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MYANMAR CONCH (MANDALAY) GREEN BUILDING MATERIALS COMPANY LIMITED

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PVC Profiles, Pipe and Pipe Fittings, Door & Windows Production Project at Patheingyi Township, Mandalay Region

FEBRUARY, 2024

Sustainable Environment Myanmar Co., Ltd.
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Date: 10th February, 2024

DECLARATIONS

Sustainable Environment Myanmar Co., Ltd. (SEM); a local environmental consultant firm, conducted environmental impact assessment report for Myanmar Conch (Mandalay) Green Building Materials Company Limited in compliance with EIA Procedure (December 2015) and other relevant laws/rules and formally submitted to the Environmental Conservation Department (ECD) for final approval.

We do state, to the best of our knowledge at the time of report preparation, that

- the accuracy and completeness of the EIA,
- that the EIA has been prepared in strict compliance with applicable laws including this Procedure, and

We also consulted to Myanmar Conch (Mandalay) Green Building Materials Company Limited to undertake that;

Myanmar Conch (Mandalay) Green Building Materials Company Limited in respect of the "PVC Profiles, Pipe and Pipe Fittings, Door & Windows Production Project" will at all times comply fully with any and all plans and the various components thereof, including without limitation, impact avoidance, mitigation, and remediation measures, and with respect to such commitments, obligations, plans and measures related to the development, operation and closure of the project, and any circumstance in which work done or to be done, or services performed or to be performed, in connection with the project's development.

Hla Myo Tun

Managing Director

Sustainable Environment Myanmar Co., Ltd.

Sustainable Environment Myanmar Co., Ltd. Reg ..... Date ..... Since 2014

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Executive Summary

1.1 Introduction

Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. is "the Project Proponent" set up between Myint Investment Group Co., Ltd. (45%) and Wuhu Conch Profiles and Science Co., Ltd (55%) as a Joint Venture Company. The expected total investment for the proposed project is 13.24 million dollars.

The proposed project is intended to build and operate on 8.3 acres of Dahattaw village Tract, East Suekhout Nat, Patheingyi Township, Mandalay Region and distribute building materials of PVC profiles, pipes, PVC doors and windows. Total PVC pipes, Doors and Profiles production capacity of the project will be approximately 10,000 tons per year. 70% of the product is planned to distribute in the domestic and the other 30% is intended for export.

The project site is located 26 miles (41.84 Km) away from Mandalay where Myanmar Conch Cement (Mandalay) Company Limited existed. Land lease agreement was made between project proponent and Myanmar Conch Cement (Mandalay) Co., Ltd. for 49 years. It is 8.3 acres wide and allocated inside the compound of Myanmar Conch Cement (Mandalay) Company Limited.

Following shows relevant organization of project implementation and implementation organizations of EIA.

Project proponent:	Myanmar Conch (Mandalay) Green Building Materials Company Limited
Implementation organizations of EIA:	Sustainable Environment Myanmar Co., Ltd.

1.2 Legal & Administrative Frameworks

1.2.1 Myanmar Conch (Mandalay) Green Building Materials Co., Ltd.'s Environmental, Social, Health and Safety Policy

Myanmar Conch (Mandalay) Green Building Materials Company Limited will try to establish international recognized company and committed to the practice and management of its business in a manner consistent with the protection of the environment.

"Company will undertake the construction and operation of building materials production factory at No.465-Kha/2, Dahattaw Village, East Sue Khout Net, Patheingyi Township, Mandalay Region in a manner that will minimize and eliminate negative impacts and improves and enhances positive impacts within the environmental and social-economic activities. Company is committed to responsible management and stewardship of the project area and surrounding area's natural resources to the benefit not only for the present peoples of nearby factory area, but also for future generations".

Company will specifically commit itself to:

- Company will follow National Law, By Laws, Regulations and Guidelines Relevant to uPVC profiles and pipes.
- The meeting of the requirements of Myanmar's statutory requirements and industry standards with respect to environmental practices.
- The prevention of pollution through the implementation of processes, practices and techniques to avoid, reduce and control the creation, emission and discharge of any type of pollutant and waste.
- Minimize the use of consumptive resources and promote the reduction and recycling of waste products where possible.
- Training and educating of Company's employees in environmental responsibilities.

Management, employees and contractors of Company to play a key role in the environmental programs by:

- Taking ownership of environmental management programs and initiatives
- Adhering and reacting to Company's environmental policy
- Integrating environmental concerns into everyday practice.

Myanmar Conch (Mandalay) Green Building Materials Company Limited is committed to responsible environmental management in all its operations during construction, operation and decommissioning, of the Project.

1.2.2 Environmental Related Applicable Legislations and Commitments

The project owner will comply these laws and regulation during construction, operation and decommissioning phase of the proposed project. The project owner will respect and comply with the Myanmar Companies Law (2017), the Myanmar Investment Law (2016), and the Myanmar Investment Rules (2017).

1. Environmental Conservation Law, 2012
2. Environmental Conservation Rules, 2014
3. Environmental Impact Assessment Procedure, 2015
4. National Environmental Quality (Emission) Guidelines, 2015
5. The Myanmar Investment Law, 2016
6. Myanmar Investment Rules, 2017
7. The Private Industrial Enterprise Law, 1990
8. The Conservation of Biodiversity and Protected Areas Law, 2018
9. The Protection and Preservation of Cultural Heritage Regions Law, 2019
10. The Protection and Preservation of Antique Objects Law, 2015
11. The Protection and Preservation of Ancient Monuments law, 2015

12. The Conservation of Water Resources and Rivers Law, 2006
13. The Conservation of Water Resources and Rivers Rules, 2013
14. Prevention of Hazard from Chemicals and Related Substances Law (2013)
15. The Myanmar Fire Brigade Law, 2015
16. Social Security Law, 2012
17. Workmen's Compensation Act, 1923
18. The Minimum Wage Law, 2013
19. The Payment of Wages Law, 2016
20. Myanmar Insurance Law, 1993
21. Employment and Skill Development Law, 2013
22. The Leave and Holiday Act, 1951
23. The Labor Organization Law, 2011
24. The Settlement of Labor Dispute Law, 2012
25. Traffic Safety and Motor Vehicle Management Law, 2020
26. Traffic Safety and Motor Vehicle Management Rules, 2022
27. The Export and Import Law, 2012
28. The Explosive Substances Act, 1908
29. The Industrial Explosive Materials Law, 2018
30. The Public Health Law, 1972
31. The Prevention and Control of Communicable Diseases Law, 1995
32. The Control of Smoking and Consumption of Tobacco Product Law, 2006
33. The Myanmar Engineering Council Law, 2013
34. Occupational Safety and Health Law, 2019
35. The Petroleum and The Petroleum Product law, 2017
36. The Petroleum Rules, 1937
37. The Ethnic Rights Protection Law, 2015
38. The Ethnic Rights Protection Rules, 2019
39. The Electricity Law, 2014

Myanmar Conch Cement Company will follow National Environmental Quality (Emission) Guidelines (NEQG) and IFC EHS General Guidelines. The detailed of the law and regulation and environmental standard are presented in Chapter 2 of this EIA report.

1.3 Project Description

The project is located at No. 465-kha/2, Dahattaw Village Tract, East Sue Khout Net, Patheingyi Township, Mandalay Region and 26 miles away from Mandalay city.

1.3.1 Project Components and Facilities

The proposed project is planning to construct two light steel structure plants and main production facilities installation are described in following table.

No	Main Production Facilities	Production Capacity
1	Extrusion line of uPVC profiles	4500 t/a
2	Extrusion line of PVC pipe	5500t/a
3	Injection molding for PVC pipe fitting	550t/a
4	Plastic doors and windows assembly equipment	100000 m^2/a
5	Water refrigeration and water supply	-
6	Compressed air station	-

Land lease agreement was made between Project Proponent and Myanmar Conch Cement (Mandalay) Company Limited for 49 years. It is (8.3) acres wide and allocated inside the compound of Myanmar Conch Cement (Mandalay) Company Limited. Total areas of land use for project and land use area for project components are provided as follows.

Total Land Area:	8.3 acres/33,333.5 m^2
Main plant area including raw materials warehouse and final products warehouse:	3.7365 acres/15,120 m^2
Doors and windows assembly plant area:	2.2418 acres/9,072 m^2

1.3.2 Project Development and Implementation Schedule

Project Task	2017	2018	2019	2020
Project Planning				
Project Construction				
Transition Period				
Project Operation				

1.3.3 Construction Activities

The proposed project is planned to construct two light steel structure buildings with installation of five PVC profile extrusion lines, four PVC pipe extrusion lines, six sets of PVC pipe injection molding equipment and two plastic steel doors and windows production lines.

1.3.4 Raw Materials

The raw materials needed for production will be mainly purchased from China or Thailand and then processed into plastic steel profiles, PVC pipes, and PVC pipe fittings. PVC, calcium carbonate, CPE, stabilizer, ACR, and ultramarine needed for production are purchased from China or Thailand, and then self-produced mixed materials are processed into plastic profiles, PVC pipes, and PVC pipe fittings.

1.3.5 Water Consumption and Electricity

It mainly includes 5 PVC profile extrusion production lines, 4 UPVC pipe extrusion lines, 2 cooling towers, total project water consumption of 135 m3/d, and 41,400 m3 per year. Outdoor fire-fighting water is unconventional water consumption and no water requirement.

Total annual power demand of 4.35 million kWh is estimated, so the average daily use of electricity is 14500 kWh (Assume 300 days per year operation).

1.3.6 Profile Production Process

After the material coming to the factory, it can be put into use after being strictly tested by the laboratory. PVC material warehouse through the positive pressure conveying system, conveys PVC to the PVC material warehouse to be used. Through negative pressure suction, reamer, PVC, modifiers, fillers and other materials are carried to the weighing system, according to the formula ratio requirements. After the materials are mixed by high-speed stirring and kneading to reach the state of pre-gelation, then enter to the cold-mixing system and are cooled to make a dry blend. After cooling, the dry blend is sent to the dry blending warehouse by positive pressure air for dispersion and homogenization. The homogenized dry blend is sucked under negative pressure onto the extruded steel platform and then distributed through the screw to a small silo in each extrusion line. he dry blend of the extruder's small silo is heated by the extruder, sheared and plasticized, and the plasticized and well-formed material is continuously extruded into the extrusion die from the barrel area of the extruder. Plasticized material through the extrusion tooling, traction into dry calibrator

for cooling. After the cooling of dry calibrator, the profile is coming to the water tank for cooling, to further reduce the temperature inside the profile chamber.

1.3.7 PVC Pipe Fittings Production Process

PVC pipe fittings are produced by injection tooling: the PVC dry blend material is heated in the barrel of the injection tooling machine and the shear heat generated by the rotation of the screw plastifies the resin material into a melt and then applies a certain pressure. The injection of the melt into the cavity with the shape of the tube is the injection molded part after cooling and shaping.

1.3.8 Windows and Doors Production Process

After the profile has been used in the factory, after passing the inspection, according to the design drawings of the windows and doors, use CNC double-angle saws to cut and accurately cut the material at a 45-degree angle. The mullion of windows and doors need to be cut accurately with a medium saw. Frame, sash, mullion need to use Flume milling to make drainage channels and pressure balance holes. The windows with mullion need to be cut with a V-port saw, and it is used for welding V-slots of mullion. According to the drawings, use of lined hacksaw, to cut galvanized steel reinforcement. Secure the reinforcement with the NC screw fastening machine. Use profile milling to make keyhole slots and handle mounting holes.

According to different window types, select the corresponding welding machine to perform the welding and molding of the door window frame, sash and mullion. Use clear angle equipment to clean the welds and improve the appearance of the window. The assembly of the auxiliary parts of the window includes the installation of the sealing strip, the installation of Tops, the assembly of glass blocks and other ancillary materials. The doors and windows are place in ventilated, rain-proof, dry, flat, non-polluting places, do not allow open storage, strictly prohibited contact with corrosive substances.

1.4 Description Of Natural and Social Environment

The following section briefly describes the surrounding environments such as physical environment, biological environment and socioeconomic profile that characterize the potential area of influence of the present project.

1.4.1 Physical Components

1.4.1.1 Climate and Meteorology

Patheingyi Township is located in central Myanmar's dry zone, which has a tropical climate. The nearest meteorology station is located in Mandalay city. The maximum temperature in Mandalay is 34.4°C, while the minimum temperature is 22.5°C.

1.4.1.2 Topography

The present project area is in the foothill of Shan Plateau. Topography of project area belongs to isolated hill of Plateau limestone on low land terrain of alluvial area and at western part of the Shan Plateau.

1.4.1.3 Summary of Physical Baseline Survey

Air Quality	Parameter	(1) Nitrogen dioxide, (2) Carbon monoxide, (3) particulate Matter PM10, (4) Particulate Matter PM 2.5, (5) Sulphur Dioxide (6) wind speed and direction, (7) relative humidity and nitric oxide
	Period	3 points for one time within survey period (24 hours)
	Location	Residential and project site
	Air quality monitoring was conducted 24 hours during 26th March 2023 to 29th March 2023. Air quality monitoring were installed at Project Compound, Htone Bo Village Village, and Aung Tha Pyay Village. According to the survey results, the average 24-hour period for $PM_{2.5}$, PM_{10} and SO_2 concentrations are within the National Environmental Quality (emission) Guideline. The daily 8-hour maximum Ozone level is within the 100 ug/m^3 standard. According to the wind rose diagram, average wind speed of air quality station is 0.29 to 2.22 m/s.	
Noise Level	Parameter	LAeq (A-weighted loudness equivalent)
	Period	One time at 3 locations for 24 hours duration
	Location	Same as Air Quality Monitoring Points
	Noise levels found the lower than the National Environmental Quality (Emission) Guideline values for residential, institutional, educational environment.	
Vibration	Parameter	Vibration (Lveq)
	Period	One time at 3 locations within one day
	Location	Same as air quality monitoring points
	Instrument	Rion Vibration meter
Surface Water Quality	Parameter	(1) Water Depth, (2) Flow rate, (3) Water temperature, (4) pH, (5) Salinity, (6) Electrical Conductivity, (7) Dissolved Oxygen, (8) Total Dissolved Solid, (9) Turbidity, and (10) Color

	Period	One time at 1 location
	Location	At the pond within the Myanmar Conch cement plant's boundary At the raw water pond beside the road, near the Mandalay Canal Groundwater extraction pipe in Aung Tha Pyay village
	Most of the water quality results are lower than the guidelines.	
Soil Quality	Parameter	pH, Cadmium (Cd), Copper (Cu), Zinc (Zn), Manganese (Mn), Lead (Pb) Arsenic (As), Iron (Fe), Chromium (Cr), Mercury (Hg), Nickel (Ni)
	Period	One time at 2 locations
	Location	Beside the access road and Aung Tha Pyay Village
	There is no standard and guidelines for soil in Myanmar so far and therefore the results will be used as baseline data for future monitoring task.	

1.4.2 Biological Components

Flora	In and around the Area of proposed project area, five major habitat types were observed namely (1) grassland, (2) agricultural land, (3) plantation, (4) Bare land and (5) shrub land area. There were 58 plant species identified in the proposed project area.
Fauna	During the survey period, 6 species of Mammals, 7 species of Reptiles and amphibian, 43 species of Birds, 22 species of Butterflies, 5 species of Dragonfly were recorded in and around the Project area. In this survey area, one threatened species of bird, were recorded as Near Threatened according to the IUCN Red List of threatened species (2018-2). There were no globally threatened species of reptiles and amphibian, butterfly, and dragonfly according to the IUCN Red list of threatened species (2018-2). Four bird species were endemic and other species were no endemic.
Protected Area and Environmentally Sensitive Area	The nearest protected area, Pyin-Oo –Lwin Bird Sanctuary is found at Northing 22° 00’ and Easting 96° 30’’ with elevation of 975-1,210 m Pyin-Oo –Lwin Bird Sanctuary situated in Pyin-O-Lwin Township, Mandalay Region.

1.4.3 Socio-economic Components

The socio- economic baseline was based on publicly available and secondary information as well as primary data collected for the project. Primary data were collected through stakeholder meeting, public consultation meeting, key informant interviews and household surveys.

Administrative Structure	The Mandalay District is directly in control of Patheingyi Township, while Pyin Oo Lwin District is directly in authority of Maddaya Township.
Demographic Profile	Myanmar Population and Housing Census show that Patheingyi Township had a total population of 263,725 persons while Madaya has 258,001. The survey result shows that studied area has a total population of 2,231 people. Of these, 1,044 are males and 1,187 are females. The total population of studied area represents 0.42 % of the total population of Patheingyi and Madaya Townships.
Ethnicity and Religion	According to the data from Township Administration Department, people in Madaya and Patheingyi Township are mostly Buddhist. Second largest is Islam followed by Christianity, Hinduism and all other faiths. Buddhism is dominant in the studied area.
Socio-Economic Structure	In Madaya Township, agriculture is most of the economic activity. Main agricultural products are rice and legumes, and the products are mostly sold at Mandalay and Sagaing. Also, in Patheingyi Township, agriculture is the main activity of economy and main product is rice. The rice in Patheingyi Township is sold at Mandalay. The major business of the studied villages is agriculture and livestock. Some people do private business- like stores, sewing, hair dressing, restaurant, grocery store, and carpentry etc. Very few people choose their career as government staff. Many are employed in company.
Community Health	In Patheingyi and Madaya townships, malaria, diarrhea, dysentery, TB, and hepatitis are mostly occurred. Seasonal flu is commonly observed. Rural Health Care center, Sub-rural health care center and private clinics have been existed in and around the studied area.
Access to Water and Sanitation	In the three surveyed villages, 96% of houses use tube wells for residential water, with 4% using dug wells. Purified drinking water is used by 85% of the investigated houses in the three communities, with tube wells discovered in 11% of them. Approximately 4% of homes use bored wells for drinking water. In general, Pour Flush Latrine is used typically in these villages and open defecation is also observed. While 97% of households in three villages

	are using pour flush latrine, using open defecation is found in some 3 % of households.
Infrastructure and Social Facilities	Township level government organizations of different sectors such as General administration, Education, Health etc., religious buildings, schools and hospitals are situated in Patheingyi town and Madaya town.
Non-Governmental Organization	The following tables present the local NGOs and social organizations based in the three villages. No data are available regarding the presence of international NGOs in the studied area.
Education	The majority of primary schooling is found in the three villages under study, according to the survey data. Middle education is the second most common level of education in the area according to the study. Graduated persons are also observed in those villages.
Electricity and Energy	15% of respondents in the study area primarily use solar power for lighting. The government provides access to power. 75% of those surveyed said they use electricity. There is also the use of candles and batteries for lighting. A few people utilize generators. Using electricity in cooking is also observed. Firewood is only used as cooking fuel when the electricity is out. 225 % of respondents are found in using firewood to cook while 75 % of respondents are utilizing electricity to cook. Charcoal is also found as fuel for cooking.
Transportation	The study area's village access roads are passable. The settlements' main roads are constructed of concrete, however there are also occasional signs of dirt and gravel roads. The motorbike is the primary mode of mobility in the area of study place. Public transportation shuttle buses are not observed. The majority of respondents said they travel between villages or outside of them on motorbikes. Some people use cars. 96 % of the respondents said they commute by motorcycle. The rest 4 % use car.
Cultural Heritage	Buddhism is the prevalent religion in the studied area, and there are pagodas and monasteries. Every village has a cemetery. If historical, archeological, and cultural heritage are found within the project's scope of influence, project activities may have a negative impact on those places. The areas which have cultural heritage are not observed in the project area of influence.

1.5 Summary of Potential Impacts

Considering the Project description and the biophysical baseline results, this section presents the environmental and biodiversity impacts potentially generated by the Project during both the construction and operation phases and indicate the mitigation measures to be adopted for avoiding or reducing such impacts.

Potential Impacts	Impact Summary	Residual Impact Significance (after implementation of Additional Mitigation and Management Measures)
Construction		
Impacts on Air Quality	Combustion and exhaust emissions generated from the construction equipment Fugitive dust generated by earthworks including excavation, equipment movement, material piling, loading, and unloading and movement of construction vehicle along the access road.	Low
Noise and Vibration	Machinery used in building construction such as cranes, concrete mixing and pile driving equipment;	Low
Impacts on Water Quality	Sewage and sanitary water from worker's camp Water consumption for construction purpose and domestic water for construction workers	Low
Waste	A variety of solid wastes will be generated during the construction phase, including: - Inert construction material (including excess soil, rubble etc.) - Metal and wood scrap - Domestic waste - Hazardous waste (such as used oil and oil filters)	Low
Impacts on Soil	Excavation of the ground, mechanization units and workers on the construction site will cause appearance of certain negative impacts on soil.	Low
Biodiversity	Change of vegetation due to the construction work in the project area.	Low

	Loss of important species and/or their habitats caused by the project development.	
Operation Phase		
Impacts on Air Quality	Air emissions from production process.	Low
Noise and Vibration	Impacts on noise environment potentially generated by the manufacturing activities.	Low
Impact on Water Quality	Water consumption for operation of factory and associated facilities Domestic wastewater discharge generated from the workforce at office and staff dormitory.	Low
Waste	Generate general domestic waste (i.e., food and packaging) and office waste (paper, etc.). The hazardous waste such as used oils filters.	Low
Impacts on Soil	Small leaks or spills from equipment containing lubricating oil used in the production process.	Low
Biodiversity	Impacts on Flora/ Fauna & Biodiversity due to atmospheric emissions, wastewater & noise from operation of project.	Low

Socioeconomic Components	**Potential Impacts**	**Mitigation Measures**
Land acquisition/ Resettlement	- Land lease agreement was made between project proponent and Myanmar Conch Cement (Mandalay) Co., Ltd. for 49 years. - No involuntary resettlement is included	No mitigation measure is needed.
Social Component	- local labor employment affected to the social components	- Recruitment should be prioritized on local sources - Project should prepare appropriate ratio of employment between local people and the ones from other areas.

Gender	The project activities need specific gender quote in some kinds of works, such as security guard but not include to affect the female headed household.	- Setting a certain quota of local employment for Myanmar women in the construction and other project-related works. - Setting up a Policy for no sexual harassment in working area
Economic Component	- Local labor employment - Income development - Local Business Improvement	- Create work opportunity near the project site, such as project staffs, retail shops and local resource supply (foods, daily routines)
Health and Safety	- Risk to occur communicable disease - Potential to have accidents in the project activities	- to follow the instructions and cooperate with the actions mentioned in the policy
Cultural Component	No Impact to a tangible human right infringement of access to basic life necessities (education, livelihood, cultural, economic, natural and social infrastructure/assets, etc.)	No mitigation measure is needed.
Aesthetic View	- Not any impact is foreseen.	- Constructing vertical buildings with bright colors shall be avoided. - green trees at the plant boundary shall be planted.
Social Conflicts	- Potential conflicts concerned with employment and dispute between labors - Cultural misunderstanding between locals and Chinese workers	-Special talk or training event of Myanmar Etiquettes to Foreign workers and sexual education to both local and foreign workers, labour skill trainings -Set up security guards and no harassment policy and Notices and punishment on violation -Recruitment should be prioritized on local sources - Project should prepare appropriate ratio of employment between local people and the ones from other areas.

Aesthetic views	- Not any impact is foreseen.	- Constructing vertical buildings with bright colors shall be avoided. - green trees at the plant boundary shall be planted.

1.6 Public Consultation and Disclosure

The present EIA report is for PVC Doors and Pipes Production Facility, Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. So, the project company conducted public consultation and disclosure process in scoping phase, the early stage of EIA process, with the help of third party, Sustainable Environment Myanmar Co., Ltd (SEM) in June, 2020. For EIA investigation, public consultation and disclosure process were conducted on 9th January of 2024.

1.6.1 Information Disclosure

Project information and environmental impact assessment is disclosed and consulted with related stakeholders. Meetings are conducted at Township Administrative Department, Environmental Conservation Department and related three villages namely Aung Tha Pyay village, Htone Bo village and Pyi Thar Yar village and disclosed about the project and environmental impact assessment. PowerPoint presentation is used at the meeting and delivered at the villages attached the executive summary. Discussion, suggestions and recommendation are recorded at the meetings and for the villagers who cannot join the meeting, feedback forms are delivered and opinions and suggestions are collected.

1.6.2 Grievance Redress Mechanism

The purpose of grievance mechanism is to ensure that all requests and complaints from individuals, groups and local communities throughout the Project life, from planning and design through construction and operations, are dealt with systematically in a timely manner with appropriate corrective actions being implemented and the complainant being informed of the outcomes.

1.7 Conclusion and Recommendation

For the Project, an EIA report has been prepared in compliance with the 2015 Myanmar EIA Procedures. Through a structured scoping process, the EIA identified potential impacts by taking into account how the Project's operations would interact with social and natural resources or receptors. The EIA has further evaluated interactions that could have major effects on the environment and society, and it has recommended suitable mitigation and enhancement strategies to lessen potential negative effects or increase potential positive effects from the Project.

It is concluded in the EIA that with proper implementation of the recommended mitigation measures. Conch Profile as the world’s largest production and marketing enterprises, the product itself has insulation, soundproofing, other environmental protection and energy-saving characteristics.

1. INTRODUCTION

1.1 Project Overview

Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. is “the Project Proponent” set up between Myint Investment Group Co., Ltd. (45%) and Wuhu Conch Profiles and Science Co., Ltd (55%) as a Joint Venture Company. The expected total investment for the proposed project is 13.24 million dollars.

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The Resource and Environment Myanmar Co., Ltd. (REM) and Sustainable Environment Myanmar Co., Ltd. (SEM) or "the Consultant(s)" have been invited by Myanmar Conch Cement (Mandalay) Green Building Material Company Ltd. to conduct Environmental Impact Assessment (EIA) for the proposed project. The EIA study (and report) for the proposed project will be conducted in compliance with applicable and relevant national legislation.

1.2 Project Proponent

Company:	Myanmar Conch (Mandalay) Green Building Material Profiles Company Limited
Address:	No. 465, Dahattaw Village, East Suekhout Nat, Patheingyi Township, Mandalay.
Contact Person:	U Myo Win (Manager)
Phone:	959-780877887
Email:	unplugged07@gmail.com
Website:	

1.3 EIA Consultants

Sustainable Environment Myanmar Company Ltd. (SEM) is one of the subsidiary companies of Resource and Environment Myanmar Company Ltd. (REM). REM provides services for Environmental, Social and Health Impact Assessment of development projects of private and government enterprises. We have also extended our services to geotechnical engineering, geological

and hydrogeological investigation, land surveying, geo-hazard assessment including potential landslide hazard mapping, deterministic and probabilistic earthquake hazard assessment and flood hazard mapping.

Organization:	Sustainable Environment Myanmar Co., Ltd (SEM)
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The member of EIA team and their responsibilities are shown in the following table.

