hour	-	-	0.3 mg/m^3	-
	24 hours	-	0.33 mg/m^3	0.2 mg/m^3	-
	1 year	-	0.10 mg/m^3	0.1 mg/m^3	-
PM_{10}	1 hour	0.2 mg/m^3	-	-	-
	24 hours	0.1 mg/m^3	0.12 mg/m^3	0.15 mg/m^3	0.15 mg/m3 (InterimTarget-1) 0.10 mg/m3 (InterimTarget-2) 0.075 mg/m3 (InterimTarget-3) 0.05 mg/m3 (Guideline)
	1 year	-	0.05 mg/m^3	0.05 mg/m^3	0.07 mg/m3 (InterimTarget-1) 0.05 mg/m3 (InterimTarget-2) 0.03 mg/m3 (InterimTarget-3) 0.02 mg/m3 (Guideline)
$PM_{2.5}$	24 hours	0.035 mg/m^3	0.05 mg/m^3	0.05 mg/m^3	0.075 mg/m3 (InterimTarget-1) 0.05 mg/m3 (Interim Target-2) 0.0375 mg/m3 (Interim Target-3) 0.025 mg/m3 (Guideline)
	1 year	0.015 mg/m^3	0.025 mg/m^3	0.025 mg/m^3	0.035 mg/m3 (InterimTarget-1) 0.025 mg/m3 (InterimTarget-2) 0.015 mg/m3 (InterimTarget-3) 0.01 mg/m3 (Guideline)
Ozone	1 hour	-	0.10 ppm	0.10 ppm	-
	8 hours	-	0.07 ppm	0.06 ppm	0.16 mg/m3 (InterimTarget-1) 0.1 mg/m3 (Guideline)
Pb	24 hours	-	-	0.0015 mg/m^3	-
	1 month	-	0.0015 mg/m^3	-	-
	1 year	-	-	0.0005 mg/m^3	-
Photochemical oxidants	1 hour	0.06 ppm	-	-	-

Note 1: Photochemical oxidants are oxidizing substances such as ozone and peroxyacetyl nitrate produced by photochemical reactions (only those capable of isolating iodine from neutral potassium iodide excluding nitrogen dioxide)

Note 2: The value of SO_2 and NO_2, CO and Ozone of Vietnam was converted to ppm units from mg/m^3.

Source: Japan: National Air Quality Standard in Japan (Circular No.25, 1973, originally), Ministry of Environment, Japan

Thailand: Notifications of National Environmental Board No.10, B.E 2538 (1995), No. 24, B.E. 2547 (2004), No. 28, B.E 2550 (2007), No. 33, B.E 2552 (2009), No. 36, B.E 2553 (2010) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

Vietnam: National Technical Regulation on Ambient Air Quality (QCVN 05:2013/BTNMT), Ministry of Science and Technology in Vietnam.

WHO: WHO Air Quality Guidelines 2005.

On the basis of the above standards, the tentative target value for air quality in this Project, as shown in Table 2.2-2, has been set with the following considerations:

- Target parameters of ambient air quality level were decided based on available measurement equipment in Myanmar (SO_2, NO_2, CO, $PM_{2.5}$, and PM_{10}).

- The averaging period adopted is 24 hours, which could be measured using the available equipment in Myanmar whereas currently it is impossible to implement continuous measurement for one month at the project site due to battery/electrical capacities.

- Basically, each of the target values has adopted the strictest standard among the standards of Japan, Thailand, Vietnam, and WHO of interim target-1.

Table 2.2-2 Ambient Air Quality Standard Established from Other Standards

Item	Average Period	Japan	Thailand	Vietnam	WHO	Tentative Target Value
SO_2	24 hours	0.04 ppm	0.12 ppm	0.04 ppm	0.125 mg/m^3 (InterimTarget-1) 0.05 mg/m^3 (InterimTarget-2) 0.02 mg/m^3 (Guideline)	0.04 ppm
NO_2	24 hours	0.04-0.06 ppm	-	0.05 ppm	-	0.05 ppm
CO	24 hours	10 ppm	9 ppm	-	-	9 ppm
$PM_{2.5}$	24 hours	0.035 mg/m^3	0.05 mg/m^3	0.05 mg/m^3	0.075 mg/m^3 (InterimTarget-1) 0.05 mg/m^3 (Interim Target-2) 0.0375 mg/m^3 (Interim Target-3) 0.025 mg/m^3 (Guideline)	0.035 mg/m^3
PM_{10}	24 hours	0.1 mg/m^3	0.12 mg/m^3	0.15 mg/m^3	0.15 mg/m^3 (InterimTarget-1) 0.10 mg/m^3 (InterimTarget-2) 0.075 mg/m^3 (InterimTarget-3) 0.05 mg/m^3 (Guideline)	0.1 mg/m^3

Source: EIA Study Team

2.2.2 Water Quality

(1) Tentative Target Value of Ambient Water Quality

Currently, there is no ambient water quality standard in Myanmar. Its target value wasn't set neither in the EIA report for Class A nor in the IR-A. In consideration of the above situation, the target value of ambient water quality for the Project is set in reference of the ambient quality standards in South-east Asia (e.g. Indonesia, Thailand and Vietnam) and Japan as shown in Table 2.2-3.

On the basis of the above standards, the tentative target value for ambient water quality in this project, as shown in Table 2.2-3, has been set with the following considerations.

- Target parameters of ambient water quality level were decided based on available measurement equipment in Myanmar.

- Basically each of target value has adopted the strictest one among the standards of Indonesia, Thailand, Vietnam and Japan.

- For tentative target value of DO, and BOD, SS, the current conditions were exceeded the strictest standards in Indonesia, Thailand, Vietnam and Japan. Thus, tentative target values were selected as the values which to be achieved with current conditions.

Table 2.2-3 Target Value of Ambient Water Quality

	Parameter	unit	Indonesia	Thailand	Vietnam	Japan	Tentative Target Value
1	DO	mg/L	3	2	4	2	4
2	BOD	mg/L	6	4	15	8	15
3	SS	mg/L	400	-	50	100	100
4	pH		6-9	5-9	5.5-9	6-8.5	6-8.5
5	COD_{Cr}	mg/L	50	-	30	-	30
6	Cyanide	mg/L	0.02	0.005	0.02	Not detectable	Not detectable
7	Phenol	mg/L	1	0.005	0.001	-	0.001
8	Zinc	mg/L	0.05	1.0	1.5	-	0.05

	Parameter	unit	Indonesia	Thailand	Vietnam	Japan	Tentative Target Value
9	Chromium (VI)	mg/L	0.05	0.05	0.04	0.05	0.04
10	Arsenic	mg/L	1	0.01	0.05	0.01	0.01
11	Copper	mg/L	0.02	0.1	0.5	-	0.02
12	Mercury	mg/L	0.002	0.002	0.001	0.0005 (Alkyl mercury: not detectable)	0.0005
13	Cadmium	mg/L	0.01	0.005* 0.05**	0.01	0.003	0.003
14	Selenium	mg/L	0.05	-	-	0.01	0.01
15	Lead	mg/L	0.03	0.05	0.05	0.01	0.01
16	Nickel	mg/L	-	0.1	0.1	-	0.1
17	Manganese	mg/L	-	1.0	-	-	1.0
18	Iron	mg/L	-	-	1.5	-	1.5
19	NO_3 as N	mg/L	20	5.0	10	10	5
20	NH_3 as N	mg/L	-	0.5	0.5	-	0.5
21	Fluoride	mg/L	1.5	-	1,5	0.8	0.8
22	Oil and Grease	mg/L	1	-	0.1	-	0.1
23	Total coliform	MPN/100 ml	10,000	20,000	7,500	-	7,500

Note: If the results of current status are exceeded the tentative target value, target value should set that does not significantly worsen the current situation.

Source: Indonesia: Government Regulation No.82/2001, Class III: Water that can be used for freshwater fish aquaculture, animal husbandry, plantation irrigation purposes and/or other uses requiring the same water quality standards)
Thailand: Notification of the National Environmental Board, No. 8, B.E. 2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992) , published in the Royal Government Gazette, Vol. 111, Part 16, dated February 24, B.E.2537 (1994), Class 3: Medium clean fresh surface water resources used for : (1) consumption, but passing through an ordinary treatment process before using, (2) agriculture
Vietnam: National technical regulation on surface water quality (NTR 08:2008), Agricultural use in surface water quality standard (Class B1)
Japan: Agricultural use in river water quality standard (Class D)

(2) Tentative Target Value of Effluent Water Quality after Wastewater Pre-treatment

The IR-A have set the target values of effluent water quality after the wastewater pre-treatment by the tenants in the industrial area (TSEZ-A's WQ Standard) based on the industrial wastewater effluent guideline value determined by the Ministry of Industry (MOI) as shown in Table 2.2-4.

Among these target parameters, BOD, COD, and SS will be treated at the central wastewater treatment plant in the industrial area. Thus, these target values are set as the design influent water quality for the central wastewater treatment plant.

Table 2.2-4 Target Value of Effluent Water Quality after Wastewater Pre-treatment

No.	Items	TSEZ-A's WQ Standard	Unit	Remarks
1.	BOD (5 days at 20 ºC)	Max. 200	mg/L	Shall be treated at the central wastewater treatment plant
2.	Suspended solids	Max. 200	mg/L	Ditto
3.	Dissolved solids	Max 2,000	mg/L	—
4.	pH Value	Between 6.5 and 8.5	—	—
5.	COD_{Mn} Permanganate value	Max. 150	ppm	Shall be treated at the central wastewater treatment plant
6.	COD_{Cr} Dicromate value	Max. 300	mg/L	Ditto
7.	Sulfide (as HS)	Max. 1	mg/L	—
8.	Cyanide (as HCN)	Max. 0.2	mg/L	—
9.	Oil and grease	Max. 5	mg/L	—
10.	Total coliform bacteria	Max. 400	MPN/100 mL	—
11.	Tar	None	-	—
12.	Formaldehyde	Max. 1	mg/L	—

No.	Items	TSEZ-A's WQ Standard	Unit	Remarks
13.	Phenols and cresols	Max. 1	mg/L	—
14.	Free chlorine	Max. 1	mg/L	—
15.	Zinc	Max. 5	mg/L	—
16.	Chromium	Max. 0.5	mg/L	—
17.	Arsenic	Max. 0.25	mg/L	—
18.	Copper	Max. 1.0	mg/L	—
19.	Mercury	Max. 0.005	mg/L	—
20.	Cadmium	Max. 0.03	mg/L	—
21.	Barium	Max. 1.0	mg/L	—
22.	Selenium	Max. 0.02	mg/L	—
23.	Lead	Max. 0.2	mg/L	—
24.	Nickel	Max. 0.2	mg/L	—
25.	Insecticides	None	-	—
26.	Radioactive Materials	None	-	—
27.	Temperature	Max. 35	ºC	—
28.	Color and Odor	150	Co-Pt	—
29.	Total Nitrogen	80[1]	mg/L	—

Note 1: This standard has been changed from 40 to 80 on July 7, 2015 by MJTD (Ref: MJTD/O/15-07-187, Notification: Standard of Wastewater Quality Changed on Thilawa Special Economic Zone (Zone A) Industrial Zone Internal Regulations

Note 2: The unit is changed to mg/L from ppm in the original source.

Source: Myanmar Japan Thilawa Development Ltd., Thilawa Special Economic Zone (Zone A) Industrial Zone Internal Regulations (1st Edition) 1 January 2015

(3) Tentative Target Value of Effluent Water Quality for Discharging to Water Body

The target value of effluent water quality for discharging to water body by MJTD has been set in the EIA report for Class A based on the industrial wastewater effluent guideline value determined by the Ministry of Industry (MOI) as shown in Table 2.2-5.

Table 2.2-5 Target Value of Effluent Water Quality for Discharging to Water Body Set in the EIA Report of Class A

No	Items	Target Value	Unit	Remarks
1.	BOD (5 days at 20 ºC)	Max. 20	mg/L	Shall be treated by the centralized treatment plant
2.	Suspended Solids	Max. 30	mg/L	Ditto
3.	Dissolved solids	Max 2,000	mg/L	—
4.	pH Value	Between 5 and 9	—	—
5.	COD_{Mn} Permanganate value	Max. 35	mg/L	Shall be treated by the centralized treatment plant
6.	Sulphide (as HS)	Max. 1	mg/L	—
7.	Cyanide (as HCN)	Max. 0.2	mg/L	—
8.	Oil and grease	Max. 5	mg/L	—
9.	Total coliform bacteria	Max. 400	MPN/100mL	—
10.	Tar	None	-	—
11.	Formaldehyde	Max. 1	mg/L	—
12.	Phenols and cresols	Max. 1	mg/L	—
13.	Free chlorine	Max. 1	mg/L	—
14.	Zinc	Max. 5	mg/L	—
15.	Chromium (total)	Max. 0.5	mg/L	—
16.	Arsenic	Max. 0.25	mg/L	—
17.	Copper	Max. 1.0	mg/L	—
18.	Mercury	Max. 0.005	mg/L	—
19.	Cadmium	Max. 0.03	mg/L	—
20.	Barium	Max. 1.0	mg/L	—
21.	Selenium	Max. 0.02	mg/L	—
22.	Lead	Max. 0.2	mg/L	—

No	Items	Target Value	Unit	Remarks
23.	Nickel	Max. 0.2	mg/L	―
24.	Insecticides	None	-	―
25.	Radioactive Materials	None	-	―
26.	Temperature	Max. 40	ºC	―

Note : The unit is changed to mg/L from ppm in the original source.
Source: The EIA report for Thilawa SEZ Development Project (Class A) (September 2013)

On the other hand, NEQG has set the general guideline value of wastewater during project operation as shown in Table 2.2-6.

Table 2.2-6 General Guideline Value of Wastewater set in NEQG

Parameter	Unit	Guideline Value
5-day Biochemical oxygen demand	mg/L	50
Ammonia	mg/L	10
Arsenic	mg/L	0.1
Cadmium	mg/L	0.1
Chemical oxygen demand	mg/L	250
Chlorine (total residual)	mg/L	0.2
Chromium (hexavalent)	mg/L	0.1
Chromium (total)	mg/L	0.5
Copper	mg/L	0.5
Cyanide (free)	mg/L	0.1
Cyanide (total)	mg/L	1
Fluoride	mg/L	20
Heavy metals (total)	mg/L	10
Iron	mg/L	3.5
Lead	mg/L	0.1
Mercury	mg/L	0.01
Nickel	mg/L	0.5
Oil and grease	mg/L	10
Ph	S.U.[a]	6-9
Phenols	mg/L	0.5
Selenium	mg/L	0.1
Silver	mg/L	0.5
Sulphide	mg/L	1
Temperature increase	ºC	<3[b]
Total coliform bacteria	100ml	400
Total phosphorus	mg/L	2
Total suspended solids	mg/L	50
Zinc	mg/L	2

Note a: Standard unit
b: At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity; when the zone is not defined, use 100 m from the point of discharge
Source: National Environmental Quality (Emission) Guidelines (December, 2015)

In the Project, the tentative target value for effluent water quality, as shown in Table 2.2-7 has been set with the following considerations.

- Target parameters of effluent water quality level were selected based on available measurement equipment in Myanmar.
- The stricter level among the above two levels are applied.

Table 2.2-7 Tentative Target Value of Effluent Water Quality Discharging to Water Body

No	Items	Unit	Target Value set by MOI	Guideline Value set in NEQG	Tentative Target Value
1.	BOD (5 days at 20 ºC)	mg/L	Max. 20	50	20
2.	Suspended Solids	mg/L	Max. 30	50	30
3.	Dissolved solids	mg/L	Max 2,000	-	2,000
4.	pH Value	mg/L	Between 5 and 9	6-9	6-9
5.	COD_{Mn} Permanganate value	mg/L	Max. 35	250	35
6.	Sulphide (as HS)	mg/L	Max. 1	1	1
7.	Cyanide (as HCN)	mg/L	Max. 0.2	0.1 (free) 1 (total)	0.2
8.	Oil and grease	mg/L	Max. 5	10	5
9.	Total coliform bacteria	MPN/100mL	Max. 400	400	400
11.	Formaldehyde	mg/L	Max. 1	-	1
12.	Phenols and cresols	mg/L	Max. 1	0.5 (Phenols only)	1 (0.5: Phenols)
13.	Free chlorine	mg/L	Max. 1	0.2 (total residual)	0.2
14	Heavy metals (total)	mg/L		10	10
15	Zinc	mg/L	Max. 5	2	2
16.	Chromium (total)	mg/L	Max. 0.5	0.5	0.5
17.	Arsenic	mg/L	Max. 0.25	0.1	0.25
18.	Copper	mg/L	Max. 1.0	0.5	0.5
19.	Mercury	mg/L	Max. 0.005	0.01	0.01
20.	Cadmium	mg/L	Max. 0.03	0.1	0.03
21.	Barium	mg/L	Max. 1.0	-	1.0
22.	Selenium	mg/L	Max. 0.02	0.1	0.1
23.	Lead	mg/L	Max. 0.2	0.1	0.1
24.	Nickel	mg/L	Max. 0.2	0.5	0.2
25.	Iron	mg/L		3.5	3.5
26	Silver	mg/L		0.5	0.5
27	Total phosphorus	mg/L		2	2
28.	Insecticides	-	None	-	Not Selected
29.	Radioactive Materials	-	None	-	Not Selected
30.	Temperature	ºC	Max. 40	-	40
31	Ammonia	mg/L	-	50	50
32.	Fluoride	mg/L		20	20

Source: EIA Study Team

(4) Tentative Target Value of Domestic Wastewater Quality

As of March 2016, there is no effluent water quality standard for domestic wastewater in Myanmar. In addition, neither the EIA report for Class A nor IR-A didn't set the target value of domestic wastewater quality. However, some of the countries in Southeast Asia as well as Japan and USA have domestic wastewater standards, as shown in Table 2.2-8.

Table 2.2-8 Effluent Water Quality Standard for Domestic Wastewater in Other Countries

Items			BOD (mg/L)	SS (mg/L)	Total Coliform (MPN/100 mL)
Japan	National Effluent Standards in Japan including Night Soil Treatment Plant		160 (max) 120 (average)	200 (max) 150 (average)	3,000 (average)
USA	USEPA Representative Concentration from Septic Tank Effluent		140-200	50-100	N/A
Indonesia	Domestic Wastewater Standard on Decree of the State Minister of Environment No. 112/ 2003		100	100	N/A
Vietnam	National Technical Regulation on Domestic Wastewater (QCVN 14: 2008/BTNMT)	Discharge to water body for domestic use	30	50	3,000
		Discharge to water body for non-domestic use	50	100	5,000

Source: EIA Study Team

Considering the characteristics of the project activity, domestic wastewater will be mainly discharged from toilet and canteen. Water quality parameters of concern are BOD, SS, and total coliform. On the basis of the above information, the target domestic wastewater quality standard in this Project has been set based on the following concepts:

- For BOD, the Vietnamese standard value is applied since it is stricter than other countries.
- For SS, the target value is adopted from the Indonesian standard and Vietnamese standard for non-domestic water use purpose, which is also within the range of USA's standard.
- For total coliform, the target value is set using the Vietnamese standard for non-domestic water use purpose, having the same characteristics as the receiving destination of domestic wastewater from the Project.

The tentative target value of treated domestic wastewater from the project area is summarized in Table 2.2-9.

Table 2.2-9 Tentative Target Value of Domestic Wastewater Quality after Treatment

BOD (mg/L)	SS (mg/L)	Total Coliform (MPN/100 mL)
30	100	5,000

Source: EIA Study Team

2.2.3 Noise

(1) Noise Level Set in NEQG

In NEQG, the noise level is set as shown in Table 2.2-10 and noise prevention and mitigation measures should be taken by all projects where the predicted or measured noise impacts from a project facility or operation exceed the applicable noise level guideline at the most sensitive point of reception. Noise impact should not exceed the levels shown below, or result in a maximum increase in background levels of three decibels at the nearest offsite receptor location.

Table 2.2-10 Target Noise Level Set in NEQG

Receptor	One Hour LAeq (dBA)	
	Daytime (7:00-22:00) (10:00-22:00 for public holidays)	Nighttime (22:00-7:00) (22:00-10:00 for public holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Source: NEQG (December 2015)

(2) Tentative Target Noise Level during the Construction Phase and Closing Phase

Tentative target noise levels during the construction phase and closing phase are set as shown in Table 2.2-11. These levels are defined for construction noise in both EIA report for Class A and in the IR-A for tenants. The difference of the target level between them is the location of the evaluation point, i.e., at the boundary of the building of receptors under EIA report for Class A that will be applied to the EIA report for Zone B, while it is at the boundary of SEZ and tenant's property under IR-A. In the Project, tentative target noise level is set same as EIA for Class A.

Since demolition noise has the same characteristics as construction noise, the above target noise level is applied during the closing phase as well.

Table 2.2-11 Tentative Target Noise Level during the Construction Phase and Closing Phase

Category	Daytime (Leq) (7 am-7 pm)		Evening Time (Leq) (7 pm-10 pm)		Nighttime (Leq) (10 pm-7 am)	
	EIA[1]	Tenant[2]	EIA	Tenant	EIA	Tenant
A side next to a residential house and monastery located less than 150 m	75 dB	75 dB	60 dB	60 dB	55 dB	55 dB
Other than above	75 dB	75 dB	65 dB	65 dB	65 dB	65 dB

Note: Evaluation point is at the boundary of building of receptors for EIA of Zone B and at boundary of SEZ and tenant's property.
1: Target noise level set in the EIA report for Class A
2: Target noise level set in the IR-A for tenants in the industrial area

Source: The EIA report for Thilawa SEZ Development Project (Class A) (September 2013), summarized by the EIA Study Team

(3) Tentative Target Noise Level during the Operation Phase

Table 2.2-12 shows the target noise levels during the operation phase in the EIA report for Class A, IR-A, and NEQG. In the Project, tentative target noise level is set same as EIA for Class A because background noise level is already exceeded NEQG sometimes.

Table 2.2-12 Tentative Target Noise Level during the Operation Phase

Category	Daytime (Leq) (7 am-7 pm)			Evening Time (Leq) (7 pm-10 pm)			Nighttime (Leq) (10 pm-7 am)		
	EIA[1]	Tenant[2]	NEQG[3]	EIA	Tenant	NEQG	EIA	Tenant	NEQG
A side next to sensitive area such as monastery, hospital, and school	60 dB	60 dB	55dB	55 dB	55 dB	55dB	50 dB	50 dB	45dB
A side next to residential area	65 dB	65 dB		60 dB	60 dB		55 dB	55 dB	
A side next to commercial and industrial areas including inside of Thilawa SEZ Zone A	70 dB	70 dB	70 dB	65 dB	65 dB	70 dB	60 dB	60 dB	70 dB

Note: Evaluation point is at the boundary of building of receptors for EIA of Zone B and at the boundary of SEZ and tenant's property, while at the most sensitive point of reception for NEQG.
1: Target noise level set in the EIA report for Class A
2: Target noise level set in the IR-A for tenants in the industrial area
3: In NEQG, the noise level should not exceed the levels shown in the table, or result in a maximum increase in background levels of three decibels at the nearest offsite receptor location during public holidays.

Source: The EIA report for Thilawa SEZ Development Project (Class A) (September 2013), summarized by the EIA Study Team

(4) Tentative Target Noise Level from Traffic

Target noise levels from traffic are set in accordance with the Japanese target level as shown in Table 2.2-13.

Table 2.2-13 Tentative Target Noise Level from Traffic

	Daytime (Leq) (6 am-10 pm)	Nighttime (Leq) (10 pm-6 am)
Target Noise Level (dB)*	75	70

Note *: Applied "proximity to major arterial roads"

Source: The Noise Regulation Law (Japan) (Law No. 98 of 1968, Latest Amendment by Law No.91 of 2000)

2.2.4 Vibration

(1) Tentative Target Vibration Level during the Construction Phase and Closing Phase

Tentative target vibration levels during the construction and closing stages applied the same levels as in the EIA Report for Class A. Target vibration level for tenants applied the same level since this was

not defined in the IR-A. Only the evaluation points of EIA of Zone B and for tenants are different. In the Project, tentative target vibration level is set same as EIA for Class A.

Demolition vibration has the same characteristics as construction vibration. Therefore, the target levels shown in Table 2.2-14 can be adopted for both construction phase and closing phase.

Table 2.2-14 Tentative Target Vibration Level during the Construction/Closing Phase

Category	Daytime (La) (7 am-7 pm)		Evening Time (La) (7 pm-10 pm)		Nighttime (La) (10 pm-7 am)	
	EIA[1]	Tenant[2]	EIA	Tenant	EIA	Tenant
A side next to residential house and monastery	65 dB	65 dB	65 dB	60 dB	60 dB	60 dB
A side next to commercial and industrial areas including inside of Thilawa SEZ Zone A	70 dB	70 dB	70 dB	65 dB	65 dB	60 dB

Note: Evaluation point is at the boundary of building of receptors for EIA of Zone B and at the boundary of SEZ and tenant's property.
1: Target vibration level set in the EIA report for Class A
2: Target vibration level set in the IR-A for tenants in the industrial area

Source: The EIA Report for Thilawa SEZ Development Project (Class A) (September 2013), summarized by the EIA Study Team

(2) Tentative Target Vibration Level during the Operation Phase

Tentative target vibration levels during the operation phase applied the same levels as in the EIA report for Class A and IR-A for tenants as shown in Table 2.2-15. In the Project, tentative target vibration level is set same as EIA for Class A.

Table 2.2-15 Tentative Target Vibration Level during the Operation Phase

Category	Daytime (La) (7 am-7 pm)		Evening Time (La) (7 pm-10 pm)		Nighttime (La) (10 pm-7 am)	
	EIA[1]	Tenant[2]	EIA	Tenant	EIA	Tenant
Residential houses and monastery	65 dB	65 dB	60 dB	60 dB	60 dB	60 dB
Office, commercial facilities, and factories	70 dB	70 dB	65 dB	65 dB	65 dB	60 dB

Note: Evaluation point is at the boundary of the building of receptors for EIA of Zone B and at the boundary of SEZ and tenant's property.
1: Target vibration level set in the EIA report for Class A
2: Target vibration level set in the IR-A for tenants in the industrial area

Source: The EIA Report for Thilawa SEZ Development Project (Class A) (September 2013), summarized by the EIA Study Team

(3) Tentative Target Vibration Level from Traffic

Since there is no target level set in either the EIA report for Class A or IR-A, the tentative target vibration levels from traffic are set in accordance with the Japanese target level as shown in Table 2.2-16.

Table 2.2-16 Tentative Target Vibration Level from Traffic

	Daytime (L_{10}) (6 am-10 pm)	Nighttime (L_{10}) (10 pm-6 am)
Target Level (dB)*	65	60

Note *: Applied "Residential Area"

Source: The Vibration Regulation Law (Japan) (Law No. 64 of 1976, Latest Amendment by Law No.75 of 1995)

2.3 Institutional Arrangement

2.3.1 Environmental Management in the Thilawa SEZ

(1) Overall Structure of TSMC and OSSC

Thilawa SEZ Management Committee (TSMC) was established as per Article (5) of the Myanmar Special Economic Zone Law as the government's licensing body which approves the investment of both foreign and domestic investors to be located in the Thilawa SEZ.

Under the TSMC, One Stop Service Center (OSSC) was established as a single window for investors in the Thilawa SEZ, where they can get all of the necessary approvals and registrations done at one place. It is staffed by representatives of various ministries who are fully authorized to grant necessary licenses and approvals required by investors.

The One-Stop Service Center is currently staffed by representatives from:

- Commerce and Consumer Department, Ministry of Commerce
- Department of Custom, Ministry of Finance
- Department of Revenue, Ministry of Finance
- Department of Immigration and National Registration, Ministry of Immigration and Population
- Labor Department, Ministry of Labor
- Department of Human Settlement and Housing Development, Ministry of Construction
- Environmental Conservation Department, Ministry of Environmental Conservation and Forestry (MOECAF)
- General Administration Department (GAD), Yangon Southern District
- Myanmar Port Authority
- Directorate of Investment and Companies Administration (DICA)

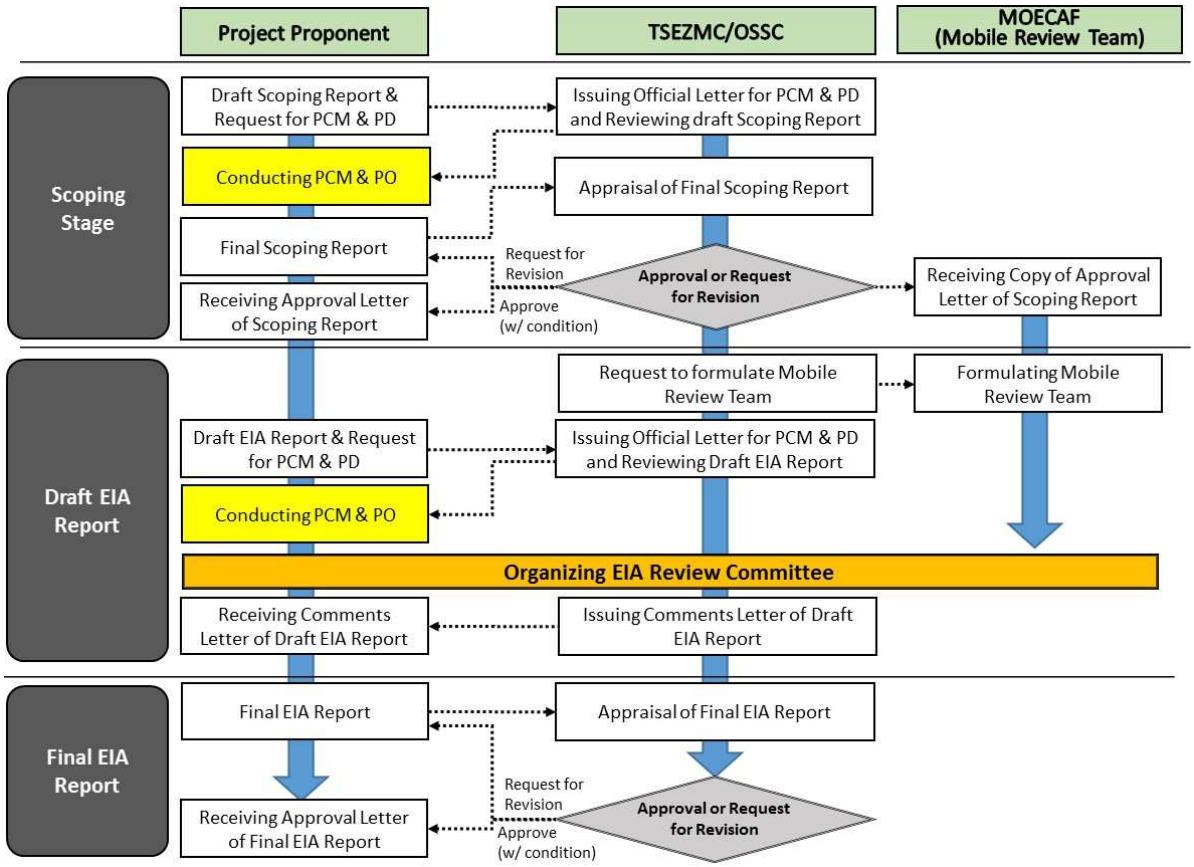
As for environmental management, two officers from Environmental Conservation Department of MOECAF have been dispatched to the environment section in OSSC. As the regular tasks, the officers review application documents related to environment from investors, conduct environmental inspection during construction phase, before commencement of operation, and during operation.

(2) Environmental Management for Zone Development in the Thilawa SEZ

As described in Chapter 1, a procedure of environmental management for zone development was established in February 2016 as shown in Figure 2.3-1[1]. The project proponents of zone development are required to submit scoping report, draft EIA report, and final EIA report, and conduct public consultation meetings and disclosures at scoping stage and draft EIA report stages. For the appraisal of the EIA study for zone development, a mobile review team, which is composed of staff from MOECAF and relevant ministries, is established to review the draft EIA report. TSMC together with the mobile review team will make comments on the draft EIA Report through EIA Review Committee. After issuing comments on the draft EIA Report, the project proponent finalizes the EIA report based on the comments from TSMC as well as the public for appraisal of the final EIA Report by TSMC.

After approval of the Final EIA Report, the project proponent will be requested to conduct environmental monitoring during construction, operation, closing phases based on Environmental Management Plan (EMP) developed based on the results of environmental impact assessment.

[1] From the technical view point of EIA, the requirement of EIA study in the Thilawa SEZ will follow the EIA Procedures.



Source: Thilawa SEZ Management Committee

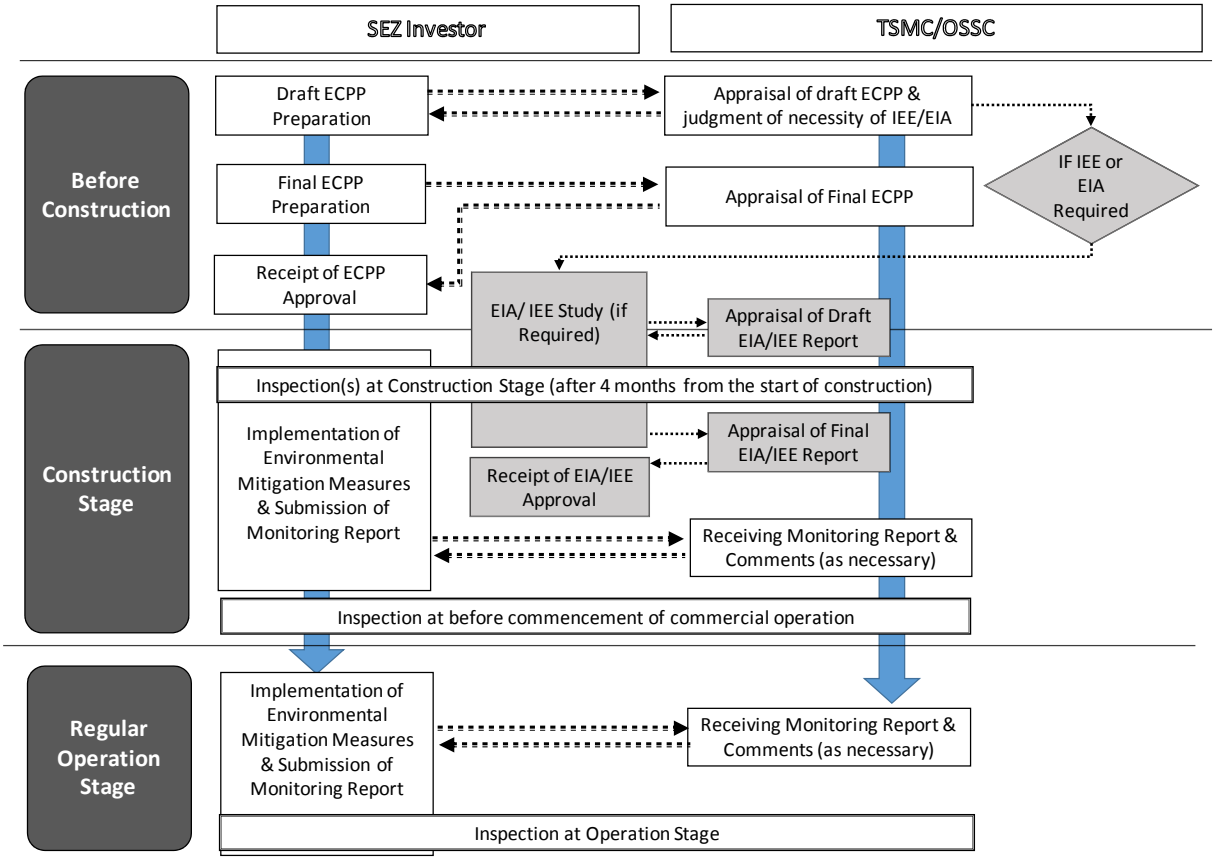
Figure 2.3-1 Procedure for EIA Appraisal for Zone Development

(3) Environmental Management for Investors in the Thilawa SEZ Zone A

1) Overall Procedures

As for environmental management for setting up a business and commencement of commercial operation by an investor in Thilawa SEZ, the following actions are requested in the three stages; "Preparatory stage for starting construction (Before construction)", "Construction stage", and "Regular operation stage" as shown in Figure 2.3-2. Standard operating procedures related to application and approval process of ECPP, IEE and EIA can be downloaded from the following link in the website of TSMC.

http://www.myanmarthilawa.gov.mm/environmental-protection-ecpp-iee-and-eia



Source: Thilawa SEZ Management Committee

Figure 2.3-2 Overall Procedures for Environmental Management in Thilawa SEZ Zone A

2) Preparatory Stage for Starting Construction

Environmental Conservation and Prevention Plan (ECPP)

In accordance with the Notification No.81/2014 of the Ministry of National Planning and Economic Development, it is required to prevent and conserve the surrounding environment in Thilawa SEZ. Hence, every applicant needs to prepare and submit Environmental Conservation and Prevention Plan (ECPP), which includes the plan for environmental management, mitigation measures and monitoring to be conducted, for its business operation. All investors shall obtain approval of ECPP from TSMC before commencing the construction works at the project site.

Environmental Impact Assessment (EIA)/ Initial Environmental Examination (IEE)

Some investors which may cause adverse environmental impacts may be required to conduct IEE or EIA. TSMC judges necessity of IEE or EIA based on the draft ECPP prepared by Applicants in accordance with the following criteria as shown in Table 2.3-1.

Table 2.3-1 Criteria for Necessity of IEE/EIA

No.	Criteria	Item
1	Requirement of IEE or EIA in accordance with existing criteria (EIA Procedures, IFC EHS Guidelines, EU Directive 2008/1/EC concerning integrated pollution prevention and control)	(a) Sectors, IEE or EIA based on production capacity, production area, etc.
2	Facing to Residential and Monetary Area	(a) Facing or Not facing
3	Air pollution	(a) Installation of combustion facilities such as boilers, furnaces, engines etc. (b) Materials used for combustion facilities (c) Generation capacity of combustion facilities (d) Amount of Emission Gas

No.	Criteria	Item
4	Water Pollution	(a) Amount of wastewater discharge (b) With toxic or Without toxic
5	Soil Contamination	(a) Possibility of infiltration or leaking of toxic substances
6	Noise and Vibration	(a) Facing to residential area or Monastery area with heavy machinery operation or without heavy machinery operation (b) Not facing to residential area or Monastery area with heavy machinery operation or without heavy machinery operation
7	Odor	(a) Facing residential area and using odor substances (b) Not facing residential and monastery area but using odor substance
8	Hazardous and Chemical Substance	(a) Amount of hazardous and chemical usage
9	Occupational Health & Safety	(a) Including dangerous works (b) Using VOC (c) Using toxic substances
10	Other environmental element founded by Expert	(a) Based on International Guidelines (b) Practical experiences

Source: Thilawa SEZ Management Committee

3） Construction Stage

During construction stage, construction contractor shall implement environmental mitigation measures and submission of monitoring report in accordance with the submitted ECPP and receives two or three times inspections; inspection(s) at construction stage (after 4 months from the start of construction and incase of the after 12 months) and inspection at before commencement of commercial operation.

4） Regular Operation Stages

During regular operation stage, investors shall implement environmental mitigation measures and submission of monitoring report biannually in accordance with the submitted ECPP and shall receive the first inspection after 4-6 months from the start of commercial operation and additional inspection after the first inspection as necessary.

2.3.2 Social Consideration Policies in Thilawa SEZ -Ensuring the Responsible Investment in Thilawa SEZ (TSEZMC Notice No.4/2015)-

TSMC issued a notice to ensure the responsible investment in the Thilawa SEZ in August 2015 (TSEZMC Notice No.4/2015). This guidance from the Thilawa SEZ Management Committee is provided for all companies, Myanmar and foreign, who are investing and doing business in the Thilawa Special Economic Zone, including subcontractors of investor companies. The guidance on responsible business conduct is intended to be supplemented by more specific guidance from the SEZ Management Committee on issues such as health, safety and environment, security, labor law, human resources and recruitment, social and community relations, and reporting/transparency. This guidance will highlight relevant Myanmar laws which all businesses in the SEZ must comply with, as well as relevant international standards to which they are encouraged to adhere, such as those of the International Finance Corporation (IFC) and the International Labor Organization (ILO).

TSMC notifies businesses investing and doing business in the SEZ, to ensure the 8 responsibilities as shown in Table 2.3-2

Table 2.3-2 8 Responsible Investment in Thilawa SEZ stipulated in TSEZMC Notice No.4/2015

Items of Responsible Investment	Description
1. Respect human rights	Companies should ensure that their operations, conduct, and activities respect the human rights of workers, the communities where they operate, their consumers, and Myanmar society as a whole.
2. Engage with stakeholders	Companies should consult with all those affected by their activities, operations, and impacts, be they workers, consumers, or communities, as well as other stakeholders, so that companies have access to accurate and useful information about their actions and can create a two-way dialogue.

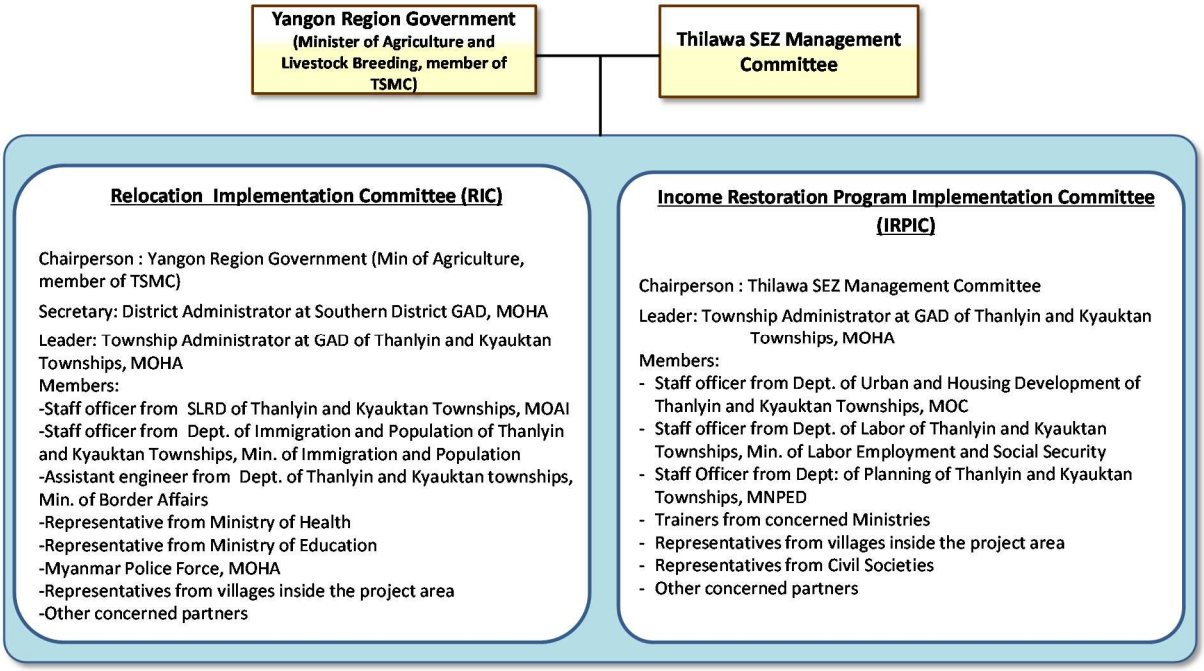
Items of Responsible Investment	Description
3. Support the rights of workers	Companies should familiarize themselves with, and fully respect, all Myanmar labor laws, including those which provide for independent trade unions, collective bargaining and workplace coordination committees. Companies can play an important role in ensuring equal opportunity for employment by addressing discrimination in hiring and in working conditions.
4. Build human capital	The SEZ Management Committee encourages companies to offer training programs to workers, and those entering the workforce, to improve their skills and to prepare them for supervisory, administrative, managerial or technical roles.
5. Ensure effective grievance mechanisms	Those affected adversely by a company's activities need access to effective remedies. This includes establishing grievance mechanism(s) that are accessible (including in the local language) to individuals, workers, consumers, and communities and the company's participation in and cooperation with the grievance mechanism. Companies can refer to Guiding Principles 29 and 31 of the UN Guiding Principles for Business and Human Rights for further information. Grievance mechanism should be legitimate, accessible, predictable, equitable, transparent, rights-compatible, and a source of continuous learning. They should be designed in collaboration with potential users of the grievance mechanism.
6. Be transparent	The SEZ Management Committee supports companies' initiatives to ensure that their conduct is as open and transparent as possible (subject to the need for commercial confidentiality). It also encourages companies to communicate with stakeholders about actions that affect them or about which they have raised concerns. It is important for companies to report publicly on the steps they have taken to ensure that their conduct respects and supports human rights in Myanmar.
7. Create shared value	The SEZ Management Committee believes that creating shared value can address social needs in a way that is commercially viable for businesses. Creating shared value for communities, workers and consumers is not corporate philanthropy, but a way in which to achieve economic success and win-win situations for businesses and society, including the poor.
8. Support the communities in which they operate	Companies are encouraged to undertake or participate in activities beneficial to the communities in which they operate and Myanmar society as a whole, both through creating shared value and through philanthropic initiatives. In doing so companies should consult the intended beneficiaries about their needs, be transparent about what they are able to provide, be clear about how long the service will be provided or the project developed, and deliver what they have promised. If the company is not able to fulfill its promise, it should inform the community early and explain the reasons why. Companies can also include credible local organizations, including civil society groups, in designing, operating, and monitoring the progress of such projects and establish effective mechanisms to receive and act on feedback.

Source: Thilawa SEZ Management Committee

2.3.3 Involuntary Resettlement in Thilawa SEZ

Figure 2.3-3 shows the institutional structure of implementing resettlement works in Thilawa SEZ. Two committees, namely, Relocation Implementation Committee (RIC) and Income Restoration Program Implementation Committee (IRPIC), were established as the supporting organizations for implementing resettlement works, including IRP activities, of the entire Thilawa SEZ (2,400 ha) according to the decisions issued by the Yangon Region Government (YRG). These organizations will be in charge of the actual relocation and resettlement works in Thilawa SEZ.

While the two committees mentioned above play a role for supporting implementation, the Multi-Stakeholder Advisory Group (MSAG), which was established for resettlement works in Zone A of Thilawa SEZ development, supports by providing advice on the resettlement works. Broader stakeholder engagement will assist in expediting the progress of the resettlement works and resolving some of the challenges, as well as providing lessons learned from Zone A in the case of 2,000 ha. In the two committees and MSAG, selected representatives from the villages will be involved and will act as members to reflect the public opinion into the resettlement process.



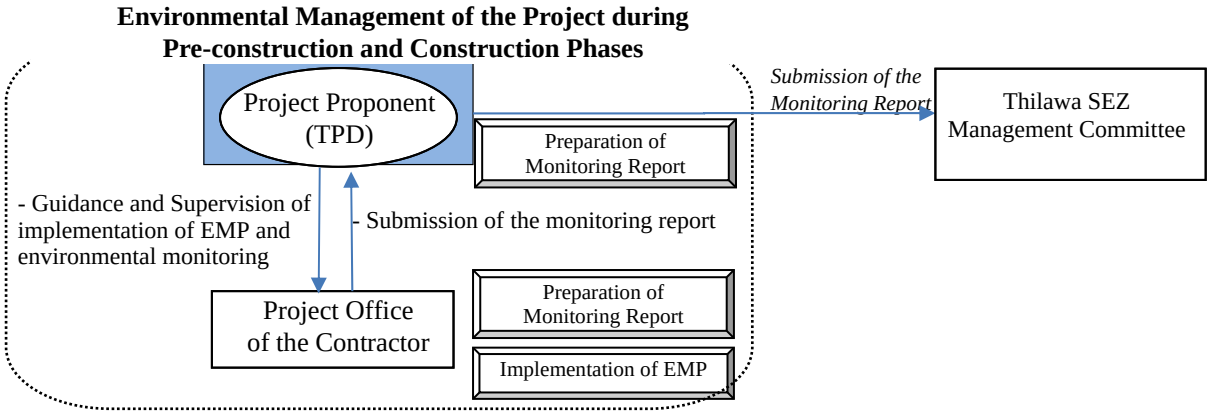
Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ), February 2016

Figure 2.3-3 Implementation Structure of Resettlement Works in Thilawa SEZ

2.3.4 Environmental Management by the Project Proponent

(1) Overall Structure during the Pre-construction and Closing Phases

The organization structure during the pre-construction and construction phases for the Project is proposed as shown in. Figure 2.3-4. The project proponent (TPD) will outsource a contractor to implement the detailed design and construction work during the pre-construction and construction phases. The outsourced contractor will establish a project office (Zone B Project Office) to undertake the implementation of the detailed design and construction works together with the environmental mitigation and management plan and the environmental monitoring, while the project proponent will supervise their works. Institutional arrangement in the closing phase will be also same structure as pre-construction and construction phases.



Source: EIA Study Team

Figure 2.3-4 Proposed Organizational Structure for Environmental Management of the Project during the Pre-construction and Construction Phase

The project office of the outsourced contractor will be responsible in dealing with environmental and social issues arising during related phases. Major tasks of the project office relevant to environmental management are listed as follows:

1) Implementation of the EMP
2) Monitoring of the construction works according to environmental monitoring plan (EMoP);
3) Provision of the technical support of TPD in coordination with relevant government organizations regarding environmental and social issues;
4) Resolution of the environmental and social issues arising during the construction and closing phases of the Project; and
5) Submission of environmental monitoring reports to TPD.

On the other hand, major task of TPD relevant to environmental management are listed as follows:

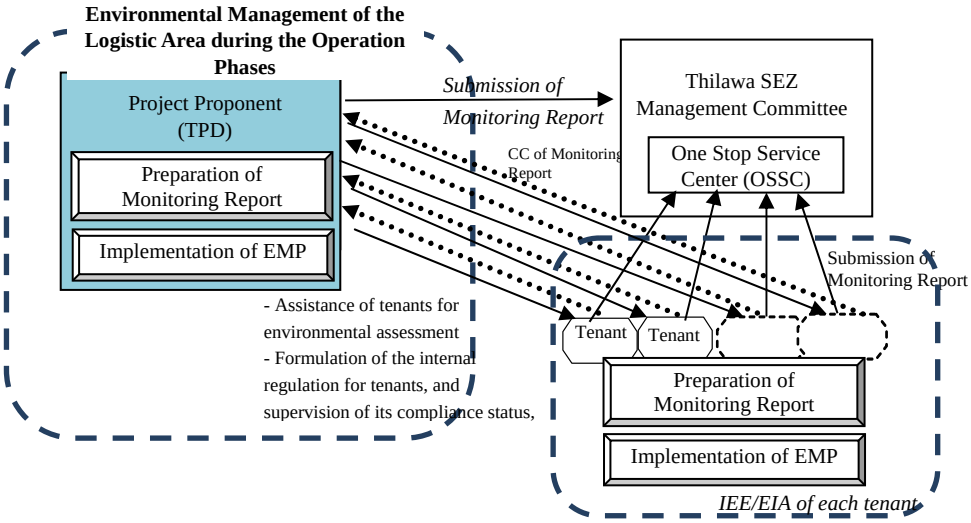
1) Guidance and supervision of implementation of the EMP and environmental monitoring
2) Review of the environmental monitoring reports submitted by the contractor
3) Preparation and submission of the environmental monitoring reports based on contractor's environmental monitoring reports to TSMC

(2) Overall Structure during the Operation Phase

The organization structure of the logistic area, and residence and commercial areas during the operation phase are proposed as shown in Figure 2.3-5 and Figure 2.3-6, respectively.

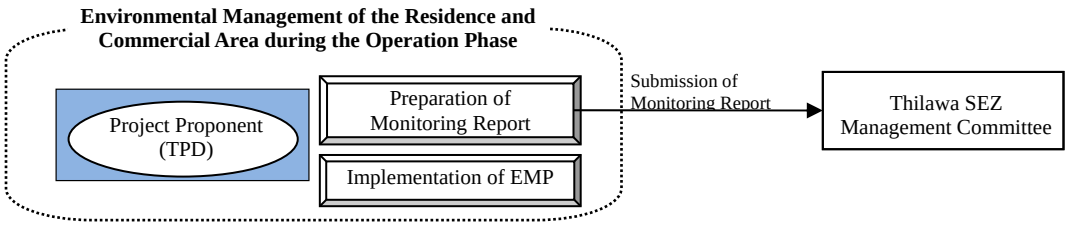
In the logistic area, each tenant will implement EMP and EMoP for each business and submit the environmental monitoring report to OSSC of TSMC and copy to TPD. TPD will submit the monitoring report based on the results of the implementation of EMP and EMoP for the logistic area.

In the residence and commercial areas, TPD will implement EMP and EMoP by themselves and submit the environmental monitoring report to OSSC of TSMC.



Source: EIA Study Team

Figure 2.3-5 Proposed Organizational Structure for Environmental Management of the Logistic Area during the Operation Phase



Source: EIA Study Team

Figure 2.3-6 Proposed Organization Structure for Environmental Management of the Residence and Commercial Areas during the Operation Phase

TPD will be in charge of the overall operation of the logistic area, residence and commercial areas of Zone B. Firstly, the Project Proponent will formulate the internal regulations for both logistic area, and residence and commercial area. In the regulations, rules for operation such as effluent standards of wastewater and air, noise control, and regulation of protective controls to the tenants are planned to be stipulated.

In addition, Environmental and Social Engineer of TPD will be responsible for environmental management. Its tasks are summarized as follows.

1) Assistance of tenants in the logistic area for environmental assessment of factory development as follows;
    - Providing information on environmental regulations and local consultants; and
    - Facilitating communication with TSMC for environmental and social issues.
2) Monitoring of the operations of the residence and commercial areas according to EMP and EMoP;
3) Handling of complaints related to environment and social issues from people living in the surrounding area; and
4) Submission of the environmental monitoring reports to TSMC.

(3) Other Key Activities related to Environmental Social Consideration by the Project Proponent

As for environmental and social consideration activities by the project proponent (MTSH (TPD)), MTSH joined the UN Global Compact which is the largest Corporate Social Responsibility Initiative in the world that focuses on the areas of Human Rights, Labor, Environment and Anti-corruption.

2.3.5 Activities on Cooperation Social Responsibilities by the Project Proponent

The project proponent considers Corporate Social Responsibility (CSR) to be only one aspect of a comprehensive multi-stakeholder effort to improve environmental and social conditions and prevent harm. CSR mission by TSMH cannot be fully “achieved” by one-time activity and decision. MTSH will approach CSR as a process of continual improvement, being constantly alert to new issues and considerations.

The representative CSR activities by MTSH are as follows;

- Support to Flood Affected Area

  Both our JV Company and MTSH donated funds to Flood Affected Area through the Union of Myanmar Federation of Chamber of Commerce and Industry.

- Development of Human Resource

MTSH (TPD) had held several seminars for both our Employees and the Community.

- Community Contribution

2.4 JICA Guidelines for Environmental and Social Considerations

As described in Chapter 3, the Project is expected to be funded by the Japan International Cooperation Agency (JICA). Therefore, the Project is required to comply with the JICA Guidelines for Environmental and Social Considerations (April 2010) (hereinafter referred to as "the JICA Guidelines").

The objectives of the JICA Guidelines are to encourage project proponents to have appropriate consideration for environmental and social impacts, as well as to ensure appropriate information disclosure to the public. According to the JICA Guidelines, the "Environmental and Social Considerations Studies" means studies including socio-economic and natural environment baseline surveys, predicting and evaluating adverse impacts and likely impacts that projects are to cause on the environment and local society, and mitigation measures to avoid and minimize these impacts.

Since the Project is classified as Category A, which is likely to have significant adverse impacts on the environment and society, information disclosure and consultation with stakeholders are mandatory to be held in the course of the EIA study of the Project.

Comparison between the JICA Guidelines and the relevant regulations in Myanmar is presented in Annex 2-1. As for EIA, there is no critical gap between the EIA Procedure in Myanmar and the JICA Guidelines. Since the JICA Guidelines require that the documents used in the public consultation meetings are written in the official language or in a language widely used in the country, Myanmar language was used for the documents provided at the public consultation meetings in the Project.

On the other hand, since there is no comprehensive law stipulating land acquisition and resettlement regulations, most of the mandates in the JICA Guidelines, such as sufficient compensation and support for project-affected peoples (PAPs), preparation of resettlement action plan, consultations with PAPs, and appropriate and accessible grievance mechanisms, have not been regulated in Myanmar. Therefore, in the Project, the resettlement works have been conducted by considering the measures to fill the gaps between the JICA Guidelines and the relevant regulations in Myanmar as shown in Annex 2-1. For example, assistance in improving or restoring livelihood to at least the pre-project level has been planned and provided. In addition, the Resettlement Work Plan (RWP) has been prepared in consultation with PAPs and disclosed to the public.

CHAPTER 3: PROJECT DESCRIPTION

3.1 Project Outline

3.1.1 Background

The Myanmar government has placed high priority on foreign direct investment as a key factor for the development of the nation. In particular, the government expects the Thilawa Special Economic Zone (SEZ), located in the outskirts of Yangon, to play an important role in economic development. Under this circumstance, the Myanmar government and the Japanese government signed a Memorandum of the cooperation (MoC) for the development of Thilawa SEZ in December 2012.

In January 2014, the Myanmar Japan Thilawa Development Limited (MJTD) was established as a joint venture among MMS Thilawa Development Company (MMST), Thilawa SEZ Management Committee (TSMC), and Myanmar Thilawa SEZ Holdings Public Limited (MTSH) to do business as operator and developer of the Thilawa SEZ Zone A, which is an early development area that covers 396 ha of the Thilawa SEZ[1].

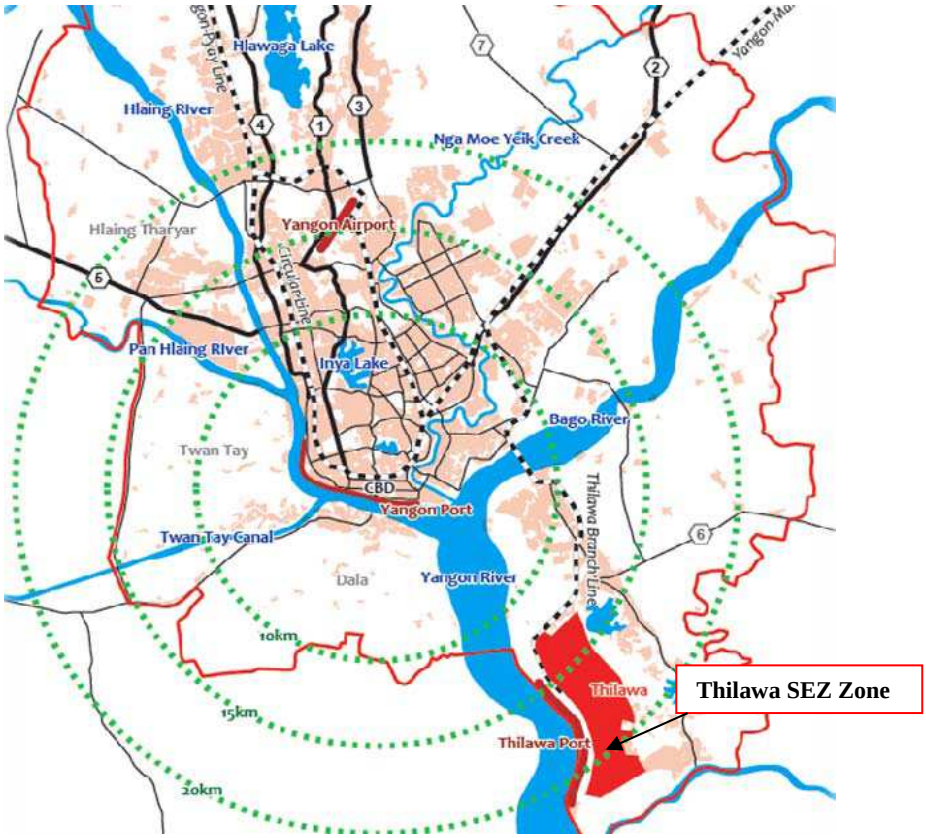
The construction of Zone A started in January 2014 after the completion of the feasibility study (F/S) and approval of the environmental impact assessment (EIA) report by TSMC. Its operation started in August 2015. In addition, MJTD has started to plan the development of another 700 ha in Thilawa SEZ together with MTSH as "Zone B", which includes about 262 ha of industrial area, 267 ha of logistic area, and 169 ha of residential and commercial areas.

In response to this, the EIA study has been started in parallel to evaluate the environmental and social impacts caused by the development of Zone B, and consider the mitigation measures and environmental management plan. Since these three areas have different project proponents, the EIA process is going to be done separately by each project proponent. This EIA report is targeted for the development project of the logistic area (approximately 267 ha) and residence and commercial area (approximately 169 ha) (hereinafter referred to as "the Project") whose project proponent is Thilawa Property Development Ltd. (TPD) that was established jointly by MTSH and TSMC[2].

3.1.2 Location of Thilawa SEZ

The Thilawa SEZ is located in Southern District, Yangon Region and about 23km southeast side of Yangon City as shown in Figure 3.1-1.

[1] Note: Japan International Cooperation Agency (JICA) participated in this joint venture later.
[2] Other development areas of Zone B, namely, industrial area, will be developed, operated, and managed by MJTD.



Source: Thilawa Special Economic Zone Development Project (Class A) Environmental Impact Assessment Report (September 2013)

Figure 3.1-1 Location of Thilawa SEZ

3.2 Land Use Plan of Zone B

The land use plan of Zone B is shown in Source: EIA Study Team prepared on the basis of the information from the project proponent

Figure 3.2-1. Zone B will be developed by dividing into three areas, namely: industrial area, logistic area, and residence & commercial areas. The project proponent of each area is shown in Table 3.2-1.

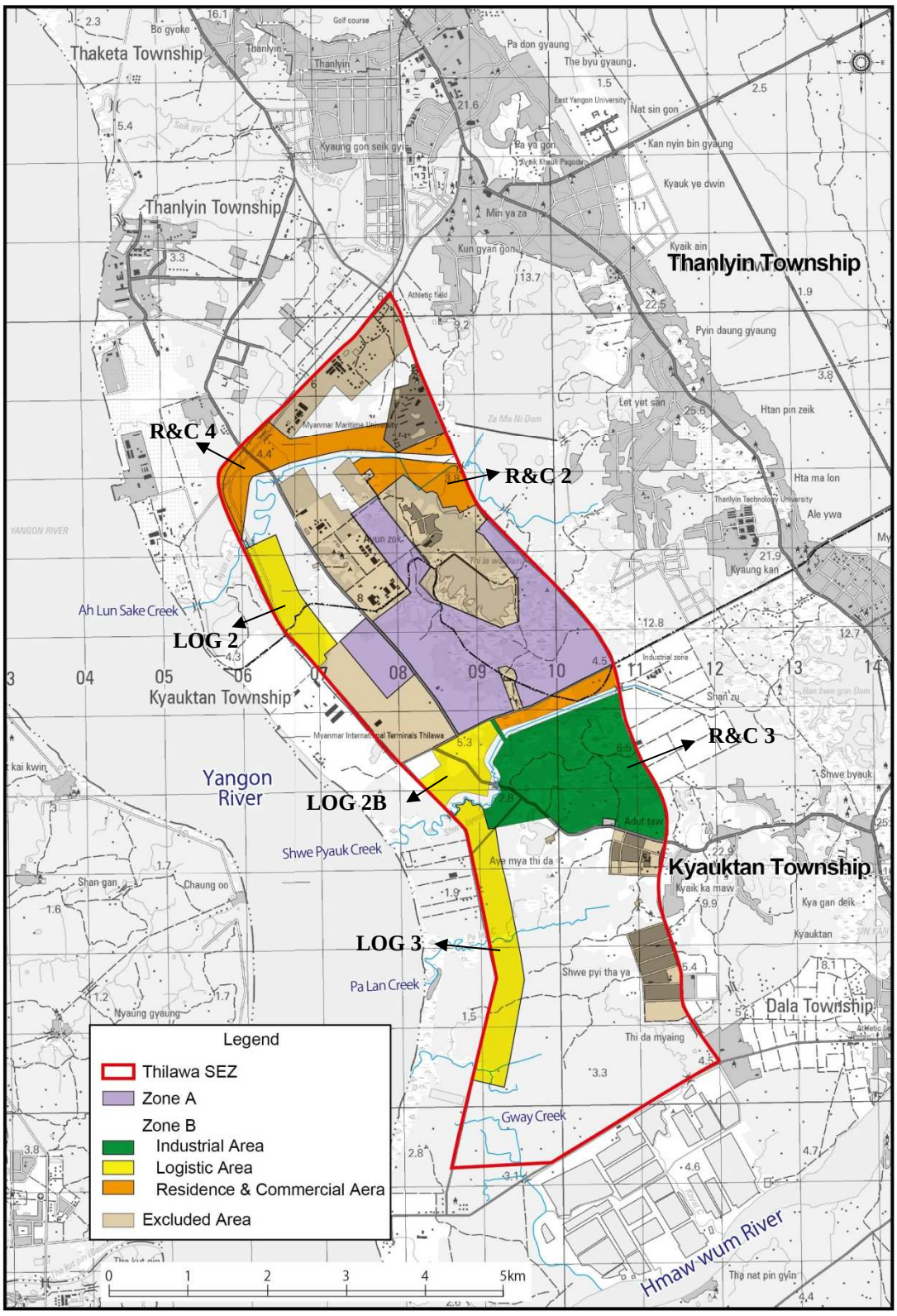
The Logistic area may be a "Logistic dependent industry area" which are businesses, industries, production, manufacturing, assembly and disassembly processes using but not limit to raw materials and/or finish and semi finish goods which are majority transported in break bulk and bulk cargo. Efficiency of such business may also dependent upon fast deliver and turnarounds of larger amounts of cargo between supplier/port/customer and factory premises. It could also be bulky cargo such as engine assembly, heavy machinery and automobile. Logistic dependent industry could also be logistic industry itself. Such as warehousing, distribution and business permitted by Thilawa SEZ management under the logistic classification including light assemble, sorting and/or packing of goods for customer as part of logistic service.

Table 3.2-1 Land Use Plan of Zone B

Land Use	Area (ha)	Project Proponent
Industrial Area	Approximately 262	MJTD
Logistic Area	Approximately 267	TPD
Residence & Commercial Area	Approximately 169	TPD
Total	Approximately 700	

Note: Above figures may change in the later stage.

Source: EIA Study Team prepared on the basis of the information from the project proponent



Source: EIA Study Team prepared on the basis of the information from the project proponent

Figure 3.2-1 Land Use Plan of Zone B

3.3 Selection of Alternative

3.3.1 Policy of Alternative Study

In order to consider the project area and the shape of Zone B, two alternatives were compared comprehensively from the viewpoint of technical, economical, safety, social and environmental considerations. The alternatives were set under the following conditions:

(a) Project site should be inside of Thilawa SEZ excluding Zone A (2,000 ha in total);
(b) SEZ excluded area that belongs to the ministries other than MOC should not be included;
(c) Public area (public road and canal, etc) should not be included;
(d) Existing houses and paddy field should eliminate as much as possible; and
(e) Shape of the development area should be simple like rectangle as much as possible for easier development.

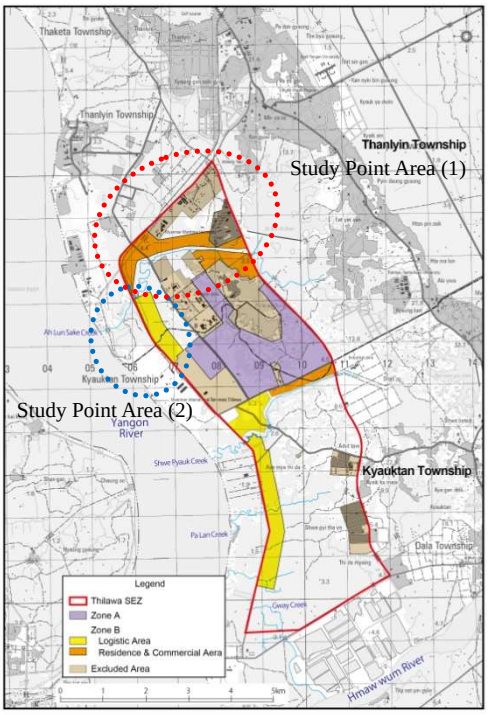
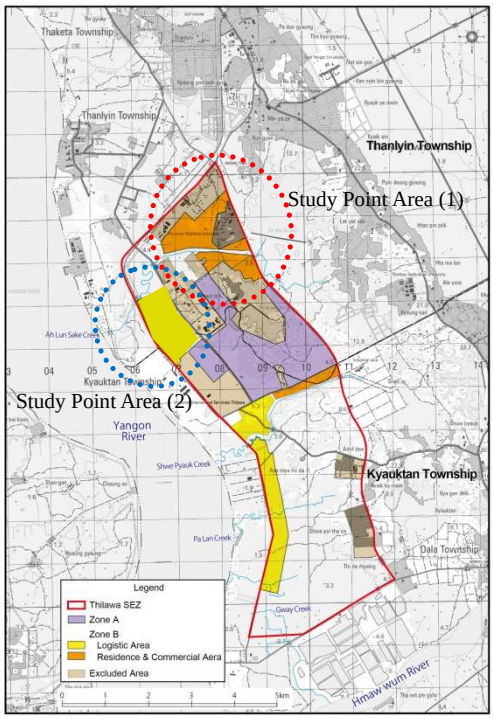
Taking into account the above conditions, two alternatives shown in Table 3.3-1 were chosen by considering efficiency and accessibility of logistic area, and residence & commercial area.

The logistic area in two alternatives was selected to be located along the Thilawa Port side in consideration of logistical efficiency. The residence and commercial areas were selected to be located along the central west-east road and in the north area that is closed to the Yangon area in consideration of people's access.

As a result of the alternative study shown in Table 3.3-1, Alternative A was selected as a priority option, because it has advantages from the viewpoint of technical, economical, safety, and environmental/social considerations shown below.

- Technical Aspect: less traffic congestion;
- Economic Aspect: less construction cost;
- Safety: less traffic volume; and
- Environment/Social Consideration: less emission gas from vehicle traffic, less number of PAHs.

Table 3.3-1 Result of Alternative Study

Alternative	**Alternative A :** **Study Point Area (1) Long in East-West Direction** **Study Point Area (2) Short in East-West Direction**	**Alternative B :** **Study Point Area (1) Short in East-West Direction** **Study Point Area (2) Long in East-West Direction**
General	The project site is adjacent to the SEZ outer road both in the east and the north in the Study Point (1) Area. The Study Point (2) Area is narrow in east-west direction. The development area is about 436 ha.	The project site is adjacent to the SEZ outer road only in the east in Study Point (1) Area. The Study Point (2) Area is broad in east-west direction. The development area is about 515 ha.
Project Plan		
Technical aspect	・Since two gates along the outer road can be set both in the east and north in the Study Point Area (1). The traffic volume will be distributed and traffic congestion may reduce.	・Since only one point is connected to the outer road in the Study Point Area (1), the traffic volume will not be distributed and traffic congestion may occur in the outer road of east side.
Economical aspect	・Since the number of PAHs will be less than that of Alternative B as stated in the environmental/social consideration below. The compensation for resettlement will be limited.	・Since the number of PAHs will be more than that of Alternative A as stated in the environment/social consideration below, the compensation for resettlement will be increased.
Safety	・Because of decreasing traffic volume at each gate, traffic congestion and the risk of traffic accidents would be mitigated.	・As traffic will be concentrated in one gate, traffic congestion and the risk of traffic accidents will be increased.
Environment /Social Consideration	・Since the traffic volume will be distributed and traffic congestion will be less, exhaust gas from the vehicle traffic will be less than Alternative B. ・Around 150-200 households might be resettled in Study Point Area (1) and (2). Since the development area was decided to as much as possible eliminate the current residence area, the impact on social aspect will be smaller than Alternative B.	・Since the traffic congestion might occur, exhaust gas from vehicle traffic might increase relative to Alternative A. ・Around 500 households might be resettled in Study Point Area (1) and (2), which is additional 300-350 households who will resettle compared to Alternative A. Therefore impact on social aspect will be much bigger than Alternative A.
Evaluation	・Compared with Alternative B, Alternative A has advantages from the viewpoint of technical, economical, safety aspect and environmental/social consideration. Therefore Alternative A is chosen as the preferable option.	

Source: EIA Study Team prepared on the basis of the information from the project proponent

3.3.2 Zero Option

In Thilawa SEZ, the development of Zone A (approximately 400 ha) and infrastructure development around Thilawa SEZ are ongoing. Therefore “Zero Option” scenario in this report should be based on the current condition in consideration of the development of Zone A and infrastructure, without any

development of Zone B. The study about "Zero Option" is shown in the table below. As a result of the study of "Zero Option", it is judged that implementation of the project should be undertaken, because of some advantages in terms of effective urban development and economic development of the country and region including infrastructure development around Thilawa SEZ. In addition, anticipated negative impacts could be avoided or minimized by taking the appropriate countermeasures.

Table 3.3-2 Study of Zero Option

Aspect	Condition without the Project	Condition with the Project
Technical Aspect	• Random development might be implemented without any plan for overall area development. Then the future development plan might be restricted after disorderly development.	• The logistic area, residence and commercial areas of Zone B would be developed efficiently in accordance with the deliberate area development plan.
Economic Aspect	• Job opportunity would not be increased from the current situation. • Economic development of overall Thilawa SEZ would be limited.	• A series of infrastructure development project (water supply, port, power supply has been ongoing around Thilawa SEZ for Zone A development. Cost-effectiveness of these projects would be increased if logistic area, residence & commercial area of Zone B would also be developed. • Job opportunities would be increased for local residents.
Environment /Social Consideration	• Involuntary resettlement might not occur. • Impact on natural and social environment that caused by the development of Zone B will not occur. • Issues on environmental and social considerations might be more complicated and segmented in case random developments are conducted in and around Zone B.	• Construction work and operation of Zone B will cause impact on natural environment and pollution and impact on social aspect such as involuntary resettlement. • Deliberate area development would make treatment of issues on environmental social consideration effective and comprehensive. • Living environment for local residents would be improved due to the development of surrounding infrastructure.

Source: EIA Study Team prepared on the basis of the information from the project proponent

3.4 Land Reclamation Plan

The land reclamation plan in the logistic, residence and commercial areas is planned as shown in Table 3.4-1 in consideration of the EL+5.0m that is higher than the highest water level with EL+4.24 m at the Myanmar International Terminals Thilawa (MITT) of the Thilawa Port since it started to record the water level[3].

Table 3.4-1 Concept of Land Reclamation in the Logistic, Residence and Commercial Areas

	Logistic, Residence and Commercial Area
Elevation	Dyke around the Area Boundary EL + over 5.0m

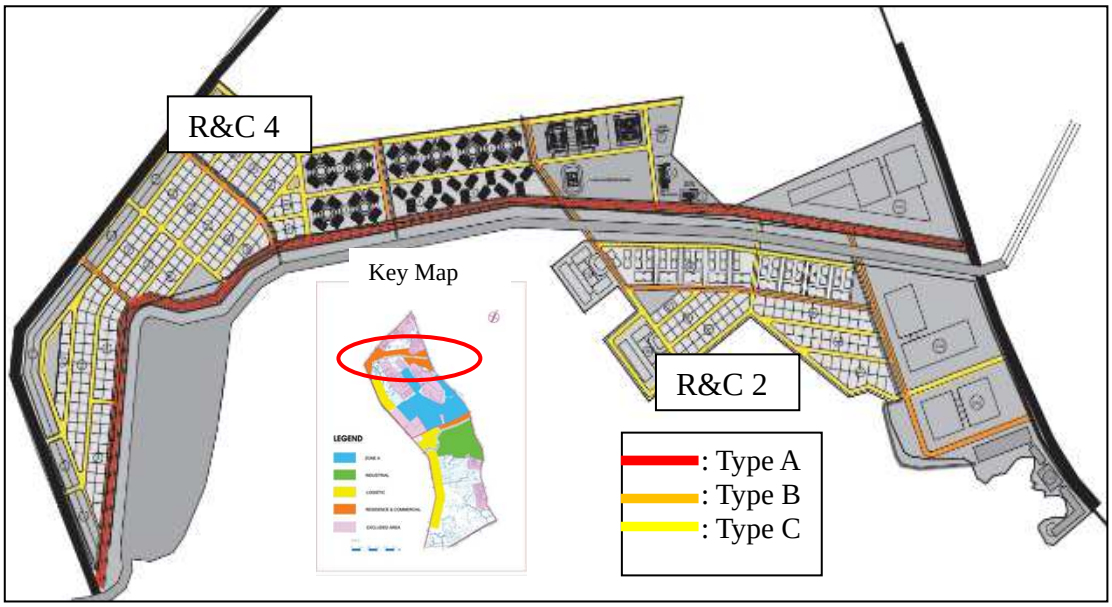
Source: EIA Study Team prepared on the basis of the information from the project proponent

3.5 Road System

3.5.1 Road Plan

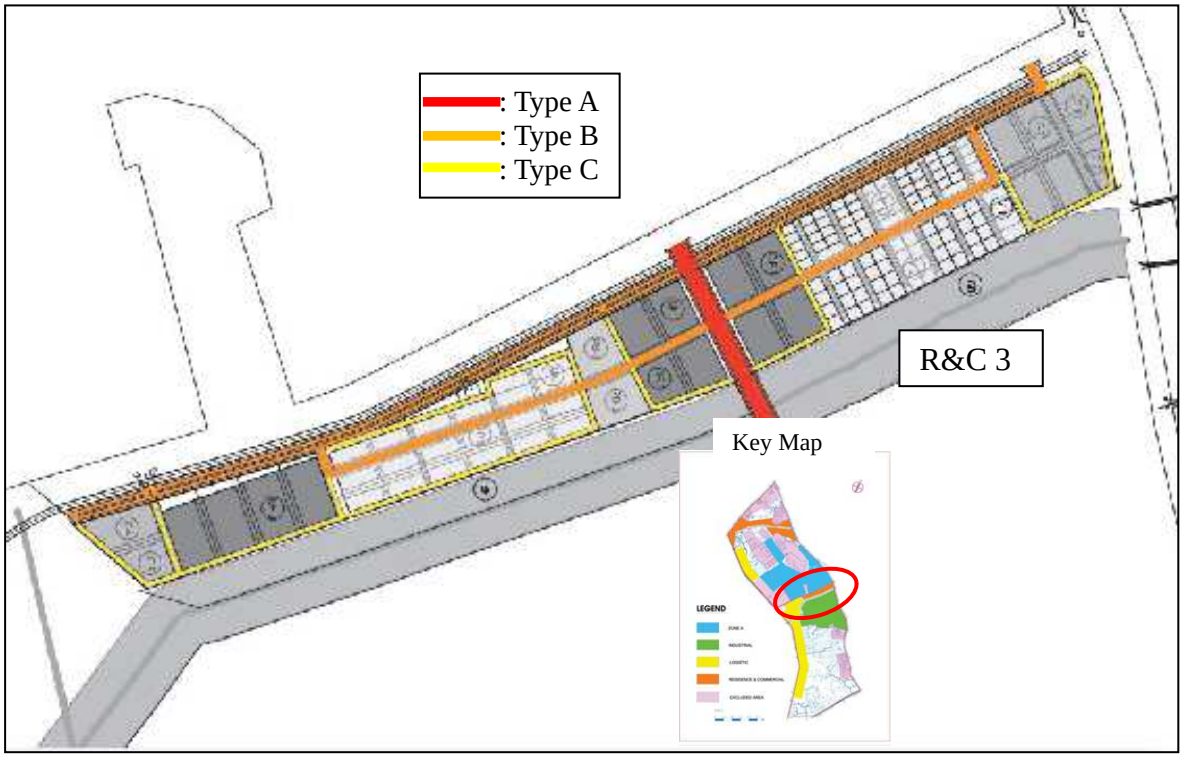
Figure 3.5-1 shows the road plan in R&C 2 and R&C 4 zones, and Figure 3.5-2 shows the road plan in R&C 3 zones. The main road go through the project area from the outer road in the east side to the outer road in the west side. The sub road divides each plot and has access road to each block. The type of roads are categorized in three type as Figure 3.5-3. Figure 3.5-4 shows the road plan in LOG 3 zones.

[3] Preparatory Study on Thilawa SEZ Infrastructure Development in Myanmar, JICA



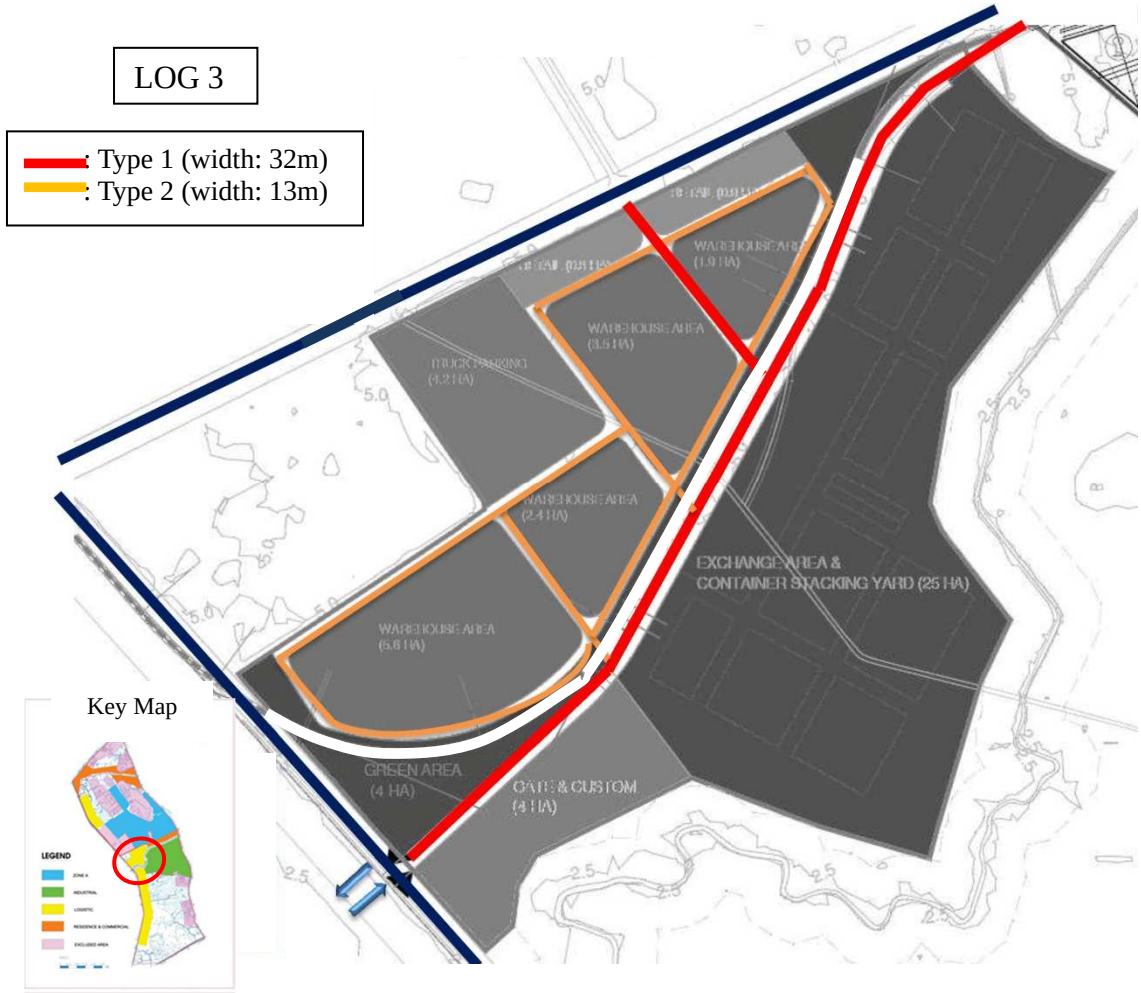
Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.5-1 Road Plan in R&C 2 and 4



Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.5-2 Road Plan in R&C 3



Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.5-3 Road Plan in LOG 3

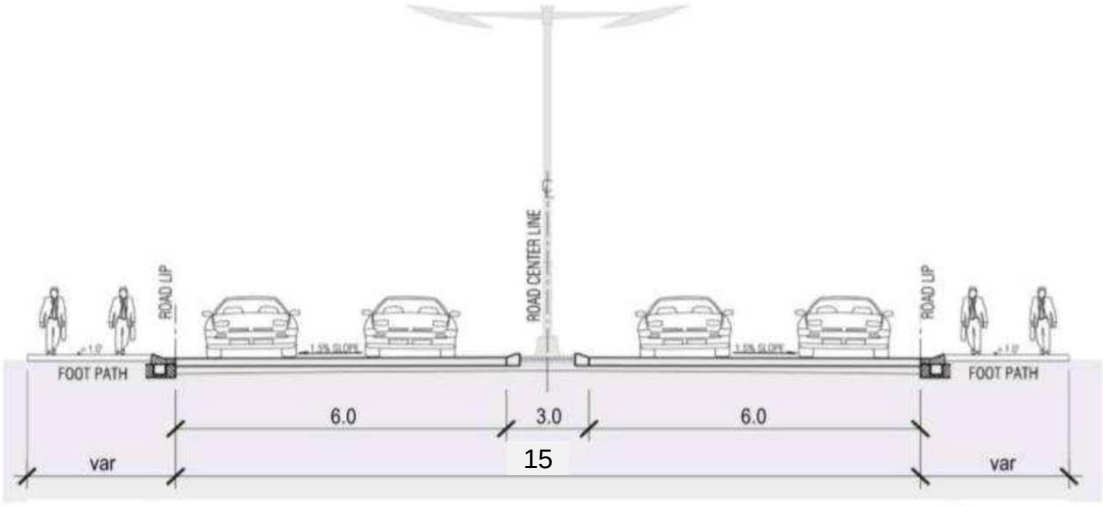
3.5.2 Road Section

There are three kinds of internal roads as shown in Figure 3.5-4. Type A road is planned as the main road in the zone. Type B and Type C road are planned as sub-road to divide the plot. Table 3.5-1 shows the description of each road.

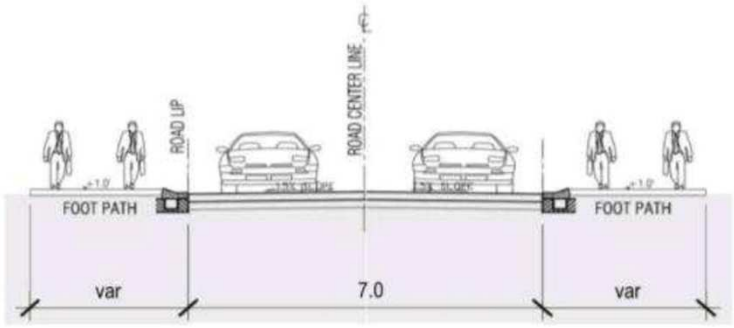
Table 3.5-1 Description of Road

Item	Type A	Type B	Type C
Lanes/Width of Pavement	4lanes/12m	2lanes/7m	2lanes/6m
Walkway	Both sides	Both sides	Both sides
Median	3m	None	None

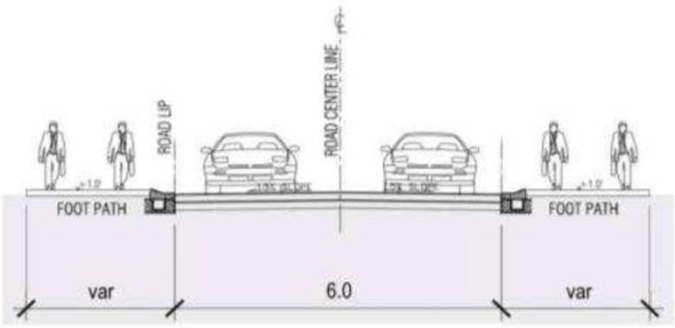
Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report



TYPICAL ROAD SECTION (TYPE- A)



TYPICAL ROAD SECTION (TYPE- B)



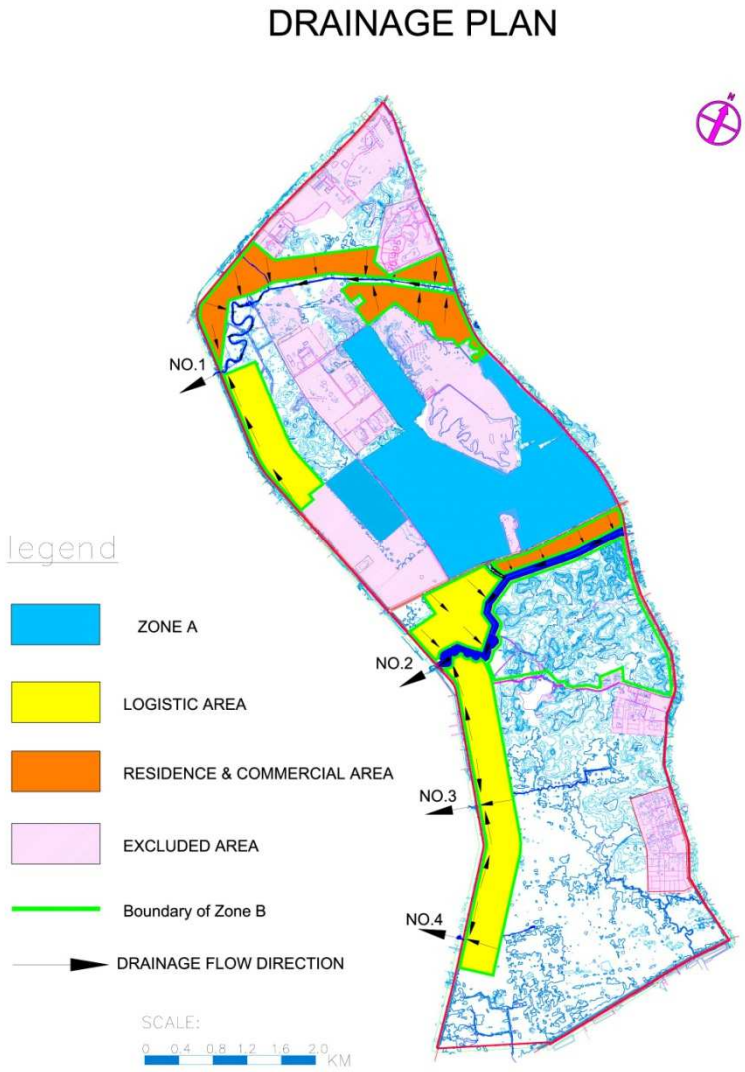
TYPICAL ROAD SECTION (TYPE- C)

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.5-4 Typical Road Seion of Main Road in R&C Area

3.6 Drainage System

The drainage system around Thilawa SEZ is shown in Figure 3.6-1. Currently, there are four (4) canals in Thilawa SEZ that connect to the Yangon River. The drainage water from the logistic, the residence and commercial areas will be discharged directly to the existing canal.

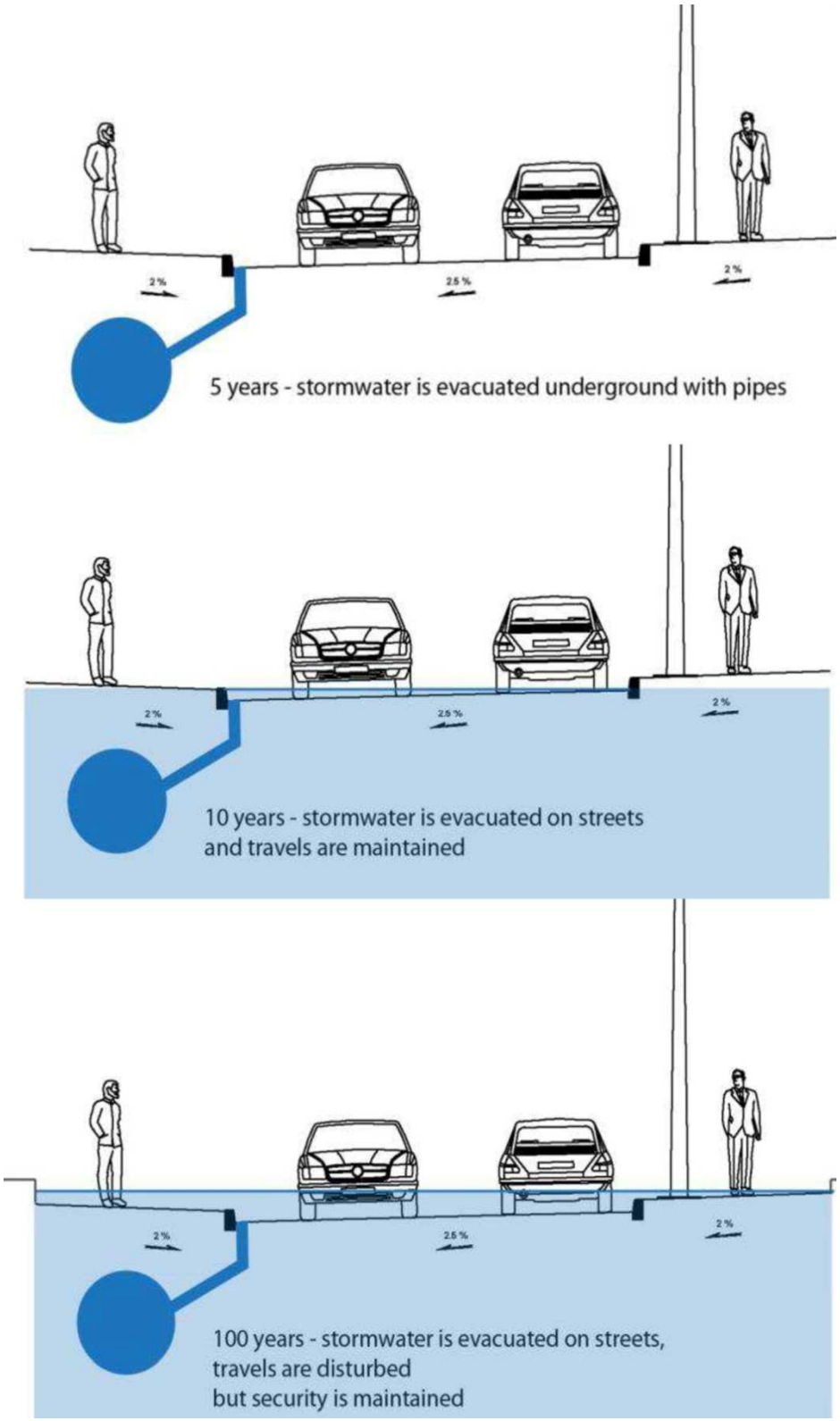


Source: EIA Study Team

Figure 3.6-1 Drainage Plan in Zone B (Logistic, Residence and Commercial Area

The objective is to secure goods and lives by collecting storm water from plots and roads. In order to reduce costs while ensuring safety, three levels of functioning were defined as shown in Figure 3.6-2.