Table 1.1 Members of EIA Study Team

Name of Expert	Position	Registration/ License No. by ECD	Area of expertise/ Responsibility	Background	Years of Experience
Organization - Resource & Environment Myanmar Co., Ltd. (REM)					
Zaw Naing Oo	Team Leader	Certificate for Transitional Consultant Registration No. 0002 (Organization)	Geoscience Environmental Management Systems Auditor/Lead Auditor	M.Sc., (Geology/ Economic Geology) Environmental Management Systems Auditor/Lead Auditor Training Course (ISO 14001:2004)	20 years
Kyaw Zin Win	Technical Expert	Certificate for Transitional Consultant Registration No. 0002 (Organization)	GIS & Air Dispersion Modelling	M.Sc. (Geographic Information Science & Systems), Certificate in AERMOD and CALPUFF Air Dispersion Modelling in New Delhi, India	18 years
Thura Aung	Environmental Expert	Certificate for Transitional Consultant Registration No. 0002 (Organization)	Project Management	M.Res. (Geology), Certificate in EIA (A.I.T. Vietnam)	9 years

De Hlaing Zaw	Environmental Expert	EIA-C 041/2023	Physical Baseline Survey & Monitoring	M.Res. (Geology), Certificate in EIA (A.I.T. Vietnam)	4 years
Myo Thura	Environmental Expert	EIA – C 046/2023	Physical Baseline Survey & Monitoring Noise modelling and noise impact assessment	B.Sc. (Geology)	3 years
Ei Ei Win Myat	Legal Expert	Certificate for Transitional Consultant Registration No. 0002 (Organization)	Legal Analysis	L.L.B, Dip. In Business Law	3 years
May Zun Oo	Legal Expert	Certificate for Transitional Consultant Registration No. 0002 (Organization)	Legal Analysis	L.L.B, H.G.P	3 years
Phyo Khaingzar Wint	Environmental Expert	EIA-C 038/2023	Water Pollution Control	B.E. (Electronic Communication), Dip. In Environmental Planning and Management, Certificate in EIA (A.I.T. Vietnam)	6 years
Organization - Sustainable Environment Myanmar Co., Ltd. (SEM)					
U Hla Myo Tun	Managing Director	Certificate for Transitional Consultant Registration No. 0025 (Organization)	General Management	M.Sc., (Geology)	20 years
Daw Nyomie Razak	Principal Consultant	EIA-C 029/2023	Cultural Assessment	Ph. D (History) (2009) B.A. (1995); MA (History) (2003); M. Res. (2004); Univ. of Yangon	20 years

Min Min Oo	Environmental Engineer	EIA-C 020/2023	Impact Assessment & Air Dispersion Modelling, Reporting	B.E (Chemical), Certificate in AERMOD and CALPUFF Air Dispersion Modelling in Hyderabad, India	8 years
Myat Thitsar Naing	Social Expert	EIA-C 021/2023	Stakeholder Engagement & Public Consultation, Social Impact Assessment, Reporting	M.A. (English), Certificate in EIA (A.I.T. Vietnam)	8 years
Than Oo	Environmental Expert	Certificate for Transitional Consultant Registration No. 0025 (Organization)	Technical Consultant Energy Specialist Environmental Impact Assessment and Management	B.E (EP), M.E (Electric Power System Management) (AIT)	12 years
Dr. Sandar Hlaing	Social and Health Expert	Certificate for Transitional Consultant Registration No. 0025 (Organization)	Stakeholder Engagement & Public Consultation, Social Survey	B.A (Hons), M.A (Geog.), Ph. D (Environmental Geography), Certificate in HIA (A.I.T. Vietnam)	10 Years
Nan Cherry Thein	Administration Manager	Certificate for Transitional Consultant Registration No. 0025 (Organization)	Stakeholder Engagement & Meeting Facilitation	M.A. (English), Certificate in Involuntary Resettlement (A.I.T. Vietnam)	7 years
Thet Naing Aung	Environmental Expert	Certificate for Transitional Consultant Registration No. 0025 (Organization)	Ecological Survey	B.Sc. (Zoology), Certificate in Biodiversity Impact Assessment (A.I.T. Vietnam)	9 years
Naing Naing Win	Environmental Expert	EIA-C 040/2023	Ecological Survey, Impact Assessment & Management (Biodiversity)	M.Sc. (Zoology), Certificate in Biodiversity Impact Assessment (A.I.T. Vietnam)	9 years

Than Than Htay	Environmental Expert	EIA-C 045/2023	Ecological Survey	M.Sc. (Zoology), Certificate in Biodiversity Impact Assessment (A.I.T. Vietnam)	7 years
Swe Wut Hmone	Environmental Expert	Certificate for Transitional Consultant Registration No. 0025 (Organization)	Ecological Survey	M.Sc. (Botany), Certificate in Biodiversity Impact Assessment (A.I.T. Vietnam)	5 years
Myat Ko Ko Hein	Environmental Expert	EIA-C 011/2023	Ecological Survey, Impact Assessment & Management (Biodiversity)	B.Sc. (Forestry), Certificate in Biodiversity Impact Assessment (A.I.T. Vietnam)	7 years
Nyan Linn Maung	Environmental Expert	EIA-C 028/2023	Ecological Survey	B.Sc. (Microbiology)	8 years
War War San	Data Analyst	Certificate for Transitional Consultant Registration No. 0025 (Organization)	Socioeconomic Data Analysing	M.P.S (YIE)	5 years
Hla Myo Han	Social Consultant	Certificate for Transitional Consultant Registration No. 0025 (Organization)	Stakeholder Engagement & Facilitation	M.P.S (YIE)	5 years
Lwin Moe	GIS Expert	Certificate for Transitional Consultant Registration No. 0025 (Organization)	Mapping	B.A (Geography)	5 years
Kay Zar Win Aung	Socioeconomic	Certificate for Transitional Consultant Registration No. 0025	Socio-economic Survey	B.Sc. (Physics)	3 years

		(Organization)			

2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 National Environmental Policy of Myanmar

The Union of Republic of Myanmar adopted a series of policies in order to make rational use of water, land, forest, and mineral resources, marine and other natural resources. Thus, protect resources and prevent environmental degradation.

National Environmental Policy (2019) builds on Myanmar's 1994 National Environmental Policy, the 1997 Myanmar Agenda 21 and the 2009 National Sustainable Development. The Government of the Republic of the Union of Myanmar recognizes the fundamental links between environmental protection, economic and social development, and poverty alleviation.

The vision and mission of the 2019 National Environmental Policy are stated as follows.

Vision

A clean environment, with healthy and functioning ecosystems, that ensures inclusive development and wellbeing for all people in Myanmar.

Mission

To establish national environmental policy principles for guiding environmental protection and sustainable development and for mainstreaming environmental considerations into all policies, laws, regulations, plans, strategies, programs and projects in Myanmar.

2.2 Myanmar Conch (Mandalay) Green Building Materials Co., Ltd.'s Environmental, Social, Health and Safety Policy

Myanmar Conch (Mandalay) Green Building Materials Company Limited will try to establish international recognized company and committed to the practice and management of its business in a manner consistent with the protection of the environment.

"Company will undertake the construction and operation of building materials production factory at No.465-Kha/2, Dahattaw Village, East Sue Khout Net, Patheingyi Township, Mandalay Region in a manner that will minimize and eliminate negative impacts and improves and enhances positive impacts within the environmental and social-economic activities. Company is committed to responsible management and stewardship of the project area and surrounding area's natural resources to the benefit not only for the present peoples of nearby factory area, but also for future generations".

Company will specifically commit itself to:

- Company will follow National Law, By Laws, Regulations and Guidelines Relevant to uPVC profiles and pipes.
- The meeting of the requirements of Myanmar's statutory requirements and industry standards with respect to environmental practices.

- The prevention of pollution through the implementation of processes, practices and techniques to avoid, reduce and control the creation, emission and discharge of any type of pollutant and waste.
- Minimize the use of consumptive resources and promote the reduction and recycling of waste products where possible.
- Training and educating of Company's employees in environmental responsibilities.

Management, employees and contractors of Company to play a key role in the environmental programs by:

- Taking ownership of environmental management programs and initiatives
- Adhering and reacting to Company's environmental policy
- Integrating environmental concerns into everyday practice.

Myanmar Conch (Mandalay) Green Building Materials Company Limited is committed to responsible environmental management in all its operations during construction, operation and decommissioning, of the Project.

2.3 Environmental Related Applicable Legislations and Commitments

The laws related to the proposed project are described in Table 2.1 and the project owner will comply these laws and regulation during construction, operation and decommissioning phase of the proposed project. The project owner will respect and comply with the Myanmar Companies Law (2017), the Myanmar Investment Law (2016), and the Myanmar Investment Rules (2017).

Table 2.1 Legislations and Commitments

Laws and Regulations	Relevant Articles	Commitments
Environmental Conservation Law, 2012	Section 7 (o), 14, 15,24, 29	The company commits to comply - To compensate if there is environmental population by the project, to contribute a portion of the project profit as prescribed by the Ministry for environmental conservation activities according to Environmental Conservation Law 2012, Section 7 (o), - To treat, discharge, dispose and accumulate the materials that cause environmental pollution in accordance with the specified environmental standards according to Section 14, - To monitor, control, manage, reduce, or avoid by installing support equipment or control equipment, or dispose in accordance with the measures not to damage the environment the environmental pollutions according to Section 15,

Laws and Regulations	Relevant Articles	Commitments
		- To follow the rules, notice of order, order, instruction, and restriction in the procedure mentioned in section 24 and 29 issued by Environmental Conservation Law.
Environmental Conservation Rules, 2014	Rule 69 (a, b)	According to Environmental Conservation Rules (2014)'s Rule 69 (a) and (b), the project proponent commits to comply - Not to emit, dispose and pile the hazardous waste or hazardous substances stipulated by rule. - Not to carry out any activity which can damage the ecosystem and the natural environment, except for the permission of the Ministry.
Environmental Impact Assessment Procedure, 2015	Section 102 to 110, 113, 115, and 117	The project company commits to comply section 102 to 110, 113, 115, and 117 as per following. - According to section 102 (a), commits to take responsibility for all the adverse impacts occurred by the actions and omissions of project proponent, and the person and organizations authorized by the project proponent. - According to Section 102(b), commits to supporting PAPs until they have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the project, in consultation with the PAPs, related government agencies, organizations, and other concerned persons for all adverse impacts. - According to Section 103, the project proponent commits to fully implementing the EMP, all project commitments, and conditions. - According to Section 104, the project proponent commits to being responsible for fully and effectively implementing all requirements set forth in the ECC, applicable laws, rules, this procedure, and standards. - According to Section 105, the project proponent commits to timely notifying and identifying, in writing to the Ministry, providing detailed information as to the proposed project's potential Adverse Impacts. - According to Section 106, the project proponent commits to conducting comprehensive self-monitoring

Laws and Regulations	Relevant Articles	Commitments
		of the project and activities during all phases of the project in compliance with applicable laws, rules, procedures, standards, the ECC, and the EMP. - According to Section 108, the Project Proponent commits to submit monitoring reports to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the Ministry. - According to Section 109, the company commits to fully providing the contents to be included in the monitoring report. - According to section 110, commits to make the monitoring report publicly available on the project's website and office within ten days of submission to the Ministry and let anyone request the digital copy of the report and to send the report via proper way within ten days of receiving the request. - To give permission the representatives to enter the project site during working hours, and the Ministry, if necessary, to the project site and other project associates for purposes of monitoring and inspection in accordance with section 113. - In the event of emergency, or fail of environmental and social requirements, to give immediate access to the representative at any time according to the section 115. - To extend the access by the representatives to the project contractors and subcontractors in accordance with section 117.
National Environmental Quality (Emission) Guidelines, 2015		The company commits to comply with General and Industry-specific Guidelines of The National Environmental Quality (Emission) Guidelines 2015 to control noise and vibration, air emissions and liquid discharges.
The Myanmar Investment Law, 2016	Section 50, 51, 65, 66, 73	According to Myanmar Investment Law, 2016 (Section 50, 51, 65, 73), the project proponent commits to - The provision of Section 50 (d) to register the land lease contract at the Office of Registry of Deeds in accordance with the Registration Act.

Laws and Regulations	Relevant Articles	Commitments
		- The company commits to carrying out capacity-building programs, employing nationals, providing insurance to workers, and settling disputes in accordance with applicable laws in accordance with the provisions of Section 51. - The company commits to comply with the provisions of Section 65 regarding registration, approvals, and compliance. - According to Section 66, the company commits to complying with the instructions of the Commission. - The company commits to ensure the types of insurance specified in the rules in accordance with the provisions of Section 73.
Myanmar Investment Rules, 2017	Rule 190, 202, 203, 206, 212, 214	The project company commits to comply with rule 190, 202, 203, 206 and 212 as follows. - To comply with rule 202, all terms and conditions in permits and other applicable laws when the investment is carried out in accordance with Myanmar Investment Rule (2017). - To fully assist the negotiation processes with the relevant government departments and government organizations for the affected persons due to proposed project according to Rule 203. - To submit the application attached with reference documents to the Commission and obtain the approval if the company desires to appoint expert foreigner according to Rule 206. - To ensure that Bodily Injury Insurance and Workmen Compensation Insurance at any insurance business entitled to carry out insurance business within the Union by the company in accordance with Rule 212. - The project company commits to complying with the provision of Rule 214.
The Private Industrial Enterprise Law, 1990	Section 27	The company commits to complying with the prohibitions of Section 27 of the Private Industrial Enterprise Law, 1990.

Laws and Regulations	Relevant Articles	Commitments
The Conservation of Biodiversity and Protected Areas Law, 2018	Section 35 (a, c, d), 29 (e) and 39 (d)	The company commits to comply with the provisions mentioned in the section 35 (a, c, d), 29 (e) and 39 (d) of The Conservation of Biodiversity and Protected Areas Law, 2018. According to the provisions of Section 35(a, c, d), the company commits not to enter a prohibited area without permission, dig on the land, cultivate or carry out any activity, or extract, collect, or destroy in any manner any kind of wild flora or cultivated plant. According to the provisions of Section 39 (d), the company commits not to intentionally polluting soil, water, or air, damaging a watercourse, poisoning or electrifying water, or using chemical or explosive materials in the water within the protected area.
The Protection and Preservation of Cultural Heritage Regions Law, 2019	Section 21 (b)	The project proponent commits to comply with the section 21 (b) mentioned in the Protection and Preservation of Cultural Heritage Regions Law, 2019. According to Section 21(b), the company commits to obtain prior permission that there is no impact on cultural heritage in accordance with the stipulations if the company constructs roads, constructs new buildings and bridges, or renovates and extends them in the buffer area.
The Protection and Preservation of Antique Objects Law, 2015	Section 12	If any known or suspected antique objects are found during the implementation of proposed project, the company commits to promptly report to the relevant Ward and Village-Tract Administration Office in accordance with section 12 of The Protection and Preservation of Antique Objects Law, 2015.
The Protection and Preservation of Ancient Monuments law, 2015	Section 12, 15, 20 (f)	If any known or suspected antique objects are found during the implementation of proposed project, the company commits to promptly report to the relevant Ward and Village-Tract Administration Office in accordance with section 12 of The Protection and Prevention of Ancient Monuments law, 2015. According to the section 15 of The Protection and Preservation of Ancient Monuments Law 2015, the company commits to apply to get prior permission to the Department

Laws and Regulations	Relevant Articles	Commitments
		if the proposed project is to be implemented within the specified area of an ancient monument. According to the section 20 (f), the company will not carry out discarding chemical substance and rubbish which can affect an ancient monument and the environment without a written prior permission.
The Conservation of Water Resources and Rivers Law, 2006	Section 8 (a), 11, 19, 21 (b), 22, 24 (b) Section 6 and 30.	The company commits to comply with the provision of section 8 (a), 11, 19, 21 (b), 22 and 24 (b) of The Conservation of Water Resources and Rivers Law, 2006. According to Section 8(a), the company commits not to do anything with the intention of damaging water sources or rivers or altering the flow of water. The company commits to comply with the provisions of Section 11. The company commits to comply with the provisions of Section 19. According to the provisions of Section 21 (b), the company commits not to excavate wells and ponds without the permission of the department. The Company commits not to accumulate sand, stones, and other heavy objects for commercial purposes in the coastal areas without the permission of the Department in accordance with the provisions of Section 22. According to the provisions of Section 24(b), the company commits not to violate the rules set by the department for not causing water pollution in the river and not changing the water course. According to section 6 and 30 of The Conservation of Water Resources and Rivers Law 2006, the company commits to obtain the approval of the relevant ministry if it is necessary to utilizing river water intake for the proposed project.
The Conservation of Water Resources and Rivers Rules, 2013	Rule 47.	According to rule 47 of The Conservation of Water Resources and Rivers Rules 2013, the company commits to obtain the approval of the relevant ministry if it is necessary to utilizing river water intake for the proposed project.

Laws and Regulations	Relevant Articles	Commitments
Prevention of Hazard from Chemicals and Related Substances Law (2013)	Section 15 (a, b), 16 (b to j), 17, 22, 27 (a to d)	According to The Prevention of Hazard from Chemical and Related Substances Law, 2013, the company commits to comply with the provisions mentioned in the section 15 (a, b) and 16 (from b to j). According to the section 17, the company commits to put the insurance in accordance with the prescriptive stipulations to be able to pay the compensation if the impact and damage is occurred. The company commits to follow the provisions mentioned in section 22 and 27 (from a to d).
The Myanmar Fire Brigade Law, 2015	Section 25	According to The Myanmar Fire Brigade Law 2015, Section 25, the project company commits to follow the directive of the Department of Fire Services.
Social Security Law, 2012	Section 11(a), 15 (a, b), 18 (b), 48 (b) and 75.	The project company commits to comply the provisions mentioned in section 11(a), 15 (a, b), 18 (b), 48 (b) and 75 of the Social Security Law, 2012. The company commits to complying with the social security system and non-registration provisions for benefits as described in Section 11(a). According to Section 15(a) and (b), the company commits to register and pay contributions to the Social Security Fund. The project company commits to comply the provisions mentioned in section 18 (b). The project company commits to comply the provisions mentioned in section 48 (b). The company commits to maintaining records and accounts and reporting them to the relevant social security office in accordance with the provisions of Section 75.
Workmen's Compensation Act, 1923		The company commits to comply with the provisions of the Workmen's Compensation Act, 1923, in relation to workers' compensation matters.
The Minimum Wage Law, 2013	Section 12, 13	The project company commits to comply with the provisions of the Section 12 and 13 mentioned in the Minimum Wage Law, 2013.

Laws and Regulations	Relevant Articles	Commitments
		The company commits to comply with the provisions of Section 13. Under Section 12, the company commits not to pay any employee less than the minimum wage specified.
The Payment of Wages Law, 2016	Section 3, 4, 5, 14 and Chapter 3.	The project company commits to comply with the provisions of the section 3, 4, 5, 14 and chapter (3) mentioned in The Payment of Wages Law, 2016.
Myanmar Insurance Law, 1993	Section 15, 16	Requires that any business, that may pollute the environment are required to have compulsory general liability insurance. The project company commits to comply section 15 and 16.
Employment and Skill Development Law, 2013	Section 5, 14, 30	According to Employment and Skill Development Law, 2013 (Section 5, 14, 30), the project proponent commits to - - compliance with the provisions of section 5. - carry out skill development of workers and training programs according to the section 14. - compliance with the provisions of section 30.
The Leave and Holiday Act, 1951	Section 3, 4, 5, 7 (a)	The company commits to providing public holidays, leaves, and benefits in accordance with sections 3, 4, 5, and 7(a) of the Leave and Holiday Act, 1951.
The Labor Organization Law, 2011	Section 17, 18, 19, 20 and 21.	Section 17 - The project owner commits to allow the labor organization to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labor laws and to summit demands to the employer and claim in accordance with the relevant law if the agreement cannot be reached. Section 18 - The project owner commits to demand the re-appointment of worker is dismissed by the employer without the conformity with the labor laws. Section 19 - The project owner commits to send the representatives to the Conciliation Body in settling a dispute between the employer and the worker. Section 20 - The project owner commits the labor organization to participate and discuss in discussing with the government, the employer and the complaining

Laws and Regulations	Relevant Articles	Commitments
		employees in respect of employee's rights or interest contained in the labor laws. Section 21 - The project owner commits the labor organization to participate in solving the collective bargains of the employees in accord with the labor laws. Section 22 - The project owner commits the labor organization to carry out the holding the meetings, going on strike and other collective activities in line with the labor laws.
The Settlement of Labor Dispute Law, 2012	Section 38, 38 (a), 39, 40, 51	The project proponent commits to comply the provisions acted in the section 38, 39, 40, and 51 of the Settlement of Labor Dispute Law, 2012. Under Section 40, the company commits not to close work without consultation and arbitration. If any act or omission occurs to reduce the employee's benefits without adequate cause during the resolution of the dispute, the company commits to pay the full monetary benefit determined by the arbitration panel or arbitration council under the provisions of Section 51.
Traffic Safety and Motor Vehicle Management Law, 2020	Section 9 (a), 12 (c), 14 (d), 18 (a), 81 (g).	The project company commits to comply with the provision under Traffic Safety and Motor Vehicle Management Law, 2020 as follows. According to the section 9 (a), the company commits to follow the regulations and restrictions on the vehicles allowed to travel in the country. According to section 12 (c), the company commits to follow rules, standards and norms on safety and environmental protection in relation to the initial registration of motor vehicles issued by the Ministry. According to section 14 (d), the company commits to follow the speed limit for the safe movement of vehicles traveling on public roads. According to section 18 (a), the company commits to perform maintenance and repair in accordance with the standards set by the Department to drive the vehicle safely.

Laws and Regulations	Relevant Articles	Commitments
		According to section 81 (g), The company commits to not transport dangerous goods in public places without complying with the regulations.
Traffic Safety and Motor Vehicle Management Rules, 2022	Chapter 9	The company commits to complying with the rules related to commercial vehicles as stipulated in Chapter 9 of the Traffic Safety and Motor Vehicle Management Rules, 2022.
The Export and Import Law, 2012	Section 7	The project company commits to comply with the provision of section 7 of The Export and Import Law, 2012.
The Explosive Substances Act, 1908	Section 3, 4, 5	The company commits to comply with the provision of section 3, 4 and 5 of The Explosive Substance Act 1908.
The Industrial Explosive Materials Law, 2018	Section 6 (c), 7 (c), 11 (b), 13, 14 (b), 15, 16, 18, 19, 20, 21	The company commits to comply with the provisions mentioned in the section 6 (c), 7 (c), 11 (b), 13, 14 (b), 15 and 16. According to Section 13, the company commits to applying to renew the license 30 days before expiration to the Chief Inspector in accordance with the stipulations if the company wishes to continue to store industrial explosive materials. According to Section 15, - The company commits to systematically store industrial explosive materials without exceeding the permitted amount in accordance with the specifications. - The company commits to accepting the inspection of the Chief Inspector or an inspector from time to time. - If damage to property, injury to, or death of people occurs due to the loss, burning, or explosion of industrial explosive materials, the company commits to informing the nearest police station immediately and reporting it to the Chief Inspector timely. - The company commits to paying license fees stipulated by the Ministry to the Department. According to Section 16, the company commits to store industrial explosive materials only in the licensed magazine

Laws and Regulations	Relevant Articles	Commitments
		and take necessary preventive measures in accordance with the specifications to avoid harm in the transport, manufacture, use, or possession of industrial explosive materials. Under section 18, the company commits to follow the inspection of the Chief Inspector or an inspector. The company commits to comply with the provisions mentioned in the section 19, 20 and 21.
The Public Health Law, 1972	Section 3 and 5	The project company commits to cooperate with the authorized person or organization in line with the section 3 and 5 of the Public Health Law, 1972.
The Prevention and Control of Communicable Diseases Law, 1995	Section 3 (a-9), 4 and 11	The project proponent commits to comply with the Section 3 (a-9), 4 and 11 mentioned in the Prevention and Control of Communicable Diseases Law, 1995 as follows. The project proponent commits to - - coordinate with relevant government departments, government organizations and non-government organizations to prevent the spread of infectious diseases according to the section 3 (a-9). - comply with the measures undertaken by Ministry of Health and the Department of Health in respect of prevention of the occurrence and spread of communicable disease and control according to the section 4. - follow the instructions of Health Officer according to the section 11.
The Control of Smoking and Consumption of Tobacco Product Law, 2006	Section 9	The project owner commits to comply the provisions mentioned in section 9 of the Control of Smoking and Consumption of Tobacco Product Law, 2006.
The Myanmar Engineering Council Law, 2013	Section 34.	The company commits to comply with the provision of the section 34 mentioned in The Myanmar Engineering Council Law, 2013.

Laws and Regulations	Relevant Articles	Commitments
Occupational Safety and Health Law, 2019	Section 12, 14, 16, 17, 18, 26, 27, 34 and 36.	Occupational Safety and Health Law, 2019, Section 12, 14, 16, 17, 18, 26, 27, 34 and 36, the project proponent commits to comply with - The company commits to appointing an Occupational Safety and Health Officer in accordance with Section 12. - The company commits to maintaining a safe and healthy workplace in accordance with Section 14. - the instructions by the inspectors according to the section 16. - the provisions mentioned in the section 17 and 18. - the provisions for occupational safety in accordance with the section 26. - the provisions mentioned in the section 27, 34 and 36.
The Petroleum and The Petroleum Product law, 2017	Section 8 (a, c), 9 (a, e), 10 (a, b, d, e), 11.	The company commits to comply with the procedures and terms in accordance with Section 8 (a and c). According to The Petroleum and The Petroleum Product law 2017's section 10 (a, b, d, e), the company commits to follow the instructions of Ministry of Natural Resources and Environmental Conservation relating to the usage of fuel for the proposed project. According to section 11, the company has to be expressed the warning sign of danger by words or signs near to the fuel storage tank.
The Petroleum Rules, 1937	Chapter 3 and 4	The project company commits to comply with the provisions of the chapter 3 and 4 mentioned in The Petroleum Rules, 1937.
The Ethnic Rights Protection Law, 2015	Section 5	According to the Ethnic Rights Protection Law (2015), Section 5, if the proposed project is to be implemented in the area of ethnic nationalities, the project proponent commits that the project information will be presented in advance and consultation with the relevant local ethnic peoples will be conducted.
The Ethnic Rights Protection Rules, 2019	Rule 20, 21	According to the Ethnic Rights Protection Rules (2019), Rule 20 and 21, the project proponent commits to comply

Laws and Regulations	Relevant Articles	Commitments
		- To present in detail the language and methods of sharing project information to the local ethnic people living in the project area to be understood about the project in accordance with Rule 20 (a). - To conduct consultation with the local ethnic people having transparency in every stage of environmental impact assessment according to the Rule 20 (d).
The Electricity Law, 2014	Section 20, 21 (a), 24, 27, 29, 33, 40 and 68	The company commits to comply with the provision of section 24, 27, 29, 33, 40 and 68 of The Electricity Law, 2014. According to the provisions of Section 20, the company commits to abide by the rules, regulations, bye-laws, notifications, orders, directives, and procedures issued by the Ministry in carrying out the electrical business contained in the permit. According to the provisions of Section 21(a), the company commits to take responsibility if it causes damages and losses to any person or entity for failing to abide by these laws, rules, procedures, regulations, bye-laws, orders, and directives. According to the provisions of Section 24, the company commits to paying for the value of damage or loss in accordance with the method prescribed by the Ministry. According to Section 27, in the event an electricity hazard occurs in respect of the generation, transmission, distribution, and utilization of electric power, the company commits to reporting to the Chief Inspector and in-charge of the relevant department as soon as possible. According to Section 40, the company commits to carrying out the work in accordance with the rules, standardizations, and procedures issued by the Ministry and the necessary inspections of relevant government departments and organizations. The company commits to complying with the provisions of Section 68 on compensation matters.

2.4 International Conventions, Treaties and Agreements

Myanmar is a signatory to several international conventions, treaties and agreements. Those potentially relevant to the project should be presented and the main elements relevant to the project's preparation and implementation should be summarized. A list of the relevant conventions, treaties and agreements that concerned with the present project are presented below:

Table 2.2 International Conventions, Treaties and Agreements

No.	International Environmental Conventions/ Protocols/ Agreements	Date of Signature	Date of Ratification	Date of Member	Cabinet Approval Date
Regional					
1	ASEAN Agreement on Transboundary Haze Pollution	10/6/2002	13-3-2003 (Ratification)		7/2003 27-2-03
International					
1	United Nations Framework Convention on Climate Change, New York, 1992 (UNFCCC)	11/6/1992	25-11-1994 (Ratification)		41/94 9-11-94
2	Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985		24-11-1993 (Ratification)	22-2-1994	46/93
3	Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987		24-11-1993 (Ratification)	22-2-1994	46/93
4	London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London, 1990		24-11-1993 (Ratification)	22-2-1994	46/93
5	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 (CITES)		13-6-1997 (Accession)	11-9-1997	17/97 30-4-97
6	Kyoto Protocol to the Convention on Climate Change, Kyoto, 1997		13-8-2003 (Accession)		26/2003 16-7-03

2.5 National Environmental Quality Standards

Emission guideline and target values of air emission, wastewater, noise and odor were set in the National Environmental Quality (Emission) Guideline (NEQG) on 29th December 2015 by MONREC.

2.5.1 Air Emissions

Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:

a. emissions do not result in concentrations that reach or exceed national ambient quality guidelines and standards, or in their absence current World Health Organization (WHO) Air Quality Guidelines[1] for the most common pollutants as summarized below; and

b. emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards (i.e., not exceeding 25 percent of the applicable air quality standards) to allow additional, future sustainable development in the same air shed.

Industry-specific guidelines summarized hereinafter shall be applied by all projects to ensure that air emissions conform to good industry practice.

Table 2.3 Air Emissions (General Guidelines)

Parameter	Averaging Period	Guideline Value µg/m^3
Nitrogen dioxide	1-year	40
	1-hour	200
Ozone	8-hour daily maximum	100
Particulate matter PM10[a]	1-year	20
	24-hour	50
Particulate matter PM2.5[b]	1-year	10
	24-hour	25
Sulfur dioxide	24-hour	20
	10-minute	500

[a] *Particulate matter 10 micrometers or less in diameter*

[b] *Particulate matter 2.5 micrometers or less in diameter*

2.5.2 Wastewater

Industry-specific guidelines apply during the operations phase of projects and cover direct or indirect discharge of wastewater to the environment. They are also applicable to industrial discharges to sanitary (domestic) sewers that discharge to the environment without any treatment. Wastewater generated from project operations includes process wastewater, wastewater from utility operations, runoff from process and storage areas, and miscellaneous activities including wastewater from laboratories, and equipment maintenance shops. Projects with the potential to generate process wastewater, sanitary sewage, or storm water should incorporate the necessary precautions to avoid,

minimize, and control adverse impacts to human health, safety or the environment. Industry-specific guidelines summarized hereinafter shall be applied by all projects, where applicable, to ensure that effluent emissions conform to good industry practice.

For project types where industry-specific guidelines are not set out in these Guidelines, the following general guideline values, or as stipulated on a case-by-case basis, apply during project operations. General wastewater guideline value is determined by the MONREC as shown in the following Table.

Table 2.4 Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (General Application)

Parameter	Unit	Guideline Value
5-day Biochemical oxygen demand	mg/L	50
Arsenic	mg/L	0.1
Cadmium	mg/L	0.05
Chemical oxygen demand	mg/L	150
Chromium (hexavalent)	mg/L	0.1
Copper	mg/L	0.3
Cyanide	mg/L	1
Cyanide (free)	mg/L	0.1
Cyanide (weak acid dissociable)	mg/L	0.5
Iron (total)	mg/L	2
Lead	mg/L	0.2
Mercury	mg/L	0.002
Nickel	mg/L	0.5
Oil and grease	mg/L	10
pH	S.U. [a]	6-9
Phenols	mg/L	0.5
Temperature	°C	<3[b]
Total suspended solids	mg/L	50
Zinc	mg/L	0.5

[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 meters from point of discharge.*

In addition to general and industry-specific wastewater guidelines applicable during project operations, the following guideline values apply during the construction phase of projects, covering storm water or surface water, and sanitary wastewater discharges from all project sites.

Table 2.5 Site Runoff and Wastewater Discharges (Construction Phase)

Parameter	Unit	Maximum Concentration
Biological oxygen demand	mg/l	30
Chemical oxygen demand	mg/l	125
Oil and grease	mg/l	10

pH	S.U. [a]	6-9
Total coliform bacteria	100 ml	400

[a] *Standard Unit*

2.5.3 Noise

Noise prevention and mitigation measures should be taken by all projects where 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 impacts should not exceed the levels shown below or result in a maximum increase in background levels of three decibels at the nearest receptor location off-site.

Table 2.6 Noise Level Guideline

Receptor	One Hour LAeq (dBA)[a]	
	Daytime 07:00 - 22:00 (10:00 - 22:00 for public holidays)	**Nighttime 22:00 - 07:00 (22:00 - 10:00 for public holidays)**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

[a] *Equivalent continuous sound level in decibels*

2.5.4 Odor

Point and diffuse source odors from industries should be minimized using available prevention and control techniques as described in the IFC EHS industry-specific guidelines. Point source activities are those that involve stack emissions of odor and which generally can be controlled using waste reduction, waste minimization and cleaner production principles or conventional emission control equipment. Diffuse source activities are generally dominated by area or volume source emissions of odor (e.g., intensive agricultural activities) and which can be more difficult to control. Projects should control odors to ensure that odors that are offensive or unacceptable to neighbors do not occur. Generally, odor levels should not exceed five to ten odorant units at the edge of populated areas in the vicinity of a project. Projects with multiple odorous point or diffuse releases, or emitting complex odors should conduct an odor impact assessment to determine ground-level maximum concentrations taking into account site-specific factors including proximity to populated areas.

2.6 International Guidelines

2.6.1 International Finance Corporation Performance Standards

International Finance Corporation (IFC), a member of the WB Group, has published the IFC Performance Standards (PS) on Environmental and Social Sustainability (2012) which defines clients' responsibilities for managing their environmental and social risks.

IFC uses a process of environmental and social categorization to reflect the magnitude of risk and impacts of the Project it finances, as summarized below:

Category A: business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented;

Category B: business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures; and

Category C: business activities with minimal or no adverse environmental or social risks and/or impacts.

The IFC PSs on Environmental and Social Sustainability are made of eight components, which provide guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way. The PS establishes standards that the client is to meet throughout the life of an investment. IFC PSs are listed below:

PS 1: Assessment and Management of Environmental and Social Risks and Impacts;

PS 2: Labor and Working Conditions;

PS 3: Resource Efficiency and Pollution Prevention;

PS 4: Community Health, Safety, and Security;

PS 5: Land Acquisition and Involuntary Resettlement;

PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;

PS 7: Local Ethnic Peoples; and

PS 8: Cultural Heritage.

2.6.2 International Finance Corporation Environmental, Health, and Safety Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry-specific examples of good international industry practice.

The General EHS Guidelines are designed to be used together with the relevant industry sector EHS guidelines that provide guidance to users on EHS issues in specific industry sectors. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent.

The EHS Guidelines for cement and lime manufacturing include information relevant to cement and lime manufacturing projects. Extraction of raw materials, which is a common activity associated with cement manufacturing projects, is covered in the EHS Guidelines for Construction Materials Extraction. The contents of both sector EHS Guidelines will be described in the following sections, after a brief presentation of the general EHS Guidelines.

2.6.2.1 General EHS Guidelines

The General EHS Guidelines are organized as reported in the following Table.

Table 2.7 Organization of the IFC EHS General Guidelines

Main Area	Topic
Environmental	• Air Emissions and Ambient Air Quality • Energy Conservation • Wastewater and Ambient Water Quality • Water Conservation • Hazardous Materials Management • Waste Management • Noise • Contaminated Land
Occupational Health and Safety	• General Facility Design and Operation • Communication and Training • Physical Hazards • Chemical Hazards • Biological Hazards • Radiological Hazards • Personal Protective Equipment (PPE) • Special Hazard Environments • Monitoring
Community Health and Safety	• Water Quality and Availability • Structural Safety of Project Infrastructure • Life and Fire Safety • Traffic Safety • Transport of Hazardous Materials • Disease Prevention • Emergency Preparedness and Response
Construction and Decommissioning	• Environment • Occupational Health & Safety • Community Health & Safety

With respect to the environmental issues, IFC Guidelines refer to World Health Organization (WHO) standards that include the following:

- WHO Ambient Air Quality Standards;
- WHO Guidelines for Community Noise;
- WHO Drinking Water Quality; and
- WHO Guidelines for the Safe Use of Wastewater, Excreta and Greywater.

In addition, the following guidelines and standards may be applicable:

- Dutch Intervention Values for Soil Quality;

- International Union for Conservation of Nature (IUCN) Red Data Book for protected species (fauna and flora);
- Occupational Health and Safety Administration (OHSA) standards – United States Department of Labor; and
- United Nations Framework Convention on Climate Change (UNFCCC) Baseline and Monitoring Methodologies for Large Scale Clean Development Mechanism (CDM) Project Activities.

According to IFC requirements, air emissions should not result in pollutant concentrations higher than the relevant national ambient quality guidelines and standards. In their absence, the current WHO Air Quality Guidelines or other internationally recognized sources, such as the United State Environmental Protection Agency (USEPA), National Ambient Air Quality Standards (NAAQS) and the relevant European Council Directives can be also referred to.

In the following Table, Ambient Air Quality values outlined in the IFC EHS General Guidelines are reported.

Table 2.8 Ambient Air Quality Values – IFC EHS General Guidelines

Pollutant	Averaging Period	Maximum Limit Value ($\mu g/m^3$)
Sulphur Dioxide (SO_2)	10 min	500
	1 hour	--
	24 hours	20
	Year	--
Nitrogen Dioxide (NO_2)	1 hour	200
	24 hours	--
	Year	40
Ozone (O_3)	1 hour	--
	8 hours	100
Carbon Monoxide (CO)	1 hour	-
	8 hours	-
Black Smoke (BS)	24 hours	--
	Year	--
Total Suspended Particles (TSP)	24 hours	--
	Year	--
Particular Matter <10 µm (PM_{10})	24 hours	50

	Year	20
Particular Matter <2.5 µm ($PM_{2.5}$)	24 hours	10
	Year	25
Lead (Pb)	Year	--

In addition, IFC EHS General Guidelines require as a general rule that Project specific ground concentration does not contribute more than 25% of the above-mentioned applicable air quality standard to allow additional, future sustainable development in the same airshed.

As outlined in the IFC EHS General Guidelines, noise impacts should be estimated by the use of baseline noise assessments for developments close to local human populations to verify that the levels presented in the following Table are not exceeded or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Table 2.9 Noise Level Guidelines – IFC EHS General Guidelines

Noise Level Guidelines		
Receptor	**IFC - One Hour L_{Aeq} (dBA)**	
	Day-time 07:00 - 22:00	**Night-time 22:00 – 07:00**
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Noise monitoring programs should be designed and conducted by trained specialists. Typical monitoring periods should be sufficient for statistical analysis and may last 48 hours with the use of noise monitors that should be capable of logging data continuously over this time period, or hourly, or more frequently, as appropriate (or else cover differing time periods within several days, including weekday and weekend workdays). The type of acoustic indices recorded depends on the type of noise being monitored, as established by a noise expert. Monitors should be located approximately 1.5 m above the ground and no closer than 3 m to any reflecting surface (e.g., wall). In general, the noise level limit is represented by the background or ambient noise levels that would be present in the absence of the facility or noise source(s) under investigation.

In terms of Occupational Health and Safety (OHS) aspects, IFC noise limits for different working environments are provided in the following Table.

Table 2.10 Noise Limits for Different Working Environments – IFC EHS General Guidelines

Noise Limits for Various Working Environments		
Location / Activity	**Equivalent Level LA_{eq},8h**	**Maximum LA_{max},fast**

Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)
Open offices, control rooms, service counters or similar	45-50 dB(A)	-
Individual officers (no disturbing noise)	40-45 dB(A)	-
Classrooms lecture halls	35-40 dB(A)	-
Hospitals	35-40 dB(A)	B(A)

Discharges of process wastewater, sanitary wastewater, wastewater from utility operations or storm water to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria or, in the absence of local criteria, other sources of ambient water quality. Receiving water use and assimilative capacity, taking other sources of discharges to the receiving water into consideration, should also influence the acceptable pollution loadings and effluent discharge quality.

Waste management should be addressed through a waste management system that addresses issues linked to waste minimization, generation, transport, disposal, and monitoring.

Land is considered contaminated when it contains hazardous materials or oil concentrations above background or naturally occurring levels. Contaminated lands may involve surficial soils or subsurface soils that, through leaching and transport, may affect groundwater, surface water, and adjacent sites. Where subsurface contaminant sources include volatile substances, soil vapor may also become a transport and exposure medium, and create potential for contaminant infiltration of indoor air spaces of buildings. Contamination of land should be avoided by preventing or controlling the release of hazardous materials, hazardous waste, or oil to the environment. When contamination of land is suspected or confirmed during any project phase, the cause of the uncontrolled release should be identified and corrected to avoid further releases and associated adverse impacts. Contaminated lands should be managed to avoid the risk to human health and ecological receptors. The preferred strategy for land decontamination is to reduce the level of contamination at the site while preventing the human exposure to contamination.

With respect to the OHS field, the General EHS Guidelines state that employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. The guidelines provide guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. Although, the focus is placed on the operational phase of projects, much of the guidance also applies to construction and decommissioning activities.

The General EHS Guidelines on Community Health and Safety complement the guidance provided for the environmental and occupational health and safety topics, specifically addressing some aspects of project activities taking place outside of the traditional project boundaries, but nonetheless related to the project operations, as may be applicable on a project basis. These issues may arise at any stage of a project life cycle and can have an impact beyond the life of the Project.

Finally, the General EHS Guidelines provide additional, specific guidance on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities.

2.7 Environmental Impact Assessment

The EIA procedure, issued on 29th December 2015, defines the requirements for the EIA and states that: "An EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual-components of the environment, together with all pertinent legal matters relating to the environment (including land use, resources use, and ownership of and rights to land and other resources) that may be affected by the Project during all project phases including pre-construction, construction, operation, decommissioning, closure, and post-closure; and shall identify and assess all Adverse impacts and risks that potentially could arise from the project.

Article 7 – This Procedure does not address specific matters in relation to resettlement. Projects involving resettlement shall additionally comply with separate procedures issued by responsible ministries, and in the absence of such procedures all such Projects shall adhere to international best practice on Involuntary Resettlement."

Three different steps are foreseen for the EIA process which is described in the following sections:

- screening phase;
- scoping phase; and
- EIA Investigation and Report Preparation

2.7.1 Screening Phase

The EIA process starts with the screening process as shown in the Figure below. The MONREC is empowered and has the exclusive authority to define the screening criteria for a project. Guidance is provided as to which projects or activities should carry out an Initial Environmental Examination (IEE) or EIA, as presented in the Annex to the law. If, as a result of that determination, an IEE or an EIA is required, then the proponent of the project or activity has to prepare, obtain approval for, and implement an appropriate Environmental Management Plan (EMP) in respect of the proposed project or activity. Any appeal from such determination must be made in accordance with the EIA Procedure.

The Annex shows for each type of economic activity, the criteria for selection of whether IEE or EIA apply to the proposed economic activity. The MONREC determines whether the project is an IEE type project or an EIA type project or if it is exempted from undertaking any environmental assessment.

The Project Proponent might be required to submit a project proposal (completed in accordance with MONREC's guidelines) to the EC department of MONREC for screening.

Within 15 days from receiving the complete project proposal, the MONREC shall determine the required type of environmental assessment (EIA, IEE, or none) and shall inform the Project Proponent in writing about its determination. In addition, the MONREC can change the status of an IEE Type Project to be an EIA Type Project if any of the above additional factors are relevant in this sense.

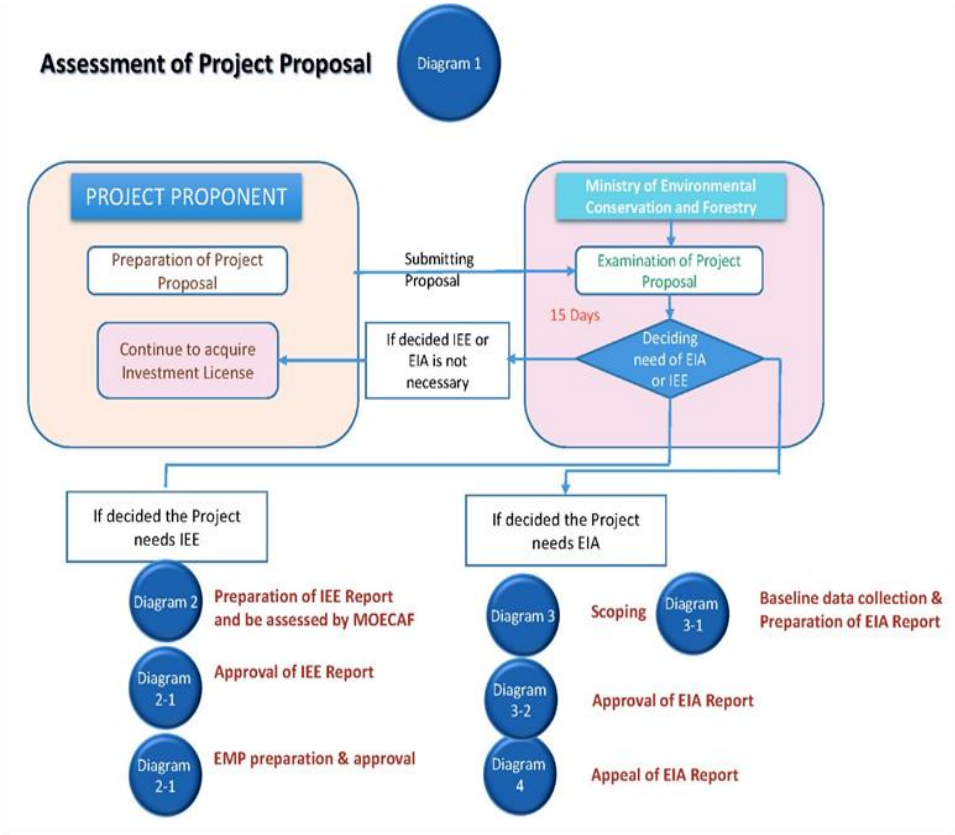


Figure 2-1 Screening process in EIA procedure

2.7.2 Scoping Phase

All EIA type projects are required to undergo the Scoping phase. The project proponent shall be responsible to ensure that the Scoping and the preparation of the Term of Reference (ToR) for the EIA report are undertaken in a professional manner and in accordance with any applicable guidelines issued or adopted by the MONREC. The scoping shall, in respect to the proposed project:

- define the study area, AoI, time boundaries, project phases, and potential stakeholders;
- start the process of understanding the applicable regulations and standards, and their context for project design and completion of the EIA;
- make a provisional identification of environmental, social and, if any, health impacts, focusing in particular on the environmental, social and health issues that need to be addressed in subsequent EIA studies;
- provide an indication of the required baseline data and information and methods to get them (although there is no need to actually collect any data at this stage);
- provide an opportunity for consultants, relevant authorities, project developers, interested and affected parties to express their views and concerns regarding the proposal before an EIA proceeds;
- enable an efficient and comprehensive assessment process that saves time, resources, costs and delays; and

- identify potentially affected communities and other stakeholders with an interest in the project.

As part of the scoping, the project proponent shall ensure that the following public consultation and participation process is carried out.

- disclose information about the proposed project to the public and civil society through local media, including by means of the prominent posting of legible sign boards and advertising boards at the Project Site which are visible to the public; and
- arrange the required complement of consultation meetings as advised by the MONREC, with local communities, potentially PAPs, local authorities, community-based organizations, and civil society.

The project proponent shall prepare a scoping report and ToR for the EIA investigations and submit the completed Scoping Report and ToR to the MONREC for review and approval. The Scoping process is shown in the following Figure.

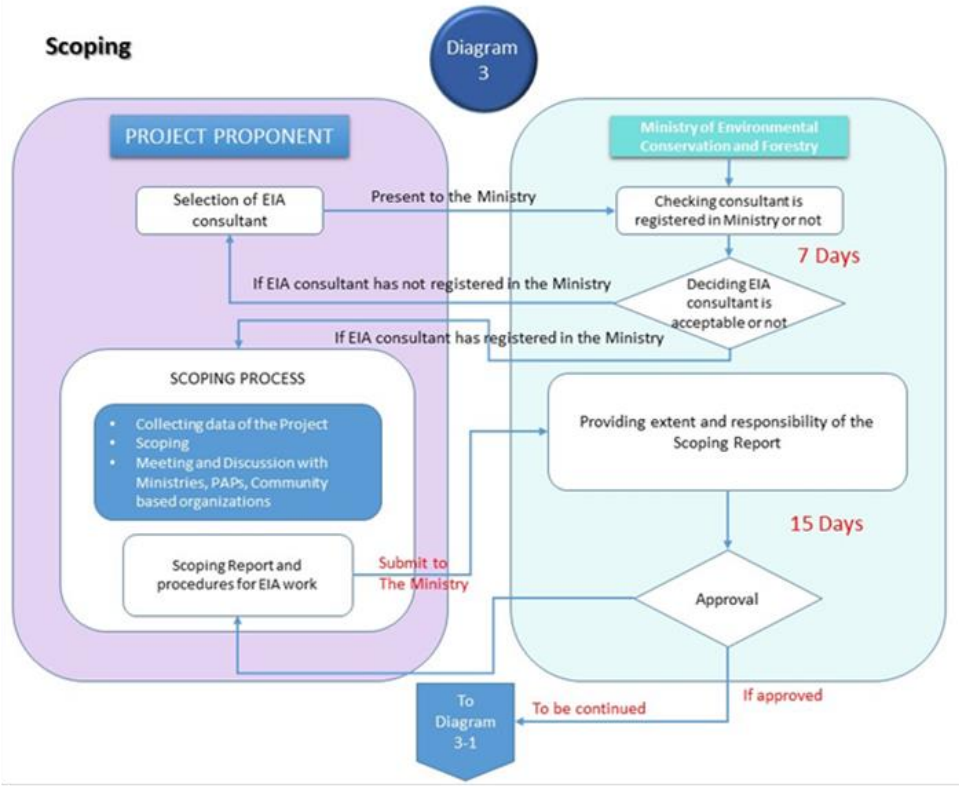


Figure 2-2 Scoping process in EIA procedure

2.7.3 EIA Investigation and Report Preparation

The Project Proponent has to ensure that the EIA investigation properly addresses all adverse impacts and is undertaken in accordance with the approved TOR. The EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the environment, together with all pertinent legal matters relating to the environment (including land use, resources use, and ownership of and rights to land and other resources) that may be affected by the Project during all project phases, including pre-construction, construction, operation, decommissioning,

closure, and post-closure; and shall identify and assess all adverse impacts and risks for environment, social and, if relevant, health that potentially could arise from the Project.

The EIA Procedure does not address the social impacts of involuntary resettlement or which relate to ethnic people. Separate procedures shall be issued by responsible ministries, and in the absence of such procedures all such Projects shall adhere to international practice on involuntary resettlement and local ethnic people.

The Project Proponent is obliged to use, comply with and refer to applicable national standards, international standards adopted by the Government and/or the MONREC, or, in the absence of relevant national or adopted international standards, such standards as may be agreed with the MONREC.

The EIA Report shall consider the views, concerns, and perceptions of stakeholders, communities and individuals that could be affected by the Project or who otherwise have an interest in the Project. The EIA should include the results of public consultations and negotiations with the affected populations on the environmental and social issues. Public concerns should also be taken into account in assessing impacts, designing mitigation measures, and selecting monitoring parameters. After completing all investigations and public consultation and participation processes required for EIA Type Projects, the Project Proponent shall submit the EIA Report to the MONREC in both digital and hard copy, together with the required service fee.

The MONREC shall within 10 days after submission disclose the EIA Report to civil society, PAPs, concerned government organizations, and other interested stakeholders. The MONREC shall submit the EIA Report to the EIA Report Review Body for comment and recommendations and also arrange for public consultation meetings at national and State/ Regional/ local levels where the Project Proponent shall present the EIA Report. All received comments and recommendations, including those of the EIA Report Review Board, will be collected and reviewed by the MONREC prior to making a final decision on approval of the EIA Report. The MONREC shall deliver its final decision within 90 days from the receipt of the EIA Report. All costs incurred in completing to the EIA Report disclosure and review, including the public participation process, shall be borne by the Project Proponent.

Upon completion of its review of the EIA Report, the MONREC will issue an ECC or inform the Project Proponent of its decision to reject the EIA Report and publicly disclose its decision. The proposed flow chart covering the EIA review process is shown in the following Figure.

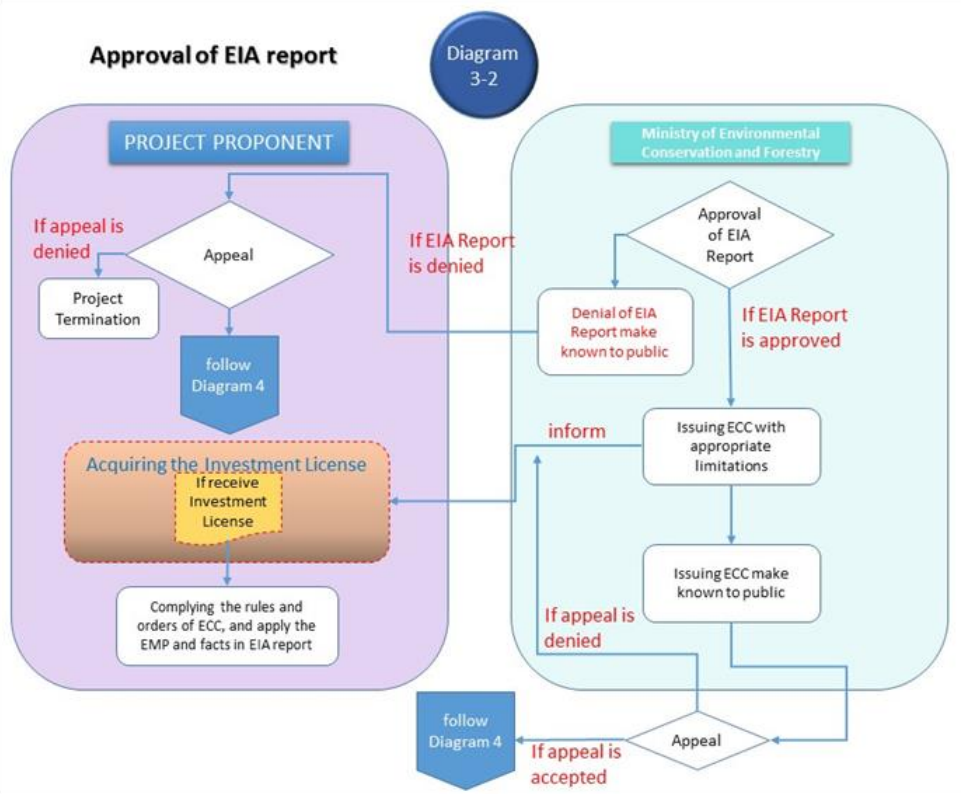


Figure 2-3 Approval process in EIA procedure

In conclusion, the IEE and EIA approval process can be summarized as reported in the following Table.

Table 2.11 The IEE & EIA Approval Process in Myanmar

EIA Process	Duration	MIC Permission	Duration
IEE/EIA/NON-Proposal Screening	15 days	Proposal Screening	15 days
		MIC Permission	90 days
IEE Process			
Approval of IEE experts	7 days		
IEE report preparation	-		
IEE report approval	60 days		
EIA Process			
Approval of EIA experts	7 days		
Developing EIA scoping report and TOR	-		
Scoping report and TOR approval	15 days		
Investigation/preparing EIA report	-		
EIA report approval	90 days		

2.8 The Institutional Framework

Ministry of Industry organized with two Directorates and four Enterprises as follows:

- Union Ministerial Office
- Directorate of Industrial Collaboration (DIC)
- Directorate of Industrial Supervision and Inspection (DISI)
- No. (1) Heavy Industries Enterprise (HIE-1)
- No. (2) Heavy Industries Enterprise (HIE-2)
- No. (3) Heavy Industries Enterprise (HIE-3)
- Myanmar Pharmaceutical Industries (MPI)

A number of institutions will have a regulatory and monitoring mandate directly or indirectly under their respective pieces of legislation. However, the following will be the key institutions whose requirements will need to be complied with.

Institutional Framework of Mandalay Region as follows:

- Mandalay Regional Government
- Ministry of Security and Border Affairs
- Ministry of Municipal Affairs
- Ministry of Agriculture, Livestock and Irrigation
- Ministry of Natural Resources and Environmental Conservation
- Ministry of Electricity, Energy and Construction
- Ministry of Planning and Finance
- Ministry of Ethnic Affairs
- Regional Advocate General's Office
- Regional General Administrative Office

Myanmar Conch (Mandalay) Green Building Materials Company Limited takes on the responsibility for developing, reviewing, updating, and properly implementing the Environmental Management Plan. Institutional Framework for the implementation of Environmental Management Plan (EMP) as follows:

- Safety Production Committee
- Project Manager
- Site Supervisor
- Environmental Officer
- HSE Representative

3. PROJECT DESCRIPTION

3.1 Project Justification and Need

The proposed project is intended to build, operate and distribute building materials such as uPVC profiles, PVC pipes, PVC pipe fitting, plastic doors and windows. It is used in drinking water and waste water pipes, window frames, doors and many other applications as it provides a modern alternative to traditional materials such as wood and metal.

At the same time, Conch Profile as the world's largest production and marketing enterprises, the product itself has insulation, soundproofing, other environmental protection and energy-saving characteristics. Moreover, product quality in the market competition has a strong competitiveness.

3.2 Project Location

The project is located at No. 465-kha/2, Dahattaw Village Tract, East Sue Khout Net, Patheingyi Township, Mandalay Region and 26 miles away from Mandalay city.

Figure 3-1 Location of Proposed Project

3.3 Project Components and Facilities

The proposed project is planning to construct two light steel structure plants and main production facilities installation are described in following table.

Table 3.1 Main production facilities installation

No	Main Production Facilities	Production Capacity
1	Extrusion line of uPVC profiles	4500 t/a

2	Extrusion line of PVC pipe	5500t/a
3	Injection molding for PVC pipe fitting	550t/a
4	Plastic doors and windows assembly equipment	100000 m^2/a
5	Water refrigeration and water supply	-
6	Compressed air station	-

3.4 Site Layout Map or Schematic Diagram

Land lease agreement was made between Project Proponent and Myanmar Conch Cement (Mandalay) Company Limited for 49 years. It is (8.3) acres wide and allocated inside the compound of Myanmar Conch Cement (Mandalay) Company Limited. Total areas of land use for project and land use area for project components are provided as follows.