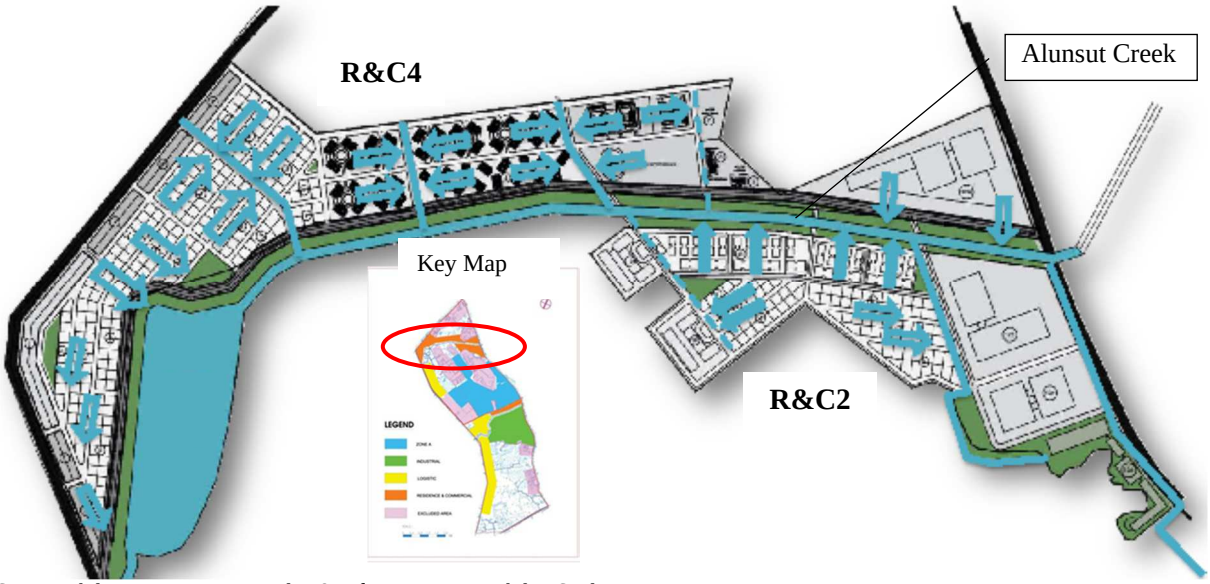
For frequent event (five-year return period), storm water is collected with drainage pipes set within public areas, under the roadways. As a result, roads are kept clear from water in case of a five-year storms. For ten-year storms, storm water might flow in the streets but normal movements are guaranteed (less than 15 cm water). Runoff from storms exceeding a ten-year storm event will however, be managed safely as long as the platforms directly flows to drainage pipe. For 100-year storms, storm water flows in the streets but the goods are safe. In able to do so, it is necessary to set building floors 20 cm above street level. Then, storm water volumes are discharged into the Central River. This canal will therefore be designed to withstand 100-year storm. Finally storm water will be discharged to the Yangon River.



Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

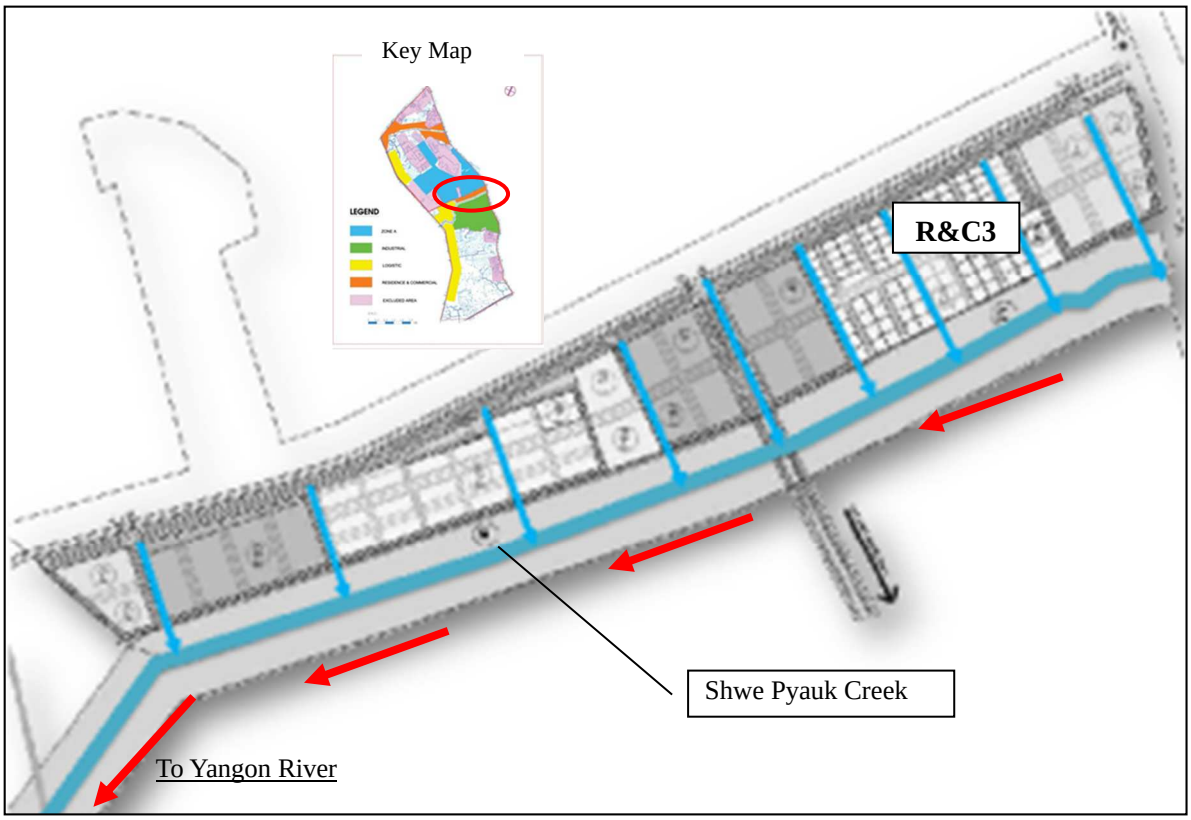
Figure 3.6-2 Storm Water Management with Three (3) Levels of Services

The drainage plan in each zone is shown in Figure 3.6-3 to Figure 3.6-5.



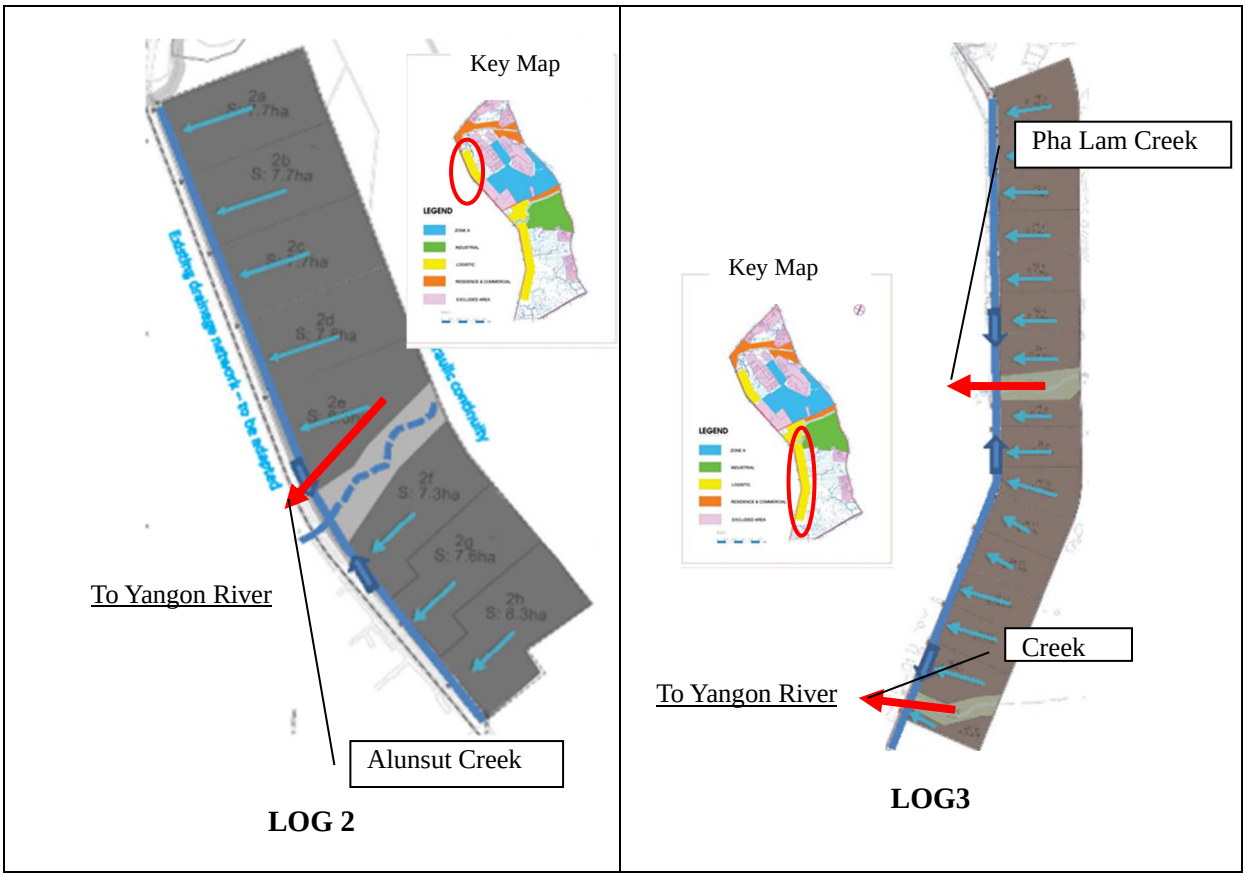
Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.6-3 Drainage Plan in R&C 2 and R&C 4



Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.6-4 Drainage Plan in R&C3



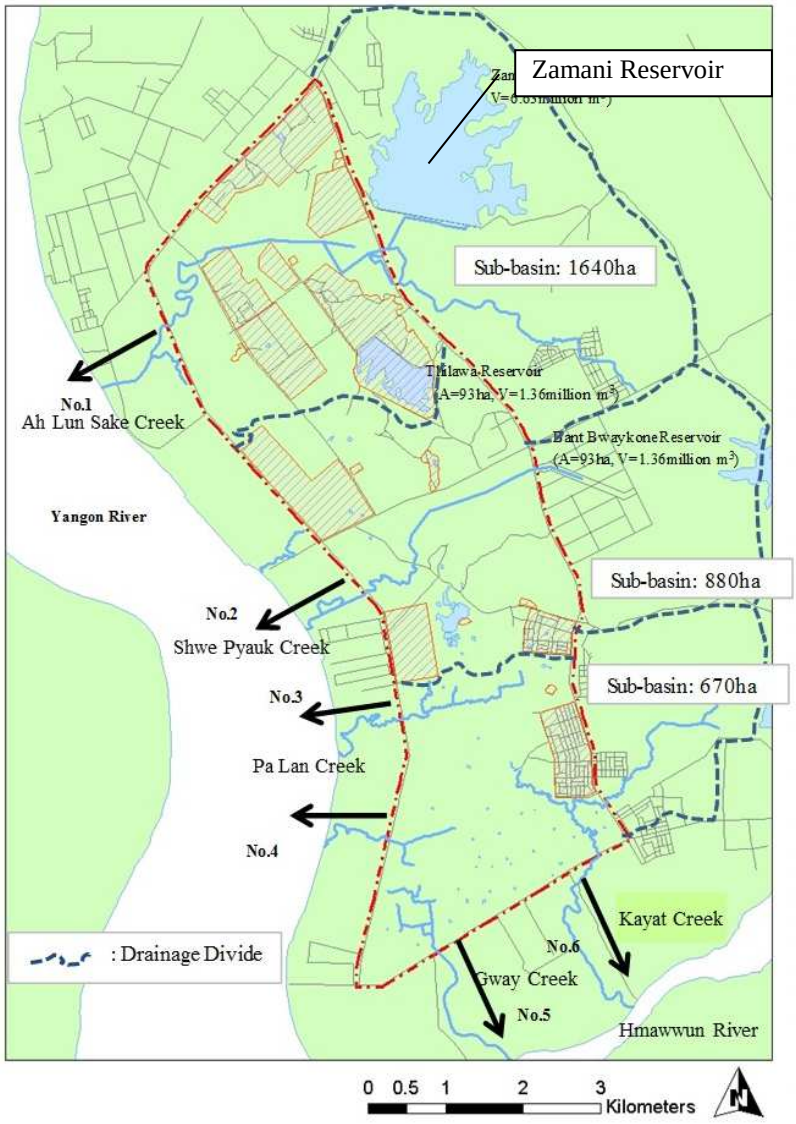
Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.6-5 Drainage Plan in LOG2 and LOG3

3.7 Water Supply Plan

3.7.1 Water Souces

The location map of water sources are shown in Figure 3.7-1 and Figure 3.7-2. Water sources for Water sources will be the Zamani Reservoir and Lagunbyin Reservoir for development of Thilawa SEZ.



Source：Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar（2014）

Figure 3.7-1 Location of Water Source for Thilawa SEZ

Source: Prepared by EIA Study Team based on the map from Myanmar Information Management Unit

Figure 3.7-2 Location of Water Source for Thilawa SEZ

3.7.2 Water Demand in R&C Area and Logistic Area

The expected water demand is forecasted as shown in Table 3.7-1. The maximum total water demand volume was calculated as 17,047 m^3/day.

Table 3.7-1 Forecasted Water Demand in R&C Area and Logistic Area

Zone	Maximum Volume (m^3/day)
R&C 2-4	5,873
R&C 3	1,065
LOG 2	3,480
LOG2B	6,549
LOG 3	80
Total	**17,047**

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

3.7.3 Water Supply Distribution System

Water from Thilawa Reservoir is planned to be transmitted to the logistics and residence and commercial areas. Meanwhile, the Japanese ODA loan project[4] is ongoing in which the public water supply pipe that makes 42,000m^3/day from the Lagumbine Reservoir to Thilawa SEZ would be established possibly by around 2019. Considering the progress of the above project, the water supply plan in Zone B will be prepared stage by stages as shown in Table 3.7-2.

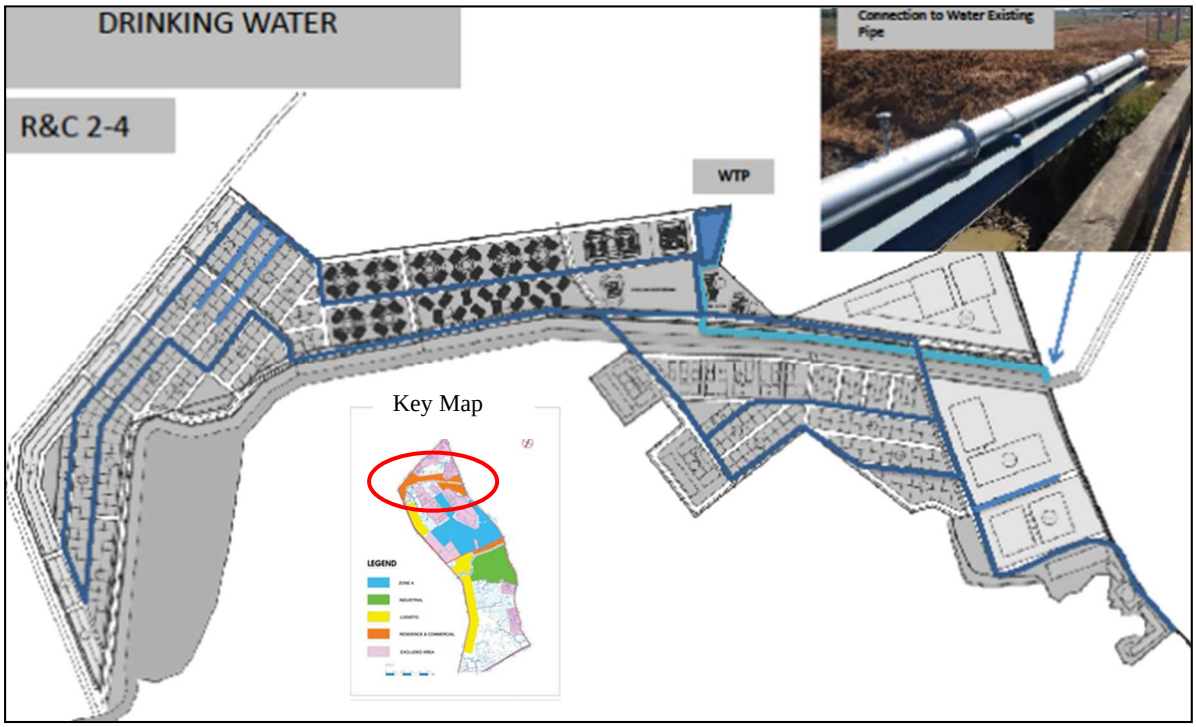
[4] Yangon Urban Water and Sewage Improvement Project

Table 3.7-2 Water Supply Plan in Logistic, Residence and Commercial Area

Timing	Water Supply Plan
Before Year 2019 （Before the water supply pipe hasn't installed）	Distribute water to each tenant from water purification plant (WPP) by pumping from Thilawa Reservoir
After Year 2019 （After the installation of the water supply pipe）	Distribute water to each tenant from water purification plant (WPP) by pumping from Thilawa Reservoir
	Connect to the public water supply pipe from Lagunbyin Reservoir and distribute water to each tenant

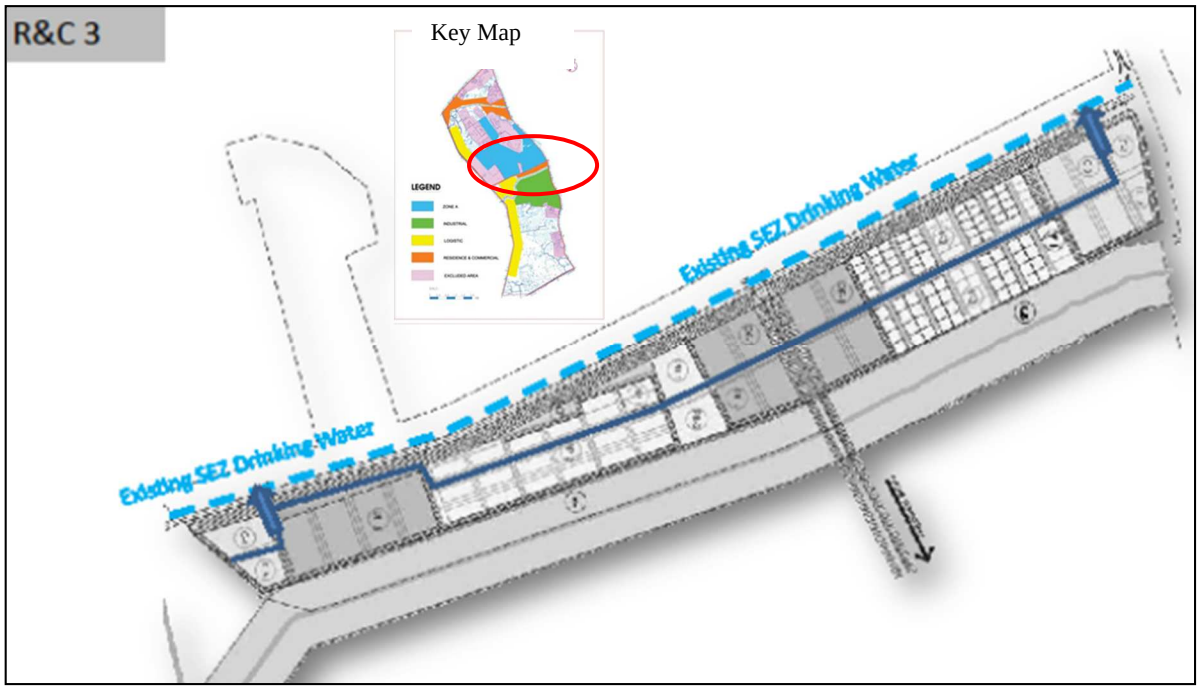
Source: EIA Study Report

The water supply distribution system in each zone is designed as shown in Figure 3.7-3 and Figure 3.7-4.



Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.7-3 Water Supply Plan in RC2



Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.7-4 Water Supply Plan in R&C2

3.8 Sewage System

3.8.1 Wastewater Volume

Waste water is designed according to water consumption. Eighty percent of water demand is considered as the wastewater volume. Waste water volume in R&C, and the logistic areas is forecasted as shown in Table 3.8-1.

Table 3.8-1 Forecasted Waste Water Volume in R&C Area and Logistic Area

Zone	Maximum Volume (m^3/day)
R&C 2-4	4,698
R&C 3	852
LOG 2	2,783
LOG2B	5,239
LOG 3	63
Total	**13,635**

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

3.8.2 Waste Water Treatment Method

In the residence and commercial area, it is planned that wastewater should be treated by the wastewater treatment tank (Joka-sou) to meet the related regulation as shown in Figure 3.8-1. This method make anaerobic microbe eat wastes in water and so that wastewater is separated into sludge and clean water. After that, clean water will be discharged to the canal. The expected specification is shown in Table 3.8-2.

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

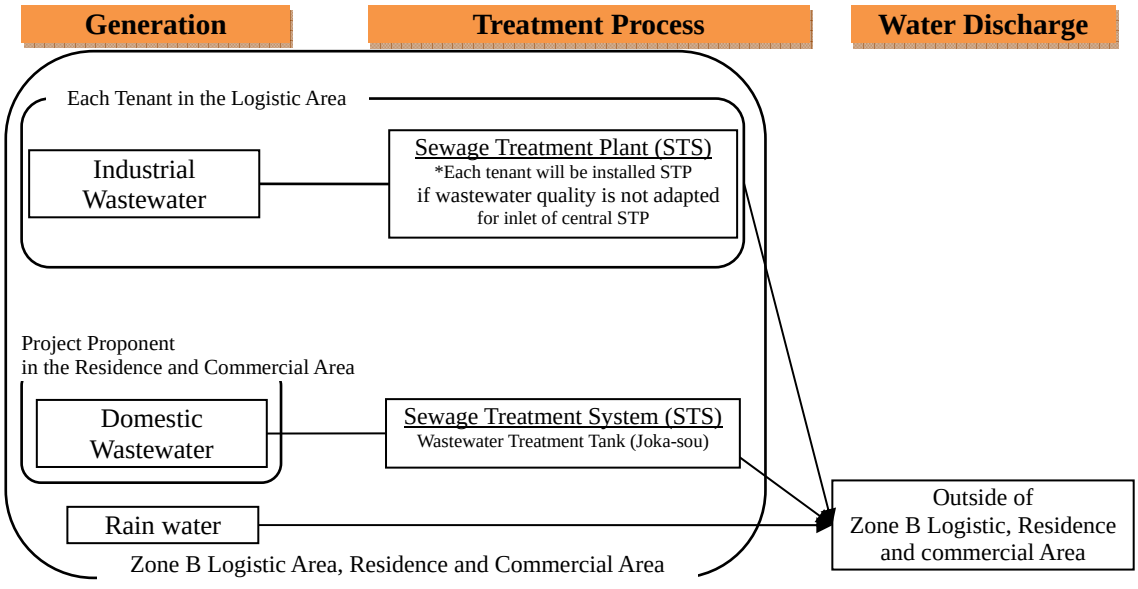
Figure 3.8-1 Image of the Wastewater Treatment Tank (Joka-sou)

Table 3.8-2 Expected Specification of Wastewater Treatment Tank (Joka-sou)

Items	Specification
Design Flow	188 m^3/day
Influent BOD Concentration	300 mg/L
Effluent BOD Concentration	30 mg/L
Sedimentation and Separation Chamber	23500 m^3
Anaerobic Contact media Chamber	43084 m^3
Moving Bed Chamber	47000 m^3
Sedimentation Chamber	15668 m^3
Disinfectant Chamber	0.876 m^3

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

The sewage treatment process in Zone B logistic area is shown in Figure 3.8-2. All of industrial and domestic wastewater will be treated by each tenant or the project proponent. Before discharging the industrial and domestic wastewater, each tenant will be installed own sewage treatment plant (STP) if their wastewater quality is not adapted to related regulation.



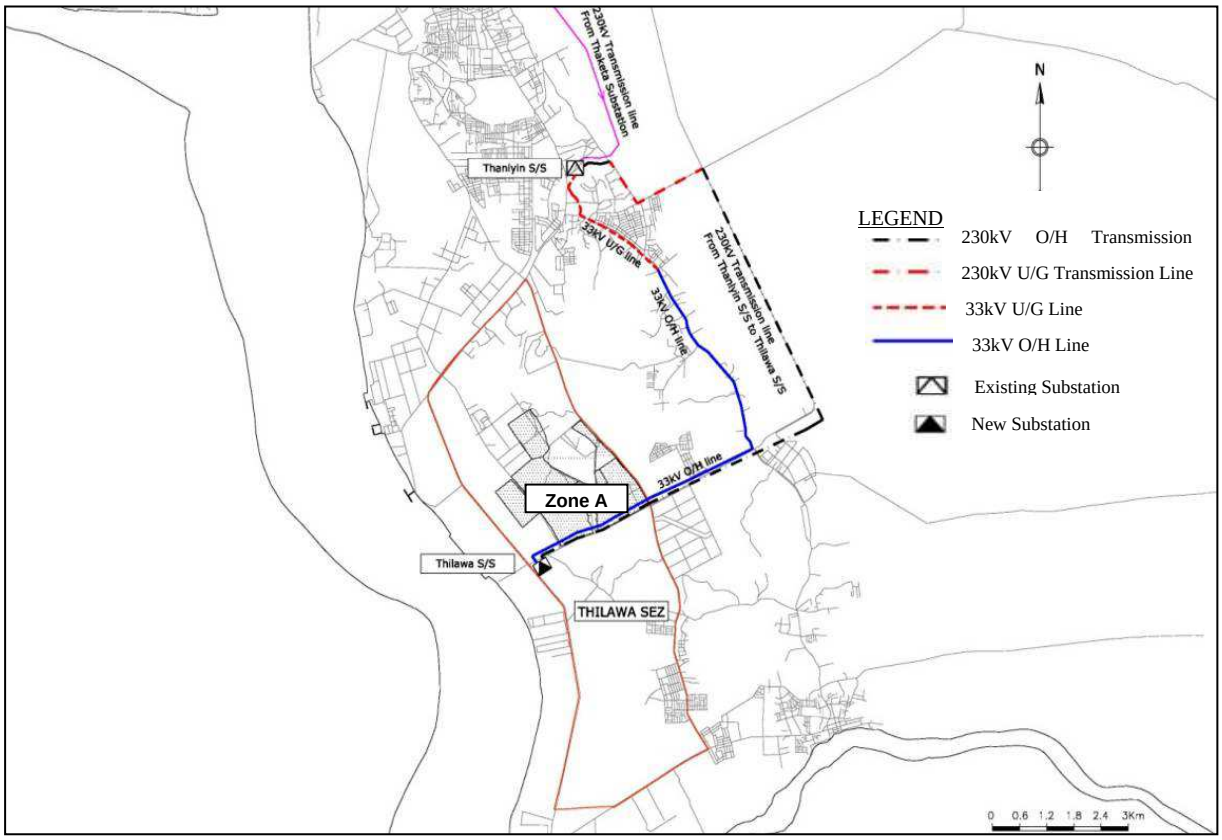
Source: EIA Study Team prepared on the basis of the information from the project proponent

Figure 3.8-2 Wastewater Treatment Process in Zone B Logistic Area, Residence and Commercial Area

3.9 Power Supply Plan

3.9.1 Power Supply Distribution System

Figure 3.9-1 shows the power supply system to Thilawa by around 2020. Power is supplied from Thanlyin substation to Thilawa substation by a 230kV transmission line. At Thilawa substation, power voltage is transformed from 230kV to 33kV, and 33kV will be distributed to Zone B.



Source: Prepared by EIA Study Team based on the Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (2014)

Figure 3.9-1 Power Supply System in Thilawa SEZ

3.9.2 Power demand in R&C and Logistic Areas

Table 3.9-1 and Table 3.9-2 show forecasted parameter and forecasted power demand in the project area.

Table 3.9-1 Forecasted Parameter of Power Demand in Logistic, Residence and Commercial Areas

Land Use	Parameter (kVA/ha)
Houses, Apartments and Shop Houses	250-300
Service Apartments and Dormitories	150
Office and Public Services	250-300
Sores and Services	500
Leisure and Sports	150
Hotels	500
School	300
Clinic	500

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Table 3.9-2 Forecasted Power Demand in Logistic, Residence and Commercial Area

Zone	Power Demand (MVA)
R&C 2-4	47
R&C 3	5
LOG 2	22
LOG2B	41
LOG 3	18
Total	**133**

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

3.10 Solid Waste Management

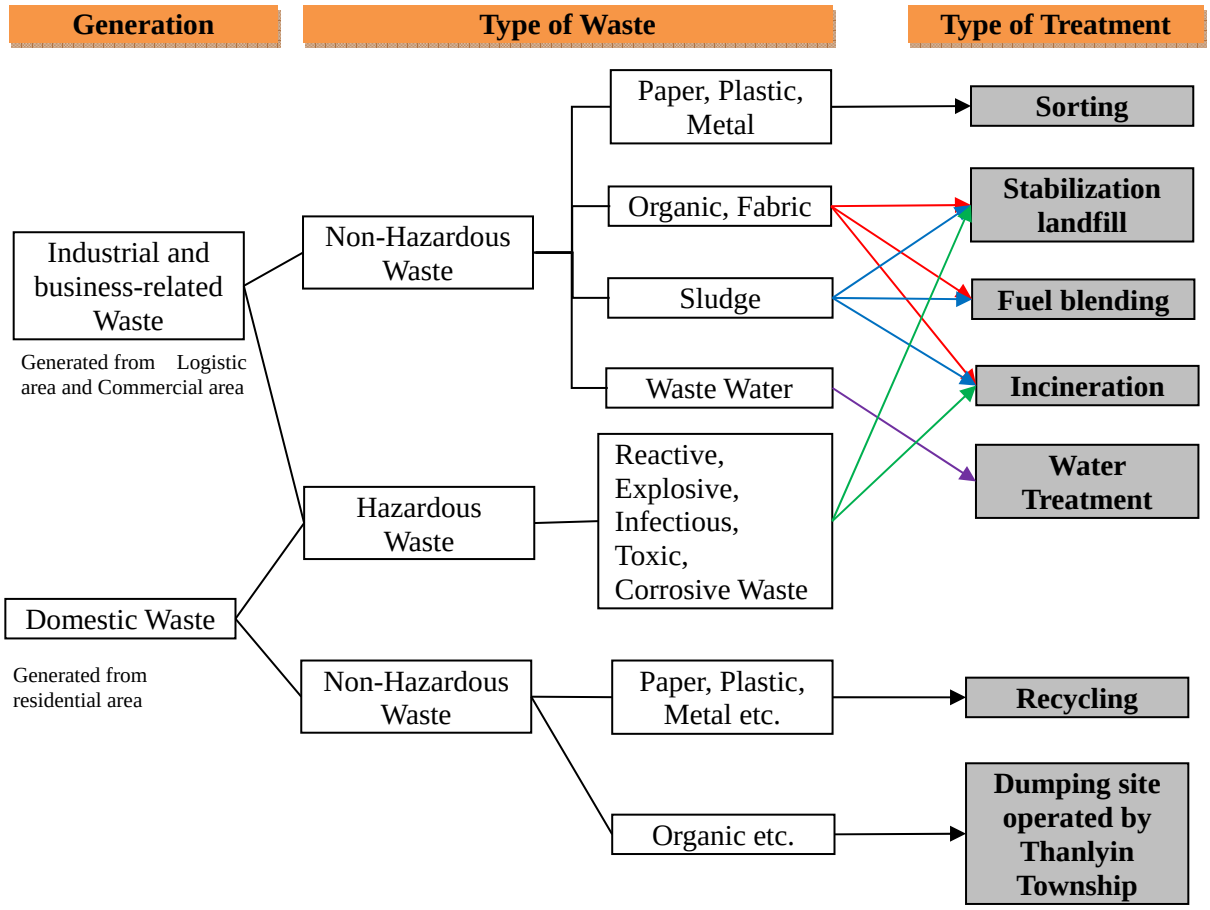
Industrial waste and business related waste generated from the logistic area and commercial area will be re-used or recycled as much as possible by collecting the waste separately. The waste which cannot be re-used or recycled, will be managed by the waste treatment firm in Zone A or public service such as Pollution Control and Cleansing Department of YCDC.

These wastes will be sorted out to each category and will be treated accordingly. The waste will follow the same process as the tenants. An incineration facility may be installed at the waste treatment firm in Zone A in the near future.

Domestic waste generated from the residential area will be disposed to the dumping site operated by Thanlyin Township. Collection and transportation of the domestic waste may be handled by the project proponent due to limitation of transportation capacity of Thanlyin Township. Before collection, the project proponent will implement following actions;

- To promote separation of waste for recycling and reducing waste; and
- To collect toxic wastes such as battery, lightning, and spray cans separately and bring the waste to the waste treatment facilities in Thilawa SEZ Zone A.

The expected process of solid waste management in Zone B in logistic, residence and commercial areas is shown in Figure 3.10-1.



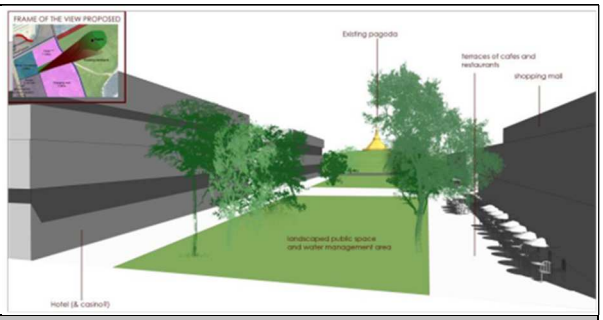
Source: EIA Study Team

Figure 3.10-1 Expected Process of Solid Waste Management in Zone B Logistic Area, Residence and Commercial Area

3.11 Greening Plan

In order to create green space for living condition of flora and fauna, landscape, and employee's comfortability, trees and sodding were arranged. Some kinds of trees are located in the sidewalks and retention canal along the main road. Bushes are located in the sidewalk along the road. The greening plan at the buffer zone along the road, public open spaces, inside plot, and along canals are shown in Figure 3.11-1.

Buffer Zone along the Road



Public Open Space

Inside Plot

Along Canals

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report

Figure 3.11-1 Image of Greening Plan

CHAPTER 4: CURRENT ENVIRONMENTAL AND SOCIAL CONDITION

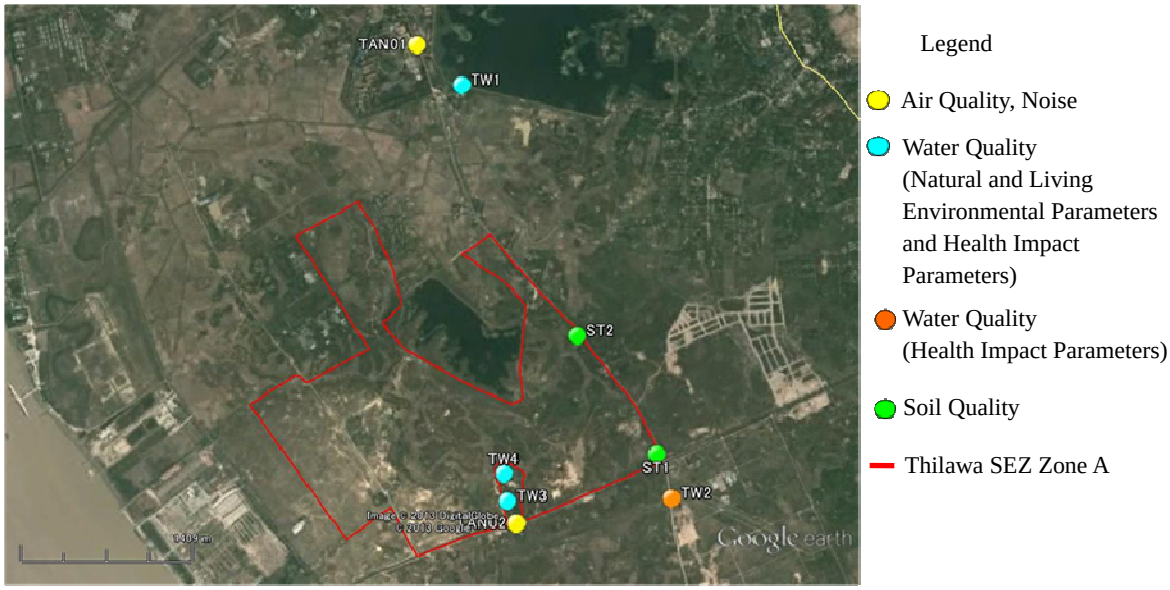
4.1 Living Environment

The overall conditions of air quality, water quality, soil quality, and noise levels are quoted from the Environmental Impact Assessment (EIA) Report for the Thilawa Special Economic Zone (SEZ) Class A Development Project by Myanmar and Japan Thilawa Development Ltd., which was approved by the Thilawa SEZ Management Committee (TSMC) based on the comments of the Ministry of Environmental Conservation and Forestry (MOECAF). The summary of the field survey for overall conditions is shown in Table 4.1-1. The location of the environmental survey for overall conditions is shown in Figure 4.1-1.

Table 4.1-1 Summary of Environmental Survey for Overall Conditions under the EIA Study of Class A

Category	Item	Description	
Environmental Conditions (quoted from the existing data from EIA studies near the Project site)	Air Quality	Parameter	1) Sulfur dioxide (SO_2), 2) Carbon monoxide (CO), 3) Nitrogen dioxide (NO_2), 4) PM10
		Period	Two points in the dry and rainy seasons (two samples in total)
		Location	Along the road
	Water Quality	Parameter	31 parameters for natural and living environment: 1) Temperature,2) Odor, 3) Color, 4) Electrical conductivity (EC), 5) Hardness, 6) pH, 7) Turbidity, 8) SS, 9) DO, 10) COD_{Cr}, 11) TOC, 12) BOD_5, 13) Oil and Grease, 14) Total Coliforms, 15) NH_4-N, 16) NO_2-N,17) NO_3-N, 18) T-N, 19) T-P, 20) Cu, 21) Zn, 22) Cd, 23) Pb, 24) Hg, 25) Ni, 26) Mn, 27) Cr (VI), 28) Fe, 29) CN, 30) Sulfide,31) Sulfate
		Frequency	Monthly (some main parameters sampled from March to August 2013 and all parameters sampled from June to August 2013)
		Location	Surface water
	Soil Quality	Parameter	Total of 11 parameters: 1) Cadmium (Cd) 2) Chromium (Cr VI) 3) pH 4) Mercury (Hg) 5) Lead (Pb) 6) Arsenic (As) 7) Zinc (Zn) 8) Nickel (Ni) 9) Manganese (Mn) 10) Iron (Fe) 11) Copper (Cu)
		Period	One time sampling at one point
		Location	Paddy field
	Noise Level	Parameter	LAeq (A-weighted loudness equivalent)
		Period	72-hour survey during weekday and weekend
		Location	Two locations

Source: EIA Report for the Thilawa SEZ Class A Development Project (September 2013)



Source: EIA Report for Thilawa SEZ Class A Development Project (September 2013)

Figure 4.1-1 Location of Environmental Survey for Overall Conditions under the EIA Study of Class A

4.1.1 Air Quality

Table 4.1-2 and Table 4.1-3 show the results of air quality survey conducted in April and June 2013 for TAN01 and TAN02.

Table 4.1-2 Results of Air Quality Survey in 2013 (TAN01)

Parameter (Unit)	Date	Season	Result	
SO_2 (ppm)	9 to 12 April 2013	Dry	Daily Average	0.015
			Minimum - Maximum	0.012 - 0.019
	22 to 29 June 2013	Rainy	Daily Average	0.020
			Minimum - Maximum	0.0085 - 0.053
CO (ppm)	9 to 12 April 2013	Dry	Daily Average	0.4305
			Minimum - Maximum	0.3414 - 0.5070
	22 to 29 June 2013	Rainy	Daily Average	0.3618
			Minimum - Maximum	0.22 - 0.46
NO_2 (ppm)	9 to 12 April 2013	Dry	Daily Average	0.036
			Minimum - Maximum	0.033 - 0.040
	22 to 29 June 2013	Rainy	Daily Average	0.022
			Minimum - Maximum	0.0090 - 0.033
PM10 (mg/m^3)	9 to 12 April 2013	Dry	Daily Average	0.13
			Minimum - Maximum	0.11 - 0.14
	22 to 29 June 2013	Rainy	Daily Average	0.039
			Minimum - Maximum	0.028 - 0.051

Source: EIA Report for the Thilawa SEZ Class A Development Project (September 2013)

Table 4.1-3 Results of Air Quality Survey in 2013 (TAN02)

Parameter (Unit)	Date	Season	Result	
SO_2 (ppm)	9 to 12 April 2013	Dry	Daily Average	0.016
			Minimum - Maximum	0.015 - 0.018
	22 to 29 June 2013	Rainy	Daily Average	0.0038
			Minimum - Maximum	0.00050 - 0.0088
CO (ppm)	9 to 12 April 2013	Dry	Daily Average	0.44
			Minimum - Maximum	0.43 - 0.46
	22 to 29 June 2013	Rainy	Daily Average	0.31
			Minimum - Maximum	0.25 - 0.42

Parameter (Unit)	Date	Season	Result	
NO_2 (ppm)	9 to 12 April 2013	Dry	Daily Average	0.041
			Minimum - Maximum	0.038 - 0.048
	22 to 29 June 2013	Rainy	Daily Average	0.035
			Minimum - Maximum	0.034 - 0.035
PM10 (mg/m^3)	9 to 12 April 2013	Dry	Daily Average	0.082
			Minimum - Maximum	0.057 - 0.10
	22 to 29 June 2013	Rainy	Daily Average	0.048
			Minimum - Maximum	0.038 - 0.060

Source: EIA Report for the Thilawa SEZ Class A Development Project (September 2013)

4.1.2 Water Quality

Tables 4.1-4 and Table 4.1-5 show the results of the water quality survey at TW1 located in Zarmani Reservoir and TW2 located on the small stream running to the Yangon River. In Armani Reservoir, the results showed that pH was 5.8-9.3, BOD_5:1.5-3.5 mg/l, SS:159-1,230 mg/l, DO:4.06-7.70 mg/l, Total coliform:100-3,000 MPN/100 ml, and COD:0.368-5.52 mg/l. On the other hand, the results at TW2 showed that pH was 7.21-7.4, BOD_5:2.5-3 mg/l, SS:73-272 mg/l, DO:4-4.6 mg/l, Total coliform:400-1,700 MPN/100 ml, and COD:0.736-2.36 mg/l.

Table 4.1-4 Results of Water Quality Survey at TW1 (April-August, 2013)

Parameters (Unit)	March	April	May	June	July	August
Temperature (ºC)	30.1	37.3	29.5	28.22	27.58	28.50
Taste and Odor	Not objectionable					
Color	Clear	Clear	Clear	Clear	Clear	Clear
Electrical Conductivity (µS/cm)	57	48	63	47	28	39
pH	5.8	6.2	9.3	7.5	7.6	8.9
BOD_5(mg/L)	2.5	2.5	3	3.5	1.5	2.5
SS (mg/L)	1,200	160	180	270	160	170
DO (mg/L)	4.1	7.0	4.4	4.5	6.8	7.7
Fecal Coliform (MPN/100 ml)	1×10^2	-	3×10^3	3×10^2	4×10^2	-
Total Coliform (MPN/100 ml)	1×10^2	-	3×10^3	3×10^2	4×10^2	-
COD (mg/l)	3.7	0.4	0.4	2.4	1.8	5.5
Total Nitrogen (mg/L)	7.6	13.28	13.3	12.9	12.7	13.4
Total Phosphorous (mg/L)	2.6	ND	ND	ND	0.2	0.2
Total Organic Compounds (mg/L)	6.5	7.9	10	13	6.4	5.0
Turbidity (FNU)	42.2	0.1	90.5	55.6	46.6	54.6
Hardness (mg/L)	40	32	14	60	80	10

Note: The results were rounded up or rounded off using an appropriate number of significant figures for each parameter.
ND; Not Detected
Source: EIA Report for the Thilawa SEZ Class A Development Project (September 2013)

Table 4.1-5 Results of Water Quality Survey at TW2 (April-August, 2013)

Parameters (Unit)	2013					
	March	April	May	June	July	August
Temperature (ºC)	-	-	-	27.39	27.25	26.5
Odor	-	-	-	Not objectionable		
Color	-	-	-	Clear	Clear	Clear
Electrical Conductivity (µS/cm)	-	-	-	48	53	62
pH	-	-	-	7.2	7.3	7.4
BOD_5(mg/L)	-	-	-	3.0	2.5	2.5
COD_{Cr} (mg/L)	-	-	-	2.4	0.74	1.1
SS (mg/L)	-	-	-	91	73	270
Turbidity (NTU)	-	-	-	240	98	650
Hardness (mg/L)	-	-	-	120	100	20
DO (mg/L)	-	-	-	4	4.6	4.5
Total Coliform (MPN/100 ml)	-	-	-	1.7×10^3	-	4.0×10^2
Total Nitrogen (mg/L)	-	-	-	8.1	8.2	8.1
Nitrite (NO_2-N) (mg/L)	7.6	ND	13	15	13	13
Nitrates (NO_3-N) (mg/L)	ND	ND	ND	4.2	ND	ND

Parameters (Unit)	2013					
	March	April	May	June	July	August
Ammonium Nitrogen (NH_4-N) (mg/L)	ND	ND	0.25	ND	ND	ND
Total Phosphorous (mg/L)	-	-	-	ND	ND	ND
Oil and Grease (mg/L)	<1	2	<1	<1	1	2
Sulfide (mg/L)	ND	ND	ND	ND	ND	ND
Sulfate (mg/L)	100	100	100	ND	5	40
Total Organic Carbon (mg/L)	-	-	-	4.9	5.3	4.1
Cyanide (CN) (mg/L)	<0.05	<0.005	<0.05	<0.05	<0.05	<0.05
Mercury (Hg) (mg/L)	ND	0.0002	0.0011	0.0001	0.0009	0.0021
Lead (Pb) (mg/L)	0.003	ND	0.062	0.009	0.05	0.010
Cadmium (Cd) (mg/L)	0.0044	0.0007	ND	0.0013	0.0152	0.0004
Hexavalent Chromium (Cr(VI)) (mg/L)	ND	ND	ND	ND	ND	ND
Copper (Cu) (mg/L)	0.04	ND	0.28	0.18	ND	ND
Zinc (Zn) (mg/L)	ND	ND	ND	ND	ND	ND
Nickel (Ni) (mg/L)	<0.01	0.01	0.01	<0.01	0.01	<0.01
Manganese (Mn) (mg/L)	ND	0.1	0.1	ND	ND	ND
Iron (Fe) (mg/L)	0.001	5	0.094	0.05	0.05	4

Note: The results were rounded up or rounded off using an appropriate number of significant figures for each parameter.
ND; Not Detected
Source: EIA Report for the Thilawa SEZ Class A Development Project (September 2013)

4.1.3 Soil Quality

The results of soil quality analysis are presented in Table 4.1-6. Copper, lead, and zinc were detected at 0.004~0.007 mg/kg, 80~83 mg/kg, and 105~115 mg/kg, respectively, while chromium and mercury were detected at 10 and 0.002~0.004 mg/kg, respectively or not detected at all.

Table 4.1-6 Results of Soil Quality Analysis at ST2 (2013)

No.	Parameter	Result			Unit
		Dry Season (April)		Rainy (July)	
		ST 1	ST 2	ST1	
1	Cadmium (Cd)	0.004	0.006	0.007	mg/kg
2	Chromium (VI)	ND	ND	10	mg/kg
3	pH	6.2	6.5	6.3	-
4	Mercury (Hg)	0.002	0.004	ND	mg/kg
5	Lead (Pb)	80	83	80	mg/kg
6	Arsenic (As)	ND	ND	ND	mg/kg
7	Zinc (Zn)	105	110	115	mg/kg
8	Nickel (Ni)	10	12	7	mg/kg
9	Manganese (Mn)	15	18	14	mg/kg
10	Iron (Fe)	5,280	5,310	5,010	mg/kg
11	Copper (Cu)	80	85	110	mg/kg

Remarks: ND: Not Detected
Source: 1) Standard of Soil Contamination Countermeasures Act, 2002, Japan
2) Environmental Quality Standards for Soil Pollution, 1994, Japan
3) Soil Quality Standard for Other Purposes, 2004, Thailand
4) Regulation for Implementing the Law on Soil Contamination Countermeasures
QCVN 03: 2008/BTNMT, Vietnam. It is applied as “farmland”

4.1.4 Noise Level

The results of noise levels (Leq) in April 2013 are shown in Table 4.1-7. The noise levels at TAN01 located along the road was at 58.3~61.1 dB(A) during daytime (6:00~22:00), and at 42.7~47.6 dB(A) during nighttime (22:00-6:00). On the other hand, the noise levels at TAN02 located in front of a monastery and about 131 m away from the road was at 53.2~59.8 dB(A) during daytime, and at 51.8~55.1 dB(A) during nighttime.

Table 4.1-7 Results of Noise Levels in April, 2013 (Dry Season)

Unit: dB(A)

Date		TAN01 (Along the Road)		TAN02 (Living Environment)	
		Daytime	Nighttime	Daytime	Nighttime
1	07-08 April 13	58.9	47.6	53.2	53.7
2	08-09 April 13	61.1	42.7	59.8	51.8
3	09-10April 13	58.3	46.7	54.5	55.1

Note: Daytime; 6:00-22:00, Nighttime; 22:00-6:00
Source: EIA Report for the Thilawa SEZ Class A Development Project (September 2013)

4.2 Natural Environment

4.2.1 Meteorology

Greater Yangon has a tropical monsoon climate characterized by altering the rainy season (from May to October) and the dry season (from November to April). Table 4.2-1 shows the amount of monthly rainfall and maximum, minimum, and mean temperature averaged from 1981 to 2010 observed at the Kaba-aye Meteorological Station, which is the nearest station from Thilawa SEZ.

The mean monthly temperature is highest in April at 30.7 °C and lowest in January at 25.0 °C. Except in December and January, the monthly temperatures are above 25.0 °C. The southwest monsoon wind is the main source of rain, and the Yangon area receives rain during the period from May to October. The average annual amount of rainfall is 2,787 mm. Rainfall sharply decreases from November and continues to be less than 10 mm from December to February.

Table 4.2-1 Monthly Maximum, Minimum, Mean Temperatures, and Rainfall at Kaba-aye Station in Yangon City (1981-2010)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average/ Total
Max. Temp. (°C)	33.2	35.2	36.8	37.5	34.1	30.8	30.3	30.0	31.0	32.2	33.1	32.5	33.1
Min. Temp. (°C)	16.7	18.3	21.1	23.8	24.3	23.6	23.2	23.3	23.2	23.1	21.3	17.7	21.6
Mean Temp. (°C)	25.0	26.8	29.0	30.7	29.2	27.2	26.8	26.7	27.1	27.7	27.2	25.1	27.4
Rainfall (mm)	1	4	12	38	325	566	608	571	393	201	61	7	2787

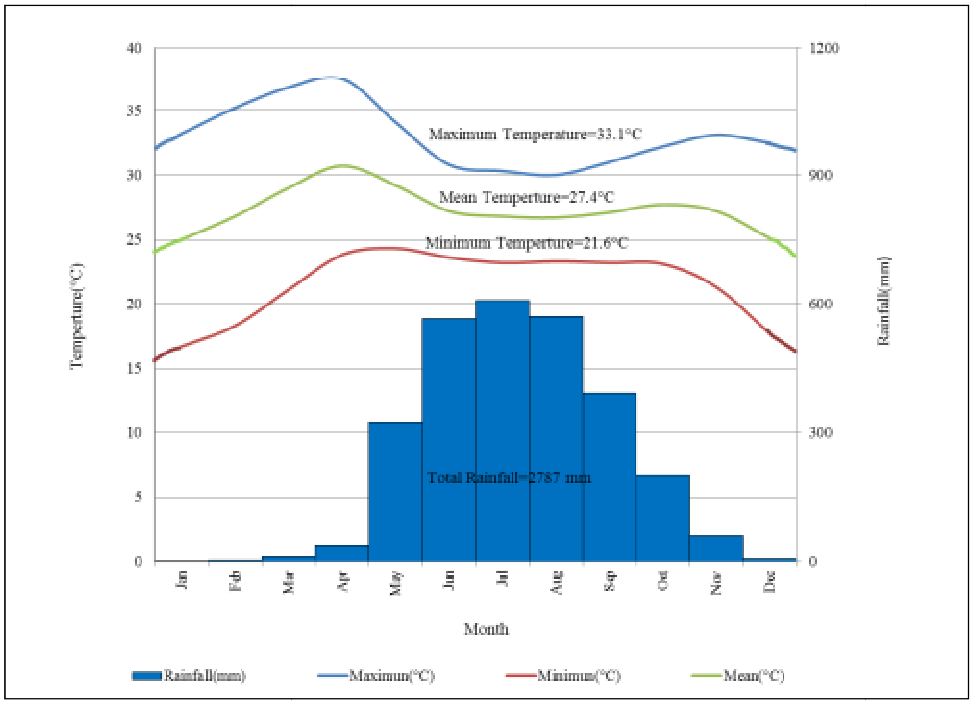
Source: Data of the Department of Meteorology and Hydrology, Kaba-aye Station, Yangon

Table 4.2-2 shows the maximum day of rainfall recorded in a year at Kaba-aye station from 2002 to 2013. In May 2008. The maximum rainfall was recorded 344 mm/day in May 2007. Cyclone Nargis brought 220 mm rainfall in a day.

Table 4.2-2 Maximum Rainfall Recorded at Kaba-aye Station in Yangon City (2002-2013)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Maximum Rainfall (mm/day)	115	82	107	94	92	344	220	180	100	99	108	143
Recorded Month	Sep	Aug	Jun	Sep	Aug	May	May (Cyclone Nargis)	Sep	Jun	Jun	Aug	Aug

Source: Data of the Department of Meteorology and Hydrology, Kaba-aye Station, Yangon



Source: Data of the Department of Meteorology and Hydrology, Kaba-aye Station, Yangon

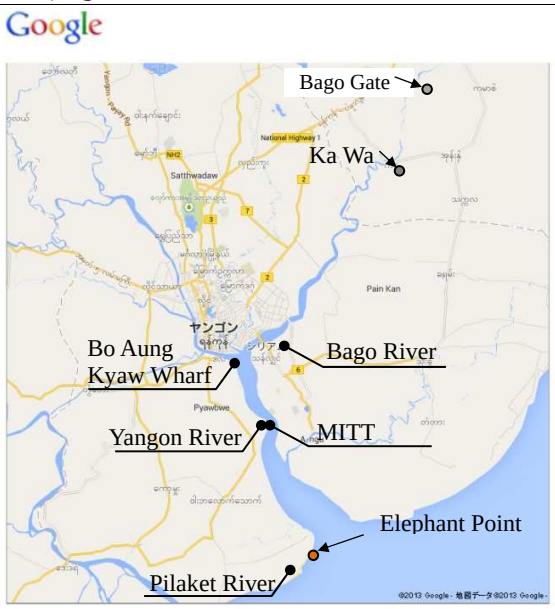
Figure 4.2-1 Climograph of Kaba-aye Station in Yangon City (1981-2010)

4.2.2 Hydrological Situations

The main river around Thilawa SEZ is the Yangon River, which is a large tidal river in the region running on the west side of Thilawa SEZ. The data on the tide levels of the Yangon River as observed at elephant point (Figure 4.2-2) by the Ministry of Port Authority (MPA) are shown in Table 4.2-3. The elephant point is located at the mouth of the Yangon River, 32 km south from the Yangon Port. The data of MPA are converted in accordance with Myanmar's standard sea level.

In Thilawa SEZ, there are six tidal rivers and small streams. Four of them, namely: Ah Lun Sake Creek, Shwe Pyauk Creek, Pa Lan Creek, and small creek flow into the Yangon River. In the south area of Thilawa SEZ, Gway Creek and Kayat Creek flow into the Hmawwun River, which flows from east to west and reaches the Yangon River.

In and around Thilawa SEZ, there are three major water reservoirs, namely: Zarmani Reservoir, Bant Bwaykone Reservoir and Thilawa Reservoir.



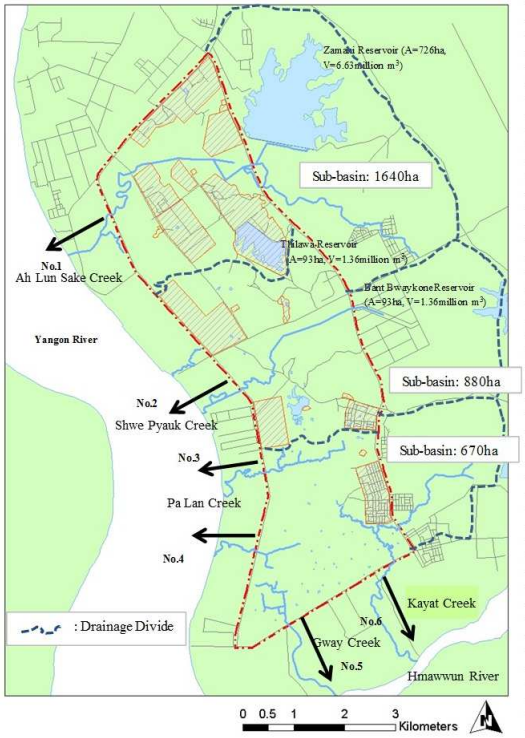
Source: JICA Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (March 2014)

Figure 4.2-2 Location of Rivers and Elephant Point

Table 4.2-3 Hydrological Data on the Yangon River

Description	Data of Sounding at Elephant Point (m)
Highest HWL (September 1930)	+4.390
MWL in Bo Aung Kyaw Wharf	+0.856
MWL in Pilaket Creek	+0.591
Zero of Tide Gauge in Yangon	-2.265
Lowest LWL (February 1888)	-2.265
High Tide Duration	1.2 hr

Source: JICA Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (March 2014)



Source：Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar(2014)

Figure 4.2-3 Surface Water in and around Thilawa SEZ

4.2.3 Topography

The Thilawa SEZ Zone B is part of the Ayeyarwaddy and Sittaung deltas. The ridges exist on both sides of Thanlyin-Kyauktan Bridge and Thilawa Road. The distinct physiographic units are as follows:

(1) Ridges

The dominant physical features of the region where the project is located are the three ridges namely: the Yangon Ridge in the northern part, the Thanlyin Anticlinal Ridge in the eastern part, and the Kawhmu Ridge in the western part of the region. Other parts are flat lowlands. These ridges are the southern continuation of the Pegu Yoma. The Yangon-Mingaladon Ridge is an anticlinal ridge but morphologically it looks like a homoclinal ridge. The highest elevation is about 68 m above sea level with 30 m base height and the regional slope is towards the south. The Thanlyin Ridge is also an anticlinal ridge and covered with thick lateritic soil. The highest elevation of the entire region is about 50 m mean sea level (msl) and base height is about 21 m above sea level. The Kawhmu Ridge is a dome shaped and covered with thick lateritic soil. The highest point is about 60 m and the basement of this ridge is about 20 m. This ridge is wide at about 34 km from the north of Twentay Town to the south of Kawhmu Town. Further in the western part along the Thanlyin-Kyauktan Highway and the western part of Nyaungwine Village Tract, Shwebyauk Village, Thanlyin Township, and Kyauktan Township are situated. The elevation of the ridges is above 17 m and is located at the border of Thanlyin Township and Kyauktan Township along the road between Ahle Village of Thanlyin Township and Thilawa Village of Kyauktan Hmawwun by the side of Thilawa Road. The ridges are covered with dense forest vegetation and boundaries and are composed of laterite. These ridges are gently sloping southward.

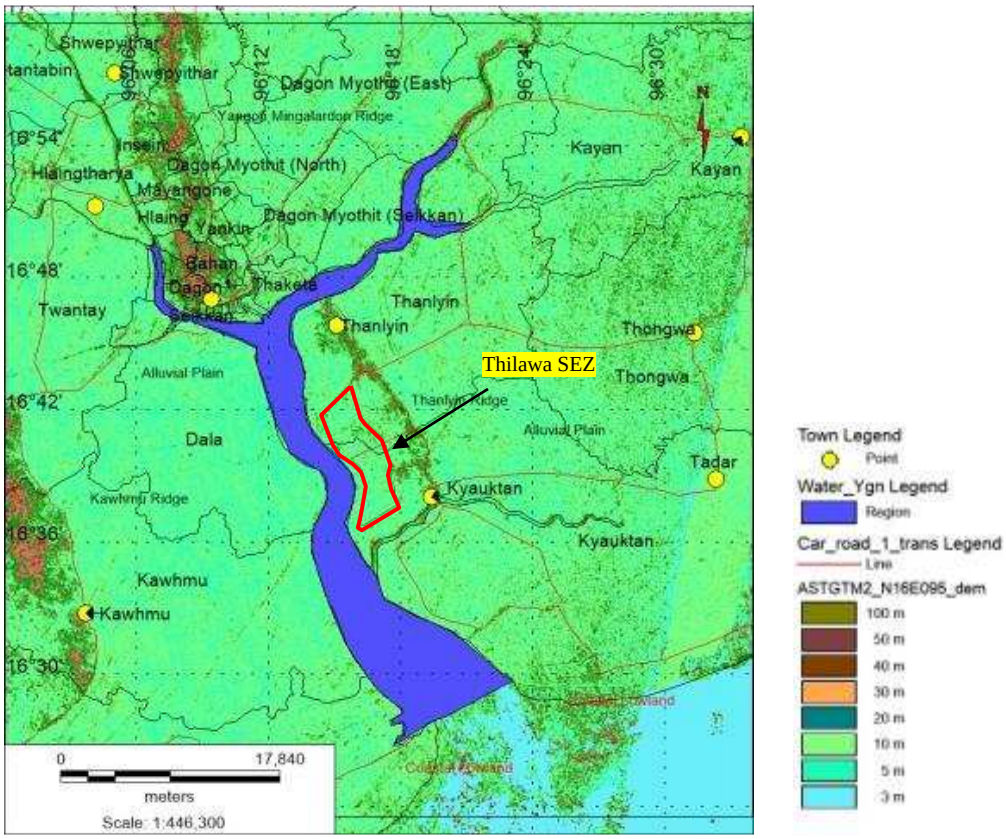
(2) Alluvial Plain

The alluvial plain is widespread and a vast agricultural land is found in the study area. This plain is built up with alluvial deposits from the Hlaing and Bago rivers. The general elevation of the alluvial plain is generally less than 6.6 m above mean sea level. In the rainy season, the plain is usually

flooded, thus, it permits old alluvial soil to be deposited in its banks. The plain is rather swampy in some places.

(3) Costal Lowland

The coastal zone exists in the southern and southeastern parts of Thanlyin Township and Kyauktan Township. These coastal zone structures are from Mibya, Zwebagon, Shan Chaung, and Sinmakwe villages in the southern part up to the Mottama Sea. Large swampy lowlands are found in the lower part of the coastal region where the Hmawwun River, Kondon Creek, and Kawdaun Creek flow into the Yangon River. The drain empties very slowly, thus, this part is unsuitable for agriculture and fishing industries. The western portion of these townships is drained by a lot of tidal rivers and creeks. The main drainage is the Hmawwun River, which flows from east to west and drains into the Yangon River. Some creeks flow into the Yangon River, some into the Hmawwun River, and some directly into the Gulf of Mottama (e.g., Kanaung, Myagaing, and Tummyaung).



Note: Scale is not applicable
Source: Resource Environmental Myanmar Ltd.

Figure 4.2-4 Physiographic Features in the Yangon Area

4.2.4 Geographical Features

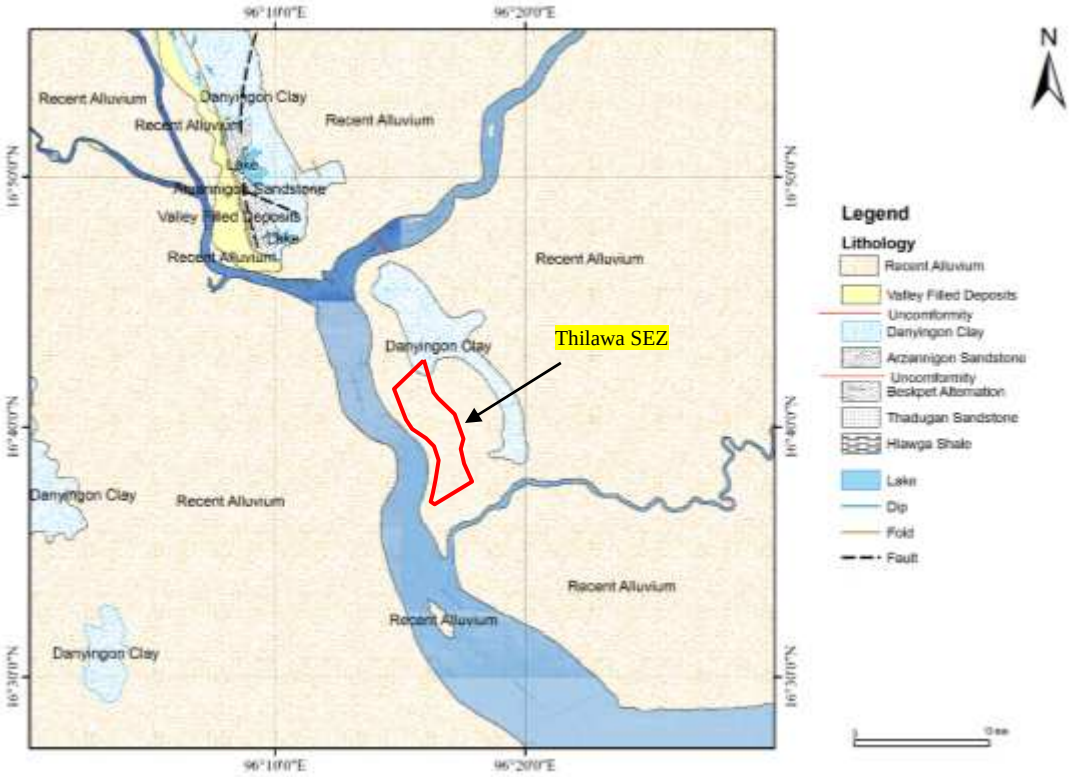
The regional geomorphic features of the entire area include ridges and deltaic lands lying south of the Pegu Yoma between the Sittaung River in the east and the Irrawaddy River in the west. This area is in a north-south trending sedimentary basin containing thick sedimentary deposits from the Tertiary to Quaternary periods. The Tertiary deposits are strongly folded into narrow en echelon anticlinal folds such as the Yangon Ridge, the Thanlyin-Kyauktan Ridge, and the Twentay-Kawhmu Ridge. All these ridges are trending south towards the Gulf of Martaban. Rocks of the Tertiary Period contain well consolidated marine sandstone and shale of the Pegu Group and semi-consolidated, continental deltaic, and marginal marine deposits of the Irrawaddy Formation. The synclinal valley or through west of the Yangon Anticlinal Ridge is filled with unconsolidated deposits from the Quaternary Period. There forms a wedge-shaped alluvial accumulation, ranging in thickness from a few feet near the ridge up to 100 m in the synclinal valley. The wedge-shaped form of these sediments extends both in the east-west

and north-south directions and shows thickening toward the south and west. These sediments include clay, silt, sand, and very coarse-grained gravel.

Table 4.2-4 Geological Survey of the Region Located in and around the Yangon Area

Lithostratigraphic Units	Geological Age	Physical Parameter
Recent Alluvial	Recent	Clay and silt with trace sand
Valley-filled Deposits	Pleistocene	Clay, silt, sand, and very coarse-grained gravel
Danyingon Clay	Pliocene	Reddish brown, grey to blue, laminated clays, with interbedded sand-rocks
Arzanigon Sand-rock		Yellowish grey to bluish grey sand-rock, fine to coarse-grained, sometimes very coarse-grained, sometimes very coarse to gritty with intercalated clay and mudstone/siltstone
Besapet Alternation	Miocene	Alternation of shale and argillaceous sandstone
Thadugan Sandstone		Well consolidated, jointed argillaceous sandstone
Hlawga Shale	Oligocene	Generally indurated shale

Source: Data from the Geology Department

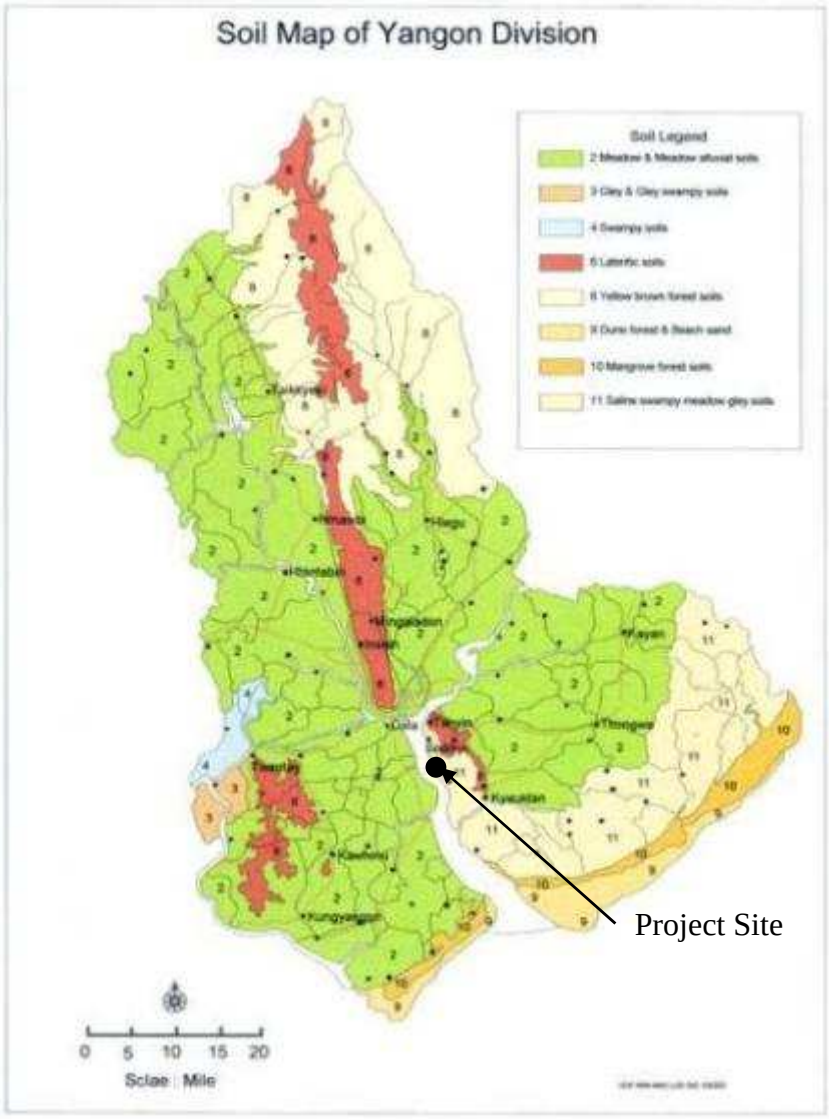


Note: Scale is not applicable
Source: Data from the Geology Department

Figure 4.2-5 Geological Map in and around the Yangon Area

4.2.5 Soil Erosion

The main types of soil are Ferrosols, Gleysols, Solovechaks, and Arenesols. Ferrosols (plinthic) or lateritic soils are found on low hills along Thanlyin-Kyauktan. The soil is good for growing rubber and vegetables and for gardening. Gleysols (dystric) or meadow gley soils occupy much of the area in this township as shown in Figure 4.2-6. About 90% of these soils are composed of silt and clay, but humus content varies from place to place. These soils are favorable for paddy cultivation. The main problem, however, is the poor drainage and water logged conditions. Meadow Solonchak are usually found in lowlands under impeded drainage. In the rainy season, they are covered with flood water. Because of the high content of clay, these soils become very dry and crack in the dry season. Solonchaks (gleyic) or saline swampy gluey soils are found along the coastal area. These soils develop from sediments transported and deposited in the estuaries of the Yangon River.



Note: Scale is not applicable
Source: Data from the Land Use Division, Myanmar

Figure 4.2-6 Soil Map of Yangon Area

4.2.6 Flora, Fauna, and Biodiversity

According to the results of Flora and Fauna Survey in 2013[1], there were 139 flora species in the dry season and 181 species in the rainy season in the Thilawa SEZ Zone A area and the downstream near the Yangon River. The listed and recorded plant species were checked with the International Union for Conservation of Nature (IUCN) Red List of threatened species. However, none of those species were found in the IUCN Red List.

The fauna survey was also conducted in 2013 in and around the Thilawa SEZ Zone A. A total of 13 butterfly species were recorded in the study area during the survey period. All the recorded butterfly species were common species. A total of 18 bird species, which belong to 13 families, were recorded in the survey area. A total of four mammal species categorized as Least Concern (Lc) by IUCN Red List were recorded during the survey period. Some species such as the white-bellied rat, *Niviventer fulvscens,* and greater bandicoot rat, *Bandicota indica*, were found mainly in the rice fields, whereas the grey squirrel *Callosciurus pygerythrus* was found in both scattered trees and scrubland areas.

[1] EIA Report for the Thilawa SEZ Class A Development Project (September 2013)

A total of 18 reptilian species and seven amphibian species were recorded in the survey area during the survey period and the total 18 species in the dry season and eight species in the rainy season had the Lc status in the IUCN Red List. The reptile species, *Calotes versicolor,* was observed in areas with mixed vegetation and scattered trees. Among the recorded species, the paddy frog, *Fejervarya limnocharis,* was found as a very common species. The frog species, *Holobatrachus tigerinus* was also common in the area and distributed in many parts of the area in the wet season. A total of 15 fish species were recorded during the survey period. The fishes are important for the ecosystem of the canal and rice field water body. The fish species, *Mystus cavasius* and *Puntius chola,* were found as the most common species in the Thilawa SEZ Zone A. The fish species, *Mystus bleekeri* and *Labeo calbasu,* were also abundant in the aquatic habitat. As a result of the survey, endangered (EN) species, vulnerable (VU) species by IUCN Red List, and prohibited species, which need to be conserved by implementing a no hunting, trading, and no disturbance by the Myanmar Law, were not identified by the Flora and Fauna Survey in 2013.

4.3 Social Environment

4.3.1 Population

Thilawa SEZ is located across Thanlyin and Kauktan townships in Yangon Region. In 2015, there are about 268,000 people in Thanlyin Township and 133,000 in Kyauktan Township as shown in Table 4.3-1. The percentage of urban population is about 32% in both townships.

Table 4.3-1 Population of Thanlyin and Kyauktan Townships

Town ship	Total (Male/Female)				Total (Urban/Rural)			Households
	Male	Female	Total	Sex Ratio	Urban	Rural	Urban Population (%)	
Thanlyin	130,537	137,526	268,063	94.9	86,065	181,998	32.1	61,597
Kyauktan	64,378	68,387	132,765	94.1	42,778	89,987	32.2	32,976

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census–The Union Report- Census Report Volume 2" May 2015

4.3.2 Ethnicity

The races residing in Thanlyin and Kyauktan townships are shown in Table 4.3-2. Most of the people who live in these townships are Bamar, followed by Kayin, Rakhine, and Indian people. A small number of Pakistani and Bangladeshi live in Thanlyin Township.

Table 4.3-2 Races in Thanlyin and Kyauktan Townships (2014)

No.	Race	Township	
		Thanlyin	Kyauktan
1	Kachin	52	3
2	Kayar	2	2
3	Kayin	1,573	224
4	Chin	224	12
5	Mon	415	8
6	Bamar	198,494	120,110
7	Rakhine	1,183	90
8	Shan	133	3
9	China	371	330
10	Indian	7,090	4,140
11	Pakistan	64	0
12	Bangladeshi	425	0
13	Others	2,615	0
Total		212,641	124,922

Remark: The total number in each township is different from the total population which is mentioned in Table 4.3-1 because of the limitation of data collection.
Source: Thanlyin and Kyauktan Township Administrative Offices

4.3.3 Religion

The different kinds of religion present in Thanlyin and Kyauktan townships are shown in Table 4.3-3. More than 90% of the people living in the two townships are Buddhists. There are more Hindus and Muslims living in Kyauktan Township than in Thanlyin Township.

Table 4.3-3 Religion in Thanlyin and Kyauktan Townships (2014)

Township	Religion	Buddhist	Christian	Hindu	Muslim	Total
Thanlyin	Number	120,110	1,220	3,232	360	124,922
	(%)	96.2	0.9	2.6	0.3	100.0
Kyauktan	Number	202,076	1,853	3,760	3,200	212,641
	(%)	93.7	0.9	2.8	2.4	100.0

Remark: The total number in each township is different from the total population which is mentioned in Table 4.3-1 because of the limitation of data collection.
Source: Thanlyin and Kyauktan Township Administrative Offices

4.3.4 Land Use

Land use in Thanlyin and Kyauktan townships are shown in Table 4.3-4. Both townships mainly use its land for agriculture followed by water area. In Thanlyin Township, settlement land covers 10.6% (3,936 ha) which is comparatively large. It is considered that Thanlyin Township is a kind of bed-town for laborers who go to Yangon to work.

Table 4.3-4 Land Use of Thanlyin and Kyauktan Townships (2012/2013)

Land Category	Thanlyin		Kyautan	
	ha	%	ha	%
Agricultural Land	24,762.3	66.4	62,882.9	74.5
Forest and Natural Area	51.4	0.1	225.4	0.3
Road and Railway	803.7	2.2	1,097.5	1.3
Water Area	5,064.6	13.6	12,087.2	14.3
Industrial Land	2,108.0	5.7	794.4	0.9
Settlement Land	3,936.0	10.6	3,840.9	4.6
Other	565.3	1.5	3,442.7	4.1
Total Area	37,291.3	100.00	84,371.0	100.00

Source: JICA/Sanyu Consultants Inc., Data Collection Survey on Water Resources Potential for Thilawa Special Economic Zone and Adjoining Areas Final Report, September 2014

4.3.5 Water Usage

The sources of drinking water and non-drinking water in Thanlyin and Kyauktan townships are shown in Table 4.3-5 and Table 4.3-6, respectively. More than 60% of the households in Thanlyin Township are using water for drinking and non-drinking purposes from wells, while about 70% of households are using water from the pool/pond/lake in Kyauktan Township. On the other hand, as shown in Figure 4.3-1, most of the wells in Thanlyin Township are located outside of Thilawa SEZ.

Table 4.3-5 Source of Drinking Water in Thanlyin and Kyauktan Townships

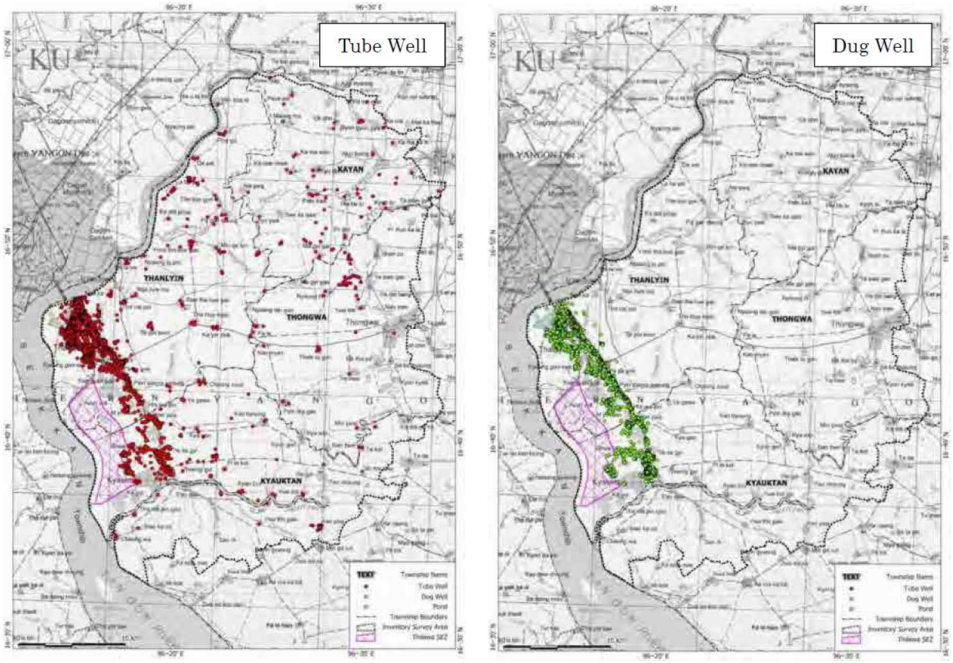
Township	Source of Water	Tap Water/ Piped	Tube Well, Borehole	Protected Well/Spring	Unprotected Well/Spring	Pool/Pond/ Lake	River/Stream /Canal	Waterfall/ Rainwater	Bottled Water Purifier	Tanker/ Truck	Other	Total
Thanlyin	Number	1,392	24,925	10,389	3,602	14,190	33	185	5,595	91	1,195	61,597
	(%)	2.3	40.5	16.9	5.8	23.0	0.1	0.3	9.1	0.1	1.9	100.0
Kyauktan	Number	1,804	2,171	3,961	1,092	22,833	14	103	864	5	129	32,976
	(%)	5.5	6.6	12.0	3.3	69.2	0.04	0.3	2.6	0.02	0.4	100.0

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census–The Union Report- Census Report Volume 2" May 2015

Table 4.3-6 Source of Non-Drinking Water in Thanlyin and Kyauktan Townships

Township	Source of Water	Tap Water/ Piped	Tube Well, Borehole	Protected Well/Spring	Unprotected Well/Spring	Pool/Pond/ Lake	River/Stream /Canal	Waterfall/ Rainwater	Bottled Water/Water Purifier	Tanker/ Truck	Other	Total
Thanlyin	Number	3,062	29,188	9,770	3,618	14,545	60	5	63	19	1,267	61,597
	(%)	5.0	47.4	15.9	5.9	23.6	0.1	0.01	0.1	0.03	2.1	100.0
Kyauktan	Number	2,292	3,376	3,183	995	22,935	15	3	34	2	141	32,976
	(%)	7.0	10.2	9.7	3.0	69.6	0.05	0.01	0.1	0.01	0.4	100.0

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census–The Union Report- Census Report Volume 2" May 2015



Source: JICA/Sanyu Consultants Inc., Data Collection Survey on Water Resources Potential for Thilawa Special Economic Zone and Adjoining Areas Final Report, September 2014

Figure 4.3-1 Distribution of Tube and Dug Wells in Thanlyin and Kyauktan Townships

4.3.6 Local Economy and Livelihood

The main sources of livelihood in the two townships are agriculture, fishing, and official employment in the government. In Thanlyin Township, other sources of earning are livestock breeding, fish farming, casual labor, and betel leaf and coconut plantations as well as small-to-medium-size businesses. In Kyauktan Township, other livelihood activities include livestock breeding, fish farming, and betel leaf and coconut plantations. Most of the casual laborers are employed in the agricultural sector.

Table 4.3-7 Existing Status of Local Livelihoods in Thanlyin and Kyauktan Townships (2014)

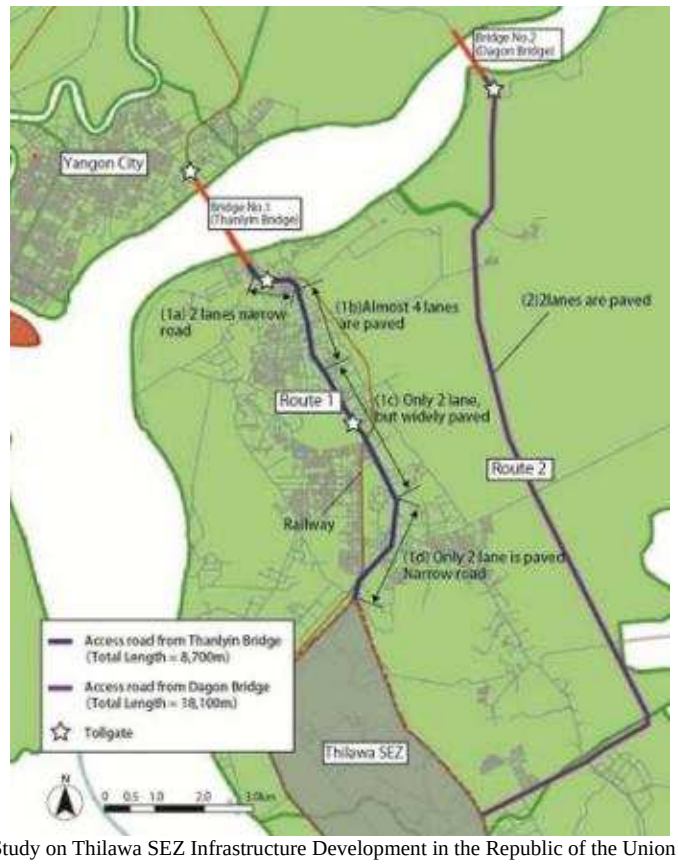
Township	Type of Workers (Person)							
	Government Staff	Service Staff	Agriculture	Livestock	Trader	Factory	Odd Job	Others
Thanlyin	7,436 (6.9%)	2,675 (2.5%)	6,650 (6.2%)	175 (0.2%)	21,003 (19.5%)	6,230 (5.8%)	41,972 (39.0%)	21,623 (20.1%)
Kyauktan	4,305 (5.2%)	11,000 (13.3%)	4,307 (5.2%)	8,706 (10.5%)	6,637 (8.0%)	5,378 (6.5%)	6,569 (7.9%)	35,851 (43.3%)

Source: Thanlyin and Kyauktan Township Administrative Offices

4.3.7 Social Infrastructure and Service

(1) Access Road

Figure 4.3-2 shows the current main roads that connect Yangon City to Thilawa SEZ, i.e., the road that passes through Thanlyin Bridge (Bridge No. 1) and the road that passes through Dagon Bridge (Bridge No. 2). The peripheral road of Thilawa SEZ is paved with concrete while the road between Thanlyin Bridge and Thilawa SEZ is paved with asphalt. Majority of the pavement is made with concrete because concrete is relatively inexpensive there while there is insufficient asphalt factories which provide good-quality asphalt. On the other hand, most of the roads connected into the villages are still unpaved. Currently, the expansion of connection road from Thanlyin Bridge to Thilawa SEZ has been planned under the support of JICA[2].



Source: Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (2014)

Figure 4.3-2 Present Conditions of the Main Roads to Thilawa SEZ

(2) Water Storage Reservoirs

a) Major Water Reservoirs in and around Thilawa SEZ

Major water reservoirs in and around Thilawa SEZ are as follows:

Zarmani Reservoir: It is a reservoir for agricultural purposes and the reservoir serves mainly for irrigation. In addition, the reservoir water is sold as drinking and domestic water to the nearby industrial area and port.

Bant Bwaykone Reservoir: It is a reservoir for agricultural purposes. The reservoir water is supplied for irrigation and sold to Kyauktan Township. A small portion is sold as drinking and domestic water to a nearby port.

[2] Infrastructure Development Project in Thilawa Area Phase 2 (Yen Credit)

Thilawa Reservoir: This reservoir's water is supplied to nearby factories and is used for irrigation, and sold to a nearby port.

Since water right for surface water belongs to the Ministry of Agriculture and Irrigation (MOAI), the Zarmani Reservoir and Bant Bwaykone Reservoir are managed by MOAI. On the other hand, the water right of Thilawa Reservoir belongs to the Ministry of Industry (MOI) and the Ministry of Construction (MOC).

The location of the above reservoirs is presented in Figure 4.2-3. Table 4.3-8 and Table 4.3-9 show outline and situation of utilization of the three reservoirs.

Table 4.3-8 Existing Three Reservoirs in and around Thilawa SEZ

No	Content	Bant Bwaykone	Zarmani	Thilawa
1	Location (Township)	Kyauktan	Thanlyin	Thanlyin
2	Name of Source Creek	Par Da	Myayaryoe	-
3	Catchment Area (km^2)	2.25	7.25	0.93
4	Gross Storage Capacity	2,140	6,616	1,363
5	Full Water Level (EL m)	7.92	7.01	9.75
6	Completion Year	June 1994	June 1995	1986

Source: Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (2014), and JICA/Sanyu Consultants Inc., Data Collection Survey on Water Resources Potential for Thilawa Special Economic Zone and Adjoining Areas Final Report, September 2014

Table 4.3-9 Utilization of Three Reservoirs in and around Thilawa SEZ (2003-2011)

Unit: 1,000 m^3/year

	Bant Bwaykone	Zarmani	Thilawa
1. Irrigation Water (average)	1,299	2,455	The amount of irrigation, domestic, and drinking water (2007-2011): 1,371
Maximum (1999-2011)	2,620	5,222	
Minimum (1999-2011)	1,023	752	
2. Domestic, Drinking Water (average: - 2011)*1	37	9	
(average: 2002 - 2003)*2	2,187	23,719	
Average water consumption (1+2)(average: - 2011) *3	1,336	2,464	1,371

*1: The average except from 2002 to 2003.
*2: The water from Zarmani and Bant Bwaykone was supplied to a nearby construction project in 2002-2003; it was different from the normal year.
*3: In the Thilawa Reservoir, the operational record before 2006 did not remain with the administrator (SHESAKA Factory).
Source: JICA/Sanyu Consultants Inc., Data Collection Survey on Water Resources Potential for Thilawa Special Economic Zone and Adjoining Areas Final Report, September 2014

b) Water Resource of Zarmani Reservoir

According to the simulation results of the water resource survey[3], water balance and its allocation are summarized in Table 4.3-10. It is estimated that the available water for Thilawa SEZ is around 15,700 m^3/day (3.5 MGD).

[3] Source: JICA/Sanyu Consultants Inc., Data Collection Survey on Water Resources Potential for Thilawa Special Economic Zone and Adjoining Areas Final Report, September 2014

Table 4.3-10 Water Resource and Allocation of Zarmani Reservoir

Water Resources	Water Recourses/Utilizable/Allocable Water		
	MCM/year	MGD	Remarks
1) Total Surface Water Resource	12.7	7.7	Total inflow to reservoir
2) Loss	4.3	2.6	Evapotranspiration and seepage, 1.5 m/sq. km. (reservoir area)
3) Utilizable Water	8.4	5.1	3) = 1) – 4)
4) Uncontrolled Flooding	2.5	1.5	Spilled water from dam spillway
5) Allocable Water Resource	5.9	3.5	5) = 3) – 6)
6) Environmental Flow	0.0	0.0	Equivalent to 9 mm/sq. km. (catchment area)
7) Irrigation Use	0.1	0.0	Yangon Water Supply
8) Industry Use	5.8	3.5	Thilawa SEZ
9) Electricity Generation	0.0	0.0	None
10) Domestic Supply	0.0	0.0	Yangon Water Supply

Source: JICA/Sanyu Consultants Inc., Data Collection Survey on Water Resources Potential for Thilawa Special Economic Zone and Adjoining Areas Final Report, September 2014

c) Future Reservoir for Water Usage in Thilawa SEZ

Currently, the development of Lagunbyin Water Supply System has been planned by the Yangon City Development Committee (YCDC) in cooperation with JICA. The source of water is Lagunbyin Reservoir which was constructed by the Ministry of Agriculture and Irrigation in 2000, located 70 km north of Thilawa SEZ on the border of Yangon District and Bago District. Figure 4.3-3 shows the location while Table 4.3-11 shows the specification.

Source: Prepared by the EIA Study Team based on the map from Myanmar Information Management Unit

Figure 4.3-3 Location of Lagunbyin Reservoir

Table 4.3-11 Specification of Lagunbyin Reservoir

	Subject	Lagunbyin Reservoir
1	Catchment Area	42 square-mile (108.78 km^2)
2	Average Annual Rainfall (Inch)	100 inch (2,500 mm)
3	Average Annual Inflow (Ac-ft)	126,000 Ac-ft (155.418 MCM)
4	Type of Dam	Earth Dam
5	Height of Dam	62 ft (18.89 m)
6	Length of Dam	5,180 ft (1578.8 m)
7	Storage Capacity of Full Tank (Ac-ft)	148,800 Ac-ft (183.512 MCM)
8	Dead Storage Capacity (Ac-ft)	5,250 Ac-ft (6.476 MCM)
9	Water Spread Area of F.T.L (Acre)	6,700 Acre (27 km^2)

Source: JICA/Sanyu Consultants Inc., Data Collection Survey on Water Resources Potential for Thilawa Special Economic Zone and Adjoining Areas Final Report, September 2014

The Lagunbyin Water Supply System managed by YCDC is planned to cover the four townships of East Dagon, North Dagon, South Dagon, and Dagon Seikkan, located in the east of Yangon City and Thilawa SEZ with a capacity of 40 MGD. The water amount allocated by the Irrigation Department will be 30 MGD for the four townships in Yangon City and 10 MGD in Thilawa SEZ.

(3) Solid Waste Management

a) Thanlyin and Kyauktan Townships

Solid waste management facilities in Thanlyin and Kyauktan townships are shown in Table 4.3-12. In Thanlyin Township, the Sanitary Department is in-charge of waste management and collects waste from all wards. On the other hand, the Sanitary Section of the Administration Department is in-charge of waste management in Kyauktan Township. As shown in Figure 4.3-4, each of the two townships has operated its own final disposal site as open dumping.

Table 4.3-12 Solid Waste Management in Thanlyin and Kyauktan Townships

Township	Department in Charge of Solid Waste Management	Waste Collection Amount [t/d]	Equipment[Vehicles, Machinery]	Collection Area	Area of Present Disposal Site [ha]
Thanlyin	Sanitary Department	60	Truck: 5 (3.5 to 4.0 ton truck)	16 of 17 wards and 2 villages	1.6
Kyauktan	Sanitary Section of the Administration Department	5	Truck: 2 (1 ton truck) Push cart: 3	6 of 9 wards	2.0

Source: Thanlyin Township and Kyauktan Township Administrative Office

Source: EIA Study Team

Figure 4.3-4 Location of the Existing Disposal Sites

Final Disposal Site in Thanlyin Township

Final Disposal Site in Kyauktan Township

Source: EIA Study Team

Figure 4.3-5 West Dumping Condition

b) Waste Management Facility in Zone A of Thilawa SEZ

The solid waste management company has been located in Zone A of Thilawa SEZ as one of the tenants, which area is about 40 ha at the corner of Thilawa Development Road and Dagon-Thilawa Port Road in Thanlyin Township. The specifications of the facility and the layout plan are shown in Table 4.3-13 and Figure 4.3-6 respectively.