Total Land Area:	8.3 acres/33,333.5 m^2
Main plant area including raw materials warehouse and final products warehouse:	3.7365 acres/15,120 m^2
Doors and windows assembly plant area:	2.2418 acres/9,072 m^2

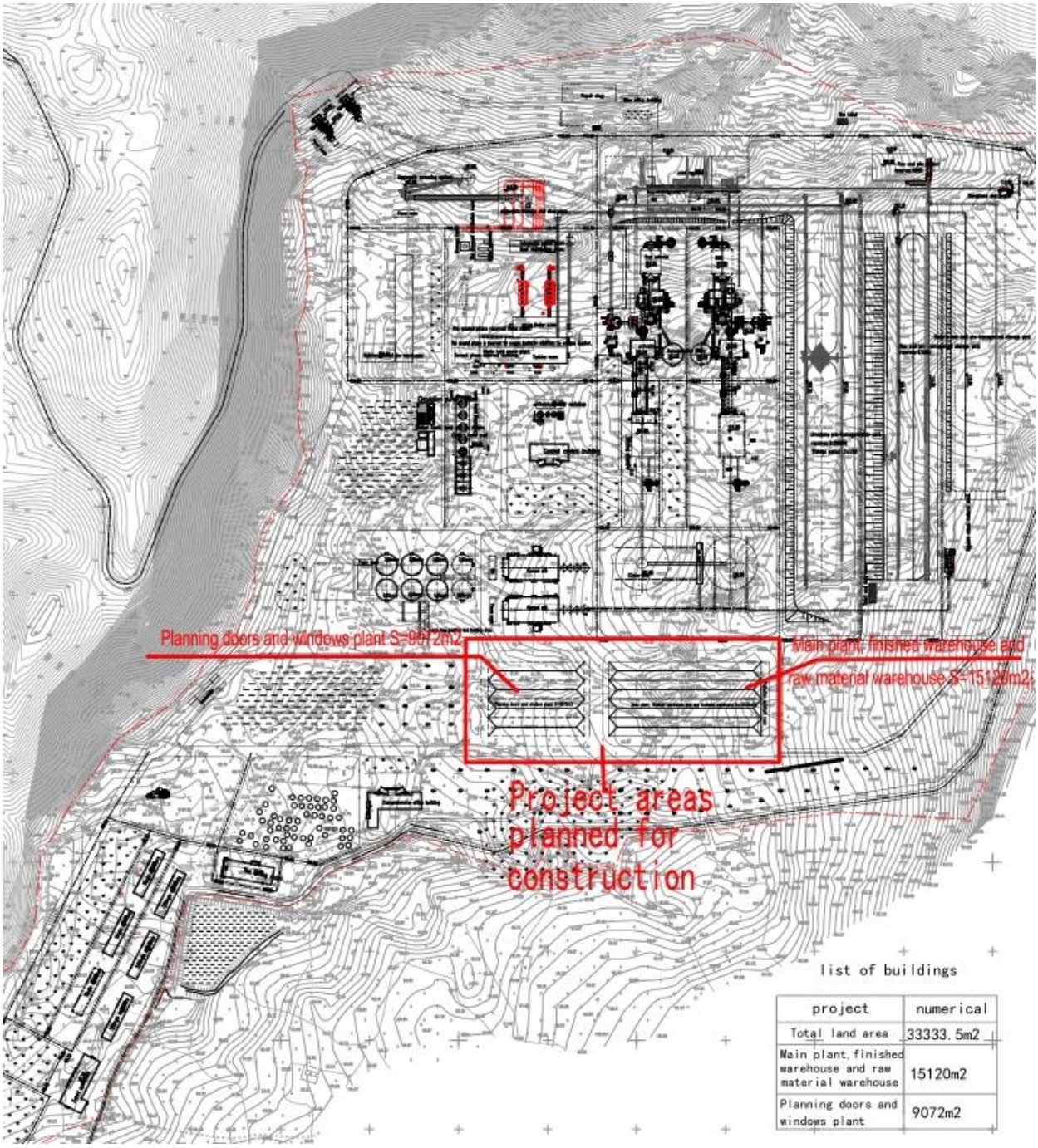


Figure 3-2 Myanmar Conch (Mandalay) Green Building Materials Co. Ltd General Layout

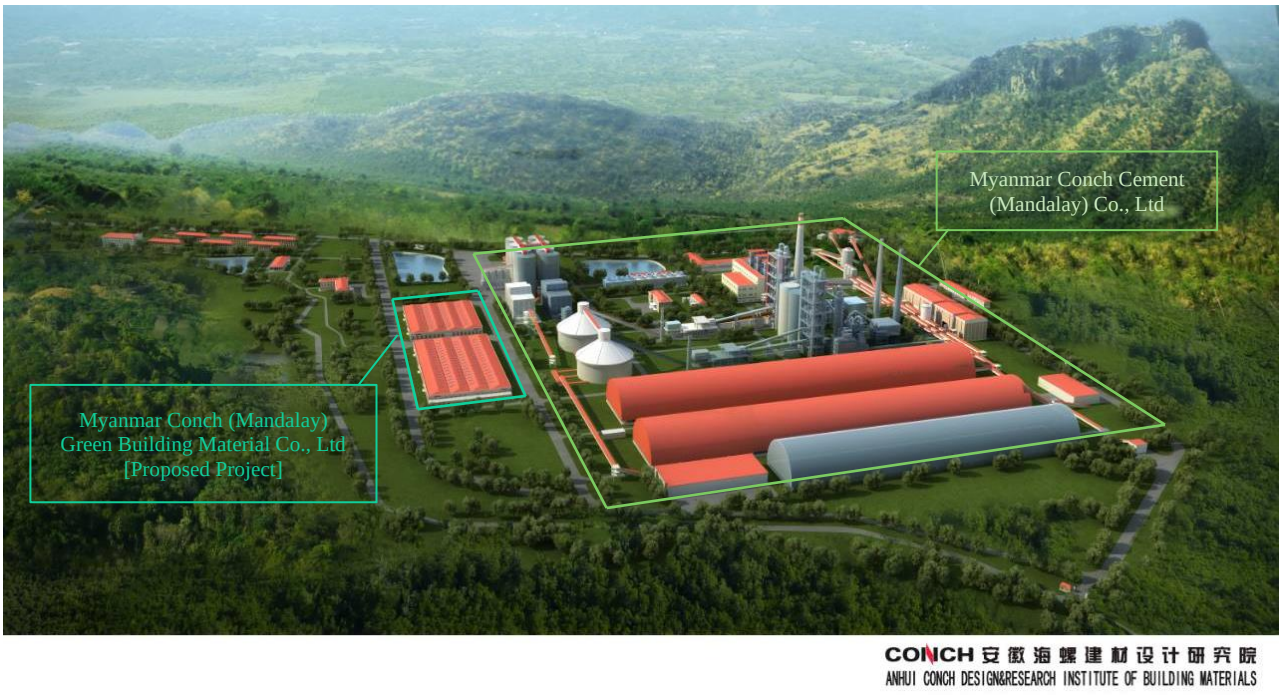


Figure 3-3 Aerial view of proposed project design (inside the compound of Myanmar Conch Cement (Mandalay) Company Limited)

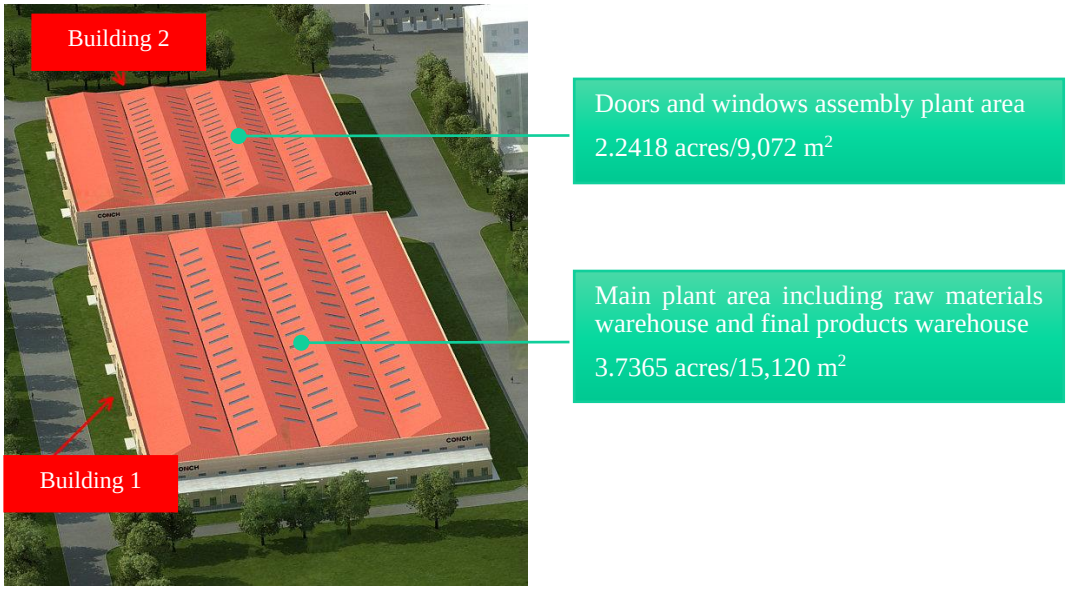


Figure 3-4 Aerial view of proposed project Plant Design (Building 1 & 2)

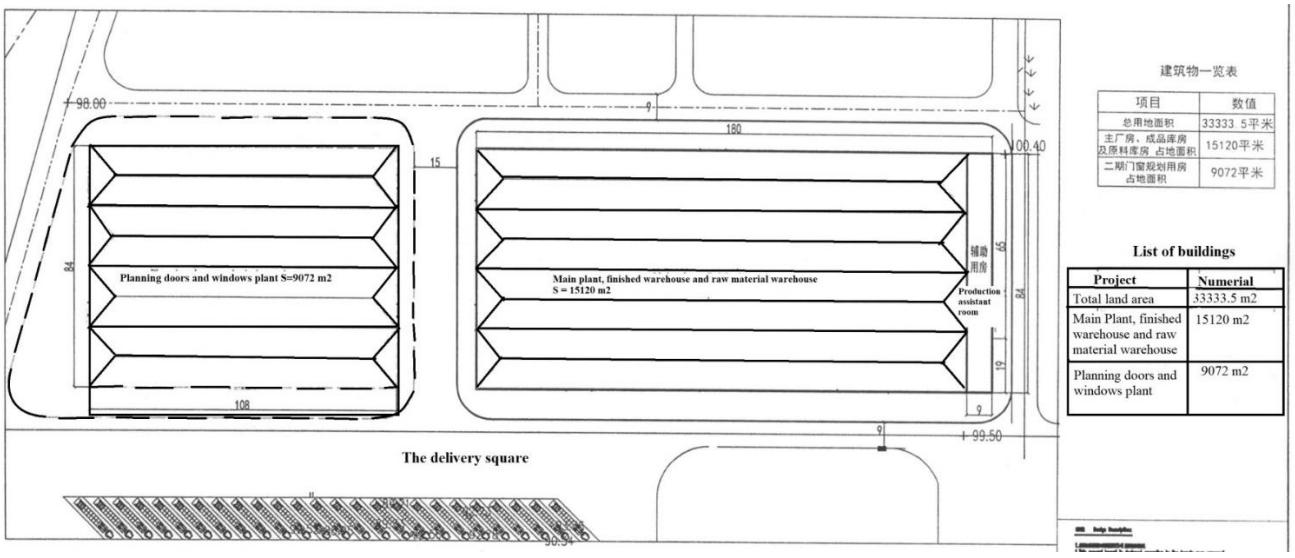


Figure 3-5 General Layout of two light steel structure buildings

3.5 Project Development and Implementation Schedule

Project Task	2017	2018	2019	2020
Project Planning				
Project Construction				
Transition Period				
Project Operation				

3.6 Expected Workforce and Working Hours

Phase	Local Employees	Foreign Employees	Total
During Preparation	1	5	6
During Construction	10	9	19
During Transition	54	16	70
Operation Phase	89	15	104
Note: This schedule is based on an eight-hour working schedule.			

3.7 Construction Activities

The proposed project is planned to construct two light steel structure buildings with installation of five PVC profile extrusion lines, four PVC pipe extrusion lines, six sets of PVC pipe injection molding equipment and two plastic steel doors and windows production lines. Construction details are as below Table 3.2.

Table 3.2 Details Construction and Installation List

No	Construction Project	Main Project Construction

1	Extrusion line of UPVC profiles (5500 t/a)	Bag emptying station and material handling equipment
		Profile extrusion line Twin screw extrusion line Vacuum calibration table Profile Haul-Off Profile Cut-off device Profile Tilting Chute
		Color co-extrusion of profiles Drying fan Single screw co-extruder
2	Extrusion line of UPVC pipe (4500t/a)	Vacuum conveying raw material of plastic piping
		Extrusion of PVC pipe Twin screw extrusion line Vacuum sizing machine Traction cutting unit Pipe expanding machine Pipe tilting chute
3	Injection molding for PVC pipe fitting (550 t/a)	Extrude granulator Twin screw extrusion line Hot cut granulation machine Cooling storage unit
		Injection molding for PVC pipe fitting
4	Plastic doors and Windows assembly equipment (100000 m^2/a)	Processing and making plastic doors and Windows Cutting saw Lock groove processing machine Sink milling machine Lock groove processing machine Welding machine Corner stitching machine Doors and Windows assembly table
5	Subsidiary facilities of the production line	Water refrigeration and water supply circulation system
		Air compressor station
		Distribution system
		Waste breakage and recovery equipment

		Lightweight steel construction workshop
		Factory Road, etc.

3.7.1 Construction Material and Equipment Use

Table 3.3 Main construction machinery equipment

No.	Device Name	Model	Quantity	Country Origin	Rated Power (KW)	Capacity	For Construction Parts
1	Excavator	SK200	1	China		$1m^3$	Earth Excavation
2	Self-unloading car	8T	2	China			Earth Transport
3	Mortar mixer	UL200	1	China	3	$6m^3/h$	Mortar stirring
4	Welding machine	UN-100	1	China	100		Steel Bar Processing
5	Bending Machine	- M type	1	China	7.5		Steel Bar Processing
6	Cutting machine	- type	1	China	5.5		Steel Bar Processing
7	Mechanical Straightening Machine	Gj6-4/12	1	China	5		Steel Bar Processing
8	Bending Hoop Machine	- type	1	China			Steel Bar Processing
9	Wire Set Machine	6-32#	1	China			Steel Bar Processing
10	Electroslag Pressure Welding Machine	ZXT630	1	China	45		On-Site Reinforcement vertical Welding
11	AC Welding Machine	bx3-500	8	China	32		On-Site steel construction system Installation
12	Ramming machine	HW280	1	China	3		Earth Backfill

13	Submersible	QY-3	5	China	2.2	50m^3/h	Drainage of Foundation Pit
14	Sewage pump	WQ15	5	China	3.5	60M	Drainage of Foundation Pit
15	Flashlight Saws		2	China			Woodworking Processing Workshop
16	Electric Circular Saw	DZ8802	2	China			Woodworking Processing Workshop
17	Hand Drill	DD2027	1	China			
18	Steel Pipe Cutting Machine	Three-phase 400#	1	China			
19	Insert Type Vibrator	ZN50	8	China	2.2kw		Concrete Vibration Ramming
20	Plate Vibrator	2.2kw	1	China	2.2kw		Concrete Vibration Ramming
21	Vibrating Rods	4-12 m	- Root	China			Concrete Vibration Ramming
22	Air Compressors	3M^3	1	China	7.5		Foundation pit

3.7.2 Construction Phase Environmental Impact and Mitigation Measures

3.7.2.1 Dust and Noise

The main pollutants during the construction phase are dust and noise. The main prevention measures are:

Dust control:

- Control the speed of construction vehicles;
- Regularly sprinkle water on roads to reduce dust.

Noise control:

- Acoustic insulation treatment of on-site generator equipment;
- Adopt advanced technology and equipment to reduce equipment noise during construction.

3.7.2.2 Sewage System

Sewage from the construction of staff quarters and toilets flows directly into the domestic sewage pool next to the building through pipes, and is then collected into the domestic sewage treatment equipment for disposal. The treated clean water is then drained to the plant drainage network.

3.8 Operation Activities

3.8.1 Raw Materials

The raw materials needed for production will be mainly purchased from China or Thailand and then processed into plastic steel profiles, PVC pipes, and PVC pipe fittings. PVC, calcium carbonate, CPE, stabilizer, ACR, and ultramarine needed for production are purchased from China or Thailand, and then self-produced mixed materials are processed into plastic profiles, PVC pipes, and PVC pipe fittings.

Table 3.4 Main Raw Material requirements

No	Description	Unit	Requirement for one day (Ton)	Requirement for one year (Ton)	Location	Duration of Agreement	Remark
1	PVC-mixture	ton	15.00	4500.00	Regional import procurement from China or Thailand	50 Year	PVC, CPE, ACR, stabilizer, ultramarine, $CaCO_3$
2	Pipe-mixture	ton	18.33	5500.00	China Regional import procurement	50 Year	PVC, CPE, ACR, stabilizer, ultramarine, $CaCO_3$
3	Lined steel	ton	1.00	300.00	China Regional import procurement	50 Year	
4	Hardware	ton	66.67	20000.00	China Regional import procurement	50 Year	
5	Glass	m^2	283.33	85000.00	Imports from Malaysia or local procurement from the	50 Year	

					Myanmar region		
6	PVC	ton	22.17	6652.00	Regional import procurement in Thailand	50 Year	
7	Calcium carbonate	ton	7.94	2381.00	Regional import procurement in Thailand	50 Year	
8	Titanium dioxide	ton	0.57	171	Regional import procurement from China or Thailand	50 Year	
9	Chlorinated Polyethylene	ton	1.62	486	Regional import procurement from China or Thailand	50 Year	
10	Stabilizer	ton	0.85	254	Regional import procurement from China or Thailand	50 Year	
11	Plastics Additives	ton	0.50	150	Regional import procurement from China or Thailand	50 Year	
12	Ultramarine	ton	0.18	54	Regional import procurement from China or Thailand	50 Year	

Remark: PVC – Polyvinyl Chloride, CPE – Chlorinated Polyethylene, ACR – Acrylics Processing Aid (Resin)

3.8.2 uPVC Profile Production Process

3.8.2.1 Input Process and Inspection

When PVC, titanium dioxide, calcium carbonate and other types of raw materials reach to the factory, all kinds of raw materials in the pallet will be discharged through the forklift, then plug into the

storage area in the raw material warehouse. All kinds of raw materials have a corresponding independent storage area. After unloading, the laboratory inspectors will inspect each batch of raw materials for sampling, according to the factory inspection standards. The materials can be put into use after qualified by testing such as the use of thermal stability tester, sieve tester, Whiteness meter, moisture tester, etc.

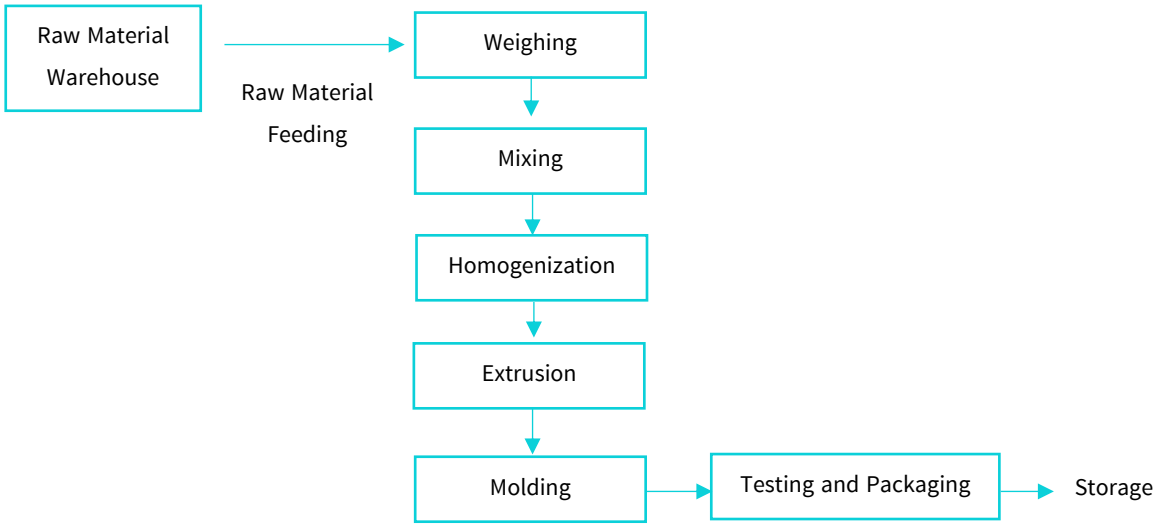


Figure 3-6 uPVC Profile Production Process Flow Chat

3.8.2.2 Raw Material Feeding

PVC main raw materials poured into the pit, using roots blower through the transmission pipeline. In order to avoid the dust emission, the filtered air is discharged through the fan, and the raw material in storage is periodically cleaned up to the dump pit and transported to the raw material storehouse. Titanium dioxide, calcium carbonate, processing auxiliaries and other types of small materials transport through the freight elevator to mixed material building, after the manual opening of the bag. In order to avoid dust emissions, setting up a centralized dust collection device connected to the process of inverted dust is drawn to the central dust collector. The air filtered through the filter bag is emitted into the outside through the fan.

3.8.2.3 Raw Material Weighing

By means of the roots fan, PVC from raw material storehouse suction to the PVC weighing (I scale) system, by coarse, Fine said to reach the raw material per batch set value, error control within 5. Titanium dioxide, calcium carbonate, processing aids and other types of small materials through the spiral reamer to the weighing system (II, III scale), by coarse, Fine said to achieve the raw material set value, error control within 5%. In order to avoid dust emission and ensure weighing accuracy, I, II, III scales are equipped with dust collection devices, the gas after the dust treatment in the back row out.

3.8.2.4 Mixing System

After the materials are mixed by high-speed stirring and kneading to reach the state of pre-gelation, then enter to the cold-mixing system and are cooled to make a dry blend. After cooling, the dry blend is sent to the dry blending warehouse by positive pressure air for dispersion and homogenization.

3.8.2.5 Homogenization

The dry mix which is screened by the vibrating screen, and it is transported to the dry mixing storehouse through the root blower, which is further homogenization and maturation, and is used after the curing effect. In order to avoid the dust discharge, the dry mix storehouse roof sets up the dust collection installment, the gas after the dust disposal treatment rear row out.

3.8.2.6 Extrusion

Homogenization of the dry mixture through the pipeline system, the use of roots fan-generated negative pressure to the middle of the extrusion steel platform, the warehouse set up a dust collection device in order to avoid dust discharge. The dry mixture in the middle silo is distributed to the small hopper of each extruder through separating wheel and screw conveying system, and the dry mixture in the small hopper is entered into the extruder screw barrel by feeding screw shear and the tube area (150-200°C) to make the material plasticized.

3.8.2.7 Molding

After plasticizing the high temperature material squeezes into the mold molding under the high pressure, the molding type billet by the traction enters the dry setting, the dry setting in the cooling water, causes the mold billet to shape quickly, after the dry shape shaping profile enters the cooling water box further will distribute the material interior heat.

3.8.2.8 Traction and Cutting

After the profile exits the cooling water tank, it is towed by a tractor, and then cut into a set length by a cutting machine. To eliminate cutting noise and saw dust, the equipment is all hot-melt and dustless.

3.8.2.9 Testing, Packaging, Storage

After cutting the product to a short stay in the stacker, after the inspection by the inspector of functional size, by packing staff to pack, through the trailer into the warehouse by region stacking.

3.8.3 Pipe Production Process

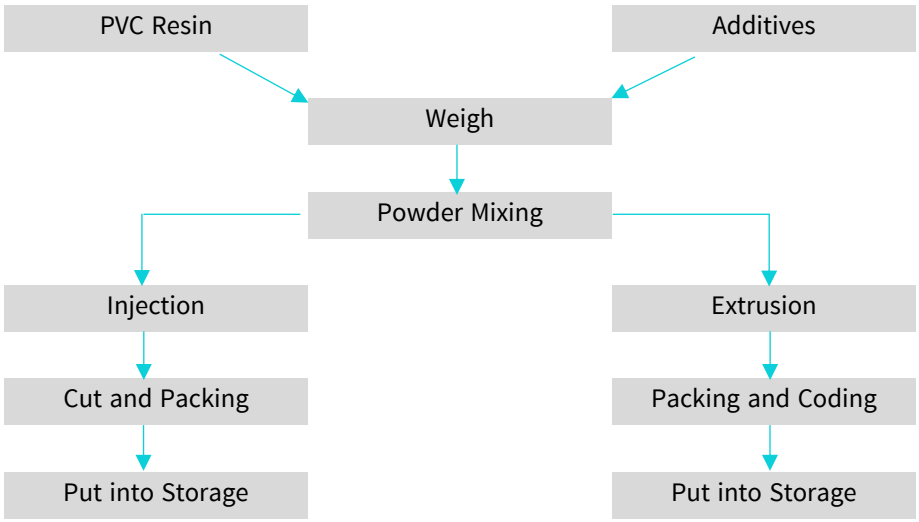


Figure 3-7 PVC Pipe and Pipe Fitting Production Process Flow Chat

3.8.3.1 Mixing Process

At high-speed mixing, the additives put into the gap of PVC resin, so that additives in the resin evenly dispersed. The general hot mixer temperature is set at 100-120°C. In order to make the auxiliaries fully contact with the PVC particles, reduce the filter to the auxiliary agent adsorption, should be added to the PVC resin that starts the hot mixer, and then according to the following order: stabilizer, a variety of processing aids, color materials, fillers. In the actual production, most of the raw materials are all put into the hot mixer, hot mixer release of the mixture temperature is very high, the need for immediate cooling, if the heat is not timely will cause material decomposition and additives volatilization. Cold mix general control in the material temperature of about 40°C when the material under treatment completed.

3.8.3.2 Extrusion and Molding Process

Extruder Screw is divided into three sections: Feeding section (Feeding section), Melting section (compression section), Metering section (homogenization section), the three sections corresponding to the material composed of functional areas: solid conveying area, material plastic zone, melt conveyor area. The barrel temperature of the solid conveying area is generally controlled at 120-160°C. If the feeding temperature is too low, the solid transport zone is prolonged, the length of the plasticizing zone and the melt transport zone is reduced, and poor plasticization is caused, which affects the product quality.

The temperature control of the material plasticizing area is 170-190°C. Controlling the vacuum degree of this section is an important process index, if the vacuum degree is low, it will affect the exhaust effect, resulting in the gas bubble in the pipe, which seriously reduces the mechanical properties of the pipe. In order to make the gas inside the material easy to escape, should control the material in

the section of the Plasticizing degree can't be too high, but also often clean exhaust pipe to avoid obstruction. The vacuum of the barrel is generally 0.08-0.09 MPa.

Melt Conveyor Zone temperature should be slightly lower generally 160-180°C. In this section to improve the speed of the screw, reduce the head resistance and in the plastic zone to increase the pressure is conductive to the increase in transmission rate, for PVC such thermal plastic, should not stay in this section for too long, screw speed is generally 20-30 r/min. Die is an important part of extrusion molding, its role is to produce high melt pressure and make the melt forming the desired shape. Each part of the process parameters is: Die Connector temperature 165°C, mouth mode temperature 170°C, 160°C, 180°C, 190°C.

3.8.3.3 Molding Process

The tube that is squeezed out of the die dies is cooled to harden and shape. In general, the fixed diameter sleeve is used for the outer diameter setting and the inner diameter setting. The diameter of the structure is simple, easy to operate, widely used in China, diameter of the fixed diameter jacket length of the general diameter of the 3 times, the diameter of the set diameter should be slightly larger than (generally not more than 2mm) pipe diameter of the nominal size. The cooling method of tube has the water immersion type cooling and the spray type cooling, the more commonly used is the spray type cooling.

Vacuum cooling molding is to vacuum tank, so that the outer wall of the tube is adsorbed on the inner wall of the stereotypes sleeve to achieve cooling stereotypes. Vacuum molding process conditions generally: vacuum degree 20.2-53.3 kpa, water temperature 15-250°C, the vacuum tank in the fog-like the best. If the vacuum degree is small, resolution in small diameter, less than the standard size, on the contrary, if the vacuum degree is large, pipe diameter is large, even the phenomenon of swelling. If the water temperature is too high, it will cause cooling bad, resulting in deformation of the tube easily.

3.8.3.4 Traction Technology

The function of the traction device is to provide certain traction and traction speed to the pipe extrusions, and to draw out the pipe evenly, and adjust the wall thickness of the pipe by adjusting the traction speed. Traction speed depends on the extrusion speed, the general traction speed of 1%-3% faster than the extrusion speed.

3.8.3.5 Cutting Process

By the travel switch according to the requirements of the length of control, automatic cutting, and delayed rollover, the implementation of water production, cutting machine to set long-term switch signal as the instructions, complete the cutting process, in the cutting process with the pipe to maintain synchronization, cutting machine is equipped with a dust-absorbing device, and the debris produced by cutting is sucked out in time and recycled.

3.8.3.6 Roasting Expand Process

The turning of the material frame is realized by the air path control of the cylinder, the material is set up with a limit device, the cutting saw cut the pipe after baking to expand the tube, after the delay, the cylinder into the work, the realization of the movement of the material, to discharge the purpose of unloading, after the delay of a few seconds automatically resets, waiting for the next cycle.

Figure 3-8 Pipe Extrusion Process

3.8.4 PVC Pipe Fittings Production Process

PVC pipe fittings are produced by injection tooling: the PVC dry blend material is heated in the barrel of the injection tooling machine and the shear heat generated by the rotation of the screw plasticizes the resin material into a melt and then applies a certain pressure. The injection of the melt into the cavity with the shape of the tube is the injection molded part after cooling and shaping.

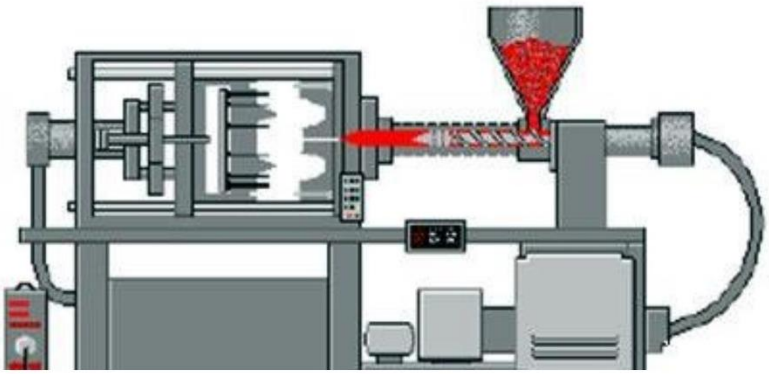


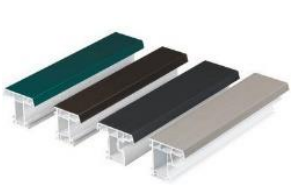
Figure 3-9 Injection Molding Machine

3.8.4.1 Main structure of equipment

General injection molding machine including injection device, mold clamping device, hydraulic system and electrical control system and other parts. The basic requirements for injection molding are plasticizing, injection and molding. Plasticizing is the prerequisite to realize and guarantee the quality of molded products, and in order to meet the requirements of molding, injection mist ensure sufficient pressure is very high, the corresponding in the mold cavity produces very high pressure (the mold cavity average pressure in general between 20-45 MPa), so must have large enough clamping force. Thus, the injection devices are the key parts of the injection molding machine.

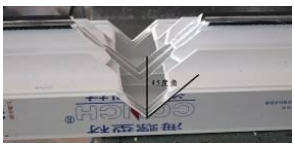
3.8.5 Door and Window Production

(1) After the profile produced in the factory, pass the inspection. According to the design drawing of the windows and doors, use CNC double-angle saw to cut material accurately at a 45- or 90-degree angle.

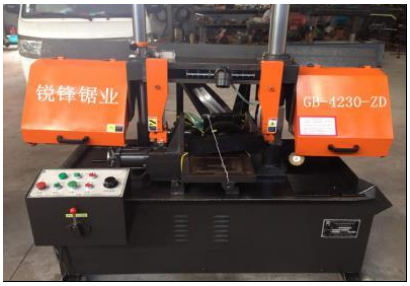


(2) Frame, sash, and mullion need to use flume milling to make drainage channels and pressure balance holes.

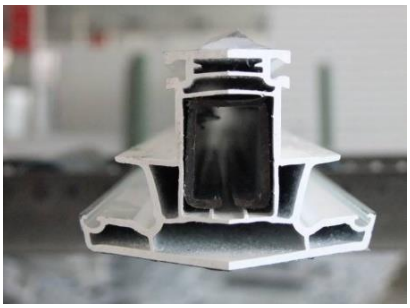
(3) The windows with mullion need to cut with a V-port saw, and it is use for welding V-slots of mullion.



(4) According to the drawing, use of lined hacksaw to cut galvanized steel reinforcement.



(5) Reinforcement into the chamfer.

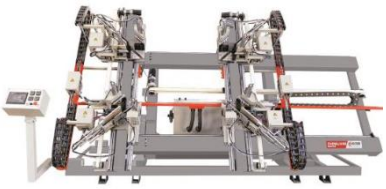


(6) Secure the reinforcement with the NC screw fastening machine.

(7) Use profile milling to make keyhole slots and handle mounting holes.

(8) Production of door and window assembling hole.

(9) According to different window types, select the corresponding welding machine to perform the welding and molding of the door and window frame, sash and mullion.



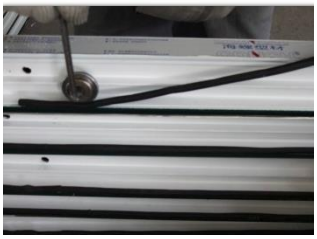
(10) Cleaning of Welding Angle

In window frames, after the casement welding, through the special angle seam cleaning machine to clean the weld, the plane will have a weld clearance angle of about 0.3 mm, groove width 2.5-3 mm, contour clear rules, box, fan outer welding tumor cleaning about 3-5 mm, to ensure that the doors and windows forming beautiful, door and window assembly and use requirements. According to the color of extrusion color profiles, choose the same color, to ensure consistency. The use of equipment for: V-angle clearing machine, CNC angle-clearing machine.




(11) Accessory Parts, Hardware Assembly

The assembly of the auxiliary parts of the window includes the installation of the sealing strip, the installation of Tops, the assembly of glass blocks and other ancillary materials,





(12) Glass Bead and Glass Assembly

According to the size of the door and window after the clear angle, calculate the length of the glass layering, install the strip, cushion the glass pad, install the glass, and install the layering.

(13) Packaging and Warehousing

After the finished product inspection, in order to avoid in the transport, the installation process is dirty, scratches, damage, etc., the use of non-corrosive soft materials to the door and window packaging. The doors and windows are place in ventilated, rain-proof, dry, flat, non-polluting places, do not allow open storage, strictly prohibited contact with corrosive substances. The storage environment temperature should be less than 50°C; the distance heat source should be less than 1m. Products should not be less than 100 mm. Products should be placed, the vertical angle should not be less than 70°C, and there are measures to prevent dumping.

3.9 Water Consumption and Sources

It mainly includes 5 PVC profile extrusion production lines, 4 UPVC pipe extrusion lines, 2 cooling towers, total project water consumption of 135 m^3/d, and 41,400 m^3 per year. Water requirements are shown in the following table:

Table 3.5 Water Demand Table

No	Water Project	Water Consumption (m^3/d)	Instructions
1	Extrusion line of UPVC profiles	50	Freshwater cycle; Replenish water
2	Extrusion line of UPVC pipe	40	Freshwater cycle; Replenish water
3	2 glass steel cooling towers	10	Replenish water after evaporation
4	Living water	20	Mainly sanitary water
Total		**120**	Total water demand for project
		138	Unrecognized water is 15% of the total
Outdoor fire-fighting water is unconventional water consumption and no water requirement. Greening and pouring roads and other water, and using recycled water as much as possible.			

3.10 Energy Consumption and Sources

The UPVC profiles and UPVC pipe average power consumption is 380 kWh/t. An annual output of 4500 tons of the UPVC profiles, 5500 tons of UPVC pipe, total 3.8 million kWh electricity demand will be used. Pipe injection of average tons of product power consumption for 1000 kWh/T, with an annual output of 550 pipe fittings, will consume electricity 550,000 kWh, total annual power demand of 4.35 million kWh is estimated, so the average daily use of electricity is 14500 kWh (Assume 300 days per year operation).

3.11 Environmental Protection Measures during Operation Phase

3.11.1 Air Emission and Mitigation Measures

3.11.1.1 Dust

In the raw material unloading link, the indoor unloading way is taken to reduce the dust outside. The mixture is transported by a pipe chain (or vacuum), which is airtight and does not produce dust. The material conveying line and metering device of the raw material storehouse are transported by the wind conveyor of fan. Dust mainly emits from the raw material warehouse and metering process and main equipment use advanced dust removal facilities. Due to dust collection system, the highest concentration of emissions in the outside perimeter of the project site is less than 1.0 mg/m^3. At the same time, Workshop is equipped with mechanical ventilation equipment. By means of air ventilation equipment and air exchange outside the workshop, it ensures a good working environment in the workshop.

3.11.1.2 Hydrogen Chloride

In the extrusion process, PVC resin molding will produce a small amount of hydrogen chloride gas. This is due to the addition of stabilizers in the ingredients. The heating temperature and heating time is controlled and closed production technology is used. According to the analogy of similar project data, the concentration of hydrogen chloride in the production workshop is 6-7 mg/ Nm3. Only the volatile trace of hydrogen chloride gas is through the workshop ventilation equipment after the proliferation. The concentration of the highest point of no tissue discharge is less than 0.2 mg/ Nm^3 in the perimeter. So, the impact of hydrogen chloride on the ambient air is Negligible.

3.11.1.3 Non-Methane Total Hydrocarbons

In the production process, PVC resin particles are heated to a thermoplastic temperature of 200- 220 C. Although the raw material is higher than the heating temperature, basically the plastic composition does not decompose. According to the analogy of similar project data, the concentration of non-methane total hydrocarbon in the production workshop is not more than 4 mg/m^3. So, the non-methane total hydrocarbon has less influence on ambient air quality.

3.11.2 Noise

The project will select low noise equipment and take damping measures for noise-generating equipment. The main noise source of strong 95dB (A) are raw material conveying system roots blower, extruder and auxiliary facilities chiller, air compressor, profile cutting and other equipment. Noise through doors and windows insulation in the building, vibration reduction and other measures, the noise can be reduced to 20-25 dB(A). After the distance attenuation, the factory boundary noise can meet GB 12348 "Industrial enterprises factory boundary environmental noise emission standards" categories 3 and 4. So, there will not be noise nuisance problem.

3.11.3 Effluent Discharges and Mitigation Measures

In the production process, cooling water is used but does not produce waste water. The main waste water is from living sewage. It can be discharged into the sewage treatment station through municipal pipelines for centralized treatment. However, for this project, septic tank will be used.

3.11.4 Waste Disposal and Mitigation Measures

The yield of this project is about 98%. The production process does not produce solid waste. Some defective and residual cutting materials are crushed and milled back to use. The solid waste generated by the project is mainly from domestic waste.

3.12 Decommissioning and Post Closure Activities

At the end of the life cycle of the PVC Plant, all the assets in the site will be decommissioned and the site will be restored (to the extent possible) to its original condition or better. Remediation of any contaminated soils will be carried out. All efforts will be made to restore the site to a level such that it can be put to useful purposes like industrial, housing or recreational use. To demonstrate the fitness of the land for the intended future use, post-closure monitoring will be carried out before transferring the land to the next landowner.

3.12.1 Decommissioning

Decommissioning activities, which involve dismantling of equipment and structures will be more or less similar to the construction phase activities. Consequently, similar environmental impacts and management plan will be applicable. However, the duration of decommissioning will be much shorter compared to the duration of construction activities.

The decommissioned equipment and the waste materials generated will be recycled to the extent possible, and the non-recyclable wastes will be disposed according to the waste management plan.

The decommissioning will be contracted to a qualified contractor, who will be responsible for environmental management.

3.12.2 Site Restoration

After the removal of structure and the equipment from the site, all above ground steelwork and concrete will be entirely removed from the site. Foundations will be excavated up to the level of the surrounding land, and back-filled with compacted granular fill, or other suitable material according to the type of ground. Waste materials generated during site abandonment and restoration shall be disposed according to the waste management plan in. The site will be leveled off.

3.12.3 Soil Conditioning

Any soil found to be contaminated with hydrocarbons or any other chemicals would be removed from the site, and replaced with virgin soil. The contaminated soil will be treated or disposed according to internationally accepted practices. Vegetation will be grown on the restored site for soil stabilization.

3.13 Project Alternatives

3.13.1 No Project Alternative

The 'No Project' alternative means that the region will continue to have no Green Building Materials manufacturing project and the country will lose Foreign Direct Investment (FDI) worthy of 3.3 million USD (capital in-cash) and 7.24 million USD (capital in-kind) totaling 10.54 million USD. Actually, total investment is 16 million USD. The local environment would remain in its present condition. In sum, there will be no economic growth as a result of the proposed project development.

3.13.2 Alternative Locations

The site chosen for the Project is considered to be the site which offers the best availability of the land lease. It will be insignificant disruption to the natural environment and some minor impact to the local community but it can be manageable.

3.13.3 Alternative Technologies

3.13.3.1 Extrusion

According to the numbers of extruder screw, plastic extruder includers single screw extruder, twin screw extruder and twin conical screw extruder.

Single Screw Extruder	Single screw extruder is used whenever some pure form of polymer has to be extruded. It basically has three zones, feed zone, compression zone and the metering zone. In addition to that they may have additional zones to improve the quality of output. Mixing zones may be introduced which makes sure that the melt is uniform.
Twin Screw Extruder	Twin screw extruder is used in compound production whenever two or more compound is to be mixed and extruded to form a pellet. While having two screws rotating in the heated barrel, they provide a wider range of possibilities regarding the output rates, mixing efficiency and the heat generation. According to the direction of rotation of the twin-screw, the extruder can be divided into two extruders: the same direction and the opposite direction. The axis line is parallel to the twin-screw extruder, and the axis line intersects as a cone. Twin-screw extruder which is equipped with automatic loader and is driven by main motor. The electric controlling system consists of a set each of frequency inverter, contactor and temperature controlling meter. The temperature controlling meter has the function of achieving the temperature adjustment precision. Thus, helping to enhance the efficiency

	of production and also giving a gloss and stability to the profiles.
Twin Conical Screw Extruder	Twin conical screw extrusion is a very impressive as it provides a complete solution for producing the uPVC profiles. The part list of the production line includes twin conical screw extruder and a vacuum fixed stand. There is also haul-off unit present, cutting machine and the tilter table. The electric system of the production line consists of temperature controlling meter, breakers and contactors.

3.13.3.2 Molding

(a) Compression Molding	The compression molding tool makes even stiff and high durometer plastic materials perfectly vulcanized and dimensionally stable. Compression molding is basically curing in a heated mold cavity under pressure. The preheated material is inserted into mold, closed and then cured under pressure. The result is always a high-quality, long-lasting plastic product that can be used in various industries.
(b) Injection Molding	The methodology of injection molding is very straightforward: the hot liquid compound is injected into a closed cavity where it is vulcanized. The result is a dimensionally stable, perfectly cured with no need of much aftercare. Injection molding is ideal for producing high volumes of the same product such as pipe fittings.

3.13.4 Description of the Preferred Alternative

The project applies the dry powder of resins in the manufacture of PVC building materials. The alternative of other process in the profiles, pipes, doors and windows production was evaluated. Polyvinyl chloride, or PVC, is one of the most popular plastics used in building and construction. It is used in drinking water and waste water pipes, window frames, flooring and roofing, wall coverings, cables and many other applications as it provides a modern alternative to traditional materials. These products are often lighter, more cost Effective and offer many performance advantages.

Location	The project site is in a good location, in Patheingyi Township, about 26 miles from the city of Mandalay and about 3.9 miles from the No. 31 National Highway, transportation is extremely convenient. The availability of land lease and infrastructure is the primary criterion for

	determining potential site for a new project. Therefore, the site is selected to build 8.3 acres area production line.
Extrusion	Single screw extruder has more widely usage for general plastic material and recycled plastic material extrusion which doesn't care about the compounding ability. Due to the advantage of less heat of friction, more uniform shearing, larger conveying capacity of screw, more stable extrusion, twin screw extruder more suitable for plastic material compounding and modification. Twin screw extruder normally adopts more advanced electric controlling system, as PLC extrusion computer or cabinet. All of the main parameters of extruder, like current, voltage, temperature, torque, rotate speed, can be easily found in the extrusion computer or cabinet. Twin screw extruder can also more effectively change the screw element combination and different accurate metering feeding hopper for various plastic material compounding.
Injection molding	Both compression and injection molding technologies are extremely common, therefore, mold costs are usually low. Compression molding allows creating large plastic products, whereas, injection molding is ideal for smaller plastic parts with tight tolerances. The production time of compression molding is significantly longer than that of injection molding. Moreover, the excess flesh around the parts must be trimmed manually in case of compression molding, slowing down the production cycle even more, making the process more labor intensive. Timewise injection molding is the more efficient technology because full automation of the process is possible. Compression molded products are rather blocky and simple. Whereas, injection molding enables manufacturing more complex parts. These products can have various wall thicknesses and can be a combination of different shapes. Injection molding creates a high production output while having a low labor cost and it is an easy process to repeat. It also helps to save resources for plastic molding, because the company will be able to recycle material or any unused molding plastic. Those items can be melted down and reground for possible future use; therefore, the project has very little wasted material. Another advantage to injection molding is the flexible design and the wide range of materials that can be used. Not only can injection molding help save a cost and time it

	also allows for mass production in a more efficient way, that way productivity may increase.
Plastics Crusher	In waste plastics recycling process, waste plastics crushing is one of the most important processes, the volume of waste plastic is reduced, which is convenient for subsequent processing. The equipment mainly includes the cutting machine and the crushing machine, whose basic principle is to destroy the material's integrity depend on the shear strength and the impact strength.
Cost-effective	PVC building materials has been a popular material for construction applications for decades due to its physical and technical properties, which provide excellent cost-performance advantages. As a material, it is very competitive in terms of performance when compared to price; its value is also enhanced by physical properties such as its durability, lifespan and low maintenance.

3.13.4.1 Conclusion

PVC has been the preferred material for construction products, interior design articles, window frames, fresh and waste water systems, and many more. It performs well technically, have good environmental considerations and very good economic properties.

4. DESCRIPTION OF NATURAL AND SOCIAL ENVIRONMENT

4.1 Setting the Study Area

This Chapter provides an overview of the surrounding conditions within the Project Study Area based on secondary data from published sources as well as primary data collected to fill data gaps. The establishment of the Area of Influence (AoI) for the Project (and thus the appropriate Project Study Area) is intended to ensure that the Impact Assessment (IA) focuses on those issues that are most important for design, decision-making and stakeholder interest.

The proposed project is planning to construct two light steel structure buildings and production facilities on 8.3 acres of Dahattaw village Tract, East Sue Khout Net, Patheingyi Township, Mandalay Region.

Temporal Boundary: In the construction phase and operation phase, the environmental impacts are expected to occur on the air quality, water quality, noise and vibration, waste and biodiversity due to construction and operation of the project. The socio-economic positive changes are expected to occur during the construction and operational period. Thus, the temporal boundaries of this EIA will be considered into the construction, operation and decommissioning phases to examine their impact on the environment.

Spatial Boundary: The AoI for a particular resource or receptor may vary depending on the nature of the change caused by the project activities and the type of effect being considered, but in each case, it is defined to include all the areas within which it is likely that impacts could result. The Project Study Area (hereinafter also referred to as 'Study Area') refers to the area that needs to be studied in order to adequately understand and describe the baseline conditions likely to be affected by the project. With the AoI established, the study area comprises two circles centered on the proposed project, with a radius of approximately 3 km for air quality, water quality, and socioeconomics, and 1 km for noise and biodiversity (see following Figure).

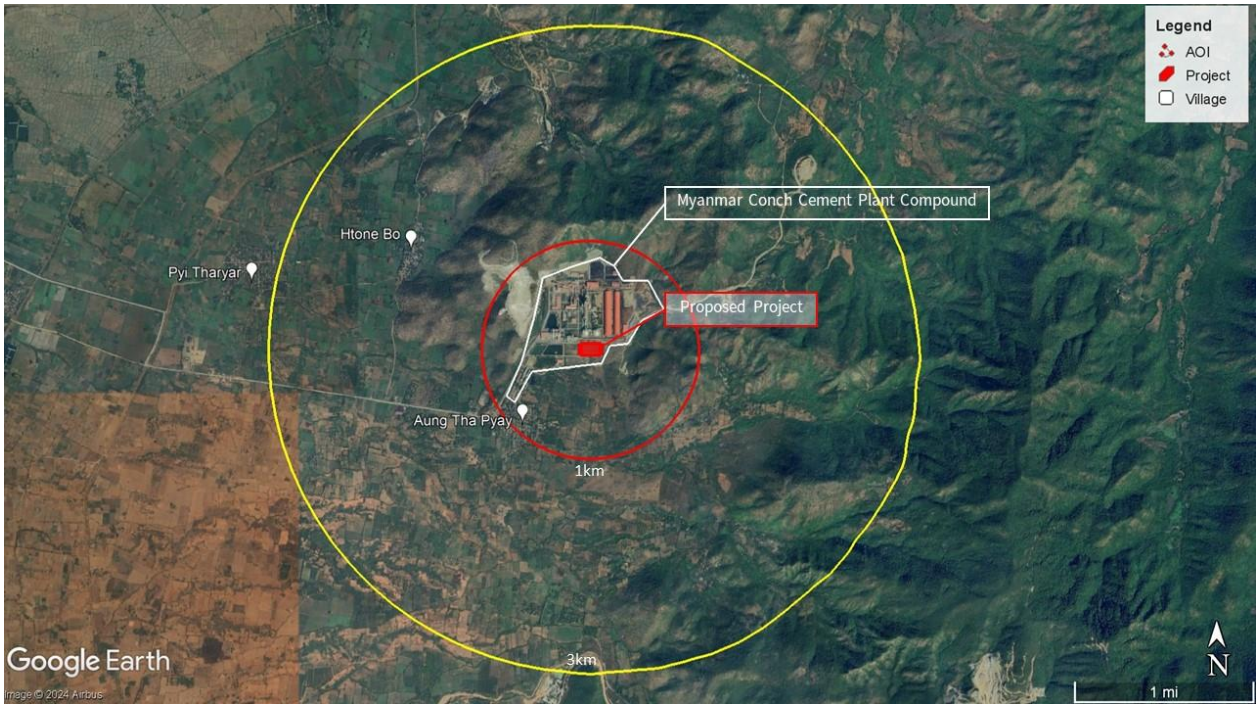


Figure 4-1 Project Study Area

4.2 Physical Components

4.2.1 Climate and Meteorology

Myanmar features numerous climate zones, including the temperate region in the north, the dry zone in central Myanmar, and monsoon-prone areas in the northwest, west, and south. Myanmar experiences a tropical wet climate with three distinct seasons: summer, rainy, and winter. Patheingyi Township is located in central Myanmar's dry zone, which has a tropical climate. The nearest meteorology station is located in Mandalay city. The maximum temperature in Mandalay is 34.4°C, while the minimum temperature is 22.5°C. Rainfall and temperature conditions until 2018 are shown below.

Table 4.1 Annual Rainfall, Temperatures, and Relative Humidity of Mandalay Region (2007 - 2018)

Station	2007-2018 Average			
	Annual Rainfall (mm)	Temperature (°C)		Mean Relative Humidity (%)
		Mean Max.	Mean Min.	
Mandalay	954	34.4	22.5	67

Table 4.2 Monthly Average Rainfall (2007-2018)

Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
7	2	6	39	157	76	70	190	166	211	22	9

Source: Department of Meteorology and Hydrology

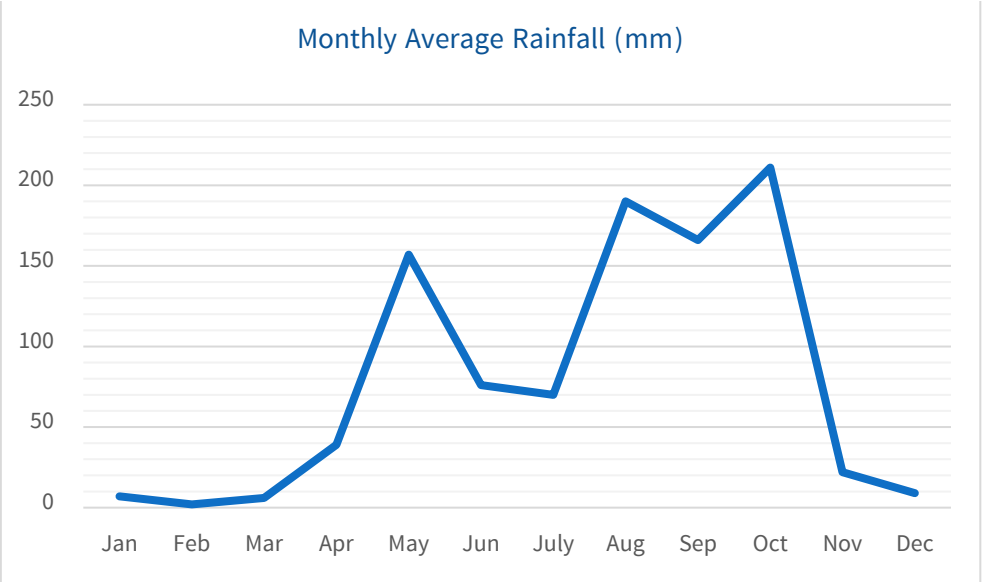


Figure 4-2 Monthly Average Rainfall (2007-2018)

Table 4.3 Monthly Mean Temperature (°C) (2007-2018)

Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
22.5	25.2	29.1	32.1	31.9	30.9	30.8	30.2	30.1	28.7	26.8	23

Source: Department of Meteorology and Hydrology

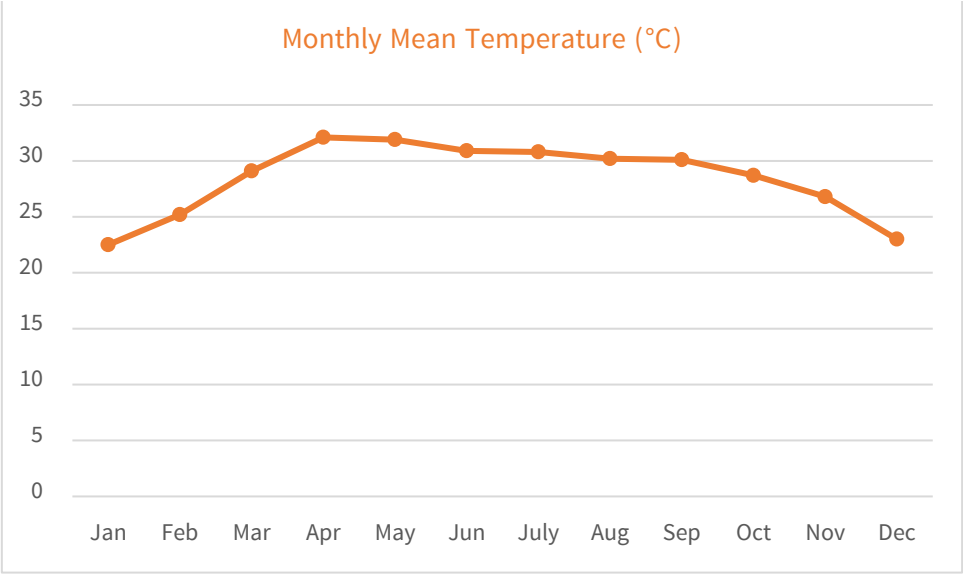


Figure 4-3 Monthly Mean Temperature (2007-2018)

4.2.2 Topography

Topography of project area belongs to isolated hill of Plateau limestone on low land terrain of Alluvial area and also at western part of the Shan Plateau range. The general elevation of the terrain is about below 100 meter and mostly flat region especially in the western part and the elevation of the eastern and northern part are 150 meters to 300 meters. The topographic map of the area is shown in Figure 4-4.

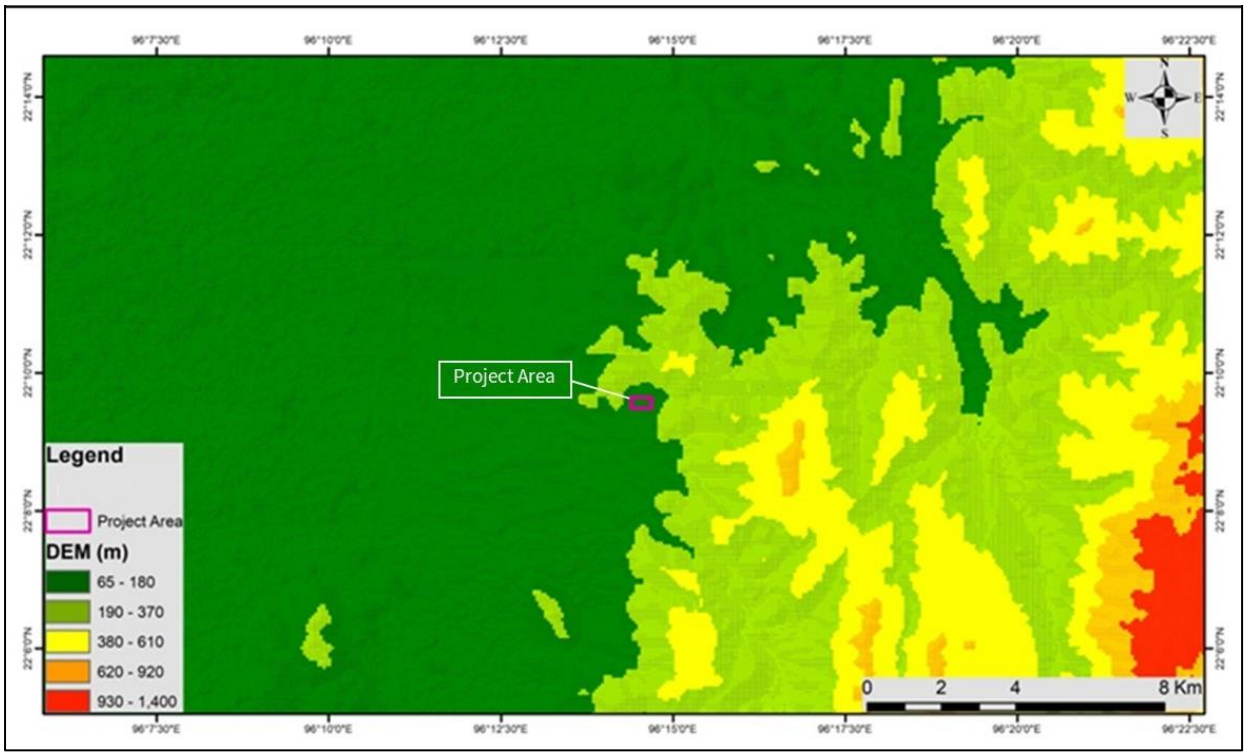


Figure 4-4 Topography of Project Area

4.2.3 Geology

Geology of the area is presented mainly based on previous literatures such as Chibber (1934) and Bender (1983), and technical reports of the geoscientists from the University of Rangoon (Yangon) and Department of Geological Survey and Mineral Exploration (DGSE). The project area is mainly covered with Permian Metamorphosed Plateau Limestone and its surrounding areas are covered by phyllite and metasedimentary rock belong to Molohein Group of Cambrian Age. The geological map of the project area is shown in Figure 4-5.

Alluvium (Quaternary): The Alluvium comprises fluvial deposits of mainly sand and clay. This deposit is occurred closely to the project site.

Plateau Limestone (Permian): Plateau Limestone Group consists of the limestone and dolomite is well exposed in this area. It is mainly composed of grey to brown color, fine to medium grained sized, massive and minor dolomitic limestone. The limestone is partially metamorphosed. The geological age of the limestone is Permian.