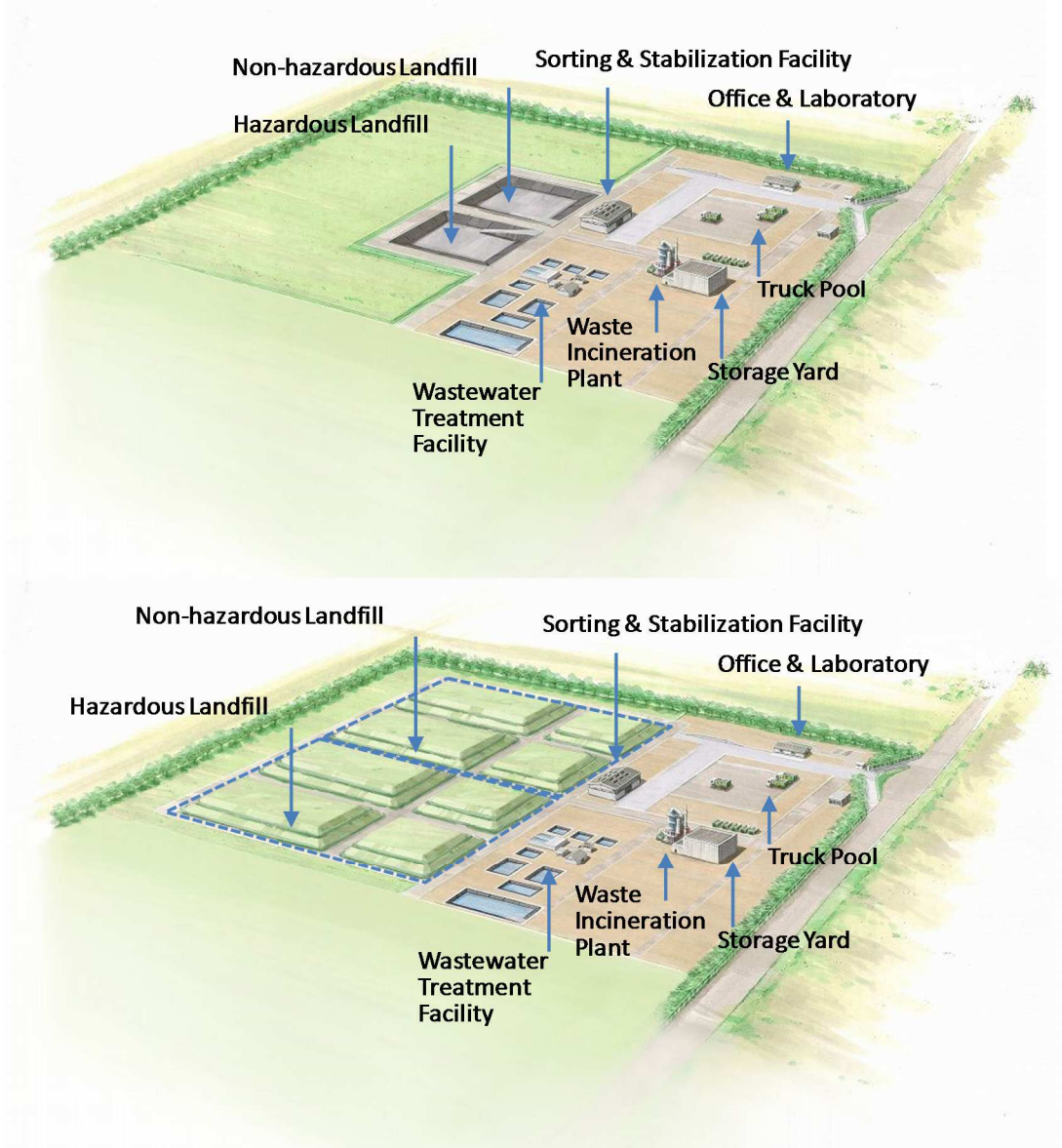
The target wastes of the facility are industrial waste, which will be generated in Thilawa SEZ as primary and outside of Thilawa SEZ as secondary. The expected volume of waste is approximately 22,700 t/year, which is about 60 % hazardous waste and 40 % non-hazardous waste.

In terms of waste weight for each treatment process, approximately, 6,100 t/year for sorting, 6,600 t/year for incineration, 4,100 t/year for fuel conversion, 2,700 t/year for landfilling, 2,600 t/year for stabilization, and tens of t/year for wastewater treatment are planned.

Table 4.3-13 Waste Management Facility in Zone A of Thilawa SEZ

Facilities	Specification and Function
Laboratory Analysis (Inspection) Facility	This facility is for analyzing waste for acceptance inspection and leachate, wastewater, and exhaust gas for environmental monitoring and so on.
Sorting Facility	This facility receives and inspects waste from generators. After separating cleaning and segregating waste, valuables will be sold to demanders and non-valuables will be transferred to the other facilities for treatment and disposal considering the characteristics of the waste.
Stabilization Facility	This facility mixes waste with agents such as cement so as to prevent elution of hazardous substances from waste. Besides, this facility has the function of moisture control for landfill waste with high water content.
Fuel Conversion Facility	This facility mixes waste and adjusts the characteristics and concentration of hazardous substances so as to produce fuel for cement factories.
Incineration Facility (to be installed)	This facility is for volume reduction, stabilization, and detoxification of waste. Exhaust gas treatment equipment (chemical baghouse filter) will be installed so as to satisfy the target level of emission gas.
Final Disposal Facility	The landfill shall equip a liner facility to strictly intercept waste and leachate from entering the surrounding environment. Leachate discharged from the landfill shall be adequately treated by the wastewater treatment facility. During waste disposal, only a limited area will be opened to activate disposal and another area will be covered by a sheet to prevent odor. After waste disposal, soil covering and liner covering shall be applied and landfill gas shall be captured and combusted to prevent air pollution and odor. At first, two landfill cells for non-hazardous and hazardous wastes will be constructed individually for the first ten years of operation. Each cell will be expanded after they get filled up. In total, eight landfill cells (four for non-hazardous waste and four for hazardous waste) will be constructed. It is planned to be operated for 60 years.
Wastewater Treatment Facility	This facility is for neutralization, solid-liquid separation, and biological treatment of wastewater generated from the project facilities. Effluent shall be discharged into the retention canal of the industrial park by satisfying the target level of wastewater quality.
Other Facilities	Other small-scale and supporting facilities such as office, security house, power receiving house, parking, car washing facility, and truck pool will be set up.

Source: DOWA/Golden Dowa Eco-System Myanmar Co., Ltd., Project on Construction of Solid Waste Management Facilities in the Thilawa Zone A Final Environment Impact Assessment Report, June 2015)



Source: DOWA/Golden Dowa Eco-System Myanmar Co., Ltd., Project on Construction of Solid Waste Management Facilities in the Thilawa Zone A Final Environment Impact Assessment Report, June 2015)

Figure 4.3-6 Perspective Image (Upper: Starting Operation, Lower: Completion of Operation)

(4) Drainage and Sewage

The destination of rainwater drainage in Thilawa SEZ is the Yangon River and Hmawwun Creek. Rainwater in Thilawa SEZ and eastern sub-basins is collected by drainage facilities consisting of culverts and canals installed along the road. The rainwater then flows into the Yangon River through the existing creeks. Even in urban areas such as Yangon City, sewerage systems have not been established and both rainwater and sewage water are collected together by using the same canals.

(5) Electricity

Three substations, namely: Thanlyin Substation, Thaketa Substation, and Kamarnat Substation are located in the surrounding area of Thilawa SEZ as shown in Table 4.3-14. Among them, the Thanlyin Substation is the closest one from Thilawa SEZ about 10 km to the north.

Table 4.3-14 Grid Substation near Thilawa Grid Substation

	No. of 230 kV Feeder Bays	Substation Voltage	230 kV Transformer Capacity
Thanlyin Substation	2	230/33/11 kV	100 MVA (100 MVA x 1 unit)
Thaketa Substation	2	230/33/11 kV	300 MVA (100 MVA x 3 units)
Kamarnat Substation	5	230/33/11 kV	100 MVA (100 MVA x 1 unit)

Source：Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar（2014）

Table 4.3-15 shows the number of conventional households by main source of lighting in Thanlyin and Kyauktan townships according to the result of the census in 2014. Around 47.7 % and 33.1 % of households use electricity in Thanlyin and Kyauktan townships, respectively.

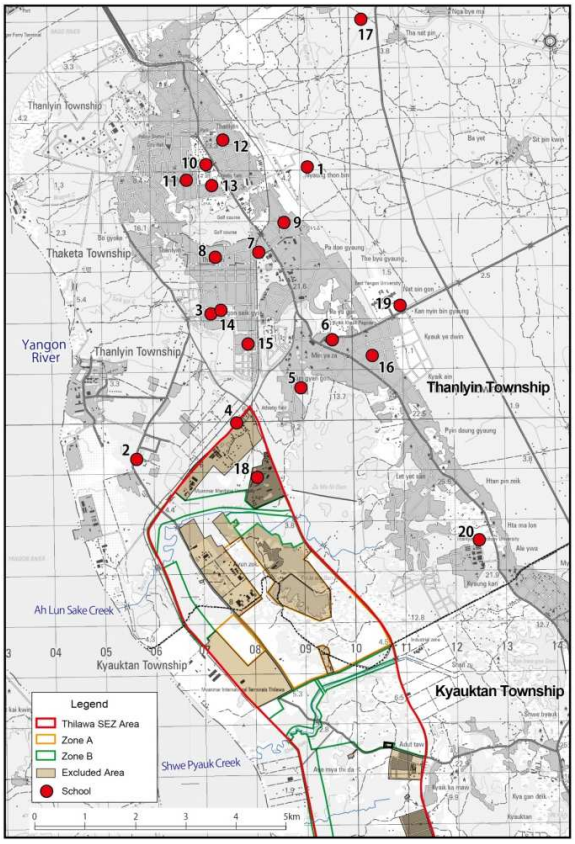
Table 4.3-15 Conventional Households by Main Source of Lighting

	Total	Electricity	Kerosene	Candle	Battery	Generator (Private)	Water Mill (private)	Solar System/ Energy	Other
Thanlyin	61,597	29,199	2,784	5,689	16,023	5,710	81	1,723	388
Kyauktan	32,976	10,914	4,617	4,436	8,218	2,057	13	1,793	928

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census–The Union Report- Census Report Volume 2" May 2015

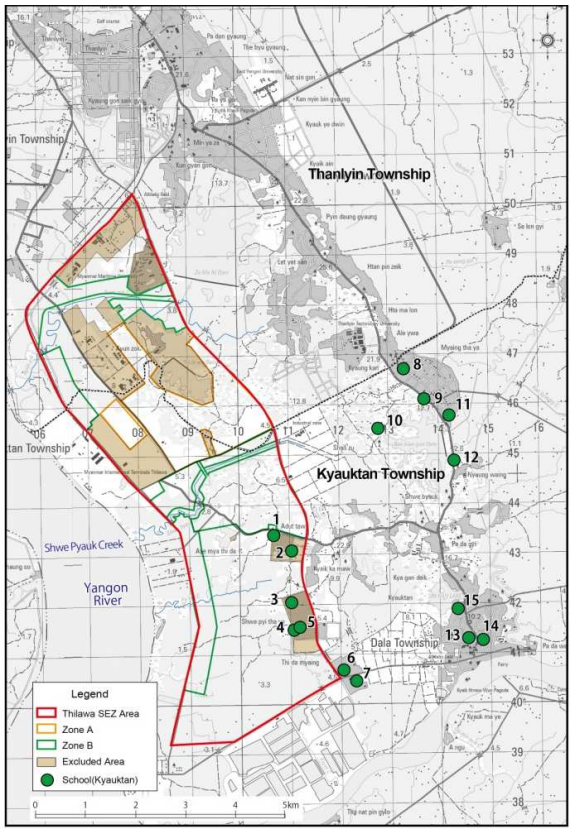
(6) School

Location of major schools, i.e. basic education primary school (B.E.P.S.), basic education middle school (B.E.M.S), basic education high school (B.E.H.S) and university, near Thilawa SEZ in Thanlyin and Kyauktan townships are shown in Figure 4.3-7 and Figure 4.3-8, and the name and the located village tract/ ward of schools are described in Table 4.3-16 and Table 4.3-17.



Source: EIA Study Team

Figure 4.3-7 Location of Major Schools near Thilawa SEZ in Thanlyin Township



Source: EIA Study Team

Figure 4.3-8 Location of Major Schools near Thilawa SEZ in Kyauktan Township

Table 4.3-16 List of Major Schools near Thilawa SEZ in Thanlyin Township

Sr. No.	Name of School	Location
1	Co-operative University	Nyaung Thone Pin Village Tract
2	B.E.H.S (Branch) Jamar	Seikkyi Village Tract
3	Su Htoo Pan Monastery School	Aye Myitta Ward
4	B.E.P.S Phan Chat	Phan Chat Ward
5	B.E.P.S (146) Battalion School	Pha Yar Kone Village Tract
6	B.E.H.S Kyauk Yay Twin	Hpa Yar Gone Village Tract
7	B.E.P.S Jamar	Aung Chan Thar Ward
8	B.E.M.S (Branch) Htaw Watt	Aung Chan Thar Ward
9	B.E.M.S (Branch) Nyaung Thone Pin	Ah Mhu Htan Ward
10	B.E.H.S (2) Thanlyin	Myo Thit (East) Ward
11	B.E.H.S (3) Thanlyin	Htan Pin Gone Village Tract
12	B.E.H.S (1) Thanlyin	Oak Pho Su Village Tract
13	B.E.H.S (4) Thanlyin	Bago Su Ward
14	B.E.H.S (Branch) Kyaung Gone Seikkyi	Kyaung Gone Seikkyi Village Tract
15	B.E.P.S Aye Thit Sar	Aye Thit Sar Ward
16	B.E.M.S Kon Chan Kone	Kon Chan Kone Village Tract
17	B.E.P.S Nga Pa	Nga Pa Village Tract

Source: EIA Study Team

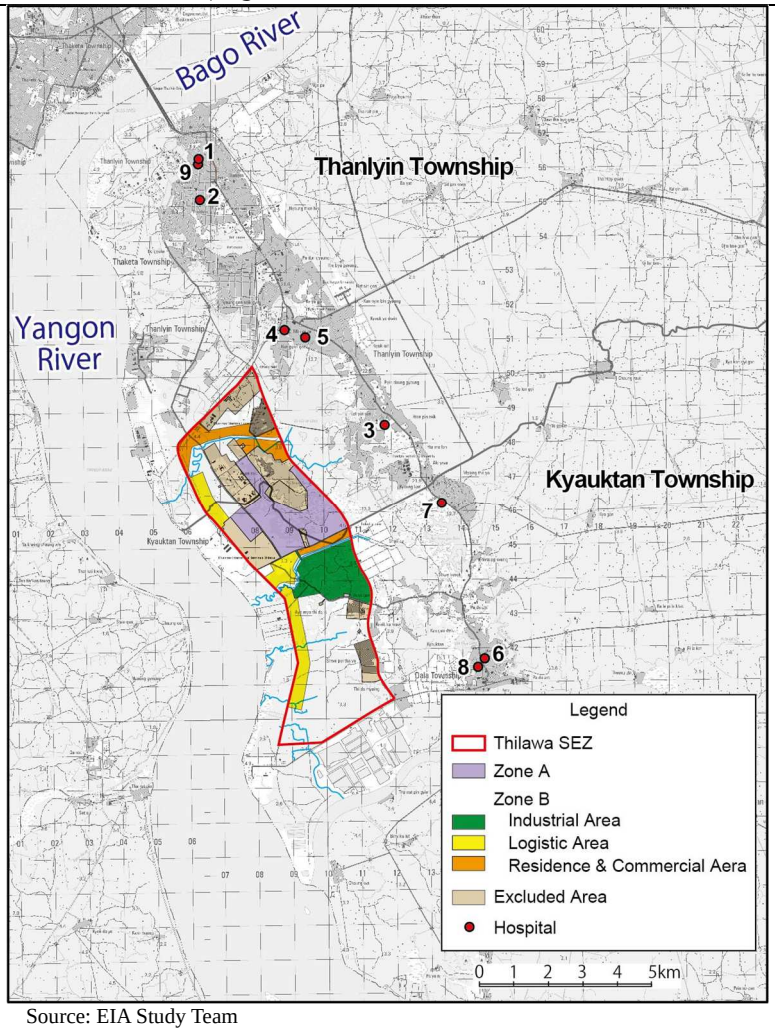
Table 4.3-17 List of Major Schools near Thilawa SEZ in Kyauktan Township

Sr. No	Name of School	Location
1	B.E.P.S Phan Lan	Aye Mya Thida Ward
2	B.E.M.H Battalion (7)	Aye Mya Thida Ward
3	B.E.P.S Shwe Pyi Thar Yar No.2	Shwe Pyi Thar Yar Ward
4	B.E.P.S Shwe Pyi Thar Yar No.3	Shwe Pyi Thar Yar Ward
5	B.E.P.S Shwe Pyi Thar Yar No.1	Shwe Pyi Thar Yar Ward
6	B.E.P.S Ka Yat	Thidar Myaing Ward
7	B.E.P.S Gway Pin	Thidar Myaing Ward
8	B.E.P.S Banbwe Kone No.1	Myaing Thar Yar Ward
9	B.E.M.S Myaing Thar Yar (Branch)	Myaing Thar Yar Ward
10	B.E.P.S Shan Su	Myaing Thar Yar Ward
11	B.E.P.S Banbwe Kone No.2	Myaing Thar Yar Ward
12	B.E.P.S Nyaung Wyne	Myaing Thar Yar Ward
13	B.E.H.S (1) Kyauktan	San Chain Mhee Ward
14	B.E.M.S Myo Ma	Ah Lal Ward
15	B.E.H.S (2) Thaw Ka School	San Chain Mhee Ward

Source: EIA Study Team

(7) Hospital

Location of major medical facilities and service near Thilawa SEZ in Thanlyin and Kyauktan townships are shown in Figure 4.3-9, and the name and the located village tract/ ward of hospitals are described in Table 4.3-18.



Source: EIA Study Team

Figure 4.3-9 Location of Major Medical Services near Thilawa SEZ in Thanlyin and Kyauktan Townships

Table 4.3-18 List of Major Medical Services near Thilawa SEZ in Thanlyin and Kyauktan Townships

Sr. No.	Name of Hospital	Location
1	Chan Myae Myitta Private Hospital	Thanlyin Township
2	Thanlyin General Hospital	Thanlyin Township
3	Rural Health Department	Lat Yat San Village Tract, Thanlyin Township
4	Rural Health Department	Hpa Yar Gone Village Tract, Thanlyin Township
5	Sub - Rural Health Department	Kon Chan Gone Village Tract, Thanlyin Township
6	Kyauk Tan General Hospital	Kyauktan Township
7	Rural Health Department (Myaing Thar Yar)	Nyaung Wine Village Tract, Kyauktan Township
8	Mother & Child Care	Ah Lal Ward Village Tract, Kyauktan Township
9	Mother & Child Care	San Chain Mhee Ward, Kyauktan Township

Source: EIA Study Team

4.3.8 Cultural Heritage/Asset

There is no cultural heritage site designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) or the Myanmar government in Thilawa SEZ. There are two cemeteries, one is found in the industrial area of Zone B in Kyauktan Township and the other one is found in the logistic area of Zone B in Thanlyin Township. There is also a small Hindu temple found in the residence and commercial areas of Zone B in Thanlyin Township.

4.3.9 Landscape

The project site and its surrounding area are composed of flat plains and typical rural landscapes of urban neighborhood.

4.3.10 Emergency Risk

(1) Natural Hazard

The "Hazard Profile of Myanmar" prepared by the five government ministries and departments of Myanmar and four non-governmental agencies in July 2009 describes the nine types of disasters in Myanmar, as follows: 1) Cyclone, 2) Drought/Dry Zone, 3) Earthquake, 4) Fire, 5) Flood, 6) Forest Fire, 7) Landslide, 8) Storm, and 9) Tsunami. Among these, some notable natural hazards are described below.

(2) Flood

Flood in Greater Yangon can be classified into three types: i) river flood; ii) localized flood inundation in urban areas due to the combination of factors such as cloudburst, poor infiltration rate, poor drainage infrastructure (possibly due to climate change, heat island phenomenon); and in rural areas due to decrepit dams, dikes and levees, and iii) flood due to cyclone and storm surge.

Past major flood events from 1997 to 2007 are described in the "Hazard Profile of Myanmar", but there are only a few flood events recorded in and around Greater Yangon as shown in Table 4.3-19.

Table 4.3-19 Past Major Floods in Yangon Region (1997-2007)

Location	Date	No. of Affected Households	Affected Population	Deaths	Remark
Kayan Township	7 June 1997	1,189	5,878	0	North part of the region
Hta/16 Ward, Shwe Pyi Thar Township	8 September 2002	886	4,541	0	Along the left bank of the Hlaing River in Greater Yangon

Source: Hazard Profile of Myanmar, July 2009

Large-scale floods rarely happen since the area is protected due to the construction of banks along the Yangon River and the Bago River. The bank elevation is more than 3.83 m. However, small-scale floods inside the SEZ happen every year due to the poor drainage system and the influence of high tide at lowland areas near the Yangon River. According to the result of the interview survey on flooding targeting households living in Thilawa SEZ and along the outer boundary of Thilawa SEZ conducted from 17 to 20 September 2012 under the JICA Study[4], 35% of the population have experienced flood at least once as shown in Table 4.3-20.

Table 4.3-20 Flood Experience of Residents

Frequent Flooding Experiences	Number of Samples	Percentage (%)
Yes	49	35
(1) Every year	5	10
(2) Sometimes (every 6-10 years or more)	1	2
(3) Only once as far as they know	43	88
No	91	65
Total	140	100

Source: JICA Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (March 2014)

[4] JICA Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (March 2014)

Table 4.3-21 shows the duration of inundation. The residents who answered that flooding occurred every year reported that the duration of inundation is below 30 min. For the residents who answered that they experienced flooding once a year, 46% of them answered that the duration of inundation is one day. In addition, 26% of the residents answered that the duration of inundation is from one to three days, and 28% experienced more than three days of inundation.

Table 4.3-21 Inundation Duration Report of Residents Who Experienced Flooding Only Once

Duration of Inundation	Number of Samples	Percentage (%)
30 min to 1 hour	6	14%
More than 1 hour	1	2%
Half day to 1 day	13	30%
1 to 3 days	11	26%
3 to 5 days	7	16%
More than 6 days	5	12%
Total	43	100%

Source: JICA Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (March 2014)

(3) Cyclone

Cyclones that originate from the Bay of Bengal generally move westward to India and then turn toward Bangladesh and Myanmar. Severe cyclones tend to occur either during the pre-monsoon season from April to May or the post-monsoon season from October to November.

Cyclones have three destructive forces, namely: i) storm surge, ii) heavy rainfall, and iii) strong winds. According to the "Hazard Profile of Myanmar", 1,248 tropical storms formed in the Bay of Bengal during the period from 1887 to 2005, of which 80 storms (6.4% of the total) hit Myanmar's coast. In total, 12 cyclones caused severe damage in Myanmar mainly due to the accompanying storm surge, and the highest death or missing toll was at 138,373 caused by Cyclone Nargis in May 2008.

Cyclone Nargis also hit Greater Yangon and floodwater spread on a number of townships around Yangon City. Most of the inundated areas during Cyclone Nargis were the Dala, Twantay, Htantabin, and Hlegu areas.

(4) Earthquake

In the Bay of Bengal, west of Myanmar, there is the Andaman Trench, where the Indian Plate is moving northward and subducting underneath the Burma Plate from west to east. In east Myanmar, there is the Sagaing Fault, which is the boundary between the Burma Plate and Sunda Plate. Hence, a magnitude 7.0+ earthquake has occurred more than 16 times, and six earthquakes of around magnitude 7.0 hit the main cities along the Sagaing Fault such as Yangon, Bago, and Mandalay from 1930 to 1956. Significantly, Yangon experienced six huge earthquakes around the 1930s.

4.4 Results of Survey for Framework of Resettlement Works for the 2,000 ha

The Thilawa SEZ Management Committee (TSMC) released the Framework of Resettlement Works for the 2,000 ha[5] Development Area of Thilawa Special Economic Zone (SEZ) (hereinafter referred to as the "Resettlement Framework for 2,000 ha") to the public in February 2016. The results of the detailed measurement survey, which was conducted to formulate the Resettlement Framework for 2,000 ha are summarized by areas such as industrial area, logistic area, and residence and commercial areas for the referential information of the following:

[5] 2,000 ha indicates the whole Thilawa SEZ excluded Zone A of 400 ha.

(1) Number of Households and Persons and Workers

Table 4.4-1 shows the number of project-affected households (PAHs), project-affected persons (PAPs) and workers. In total, 415 PAHs are estimated with the total of 1,629 persons. About 60 % of the total persons have income source from their work.

Table 4.4-1 Outline of PAHs/PAPs

Category	Households	Persons	No. of Workers
Industrial Area	161	611	295
Logistic Area	82	348	189
Residence and Commercial Area	172	670	435
Total	415	1629	919

Remark: The definition of "Worker" is to have income source in this analysis.
Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ), February 2016

(2) Ethnicity and Religion

Table 4.4-2 shows the ethnicity and religion of PAHs. In total, around 82 % of the people are Burmese while around 15% are Indian. On the other hand, 90% are Buddhist and 8.2 % are Hindu.

Table 4.4-2 Ethnicity and Religion of PAHs

Unit: households

Category	Ethnicity			Religion		
	Burma	India	Others	Buddhist	Hindu	Others
Industrial Area	131 (81.4%)	24 (14.9%)	6 (3.7%)	141 (87.6%)	16 (9.9%)	4 (2.5%)
Logistic Area	61 (74.4%)	20 (24.4%)	1 (1.2%)	73 (89.0%)	9 (11.0%)	0 (0.0%)
Residence and Commercial Area	150 (87.2%)	16 (9.3%)	6 (3.5%)	157 (91.3%)	9 (5.2%)	6 (3.5%)
Total	342 (82.4%)	60 (14.5%)	13 (3.1%)	371 (89.4%)	34 (8.2%)	10 (2.4%)

Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ), February 2016

(3) Literacy

Table 4.4-3 shows the literacy of PAHs. In total, around 46 % are able to speak, read, and write fluently while around 1 % cannot read and write.

Table 4.4-3 Literacy of People

Category	Not able to speak, read, and write		Able to speak, but not to read and write		Able to speak, but read and write a little		Speak, read and write fluently	
	Households	%	Households	%	Households	%	Households	%
Industrial Area	3	1.9	22	13.9	58	36.7	75	47.5
Logistic Area	2	0.8	12	9.5	37	37.7	30	52.4
Residence and Commercial Area	0	0.0	18	10.5	69	40.4	84	49.1
Total	5	1.2	52	12.7	164	40.0	189	46.1

Remark: This information is not available at the five households in total.
Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ),) February 2016

(4) Major Income Source and Annual Income

Table 4.4-4 shows major income source and annual average of main income. Majority of the income sources are odd job workers, which dominate around 35 % to 45 % in each category. Average income is around 4,900,000 kyats/year.

Table 4.4-4 Major Income Source of Household Head

Category	Major Income Source (%)						Annual Average of Main Income (Kyats/year)
	Paddy Farmer	Vegetable Farmer	Odd Job Worker	Wage Worker	Self-Employed	Other	
Industrial Area	14.3	12.9	37.4	5.4	19.7	10.2	4,864,427
Logistic Area	36.6	0.0	35.4	9.8	9.8	8.5	6,239,227
Residence and Commercial Area	15.2	5.8	45.0	5.3	14.0	14.6	4,293,660
Total	16.9	6.9	40.4	6.6	15.3	14.0	4,901,335

Remark:
1: Amount of the income from main income source is according to the interview results.
2: The information on the type of income source is not available at the 15 households in total.
3: Annual average of main income is calculated based on the total amount of main income from all working members in a household.
Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ), February 2016

(5) Vulnerable Households

The Resettlement Framework for 2,000 ha defines vulnerable households as household headed by women, disabled person, or elderly person (over 61 years old), a household including a disabled person or a household below the poverty line[6]. Table 4.4-5 outlines vulnerable households in each category.

Table 4.4-5 Vulnerable Households

Category	Households Headed by Woman	Households Headed by Disable Person	Households Headed by Elderly	Households Below the Poverty Line	Households Including Members of Disabled Person	Total
Industrial Area	20	2	16	3	1	36
Logistic Area	9	0	7	2	9	26
Residence and Commercial Area	28	0	23	1	2	44
Total	57	2	46	6	12	106

Remark: Total number of vulnerable households is different from the sum of each category, because some HH fell into multiple categories.
Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000ha Development Area of Thilawa Special Economic Zone (SEZ), February 2016

4.5 Environmental Management Program in Thilawa SEZ ZoneA

(1) Environmental Monitoring

During the construction phase of Thilawa SEZ Development Project (Zone A), MJTD have conducted the environmental monitoring and submitted the report to TSMC in accordance with the Environmental Monitoring Plan of the EIA Report of Thilawa SEZ Development Project (Zone A), 2013.

The main environmental monitoring results during the construction of Thilawa SEZ Development Project (Zone A) are summarized in Table 4.5-1.

[6] Integrated Household Living Conditions and Survey in Myanmar (2009-2010) was conducted by UNDP, UNICF, SIDA and the Ministry of National Panning and Economic Development, and survey result was publicized as Poverty Profile in June 2011. Poverty line as of 2010 was defined as 376,151 kyats per adult equivalent per year in Poverty Profile, and this amount is referred as poverty line in many reports. This framework also regards 376,151 kyats per adult equivalent per year as the poverty line.

Table 4.5-1 Results of Monitoring of Thilawa SEZ Development Project (Zone A) during Construction

Survey item	Parameters	Summary of Result
Air Quality	- NO_2, SO_2, CO, TSP, PM_{10}	Concentrations of all parameters were lower than the target ambient air quality level during the monitoring period.
Water Quality	- pH, SS, DO, BOD_5, COD, Oil and Grease, Cr, Total Coliforms	Monitoring points were set at several locations including upper stream and downstream of the discharge point from Zone A. Based on the monitoring results, there was no significant difference of water quality among different points.
Noise	- Noise level	Noise level monitoring locations were set near the monasteries, university, and along the road. During the monitoring period, noise level at each monitoring point was lower than the target noise level.
Ground Subsidence	- Ground elevation - Consumption of groundwater amount	Based on the periodic monitoring, there was no significant change in the ground elevation due to groundwater usage.
Accident	- Existence of accident	No accidents nor incidents happened during the monitoring period.

Source: Environmental Monitoring Report, MJTD

(2) Environmental Mitigation Measurement

MJTD have conducted the environmental mitigation measurements in accordance with the Environmental Management Plan of the EIA Report of Thilawa SEZ Development Project (Zone A), 2013. Some of the mitigation measurements are as follows:

Sprinkler Truck

Tentative Drainage (to prevent soil erosion)

Retention Canal

Planting Trees

Source: MJTD and EIA Study Team

Figure 4.5-1 Samples of Environmental Mitigation Measurement

CHAPTER 5: SCOPING AND TERMS OF REFERENCE FOR ENVIRONMENTAL IMPACT ASSESSMENT

5.1 Procedure of Scoping for Environmental and Social Impact Assessment

In order to assess the likely significant environmental and social impacts, potential environmental and social impacts of the Project were preliminary identified based on the project description and overall environmental and social conditions in and around Zone B. The impacts of pollution, natural environment and social environment, health and safety, and emergency risk, and others were classified as A to D in accordance with the following criteria, assuming no specific measures toward the impacts are taken:

1) A-: Significant negative impact A+: Significant positive impact
2) B-: Some negative impact B+: Some positive impact
3) C: Impacts are not clear, need more investigation
4) D: No impact or impacts are negligible, no further study required

5.2 Results of Scoping for Environmental and Social Impact Assessment

Results of the scoping for environmental and social impact assessment are shown in Table 5.2-1. Scoping was conducted toward the development project in the logistic, residence and commercial areas of Zone B. These impacts were evaluated in each of the three phases separately, namely: pre-construction/construction phase, operation phase and closing phase. Even though the Project does not plan to close in the near future, the impact at the closing phase was estimated in case the Project should be closed due to unanticipated cases such as when the tenants in the industrial area terminate the operation of their business or when the industrial area will close after completion of the period for lease agreement.

Table 5.2-1 Results of Scoping for Environmental and Social Impact Assessment (Pre-Construction/Construction Phase (PC/CO), Operation Phase (OP) and Closing Phase (CLP))

Category	Scoping Item	Evaluation			Reason for Scoping Evaluation
		PC/CO	OP	CLP	
Pollution	Air Quality	B-	B-	B-	**CO/CLP:** Impact on air quality due to operation of construction machineries and traveling of construction vehicles is expected. **OP:** Impact on air quality due to increase of vehicle traffic caused by the operation of the project area is expected. Exhaust gases would be generated from the tenants in the logistic area.
	Water Quality	B-	B-	B-	**CO/CLP:** Impact on water quality from muddy water flowing to the river due to land reclamation work is expected. **OP:** Impact on water quality of the surrounding water bodies is expected due to wastewater generated from the project area.
	Waste	B-	B-	B-	**CO:** Construction waste soil will not be generated according to the construction plan. Waste would be generated from construction workers. **OP:** Solid waste would be generated from the tenants in the logistic and commercial areas. Domestic waste would be generated from the residence area. **CLP:** Demolition waste and waste from construction workers would be generated.
	Soil Contamination	B-	B-	B-	**CO:** Soil contamination would be diffused if the soil in the project site is originally contaminated. **OP:** Soil contamination would occur due to the inadequate operation of the tenants. **CLP:** Soil contamination would be diffused if the site becomes contaminated at the closing point.

Category	Scoping Item	Evaluation			Reason for Scoping Evaluation
		PC/CO	OP	CLP	
	Noise and Vibration	B-	B-	B-	**CO/CLP:** Increase of noise and vibration levels due to construction machineries and traveling of construction vehicle would temporarily occur. **OP:** Increase of noise and vibration levels due to the traveling of vehicle traffic and operation of the tenants would occur.
	Ground Subsidence	D	D	D	**CO:** Groundwater will be used during construction phases: however, no impact is expected because there was no change of ground elevation as monitored by the Zone A Project and the same kind of construction works will be conducted in the project area. **OP/CLP:** No activities are planned that will cause ground subsidence.
	Offensive Odor	D	B-	D	**CO/CLP:** There is no factor to cause offensive odor. **OP:** There is a possibility that offensive odor would be generated from some tenants in the logistic area.
	Bottom Sediment	D	B-	D	**CO/CLP:** No construction works are planned that will cause impact on the bottom sediment. **OP:** Bottom sediment of the surrounding water bodies would be deteriorated by wastewater generated from the project area.
Natural Environment	Protected Areas	D	D	D	Since no natural preservation area and national parks exist in and around Zone B, the impact on protected areas is not expected.
	Flora/Fauna and Ecosystem	C	C	C	Since there is inadequate information about flora and fauna living in the development area, field survey will be done.
	Hydrology	B-	B-	B-	**CO/CLP:** Impact on hydrology is temporarily expected caused by land modification. **OP:** Impact on hydrology is expected caused by the existence of development area.
	Topography and Geology	D	D	D	**CO/CLP:** Since there is no unique topography and geology in this area, no impact caused by the construction is expected. **OP:** No activities are planned that will cause impact on topography and geology.
	Soil Erosion	B-	B-	B-	**CO/CLP:** Soil erosion would occur due to land reclamation work. **OP:** Drainage water from the project area will be discharged to the creek flowing in Thilawa SEZ. That would cause the creek to erode.
Social environment	Involuntary Resettlement	A-	A-	C	**PC:** Land acquisition will be required partially and some scale of involuntary resettlement is expected. **OP:** Impact on livelihood of the relocated households is expected. **CLP:** The possibility and conditions of closing phase of the residential area is not clear, although some involuntary resettlement might occur in case of the closure of residence area.
	Living and Livelihood	A-/B+	A-/B+	C	**PC/CO:** PAHs who earn income from paddy fields and/or vegetable fields might lose their income source. On the other hand, increase of job opportunity as construction workers or commercial opportunity targeted to the workers is expected. **OP:** Impact on the livelihood of relocated households is expected. On the other hand, increase of job opportunity as workers of the logistic and commercial areas or commercial opportunity targeted to these workers is expected. **CLP:** The possibility and conditions of the tenants is not clear during closing stage, although some workers would lose their income source in case of the closure of the logistics and commercial area.
	Vulnerable Group	A-/B+	A-/B+	D	**PC/CO:** Vulnerable people in the project area would be affected. On the other hand, job opportunity and commercial opportunity would increase. **OP:** Vulnerable people would not be able to receive the benefits of the Project. On the other hand, job opportunity as workers of the tenants and commercial opportunity would increase. **CLP:** There is no factor to cause negative impact on vulnerable group**.**
	Local Conflict of Interests	A-	A-	D	**PC/CO/OP:** Local conflict of interest would happen if job opportunity increased by the Project is misdistributed to the community. In addition, conflicts of interest would occur between the relocated households and the host community, or PAHs of Zone A and those of the Project. **CLP:** There is no factor to cause the local conflict of interest**.**
	Misdistribution of Benefit and Damage	B-	B-	D	**PC/CO/OP:** Misdistribution of benefits and damages would occur since there are PAHs who lose their income source, while there are people who would get job opportunity as construction workers and workers of the tenants. **CLP:** There is no factor to cause the misdistribution of benefits and damages.

Category	Scoping Item	Evaluation			Reason for Scoping Evaluation
		PC/CO	OP	CLP	
	Children's Rights	B-	B-/B+	C	**PC/CO/OP:** Due to the relocation, children's education would be temporarily disrupted. On the other hand, children would be indirectly influenced by the improvement of social infrastructure in the region as a result of the Project. **CLP:** The possibility and conditions of closing phase of the residence area is not clear, although children's education might be temporarily disrupted in case of the closure of the residence area.
	Existing Social Infrastructures and Services	B-/B+	B-/B+	D	**CO:** Traffic congestion due to increase of construction vehicles is expected. Accessibility to school, hospital, and shops would be changed for PAHs. On the other hand, social infrastructures would be improved in and around the project area. **OP:** Accessibility to school, hospital, and shops would be changed for PAHs. On the other hand, positive impact is expected by the development of traffic network and improvement of social infrastructure related to the Project. **CLP:** There is no factor to cause the negative impact on the existing social infrastructures and services.
	Water Usage	C	C	D	Since existing information of water usage is not enough and the detailed plan of water usage has not been prepared, the impact on water usage is not clear.
	Cultural Heritage/Asset	B-	D	D	The Hindu temple found in the development area would be affected by the development.
	Landscape	D	B-/B+	D	**OP:** Landscape would be changed by semi-urbanization of the project area and its surrounding area.
Health and Safety	Risks for Infectious Diseases such as AIDS/HIV	B-	B-	B-	**CO/CLP:** There is a possibility to increase the risks of infectious diseases due to influx of construction workers into the project area. **OP:** There is a possibility to increase the risks of infectious diseases due to influx of workers of the commercial and logistic facilities and semi-urbanization of the project area and its surrounding area.
	Occupational Health and Safety	B-	B-	B-	**CO/CLP:** Impact on the working conditions of the workers is expected. **OP:** Impact on the working conditions of workers of the tenants is expected.
	Community Health and Safety	B-	B-	B-	**CO/CLP:** Impacts on community health and safety are expected due to influx of construction workers, increase of vehicle traffic, and operation of construction machineries. **OP:** Impacts on community health and safety are expected due to influx of workers, increase of vehicle traffic, and semi-urbanization of the project area and its surrounding area.
	Usage of Chemicals	D	B-	D	**CO/CLP:** There is no plan to use chemicals during the construction phase. **OP:** There is a possibility that some kinds of chemicals would be used by the tenants in the logistic area.
Emergency Risk	Flood Risk	B-	B-	B-	There is a possibility of flood caused by rainstorm and cyclone.
	Risk of Fire	B-	B-	B-	**CO/CLP:** There is a possibility for the risk of fire to increase due to the construction work. **OP:** There is a possibility for the risk of fire to increase due to economic activities.
	Earthquake	B-	B-	B-	**CO/CLP:** There is a possibility that structures for construction works would be collapsed if earthquake occurs. **OP**: There is a possibility that buildings and structures in the project area would be collapsed when earthquake occurs.
Other	Global Warming	B-	B-	B-/ B+	**CO:** Emission of greenhouse gases (GHGs) would be generated from the construction machineries and vehicles traffic due to the Project. **OP:** Emissions of GHGs would be generated from vehicle traffic due to the Project and the operation of the tenants **CLP:** Emission of GHGs would be generated from construction machineries and vehicle traffic caused by the Project. On the other hand, emissions of GHGs would be reduced from operation activities.

Note: PC: Pre-Construction, CO: Construction Phase, OP: Operation Phase, CLP: Closing Phase
Evaluation: A-: Significant Negative Impact A+: Significant Positive Impact
B-: Some Negative Impact B+: Some Positive Impact
C: Impacts are not clear, need more investigation
D: No impacts or impacts are negligible, no further study is required
Source: EIA Study Team

The project proponent does not expect to close and terminate the operation of logistics and commercial activities at this moment. On the other hand, in case closure and termination of tenants in Thilawa Special Economic Zone (Class B) will occur, the tenants will take necessary environmental

mitigation measures. The project proponent will confirm their performance of environmental mitigation measures especially in soil remediation and treatment of chemical and hazardous substances after termination of the tenant.

5.3 Terms of Reference for Environmental Impact Assessment

Investigation of environmental impact assessment will be conducted for the environmental and social contents that would be affected by the project implementation as shown above. The survey for involuntary resettlement will be implemented by the Government of Myanmar and the results of it will be provided.

As to the terms of reference (TOR) for investigation of environmental impact assessment, the survey items and method of each impact evaluation item, which was identified as A and B or C by scoping as described in Section 5.1, are shown in Table 5.3-1. Among the items of this survey, baseline values of air quality, water quality, soil quality, noise level, flora/ fauna, cultural heritage/asset, and hydrology are being confirmed through laboratory analysis and field survey.

5.3.1 Field Survey Methodology

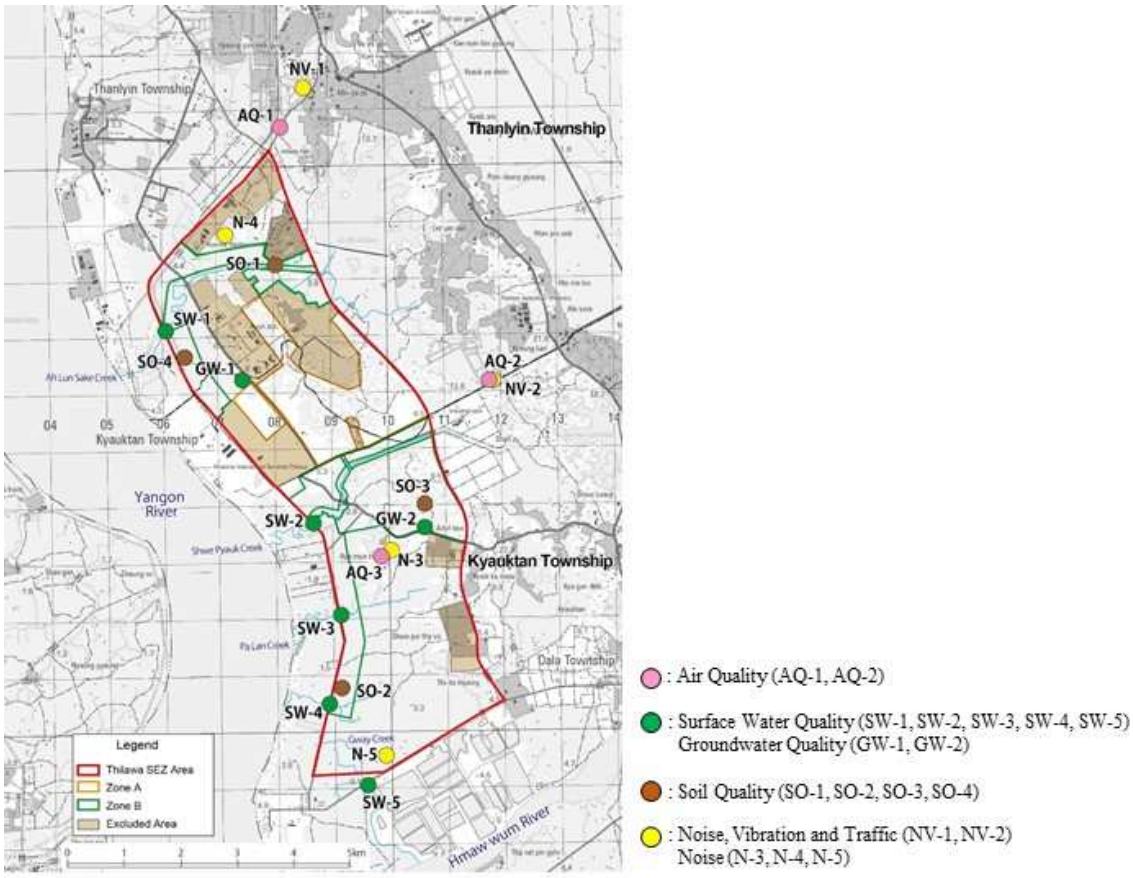
In order to appropriately forecast and evaluate the environmental and social impacts caused by the Project, the following field survey is planned to be conducted.

Table 5.3-1 Field Survey Methodology

Field Survey	Location of Survey Point	Period	Survey Items and Methods
Air Quality	3 spots (see Figure 5.3-1)	2 times (Rainy season and dry season) Continuously for 1 week (7 days)	**Survey Items** 1) Nitrogen dioxide (NO_2), 2) Nitrogen monoxide (NO), 3) Sulfur dioxide (SO_2), 4) Carbon monoxide (CO), 5) PM2.5, 6) PM10 **Survey Methods** USEPA reference methods or equivalent methods
Water Quality (Surface Water and Groundwater)	For surface water : 5 spots For Groundwater : 2 spots (see Figure5.3-1)	Surface Water: 2 times (Rainy season and dry season, total 13 samples) Groundwater: 2 times (Total 4 samples)	**Survey Items** For surface water: 1) Temperature, 2) pH, 3) Dissolved oxygen (DO), 4) Electrical conductivity (EC), 5) Odor , 6) Color, 7) Hardness, 8) Suspended solid (SS), 9) BOD_5, 10) COD, 11) Total nitrogen, 12) Total phosphorous, 13) Oil and grease, 14) Arsenic (As), 15) Mercury (Hg), 16) Lead (Pb), 17) Cadmium (Cd), 18) Hexavalent chromium (Cr(VI)), 19) Copper (Cu), 20) Zinc (Zn), 21) Manganese (Mn) 22) Nickel (Ni), 23) Iron (Fe), 24) Cyanide (free and total), 25) Fluoride, 26) Nitrates (NO_3-N), 27) Ammonium nitrogen (NH_4-N), 28) Total coliform, 29) Nitrite (NO_2-N), 30) Barium, 31) Selenium, 32) Formaldehyde, 33) Phenol, 34) Sulfide, 35) Chlorine For groundwater: 1) Temperature, 2) Odor , 3) Color, 4) Electrical conductivity, 5) Hardness, 6) pH, 7) BOD5, 8) SS, 9) DO, 10) COD, 11) Total nitrogen, 12) Total phosphorous, 13) Oil and grease, 14) Turbidity 15) Arsenic (As), 16) Mercury (Hg), 17) Lead (Pb), 18) Cadmium (Cd), 19) Hexavalent chromium (Cr(VI)), 20) Copper (Cu), 21) Zinc (Zn), 22) Manganese (Mn) 23) Nickel (Ni), 24) Iron (Fe), 25) Cyanide (CN), 26) Fluoride, 27) Nitrates (NO_3-N, NO_2-N), 28) Ammonium nitrogen (NH4-N), 29) Total coliform **Survey Methods** International standard methods or equivalent methods

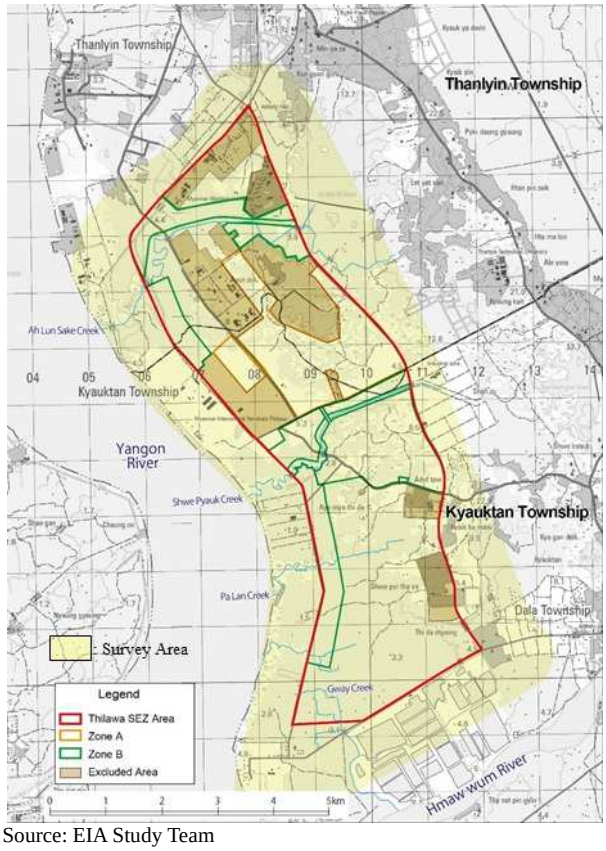
Field Survey	Location of Survey Point	Period	Survey Items and Methods
Noise and Vibration Level	Roadside : 2 spots (noise and vibration) Environment: 3 spots (noise) (see Figure5.3-1)	One time (dry season) at 5 points for 24 hours duration of weekday and 24 hours of weekend	**Survey Items** 1) Environmental/roadside noise level : LAeq (dB) (A-weighted loudness equivalent), **2)** Roadside vibration level :Lv **Survey Methods** International standard methods or equivalent methods
Traffic Volume	Two sections, Same as the noise and vibration roadside survey (see Figure5.3-1)	24 hours duration of weekday and 24 hours of weekend	**Survey Items** Number of vehicles. Vehicles are classified into four types :1) Motorbike, 2) Ordinary vehicle, 3) Heavy vehicles, and 4) Others (Tractor and others) **Survey Methods** Manual count
Soil	3 spots (see Figure5.3-1)	Dry Season：1 time	**Survey Items** 1) Mercury (Hg), 2) Arsenic (As), 3) Lead (Pb), 4) Cadmium (Cd), 5) Copper (Cu), 6) Zinc (Zn), 7) Chromium (Cr VI), 8) Iron (Fe), 9) Manganese (Mn) **Survey Methods** International standard methods or equivalent methods
Flora and Fauna	Thilawa SEZ area and its surrounding area (about 1.0 km in various directions) (see Figure5.3-2)	Rainy Season： 1 time (List of Flora and Fauna) Dry Season： 1 time (List of Flora and Fauna, and Vegetation Maps)	**Survey Methods** 1) Interview survey 2) Plot survey and line census survey **Survey Result to be prepared** List of flora and fauna, vegetation maps in Thilawa SEZ and its surrounding area
Cultural Assets	Zone B site and its surrounding area	One time	**Survey Methods** 1) Interview survey 2) Field observation
Hydrology (Topography)	Zone B and its surrounding area (about 500 m in various directions)	One time	**Survey Methods** 1) Interview survey 2) Field observation

Source: EIA Study Team



Source: EIA Study Team

Figure 5.3-1 Field Survey Spots for Air, Water, Soil, Noise/Vibration, and Traffic Volume



Source: EIA Study Team

Figure 5.3-2 Field Survey Area (Flora and Fauna)

5.3.2 Methodology of Forecast and Evaluation

Based on the current situation of environmental and social condition collected through existing materials and field survey, the contents and volume of the environmental and social impacts caused by the Project will be forecasted and evaluated. The basic concept of forecast and evaluation methodology is shown in Table 5.3-2.

Table 5.3-2Basic Concept of Forecast and Evaluation Methodology

Content	Item	Methods of Forecast and Evaluation
Pollution	Air Quality	**CO/CLP:** Impact on air quality along the roadside is qualitatively forecasted and evaluated based on the result of the field survey and the estimated number of construction vehicles. Impact on air quality caused by the operation of the construction machineries is qualitatively forecasted and evaluated. **OP:** Impact on air quality along the roadside is quantitatively forecasted and evaluated based on the result of the field survey and estimated number of vehicles. Impact on air quality caused by the generation of effluent gas from the tenants in the industrial area is qualitatively forecasted and evaluated with reference to the generating condition of effluent gas from similar facilities.
	Water Quality	**CO/CLP:** Generation of water pollutant and its impact is qualitatively forecasted and evaluated based on the results of the field survey and the construction method estimated from similar cases. **OP:** Occurrence of water pollutant is quantitatively forecasted and evaluated based on the results of the field survey and existing data.
	Waste	**CO:** Impact of waste generation from construction workers is qualitatively forecasted and evaluated with reference to the current condition of waste collection and disposal and similar cases. **OP:** Impact of waste generation (domestic waste, industrial waste, and hazard waste) is qualitatively forecasted and evaluated with reference to the current condition of waste collection and disposal, and similar cases. **CLP:** Volume of demolition waste is qualitatively forecasted based on the similar cases.
	Soil Contamination	**CO/CLP:** Impact is qualitatively forecasted and evaluated based on the result of the field survey, existing data, and similar cases. **OP:** Impact is qualitatively forecasted and evaluated referring to the management situation of pollutants and its amount generated in the similar kinds of tenants.
	Noise and Vibration	**CO/CLP:** Noise and vibration along the roadside is qualitatively forecasted based on the results of the field survey and the estimated number of construction vehicles. Noise and vibration increased due to operation of the construction machineries is qualitatively forecasted and evaluated. **OP:** Equivalent sound level along the roadside is quantitatively forecasted and evaluated based on the results of the field survey and estimated number of vehicles generated by the Project. Noise and vibration increased due to the operation of tenants and relevant facilities is qualitatively forecasted and evaluated.
	Offensive Odor	**OP:** Impact is qualitatively forecasted and evaluated based on existing data and similar cases.
	Bottom Sediment	**OP:** Impact is qualitatively forecasted based and evaluated based on existing data and similar cases.
Natural	Flora/Fauna and Ecosystem	Impact is qualitatively forecasted and evaluated based on the result of field survey, existing data, and reference to the project plan and similar cases.
	Hydrology	Impact is qualitatively forecasted and evaluated based on existing data and similar cases.
	Soil Erosion	Impact is qualitatively forecasted and evaluated based on the site investigation and the project plan.
Social	Involuntary Resettlement	Number of the PAHs and their properties are quantitatively estimated. The impact is qualitatively forecasted based on the results of the detailed measurement survey provided by TSMC.
	Living and Livelihood	Impact is qualitatively forecasted and evaluated based on the information about livelihoods of PAHs provided by TSMC, existing data, and similar cases.
	Vulnerable Group (Gender, Poor, Disabled People)	Impact is qualitatively forecasted and evaluated based on the information about the vulnerable group provided by TSMC, the existing data and similar cases.

Content	Item	Methods of Forecast and Evaluation
	Local Conflict of Interests	Possibility that local conflict of interests would happen is qualitatively forecasted and evaluated based on the current situation and similar cases.
	Misdistribution of Benefits and Damages	Possibility that misdistribution of benefits and damages would occur is qualitatively forecasted and evaluated based on the current situation and similar cases.
	Children's Right	Possibility of disruption of children's education and indirect influence to children by improvement of social infrastructure is qualitatively forecasted and evaluated based on the current situation and similar cases.
	Existing Social Infrastructure and Services	Impact is qualitatively forecasted and evaluated based on the existing situation of the social infrastructure, existing data, and similar cases.
	Water Usage	Impact is qualitatively forecasted and evaluated based on existing data and similar cases.
	Cultural Heritage/Asset	Impact is qualitatively forecasted and evaluated based on the result of interview survey and field observation.
	Landscape	Impact is qualitatively forecasted and evaluated based on the result of field observation and facility plan.
Health and Safety	Risks for Infectious Diseases such as AIDS/HIV	Impact is qualitatively forecasted and evaluated with reference to the construction plan and similar cases.
	Occupational Health and Safety	Impact is qualitatively forecasted based on the construction plan and similar cases.
	Community Health and Safety	Impact is qualitatively forecasted and evaluated with reference to the construction/operation plan and similar cases.
	Usage of Chemicals	Impact is qualitatively forecasted and evaluated based on existing data and similar cases.
Risk	Flood Risk	Impact is qualitatively forecasted and evaluated based on the result of the field observation, interview with the relevant organizations and people, and existing data.
	Risk of Fire	Impact is qualitatively forecasted and evaluated based on existing data and similar cases.
	Earthquake	Impact is qualitatively forecasted and evaluated based on existing data and similar cases.
Other	Global Warming	Impact is qualitatively forecasted and evaluated based on existing data and similar cases.

Note: PC: Pre-construction Phase, CO: Construction Phase, OP: Operation Phase, CLP: Closing Phase
Source：EIA Study Team

CHAPTER 6: FIELD SURVEY

6.1 Air Quality

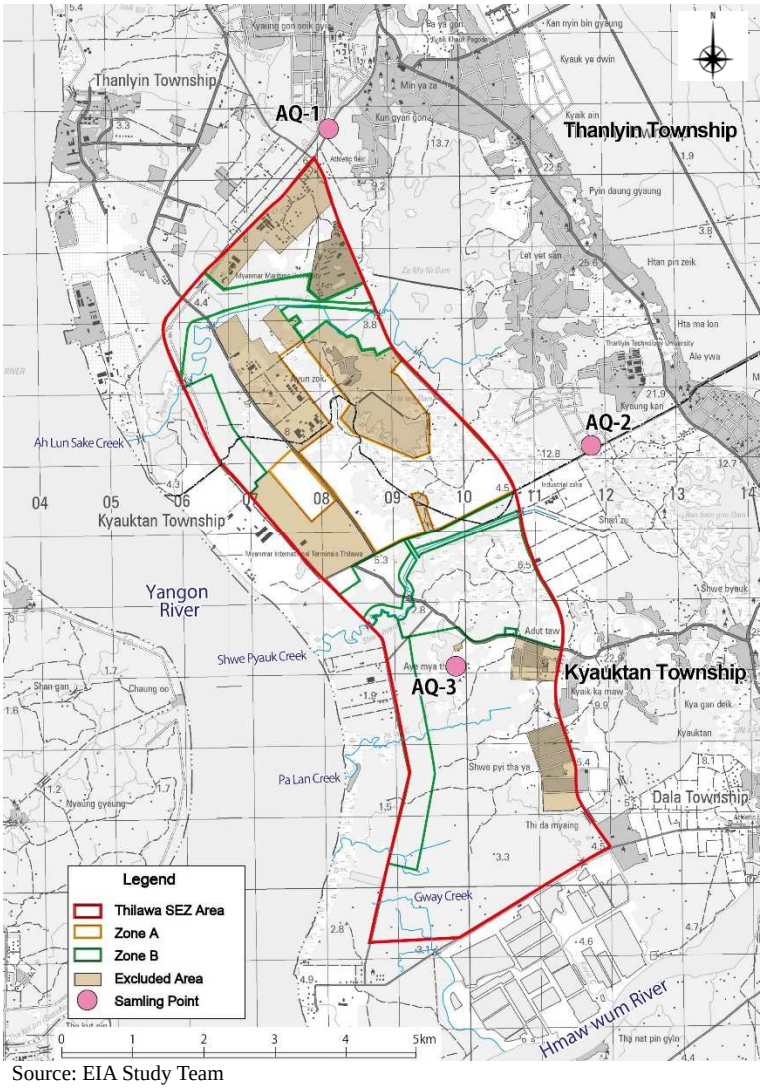
6.1.1 Survey Item

The parameters for air quality survey were SO2, NO2, NO, CO, $PM_{2.5}$, and PM_{10}.

NO was measured as the reference parameter to grasp the balance of NO_2 and NO at different three conditions, since NO_2 is generated by oxidizing NO in accordance with the time and distance from exhaust gas sources (e.g. chimney of combustion facility, vehicles, etc.) in ambient air.

6.1.2 Survey Location

The air quality survey was carried out during both the dry season and the rainy season. There were three survey sites corresponding to two kinds of environment. AQ-1 and AQ-2 were located along the road, while AQ-3 was placed inside the paddy field. The details of the location of air quality survey points are presented in Table 6.1-1 and Figure 6.1-1 below.



Source: EIA Study Team

Figure 6.1-1 Location of Air Quality Survey Location

Table 6.1-1 Location of Air Quality Survey Location

Survey Point	Coordinates	Type of Survey Point	Detailed Description of Survey Point
AQ-1	16°43´17.6″N, 96°15´48.3″E	Along the road	Beside the Thanlyin-Thilawa Road and near Kyaikkhauk Pagoda, Thanlyin Township
AQ-2	16°40´49.6″ N, 96°17´53.2″E	Along the road	Beside the Dagon-Thilawa Road, Thanlyin Township
AQ-3	16°39´13.6″ N, 96°16´50.6″E	Paddy field	East of Phalan Ywa Haung Monastery, Kyauktan Township

Source: EIA Study Team

(1) AQ-1 (along the road)

This station was installed in a flat area, located beside Thanlyin-Thilawa Road and about 1.5 km away from the junction of Thanlyin-Thilawa Road and Thanlyin-Kyauktan Road. The Thilawa SEZ development areas are located southwest of this station. As there are no residential houses or buildings nearby this station, the possible emission source is mostly from running vehicles on Thanlyin-Thilawa Road, as shown in Figure 6.1-2.

Source: EIA Study Team

Figure 6.1-2 Air Quality Survey at AQ-1

(2) AQ-2 (along the road)

This station was also installed in a flat area, located beside Thilawa Road and about 1.3 km away from the junction of Dagon-Thilawa Road and Thanlyin-Kyauktan Road. The industrial area of Thilawa SEZ Zone B is located southwest of AQ-2 and the Thilawa SEZ Zone A area lies to the west of the station. Htamalone Village is situated about 3 km to the north of the station. As there are no residential houses or buildings nearby this station, the possible emission source is mostly from running vehicles on Dagon-Thilawa Road and vehicles used for construction activities in Zone A, as shown in Figure 6.1-3.

Source: EIA Study Team

Figure 6.1-3 Air Quality Survey at AQ-2

(3) AQ-3 (paddy field)

This station was installed in a paddy field located to the east of the monastery compound of Old Phalan Village, Kyauktan Township. The New Phalan Village area is situated about 1 km to the east of AQ-3. The surrounding area of AQ-3 is paddy field with few residential houses, as shown in Figure 6.1-4. AQ-3 is located just outside of the industrial area of Zone B. Possible emission sources are from human activities in nearby villages.

Source: EIA Study Team

Figure 6.1-4 Air Quality Survey at AQ-3

6.1.3 Survey Period

Air quality survey was conducted for seven consecutive days during the rainy season (September to October 2015) and dry season (December 2015). The measurement duration is shown in Table 6.1-2.

Table 6.1-2 Sampling Duration for Air Quality Survey

Sampling Point	Rainy Season	Dry Season
AQ-1	30 (Wed) September - 7 (Wed) October 2015	10 (Thu) - 17 (Thu) December 2015
AQ-2	30 (Wed) September - 7 (Wed) October 2015	10 (Thu) - 17 (Thu) December 2015
AQ-3	30 (Wed) September - 7 (Wed) October 2015	10 (Thu) - 17 (Thu) December 2015

Source: EIA Study Team

6.1.4 Survey Method

Sampling and analysis of ambient air quality were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air survey data. Sampling rate or air quality data were measured automatically every one minute and directly read and recorded onsite for measured parameters (SO_2, NO_2, NO, CO, PM_{10}, $PM_{2.5}$), as shown in Table 6.1-3. Sampling pump was operated at 2 L/min. Different analysis methods are integrated in the instrument, such as Particulates 90^o Infrared Light Scattering for particulate matters (PM_{10}, $PM_{2.5}$) and electrochemical sensors for toxic gases (CO, NO_2, NO, SO_2).

Table 6.1-3 Sampling and Analysis Method for Air Quality

No.	Parameter	Analysis Method
1	Sulfur dioxide (SO_2)	On site reading
2	Nitrogen dioxide (NO_2)	On site reading
3	Nitrogen monoxide (NO)	On site reading
4	Carbon monoxide (CO)	On site reading
5	Particulate matter 2.5 ($PM_{2.5}$)	On site reading
6	Particulate matter 10 (PM_{10})	On site reading

Source: EIA Study Team

6.1.5 Survey Result

The air quality survey results obtained every minute at each survey site were combined to make daily average values (24 hours) for further evaluation and comparison with corresponding standard values.

(1) AQ-1 (along the road)

Results of ambient air quality measured at AQ-1 are presented in Table 6.1-4. It is obvious that the concentrations of NO_2, CO, and especially $PM_{2.5}$ and PM_{10} during the dry season were higher than those during the rainy season. Comparing with the tentative target value, the concentration of all pollutants during the rainy season complied with the standard. During the dry season, concentrations of SO_2, NO_2, and CO were lower than the standard, whereas $PM_{2.5}$ measured for seven days and PM_{10} for one weekend exceeded the tentative target value.

Table 6.1-4 Ambient Air Quality (Daily Average) at AQ-1

Season	Date	SO_2	NO_2	NO	CO	$PM_{2.5}$	PM_{10}
		ppm	ppm	ppm	ppm	mg/m^3	mg/m^3
Rainy	30 Sep-1 Oct	0.022	0.042	0.171	0.33	0.021	0.021
	1-2 Oct	0.030	0.036	0.309	0.32	0.020	0.026
	2-3 Oct	0.030	0.036	0.287	0.31	0.021	0.022
	3-4 Oct	0.020	0.041	0.262	0.28	0.016	0.023
	4-5 Oct	0.014	0.040	0.240	0.25	0.014	0.016
	5-6 Oct	0.015	0.025	0.187	0.20	0.015	0.018
	6-7 Oct	0.016	0.025	0.215	0.23	0.012	0.016
Dry	10-11 Dec	0.013	0.037	0.025	0.37	0.068	0.069
	11-12 Dec	0.017	0.047	0.024	0.60	0.077	0.086
	12-13 Dec	0.014	0.047	0.032	0.64	0.115	0.126
	13-14 Dec	0.016	0.045	0.029	0.48	0.076	0.088
	14-15 Dec	0.017	0.043	0.042	0.63	0.080	0.083
	15-16 Dec	0.020	0.046	0.034	0.62	0.087	0.091
	16-17 Dec	0.012	0.050	0.035	0.52	0.093	0.096
Tentative Target Value		**0.04**	**0.05**	**-**	**9**	**0.035**	**0.10**

Source: EIA Study Team

(2) AQ-2 (along the road)

Results of ambient air quality measured at AQ-2 are presented in Table 6.1-5 below. The concentrations of PM_{10} and CO during the dry season were higher than those during the rainy season. Comparing with the tentative target value, concentrations of NO_2 measured in one day during the rainy season exceeded the tentative target value.

Table 6.1-5 Ambient Air Quality (Daily Average) at AQ-2

Season	Date	SO_2	NO_2	NO	CO	$PM_{2.5}$	PM_{10}
		ppm	ppm	ppm	ppm	mg/m^3	mg/m^3
Rainy	30 Sep-1 Oct	0.006	0.037	0.032	0.22	0.020	0.018
	1-2 Oct	0.009	0.029	0.059	0.23	0.013	0.028
	2-3 Oct	0.006	0.030	0.071	0.18	0.012	0.017
	3-4 Oct	0.005	0.031	0.031	0.16	0.012	0.013
	4-5 Oct	0.005	0.034	0.026	0.16	0.012	0.011
	5-6 Oct	0.007	0.033	0.015	0.18	0.012	0.012
	6-7 Oct	0.006	0.061	0.493	0.13	0.018	0.017
Dry	10-11 Dec	0.010	0.031	0.042	0.24	0.010	0.040
	11-12 Dec	0.007	0.036	0.053	0.36	0.011	0.040
	12-13 Dec	0.006	0.037	0.027	0.37	0.017	0.055
	13-14 Dec	0.005	0.036	0.071	0.30	0.013	0.048
	14-15 Dec	0.010	0.031	0.025	0.41	0.009	0.053
	15-16 Dec	0.005	0.048	0.073	0.39	0.022	0.035
	16-17 Dec	0.005	0.036	0.024	0.36	0.008	0.054
Tentative Target Value		**0.04**	**0.05**	**-**	**9**	**0.035**	**0.10**

Source: EIA Study Team

(3) AQ-3 (paddy field)

Results of ambient air quality measured at AQ-3 are presented in Table 6.1-6 below. It is obvious that the concentrations of all contaminants during the dry season were higher than those during the rainy season. Comparing with the tentative target value, the concentration of all pollutants during the rainy season complied with the standard. During the dry season, concentrations of SO_2 and CO were lower than the standard, whereas NO_2 and $PM_{2.5}$ measured for six days and PM_{10} for four days exceeded the tentative target value.

Table 6.1-6 Ambient Air Quality (Daily Average) at AQ-3

Season	Date	SO_2	NO_2	NO	CO	$PM_{2.5}$	PM_{10}
		ppm	ppm	ppm	ppm	mg/m^3	mg/m^3
Rainy	30 Sep-1 Oct	0.0006	0.038	0.027	0.10	0.006	0.012
	1-2 Oct	0.0036	0.034	0.043	0.15	0.016	0.033
	2-3 Oct	0.0036	0.030	0.008	0.11	0.007	0.016
	3-4 Oct	0.0005	0.030	0.002	0.09	0.005	0.012
	4-5 Oct	0.0010	0.025	0.031	0.09	0.004	0.015
	5-6 Oct	0.0018	0.027	0.021	0.14	0.005	0.017
	6-7 Oct	0.0026	0.032	0.004	0.16	0.008	0.020
Dry	10-11 Dec	0.0147	0.050	1.008	0.18	0.033	0.099
	11-12 Dec	0.0030	0.062	1.013	0.19	0.043	0.106
	12-13 Dec	0.0040	0.066	0.736	0.24	0.057	0.161
	13-14 Dec	0.0043	0.064	0.764	0.20	0.045	0.171
	14-15 Dec	0.0082	0.059	1.194	0.18	0.048	0.099
	15-16 Dec	0.0064	0.064	1.186	0.22	0.049	0.118
	16-17 Dec	0.0072	0.057	1.002	0.24	0.057	0.097
Tentative Target Value		**0.04**	**0.05**	**-**	**9**	**0.035**	**0.10**

Source: EIA Study Team

6.2 Water Quality

6.2.1 Survey Item

Parameters for surface water and groundwater survey are shown in Table 6.2-1.

Table 6.2-1 Parameters for Water Quality Survey

No.	Item	Analysis Method	Water Quality	
			Surface Water	Groundwater
1	Temperature	HI7609829-1 Sensor	✓	✓
2	pH	HI7609829-1 Sensor	✓	✓
3	Dissolved Oxygen (DO)	HI7609829-2 Sensor	✓ (*)	✓
4	Electrical Conductivity (EC)	HI7609829-4 Sensor	✓	✓
5	Odor	In-situ	✓ (*)	✓
6	Color	APHA Platinum Cobalt Unit	✓ (*)	✓
7	Hardness	EDTA Titrimetric Method	✓ (*)	✓
8	Suspended Solids (SS)	Gravimetric Method	✓ (*)	✓
9	BOD_5	5210B. 5 Days BOD Test	✓ (*)	✓
10	COD	Close Reflux, Titrimetric Method	✓ (*)	✓
11	Total Nitrogen	APHA-AWWA-WEF Method	✓ (*)	✓
12	Total Phosphorous	APHA-AWWA-WEF Method	✓ (*)	✓
13	Oil & Grease	APHA-AWWA-WEF Method	✓	✓
14	Arsenic (As)	AAS – Graphite Hydride Method	✓ (*)	✓
15	Mercury (Hg)	APHA-AWWA-WEF Method	✓ (*)	✓
16	Lead (Pb)	AAS – Graphite Furnace Method	✓ (*)	✓
17	Cadmium (Cd)	APHA-AWWA-WEF Method	✓ (*)	✓
18	Chromium (hexavalent)	AAS – Graphite Furnace Method	✓ (*)	✓
19	Copper (Cu)	AAS – Graphite Furnace Method	✓ (*)	✓
20	Zinc (Zn)	AAS – Graphite Furnace Method	✓ (*)	✓
21	Manganese (Mn)	AAS – Graphite Furnace Method	✓	✓
22	Nickel (Ni)	APHA-AWWA-WEF Method	✓ (*)	✓
23	Iron (Fe)	AAS – Graphite Furnace Method	✓ (*)	✓
24	Cyanide (CN)	APHA-AWWA-WEF Method	✓ (*)	✓
25	Fluoride	APHA-AWWA-WEF Method	✓ (*)	✓
26	Nitrate	APHA-AWWA-WEF Method	✓ (*)	✓
27	Ammonium nitrogen	APHA-AWWA-WEF Method	✓ (*)	✓
28	Total Coliform	APHA-AWWA-WEF Method	✓ (*)	✓
29	Nitrite (*)	APHA-AWWA-WEF Method	✓ (*)	
30	Barium (*)	APHA-AWWA-WEF Method	✓ (*)	
31	Selenium (*)	APHA-AWWA-WEF Method	✓ (*)	
32	Formaldehyde (*)	APHA-AWWA-WEF Method	✓ (*)	
33	Phenol (*)	APHA-AWWA-WEF Method	✓ (*)	
34	Sulfide (*)	APHA-AWWA-WEF Method	✓ (*)	
35	Chlorine (*)	APHA-AWWA-WEF Method	✓ (*)	

Note: (*) The parameters were surveyed only during the dry season at SW-1, SW-2, and SW-3 as shown in Table 6.2-2 and Figure 6.2-1.
Source: EIA Study Team

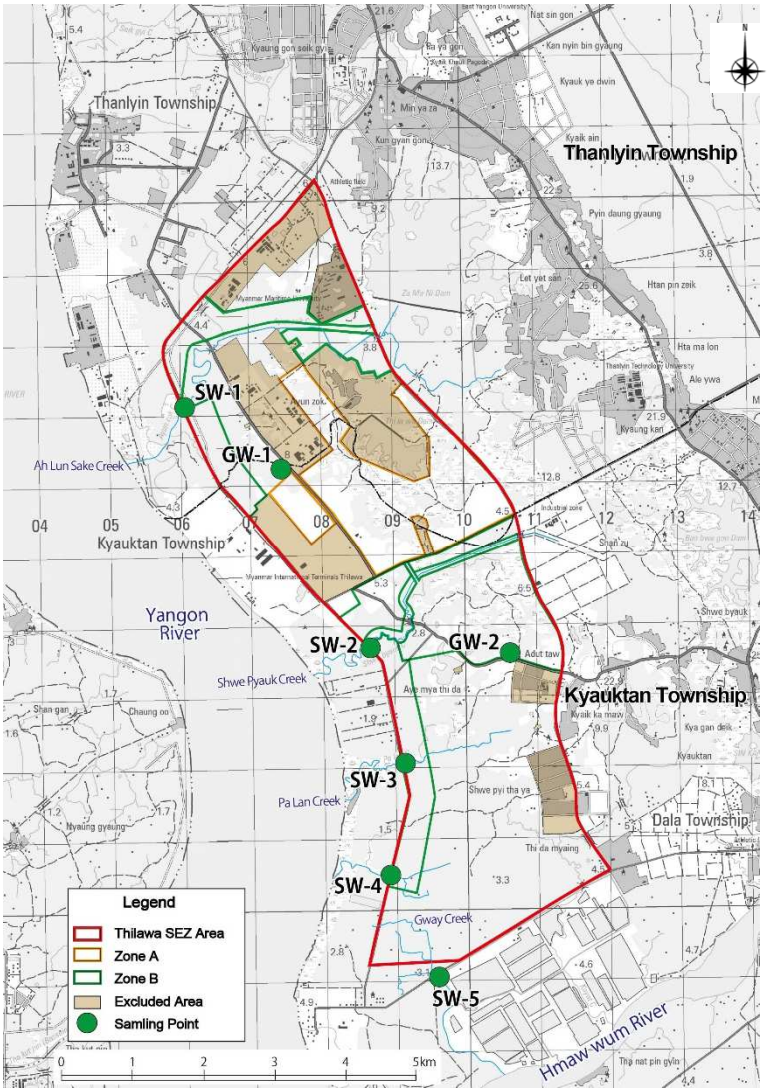
6.2.2 Survey Location

There were five survey sites for surface water quality and two survey sites for groundwater quality. The brief description of sampling points is presented in Table 6.2-2 and their locations are shown in Figure 6.2-1. The details of each sampling point are described below.

Table 6.2-2 Sampling Points for Water Quality Survey

Category	Sampling Point	Coordinates	Description of Sampling Point
Surface Water	SW-1	16° 41' 19.11" N 96° 14' 38.19" E	Ah Lun Soke Creek in Thilawa SEZ area
	SW-2	16° 39' 28.20" N 96° 16' 06.52" E	Shwe Pyauk Creek in Thilawa SEZ area
	SW-3	16° 38' 35.39" N 96° 16' 22.65" E	Pa Lan (Bay Bauk) Creek in Thilawa SEZ area
	SW-4	16° 37' 44.91" N 96° 16' 17.31" E	One creek located west of Kyauktan Town
	SW-5	16° 36' 58.48" N 96° 16' 39.13" E	Gway Creek located west of Kyauktan Town
Ground water	GW-1	16° 41' 01.2" N 96° 15' 18.3" E	Tube well in Ah Lun Soke Village
	GW-2	16° 39' 24.39" N 96° 17' 15.04" E	Tube well in monastery compound in Phalan Village

Source: EIA Study Team



Source: EIA Study Team

Figure 6.2-1 Location of Water Quality Sampling Points

(1) SW-1

SW-1 is located on Ah Lun Soke Creek where Thanlyin-Thilawa Road crosses the creek. The creek flows from northeast to southwest and joins the Yangon River at its end. The surrounding area of the sampling point is flat and paddy field, as shown in Figure 6.2-2 below. The width of the creek is about 8 m.

Source: EIA Study Team

Figure 6.2-2 Surface Water Sampling at SW-1

(2) SW-2

SW-2 is located on Shwe Pyauk Creek where it crosses Thilawa Road. The creek flows from the east of the industrial area of Thilawa SEZ Zone B to the west and then enters into the Yangon River. The surrounding area of the sampling point is a paddy field and agricultural land, especially to the east of the site, as shown in Figure 6.2-3 below. The width of the creek is about 7 m.

Source: EIA Study Team

Figure 6.2-3 Surface Water Sampling at SW-2

(3) SW-3

SW-3 is located on Pa Lan (Bay Bauk) Creek where Thilawa Road crosses it. The creek flows from east to west and then enters into Yangon River. SW-3 is located within Thilawa SEZ Zone B area and about 1.7 km to the south of SW-2 along the road. The surrounding area of the sampling point is paddy field and agricultural land, as shown in Figure 6.2-4 below. The width of the creek is about 9 m.

Source: EIA Study Team

Figure 6.2-4 Surface Water Sampling at SW-3

(4) SW-4

SW-4 is located at the crossing of a small creek and Thilawa Road. The creek flows east-west and finally discharges into the Yangon River. The sampling point is located inside Thilawa SEZ Zone B area and about 1.5 km to the south of SW-3 along the road. The surrounding area of the sampling point is a paddy field and agricultural land, as shown in Figure 6.2-5 below. The width of the creek is about 5 m.

Source: EIA Study Team

Figure 6.2-5 Surface Water Sampling at SW-4

(5) SW-5

SW-5 is located at the crossing of Gway Creek and Kyauktan-Thilawa Road. The creek runs north-south and finally joins into Hmaw Wun Chaung. The sampling point is located at the south edge of the entire Thilawa SEZ and about 1.5 km to the south of SW-4. The surrounding area of the

sampling point is a paddy field and agricultural land, especially to the north of the station, as shown in Figure 6.2-6 below. The width of the creek is about 7 m.

Source: EIA Study Team

Figure 6.2-6 Surface Water Sampling at SW-5

(6) GW-1

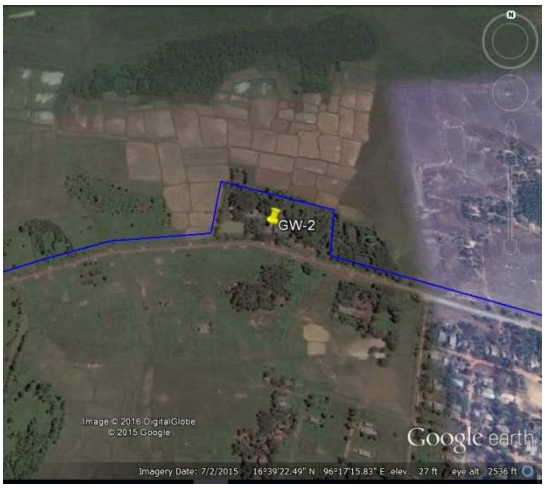
GW-1 sample was taken from one tube well located in Ah Lun Soke Village, Thanlyin Township, as shown in Figure 6.2-7 below. The depth of the tube well is about 30 m. Water from the well is utilized for washing, cooking, and planting. The water sample is highly transparent.

Source: EIA Study Team

Figure 6.2-7 Groundwater Sampling at GW-1

(7) GW-2

GW-2 sample was taken from one tube well located in the monastery compound in Phalan Village, as shown in Figure 6.2-8 below. GW-2 is located inside Thilawa SEZ Zone B area. The depth of the tube well is about 60 m. Water from the well is utilized especially for drinking. The water sample is highly transparent.



Source: EIA Study Team

Figure 6.2-8 Groundwater Sampling at GW-2

6.2.3 Survey Period

Water quality survey was conducted two times during the rainy season and dry season, as shown in Table 6.2-3.

Table 6.2-3 Survey Time for Water Quality

Category	Survey Point	Rainy Season	Dry Season
Surface Water	SW-1, SW-2, SW-3	6 Oct (2015)	15 Dec (2015) 2 Feb (2016)
	SW-4, SW-5	6 Oct (2015)	15 Dec (2015)
Groundwater	GW-1, GW-2	6 Oct (2015)	13 Jan (2016)

Source: EIA Study Team

6.2.4 Survey Method

(1) Sampling and Preservation Method

Water samples were taken by Alpha horizontal water sampler and collected in sterilized sample containers. Sampling was conducted strictly in accordance with recognized standard procedures. The parameters such as pH, temperature, dissolved oxygen (DO), electrical conductivity (EC), and turbidity were measured at each site concurrently with the sample collection. All samples were kept in iced boxes and transported to laboratories and stored at 2-4 °C. Detailed description of field equipment and containers used for water sampling and preservation method are described in the following tables.

Table 6.2-4 Field Equipment for Water Quality Survey

No.	Equipment	Manufacturer	Country of Origin	Model
1	Multiparameter (Temp., pH, EC, ORP, DO, TDS, Turbidity)	HANNA	USA	HI7609829 (with 3 sensors)
2	SmarTROLL multiparameter	In-situ Inc.	USA	-
3	Alpha Bottle (Water Sampler)	Wildlife Supply Company®	Indonesia	-

Source: EIA Study Team

Table 6.2-5 Container and Preservation Method of Water Samples

No.	Parameter	Container	Preservation
1	Oil and grease	1,000 mL glass bottle	Sulfuric acid, Refrigerate
2	Chromium (Total)	1,000 mL plastic bottle	HNO_3, Refrigerate
3	Suspended solid	1,000 mL plastic bottle	Refrigerate
4	Heavy metals	3,000 mL plastic bottle	Refrigerate
5	Coliform	1,000 mL glass bottle	Refrigerate
6	Other	2,000 mL plastic bottle	Refrigerate

Source: EIA Study Team

(2) Test Method

Water samples were sent to ISO Tech Lab, Agricultural Department, SGS Myanmar and SGS Thailand for laboratory analysis. The test method for each parameter is presented in detail in Table 6.2-1.

6.2.5 Survey Result

(1) Surface Water Quality

Results of surface water quality survey are shown in the following Table 6.2-6. The measured level of parameters was compared with the tentative target value. Table 6.2-6 shows that most of the measured parameters complied with the tentative target value during both dry and rainy seasons at all water sampling sites, except for SS, COD, Mn, Fe and CN.

Table 6.2-6 Survey Results of Surface Water Quality

Parameter	Unit	SW-1		SW-2		SW-3		SW-4		SW-5		Tentative Target Value
		rainy	dry	rainy	dry	rainy	dry	rainy	dry	rainy	dry	
Temperature	°C	27.1	28.2	26.7	27.0	28.1	30.0	28.4	28.9	27.7	28.7	-
pH	-	7.8	7.5	6.6	7.8	6.8	8.4	6.9	7.3	6.6	7.3	**6 – 8.5**
DO	mg/L	7.3	5.9	6.5	6.5	6.6	9.6	6.6	6.5	5.5	6.6	**≥4**
EC	µs	84	330	100	420	210	340	480	330	590	910	-
TSS	mg/L	-	430	-	490	-	240	-	-	-	-	**100**
BOD_5	mg/L	-	3	-	8	-	9	-	-	-	-	**15**
COD	mg/L	-	1,400	-	810	-	1,300	-	-	-	-	**30**
Total Nitrogen	mg/L	-	1.4	-	1.1	-	<1	-	-	-	-	**1**
Total Phousphorous	mg/L	-	0.02	-	0.05	-	0.05	-	-	-	-	-
Oil & grease	mg/L	1.2	<0.2	3.4	5.2	<0.2	0.9	<0.2	5.4	2	1.0	**1**
As	mg/L	-	<0.002	-	<0.002	-	<0.002	-	-	-	-	**0.01**
Hg	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	**0.0005**
Pb	mg/L	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	**0.01**
Cd	mg/L	-	<0.002	-	<0.002	-	<0.002	-	-	-	-	**0.003**
Cr (total)	mg/L	-	<0.02	-	<0.02	-	<0.02	-	-	-	-	**0.04 as $Cr_{(VI)}$**
Cu	mg/L	-	<0.1	-	<0.1	-	<0.1	-	-	-	-	**0.02**
Zn	mg/L	-	<0.1	-	<0.1	-	<0.1	-	-	-	-	**0.05**
Mn	mg/L	<0.1	1.4	<0.1	0.6	<0.1	<0.1	<0.1	0.5	<0.1	1.1	**1**
Ni	mg/L	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	**0.1**
Fe	mg/L	-	6.9	-	8.2	-	1.4	-	-	-	-	**1.5**
CN	mg/L	-	0.009	-	<0.004	-	<0.004	-	-	-	-	**Not detectable**
Fluoride	mg/L	-	0.63	-	0.49	-	0.66	-	-	-	-	**0.8**
Nitrate	mg/L	-	1.59	-	<0.02	-	0.58	-	-	-	-	**5**
Ammonium N	mg/L	-	0.25	-	0.23	-	0.28	-	-	-	-	**0.5**
Total Coliform	MPN/ 100mL	-	1,100	-	490	-	130	-	-	-	-	**7,500**
Nitrite	mg/L	-	<0.02	-	0.17	-	<0.02	-	-	-	-	-
Barium	mg/L	-	<0.1	-	<0.1	-	<0.1	-	-	-	-	-
Selenium	mg/L	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	**0.01**
Formaldehyde	mg/L	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	-

Parameter	Unit	SW-1		SW-2		SW-3		SW-4		SW-5		Tentative Target Value
		rainy	dry	rainy	dry	rainy	dry	rainy	dry	rainy	dry	
Phenol	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	**0.001**
Sulfide	mg/L	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	**-**
Chlorine	mg/L	-	0.03	-	0.03	-	0.02	-	-	-	-	**-**

Source: EIA Study Team

(2) Groundwater Quality

Results of the groundwater quality survey are shown in Table 6.2-7 below. The measured level of parameters was compared with the standards of groundwater quality, QCVN 09:2008/BTNMT issued by the Ministry of Natural Resources and Environment of Vietnam. The table shows that most of the measured parameters complied with the standard during the rainy season at all water sampling sites, except for COD, ammonium, nitrate, nitrate nitrogen, hardness, and manganese. The concentrations of COD at GW-1 during the rainy season and at GW-2 during both the rainy and dry seasons were found to be higher than the standard. Some parameters related to nitrogen also exceeded the standards. The concentrations of ammonium nitrate during both the rainy and dry seasons, and nitrate nitrogen at GW-1 and GW-2 during the rainy season were found to be higher than the standard. Total hardness and manganese at GW-1 were found to be higher than the standard, whereas these parameters at GW-2 complied with the standard.

Table 6.2-7 Survey Results of Groundwater Quality

Parameter	Unit	GW-1		GW-2		Environmental Standard in Vietnam
		Rainy	Dry	Rainy	Dry	
Temperature	^oC	28.5	28.5	28.5	28.7	-
Odor		None	None	None	None	-
Color	Pt.Co	<1	<1	<1	<1	-
pH		6.6	7.0	6.7	7.0	**5.5-8.5**
DO	mg/L	7.8	7.6	7.5	7.5	-
EC	µs	360	480	290	280	-
BOD_5	mg/L	<2	<2	<2	<2	-
COD	mg/L	<10	50	11	38	**4 (KMnO4)**
TSS	mg/L	97	46	120	26	-
Total nitrogen (organic)	mg/L	<0.6	1.1	<0.6	<1	-
Ammonium NH_4-N	mg/L	0.13	0.73	0.24	0.38	**0.1**
Nitrite NO_2-N	mg/L	0.76	<0.02	<0.02	<0.02	**1.0**
Nitrate NO_3-N	mg/L	16	0.03	15	0.88	**15**
Phosphorus	mg/L	0.03	0.02	0.39	0.34	-
Total hardness (as $CaCO_3$)	mg/L	970	740	350	92	**500**
Cyanide	mg/L	<0.01	<0.01	<0.01	<0.01	**0.01**
Oil and grease	mg/L	<0.2	<0.5	<0.2	<0.5	-
Iron	mg/L	<0.1	<0.1	0.19	0.35	**5.0**
Copper	mg/L	<0.1	<0.1	<0.1	<0.1	**1.0**
Zinc	mg/L	<0.1	<0.1	<0.1	<0.1	**3.0**
Manganese	mg/L	5.7	6.5	0.23	0.25	**0.5**
Arsenic	mg/L	<0.001	<0.001	<0.001	0.001	**0.05**
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	**0.005**
Cr (VI)	mg/L	<0.02	<0.02	<0.02	<0.02	**0.05**
Fluoride	mg/L	0.55	0.63	0.25	0.26	**1.0**
Lead	mg/L	<0.006	<0.006	<0.006	<0.006	**0.01**
Mercury	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	**0.001**
Nickel	mg/L	<0.002	0.004	<0.002	<0.002	-
Total coliform	MPN/100 mL	>23	2.2	>23	>23	**3**

Source: EIA Study Team

6.3 Noise and Vibration Level

6.3.1 Survey Item

The noise and vibration level survey items are shown in Table 6.3-1.

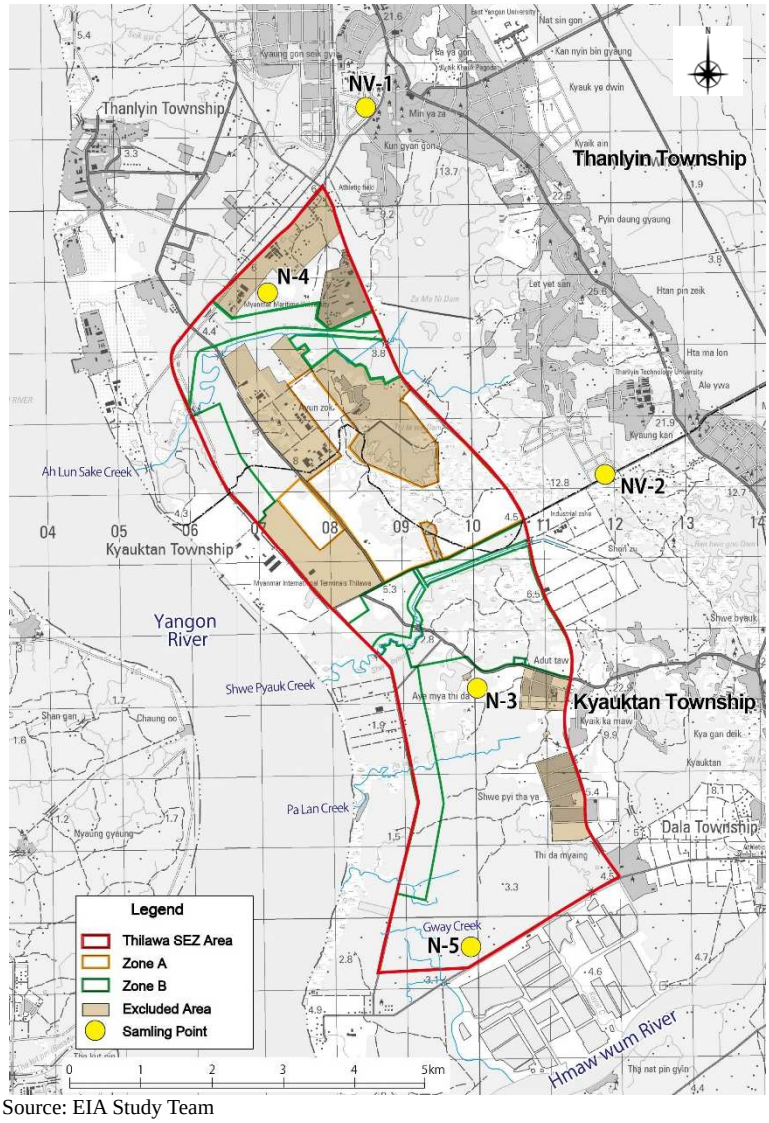
Table 6.3-1 Survey Parameters for Noise and Vibration Level

No.	Item	Parameter
1	Noise	A-weighted loudness equivalent (L_{Aeq})
2	Vibration	Vibration level, vertical, percentile (L_{V10})

Source: EIA Study Team

6.3.2 Survey Location

The description of their location is presented in Figure 6.3-1 and Table 6.3-1.



Source: EIA Study Team

Figure 6.3-1 Location of Environmental Noise Survey Points

There were five survey points for noise and vibration, divided into two types of noise and vibration. The first two points were installed to monitor both noise and vibration generated along the roads. These points were also combined to monitor traffic volume, as presented in detail in the next section.

The three remaining survey points were established to measure environmental noise. The details of the survey points are presented below.