Molohein Group (Cambrian): A distinctive suite of lithostratigraphic units that occur between the Pindaya Group of Ordovician age and the typical Chaungmagyi Group at the central and northern portion of the Pindaya Range is referred to as the "Molohein Group" by Myint Lwin Thein (1973) and it is the southern Shan State's representative of Cambrian System. This group consists of pinkish, purplish, or reddish brown, highly micaceous, and very slightly regionally metamorphosed sandstones, white pinkish white or purplish white granular quartizite, subgreywacke, gritty sandstone and phyllite. Dolomite, limestone, and conglomerate are minor constituents.

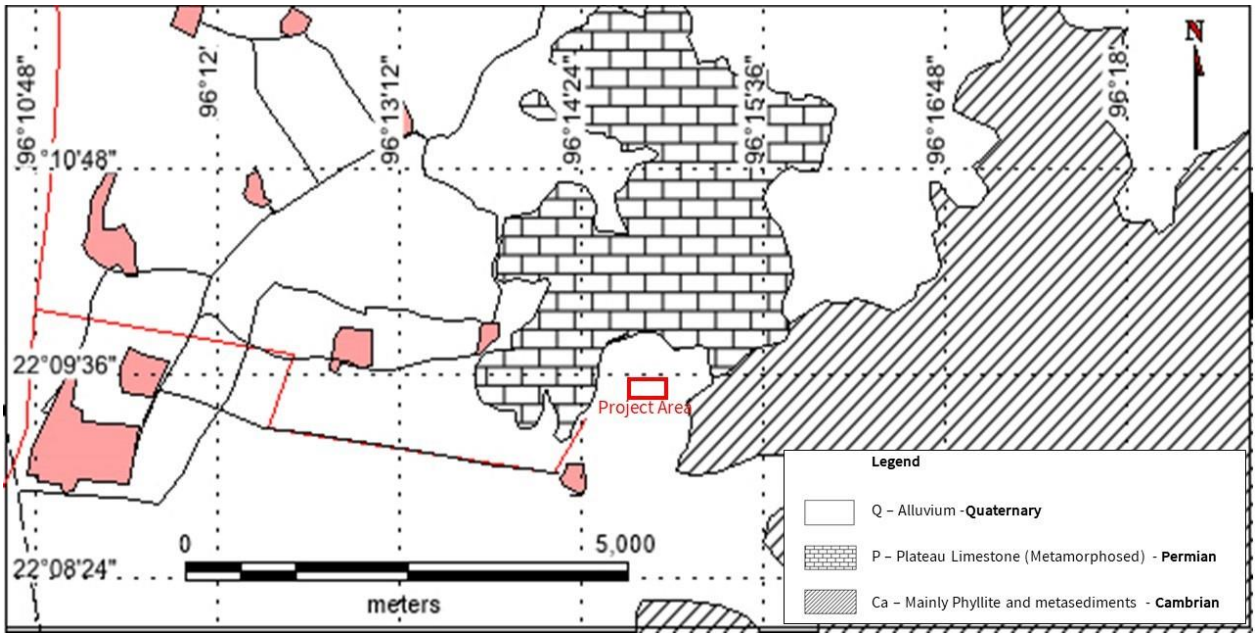


Figure 4-5 Geological Map of Project Area

4.2.4 Soil

4.2.4.1 Soil Type

The soil of the region varies according to aspect, slope and climate conditions. According to distribution of soil map as shown in Figure, Dark Compact Soils of tropical dry savannas, it is covered with the cultivated land and scrub land, are occurred in project area.

Plain areas:	1. Lateritic Soils and Laterites, 2. Red-brown Forest Soils of tropical evergreen forests, 3. Yellow-brown Forest Soils of tropical monsoon forests, 4. Cinnamon-brown Soils of tropical dry shrub stands, 5. Dark Compact Soils of tropical dry savannas, 6. Red-brown Soils of tropical dry savannas, 7. Primitive Gravelly Soils of tropical dry savannas.
River valleys and lowlands:	8. Complex of Meadow, Bog, and Alluvial Soils of river valleys, 9. Salinized Soils of maritime lowlands, 10. Salty muds of tropical mangrove forests.
Mountain areas:	11. Mountain Red-brown Forest Soils of tropical evergreen forests, 12. Yellow-brown Mountain Forest Soils of tropical monsoon forests, 13. Red Earths and Yellow Earths, 14. Mountain Red Earths, 15. Complex of Mountain Soil, Meadow, and Red-Brown Forest Soils, 16. Brown Mountain-Forest Soils of temperate coniferous-broadleaf forests, 17. Mountain-Meadow Alpine Soils, 18. Mountain red Soils.

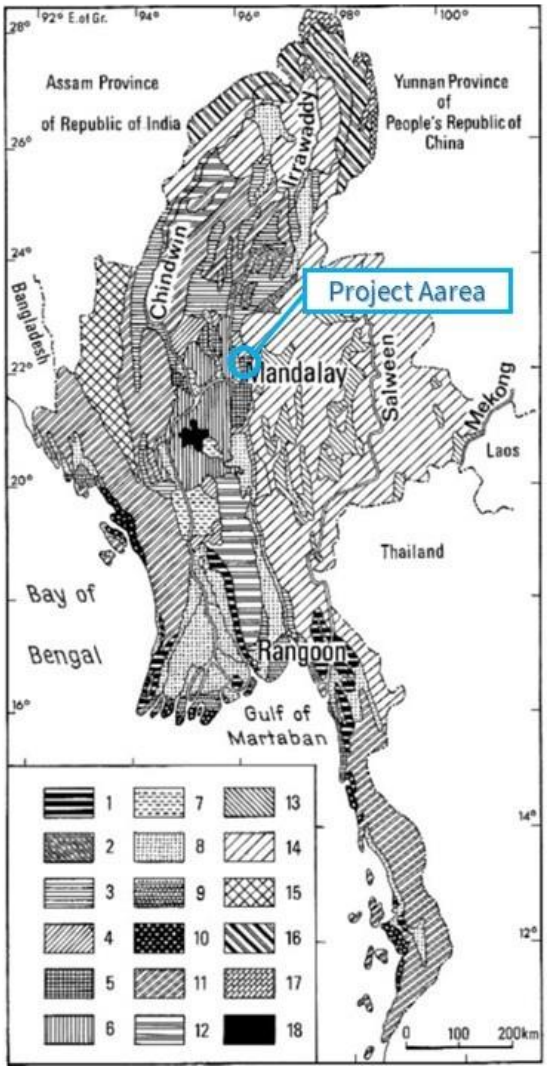


Figure 4-6 Distribution of soils in Myanmar (modified after Rozanov, 1965; Bender, 1983)

4.2.4.2 Soil Quality

4.2.4.2.1 Baseline Soil Sampling Methodology

Soil samples were collected from two (2) sample points in the Study Area on the 28th March 2023, and were tested for several types of parameters which are listed together with the results below. The soil samples were collected using a manual hand auger tool, and the samples were collected from top soil (30 cm – 50 cm depth). The sampler is a stainless-steel tube that is sharpened on one end and fitted with a long, T-shaped handle. All sampling was conducted in accordance with recognized standard procedures, as listed together with the laboratory results in Appendix A.

Figure 4-7 Soil Quality Survey Activities

4.2.4.2.2 Baseline Soil Sampling Locations

The description of the soil sampling locations can be found in Table 4.4. The location of each soil sampling site is shown in Figure 4-8.

Table 4.4 Soil Sampling Locations

Sampling Points	Coordinates	Description of Sampling Point
S-1	22° 9'12.74"N 96°13'51.04"E	Beside the road (near the paddy field), Patheingyi Township, Mandalay Region. Approximately 1.2 kilometers West of the proposed project.
S-2	22° 9'6.90"N 96°14'22.28"E	In the paddy field (near Aung Tha Pyay Village), Patheingyi Township, Mandalay Region. Approximately 0.52 kilometers South of the proposed project.

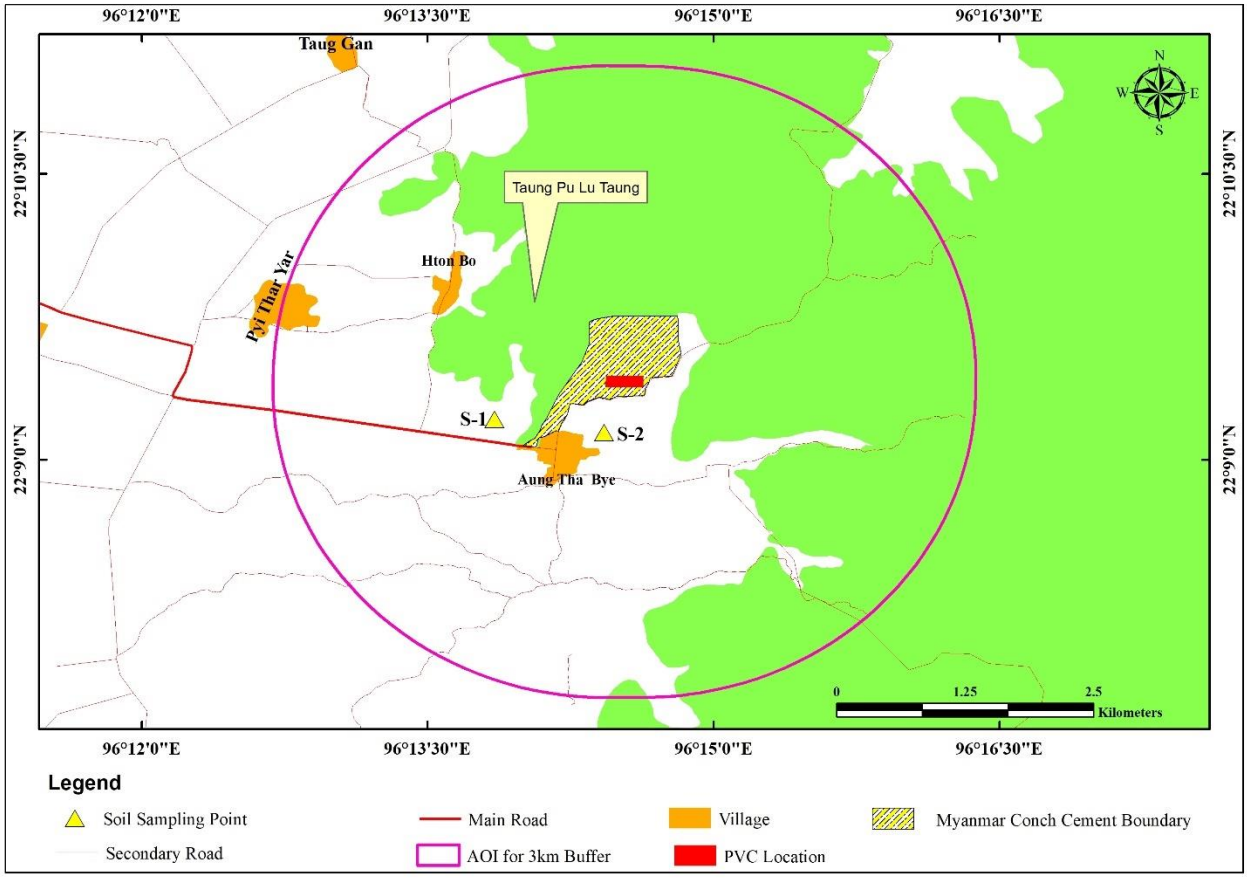


Figure 4-8 Soil Sampling Locations

4.2.4.2.3 Soil Sampling Results

In the absence of Myanmar regulations/standards, it is use globally recognized 'Dutch Target and Intervention Values, 2000 (the Dutch Standard)' to assess soil quality and to determine the need, if any, for remedial action. According to the soil sampling results, parameters were found to be within the Dutch Standard. Table 4.5 presents the baseline results for laboratory analysis from the surveys conducted in March 2023.

Table 4.5 Results from Soil Quality Sampling

Parameter	Unit	Results		Dutch Standard[a]	
		S-1	S-2	Target Value	Intervention Value
Zinc	mg/kg	0.2112	0.0482	140	720
Copper	mg/kg	0.618	0.944	36	190
Iron	mg/kg	4.159	9.314	-	-
Manganese	mg/kg	37.82	30.96	-	-
Lead	mg/kg	0.22	0.06	85	530
Cadmium	mg/kg	ND	ND	0.8	12
Nickle	mg/kg	0.586	0.386	-	-

Chromium	mg/kg	ND	ND	100	380

ND: Non-Detectable

[a] Dutch Target and Intervention Values, 2000

4.2.5 Hydrology

The majority of the water resources in the area are freshwater. Irrigation water from the Sedawgyi dam flows through the Mandalay Canal and can be used for irrigation. Groundwater is also used to provide drinking water. There are no rivers or canals within 3 kilometers of the project area, and the drainage pattern is illustrated in Figure.

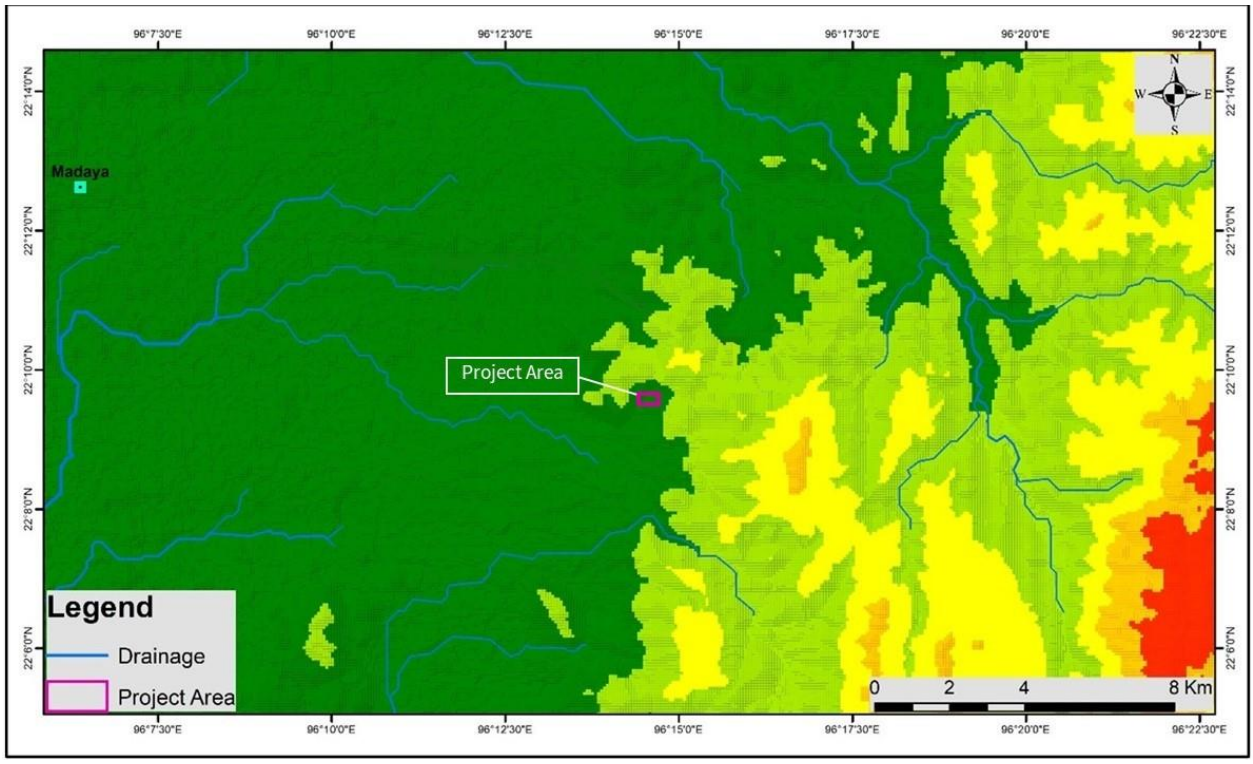


Figure 4-9 Drainage Pattern of The Project Area

4.2.6 Surface and Groundwater Quality

A number of baseline water quality sampling surveys have been conducted in the Study Area as part of this EIA report. An overview of the surveys and their results are presented in this section.

4.2.6.1 Baseline Water Sampling Methodology

Surface and Groundwater samples were collected from three (3) sample points in the Study Area on the 30th March 2023. Water samples were collected in plastic and sterilized glass sample containers. All samples were transported to the laboratory within 24 hours (under all recommended holding time). The In-Situ parameters have been measured using high accuracy measurement device (SmarTroll Multiparameter Meter). Photographs of the baseline water quality sampling operations are shown in Figure.

Figure 4-10 Water Quality Survey Activities

4.2.6.2 Baseline Water Sampling Locations

The description for each of the sampling locations is shown in Table 4.6, and the locations of each sampling site is shown in Figure 4-11. In-Situ testing was conducted on site by the data collection team, and samples were sent for laboratory testing.

Table 4.6 Surface Water and Groundwater Sampling Locations

Sampling Points	Coordinates	Description of Sampling Point
SW-1 (Surface Water)	22° 9'34.09"N 96°14'21.02"E	At the pond within the Myanmar Conch cement plant's boundary, approximately 0.35 kilometers North-west of the proposed project.
SW-2 (Surface Water)	22° 9'56.10"N 96°10'56.38"E	At the raw water pond beside the road, near the Mandalay Canal. Approximately 6.2 kilometers West of the proposed project.
GW-1 (Groundwater)	22° 9'3.29"N 96°14'10.55"E	Groundwater extraction pipe in Aung Tha Pyay village, Patheingyi Township, Mandalay Region. Approximately 0.8 kilometers South of the proposed project.

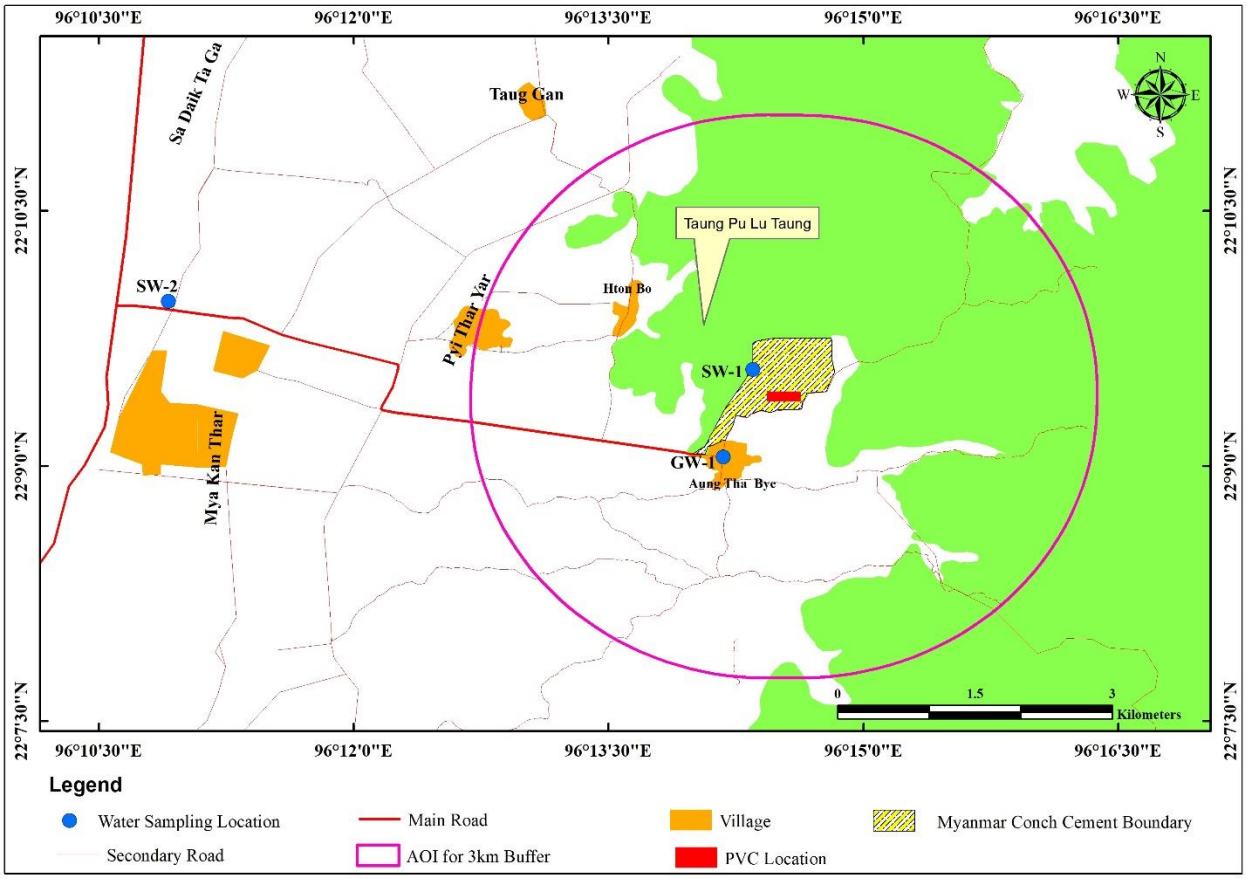


Figure 4-11 Water Sampling Locations

4.2.6.3 Water Quality Results

The water samples sent to REM-UAE Laboratory, ISO Tech Laboratory and SGS Laboratory in Myanmar. Surface water quality results were compared to the NEQG's effluent level (general application), and groundwater quality results were compared to the Drinking Water Quality Standard, MOHS. Most of the water quality results are lower than the guidelines. The In-Situ and laboratory results of the surface water and groundwater are shown in following tables, as listed together with the laboratory results in Appendix B.

Table 4.7 In-Situ Surface and Groundwater Quality Results

Parameter	Unit	GW-1	SW-1	SW-2
Weather		Sunny	Sunny	Sunny
Color		Colorless	Colorless	Colorless
Water Sampling		84	5	8
Depth/ Well Depth	Ft.	27.3	30.9	30.7
Water Temperature	°C	7.4	7.97	7.62
pH		7.16	7.69	7.18

DO	mg/L	532	231	248
EC	µs/cm	98	132	108
TDS	ppm	0.27	0.35	0.32
Salinity	psu	Sunny	Sunny	Sunny
Remark		Drinking & Domestic use	Domestic use	Domestic use

Table 4.8 Surface Water Quality Results

Parameter	Unit	SW-1	SW-2	NEQG
Fluoride(F)	mg/l	0.7	0.4	20
Arsenic	mg/l	Nil	Nil	0.1
Ammonia	mg/l	Nil	Nil	10
COD	mg/l	64	32	250
BOD	mg/l	8	4	50
Cyanide	mg/l	Nil	Nil	1
Zinc	mg/l	Nil	Nil	2
Copper	mg/l	Nil	Nil	0.5
Iron	mg/l	0.47	0.33	3.5
Total Suspended Solid	mg/l	30	12	50
Free Cyanide	mg/l	ND	ND	0.1
Phenols	mg/l	ND	ND	0.5
Aluminum	mg/l	0.126	0.127	-
Cadmium	mg/l	ND	ND	0.1
Hexavalent Chromium	mg/l	ND	ND	0.1
Lead	mg/l	ND	ND	0.1
Mercury	mg/l	0.0041	0.0037	0.01
Nickel	mg/l	ND	ND	0.5
Silver	mg/l	ND	ND	0.5
Suspended Solids	mg/l	ND	ND	-
Total Coliform Bacteria	MPN/100L	2200	4700	400

Nitrogen	mg/l	<1	<1	-
Sulfide	mg/l	<2	<2	1
Phosphorus	mg/l	<0.01	<0.01	2
Oil & Grease	mg/l	<5	<5	10
Tin	mg/l	<0.1	<0.1	-

ND: Non-detectable

Table 4.9 Groundwater Quality Results

Parameter	Unit	GW-1	Drinking Water Quality, MOHS
Fluoride(F)	mg/l	0.2	-
Arsenic	mg/l	Nil	0.05
Ammonia	mg/l	Nil	-
COD	mg/l	32	-
BOD	mg/l	2	-
Cyanide	mg/l	Nil	0.07
Zinc	mg/l	Nil	3
Copper	mg/l	Nil	2
Iron	mg/l	0.2	1
Total Suspended Solid	mg/l	5	-
Free Cyanide	mg/l	ND	-
Phenols	mg/l	ND	-
Aluminum	mg/l	0.029	-
Cadmium	mg/l	ND	0.003
Hexavalent Chromium	mg/l	ND	0.05
Lead	mg/l	ND	0.01
Mercury	mg/l	0.001	0.001
Nickel	mg/l	ND	0.07
Silver	mg/l	ND	-
Suspended Solids	mg/l	ND	-
Total Coliform Bacteria	MPN/100ml		10
Nitrogen	mg/l	<1	-

Sulfide	mg/l	<2	-
Phosphorus	mg/l	<0.01	-
Oil & Grease	mg/l	<5	-
Tin	mg/l	<0.1	-

ND: Non-detectable

4.2.7 Air Quality

4.2.7.1 Baseline Air Quality Survey Method

The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air monitoring data. Sampling rate or air quality data were measured automatically and directly read and recorded onsite. Wind parameters are also measured by Haz-scanner EPAS and the required data are analyzed by using the WRPLOT View of AERMOD.

Instrument	Brand & Model
Environmental Perimeter Air Monitoring System	HAZ-SCANNER EPAS

Total three air quality monitoring were conducted around the project site within 3km area of interest. Air quality monitoring activities was shown in figure.

Figure 4-12 Air quality monitoring activities

4.2.7.2 Baseline Air Quality Survey Locations and Period

Air quality monitoring was conducted 24 hours during 26th March 2023 to 29th March 2023. Air quality monitoring were installed at Project Compound, Htone Bo Village Village, and Aung Tha Pyay Village. The locations of sampling points and the description of each sampling point is described below.

Table 4.10 Air Quality Monitoring Locations

Monitoring Stations	Coordinates	Description of Survey Point
AQ-1	22° 9'25.76"N 96°14'29.93"E	Project Compound
AQ-2	22° 9'53.25"N 96°13'40.22"E	Htone Bo Village
AQ-3	22° 9'7.10"N 96°14'18.93"E	Aung Tha Pyay Village

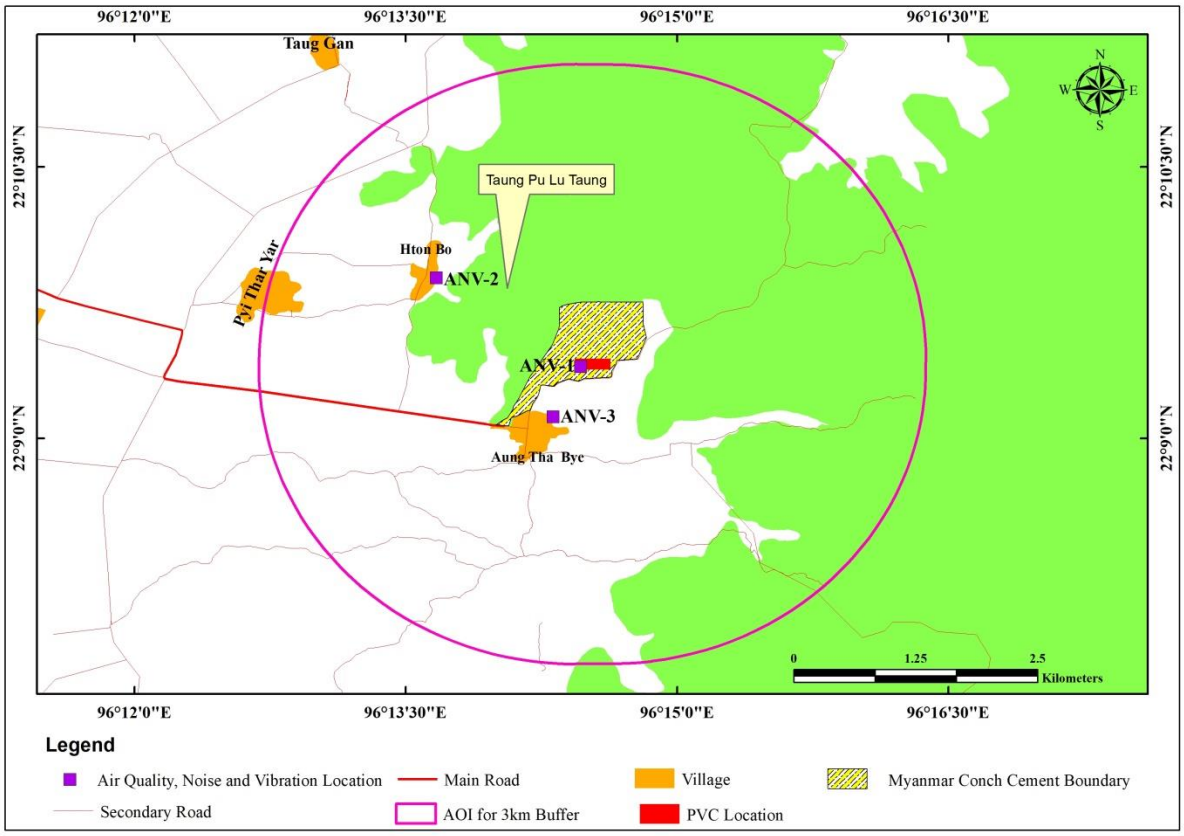


Figure 4-13 Location of Air Quality Monitoring Points

The measurement duration is shown in the following Table.