Table 6.3-2 Location of Noise and Vibration Survey Point

Survey Point	Items	Coordinates	Description of Sampling Point
NV-1	Noise, Vibration and Traffic Volume	16°43'33.99"N, 96°16'02.99"E	Beside Thanlyin-Thilawa Road from Kyaikkauk Pagoda to SEZ , 8 m away from the road
NV-2	Noise, Vibration and Traffic Volume	16°40'49.93"N, 96°17'53.37"E	Beside Thilawa Road, 13.5 m away from the road
N-3	Noise	16° 39' 13.47" N, 96° 16' 51.11" E	To the east of Phalan Ywa Haung Monastery, Kyauktan Township
N-4	Noise	16° 42' 11.90" N, 96° 15' 14.90" E	Near Thilawa SEZ Zone B area, Thanlyin Township
N-5	Noise	16° 37' 19.00" N, 96° 17' 6.40" E	At the southernmost part of Thilawa SEZ area, Kyauktan Township

Source: EIA Study Team

(1) Traffic noise and Vibration

Two survey points for concurrent measurement of noise and vibration were named as NV-1 and NV-2.

(i) NV-1

Survey point NV-1 is located in an open area beside Thanlyin-Thilawa Road (8 m away from the road), as shown in Figure 6.3-2. The road is paved with asphalt; heavy vehicles use the road to go to Thilawa SEZ. Heavy vehicles such as wheel loader and heavy dump trucks were parking behind the field of the survey point. However, the survey point and the parking field are separated by 4 m high concrete fence and 6 m high bamboo trees. The survey point is located 3.7 m away from the fence. The nearest house is 30 m away from the survey point.

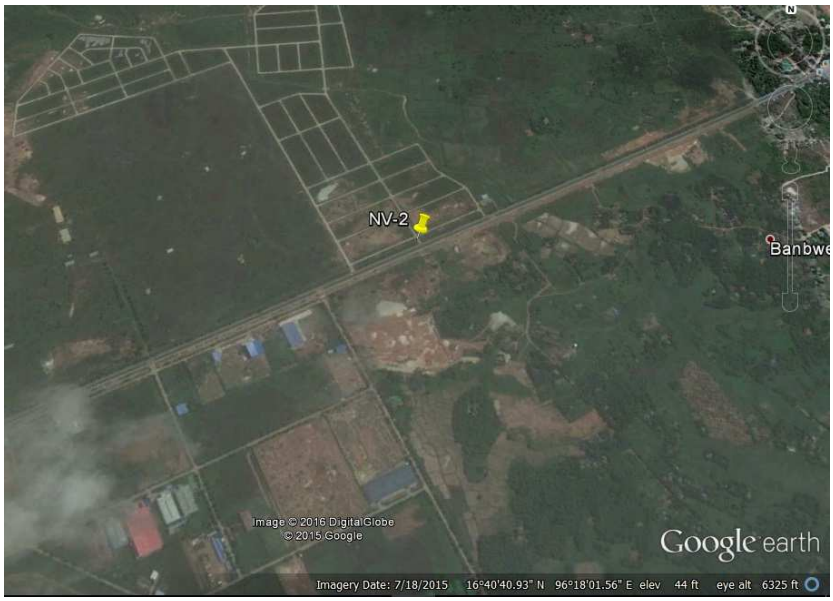
Source: Prepared by the EIA Study Team based on Google Earth

Figure 6.3-2 Location of Noise and Vibration Survey Point at NV-1

(ii) NV-2

The survey point NV-2 is almost identical with AQ-2. The survey point is located in an open area beside Thilawa Road and 13.5 m away from the road, as shown in Figure 6.3-3 below. The road is paved with concrete; light and heavy vehicles use the road to go to Thilawa SEZ. Works on one construction site have started during the survey period; this construction site is about 180 m away from

the survey point. However, no significant noise and vibration are expected to be transmitted from the construction site. It is noted that sometimes some motorbike and dump trucks pass closely to the survey point.



Source: Prepared by the EIA Study Team based on Google Earth

Figure 6.3-3 Location of Noise and Vibration Survey Point at NV-2

(2) Environmental Noise

Three survey points for environmental noise were named as N-3, N-4, and N-5.

(iii) N-3

The location of N-3 is identical with the location of AQ-3. This survey point is surrounded by paddy field and few residential houses, as shown in Figure 6.3-4 below.

Source: EIA Study Team

Figure 6.3-4 Environmental Noise Survey at N-3

(iv) N-4

The survey point is located within Sanpoenar Village. There is a garment factory which is about 200 m northwest of N-4, as shown in Figure 6.3-5. The area is flat and paddy field to the east and there are

residential houses of one village to the west. The dominant noise sources of this station are from daily human activities in the village and from motorbikes running along nearby local access roads.

Source: EIA Study Team

Figure 6.3-5 Environmental Noise Survey at N-4

(v) N-5

N-5 is located at the southernmost part of Thilawa SEZ area, Kyauktan Township, as shown in Figure 6.3-6. N-5 is 100 m away from Kyauktan-Thilawa Road whose traffic is not very high. The survey point is surrounded by paddy field to the north and crab breeding ponds to the south.

Source: EIA Study Team

Figure 6.3-6 Environmental Noise Survey at N-5

6.3.3 Survey Period

(1) Traffic Noise and Vibration

The noise and vibration level survey was conducted on two consecutive days (weekday and weekend) during the dry season in 2015. The details of the survey period are shown in Table 6.3-3.

Table 6.3-3 Survey Period for Traffic Noise and Vibration Survey

No.	Survey Point	Survey Period (Noise)	Survey Period (Vibration)
1	NV-1	29 Nov (9 a.m.) – 01 Dec (9 a.m.)	31 Jan (1 p.m.) – 02 Feb (1 p.m.)
2	NV-2	27 Nov (6 a.m.) – 29 Nov (6 a.m.)	29 Jan (10 a.m.) – 31 Jan (10 a.m.)

Source: EIA Study Team

(2) Environmental Noise

The environmental noise survey was conducted on two consecutive days including one weekday and one weekend during the dry season in 2015. The measurement duration is shown in Table 6.3-4.

Table 6.3-4 Survey Period for Environmental Noise Survey

No.	Survey Point	Survey Period
1	N-3	11 Dec (7 a.m.) – 13 Dec (7 a.m.)
2	N-4	11 Dec (7 a.m.) – 13 Dec (7 a.m.)
3	N-5	11 Dec (7 a.m.) – 13 Dec (7 a.m.)

Source: EIA Study Team

6.3.4 Survey Method

Measurement of noise and vibration level was conducted by referring to the recommendation of the Japanese Industrial Standard (JIS) and International Organization for Standardization (ISO), as detailed in Table 6.3-5.

Table 6.3-5 Methods for Noise and Vibration Measurement

No.	Parameter	Method
1	Traffic Noise Level (L_{Aeq})	JIS Z 8731:1999
2	Traffic Vibration Level (L_{v10})	JIS C 1510: 1995 (JIS C 1510: 1976)
3	Environmental Noise Level (L_{Aeq})	ISO 1996-1:2003 and ISO 1996-2:2007

Source: EIA Study Team

The instrument used for measurement of noise and vibration level is described in Table 6.3-6.

Table 6.3-6 Instrument for Measurement of Noise and Vibration Level

Parameter	Instrument	Model	Manufacture	Note
Traffic Noise	Sound level meter	NL-42	Rion Co. Ltd. (Japan)	
Traffic Vibration	Vibration level meter	VM-53A	Rion Co. Ltd. (Japan)	Accompanied by a 3-axis accelerometer PV-83C (Rion Co. Ltd.)
Environmental Noise	Sound level meter	NM102	Noise Meter Inc. (USA)	Sound level meter with SD Card, Model SL-4023SD

Source: EIA Study Team

The instrument used for noise measurement was set at the height of 1.2 m. A-weighted loudness equivalent level was measured automatically every 10 minutes and recorded in a memory card.

The vibration instrument used was the VM-53A Vibration Level Meter (Rion Co. Ltd., Japan) accompanied by a 3-axis accelerometer PV-83C (Rion Co. Ltd.) which was placed on solid soil ground near the roads. Vertical vibration (z axis), L_v, was measured every 10 minutes and recorded to a memory card. L_v (dB) vibration levels were recorded as $L_{v,max}$, $L_{v,min}$, L_{v5}, L_{v10}, L_{v50}, L_{v90}, L_{v95}, and L_{veq}. L_{v10} was the vibration level used for this Project in accordance with Vibration Control Law of Japan.

6.3.5 Survey Result

(1) Traffic Noise

Noise level (L_{Aeq}) along the road during the dry season is presented in Table 6.3-7. Noise levels measured on both weekday and weekend at NV-1 and NV-2 were found to be lower than the tentative target value. It is obvious that noise levels measured at the same point on weekday were higher than those on weekend.

Table 6.3-7 Equivalent Noise Levels (L_{Aeq}) Monitored along the Road

Survey Point	Date	Type of Day	Equivalent Noise Level (L_{Aeq}, dB)	
			Daytime (6 a.m. – 10 p.m.)	Nighttime (10 p.m. – 6 a.m.)
NV-1	29 Nov (Sun)	Weekend	66	59
	30 Nov (Mon)	Weekday	68	63
NV-2	27 Nov (Fri)	Weekday	65	59
	28 Nov (Sat)	Weekend	65	59
Tentative Target Value			**75**	**70**

Source: EIA Study Team

(2) Environmental Noise

The noise level (L_{Aeq}) during the dry season at the three survey points is presented in Table 6.3-8. Most of the noise levels measured at the survey points on weekday and weekend complied with the tentative target value which is applied for the most sensitive case (monastery, hospital, school), except for only one case. Noise level recorded on a Friday evening at N-3 was slightly higher than the standard.

Table 6.3-8 Equivalent Noise Levels (L_{Aeq}) in the Surrounding Environment

Survey Point	Date	Type of Day	Equivalent Noise Level (L_{Aeq}, dB)		
			Daytime (7 am – 7 pm)	Evening Time (7 pm – 10 pm)	Nighttime (10 pm – 7 am)
N-3	11 Dec (Fri)	Weekday	46	57	45
	12 Dec (Sat)	Weekend	47	45	47
N-4	11 Dec (Fri)	Weekday	47	52	53
	12 Dec (Sat)	Weekend	46	52	53
N-5	11 Dec (Fri)	Weekday	44	41	43
	12 Dec (Sat)	Weekend	45	42	43
Tentative Target Value*			**60**	**55**	**50**
*: applied to sensitive area (monastery, hospital, school)					

Source: EIA Study Team

(3) Traffic Vibration

The vibration level (L_{V10}) along the road during the dry season is presented in Table 6.3-9 below. All vibration levels measured at the survey points on weekday and weekend were much lower than the tentative target value, which is applied for residential area and two-lane road.

Table 6.3-9 Vibration Levels (L_{V10}) Monitored along the Road

Survey Point	Date	Type of Day	Vibration level (L_{V10}, dB)	
			Daytime (6 a.m. – 10 p.m.)	Nighttime (10 p.m. – 6 a.m.)
NV-1	31 Jan (Sun)	Weekend	42	33
	1 Feb (Mon)	Weekday	42	30
NV-2	29 Jan (Fri)	Weekday	36	28
	30 Jan (Sat)	Weekend	35	28
Tentative Target Value			**65**	**60**

Source: EIA Study Team

6.4 Traffic Volume

6.4.1 Survey Item

The survey items for traffic volume survey are number of vehicles, types of vehicles, and direction of vehicle movement when vehicles pass through the survey point.

6.4.2 Survey Location

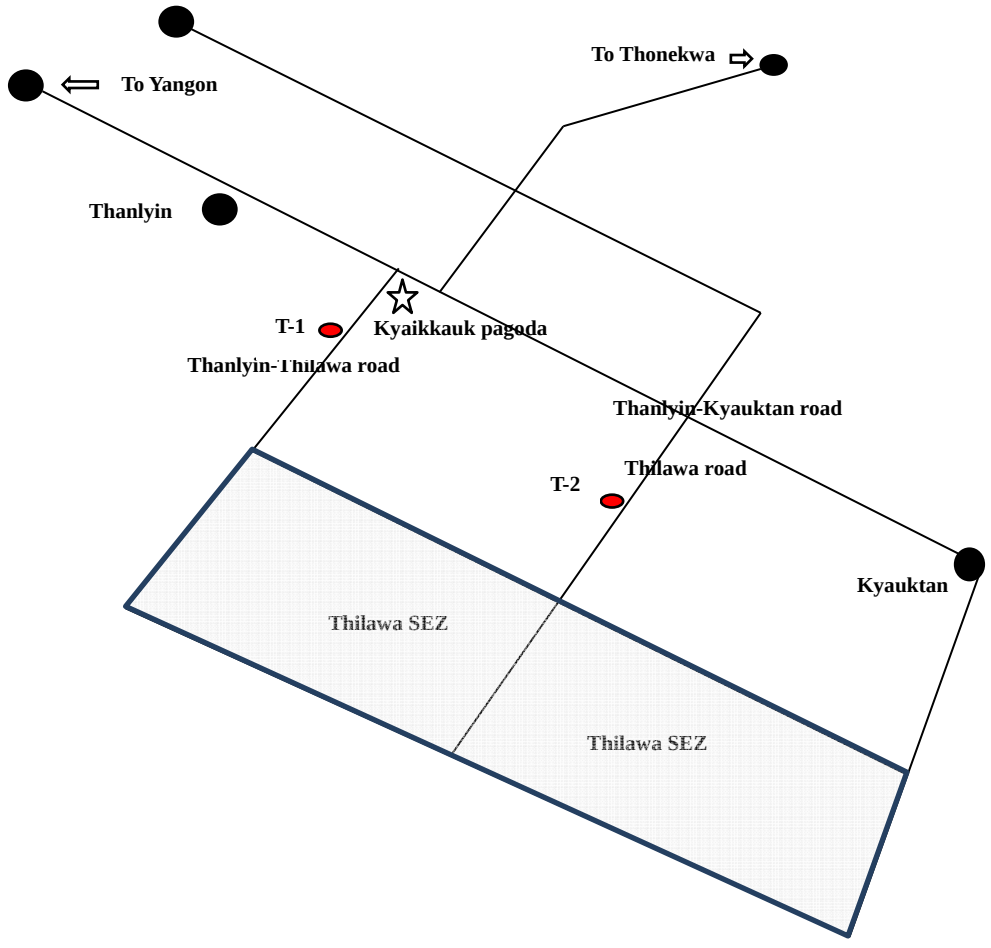
Traffic volume survey was conducted at the same survey points as traffic noise and vibration survey points but 7 m away from noise and vibration meters. Traffic volume survey points were named as T-1 and T-2 and their description were described again in the following Table 6.4-1.

Table 6.4-1 Location of Traffic Volume Survey Points

Traffic Volume Survey Point	Coordinate	Detailed Description	Note
T-1	16°43'33.99"N, 96°16'02.99"E	Beside Thanlyin-Thilawa Road from Kyaikkauk Pagoda to SEZ , 8 m away from the road	Same location of NV-1
T-2	16°40'49.93"N, 96°17'53.37"E	Beside Thilawa Road, 13.5 m away from the road	Same location of NV-2

Source: EIA Study Team

The location of the survey points and their relationship with the transportation network in the area can be visualized in Figure 6.4-1 below.



Source: EIA Study Team

Figure 6.4-1 Transportation Network and Traffic Volume Survey Points

6.4.3 Survey Period

The vehicle traffic survey was conducted for two consecutive days including a weekday and a weekend during the dry season in 2015 at the same time as the traffic noise and vibration level survey. Details of the survey period are shown in the following Table 6.4-2.

Table 6.4-2 Survey Period for Traffic Noise and Vibration Survey

No.	Survey Point	Survey Period
1	T-1	29 Nov (9 a.m.) – 01 Dec (9 a.m.)
2	T-2	27 Nov (6 a.m.) – 29 Nov (6 a.m.)

Source: EIA Study Team

6.4.4 Survey Method

Manual direct observation and recording using tally counters were conducted to count the number of vehicles moving in each direction (e.g., from Thilawa SEZ or to Thilawa SEZ). Type of vehicles was also recorded concurrently. All vehicles were classified into four types as detailed in Table 6.4-3. Hourly quantities of each type of vehicle recorded by the tally counters were summarized and then the tally counters were reset for counting again.

Table 6.4-3 Classification of Vehicles Types

No.	Classification	Description
1	Two-wheeled vehicle	Motorbike, motorcycle taxi
2	Four-wheeled light vehicle	Pick-up car, jeep,taxi, saloon car, light truck (under 2 tons)
3	Four-wheeled heavy vehicle	Medium bus, express, big bus, medium truck, heavy truck
4	Others	Tractor

Source: EIA Study Team

6.4.5 Survey Result

Traffic volume recorded at the two survey points is presented in Table 6.4-4. The table shows that the number of all types of vehicle on a weekday is higher than that on a weekend at both survey points. Comparing the two survey points, the number of 2-wheel vehicles passing T-1 is significantly higher than that passing T-2. The number of 4-wheel light vehicles passing T-1 is also higher than that passing T-2, especially on weekday. However, the number of 4-wheel heavy vehicles running on Thanlyin-Thilawa Road (T-1) is similar to that on Thilawa Road (T-2).

Table 6.4-4 Vehicle Traffic Volume Recorded at T-1 and T-2

Unit: vehicles

Survey Point	Direction	Date	Weekday	2-wheel Vehicles	4-wheel Light Vehicles	4-wheel Heavy Vehicles	Others	Total
T-1	To SEZ	29-Nov	Sun	4,125	800	478	46	10,552
	From SEZ			4,004	715	372	12	
	To SEZ	30-Nov	Mon	4,640	1,384	613	50	13,228
	From SEZ			4,458	1,544	522	17	
T-2	To SEZ	27-Nov	Fri	1,592	655	516	27	5,760
	From SEZ			1,540	788	626	16	
	To SEZ	28-Nov	Sat	1,373	554	484	23	5,105
	From SEZ			1,450	626	577	18	

Source: EIA Study Team

6.5 Soil Quality

6.5.1 Survey Item

Nine heavy metal parameters for soil quality survey were determined by referring to the relevant parameters for soil quality in Japan and neighboring countries, as shown in Table 6.5-1.

Table 6.5-1 Parameters for Soil Quality Survey

No.	Parameter
1	Arsenic (As)
2	Cadmium (Cd)
3	Chromium (Cr)
4	Copper (Cu)
5	Iron (Fe)
6	Lead (Pb)
7	Manganese (Mn)
8	Mercury (Hg)
9	Zinc (Zn)

Source: EIA Study Team

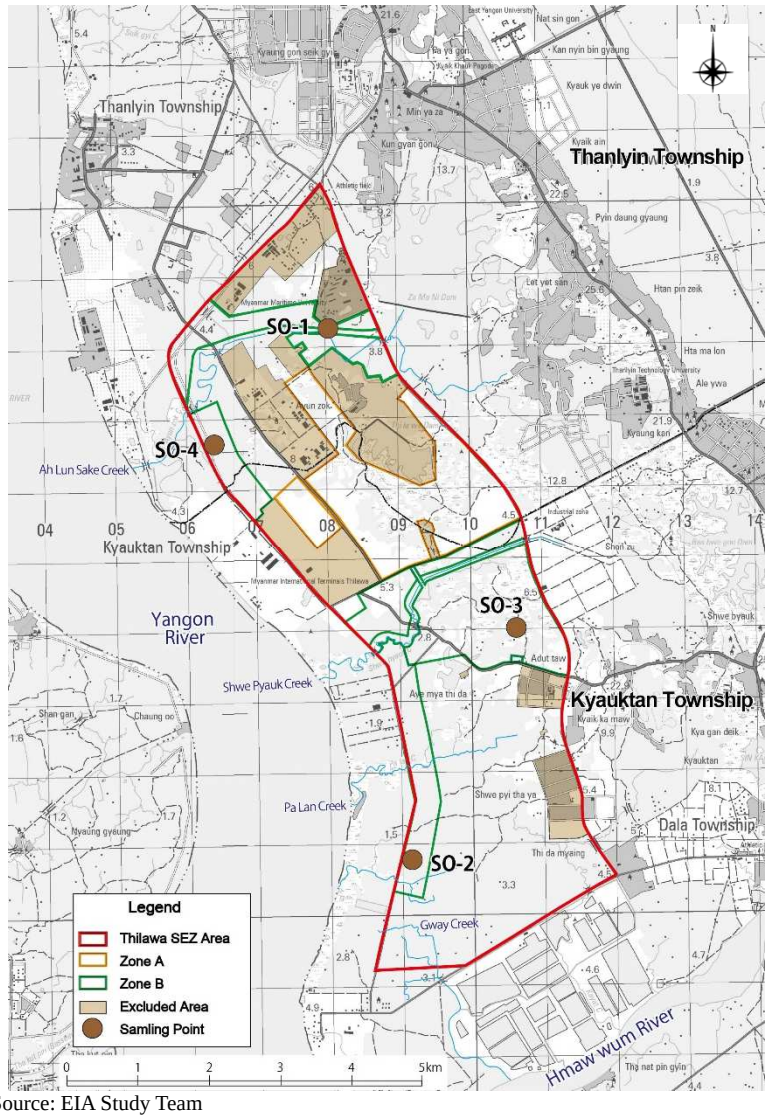
6.5.2 Survey Location

There were four sampling points for soil quality survey. The description of the locations of the sampling points is presented in Table 6.5-2 and the detailed location of each sampling point can be found in Figure 6.5-1.

Table 6.5-2 Sampling Points for Soil Quality Survey

Sampling Point	Coordinates	Description of Sampling Point
SO-1	16° 41' 56.00" N 96° 15' 43.10" E	Inside Thilawa SEZ Zone B area, Thanlyin Township
SO-2	16° 37' 54.40" N 96° 16' 26.00" E	Inside Thilawa SEZ Zone B area, Kyauktan Township
SO-3	16° 39' 59.10" N 96° 16' 54.30" E	Inside Thilawa SEZ Zone B area, Kyauktan Township
SO-4	16° 41' 6.70" N 96° 14' 49.20" E	Inside Thilawa SEZ Zone B area, northwestern part of Thilawa SEZ area, Thanlyin Township

Source: EIA Study Team



Source: EIA Study Team

Figure 6.5-1 Location of Soil Quality Survey Points

(1) SO-1

SO-1 is located inside a paddy field in the Thilawa SEZ Zone B area. The surrounding area is mainly flat and paddy field. The northern boundary of Thilawa SEZ Zone A area is about 1 km to the south of SO-1. Soil sample had gray to dark gray color, which can be roughly classified as silty clay.

Source: EIA Study Team

Figure 6.5-2 Soil Quality Survey at SO-1

(2) SO-2

The survey point is located inside a paddy field and situated in the southern part of Thilawa SEZ Zone B area. The soil sample had gray color, which can be roughly classified as silty clay.

Source: EIA Study Team

Figure 6.5-3 Soil Quality Survey at SO-2

(3) SO-3

The survey point is located in a paddy field and situated in the northern part of the industrial area of Thilawa SEZ Zone B. There are some bushes or shrubs around this sampling point. Thilawa Road is 500 m to the north of SO-3. The soil sample had yellowish brown color, which can be roughly classified as sandy clay.

Source: EIA Study Team

Figure 6.5-4 Soil Quality Survey at SO-3

(4) SO-4

The sample is located in a paddy field and situated in the northwestern part of Thilawa SEZ area. The surrounding area is flat and paddy field. Thanlyin-Thilawa Road lies to the west of SO-4. The soil sample had light gray to gray color, which can be roughly classified as sandy clay.

Source: EIA Study Team

Figure 6.5-5 Soil Quality Survey at SO-4

6.5.3 Survey Period

Soil quality survey was conducted on 14 December 2015 during the dry season.

6.5.4 Survey Method

(1) Sampling and preservation method

For soil sampling, the standard agricultural sampler (soil auger) was employed. The sampler is a stainless steel tube that is sharpened on one end and fitted with a long, T-shaped handle. This tube has an inside diameter of about 3 inches. In order to refrain from contamination, about 20~30 cm of top soil were removed by the sampler before sampling. Then, sample was taken and collected in a cleaned plastic bag. Chemical preservation of soil is not generally recommended. Samples were cooled in an

ice box whose temperature was under 4 ^{o}C. Samples were protected from sunlight to minimize any potential reaction.

(2) Analysis method

Soil samples were sent to the Applied Geology Department's laboratory for analysis. The analysis method for all concerned heavy metal parameters is Atomic Absorption Spectrophotometer (Aqua-regia).

6.5.5 Survey Result

The result of soil quality analysis is presented in Table 6.5-3. All parameters showed significantly lower levels than the examined standards in Vietnam and Thailand. Therefore, the soil quality at the sampling sites is suitable for the project development.

Table 6.5-3 Soil Quality Survey Results

No.	Parameter	Unit	SO-1	SO-2	SO-3	SO-4	Environmental Standard	
							Vietnam (Industrial land)	Thailand (Not for habitat or agriculture)
1	Arsenic (As)	mg/kg	ND	ND	ND	ND	12	27
2	Cadmium (Cd)	mg/kg	0.007	0.006	0.006	0.005	10	810
3	Chromium (Cr)	mg/kg	12	10	8	11	-	640
4	Copper (Cu)	mg/kg	60	65	68	72	100	-
5	Iron (Fe)	mg/kg	5,200	5,400	4,900	4,800	-	-
6	Lead (Pb)	mg/kg	85	80	87	90	300	750
7	Manganese (Mn)	mg/kg	10	8	12	9	-	32,000
8	Mercury (Hg)	mg/kg	ND	ND	ND	ND	-	610
9	Zinc (Zn)	mg/kg	75	70	80	78	300	-

ND: Not detected
Source: Vietnam: QCVN 03:2008/BTNMT, "industrial land" class
Thailand: Notification of National Environmental Board No. 25, B.E. (2004), "other purpose" class

6.6 Flora and Fauna

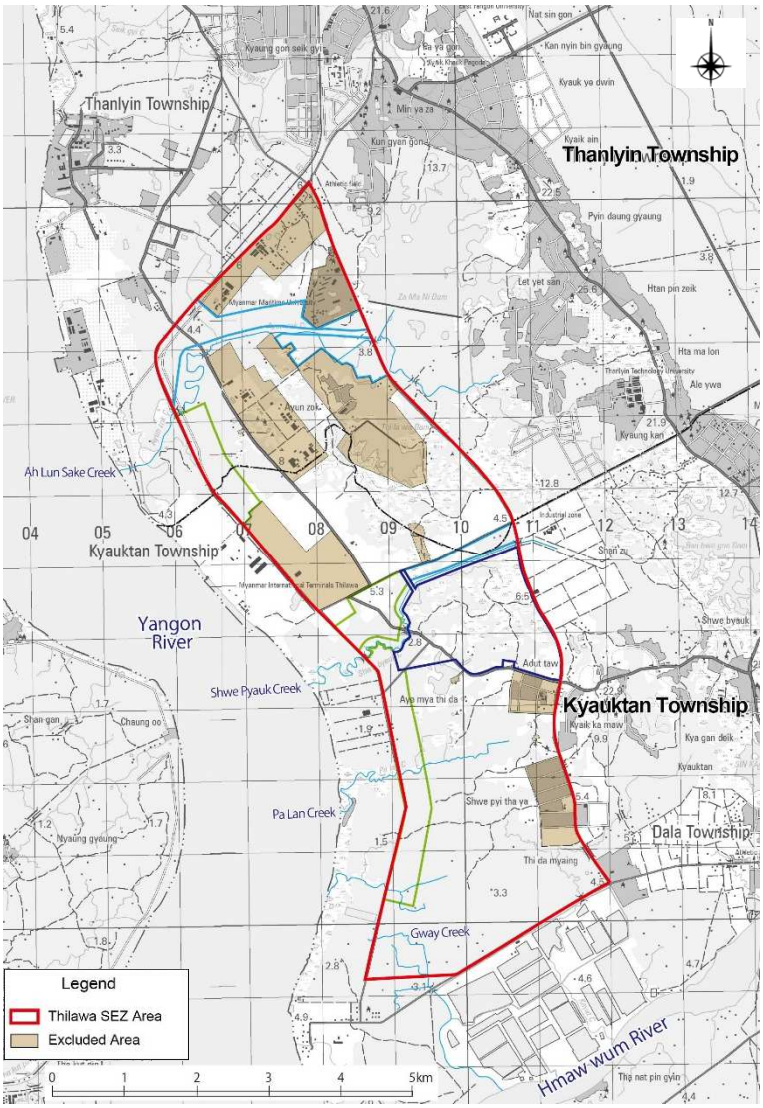
6.6.1 Survey Item

The flora and fauna survey items are as follows:

i) Vegetation
ii) Flora species
iii) Fauna species
iv) Important species

6.6.2 Survey Area

The survey area is in and around the Thilawa SEZ Zone B area, focusing on areas marked by the green, blue, and cyan polygons, as shown in the following Figure 6.6-1.



Source: EIA Study Team

Figure 6.6-1 Survey Area for Flora and Fauna

6.6.3 Survey Period

The flora and fauna field survey including interview survey was conducted both during the dry and rainy seasons. The survey duration is as shown in Table 6.6-1. Literature survey was conducted during 24-30 September, 2015.

Table 6.6-1 Field Survey Periods for Flora and Fauna Survey

Season	Period
Rainy Season	1st October, 2015 (one day)
Dry Season	10th December, 2015 (one day)

Source: EIA Study Team

6.6.4 Survey Method

(1) Vegetation Survey

The vegetation map was obtained by conducting field observation together with the use of secondary image from Google Earth and GIS software. At first, field observation was performed for the habitat

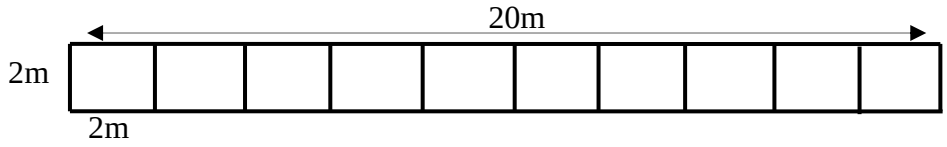
survey at the project site to collect data using Garmin GPS. The data was then retrieved and processed by the Map Info software. The Google images used were visually digitized based on the primary field survey. Finally, the vegetation map was formulated and analyzed based on both field survey and secondary image data from the Map Info software.

The materials and tools used for the field survey and formulation of the vegetation map include the following:

i) Garmin GPS 62 cx
ii) Map Info 11.0 and Discover
iii) Google Earth software and Google Images
iv) Field survey record

(2) Flora Species Survey

A global positioning system (GPS) was used to navigate and mark coordinates between the sample plots around the study area. Field observation was conducted in and around Zone B. In order to obtain essential ecological data for predicting flora of shrubs and herbs, 2 x 20 m belt transects were laid down and observed as shown in Figure 6.6-2. In each sub-plot, every plant species was listed and counted. For the tree species, 10 x 10 m quadrates (total of 10) were subjectively chosen and observed. In each sample plot, every living tree with girth at breast height (gbh) ≥ 10 cm was measured, listed, and counted. In each sub-plot along the belt transect, every plant species was listed and counted. Care had been taken to cover different elevation, slope, aspect, drainage, and density gradients to study the overall spectrum of species diversity. In addition, all plant species (trees, shrubs, herbs, and cultivated crops) around the area were recorded and listed.



Source: EIA Study Team

Figure 6.6-2 Layout Design of the Belt Transect

Identification of plant and animal species was conducted with the assistance of skilled local people. The identified species were translated to scientific name with the assistance of senior researchers at Yangon University. The families were identified using a key to the families of the flowering plants, issued by the Department of Botany, Yangon University (1994). Specimen identification was performed using the literature by Backer *et a*l., 1963 and Kress *et al*., 2003 and confirmed at the Herbarium in the Department of Botany, University of Yangon.

(3) Fauna Species Survey

Butterfly and dragonfly species were collected by aerial nets along the trail, packed by trasipaper (triangle paper), and placed in a plastic box together with mothball to keep the specimen for a long time. In addition, photos of butterflies were taken and used along with the specimen for identification of the species by examining using reference books.

Bird species were studied using binocular and camera. Photos of bird species were taken and then identified using reference books. The point count method was used for the bird survey in selected habitats. The species recorded by the point count method was examined and then identified using reference books.

Mammal species were confirmed by interview survey with the local people, because some mammals only lived in the survey area in the past and they were no longer found during the survey and in recent

time. Both observed and unobserved mammals were confirmed again through interview with experienced local people. All data recorded in the survey area were entered into the field data sheet.

Reptilian and Amphibian species were mainly collected by capturing them using the hands during the survey. Photos of reptiles and amphibians were taken as well. Information on some species was obtained from interviews with the local people.

Water bodies such as creeks, irrigation canal, lakes, and ponds were studied for aquatic fauna. Fishes were collected with the help of fishermen during the survey period. Traps were also used to get various types of fish like surface dwellers and bottom dwellers. The fishes were photographed soon after the collection and measurements were also taken for key characteristics. The fishes were then preserved in 10% formalin solution for further identification in the laboratory. The fishes were then identified according to Jayaram (1981) and Talwar and Jhingram (1991). In addition, fishermen were interviewed with regard to fishing gears, number of fishing time per day, and target species. The fishing gears were identified as trap, hook and line, and gill nets.

The list of instruments, tools, and materials used for the fauna survey is presented in Table 6.6-2 and some of their images are shown in Figure 6.6-3 below.

Table 6.6-2 Instruments, Tools, and Materials Used for Fauna Survey

No.	Instrument and Tool	Material
1	Camera (Nikon)	GPS map 62s (Garmin) for coordinates of collection
2	Binocular (Nikon)	Field guide to identify the species
3	Aerial net (PVC) net patch d1 millimetre, ring size 15 inches diameter made in Myanmar	Data sheet (to note the survey condition)
4	Plastic box, Mothball.	Vernier caliper and measuring tape to take the measurement

Source: EIA Study Team

Source: EIA Study Team

Figure 6.6-3 Instruments and Tools Used for Fauna Survey

(4) Interview and Literature Survey for Flora and Fauna

In addition to the field observation, secondary data were also surveyed by interviewing local residents (see Figure 6.6-4 below) and through literature review. In the interview survey, the surveyor visited the residents in and around the survey area and asked about the name of plants and animals existing in and around the area. Also, the past situation of flora and fauna, and the change in biodiversity and ecosystem in the area were asked.


Dry Season: 10th December, 2015


Dry Season: 10th December, 2015


Rainy Season: 1st October, 2015


Rainy Season: 1st October, 2015

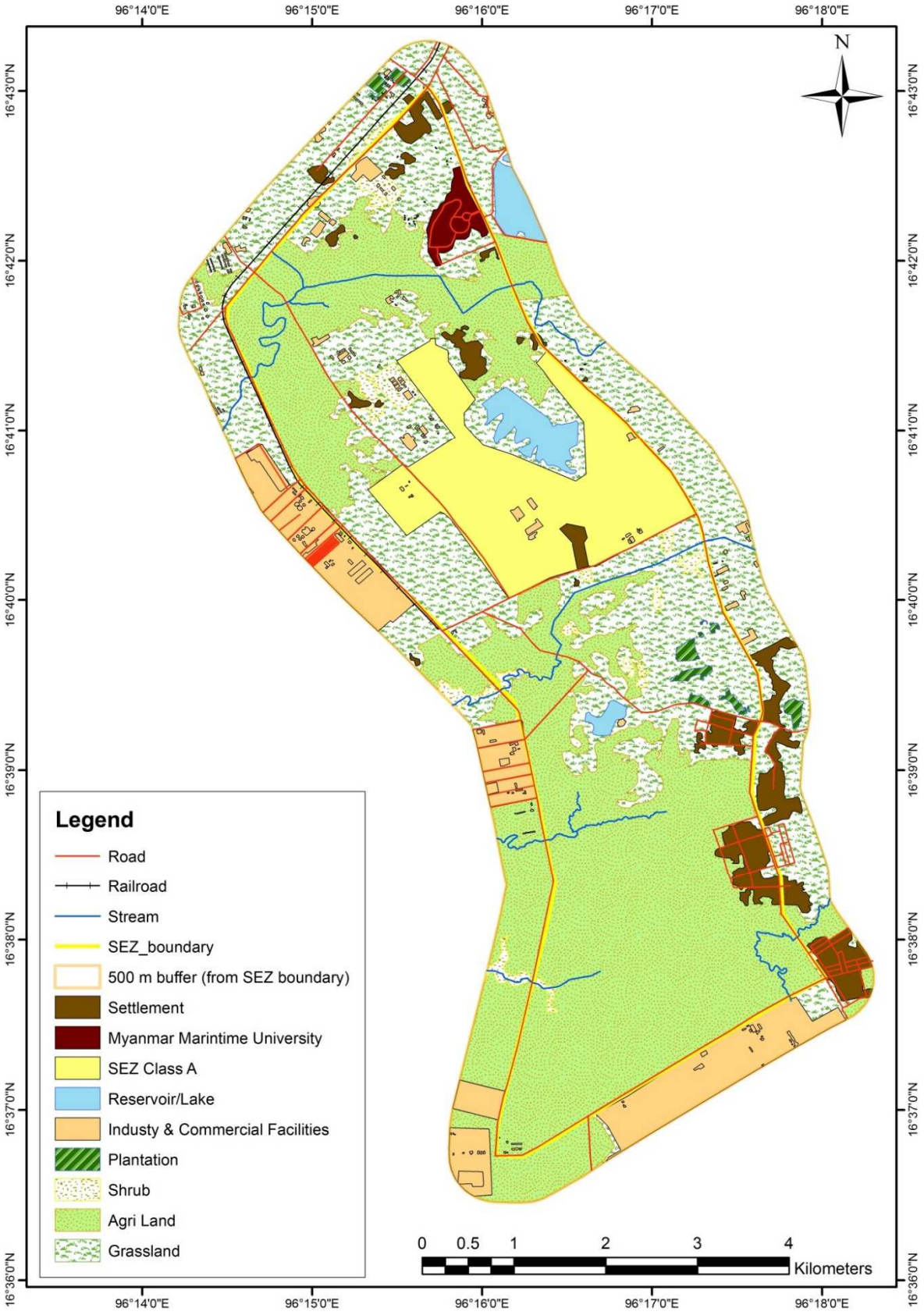
Source: EIA Study Team

Figure 6.6-4 Interview Survey with Local People

6.6.5 Survey Result

(1) Vegetation Survey

In the Thilawa SEZ Zone B area, four major habitat types were observed, namely: (1) patches of mixed vegetation with scattered trees, (2) cultivated land, (3) aquatic habitat, and (4) human habitation area. Vegetation map of Thilawa SEZ Zone B area is shown in Figure 6.6-5. The map shows clearly that the dominant areas are cultivated/agricultural land and grass and shrub land.



Source: EIA Study Team

Figure 6.6-5 Vegetation Map of Thilawa SEZ Zone B Area

The vegetation types in the study area are herb land, shrub land, mangrove/swamp land, grass land, and paddy field. Sceneries of the survey area can be visualized in Figure 6.6-6.

Source: EIA Study Team

Figure 6.6-6 Scenery of the Survey Area

(2) Flora

A total of 146 flora species were recorded in the survey area during the survey periods. (The list of flora species is presented in Annex 6-1.) The habitat of identified species consists of seven types, including tree, small tree, shrub, herb, creeper, climber, and grass. The recorded species were checked with the IUCN Red List of Threatened Species 2015-4 Version 3.1. All species were classified as either Not Evaluated (NE), Data Deficient (DD), or Least Concern (LC).

(3) Butterfly

A total of 73 butterfly species were recorded in the survey area during the survey periods. (The list of butterfly species is presented in Annex 6-1.) The habitat of identified species includes tree, shrub, bush, and trail. All recorded butterfly species were common species. Recorded species were checked with the IUCN Red List of Threatened Species 2015-4 Version 3.1. All species were classified as either NE or LC.

Peacock Pansy (Junonoa Almanac)

Common Tiger (Danus Genutia)

Source: EIA Study Team

Figure 6.6-7 Butterfly Species Recorded in Thilawa SEZ Zone B

(4) Dragonfly

There were four dragonfly species observed during the survey. (The list of dragonfly species is presented in Annex 6-1.) All species were classified as either NE or LC according to the IUCN Red List of Threatened Species 2015-4 Version 3.1

(5) Birds

A total of 69 bird species were recorded in the survey area. (The list of bird species is presented in Annex 6-1.) The survey area is mainly characterized by grass land and scattered area; bird species common in this area are Black Drongo (*Dicrurus macrocercus*), Spotted Dove (*Spilopelia chinensis*), Barn Swallow (*Hirundo rustica*), and Common Myna (*Acridotheres tristis*). One species, White-throated Babbler (*Turdoides gularis*), was reported as Myanmar endemic species. Images of some bird species found in the area are shown in Figure 6.6-8. During the study period, some bird species were seen in all kinds of habitat showing their capability for wide distribution. Such commonly distributed species comprised insect eaters and some omnivores that have alternative food choices such as insects, flowers, seeds, and fruits.

Recorded species were checked with the IUCN Red List of Threatened Species 2015-4 Version 3.1. Most of the species were classified as NE and LC. There were two species, including *Anhinga melanogaster* (Oriental Darter) and *Ploceus hypoxanthus* (Asian Golden Weaver), which were considered as Near Threatened (NT) species.

Asian Golden Weaver *(Ploceus hypoxanthus*)

Barn Swallow (*Hirundo rustica*)

Asian Pied Starling (*Gracupica contra (Sturnus contra)*)

Common Sandpiper (*Actitis hypoleucos)*

Source: EIA Study Team

Figure 6.6-8 Some Bird Species Found in the Survey Area

(6) Mammals

A total of seven mammal species were recorded during the survey periods. (The list of mammals is presented in Annex 6-1.) Recorded species were checked with the IUCN Red List of Threatened Species 2015-4 Version 3.1. All species were classified as LC.

(7) Reptilian and Amphibian Species

There were a total of 12 reptilian and amphibian species recorded in the survey area during the survey periods. (The list of reptilian and amphibian species is presented in Annex 6-1.) The Garden Lizard (*Calotes versicolor*) was observed in the mixed vegetation with scattered trees area. Among the recorded species, the Paddy Frog (*Fejervarya limnocharis)* was found as a very common species. Recorded species were checked with the IUCN Red List of Threatened Species 2015-4 Version 3.1. Most of the species were classified as NE and LC. One species, *Ophiophagus hannah* (King Cobra), was considered as Vulnerable (VU).

(8) Fish

A total of 22 fish species were recorded during the survey period. (The list of fish species is presented in Annex 6-1.) The fishes are important for the ecosystem of the canal and rice field water bodies. The fish species such as Giant Snakehead (*Channa marulius*), Ceylon Snakehead (*Channa orientalis*), Gangetic mystus (*Mystus cavasius*), and Chola barb (*Puntius chola*) were found as very common species in the project area. Recorded species were checked with the IUCN Red List of Threatened Species 2015-4 Version 3.1. Most of the species were classified as NE and LC. There were three species classified as NT, including *Ompok bimaculatus* (Indian Butterfish), *Oreochromis mossambicus* (Mozambique Tilapia), and *Wallago attu* (Wallago).

(9) Important Species

The number of flora and fauna recorded in the survey area is summarized in Table 6.6-3. Some species were classified as vulnerable and near threatened species in accordance with the IUCN Red List of Threatened Species (2015-4 Version 3.1), as listed in Table 6.6-4. There were one threatened species (reptile) and five near threatened species including two birds and three fishes.

Table 6.6-3 Identified Species of Flora and Fauna during the Survey Period

	Number of Species					
	Total	IUCN Red List				
		NE	DD	LC	NT	VU
Flora	146	129	3	14		
Butterfly	73	71		2		
Dragonfly	4	2		2		
Birds	69	4		63	2	
Mammals	7			7		
Reptilian and amphibian species	12	8		3		1
Fish	22	5		14	3	
Total	333	219	3	105	5	1

Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern; NT: Near Threatened; VU: Vulnerable; EN: Endangered
Source: Summarized by the EIA Study Team

Table 6.6-4 Threatened and Near Threatened Species Recorded during the Survey Period

No.	Scientific Name	Common Name	Family	IUCN (2015-4 Ver. 3.1)	Type of Species
A.	**Threatened Species (CR: Critically Endangered, EN: Endangered, VU: Vulnerable)**				
1	*Ophiophagus hannah*	King Cobra	Elapidae	VU	Reptile
B.	**Nearly Threatened Species (NT)**				
1	*Anhinga melanogaster*	Oriental Darter	Anhingidae	NT	Bird
2	*Ploceus hypoxanthus*	Asian Golden Weaver	Ploceidae	NT	Bird
3	*Ompok bimaculatus*	Indian Butterfish	Siluridae	NT	Fish
4	*Oreochromis mossambicus (Tilapia mossambica)*	Mozambique Tilapia	Cichlidae	NT	Fish
5	*Wallago attu*	Wallago	Siluridae	NT	Fish

Note: NT: Near Threatened; VU: Vulnerable; EN: Endangered
Source: EIA Study Team

6.7 Cultural Asset

6.7.1 Survey Item

Cultural survey was conducted to examine the existence of cultural assets in the project area. A list of survey items for cultural survey is presented in the following Table 6.7-1, including religious and non-religious items.

Table 6.7-1 Survey Items for Cultural Survey

Religious Items	Non-religious Items
Pagoda	Palace
Church	Architectural structures
Shrines	Sculpture
Stupas	Excavated building
Temple	Historic site
Monastery	Cultural landscape
Cemetery	Painting

Source: EIA Study Team

6.7.2 Survey Area

The cultural survey was carried out in and around the project area.

6.7.3 Survey Period

The cultural survey to collect cultural heritage data was implemented from 22 to 23 December 2015.

6.7.4 Survey Method

The survey method to identify cultural heritages in the project area is as follows:

- Documentary survey and field investigation.

In the course of field investigation, various types of cultural assets were identified and noted. Local monks, wise men, and concerned elders were interviewed to obtain detailed information of the assets which were found inside the project area.

6.7.5 Survey Result

(1) Summary of Survey Results

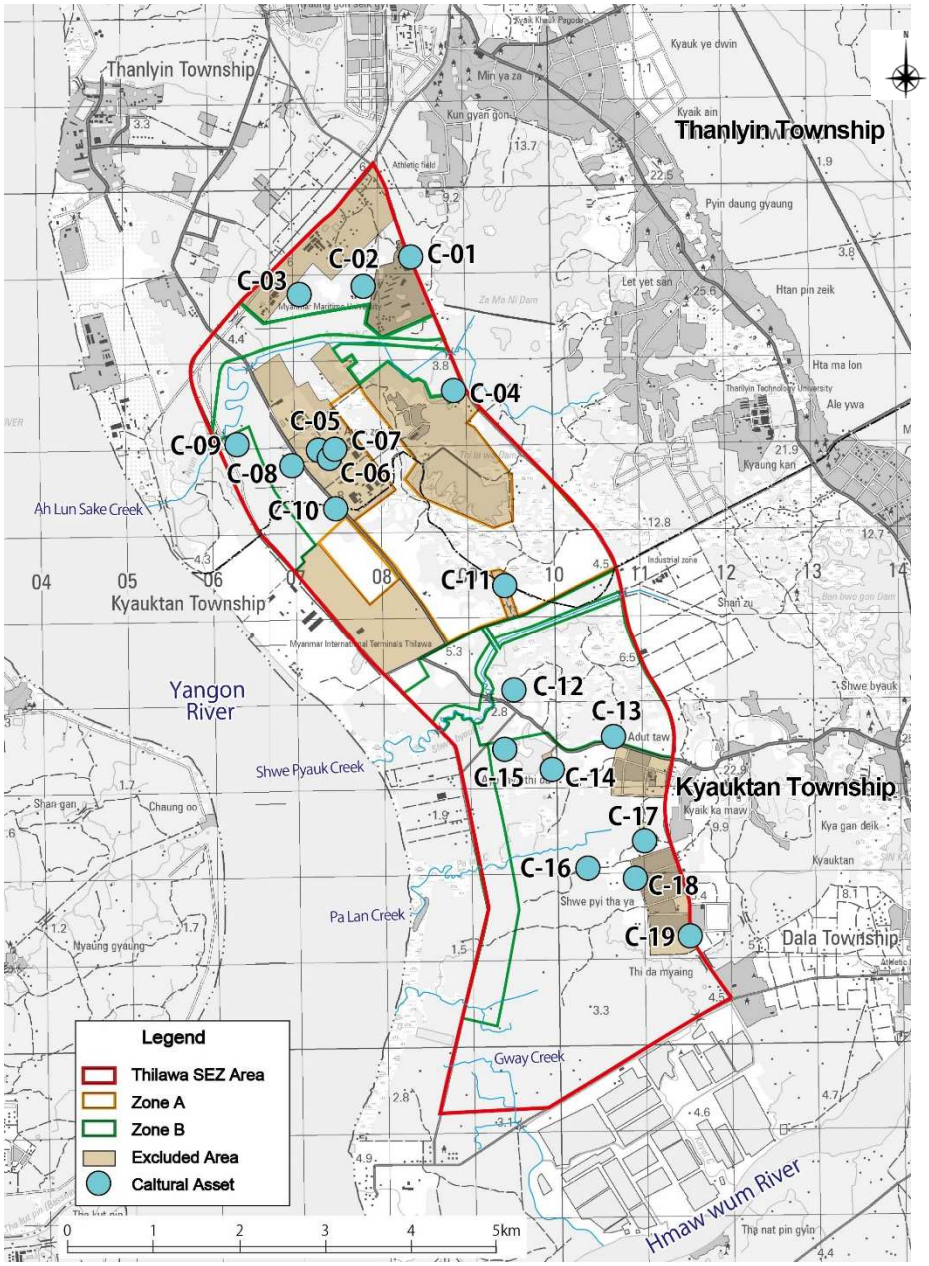
There were 19 cultural structures and assets found within the whole Thilawa SEZ area and its surrounding area. There were three cultural assets in the Zone B area, namely: Own Maw Taw Temple, Phalan Cemetery, and another cemetery. The list and location of the cultural structures and assets are presented in Table 6.7-2.

Table 6.7-2 List of Cultural Structures and Assets Within or Around Thilawa SEZ

No.	Code	Coordinate	Name of Cultural Structure/Asset	Location	Remark
1	C-01	16°42'26.80"N 96°15'54.20"E	Phan Chat Taw Ya Monastery	Ah Lun Soke Village, Thanlyin Township	Excluded Area
2	C-02	16°42'17.39"N 96°15'36.29"E	Siri Sadal Mune Warat Temple (Hinduism)	Phan Chat Ward, Thanlyin Township	In Thilawa SEZ
3	C-03	16°42'10.89"N 96°15'9.54"E	Chapel (RWP6)	Ah Lun Soke Village, Thanlyin Township	In Thilawa SEZ
4	C-04	16°41'32.53"N 96°16'8.08"E	Own Maw Taw Temple (Hinduism)	Ah Lun Soke Village, Thanlyin Township	Inside Zone B (Residence and Commercial Area)
5	C-05	16°41'13.86"N 96°15'19.17"E	Siri Meriman Temple (Hinduism)	Ah Lun Soke Village, Thanlyin Township	Excluded Area
6	C-06	16°41'12.62"N 96°15'20.31"E	Phaung Taw-U Pagoda	Ah Lun Soke Village, Thanlyin Township	Excluded Area
7	C-07	16°41'9.37"N 96°15'23.34"E	Ah Lun Soke Monastery	Ah Lun Soke Village, Thanlyin Township	Excluded Area
8	C-08	16°41'8.70"N 96°15'10.86"E	Than Ann Nar Church (Catholic)	Ah Lun Soke Village, Thanlyin Township	Excluded Area
9	C-09	16°41'14.53"N 96°14'48.37"E	Cemetery	Ah Lun Soke Village, Thanlyin Township	Inside Zone B (Logistic Area)
10	C-010	16°40'53.07"N 96°15'25.12"E	Ah Lun Soke Cemetery	Ah Lun Soke Village, Thanlyin Township	In Thilawa SEZ
11	C-011	16°40'24.64"N 96°16'31.90"E	Moe Gyoe Swan Monastery (RWP3)	Ah Lun Soke Village, Thanlyin Township	Excluded Area
12	C-12	16°39'45.11"N 96°16'34.88"E	Phalan Cemetery	Phalan Village, Kyauktan Township	Inside Zone B (Industrial Area)
13	C-13	16°39'24.84"N 96°17'14.94"E	Phalan Ywa Haung Monastery	Phalan Village, Kyauktan Township	Excluded Area
14	C-14	16°39'17.43"N 96°16'49.79"E	Phalan Ywa-U Phayalay Monastery	Phalan Village, Kyauktan Township	Excluded Area
15	C-15	16°39'21.24"N 96°16'34.57"E	Hindu Temple	Phalan Village, Kyauktan Township	In Thilawa SEZ
16	C-16	16°38'36.56"N 96°16'58.87"E	Hindu Temple	Na Bal Sonn Village, Kyauktan Township	In Thilawa SEZ
17	C-17	16°38'50.03"N 96°17'27.13"E	Hindu Temple	Phalan Village, Kyauktan Township	Excluded Area
18	C-18	16°38'36.69"N 96°17'25.09"E	Monastery	Shwe Pyi Thar Yar Ward, Kyauktan Township	Excluded Area
19	C-19	16°38'13.17"N 96°17'43.70"E	Siri Rama Temple (Hinduism)	Shwe Pyi Thar Yar Ward, Kyauktan Township	Excluded Area

Source: EIA Study Team

Detailed location of the cultural structures and assets can be found in Figure 6.7-1.



Source: EIA Study Team

Figure 6.7-1 Location of Cultural Structures/Assets In/Around Thilawa SEZ Area

(2) Description of Major Cultural Structure/Asset

Photos and some information related to major cultural structure/asset found in and around Thilawa SEZ are presented as follows:

Siri Sadal Mune Warat Temple (Hinduism) (C-02)

This temple is situated in Phan Chat Ward, Thanlyin Township, and belongs to the Hindus who are living nearby. This area is surrounded by the Myanmar Maritime University in the east, a glass factory (Ministry of Industry) in the north, and some paddy field in the west and south. The temple has been established since 1991 and is made of bamboo and wood. The temple was damaged due to Cyclone Nargis in 2008. After that, it was renovated as a brick structure, which is its current appearance. Hindus usually celebrate their religious festival and traditional ceremony in this temple.


Own Maw Taw Temple (Hinduism) (C-04)

This small temple is located in the residence and commercial area of Zone B, Thanlyin Township. According to the villagers, it was founded in 1998 and used by around 35 households.

Cemetery (C-09)

This cemetery is located in the logistic area of Zone B, Thanlyin Township. According to the villager, it was founded over 100 years ago and it covers around 0.5 acres. Around 50 households are using it.


Phalan Cemetery (C-12)

Phalan Cemetery is located in the industrial area of Zone B, Kyauktan Township. Topographically, the cemetery is slightly higher than the surrounding area which is recognized as paddy field and cultivation land. This cemetery mostly belongs to Phalan Village and local people bury or entomb corpse in this cemetery.


Phalan Ywa Haung Monastery (C-13)

This is located in the excluded area of Thilawa SEZ. According to a villager, it was founded in 1913 and around 200 households are using it.


Phalan Ywa-U Phayalay Monastery (C-14)

This is located in the excluded area of Thilawa SEZ. According to a villager, it was founded over 100 years ago and the whole village is using it.


6.8 Hydrology

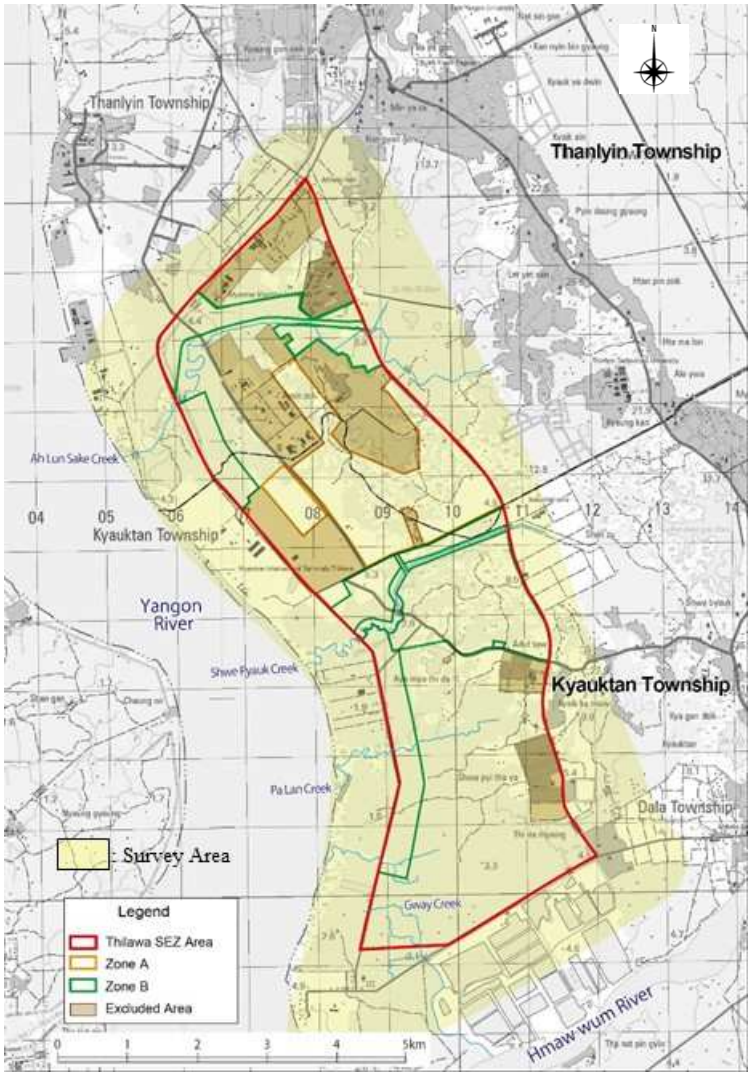
6.8.1 Survey Item

The hydrology survey items include the following:

i) Topography of Thilawa SEZ area
ii) Surface water flow direction in the area

6.8.2 Survey Area

The topography and surface water flow survey area covers the entire Thilawa SEZ area and the 500-m buffer area which was determined as 500 m from the SEZ boundary, as shown in the following Figure 6.8-1.



Source: EIA Study Team

Figure 6.8-1 Field Survey Area for Hydrology

6.8.3 Survey Period

The topography and surface water flow survey was carried out from 22 to 24 December 2015.

6.8.4 Survey Method

Firstly, the field survey was conducted using hand-held Garmin GPS instrument to estimate the elevation of the area and to record the practical observation of the water flow direction onsite. The field survey data was utilized to formulate ASTER image (15 m resolution) with 1.0-m interval contours by applying GIS software. Then, the water flow direction was visually digitized based on the topographic elevation of the contour interval. Water flow direction was again checked by practical observation during the survey.

The materials and tools used for the field survey and formulation of hydrology (topography) map include the following:

i) ASTER image (15 m resolution)

ii) Global Mapper 15 software

iii) Map Info 11.0 and Discover

iv) Garmin GPS 62 cx

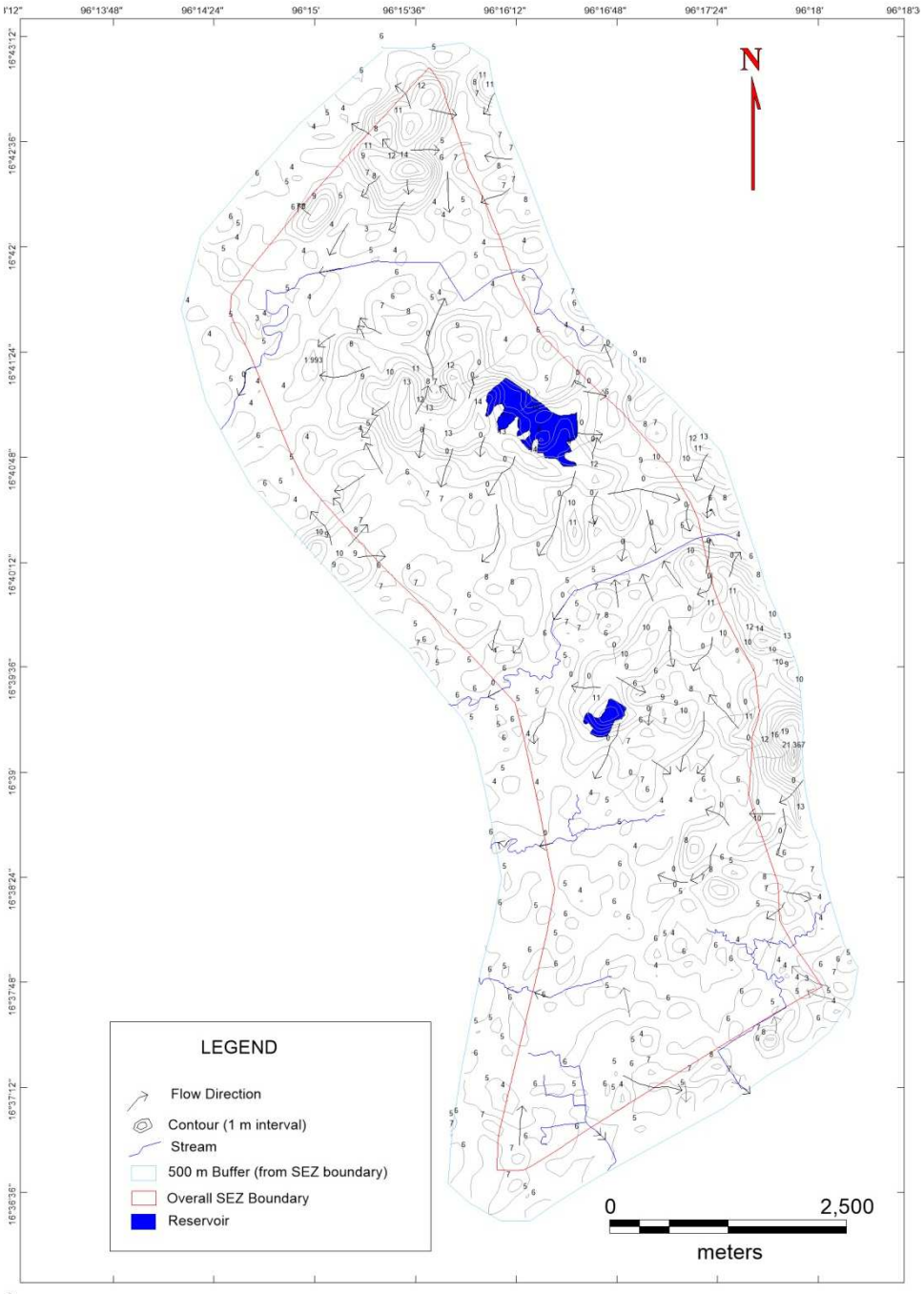
6.8.5 Survey Result

(1) Topography Condition

According to the result generated by the GIS software, the topography of the Thilawa SEZ area is generally characterized by flat terrain with some changes in elevation from 3 m to 21 m, as shown in Figure 6.8-2.

(2) Surface Water Flow Direction

The figure shows that Thilawa SEZ area is characterized by higher areas in the middle and in the east and low-elevation land located in the west and south. Highest areas are found in the Thilawa SEZ Zone A area and in the industrial area of Thilawa SEZ Zone B. Pursuant to its topography, surface water flow in the main area of the SEZ is mostly from east to west and surface water flow in the southern part of the SEZ is from north to south. There are four creeks, running from east to west and discharging into the Yangon River, namely: Ah Lun Soke Creek, Shwe Pyauk Creek, Bay Bauk (Pa Lan) Creek, and another creek. There are two creeks, flowing from north to south and discharging into Hmaw Wunn Chaung, namely, Gway Creek and Kayat Creek. Surface water runoff in adjacent areas of a creek flows in different directions, such as east-west, north-south, and south-north, but is directed to the creek. The watershed area of each creek has a span of less than 2 km, implying a length of 1 km in each side of the creek.



Source: EIA Study Team

Figure 6.8-2 1-m Interval Contour Map with Water Flow Direction

CHAPTER 7: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

7.1 Summary of the Environmental and Social Impact Assessment

Environmental and social impacts of the Project are predicted and evaluated based on the project description, results of baseline survey, and set target level. Table 7.1-1 shows the summary of the environmental and social impacts of the Project.

In this assessment of the Project, air quality, water quality, waste, and noise and vibration were identified as the items that should consider the cumulative impacts of other development projects in Thilawa SEZ, i.e. development project of Zone A and development project of Zone B that includes the development of the industrial area and the development of the logistic, residence and commercial area.

Table 7.1-1 Summary of the Environmental and Social Impacts of the Project (Logistic, Residence and Commercial Area of Zone B)

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
Pollution	Air Quality	B-	B-	B-	B-	B-	B-	**CO/CLP:** Impact on air quality is expected to be limited because dust and emission gases from construction works will be within the narrow area near the construction site. In addition, emission gas effect from construction vehicles travelling around the area will be little, comparatively limited vehicles are operating. **OP:** Impact on air quality is expected to be little, because roadside air quality is predicted to comply with the target level. In addition, emission gas effect from the tenants is expected to be limited because the large emitter will be required to submit an EIA or IEE report with EMP including mitigation measures on air pollution to MOECAF.
	Water Quality	B-	B-	B-	B-	B-	B-	**CO/CLP:** Impact on wastewater quality caused by construction/demolition work is expected to be limited because discharging muddy water from bare land of construction site will be temporary and wastewater from a construction camp will be treated by the septic tanks. **OP:** Impact on water quality is expected to be limited because water discharge from residential and commercial areas will be treated onsite thorough the septic tank. Discharged water from tenants will also be well treated by treatment plant to comply with the industrial wastewater effluent guideline values stipulated by MOI and MOECAF and the proposed internal regulation.
	Waste	B-	B-	B-	B-	B-	B-	**CO/CLP:** The impact of the construction waste is expected to be limited because construction waste will be utilized to embankment work and scrap material generated from removal of structure will also be utilized as recyclable materials as much as possible. The rest of the waste will be treated by outsourcing to the private waste treatment firm in Thilawa SEZ which has functions of recycling, intermediate treatment, and the controlled landfill site or other proper waste treatment facilities outside of

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								Thilawa SEZ. **OP:** Impact of industrial and business-related waste generated from the logistic and the commercial area in addition to the industrial area of Zone A and Zone B is expected to be limited because solid waste management facilities in Zone A which have functions of recycling, intermediate treatment, and the controlled landfill site and enough capacity of receiving waste from all of the industrial waste and business-related waste in Zone A and Zone B. Impact of waste generated from the residence area is limited because the project proponent will reduce waste as much as possible through recycling and collect toxic wastes and bring the waste to the waste treatment facilities in Zone A. The project proponent will also prepare waste collection and transportation trucks by themselves as necessary.
	Soil Contamination	B-	B-	B-	D	B-	D	**CO:** In the construction phase, all excavated soil would be backfilled into Zone B area as embankment soils. Excavated soil would not cause any soil contamination inside the industrial area and the surrounding area because the soil quality of Zone B was observed complying with the relevant environmental standards. **OP:** Soil contamination caused by the tenants is estimated to be limited because tenants will be prohibited to infiltrate liquid waste into the soil based on the proposed internal regulation. **CLP**: Demolition work in the project area and domestic activities during the period would not be expected to cause any pollution to the soil environment.
	Noise and Vibration	B-	B-	B-	B-	B-	B-	**CO/CLP:** Impacts of noise and vibration from construction machineries are expected to be limited because noise and vibration caused by construction works are site specific and temporary events. Impact of noise and vibration from construction vehicles is expected to be limited because the construction vehicular traffic volume is estimated to be little compared with the present traffic volume. **OP:** Impacts of noise and vibration by tenants are expected to be limited because mitigation measures such as soundproof wall will be installed as necessary. Impacts of noise and vibration from traveling vehicles are expected to be limited because noise and vibration levels are forecasted to be less than the target values.
	Ground Subsidence	D	D	D	D	D	D	**CO:** Groundwater will be used during the construction phase; however, no impact is expected because there is no change in ground elevation as monitored by Zone A Project and the same kind of construction work will be conducted in the project area. **OP/CLP:** No activities are planned that will cause ground subsidence.
	Offensive Odor	D	B-	D	D	B-	D	**CO/CLP:** There is no factor to cause offensive odor. **OP:** Odor caused by tenants is estimated to be limited because offensive odor shall be controlled and minimized by tenants in accordance with the proposed internal

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								regulation.
	Bottom Sediment	D	B-	D	D	B-	D	**CO/CLP:** No construction works are planned that will cause impact on bottom sediment. **OP:** Impact on bottom sediment is expected to be limited because water discharge from the tenants will be treated at the treatment plant to comply with the industrial wastewater effluent guideline value stipulated by MOI and MOECAF and the proposed internal regulation. Domestic wastewater would be treated in septic tanks.
Natural Environment	Protected Areas	D	D	D	D	D	D	Since no natural preservation area and national parks exist in and around Zone B, impact on the protected areas is not expected.
	Flora/Fauna and Ecosystem	C	C	C	B-	B-	B-	Based on the field survey, it was observed that biodiversity in the project area is not rich because of the fact that the area has been inhabited and cultivated by local people for a long time. In addition, the area, located near Yangon City, has been recently urbanized and strongly industrialized with the presence of industrial areas and deep terminals. The project area is not a special area in terms of biodiversity and ecosystem. Similar ecosystem and equivalent level of biodiversity would be found in nearby areas. Besides, the loss of some important species would not occur during the project development. Therefore, the development of the project would not cause any significant impact on biodiversity and ecosystem of the region, although there will be a change of vegetation due to the construction work in the industrial area.
	Hydrology	B-	B-	B-	B-	B-	B-	**PC/CO**: Impact on hydrology is expected to be limited because the amount of water consumption used in the construction work will be minimal; only in the case of washing machines and sprinkling. **OP**: Impact on hydrology is limited because stormwater flow to the river will be equalized through retention ponds and minimized making changes to the water current and riverbed.
	Topography and geology	D	D	D	D	D	D	**CO/CLP:** Since there are no unique topography and geology in this area, no impact from construction is expected. **OP:** No activities are planned that will cause impact on topography and geology.
	Soil Erosion	B-	B-	B-	B-	B-	B-	**CO/CLP:** Soil erosion in the bare area/bank would occur as a result of rainwater. **OP:** Impact of erosion on the creek is limited because stormwater flow to the river will be controlled by natural retention function along existing canals.
Social environment	Involuntary Resettlement	A-	A-	D	A-	A-	B-	**PC:** Land acquisition will be required partially and the involuntary resettlement of 254 households is expected through the project (logistic area: 82, residence and commercial areas: 172). However, the impact will be minimized by providing compensation for the loss of assets/income source and livelihood/relocation based on the Framework for 2,000 ha by TSMC. In addition, the relocation of the households currently living in the proposed relocation site is anticipated because of the development of the relocation site. TSMC will organize an adequate consultation with the households in a timely manner.

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								OP: Among the 254 households to be affected by the Project, 226 households are required to relocate. The impact on the livelihood of relocated household is expected due to the changes in their situation. However, the impact will be minimized due to the implementation of an Income Restoration Program (IRP) based on the Framework for 2,000 ha by TSMC. **CLP:** It is expected that certain scale of workers will be required to move to other place due to the closure of operations at the project area. However, the displacement will be planned and residents will be informed under the contract agreement, and will be implemented with the understanding of residents.
	Living and Livelihood	A-/ B+	A-/ B+	C	A-/B-/B+	A-/B-/B+	B-/B+	**PC/ CO/ OP:** *Impact to PAHs by Land Reclamation (A-)* Among the entire project affected households, approximately 25 % have land-based income source and 5 % has non land- based income source. They might lose their income source or face the decrease in income due to resettlement. However, the impact will be minimized by providing assistance package and IRP based on the Framework for 2,000 ha by TSMC. In addition, TSMC will provide IRP activities such as job matching and facilitation of job opportunity for some PAHs who would spend some time to restore their living after their resettlement. **CO/ OP/ CLP:** *Impact to Surrounding Community (B-)* Unexpected impact on living and livelihood of the surrounding community would be arisen due to the construction work and the operation. The project proponent will consider implementing social contribution activities as necessary under their approach of CSR in order to mitigate the impact on living and livelihood. In closing phase, it is expected that some people would lose their income source belong to the Project. However, the general procedure of dismissal will be applied to people based on their respective contract agreement with each tenant in accordance with the laws/regulations in Myanmar. Moreover, facilitation of job opportunity will be arranged by the government to assist workers to find alternative livelihood. **CO/ OP/ CLP:** *Impact on Improvement of Local Economy (B+)* There will be the improvement of local economy due to the increase of job opportunity with the start of the construction/ demolished work and the operation by the Project.
	Vulnerable Group	A-/ B+	A-/ B+	D	A-/B-/B+	A-/B-/B+	D	**PC/ CO/ OP:** *Impact to Vulnerable PAHs by Land Reclamation (A-)* Among the project affected households, 70 households are defined as vulnerable people in the Project (logistic area: 26, residence and commercial area: 44). They are easily affected by the Project. In order to mitigate the impact, special attention will be given to them by providing additional assistance based on the Framework for 2,000 ha by TSMC. **CO/ OP:** *Impact to Surrounding community (B-)* Unexpected impact on living and livelihood of the surrounding community would be arisen due to the

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								construction work and the operation. The project proponent will consider implementing social contribution activities as necessary under their approach of CSR in order to mitigate the impact on vulnerable group. **CO/ OP:** *Impact on Improvement of Local Economy (B+)* There will be the improvement of local economy due to the increase of job opportunity with the start of the construction/ demolished work and the operation by the Project.
	Local Conflict of Interests	A-	A-	D	B-	B-	D	**PC/CO/OP:** It is expected that local conflict of interests would happen due to the implementation of the Project, since inequality between relocated PAHs and host community, between PAHs for Zone A and Zone B, or between construction workers and local people might happen. These conflicts would be mitigated by IRP activity for community harmonization, the design of assistance package, environmental and safety education training to workers by contractor.
	Misdistribution of Benefit and Damage	B-	B-	D	B-	B-	D	**PC/CO/OP:** Inequality among the stakeholders is expected, since some would receive a benefit from the Project while others would be affected negatively by the Project. However, the impact is minimized by implementing IRP by TSMC. Also, complaint or claim from local people due to the construction work/operation work will be dealt by the contractor or the project proponent/ TSMC.
	Children's Right	B-	B-/ B+	D	B-	B-/ B+	D	**PC:** Since there are a total of 250 school children among the relocated PAHs, children's education would be temporarily disrupted due to relocation. On the other hand, children would be indirectly influenced by the improvement of social infrastructure in the region caused by the Project. **CO/OP/CLP:** It is expected that the increase in traffic volume might affect the safety of children in commuting to school. Therefore, the contractor/proponent shall design the mitigation measures for security of schoolchildren.
	Existing Social Infrastructures and Services	B-/ B+	B-/ B+	D	B-/ B+	B-/ B+	D	**CO:** Traffic congestion due to the increase in number of construction vehicles is expected. Accessibility of PAHs to school, hospital, and shops would be affected. On the other hand, the social infrastructure is expected to be improved in and around the project area. **OP:** For relocated PAHs, the impact on the accessibility to social infrastructure is unavoidable after relocation. Therefore TSMC will arrange the resettlement site including basic social infrastructures. For local people, the accessibility would be changed because of the construction /operation work. On the other hand, the basic infrastructures such as the existing road and power supply will be improved due to the infrastructure development projects around Thilawa SEZ.
	Water Usage	C	C	D	B-	B-	D	**CO:** Some paddy farmers would be affected by the development of the project area because of the rice cultivation for not only monsoon paddy but also summer paddy fields by utilizing the irrigated water from the existing water source. However, the loss of income source for these farmers will be appropriately compensated by providing the assistance package based on the Resettlement Framework for 2000ha by

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								TSMC. In addition, adequate amount of water to be used for the construction work would be secured from the outside or groundwater inside the Project area by the project proponent/contractor in order to minimize the impact on local water usage. **OP:** It is planned to use local water source for the Project, however the impact of water usage is expected to be negligible because the amount of water consumption will be well controlled based on the project plan.
	Cultural Heritage/Asset	B-	D	D	B-	D	D	**PC:** One Hindu temple and one cemetery will be affected by the Project in the project area. However, it will be considered to keep this utility in the community with the providing several options to local people.
	Landscape	D	B-/ B+	D	D	B-/ B+	D	**OP:** Impact on landscape is not expected because there are no important landscapes and viewpoints to be considered around the project area even though the landscape would be changed by the semi-urbanization of the project area and its surrounding area.
Health and Safety	Risks for Infectious Disease such as AIDS/HIV	B-	B-	B-	B-	B-	B-	**CO/CLP:** Risks for infectious disease are expected due to the influx of construction workers into the project area, however, it will be very limited because it is temporary and typical work. In order to minimize the impact, preventive measures against infectious disease shall be considered. **OP:** Risks for infectious disease are expected because of the influx of workers of the tenants and semi-urbanization of the project area and its surrounding.
	Occupational Health and Safety	B-	B-	B-	B-	B-	B-	**CO/OP/CLP:** Minor negative impacts on occupational health and safety (OHS) are inevitable to some extent. To minimize the negative impacts, the contractor/the project proponent shall take mitigation measures stipulated in the Environment, Health, and Safety (EHS) Guidelines of the International Finance Corporation (IFC).
	Community Health and Safety	B-	B-	B-	B-	B-	B-	**CO/CLP/OP:** Minor negative impacts on community health and safety (CHS) are inevitable to some extent. To minimize the negative impacts, the contractor/the project proponent shall take mitigation measures stipulated in the EHS Guidelines of the IFC.
Emergency Risk	Usage of Chemicals	D	B-	D	D	B-	D	**OP:** During the operation phase, some tenants would use chemical materials to be managed under specific condition. Risk of chemical material is expected to be limited because the tenants will be required to prepare proper chemical substances management plan.
	Flood Risk	B-	B-	B-	B-	B-	B-	**CO/OP/CLP:** Flood risks such as heavy rain, cyclone, and high tide are expected to be limited because land reclamation plan is prepared considering EL+over 5.0 m, which is higher than EL +4.24 m, the highest water level recorded at Myanmar International Terminals Thilawa (MITT) of Thilawa Port.
	Risk of Fire	B-	B-	B-	B-	B-	B-	**CO/CLP:** Risk of fire is expected to be limited because the fire safety plan and equipment will be prepared by the project proponent to comply with the Building Construction and Fire Safety Rule regulated by TSMC. **OP:** Risk of fire is expected to be limited because the tenants shall install and maintain an effective fire

Category	Scoping Item	Scoping Result			Assessment Result			Reason for Assessment
		PC/ CO	OP	CLP	PC/ CO	OP	CLP	
								alarm system and firefighting system for each building in the plot with reference to the TSMC rules and the proposed internal regulation.
	Earthquake	B-	B-	B-	B-	B-	B-	**CO/CLP:** There is a possibility of occurrence of earthquake. However, the contractor for construction and demolition work will prepare disaster prevention activities to minimize the damage. Therefore, the negative impact of the earthquake would be limited. **OP:** There is a possibility of occurrence of earthquake. However, each tenant would design and construct properly to meet the required standard such as quake-resistance standard. Therefore, the negative impact of anon earthquake would be limited.
Other	Global Warming	B-	B-	B-/ B+	B-	B-	B-	**CO:** Emission of greenhouse gases (GHGs) would be generated from construction machineries and vehicular traffic caused by the Project. **OP:** Emissions of GHGs would be generated from vehicular traffic in the Project and operation of the tenants. **CLP:** Emission of GHGs would be generated from construction machineries and vehicular traffic caused by the Project. On the other hand, emissions of GHGs from operation activities would be reduced.

Note: PC: Pre Construction Phase, CO: Construction Phase, OP: Operation Phase, CLP: Closing Phase
Evaluation: A-: Significant Negative Impact A+: Significant Positive Impact
B-: Some Negative Impact B+: Some Positive Impact
C: Impacts are not clear, need more investigation
D: No impacts or impacts are negligible, no further study required
Source: EIA Study Team

7.2 Air Quality

7.2.1 Forecast Item

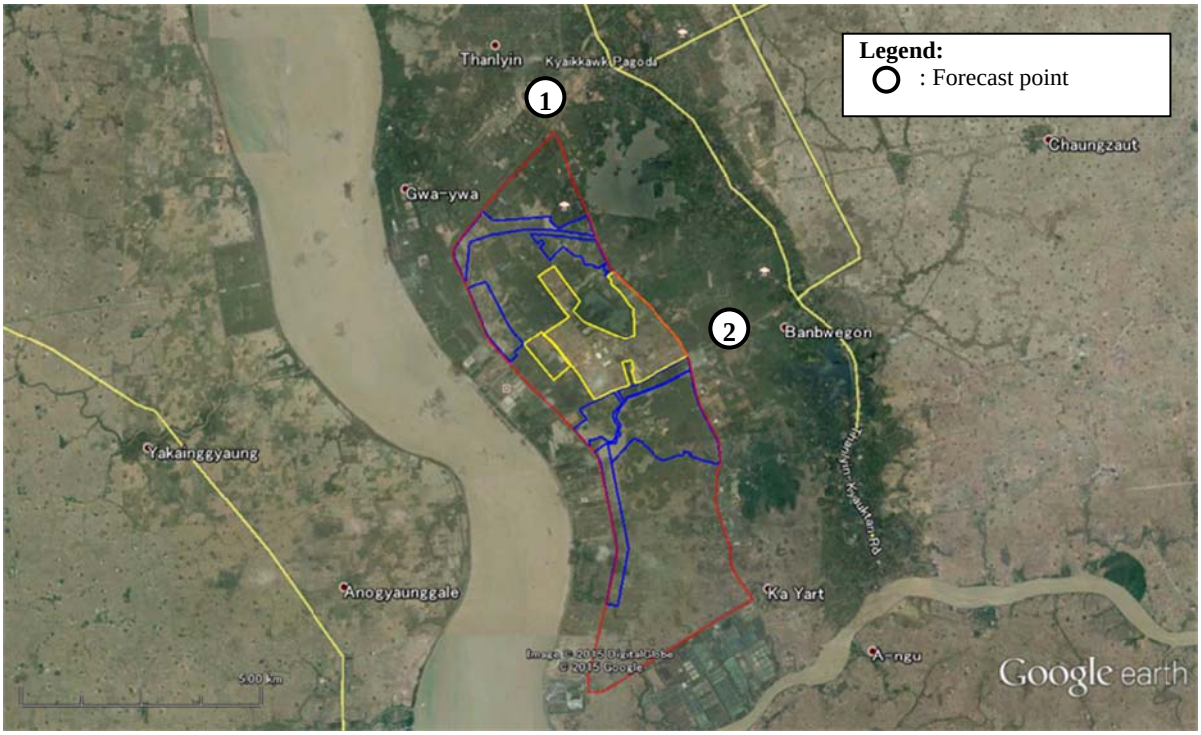
The following items were examined to forecast the impact:

- Air pollution along the main roads increased due to construction vehicles of the Project.
- Air pollution caused by construction work of the Project.
- Air pollution along the main roads increased during the operation phase of Zone B.
- Air pollution caused by the tenants during the operation phase in the Project.

7.2.2 Forecast Area

The area examined to forecast the impact was set around Thilawa SEZ.

The forecast points for the main roads nearby Thilawa SEZ were set as shown in Table 7.2-1. These forecast points are located along the Thanlyn-Thilawa Road and Dagon-Thilawa Road.



Source: EIA Study Team

Figure 7.2-1 Forecast Points for Air Pollution along the Road

7.2.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the construction work period for the Project.

As for the operation phase, the period examined to forecast the impact was set after the start of the operation of all phases, i.e., when all the tenants in the industrial area and logistic area of Zone B as well as Zone A would start their operation. all residential and commercial buildings would be fully occupied and all tenants in the industrial area and logistic areas of Zone B would start their operation

7.2.4 Forecast Method

The forecast of air pollution impact was conducted as follows:

- To examine the air pollutant emission by considering the number of construction vehicles for the Project during the construction phase;
- To examine the air pollutant emission by considering the construction work plan for the Project during the construction phase;
- To estimate the NO_2 concentration[1] increase due to vehicle traffic generated in Zone B during the operation phase to assess its impact in the surrounding area; the prior development of Thilawa SEZ Zone A was also included; and
- To estimate the air pollutant emission by considering the possible tenants in the industrial and logistic area during the operation phase.

The methodology of the impact forecast is described below.

(1) Forecast Conditions

1) Road Traffic Volume from Thilawa SEZ during the Operation Phase

The traffic volumes on each forecast point during the forecast period were estimated based on the tentative road network system of Thilawa SEZ Zone A as reported in the Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (2013) and Final report of the preparatory survey for the project for expansion of Yangon Port in Thilawa area (2013). Basic concept is explained as follows:

Commuter Traffic Volume to Thilawa SEZ

The number of commuters from Thilawa SEZ Zone A and Zone B was assumed as 30,231. Basis for calculation is shown in Table 7.2-1. The numbers and percentages, such as unit number of labor per unit area and number of commuters out of SEZ, were utilized from the report of the JICA Preparatory Study on Thilawa SEZ Infrastructure Development in the Republic of the Union of Myanmar (2013).

Table 7.2-1 Estimation of Commuters Using Vehicles from Thilawa SEZ

Zone		Selling Area of Each Zone (ha) ①	Unit Number of Laborer per Unit Area (person/day・ha) ②	Number of Laborers (person/day) ③ =①×②	Number of Commuters Out of SEZ Zone A (person/day) ④=③×0.42[1)]	Number of Commuters that will Use Car or Public Transport (person/day) ⑤=④×0.7[2)]
A	Industrial Area	284.0	200	56,800	23,856	**16,699**
B	Industrial Area	183.4	200	36,680	15,406	**10,784**
	Logistics Area	186.9	50	9,345	3,925	**2,748**
Total		-	-	102,825	43,187	**30,231**

Note 1): Percentage of commuters outside of Thilawa SEZ: 42%
2): According to a research on actual condition of commuting in South East Asia, about 30% of people whose wages are lower than USD 150/month commute by foot. Using this data, traffic volume after the development of Thilawa SEZ is estimated.
Source: EIA Study Team

[1] As a result of the field survey, SO_2 and CO levels during both rainy and dry seasons were less than half of the applied standards. $PM_{2.5}$ and PM_{10} during the dry season were higher than those during the rainy season; this might be affected by the dust due to the wind. Relatively high NO_2 concentration might be due to vehicle exhaust emission. In this connection, NO_2 was selected as a representative parameter to assess the environmental impact of air pollution due to the increase of traffic.

The commuter traffic volume is assumed as 24,789. Basis for calculation is shown in Table 7.2-2.

Table 7.2-2 Traffic Volume of Commuting and Returning to/from SEZ

Zone		Transportation	Commuting Rate of Each Vehicle[1)] (%)	Number of Commuters Using Each Vehicle (person/day)	Average Unit Number of Passengers (person/car)	Generated and Attracted Traffic Volume (car/day)	
			⑥	⑦=⑤×⑥	⑧	⑨=⑦/⑧×2	
A	Industrial Area	Two-wheel Vehicle	38	6,346	1	**12,69**	
		Four-wheel Light Vehicle	2	334	2	**334**	
		Four-wheel Heavy Vehicle	60	10,019	30	**668**	
B	Industrial Area	Two-wheel Vehicle	38	4,098	1	**8,196**	
		Four-wheel Light Vehicle	2	216	2	**216**	
		Four-wheel Heavy Vehicle	60	6,470	30	**431**	
	Logistics Area	Two-wheel Vehicle	38	1,044	1	**2,088**	
		Four-wheel Light Vehicle	2	55	2	**55**	
		Four-wheel Heavy Vehicle	60	1,649	30	**110**	
Total		-	-	**30,231**	-	**Two-wheel**	**22,975**
						Light Vehicle	**605**
						Heavy Vehicle	**1,209**
							24,789

Note 1) Different from inner Yangon City, bus network is not well developed near Thanlyin and the area around Thilawa SEZ Zone A. The percentage of commuters using fixed route bus out of all commuters using vehicles and public transportation is set at 30%. The percentage of those using pickup bus is set as the same percentage as those using fixed route bus, i.e., 30%. Almost all workers cannot buy their own car; thus, persons who will use their own car are assumed only at 2% out of the remaining 40%. Thus, 38% of the workers will use their bicycle or bike.
Source: EIA Study Team

Trip Generation from Commercial Area

The amount of trip generation from the commercial area was assumed as 5,970 person/day. This estimate is based on the planning manual for urban transportation with large-scale development in Japan. Basis for calculation is shown in Table 7.2-3.

Table 7.2-3 Estimation of Trip Generation from Commercial Area

Zone		Total Store Floor Area (ha)	Trip Generation Unit[1)] (person/day･ha)	Correction Factor[2)] -	Trip Generation (person/day)	Customer Ratio from Outside of SEZ[3)] (%)	Generated and Attracted Trip (person/day)
		①	②	③	④=①×②×③	⑤	⑥=④×⑤
B	Commercial Area	16.1 [1)]	10,600 [2)]	0.7 [3)]	66,700	5% [4)]	**5,970**

Note 1): Store floor area is assumed from Master Plan & Infrastructure Feasibility Study Report Thilawa SEZ Zone B. (13/01/2016) Total store floor area is estimated as 30% of building area of commercial use (53.8 ha).
2): Trip generation unit is quoted from planning manual for urban transportation with large-scale development in Japan.
3): This correction factor is specified in the manual as decrease ratio based on commercial area scale.
4): This rate is assumed from the land use situation around SEZ.
Source: EIA Study Team

The amount of traffic volume for commercial area was assumed as 3,184 car/day. Basis for calculation is shown in Table 7.2-4.

Table 7.2-4 Traffic Volume of Commercial Area

Zone		Transportation	Usage Rate of Transportation (%)	Number of Customers Using Vehicle (person/day)	Average Number of Passengers (person/car)	Generated and Attracted Traffic Volume (car/day)
			⑦	⑧=⑥×⑦	⑨	⑩=⑧/⑨
B	Commercial Area	Two-wheel Vehicle	33%	1,990	1	**1,990**
		Four-wheel Light Vehicle	33%	1,990	2	**995**
		Four-wheel Heavy Vehicle	33%	1,990	10	**199**
Total		-	-	-	-	**3,184**

Source: EIA Study Team

Freight Transport

Traffic generation of freight transportation from the SEZ area was estimated under the following assumptions:

✓Amount of cargo handling will be 1,600,000 TEU/year in Thilawa area port in 2025.

✓Transportation volume between Thilawa area port and SEZ will be 1,280,000 TEU/year
(1,280,000 = 1,600,000×80%)
✓The remaining cargo of 20% will be transported between Thilawa area port and Yangon City directly.
(320,000 = 1,600,000×20%)

✓Transportation volume between Thilawa SEZ and Yangon City will be 256,000 TEU/year.
(256,000 = 1,280,000×20%)

Basis for calculation is shown in Table 7.2-5.

Table 7.2-5 Amount of Freight Transportation from Thilawa SEZ Area

Zone		Selling Area of Each Zone (ha)	Transportation Volume between Thilawa SEZ and Yangon City (TEU/year)		Weight per TEU* (t/TEU)	Loading Capacity of Heavy Vehicle (t/car)	Operating Days (day/year)	Generated and Attracted Traffic Volume (car/day)
			①		②	③	④	⑤=①×②/③/④
A	Industrial Area	284	256,000	110,880	10	20	250	222
B	Industrial and Logistics Area	372		145,120	10	20	250	290
Total		-	-	-	-	-	-	512

* TEU: twenty-foot equivalent unit
Source: EIA Study Team

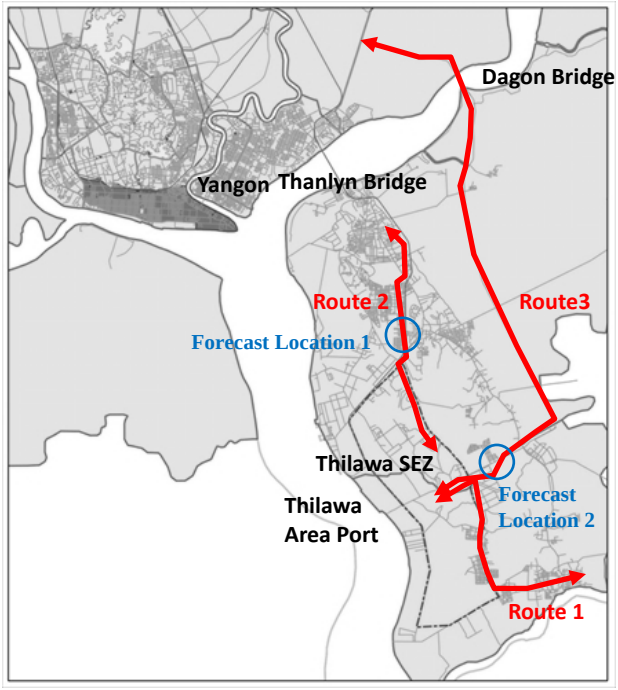
2） Trip Distribution

Generated and attracted traffic volume will be distributed to the access routes in the perimeter of SEZ. The distribution rates, which are referred from the EIA report of Zone A, are shown in Table 7.2-6 and the route map is shown in Figure 7.2-2.

Table 7.2-6 Distribution Rate of Each Access Road to Thilawa SEZ

Transportation		Route 1	Route 2	Route 3
Two-wheel Vehicle		15.05%	69.9%	15.05%
Four-wheel Light Vehicle		15.05%	69.9%	15.05%
Four-wheel Heavy Vehicle	Bus	15.05%	69.9%	15.05%
	Freight	0.0%	0.0%	100.0%

Note Distribution rate of above table is referring to EIA Report for Thilawa Special Economic Zone Development Project (Class A). In this EIA study, Traffic volume bound for Kyauktan Township is divided on Route 2 and Route 5.
Source: EIA Study Team



Source: EIA Study Team

Figure 7.2-2 Transport Route from/to Thilawa SEZ and Forecast Points

Traffic volumes of each route are shown in Table 7.2-7.

Table 7.2-7 Estimated Traffic Volume of Each Access Route

(Unit: car/day)

Zone		Route 1			Route 2			Route 3		
		Two-wheel Vehicle	Four-wheel Light Vehicle	Four-wheel Heavy Vehicle	Two-wheel Vehicle	Four-wheel Light Vehicle	Four-wheel Heavy Vehicle	Two-wheel Vehicle	Four-wheel Light Vehicle	Four-wheel Heavy Vehicle
A	Industrial Area	764	50	101	3,549	233	467	764	50	323
B	Industrial Area	493	33	65	2,292	151	301	493	33	401
	Logistics Area	126	8	17	584	38	77	126	8	
	Commercial Area	120	150	30	556	696	139	120	150	
	Subtotal	739	191	112	3,432	885	517	739	191	401
Total		**1,503**	**241**	**213**	**6,981**	**1,118**	**984**	**1,503**	**241**	**724**

Note 1) It is assumed that 60% of two-wheel vehicles are bicycle and 40% are bike.
Source: EIA Study Team

3) Traffic Volume at Forecast Points

The traffic volumes at forecast points, namely, location 1 (Route 1) and location 2 (Route 3) are shown in Table 7.2-8. Present traffic volumes are mentioned in Section 6 of the Chapter 6.

Table 7.2-8 Traffic Volume at Forecast Point during Operation Phase

Type of Vehicle		Present Traffic Volume (cars/day)	Traffic Volume Related to Thilawa SEZ (cars/day)		Total Traffic Volume (cars/day)	
			Zone A	Zone B	Start of Operation of Zone A	Start of Operation of Zone B
Location 1 (Route2)	Two-wheel Vehicle	9,098	3,549	3,432	12,647	16,079
	Four-wheel Light Vehicle	2,928	233	885	3,161	4,046
	Four-wheel Heavy Vehicle	1,135	467	517	1,602	2,119
Location 2 (Route3)	Two-wheel Vehicle	3,132	764	739	3,896	4,635
	Four-wheel Light Vehicle	1,443	50	191	1,493	1,684
	Four-wheel Heavy Vehicle	1,142	323	401	1,465	1,866

Source: EIA Study Team

4) Coefficient of Discharge

The coefficient of discharge for NO_2 was set as shown in Table 7.2-9.

Table 7.2-9 Coefficient of Discharge for NOx

(Unit: g/km/car)

Traveling Velocity (km/hr)	Two-wheeled Vehicle (Bike)	Four-wheeled Vehicle (Car)	Four-wheeled Vehicle (Fixed Route Bus)	Four-wheeled Vehicle (Pickup Bus, 5 t bus)
30	0.047	0.097	1.67	0.0785
40	-	0.077	1.35	0.0571
50	-	0.070	1.23	0.0491

Source: Thilawa Special Economic Zone Development Project (Class A) Environmental Impact Assessment Report

7.2.5 Forecast Result

(1) Construction Phase

1) Impact from Vehicle Exhaust Emission along Route 2 (Thanlyn-Thilawa Road)

During the construction phase, air pollutants such as NO_2, SO_2, CO, $PM_{2.5}$, and PM_{10} would be discharged from construction vehicles. Taking into account the peripheral air quality situation, NO_2 was selected as a representative parameter of this study. According to the actual result of construction works in Zone A, the traffic volume of the construction vehicles was at most about 200 vehicles a day. It would be assumed that the generated traffic volume of construction vehicles in the project area is the same as in Zone A.

Present traffic volume of Route 2 (Thanlyn-Thilawa Road) is approximately 4,000 cars per day. If 50% of the 200 construction vehicles will use Route 3, increment of traffic volume will not be more than 5%. Impact of air pollution is expected to be limited because construction vehicles will be little as compared with the current traffic.

2) Impact from Vehicle Exhaust Emission along Route 3 (Dagon-Thilawa Road)

Present traffic volume of Route 3 (Dagon-Thilawa Road) is approximately 2,500 cars per day. If 50% of the 200 construction vehicles will use Route 3, increment of traffic volume will not be more than 8%. Impact of air pollution is expected to be limited because construction vehicles will be little as compared with the current traffic.

3) Impact from Construction Machineries

During the construction phase, the dust would be generated by the landfill activity in the project site, and air pollutants would be discharged from construction machineries at specific and temporary time. The dust generated by cutting, heaping up and transporting the earth shall be controlled and minimized by sprinkling a road and cleaning the tire. The air pollutants discharged by construction machineries shall be controlled and minimized by the contractor. Impact of air pollution is expected to be limited because dust and emission gases from construction works will be diffused within a narrow area near the construction site and construction works are temporary events. As one example, air monitoring results in Zone A during construction are still acceptable level.

Hence, it is judged that air pollution from the construction work of the Project would not cause any significant environmental impact in the surrounding area.

(2) Operational Phase

1) Impact from Vehicle Exhaust Emission at the Residential Area (Route 2 and Route 3)

Regarding the NO_2 concentration at the residential area along the main roads, the NO_2 discharge amount from vehicles and contribution rate in each phase are shown in Table 7.2-10 and Table 7.2-11.

Table 7.2-10 NO_2 Discharge Amount in Route 2 during Operation phase

Type of Vehicles	Traveling Velocity (km/hr)		Traffic Volume (car/day)			Discharge Amount (g/km/day)		
	Present	Operational Phase	Present	Operational Phase		Present	Operational Phase	
				Start of Operation of Zone A	Start of Operation of Zone B		Start of Operation of Zone A	Start of Operation of Zone B
Two-wheel Vehicle	30	30	9,098	12,647	16,079	427.6	594.4	755.7
Four-wheel Light Vehicle	30	50	2,928	3,161	4,046	284.0	221.3	283.2
Four-wheel Heavy Vehicle	30	50	1,135	1,602	2,119	1532.3	1970.5	2,606.4
Total	-	-	13,161	17,410	22,244	2243.9	2786.1	3,645.3
Contribution Rate for Future Air Quality (%)						100.0	124.2	162.5

Source: EIA Study Team

Table 7.2-11 NO_2 Discharge Amount in Route 3 during Operation Phase

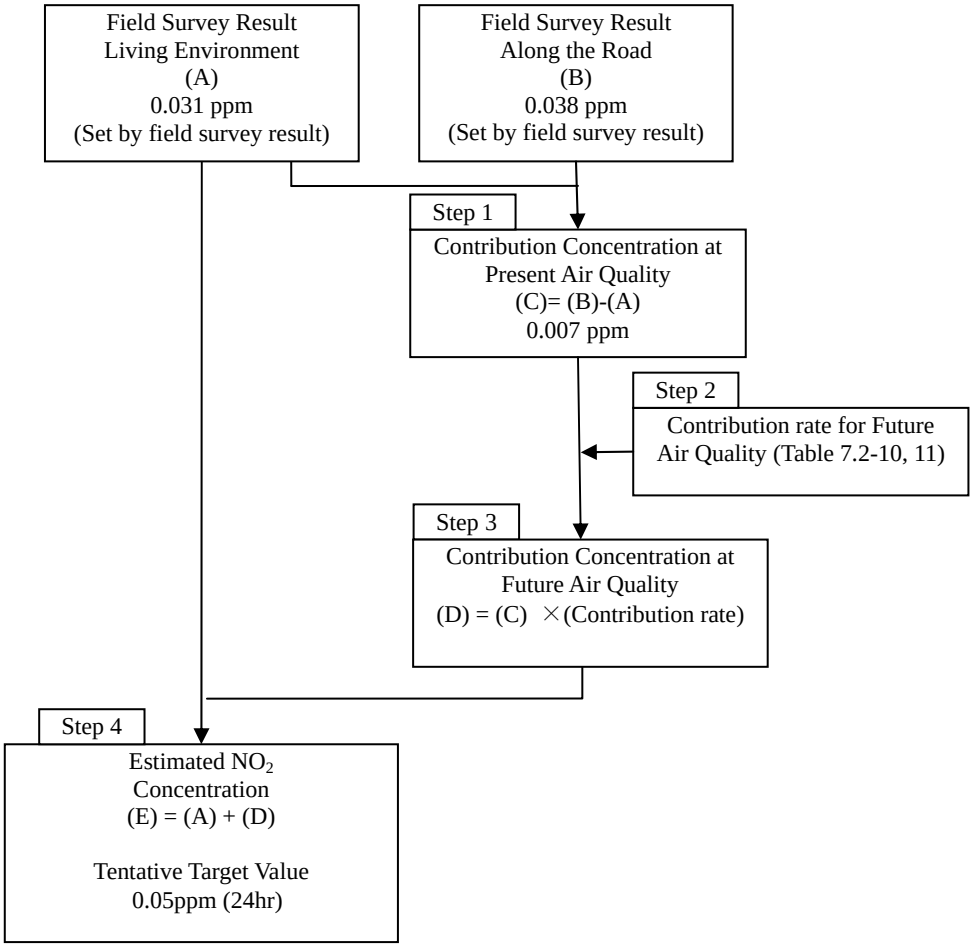
Type of Vehicles	Traveling Velocity (km/hr)		Traffic Volume (car/day)			Discharge Amount (g/km/day)		
	Present	Operational Phase	Present	Operational Phase		Present	Operational Phase	
				Start of Operation of Zone A	Start of Operation of Zone B		Start of Operation of Zone A	Start of Operation of Zone B
Two-wheel Vehicle	30	30	3,132	3,896	4,635	147.2	183.1	217.8
Four-wheel Light Vehicle	50	50	1,443	1,493	1,684	101.0	104.5	117.9
Four-wheel Heavy Vehicle	50	50	1,142	1,465	1,866	1404.7	1802.0	2295.2
Total	-	-	5,717	6,854	8,185	1652.9	2089.6	2630.9
Contribution Rate for Future Air Quality (%)						100.0	126.4	159.2

Source: EIA Study Team

To use this rate, NO_2 concentration was estimated as shown in Figure 7.2-3 using the following steps:

Step 1: To calculate contribution concentration at present air quality
Step 2: To calculate contribution rate for future air quality (Table 7.2-10 and Table 7.2-11)
Step 3: To calculate contribution concentration at future air quality
Step 4: To estimate future NO_2 concentration

The forecasted concentration in each project phase is shown in Table 7.2-12 and satisfy the tentative target value. Besides, the utilization of tenants' commuter bus for workers will help to reduce the emission gas generated from private cars.



Source: EIA Study Team

Figure 7.2-3 Steps of NO_2 Concentration Calculation

Table 7.2-12 Forecasted Results of NO_2 Concentration

Concentration	Route 2		Route 3	
	Start of Operation of Zone A	Start of Operation of Zone B	Start of Operation of Zone A	Start of Operation of Zone B
(A) Living Environment (ppm)	0.031			
(D) Contribution Concentration (ppm)	0.009	0.011	0.009	0.011
(E) Estimated NO_2 Concentration (ppm)	0.040	0.042	0.040	0.042
(E) Estimated NO_2 Concentration (mg/m^3)	0.074	0.078	0.074	0.078
Tentative Target Value (ppm)	0.05			

Source: EIA Study Team

2) Impact from Tenants in Industrial and Logistic Area

Air pollutants which might be discharged by the operations of tenant industries in the industrial and logistic area would be well controlled and managed by the tenants. Tenants associated with emission gas would not be anticipated. In case that a tenant which may cause exhaust gas pollution such as paper and heavy industries moves into the Thilawa SEZ Zone B, the tenant will be required to submit EIA or IEE Report with EMP including mitigation measures on air pollution to MOECAF.

Hence, it is judged that the air pollution caused by the Thilawa SEZ Zone B operation would not cause any significant environmental impact on the surrounding area.

7.3 Water Quality

7.3.1 Forecast Item

The following items were examined to forecast the impact:

- Quality and quantity of wastewater discharged from the project area during the construction/closing and operation phases; and
- Environmental impact of water discharge (stormwater, domestic wastewater, and industrial wastewater) onto the receiving water bodies.

7.3.2 Forecast Area

The areas examined to forecast the impact were set in the project area and reeks, which receives water discharge from the project area.

7.3.3 Forecast Period

As for the construction/closing phases, the period examined to forecast the impact was set during the implementation of the construction/closing work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.3.4 Forecast Method

(1) Construction/Closing phases

The impact of wastewater discharge during the construction/closing phases was assessed by evaluating the possibility of generation of muddy water and sewage water due to construction/demolition work and the application of suitable mitigation measures during the period.

(2) Operation Phase

The quality and quantity of industrial and domestic wastewater discharged from the logistic and industrial area during the operation phase was estimated based on:

i) estimated water supply capacity for the logistic area, residence and commercial area

ii) estimated quality of treated effluent from the logistic area, residence and commercial area

The environmental impact of the industrial and domestic wastewater on the receiving canals were predicted by using a complete mixing model, as shown in the following formula:

$$C = \frac{C_1 \times Q_1 + C_2 \times Q_2}{Q_1 + Q_2}$$

where, C (mg/L): Concentration of pollutant in the creek after complete mixing with wastewater
C_1 (mg/L): Concentration of pollutant in the creek at the forecast point before mixing
C_2 (mg/L): Concentration of pollutant in the wastewater before mixing
Q_1 (m^3/s): Flow rate of the creek at the forecast point before mixing
Q_2 (m^3/s): Flow rate of wastewater discharge before mixing

The impact of stormwater and domestic wastewater discharged from the industrial area would be judged based on qualitative determination and evaluation of the proposed design of the Project.

7.3.5 Forecast Result

(1) Construction/Closing Phase

During the construction/closing phases, muddy water would be formed during the rainy season (May to October) from the exposed soil surface and discharged to receiving water bodies. The project proponent would request contractors to optimize the work schedule in order to minimize the generation of bare land, excavation, filling, and founding embankment as much as possible. Excavation work would be arranged appropriately as much as possible to be implemented and completed in the dry season (November to April). If necessary, settling ponds would be set up to collect generated muddy water and to settle down particulate matter before discharged to the environment.

Considering domestic wastewater generated from lodging facilities provided for construction/demolition work, septic tanks would be installed at the construction/demolition site by contractors for collecting and storing wastewater from toilets. The sludge in the septic tanks would be regularly collected to attain the highest treatment efficiency.

Hence, it can be judged that wastewater resulting from the construction/demolition work in the project area would not cause any significant impact on the surrounding area and downstream water bodies.

(2) Operation Phase

There are three types of wastewater generated from the project area during the operation phase, which are considered as potential causes of environmental impacts, including: a) stormwater, b) domestic wastewater, and c) industrial wastewater.

1） Stormwater

Stormwater runoff from paved surfaces, roof of buildings, and facilities in the project areas would be collected by drains, then discharged to internal canals, and finally discharged to the creeks that further flows into the Yangon River. There are four drainage creeks, including No.1 (AhLun Soke Creek), No.2 (Shwe Pyauk creek), No. 3 (Pa lan or Bay Bauk creek), and No. 4 creek. Stormwater runoff collected from different areas may contain different types and concentrations of contaminants. Stormwater runoff from the residence and commercial areas would be mainly characterized with BOD and TSS, while runoff from the logistic areas would be highly dependent on the implementation of control and mitigation measures to minimize spillage and leakage of fine materials, fuel, and waste onto the surface. For logistic areas, the activities and locations which have high pollution potential are transportation, loading and unloading, and storage of materials, fuel, and waste. Tenants in the logistic areas, during their daily operation, would be requested to implement sufficient measures and controls to minimize spillage of materials during transfer and handling. The storage of materials, fuel, and waste would be examined regularly to detect any spillage and leakage. Finally, the project proponent will regularly monitor the quality of stormwater to ensure that its quality will comply with the tentative target value.

2） Domestic wastewater

Domestic wastewater is generated mainly from domestic activities in the residential and commercial areas and a part from office buildings inside the logistic areas. Domestic wastewater would be mainly produced from condominium, apartment, commercial buildings, and so on, due to the activities such as washing, cleaning, bathing, and toilet flushing.

Based on the water supply rate for different types of land use, water supply volume and then wastewater amount estimated at 80% of water supply demand were calculated based on the master plan and feasibility study of the project area, as shown in Table 7.3-1 below.

Table 7.3-1 Domestic Wastewater Amount Generated from RC Areas

Item	Water Supply Demand (m^3/day)	Domestic Wastewater Amount (m^3/day)
Residence and Commercial Areas 2&4	5,873	4,698
Residence and Commercial Areas 3	1,065	852

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report (logistic, residence and commercial area)

Domestic wastewater from residential and commercial areas would be treated by wastewater treatment tank onsite. In the logistic area, tenants would be requested to install own sewage treatment plant (STP) before discharging to the drains. The project proponent shall monitor the quality of wastewater in drainage canals at the outlets toward the creeks to ensure that its quality will comply with the target standards.

3) Industrial wastewater

a) Water Supply and Wastewater Amount

Water supply volume and wastewater amount estimated at 80% of water supply demand were calculated based on the master plan and feasibility study of the project area, as shown in Table 7.3-4.

Table 7.3-2 Industrial Wastewater Amount Generated from Logistic Areas

Area	Water Supply Demand (m^3/day)	Industrial Wastewater Amount (m^3/day)
Logistic Area 2	3,480	2,783
Logistic Area 2B	6,549	5,239
Logistic Area 3	80	63

Source: Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report (logistic, residence and commercial area)

b) Quality of Effluent

Wastewater generated from tenants would undergo preliminary treatment by tenants before discharged to a central wastewater treatment plant operated by the project proponent. The tentative target value of effluent water quality discharged to the surrounding water bodies is set by the project proponent, which is pursuant to the industrial wastewater effluent guideline of the Ministry of Industry (MOI) and MOECAF as mentioned in Chapter 2.

c) Impact on Downstream River Basin

The environmental impact of industrial wastewater discharged onto the receiving creek was predicted by using a complete mixing model with assumptions on flow rate and concentration of pollutants in the creek. AhLun Soke Creek and Shwe Pyauk Creek were selected as the forecasting creek, since industrial wastewater amount from Logistic Area 2 and Logistic Area 2B are large amount.

Based on the field survey, the width of creeks and sectional area were confirmed. The flow rate of the creek during the dry and rainy seasons was estimated by using Manning's equation and hypothetical values for its conditions, as presented in Table 7.3-3

Table 7.3-3 Assumed Conditions of Shwe Pyauk Creek

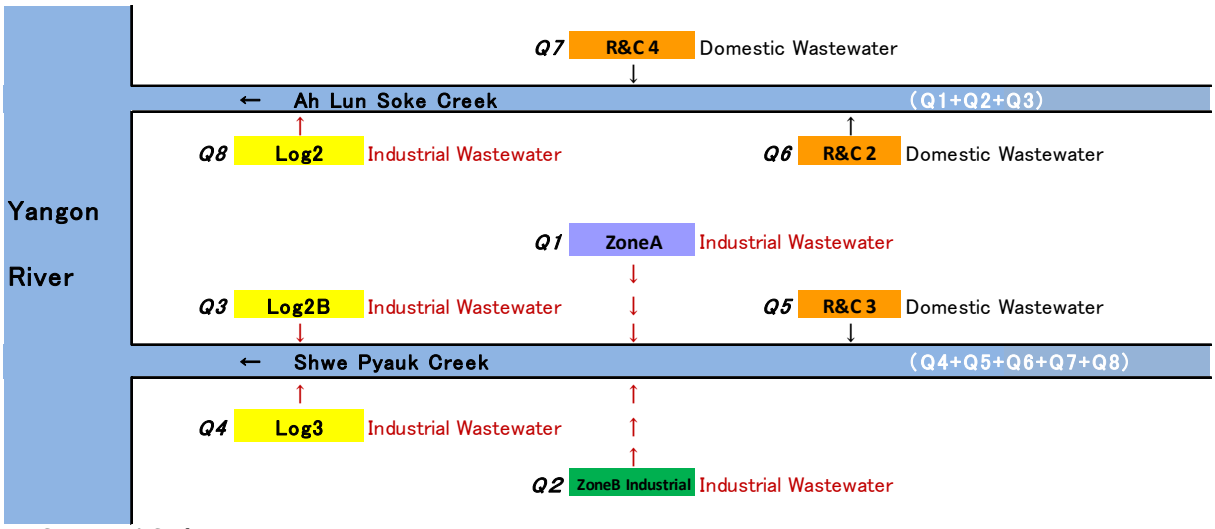
Creek	Season	Sectional Area (m^2)	Wetted Perimeter (m)	Slope	Manning Roughness Coefficient*	Flow Velocity (m/s)	Flow Rate (m^3/s)
AhLun Soke Creek	Rainy	17.3	13.2	0.000125	0.06	0.23	3.98
	Dry	12.5	13	0.000125	0.06	0.19	2.37
	Average	14.9	13.1	0.000125	0.06	0.21	3.17
Shwe Pyauk Creek	Rainy	4.9	7	0.000125	0.06	0.15	0.74
	Dry	2.1	5.5	0.000125	0.06	0.10	0.21
	Average	3.5	6.25	0.000125	0.06	0.13	0.47

Note:*: This coefficient is applied for minor streams on plains with weeds and winding
Source: EIA Study Team

BOD_5 was selected as the representative indicators for evaluating the impact on the environment since this parameters are the most basic parameters of concern for the environment as well as the main pollutants discharged from the industrial area.

The water quality of AhLun Soke Creek and Shwe Pyauk Creek were considered the cumulative impacts of other development projects in Thilawa SEZ, i.e. development project of Zone A and development project of Zone B that includes the development of the Project and the development of the logistic, residence and commercial area. Inflow situation is as shown in Figure 7.3-1.

The results estimated using the complete mixing model is presented in Table 7.3-4.



Source: EIA Study Team

Figure 7.3-1 Forecast Inflow Model into Ah Lun Soke Creek and Shwe Pyauk Creek

Table 7.3-4 Results of Water Quality Forecast

No.	Inflow Condition					Existing Creek Condition		Forecast Result (After Mixing)		Tentative Target Value
	Area		Wastewater Type	Q (m3/day)	BOD (mg/l)	Q m3/sec	BOD (mg/l)	Q m3/sec	BOD (mg/l)	
1	ZoneB	R&C2	Domestic	4,698(3)	30	3.17	3.0(2)	3.26	10	15
2		R&C4	Domestic		30					
3		Logistic 2	Industrial	2,783(3)	20					
4	ZoneA	Industrial	Industrial	27,600(1)	20	0.47	4.0(2)	1.14	13.7	15
5	ZoneB	Industrial	Industrial	24,000	20					
6		Logistic2B	Industrial	5,239(3)	20					
7		Logistic 3	Industrial	13(3)	20					
8		R&C3	Domestic	852(3)	30					

Note: (1): The values adopted from EIA report for Thilawa SEZ Class A Development Project (September 2013)
(2): The values is average of EIA report for Thilawa SEZ Class A Development Project (September 2013) and/or result of the field survey in Chapter 6
(3): Thilawa Zone B Master Plan & Infrastructure Feasibility Study Report (logistic, residence and commercial area)
Source: EIA Study Team

As shown in Table 7.3-4, the estimated results obviously show that although the quality of creek would be changed by receiving industrial and domestic wastewater from the industrial area, residence and commercial area, its water quality would still comply with the tentative target value for protection of aquatic life. Therefore, the impacts from wastewater to the surrounding environment would be less.

In summary, it is judged that wastewater generated from the project areas during the operation phase, including stormwater, domestic wastewater, and industrial wastewater would be well controlled and managed, and would not cause any significant impact on the surrounding area and downstream bodies of water.

7.4 Waste

7.4.1 Forecast Item

The following items were examined to forecast the impact:

- Waste generated from the construction work during the construction phase and from the demolition works during the closing phase; and
- Waste generated from the commercial operation work during the operation phase.

7.4.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.4.3 Forecast Period

As for the construction/closing phases, the period examined to forecast the impact was set during the implementation of the construction/closing work for the Project.

The period examined to forecast the impact was set during the operation phase after all the residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.4.4 Forecast Method

(1) Waste during the Construction Phase and the Closing Phase

The forecast of impact of waste generated during the construction phase and the closing phase was conducted as follows:

- To evaluate management of solid waste generated from the construction work for the development of infrastructure facilities of the Project as well as the construction work of housing facilities, commercial facilities, and public service facilities in the residence and commercial areas, and tenants facilities in the logistic areas.
- To evaluate management of solid waste generated from demolition work for the closing the Project as well as closing residence and commercial facilities and tenants in the logistic area.

(2) Waste during the Operation Phase

The forecast of waste generated during the operation phase was conducted as follows:

- To evaluate capacity of treatment and disposal of industrial waste and business-related waste generated in Zone A, and industrial area of Zone B in addition to the Project area as assessment of cumulative impact by estimating the quantity of industrial waste and business-related waste based on the projection in the EIA of Zone A development
- To evaluate capacity of transportation and disposal site operated by Thanlyin Township to manage solid waste generated from the residence areas.

7.4.5 Forecast Result

(1) Construction Waste

1) Construction Phase

Before land reclamation work, households are required to relocate, and their living structures will be demolished after compensation and assistance by the government. The waste generated from the demolition work such as logged trees, scrap steel and scrap wood by removal structure will be utilized as recyclable materials as much as possible. The rest of the waste will be treated by outsourcing to the private waste treatment firm in Thilawa SEZ which has functions of recycling, intermediate treatment, and the controlled landfill site or other proper waste treatment facilities outside of Thilawa SEZ.

After demolition work, according to the land reclamation plan, all the residual soil generated from the cutting work will be used for filling work in the Project site or the other construction sites to be embanked in Thilawa SEZ, and there is no plan to dispose residual soil outside of Thilawa SEZ.

During the construction work for infrastructure facilities of the Project after land reclamation, pieces of the construction materials such as used wood form, scrap metal, scrap wood, reinforcing bars, and plastics, and general waste from the construction office and rest space will be generated. The pieces of the construction materials will be utilized as recyclable materials as much as possible. The rest of pieces of the construction materials after recycling and the general waste will be also treated by outsourcing to the private waste treatment firm in Thilawa SEZ or other proper waste treatment facilities outside of Thilawa SEZ. As for the construction work of residential facilities, commercial facilities, and public service facilities in the residence and commercial areas, and tenant facilities in the logistic areas, methodology of waste management is same as the Project.

Therefore, the impact of waste generated during the construction phase is expected to be limited and well managed.

2) Closing Phase

During the closing phase, earthwork would not be implemented and residual soil would not be generated. Regarding the construction waste generated from the demolition of the infrastructure facilities of the Project and residential facilities, commercial facilities, and public service facilities in the residence and commercial areas, and tenant facilities in the logistic areas, methodology of waste management is same as the construction phase.

Therefore, the impact of waste generated during the closing phase is expected to be limited and well managed.

(2) Industrial Waste and Business-Related Waste in Operation Phase

For evaluating the impact of waste during the operation phase, it is necessary to consider the cumulative impact of the waste generated from the Project in combination with the waste generated in Zone A, and the industrial area of Zone B. Thus, capacity of treatment and disposal of industrial waste and business-related waste generated from the Project and the above related Projects was confirmed.

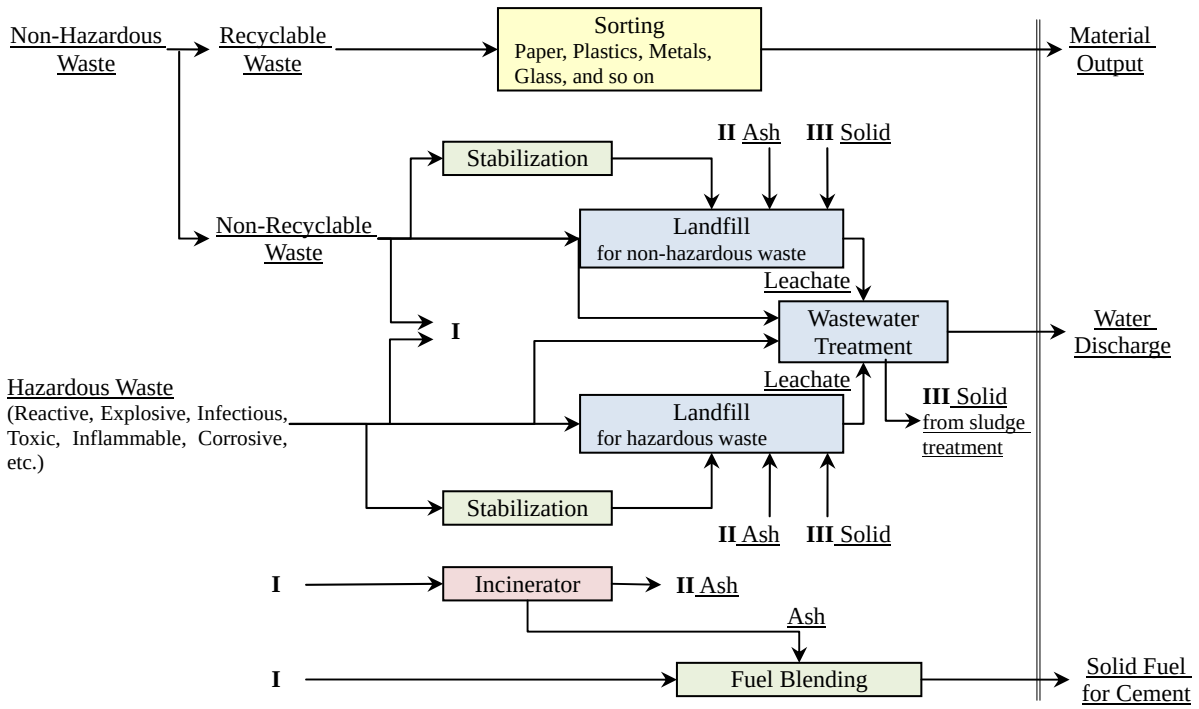
1) Treatment and disposal of industrial waste and business-related waste to prevent environmental impact to surrounding area

A solid waste treatment and management facilities operated by a Japanese waste management company (Golden Dowa Eco-System Myanmar Co., Ltd) are located in Thilawa SEZ Zone A. According to “Final EIA Report for the Project on Construction of Solid Waste Management Facilities in the Thilawa Zone A (DOWA Eco-System and Golden Dowa Eco-System Myanmar Co., Ltd., June 2015)”, the waste treatment and management facilities have intermediate treatment facilities (sorting, stabilization, fuel conversion, and incineration to be installed), final disposal facility (controlled

landfill to meet US-EPA requirement), wastewater treatment facility, laboratory analysis facility, and so on to treat hazardous and non-hazardous wastes as described in Chapter 4.

The process flow of solid waste management of the facility is shown in Figure 7.4-1. It is a very detailed process for managing industrial waste properly from collection of recyclable materials, treatment and control of hazardous and non-hazardous wastes, and minimization of pollution discharge to the surrounding environment.

Before receiving waste, at first each generator will provide a representative waste sample to be disposed, and the operator of solid waste management facilities will then check the waste sample the generator wants to dispose of and conduct sample analysis to evaluate whether the waste can be received and managed properly. At the same time, the operator will also decide how to treat the waste. The first batch of waste from the generator will be checked carefully whether the waste characteristics are the same as in the sample analysis. After that, waste will be checked, as a kind of manifest examination, through fingerprint testing before its receipt and unloading. The treated waste and wastewater will also be analyzed to check whether or not the treatment processes are functioning properly. As for environmental monitoring, treated wastewater discharged to the water body and gas emitted from the incinerator will go through analyzing devices to check their conformity with the target environmental levels.



Note) I, II and III shows the on-page reference which indicates that next step with the same Roman Figure is somewhere else on the drawing.
Source: DOWA Eco-System Co., Ltd.

Figure 7.4-1 Process Flow of Solid Waste Management

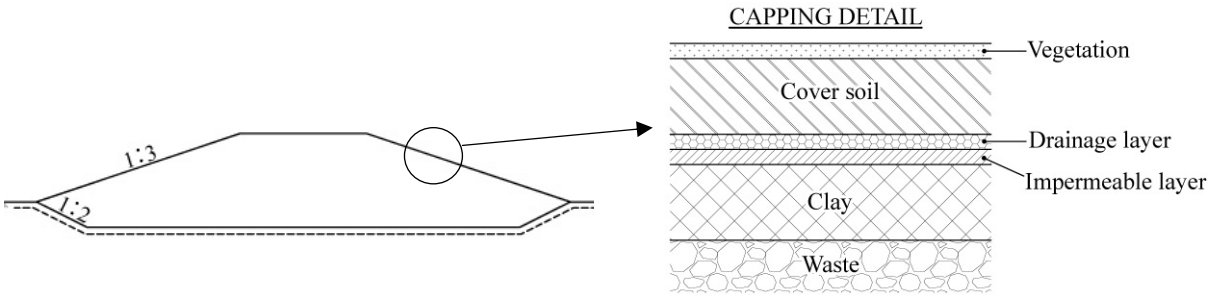
After completion of waste disposal, final covering of the landfill by means of clay soil, impermeable layer, drainage layer, cover soil, and vegetation will be installed on the top of landfill waste as shown in Figure 7.4-2.

After installation of final covering, the Project proponent will continuously conduct the post-closure care such as the following:

Maintaining the integrity and effectiveness of the final covering, including maintenance against anticipated settlement, subsidence, and erosion of landfill caused by decomposition and consolidation of waste and other damage;

- Maintaining and operating the leachate and gas collection systems; and
- Monitoring the groundwater quality and odor.

Maintenance and monitoring will be conducted for ten years at least after installation of the final covering, and then the project proponent will close the landfill site if no environmental impact is observed for two years.



Cross Section of Landfill **Structure of Final Cover**

Source: DOWA Eco-System Co., Ltd.

Figure 7.4-2 Cross Section of Landfill and Structure of Final Cover

After completion of closure of the landfill, various types of eco-friendly facilities will be developed such as a park and/or a mega solar park. Figure 7.4-3 shows examples of eco-friendly facilities and its usage.

Park (Portland, USA) **Mega Solar Park (Akita, Japan)**

Source: DOWA Eco-System Co., Ltd.

Figure 7.4-3 Examples of Eco-friendly Facilities after Completion of Closure of Landfill

On the above information, it is confirmed that the solid waste management facilities with enough capacity of treatment and disposal for industrial waste and business-related waste including hazardous waste is existed in Thilawa SEZ at least.

2) Capacity of final disposal site

Table 7.4-1 shows estimated maximum generation amount of industrial and business related waste in Zone A and Zone B in Thilawa based on tenant of Zone A which submitted Environmental Conservation Prevention Plan (ECPP) to TSMC and EIA report in Japan.

Table 7.4-1 Estimation of Maximum Generated Amount of Industrial Waste and Business Related Waste

Area		Sellable/ Total Building Area	Unit	Maximum Amount of Waste (ton/year)
Zone B	Industrial Area (262ha)	201 ha	135 t/ha/yr[*1]	28,296
	Logistic Area (267ha)	214 ha	2.1 t/ha/yr[*2]	449
	Commercial Area (24ha)	86 ha	124 t/ha/yr[*2]	10,664
Zone A	Industrial Area (370ha)	251 ha	135 t/ha/yr[*1]	33,912
Total of Zone A and B in Thilawa SEZ				73,321

Note: *1: Tenants in Zone A which submitted Environmental Conservation Prevention Plan (ECPP)
*2: EIA reports for Construction of Shopping Malls in Japan
Source: TSMC and EIA Reports in Japan

In order to evaluate impact of generated solid waste in terms of receiving capacity, it was confirmed whether the controlled landfill site in Thilawa SEZ has enough capacity of receiving waste for their operation period (60 years) or not. The estimated cumulative amount of industrial waste and business related waste to be generated and disposed in Zone A and Zone B in Thilawa SEZ is shown in Table 7.4-2.

Table 7.4-2 Estimation of Yearly and Cumulative Generated Amount of Industrial Waste and Business Related Waste in Zone A and Zone B in Thilawa SEZ

Year		Amount of Solid Waste [ton/year]					Amount to Final Disposal [ton/year][*1]	Cumulative Amount [ton/year]
		Zone B Industrial	Zone B Logistic	Zone B Commercial	Zone A Industrial	Total		
2016	1	0	0	0	2,700	2,700	2,700	478
2017	2	0	0	0	5,400	5,400	8,100	1,434
2018	3	2,700	0	0	8,100	10,800	18,900	3,345
2019	4	5,400	42	2,480	10,800	18,722	37,622	6,659
2020	5	8,100	84	4,960	13,500	26,644	64,266	11,375
2021	6	10,800	126	7,440	16,200	34,566	98,832	17,493
2022	7	13,500	168	9,920	18,900	42,488	141,320	25,014
2023	8	16,200	210	10,664	21,600	48,674	189,994	33,629
2024	9	18,900	252	10,664	24,300	54,116	244,110	43,207
2025	10	21,600	294	10,664	27,000	59,558	303,668	53,749
2026	11	24,300	336	10,664	29,700	65,000	368,668	65,254
2027	12	27,000	378	10,664	32,400	70,442	439,110	77,722
2028	13	28,296	420	10,664	33,912	73,292	512,402	90,695
2029	14	28,296	449	10,664	33,912	73,321	585,723	103,673
2030	15	28,296	449	10,664	33,912	73,321	659,043	116,651
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2040	25	28,296	449	10,664	33,912	73,321	1,392,249	246,428
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2050	35	28,296	449	10,664	33,912	73,321	2,125,454	376,205
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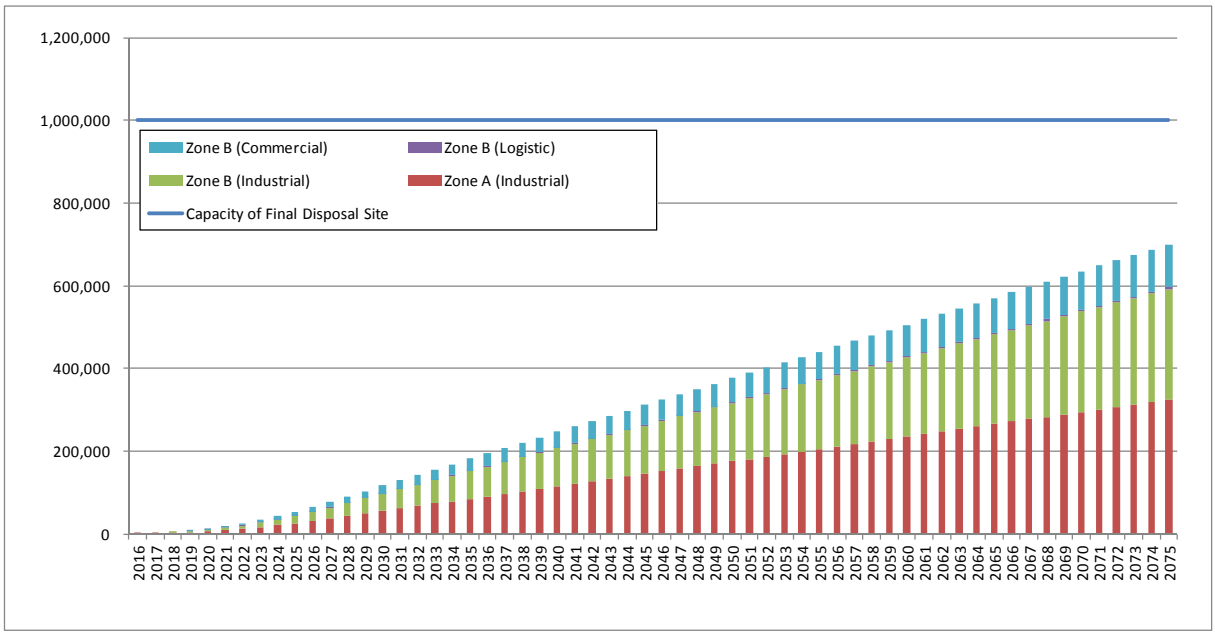
2060	45	28,296	449	10,664	33,912	73,321	2,858,660	505,983
---	---	---	---	---	---	---	---	---
2070	55	28,296	449	10,664	33,912	73,321	3,591,866	635,760
---	---	---	---	---	---	---	---	---
2075	60	28,296	449	10,664	33,912	73,321	3,958,468	700,649

Note: *1: Ratio between amount of waste to final disposal site and total waste generation is 11.9 % in accordance with Final EIA Report for the Project on Construction of Solid Waste Management Facilities in the Thilawa Zone A.
Source: EIA Study Team

The yearly cumulative amount of industrial waste and business related waste in Zone A and Zone B in Thilawa SEZ is shown in Figure 7.4-4 and the cumulative amount of the waste at 60 years after operation is estimated as 0.7 million ton. According to DOWA Eco-System and Golden Dowa Eco-System Myanmar Co., Ltd., the receiving capacity of the controlled landfill sites of the solid waste treatment and management facilities in Thilawa SEZ is estimated as 1.0 million ton at least. Thus the capacity of receiving capacity of industrial waste and business related waste in Zone A and Zone B in Thilawa SEZ is judged enough.

On the bases of the above examination, the impact of waste generated in the operation phase is expected to be limited and well managed.



Source: EIA Study Team

Figure 7.4-4 Yearly Cumulative Amount of Industrial Waste and Business Related Waste in Zone A and Zone B in Thilawa SEZ

On the bases of the above examination, the impact of waste generated in the operation phase is expected to be limited and well managed.

(3) Domestic Waste during the Operation Phase

For evaluating the impact of domestic waste, capacity of transportation and disposal site operated by Thanlyin Township to manage solid waste generated from residential areas was confirmed.

The amount of domestic waste generated from residential areas in Thilawa SEZ Zone B was estimated in the EIA report of the Zone A.

$$DW = WGR \times POP$$

Where, DW is the amount of generated waste (kg/day)
WGR is the waste generation rate (kg/person/day)
POP is the population

The estimated amounts of domestic waste in Thilawa SEZ Zone B and Zone B is shown in Table 7.4-3., The estimated generated amount from residential area in Thilawa SEZ Zone A and Zone B is 11 ton/day (11,241 kg/day).

Table 7.4-3 Estimated Amount of Generated Domestic Solid Waste in Zone B

Zone	Area	Kind of Residence	Number of Residents	Waste Generation Rate	Amount of Solid Waste
			(a)	(b)	(c)=(a)x(b)
			Person	kg/person/day	Kg/day
Zone A	Residential Area	Villas, Condominium, and Apartments	3,450	0.543	1,874
Zone B	Residential Area	Villas	2,408		1,308
		Condominium	1,1260		6,114
		Apartments	3,584		1,946
		Total	17,252		9,368
Total in Zone A and Zone B			20,702		11,241

Note: Waste generation rate by residents was quoted from the Strategic Urban Development Plan. The figure of 0.543 kg/person/day is under the medium economic growth scenario in 2025.
Source: EIA Study Team

As for the receiving capacity of dumping site, according to Cleansing Department of Thanlyin Township, new dumping site which has 1.6 ha area has been operated since December 2015, located at 1.5 km south-east from the old dumping site along to the Bago River in the north of the township as described in Chapter 4. The new dumping site is established next to crematory which can burn wastes and type of the dumping site is open dumping. The estimated receiving capacity of the dumping site is 20,000 – 30,000 ton. As of February 2016, the new dumping site receives approximately 4 tons/day of domestic waste from 11 wards in the Thanlyin Township and approximately 5 tons/day from a residential and commercial area located near Thalyin Bridge. In case that domestic waste from Thilawa Zone A and Zone B is added to the existing receiving waste to the new dumping site, the new dumping site receive waste approximately 20 tons/day (7,300 tons/year) in total and can receive waste for only 3-4 years. After several years from starting operation of residential area, Thanlyin Township has to secure another new dumping site.

As for the transportation capacity of Cleansing Department of Thanlyin Township, 5 trucks with 3-4.5 tons of maximum load each can be used for collection n and transportation of domestic waste. At present, an operator of the residential and commercial area located near Thalyin Bridge has already collected the waste in the area and transport the waste by their own truck. The operator paid a certain amount of money for disposing waste by their truck in accordance with a contract between the operator and Thanlyin Township. Thus the Project Proponent will prepare waste collection and transportation trucks by themselves in case that Thanlyin Township cannot provide waste collection and transportation services.

In order to prevent expansion of toxic from domestic waste, the following actions will be taken by the Project Proponent itself.

- To promote separation of waste for recycling and reducing waste; and
- To collect toxic wastes such as battery, lightning, and spray cans separately and bring the waste to the waste treatment facilities in Thilawa SEZ Zone A.

On the bases of the above examination, the impact of waste generated in the operation phase is expected to be limited and well managed.

7.5 Soil Contamination

7.5.1 Forecast Item

The following items was examined to forecast the impact:

- Possibility of soil contamination as a result of the activities of the Project the construction, operation, and closing phases.

7.5.2 Forecast Area

The areas examined to forecast the impact were set in the project area.

7.5.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

The period examined to forecast the impact was set during the operation phase after all the residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area after all tenants stop their operation.

7.5.4 Forecast Method

The forecast of the impact of soil contamination was conducted as follows:

- During the construction phase, the possibility of soil contamination and distribution of contaminated soil as a result of the construction work in the project area was evaluated in consideration of the field survey result and the proposed construction plan of the project area.
- During the operation phase, the possibility of soil contamination in the project area by solid waste, hazardous waste (if any), and wastewater was evaluated in consideration of the proposed design and operation manner of the central wastewater treatment plant and commitment of tenant industries to install necessary pre-treatment facilities (e.g., neutralization, oil separation) as well as to handle generated waste properly.
- In the closing phase, the possibility of soil contamination and distribution of contaminated soil as a result of the demolition work in the project area was evaluated in consideration of the possibility of soil contamination during the operation phase.

7.5.5 Forecast Result

During the construction phase, all excavated soil would be backfilled into the Thilawa SEZ Zone B area as embankment soil. Excavated soil would not cause any soil contamination inside the project area and the surrounding area because soil quality of the industrial area as well as the entire area of Thilawa Zone B was observed to comply with the relevant environmental standards, as described in Section 6 of the Chapter 6. In addition, construction activities in an industrial zone and domestic activities during the construction phase would not be expected to cause any pollution to the soil environment.

During the operation phase, industrial wastewater discharged by the tenants would be collected and treated properly in the central wastewater treatment plant. Domestic wastewater would be treated by septic tanks, while the pollution from stormwater runoff would be controlled and minimized as much

as possible. Accordingly, the possibility for soil contamination caused by improper treatment of wastewater would be eliminated. Sludge formed from industrial wastewater and domestic wastewater treatment would be treated properly as aforementioned. Hazardous waste (if any), industrial waste, and domestic waste would be well controlled and managed by each tenant, as described in detail in the previous section, to prevent from distributing to the soil environment. Therefore, soil contamination caused by sludge, hazardous waste, industrial waste, and domestic waste would be minimized during the operation phase.

During the closing phase, demolition work of the industrial zone and domestic activities during the period would not be expected to cause any pollution to the soil environment. As aforementioned, soil contamination would not be expected to occur during the operation phase due to proper management and control, implying that there would be no contaminated soil at the start of the demolition work. As a result, the possibility that the contaminated soil from the industrial area is distributed to the surrounding area would not be anticipated.

In summary, it can be judged that soil contamination as a result of activities from the project during the construction, operation, and closing phases would not cause any significant environmental impact.

7.6 Noise and Vibration

7.6.1 Forecast Item

The following items were examined to forecast the impact:

- Noise and vibration along the main roads increased due to construction vehicles of the Project.
- Noise and vibration generated by construction work of the Project.
- Noise and vibration along main roads increased during operation phase of Zone B.
- Noise and vibration increased due to the tenants during the operation phase.

7.6.2 Forecast Area

The area examined to forecast the impact was set in and around Thilawa SEZ Zone B.

The forecast points for main roads nearby Thilawa SEZ Zone B were set as shown in Figure 7.2-1. The forecast points are along Thanlyn-Thilawa Road and Dagon-Thilawa Road.

7.6.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set during the operation phase after all the residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.6.4 Forecast Method

The impact forecast for noise and vibration was conducted as follows:

- To estimate the noise and vibration level increased by construction work during the construction phase by using formula prepared by the Institute of Noise Control Engineering of Japan (noise) and formula prepared by the Public Works Research Institute of Japan (vibration);
- To estimate the noise and vibration level increased by the tenant industries during the operation phase by using formula prepared by the Institute of Noise Control Engineering of Japan (noise) and formula prepared by Public Works Research Institute of Japan (vibration); and
- To estimate the noise and vibration level increased by vehicle traffic generated from Thilawa SEZ Zone B during the operation phase by utilizing ASJ RTN-Model 2013 (noise) and formula prepared by Public Works Research Institute of Japan (vibration).

The methodology of the impact forecast was described as follows.

(1) Method for Construction Noise Forecast during the Construction Phase

In order to forecast the noise level from the construction activities, the following formula formulated by the Institute of Noise Control Engineering of Japan was adopted:

$$L_C = L_{Source} - 20 \log_{10}\left(\frac{r}{r_0}\right)$$

L_C: Noise level at evaluation point [dB]
L_{Source}: Noise level at reference point [dB]

r_0: *Distance from source to reference point [m]*
r: *Distance from source to evaluation point [m]*

(2) Method for Construction Vibration Forecast during the Construction Phase

In order to forecast the vibration level from the construction activities, the following formula formulated by the Public Works Research Institute of Japan was adopted:

$$L_V = L_{V,reference} - 15\log_{10}\left(\frac{r}{r_0}\right) - 8.68\alpha(r - r_0)$$

Lv: Vibration level at evaluation point [dB]
$L_{V,reference}$: *Vibration level at reference point [dB]*
r_0: *Distance from source to reference point [m]*
r: *Distance from source to evaluation point [m]*
α: *Internal reduction coefficient in ground (Normal: 0.01, Hard Rock: 0.001)*

(3) Method for Noise Forecast from Logistics Factory during the Operation Phase

In order to forecast noise level from logistics factory during operation phase, the following formula was applied:

$$L_{OP} = L_{Source} - 20\log_{10}\left(\frac{r}{r_0}\right) - TL$$

L_{OP}: *Noise level at evaluation point [dB]*
L_{Source}: *Noise level at reference point [dB]*
r_0: *Distance from source to reference point [m]*
r: *Distance from source to evaluation point [m]*
TL: Effect of soundproof by wall and window [dB], set as 30 [dB] this time

(4) Method for Vibration Forecast from Logistics Factory during the Operation Phase

Method for vibration forecast from logistics factory during the operation phase is the same as that during the construction phase.

(5) Method for Noise Forecast from Traffic during the Operation Phase

In order to forecast the noise level from traffic during the operation phase, ASJ RTN Model 2013 was applied along the main road as follows:

1) A-weighted sound level

A-weighted sound level (L_{PAi}) is calculated as follows:

$$L_{PAi} = L_{WA} - 8 - 20\log_{10} r + \Delta L_d + \Delta L_g$$

where, L_{pAi}: A-weighted sound level propagated by sound source (i) (dB)
L_{WA}: A-weighted sound power level by vehicle traffic (dB)
Heavy vehicles : $L_{WA} = 88.8 + 10log_{10}V$
Light vehicle : $L_{WA} = 82.3 + 10log_{10}V$
Bike : $L_{WA} = 85.2 + 10log_{10}V$
V: Average traveling velocity (km/hr)
r: Distance from sound source (i) to forecast point (m)

ΔL_d: Compensation value by diffraction effect (dB)

ΔL_g : Compensation value by ground surface effect (dB)

As the road structures forecasted were flat and no equipments which cause diffraction were installed, ΔL_d =0 was applied in the calculation. Also, as the road condition would be solid concrete and/or asphalt, ΔL_g=0 was applied in the calculation.

2) A-weighted equivalent sound level

A-weighted equivalent continuous sound pressure level is calculated as follows:

$$L_{AE} = 10\log_{10}\left(\frac{1}{T_0}\sum_{i=1}^{n} 10^{L_{PAi}/10}\Delta t_i\right)$$

$$L_{Aeqj} = 10\log_{10}\left(10^{L_{AE}/10}\times\frac{N}{3600}\right) = L_{AE} + 10\log_{10} N - 35.6$$

where, L_{AE} : Sound exposure level (dB)

L_{Aeqi} : A-weighted equivalent sound level by vehicle types and traffic lanes (dB)

n : Number of set sound source (-)

L_{PAi} : Sound level of sound source (i) (dB)

Δt_i : Passing time of sound source interval (i)(sec) (= $\Delta d_i/V$)

Δd_i : Length of sound source interval (i) (m)

V : Average traveling velocity (m/sec)

N : traffic volume (vehicle/hr)

T_0 : Standard time (sec) (=1)

3) Synthesis equation

The calculated equivalent sound level by vehicle types and traffic lanes is synthesized as follows:

$$L_{Aeq} = 10\log_{10}\left(10^{L_{Aeq1}/10} + 10^{L_{Aeq2}/10} + \cdots + 10^{L_{Aeqm}/10}\right)$$

Where, L_{Aeq}: Synthesized A-weighted equivalent sound level at forecast point (dB)

(6) Method for Vibration Forecast from Traffic during Operation Phase

In order to forecast the vibration level from traffic during the operation phase, the following formula formulated by the Public Works Research Institute of Japan was adopted:

$$L_{10} = L_{10}{}^{*} - \alpha_1$$

$$L_{10}{}^{*} = a\log_{10}(\log_{10}Q^{*}) + b\log_{10}V + c\log_{10}M + d + \alpha_\sigma + \alpha_{\sigma\mathrm{f}} + \alpha_{\mathrm{s}}$$

where, L_{10}: vibration level at evaluation point (dB)

$L_{10}{}^{*}$: vibration level at reference point (dB)

$L_{10}{}^{*}$: vibration level at reference point (dB)

Q^{*}: equivalent traffic volume during 500 seconds per lane (vehicles/500s/lane)

$$Q^{*} = \frac{500}{3{,}600}\times\frac{1}{M}\times(Q_1 + KQ_2)$$

Q_1: traffic volume of light vehicle (vehicles/hr)

Q_2: traffic volume of heavy vehicle (vehicles/hr)

K: conversion factor of heavy vehicle to light vehicle, set as 13 this time

V: Average traveling velocity (m/s)

M: number of lanes on a road

α_σ: correction value of the roughness of the pavement

$\alpha_\sigma = 8.2\log_{10}\sigma$ (in case of asphalt pavement)

σ : a standard deviation of pavement roughness, set as 5 mm this time

α_f: correction value of specific frequency of the ground

$\alpha_f = -9.2\log_{10}(f) - 7.3$ (in case of $f < 8$ Hz)

f: specific frequency of the ground, estimated by empirical equation this time

$f = 8.4N^{1/3}$

N: N. value, this time set as 1

α_s: correction value of structure of the road, this time set as 0

α_l: correction value of distance decay from reference point to evaluation point

$\alpha_l = \beta \log(r/5+1)/\log 2$

r: distance from reference point to evaluation point

β : $0.068L_{10}^{*} - 2.0$ (in case of plane road on cohesive soil ground)

a, b, c, d: constant value, this time set as 47, 12, 3.5, 27.3 respectively (plane road)

7.6.5 Forecast Condition

(1) Construction Noise Forecast during Construction Phase

Table 7.6-1 shows the condition for construction noise forecast. Among the construction works, excavation for groundwork was adopted as the main construction work and one of the noisiest works of Zone B development. The ratio of time with noisy work to operating time is assumed as 70%.

Table 7.6-1 Condition for Construction Noise Forecast

Kind of Construction	Heavy Equipment	Noise Level at Reference Point [dB]	Distance from Source to Reference Point [m]	Number of Equipment [Unit]	Forecast Point
Excavation for groundwork	Bulldozer	80	10	3	- Marine University (approximately 40 m from the boundary of the residence and commercial areas as the nearest case) - Houses (approximately 40 m from the boundary of the logistic area as the nearest case)
	Excavator	74	10	3	

Source: Construction Noise Prediction Model 'ASJ CN-Model 2007', The Acoustical Society of Japan, 2008

(2) Construction Vibration Forecast during Construction Phase

Table 7.6-2 shows the condition for construction vibration forecast. Among the construction works, compacting for groundwork was adopted as the main construction work and one of the highest vibration works of Zone B development.

Table 7.6-2 Condition for Construction Vibration Forecast

Kind of Construction	Heavy Equipment	Noise Level at Reference Point [dB]	Distance from Source to Reference Point [m]	Number of Equipment [Unit]	Forecast Point
Compacting for groundwork	Bulldozer	63	5	1	- Marine University (approximately 40 m from the boundary of the residence and commercial areas as the nearest case) - Houses (approximately 40 m from the boundary of the logistic area as the nearest case)
	Excavator				
	Compaction roller				

Source: Environment Impact Assessment Technique for Road Project, National Institute for Land and Infrastructure Management and Public Works Research Institute, Japan, FY2012

(3) Noise Forecast from Logistics Factory during Operation Phase

Table 7.6-3 shows the condition for noise forecast from logistics factory during the operation phase. As of March 2016, there is no clear information about what kind of industries will move into the Thilawa SEZ Zone B but it would be assumed that almost the same type of industries as in Zone A will move into Zone B. According to the list of approved investors from the website of Thilawa Special Economic Zone, a large-scale industrial pressing machine would be installed, which is one of the highest noise-generating equipment during the operation phase.

Table 7.6-3 Condition for Noise Forecast from Logistics Factory during Operation Phase

Heavy Equipment	Noise Level at Reference Point [dB]	Distance from Source to Reference Point [m]	No. of Equipment	Forecast Point
Large-scale Pressing Machine	105	1	1	Houses (approximately 40 m from the boundary of the logistic area as the nearest case)

Source: Hand book of Noise Control Engineering, Institute of Noise Control Engineering, Japan, 2001

(4) Vibration Forecast from Logistics Factory during Operation Phase

Table 7.6-4 shows the condition for vibration forecast from logistics factory during operation phase. The adopted heavy equipment was a large-scale industrial pressing machine, which is one of the highest vibration-generating machines during the operation of logistic industry.

Table 7.6-4 Condition for Noise Forecast from Logistics Factory during Operation Phase

Heavy Equipment	Unit Vibration Level L_{v0} [dB]	Distance from Source to Reference Point [m]	No. of Equipment	Forecast Point
Large-scale Pressing Machine	73	1	1	Houses (approximately 40 m from the boundary of the logistic area as the nearest case)

Source: Hand book of Noise Control Engineering, Institute of Noise Control Engineering, Japan, 2001

(5) Noise Forecast from Traffic during Operation Phase

1) Traffic volume and traveling velocity

The traffic volume and traveling velocity at each forecast point during the forecast period were the same as mentioned in Section 2 of the Chapter 7. The traffic volumes at the forecast points during the operation phase are shown in Table 7.6-5.

Table 7.6-5 Traffic Volumes at Forecast Points during Operation Phase

Type of Vehicle		Present Traffic Volume (vehicle/day)	Traffic Volume Related to Thilawa SEZ Zone A (vehicle/day)	Traffic Volume Related to Thilawa SEZ Zone B (vehicle/day)
Kyaik Khauk Pagoda (Thanlyn-Thilawa Road)	Two-wheel Vehicle (Bike)	9,098	3,549 1)	3,432 1)
	Four-wheel Light Vehicle (Car)	2,928	233	885
	Four-wheel Heavy Vehicle (Pickup/Fixed route bus)	1,135	467	517
Planned residential site (Dagon-Thilawa Road)	Two-wheel Vehicle (Bike)	3,132	764	739-
	Four-wheel Light Vehicle (Car)	1,443	50	191
	Four-wheel Heavy Vehicle (Pickup/Fixed route bus)	1,142	323	401

Note 1) It is assumed that the ratio of using bike to using bicycle is 40% to 60%. Thus, the traffic volume of bike is calculated as 40% of the congested traffic volume of two-wheel vehicles
Source: EIA Study Team

2） Road Condition

The road conditions at the forecast points during the forecast period are presented in Table 7.6-6.

Table 7.6-6 Road Conditions at Forecast Points

Forecast Point (Name of Road)	Width of Road (m)				Remark
	Pavement	Medium	Buffer Zone	Total	
Kyaik Khauk Pagoda (Thanlyn-Thilawa Road)	7.0+7.0	1.0	4.5+4.5	24.0	Expanded road
Planned residential site (Dagon-Thilawa Road)	6.85+6.85	4.6	13.85+13.85	46.0	Existing road

Source: EIA Study Team

3） Position of Sound Source and Forecast Point

The sound sources were set on the center of both upward and downward traffic lanes. Forecast points were set at the edge of the road at a height of 1.2 m.

4） Position of Vibration Source and Forecast Point

The vibration sources were set on the center of the nearest lane to the forecast point. Forecast points were set at the edge of the road.

7.6.6 Forecast Result

(1) Construction phase

1） Forecast Result of Noise and Vibration from Construction Vehicle at Thanlyn-Thilawa Road

During the construction phase, noise would be emitted from construction vehicles. According to the actual result of construction works in Zone A, the traffic volume of the construction vehicles were at most about 200 vehicles a day. It would be assumed that the traffic volume of construction vehicles of Zone B is generated to the same extent as Zone A.
Present traffic volume of four-wheel vehicle is about 4,000 vehicles a day, so if 50% of the construction vehicles travel along the Thanlyn-Thilawa Road, traffic volume will be temporarily increased by 5% at most. Impact of noise is expected to be limited because it would be site specific and temporary.
Hence, it is judged that the noise and vibration generated by the construction vehicles in Thilawa SEZ Zone B would not cause any significant impact.

2) Forecast Result of Noise and Vibration from Construction Vehicle at Dagon-Thilawa Road

Present traffic volume of four-wheel vehicle is about 2,500 vehicles a day, so if 50% of the construction vehicles travel along the Dagon-Thilawa Road, traffic volume will be temporarily increased by 8% at most. Impact of noise is expected to be limited because it would be site specific and temporary.
Hence, it is judged that the noise and vibration generated by the construction vehicles in Thilawa SEZ Zone B would not cause any significant impact.

3) Forecast Result of Construction Noise

Table 7.6-7 shows the forecast results of construction noise level depending on the distance from the sound source. In the daytime, areas less than 30 m from the houses in the residence area will be prohibited to implement construction work by heavy equipment that generate noise without installation of noise prevention sheet. In the evening, areas that are less than 200 m from the houses in Phalan Monastery and in other residential area will be prohibited to implement construction work. At nighttime, areas less than 300 m from the monastery and residential area will be also prohibited to implement construction work. These results will be reflected in the conditions of environmental consideration of the contractor.

Hence, it is judged that the noise generated from the construction work in Thilawa SEZ Zone B would not cause any significant impact.

Table 7.6-7 Forecast Results of Construction Noise

Distance from the Source of Noise	Forecasted Noise Level	Tentative Target Value of Noise Level for the Monastery and Residence Area			Note (NG: Not Good)
		Daytime (Leq) (7 am-7 pm)	Evening time (Leq) (7 pm-10 pm)	Nighttime (Leq) (10 pm-7 am)	
		75 dB	60 dB	55 dB	
10 m	84 dB	NG	NG	NG	
15 m	81 dB	NG	NG	NG	
20 m	78 dB	NG	NG	NG	
30 m	75 dB	OK	NG	NG	
40 m	72 dB	OK	NG	NG	- Marine University (approximately 40 m from the boundary of the residential and commercial areas as the nearest case) - Houses (approximately 40 m from the boundary of the logistic area as the nearest case)
50 m	70 dB	OK	NG	NG	
100 m	64 dB	OK	NG	NG	
150 m	61 dB	OK	NG	NG	
200 m	58 dB	OK	OK	NG	
300 m	55dB	OK	OK	OK	

Source: EIA Study Team

4) Forecast Result of Construction Vibration

Table 7.6-8 shows the forecast results of construction vibration level depending on the distance from the vibration source. The vibration levels at all distances are forecasted to be less than the target vibration level for construction. However, prohibited areas will be set the same as the prohibited areas of noise for safety.

Hence, it is judged that the vibration generated from the construction work in Thilawa SEZ Zone B would not cause any significant impact.

Table 7.6-8 Forecast Results of Construction Vibration

Distance from the Source of Vibration	Forecasted Noise Level	Tentative Target Value of Vibration for the Monastery and Residence Area			Note
		Day time (Leq) (7am-7pm)	Evening time (Leq) (7pm-10pm)	Night time (Leq) (10pm-7am)	
		65 dB	65 dB	60 dB	
10 m	58 dB	OK	OK	OK	
15m	55 dB	OK	OK	OK	
20 m	53 dB	OK	OK	OK	
30 m	49 dB	OK	OK	OK	
40 m	46 dB	OK	OK	OK	Marine University (approximately 40 m from the boundary of the residential and commercial areas as the nearest case) Houses (approximately 40 m distance from boundary of logistic area as nearest case)
50 m	44 dB	OK	OK	OK	
100 m	35 dB	OK	OK	OK	
150 m	28 dB	OK	OK	OK	
200 m	<25 dB	OK	OK	OK	

Source: EIA Study Team

(2) Operation phase

1) Forecast Result of Noise from Logistics Factory during Operation Phase

Table 7.6-9 shows the forecast results of noise level depending on the distance from logistics factory during the operation phase. As for houses in the residence area, areas less than 20 m from the houses will be prohibited to use equipment which generation of noise without any measures such as installation of sound-proof wall because operation hour might be 24 hours. These results will be reflected in the proposed internal regulation.

Hence, it is judged that the noise generated from logistics factory during the operation phase would be well controlled and managed, and would not cause any significant impact.

Table 7.6-9 Forecast Results of Noise from Logistics Factory during Operation Phase

Distance from the Source of Noise	Forecast Noise Level	Tentative Target Value of Noise for the Monastery and Residence			Note (NG: Not Good)
		Day time (Leq) (7am-7pm)	Evening time (Leq) (7pm-10pm)	Night time (Leq) (10pm-7am)	
		60 dB	55 dB	50 dB	
10 m	55 dB	OK	OK	NG	Need to install sound-proof wall
15 m	51 dB	OK	OK	NG	
20 m	49 dB	OK	OK	OK	
30 m	45 dB	OK	OK	OK	
40 m	43 dB	OK	OK	OK	Marine University (approximately 40 m from the boundary of the residential and commercial areas as the nearest case) Houses (approximately 40 m distance from boundary of logistic area as nearest case)
50 m	41 dB	OK	OK	OK	
100 m	35 dB	OK	OK	OK	
150 m	31 dB	OK	OK	OK	
200 m	29 dB	OK	OK	OK	

Source: EIA Study Team

2) Forecast Result of Vibration from Logistics Factory during Operation Phase

Table 7.6-10 shows the forecast results of vibration level depending on the distance from logistics factory during the operation phase. The vibration levels at all distances are forecasted to be less than the target vibration level for operation.

Table 7.6-10 Forecast Results of Vibration from Logistics Factory during Operation Phase

Distance from the Source of Vibration	Forecast Vibration Level	Tentative Target Value of Vibration for the Monastery and Residence Area			Note
		Day time (Leq) (7am-7pm)	Evening time (Leq) (7pm-10pm)	Night time (Leq) (10pm-7am)	
		65 dB	60 dB	60 dB	
10 m	57 dB	OK	OK	OK	
15 m	54 dB	OK	OK	OK	
20 m	52 dB	OK	OK	OK	
30 m	48 dB	OK	OK	OK	
40 m	46 dB	OK	OK	OK	- Marine University (approximately 40 m from the boundary of the residential and commercial areas as the nearest case) - Houses (approximately 40 m distance from boundary of logistic area as nearest case)
50 m	43 dB	OK	OK	OK	
100 m	34 dB	OK	OK	OK	
150 m	27 dB	OK	OK	OK	
200 m	<25 dB	OK	OK	OK	

Source: EIA Study Team

3) Forecast Results of Noise from Traffic during Operation Phase

The A-weighted equivalent sound levels estimated at each forecast point are presented in Table 7.6-11. All the forecasted sound levels under the "with Project" case would satisfy the tentative target value.

Table 7.6-11 Traffic Sound Level (Leq) for With and Without Project Case along the Road

Forecast Point	Time Period	Without Project		With Project	Request Limit for Road Noise[2)]
		Present Condition	After Development of Thilawa SEZ Zone A		
Kyaik Khauk Pagoda (Thanlyn-Thilawa Road)	Day	71 dB	72 dB	73 dB	75 dB
	Night	60 dB	62 dB	63 dB	70 dB
Planned residential site1) (Dagon-Thilawa Road)	Day	65 dB	66 dB	67 dB	75 dB
	Night	59 dB	60 dB	61 dB	70 dB

Note: 1) As the road is already developed, forecast result is calibrated based on the field survey data.
2) Applied "proximity to major arterial roads".
Source: EIA Study Team

4) Forecast Results of Vibration from Traffic during Operation Phase

The vibration levels estimated at each forecast point are presented in Table 7.6-12. All the forecasted vibration levels under the "with Project" case would satisfy the tentative target value.

Table 7.6-12 Traffic Vibration Level (L_{10}) for With and Without Project Case along the Road

Forecast Point	Time Period	Without Project		With Project	Request Limit for Road Vibration[2)]
		Present Condition	After Development of Thilawa SEZ Zone A		
Kyaik Khauk Pagoda (Thanlyn-Thilawa Road)	Day	46 dB	48 dB	49 dB	65 dB
	Night	39 dB	40 dB	41 dB	60 dB
Planned residential site[1)] (Dagon-Thilawa Road)	Day	36 dB	37 dB	39 dB	65 dB
	Night	28 dB	30 dB	32 dB	60 dB

Note 1) As the road is already developed, forecast result is calibrated based on the field survey data.
2) Applied "Residential Area".
Source: EIA Study Team

In addition, the noise and vibration which might be generated from the operation of the tenant industries in Thilawa SEZ Zone B would be well controlled and managed by the tenants. Moreover, impacts of noise and vibration are expected to be limited because the distance between source (tenants) and receptors is more than enough.

Hence, it is judged that the noise and vibration generated from Thilawa SEZ Zone B operation would not cause any significant environmental impact on the surrounding area.

7.7 Offensive Odor

7.7.1 Forecast Item

The following item was examined to forecast the impact:

- Offensive odor from the development of the project area during the operation phase.

7.7.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.7.3 Forecast Period

The period examined to forecast the impact was set during the operation phase after all the residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.7.4 Forecast Method

The impact forecast for offensive odor was conducted as follows:

- To examine the impact on the surrounding area of the project area of offensive odor generated from the Project.

7.7.5 Forecast Result

(1) Operation Phase

Offensive odor might be generated from tenants' operations in the logistic and commercial areas. Waste and wastewater are main generation source of offensive odor in the project area. They would be well controlled and managed by having tenants secure a commitment to install pre-treatment facilities for neutralization, oil separation, removal of toxic and heavy metals. Adequate management of waste and wastewater by the tenants would minimize the impact on surrounding environment.

Hence, it is judged that the offensive odor generated from the Project would not cause any significant environmental impact on the surrounding area.

7.8 Bottom Sediment

7.8.1 Forecast Item

The following item was examined to forecast the impact:

- Possibility for contamination of bottom sediment due to the activities in the project is during the operation phase.

7.8.2 Forecast Area

The areas examined to forecast the impact were set in the project area, and four creeks which receive wastewater from the project area

7.8.3 Forecast Period

The period examined to forecast the impact was set during the operation phase after all the residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.8.4 Forecast Method

The impact forecast for bottom sediment was conducted as follows:

- The impact on the bottom sediment in the creek of receiving wastewater discharge from the project area was evaluated by considering the result of the impact forecast for water pollution.

7.8.5 Forecast Result

The potential for contamination of bottom sediment in the four creeks, including No. 1 (AhLun Soke Creek), No. 2 (Shwe Pyauk Creek), No. 3 (Bay Pauk Creek), and No. 4 (Phalam Creek), receiving wastewater and then the Yangon River mainly comes from polluted stormwater, domestic wastewater, and industrial wastewater discharged from the project sites. The dissolved pollutants in stormwater and wastewater which are not treated properly can be absorbed by the existing bottom sediment, while undissolved pollutant matters or suspended particulates containing pollutants settle down to become part of the bottom sediment. The contamination of bottom sediment, therefore, is greatly dependent on the contamination of the creeks as a result of receiving contaminated stormwater, domestic wastewater, and industrial wastewater.

As aforementioned, domestic wastewater would be treated in septic tanks and tenants would perform necessary mitigation measures to minimize contamination of stormwater. As a result, it would be expected that water and wastewater collected by drains and discharged into the creeks will be well controlled and managed. Meanwhile, industrial wastewater generated from the factories inside the logistic areas would be collected and treated in dedicated wastewater treatment plants and its effluent would comply with the designated standards. As a whole, the water quality of the creeks receiving stormwater and wastewater from the project area would comply with the required standards. Hence, it is expected that the bottom sediment in the creeks would not be contaminated by wastewater discharge during the operation phase of the project areas. In addition, the project proponent will regularly monitor quality of bottom sediment in the creeks, along with regular monitoring of the environmental water quality and effluent water quality, as mentioned above.

Hence, it is judged that stormwater and wastewater generated from the project areas would not cause any significant environmental impact on the bottom sediment of the receiving creeks and the Yangon River.

7.9 Flora/ Fauna and Biodiversity

7.9.1 Forecast Item

The following items were examined to forecast the impact:

- Change of vegetation due to the construction work in the project area;
- Loss of important species and/or their habitats caused by the project development.
- Impact on biodiversity and ecosystem by the project development.

7.9.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.9.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

The period examined to forecast the impact was set during the operation phase after all the residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area after all tenants stop their operation.

7.9.4 Forecast Method

The impact forecast for flora, fauna, and biodiversity was conducted as follows:

- The current status of vegetation in the project area was examined and then the impact on vegetation was evaluated by referring to the proposed land reclamation plan for the project development;
- The loss of important species and/or their habitats was determined by overlaying the project area on the habitats of important species; and
- The impact on biodiversity and ecosystem in the project area was evaluated in consideration of biodiversity and ecosystem of the larger region.

7.9.5 Forecast Result

(1) Alteration of vegetation

The current vegetation in the project area, as described in Chapter 6, is mainly composed of grass and cultivated land. A part of the project area is covered by shrub land and plantation. The vegetation of the area is low-rich natural environmental vegetation and the same types of vegetation are distributed in the surrounding area of the project site. However, the project proponent will spend a significant area for green area to achieve natural friendly environment and attractive landscape. Each tenant will prepare green space in their plot as well. Hence, it is judged that the change of vegetation due to the project development would not cause significant impact on the environment.

(2) Loss of important species and their habitats

The summary of flora and fauna survey showed that 146 flora species, 73 butterflies, 4 dragonflies, 69 birds, 7 mammals, 12 reptiles and amphibians, and 22 fish species were observed or recorded through interview with the local people in the project site and the surrounding area. Most species were classified as Not Evaluated (NE), Data Deficient (DD), and Least Concern (LC) under the IUCN Red List of Threatened Species (2015-4 Version 3.1). There were 1 threatened species (1 reptile) and 5 near threatened species (2 birds and 3 fishes) recorded in the area. However, the loss of important species due to the project development would be evaluated carefully with the consideration of their habitats and specific living behavior.

Considering near threatened fish species, their habitats would remain unchanged as they can keep living in the existing creeks and lakes. The creeks would be conserved as much as possible in terms of drainage area, pathway, direction, and water quality. The water quality of the creeks would be adequately protected for conservation of aquatic life, as described previously in the section on water quality. Hence, fish species, in general, and near threatened fish species would be conserved in the project area. Meanwhile, habitats for bird species would be changed due to the project development. However, bird species can find similar habitats in nearby areas. Therefore, loss of near threatened bird species would be avoided. Although one threatened reptilian species (*Ophiophagus Hannah*) was recorded through the interview with the local people, the presence of this species in the project site was not confirmed by direct observation during the field survey. Therefore, the impact on this species due to the project development would be undetermined and uncertain. It is noted that habitats of the reptilian species were also confirmed in the surrounding area, according to information from experts and local residents. As a whole, the loss of six threatened and near threatened species due to the project development would be minimized and limited and therefore would not cause significant impact on the environment and their existence in nature. In summary, it is judged that the project would not cause significant impact on important species and their habitats.

(3) Impact on biodiversity and ecosystem

Through the field survey, it was observed that biodiversity in the project area was not rich because of the fact that the area has been inhabited and cultivated by local people for a long time. In addition, the area which is located near Yangon City has recently been urbanized and strongly industrialized with industrial areas and deep terminals. The project area is not a special area in terms of biodiversity and ecosystem, compared with nearby areas in the same region. Similar ecosystem and equivalent level of biodiversity would be found in nearby areas. Besides, the loss of some important species would not occur during the project development, as discussed above. Therefore, the development of the project would not cause any significant impact on biodiversity and ecosystem of the region.

7.10 Hydrology

7.10.1 Forecast Item

The following items were examined to forecast the impact:

- Surface water flow direction;
- Water drainage volume from the project area; and
- Water consumption and its impact to the creek flow.

7.10.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.10.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

The period examined to forecast the impact was set during the operation phase after all the residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area after all tenants stop their operation.

7.10.4 Forecast Method

The impact forecast for hydrology was conducted as follows:

- During the construction phase, the impact of the construction work in the project area on surface water flow, water drainage volume, and water consumption was examined in consideration of the result of the hydrology survey and the proposed construction plan of the project site.
- During the operation phase, the impact of the operation of the industrial zone on surface water flow, water drainage volume, and water consumption was determined by referring to the proposed design plan of the industrial zone.
- During the closing phase, the impact of the closing of the project area on surface water flows, water drainage volume, and water consumption was estimated by considering the scenario of the previous phases and the field survey result.

7.10.5 Forecast Result

(1) Construction phase

a) Surface water flows

It was confirmed that the path and the direction of the four drainage creeks for the project areas, including Ahlun Soke Creek, Shwe Pyauk Creek, Pa lan (or Bay Bauk) creek, and the fourth creek would be kept intact during all phases of the Project. According to the land reclamation plan and the stormwater drainage plan, the project area would be excavated and embanked to attain a level platform with E.L. 5.0 m and general slope would be 0.2% in the direction of the drainage system with its canals and then toward the four creeks. The excavation and embankment work would be designed to

minimize the excavation volume and embankment volume as much as possible. In general, the difference in elevation between adjacent points might change but their order would be almost kept unchanged. As a result, surface water flow would not change significantly and would basically keep its current water flow. According to the hydrology survey result (see Chapter 6), the current surface water in each project area mainly flows from the higher elevation points in the adjacent areas (within 300–500 m from creek bank) toward the creek. During and at the end of the construction phase, surface water runoff would flow mainly from the adjacent areas toward the drainage system, collected canals, and then discharge to four drainage creeks. In short, the surface water flow would not be significantly altered during the construction phase.

b) Water drainage volume

Currently, as pointed out from the result of the hydrology survey, most stormwater runoff from each project area would be discharged to one of the four drainage creeks. During the construction phase, all stormwater from each project area would be collected by drains, canals, and finally discharged to one of the four drainage creeks, which would be the same as the current situation. Exceeding flowrate of stormwater from drainage canals would be equalized by natural retention function along the existing canals, which is out of Zone B, so that water drainage volume discharged to one of the four drainage creeks would be evenly distributed. Therefore, it is expected that changes in water current and water flow rate of the creek due to the project development would be minimized. In summary, although the project development would result in a significant change in the water volume discharged to the creek, the impact on water current and flow rate of the creek would be limited by the installation of retention ponds and retention canals.

c) Water consumption and its impact to creek flow

Water consumed for the construction work and related activities during the construction phase would include water for washing vehicles and equipment, sprinkling water, and domestic water. The source of water during construction is groundwater. The amount of water consumption is limited and short term. It can be concluded that water uptake from the groundwater during construction phase would be very limited and would not cause any significant impact on the four creeks.

(2) Operation phase

a) Surface water flows

During the operation phase, surface water flow would be the same as the flow at the end of the construction phase because the drainage system, platform, and structures on the surface during this phase would undergo no change since they would have been completed in the previous phase. Stormwater in each project area would be collected toward drains, canals, and finally discharged to one of the four drainage creeks. Hence, as discussed previously in the above section, it can be judged that the impact on surface water flow would be considered to be less than significant during the operation phase.

b) Water discharge volume

During the operation phase, after all residential and commercial buildings would be fully occupied and all tenants in logistic areas would start their operation, the land cover of the project area would be the same as the situation at the end of the construction phase. Stormwater runoff collected during the operation phase would be equal to that at the end of the construction phase. However, in addition to stormwater runoff, the four drainage creeks would receive treated industrial wastewater and domestic wastewater from the project areas. Therefore, the total volume of water discharged to each creek; including stormwater runoff, industrial wastewater, and domestic wastewater; would be significantly higher in comparison with the current situation. However, exceeding flowrate of water discharged from each project area to the corresponding creek would be equalized by retention ponds which are natural retention function along the existing canals out of Zone B. As a result, it is expected that changes in water current and water flow rate of the creeks due to the project development would be

minimized and limited. In short, the impact of water discharge from the project areas on water current and flow rate of the creeks would be limited by the installation of retention ponds.

c) Water consumption and its impact to creek flow

Water consumption in the project area will be provided by water purification plants which explore water resource from designated reservoirs in the region. Water exploration from creeks or groundwater in the project areas would not be carried out. Therefore, the impact on hydrology by means of water consumption of tenants is negligible.

In summary, it is judged that the impact of the operation of the project area on hydrology in terms of surface water flow, water drainage volume, and water consumption would not cause significant environmental impact on the surrounding area and downstream water bodies.

(3) Closing phase

a) Surface water flows

During the closing phase, all tenants would stop their operations and then demolition work would be implemented. Factories, buildings, and facilities would be demolished. However, the topography of the project areas would not be changed significantly. Therefore, based on the judgment on surface water flow during construction and operation phases mentioned above, it is expected that surface water flow basically would not be altered by demolition work.

b) Water drainage volume

Demolition of structures, buildings, and facilities on the land surface would return the surface of the project area to the state before the project development. Water drainage volume collected from the project area would be equal to the current volume. Therefore, water drainage volume from the project areas to the drainage creeks during the closing phase would be the same as in the current situation.

c) Water consumption and its impact to creek flow

Water consumed for demolition work and related activities during the closing phase would be similar to that during the construction phase; including water for washing of vehicles and equipment, sprinkling water, and domestic water. Therefore, as discussed and evaluated in the above section, it can be concluded that water uptake from groundwater during the closing phase would be very limited and would not cause any significant impact on the four creeks.

In summary, it is judged that the impact of demolition work of the project area on hydrology in terms of surface water flow, water drainage volume, and water consumption would not cause significant environmental impact.

7.11 Soil Erosion

7.11.1 Forecast Item

The following items were examined to forecast the impact:

- Soil erosion of the bank of the project area during the construction and closing phases; and
- Soil erosion of the existing canal's riverbed due to the heavy water stream of water discharge from the project area during the operation phase.

7.11.2 Forecast Area

The areas examined to forecast the impact were the project area and Alunsut Creek, Shwe Pyauk Creek, Bay Pauk Creek, and Phalam Creek which receive water discharge from the project areas.

7.11.3 Forecast Period

As for the construction/closing phase, the period examined to forecast the impact was set during the implementation of the construction/closing work for the Project.

The period examined to forecast the impact was set during the operation phase after all the residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.11.4 Forecast Method

The impact forecast for soil erosion was conducted as follows:

- During the construction/closing phases, the possibility of soil contamination due to the construction/demolition works in the project area was evaluated in consideration of the result of field survey and the proposed construction plan of the project area; and
- During the operation phase, the possibility of soil erosion due to stormwater and wastewater discharged from the project area was evaluated in consideration of the proposed design.

7.11.5 Forecast Result

During the construction/closing phases, soil erosion of bare area/bank might occur due to heavy rainwater. To keep the stability of the foundation bank and to prevent muddy water flow downstream during the rainy season (May to October), the project proponent would request contractors to prepare temporary drainage and sandbags bank. After completion of the landfill, planting trees, vegetation, and sodding in the bare area shall be implemented as soon as possible.

During the operation phase, the stormwater and wastewater from the project site are controlled by natural retention function which is along the existing canals out of Zone B and would be the same as the current situation since existing environmental conditions along the canal will be not developed. It can be concluded that soil erosion in the creek during the operation phase would be very limited and would not cause any significant impact on Alunsut Creek, Shwe Pyauk Creek, Bay Pauk Creek, and Phalam Creek.

Hence, it is judged that the impact on soil erosion would not cause significant environmental impact.

7.12 Involuntary Resettlement

7.12.1 Forecast Item

The following items were examined to forecast the impact:

- Impact of land acquisition and involuntary resettlement due to the implementation of the Project.
- Impact on livelihood of relocated households after their resettlement.

7.12.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.12.3 Forecast Period

As for the pre-construction phase, the period examined to forecast the impact was set before the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

As for closing phase, the period examined to forecast the impact was set after closing all facilities and area in the Project.

7.12.4 Forecast Method

The impact forecast for involuntary resettlement was conducted as follows:

- To quantitatively examine the scale of involuntary resettlement caused by the Project by analyzing the results of the detailed measurement survey (DMS) for the Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (Resettlement Framework for 2,000 ha).
- To confirm the contents of the assistance package for the project-affected households (PAHs) which determined in the Resettlement Framework for 2,000 ha.

7.12.5 Forecast Result

(1) Summary of Assistance Package

In principle, the resettlement works for the development of the Project are implemented based on the Resettlement Framework for 2,000 ha which was prepared by the Thilawa SEZ Management Committee (TSMC). This framework is considered based not only on the laws/regulations in Myanmar but also JICA Guidelines for Environmental and Social Considerations (April 2010) which confirms any significant deviation from the World Bank Safeguard Policy: Operational Policy 4.12 on Involuntary Resettlement as the international standard. It provides the combination of the assistance package for PAHs in order to restore their livelihood to at least the pre-displacement level. The contents of respective assistance are summarized in Table 7.12-1 to Table 7.12-3.

Table 7.12-1 Summary of Contents of Assistance by TSMC

Category	Target/ Content of Assistance
1. Loss of Asset	(1) Fixed asset (2) Movable asset
2. Loss of Income Source (regardless of main or secondary income)	(1) Land-based income (2) Non land-based income
3. For Relocation	(1) Moving allowance (2) Commuting assistance (3) Cooperation allowance
4. Vulnerable Groups	Poor households, woman-headed households, households with disabled or elderly person
5. Special Arrangement	(1) Arrangement of resettlement site (2) Income Restoration Program (IRP)

Source: Prepared by the EIA Study Team based on Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ), February 2016

Table 7.12-2 Summary of IRP Components by TSMC

Component	Contents	Detailed Main Activities
1. Support for Restoration of Economic Condition	(1) Support for income earning opportunity	i) Series of technical support for improvement of work skills ii) Facilitation for job matching in and around the Thilawa SEZ area iii) Assistance for starting business
	(2) Support for account management	i) Support to open bank account ii) Support to learn knowledge on increase of saving and reduce of debt
2. Support for Development of Environmental and Social Living Conditions	(1) Support for community development	i) Support to create a sense of cooperation among people ii) Support for coordination with host communities iii) Support for establishment of internal rules and system
	(2) Support for awareness raising	i) Support for enlightenment on appropriate environmental and hygienic management ii) Support for training for sustainable resettlement site management
3. Monitoring and Follow-up		i) Monitoring of economic restoration ii) Monitoring of environmental and social living conditions of the resettlement site iii) Further measures if necessary

Source: Prepared by the EIA Study Team based on Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2000 ha Development Area of Thilawa Special Economic Zone (SEZ), February 2016

Table 7.12-3 Contents of Assistance by TSMC for Vulnerable Households

Content of Assistance	Category	Number/Definition of Applicable Person
Cash assistance equivalent to one big bag of rice (equivalent to 50 kg of rice) per applicable person	Households headed by woman	No. of unemployed persons*
	Households headed by elderly	Total two persons: elderly person and one support person in the household
	Households headed by disabled person, or including a disabled person	Total two persons: disabled person and one support person in the household
	Households below the poverty line	No. of unemployed persons in the household

Note: Unemployed person is defined as a person who is under workable age but not employed.
Source: Prepared by the EIA Study Team based on Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2000 ha Development Area of Thilawa Special Economic Zone (SEZ), February 2016

(2) Pre-construction Phase

According to the result of DMS, there are 1,088 households to be affected in total by the entire development of Thilawa SEZ except Zone A. Among the total affected households, 254 households would be affected by the Project physically and economically, and 226 households would be required to be displaced from their current living area due to the land acquisition as shown in Table 7.12-4.

Table 7.12-4 Number of the affected households

Category	No. of affected households	No. of HHs required relocation
Logistic Area	172	170
Residence and Commercial Area	82	56
Total	254	226

Source: EIA Study Team

In order to minimize the impact, TSMC will support PAHs with the assistance packages based on Resettlement Framework for 2,000 ha, which consists of i) assistance for loss of assets, income sources/livelihood and relocation, ii) assistance for vulnerable groups, and iii) special arrangement (arrangement of resettlement site and income restoration program). The contents of the assistance packages are summarized in Table 7.12-1.

The resettlement site will be arranged for the applicable PAHs, however, it was confirmed that some households currently reside or possess in the proposed relocation site. Some are living inside the proposed relocation site, and some are living outside but leasing their land to their relatives or friends. Therefore, these households are required to relocate/resettle in other area in order to develop the relocation site. For such households, TSMC will organize adequate consultation to provide sufficient information and appropriate compensation/ assistance in a timely manner.

(3) Operation Phase

After the relocation, some PAHs are forecasted to lose their income sources because it might be difficult for them to commute to their working place from their new living place due to the displacement and also difficult for them to cultivate their farmlands continuously. In order to restore and stabilize the livelihood of displaced PAHs to at least the pre-displacement level after their resettlement, TSMC plans to provide an Income Restoration Program (IRP) based on the Resettlement Framework for 2,000 ha as shown in Table 7.12-2.

(4) Closing Phase

It is expected that certain scale of residents will be required to move to other place due to the closing of the operation at the project area. However, the displacement will be planned and residents will be informed under the contract agreement with the project proponent, and will be implemented with the consent of residents.

As mentioned above, the negative impacts of involuntary resettlement due to the Project are inevitable. However, appropriate mitigation for the resettlement based on the Resettlement Framework for 2,000 ha would minimize the impact.

Hence, it is judged that the involuntary resettlement due to the Project would not cause any significant negative impact.

7.13 Living and Livelihood

7.13.1 Forecast Item

The following items were examined to forecast the impact:

- Impact of the Project on living and livelihood of PAHs by land reclamation
- Impact of the Project on living and livelihood of local community by construction work and the operation, the closing of the Project.

7.13.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.13.3 Forecast Period

Throughout all phases from pre-construction phase to closing phase, the period examined to forecast the impact was set from the start of the pre-construction work for the Project until after closing all facilities and area in the Project.

7.13.4 Forecast Method

The impact forecast for living and livelihood was conducted as follows:

- To quantitatively examine the livelihood of PAHs by analyzing the results of DMS for Resettlement Framework for 2,000 ha.
- To qualitatively examine the impact of the Project on living and livelihood by referring to the proposed operation plan for the Project

7.13.5 Forecast Result

(1) Impact on living and livelihood of PAHs by land reclamation

The impact on living and livelihood of PAHs is expected during the pre-construction phase because PAHs would lose their income sources after the resettlement due to the changes in their life.
The main income sources of PAHs are non land-based income sources such as odd/ wage worker (approximately 50%) and followed by land-based income such as farming monsoon paddy/ vegetable. (approximately 25%). It is expected that land-based income source would be affected more than non land-based income source since the paddy fields will not be able to be cultivated after their resettlement. Even for PAHs who has non land-based income source, it might be difficult to continue their livelihood due to the life change caused by the relocation.

Additionally, it is expected that there will be an impact on the loss of livelihood from aquaculture in the downstream of discharging point of domestic wastewater from tenants. According to the DMS results for the Framework for 2,000 ha, 11 households is engaging in the aquaculture in and around Thilawa SEZ, and the fishponds are mainly located along Alunsut Creek near the development area planned for residence and commercial areas. However, the impact on water quality is expected to be limited because the discharged domestic wastewater from residence and commercial areas would be treated onsite through the septic tank. Discharged water from tenants will also be treated at the treatment plant to comply with the industrial wastewater effluent guideline value stipulated by MOI and MOECAF and internal regulation of Thilawa SEZ Zone A. Therefore, there will not be much impact on the aquaculture.

In order to minimize the impact, the assistance for the loss of income source, which is not only for land-based (e.g., paddy farmer/vegetable farmer) but also for non land-based (e.g., odd job worker/wage worker, self-employed), will be provided based on the Resettlement Framework for 2,000 ha under the responsibility of TSMC. PAHs will be compensated for the loss of their income source before the resettlement. In addition, IRP for PAHs will be planned using the participatory approach in order to restore and stabilize the livelihood of the displaced PAHs to at least the pre-displacement level and will be implemented continuously during the construction phase. PAHs whose income source will be directly affected by the Project, assistance for finding job opportunity and facilitation for job-matching in and around Thilawa SEZ would be provided under the IRP in order to restore their livelihood.

In addition, the project proponent will consider implementing social contribution activities as necessary under their approach of CSR in order to mitigate the impact on living and livelihood.

The summary of the IRP components is shown in Table 7.12-2 in Section 7.12.

(2) Impact on living and livelihood of the surrounding community

In construction and operation phase, the unexpected impact on living and livelihood of the surrounding community would be arisen due to the construction work and the operation more or less. The project proponent will consider implementing social contribution activities as necessary under their approach of CSR in order to mitigate the impact on living and livelihood.

During closing phase, it is expected that some people would lose their income source belong to the Project. However, the general procedure of dismissal will be applied to people based on their respective contract agreement with each tenant in accordance with the laws/regulations in Myanmar. Moreover, facilitation of job opportunity will be arranged by the government to assist workers to find alternative livelihood.

(3) Impact on the improvement of local economy

In construction and closing phase, there will be expected an increase in job opportunities for the construction and demolished work, e.g., construction worker, selling of fuel for the project vehicle, and food for the workers in the surrounding community due to the influx of construction labors.

During the operation phase, there will be expected an increase in job opportunities continuously because the tenants will start their operation, and fuel for the Project and food for the worker will be supplied from the surrounding community.

Hence, it is judged that the Project would minimize significant negative impact on living and livelihood in the surrounding area.

7.14 Vulnerable People

7.14.1 Forecast Item

The following item was examined to forecast the impact:

- Impact of the Project on vulnerable groups of PAHs by land reclamation
- Impact of the Project on vulnerable groups of the surrounding community by construction work and the operation

7.14.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.14.3 Forecast Period

As for the pre-construction phase, the period examined to forecast the impact was set after the start of planning and designing of the Project.

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.14.4 Forecast Method

The impact forecast for vulnerable people was conducted as follows:

- To quantitatively examine the scale of PAHs that is defined as vulnerable group by analyzing the results of DMS for Resettlement Framework for 2,000 ha.
- To examine the impact of the Project on vulnerable people among PAHs and the surrounding community qualitatively by referring to the proposed project area.

7.14.5 Forecast Result

(1) Impact of the Project on vulnerable groups of PAHs by land reclamation

Since there is no official definition of vulnerable groups in Myanmar, the Resettlement Framework for 2,000 ha defines a vulnerable household as: i) a household headed by a woman, ii) disabled person or elderly, and iii) a household including a member of disabled person or a household below the poverty line[2] by referring to the international practices of WB and ADB.

According to the result of DMS for Resettlement Framework 2,000 ha, a total of 70 households are confirmed as vulnerable groups to be affected by the Project. The project affected households defined as vulnerable groups are categorized as follows:

[2] Integrated Household Living Conditions and Survey in Myanmar (2009-2010) was conducted by UNDP, UNICEF, SIDA and the Ministry of National Panning and Economic Development, and survey result was publicized as Poverty Profile in June 2011. Poverty line as of 2010 was defined as 376,151 kyats per adult equivalent per year in the Poverty Profile, and this amount is referred to as the poverty line in many reports. This framework also regards 376,151 kyats per adult equivalent per year as the poverty line.