Table 4.11 Measurement Duration

Sampling Point	Period
AQ-1	25th-26th March, 2023
AQ-2	27th-28th March, 2023
AQ-3	28th-29th March, 2023

4.2.7.3 Baseline Air Quality Survey Results

The average values of ambient gaseous levels of all air quality monitoring for 24 hours are shown in Table 4.12. According to the survey results, the average 24-hour period for $PM_{2.5}$, PM_{10} and SO_2 concentrations are within the National Environmental Quality (emission) Guideline. The daily 8-hour maximum Ozone level is within the 100 ug/m^3 standard.

Table 4.12 Air Quality Results

Sampling No.	Date	Time	CO	NO_2	NO	$PM_{2.5}$	PM_{10}	RH	SO_2	Tem °C
	D.M.	hours	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	%	µg/m^3	°C
AQNV-1	25th-26th March	24hrs	1665.30	98.74	3.53	5.3	11.42	77.67	9.97	29.25
AQNV-2	27th-28th March	24hrs	413.96	46.15	1.96	6.00	27.62	26.48	11.29	24.10
AQNV-3	28th-29th March	24hrs	1272.05	59.22	0.25	6.37	15.86	64.05	2.51	24.35
National Environmental Quality (Emission) Guideline			—	200	—	25	50	—	20	—

4.2.7.4 Wind Speed and Direction

According to the wind rose diagram, average wind speed of air quality station is 0.29 to 2.22 m/s. Prevailing wind direction of air quality station is blowing from and direction AQ-1, AQ-2 (southwest to southeast) and AQ-3 (southwest to east). Wind rose diagram of air quality station is shown in Figures.

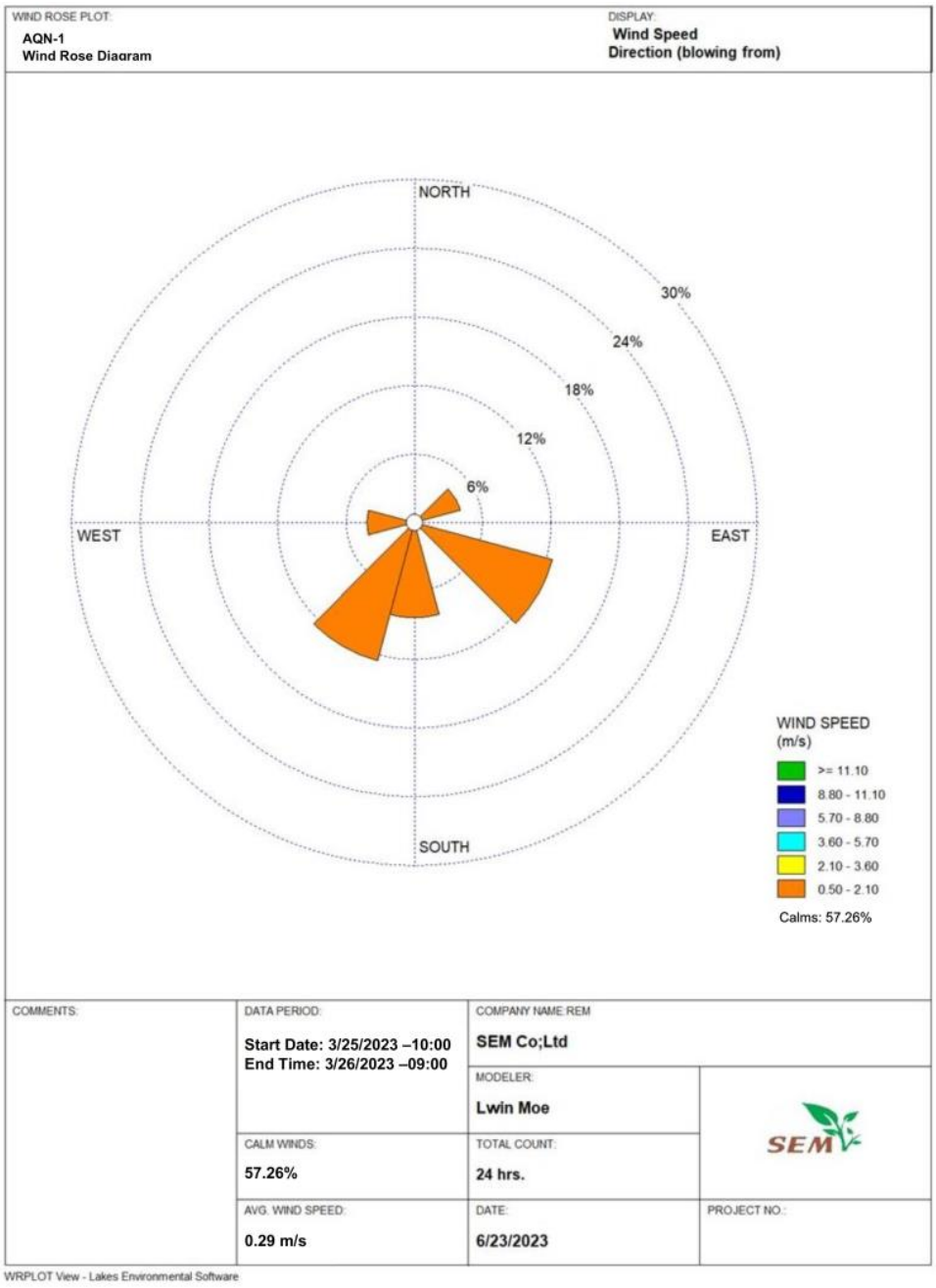


Figure 4-14 Wind Speed and Direction Diagram at AQ1

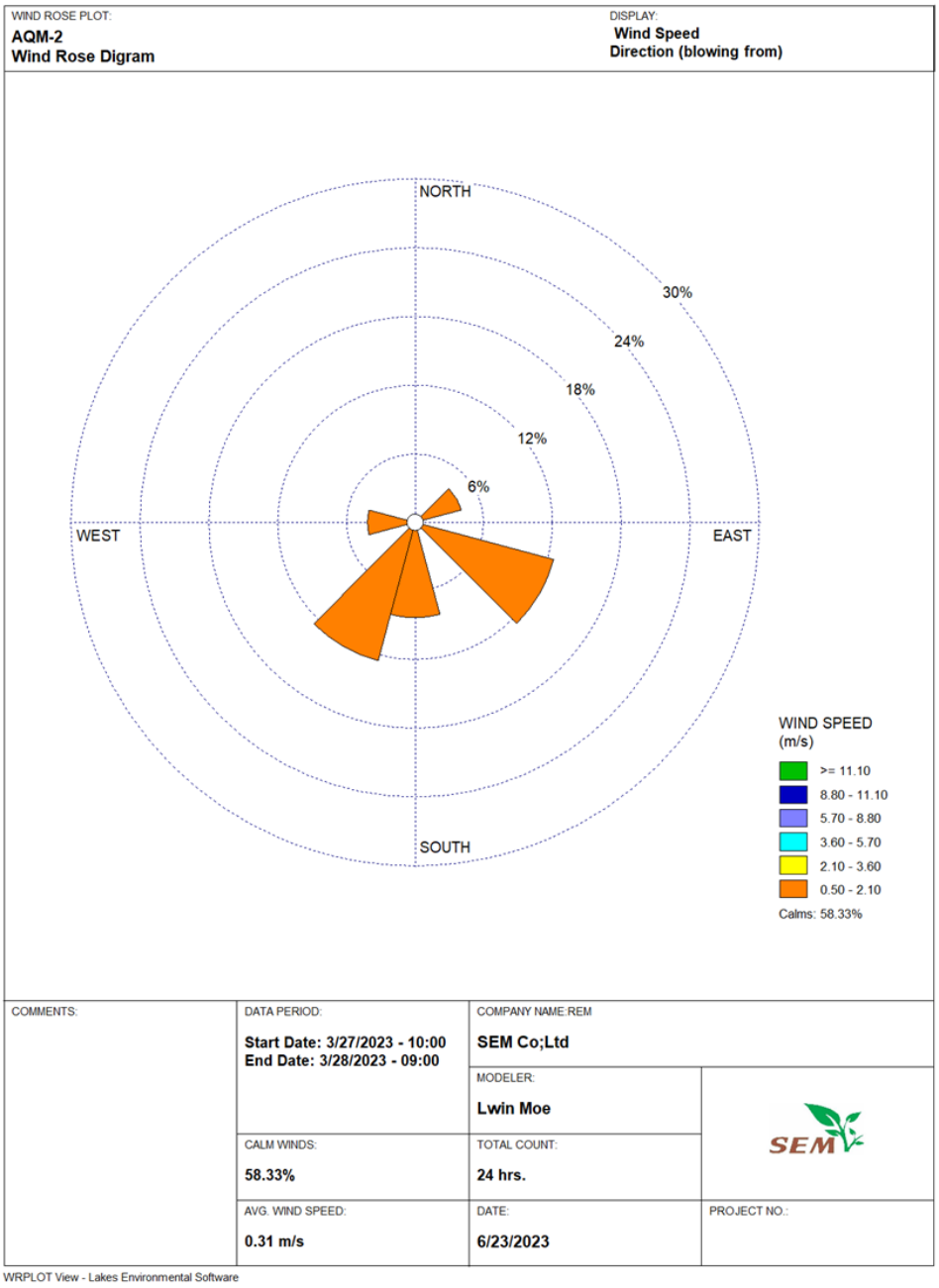


Figure 4-15 Wind Speed and Direction Diagram at AQ2

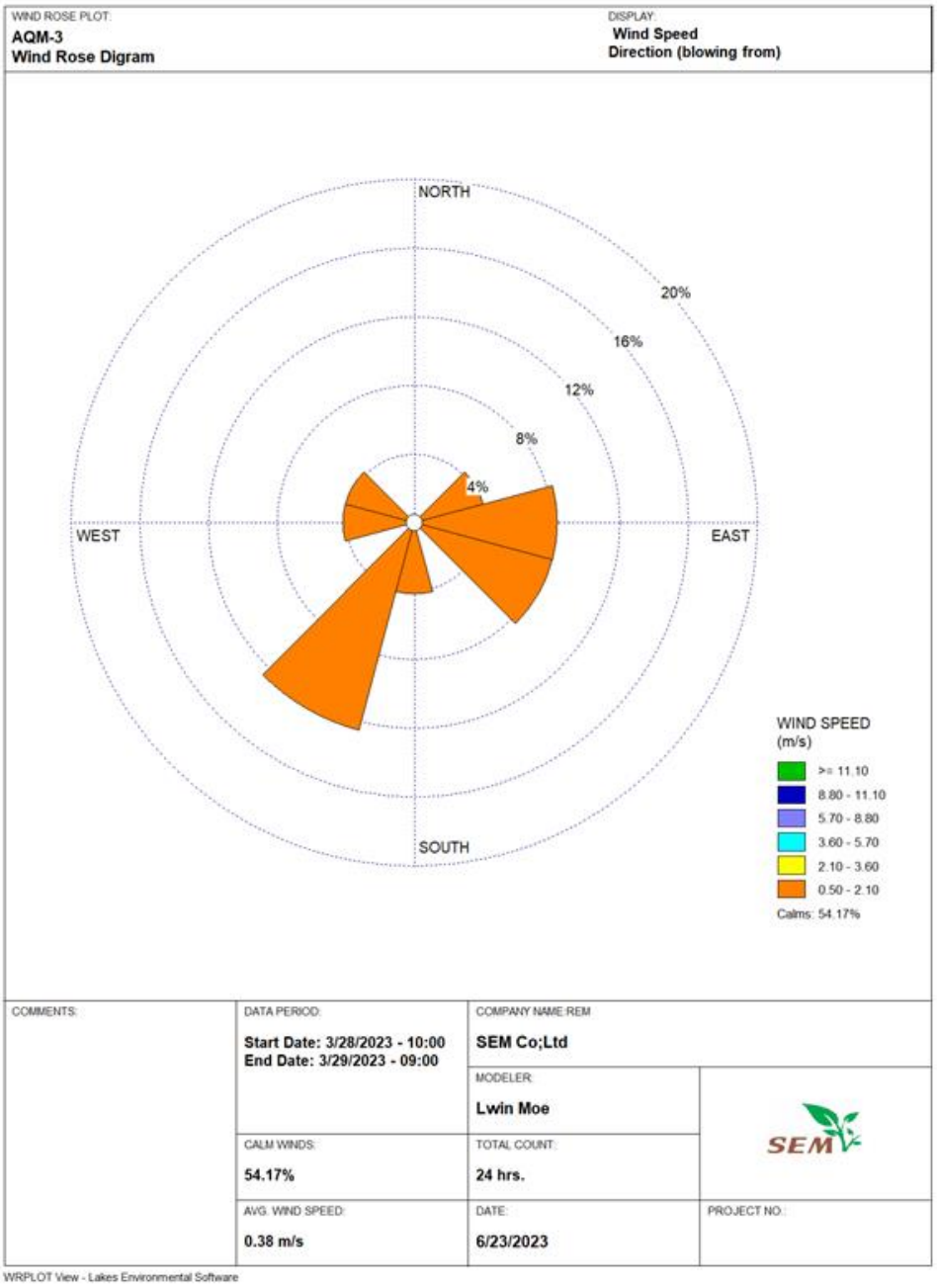


Figure 4-16 Wind Speed and Direction Diagram at AQ3

4.2.8 Noise

4.2.8.1 Baseline Noise Level Survey Method

Sampling and monitoring of surrounding sound were conducted by using following instrument for 24 hours/1-day measurement. Measurement of environmental sound level was conducted by referring to the recommendation of International Organization for Standardization (ISO), i.e., ISO 1996-1:2003 and ISO 1996-2:2007. Noise meter was set up to record the log as ten minutes intervals during an hour for one consecutive day. The instrumentation used for noise quality survey is shown in the following Figure.

Figure 4-17 Lutron Sound Level Meter (Model - SL-4023SD)

4.2.8.2 Baseline Noise Level Survey Locations and Period

Noise monitoring stations were conducted as same time and same location as of air quality station. The survey duration of noise level is as same as air quality monitoring survey.

4.2.8.3 Baseline Noise Level Survey Results

Daily average noise levels (LAeq) of the monitoring point were presented in Table 0.0. Day time and night time was calculated by using the following array formula in the excel sheet. This formula is firstly used for hourly LAeq and then for the 24 hours LAeq.

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

Noise levels found the lower than the National Environmental Quality (Emission) Guideline values for residential, institutional, educational environment.

Table 4.13 Noise Level Results

A Weighted Loudness Equivalent (LAeq) Level						
Result	**N-1**		**N-2**		**N-3**	
	Day	Night	Day	Night	Day	Night

	49	45	45	42	50	39
NEQG	55	45	55	45	55	45

4.2.9 Vibration

4.2.9.1 Baseline Vibration Survey Method

The instrumentation for vibration level was used by RION VM-55 vibration meter. This instrument is a 3-Axis (X, Y, Z) vibration meter that can be used in a wide range of applications for measurement and analysis of different parameters. The unit is equipped to measure the instantaneous value for vibration level and vibration acceleration level, as well as the time percentile level, time averaged level, maximum and minimum values in three axes simultaneously.

Figure 4-18 Vibration Meter (Rion VM55 with SD Card)

4.2.9.2 Baseline Vibration Survey Location and Period

Noise monitoring stations were conducted as same time and same location as of air quality station. The survey duration of noise level is as same as air quality monitoring survey.

4.2.9.3 Baseline Vibration Survey Results

As there is no vibration standard to receptors in Myanmar, the target vibration level at construction phase shall be set based on the standards in some foreign countries. Accordingly, the target level of vibration is set based on the following policies.

Table 4.14 Regulatory Standards for Vibration Emitted from Specified Factories (Summary)

Time Area	Daytime	Nighttime	Applicable Areas
I	60 – 65 dB	55 – 60 dB	Areas where maintenance of quiet is particularly needed to preserve a good living environment and where quiet is needed for as they are used for residential purposes.

II	65 – 70 dB	60 – 65 dB	Areas used for commercial and industrial as well as residential purposes where there is a need to preserve the living environment of local residents and areas mainly serving industrial purposes which are in need of measures to prevent the living environment of local residents from deteriorating.

Raw vibration data was calculated by using the following array formula in the excel sheet.

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

According to the calculated results, all vibration level is lower than the applied standard.

Table 4.15 Daily Average Vibration Level Result(dB)

Result	**V-1**		**V-2**		**V-3**	
	Day	Night	Day	Night	Day	Night
	16	14	14	12	14	13
Target Value	65	60	65	60	65	60

4.2.10 Natural Disasters

Mandalay Region covers the central part of Myanmar and it includes the major part of the boundary between Sagaing fault in the west (8 km from Mandalay), Shan scrap fault in the east, Shweli and Moemeik faults in the north. The Sagaing fault is a major strike-slip right –lateral continental fault that extends over 1200 km and connects to the Andaman spreading center at its southern termination. Moreover, some active faults occurred in Myanmar, e.g., Sagaing dextral fault, Kyaukkyan fault, Kyaukme fault, Momeik fault, Shan scrap fault, Kabaw fault, Gwegyo fault etc. Among them, Sagaing fault is the most active fault and several high magnitude earthquakes have been originated from this fault. Project site is located in Zone V (Destructive Zone) with probable intensity range of 0.4-0.5 g) from the seismic zone map of Myanmar 2005.

There are two major active faults named as Sagaing Fault (left side) and Kyaukkyan Fault (right side) are observed far away from the project area. There is no historical earthquake in the project area.

According to the probabilistic seismic hazards assessment (PSHA) map 2012, which was presented by Myanmar Earthquake Committee, 0.21-0.4 pga (g) values of 100% probability for 500 years will be estimated in the project area (Figure).

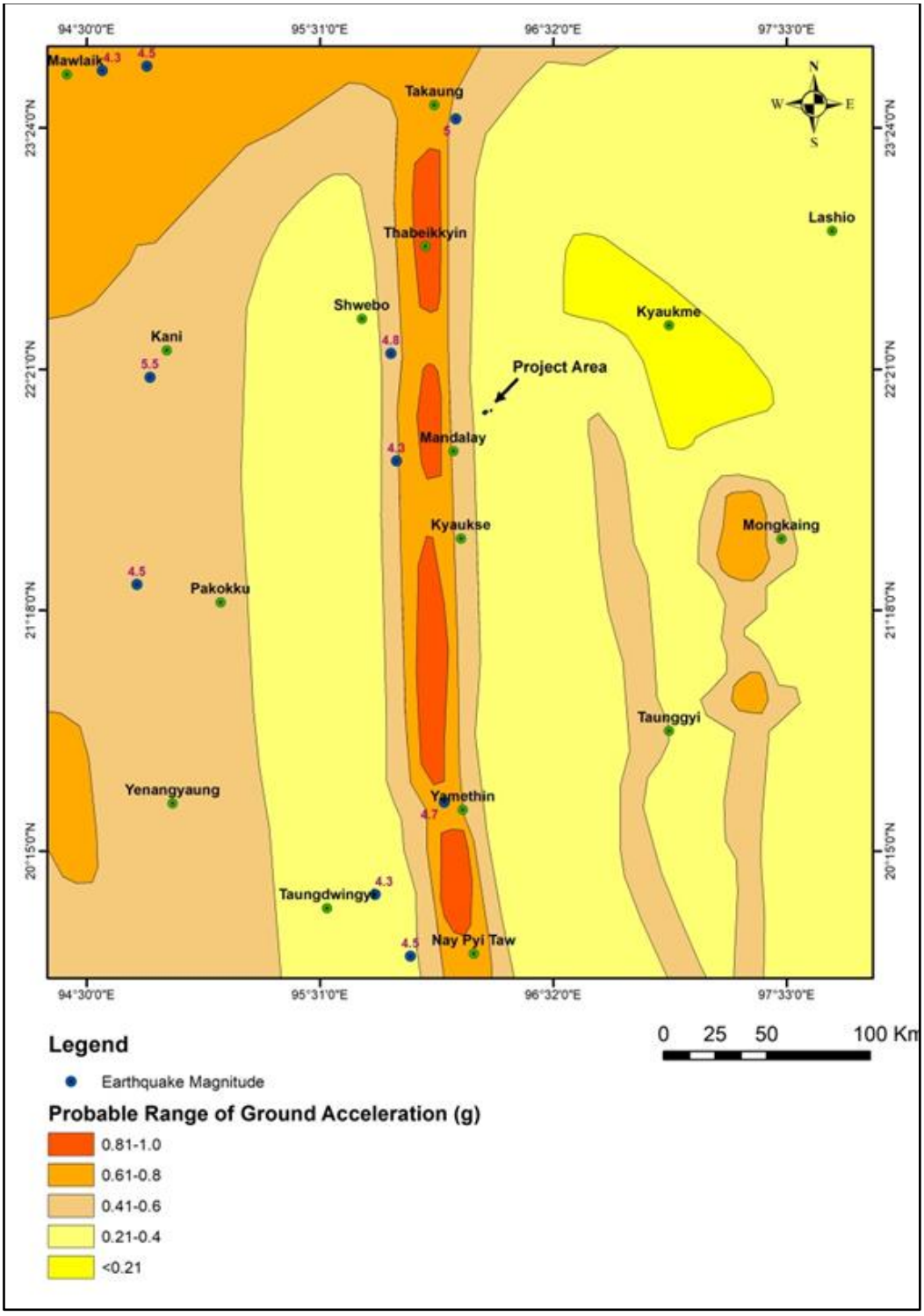


Figure 4-19 Probabilistic Seismic Hazard Map of Project Area

A tropical cyclone is a tropical storm with rotating winds at speeds of greater than 74 miles (119 km) per hour. Myanmar is vulnerable to cyclones, which often originate in the Southern Andaman Sea and enter the Bay of Bengal. These cyclones can result in heavy rains, storms, and floods. There are two prominent cyclone seasons for the country, between April to May and October to December.

The project site is located in the eastern part of dry zone and topography is flat plain. Over water point of Patheingyi Township is (1325) cm. The project site had no experience about the natural

disaster such as storm and flooding based on the township profile data. Fire and drought hazard may occur in this region. Natural Disaster Condition in (2016-2017) is as the following Table.

Table 4.16 Disaster Condition (2016-2017)

No	Title	Occurrence No.	Live/Death No.	Building Damages	Cost of Lost (Million)
1	Storm	-	-	-	-
2	Tsunami	-	-	-	-
3	Earthquake	-	-	-	-
4	Flood	-	-	-	-
5	Fire	10	3	19	38.44
	Total	10	3	19	38.44

Source: General Administrative Department, Patheingyi Township

4.3 Biological Components

4.3.1 Scope and Purpose of the Baseline Study

The scope and purpose of the ecological baseline study are:

- To provide comprehensive and accurate information on the ecological baseline;
- To identify and predict potential ecological impacts;
- To evaluate the significance of the impacts identified;
- To recommend effective and practicable alternatives and mitigation measures; and
- To recommend the need for and the scope of an appropriate monitoring and audit programme.

4.3.1.1 Site Reconnaissance

A targeted site reconnaissance was conducted from 25th to 30th, March 2023 to ground-truth information gathered and supplements it with site observations, data and photographs. The site reconnaissance targeted the following specific ecological and legislative/organizational objectives:

- To name, describe and map vegetation communities and habitats present within the Project Area at a suitable scale, using existing community nomenclature where possible;
- To identify, describe and map other ecologically sensitive areas within the Project Area such as springs, watercourses and other water bodies;
- To the extent possible within the survey time frame and season, determine if species of conservation significance known or predicted likely to be present in the Study Area are actually present within the Project Area;
- To identify opportunities for future ecological monitoring and enhancement within the framework of the proposed project.

4.3.1.2 Desktop Study

Publicly available sources of information were analyzed to build an outline of known and likely ecological values for the Study Area. Aerial imagery was used to build a more complete spatial understanding of the pattern of vegetation communities and human uses on the site, and to map access routes and internal tracks. In addition, ecologists with experience of the Study Area were consulted where possible to obtain information about species known to be present or previously recorded from the site, and other ecological values considered by them to be relevant.

4.3.1.3 Field Observation

(a) Flora

A Global Positioning System was used to navigate and mark coordinates of sampling points around the study area. Field observation was conducted in and around the project area. During the field survey period, plotless sampling method was used. Plotless sampling methods are based on the random selection of points within a particular survey area. In addition, all trees, shrubs, herbs and cultivated crops were recorded and listed. Identification of plants and animal species was conducted with assistances of skilled local people. The identified species and families were translated to scientific name with assistance of a checklist of trees, shrubs, herbs and climbers of Myanmar.

(b) Fauna

Mammal

The data collection for mammal species was conducted in three ways (1) Direct Observing of mammals in the field, (2) Observation of track and signs such as footprints, scats feeding signs in their natural habitats, and (3) Interview survey.

Mammal Survey was done by point count and transects count method during both day time survey.

The direct observation method was used for the species of arboreal mammals such as squirrels and tree shrews. Track and sign observation method was used for some small carnivores. All encountered signs and footprints found by track and sign observation were examined and then took photo record for species identification. The presence or absence of the very well-known mammal species was confirmed by interviewing local people already familiar with the forest. All data collected in the survey area were recorded in the field data sheets.

Herpetology

Herpetofauna surveys was conducted through direct observation and active searching in all major representative habitat types along survey transects and in potential hiding places such as among leaf litter, inside holes and under stones and logs within the study area. Surveys were conducted during day time periods. Visual observations, documented where possible by photographs, were made of some captured specimens that were not collected for preservation. Wherever possible, animals were captured by hand with the aid of a long stick caliper. Photo records were taken by digital. Their

morphometric characters of each specimen were recorded such as sizes, shapes, patterns, spots, stripes, and color and body length in the data sheet.

Butterflies and Odonata

Butterflies and Odonata of different habitats within the study area were surveyed using point count method subject to the on-site conditions. Butterfly species and Odonata species were collected by aerial net along the trail and collected species identify to release off. Some Butterflies cannot identify in field so that we took photo and identify the species with reference book.

Bird

Random Point count method was used for the bird survey and took the photo for species identification, observed numbers and habitat utilization. Species identification was done by using the field guide books, with help of the binoculars, camera and GPS. Nocturnal birds were observed when it becomes dusk. Point count and opportunistic methods were used to census the species richness and point counting was used to get the relative measure of bird abundance.

Butterflies and Dragonfly

Butterflies and dragonflies of different habitats within the study area were surveyed using point count method subject to the on-site conditions. Butterfly species were identified in field so that we took photo and identify the species with reference book. Butterfly species were released after photo record.

4.3.1.4 Interview survey

In addition to the field observation, secondary data was also surveyed by interviewing from local residents and literature reviewing. In the interview survey, the surveyor visited the residents in and around the survey area and interviewed the name of plants and animals existing in and around the area. Also, the past situation of flora and fauna, and the change on biodiversity and ecosystem in the area was interviewed for examination.

Figure 4-20 Interview survey with local people

Biodiversity survey was conducted within 1 km radius of the project Area. The coordinate locations of sampling points and location map are shown in following table and figure.

Table 4.17 Coordinate location of biodiversity survey points

No	Name	Latitude	longitude
1	Flora & Fauna -1	22° 9'25.10"N	96°14'12.07"E
2	Flora & Fauna -2	22° 9'10.45"N	96°14'0.85"E
3	Flora & Fauna -3	22° 9'20.91"N	96°14'30.70"E
4	Flora & Fauna -4	22° 9'42.99"N	96°14'5.43"E
5	Flora & Fauna -5	22° 9'55.86"N	96°14'27.47"E
6	Flora & Fauna -6	22° 9'41.46"N	96°14'54.43"E
7	Flora & Fauna -7	22° 9'24.53"N	96°14'52.80"E
8	Flora & Fauna -8	22° 9'7.14"N	96°14'31.30"E
9	Flora & Fauna -9	22° 9'10.29"N	96°14'50.11"E

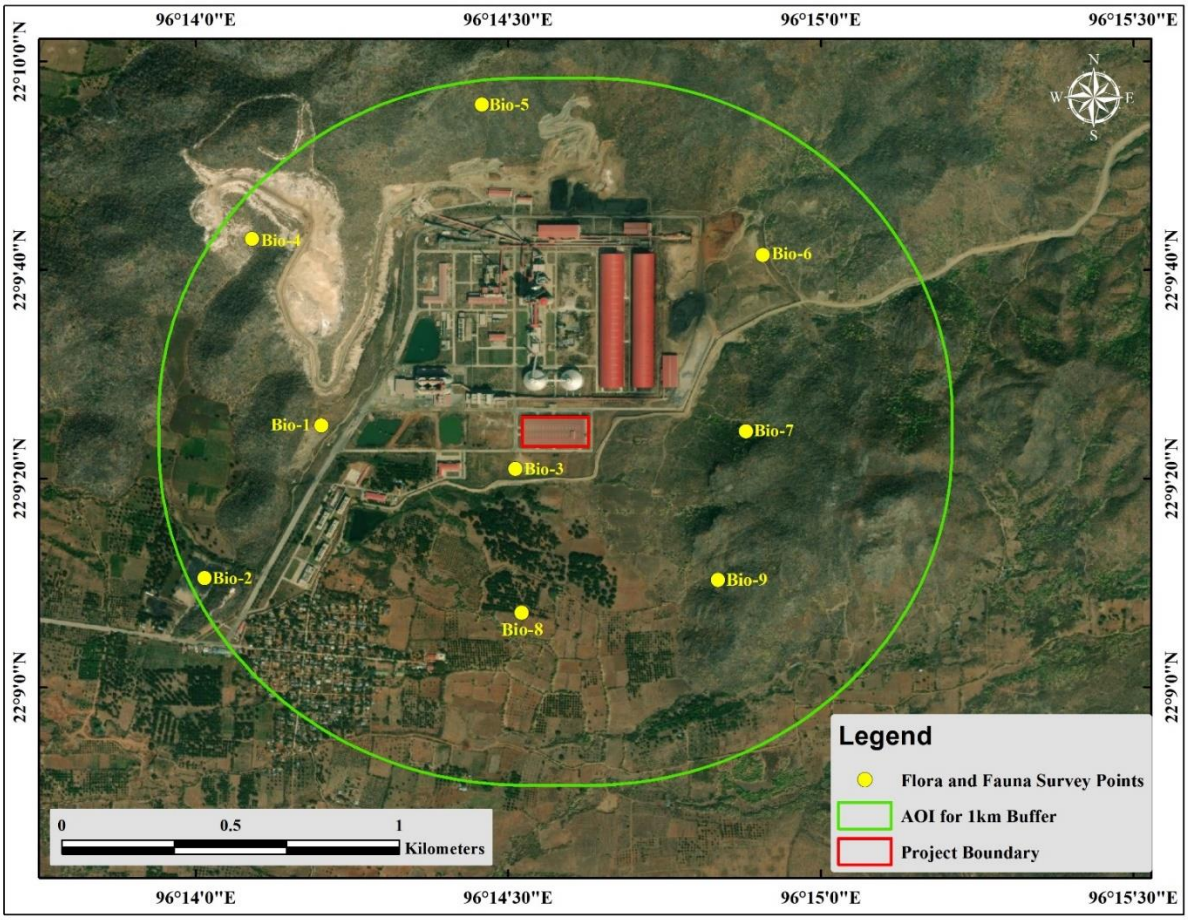


Figure 4-21 Location map of Biodiversity Survey Points in the Project AOI

4.3.2 Survey Result for Biological Components

4.3.2.1 Flora

4.3.2.1.1 Habitat

In and around the Area of proposed project area, four major habitat types were observed namely (1) some extent of tree in plantation (2) agricultural land and (3) Shrub land and (4) Bare Land.