Table 7.14-1 Number of Vulnerable Households

Category	No. of Households		Total
	Logistic Area	Residence and Commercial Area	
Households headed by woman	9	28	37
Households headed by elderly	7	23	30
Households headed by disabled person	0	0	0
Households below the poverty line	2	1	3
Households including a member of disabled person	9	2	11
Total (Category)	26	44	
Total	70		

Note: Total number is different of sum of each category, because some HH felled under into multiple categories.
Source: EIA Study Team

In pre-construction and during construction phase, the impact on the economic situation of vulnerable group is expected. In general, they tend to be affected easily and seriously compared with that of the non-vulnerable households. In order to mitigate the impact on vulnerable group, special attention will be given by providing additional assistance based on the Resettlement Framework for 2,000 ha under the responsibility of TSMC. According to the assistance package in Resettlement Framework for 2,000 ha, households defined as vulnerable groups will be given the assistance differently depending on the category. This assistance will be provided in advance of the resettlement together with the other assistance package. The content of other assistance is described in Table 7.12-3 in Section 7.13.

During the operation phase, more impact on the economic situation of vulnerable group is expected than that of non-vulnerable group because they will need to spend longer period to restore their living standards. Therefore, TSMC would assist them, as part of the activities under IRP, such as giving priority for finding job opportunity and facilitation for job-matching in and around Thilawa SEZ. Moreover, internal/external monitoring will be conducted by TSMC to follow the socio-economic situation of PAHs including vulnerable group.

In addition, the project proponent will consider implementing social contribution activities as necessary under their approach of CSR in order to mitigate the impact on vulnerable group.

(2) Impact of the Project on vulnerable groups of the surrounding community

In construction and operation phase, unexpected impact on living and livelihood of the surrounding community would be arisen due to the construction work and the operation more or less. The project proponent will provide job opportunity and community support program. The project proponent will consider implementing social contribution activities as necessary under their approach of CSR in order to mitigate the impact on vulnerable group.

(3) Impact on the improvement of local economy

During construction and closing phase, there will be expected an increase in job opportunities for the construction and demolished work, e.g., construction worker, selling of fuel for the project vehicle, and food for the workers in the surrounding community due to the influx of construction labors.

During the operation phase, there will be expected an increase in job opportunities continuously because the tenants will start their operation, and fuel for the Project and food for the worker will be supplied from the surrounding community.

Hence, it is judged that the Thilawa SEZ, the Project, would minimize significant negative impact on vulnerable people in the surrounding area.

7.15 Local Conflict of Interests

7.15.1 Forecast Item

The following item was examined to forecast the impact:

- Impact on local conflict of interest caused by the Project between the following:

  1) Relocated PAHs and the host community in the relocation site;
  2) PAHs of Zone A and PAHs of the Project; and
  3) Construction workers and local people.

The conflict which may be caused by job opportunities is predicted and evaluated in Section 7.17 Misdistribution of Benefit and Damage.

7.15.2 Forecast Areas

The area examined to forecast the impact was set in and around the project area.

7.15.3 Forecast Period

As for the pre-construction phase, the period examined to forecast the impact was set after the start of planning and designing of the Project.

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.15.4 Forecast Method

The impact forecast for local conflict of interest was conducted as follows:

- To examine the impact of the Project on local conflict of interest by referring to the proposed plan for the Project.

7.15.5 Forecast Result

(1) Relocated PAHs and Host Community in the Relocation Site

The impact on the local conflict of interest is expected from the pre-construction phase to the operation phase continuously. According to the result of DMS for the Resettlement Framework for 2,000 ha, 226 PAHs will be required to relocate from the project area because of the Project. The population will be suddenly increased during the short period due to the relocation of PAHs in the community. The local people in the community will face more or less changes in various aspects of their life, for example, the increase of users for the existing social infrastructure/ service such as school and village health care center, public well, etc. Therefore, it should be considered and planned the expansion of capacity and the improvement of specification in advance according to the expected demand of future users. In this case, TSMC will support their smooth relocation and arrange the resettlement site for the applicable PAHs with options regarding the location.

On the other hand, the assistance targeted for the relocated PAHs by TSMC may cause a sense of unfairness for the local people in the host community because the project-affected peoples (PAPs) of the resettlement site will be preferentially hired as construction workers for the resettlement site development as a part of IRP. Therefore, it will bring negative feeling for non-PAPs in the surrounding

area that PAPs will take advantage of the development of the proposed relocation site. Moreover, there is a possibility for conflict to arise since their living styles and conditions may be different or it might be difficult to understand the existing social rules and system.

In order to avoid the serious conflict, TSMC will provide support for social integration with host communities and support for establishment of the harmonization by IRP based on the Resettlement Framework for 2000 ha.

(2) PAHs of Zone A and PAHs of the Project

Complaints are expected to arise regarding the difference in the rate of compensation between PAHs of Zone A and PAHs of the Project. However, TSMC will consider the amount of compensation for the PAHs of the Project by taking into consideration the price inflation based on the current economic situation. Through such explanation, conflict between PAHs of Zone A and PAHs of the Project is expected to be avoided.

(3) Construction Workers and Local People

During the pre-construction phase and construction phase, the conflict between construction workers and local people might be anticipated because of the worker's behavior such as bad driving rules or disposing wastes in the community. Therefore, contractor shall provide environmental and safety education training to workers to avoid the conflict with local people as a mitigation measure. The education program should include public health program, safety driving program, and other programs.

As mentioned above, minor negative impacts on local conflict of interest are inevitable during the pre-construction, construction, and operation phases depending on the situation. However, the implementation of IRP and appropriate mitigation measures would minimize the impact for each conflict.

Hence, it is judged that the Project would not cause any significant negative impact on local conflict of interest in the surrounding area.

7.16 Misdistribution of Benefit and Damage

7.16.1 Forecast Item

The following item was examined to forecast the impact:

- Impact of the assistance to be provided by TSMC in the Project on the misdistribution of benefit and damage.

7.16.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.16.3 Forecast Period

As for the pre-construction phase, the period examined to forecast the impact was set after the start of planning and designing of the Project.

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.16.4 Forecast Method

The impact forecast on misdistribution of benefit was conducted as follows:

- To examine the impact of the assistance to be provided by TSMC on the misdistribution of benefit and damage by reviewing the Resettlement Framework for 2,000 ha.

7.16.5 Forecast Result

Generally, the misdistribution of benefit and damage would be anticipated when certain people are unfairly benefitted by the Project and it might be a potential factor to cause local conflict of interest.

Under the Project, the assistance for PAHs such as the assistance for the loss of assets/income source, is basically designed to restore their livelihood to at least the pre-displacement level by mitigating the negative impact of the involuntary resettlement due to the change caused by the Project. Therefore, there is no misdistribution of benefit between PAHs and non-PAHs by the Project as a result of the assistance to be provided by TSMC.

On the other hand, the impact on the living environment of some people who are directly affected by the construction work or by the operation of each tenant is expected. If complaint or clamor about the Project occurs from local people, they can communicate with Environmental and Social Engineer of TPD to solve the raised issues through discussion among stakeholders.

Therefore, these activities would help to establish harmonization with local communities and to balance the social, environmental and economic impacts of the Project by playing positive role as neighbor in Thilawa SEZ. As a result, misdistribution of benefit and damage is minimized by the effort of TPD.

Hence, it is judged that the Project would not cause any significant negative impact related to the misdistribution of benefit and damage in the surrounding area.

7.17 Children's Rights

7.17.1 Forecast Item

The following item was examined to forecast the impact:

- Impact on children's rights of educational opportunity of PAHs in the Project and of local community in and around the project area
- Impact of the Project on increase of child labor

7.17.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.17.3 Forecast Period

As for the pre-construction phase, the period examined to forecast the impact was set after the start of planning and designing of the Project.

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area.

7.17.4 Forecast Method

The impact forecast for children's rights is conducted as follows:

- To examine the population of children in PAHs under the Project by analyzing the results of DMS for the Resettlement Framework for 2,000 ha; and
- To review legal documents on child labor in Myanmar and international project/program on this subject.

7.17.5 Forecast Result

(1) School Children in PAHs

There are 250 school children in total among the relocated PAHs, and these children's educational opportunity will be temporarily disrupted due to the relocation. Currently, majority of the children in PAHs go to the school in and around Thilawa SEZ area. For primary school (B.E.P.S) students, they mostly go to schools in and around the logistic, residence and commercial area. It is located in the urban wards of Thanlyin Township and along the outer boundary of Thilawa SEZ. For middle/high school (B.E.M.S/B.E.H.S) students, they mostly go to schools near urban wards of Thanlyin Township such as along Thanlyin-Kyauktan Road. In case that they relocate in the proposed relocation site in Myan Thar Yar ward, it is expected even those children can continue to go to their school but they have to spend more time/money for the commuting. Since relocation is necessary for some households, TSMC will provide cash assistance for commuting to school and will consider measure to minimize the impact as part of the IRP activities based on the dialogue with PAHs.

(2) Regulation and Rule on Prohibition of Child Labor

The Shops and Establishments Act 1951 provides that children below 13 years old are not permitted to work in any shop, commercial establishment or establishment for public entertainment. It further mentions that no person employed by those shops or establishments shall be permitted to work for more than 8 hours in any day or more than 48 hours in a week. The Factories Act of 1951 prohibits children below 13 years old from working in factories while those 13 years old and above are allowed to work but are required by law to procure a Certificate of Fitness to gain employment[3]. In addition, children between 13-15 years old are not allowed to work in any factory for more than 4 hours a day and between 6 p.m. to 6 a.m. Those 16-17 years old are allowed to work up to 44 hours weekly. (ILO, 2015[4])

As mentioned above, as long as the Project and tenants keep laws in Myanmar, illegal child labor will be prevented in employment of labors. In addition, recommendations by international organizations such as ILO should be referred the Project and tenants for the Thilawa SEZ as international industrial area.

Hence, it is judged that the Project would not cause any significant negative impact on children's rights in the surrounding area.

[3] Amendments to these laws increasing the minimum age to 14 have been submitted to the Parliament.
[4] Myanmar: Child labour knowledge, attitudes and practices (KAP) study in Yangon, Ayeyarwady Region and Mon State / International Labour Office, International Programme on the Elimination of Child Labour (IPEC) / Fundamental Principles and Rights at Work Branch (FUNDAMENTALS) - Geneva: ILO, 2015

7.18 Existing Social Infrastructure and Service

7.18.1 Forecast Item

The following item was examined to forecast the impact:

- Impact on the accessibility to social infrastructure and services for relocated PAHs in the project area and for local people in the surrounding community of the project area.

7.18.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.18.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.18.4 Forecast Method

The impact forecast for existing social infrastructure and services was conducted as follows:

- To examine the impact of the Project on existing social infrastructure and services by referring to the proposed construction plan for the Project.

7.18.5 Forecast Result

(1) Relocated PAHs

For relocated PAHs, the impact of the Project on the accessibility to social infrastructure is unavoidable because they will not be able to/ will be difficult to access the social infrastructure such as schools and hospitals which they usually access before their relocation. On the other hands, the resettlement site will be arranged with basic social infrastructure as a part of the assistance by TSMC for those PAHs. Therefore, it is expected to provide the opportunity for the relocated PAHs to continuously access another social infrastructure even after their relocation.

(2) Local People in the Surrounding Community of the Industrial Area

For local people/community in and around the project area, the accessibility to social infrastructure would be changed because of the construction work and the operation work.

During the construction phase, the access road which connects between Thilawa Road and the industrial area is planned to be newly constructed and it will be designed as the main entrance for coming and going construction vehicles. On the other hand, it is confirmed based on the existing regional information that social infrastructures such as schools and hospitals are located in the populated area outside of Thilawa SEZ. Therefore, even though the traffic congestion might be occurred near the access road due to the temporal increasing on the construction vehicles, it will not be seriously affected to the accessibility to schools and hospitals. However, contractors/the project proponent should control the traffic volume of construction vehicles to avoid the traffic congestion as much as possible.

In operation phase, the impact on social infrastructure and service is expected to some extent in terms of local community scale. Accessibility to social infrastructure and service such as school, hospital and

shops would be affected by the presence of tenants in the Project because most of the tenants in the project area would ban to access their plots after starting operation. It is planned to construct the residential road by the project proponent leading the area along the Yangon River in order to keep or improve the accessibility to the local community.

In terms of the entire regional scale, positive impact is assumed because the basic infrastructures such as existing road and power supply will be improved combined with the development of the Project. As of March 2016, there are several infrastructure development projects ongoing around Thilawa SEZ supported by JICA. One of them is the official development assistance (ODA) loan project in which the development of the Thilawa Port facilities and power related facilities, composing of 50 MW power plant, substation, 33 kV distribution line, 230 kV transmission line, and gas pipeline. In addition, the improvement of the access road from Yangon City to Thilawa SEZ has also been planned in Phase II. Based on above, the improvement of the infrastructure in and around Thilawa SEZ area would bring smooth transportation and stable power supply to the surrounding community.

Hence, it is judged that the Project would not cause any significant impact on the social infrastructure and services in the surrounding area.

7.19 Water Usage

7.19.1 Forecast Item

The following item was examined to forecast the impact:

- Impact of the Project on water usage for daily life and on local water resources in and around the project area.

7.19.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.19.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.19.4 Forecast Method

The impact forecast on water usage and water rights is conducted as follows:

- To examine the impact on water usage for daily life and on local water resources in and around the project area by referring to the proposed construction plan and water supply plan for the Project.

7.19.5 Forecast Result

(1) During Construction Phase

In Thanlyin Township side of Thilawa SEZ, about 20 households would be affected by the development of the project area based on the results of DMS because they were cultivating not only monsoon paddy but also summer paddy fields by utilizing the irrigated water from the existing water source near Thilawa SEZ. In addition, there are confirmed two wells (shown as “Wells No.1 and No.2”) used for domestic and drinking water adjacent to the residence and commercial areas as described in Figure 7.19-1 based on the site reconnaissance. Residents in Alunsut Village are mainly using these wells and they would be affected in their water use in case these well cannot be utilized due to the activities of the Project.

However, the loss of income source for these households will be compensated by providing the assistance package based on the Resettlement Framework for 2000ha by TSMC. This assistance is especially designed under taking the loss of income for semiannual rice cultivation in dry and rainy seasons into consideration. And also, it is expected that these two wells near the project area will be kept the utility continuously during the construction phase. Therefore, the impact on water usage is expected to be limited due to the construction work.

During the construction phase, adequate amount of water to be used for the construction work would be secured from the outside or groundwater inside the Project area by the project proponent/contractor. Existing local water resources such as Thilawa Reservoir or Zarmani Reservoir would not be used for the construction work for the Project. In addition, the volume of water used for the construction work is expected to be limited such as for washing construction machines or sprinkling water to construction site. Discharging muddy water from bare land of construction site will just be temporary

and wastewater from a construction camp will be properly treated by the septic tanks. Therefore, the impact of water usage for the construction work on the local water resource is expected to be negligible.

Source: EIA Study Team

Figure 7.19-1 Situation of Water Usage in and around Residence and Commercial Areas

(2) Operation Phase

Based on the water supply plan for the Project, water from Zamani Reservoir is planned to be transmitted to the water purification plant (WPP) (Q=6,000 m^3/day) established in Zone A through the pipe by the pump. The treated water from WPP is distributed to each tenant. Meanwhile, one Japanese ODA loan project is ongoing in which the public water supply pipe from Lagumbine Reservoir to Thilawa SEZ would be established. Proposed unit volume of water supply (daily maximum water flow) is 115 m^3/ha/day by 2018. The amount of water consumption will be well controlled without causing impact on the local water usage. Considering the progress of the above project, the water supply plan for Zone B is prepared in two stages as shown in Table 7.19-1.

Table 7.19-1 Water Supply Plan in the Project Area

Timing	Planned Water Source
Before 2019(Before the water supply pipe has been installed)	Distribute water to each tenant from WPP (Water Purification Plant) in Zone A by pumping
After 2019(After the water supply pipe has been installed)	Two water source will be used in parallel, - Distribute water to each tenant from WPP in Zone A by pumping and, - Connect to the public water supply pipe

Source: EIA Study Team

According to the drainage plan of the project area, drainage water from the project area will be discharged to Alunsut Creek that connects to the Yangon River. Regarding the water usage for daily living, the deterioration of water quality of the wells and lake adjacent to the project area is anticipated due to the discharged water from tenants during the operation phase. However, the water discharge from tenants will be treated at the treatment plant to comply with the industrial wastewater effluent guideline value stipulated by MOI and MOECAF and internal regulations to be prepared by TPD. Therefore, the impact on water usage along Alunsut Creek for the daily life of the local people is expected to be limited in the project area.

Hence, it is judged that the impact on water usage and water rights caused by the Project during the construction and operation phases would not cause any significant social impact in the surrounding area.

7.20 Cultural Heritage/ Asset

7.20.1 Forecast Item

The following item was examined to forecast the impact:

- Existence and alteration of common assets in the project area.

7.20.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.20.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

7.20.4 Forecast Method

The impact forecast for cultural heritage is conducted as follows:

- To overlap the existence of common assets and the project-affected area whether alternation of common assets would occur because of the Project.

7.20.5 Forecast Result

Common assets as shown in Table 7.20-1 are located in and around the project area.
One cemetery is located in the logistic area, and one Hindu temple are located in the residence and commercial area. They are mainly used by villagers in Alunsut Village under the ownership of the village, and called as Outt Ywar Su Cemetary and Siri Sadal Mune Warat Temple. Therefore, it is expected that villagers will not be able to use this cemetery and Hindu temple because the area is required the clearance before the commencement of construction work. In this case, it should be made the adequate dialogue between villagers and TSMC in order to discuss the necessity of relocation and the arrangement of alternative place for these assets.

Meanwhile, one cemetery and two Hindu temples and three monasteries are located outside but adjacent of the project area. These are all located inside Thilawa SEZ.These assets are used by villagers in Alunsut Village, Phayarkone and Aye Myar Thidar under the ownership of the respective village. These are not required to relocate by the Project, however, it will be required to relocate at the time of further development of the industrial area. In that stage, TSMC should be made the adequate dialogue with villagers in order to discuss the necessity of relocation and the arrangement of alternatives.

Table 7.20-1 Common Assets Located in and around Project Area

No	Type of Asset (name)	Address of Asset	Total No. of Applied Households	Remark
1	Cemetery (Outt Ywar Su Cemetary)	Alunsut, Thanlyin	50	Inside of logistic area (inside Thilawa SEZ)
2	Hindu Temple (Siri Sadal Mune Warat Temple)	Alunsut, Thanlyin	35	Inside of residence and commercial area (inside Thilawa SEZ)
3	Cemetery (A Paw Ywar Su Cemetary)	Alunsut, Thanlyin	400	Outside of logistic area (inside Thilawa SEZ)
4	Hindu Temple (Phan Chat Hindu Temple)	Phayarkone, Thanlyin	100	Outside of residence and commercial area (inside Thilawa SEZ)
5	Hindu Temple (N.A.)	Aye Myar Thidar, Kyauktan	20	Outside of logistic area (inside Thilawa SEZ)

Note: Total no. of applied households is based on the interview results.
Source: EIA Study Team

In order to minimize the impact mentioned above, affected common assets should be relocated to the appropriate location based on the dialogue between TSMC and the local people.

Hence, it is judged that the impacts on common assets in the Project would not cause any significant social impact.

7.21 Landscape

7.21.1 Forecast Item

The following items were examined to forecast the impact:

- Existence and alteration of landscape resources in the project area
- Landscape design within the SEZ

7.21.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.21.3 Forecast Period

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

7.21.4 Forecast Method

The impact forecast for landscape was conducted as follows:

- To examine the existence of landscape resources and whether alteration of landscape resources would occur as a result of the construction work of the Project

7.21.5 Forecast Result

(1) Existence and Alteration of Landscape Resources

According to the existing statistic data for land use in Thanlyin and Kyauktan townships, the main land use is agricultural land which is followed by water area and settlement area. Especially, Thanlyin Township has more human settlement area since the population is almost double of the one in Kyauktan Township. Focusing on the inside of Thiawa SEZ area, it was confirmed that agricultural land and grass land dominates the type of land use from the result of field survey conducted by EIA Study Team. Based on above, landscape of Thilawa SEZ is composed of ordinary human living area and agri-purpose land such as paddy fields.

On the other hand, the landscape has been changed time by time since the construction work for Thilawa SEZ Zone A has been started in the late of 2013. Agricultural land has been cleared and altered as the industrial zone, and then several tenants has been moved into already and partly started their operation.

Therefore, it is expected that the development of the project area as the part of Zone B will push the semi-urbanization of the existing landscape more under the current situation of the development of Zone A.

(2) Landscape Design within the SEZ

The internal regulation of TPD for the development of Thilawa SEZ mentions that the owner of tenant shall be responsible for landscaping the plot and maintaining the same in a well-kept condition including, but not limited to, trimming, watering and fertilization. Moreover, it is also mentioned that the landscape of each plot shall be harmonized with the public space of Thilawa SEZ. In addition, according to the master plan, it is proposed to develop with respecting the existing Alunsut Creek

flowing near the residence and commercial area in Thanlyin Township with aiming to create a unique and efficient landscape.

Therefore, as long as the tenants follows the internal regulation, the landscape of the project area is expected to be maintained well so as to secure the environmental friendliness for users and residents around the Project.

Hence, it is judged that the landscape in the Project would be well controlled and managed, and new urban landscape would be developed in the area.

7.22 Risks for Infectious Diseases such as AIDS/HIV

7.22.1 Forecast Item

The following item was examined to forecast the impact:

- Impact on the risks for infectious diseases such as AIDS/HIV which might occur during the construction work/operation work of the Project.

7.22.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.22.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area.

7.22.4 Forecast Method

The impact forecast for the risk for infectious diseases was conducted as follows:

- To examine the risks for infectious diseases such as AIDS/HIV by considering the construction work plan/operation work plan for the Project.

7.22.5 Forecast Result

(1) During Construction /Closing Phase

Risks for infectious diseases such as AIDS/HIV would be expected during construction work/ demolition work due to the influx of construction workers from outside. As a pre-training for the workers, lecture on the management of AIDS/HIV for health and safety will be provided with the appropriate languages for workers during the pre-construction phase by the contractor. Moreover, the situation of incidents regarding AIDS/HIV will be monitored by the contractor regularly, and the contractor will report, with the appropriate countermeasure, to the project proponent if any incident might occur during the construction and closing work. Therefore, it is expected that the impact on the risks for infectious disease such as AIDS/HIV will be managed and controlled during the construction /closing phases.

(2) Operation Phase

Risks for infectious diseases such as AIDS/HIV would be expected during the operation phase due to the influx of workers from outside. Similar to that during construction/closing phase, the situation of incidents regarding AIDS/HIV will be monitored by each tenant regularly, and the respective tenants will report, with the appropriate countermeasure, to the project proponent if any incident might occur during the operation phase. Therefore, it is expected that the impact on the risks for infectious disease such as AIDS/HIV will be managed and controlled.

Hence, it is judged that the Project would not cause any significant social impact on infectious diseases.

7.23 Occupational Health and Safety

7.23.1 Forecast Item

The following item was examined to forecast the impact:

- Impact on occupational health and safety which might occur during the construction/operation/closing work of the Project.

7.23.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.23.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area.

7.23.4 Forecast Method

The impact forecast for occupational health and safety was conducted as follows:

- To examine the impact on occupational health and safety by considering the construction/operation work plan for the Project.

7.23.5 Forecast Result

(1) During Construction /Closing Phase

Working condition during construction/demolition work should be managed by contractor based on occupational health and safety (OHS) training stipulated in the international guidelines such as EHS Guidelines by IFC. Contractor will prepare the action plan to cover several types of accidents such as heavy equipment accident, traffic accident, and third party accident. Also, the standard of working condition for safety, health, and hygiene will be formulated and implemented to properly keep the standards of the working environment.

(2) Operation Phase

Accidents or incidents are expected more or less depending on the type of business of the tenants during the operation phase for the logistic and commercial areas. In order to prevent them and minimize the possibility, each tenant should formulate the environmental management plan based on the respective contents of EIA. The tenants will prepare the accident prevention plan for safety, health, and hygiene for the worker based on OHS training stipulated in the international guidelines such as EHS Guidelines by IFC.

Based on above, the occupational health and safety will be managed by the contractor and each tenant under the internal regulation of the project proponent. Therefore, only minor negative impacts on occupational health and safety in each phase are expected.

Hence, it is judged that the Project would not cause any significant negative impact on occupational health and safety.

7.24 Community Health and Safety

7.24.1 Forecast Item

The following item was examined to forecast the impact:

- Impact on community health and safety which might occur during the construction/closing work in the project area.

7.24.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.24.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after all residential and commercial buildings would be fully occupied and all tenants in the logistic areas would start their operation.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area.

7.24.4 Forecast Method

The impact forecast for community health and safety was conducted as follows:

- To examine the impact on community health and safety during the construction/closing phases by considering the construction/closing work plan for the Project.
- To examine the impact on community health and safety during the operation phase by considering the operation work plan for the Project.

7.24.5 Forecast Result

(1) Construction Phase/Closing Phase

Impact on community health and safety such as third party accidents due to the increase of vehicle traffic and operation of construction machineries is expected. Moreover, indirect impacts such as risks for infectious diseases or garbage disposal due to the influx of construction workers are also expected. In order to minimize the negative impacts such as conflict between construction workers and local people in the community, the contactor shall manage the workers by providing training based on international guidelines such as the EHS Guidelines by IFC during the construction/closing phase.

(2) Operation Phase

During the operation phase, the influx of workers of the tenants and the increase of vehicle traffic would bring negative impact on the health and safety in the surrounding community of the project area. In order to mitigate these impacts, each tenant will formulate an environmental management plan based on the respective contents of EIA in order to mitigate these impacts.

As mentioned above, minor negative impacts on community health and safety are inevitable. However, appropriate mitigation would minimize each impact.

Hence, it is judged that the Project would not cause any significant negative impact on community health and safety in the surrounding area.

7.25 Usage of Chemicals

7.25.1 Forecast Item

The following item was examined to forecast the impact:

- Risk on usage of chemicals which might increase during the operation phase of the logistic and commercial activities in the Project.

7.25.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.25.3 Forecast Period

As for the operation phase, the period examined to forecast the impact was set after the start of the operation of all phases when all the tenants in the logistic and commercial areas start their operation.

7.25.4 Forecast Method

The impact forecast for usage of chemicals was conducted as follows:

- To examine the risk on usage of chemicals during the operation phase by considering the management activities to be carried out by the tenants.

7.25.5 Forecast Result

At present, the types of activities of tenants moving into the logistic and commercial areas could not be clearly expected. Although the project proponent is not supposed to accept tenants whose operation is related to heavy chemical industries, some tenants would use chemicals to be managed under specific condition. Such tenants should have a chemicals management plan which shall regulate their storage and usage condition. Under the plan, each tenant would secure specific storage site for chemicals, record the amount of chemicals used, provide the required training for safe usage, and prepare emergency response plans in case of emergency.

In addition, under the Law on Prevention of Danger by Chemical and Associated Materials (No.28/2013), the tenant dealing with vapor and oily liquid materials and solid having active chemical reaction should have the registered certifications for dealing with such chemicals, and conduct required actions stipulated under the abovementioned law, i.e: (a) classify the danger level according to the properties of the chemicals, (b) reveal the danger warning sign, (c) attend the training for maintaining personal protective equipment and using them systematically to prevent accident, and (d) carry out the stipulations under the law in connection with the transporting, storing, using, and disposing of the chemicals. In case that each tenant operates the chemical management plan properly, the risk of usage of chemicals can be reduced to an acceptable level.

Therefore, the risk of usage of chemicals is expected to be limited through the implementation of proper chemical management plans by the tenants with the regular monitoring of the project proponent.

7.26 Flood Risk

7.26.1 Forecast Item

The following item was examined to forecast the impact:

- Flood risk which might occur during the construction/operation/closing phases of the Project.

7.26.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.26.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after the start of the operation of all phases when all the tenants in the industrial area start their operation and people start to live in the residence area.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area.

7.26.4 Forecast Method

The impact forecast for flood risk was conducted as follows:

- To examine the impact on flood risk during the construction/operation/closing phases by considering the project plan.

7.26.5 Forecast Result

(1) Construction/Operation/Closing Phases

The elevation under the land reclamation plan of the Project is planned to be EL+5.0 m, which is higher than the highest water level of EL+4.24 m recorded at the Myanmar International Terminals Thilawa (MITT) of Thilawa Port. In addition, appropriate drainage system will be installed so as to prevent inundation in the project area.

Hence, it is judged that flood risk is expected to be minimized by setting the abovementioned elevation level and appropriate drainage system in the proposed project plan.

7.27 Risk of Fire

7.27.1 Forecast Item

The following items were examined to forecast the impact:

- Risk of fire which might increase due to the construction/closing work of the Project.
- Risk of fire which might increase due to the operation of the Project.

7.27.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.27.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after the start of the operation of all phases when all the tenants in the industrial area start their operation and people start to live in the residence area.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area.

7.27.4 Forecast Method

The impact forecast for fire risk was conducted as follows:

- To examine the increase of risk of fire during the construction/closing phase by considering the construction/closing work-plan for the Project; and
- To examine the increase of risk of fire during the operation phase by considering the proposed internal regulations for the logistic and commercial areas prepared by TPD.

7.27.5 Forecast Result

(1) Construction Phase

Risk of fire would increase due to the construction works and laborer's camp. However, it would be limited because the TSMC will regulate and apply the "building construction and fire safety rule" in the project area. According to this rule, investors shall apply for a Fire Safety Certificate to the Construction Section through the front office of the One Stop Service Center (OSSC) before construction. The application includes the following drawings: 1) architectural drawings (layout plan, finishing schedule, floor plans, elevations and sections), 2) means of egress (fire escape plan), 3) emergency lighting and exit signs, 4) fire alarm and detection system, 5) emergency generator, 6) fire hydrant (hose reel), 7) fire extinguisher, 8) sprinkler (if necessary), 9) dry riser/ breeching inlet (if necessary), 10) lightning arrester, 11) hazardous material safety plan, and 12) other items required by the Construction Section of OSSC. Investors should receive the certificate during the pre-construction phase.

In addition, internal regulation will be prepared for the logistic and commercial areas that obligates the installation and maintenance of security and safety measures and devices suitable for use during construction.

(2) Operation Phase

Risk of fire would increase due to the economic activities of the tenants and population growth in and around the project area. To minimize the impact, the abovementioned TSMC rule and the internal regulation for the logistic and commercial areas will be applied and obligate tenants to install appropriate security and safety system for their operations. The tenants shall install and maintain an effective fire alarm system and firefighting system for each building in the plot with reference to the rule and regulation.

(3) Closing Phase

Risk of fire would be generated during the closing work such as demolition of facilities and removal of tenants in the logistic and commercial areas. However, mitigation measures that will be applied during the construction phase will also be applied during the closing phase to minimize the impact.

As mentioned above, risk of fire are expected. However, appropriate mitigation measures will minimize the impact. Hence, it is judged that the Project would not cause any significant negative impact related to the risk of fire.

7.28 Earthquake

7.28.1 Forecast Item

The following item was examined to forecast the impact:

- Earthquake damage which might be extended during the construction/operation/closing phases of the Project.

7.28.2 Forecast Area

The area examined to forecast the impact was set in the project area.

7.28.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after the start of the operation of all phases when all the tenants in the logistic and commercial areas start their operation and people start to live in the residence area.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area.

7.28.4 Forecast Method

The impact forecast for earthquake damage was conducted as follows:

- To examine the earthquake damage extended by the Project during the construction/closing phases by considering the construction/closing work-plans for the Project.
- To examine the earthquake damage extended by the Project during the operation phase by considering the residential structures in the residence area and environmental management by each tenant of the logistic and commercial areas.

7.28.5 Forecast Result

(1) Construction and Closing Phases

Yangon has experienced several huge earthquakes in the past as mentioned in Chapter 4 and there is a possibility that earthquake will occur in and around Thilawa SEZ. If earthquake occurs during the construction/closing phases, the damage would be extended to some extent such as collapse of stage planks or buildings and injury by falling object. To minimize the damage by earthquake, working condition and disaster prevention activities should be managed by the contractor based on OHS training stipulated in international guidelines such as the EHS Guidelines of the IFC.

(2) Operation phase

If earthquake occurs during the operation phase, the damage would be extended in the project area including buildings/factories of each tenant and the residential structures. To minimize the damage, the tenants' buildings and the residential structures should be designed and constructed properly to meet required standards such as earthquake resistance standards. As of March 2016, there are no enforced earthquake resistance standards in Myanmar. However, the Provisional Myanmar National Building Code 2012 was issued by the Ministry of Construction in Myanmar which sets the building design requirements including strength design. OSSC of TSMC has inspected the tenant's building

design with reference to this Code 2012. Emergency response plan for earthquake should be established by each tenant, and emergency drill should be implemented by the tenants to minimize the negative impact of earthquake.

Hence, it is judged that the earthquake damage during the construction/operation/closing works of the Project is expected to be limited because of the disaster prevention activities and application of earthquake resistance standards by the tenants.

7.29 Global Warming

7.29.1 Forecast Item

The following items were examined to forecast the impact:

- Greenhouse gas (GHG) emission increase due to the construction work of the Project; and
- GHG emission increase because of the Project during the operation/closing phases.

7.29.2 Forecast Area

The area examined to forecast the impact was set in and around the project area.

7.29.3 Forecast Period

As for the construction phase, the period examined to forecast the impact was set during the implementation of the construction work for the Project.

As for the operation phase, the period examined to forecast the impact was set after the start of the operation of all phases when all the tenants in the logistic and commercial area start their operation and people start to live in the residence area.

As for the closing phase, the period examined to forecast the impact was set during the implementation of the closing work in the project area.

7.29.4 Forecast Method

The impact forecast for global warming was conducted as follows:

- To examine GHG emission during the construction/closing phases by considering the construction/closing work-plans for the Project.
- To examine GHG emission from tenants in the project area and vehicle traffic during the operation phase by considering the proposed internal regulations prepared by TPD

7.29.5 Forecast Result

(1) Construction Phase

GHG will be discharged from construction machineries and vehicles to some extent during the construction phase. To minimize GHG emission during the construction phase, mitigation measures shall be taken by the contractor, such as management of operation time of construction machineries, avoidance of excessive loading operation, and education of construction workers/drivers about the idling stop practice for construction machineries and vehicles.

(2) Operation Phase

GHG will be emitted by vehicles related to the Project, from the operation of tenants and private cars of the residents. The minimization of GHG emission will be recommended by MJTD to all tenants for their operations as much as possible. Besides, the utilization of commuter bus for workers to reduce traffic GHG emission will be initiated by the tenants.

(3) Closing Phase

GHG will be emitted from construction machineries and vehicles to some extent due to closing work such as demolition of facilities and removal of tenants. As is the case in the construction phase, GHG emissions would be reduced by mitigation measures for controlling GHG emissions.

Hence, it is judged that GHG emission due to the construction/operation/closing works of the Project would not cause any significant impact on global warming.

CHAPTER 8: ENVIRONMENTAL AND SOCIAL CONSIDERATIONS IN CLOSING, TERMINATINON, AND AFTER TERMINATION

The "closing" hereby means demolition of facilities and structures within the project site. Whereas, "termination" and "after termination" mean complete stop of the Project (and returning the project site to pre-project condition) after the closing. The project proponent does not expect to close and terminate the operation of Thilawa Special Economic Zone B logistic, and residence and commercial areas at this moment. On the other hand, in case closing and termination of tenants in Thilawa Special Economic Zone B logistic, residence and commercial areas will occur in the future the project proponent and each tenant in the logistic area will take necessary environmental mitigation measures in the termination phase as shown in Table 8.1-1Table 8.1-1. The project proponent will confirm their performance of environmental mitigation measures especially soil remediation, treatment of chemical and hazardous substances after termination of tenant, and report it to TSMC as shown in Table 8.1-2

Table 8.1-1 Mitigation and Consideration Measures in the Termination Phase

Category	Item	Mitigation and Consideration Measures	Responsibility
Pollution	Waste, Soil contamination, Chemical	- Implementation of soil contamination survey including laboratory analysis. - Treatment or removal of contaminated soil if contamination is found in the project site. - Preparation of report to certify completion of treatment or removal of contaminated soil and its submission to the project proponent.	Project Proponent/ Tenant

Source: EIA Study Team

Table 8.1-2 Mitigation and Consideration Measures after the Termination Phase

Category	Item	Mitigation and Consideration Measures	Responsibility
Pollution	Waste, Soil contamination, Chemical	- Confirmation of the termination of tenants and performance of treatment or removal of soil contamination. - Report the results of confirmation of termination of tenants and the performance of treatment or removal of soil contamination to TSMC.	Project Proponent/ Tenant

Source: EIA Study Team

CHAPTER 9: ENVIRONMENTAL MITIGATION, MANAGEMENT AND MONITORING PLAN

9.1 Environmental Mitigation and Management Plan

As for the environmental items evaluated as A^- or B^- in accordance with the result of the impact assessment described in Chapter 7, the proposed Environmental Management Plans (EMPs) including mitigation measures to reduce and minimize the negative impacts for each phase of the Project: pre-construction phase, construction/closing phase, and operation phase, are prepared as shown in Table 9.1-1 to Table 9.1-3.

In implementation of the resettlement, the Thilawa SEZ Management Committee (TSMC) coordinated by two committees, namely: Relocation Implementation Committee (RIC) and Income Restoration Program Implementation Committee (IRPIC), will be responsible for the actual relocation and resettlement works in Thilawa SEZ, including income restoration program.

Table 9.1-1 Environmental Mitigation and Management Plan (Pre-construction Phase)

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of Expenditure
Social Environment	Involuntary Resettlement	- Change of livelihood of relocated households - Social impact to the host community/household in the resettlement site	- Implementation of the Income Restoration Program for PAHs - Preliminary discussion with the host community/household - Provision of adequate compensation and assistance for land owners/former residents in the resettlement site	TSMC	TSMC	Cost for assistance package defined by the Resettlement Work Plan (Assistance Package)
	Living and Livelihood	- Impact of loss of livelihood opportunity, especially land-based livelihood such as paddy field and/or vegetable field	- Full implementation of the income restoration program	TSMC	TSMC	
	Vulnerable Group	- Change the living condition	- Additional assistance based on the resettlement framework for 2000 ha	TSMC	TSMC	
	Cultural Heritage/ Asset	- Impact on common asset	- Discussion with relevant community	TSMC	TSMC	

Source: EIA Study Team

Table 9.1-2 Environmental Mitigation and Management Plan (Construction/Closing Phase)

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
Pollution	Air Quality	- Impact of air pollution, dust/emission gases by construction work	- Sprinkle water around the project site and roads. - Avoidance of intensive operation of construction machineries	Contractor	Project Proponent	- Water and car running cost for sprinkling water
	Water Quality	- Discharging muddy water from bare land - Wastewater from construction camps	- Installation of settling ponds or simple turbid water treatment - Installation of septic tank - Preparation of the discharge water treatment plan	Contractor	Project Proponent	- Equipment Installation Cost
	Waste	- Construction waste by cut earthwork	- Reuse the residual soil generated in cutting work for filling work in the site - Preparation and implementation of the waste management program	Contractor	Project Proponent	-Included in construction cost
	Noise and Vibration	- Impacts of noise and vibration by construction machineries and vehicles	- Installation of sound-proofing sheet, - Avoidance of construction at nighttime, - Advanced notice for construction work time near the monastery and residential area - Avoidance of intensive operation of construction machineries - Speed limit for drivers	Contractor	Project Proponent	- Facility installation cost - Education cost - Miscellaneous expenses
Natural Environment	Flora, Fauna, and Biodiversity	- Clearance of existing vegetation	- Clear marking of boundary of the project site to prevent the contractor from clearing the vegetation outside of the project site	Contractor	Project Proponent	-Miscellaneous expenses
	Hydrology	- Impact on hydrology due to water consumption used in the construction work	- Limited and short term usage of groundwater - Preparation of tentative retention pond	Contractor	Project Proponent	- Construction cost for tentative retention pond
	Soil Erosion	- Soil erosion of the bank	- Provision of temporary drainage and/or sandbag to minimize soil erosion of the bank due to rainy water	Contractor	Project Proponent	-Miscellaneous expenses
Social Environment	Living and livelihood	- Impact on the living and livelihood by construction works	- Implementation of the income restoration program	TSMC	TSMC	- Assistance Package
			- Advanced notice for construction work time - Avoidance of intensive operation of construction vehicle	Contractor	Project Proponent	-Miscellaneous expenses
	Local Conflict	- The conflict between construction workers and local people	- Education training to workers to avoid the conflict with local people	Contractor	Project Proponent	- Education cost
	Misdistribution	- Misdistribution	- Livelihood restoration	TSMC	TSMC	-Assistance Package

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
	Benefit and Damage	benefit and damage between PAHs and non-PAHs	activities for PAHs by Assistance Package			
			- Establishment of the community relation department	Project Proponent	Project Proponent	-Operation cost
	Children's right	- Spend more time /money to coming school	- Assistance for coming school	TSMC	TSMC	-Assistance Package
		- Illegal child labor	- Compliance with the relevant regulations	Contractor	Project Proponent	
	Existing Infrastructures and Services	- Accessibility to social infrastructure would be relocated PHHs	- Assistance for arrange of basic social infrastructure	TSMC	TSMC	-Assistance Package
	Water Usage	- Impact on the daily water use of local people by well of lake near project site	- Assistance for daily water use as necessary	TSMC	TSMC	-Assistance Package
Health and Safety	Risks for infectious diseases such as AIDS/HIV	- Risks for infectious disease by inflow of construction workers	- Training and awareness rising for workers	Contractor	Project Proponent	- Education cost
	Occupational Health and Safety	- Accidents in the operation of construction machinery and increase of traffic volume during construction	- Conducting training activities for construction workers based on OHS training stipulated in the international guidelines such as EHS Guidelines of IFC - Arrange the accident-prevention measures	Contractor	Project Proponent	- Education cost - Cost for installation of safety facilities - Equipment purchase cost
	Community Health and Safety	- Accidents of residents by construction vehicles - Dust and noise due to the construction activities	- Speed limit for drivers - Sprinkle water around the project site and roads. - Avoidance of intensive operation of construction machineries	Contractor	Project Proponent	- Education cost - Water and car running cost for sprinkling water
Emergency	Flood Risk	- Increase of the impact of flood in and around the projects site	- Preparation of the disaster prevention equipment and management manual	Contractor	Project Proponent	- Education cost - Equipment purchase cost
	Risk of Fire	- Impact on the community around the project site by increasing of risk of fire	- Compliance with the TSMC's regulation for building construction and fire safety	Contractor	Project Proponent	- Education cost - Equipment purchase cost
	Earthquake	- Increasing of the damage of the earthquake in and around the projects site	- Preparation of the disaster prevention equipment and management manual	Contractor	Project Proponent	-Education cost -Equipment purchase cost
Others	Global Warming	- Emission of greenhouse gases (GHGs) construction machineries and vehicles	- Control of GHGs emission in the construction work	Contractor	Project Proponent	- Miscellaneous expenses

Source: EIA Study Team

Table 9.1-3 Environmental Mitigation and Management Plan (Operation Phase)

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
Pollution	Air Quality	- Impact of air pollution caused by the tenants	- Provision of commuter bus - Speed limit for drivers in the project area	Tenants including Project Proponent	Tenants including Project Proponent	- Bus Operation cost
	Water Quality	- Effluent water from tenants and offices in logistic area, and residence and commercial area	- Operation and maintenance of wastewater treatment	Tenants	Tenants	- Installation cost - O&M cost
	Waste	- Impact of waste generated from factories and offices.	- Management of non-hazardous waste from tenants and utility area of themselves	Tenants	Tenants	- Disposal cost
			- Management of hazardous waste by tenants	Tenants	Tenants	- Treatment cost - Disposal cost
	Soil Contamination	- Soil contamination is caused by the tenants and offices	- Control of solid and liquid waste which causes soil contamination	Tenants	Tenants	- Treatment cost
	Noise and Vibration	- Noise and vibration from tenants	- Preparation of the sound barrier as necessary	Tenants	Tenants	-Installation cost
	Offensive Odor	- Odor caused by the tenants.	- Control of emission gas and waste which causes offensive odor, as necessary	Tenants	Tenants	- Treatment cost
	Bottom Sediment	- Impact on bottom sediment by discharge water	- Operation and maintenance of the centralized wastewater treatment system	Project Proponent	Project Proponent	- Installation cost - O&M cost
Natural Environment	Flora, Fauna, and Biodiversity	- Impact of changing the vegetation	- Planting trees, vegetation, sodding of public spaces such as road, and other open space of each tenant	Tenants and Project Proponent	Tenants and Project Proponent	- Maintenance cost
	Hydrological	- Impact on hydrology due to the change in land use.	- Maintenance of existing canal condition to keep its natural retention function	Project Proponent	Project Proponent	- Maintenance cost
	Soil Erosion	- Impact on existing canal by discharge water	- Maintenance of existing canal condition to keep its natural retention function	Project Proponent	Project Proponent	- Maintenance cost
Social Environment	Living and Livelihood	- Impact on the living and livelihood for PAHs due to involuntary resettlement and for local communities	- Implementation of the income restoration program	TSMC	TSMC	-Assistance Package
	Water Usage	- Impact on the daily water use of local people by well of lake near project site	- Management of drainage ditch and maintenance existing creek crossing the Zone B logistic, residence and commercial areas	Project Proponent	Project Proponent	- Installation cost - O&M cost
	Landscape	- Impact on the landscape	- Following the rule of landscape in accordance with proposed internal regulation for residence and commercial proposed internal regulations	Tenants including Project Proponent	Tenants including Project Proponent	- Design and construction cost
Health and Safety	Risks for Infectious Diseases such as AIDS/HIV	- Risks for infectious diseases by inflow of workers.	- Training and awareness rising for workers	Tenants including Project Proponent	Tenants including Project Proponent	-Education cost

Category	Item	Expected Environmental and Social Impacts	Proposed Environmental Mitigation Measures and Environmental Management	Implementing Organization	Responsible Organization	Item of expenditure
	Occupational Health and Safety	- Accidents of tenant's workers. - Working conditions and safety of the operation phase	- Conduct training activities for workers based on OHS training stipulated in the international guidelines such as EHS Guidelines of IFC - Accident-prevention measures	Tenants	Tenants	- Education cost - Cost for installation of safety facilities
	Community Health and Safety	- Accidents of residents by operation vehicles - Emission and noise due to the operation activities	- Speed limit for drivers - Avoidance of intensive operation of the tenants' machineries	Tenants	Tenants	- Education cost - Cost for installation of safety facilities
Emergency	Usage of Chemical	- Risk of chemical material	- Training of safety usage and preparation of the emergency response plans - Implementation of the proper storage and record of usage.	Tenants	Tenants	-Education cost - Equipment purchase cost
	Flood Risk	- Increasing of the impact of flood in and around the projects site	- Preparation of the disaster prevention equipment and management manual	Tenants including Project Proponent	Tenants including Project Proponent	-Education cost - Equipment purchase cost
	Risk of Fire	- Impact on the community around the project site by increasing of risk of fire	- Installation of the fire hydrants along the road - Implementation of emergency drill	Tenants including Project Proponent	Tenants including Project Proponent	-Education cost - Equipment purchase cost
	Earthquake	- Increasing of the damage of the earthquake in and around the projects site	- Compliance with the TSMC's Standard Operational Procedure for (SOP) for building construction - Preparation of the disaster prevention plan such as emergency contact list	Tenants including Project Proponent	Tenants including Project Proponent	-Education cost - Equipment purchase cost
Others	Global Warming	- Impact in the increase of GHGs by vehicle traffic operation of tenants in the operation phase.	- Control of GHGs emission by the tenants - Provision of commuter bus	Tenants	Tenants	- Installation cost - O&M cost - Bus operation cost

Source: EIA Study Team

9.2 Environmental Monitoring Plan

The environmental monitoring plan including monitoring items, location, frequency, and responsible organization at the pre-construction phase, construction phase, and operation phase are shown in Table 9.2-1 to Table 9.2-3. Responsible organizations implement monitoring activities and preparation of monitoring report on its results. The project proponent will submit the monitoring report at three stages to TSMC. The proposed monitoring form is shown in Annex 9-1.

Table 9.2-1 Monitoring Plan (Pre-construction Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Checking and revising the Environmental Mitigation and Management Plan by reviewing the final detailed design of the Project - Checking the Environmental Monitoring Plan during Construction prepared by Contractor	Project Site	Once	Contractor
Social Environment	- Monitoring of the implementation status of the Assistance Package for involuntary resettlement, living and livelihood, vulnerable group and cultural heritage/ asset	Project Site and Relocation Site	Once	TSMC
Existing social infra-structures and services	- Securing of community accessibility	Around Project Site	Once	Contractor

Source: EIA Study Team

Table 9.2-2 Monitoring Plan (Construction Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	Each location	Once/month	Contractor
Air Quality	- NO_2, SO_2, CO, $PM_{2.5}$, PM_{10}	Construction site (1 point)*	1 week/3 months	Contractor
Water Quality	- Water temperature, pH, SS, DO, BOD_5, COD, coliforms, oil and grease, chromium	- Outflow of construction site to the creek (at least 3 sampling points/mixing point: i) discharge water, ii) upstream water, and iii) downstream water) ** - Well near the construction site (1 point)	Once/2 months	Contractor
Waste	- Amount and kind of solid waste	Construction site	Once/3 months	Contractor
Noise and Vibration	- Noise and vibration level - Traffic count	Preservation area such as residence around the proposed construction site (at least 1 point)	Once (24 hours)/3 months	Contractor
		preservation site such as residence along the route for on-site vehicles (2 points)	Once (24 hours)/3 months	Contractor
Hydrology	- Groundwater level - Ground elevation level - Consumption of groundwater amount	Well near the construction site	Once/ months	Contractor
Risks for Infectious Disease such as AIDS/HIV	- Awareness of infectious diseases	Construction site	Once/month	Contractor
Occupational Health and Safety	- Record of accidents and infectious diseases	Construction site	Once/month	Contractor
Community Health and Safety	- Record of accidents and infectious diseases related to the community	Around construction site	Once/month	Contractor

Source: EIA Study Team

Note: *Air quality monitoring site in the construction area should be selected in consideration of keeping the same location during construction phase.

** Water quality monitoring location should be selected at least three points for one discharge point to confirm the impact of the effluent water from the project site to the existing canal.

Table 9.2-3 Monitoring Plan (Operation Phase)

Survey Item	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	Project site	Quarterly (3 years after operation) Yearly (after 3 years operation)	Project Proponent
Air Quality	- NO_2, SO_2, CO, $PM_{2.5}$, PM_{10}	Representative point	1 week each in the dry	Project

Survey Item	Item	Location	Frequency	Responsible Organizations
		inside the project area	and rainy seasons (first 3 years after starting of the operation stage)	Proponent
Water Quality	- Water temperature, pH, SS, DO, BOD_5, COD, color and odor, Total Nitrogen, Total Phosphorus, Sulphide, HCN, Oil, Grease, Formaldehyde, Phenols, Free chlorine, Zinc, Chromium, Arsenic, Copper, Mercury, Cadmium, Barium, Selenium, Lead, and Nickel	- Discharge water from each area to the creeks (Logistic, residential and commercial) , (at least 3 sampling points/mixing point: discharge water, upstream water, and downstream water)	Every 2 month: Water temperature, pH, SS, DO, BOD_5, COD, color and odor, Every 6 month :all parameters	Project Proponent
Waste	- Amount of non-hazardous waste management - Amount of hazardous waste management	Each tenant	Twice/year (submission of the environmental report by the tenants)	Tenants
Soil Contamination	- Status of control of solid and liquid waste which causes soil contamination	Each tenant	Twice/year (submission of the environmental report by the tenants)	Tenants
Noise and Vibration	- Noise level at the monastery and residences -Traffic count	Tenants including Project Proponent	One time each in the dry and rainy seasons (first 3 years after starting the operation stage)	Tenants including Project Proponent
Offensive Odor	- Status offensive odor control by the tenants	Each tenant	Twice/year (submission of the environmental report by tenants)	Tenants
Bottom Sediment	- Water quality monitoring (as indicator of the pollution of the bottom sediment)	Same as the water quality monitoring	- Additional analysis on the bottom sediment of creek, in case of finding continuous high concentration	Project Proponent
Hydrological Situation	- Checking the function of existing creek at heavy rain.	Existing creek crossing the project site	When the heavy rain	Project Proponent
Risks for Infectious Disease such as AIDS/HIV	- Status of measures against infectious diseases	Each tenant	Twice/year (Submission of the environmental report by the tenants)	Tenants
Occupational Health and Safety	- R Record of accidents and infectious diseases	Work site and office	Twice/year (Submission of the environmental report by the tenants)	Tenants including Project Proponent
Community Health and Safety	- Record of accidents and infectious diseases related to the community	Around the project site	Twice/year (Submission of the environmental report by the tenants)	Project Proponent

Source: EIA Study Team

9.3 Budget for the Environmental Management and Monitoring

This section describes the budget plans for the environmental management and environmental monitoring by the project proponent.

On the other hand, the tenants will take necessary environmental mitigation measures and its expenses for the environmental management not only at the construction and operation phases but also at the closing, termination, and after termination phases in accordance with their EIA/IEE studies. However, the budget plan for environmental management of each work cannot be estimated at this stage because there is no certain information on logistic and commercial sectors of tenants.

9.3.1 Budget Plan for the Environmental Management

Most of the mitigation measures such as wastewater treatment plant, and plans and trainings are already included in the project cost. The main costs for mitigation measures are shown in Table 9.3-1. The detailed costs for each mitigation measure are to be calculated at the detailed design stage.

Table 9.3-1 Cost for Main Mitigation Measures (as of March 2016)

No.	Item	Budget	
		Before/During Construction Phase	Operation Phase
1	Residential road for the purpose of community accessibility improvement	USD 50,000	USD 2,500/year
2	Greening area	USD 220,000	USD 11,000/year
3	Others (sprinkle water, waste disposal, training and education)	Included in the project cost	-

Note: Budget is estimated as March, 2016
Source: EIA Study Team

9.3.2 Budget Plan for Environmental Monitoring

In terms of the budget for environmental monitoring before/during construction and operation phases, main monitoring cost is a cost for field measurements such as air quality, water, and quality noise. Annual costs for field measurements in the construction phase by contractor and in the operation phase by the project proponent are estimated, respectively, as shown in Table 9.3-2.

Table 9.3-2 Estimated Annual Costs for Monitoring in the Construction and Operation Phases

Phase	Monitoring Items	Implementing Organization	Expected Cost	Remarks
Construction Phase	Air Quality, Water Quality, Noise and Vibration、Ground Water Level	Contractor	USD 15,000/year	Only the cost for field measurements is included
Operation Phase	Air Quality, Water Quality, Noise and Vibration, Ground Water Level	Project proponent	USD 10,000/year	Not included is the cost used by tenants. Only the cost for field measurements is included

Note: Budget is estimated as March, 2016
Source: EIA Study Team

9.4 Implementation Schedule

The implementation schedule as of March 2016 of the pre-construction, construction, and operation phases of Thilawa SEZ Development Project (Logistic Area, Residence and Commercial Area of Zone B) is as follows:

1) Pre-Construction period : from 2015 to get approval of EIA and land lease agreement

2) Construction period : 66 months (After get approval of EIA and land lease agreement)

3) Operation period : 75 years (Maximum)

9.5 Institutional Arrangement

The organizational structure for the operation and management of environmental monitoring is shown in Section 2.3.

CHAPTER 10: PUBLIC CONSULTATION AND PUBLIC DISCLOSURE

10.1 Approach and Objectives of PCM and PD for EIA

10.1.1 Approach of PCM and PD for EIA

Public consultation meeting (PCM) and public disclosure (PD) offer an opportunity for people to participate in the decision making process for project design, development, and implementation of the Project. It provides a platform for project-affected persons and different stakeholders to express their views on possible impacts of the proposed intervention on environmental and social parameters.

PCM and PD for EIA are planned at two different stages (EIA scoping stage and draft EIA report stage) in order to collect opinions and feedback of the public and to disseminate information on the Project and EIA Study.

(1) EIA Scoping Stage

The first stage of the PCM and PD for EIA is conducted at the time of environmental scoping in the initial stage of the EIA study. Information on the Project and scope of the EIA study is disseminated to the public and then comments and opinions are collected to incorporate into the EIA study.

(2) Draft EIA Report Stage

The second stage of the PCM and PD for EIA is conducted at the time of preparations of draft EIA report. Information about findings of draft environmental and social impact assessment study and proposed mitigation measures are disseminated to the general public that are directly or indirectly affected by the Project. In addition, their feedback and opinions are obtained which are reflected in the EIA report together with their comments and request on the environmental and social mitigation measures, environmental management plan (EMP) and environmental monitoring plan (EMoP).

10.1.2 Objectives of PCM and PD for EIA

The primary objective of the PCM and PD is to incorporate the opinion and suggestions of the public and all other stakeholders at the project planning stage to ensure wider acceptability of the Project. The key objectives are as follows:

1) To provide information on the economic, environmental, and social benefits as well as potential negative impacts from the Project;
2) To ensure that the potential PAPs, stakeholders, and local communities are engaged in a meaningful dialogue and are well informed prior to the decision of the project proponent as to the nature and extent of social and environmental impacts attributable to the proposed project with respect to planning;
3) To ensure that the concerns of, and issues raised by the PAPs, stakeholders, and local communities are incorporated and adequately addressed in the EIA study;
4) To engage in a participative exercise with PAPs, stakeholders, and local communities and obtain expertise and local, traditional wisdom and knowledge from them in order to plan the mitigation measures; and
5) To facilitate periodic opportunities to the principal stakeholders to offer their inputs on all key components of the Project.

10.2 Scoping Stage

10.2.1 Public Consultation Meeting

(1) Implementation of PCM at the Scoping Stage

For the public consultation meetings, four meetings were planned on two different days, namely: one meeting in the morning and another in the afternoon per day, which were organized for one weekday and one-day weekend in order to ensure the participation of the stakeholders in the public sector as well as the local residents who are not available during the weekdays. The venue was selected in terms of easy accessibility from villages in and around Thilawa SEZ and the meeting room capacity of the building. Local transportation, arrangement of a shuttle bus, was offered from the major residential areas in the project area to the meeting venue, and the actual provision was decided based on the requests/decision from each village tract office.

The project proponent prepared the invitation letter together with the notice of the meeting in Myanmar language and announced to the invitees, who are villagers in Thilawa SEZ and relevant governmental organizations, non-governmental organizations (NGOs), community-based organizations (CBOs), and anyone who are interested.

Basically, information on the meeting was announced to the invitees one week in advance before the meeting by sending invitation letters to the respective invitees.

Especially for the villagers, the information on the meeting was announced based on the administrative procedure and local practice. Firstly, the invitation letter was sent to the township offices in order to ask them to provide instructions to each village-tract office under their jurisdiction. And then it was sent from the township offices to each village-tract office one week in advance. The notice of the meeting was displayed together with the invitation letter on the public notice board of townships and village-tract level. Afterwards, the information on the meeting under the village level was requested to be disseminated by 100 household head leaders of the respective villages in accordance with local practice. The 100 household head leaders were informed about the meeting in a convenient way and timing such as verbal announcement or displaying the notice somewhere. Moreover, the dissemination of the information on the meeting below the village level was followed up and reminded over phone.

The invitation letter with the notice and list of invitees as attachments are enclosed in Annex 10-1.

The presentation and handouts were prepared and explained in Myanmar language. The opinions from the participants were received in the question and answer session. Additionally, feedback forms were provided to the participants so that those who are hesitant to speak out in public could share their views and comments. Special arrangement for the vulnerable group was given; assistant staff were available to fill out the form in case the participant needs help in writing/reading. Furthermore, female assistants were also available for the female participants who need any help. The presentation material and handouts both in Myanmar and English language, and a sample of the feedback form are shown in Annex 10-2.

Notice Displayed in
Thi Tar Myaing Village Tract Office

Notice Displayed in 100 Household Head Leader's House in
Lat Yat San Village under Hpa Yar Kone Village Tract

Source: EIA Study Team

Figure 10.2-1 Pictures of Notice Displayed in the Village Tract Office and 100 Household Head Leader's House (PCM at the Scoping Stage)

(2) Summarized Outcomes of PCMs at the Scoping Stage

Three PCMs were organized on 19 and 22 December 2015 at the Convention Hall of the Housing Department in Thanlyin Township. Originally, it was planned to be held in four meetings; however, the afternoon session on 19 December 2015 was canceled on that day in consultation with the participants and TSMC due to the small number of participants (i.e., three participants).

On 19 December 2015, 347 people attended the morning session, while on 22 December 2015, 35 people attended the morning session and 48 people attended the afternoon session. In total, approximately 30% of the participants are women. The list of attendees is shown in Annex 10-3.

In the consultation meeting, after the explanation on the project outline planned in Zone B, which includes the industrial area, residential and commercial areas, and the logistic area, the expected key environmental and social benefits as well as potential negative impacts were explained during the construction and in the operation stage. In addition, survey items of the baseline EIA study and future schedule for the EIA were presented to the participants. At the end, a question and answer session was organized in all the meetings. As a whole, eight questions were raised from the participants and discussed with the project proponent and coordinating organization. The summary of the meetings is provided in Table 10.2-2 and Table 10.2-3. The meeting records in Myanmar language are included in Annex 10-4.

Moreover, feedback forms were distributed to the participants in order to receive comments and opinions from them. A total of 18 comment forms were received. The major comments and opinions written in the collected feedback forms were summarized in each session.

Table 10.2-1 Summary of Public Consultation Meeting for EIA at the Scoping Stage

Time and Date	(1) Saturday, 19 December 2015 1st session: 9:30 AM to 10:45 AM (2) Tuesday, 22 December 2015 2nd session: 9:30 AM to 10:45 AM, 3rd session: 3:00 PM to 4:15 PM
Venue	Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Thanlyin Township near Thilawa SEZ
Invitees	- Director, Environmental Conservation Department in Yangon Division, MOECAF - Deputy Commissioner, General Administration Department, Yangon Southern District - Officers, General Administration Dept. in Thanlyin and Kyauktan townships - Officers, Housing Department, Ministry of Construction, Thanlyin Township - Township officers, Municipal Dept. and Rural Development Department, Department of Health in Thanlyin Township and Kyauktan Township - Officers, Myanmar Port Authority, Ministry of Transportation - Relevant companies/factories in Thilawa SEZ - Local residents in and around Thilawa SEZ area - Project proponent/developer and related government organizations (e.g., TSMC, MJTD) - Other organizations and individuals who are interested in the Project
Attendee	1st session: 347 people (men: 234, women: 113) 2nd session: 35 people (men: 30, women: 5) 3rd session: 48 people (men: 34, women: 14)
Agenda	- Brief explanation on the past EIA-related studies - Project brief in the industrial area, residential and commercial areas, and the logistic area planned in Zone B area - Major positive and negative findings on the draft scoping results - Scope of the EIA study - Further schedule of EIA
Language Used	In local language: Myanmar language

Source: EIA Study Team

(3) Summary of Comments from PCMs at the Scoping Stage

1) First Session (Morning, 19 December 2015)

Table 10.2-2 Main Questions and Responses at the First Session of PCM at the Scoping Stage

No.	Questions	Answers
1	Currently, the road surrounding Thilawa SEZ area is seriously being damaged. Do you consider the impact on the road condition in this EIA study? If it is considered in this EIA study, what kind of activities will be implemented for those roads in the development of Zone B area?	The road in front of the garment factory is already maintained by MOC according to a letter regarding the road condition which was submitted on 19 November. For the Thilawa Development Road, one Japanese company is now investigating the physical ground condition of the road and then they will design and maintain it. (TSMC)
2	In the other previous meetings, if the villagers want to send their suggestion letters, comments, or complaints, they send it to TSMC only. However, in this meeting, two addresses (MJTD and TSMC) are mentioned. If the villagers want to send their letters, which office addresses should they used?	The villagers should send suggestion letters, comments, and complaint letters to both TSMC and MJTD. (TSMC)
3	In this presentation, it mentioned the impacts on air and soil due to the disposal of wastes by those workers who came from other places. If so, is there any place or accommodation where such kind of workers can stay in Thilawa SEZ area? If there is no place for these workers, how can they stay in Thilawa SEZ area?	Some workers came from other places to work in the SEZ area but their accommodation has not been arranged yet at present. They are staying in a monastery or a part of the village area. Currently, there are two six-storied buildings being constructed. When these two buildings are finished, these workers can stay in the said buildings. After that, the impact on the environment due to the disposal of wastes by these workers will decrease. (TSMC)
4	The offices where EIA will be disclosed are very far from the villages. I would like to request for the distribution of the summary of the scoping report in Myanmar language and in English.	Noted. After confirmation whether it is okay or not, the report will be shared, if possible. (Local consultant: REM)
5	Will the EIA study be carried out in Zone B area (700 ha) or entire Thilawa SEZ area?	As it is already explained in the presentation, the EIA study was conducted targeting the entire 2,000 ha, although the explanation is intended for 700 ha. (TSMC)

No.	Questions	Answers
6	I would like to know about the power supply plan and water resources plan of the Thilawa SEZ area. If the Thilawa SEZ uses underground water, exploitation of underground water from SEZ can indirectly affect other villages' cultivation in the long term. The electricity is also not sufficient in our country that is why the monk would like to know the power supply source of the SEZ area.	For the source of power supply, the electricity will be provided to Thilawa SEZ area from Yangon through the substation in Thanlyin. Moreover, 50 MW of Gas Turbine Station will be also constructed to get sufficient power. For water resource, exploitation of underground water is not allowed in Thilawa SEZ area. It is currently provided by Zarma Ni Dam under the permission of providing 60,000 m^3/day. After 2018, the Lagunbyin Dam will be the source of water of the Thilawa SEZ area. (TSMC)

Source: EIA Study Team

Presentation

Participants

Source: EIA Study Team

Figure 10.2-2 Pictures of PCM at Scoping Stage (First Session)

2) Second Session (Morning, 22 December 2015)

Table 10.2-3 Main Questions and Responses at the Second Session of PCM at the Scoping Stage

No.	Questions	Answers
1	In Shwe Pyauk Village, 45 households will have to relocate. So, I would like to request for a relocation between the area of Aye Mya Thida Village Tract and Shwe Pyi Thar Yar Village Tract.	Well noted. I will submit your request to the chairman of Thilawa SEZ Management Committee. (TSMC)
2	How far is the safest distance from the project site that will have less health effects on local villagers?	Impacts on the environment can either be positive or negative. If it is explained in simple words, we can say it is safe to "live far away from the project site". (Local consultant: REM) This Project has been planned according to the international guideline and JICA guideline, and the environmental mitigation measure will be implemented properly. Therefore, you do not need to worry about health problems due to the Project. (TSMC)

Source: EIA Study Team

Presentation

Question from the Participant

Source: EIA Study Team

Figure 10.2-3 Pictures of PCM at the Scoping Stage (Second Session)

3） Third Session (Afternoon, 22 December 2015)

No questions were raised from the participants.

Presentation

Participants

Source: EIA Study Team

Figure 10.2-4 Pictures of PCM at the Scoping Stage (Third Session)

(4) Summary of Comments from Feedback Forms

There are 18 comment forms received from the participants in total at the three PCM sessions. The major comments and opinions written in the collected feedback forms and their answers are summarized in Table 10.2-4 below.

Table 10.2-4 Major Comments from Feedback Forms and Responses

	Major Comment	Comment From	Answer to the Comments
1	In the implementation of the Project, the concerned authorities should provide more consideration on the social environment such as health care, road accessibility, and education program for local people's happiness.	Villager, Male	Impact on social environment including health care, road accessibility, and education by the Project will be assessed in the draft EIA report. In addition, mitigation measures toward the potential adverse impacts will be proposed in the draft EIA report.

	Major Comment	Comment From	Answer to the Comments
2	The impact on natural environment should be assessed to reduce social impact such as impacts on the economy and health because social impact can be expected secondarily from the impact on natural environment.	Villager, Female	Not only the impacts on natural environment but also impacts on social environmental including indirect impacts by the Project will be assessed in the draft EIA report.
3	Careful assessment with adequate time is necessary to avoid great impacts on the environment, destruction and loss, and effects on weather because of a long-term project.	Villager, Female	Environmental impact assessment will be carefully conducted in the draft EIA report.
4	Person in authority needs to implement the Project by assigning competent staff in appropriate places with precise duties.	Villager, Male	Environmental and social consultants will conduct the environmental impact assessment in cooperation with the relevant organizations.
5	What kind of environmental mitigation measures are planned to avoid possible problems, for example, air pollution, water pollution, or contamination problems of water and latrine, and health? If those problems occur, systematic management is necessary (e.g., fire accident, shortage of electricity).	Villager, Female	Mitigation measures will be proposed toward the potential adverse impacts in the draft EIA report. In addition, environmental management plan and environmental monitoring plan proposed in the draft EIA report will be conducted during project implementation.
6	Developer side needs to consider the voice and advice from local residents to avoid any negative impacts on the environment. Therefore, they need to monitor the whole process of the Project.	Villager, Female	Comments and opinions received this time will be reflected to the draft EIA report. Environmental management plan and environmental monitoring plan proposed in the draft EIA report will be conducted during project implementation.
7	Planting of green trees is needed to serve as protection around the factory and resident population.	Villager, Male	Project plan will be designed in the draft EIA report in consideration of the environmental and social impacts.
8	Cemetery within the project area needs to be relocated.	Villager, Male	Discussion with the concerned people will be conducted to discuss how to manage the cemetery within the project area.
9	Developer of the Project needs to clean up the dust and mud left on the road.	Villager, Male	Environmental management plan at the construction stage will be proposed in the draft EIA report.
10	People should receive explanation about the situation of the Project concerning the natural environment transparently on a monthly or yearly basis from the developer.	Villager, Male	Environmental monitoring will be conducted based on the EMoP during the construction stage and operation stage. The project proponent is considering having a meeting with local people periodically during project implementation to disclose the monitoring results.
11	Mutual understanding can be achieved by direct discussions and explanation between the project developer and local people.	Villager, Male	Another public consultation meeting and public disclosure are planned to be conducted again for the draft EIA report.
12	My house was displaced in the project area and now I have difficulty on my residency. Therefore, I would like to give an advice to implement this Project as early as possible.	Villager, Male	The project will be implemented through an appropriate process in reference to the JICA Guidelines and legal procedure in Myanmar, at the same time listening to the opinions of relevant people. According to TSMC, Resettlement Work Plan shall be formulated by TSMC. It is based on the opinions of relevant people.
13	It is good the development of Thilawa SEZ will create a lot of job opportunities among our township/community/area.	Villager, Male	--
14	Special thanks to the development of Thilawa SEZ. However, it is best to do this without causing any harmful effects on health, social affairs, and economic status among the communities.	Villager, Male	Mitigation measures will be proposed in the draft EIA report in order to minimize the potential adverse impacts of the Project.

Source: EIA Study Team

10.2.2 Public Disclosure

(1) Implementation of Public Disclosure at the Scoping Stage

As part of public consultation, the public disclosure of the draft scoping report is organized for review and comments of the public after holding the public consultation meeting. The set of draft scoping reports, which consists of three documents, the main part is in English and the summary is both in English and in Myanmar language, is prepared and distributed to the designated places for disclosure. Comment form is provided to each place as well. The public disclosure period sets ten working days, which excludes national holidays, Saturday, and Sunday. The details, such as exact disclosure period and comment submission method, are announced in the public consultation meetings and described in the disclosure places.

(2) Summarized Outcomes of Public Disclosure at the Scoping Stage

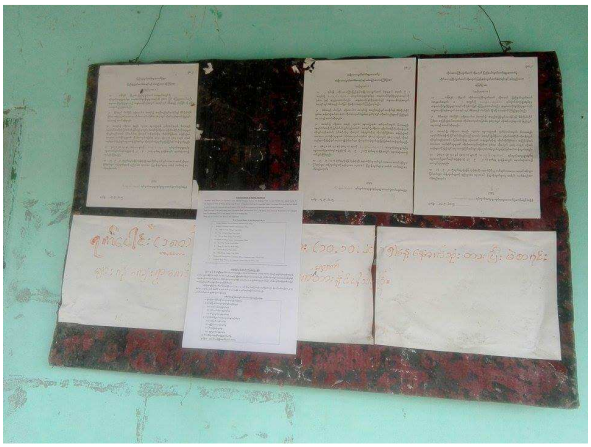
Originally, the public disclosure of the draft scoping report was scheduled as 23 December 2015 to 7 January 2016 in 12 disclosure places as shown in Table 10.2-5 below as it was explained in the meetings. However, the event was re-arranged from 31 December 2015 to 14 January 2016 for ten working days in order to secure enough time for reviewing the scoping report on the project proponent's side. This rearrangement of disclosure period was informed to the public by sending the announcement letter to the each disclosure place. The announcement letter is enclosed in Annex 10-5.

In addition to the information mentioned on the table below, the participants were requested during the meeting to ask their neighbors to submit their views or comments regardless of whether they attended the meeting or not. Moreover, it was also notified that the each disclosure place will provide assistance to fill up the comment box for those who have difficulties in writing or reading.

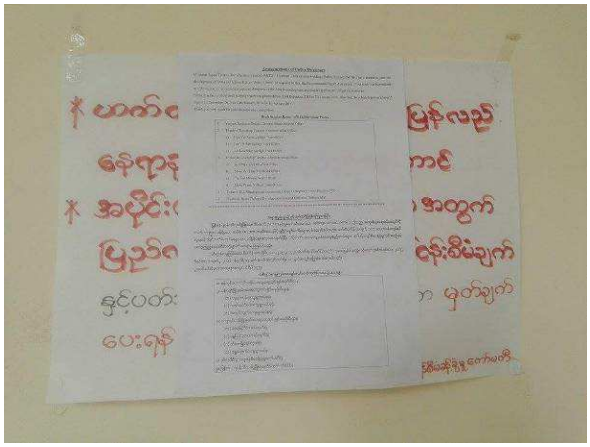
Table 10.2-5 Summary of Public Disclosure for EIA at Scoping Stage

Disclosure Period (Ten Working Days)	[Original] Wednesday, 23 December 2015 to Thursday, 7 January 2016 [Re-arranged] Monday, 18 January 2016 to Thursday, 29 January, 2016
Disclosure Place	A total of 12 places 1) Yangon Southern District General Administration Office 2) Thanlyin Township General Administration Office 3) Kyauktan Township General Administration Office 4) Thilawa SEZ Management Committee Office (Temporary) near Thilawa SEZ; and 5) Myanmar Japan Thilawa Development Limited Office in Thilawa SEZ 6) Seven (7) Village Tracts/Ward Office in Thanlyin and Kyauktan Township; - Hpa Yar Kone Village Tract Office - Let Yet San Village Tract Office - Ah Lun Soke Village Tract Office - Aye Mya Thi Dar Ward Office - Shwe Pyi Thar Yar Ward Office - Thi Tar Myaing Ward Office - Shwe Pyauk Village Tract Office
Comment Submission Method	Comments can be submitted with the comment form provided at the disclosure places or by e-mail either in Myanmar or English language.
Language Used	In local language, Myanmar and English language

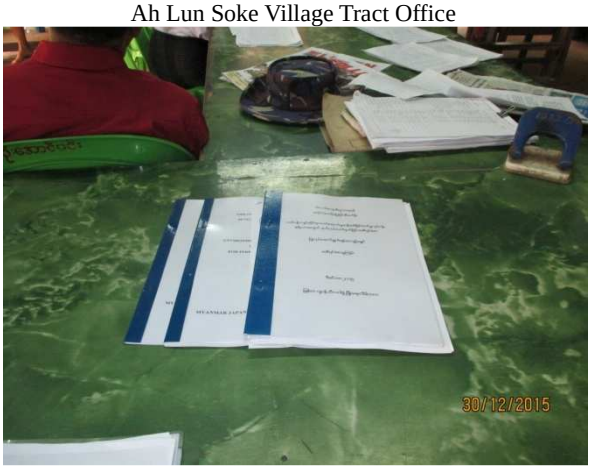
Source: EIA Study Team



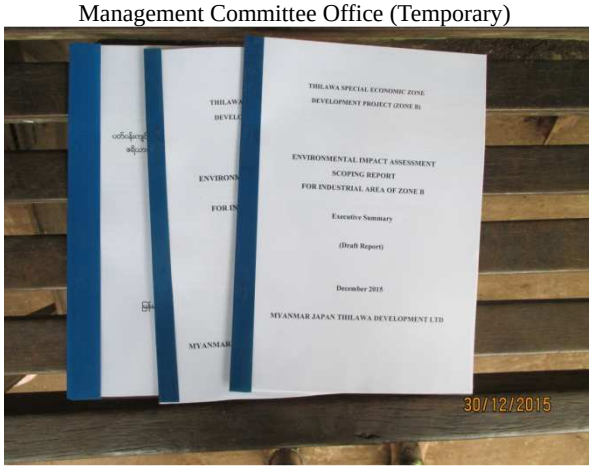
Announcement Letter Displayed at
Ah Lun Soke Village Tract Office



Announcement Letter Displayed at Thilawa SEZ
Management Committee Office (Temporary)



Draft Scoping Report Distributed at
Let Yet San Village Tract Office



Draft Scoping Report Distributed at
Shwe Pyauk Village Tract Office

Source: EIA Study Team

Figure 10.2-5 Pictures of Announcement Letter and the Draft Scoping Report distributed at Village Tract Office

(3) Summary of Comments from Public Disclosure at the Scoping Stage

One letter including nine comments was received from the public. The comments and the responses are summarized in Table 10.2-6 below.

Table 10.2-6 Brief Summary of Public Comments and Responses

No.	Comment	Comment From	Answer to the Comments
1	In the summary of the draft scoping report (in Myanmar language version), the public disclosure period is described as ten working days which is stated in page 16. However, it is not enough time for reviewing the report and should be at least about two weeks.	Thilawa Local People	Ten working days (Monday to Friday) that covers two weeks. The draft scoping report and its summary (written in Myanmar language) was disclosed from 18 January (Monday) to 29 January (Friday), 12 days including weekend.
2	Although both full version of the draft scoping report and its summary were disclosed in English, only the summary was disclosed in Myanmar language. So, we would like to have the Myanmar language version of the full scoping report.	Thilawa Local People	Full version of the scoping report and draft EIA report as well as the summary will be disclosed in Myanmar language.

No.	Comment	Comment From	Answer to the Comments
3	In the summary of draft scoping report (in Myanmar language version), the public disclosure period is described as two weeks which is stated in page 16. However, it is not enough time for reviewing the report and should be at least about one month.	Thilawa Local People	Taking account of your opinion, we will reconsider disclosing period of public disclosure of the draft EIA report.
4	We would like to know about the draft EIA report. Will the draft EIA report be prepared separately for the "Industrial Area" and the "Logistic, Residence & Commercial Area", or it will be prepared combining all areas into one report covering 700 ha area?	Thilawa Local People	Yes, draft EIA report will be prepared separately for "industrial area" and "logistic, residence and commercial areas".
5	We would like you to distribute the copies of the draft EIA reports not only to the village tract offices and Thilawa Social Development Group (TSDG) but also to other places where has good accessibility for the local people in reviewing the report. (It is not necessary to distribute the copies of draft EIA report to all villages under the village tracts in Thilawa; however, the number of disclosure places should be considered based on the scale of each village tract.)	Thilawa Local People	Taking into account of your opinion, we will reconsider the place where the draft EIA reports will be disclosed based on the scale of each village tract.
6	As the draft EIA report is normally disclosed after PCM, the suggestions and comments from the public cannot be submitted during PCM. In order to discuss about the report in more detail during PCM, the draft EIA reports should be disclosed about two weeks before PCM.	Thilawa Local People	Taking into account of your opinion, the draft EIA report will be disclosed before PCM in order for the people to read the report beforehand.
7	We found that the Hindu Temple, which is described under the scoping item "Cultural Heritage" of the draft scoping report, is not included in the 700 ha of Zone B development area. It is situated in the remaining 1,300 ha area. Therefore, we would like to revise this information.	Thilawa Local People	There is a small Hindu Temple (a small place for praying) in the south of the Myanmar Maritime University. It is located in the planned residence and commercial areas.
8	In the table "Result of Scoping for Environmental and Social Impact Assessment", the evaluation levels mentioned for "Living and Livelihood" and "Vulnerable Group" during the construction stage and the operation stage are the same "A-/B+". However, these evaluation levels mentioned in the closing stage are different, "C" for "Living and Livelihood" and "D" for "Vulnerable Group". I would like to know the reason behind these differences in evaluation. This information is not clear to the local people and should be explained clearer.	Thilawa Local People	Evaluation "C" means that impacts are not clear and will be investigated in the draft EIA report. With respect to "Living and Livelihood", it was predicted that the possibility and conditions during the closing phase of the commercial facilities and the logistic facilities are not clear, although some workers would lose their source of income in case of closure of the logistic and commercial areas. In consideration of the unclear situation, the evaluation was concluded as "C". On the other hand, since there would be no specific factor that would make an impact on vulnerable groups, in particular, at the closing stage, the "Vulnerable Group" was evaluated as "D". The results of the evaluation will be considered in order that the people can understand easily what is being described in the draft EIA report.
9	The scoping evaluation in the impact assessment (described in the summary scoping report) can be obviously implemented and the plans should be prepared in detail in the draft EIA. The impact evaluation in the scoping stage should be implemented with clear explanation to the local people. Namely, the results of the evaluation should be described in Myanmar language, and should not be labeled as "A+/- and B+/-and C, D" for better understanding of the local people. The impact evaluation in EIA stage should also be implemented clearly.	Thilawa Local People	The way to describe the result of evaluation will be considered in order that people can understand easily and described in Myanmar language in the draft EIA report.

Source: EIA Study Team

10.2.3 Conclusion for the EIA at Scoping Stage

As described above, 411 participants in total joined the three-day public consultation meetings (PCM) at the scoping stage. Among them, 132 were women. There were local leaders and local NGO members, too. During the PCM session, people seemed to be interested in the Project and some were taking photographs of the explanation slides.

In total, 18 comments in the three PCM sessions and one comment during the public disclosure were submitted. Among them, there were several comments concerning health and social infrastructure that might be impacted by the Project. On the other hand, there was a comment about the positive impact of new employment opportunity. These received comments were be reflected in the draft EIA report, EMP, and EMoP.

10.3 Draft EIA Stage

10.3.1 Public Consultation Meeting at Draft EIA stage

In the draft EIA stage, another PCM will be conducted at the time of the draft EIA report preparation as shown in Table 10.3-1.

Table 10.3-1 Public Consultation for the Draft EIA

Methodology and Special Considerations
【Method and Number of Meetings】 - Total of four meetings: one meeting in the morning and one meeting in the afternoon per day; which were organized for one day during weekday and another one-day weekend (planned) to ensure the participation of the stakeholders in the public sector as well as local residents who are not available during weekdays. - Local transportation will be provided from the major residential area in the project area to the meeting venue 【Venue】 - Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Thanlyin Township near Thilawa SEZ 【Agenda】 - Draft final plan on the industrial area, residential and commercial areas, and logistic area - Baseline survey result and impact assessment results - Proposed mitigation measures and monitoring plan - Further EIA study schedule 【Expected Participants and Invitation Method】 - Local government in and around the Thilawa SEZ in Thanlyin and Kyauktan townships - Local residents in Thilawa SEZ area - Project proponent/developer and related government organizations (e.g., TSMC, MJTD) - Anyone interested - The invitation/notice of the meeting will be posted in each village one week in advance. 【Language Used】 - The presentation and handout in Myanmar language. The explanation will also be provided in Myanmar language. 【Special Considerations to Socially Vulnerable Groups】 - Feedback forms will be provided to the participants so that they can share their views and comments without even presenting it to the public. - Assistant staff will be available to fill out the form in case the participant needs assistance in writing/reading. Female assistants will be available for female participants who need any help.

Source: EIA Study Team

10.3.2 Public Disclosure at the Draft EIA Stage

In the draft EIA stage, another PD will be conducted at the time of draft EIA report preparation as shown in Table 10.3-2.

Table 10.3-2 Public Disclosure for the EIA (Planned)

Methodology and Special Considerations
【Announcement Method】 - Public disclosure will be organized in advance of public consultation meetings. - Disclosure period and the comment submission method will be described in the disclosure places. - The draft report will be available on the official website. 【Disclosure Place】 - Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Thanlyin Township near Thilawa SEZ (planned) - General Administration Office, Thanlyin Township - General Administration Office ,Kyauktan Township - Village Tract Office/Ward Office in the Thilawa SEZ Area - Other places based on the request from project-affected people 【Disclosure Period】 - One month 【Comment Submission Method】 - Comments can be submitted with the comment form provided at the disclosure places or by e-mail either in Myanmar or English language.

Source: EIA Study Team

10.4 Public Consultation Meeting and Public Disclosure for the RWP

A series of public consultation meetings and public disclosure for Resettlement Work Plan (RWP) is planned to be implemented by the respective RWP area based on the framework. In the framework, the 2,000 ha development area is broadly divided into Area 1 to Area 6 and moreover, some RWP areas are divided into small parts as shown in Figure 10.4-1 in terms of the smooth implementation of resettlement works and the timing of actual development.

The industrial area is composed of four RWP areas which are Area 2-1, a part of Area 2-2, and Area 4-1. The resettlement works for Area 2-1 has been already started to be implemented as the first step since Area 2-1 is currently determined as the initial development area. Afterwards, it will be followed by Area 2-2, and Area 4-1 according to the actual development schedule. The provisional schedule is

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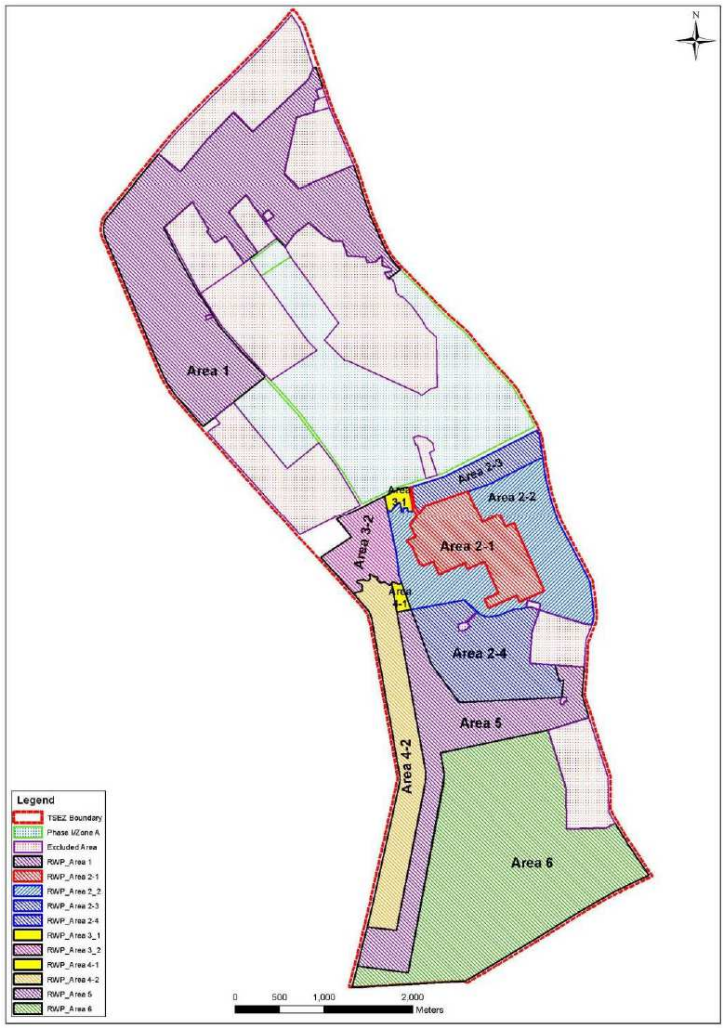
Based on the schedule, a series of public consultation meetings and public disclosure for RWP is planned to be implemented by each RWP area which formulated in the Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ).



Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ) February 2016

Figure 10.4-1 Provisionally Divided Area for Resettlement Works of the 2,000 ha Development Area

Table 10.4-1 Provisional Commencing Time of Resettlement Works for the Industrial Area

RWP Area	Provisional Commencing Time
Area 2-1, Area 2-2	Beginning of 2016
Area 4-1	Beginning of 2017

Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2,000 ha Development Area of Thilawa Special Economic Zone (SEZ) February 2016

10.4.1 Public Consultation Meeting for the RWP

(1) Area 2-1

The public consultation meeting for the draft RWP for Area 2-1 was held on 14 February 2016 at Ordination Hall, Aye Myar Thida Ward (Phalan), Kyauktan Township. The summary of the consultation meeting is presented in Table 10.4-2. Additional consultation meetings are planned after mid-February 2016.

Table 10.4-2 Summary of Consultation Meeting for Area 2-1

Items	Contents
1. Date and time	14:00 – 16:30, Sunday, 14 February 2016
2. Venue	Ordination Hall, Aye Myar Thida Ward (Phalan), Kyauktan Township
3. Invitee	PAHs
4. Participant	Approximately 95 persons
5.Main invitees/participants from government/others	1. Administrator, General administration Department, Thanlyin Township 2. Administrator, General administration Department, Kyauktan Township 3. Village Administrator, Shwe Pyi Thar Yar Village Tract 4. Village Administrator, Aye Mya Thida Ward 5. 100/10 household head leaders, Shwe Pyi Thar Yar Village Tract 6. 100/10 household head leaders, Aye Mya Thida Ward 7. Villagers from Shwe Pyi Thar Yar Village Tract 8. Villagers from Aye Mya Thida Ward 9. Other organizations and individuals who are interested in the Project
6. Agenda	1. Background and RWP activities 2. Area of 100 ha Initial Development Area (Area 2-1) 3. Eligible households for Area 2-1, 4. Proposed compensation and assistance package 5. Planned implementation organization 6. Planned grievance redress mechanism 7. Possible relocation sites 8. Further steps 9. Q & A session
7. Major opinions and comments from the participants	Q-1: How will a cemetery in Area 2-1 be affected? A-1: The boundary will be fixed on the ground. If the cemetery will be inside the boundary, the issues will be discussed with concerned persons/ authorities. Q-2: How will cows on pasture land be affected? A-2: Since pasture land is government land, please farm your cows at your home. Q-3: Since La Na (39) mentions 700ha, please clarify why it is different from 500 ha area which is currently in the land acquisition procedure. A-3: La Na (39) was issued for the area which was already acquired and compensated and is not for the land which is currently in the land acquisition procedure. Q-4: Why do we need to pay the tax after La Na(39) was issued? A-4: The tax you mentioned is the tax on crops. Q-5: We have sent a letter on our comments about three month ago; however, there is no reply so far. A-5: It will be checked, and we (TSMC) will update you soon.
8. Feedback Form	No comments and opinions were submitted in the collected feedback form.

Source: Thilawa SEZ Management Committee, Resettlement Work Plan (RWP) for Development of Area 2-1 (100ha) of Thilawa Special Economic Zone (Draft) February, 2016

Presentation

Participants

Source: Thilawa SEZ Management Committee, Resettlement Work Plan (RWP) for Development of Area 2-1 (100ha) of Thilawa Special Economic Zone (Draft) February, 2016

Figure 10.4-2 PCM on 14 February 2016

During the consultation meeting, feedback forms were distributed to the participants to receive comments and opinions from them. The major comments and opinions written in the collected feedback forms will be summarized in the draft final RWP.

(2) Other RWP Area

The public consultation meeting for the draft RWP for other areas is planned to be implemented area by area, as shown in Table 10.4-3.

Table 10.4-3 Public Consultation Meetings for the RWP (Planned)

Methodology and Special Considerations
【Method and Number of Meetings】 - A total of three meetings at a maximum in one day during weekend based on the number of expected participants (planned) - Local transportation will be provided from major residential area in the project area to the meeting venue 【Venue】 - Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Kyauktan Township near Thilawa SEZ (can be arranged to another places based on the accessibility of participants) 【Agenda】 - Contents of assistance package for loss of assets, income source, relocation, etc. - Resettlement site - Contents of Income Restoration Program (IRP) - Further schedule (schedule of individual negotiation and relocation) 【Expected Participants and Invitation Method】 - Project Affected Households - The meeting will be informed through the invitation letters or public notice posted in each village one week in advance. 【Language Used】 - The presentation and handout in Myanmar language. The explanation will be provided in Myanmar language. 【Special Considerations to Socially Vulnerable Groups】 - Feedback forms will be provided to the participants to share their views and comments without presenting it to the public.

Source: EIA Study Team

10.4.2 Public Disclosure

(1) Area 2-1

The draft RWP for Area 2-1 has been disclosed from the late mid-February 2016 to mid-March 2016 in nine places listed in Table 10.4-4. In addition, the draft RWP both in English and Myanmar language is to be uploaded on the website of TSMC. Public comments will be received with the comment form at the disclosure places or by e-mail either in Myanmar or English language.

Table 10.4-4 Draft RWP Disclosure Places

1.	Office of Thilawa SEZ Management Committee (temp)
2.	Office of Thilawa SEZ Management Committee, Thilawa SEZ
3.	Office of Department of Urban and Housing of MOC in Yangon
4.	Administrative Office of Kyauktan Township
5.	Administrative Office of Thanlyin Township
6.	Administrative Office of Aye Mya Thida
7.	Administrative Office of Shwe Pyi Thar Yar
8.	One nearest 100 HH Head's place each for Aye Mya Thida and Shwe Pyi Thar Yar

Source: Thilawa SEZ Management Committee, Resettlement Work Plan (RWP) for Development of Area 2-1 (100ha) of Thilawa Special Economic Zone (Draft) February, 2016

(2) Other RWP Area

The public disclosure of the draft RWP in other areas will be organized as part of public consultation. The draft RWP will be disclosed as described in Table 10.4-5 for review and comments, and the final RWP will be available for public viewing at the Thilawa SEZ Office (planned) and on the website.

Table 10.4-5 Public Disclosure for the RWP (Planned)

Methodology and Special Considerations
【Announcement Method】 - Public disclosure will be announced in the public consultation meetings. - Disclosure period and comment submission method will be described in the disclosure places. - The draft RWP will be available on the official website. 【Disclosure Place】 - Convention Hall, Department of Human Settlement and Housing Development, Thilawa SEZ Management Committee Office (Temporary), Kyauktan Township near Thilawa SEZ (planned) - General Administration Office, Thanlyin Township - General Administration Office ,Kyauktan Township - Village Tract Office/Ward Office in the Thilawa SEZ Area - Other places based on the request from the project-affected people 【Disclosure Period】 - One Month 【Comment Submission Method】 - Comments can be submitted with the comment form provided at the disclosure places or by e-mail either in Myanmar or English language.

Source: EIA Study Team

CHAPTER 11: COMMENTS FROM TSMC

The Thilawa SEZ Management Committee (TSMC) issued an approval letter (Ref: TSEZ-EIA-004) of the Scoping Report on Environmental Impact Assessment for Development of Logistic Area, Residential and Commercial Areas of Zone B in the Thilawa Special Economic Zone on 26 February 2016 with terms and conditions. The project proponent prepared the draft EIA report which corresponds to these terms and conditions as shown in Table 11.1-1.

Table 11.1-1 Correspondence to the Terms and Conditions from TSMC

No.	Terms and Condition from TSMC	Correspondence
(i)	You shall describe the contact address, profile, and relevant experience of the organization which has been conducting the EIA study as well as information on environmental, social, and health experts as key personnel including each person's experience in the field of environmental, social, and health impacts assessment, academic credentials, and relevant certificates and accreditations.	Information of the implementation organizations of EIA was described in Chapter 1 of the draft EIA report. CVs of each experts of the EIA Study Team were attached in Annex.
(ii)	You shall describe international conventions, treaties and agreements related to your project as the project's policy and legal framework.	Major international conventions, treaties and agreements that the Myanmar government has ratified related to the Project were described in Chapter 2 of the draft EIA report.
(iii)	You shall set project's target levels for environment taking into consideration Myanmar National Environmental Quality (Emission) Guidelines issued by Ministry of Environmental Conservation and Forestry on 29 December 2015 and conditions of surrounding area.	Taken into account of Myanmar National Environmental Quality (Emission) Guideline, the project's target levels were revised and described in the Chapter 2 of draft EIA report.
(iv)	You shall add project's target levels for effluent water quality for logistic area and residence and commercial area separately.	Target levels for (i) effluent water quality of logistic area and (ii) effluent domestic wastewater for residential and commercial areas were set in Chapter 2 of the draft EIA report.
(v)	You shall describe institutional arrangement for environmental management by your organization including organization chart, a section in charge of environment, and its role and responsibility in construction stage and operation stage at least.	Institutional arrangements for environmental management for two stages; (i) pre-construction, construction, and closing stages and (ii) operation stage were summarized in Chapter 2 of the draft EIA report.
(vi)	You shall describe detailed project information in order to assess environmental, social, and health impacts properly.	Detailed project information was presented in Chapter 3 of the draft EIA report.
(vii)	You shall include socioeconomic components such as access to public services and natural resources in the ToR for the EIA Investigation in order to assess social impacts properly.	Impact on accessibility to public services and natural resources was included in the TOR for EIA investigation and assessment in Chapter 7 of the draft EIA report.
(viii)	You shall conduct scoping evaluation for impacts on soil erosion, usage of chemicals, and earthquakes, and shall conduct its impact assessment if any.	Impacts on soil erosion, usage of chemicals, and earthquakes were considered for scoping and evaluated in Chapter 7 of the draft EIA report.
(ix)	You shall conduct scoping evaluation for residual impact in the stage of after project closure and conduct its impact assessment if any.	Residual impacts in the stage after project closure were considered and described in Chapter 8 of the draft EIA report.
(x)	In addition to the impact assessment for the development of logistic area and residence and commercial area of Zone B, you shall assess cumulative impact including the development of Zone A and the development of industrial area of Zone B.	Cumulative impacts of the development of Zone A were taken into consideration when impacts of the Project were assessed in Chapter 7 of the draft EIA report. Impacts which should be assessed cumulatively such as air and noise/vibration were evaluated in consideration of Zone B development including industrial area.
(xi)	You shall reflect all of the above comments to the draft EIA Report.	The comments received from TSMC were considered to be reflected in the draft EIA report.

Source: EIA Study Team

CHAPTER 12: CONCLUSIONS

As to the results of the EIA study for the logistic area, residence and commercial areas of Thilawa SEZ project, the following items are found:

1) In terms of living environment, most of the impacts are controlled and limited in and around the project area. The key negative impacts such as emission gas and dust, deterioration of water quality, generation of noise and vibration are expected. However, implementation of appropriate mitigation and management plan, such as to spray water to bare areas for dust prevention and to avoid the incentive operation of the construction machinery for prevention of emission gas, noise and vibration during construction phase, and to provide the commuter bus by tenants and to comply with the tentative target value of effluent water flowing out of the wastewater treatment plant by tenant during operation phase, will minimize these impacts.

2) In terms of natural environment, the key negative impact is the clearance of existing vegetation during construction phase, though there is no sensitive ecological protection area. However, implementation of appropriate mitigation measures, such as planting trees, vegetation and sodding of public spaces as soon as possible and keeping the environmental conditions along the existing canal will minimize the impact on the ecosystem.

3) In terms of social environment, land acquisition and some scale of involuntary resettlement are expected. Impact on livelihood of the project-affected persons (PAPs) including vulnerable people and children is also expected during the pre-construction, construction and operation phase. Toward this issue, the resettlement framework of the Thilawa Special Economic Zone (SEZ) (2,000 ha) was prepared that includes compensation and assistance package and income restoration program for the PAPs and will be conducted by Thilawa SEZ Management Committee (TSMC), that will mitigate the impacts of the Project on social environment.
   On the other hand, some positive impacts of the Project such as increase in job opportunity and improvement of social infrastructure are also expected.

4) In terms of health and safety, some impacts on occupational/community health and safety and increase in number of accidents are expected. However, implementation of appropriate mitigation and management plan, such as to manage working conditions during the construction work and to provide security and maintain safety prevention measures during construction /operation phase will minimize these impacts.

5) In consideration of the result of the EIA study for the Project, the Environmental Management Plans (EMPs) including adequate mitigation measures to reduce the negative impacts and Environmental Monitoring Plan (EMP) are proposed for each phase of the Project: pre-construction phase, construction/closing phase, and operation phase.

This draft EIA report will be updated and finalized in accordance with the comments received during the public consultation meeting and public disclosure on the draft EIA, and the examination of TSMC.

ANNEX

Annex 2-1

Comparison between the JICA Guidelines and the Relevant Regulations in Myanmar

Annex 2-1 Comparison between the JICA Guidelines and the Relevant Regulations in Myanmar

Table 2-1-1 Comparison between the JICA Guidelines and EIA Procedure in Myanmar

Contents	Requirements and Key Points in the JICA Guidelines	Requirements in EIA Procedure in Myanmar	Consistency/Differences between JICA Guideline and EIA Procedure in Myanmar
Information Disclosure in the official language or/and in a language widely used in the country	EIA reports must be written in the official language or in a language widely used in the country in which the project is to be implemented. When explaining projects to local residents, written materials must be provided in a language and form understandable to them. The documents that would be used in the meetings with local stakeholders will be prepared in an official or widely used language and in a form understandable by local people.	IEE report, scoping report and EIA report shall be prepared either in the Myanmar language or in the English language with an accompanying accurate summary in the Myanmar language. (Chapter IV 35, Chapter V 51, 62)	Since the relevant reports are required to be written in the Myanmar language (summary or the entire text), EIA Procedure in Myanmar is consistent with the JICA Guidelines. On the other hand, there is no written rule about the language to be used in the public consultation meetings. In the Project, Myanmar language was used for a series of public consultation meeting and the documents used in the meeting.
Scope of impact to be assessed	The impacts to be assessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples and equality of benefits and losses. In addition to the direct and immediate impacts of projects, their derivative, secondary, and cumulative impacts as well as the impacts of projects that are indivisible from the project are also to be examined and assessed to a reasonable extent.	The EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the study area during all project phases including pre-construction, construction, operation, decommissioning, closure and post-closure and shall identify and assess all adverse impacts, risks, cumulative impacts and residual impacts. (Chapter V 56)	EIA Procedure in Myanmar is consistent with the JICA Guidelines.
Examination of Alternatives	Multiple alternatives must be examined in order to avoid or minimize adverse impacts and to choose better project options in terms of environmental and social considerations.	In the procedure of EIA investigation, consideration of the selected alternatives and comparison and selection of the preferred alternatives shall be done. (Chapter V 58)	EIA Procedure in Myanmar is consistent with the JICA Guidelines.

Contents	Requirements and Key Points in the JICA Guidelines	Requirements in EIA Procedure in Myanmar	Consistency/Differences between JICA Guideline and EIA Procedure in Myanmar
Environmental Management Plan, Environmental Monitoring Plan	Appropriate follow-up plans and systems, such as monitoring plans and environmental management plans, must be prepared; the costs of implementing such plans and systems, and the financial methods to fund such costs, must be determined.	Management and monitoring sub-plans by project phase (pre-construction, construction, operation, decommissioning, closure and post-closure) shall be prepared in the EIA Report. The project Proponent shall submit monitoring reports o the Ministry not less frequently than every six months as provided in a schedule in the environmental monitoring plan. (Chapter V 63, Chapter IX)	EIA Procedure in Myanmar is consistent with the JICA Guidelines.

Source: EIA Study Team

Table 2-1-2 Comparison between the JICA Guidelines and Relevant Laws in Myanmar regarding Land Acquisition and Involuntary Resettlement

No.	JICA Guidelines/ World Bank Safeguards Policies	Law in Myanmar	Gap Between Laws in Myanmar and JICA Guidelines	Measures to Filling Gap
1.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA Guidelines: JICA GL)	Not applicable	There is no regulation which mentions or requests to avoid or minimize involuntary resettlement and loss of livelihood means.	The project examines alternatives to avoid or minimize resettlement impact..
2.	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	Compensation or indemnity is provided for farmland acquisition for the interest of the State or public. (Farmland Law (2012) Art. 26, Farmland Rules (2012) Art. 64)	There is no difference.	-
3.	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	Damages to standing crops/trees, lands, movable/immovable properties, relocation cost, economic activities are requested to compensate. (Land Acquisition Act (1894) Art. 23, Farmland Rules (2012) Art. 67)	There is no stipulation of improving or at least restoring living standard, income opportunities and production levels to pre-project levels in the Myanmar legal framework.	Assistance for improving or restoring livelihood at least to pre-project level is provided.
4.	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	Land: Market-value compensation (Land Acquisition Act (1894) Art.9, 23 (1) and 23(2)) Crops: Compensation at three times of the value calculated based on the average	Land: Partial gap since the act lacks standard methodology in determining compensation, though it requires considering the market value. Additionally, there	Land: Needs to be compensated at replacement cost which generally consists of the market value and other transaction costs.

No.	JICA Guidelines/ World Bank Safeguards Policies	Law in Myanmar	Gap Between Laws in Myanmar and JICA Guidelines	Measures to Filling Gap
		production of crops in the current market price of that area is provided. (Farmland Rules (2012) Art. 67)	would be a gap between the market value and full replacement cost. Crops: There is no significant difference.	
5.	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	When compensation is not paid on or before land acquisition, compensation amount awarded with interest rate must be paid.	There is no clear indication about timing of compensation payment in the Myanmar legal framework.	Assistance is planned to be provided by dividing in a few times (not providing all amount in one time before displacement) in order to manage provided assistance amount properly.
6.	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	Not applicable	There is no regulation which mentions or requests to avoid or minimize involuntary resettlement and loss of livelihood means.	Resettlement Work Plan (RWP) is prepared in consultation with PAPs and will be disclosed to the public.
7.	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	Not applicable	There is no regulation requesting to organize consultations with PAPs.	Consultations with PAPs have been organized in timely manner.
8.	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Not applicable	There is no regulation requesting to organize consultations with PAPs.	Consultations with PAPs have been organized using understandable explanation methods.
9.	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	Not applicable	There is no regulation requesting participation of PAPs into planning, implementation and monitoring of resettlement action plans.	Participation of PAPs is secured by organizing consultations in timely manner.
10.	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	1) Notice of compensation amount to PAPs directly: appeal to the court within 6 weeks from the date of compensation award 2) Notice of compensation amount to representatives of PAPs: i) within 6 weeks of receipt of compensation notice, or ii) within 6 months from the from the date of compensation award,	The procedure of grievance in the Myanmar context is direct settlement at the court, which is not necessarily easy or accessible to PAPs.	The grievance redress mechanism is established by utilizing the existing administration system to be convenient for PAPs.

No.	JICA Guidelines/ World Bank Safeguards Policies	Law in Myanmar	Gap Between Laws in Myanmar and JICA Guidelines	Measures to Filling Gap
		whichever period shall be first expire (Land Acquisition Act (1894) Art. 18)		
11.	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP4.12 Para.6)	A notification of land acquisition or public purposes is published in the Gazette, which is also published at the convenient place in the concerned municipality. (Land Acquisition Act (1894) Article 4)	There is no specific description of identifying affected people as early as possible in the national law.	Census was initially conducted at the preliminary delineated boundary in April 2013, and supplemental survey was conducted to the final boundary in May 2014 to September 2015 for identifying number of affected households as well as their socio-economic condition.
12.	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying.(WB OP4.12 Para.15)	Occupiers/stakeholders of lands to be acquired are explained about acquisition and claims to compensations. (Land Acquisition Act (1894) Article 9)	Detail procedures as well as eligibility criteria are not clearly defined. Also there is no specific indication about displaced persons without titles.	The project establishes eligibility for assistance to all households whose income sources or assets are confirmed as affected due to project implementation.
13.	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	Not Applicable	There is no regulation stipulating to give land-based resettlement strategies.	Appropriate measures are provided to PAPs based on consultation with them.
14.	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	Not Applicable	There is no regulation stipulating to provide support for the transition period.	Sufficient support for the transition period is provided.
15.	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP4.12 Para.8)	Not Applicable	There is no regulation stipulating to provide particular attention to the vulnerable groups.	Additional support for the vulnerable groups is provided.

No.	JICA Guidelines/ World Bank Safeguards Policies	Law in Myanmar	Gap Between Laws in Myanmar and JICA Guidelines	Measures to Filling Gap
16.	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	Not Applicable	There is no regulation stipulating to prepare resettlement plan.	The project requests more than 200 people of displacement, and prepares RWP accordingly.

Source: Thilawa SEZ Management Committee, Framework of Resettlement Works for the 2000ha Development Area of Thilawa Special Economic Zone (SEZ) February 2016

Annex 6-1

Laboratory Analysis Record

Annex 6-1 Laboratory Analysis Record

Surface Water Quality Survey – Rainy Season-

SGS

ANALYSIS REPORT

ORIGINAL

Job Ref: 6216/2015
Date : 20.10.2015
Page 1 of 1

Sample Described as	:	**SURFACE WATER (8.10.15) EIA STUDY FOR PHASE II AREA DEVELOPMENT IN THILAWA SEZ**
Client Name	:	RESOURCE & ENVIRONMENT MYANMAR
Sample Received Date	:	8.10.2015
Sample Brought By	:	Client
Sample Reference	:	SW – 1 (THILAWA)
Analysed Date	:	9.10.2015
Lab Code No.	:	170/15

No	Test Parameter	Method	Lod	Result	Unit
1	Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF 22nd ed, 2012 ; 5520 B	0.2	1.2	mg/l
2	Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.1	<0.1	mg/l

*********************End of Report*********************

sym

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ORIGINAL

ANALYSIS REPORT

Job Ref: 6216/2015
Date : 20.10.2015
Page 1 of 1

Sample Described as	:	**SURFACE WATER (6.10.15) EIA STUDY FOR PHASE II AREA DEVELOPMENT IN THILAWA SEZ**
Client Name	:	RESOURCE & ENVIRONMENT MYANMAR
Sample Received Date	:	6.10.2015
Sample Brought By	:	Client
Sample Reference	:	SW – 2 (THILAWA)
Analysed Date	:	9.10.2015
Lab Code No.	:	171/15

No	Test Parameter	Method	Lod	Result	Unit
1	Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 : 5520 B	0.2	3.4	mg/l
2	Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air-Acetylene Flame method)	0.1	<0.1	mg/l

********************End of Report********************

syw

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ANALYSIS REPORT

ORIGINAL

Job Ref: 6216/2015
Date : 20.10.2015
Page 1 of 1

Sample Described as	:	**SURFACE WATER (8.10.15) EIA STUDY FOR PHASE II AREA DEVELOPMENT IN THILAWA SEZ**
Client Name	:	RESOURCE & ENVIRONMENT MYANMAR
Sample Received Date	:	8.10.2015
Sample Brought By	:	Client
Sample Reference	:	SW – 3 (THILAWA)
Analysed Date	:	9.10.2015
Lab Code No.	:	172/15

No	Test Parameter	Method	Lod	Result	Unit
1	Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B	0.2	<0.2	mg/l
2	Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.1	<0.1	mg/l

**********End of Report**********

sywi

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ORIGINAL

ANALYSIS REPORT

Job Ref: 6216/2015
Date : 20.10.2015
Page 1 of 1

Sample Described as	:	**SURFACE WATER (6.10.15) EIA STUDY FOR PHASE II AREA DEVELOPMENT IN THILAWA SEZ**
Client Name	:	RESOURCE & ENVIRONMENT MYANMAR
Sample Received Date	:	8.10.2015
Sample Brought By	:	Client
Sample Reference	:	SW – 4 (THILAWA)
Analysed Date	:	9.10.2015
Lab Code No.	:	173/15

No	Test Parameter	Method	Lod	Result	Unit
1	Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B	0.2	<0.2	mg/l
2	Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air-Acetylene Flame method)	0.1	<0.1	mg/l

********************End of Report********************

syw

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ORIGINAL

ANALYSIS REPORT

Job Ref: 6216/2015
Date : 20.10.2015
Page 1 of 1

Sample Described as	:	SURFACE WATER (6.10.15) EIA STUDY FOR PHASE II AREA DEVELOPMENT IN THILAWA SEZ
Client Name	:	RESOURCE & ENVIRONMENT MYANMAR
Sample Received Date	:	8.10.2015
Sample Brought By	:	Client
Sample Reference	:	SW – 5 (THILAWA)
Analysed Date	:	9.10.2015
Lab Code No.	:	174/15

No	Test Parameter	Method	Lod	Result	Unit
1	Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B	0.2	2	mg/l
2	Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.1	<0.1	mg/l

**********End of Report**********

syw

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Surface Water Quality Survey – Dry Season-

SGS

Report No. : 2016-00182 / 001 (Page 1 of 1) Issued date : March 3, 2016

CLIENT : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
CONTACT : Ms. Toe Toe Hlaing
ADDRESS : B702 Delta Plaza, Shwegondaing Rd., Bahan, Yangon, Myanmar
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E-mail : toetoehlainggeo@gmail.com

Analysis Report

PROJECT NAME : EIA Study for Phase II Area Development in Thilawa SEZ
SAMPLE DESIGNATED AS : Surface Water Quality
SAMPLING DATE : Febuary 2, 2016
SAMPLING LOCATION : Thilawa, Myanmar
SAMPLING BY : Client

Parameters	Units	LOQ	Results		
			SW-1	SW-2	SW-3
Color	Pt.Co	1	<1	6	2
Odor	-	-	Natural	Natural	Natural
Phenol	mg/l	0.001	<0.001	<0.001	<0.001
Formaldehyde	mg/l	0.01	<0.01	<0.01	<0.01
Free Chlorine (Cl_2)	mg/l	0.01	0.03	0.03	0.02
Arsenic (As)	mg/l	0.002	<0.002	<0.002	<0.002
Barium (Ba)	mg/l	0.1	<0.1	<0.1	<0.1
Total Chromium (Cr)	mg/l	0.02	<0.02	<0.02	<0.02
Cadmium (Cd)	mg/l	0.0020	<0.0020	<0.0020	<0.0020
Lead (Pb)	mg/l	0.010	<0.010	<0.010	<0.010
Nickel (Ni)	mg/l	0.010	<0.010	<0.010	<0.010
Mercury (Hg)	mg/l	0.0005	<0.0005	<0.0005	<0.0005
Selenium (Se)	mg/l	0.01	<0.01	<0.01	<0.01
Total Coliform Bacteria	MPN/100mL	-	1,100	490	130
Nitrate-Nitrogen (NO_3-N)	mg/l	0.02	1.59	<0.02	0.58
Fluoride (F)	mg/l	0.06	0.63	0.49	0.66
Cyanide (CN)	mg/l	0.004	0.009	<0.004	<0.004
Ammonia-Nitrogen (NH_3-N)	mg/l	0.02	0.248	0.230	0.282
Nitrogen-Nitrite (as N)	mg/l	0.02	<0.02	0.17	<0.02
Sulfide (S)	mg/l	0.01	<0.01	<0.01	<0.01
Total Chlorine	mg/l	0.01	0.06	0.07	0.02

Remarks : - Analysis Methods followed 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) except :
- Odor followed ISO 6588-1987.
- Formaldehyde followed Water and Wastewater Analysis endorsed by Environmental Engineering Association of Thailand (EEAT).
- Mercury (Hg) followed U.S. EPA method 245.1.

- LOQ = Limit of Quantitation

(Siriporn Imwilaiwan)
Environmental Monitoring Manager

(Thepson Yommana)
Technical Manager

SGS (THAILAND) LIMITED

TY/Client/JC/C)

E 114665

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ORIGINAL

ANALYSIS REPORT

Job Ref: 0626/2016
Date : 25.02.2016
Page 1 of 2

Client Name	:	**RESOURCE AND ENVIRONMENT MYANMAR CO., LTD** B-702 Delta Plaza, Shwegondaing Rd, Bahan Township, Yangon, Myanmar
Project Name	:	EIA Study for Phase II Area Development in Thilawa SEZ
Sample Brought By	:	Client
Sample Location	:	Thilawa
Sample Received Date	:	11.02.2016
Analysed Date	:	11.02.2016

Results (mg/l)	Methods	Stations			Detection Limit
		SW-1 (2.2.2016)	SW-2 (2.2.2016)	SW-3 (2.2.2016)	
Lab Code	-	015/16	016/16	017/16	-
Commodity Name	-	Surface Water	Surface Water	Surface Water	-
Total Suspended Solid	Based on Standard methods for the examination of water & waste water APHA , AWWA & WEF,22nd ed, 2012; 2540 D	431.67	488.67	235.5	20
Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B	<5	6.1	<5	5
Total Nitrogen (organic)	Based on Standard methods for the examination of water & waste water APHA , AWWA & WEF,22nd ed, 2012; 4500-N_{org} C	1.4	1.12	<1	1
Total Hardness(as$CaCO_3$)	AOAC 18 Ed (2005) Rev 4, 2011 (method no973.52)	1275	668.84	1410	5
Total Phosphorus	Laboratory Manual For the Physico-Chemical Analysis of Soil, Water and Plant ; Photolmetric (Ascorbic) Method	0.023	0.047	0.045	0.01

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ORIGINAL

Job Ref: 0626/2016
Date : 25.02.2016
Page 2 of 2

Results (mg/l)	Methods	Stations			Detection Limit
		SW-1 (2.2.2016)	SW-2 (2.2.2016)	SW-3 (2.2.2016)	
Lab Code	-	015/16	016/16	017/16	-
Commodity Name	-	Surface Water	Surface Water	Surface Water	-
BOD	In-house method based on Standard methods for the examination of water & waste water, APHA , AWWA & WEF,22nd ed, 2012 ;5210 D (Respirometric) and manual of BOD System Ox direct (Lovibond)	3	8	9	2
COD	In-house method based on Standard methods for the examination of water & waste water APHA , AWWA & WEF,22nd ed, 2012; 5220 D(Closed Reflux ,Colorimetric) and manual of Photometer-system MD 100 and RD 125 Reactor(Lovibond)	1380	810	1280	10
Iron	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	6.920	8.243	1.401	0.1
Copper	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	<0.1	<0.1	<0.1	0.1
Zinc	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	<0.1	<0.1	<0.1	0.1
Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.144	0.178	<0.1	0.1

**********End of report**********

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ORIGINAL

ANALYSIS REPORT

Job Ref: 6810/2015
Date : 23.12.2015
Page 1 of 1

Client Name : **RESOURCE AND ENVIRONMENT MYANMAR CO., LTD**
B-702 Delta Plaza, Shwegondaing Rd, Bahan Township,
Yangon, Myanmar
Project Name : EIA Study for Phase II Area Development in Thilawa SEZ
Sample Brought By : Client
Sample Location : Thilawa
Sample Received Date : 16.12.2015
Analysed Date : 17.12.2015

Stations	Commodity Name	Lab Code	Results (mg/l)	
			Manganese	Oil & Grease
Method	-	-	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B
SW-1	Surface Water	260/15	1.373	<0.2
SW-2	Surface Water	261/15	0.558	5.2
SW-3	Surface Water	262/15	<0.1	0.9
SW-4	Surface Water	263/15	0.481	5.4
SW-5	Surface Water	264/15	1.099	1.0
Detection Limit			0.1	0.2

End Of Report

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Ground Water Quality Survey – Rainy Season-

SGS

Report No. : 2015-01367 / 001 (Page 1 of 1) Issued date : November 4, 2015

CLIENT : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
CONTACT : Ms. Toe Toe Hlaing
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E-mail : toetoehlainggeo@gmail.com

Analysis Report

PROJECT NAME : EIA Study for Phase II Area Development in Thilawa SEZ
SAMPLE DESIGNATED AS : Groundwater Quality SAMPLING DATE : October 6, 2015
SAMPLING LOCATION : Thilawa, Yango, Myanmar SAMPLING BY : Client

Parameters	Units	LOQ	Results	
			GW-1	GW-2
Odor	-	-	None	None
Color	Pt.Co	1	<1	<1
Biochemical Oxygen Demand (BOD_5)	mg/l	2	<2	<2
Chemical Oxygen Demand (COD)	mg/l	10	<10	11
Ammonium-Nitrogen (NH_4-N)	mg/l	-	0.13	0.24
Nitrite-Nitrogen (NO_2-N)	mg/l	0.02	0.76	<0.02
Nitrate-Nitrogen (NO_3-N)	mg/l	0.02	16.07	14.96
Cyanide (CN)	mg/l	10	<10	<10
Arsenic (As)	mg/l	0.001	<0.001	<0.001
Cadmium (Cd)	mg/l	0.001	<0.001	<0.001
Chromium Hexavalent (Cr^{6+})	mg/l	0.02	<0.02	<0.02
Fluoride (F)	mg/l	0.05	0.55	0.25
Lead (Pb)	mg/l	0.006	<0.006	<0.006
Mercury (Hg)	mg/l	0.0005	<0.0005	<0.0005
Nickel (Ni)	mg/l	0.002	<0.002	<0.002
Total Coliform Bacteria	MPN/100mL	-	>23	>23

Remarks : - Analysis Methods followed 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) except Mercury (Hg) followed U.S. EPA method 245.1.
- Ammonium Nitrogen (NH_4-N) is from calculation and the field data (pH and Temperature) for the calculation was measured by client.
- LOQ = Limit of Quantitation

(Sirilom Imwilaiwan)
Environmental Monitoring Manager

(Thepson Yommana)
Technical Manager

SGS (THAILAND) LIMITED

TY/Client/PPT/CJ

WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was (were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty as to the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

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ANALYSIS REPORT

ORIGINAL

Job Ref: 6216/2015
Date : 20.10.2015
Page 1 of 1

Sample Described as	:	**GROUND WATER (6.10.15) EIA STUDY FOR PHASE II AREA DEVELOPMENT IN THILAWA SEZ**
Client Name	:	RESOURCE & ENVIRONMENT MYANMAR
Sample Received Date	:	8.10.2015
Sample Brought By	:	Client
Sample Reference	:	GW – 1 (THILAWA)
Analysed Date	:	9.10.2015
Lab Code No.	:	17515

No	Test Parameter	Method	Lod	Result	Unit
1.	Total Suspended Solid	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 2540 D	30	97	mg/l
2	Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B	0.2	<0.2	mg/l
3.	Total Nitrogen (organic)	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-N_{org} C	0.6	<0.6	mg/l
4.	Phosphorus	Laboratory Manual For the Physico-Chemical Analysis of Soil, Water and Plant ; Phototmetric (Ascorbic) Method	0.01	0.03	mg/l
5.	Total Hardness (as$CaCo_3$)	AOAC 18 Ed (2006) Rev 4, 2011(method no973.52)	2	972.4	mg/l
6	Iron	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.1	<0.1	mg/l
7	Copper	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.1	<0.1	mg/l
8	Zinc	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.1	<0.1	mg/l
9	Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.1	5.7	mg/l

**********End of Report**********

syw

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Manager

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ANALYSIS REPORT

ORIGINAL

Job Ref: 6216/2015
Date : 20.10.2015
Page 1 of 1

Sample Described as	:	**GROUND WATER (6.10.15) EIA STUDY FOR PHASE II AREA DEVELOPMENT IN THILAWA SEZ**
Client Name	:	RESOURCE & ENVIRONMENT MYANMAR
Sample Received Date	:	8.10.2015
Sample Brought By	:	Client
Sample Reference	:	GW – 2 (THILAWA)
Analysed Date	:	9.10.2015
Lab Code No.	:	176/15

No	Test Parameter	Method	Lod	Result	Unit
1.	Total Suspended Solid	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 2540 D	30	119	mg/l
2	Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B	0.2	<0.2	mg/l
3.	Total Nitrogen (organic)	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-N_{org} C	0.6	<0.6	mg/l
4.	Phosphorus	Laboratory Manual For the Physico-Chemical Analysis of Soil, Water and Plant ; Phototmetric (Ascorbic) Method	0.01	0.39	mg/l
5.	Total Hardness (as$CaCo_3$)	AOAC 18 Ed (2005) Rev 4, 2011(method no973.52)	2	360.4	mg/l
6	Iron	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air-Acetylene Flame method)	0.1	0.186	mg/l
7	Copper	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air-Acetylene Flame method)	0.1	<0.1	mg/l
8	Zinc	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air-Acetylene Flame method)	0.1	<0.1	mg/l
9	Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air-Acetylene Flame method)	0.1	0.226	mg/l

**********End of Report**********

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Ground Water Quality Survey – Dry Season-

SGS

ORIGINAL

ANALYSIS REPORT

Job Ref: 0626/2016
Date : 25.02.2016
Page 1 of 2

Client Name	:	**RESOURCE AND ENVIRONMENT MYANMAR CO., LTD** B-702 Delta Plaza, Shwegondaing Rd, Bahan Township, Yangon, Myanmar
Project Name	:	EIA Study for Phase II Area Development in Thilawa SEZ
Sample Brought By	:	Client
Sample Location	:	Thilawa
Sample Received Date	:	11.02.2016
Analysed Date	:	11.02.2016

Results (mg/l)	Methods	Stations			Detection Limit
		SW-1 (2.2.2016)	SW-2 (2.2.2016)	SW-3 (2.2.2016)	
Lab Code	-	015/16	016/16	017/16	-
Commodity Name	-	Surface Water	Surface Water	Surface Water	-
Total Suspended Solid	Based on Standard methods for the examination of water & waste water APHA , AWWA & WEF,22nd ed, 2012; 2540 D	431.67	488.67	235.5	20
Oil & Grease	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012 ; 5520 B	<5	6.1	<5	5
Total Nitrogen (organic)	Based on Standard methods for the examination of water & waste water APHA , AWWA & WEF,22nd ed, 2012; 4500-N_{org} C	1.4	1.12	<1	1
Total Hardness(as$CaCO_3$)	AOAC 18 Ed (2005) Rev 4, 2011 (method no973.52)	1275	668.64	1410	5
Total Phosphorus	Laboratory Manual For the Physico-Chemical Analysis of Soil, Water and Plant ; Photolmetric (Ascorbic) Method	0.023	0.047	0.045	0.01

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SGS

ORIGINAL

Job Ref: 0626/2016
Date : 25.02.2016
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Results (mg/l)	Methods	Stations			Detection Limit
		SW-1 (2.2.2016)	SW-2 (2.2.2016)	SW-3 (2.2.2016)	
Lab Code	-	015/16	016/16	017/16	-
Commodity Name	-	Surface Water	Surface Water	Surface Water	-
BOD	In-house method based on Standard methods for the examination of water & waste water, APHA , AWWA & WEF,22nd ed, 2012 ;5210 D (Respirometric) and manual of BOD System Ox direct (Lovibond)	3	8	9	2
COD	In-house method based on Standard methods for the examination of water & waste water APHA , AWWA & WEF,22nd ed, 2012; 5220 D(Closed Reflux ,Colorimetric) and manual of Photometer-system MD 100 and RD 125 Reactor(Lovibond)	1380	810	1280	10
Iron	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	6.920	8.243	1.401	0.1
Copper	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	<0.1	<0.1	<0.1	0.1
Zinc	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	<0.1	<0.1	<0.1	0.1
Manganese	Based on Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012 ; 3111B (Direct Air- Acetylene Flame method)	0.144	0.178	<0.1	0.1

**********End of report**********

SGS (Myanmar) Limited

(Nu Nu Yi)
Manager

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Soil Quality Survey

APPLIED GEOLOGY DEPARTMNENT, GEOCHEMISTRY LABORATORY

Sample Type – Soil
Method – Atomic Absorption Spectrophotometer
Digestion – Aqua-regia

Project – EIA Study for Phase II Area Development in Thilawa SEZ
Resource and Environment Myanmar Co.,Ltd.
Sampling Date – 14-12-2015

Unit – mg/kg

Sample No	Mercury (Hg)	Arsenic (As)	Lead (Pb)	Cadmium (Cd)	Copper (Cu)	Zinc (Zn)	Chromium (Cr)	Iron (Fe)	Manganese (Mn)
SO-1	ND	ND	85	0.007	60	75	12	5210	10
SO-2	ND	ND	80	0.006	65	70	10	5400	8
SO-3	ND	ND	87	0.006	68	80	8	4900	12
SO-4	ND	ND	90	0.005	72	78	11	4750	9

Dr. Han Sein
Associate Professor
Applied Geology Department

Annex 6-2

Flora and Fauna List of Thilawa SEZ Zone B Area

Annex 6-2 Recorded Speices of Thilawa SEZ Zone B Area

Table 6-1-1 Recorded Flora of Thilawa SEZ Zone B Area

No.	Scientific Name	Local Name	Family	Habitat	Distribution	IUCN (2015-4 ver.3.1)
1	*Abelmoschus esculentus*	Yonbade	Malvaceae	Shrub	Cultivated	NE
-2	*Acacia auriculiformis*	Malaysia-padauk	Mimosaceae	Small Tree	Cultivated	LC
3	*Acacia concinna*	Kinmun-gyin	Mimosaceae			NE
4	*Acacia inopinata*	Sha-hta-naung	Mimosaceae	Tree	Mandalay, Shan	NE
5	*Acacia pennata*	Suyit	Mimosaceae	Climber/Creeper	Reported from Myanmar	LC
6	*Acanthus illicifolius*	Khaya	Acanthaceae	Shrub	Ayeyarwady, Rakhine, Taninthayi, Yangon	NE
7	*Achyranthes aspera*	Kyet-mauk-sue-pyan	Amaranthaceae	Herb	Magway, Yangon	NE
8	*Albizia falcata*	Thinbaw-magyi	Mimosaceae	Tree	Cultivated	NE
9	*Albizia lebbeck*	Kok-ko	Mimosaceae	Tree	Reported from Myanmar	NE
10	*Albizia procera*	Sit	Mimosaceae	Tree	Reported from Myanmar	NE
11	*Althaea rosea*	Pan-chinbaung	Malvaceae	Shrub	Cultivated	NE
12	*Alysicarpus vaginalis*	Than-ma-naing-kyauk-ma-naing	Fabaceae	Shrub	Bago, Mandalay, Mon, Sagaing, Shan, Yangon	NE
13	*Amaranthus bitoides*	Hin-nu-new	Amaranthaceae	Herb	Cultivated	NE
14	*Amaranthus caudatus*	Kyet-mauk	Amaranthaceae	Herb	Cultivated	NE
15	*Amaranthus spinosus*	Hin-nu-new-subauk	Amaranthaceae	Herb	Cultivated	NE
16	*Anacardium occidentale*	Thiho	Anacardiaceae	Tree	Cultivated	NE
17	*Annona squamosa*	Awza	Annonaceae	Small Tree	Cultivated	NE
18	*Areca catechu*	Kunthi-pin	Arecaceae	Small Tree	Cultivated	NE
19	*Artocarpus heterophyllus*	Peinne	Moraceae	Tree	Cultivated	NE
20	*Azadirachta indica*	Tama	Meliaceae	Tree	Wide	NE
21	*Bambusa bambos*	Kyakat-wa	Poaceae	Bamboo	Reported from Myanmar	NE
22	*Bambusa burmanica*	Waya	Poaceae	Bamboo	Bago, Kachin, Magway, Mandalay, Mon, Sagaing, Shan, Taninthayi	NE
23	*Bambusa wamin*	Wamin	Poaceae	Bamboo	Cultivated	NE
24	*Bauhinia acuminata*	Swe-daw	Caesalpiniaceae	Small Tree	Wide	LC
25	*Benincasa hispida*	Kyauk-pha-yon	Cucurbitaceae	Climber/Creeper	Cultivated	NE
26	*Bombax ceiba*	Let-pan	Bombacaceae	Tree	Wide	NE
27	*Borassus flabellifer L.*	Htan	Areaceae	Tree	Bago, Mandalay, Sagaing, Taninthayi	NE
28	*Butea frondosa*	Pauk	Fabaceae	Tree	Reported from Myanmar	NE
29	*Canna indica*	Budatharana	Cannaceae	Herb	Cultivated	NE
30	*Capparis spinosa*	Kywel-na-khaung	Capparaceae	Shrub	Mandalay	NE
31	*Capsicum annuum*	Ngayote	Solanaceae	Shrub	Cultivated	NE
32	*Caraya arborea*	Bambwe	Lecythidaceae	Tree	Wide	NE
33	*Cassia fistula*	Ngu	Caesalpinaceae	Tree	Wide	NE
34	*Cassia occidentalis*	Dangwe	Caesalpiniceae	Shrub	Wide	NE
35	*Ceiba pentandra*	Moh-pin	Bombacaceae	Tree	Cultivated	NE
36	*Cerbera manghas*	Zalat	Apocynaceae	Small tree	Ayeyarwady, Bago, Rakhine, Taninthayi, Yangon	NE

No.	Scientific Name	Local Name	Family	Habitat	Distribution	IUCN (2015-4 ver.3.1)
37	*Chionanthus macrocarpus*	Taw-sabe	Oleaceae	Shrub	Kachin, Mon, Taninthayi, Yangon	NE
38	*Chromolaena odorata*	Bezat	Asteraceae	Shrub	Wide	NE
39	*Chukrasia velutina*	Yinma	Meliaceae	Tree	Wide	NE
40	*Citris medica*	Shauk	Rutaceae	Shrub/Small Tree	Cultivated	NE
41	*Clerodendrum villosum*	Ka-on	Verbenaceae	Herb	Wide	NE
42	*Clitoria mariana*	Taw-peik-san	Fabaceae	Climber/Creeper	Kachin, Magway, Mandalay, Yangon	NE
43	*Cnestis ramflora*	Gwe-dauk	Connaraceae	Shrub, Small Tree	Ayeyarway, Mon, Taninthayi, Yangon	NE
44	*Cocos nucifera L.*	Ohn	Arecaceae	Tree	Cultivated	NE
45	*Codiaeum variegatum*	Ywet-hla	Euphorbiaceae	Shrub	Cultivated	NE
46	*Colocasia esculenta*	Pein	Araceae	Herb	Cultivated	LC
47	*Commelina diffusa*	Myat kyut	Commelinaceae	Herb	Bago, Kachin, Mandalay, Shan, Yangon	LC
48	*Costus speciosus*	Phalan taung hmwe	Costaceae	Herb	Yangon, Sagaing, Mandalay, Bago, Shan, Kachin	NE
49	*Croton oblongifolius*	Thetyin-gyi	Euphorbiaceae	Shrub	Wide	NE
50	*Delonix regia*	Sein-ban	Caesalpiniaceae	Tree	Cultivated	NE
51	*Dendrocalamus brandisii*	Wabo	Poaceae	Bamboo	Bago, Chin, Kachin, Mandalay, Shan, Yangon, Yangon	NE
52	*Dendrocalamus strictus*	Hmyin-wa	Poaceae	Bamboo	Bago, Kachin, Kayin, Mon,	NE
53	*Desmodium triflorum*	Pe yaing	Fabaceae	Herb	Wide	LC
54	*Dichanthium caricosum*	Myet-kha	Poaceae	Grass	Bago, Magway, Mandalay, Yangon	NE
55	*Dioscorea wallichii*	Ka-dat	Dioscoreaceae	Climber/Creeper	Rakhine, Yangon	LC
56	*Dregea volubilis*	Gwe-dauk-nwe	Asclepiadaceae	Climber/Creeper	Wide	NE
57	*Eclipta alba*	Kyeik-hman	Asteraceae	Herb	Reported from Myanmar	DD
58	*Eleusine indica*	Sin-ngo-myet	Poaceae	Grass	Bago, Kachin, Mandalay, Shan, Yangon	LC
59	*Enhydra fluctuans*	Kana-hpaw	Asteraceae	Herb	Yangon, Mandalay, Taninthayi	NE
60	*Eryngium foetidum*	Shan-nan-nan	Apiaceae	Herb	Chin, Mandalay	NE
61	*Erythrina arborescens*	Kathis	Fabaceae	Tree	Kachin, Sagaing	NE
62	*Eucalyptus camaldulensis*	Eucalypt	Myrtaceae	Tree	Cultivated	NE
63	*Eucalyptus torelliana*	Pyi-lon-chantha	Myrtaceae	Tree	Cultivated	NE
64	*Eugenia bracteolata*	Tha-bye	Myrtaceae	Tree	Rakhine, Taninthayi	NE
65	*Euphorbia milii*	Kiss-me-quick	Euphorbiaceae	Shrub	Cultivated	DD
66	*Euphorbia neriifolia*	Ta-zaung	Euphorbiaceae	Small tree	Cultivated	NE
67	*Ficus glomerata*	Ye-thapan	Moraceae	Tree	Bago, Kachin, Mandalay, Yangon	NE
68	*Ficus religrosa*	Bawdi-nyaung	Moraceae	Tree	Cultivated	NE
69	*Ficus rumphii*	Nyaung	Moraceae	Tree	Bago,Yangon, Rakhine	NE
70	*Flueggea leucopyrus*	Chinya-phyu	Euphorbiaceae	Shrub	Kachin, Sagaing, Shan	NE
71	*Fuirena ciliaris*	-	Cyperaceae	Grass	-	LC
72	*Garcinia cowa*	Taung-thale	Hypericaceae	Tree	Wide	NE
73	*Gardenia jasminoides*	Zizawa	Rubiaceae	Shrub	Cultivated	NE
74	*Gardenia sessiliflora*	Magyi-bauk	Rubiaceae	Small Tree	Wide	NE
75	*Gigantochloa wanet*	Wa-net	Poaceae	Bamboo	Kachin, Sagaing	NE
76	*Glochidion fagifolium*	Htamasok gyi	Euphorbiaceae	Small Tree	-	NE

No.	Scientific Name	Local Name	Family	Habitat	Distribution	IUCN (2015-4 ver.3.1)
77	*Gnaphalium indium*	Byaing-che	Asteraceae	Herb	Magway, Yangon	NE
78	*Gossypium arboreum*	Wah	Malvaceae	Shrub	Cultivated	NE
79	*Hedychium gracile*	Pade-gaw	Zingiberaceae	Herb	Mandalay	NE
80	*Hibiscus cannabinus*	Chin-baung	Malvaceae	Shrub	Cultivated	NE
81	*Hibiscus panduriformis*	Taw-yone-pa-di	Malvaceae	Shrub	Yangon	NE
82	*Hygrophila phlomoides*	Migyaung-kunbat	Acanthaceae	Herb	Bago, Mandalay, Taninthayi, Yangon	NE
83	*Hyptis suaveolens*	Kala pin sein	Lamiaceae	Herb	Mandalay, Rakhine, Taninthayi, Yangon	NE
84	*Ipomoea aquatica*	Kazun-ywet	Convolvulaceae	Climber / Creeper	Wide	LC
85	*Ixora coccinea*	Pon-na-yeik	Rubiaceae	Shrub	Cultivated	NE
86	*Jasminnum arborescens*	Sabe	Oleaceae	Shrub/Climber	Magway, Mandalay, Yangon	NE
87	*Justica decussata*	Nat-pan	Acanthaceae	Shrub	Wide	NE
88	*Kalanchoe pinnata*	Ywet-kya-pin-pauk	Crassulaceae	Herb	Wide	NE
89	*Lagenaria siceraria*	Bu	Cucurbitaceae	Climber/Creeper	Cultivated	NE
90	*Lagerstroemia speciosa*	Pyinma	Lythraceae	Tree	Reported from Myanmar	NE
91	*Lannea coromandelica*	Nabe	Anacardiaceae	Tree	Bago, Kayin, Mandalay, Rakhine, Shan, Taninthayi	NE
92	*Lawsonia alba*	Dan	Lythraceae	Shrub	Cultivated	NE
93	*Leucaena leucocephala*	Baw-sa-gaing	Mimosaceae	Tree	Mandalay,Sagaing,Yangon	NE
94	*Leucas aspera*	Taw-pin-sein	Lamiaceae	Shrub	Bago, Mandalay, Shan, Yangon	NE
95	*Luffa acutangula*	Kha-we-yaing	Cucurbitaceae	Climber/Creeper	Reported from Myanmar	NE
96	*Malvastrum coromandelianum*	Taw-pilaw	Malvaceae	Herb	Kachin, Sagaing	NE
97	*Mangifera indica*	Tha-yet	Anacardiaceae	Tree	Wide	DD
98	*Markhamia stipulata*	Ma-hlwa	Bignoniaceae	Tree	Wide	NE
99	*Melia azedarach*	Pan-tama	Meliaceae	Small Tree	Cultivated	NE
100	*Microcos paniculata*	Mya-yar	Tiliaceae	Small Tree	Ayeyarwady, Bago, Yangon, Mandalay,Mon, Taninthayi	NE
101	*Millettia pendula*	Thinwin	Febaceae	Tree	Bago, Magway, Mandalay, Taninthayi, Yangon	NE
102	*Mimosa pudica*	Hti-ka-yone	Mimosaceae	Herb	Wide	LC
103	*Mimosa rubicaulis*	Biat-hti-ka-yone	Mimosaceae	Herb	Yangon	NE
104	*Momordica charantia*	Kyet-hin-khar	Cccurbitaceae	Climber/Creeper	Cultivated	NE
105	*Morinda angustifolia*	Yeyo	Rubiaceae	Small Tree	Wide	NE
106	*Moringa oleifera*	Dan-da-lun	Moringaceae	Tree	Cultivated	NE
107	*Mucuna pruriens*	Khwele-ya	Fabaceae	Climber	Bago, Bago, Chin, Kayin, Kayin, Mandalay, Mandalay, Sagaing, Sagaing, Shan, Yangon	NE
108	*Musa sapientum*	Nget-pyaw	Musaceae	Herb	Cultivated	NE
109	*Oreocnide frutescens*	Obok	Urticaceae	Small Tree	Kachin, Mandalay, Shan, Unknown	NE
110	*Oroxylum indicum*	Kyaung-sha	Bignoniceae	Tree	Wide	NE
111	*Oxytenanthera albociliata*	Wa-gauk	Poaceae	Bamboo	Reported from Myanmar	NE
112	*Peltophorum pterocarpum*	Thinbaw-mezali	Caesalpiniaceae	Tree	Cultivated	NE
113	*Phragmites vallatoria*	Kyu	Poaceae	Grass	Reported from Myanmar	NE

No.	Scientific Name	Local Name	Family	Habitat	Distribution	IUCN (2015-4 ver.3.1)
114	*Physalis minima*	Bauk-pin	Solanaceae	Herb	Bago, Taninthayi, Yangon	NE
115	*Piper betle*	Betle	Piperaceae	Climber/Creeper	Cultivated	NE
116	*Polyalthia simiarum*	Thabut	Annonaceae	Tree	Mandalay, Taninthayi, Yangon	NE
117	*Psidium guajava*	Malaka	Myrtaceae	Small Tree	Cultivated	NE
118	*Pterocarpus macrocarpus*	Padauk	Fabaceae	Tree	Bago, Mandalay, Sagaing, Shan, Taninthayi	NE
119	*Pueraria sp.*	Taw-pe	Febaceae	Climber,Creeper	Bago, Mon	NE
120	*Raphanus sativus*	Monla-u	Brassicaceae	Herb	Cultivated	NE
121	*Ricinus communis*	Kyet-su	Euphorbiaceae	Small tree	Cultivated	NE
122	*Saccharum sinense*	Kyan	Poaceae	Grass	Yangon	NE
123	*Sandoricum koetijabe*	Thitto	Meliaceae	Tree	Ayeyarwady, Kayin, Mon, Taninthayi, Yangon	NE
124	*Scoparia dulcis*	Darna-thu-kha	Scorphulariaceae	Herb	Bago,Chin,Mandalay,Taninthayi,Yangon	NE
125	*Senna siamea*	Mazali	Caesalpiniaceae	Tree	Reported from Myanmar	NE
126	*Sesbania bispinosa*	Nyan	Fabaceae	Shrub	Rakhine, Sagaing	LC
127	*Sesbania grandiflora*	Pauk pan phyu	Fabaceae	Small Tree	Cultivated	NE
128	*Sida acuta*	Wet-chay-pan	Malvaceae	Herb	Reported from Myanmar	NE
129	*Solanum indicum L.*	Khayan-kazaw	Solanaceae	Shrub	Bago, Mandalay, Shan, Yangon	NE
130	*Solanum melongena*	Khayan	Solanaceae	Shrub	Cultivated	NE
131	*Sphaeranthus indicus*	Mwe-sok	Asteraceae	Herb	Bago, Chin, Sagaing, Taninthayi, Yangon	LC
132	*Spondias malayana*	Gwe	Anacardiaceae	Tree	Reported from Myanmar	NE
133	*Stemona tuberosa*	Simi-tauk	Stemonaceae	Herb	Bago	NE
134	*Streblus asper*	Okhne	Moraceae	Small Tree	Bago, Sagaing, Tanintharyi, Unknown,	NE
135	*Syzygium aromaticum*	Lay-hnyin	Myrtaceae	Small Tree	Cultivated	NE
136	*Syzygium fruticosum*	Taw-thabye	Myrtaceae	Tree	Bago, Mon, Taninthayi	NE
137	*Tabernaemontana divaricata*	Taw-zalat	Apocynaceae	Shrub/Climber	Cultivated	NE
138	*Tamarindus indica*	Magyi	Caesalpiniaceae	Tree	Cultivated	NE
139	*Tectona grandis*	Kyun	Verbenaceae	Tree	Wide	NE
140	*Terminalia catappa*	Banda	Combretaceae	Tree	Cultivated	NE
141	*Themeda triandra*	Myauk-mi	Poaceae	Grass	Bago, Magway, Yangon	NE
142	*Thyrsostachys siamensis*	Htiyo-wa	Poaceae	Bamboo	Cultivated	NE
143	*Urena lobata*	Wetchi-pane	Malvaceae	Shrub	Bago, Cnin, Mandalay, Taninthayi, Yangon	NE
144	*Vigna catjang*	Pe-doung-she	Fabaceae	Climber/Creeper	Cultivated	NE
145	*Ziziphus jujuba*	Zee	Rhamnaceae	Tree	Cultivated	LC
146	*Ziziphus oenoplia*	Supauk-pin	Rhamnaceae	Shrub	Wide	NE

Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern;
NT: Near Threatened; VU: Vulnerable; EN: Endangered

Source: Resource & Environment Myanmar Co., Ltd.

Table 6-1-2 Recorded Butterfly Species of Thilawa SEZ Zone B Area

No.	Scientific Name	Common name	Family	Habitat	IUCN (2015-4 ver.3.1)
1	*Anthene lycaenina*	Pointed Ciliate Blue	Lycaenidae	bush	NE
2	*Appias lalage*	Spot Puffin	Pieridae	tail	NE
3	*Appias libythea*	Striped Albatross	Pieridae	bush	NE
4	*Appias lyncida*	Chocolate Albatross	Pieridae	bush	NE
5	*Appias nero*	Orange Albatross	Pieridae	trail	NE
6	*Ariadne ariadne*	Angled Castor	Nymphalidae	shrub	NE
7	*Arnetta atkinsoni*	Black-tufted Bob	Hesperiidae	trail	NE
8	*Athyma perius*	Common Sergeant	Nymphalidae	trail	NE
9	*Bassarona sahadeva (Euthalia sahadeva)*	Green Duke	Nymphalidae	trail	NE
10	*Castalius rosimon*	common Pierrot	Lycaenidae	shrub, bush, trail	NE
11	*Catopsilia florella*	African Migrant	Pieridae	trail	NE
12	*Catopsilia pomona*	Common Emigrant	Pieridae	on the trail	NE
13	*Catopsilia pyranthe*	Mottled Emigrant	Pieridae	trail	NE
14	*Celastrina argiolus*	Holy Blue	Lycaenidae	bush	NE
15	*Celastrina carna*		Lycaenidae	trail	NE
16	*Celastrina musina*	Swinhoe's Hedge Blue	Lycaenidae	bush	NE
17	*Celastrina rona*		Lycaenidae	on the trail	NE
18	*Cepora nerissa*	Common Gull	Pieridae	trail	NE
19	*Cethosia biblis*	Red Lacewing	Nymphalidae	trail	NE
20	*Cethosia cyane*	Leopard Lacewing	Nymphalidae	bush	NE
21	*Cethosia penthesilea*	Orange Lacewing	Nymphalidae	on the shrub	NE
22	*Chilasa clytia*	Common Mime	Papilionidae	trail	NE
23	*Danaus affinis*	Malay Tiger	Danaidae	bush	NE
24	*Danaus chrysippus*	Plain Tiger	Danaidae	bush	NE
25	*Danaus genutia*	Common Tiger	Danaidae	bush	NE
26	*Delias agostina*	Yellow Jezebel	Pieridae	trail	NE
27	*Delias descombi*	Redspot Jezebel	Pieridae	on the trail	NE
28	*Delias eucharis*	Common Jezebel	Pieridae	trail	NE
29	*Delias hyparete*	Painted Jezebel	Pieridae	shrub	NE
30	*Dercas lycorias*	Plain Sulphur	Pieridae	bush	NE
31	*Euploea diocletianus*	Magpie Crow	Nymphalidae	on the shrub	NE
32	*Euploea sylvester*	Double-branded Crow	Nymphalidae	on the shrub	NE
33	*Eurema ada*		Pieridae	trail	NE
34	*Eurema andersonii*	One-spot Grass Yellow	Pieridae	trail	NE
35	*Eurema blanda*	Three-Spot Grass Yellow	Pieridae	trail	NE
36	*Eurema brigitta*	Small Grass Yellow	Pieridae	trail	NE
37	*Eurema hecabe*	Large Grass Yellow	Pieridae		NE
38	*Eurema laeta*	Spotless Grass Yellow	Pieridae	trail	NE
39	*Eurema sari*	Chocolate Grass Yellow	Pieridae	shrub	NE
40	*Eurema simulatrix*	Changeable Grass Yellow	Pieridae	bush	NE

No.	Scientific Name	Common name	Family	Habitat	IUCN (2015-4 ver.3.1)
41	*Euthalia phemius*	White-edged Blue Baron	Nymphalidae	trail	NE
42	*Gandaca harina*	Tree Yellow	Pieridae	trail	NE
43	*Graphium doson*	Common Jay	Papilionidae	bush	NE
44	*Graphium sarpedon*	Common Bluebottle	Papilionidae	bush	NE
45	*Halpe ormeses*		Hesperidae	trail	NE
46	*Hypolimnas bolina*	Great Eggfly	Nymphalidae	on the trail	NE
47	*Ixias pyrene*	Yellow Orange Tip	Pieridae	Shrub	NE
48	*Junonia almana*	Peacock Pansy	Nymphalidae	on the shrub	LC
49	*Junonia atlites*	Gray Pansy	Nymphalidae	bush	NE
50	*Junonia hierta*	Yellow Pansy	Nymphalidae	trail	LC
51	*Junonia lemonias*	Lemon Pansy	Nymphalidae	bush	NE
52	*Leptosia nina*	Psyche	Pieridae	trail	NE
53	*Megisba malaya*	Malayan	Lycaenidae	on the tree	NE
54	*Mycalesis perseus*	Dingy Bushbrown	Nymphalidae		NE
55	*Nacaduba beroe*	Opaque Six-line Blue	Lycaenidae	shrub	NE
56	*Neptis hylas*	Common Sailer	Nymphalidae	on the trail	NE
57	*Neptis jumbah*	Chestnut-Streaked Sailer	Nymphaidae	bush	NE
58	*Neptis soma*	Sullied Sailer	Nymphalidae	bush	NE
59	*Papilio demoleus*	Common Lime	Papilionidae	bush	NE
60	*Papilio iswara*	Great Helen	Papilionidae	bush	NE
61	*Papilio mahadeva*	Burmese Raven	Papilionidae	on the trail	NE
62	*Papilio memnon*	Great Mormon	Papilionidae	trail	NE
63	*Papilio polytes*	Common Mormon	Papilionidae	on the tree	NE
64	*Parantica agleoides*	Dark Glassy Tiger	Nymphalidae	bush	NE
65	*Parnara ganga*	Continental Swift	Hesperiidae		NE
66	*Prioneris thestylis*	Spotted Sawtooth	Pieridae	trail	NE
67	*Prosotas lutea*		Lycaenidae	bush	NE
68	*Pseudergolis wedah*	Tabby	Nymphalidae	bush	NE
69	*Syntarucus plinius*	Zebra Blue	Lycaenidae	bush	NE
70	*Tirumala limniace*	Blue Tiger	Nymphalidae		NE
71	*Zizeeria karsandra*	Dark Grass Blue	Lycaenidae	trail	NE
72	*Zizeeria maha*	Pale Grass Blue	Lycaenidae		NE
73	*Zizula hylax*	Gaika Blue	Lycaenidae	trail	NE

Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern;
NT: Near Threatened; VU: Vulnerable; EN: Endangered
Source: Resource & Environment Myanmar Co., Ltd.

Table 6-1-3 Recorded Dragonfly Species of Thilawa SEZ Zone B Area

No.	Scientific name	Common name	Family	Habitat	IUCN (2015-4 ver. 3.1)
1	*Brachydiplax sobrina*	Sombre Lieutenant	Libellulidae	near paddy field	LC
2	*Ictinogomphus rapax*		Gomphidae	near paddy field	LC
3	*Neurothemis tullia tullia*	Pied Paddy Skimmer	Libellulidae	trail	NE
4	*Urothemis signata signata*	Greater Crimson Glider	Libellulidae	near the paddy field	NE

Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern;
NT: Near Threatened; VU: Vulnerable; EN: Endangered
Source: Resource & Environment Myanmar Co., Ltd.

Table 6-1-4 Bird Species Recorded in Thilawa SEZ Zone B Area

No.	Scientific Name	Common Name	Family	IUCN (2015-4 ver.3.1)
1	*Accipiter badius*	Shikra	Accipitridae	LC
2	*Acridotheres fuscus*	Jungle Myna	Sturnidae	LC
3	*Acridotheres tristis*	Common Myna	Sturnidae	LC
4	*Actitis hypoleucos*	Common Sandpiper	Scolopacidae	LC
5	*Aegithina tiphia*	Common Iora	Aegithinidae	LC
6	*Anhinga melanogaster*	Oriental Darter	Anhingidae	NT
7	*Anthus hodgsoni*	Olive- backed Pipit	Motacillidae	LC
8	*Anthus rufulus*	Paddy Field Pipit	Motacillidae	LC
9	*Apus nipalensis*	House Swift	Apodidae	LC
10	*Ardea alba*	Great Egret	Ardeidae	LC
11	*Ardea cinerea*	Grey Heron	Ardeidae	LC
12	*Ardea modesta*	Eastern Great Egret	Ardeidae	NE
13	*Ardea purpurea*	Purple Heron	Ardeidae	LC
14	*Ardeola bacchus*	Chinese Pond Heron	Ardeidae	LC
15	*Ardeola grayii*	Indian Pond Heron	Ardeidae	LC
16	*Bubulcus ibis*	Cattle Egret	Ardeidae	LC
17	*Cacomantis merulinus*	Plaintive Cuckoo	Cuculidae	LC
18	*Charadrius dubius*	Little Ringed Plover	Charadriidae	LC
19	*Chlidonias leucopterus*	White-winged Tern	Sternidae	LC
20	*Chroicocephalus ridibundus*	Black –headed Gull	Laridae	LC
21	*Circus melanoleucos*	Pied Harrier	Accipitridae	LC
22	*Columba livia*	Rock Pigeon	Columbidae	LC
23	*Copsychus malabaricus*	White –rumped shama	Muscicupidae	LC
24	*Copsychus saularis*	Oriental Magpie Robin	Muscicapidae	LC
25	*Coracias benghalensis*	Indian Roller	Coraciidae	LC
26	*Corvus splendens*	House Crow	Corvidae	LC
27	*Crypsirina temia*	Racket –tailed Treepie	Corvidae	LC
28	*Cypsiurus balasiensis*	Asian Palm Swift	Apodidae	LC
29	*Dendrocygna javanica*	Lesser Whistling Duck	Anatidae	LC
30	*Dicrurus macrocercus*	Black Drongo	Dicruridae	LC

No.	Scientific Name	Common Name	Family	IUCN (2015-4 ver.3.1)
31	*Egretta garzetta*	Little Egret	Ardeidae	LC
32	*Gallinago gallinago*	Common snipe	Scolopacidae	LC
33	*Gracupica contra (Sturnus contra)*	Asian pied Starling	Sturnidae	LC
34	*Halcyon smyrnensis*	White-throated Kingfisher	Halcyonidae	LC
35	*Hirundo rustica*	Barn Swallow	Hirundinidae	LC
36	*Hirundo tahitica*	Pacific Swallow	Hirundinidae	LC
37	*Jynx torquilla*	Eurasian Wryneck	Picidae	LC
38	*Lanius cristatus*	Brown shrike	Laniidae	LC
39	*Lonchura punctulata*	Scaly – breasted Munia	Estrildidae	LC
40	*Merops orientalis*	Little Green Bee eater	Meropidae	LC
41	*Mesophoyx intermedia*	Intermediate Egret	Ardeidae	NE
42	*Metopidius indicus*	Bronze-winged Jacana	Jacanidae	LC
43	*Milvus lineatus*	Black –eared Kite	Accipitridae	NE
44	*Milvus migrans*	Black Kite	Accipitridae	LC
45	*Motacilla alba*	White Wagtail	Montacillidae	LC
46	*Nettapus coromandelianus*	Cotton Pygmy-goose	Anatidae	LC
47	*Oriolus chinensis*	Black–naped Oriole	Oriolidae	LC
48	*Orthotomus atrogularis*	Dark-necked tailorbird	Sylviidae	LC
49	*Passer domesticus*	House Sparrow	Passeridae	LC
50	*Passer montanus*	Eurasian Tree Sparrow	Passeridae	LC
51	*Phalacrocorax niger*	Little Cormorant	Phalacrocoracidae	LC
52	*Ploceus hypoxanthus*	Asian Golden Weaver	Ploceidae	NT
53	*Ploceus philippinus*	Baya weaver	Ploceidae	LC
54	*Pluvialis fulva*	Pacific Golden Plover	Charadriidae	LC
55	*Prinia hodgsonii*	Grey-breasted Prinia	Cisticolidae	LC
56	*Prinia inornata*	Plain Prinia	Cisticolidae	LC
57	*Psilopogon haemacephalus*	Coppersmith Barbet	Megalaimidae	LC
58	*Pycnonotus blanfordi*	Streak–eared Bulbul	Pycnonotidae	LC
59	*Pycnonotus cafer*	Red-vented Bulbul	Campephagidae	LC
60	*Pycnonotus jocosus*	Red-whiskered Bulbul	Pycnonotidae	LC
61	*Saxicola caprata*	Pied Bushchat	Muscicapidae	LC
62	*Saxicola maurus*	Asian Stonechat	Muscicapidae	NE
63	*Spilopelia chinensis*	Spotted Dove	Columbidae	LC
64	*Streptopelia tranquebarica*	Red-turtle Dove	Columbidae	LC
65	*Timalia pileata*	Chestnut–capped Babbler	Timaliidae	LC
66	*Tringa ochropus*	Green sandpiper	Scolopacidae	LC
67	*Turdoides gularis*	White-throated Babbler	Timaliidae	LC
68	*Vanellus cinereus*	Grey-headed Lapwing	Charadriidae	LC
69	*Vanellus indicus*	Red-Wattled Lapwing	Charadriidae	LC

Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern;
NT: Near Threatened; VU: Vulnerable; EN: Endangered
Source: Resource & Environment Myanmar Co., Ltd.

Table 6-1-5 Recorded Mammal Species of Thilawa SEZ Zone B Area

No.	Scientific Name	Common Name	Family	IUCN (2015-4 ver.3.1)	Remark
1	*Bandicota indica*	Greater bandicoot rat	Muridae	LC	Interviewed
2	*Echinosorex gymnura*	Moon rat	Erinaceidae	LC	Interviewed
3	*Herpestes javanicus*	Javan Moongoose	Hespestidae	LC	Observed
4	*Herpestes urva*	Crab-eating Moongoose	Herpestidae	LC	Interviewed
5	*Lepus peguensis*	Burmese Hare	Leporidae	LC	Interviewed
6	*Paradoxurus hermaphroditus*	Common Palm Civet	Viverridae	LC	Interviewed
7	*Viverricula indica*	Small Indian Civet	Viverridae	LC	Interviewed

Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern;

NT: Near Threatened; VU: Vulnerable; EN: Endangered

Source: Resource & Environment Myanmar Co., Ltd.

Table 6-1-6 Recorded Reptile and Amphibian Species of Thilawa SEZ Zone B Area

No.	Scientific Name	Common name	Family	IUCN (2015-4 ver.3.1)	Remark
1	*Duttaphrynus melanostictus (Bufo melanostictus)*	Asian Common toad	Bufonidae	LC	Observed
2	*Fejervarya limnocharis*	Paddy Frog	Dicroglossidae	LC	Observed
3	*Kaloula pulohra*	Painted Bull Frog	Microhylidae	NE	Observed
4	*Hylara leptoglossa (Rana leptoglossa)*	Long-tounged Frog	Ranidae	LC	Observed
5	*Amphiesma stolatum*	Buff-striped Keelback	Colubridae	NE	Observed
6	*Xenochrophis piscator*	Checkered Keelback	Colubridae	NE	Interviewed
7	*Calotes emma*	Forest crested Lizard	Agamidae	NE	Observed
8	*Calotes versicolor*	Garden Lizard	Agamidae	NE	Observed
9	*Ptyas mucosa*	Indian Rat Snake	Colubridae	NE	Observed
10	*Bungarus fasciatus*	Banded Krait	Elapidae	NE	Interviewed
11	*Ophiophagus hannah*	King Cobra	Elapidae	VU	Interviewed
12	*Daboia russelli*	Russell's viper	Viperidae	NE	Interviewed

Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern;
NT: Near Threatened; VU: Vulnerable; EN: Endangered
Source: Resource & Environment Myanmar Co., Ltd.

Table 6-1-7 Fish Species Recorded in Thilawa SEZ Zone B Area

No.	Scientific Name	Common Name	Family	IUCN (2015-4 ver.3.1)	Remark
1	*Anabas testudineus*	Climbing perch	Anabantidae	LC	Observed
2	*Channa marulius*	Giant snakehead	Channidae	LC	Interviewed
3	*Channa orientalis*	Ceylon snakehead	Channidae	NE	Interviewed
4	*Channa punctata*	Spotted snakehead	Channidae	LC	Interviewed
5	*Chela sardinella*	Sardinella Razobelly Minnow	Cyprinidae	LC	Interviewed
6	*Cirrhinus mrigala*	Mrigal carp	Cyprinidae	LC	Interviewed
7	*Clarias batrachus*	Walking Catfish	Clariidae	LC	Interviewed
8	*Fenneropenaeus indicus*	Indian Prawn	Penaeidae	NE	Interviewed
9	*Gecarcoidea natalis*	Christmas Island red crab	Gecarcinidae	NE	Interviewed
10	*Lates calcarifer*	Asian seabass	Latidae	NE	Interviewed
11	*Monopterus albus*	Rice swamp eel	Synbranchidae	LC	Interviewed
12	*Mystus cavasius*	Gangetic mystus	Bagridae	LC	Interviewed
13	*Notopterus notopterus*	Bronze Featherback	Notopteridae	LC	
14	*Ompok bimaculatus*	Indian butter-fish	Siluridae	NT	Interviewed
15	*Channa striata (Ophiocephalus striatus)*	Snakehead Murrel	Chandidae	LC	
16	*Osteobrama feae*	Burmese Osteobrama	Cyprinidae	LC	Interviewed
17	*Parambassis ranga*	Indian Glassy fish	Ambassidae	LC	Interviewed
18	*Cyclocheilichthys apogon (Puntius apogon)*	Beardless Barb	Cyprinidae	LC	
19	*Puntius chola*	Chola barb	Cyprinidae	LC	Interviewed
20	*Scylla serrata*	Mud crab	Portunidae	NE	Interviewed
21	*Oreochromis mossambicus (Tilapia mossambica)*	Mozambique Tilapia	Cichlidae	NT	
22	*Wallago attu*	Wallago	Siluridae	NT	

Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern;
NT: Near Threatened; VU: Vulnerable; EN: Endangered

Source: Resource & Environment Myanmar Co., Ltd.

Annex 9-1

Environmental Monitoring Plan

Annex 9-1 Environmental Monitoring Plan

ENVIRONMENTAL MONITORING PLAN

1. Environmental Monitoring Plan

Environmental monitoring plan including monitoring items, location, frequency and responsible organization at pre-construction stage, construction stage, and operation stage are shown in Table 1-1 to Table 1-3. Responsible organizations are in charge of monitoring and preparation of its results. The project proponent will submit the monitoring report at pre-construction phase, construction phase and operation stage to TSMC. Proposed monitoring form is attached in EMP as Attachment.

Table 1-1 Monitoring Plan (Pre-Construction Stage)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Checking and revising the Environmental Mitigation and Management Plan by reviewing the final detailed design of the Project - Checking the Environmental Monitoring Plan during Construction prepared by Contractor	Project Site	Once	Contractor
Social Environment	- Monitoring of the implementation status of the Assistance Package for involuntary resettlement, living and livelihood, vulnerable group and cultural heritage/ asset	Project Site and Relocation Site	Once	TSMC
Existing social infra-structures and services	- Securing of community accessibility	Around Project Site	Once	Contractor

Source: EIA Study Team

Table 1-2 Monitoring Plan (Construction Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	Each location	Once/month	Contractor
Air Quality	- NO_2, SO_2, CO, $PM_{2.5}$, PM_{10}	Construction site (1 point)*	1 week/3 months	Contractor
Water Quality	- Water temperature, pH, SS, DO, BOD_5, COD, coliforms, oil and grease, chromium	- Outflow of construction site to the creek (at least 3 sampling points/mixing point: i) discharge water, ii) upstream water, and iii) downstream water) ** - Well near the construction site (1 point)	Once/2 months	Contractor
Waste	- Amount and kind of solid waste	Construction site	Once/3 months	Contractor
Noise and Vibration	- Noise and vibration level - Traffic count	Preservation area such as residence around the proposed construction site (at least 1 point)	Once (24 hours)/3 months	Contractor
		preservation site such as residence along the route for on-site vehicles (2 points)	Once (24 hours)/3 months	Contractor
Hydrology	- Groundwater level - Ground elevation level - Consumption of groundwater amount	Well near the construction site	Once/ months	Contractor
Risks for Infectious Disease such as AIDS/HIV	- Awareness of infectious diseases	Construction site	Once/month	Contractor

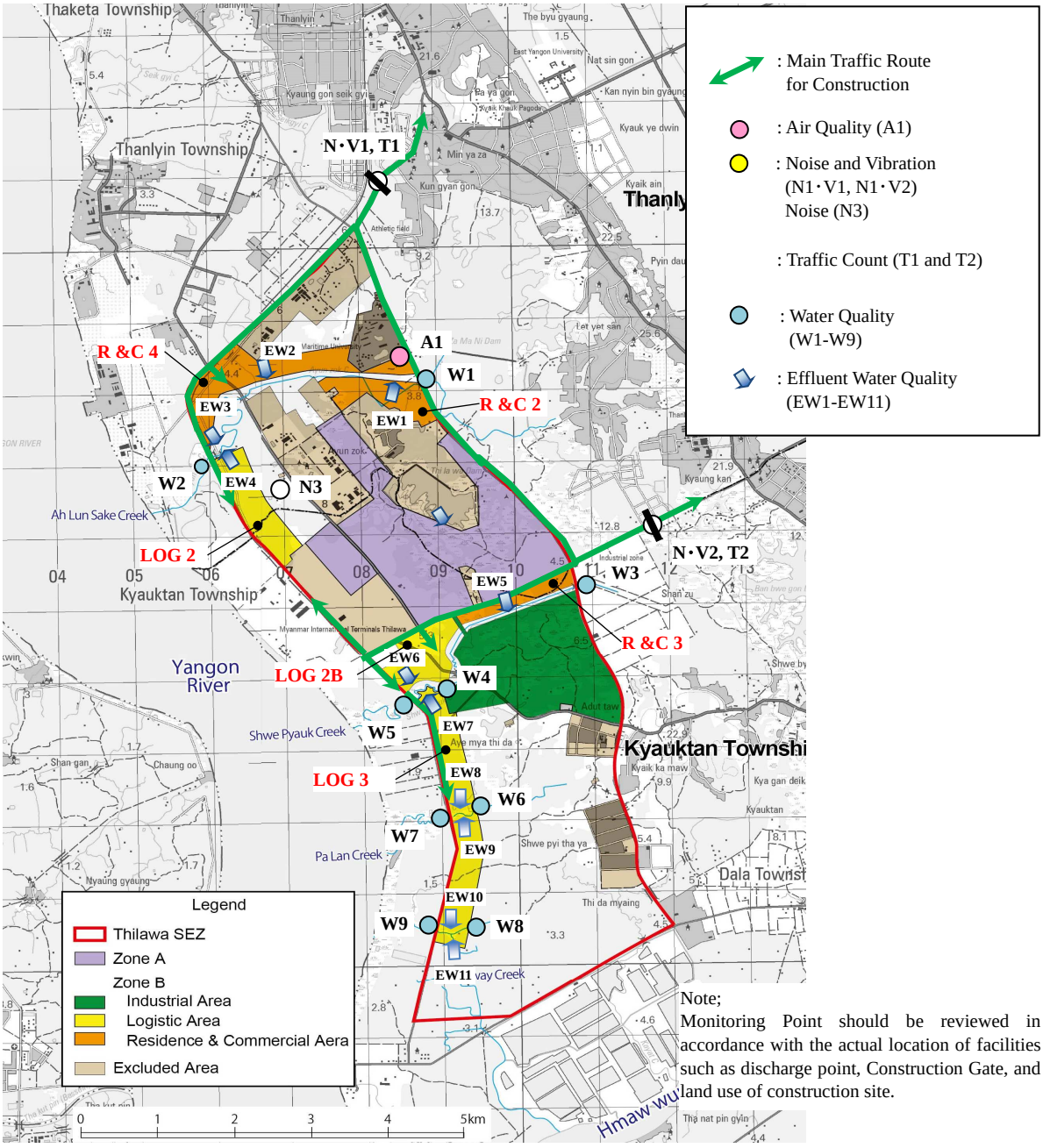
Category	Item	Location	Frequency	Responsible Organizations
Occupational Health and Safety	- Record of accidents and infectious diseases	Construction site	Once/month	Contractor
Community Health and Safety	- Record of accidents and infectious diseases related to the community	Around construction site	Once/month	Contractor

Source: EIA Study Team

Note: *Air quality monitoring site in the construction area should be selected in consideration of keeping the same location during construction phase.(A1 in Figure1.1-1)

** Water quality monitoring location should be selected at least three points for one discharge point to confirm the impact of the effluent water from the project site to the existing canal.

*** Traffic Count should be conducted at noise and vibration measurement section and construction gate of the Project.



Note;
Monitoring Point should be reviewed in accordance with the actual location of facilities such as discharge point, Construction Gate, and land use of construction site.

Figure 1-1 Tentative Monitoring Point during Construction
(Air, Noise and Vibration,Traffic, and Water Quality)

Table 1-3 Monitoring Plan (Operation Phase)

Survey Item	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	Project site	Quarterly (3 years after operation) Yearly (after 3 years operation)	Project Proponent
Air Quality	- NO_2, SO_2, CO, $PM_{2.5}$, PM_{10}	Representative point inside the project area	1 week each in the dry and rainy seasons (first 3 years after starting of the operation stage)	Project Proponent
Water Quality	- Water temperature, pH, SS, DO, BOD_5, COD, color and odor, Total Nitrogen, Total Phosphorus, Sulphide, HCN, Oil, Grease, Formaldehyde, Phenols, Free chlorine, Zinc, Chromium, Arsenic, Copper, Mercury, Cadmium, Barium, Selenium, Lead, and Nickel	- Discharge water from each area to the creeks (Logistic, residential and commercial) , (at least 3 sampling points/mixing point: discharge water, upstream water, and downstream water)	Every 2 month: Water temperature, pH, SS, DO, BOD_5, COD, color and odor, Every 6 month :all parameters	Project Proponent
Waste	- Amount of non-hazardous waste management - Amount of hazardous waste management	Each tenant	Twice/year (submission of the environmental report by the tenants)	Tenants
Soil Contamination	- Status of control of solid and liquid waste which causes soil contamination	Each tenant	Twice/year (submission of the environmental report by the tenants)	Tenants
Noise and Vibration	- Noise level at the monastery and residences -Traffic count	Tenants including Project Proponent	One time each in the dry and rainy seasons (first 3 years after starting the operation stage)	Tenants including Project Proponent
Offensive Odor	- Status offensive odor control by the tenants	Each tenant	Twice/year (submission of the environmental report by tenants)	Tenants
Bottom Sediment	- Water quality monitoring (as indicator of the pollution of the bottom sediment)	Same as the water quality monitoring	- Additional analysis on the bottom sediment of creek, in case of finding continuous high concentration	Project Proponent
Hydrological Situation	- Checking the function of existing creek at heavy rain.	Existing creek crossing the project site	When the heavy rain	Project Proponent
Risks for Infectious Disease such as AIDS/HIV	- Status of measures against infectious diseases	Each tenant	Twice/year (Submission of the environmental report by the tenants)	Tenants
Occupational Health and Safety	- R Record of accidents and infectious diseases	Work site and office	Twice/year (Submission of the environmental report by the tenants)	Tenants including Project Proponent
Community Health and Safety	- Record of accidents and infectious diseases related to the community	Around the project site	Twice/year (Submission of the environmental report by the tenants)	Project Proponent

Source: EIA Study Team

2. Preparation of the Environmental Monitoring Report

2.1 Contents of the Environmental Monitoring Reports

Project proponent shall prepare the monitoring report and submit to Authorities on once at Pre-construction phase and on quarterly basis at Construction phase and on bi-annually base at Operation phase.

The contents of monitoring reports shall be including the latest result of the analysis and surround monitoring conditions, not limited as follows;

-Objective of the Monitoring

-Summary of Monitoring Activities

-Project activities (summary of the construction work or operation work)

-Difficulties encountered in implementing of the EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties

-Number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation

-Accidents or incidents relating to the occupational and community health and safety and the environment

-Monitoring data on environmental parameters including sampling date, sampling and analysis method, sampling point, and laboratory result

-Photos

2.2 Environmental Monitoring Form

Tentative Environmental Monitoring Form is shown as follows;

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 (Industrial Area of Zone B). 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

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

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) Air Quality

NO_2, SO_2, CO, $PM_{2.5}$, PM_{10}

Location	Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standard	Target value to be applied	Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
Residential Area	NO_2	ppm			None		To be Set			
	SO_2	ppm			None		To be Set			
	CO	ppm			None		To be Set			
	$PM_{2.5}$	Ppm			None		To be Set			
	PM10	ppm			None		To be Set			

Complaints from Residents

- Are there any complaints 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 Complaints from Residents	Countermeasures

2) Water Quality

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 (Mean)	Measured Value (Max.)	Country's Standard	Target value to be applied	Frequency	Method	Note (Reason of excess of the standard)
					None	Refer the section 2.2 in EIA main report			
					None				
					None				

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

Noise Level

Location	Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standard	Target value to be applied	Referred International Standard	Frequency	Method	Note (Reason of excess of the standard)
Residential Area	Leq (day)	dB(A)			None		To be Set			
Along the road	Leq (night)	dB(A)			None		To be Set			

Complaints from Residents

- Are there any complaints 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 Complaints 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.

Item	Generated from	Unit	Value	Solid Waste Management Activities
Amount of Sludge				
Amount of Sludge				
Amount of Sludge				

6) Ground Subsidence and Hydrology

Duration (Week)	Water Consumption		Ground Level		Note
	Quantity	Unit	Quantity	Unit	
		m3/week		m	
		m3/week		m	
		m3/week		m	
		m3/week		m	

7) Offensive Odor (only operation phase)

Complaints from Residents

- Are there any complaints 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 Complaints from Residents	Countermeasures

Situations environmental report from tenants

- 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 occurred, the information shall be reported to the relevant organizations and authorities immediately.

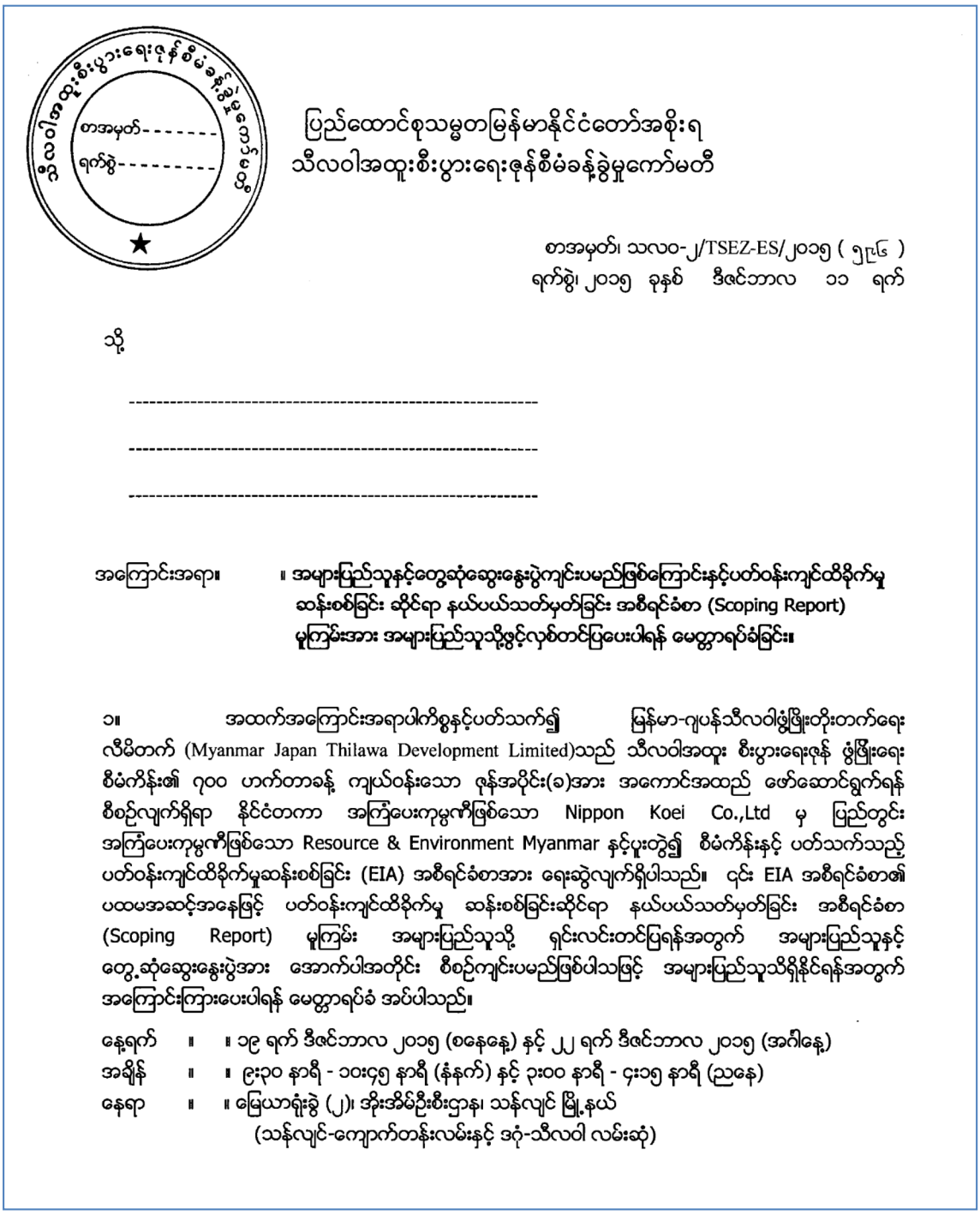
End of Document

Annex 10-1

Invitation Letter, Notice and List of Invitees for Public Consultation Meeting for EIA at Scoping Stage

Annex 10-1　Invitation Letter, List of Invitees and Notice for the PCM and PD (Scoping Stage)

Invitation Letter for the Public Consultation Meeting of the EIA on the Thilawa SEZ Development Project (Zone B)



သီလဝါအထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ
စာအမှတ်-------
ရက်စွဲ---------

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
သီလဝါအထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ

စာအမှတ်၊ သလဝ-၂/TSEZ-ES/၂၀၁၅ (၅၂၄)
ရက်စွဲ၊ ၂၀၁၅ ခုနှစ် ဒီဇင်ဘာလ ၁၁ ရက်

သို့

အကြောင်းအရာ။ ။ အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးပွဲကျင်းပမည်ဖြစ်ကြောင်းနှင့်ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ နယ်ပယ်သတ်မှတ်ခြင်း အစီရင်ခံစာ (Scoping Report) မူကြမ်းအား အများပြည်သူသို့ဖွင့်လှစ်တင်ပြပေးပါရန် မေတ္တာရပ်ခံခြင်း။

၁။ အထက်အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ မြန်မာ-ဂျပန်သီလဝါဖွံ့ဖြိုးတိုးတက်ရေး လီမိတက် (Myanmar Japan Thilawa Development Limited)သည် သီလဝါအထူး စီးပွားရေးဇုန် ဖွံ့ဖြိုးရေး စီမံကိန်း၏ ဂဝဝ ဟက်တာခန့် ကျယ်ဝန်းသော ဇုန်အပိုင်း(ခ)အား အကောင်အထည် ဖော်ဆောင်ရွက်ရန် စီစဉ်လျက်ရှိရာ နိုင်ငံတကာ အကြံပေးကုမ္ပဏီဖြစ်သော Nippon Koei Co.,Ltd မှ ပြည်တွင်း အကြံပေးကုမ္ပဏီဖြစ်သော Resource & Environment Myanmar နှင့်ပူးတွဲ၍ စီမံကိန်းနှင့် ပတ်သက်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာအား ရေးဆွဲလျက်ရှိပါသည်။ ၎င်း EIA အစီရင်ခံစာ၏ ပထမအဆင့်အနေဖြင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ နယ်ပယ်သတ်မှတ်ခြင်း အစီရင်ခံစာ (Scoping Report) မူကြမ်း အများပြည်သူသို့ ရှင်းလင်းတင်ပြရန်အတွက် အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးပွဲအား အောက်ပါအတိုင်း စီစဉ်ကျင်းပမည်ဖြစ်ပါသဖြင့် အများပြည်သူသိရှိနိုင်ရန်အတွက် အကြောင်းကြားပေးပါရန် မေတ္တာရပ်ခံ အပ်ပါသည်။

နေ့ရက် ။ ။ ၁၉ ရက် ဒီဇင်ဘာလ ၂၀၁၅ (စနေနေ့) နှင့် ၂၂ ရက် ဒီဇင်ဘာလ ၂၀၁၅ (အင်္ဂါနေ့)
အချိန် ။ ။ ၉း၃၀ နာရီ - ၁၀း၄၅ နာရီ (နံနက်) နှင့် ၃း၀၀ နာရီ - ၄း၁၅ နာရီ (ညနေ)
နေရာ ။ ။ မြေယာရုံးခွဲ (၂)၊ အိုးအိမ်ဦးစီးဌာန၊ သန်လျင် မြို့နယ်
(သန်လျင်-ကျောက်တန်းလမ်းနှင့် ဒဂုံ-သီလဝါ လမ်းဆုံ)

(မှတ်ချက်- စုစုပေါင်းအစည်းအဝေး ၄ ကြိမ်ပြုလုပ်မည်ဖြစ်သော်လည်း တူညီသောအကြောင်းအရာများကိုသာ တင်ပြဆွေးနွေးမည် ဖြစ်ပါသည်။ စိတ်ပါဝင်စားသူများအနေဖြင့် ကြိုက်နှစ်သက်ရာ အစည်းအဝေးအချိန်တွင် တက်ရောက်နိုင်ပါသည်။)

၂။ ထို့အပြင်အဆိုပါစီမံကိန်း၏ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ နယ်ပယ်သတ်မှတ်ခြင်း အစီရင်ခံစာ (Scoping Report) မူကြမ်းအားအများ ပြည်သူသိရှိနိုင်စေရန်အတွက်အောက်ပါနေရာများတွင် ၂၃.၁၂.၂၀၁၅ နံနက်၁၀း၀၀ နာရီမှ ၅.၁.၂၀၁၆ ညနေ ၄း၃၀နာရီအထိ အများပြည်သူအား ဖွင့်လှစ်ဖော်ပြ ပေးပါရန် မေတ္တာရပ်ခံအပ်ပါသည်။

(၁) ရန်ကုန်တောင်ပိုင်းခရိုင်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန
(၂) သန်လျင်မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန
  (က) ဘုရားကုန်းကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးရုံး
  (ခ) လက်ယက်စမ်းကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးရုံး
  (ဂ) အလွမ်းဆွတ်ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးရုံး
(၃) ကျောက်တန်းမြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန
  (က) အေးမြသီတာရပ်ကွက် အုပ်ချုပ်ရေးမှူးရုံး
  (ခ) ရွှေပြည်သာယာရပ်ကွက် အုပ်ချုပ်ရေးမှူးရုံး
  (ဂ) သီတာမြို့ရပ်ကွက် အုပ်ချုပ်ရေးမှူးရုံး
  (ဃ) ရွှေပေါက်ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးရုံး
(၄) သီလဝါအထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီရုံး (သီလဝါအထူးစီးပွားရေးဇုန်)
(၅) မြန်မာ-ဂျပန်သီလဝါဖွံ့ဖြိုးတိုးတက်ရေးလီမိတက်ရုံး

ဥက္ကဋ္ဌ (ကိုယ်စား)

(ဒေါက်တာ သန်းအောင်၊ အတွင်းရေးမှူး)

မိတ္တူကို

မြန်မာ-ဂျပန်သီလဝါဖွံ့ဖြိုးတိုးတက်ရေးလီမိတက်
ရုံးလက်ခံ

List of Invitees for Public Consultation Meeting

နောက်ဆက်တွဲ (၁)

လူထုဆွေးနွေးပွဲဖိတ်ကြားမည့်စာရင်း

၁။ ပန်ကြီး၊ ရန်ကုန်တိုင်းဒေသကြီးအစိုးရအဖွဲ့ဝင်၊ သီလဝါအထူးစီးပွားရေးဇုံစီမံခန့်ခွဲမှုကော်မတီ။

၂။ ညွှန်ကြားရေးမှူး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ ရန်ကုန်မြို့။

၃။ အုပ်ချုပ်ရေးမှူး၊ အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ရန်ကုန်တောင်ပိုင်းခရိုင်။

၄။ အုပ်ချုပ်ရေးမှူး၊ အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ သန်လျင်မြို့နယ်။

၅။ အုပ်ချုပ်ရေးမှူး၊ အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ ကျောက်တန်းမြို့နယ်။

၆။ မြို့နယ်အရာရှိ၊ စည်ပင်သာယာရေးအဖွဲ့၊ သန်လျင်မြို့နယ်။

၇။ မြိုနယ်အရာရှိ၊ စည်ပင်သာယာရေးအဖွဲ့၊ ကျောက်တန်းမြို့နယ်။

၈။ မြို့ရွာနှင့်အိုးအိမ်မွဲမြိုးရေးဦးစီးဌာန၊ ဆောက်လုပ်ရေးပန်ကြီးဌာန၊ သန်လျင်မြို့နယ်။

၉။ မြို့နယ်အရာရှိ၊ ကျေးလက်ဖွံ့ဖြိုးတိုးတက်ရေးဦးစီးဌာန၊ သန်လျင်မြို့နယ်။

၁၀။ မြို့နယ်အရာရှိ၊ ကျေးလက်ဖွံ့ဖြိုးတိုးတက်ရေးဦးစီးဌာန၊ ကျောက်တန်းမြို့နယ်။

၁၁။ မြို့နယ်ကျန်းမာရေးအရာရှိ၊ ကျန်းမာရေးဦးစီးဌာန၊ သန်လျင်မြို့နယ်။

၁၂။ မြို့နယ်ကျန်းမာရေးအရာရှိ၊ ကျန်းမာရေးဦးစီးဌာန၊ ကျောက်တန်းမြို့နယ်။

၁၃။ သီလဝါအထူးစီးပွားရေးဇုံအနီးရှိကျေးရွာအုပ်ချုပ်ရေးမှူးများနှင့် ရွာသူရွာသားများ။

က။ သန်လျင်မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနအောက်ရှိ

၁။ ဘုရားကုန်းကျေးရွာအုပ်စုရုံး

၂။ လက်ယက်စမ်းကျေးရွာအုပ်စုရုံး

၃။ အလွမ်းဆွတ်ကျေးရွာအုပ်စုရုံး

ခ။ ကျောက်တန်းမြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနအောက်ရှိ

၁။ အေးမြသီတာရပ်ကွက်ရုံး

၂။ ရွှေပြည်သာယာရပ်ကွက်ရုံး

၃။ သီတာမြိုင်ရပ်ကွက်ရုံး

၄။ ရွှေပေါက်ကျေးရွာအုပ်စုရုံး

၁၄။ မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်၊ ပို့ဆောင်ရေးပန်ကြီးဌာန

၁၅။ သီလဝါအထူးစီပွားရေးဇုံ အတွင်းရှိ သက်ဆိုင်ရာ စက်ရုံများနှင့် ကုမ္ပဏီများ

၁၆။ စီမံကိန်းအားစိတ်ပါဝင်စားသူများနှင့် အခြားအဖွဲ့အစည်းများ။

သက်ဆိုင်သောအဖွဲ့အစည်းမှ ဖိတ်ကြားမည့်သူစာရင်းများ

၁။ ဥက္ကဋ္ဌ၊ သီလဝါအထူးစီးပွားရေးဇုံစီမံခန့်ခွဲမှုကော်မတီ

၂။ ဒုတိယဥက္ကဋ္ဌ၊ သီလဝါအထူးစီးပွားရေးဇုံစီမံခန့်ခွဲမှုကော်မတီ

၃။ အတွင်းရေးမှူး၊ သီလဝါအထူးစီးပွားရေးဇုံစီမံခန့်ခွဲမှုကော်မတီ

၄။ အဖွဲ့ဝင်များ၊ သီလဝါအထူးစီးပွားရေးဇုံစီမံခန့်ခွဲမှုကော်မတီ

၅။အဖွဲ့ဝင်များ၊ One Stop Service Center၊ သီလဝါအထူးစီးပွားရေးဇုံ စီမံခန့်ခွဲမှုကော်မတီ

Notice for Public Consultation Meetings and Public Disclosure of the Draft Scoping Report of the Environmental Impact Assessment for the Thilawa SEZ Development Project (Zone B)

သီလဝါအထူးစီးပွားရေးဇုံဖွံ့ဖြိုးတိုးတက်မှုစီမံကိန်း (Zone B) အတွက်
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာမူကြမ်းအား အများပြည်သူများသို့တင်ပြဆွေးနွေးခြင်း

ယခုအချိန်တွင် ဂျပန်မြန်မာဖွံ့ဖြိုးတိုးတက်မှုကော်မတီသည် သီလဝါအထူးစီးပွားရေးဇုံ ဖွံ့ဖြိုးတိုးတက်မှု စီမံကိန်း (Zone B)အတွက် ပတ်ဝန်းကျင်ဆိုင်ရာထိခိုက်ဆန်းစစ်မှု အစီရင်ခံစာမူကြမ်းကို ပြင်ဆင်လျက် ရှိပါသည်။ စီမံကိန်းနောက်ခံ၊ ဖြစ်နိုင်ခြေရှိသောထိခိုက်မှုများ နှင့် သဘာဝပတ်ဝန်းကျင်လေ့လာမှု အချက်အလက်များကို စီမံကိန်းဝန်းကျင်ရှိ အများပြည်သူများ ရှင်းလင်းမြင်သာစေရန်နှင့် ပူးပေါင်းပါဝင်လာနိုင်စေရန် တင်ပြဆွေးနွေးခြင်းကို ၂၀၁၅ခုနှစ် ဒီဇင်ဘာ (၁၉)ရက်နှင့် (၂၂)ရက်နေ့များတွင် အောက်ပါအတိုင်း ကျင်းပပြုလုပ်ရန် စီစဉ်ထားသည်။

ထို့အပြင် အင်္ဂလိပ်ဘာသာဖြင့်ပြုစုထားသော အစီရင်ခံစာမူကြမ်းအပြည့်အစုံ နှင့် အနှစ်ချုပ်မြန်မာဘာသာ အစီရင်ခံစာမူကြမ်းတို့ကို အောက်ပါနေရာများတွင် ၂၀၁၅ခုနှစ် ဒီဇင်ဘာ (၂၃)ရက် မှ ၂၀၁၆ခုနှစ် ဇန်နဝါရီ (၇)ရက် အထိ (အလုပ်လုပ်ရက် ၁၀ ရက်အတွင်း) တင်ပြထားရှိသွားမည်ဖြစ်ပြီး သဘောထားမှတ်ချက်များနှင့် ဝေဖန်အကြံပြုချက်များကို အဆိုပါအချိန်နှင့် နေရာများတွင် တင်သွင်းနိုင်ပါသည်။

❖ အများပြည်သူများနှင့်တွေ့ဆုံဆွေးနွေးခြင်း

စဉ်	နေ့ရက်	အချိန်	စာရင်းပေးချိန်	နေရာ
ပထမအချိန်	၂၀၁၅၊ ဒီဇင်ဘာလ (၁၉)ရက် (စနေနေ့)	နံနက် (၉:၃၀) မှ (၁၀:၄၅) နာရီ	နံနက် (၉:၀၀) မှစတင်	အစည်းအဝေးခန်းမ၊ မြို့ရွာနှင့်အိုးအိမ်ဖွံ့ဖြိုးရေးဦးစီးဌာန၊ သီလဝါအထူးစီးပွားရေးဇုံ စီမံခန့်ခွဲမှုကော်မတီ၊ ကျောက်တန်းမြို့နယ်။
ဒုတိယအချိန်		နေ့လည် (၃:၀၀) မှ (၄:၁၅) နာရီ	နေ့လည် (၂:၃၀) မှစတင်	
တတိယအချိန်	၂၀၁၅၊ ဒီဇင်ဘာလ (၂၂)ရက် (အင်္ဂါနေ့)	နံနက် (၉:၃၀) မှ (၁၀:၄၅) နာရီ	နံနက် (၉:၀၀) မှစတင်	
စတုတ္ထအချိန်		နေ့လည် (၃:၀၀) မှ (၄:၁၅) နာရီ	နေ့လည် (၂:၃၀) မှစတင်	

မှတ်ချက်။

၁။ ကြို/ပို့ယာဉ်များအား စီစဉ်ထားမည်ဖြစ်ပြီး၊ အချိန်နှင့်စုရပ်နေရာများအား သက်ဆိုင်ရာကျေးရွာအုပ်စုရုံးများတွင်ကြိုတင်ကြော်ငြာပေးမည်ဖြစ်သည်။

၂။ အစည်းအဝေးအချိန်(၄)ခုလုံးတွင် တင်ပြဆွေးနွေးမည့်အကြောင်းအရာမှာ အားလုံးအတူတူဖြစ်သဖြင့် မိမိအဆင်ပြေရာအချိန်ကိုတက်ရောက်နိုင်ပါသည်။

❖ တင်ပြထားရှိမည့်နေရာများ

၁။ ရန်ကုန်တောင်ပိုင်းခရိုင်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန

၂။ သန်လျင်မြို့နယ်အထွေထွေအုပ်ချုပ်အုပ်ချုပ်ရေးဦးစီးဌာန

(က) ဘုရားကုန်းကျေးရွာအုပ်စုရုံး

(ခ) လက်ယက်စမ်းကျေးရွာအုပ်စုရုံး

(ဂ) အလွမ်းဆွတ်ကျေးရွာအုပ်စုရုံး

၃။ ကျောက်တန်းမြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန

(က) အေးမြသီတာရပ်ကွက်ရုံး

(ခ) ရွှေပြည်သာယာရပ်ကွက်ရုံး

(ဂ) သီတာမြိုင်ရပ်ကွက်ရုံး

(ဃ) ရွှေပေါက်ကျေးရွာအုပ်စုရုံး

၄။ သီလဝါအထူးစီးပွားရေးဇုံစီမံခန့်ခွဲမှုကော်မတီရုံး

၅။ မြန်မာ-ဂျပန်သီလဝါဖွံ့ဖြိုးတိုးတက်ရေးလီမိတက် (MJTD)

လူကြီးမင်း၏ပူးပေါင်းပါဝင်အားအထူးလိုလားပါသည်။

Annex 10-2

Presentation Materials, Handout and Sample of the Feedback Form in Myanmar Language for Public Consultation Meeting for EIA at Scoping Stage

Annex 10-2 Presentation Materials, Handout and Sample of the Feedback Form in Myanmar Language for Public Consultation Meeting for EIA at Scoping Stage

Presentation Material used at PCM at Scoping Stage

သဘာဝပတ်ဝန်းကျင်လေ့လာဆန်းစစ်ခြင်း အတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲ (နယ်ပယ်သတ်မှတ်ခြင်းအဆင့်)

သီလဝါအထူးစီးပွားရေးဇုန် ဖွံ့ဖြိုးတိုးတက်ရေး စီမံကိန်း (အပိုင်း ခ)

၂၀၁၅ခုနှစ်၊ ဒီဇင်ဘာလ (၁၉)ရက်နှင့် (၂၂)ရက်

အစည်းအဝေးခန်းမ၊ မြို့ရွာနှင့်အိုးအိမ်ဖွံ့ဖြိုးရေးဦးစီးဌာန၊ သီလဝါအထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီရုံး၊ ကျောက်တန်းမြို့နယ်

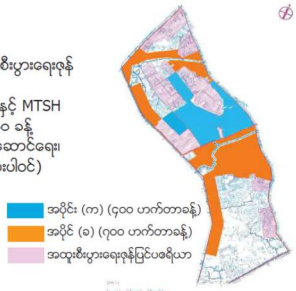
အစီအစဉ်

၁။ သီလဝါအထူးစီးပွားရေးဇုန် အပိုင်း (ခ) စီမံကိန်း မိတ်ဆက်နှင့် ဖော်ပြချက်
၂။ နယ်ပယ်သတ်မှတ်ရာတွင် သဘာဝနှင့် လူမှုဝန်းကျင်သက်ရောက်နိုင်မှုများ
၃။ EIA တွင်လေ့လာမည့်အကြောင်းအရာများ
၄။ ရှေ့ဆက်လုပ်ဆောင်မည့် EIA အချိန်ဇယား
၅။ အဖေး၊ အဖြေ

၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

စီမံကိန်းနောက်ခံ

- စီမံကိန်းအမည် - သီလဝါအထူးစီးပွားရေးဇုန် ဖွံ့ဖြိုးရေးစီမံကိန်း (အပိုင်း ခ)
- စီမံကိန်းပါဝင်ဖက်များ - MJTD နှင့် MTSH
- စီမံကိန်းဧရိယာ - ဟက်တာ ၇၀၀ ခန့် (စက်မှုလုပ်ငန်းများ၊ သယ်ယူပို့ဆောင်ရေး၊ လူနေနှင့် ကုန်သွယ်မှုဧရိယာများပါဝင်)



၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

ဆက်စပ်စီမံကိန်းဆောင်ရွက်မှု အကျဉ်းချုပ်

၁. အပိုင်း (က)စီမံကိန်း တိုးတက်မှု
၂၀၁၅၊ ဒက်တင်ဘာ (၂၃)ရက်တွင် တရားဝင်ဖွင့်လှစ်

၂. ဆက်စပ် EIA လုပ်ဆောင်မှုများ
ဒက်တင်ဘာ ၂၀၁၃ - အပိုင်း(က) EIA (၄၀၀ဟက်တာခန့်)
ဖေဖော်ဝါရီ၂၀၁၆ (စီမံချက်ချိုး) - သဘာဝပတ်ဝန်းကျင်လေ့လာဆန်းစစ်ခြင်း မဟာဗျူဟာ (၂၀၀၀ဟက်တာခန့်)
မတ် ၂၀၁၆ (စီမံချက်ချိုး) - အပိုင်း(ခ) EIA (၇၀၀ဟက်တာခန့်)

ယခုလွှေးဆွေးနွေးပွဲ

၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

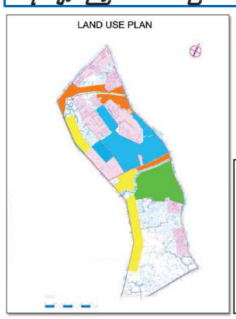
လူထုတွေ့ ဆုံပွဲကျင်းပရခြင်းရည်ရွယ်ချက်

လူထုတွေ့ဆုံပွဲအား စီမံကိန်းရေးဆွဲကာလအတွင်းကျင်းပခြင်းဖြစ်ပြီး သက်ဆိုင်သူများ၏ သဘာဝနှင့် လူမှုဝန်းကျင်များအပေါ် သက်ရောက်နိုင်ခြေအကြံဉာဏ်များကို ရယူကာ EIA လေ့လာဆန်းစစ်မှုများအား ပိုမိုထိရောက်စွာလုပ်ဆောင်နိုင်ရန်ဖြစ်သည်။

၁. စီမံကိန်းအချက်အလက်များဖြစ်သော ရည်ရွယ်ချက်၊ အစီအစဉ်၊ သက်ရောက်နိုင်ခြေများ၊ လျော်ပါးစေရေးနည်းလမ်းများနှင့် အချိန်ဇယား စသည်တို့အားအသိပေးရန်
၂. စီမံကိန်းရေးဆွဲကာလအတွင်း သက်ဆိုင်သူများ၏ အကြံဉာဏ်များရယူခြင်း
၃. လူထုတွေ့ဆုံပွဲမှရရှိသော အကြံဉာဏ်များအား စီမံကိန်းရေးဆွဲရာတွင် ထည့်သွင်းစဉ်းစားခြင်း
၄. စီမံကိန်း၏ သဘာဝနှင့် လူမှုဝန်းကျင်သက်ရောက်မှုများအား အသိပေးရန်

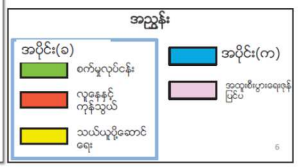
၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

တိုးချဲ့ မည့်အစီအစဉ်



အမျိုးအစား	ဟက်တာ
စက်မှုလုပ်ငန်း	၂၆၂ ခန့်
သယ်ယူပို့ဆောင်ရေး	၂၆၇ ခန့်
လူနေနှင့် ကုန်သွယ်	၁၆၉ ခန့်
စုစုပေါင်း	၇၀၀ ခန့်

မှတ်ချက်။ ဧရိယာသတ်မှတ်ချက်မှာ အပြောင်းအလဲရှိနိုင်ပါသည်။



၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

အခြေခံအဆောက်အဦတိုး၏ ရေးအစီအစဉ် (၁)

မြေညှိခြင်း (ပင်လယ်ရေမျက်နှာပြင်အမြင့်)

- စက်မှုလုပ်ငန်းဇရိယာများအတွက် မျက်နှာပြင်အမြင့် ၅မီတာအထက်မှ ၆.၅ မီတာထိ (ဇရိယာနယ်နမိတ်တွင် အမြင့် ၆မီတာအထက်မှ ၆.၅မီတာအထိ)
- သယ်ယူပို့ဆောင်ရေး၊ လူနေနှင့် ကုန်သွယ်ဇရိယာများအတွက် အမြင့် ၅ မီတာအထက်

ရေဖြန့်ဝေခြင်း

- အပိုင်း(က)ရှိရေသန့်စင်စက်ရုံမှရေအားဖြန့်ဝေခြင်း
- ၂၀၁၉ဝန်းကျင်တွင်လုပ်ဆောင်မည့် အများပြည်သူသုံးရေပိုက်လိုင်းသို့ ဆက်သွယ်ခြင်း

ရေဆိုးသန့်စင်ခြင်း

- စက်မှုလုပ်ငန်းဇရိယာတွင် ဗဟိုရေဆိုးသန့်စင်စက်ရုံတည်ဆောက်ရန် (မူဝါဒများအားအခြေခံ၍ စက်ရုံတစ်ရုံချင်းစီတွင် ပထမရေသန့်စင်စနစ်အားထားရှိရန်)
- သယ်ယူပို့ဆောင်ရေး၊ လူနေနှင့် ကုန်ယွယ်ဇရိယာများတွင် မိလ္လာကန်များထားရှိခြင်း

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၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

အခြေခံအဆောက်အဦတိုး၏ ရေးအစီအစဉ် (၂)

ရေမြောင်းများ

- စက်မှုဇုန်ဇရိယာများတွင် သိုလှောင်ကန်နှင့်မြောင်းများတဆင့် လက်ရှိရေမြောင်းအတွင်း စွန့်ထုတ်ခြင်း
- သယ်ယူပို့ဆောင်ရေးဇရိယာ၊ လူနေနှင့် ကုန်သွယ်ဇရိယာများတွင် လက်ရှိရေမြောင်း အတွင်းတိုက်ရိုက်စွန့်ထုတ်ခြင်း

လမ်းများ

- ရှေ့-နောက်နှင့် တောင်-မြောက်လမ်းမကြီးများ၊ စက်မှုဇုန်အတွင်း အကွက်လိုက်ပိုင်းထားသကဲ့သို့ လမ်းသွယ်များတည်ဆောက်ခြင်း
- သယ်ယူပို့ဆောင်ရေးဇရိယာ၊ လူနေနှင့် ကုန်သွယ်ဇရိယာများတွင် လမ်းမကြီးများနှင့် လမ်းသွယ်များတည်ဆောက်ခြင်း

စွန့်ပစ်အစိုင်အခဲစီမံခြင်း

- တက်နိုင်သမျှပြန်လည်အသုံးပြုရန်
- အပိုင်း(က)၏ စွန့်ပစ်ပစ္စည်းသန့်စင်အဖွဲ့မှ စီမံခန့်ခွဲရန်
- ရန်ကုန်စည်ပင်သာယာရေးကော်မတီမှ သိမ်းဆည်းသန့်စင်ရန်

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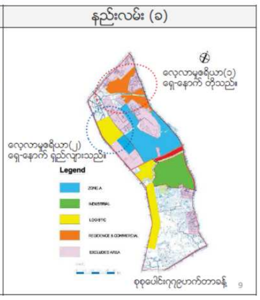
၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

အပိုင်း(ခ)အတွက်ရွေးချယ်စရာနည်းလမ်းများအကျဉ်းချုပ် (၁)

နည်းလမ်း (က)	နည်းလမ်း (ခ)
	

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၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

အပိုင်း(ခ)အတွက်ရွေးချယ်စရာနည်းလမ်းများအကျဉ်းချုပ် (၂)

နည်းလမ်း (က)	နည်းလမ်း (ခ)
✓ အရှေ့ဘက်နှင့် မြောက်ဘက်ရှိ အပြင်လမ်းမကြီးတွင်ဂိတ်နှစ်ခုထားရှိခြင်းဖြင့် ယာဉ်ကြောကျပ်တည်းမှု လျော့ပါးစေခြင်း	✓ အရှေ့ဘက်ရှိလမ်းမကြီးတွင် ဂိတ်တစ်ခုတည်းထားရှိခြင်းဖြင့် ယာဉ်ကြောကျပ်တည်းမှု ပိုမိုစေခြင်း
✓ ဇရိယာ(၁)နှင့်(၂)အတွင်း အိမ်ထောင်စု ၁၅၀ မှ ၂၀၀ ခန့်ပြောင်းရွှေ့ရန် ✓ လူမှုဝန်းကျင်အပေါ်သက်ရောက်နိုင်ခြေနည်း၍ ပြန်လည်နေရာချထားရေးအတွက် နစ်နာကြေး အနည်းငယ်သာလိုအပ်	✓ ဇရိယာ(၁)နှင့်(၂)အတွင်း အိမ်ထောင်စု ၅၀၀ ခန့်ပြောင်းရွှေ့ရန်၊ နည်းလမ်း(က)ထက် ၃၀၀မှ ၃၅၀ ခန့်ပိုမိုနိုင် ✓ လူမှုဝန်းကျင်အပေါ်သက်ရောက်နိုင်ခြေများပြီး ပြန်လည်နေရာချထားရေးအတွက် နစ်နာကြေး ပိုမိုလိုအပ်
✓ နည်းလမ်း(ခ)နှင့်နှိုင်းယှဉ်လျှင် နည်းလမ်း(က)တွင် နည်းပညာရှုထောင့်၊ စီးပွားရေးရှုထောင့်နှင့် သဘာဝ/လူမှုဝန်းကျင်ရှုထောင့်များအရ အကျိုးကျေးဇူးပိုမိုများပြားပါသည်။ ထို့ကြောင့် နည်းလမ်း(က) အားရွေးချယ်ထားပါသည်။	

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၁. အပိုင်း(ခ)စီမံကိန်းမိတ်ဆက်နှင့်ဖော်ပြချက်

အပိုင်း(ခ)အတွက်ရွေးချယ်စရာနည်းလမ်းများအကျဉ်းချုပ် (၃)

Zero Option

ရှုထောင့်	စီမံကိန်းမရှိသည့်အခြေအနေ	စီမံကိန်းရှိသည့်အခြေအနေ
နည်းပညာ	✓ ဇရိယာအားလုံးတွင် အစီအစဉ်မရှိ အဆင်ပြေသလိုတိုးချဲ့ခြင်း ✓ အစီအစဉ်မရှိတိုးချဲ့မှုနောက်ပိုင်းတွင် အနာဂတ်တိုးချဲ့ရန်အတွက် ကန့်သတ်မှုရှိခြင်း	✓ စနစ်တကျရည်ရွယ်ချက်ရှိရှိ တိုးချဲ့ရေးအစီအစဉ်နှင့်အတူ အကျိုးဖြစ်ထွန်းသော တိုးချဲ့မှု
စီးပွားရေး	✓ လက်ရှိအခြေအနေမှအနည်းငယ်သောအလုပ်အကိုင်များသာရရှိနိုင် ✓ သီလဝါအထူးစီးပွားရေးဇုန်အနေဖြင့် စီးပွားရေးဖွံ့ဖြိုးမှုအကန့်အသတ်ရှိနိုင်	✓ အပိုင်း(ခ)ပတ်ဝန်းကျင်တွင် ကုန်ကျစရိတ်သက်သာသော အခြေခံအဆောက်အဦစီမံကိန်းများဖြစ်ပေါ်နိုင် ✓ အလုပ်အကိုင်အခွင့်အလမ်း အများအပြားရရှိနိုင်
သဘာဝနှင့် လူမှုဝန်းကျင်	✓ အစီအစဉ်မကျသောပြန်လည်နေရာချထားပေးမှု ✓ အစီအစဉ်မကျတိုးချဲ့ခြင်းကြောင့် တွေ့ရှိနိုင်မည့် သဘာဝနှင့်လူမှုဝန်းကျင် သုံးသပ်ချက်ရှုပ်ထွေးမှုများ	✓ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင်အပေါ် သက်ရောက်နိုင်ခြေများ ✓ စနစ်တကျတိုးချဲ့ခြင်းနှင့် သဘာဝပတ်ဝန်းကျင်သက်ရောက်မှုများအား လျော့ပါးစေခြင်း ✓ ဒေသခံများအတွက် အခြေခံအဆောက်အဦများနှင့် နေထိုင်မှုဝန်းကျင်များ တိုးတက်လာနိုင်ခြင်း
✓ စီမံကိန်းအကောင်အထည်ဖော်ခြင်း၏အကျိုးကျေးဇူးများနှင့်အတူ နိုင်ငံနှင့်ဒေသတစ်ခု၏ စီးပွားရေးနှင့်မြို့ပြစနစ်ဖွံ့ဖြိုးတိုးတက်လာစေနိုင်ခြင်း။		

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၂. သဘာဝနှင့်လူမှုရေးသက်ရောက်မှုများ (နယ်ပယ်သတ်မှတ်ခြင်း)

ဆောက်လုပ်ရေးနှင့်လည်ပတ်ရေးကာလအတွင်းကောင်းကျိုးသက်ရောက်မှုများ

သက်ရောက်မှုအမျိုးအစား	မျှော်မှန်းသက်ရောက်နိုင်ခြေများ
စီးပွားရေးတိုးတက်မှု	အပိုင်း(ခ)အတွင်းနှင့် ဝန်းကျင်တွင် စီးပွားရေးလုပ်ငန်းများပိုမိုချဲ့ထွင်လာနိုင်ခြင်း
အလုပ်အကိုင်အခွင့်အလမ်း	ဆောက်လုပ်ရေးနှင့်လည်ပတ်ရေးကာလအတွင်း အလုပ်အကိုင်များဖန်တီးပေးနိုင်ခြင်းနှင့် လူနေမှုဘဝများပိုမိုကောင်းမွန်လာစေခြင်း
အခြေခံအဆောက်အဦ	အပိုင်း(ခ)ဝန်းကျင်တွင် လူမှုအဆောက်အဦများတိုးတက်လာခြင်းနှင့် အတူလမ်းပန်းဆက်သွယ်ရေးများဖွံ့ဖြိုးလာစေခြင်း
အငယ်စားမြို့ပြစနစ်	အပိုင်း(ခ)ဝန်းကျင်တွင် လူအများအပြားရောက်ရှိခြင်းနှင့် စီးပွားရေးလုပ်ငန်းများပိုမိုချဲ့ထွင်လာနိုင်ခြင်းကြောင့် အငယ်စားမြို့ပြစနစ်ဖြစ်ပေါ်လာစေနိုင်ခြင်း

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၂. သဘာဝနှင့်လူမှုရေးသက်ရောက်မှုများ (နယ်ပယ်သတ်မှတ်ခြင်း)

***ဆောက်လုပ်ရေးမတိုင်မီနှင့်ဆောက်လုပ်ရေးကာလ** (ညစ်ညမ်းမှုနှင့်သဘာဝပတ်ဝန်းကျင်)*

သက်ရောက်မှုအမျိုးအစား	အဆင့်	မျှော်မှန်းသက်ရောက်နိုင်ခြေများ
လေထုအရည်အသွေး	B-	ဆောက်လုပ်ရေးယာန္တရားများနှင့်ယာဉ်များမှ လေထုညစ်ညမ်းစေသည့်အရာများနှင့်ဖုန်မှုန့်များထွက်ရှိနိုင်ခြင်း။
ရေထုအရည်အသွေး	B-	မြေသားတူးခြင်းလုပ်ငန်းကြောင့် ရွှံ့ရည်များမြစ်အတွင်းသို့ စီးဝင်နိုင်ခြင်း။
စွန့်ပစ်ပစ္စည်း	B-	ဆောက်လုပ်ရေးလုပ်ငန်းနှင့် အလုပ်သမားများမှ စွန့်ပစ်ပစ္စည်းများ ထွက်ရှိနိုင်ခြင်း။
မြေဆီလွှာ	B-	စီမံကိန်းဧရိယာအတွင်း မြေဆီလွှာညစ်ညမ်းမှုသည် ပြင်ပသို့ပျံနှံနိုင်ခြင်း။
အသံနှင့်တုန်ခါမှု	B-	ဆောက်လုပ်ရေးယန္တရားများနှင့်ယာဉ်များကြောင့် အသံနှင့်တုန်ခါမှုများ ပိုမိုထွက်ရှိနိုင်ခြင်း။
ဇလဗေဒ	B-	မြေယာပြုပြင်ခြင်းကြောင့် ဇလဗေဒဆိုင်ရာသက်ရောက်မှု ယာယီရှိနိုင်ခြင်း။

13

၂. သဘာဝနှင့်လူမှုရေးသက်ရောက်မှုများ (နယ်ပယ်သတ်မှတ်ခြင်း)

***ဆောက်လုပ်ရေးမတိုင်မီနှင့်ဆောက်လုပ်ရေးကာလ** (လူမှုဝန်းကျင်၊ ကျန်းမာရေး၊ လုံခြုံမှု၊ အရေးပေါ်အခြေအနေစသည်)*

သက်ရောက်မှုအမျိုးအစား	အဆင့်	မျှော်မှန်းသက်ရောက်နိုင်ခြေများ
မြန်လည်နေရာချထားခြင်း	A-	အိုင်း(ခ)ဧရိယာအတွင်း မြေနေရာရယူခြင်းနှင့် မြန်လည်နေရာချထားခြင်း
နေထိုင်မှုနှင့်အသက်မွေးမှု	A-	စီမံကိန်းသက်ရောက်သူများမှ လယ်ယာမြေများနှင့် သီးနှံစိုက်ခင်းများဆုံးရှုံးနိုင်ခြင်း
လက်ရှိအခြေခံအဆောက်အဦများနှင့်ဝန်ဆောင်မှုများ	B-	ဆောက်လုပ်ရေးယာဉ်များကြောင့် ယာဉ်ကြောပိတ်ဆို့မှုဖြစ်ပေါ်လာနိုင်ခြင်း။ ကျောင်း၊ ဆေးရုံ၊ ရေးဆိုင်များသို့ သွားလာရေးလမ်းကြောင်းပြောင်းလဲလာနိုင်ခြင်း။
ယဉ်ကျေးမှုအမွေအနှစ်	B-	အိုင်း(ခ)အတွင်းရှိ သုသာန်နှင့် ဟိန္နဘုရားကျောင်းအား သက်ရောက်မှုရှိနိုင်ခြင်း။
လူထုကျန်းမာရေးနှင့် လုံခြုံရေး	B-	ဆောက်လုပ်ရေးလုပ်သားများဝင်ရောက်လာခြင်းနှင့် ယာဉ်သွားလာမှုများပြားလာခြင်းကြောင့် လူထုကျန်းမာရေးနှင့် လုံခြုံရေးအပေါ် သက်ရောက်နိုင်ခြင်း။

14

၂. သဘာဝနှင့်လူမှုရေးသက်ရောက်မှုများ (နယ်ပယ်သတ်မှတ်ခြင်း)

***လည်ပတ်ကာလ** (ညစ်ညမ်းမှုနှင့်သဘာဝပတ်ဝန်းကျင်)*

သက်ရောက်မှုအမျိုးအစား	အဆင့်	မျှော်မှန်းသက်ရောက်နိုင်ခြေများ
လေထုအရည်အသွေး	B-	ယာဉ်များ၊ စက်ရုံများနှင့် ကုန်သွယ်ရေးလုပ်ငန်းများ စသည်တို့မှ လေထုညစ်ညမ်း စေသည့်အရာများနှင့် ဖုန်မှုန့်များထွက်ရှိနိုင်ခြင်း။
ရေထုအရည်အသွေး	B-	ဌာနဆိုင်းလုပ်ကိုင်သည့်လုပ်ငန်းများ၊ ကုန်သွယ်ရေးလုပ်ငန်းများ စသည်တို့မှထွက်ရှိသော စွန့်ပစ်ရေများသည် ရေအရည်အသွေးပေါ် သက်ရောက်နိုင်ခြင်း။
စွန့်ပစ်ပစ္စည်း	B-	စက်မှုဇုန်ဧရိယာတွင် စက်မှုလုပ်ငန်းများမှစွန့်ပစ်ပစ္စည်းများ ထွက်ရှိနိုင်ခြင်း။ လူနေဧရိယာတွင် သယ်ယူပို့ဆောင်ခြင်း၊ အိမ်သုံးနှင့် ရောင်းဝယ်ခြင်းများကြောင့် အိမ်သုံးစွန့်ပစ်ပစ္စည်းများထွက်ရှိနိုင်ခြင်း
အသံနှင့်တုန်ခါမှု	B-	ယာဉ်များ၊ စက်ရုံများနှင့် ကုန်သွယ်ရေးလုပ်ငန်းများ စသည်တို့ကြောင့် အသံနှင့်တုန်ခါမှုများ ပိုမိုထွက်ရှိနိုင်ခြင်း
ဇလဗေဒ	B-	ရွံ့ဖြိုရေဇရိယာများတည်ရှိနေခြင်းကြောင့်ဇလဗေဒဆိုင်ရာ သက်ရောက်မှုရှိနိုင်ခြင်း။
အောက်ခြေအနည်အနှစ်	B-	ဌာနဆိုင်းနေထိုင်သူများနှင့် ရောင်းဝယ်ဧကာက်ကားမှုများမှ စွန့်ပစ်ရေများသည်အောက်ခြေအနည်အနှစ် ဖြစ်ထွန်းမှုအား သက်ရောက်နိုင်ပါသည်။

15

၂. သဘာဝနှင့်လူမှုရေးသက်ရောက်မှုများ (နယ်ပယ်သတ်မှတ်ခြင်း)

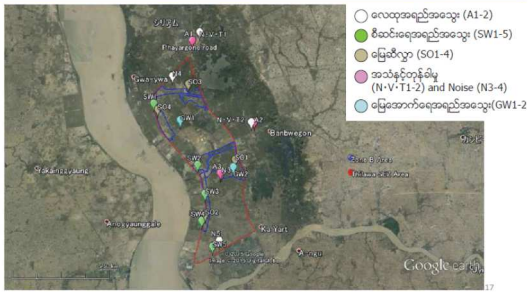
***လည်ပတ်ကာလ** (လူမှုဝန်းကျင်၊ ကျန်းမာရေး၊ လုံခြုံမှု၊ အရေးပေါ်အခြေအနေစသည်)*

သက်ရောက်မှုအမျိုးအစား	အဆင့်	မျှော်မှန်းသက်ရောက်နိုင်ခြေများ
နေထိုင်မှုနှင့်အသက်မွေးမှု	B-	စီမံကိန်းသက်ရောက်သူများ၏ ဝင်ငွေအရင်းမြစ်များ (စပါး၊ သီနှံစိုက်ပျိုးခြင်းစသည်) ဆုံးရှုံးနိုင်ခြင်း။
လူထုကျန်းမာရေးနှင့် လုံခြုံရေး	B-	အလုပ်သမားများအများပြားဝင်ရောက်လာခြင်း၊ ယာဉ်သွားလာမှုများပြားလာခြင်းနှင့် အငယ်တန်းမြို့ပြစနစ် ပေါ်ပေါက်လာခြင်းတို့ကြောင့် လူထုကျန်းမာရေးနှင့် လုံခြုံရေးအပေါ် သက်ရောက်နိုင်ခြင်း။
လက်ရှိအခြေခံအဆောက်အဦများနှင့်ဝန်ဆောင်မှုများ	B-	စီမံကိန်းသက်ရောက်သူများ၏ ကျောင်း၊ ဆေးရုံ၊ ရေးဆိုင်များသို့ သွားလာရေးလမ်းကြောင်းပြောင်းလဲလာနိုင်ခြင်း။
ရွှေခင်း	B-/B+	ပတ်ဝန်းကျင်တွင် အငယ်စားမြို့ပြစနစ်ပေါ်ပေါက်လာခြင်းကြောင့်ရွှေခင်းပြောင်းလဲလာနိုင်ခြင်း။
ကမ္ဘာကြီးပူနွေးလာမှု	B-	ယာဉ်များ၊ စက်ရုံများနှင့် ကုန်သွယ်ရေးလုပ်ငန်းများ စသည်တို့မှ ဖန်လုံအိမ်ဓါတ်ငွေ့ထုတ်လွှတ်နိုင်ခြင်း။

16

၃. EIA တွင်လေ့လာမည့်အကြောင်းအရာများ

အခြေခံလေ့လာမည့်အကြောင်းအရာများအကျဉ်းချုပ်(၁)



17

၃. EIA တွင်လေ့လာမည့်အကြောင်းအရာများ

အခြေခံလေ့လာမည့်အကြောင်းအရာများအကျဉ်းချုပ်(၂)

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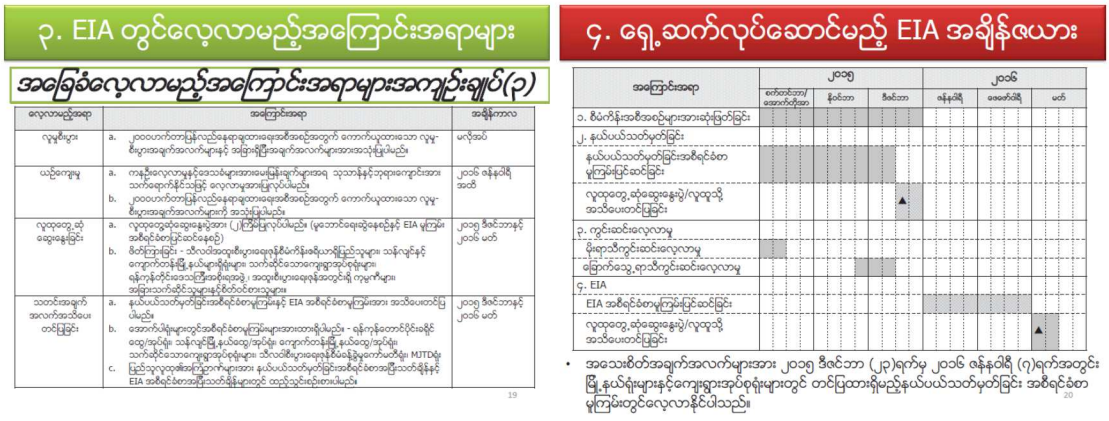

၃. EIA တွင်လေ့လာမည့်အကြောင်းအရာများ

အခြေခံလေ့လာမည့်အကြောင်းအရာများအကျဉ်းချုပ်(၃)

လေ့လာမည့်အရာ	အကြောင်းအရာ	အချိန်ကာလ
လူမှုစီးပွား	a. ၂၀၀၀ပတ်တာမြေလည်ခေရာဇူထားဧရိယာစီအရင်းအတွက် ကောက်ယူထားသော လူမှုစီးပွားအချက်အလက်များနှင့် အခြားရပြီးအချက်အလက်များအားအားသုံးပြုပါမည်။	မလိုအပ်
ယဉ်ကျေးမှု	a. ကန့်လေ့လာမှုနှင့်ဒေသခံများအားမေးမြန်းချက်များအရ သုသာနိုးဒုဝရားကျောင်းအား သက်ရောက်နိုင်သဖြင့် လေ့လာမှုအားပြုလုပ်ပါမည်။ b. ၂၀၀၀ပတ်တာမြေလည်ခေရာဇူထားဧရိယာစီအရင်းအတွက် ကောက်ယူထားသော လူမှုစီးပွားအချက်အလက်များကို အသုံးပြုပါမည်။	၂၀၁၆ ဇန်နဝါရီ အထိ
လူထုတွေ့ဆုံဆွေးနွေးခြင်း	a. လူထုတွေ့ဆုံဆွေးနွေးပွဲအား (၂)ကြိမ်ပြုလုပ်ပါမည်။ (မူဘောင်ရေးဆွဲခန့်နှင့် EIA မူကြမ်းအစီရင်ခံစာပြုစုဆင်ခန့်စဉ်) b. စိတ်ဝင်းစားခြင်း - သီလပါအထူးစီးပွားရေးနိုင်ငံကိန်းရိယာရှိပြည်သူများ၊ သန်ဂျင်နှင့် ကျောက်တန်းမြို့နယ်များရှိရုံးများ၊ သက်ဆိုင်သောဂေဟာများ၊ ရန်ကုန်တိုင်းဒေသကြီးအစိုးရအဖွဲ့ ၊ အထူးစီးပွားရေးခန့်အတွင်းရှိ ဂေဟာများ။ အခြားသက်ဆိုင်သူများနှင့်တိုင်ပင်စားသွေများ။	၂၀၁၅ ဒီဇင်ဘာနှင့် ၂၀၁၆ မတ်
သတင်းအချက်အလက်အသိပေးတင်ပြခြင်း	a. နယ်ပယ်သတ်မှတ်ခြင်းအစီရင်ခံစာမူကြမ်းနှင့် EIA အစီရင်ခံစာမူကြမ်းအား အသိပေးတင်ပြပါမည်။ b. အောက်ပါရိုးများတွင်အစီရင်ခံစာမူကြမ်းများအားထားရှိပါမည်။ - ရန်ကုန်တောင်ပိုင်းခရိုင်ဝေ့/အုပ်ရုံး၊ သန်လျင်မြို့နယ်ဝေ့/အုပ်ရုံး၊ ကျောက်တန်းမြို့နယ်ဝေ့/အုပ်ရုံး၊ သက်ဆိုင်ဝေသာကျေးရွာအုပ်စုရုံးများ၊ သီလဝါစီးပွားရေးခန့်ခံဝန်ခံမှုကော်မတီရုံး၊ MJTDမှ c. ပြည်သူလူထုအကြည်ာက်များအား နယ်ပယ်သတ်မှတ်ခြင်းအစီရင်ခံစာအပြီးသတ်ရိုးနှင့် EIA အစီရင်ခံစာအပြီးသတ်ရိုးများတွင် ထည့်သွင်းစဉ်းစားပါမည်။	၂၀၁၅ ဒီဇင်ဘာနှင့် ၂၀၁၆ မတ်

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၄. ရှေ့ဆက်လုပ်ဆောင်မည့် EIA အချိန်ဇယား

အကြောင်းအရာ	၂၀၁၅			၂၀၁၆		
	စက်တင်ဘာ/အောက်တိုဘာ	နိုဝင်ဘာ	ဒီဇင်ဘာ	ဇန်နဝါရီ	ဖေဖော်ဝါရီ	မတ်
၁. စီမံကိန်းအစီအစဉ်များအားဆုံးဖြတ်ခြင်း						
၂. နယ်ပယ်သတ်မှတ်ခြင်း						
နယ်ပယ်သတ်မှတ်ခြင်းအစီရင်ခံစာမူကြမ်းပြင်ဆင်ခြင်း						
လူထုတွေ့ဆုံဆွေးနွေးပွဲ/လူထုသို့အသိပေးတင်ပြခြင်း			▲			
၃. ကွင်းဆင်းလေ့လာမှု						
မိုးရာသီကွင်းဆင်းလေ့လာမှု						
ဖြောက်သွေ့ရာသီကွင်းဆင်းလေ့လာမှု						
၄. EIA						
EIA အစီရင်ခံစာမူကြမ်းပြင်ဆင်ခြင်း						
လူထုတွေ့ဆုံဆွေးနွေးပွဲ/လူထုသို့အသိပေးတင်ပြခြင်း						▲

- အသေးစိတ်အချက်အလက်များအား ၂၀၁၅ ဒီဇင်ဘာ (၂၃)ရက်မှ ၂၀၁၆ ဇန်နဝါရီ (၇)ရက်အတွင်း မြို့နယ်ရုံးများနှင့်ကျေးရွာအုပ်စုရုံးများတွင် တင်ပြထားရှိမည့်နယ်ပယ်သတ်မှတ်ခြင်း အစီရင်ခံစာမူကြမ်းတွင်လေ့လာနိုင်ပါသည်။

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ဆွေးနွေးပွဲတက်ရောက်ခြင်းအတွက်
အထူးကျေးဇူးတင်ပါသည်။

အကြံဉာဏ်များလည်းပေးနိုင်ပါသည်။

Handout used at PCM at Scoping Stage

သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင်သက်ရောက်နိုင်ခြေ အလားအလာများ

စီမံကိန်းသည် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင်တို့ကို အနည်းငယ်သိသာ ထင်ရှားစွာ သက်ရောက်နိုင်ပါသည်။ ဆောက်လုပ်ရေးလုပ်ငန်းများမစတင်မီ စီမံကိန်းကြောင့် ပြောင်းရွေ့နေရာ ချထားခြင်းများရှိနိုင်ပါသည်။ စီမံကိန်းဧရိယာအတွင်း လယ်သမားအများစုသည် မိမိတို့ပိုင်မြေတွင်၎င်း၊ အစိုးရပိုင်မြေတွင်၎င်း စိုက်ပျိုးရေးလုပ်ငန်းများ လုပ်ကိုင်ဝန်းကြေသောကြောင့် ဆောက်လုပ်ရေးအချိန်နှင့် စီမံကိန်းလည်ပတ်ပြီးချိန်များတွင် ၎င်းတို့၏လူနေမှုဘဝများအား ထိခိုက်နိုင်ကြောင်းမျှော်မှန်းရပါသည်။ ထိုထိခိုက်နိုင်ခြေနှင့် လျော်ပါးစေရေးနည်းလမ်းများအား ပြန်လည်ဆန်းစစ်ပါသည်။

အခြားတစ်ဖက်တွင်မူ အနာဂတ်စီးပွားရေးခုန်ဖွံ့ဖြိုးတိုးတက်ရေးအရ ဆောက်လုပ်ရေးနှင့် လည်ပတ်ရေး လုပ်ငန်းများ၏ အလုပ်အကိုင်ဖန်တီးပေးမှုများကြောင့် ဒေသတွင်းစီးပွားရေး တိုးတက်လာနိုင်ပါသည်။ ထပ်လောင်းရေးဆွဲထားသော့ဖွံ့ဖြိုးရေးအစီအမံများအရ လူမှုအခြေခံအဆောက်အဦများနှင့် မြေယာ အနေအထားများအတွက်လည်း ကောင်းကျိုး သက်ရောက်နိုင်ပါသည်။

ဆောက်လုပ်ရေးအချိန် သဘာဝပတ်ဝန်းကျင်ဆိုးကျိုးသက်ရောက်မှုများအနေဖြင့် သစ်ပင်များ ဆုံးရှုံးခြင်း၊ ဖုန်ထခြင်း၊ လေထုညစ်ညမ်းခြင်း၊ ဆူညံသံနှင့်တုန်ခါမှုများ၊ အလုပ်သမားဝန်းများနှင့် ဖြည့်ခြင်းတို့မှတ္တပ်ရှိလာမည့်ရေဆိုးများစသည်တို့ကို မျှော်မှန်းထားပါသည်။

လုပ်ငန်းလည်ပတ်စဉ်ကာလတွင်လည်း တိုးပွားလာမည့်ယာဉ်သွားလာမှုများအရ ဆူညံသံ၊ တုန်ခါမှုနှင့် လေထုညစ်ညမ်းမှုများအား မျှော်မှန်းပါသည်။ စက်ရုံအလုပ်ရုံများနှင့် လူနေအိမ်များမှ ထွက်ရှိလာမည့် စွန့်ပစ်ရေ၊ အိမ်သုံးစရေးနှင့် စက်ရုံမှစွန့်ပစ်ရေများအားလည်း မျှော်မှန်းထားပါသည်။ စီမံကိန်းအနေဖြင့် သဘာဝပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအမံများနှင့် စောင့်ကြည့်ထိန်းချုပ်ရေး အစီအမံများ အတိုင်း အကောင်အထည်ဖော်ဆောင်ရွက်မည်ဖြစ်ပါသည်။

အနာဂတ်လူထုတွေ့ဆုံပွဲလှုပ်ရှားမှုများ

ဒုတိယအကြိမ် လူထုတွေ့ဆုံပွဲအား ၂၀၁၆ခုနှစ် မတ်လအတွင်းမြို့လုပ်ရန်ရှိပြီး ၎င်းတွင် စီမံကိန်းနောက်ဆုံးအစီအစဉ်၊ သက်ရောက်နိုင်ခြေလေ့လာမှုရလာဒ်၊ အဆိုပြုလျော်ပါးစေရေးနည်းလမ်း၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအမံနှင့် စောင့်ကြည့်ရေးအစီအမံများအား တင်ပြမည်ဖြစ်ပြီး၊ အများပြည်သူများ ထံမှအကြံဉာဏ်များရယူမည်ဖြစ်သည်။ EIA အစီရင်ခံစာမူကြမ်းအား ပြင်ဆင်ရန်နှင့် အကြံဉာဏ်များရယူရန် တင်ပြထားရှိထားမည်ဖြစ်သည်။ ထပ်လောင်း၍ ပြန်လည်ရေးဆွဲထားရေးအစီအစဉ်အတွက် လူထု တွေ့ဆုံပွဲအားလည်း သီးခြားလေ့လာမှု အရကျင်းပသွားမည်ဖြစ်သည်။

EIA သတင်းအချက်အလက်များအတွက် ထပ်မံသိရှိလိုပါကအောက်ပါအတိုင်းဆက်သွယ်ပါရန်

Environment, Safety and Health Section, Operations Department, MJTD

ဖုန်း - ၀၉၂၅၉၀၁၆၇၆၄

ပတ်ဝန်းကျင်သက်ရောက်မှုဆန်းစစ်ခြင်းအတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲ
(နယ်ပယ်သတ်မှတ်ခြင်းအဆင့်)

သီလဝါအထူးစီးပွားရေးခုန်ဖွံ့ဖြိုးတိုးတက်ရေးစီမံကိန်း
အပိုင်း (၁)

သတင်းအချက်အလက်စာစည်

၂၀၁၅ခုနှစ်၊ ဒီဇင်ဘာလ (၁၉) ရက်နှင့် (၂၂) ရက်

မြန်မာ-ဂျပန်သီလဝါဖွံ့ဖြိုးရေးလီမိတက် (MJTD)
နှင့်
မြန်မာသီလဝါအထူးစီးပွားရေးခုန်အများပိုင်လီမိတက် (MTSH)

သီလဝါဖွံ့ဖြိုးတိုးတက်ရေးစီမံကိန်းနှင့် ဦးတည်ချက်များ

မြန်မာနိုင်ငံတော်အစိုးရသည် နိုင်ငံခြားတိုက်ရိုက်ရင်းနှီးမြှုပ်နှံမှုအား နိုင်ငံတွင်းဖွဲ့ဖြိုးတိုးတက်မှုအချက်တစ်ချက်အနေဖြင့် လုပ်ဆောင်ခဲ့ပါသည်။ အထူးသဖြင့် နိုင်ငံတော်အစိုးရသည် ရန်ကုန်မြို့အပြင်အဝန်းရှိ သီလဝါအထူးစီးပွားရေးခုန်အား စီးပွားရေးဖွဲ့ဖြိုးတိုးတက်မှုတွင် အရေးပါသောအခန်းကဏ္ဍအဖြစ်မျှော်မှန်းထားပါသည်။ ယင်းအခြေအနေအရ မြန်မာနိုင်ငံနှင့် ဂျပန်နိုင်ငံတို့သည် သီလဝါအထူးစီးပွားရေးခုန်ဖွံ့ဖြိုးရေးအတွက် ပူးပေါင်းဆောင်ရွက်ရန် နားလည်မှုစာချွန်လွှာအား ၂၀၁၂ခုနှစ် ဒီဇင်ဘာလတွင် လက်မှတ်ရေးထိုးခဲ့ကြပါသည်။

၂၀၁၃ခုနှစ် အောက်တိုဘာတွင် Myanmar Thilawa SEZ Holdings Public Limited (MTSH) နှင့် MMS Thilawa Development Company (MMST) တို့သည် အဂျိုးတူပူးပေါင်းမှုအနေဖြင့် Myanmar Japan Thilawa Development Limited (MJTD) အားထူထောင်ခဲ့ စည်းပြီး အထူးစီးပွားရေးခုန်အတွင်း ဟက်တာ (၄၀၀) ခန့်ရှိ အပိုင်း(က)အား ကနဦးအနေဖြင့် ဖွံ့ဖြိုးရေးစီမံကိန်းများလုပ်ဆောင်ခဲ့ပါသည်။

MJTD သည် မြစ်တန်ခြေလေ့လာမှုပြီးစီးပြီး၊ သီလဝါအထူးစီးပွားရေးခုန်စီမံခန့်ခွဲမှုကော်မတီမှ EIA အစီရင်ခံစာအားအတည်ပြုပြီးနောက် ၂၀၁၃ခုနှစ် ဒီဇင်ဘာလမှစတင်ကာ ဆောက်လုပ်ရေးလုပ်ငန်းများ လုပ်ဆောင်ခဲ့ပါသည်။ အပိုင်း(က)၏ အချို့အစိတ်အပိုင်းများအား လုပ်ငန်းလည်ပတ်ရန် ၂၀၁၅ခုနှစ် စက်တင်ဘာလတွင် တရားဝင်ခွင့်လုပ်ခဲ့ပါသည်။

ထို့အပြင် MJTD သည် အခြား(၇၀၀)ဟက်တာတိုးချဲ့ခြင်းစီမံကိန်း (ယခုစီမံကိန်း)အား အဂေကာင်ထည်ဖော်ဆောင်ရန် စီစဉ်ခဲ့ပြီး၊ ၎င်းတွင် စက်မှုလုပ်ငန်း (၂၆၂) ဟက်တာ၊ သယ်ယူပို့ဆောင်ရေး (၂၆၇)ဟက်တာနှင့် လူနေနှင့်ရောင်းဝယ်ဖောက်ကားရေး (၁၆၉)ဟက်တာခန့်ပါဝင်ပါမည်။ ယင်းစီမံကိန်းအတွက် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင်သက်ရောက်မှုများအား သိရှိနိုင်ရန် လေ့လာလျက်ရှိပြီး သင့်တော်သောလျော်ပါးစေရေးနည်းလမ်းများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြည့် ရေး အစီအစဉ်များကို ရေးဆွဲမည်ဖြစ်ပါသည်။

လူထုတွေ့ဆုံပွဲအပြီးတွင်ရည်ရွယ်ချက်

လူထုတွေ့ဆုံပွဲကျင်းပရခြင်းရည်ရွယ်ချက်မှာ အများပြည်သူနှင့် အခြားသက်ဆိုင်သူများ၏ အကြံဉာဏ်များရယူ၍ စီမံကိန်းအစီအမံများ၊ သက်ရောက်နိုင်ခြေဆန်းစစ်မှုများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် စောင့်ကြည့် ရေးအစီအစဉ်များအပေါ် ပိုမိုကိုယ်တက် ကောင်းမွန်စေရန် ဖြစ်ပါသည်။

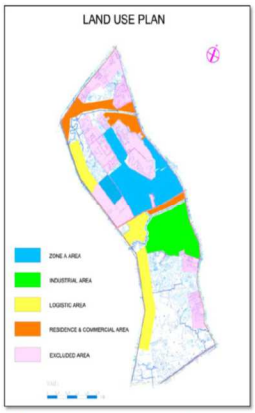
အဓိကရည်ရွယ်ချက်များ

- စီမံကိန်းအကြောင်းအရာများဖြစ်သော အစီအမံများနှင့် အရိုးကာလတို့ကိုသိရှိစေရန်
- စီမံကိန်း၏ ကောင်းကျိုး ဆိုးကျိုးသက်ရောက်မှုများကို တင်ပြရန်
- လူထုတွေ့ဆုံပွဲအတွင်း သက်ဆိုင်သူများထံမှ စီမံကိန်းစီမံချက်ကာလနှင့်ပက်သက်သော အကြံဉာဏ်များကိုရယူ၍ စီမံချက်ရေးဆွဲရာတွင် ထည့်သွင်းစဉ်းစားရန်

စီမံကိန်းအကြောင်းအရာ

- အပိုင်း (ခ) အနေဖြင့် စုစုပေါင်း ဟက်တာ (၇၀၀)ခန့် ဖွံ့ဖြိုးရေးလုပ်ဆောင်ရန်
- အပိုင်း (ခ)တွင် ဖွံ့ဖြိုးရေးဇုံယာ (၃)ခုပါဝင်ပါသည်။ စက်မှုလုပ်ငန်း (၂၆၂)ဟက်တာခန့်၊ သယ်ယူပို့ဆောင်ရေး (၂၆၇)ဟက်တာခန့်နှင့် လူနေနှင့်ရောင်းဝယ်ဖောက်ကားရေး (၁၆၉)ဟက်တာခန့်ပါဝင်ပါမည်။
- စီမံကိန်းပါဝင်ဇုံများ - MJTD (စက်မှုဇုံအတွက်) နှင့်MTSH (သယ်ယူပို့ဆောင်ရေး၊ လူနေနှင့် ရောင်းဝယ်ဖောက်ကားရေးဇုံယာများအတွက်)

အဆိုပြုခြံယာအသုံးပြုမှုအစီအစဉ်နှင့် အဆောက်အဦများ



- အပိုင်း(က)ရှိရေသန့်စင်စက်ရုံမှ ရေအား ၂၀၁၉ ခုနှစ်တွင်လုပ်ဆောင်မည့် အများပြည်သူသုံးရေပိုက်လိုင်းသို့ ဆက်သွယ်ပေးခြင်း။
- ဝဟိုရေဆိုးသန့်စင်စက်ရုံအား စက်မှုခန့်ဇုံယာတွင်တပ်ဆင်ခြင်းနှင့် မိလ္လာကန်များအား သယ်ယူပို့ဆောင်ရေး၊ လူနေနှင့် ရောင်းဝယ်ဖောက်ကားရေး ဇုံယာများတွင် ထားရှိခြင်း။
- အဓိကလမ်းမများနှင့် လမ်းသွယ်များအား ဇုံယာ (၃) ခုလုံးတွင်တည်ဆောက်ခြင်း
- စက်မှုခန့်ဇုံယာများအတွက် ပင်လယ် ရေမျက်နှာပြင်အမြင့် ၅ မှ ၆.၅ မီတာ၊ သယ်ယူပို့ဆောင်ရေး၊ လူနေနှင့် ရောင်းဝယ်ဖောက်ကားရေး ဇုံယာများ အတွက် ၅ မီတာ အထက်ထားရှိခြင်း

EIA လေ့လာမှု၏ရည်ရွယ်ချက်အကျဉ်း

သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင် ရှုထောင့်များအရ စီမံကိန်းအောင်မြင်စေရန် MJTD နှင့် MTSH တို့သည်သဘာဝပတ်ဝန်းကျင်လေ့လာ ဆန်းစစ်ခြင်းများကိုလုပ်ဆောင်လျက်ရှိပါသည်။

EIA လေ့လာခြင်း၏ရည်ရွယ်ချက်အကျဉ်းမှာ

- စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော လူမှု/သဘာဝ ဝန်းကျင်သက်ရောက်မှုများအားလေ့လာ အကဲဖြတ်နိုင်ရန်အတွက် သဘာဝ/လူမှု ပတ်ဝန်းကျင်ဆိုင်ရာအခြေခံအချက်အလက်များကောက်ယူရန်
- လူမှု/သဘာဝ ဝန်းကျင်ဆိုးကျိုးသက်ရောက်မှုများအား ပြေလျော့စေရန်အတွက် သင့်တော်သော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြည့်ရေးအစီအစဉ်များ ရေးဆွဲရန်

Sample of the Feedback Form used at PCM at Scoping Stage

Public Consultation Meeting for EIA (Scoping Stage) of Thilawa SEZ Development Project (Zone B)
သီလဝါအထူးစီးပွားရေးဇုန်အပိုင်း(ခ)တိုးချဲ့ခြင်းအတွက်အများပြည်သူများနှင့်တွေ့ဆုံဆွေးနွေးပွဲ (နယ်ပယ်သတ်မှတ်ခြင်းအဆင့်)

Thank you very much for your participation in this Public Consultation Meeting. Your suggestions and feedback on environmental and social issues related to the project will help us to improve the plan and minimize the adverse impacts of the project.
ဆွေးနွေးပွဲတက်ရောက်သည့်အတွက်အထူးပင်ကျေးဇူးတင်ပါသည်။ လူကြီးမင်းတို့၏ စီမံကိန်းနှင့်ဆက်နွယ်သော သဘာဝ ပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင်ဆိုင်ရာအကြံပြုချက်များသည် စီမံကိန်းတန်ပြန်သက်ရောက်မှုများ လျော့ချရာတွင်လည်းကောင်း၊ စီမံကိန်းအစီအမံများ ရေးဆွဲရာတွင်လည်းကောင်းများစွာအထောက်အကူဖြစ်စေနိုင်ပါသည်။

Date:
ရက်စွဲ

1. Name :
အမည်

2. Township: မြို့နယ်
3. Village: ကျေးရွာ
3. Mobile (if possible): ဖုန်း
4. Age: အသက်
6. Gender – Male ☐ ကျား **Female** ☐ မ
7. Occupation:
အလုပ်အကိုင်
8. Vulnerability (if applicable):
(a) Women headed household ☐ အမျိုးသမီးဦးစီးသောအိမ်ထောင်စု
(b) Disabled headed household ☐ မသန်စွမ်းသူဦးစီးသောအိမ်ထောင်စု
(c)Below poverty line household ☐ ဆင်းရဲသောအိမ်ထောင်စု
Elderly headed household ☐ သက်ကြီးရွယ်အိုဦးစီးသောအိမ်ထောင်စု
Household with the Disabled ☐ မသန်စွမ်းသူပါဝင်သောအိမ်ထောင်စု

8. Suggestion to the Project proponent in terms of Environmental Concern
သဘာဝပတ်ဝန်းကျင်နှင့်ပတ်သက်၍ စီမံကိန်းဖော်ဆောင်သူများသို့အကြံပြုချက်များ

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……

9. Suggestion to the Project proponent in terms of Social Concern
လူမှုဝန်းကျင်နှင့်ပတ်သက်၍ စီမံကိန်းဖော်ဆောင်သူများသို့အကြံပြုချက်များ

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……

10. Suggestion to the Project proponent in terms of Any Other Concern
စီမံကိန်းဖော်ဆောင်သူများသို့အခြားအကြံပြုချက်များ

……
……
……

Thank you very much for your participation. Please submit this to the receptionist before you leave.
တက်ရောက်ခြင်းအတွက် အထူးကျေးဇူးတင်ပါသည်။ ဤအကြံပြုစာအား ပြန်လည်မထွက်ခွာမီ သက်ဆိုင်သူများသို့ ပေးစေလိုပါသည်။

Annex 10-4

Meeting Records of Public Consultation Meeting for EIA at Scoping Stage

Annex 10-4 Meeting Records of Public Consultation Meeting for EIA at Scoping Stage

First Session: December 19th, 2015 A.M.

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ အများပြည်သူ အကြံပြုဆွေးနွေးပွဲ

ပထမနေ့၊ ပြည်သူ့ အကြံပြုဆွေးနွေးပွဲ၊ အစည်းအဝေးမှတ်တမ်း

နေ့စွဲ - ၁၉.၁၂.၁၅

နေရာ - သီလဝါအိုးအိမ်ရုံး (ယာယီ)

အချိန် - နံနက် ၉း၃၀

၁. အဖွင့်အမှာစကားပြောကြားခြင်း

ဒေါက်တာဒေါ်သန်းသန်းသွယ်မှ အစည်းအဝေးသို့ တက်ရောက်လာသူများကို ကျေးဇူးတင်ကြောင်း၊ အဖွင့်အမှာစကားကို ဒေါက်တာသန်းအောင်ကိုယ်စား ပြောကြားခြင်းဖြစ်ကြောင်း၊ ယခုအစည်းအဝေးသည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လေ့လာမှုများအား ပြည်သူလူထုသိရှိစေရန် အသိပေးခြင်းဖြစ်ကြောင်း၊ ပြန်လည်နေရာချထားရေးနှင့် မသက်ဆိုင်ကြောင်း ရှင်းလင်းပြောကြားခဲ့ပါသည်။

၂. သီလဝါအထူးစီးပွါးရေးဇုန် အပိုင်း (ခ) နှင့်သက်ဆိုင်သော လေ့လာချက်များအား အစီစဉ်အလိုက်ရှင်းလင်းပြောကြားခြင်း

သီလဝါ အထူးစီးပွါးရေးဇုန် အပိုင်း (ခ) စိမံကိန်း မိတ်ဆက်နှင့် ဖော်ပြချက်၊ နယ်ပယ်သတ်မှတ်ရာတွင် သဘာဝနှင့်လူမှု ဝန်းကျင်သက်ရောက်နိုင်မှုများ၊ EIA တွင်လေ့လာမည့် အကြောင်းအရာများ၊ ရှေ့ဆက်လုပ်ဆောင်မည့်EIA အခြေအနေများကို REMမှတာဝန်ရှိသူ ဒေါ်ဖြူဖြူရှိန်မှ ရှင်းပြခဲ့ပါသည်။

၃. အမေး၊ အဖြေ

မေးခွန်း - ၁. EIA ဆိုတာ ထိခိုက်မှု ဆန်းစစ် လေ့လာတာလို့ နားလည်ထားပါတယ်။ လမ်းတွေ ဆိုးရွာနေမှုက EIA နှင့် သက်ရောက်နိုင်မှုရှိ သလားဆိုတာသိချင်ပါတယ်။လမ်းဆိုးရွားမှုက လူ၊ စက်ပစ္စည်းထိခိုက်နိုင်ပါတယ်။ (ဦးမြလှိုင်)

အဖြေ - ၁. ကျွန်မတို့ ဆီ နိုဝင်ဘာ ၁၉ ရက်က လမ်းမြေစမ်းသပ်ရန် စာတင်ပါတယ်။မြေကြီးခံနိုင်မှု ကိုစမ်းသပ်မှာပါ ပြီးရင် ဖွံ့ဖြိုးရေးလမ်း က ဆောက်လုပ်မှာပါ။ (TSMC)

မေးခွန်း - ၂. ဒီနေ့ အစည်းဝေးပွဲက ထူးခြားချက်ရှိပါတယ်။ ပထမတုန်းကတင်ပြရင် TSMC ကို ဘဲ တင်ပြရပါတယ်။ ယခု MJTD ကိုပါတင်ပြလို့ရတယ်ဆိုတော့ TSMC ကိုဘဲတင်ပြရမှာလား ၊ MJTD ကိုဘဲ တင်ပြရမှာပါပါလား (ဦးမြလှိုင်)

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ အများပြည်သူ အကြံပြုဆွေးနွေးပွဲ

အဖြေ - ၂. EIA ကို အရင်က TSMC ကိုစာတင်ရတာ ဟုတ်ပါတယ်။ ယခု MJTD ကိုလည်းတင်ရတာဟုတ်ပါတယ်။ One-stop service / Operation Department ကိုလည်းတင်လို့ရပါတယ်။ (TSMC)

မေးခွန်း - ၃. အခြားနေရာကလာရောက်နိုင်တဲ့ လုပ်သားတွေ စွန့်ပစ်ပစ္စည်းတွေ ရေ၊ လေ ညည်းညစ်မှု ဆိုတော့ ဒီဇုန်ထဲမှာနေဖို့ နေရာရော ရှိလို့လား (ဦးမြလှိုင်)

အဖြေ - ၃. စက်ရုံတွေ အလျင်အမြန်တည်ဆောက်တော့ ပတ်ဝန်းကျင်ထိခိုက်မှုတော့ရှိပါတယ်။အခု ၆ ထပ်တိုက် ၂ခုဆောက်နေပါတယ် ။ အဲဒါပြီးရင်တော့ သက်သာနိုင်ပါတယ်။ယခုတော့ အဆောက်အအုံ မပြီးသေးခင် အနည်းငယ်တော့ ခက်ခဲနိုင်ပါတယ်။ (TSMC)

မေးခွန်း - ၄. အခုထုတ်ပြန်မယ့် အကြောင်းအရာ ဆိုရင် ပြည်သူတွေရှိတဲ့ နေရာနဲ့ ဝေးလွန်းပါတယ်။ ထို့ကြောင့် EIA မူကြမ်းကို ကျွန်တော်တို့ဆီရောပေးပို့ပေးနိုင်မလား (ဦးမြလှိုင်)

အဖြေ - ၄. EIA စာအုပ်ကိုပို့ပေးပါ့မယ်။ (TSMC)

မေးခွန်း - ၅. ဘယ်နေရာကိုပို့ပေးရင် အဆင်ပြေနိုင်မလဲ (REM)

အဖြေ - ၅. အလွမ်းဆွတ် ဆိုရင်ကျွန်တော်တို့ ဆီ ပေးပို့ပေးပါ (ဦးမြလှိုင်)

မေးခွန်း - ၆. EIA/SIA ကဒေသခံ တော်တော်များများ နားလည်ဖို့ ခက်ခဲပါတယ်။ ယခု EIA နှင့် ပတ်သတ်ပြီး အပိုင်း ခ နှင့် ပတ်သတ်ပြီး ပြောင်းရွှေ့ ရတဲ့ လူတွေဘဲပြောနေကြတာတွေ့ပါတယ်။ သဘာဝဝန်းကျင်က ကျယ်ဝန်းပါတယ်။ TSEZ နှင့်ပတ်သက်ပြီး power supply နဲ့ ပတ်သက်ပြီး ရှင်းရှင်းလင်းလင်းသိချင်ပါတယ်။ Water Resourse က ကျောက်တန်းဆီက ယူသုံးရင် ကြာရင် မြေအောက်ရေထိခိုက်နိုင်ပါတယ်။ (ဘုန်းကြီး)

အဖြေ - ၆. ကျွန်မတို့ ဟက်တာ၇၀၀ ကို အခြေခံ ဒေတာယူတာပါ။ မီးက Thanlyin Sub- Station ကယူတာပါ။ အရေးပေါ်အတွက် 50MW တည်ဆောက်ထားပါတယ်။ နောက်ထပ် ၂၃၀KV က ရန်ကုန်က လာမှာပါ။ ယခုလက်ရှိ မီးကတော့ ဇာမဏီဆည်ကနေ သုံးပါတယ်။ တစ်နေ့ကို ၆၀၀၀ ကုဗပေ ခန့် သုံးပါတယ်။ လက်ကွင်းပင် ရေပေးဝေရေး ကနေ ၂၀၁၈ မှာ ရောက်အောင် ပို့ပေးမှာပါ။ ဘန့်ဘွေးကုန်း ကနေလည်းမယူပါဘူး ။ မြေအောက်ရေလည်း တူးခွင့်မပေးပါဘူး။ (TSMC)

Second Session: December 22th, 2015 A.M.

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ အများပြည်သူ အကြံပြုဆွေးနွေးပွဲ

ဒုတိယနေ့၊ ပြည်သူ့အကြံပြုဆွေးနွေးပွဲ၊ အစည်းအဝေးမှတ်တမ်း

နေ့စွဲ - ၂၂.၁၂.၁၅

နေရာ - သီလဝါအိုးအိမ်ရုံး (ယာယီ)

အချိန် - နံနက် ၉း၃၀

၁. အဖွင့်အမှာစကားပြောကြားခြင်း

ပြောကြားခြင်းမရှိပါ

၂. သီလဝါအထူးစီးပွါးရေးဇုန် အပိုင်း (ခ) နှင့်သက်ဆိုင်သော လေ့လာချက်များအား အစီစဉ်အလိုက်ရှင်းလင်းပြောကြားခြင်း

သီလဝါ အထူးစီးပွါးရေးဇုန် အပိုင်း (ခ) စီမံကိန်း မိတ်ဆက်နှင့် ဖော်ပြချက်၊ နယ်ပယ်သတ်မှတ်ရာတွင် သဘာဝနှင့်လူမှုဝန်းကျင် သက်ရောက်နိုင်မှုများ၊ EIA တွင်လေ့လာမည့် အကြောင်းအရာများ၊ ရှေ့ဆက်လုပ်ဆောင်မည့်EIA အခြေအနေများကို REMမှတာဝန်ရှိသူ ဒေါ်ဖြူဖြူရှိန်မှ ရှင်းလင်းတင်ပြခဲ့ပါသည်။

၃. အမေး၊ အဖြေ

မေးခွန်း - ၁. ကျွန်တော်တို့ ရွှေပျောက် အပိုင်းထဲမှာအိမ်ခြေ ၄၅ လုံးရွှေပြောင်းရမှာ ဖြစ်ပါတယ်။ ထို့ကြောင့်မြေယာအစားထိုးမှုအား တောင်းဆိုချင်တာရှိပါတယ်။ အေးမြသီတာ နှင့် ရွှေပြည်သာယာကြားကဖုန်နေရာလေးလိုချင်ပါတယ်။

အဖြေ - ၁. ဖုန်ဇရိယာထဲမှာ ကျနေပါတယ်။ ပထမဦးစားပေးနေရာက ရွာ ၂ ရွာကြားတောင်းဆိုသည့်အကြောင်းအား အထက်ကို တင်ပြပေးပါမယ်။ ဒုတိယ ဦးစားပေးအနေဖြင့် ရဲတပ်ရင်းနားလို့ သိရှိရကြောင်းနှင့် ရွှေပြည်သာယာ သီလဝါက ကုလားဘုရားကျောင်းနားတွင်လည်း ပထမဦးစားပေးတောင်းဆိုထားကြောင်းသိရပါတယ်။ တောင်းဆိုမှုတွေကို အထက်ကို တင်ပြပေးပါ့မယ်။ မြေကိစ္စကို တစ်ပိုင်းတင်ပြ သွားပေးပါ့မယ်။ ရွှေမော်ဝန်းအဖွဲ့ (ပ) သီလဝါအထူးစီးပွားရေးဇုန် အကြောင်း အမျိုးမျိုးကြောင့် ပျက်စီးအောင်လုပ်မယ့် သူတွေကို ပြန်တိုက်ခိုက်မယ့် အဖွဲ့ပါ။ သီလဝါလူထုဖွံ့ဖြိုးတိုးတက်ရေးအဖွဲ့ (ဒ)က လူထုဘက်က ရပ်တည်မှာပါ။ ၄င်း နှစ်ဖွဲ့ ကို အစီရင်ခံစာ မူကြမ်းစာအုပ် ပေးပို့ရင် ပိုကောင်းပါတယ်။ ဒါမှသာ အကြံဉာဏ်တွေရရှိမှာ ဖြစ်ပါတယ်။ ဒေါ်အိအိခိုင်က တစ်ဆင့်ပေးလို့ရပါတယ်။ (TSMC)

ဆွေးနွေးတင်ပြခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ အများပြည်သူ အကြံပြုဆွေးနွေးပွဲ

အဓိက ဒီနေ့ အစည်းအဝေးက သီလဝါ Zone B အတွက် သဘာဝ ပတ်ဝန်းကျင် လေ့လာတာဖြစ်ပါတယ်။ အောက်တိုဘာ (၁၀)နှင့် (၁၂) ရက်တို့တွင် ပြန်လည် နေရာချထားရေး အစီအစဉ်ကို ဆွေးနွေးတိုင်ပင်ခဲ့ပါတယ်။ ဇန်နဝါရီ လတွင် အဆုံးသတ် ဆွေးနွေးရေးဆွဲ နေပါတယ်။ (TSMC)

မေးခွန်း - ၂. EIA အဖွဲ့ကို ဗဟုသုတ အနေဖြင့် တစ်ခုလောက်မေးချင်ပါတယ်။၇၀၀ ဟက်တာ အပြင် ဘယ်လောက်အကွာအဝေးမှာနေထိုင်လျှင်ဆိုးကျိုးထိခိုက်မှု မရှိနိုင်ဘူးလဲ သိချင်ပါတယ်။

အဖြေ - ၂. စီမံကိန်းမစတင်မီ နှင့် စတင်ချိန်ကာလတွေမှာ လေ့လာခဲ့ပါသည်။ လည်ပတ်နေစဉ်ကာလမှာ လဲ MJTD ကို အကြံဉာဏ်ပေးပါသည်။ ဘေးအန္တရယ်လျော့ ကျနိုင်တဲ့ နည်းလမ်းတွေ ကို အကြံဉာဏ်ပေးပါတယ်။ အကောင်းဆုံးအကြံ ဉာဏ်ပေးရရင် စီမံကိန်းဇရိယာနှင့်အဝေးဆုံးမှာနေထိုင်ပါ။ အကိုတို့ ကို တိုက်ရိုက် မဟုတ်သော်လည်း သွယ်ဝိုက်သောနည်းလမ်းနှင့် ပတ်သတ်နိုင်ပါတယ်။ ပုံမှန်ထက် ဖုန် မှုန့်တွေ များရင် ပြောကြားပါ။ျပန်ကုပ္ပဏီက ဦးဆောင်တာပါ။ စီမံကိန်းဇရိယာမှာ တစ်နေ့ရောဘယ်နှစ်ခေါက် ဖြန်းရမယ်ဆိုတာ ပါပါတယ်။လျော့ပါးနိုင်မယ့် နည်းလမ်းတွေ အကြံပြုထားပါတယ်။ လိုက်နာတာ ၊ မလိုက်နာတာ ကတော့ ကုပ္ပဏီပိုင်ရှင်ဘက်ကပါ။သဘာဝပတ်ဝန်းကျင်နှင့် ပတ်သတ်ပြီး တစ်ဦးတစ်ယောက်နဲ့ မဆိုင်ပါဘူး။ နိုင်ငံတော် အစိုးရအစ ပြည်သူတွေ တစ်ရပ်လုံးပူးပေါင်း ပါဝင်ဆွေးနွေးရမှာဖြစ်ပါတယ် (REM)

Third Session: December 22th, 2015 P.M.

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ အများပြည်သူ အကြံပြုဆွေးနွေးပွဲ

ဒုတိယနေ့၊ ပြည်သူ့အကြံပြုဆွေးနွေးပွဲ၊ အစည်းအဝေးမှတ်တမ်း

နေ့စွဲ - ၂၂.၁၂.၁၅

နေရာ - သီလဝါအိုးအိမ်ရုံး (ယာယီ)

အချိန် - နေ့လည်

၁. အဖွင့်အမှာစကားပြောကြားခြင်း

ပြောကြားခြင်းမရှိ

၂. သီလဝါအထူးစီးပွါးရေးဇုန် အပိုင်း (ခ) နှင့်သက်ဆိုင်သော လေ့လာချက်များအား ခြုံငုံ၍ ရှင်းလင်းပြောကြားခြင်း

သီလဝါ အထူးစီးပွါးရေးဇုန် အပိုင်း (ခ) စီမံကိန်း မိတ်ဆက်နှင့် ဖော်ပြချက်၊ နယ်ပယ်သတ်မှတ်ရာတွင် သဘာဝနှင့်လူမှု ဝန်းကျင်သက်ရောက်နိုင်မှုများ၊ EIA တွင်လေ့လာမည့် အကြောင်းအရာများ၊ ရှေ့ဆက်လုပ်ဆောင်မည့်EIA အခြေအနေများကို REMမှတာဝန်ရှိသူ ဒေါ်ဖြူဖြူရိန်မှ ရှင်းပြခဲ့ပါသည်။

၃. အမေး၊ အဖြေ

မရှိ

ဆွေးနွေးတင်ပြခြင်း

ရန်ကုန်တိုင်းဒေသကြီး ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနတွင်တာဝန်ထမ်းဆောင်နေသော ဦးစီးမှူးမှ ယခင်လွန်ခဲ့သောနှစ်များက စက်ရုံများတည်ဆောက်လျှင် ယခုကဲ့သို့ ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုဆန်းစစ်ခြင်းများမရှိခဲ့ကြောင်း၊ ယခုအစိုးရလက်ထက်တွင် ၂၀၁၂ ခုနှစ်နောက်ပိုင်း စီးပွားရေးဖွံ့ဖြိုးတိုးတက်မှုများ လုပ်ဆောင်ရာတွင် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းများကို ထည့်သွင်းလုပ်ဆောင်ရန် ဥပဒေများချမှတ်ထားကြောင်း၊ ပြန်လည်နေရာချထားရေး ကိစ္စများဆောင်ရွက်ရာတွင်လည်း ပွင့်လင်းမြင်သာမှုရှိလာပြီဖြစ်ကြောင်း သုံးသပ်တင်ပြခဲ့ပါသည်။

Annex 10-5

Announcement Letter for Public Disclosure of the Draft Scoping Report

Annex 10-5 Announcement Letter for Public Disclose of the Draft Scoping Report

Announcement of Public Disclosure

Myanmar Japan Thilawa Development Limited (MJTD)/ Myanmar Thilawa SEZ Holdings Public Limited (MTSH) have started to plan the development of 700ha in Thilawa SEZ as "Zone B Area". In response to this, the Environmental Impact Assessment (EIA) study has been started in order to assess environmental and social impacts of the Zone B development and prepare appropriate mitigation measures.

Public disclosure of the draft scoping report was planned from 23rd December 2015 to 7th January 2016. However, the schedule is now changed from 31st December, 2015 to 14th, January, 2016 for 10 working days.

Thank you very much for your attention and cooperation.

Draft Scoping Report of EIA Disclosure Places

1. Yangon Southern District General Administration Office
2. Thanlyin Township General Administration Office
   a) Hpa Yar Kone Village Tract Office
   b) Let Yet San Village Tract Office
   c) Ah Lun Soke Village Tract Office
3. Kyauktan Township General Administration Office
   a) Aye Mya Thi Dar Ward Office
   b) Shwe Pyi Thar Yar Ward Office
   c) Thi Tar Myaing Ward Office
   d) Shwe Pyauk Village Tract Office
4. Thilawa SEZ Management Committee Office (Temporary) near Thilawa SEZ
5. Myanmar Japan Thilawa Development Limited Office in Thilawa SEZ

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အများပြည်သူသို့ ဖွင့်လှစ်တင်ပြရန်ကြေညာခြင်း

မြန်မာ-ဂျပန် သီလဝါဖွံ့ဖြိုးရေးလီမိတက် (MJTD) နှင့်မြန်မာ-သီလဝါ SEZ ဦးပိုင်လီမိတက် (MTSH) တို့သည် အထူးစီးပွါးရေးဇုန်အတွင်းရှိ ဟတ်တာ ၄၀၀ ခန့်ရှိသော အပိုင်း (ခ) အား ကနဦးအနေဖြင့် ဖွံ့ဖြိုးရေးစီမံကိန်းများလုပ်ဆောင်ခဲ့ပါသည်။ ယင်းစီမံကိန်းအတွက် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်သက်ရောက်မှုများအား သိရှိနိုင်ရန်လေ့လာလျက်ရှိပြီး သင့်တော်သော လျော့ပါးစေရေးနည်းလမ်းများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြည့်ရေးအစီအစဉ်များကိုရေးစွဲမည်ဖြစ်ပါသည်။

အစီရင်ခံစာမူကြမ်းအား စီမံကိန်းရေးစွဲပြီး ၃၁.၁၂.၁၅ မှ ၁၄.၁.၁၆ ထိထုတ်ဖော်ပြသမည် ဟုဖော်ပြခဲ့ပါသည်။ သို့သော် အစီအစဉ်အား ၂၀၁၅ ဒီဇင်ဘာ ၃၁ရက်မှ ၂၀၁၆ ဇန်နဝါရီ ၁၄ ရက် အထိ အလုပ်လုပ်ချိန် ၁၀ ရက်အတွင်းပြောင်းလဲထားပါသည်။

ပူးပေါင်းပါဝင်မှုအားကျေးဇူးအထူးတင်ရှိပါသည်။

အစီရင်ခံစာမူကြမ်းအားရှင်းလင်းဖော်ထုတ်ပြသမည့်နေရာများ

၁။ ရန်ကုန်တောင်ပိုင်းခရိုင်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန
၂။သန်လျင်မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန
   (က) ဘုရားကုန်းကျေးရွာအုပ်စုရုံး
   (ခ) လက်ယက်စမ်းကျေးရွာအုပ်စုရုံး
   (ဂ) အလွမ်းဆွတ်ကျေးရွာအုပ်စုရုံး
၃။ ကျောက်တန်းမြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန
   (က) အေးမြသီတာရပ်ကွက်ရုံး
   (ခ) ရွှေပြည်သာယာရပ်ကွက်ရုံး
   (ဂ) သီတာမြိုင်ရပ်ကွက်ရုံး
   (ဃ) ရွှေပျောက်ကျေးရွာအုပ်စု
၄။ သီလဝါစီးပွါးရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီရုံး
၅။ မြန်မာ - ဂျပန်သီလဝါဖွံ့ဖြိုးရေးလီမိတက် (MJTD)

Announcement of Public Disclosure

31st December 2015

Myanmar Japan Thilawa Development Limited (MJTD)/ Myanmar Thilawa SEZ Holdings Public Limited (MTSH) have started to plan the development of 700ha in Thilawa SEZ as "Zone B Area". In response to this, the Environmental Impact Assessment (EIA) study has been started in order to assess environmental and social impacts of the Zone B development and prepare appropriate mitigation measures.

Public disclosure of the draft scoping report on industrial area is conducted from 31st December 2015 to 14th January 2016. However, the schedule for the public disclosure of the draft scoping report on logistic, residence and commercial area is now changed from middle of January 2016 for 10 working days.

Thank you very much for your attention and cooperation.

Draft Scoping Report of EIA Disclosure Places

1. Yangon Southern District General Administration Office	6. Hpa Yar Kone Village Tract Office (Under Thanlyin Tsp.)
2. Thanlyin Township General Administration Office	7. Let Yet San Village Tract Office (Under Thanlyin Tsp.)
3. Kyauktan Township General Administration Office	8. Ah Lun Soke Village Tract Office (Under Thanlyin Tsp.)
4. Thilawa SEZ Management Committee Office (Temporary) near Thilawa SEZ	9. Aye Mya Thi Dar Ward Office (Under Kyauktan Tsp.)
	10. Shwe Pyi Thar Yar Ward Office (Under Kyauktan Tsp.)
5. Myanmar Japan Thilawa Development Limited Office in Thilawa SEZ	11. Thi Tar Myaing Ward Office (Under Kyauktan Tsp.)
	12. Shwe Pyauk Village Tract Office (Under Kyauktan Tsp.)

အများပြည်သူသို့ ဖွင့်လှစ်တင်ပြရန်ကြေညာခြင်း

၂၀၁၅ ခုနှစ်၊ ဒီဇင်ဘာလ (၃၁) ရက်

Myanmar Japan Thilawa Development Limited (MJTD) နှင့် Myanmar Thilawa SEZ Holdings Public Limited (MTSH) တို့သည် အထူးစီးပွါးရေးဇုန်အတွင်းရှိ ဟတ်တာ ၇၀၀ ခန့်ရှိသော အပိုင်း (ခ) အား ကနဦးအနေဖြင့် မဲ့ဖြိုးရေးစီမံကိန်းများလုပ်ဆောင်ခဲ့ပါသည်။ ယင်းစီမံကိန်းအတွက် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်သက်ရောက်မှုများအား သိရှိနိုင်ရန် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုများကို လေ့လာလျက်ရှိပြီး သင့်တော်သော လျော့ပါးစေရေးနည်းလမ်းများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြည့်ရေးအစီအစဉ်များကို ရေးဆွဲမည်ဖြစ်ပါသည်။

စက်မှုဇုန် ဇရိယာအတွက် နယ်ပယ်သတ်မှတ်ခြင်း အစီရင်ခံစာမူကြမ်းအား ၂၀၁၅ခုနှစ်၊ ဒီဇင်ဘာ (၃၁) ရက် မှ ၂၀၁၆ခုနှစ်၊ ဇန်နဝါရီ (၁၄) ရက် ထိ ပြည်သူလူထုအား ထုတ်ဖော်ကြေညာသွားမည် ဖြစ်သည်။ သို့သော် သယ်ယူပို့ဆောင်ရေးဇရိယာ၊ လူနေဇရိယာနှင့် ရောင်းဝယ်ဖောက်ကားရေးဇရိယာများ၏ နယ်ပယ်သတ်မှတ်ခြင်း အစီရင်ခံစာမူကြမ်းအား ပြည်သူလူထုအားထုတ်ဖော် ကြေညာရန်အတွက် အစီအစဉ်အား ၂၀၁၆ခုနှစ် ဇန်နဝါရီလလယ်တွင် အလုပ်လုပ်ဆိုန် (၁၀) ရက်ကြာအသိပေး ပြောင်းလဲကြေငြာမည်ဖြစ်သည်။
ပူးပေါင်းပါဝင်မှုအားကျေးဇူးအထူးတင်ရှိပါသည်။

အစီရင်ခံစာမူကြမ်းအားရှင်းလင်းဖော်ထုတ်ပြသမည့်နေရာများ

၁။ ရန်ကုန်တောင်ပိုင်းခရိုင်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	၆။ ဘုရားကုန်းကျေးရွာအုပ်စုရုံး (သန်လျင်မြို့နယ်)
၂။သန်လျင်မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	၇။ လက်ယက်စမ်းကျေးရွာအုပ်စုရုံး (သန်လျင်မြို့နယ်)
၃။ ကျောက်တန်းမြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	၈။ အလွမ်းဆွတ်ကျေးရွာအုပ်စုရုံး (သန်လျင်မြို့နယ်)
၄။ သီလဝါစီးပွါးရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီရုံး	၉။ အေးမြသီတာရပ်ကွက်ရုံး (ကျောက်တန်းမြို့နယ်)
၅။ မြန်မာ - ဂျပန်သီလဝါမဲ့ဖြိုးရေးလီမိတက် (MJTD)	၁၀။ ရွှေပြည်သာယာရပ်ကွက်ရုံး (ကျောက်တန်းမြို့နယ်)
	၁၁။ သီတာမြိုင်ရပ်ကွက်ရုံး (ကျောက်တန်းမြို့နယ်)
	၁၂။ ရွှေပျောက်ကျေးရွာအုပ်စု (ကျောက်တန်းမြို့နယ်)

Announcement of Public Disclosure

14th January 2016

Myanmar Japan Thilawa Development Limited (MJTD)/ Myanmar Thilawa SEZ Holdings Public Limited (MTSH) have started to plan the development of 700ha in Thilawa SEZ as "Zone B Area". In response to this, the Environmental Impact Assessment (EIA) study has been started in order to assess environmental and social impacts of the Zone B development and prepare appropriate mitigation measures.

Public disclosure of the draft scoping report on industrial area is conducted from 31st December 2015 to 14th January 2016. However, the schedule for the public disclosure of the draft scoping report on logistic, residence and commercial area is now changed from 15th January 2016 to 28th January 2016 for 10 working days.

Thank you very much for your attention and cooperation.

Draft Scoping Report of EIA Disclosure Places

1. Yangon Southern District General Administration Office	6. Hpa Yar Kone Village Tract Office (Under Thanlyin Tsp.)
2. Thanlyin Township General Administration Office	7. Let Yet San Village Tract Office (Under Thanlyin Tsp.)
3. Kyauktan Township General Administration Office	8. Ah Lun Soke Village Tract Office (Under Thanlyin Tsp.)
4. Thilawa SEZ Management Committee Office (Temporary) near Thilawa SEZ	9. Aye Mya Thi Dar Ward Office (Under Kyauktan Tsp.)
	10. Shwe Pyi Thar Yar Ward Office (Under Kyauktan Tsp.)
5. Myanmar Japan Thilawa Development Limited Office in Thilawa SEZ	11. Thi Tar Myaing Ward Office (Under Kyauktan Tsp.)
	12. Shwe Pyauk Village Tract Office (Under Kyauktan Tsp.)

အများပြည်သူသို့ ဖွင့်လှစ်တင်ပြရန်ကြေညာခြင်း

၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ (၁၄) ရက်

Myanmar Japan Thilawa Development Limited (MJTD) နှင့် Myanmar Thilawa SEZ Holdings Public Limited (MTSH) တို့သည် အထူးစီးပွါးရေးဇုန်အတွင်းရှိ ဟတ်တာ ၇၀၀ ခန့်ရှိသော အပိုင်း (ခ) အား ကနဦးအနေဖြင့် ဖွံ့ဖြိုးရေးစီမံကိန်းများလုပ်ဆောင်ခဲ့ပါသည်။ ယင်းစီမံကိန်းအတွက် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်သက်ရောက်မှုများအား သိရှိနိုင်ရန် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုများကို လေ့လာလျက်ရှိပြီး သင့်တော်သော လျော့ပါးစေရေးနည်းလမ်းများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြည့်ရေးအစီအစဉ်များကို ရေးဆွဲမည်ဖြစ်ပါသည်။

စက်မှုဇုန် ဇရိယာအတွက် နယ်ပယ်သတ်မှတ်ခြင်း အစီရင်ခံစာမူကြမ်းအား ၂၀၁၅ခုနှစ်၊ ဒီဇင်ဘာ (၃၁) ရက် မှ ၂၀၁၆ခုနှစ်၊ ဇန်နဝါရီ (၁၄) ရက်ထိ ပြည်သူလူထုအား ထုတ်ဖော်ကြေညာသွားမည် ဖြစ်သည်။ သို့သော် သယ်ယူပို့ဆောင်ရေးဇရိယာ၊ လူနေဇရိယာနှင့် ရောင်းဝယ်ဖောက်ကားရေးဇရိယာများ၏ နယ်ပယ်သတ်မှတ်ခြင်း အစီရင်ခံစာမူကြမ်းအား ပြည်သူလူထုအားထုတ်ဖော် ကြေညာရန်အတွက် အစီအစဉ်အား ၂၀၁၆ခုနှစ် ဇန်နဝါရီလ(၁၅)ရက်မှ ၂၀၁၆ခုနှစ် ဇန်နဝါရီလ (၂၈) ရက်အထိ အလုပ်လုပ်ချိန် (၁၀) ရက်ကြာအသိပေး ပြောင်းလဲကြေငြာမည် ဖြစ်သည်။

ပူးပေါင်းပါဝင်မှုအားကျေးဇူးအထူးတင်ရှိပါသည်။

အစီရင်ခံစာမူကြမ်းအားရှင်းလင်းဖော်ထုတ်ပြသမည့်နေရာများ

၁။ ရန်ကုန်တောင်ပိုင်းခရိုင်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	၆။ ဘုရားကုန်းကျေးရွာအုပ်စုရုံး (သန်လျင်မြို့နယ်)
၂။သန်လျင်မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	၇။ လက်ယက်စမ်းကျေးရွာအုပ်စုရုံး (သန်လျင်မြို့နယ်)
၃။ ကျောက်တန်းမြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	၈။ အလွမ်းဆွတ်ကျေးရွာအုပ်စုရုံး (သန်လျင်မြို့နယ်)
၄။ သီလဝါစီးပွါးရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီရုံး	၉။ အေးမြသီတာရပ်ကွက်ရုံး (ကျောက်တန်းမြို့နယ်)
၅။ မြန်မာ - ဂျပန်သီလဝါဖွံ့ဖြိုးရေးလီမိတက် (MJTD)	၁၀။ ရွှေပြည်သာယာရပ်ကွက်ရုံး (ကျောက်တန်းမြို့နယ်)
	၁၁။ သီတာမြိုင်ရပ်ကွက်ရုံး (ကျောက်တန်းမြို့နယ်)
	၁၂။ ရွှေပျောက်ကျေးရွာအုပ်စု (ကျောက်တန်းမြို့နယ်)

Annex 11-1

“ Approval of Scoping Report (TSEZ-EIA-004)” issued by TSMC on February 26th, 2016

Annex 11-1 "Approval of Scoping Report (TSEZ-EIA-004)" issued by TSMC on February 26th, 2016

FORM-2

Republic of the Union of Myanmar
Thilawa Special Economic Zone Management Committee

APPROVAL OF SCOPING REPORT

Our Ref: **TSEZ-EIA-004**
Date: **26 February 2016**

To: **MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED**
Administration Complex Area, Zone A, Thilawa Special Economic Zone
THILAWA PROPERTY DEVELOPMENT LIMITED
Room 1103, 11th Floor, UMFCCI Tower, No 29, Min Ye Kyaw Swa Street, Lanmadaw Township, Myanmar

Subject: Approval of the Scoping Report on Environmental Impact Assessment for Development of Logistic Area, Residence and Commercial Area of Zone B in the Thilawa Special Economic Zone

Reference: Your letter dated on 11 February 2016 for approval of Final Scoping Report

With reference to the above mentioned Final Scoping Report, the Thilawa Special Economic Zone Management Committee hereby approves, under the conditions described herein, Environmental Impact Assessment for Development of Industrial Area in of Zone B in the Thilawa Special Economic Zone under the name of MYANMAR JAPAN THILAWA DEVELOPMENT LIMITED and THILAWA PROPERTY DEVELOPMENT LIMITED in Thilawa Special Economic Zone.

Terms and Conditions for Approval:

(i) You shall describe the contact address, profile, and relevant experience of the organization which has been conducting the EIA study as well as information on environmental, social, and health experts as key personnel

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including each person's experience in the field of environmental, social, and health impacts assessment, academic credentials, and relevant certificates and accreditations.

(ii) You shall describe international conventions, treaties and agreements related to your project as the project's policy and legal framework.

(iii) You shall set project's target levels for environment taking into consideration Myanmar National Environmental Quality (Emission) Guidelines issued by Ministry of Environmental Conservation and Forestry on 29 December 2015 and conditions of surrounding area.

(iv) You shall add project's target levels for effluent water quality for logistic area and residence and commercial area separately.

(v) You shall describe institutional arrangement for environmental management by your organization including organization chart, a section in charge of environment, and its role and responsibility in construction stage and operation stage at least.

(vi) You shall describe detailed project information in order to assess environmental, social, and health impacts properly.

(vii) You shall include socio-economic components such as access to public services and natural resources in the ToR for the EIA Investigation in order to assess social impacts properly.

(viii) You shall conduct scoping evaluation for impacts on soil erosion, usage of chemicals, and earthquakes, and shall conduct its impact assessment if any.

(ix) You shall conduct scoping evaluation for residual impact in the stage of after project closure and conduct its impact assessment if any.

(x) In addition to the impact assessment for the development of logistic area and residence and commercial area of Zone B, you shall assess cumulative impact including the development of Zone A and the development of industrial area of Zone B.

(xi) You shall reflect all of the above comments to the draft EIA Report.

Set Aung
Chairman, Management Committee
Thilawa Special Economic Zone

Copy forwarded to:—
Vice Chairman of Thilawa Special Economic Zone
Secretary of Thilawa Special Economic Zone
Joint secretary of Thilawa Special Economic Zone
Environment Section of One Stop Service Center of Thilawa Special Economic Zone
Environmental Conservation Department of Ministry of Environmental Conservation and Forestry