Figure 4-22 Sceneries of the survey area

4.3.2.1.2 Habitat Map

To obtain the habitat map and land use map, there was combination between field observation and secondary image from Google Earth and generate it applying in GIS software. At first, the field observations were performed for habitat survey at site collecting the data with the Garmin GPS and upload it in ArcGIS. On the other hand, the Google image was visually digitized based on the primary field survey. Finally, the habitat map and land use mpa were analyzed based on both of field survey and secondary image data using the ArcGIS software and Google Earth software.

Sources & Tools

- Google Earth Images
- ArcGIS 10.6
- Garmin GPS Map 78 s
- Field survey

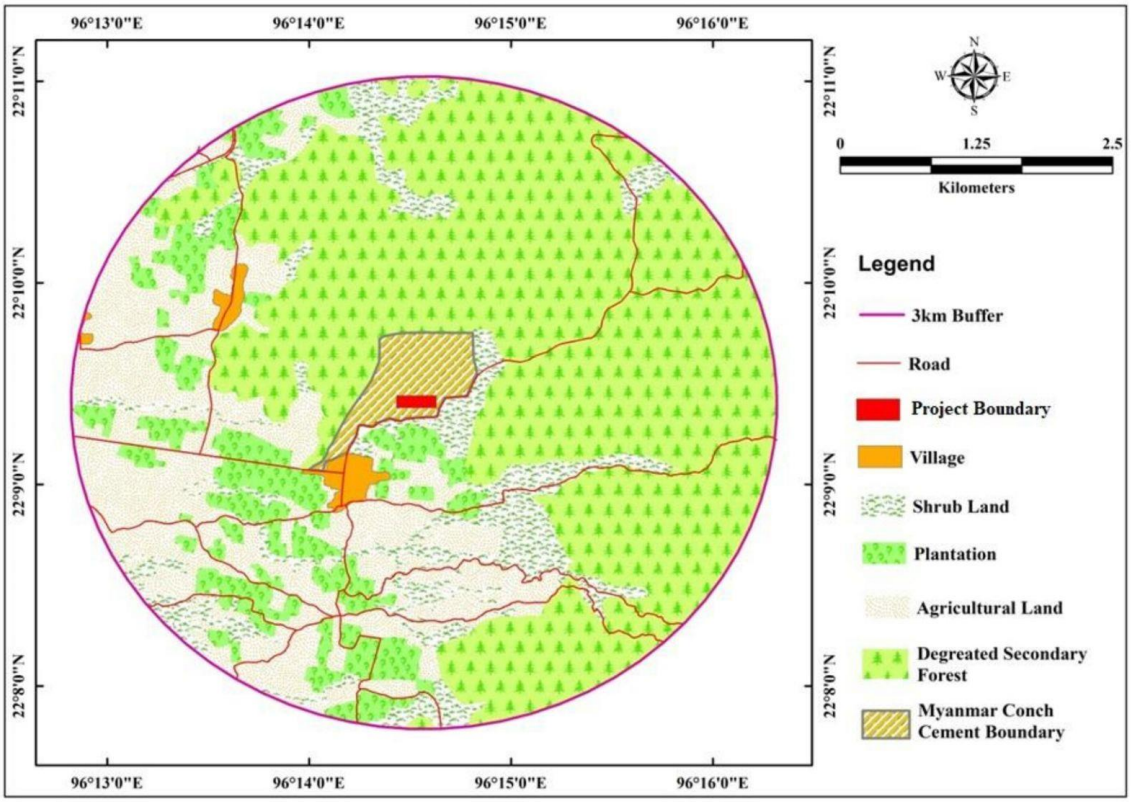


Figure 4-23 Habitat map of the survey area

4.3.2.1.3 Vegetation Communities

In and around the project area, grassland, agricultural land, bare land, shrub land and some extents of plantation were found. Description of vegetation community was summarized below.

Table 4.18 Vegetation Community and plant species observed in community footprint

Community Name	Description	Plant Species observed in community footprint
Grass Land	Grassland is an area covered in large part by grass and other non-woody trees. Grasslands are generally open and fairly flat. When rainy season arrives, many types of grassland become coated with flowers and the most agriculturally useful habitat to humans.	*Thysanolaena maxima* (Tabyetsi) *Cynodon dactylon* (Mye-sa)

Bare Land	Bare Land is soil that is not covered by vegetation, litter or duff and woody material. Soil not covered by desirable vegetation in an area that can lead to invasion of noxious weeds or other undesirable plant species.	*Tribulus terrestris* (Tsule) *Dendrocalamus strictus* (Htikayon)
Agricultural Land	Land able to be used for farming is called agricultural land. Agricultural land refers to plots that are permitted to be used for agricultural activities.	*Oryza sativa* (Saba) *Arachis hypogaea* (Myay-pe) *Sesamum indicum* (Hnan) *Phaseolus radiates* (Pe-di-sein) *Sorghum bicolor* (Pyaung) *Citrullus lanatus* (Watermelon) *Cucumis sativus* (Tha-khwar-thi)
Plantation	Plantation is a great deal of land not devoted to agricultural use. Permanent plantation includes forested plantations used to harvest coffee, mango, banana, or fruit.	*Cynodon dactylon* (Thabye) *Mangifera indica* (Thayet) *Ziziphus jujube* (Zi) *Cocas nucifera* (Ohn) *Psidium guajava* (Malaka) *Musa sapientum* (Nget-pyaw)
Shrub Land	Shrub land habitats contain thickets of shrubs and young trees mixed with scattered grasses and wildflowers.	*Chromolaena odorata* (Bizat) *Waltheria indica* (Khwe-tayaw) *Jatropha gossypifolia* (Kyetsu-kanako) *Osyris weidhtiana* (Zaung-gyan) *Cassia italic* (Dan-gywe) *Uvaria cordata* (Thabut-gyi) *Grewia hirsute* (Tayaw) *Gossypium herbaceum* (Wah)

4.3.2.1.4 Survey Result

A total of 49 flora species has been identified during the survey. List of identified plant species were presented in Table.

Table 4.19 List of plant species recorded in the survey area

No	Family Name	Scientific Name	Common Name	Habitat	Distribution	IUCN Status	Remark
1	Amaranthaceae	Achyranthes aspera	Kyet-mauk-sue-pyan	Herb	Magway, Yangon	NE	
2	Anacardiaceae	Lannea coromandelica	Nabe	Tree	Bago, Kayin, Mandalay, Rakhine, Shan, Taninthayi, Yangon	LC	
3	Anacardiaceae	Mangifera indica	Thayet	Tree	Wide	DD	
4	Annonaceae	Uvaria cordata	Thabut-gyi	Shrub	Wide	NE	
5	Apiaceae	Centella asiatica	Myin-hkwa	Herb	Wide	LC	
6	Araceae	Colocasia esculenta	Pein	Herb	Cultivated	LC	
7	Arecaceae	Borassus flabellifer	Htan	Tree	Bago, Mandalay, Sagaing, Taninthayi	EN	Globally Threatened but can be found abundantly in Central Dry Zone Region of Myanmar
8	Arecaceae	Cocas nucifera	Ohn	Tree	Cultivated	LC	
9	Asclepiadaceae	Calotropis procera	Mayo	Shrub	Magway, Mandalay, Sagaing, Shan	NE	
10	Asclepiadaceae	Streptocaulon tomentosum	Myinsa-gonni	Climber/ Creeper	Bago, Mandalay, Mon, Yangon	NE	
11	Asteraceae	Chromolaena odorata	Bizat	Shrub	Wide	NE	
12	Bignoniaceae	Millingtonia hortensis	Egayit	Tree	Wide	NE	
13	Bombaceae	Bombax ceiba	Letpan	Tree	Wide	LC	
14	Caesalpiniaceae	Tamarindus indica	Magyi	Tree	Cultiveted	LC	
15	Caesalpiniaceae	Cassia fistula	Ngu	Tree	Wide	LC	
16	Caesalpiniaceae	Cassia italica	Dan-gywe	Shrub	Wide	NE	
17	Caesalpiniaceae	Bauhinia vahlii	Palan-nwe	Tree	Wide	NE	

18	Capparaceae	Gynandropsis gyandra	Hingala	Herb	Wide	NE	
19	Cucurbitaceae	Luffa acutangula	Kha-we-yaing	Climber/ Creeper	Cultivated	NE	
20	Cyperaceae	Carex pandanophylla	Myet-monnyin	Herb	Bago, Kachin, Kayin, Mandalay, Mon, Taninthayi	NE	
21	Ebenaceae	Diospyros montana	Goke	Tree	Wide	NE	
22	Euphorbiaceae	Jatropha gossypifolia	Kyetsu-kanako	Shrub	Cultivated	LC	
23	Euphorbiaceae	Bridelia tomentosa	Baung-bin	Small Tree	Bago, Taninthayi	LC	
24	Fabaceae	Mucuna pruriens	Khwele-ya	Climber	Bago, Chin, Kayin, Kayin, Mandalay, Mandalay, Sagaing, Sagaing, Shan, Yangon	LC	
25	Fabaceae	Abrus precatorius	Ywe	Climber/ Creeper	Wide	NE	
26	Moraceae	Ficus glomerata	Thapan	Tree	Bago, Kachin, Mandalay, Yangon	NE	
27	Meliaceae	Azadirachta indica	Tama	Tree	Wide	LC	
28	Mimosaceae	Acaccia catechu	Sha	Tree	Magway, Mandalay	NE	
29	Mimosaceae	Leucaena leucocephala	Bawsagaing	Tree	Mandalay, Sagaing, Yangon	NE	
30	Mimosaceae	Albizia lebbekoides	Kokko	Tree	Reported from Myanmar	LC	
31	Mimosaceae	Mimosa pudica	Htikayon	Herb	Wide	LC	
32	Mimosaceae	Albizia procera	Sit	Tree	Reported from Myanmar	LC	
33	Meliaceae	Azadirachta indica	Tama	Tree	Wide	LC	
34	Myrtaceae	Psidium guajava	Malaka	Small Tree	Cultivated	LC	
35	Myrtaceae	Eugenia praetermissa	Thabye	Tree	Ayeyarwady, Sagaing, Taninthayi	NE	
36	Poaceae	Cynodon dactylon	Mye-sa	Grass	Wide	NE	

37	Poaceae	Dendrocalamus strictus	Hmyin-wa	Bamboo	Bago, Chin, Kachin, Mandalay, Shan, Yangon,	NE	
38	Poaceae	Thysanolaena maxima	Tabyetsi	Grass	Bago, Mandalay, Shan, Yangon	NE	
39	Poaceae	Bambusa bambos	Kyakat-wa	Bamboo	Reported from Myanmar	NE	
40	Rhamnaceae	Ziziphus jujuba	Zi	Tree	Cultivated	LC	
41	Smilacaceae	Smilax perfoliata	Sein-na-baw	Climber/ Creeper	Reported from Myanmar	NE	
42	Sterculiaceae	Waltheria indica	Khwe-tayaw	Shrub	Mandalay, Shan, Yangon	LC	
43	Steruliaceae	Scaphium scaphigerum	Mohbin	Tree	Mon, Taninthayi	NE	
44	Santalaceae	Osyris weidhtiana	Zaung-gyan	Shrub	Chin, Mandalay, Sagaing	NE	
45	Verbenaceae	Tectona hamitoniana	Dahat	Tree	Bago, Magway, Mandalay	NE	
46	Vitaceae	Cayratia trifolia	Taw-sabyit	Climber/ Creeper	Bago, Mandalay, Yangon, Unknown	NE	
47	Fabaceae	Pterocarpus macrocarpus	Thit -padauk	Tree	Reported from Myanmar	EN	
48	Rutaceae	Hesperethusa crenulata	Tha Na kha	Tree	Central Myanmar	NE	
49	Sapotaceae	Mimusops elengi	Kha Yay	Tree	Reported From Myanmar	NE	

NE = Not Evaluated

LR/LC = Least Concerned/Lower Risk

EN = Endangered

4.3.2.2 Fauna

A biodiversity survey was conducted that covered a range of fauna species mammals, birds, reptiles and amphibians, butterflies and dragonflies. The fauna survey was conducted via direct observation in the field observation of track and sign such as footprint and feeding sings in their natural habitat and interview were local communities.

4.3.2.2.1 Survey Result

Birds

A total of 35 bird species were recorded during the survey period. A part from the species, the species of family Coraciidae were Indian Roller (*Coracias benghalensis*) were found near the survey area and listed as forest birds. Member of the family Accipitridae was Black-Shoulder kite (*Elanus axillaris*) were predator bird species and also noted as forest birds. Common Myna (*Acridotheres tristis*), Rock pegion (*Columba livia*) and Spotted Dove (*Streptopelia chinensis*) were invasive species of Myanmar. The member of species in the family Alaudidae was Burmese bush lark (*Mirafra microptera*) and the member of family Leiothrichidae was White-throated babbler (*Turdoides gularis*), the member of Columbidae was Burmese collared Dove (*Streptopelia xanthocycla*), the member of family Pycnontidae was Ayeyarwady Bulbul (*Pyconotus blanfordi*) and were found near the survey site and they were endemic species of Myanmar. Plain prinia (*Prinia flaxiventris*) which belongs in the family Cisticiolidae was very common in study area. Barred Button Quail (*Turnix suscitator*) which belongs in the family Turnitidae was common species of central dry zone region of Myanmar. According to the IUCN Red List of threatened species (2022-2), there was no threatened species and three species were endemic in Myanmar.

Table 4.20 List of Bird Species recorded from the Survey area

No	Scientific Name	Common Name	Family	IUCN Status
1	Megalaima haemacephala	Coppersmith Barbet	Ramphastidae	Least concern
2	Coracias benghalensis	Indian Roller	Coraciidae	Least concern
3	Elanus axillaris	Black-Shoulder kite	Accipitridae	Least concern
4	Turnix suscitator	Barred Button Quail	Turnitidae	Least concern
5	Clamator jacobinus	Pied cuckoo	Cuculidae	Least concern
6	Cypsiurus balasiensis	Asian Palm-Swift	Apodidae	Least concern
7	Halcyon smyrnensis	White-throated Kingfisher	Alcedinidae	Least concern
8	Merops orientalis	Little green bee-eater	Meropidae	Least concern
9	Centropus sinensis	Greater Coucal	Cuculidae	Least concern
10	Orthotomus sutorius	Common Tailorbird	Sylviidae	Least concern
11	Lonchura punctulata	Scaly-breasted Munia	Estrildidae	Least concern
12	Streptopelia chinensis	Spotted Dove	Columbidae	Least concern
13	Streptopelia tranquebarica	Red collared Dove	Columbidae	Least concern
14	Streptopelia xanthocycla	Burmese collared Dove	Columbidae	Least concern/Endemic
15	Columba livia	Rock Pigeon	Columbidae	Least concern
16	Lanius collurioides	Burmese Shrike	Laniidae	Least concern
17	Corvus splendens	House Crow	Corvidae	Least concern
18	Aegithina tiphia	Common Iora	Aegithininae	Least concern
19	Dicrurus macrocercus	Black Drongo	Dicruridae	Least concern

20	Copsychus saularis	Oriental Magpie-robin	Muscicapidae	Least concern
21	Pyconotus cafer	Red-vented Bulbul	Pycnontidae	Least concern
22	Pycnonotus jocosus	Red-whiskered Bulbul	Pycnontidae	Least concern
23	Pyconotus blanfordi	Ayeyarwady Bulbul	Pycnontidae	Least concern
24	Upupa epops	Common Hoopoe	Upupidae	Least concern
25	Mirafra microptera	Burmese bush lark	Alaudidae	Least concern/Endemic
26	Turdoides gularis	White-throated babbler	Leiothrichidae	Least concern/Endemic
27	Chrysomma sinensis	Yellow-eyed Babbler	Timaliidae	Least concern
28	Acridotheres tristis	Common Myna	Sturnidae	Least concern
29	Acridotheres leucocephalus	Vinous –breasted Myna	Sturnidae	Least concern
30	Anthus rufulus	Paddyfield pipit	Motacillidae	Least concern
31	Passer domesticus	House Sparrow	Passeridae	Least concern
32	Passer montanus	Eurasian Tree-sparrow	Passeridae	Least concern
33	Saxicola caprata	Pied Bushchat	Muscicapidae	Least concern
34	Saxicola maurus	Siberian stonechat	Muscicapidae	Not Evaluated
35	Prinia flaxiventris	Plain prinia	Cisticiolidae	Least concern

Eurasian Tree Sparrow (*Passer montanus*)

Red-vented Bulbul (*Pyconotus cafer*)

Ayeyarwaddy Bulbul (*Pyconotus blanfordi*)

Vinous –breasted Myna (*Acridotheres leucocephalus*)

Figure 4-24 Bird Species Photo Recorded in Survey Period

Mammals

During survey period, a total of 4 mammal species belonging to 4 genera were recorded through observation and interviewed survey in the project area. According to the interview information from Villagers, the mammal species of recognized conservation interest were found within the forest habitat of the study area. These are Common Palm Civet, Burmese Hare, Variable Squirrel, Small Asian Mongoose were recorded by interview survey from local people.

They are one species of Civet, one species of Burmese Hare, one species of Mongoose. All species were interview information. According to the IUCN Red List of threatened (2022-2), there was no threatened species and endemic species were also not found in this area.

Table 4.21 List of Mammal Species recorded in the Survey area

No	Scientific Name	Common Name	Family Name	IUCN Status	Observation Status
1	Callosciurus finlaysonii	Variable Squirrel	Sciuridae	LC	Interviewed
2	Paradoxurus hermaphrodites	Common Palm Civet	Viverridae	LC	Interviewed
3	Herpestes javanicus	Small Asian Mongoose	Herpesridae	LC	Interviewed
4	Lepus peguensis	Burmese Hare	Leporidae	LC	Interviewed

LC = Least Concerned

Herpetology (Reptiles & Amphibians)

During the herpetofauna survey, 5 reptile and amphibian species were recorded within the Study Area through interview and observation. Three species were observed and two species were interviewed from local people during survey period. The observed herpetofauna included 1 species of lizards, 1 species of Skink, 2 species of Snake and 1 species of Frog. The number of herpetofauna belonging to their families were one species in families Agamidae and the families of snake were one species in families Colubridae and one species in families Viperidae, one species in families Scincidae, and one species in families Mycrohylidae.

The Lizards were rather evenly distributed in and around the Site. Frog was found at Stream and Snake were rare. According to the IUCN Red List of threatened species (2022-2), there were no threatened species and no endemic species in this survey area.

Table 4.22 List of Herpetofauna species recorded by interview information

No	Scientific Name	Common Name	Family Name	IUCN Status	Observation Status
1	Calotes versicolor	Garden lizard	Agamidae	NE	Observed
2	Microhyla fissipes	Ornate Pigmy Frog	Microhylidae	LC	Observed
3	Eutropis multifasciata	Common Sun skink	Scincidae	LC	Observed
4	Ptyas mucosa	Indian Rat Snake	Colubridae	NE	Interviewed
5	Daboia russelii	Russell's Viper	Viperidae	LC	Interviewed

NE = Not Evaluated, LC = Least Concerned

Garden lizard (*Calotes versicolor)*

Common Sun skink (*Ptyas mucosa)*

Figure 4-25 The photo of Herpetology species recorded in the survey area

Butterfly

Total of 17 butterfly species were recorded in the study area. These included 2 species of Papilionidae, 6 species of Pieridae and 9 species of Nymphalidae. One species were recorded as least concerned species such as Peacock Pansy (*Junonia almana*), According to the IUCN Red List of (2018-2), there were no threatened species and no endemic species.

Table 4.23 List of butterfly species recorded from the survey area

No.	Scientific Name	Common Name	Family Name	IUCN Status
1	Papilio polytes	Common Mormon	Papilionidae	NE
2	Papilio demoleus	Lime Butterfly	Papilionidae	NE
3	Catopsilia pomona	Lemon Emigrant	Pieridae	NE
4	Catopsilia pyranthe	Mottled Emigrant	Pieridae	NE
5	Appias libythea	Striped Albatross	Pieridae	NE
6	Ixias pyrene	Yellow Orange tip	Pieridae	NE

7	Leptosia nina	Psyche	Pieridae	NE
8	Eurema hecabe	Common Grass Yellow	Pieridae	NE
9	Danaus chrysippus	Plain Tiger	Nymphalidae	NE
10	Danaus genutia	Common Tiger	Nymphalidae	NE
11	Tirumala limniace	Blue Tiger	Nymphalidae	NE
12	Junonia almana	Peacock Pansy	Nymphalidae	LC
13	Junonia iphita	Grey Pansy	Nymphalidae	NE
14	Junonia lemonias	Lemon Pansy	Nymphalidae	NE
15	Ypthima baldus	Common Five Ring	Nymphalidae	NE
16	Neptis hylas	Common Sailer	Nymphalidae	NE
17	Orsotriaena medus	Nigger	Nymphalidae	NE

NE = Not Evaluated, LC = Least Concerned

Eurema hecabe(Common Grass Yellow)

Danaus genutia(Common Tigerk)

Junonia iphita (Grey Pansy)

Tirumala limniace (Blue Tiger)

Figure 4-26 Some photo of butterfly species recorded in the survey area

Dragonfly

Five species of dragonfly species were observed in the survey area. All species of dragonfly included under the same family Libellulidae. They were found throughout the year. There were no threatened species according to IUCN Red List of threatened species (2022-2).

Table 4.24 List of dragonfly species recorded in survey area

No.	Scientific Name	Common Name	Family Name	IUCN Status
1	Orthetrum sabina	Green Marsh Hawk	Libellulidae	LC
2	Crocothemis servilia	Scarlet Skimmer	Libellulidae	LC
3	Trithemis aurora	Marsh Glider	Libellulidae	LC
4	Diplacodes trivialis	Ground Skimmer	Libellulidae	LC
5	Macrodiplax cora	Coastal glider	Libellulidae	LC

LC = Least Concerned

Trithemis aurora (Marsh Glider)

Macrodiplax cora (Coastal Glider)

Diplacodes trivialis (*Ground Skimmer*)

Crocothemis servilia (Scarlet Skimmer)

Figure 4-27 Some photo of dragonfly species recorded in survey area

4.3.3 Protected Areas

The project is located 7.2 kilometers away from Taung Kaung Reserved Forest and 29 kilometers away from National Kandawgyi Garden (Pyin Oo Lwin).

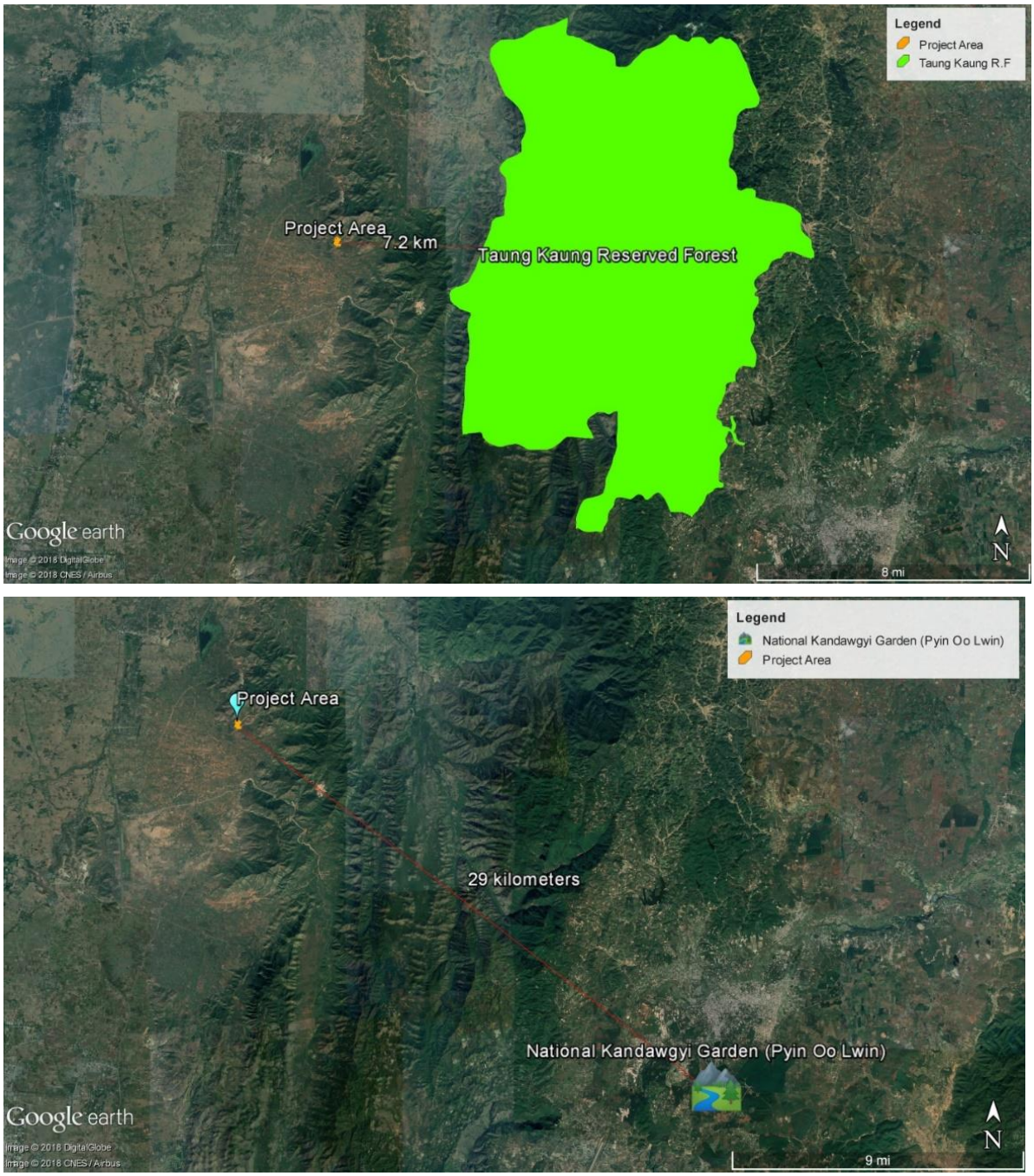


Figure 4-28 Protected Areas

4.4 Socio-economic Components

It is necessary to study existing demographic profile of the region, the economic resources, the health conditions, education and cultural resources of the community for social impact assessment of the project. This study primarily emphasized on the existing socio-economic conditions of villages which are located in the project area especially those residing closely at the Myanmar Conch (Mandalay) Green Building Materials Co., Ltd.'s project.

Study objectives are:

- To examine the possible impact of the project on socio-economy of the affected area where relocation is necessary,
- To assess people's attitudes, feelings and opinions on the project before implementation, and
- To comprehend local people's suggestion in the consideration of the project.

Data collection process is necessary to collect and measure information in socio-economic investigation of project affected area. Data are collected in different type of ways.

Firstly, Secondary data are collected from Patheingyi and Madaya Township General Administrative Departments, Myanmar Population and Housing Census, Myanmar Information Management Unit and records from the project developer.

Stakeholder engagements, consultation meetings and social surveys are carried out. In stakeholder engagement process, township level engagement and local level engagement are undertaken. Social team met officers, monks, village heads and local villagers who live in the targeted three villages for discussion and consultation about the project and observed actual condition of the communities. And then household data are collected using questionnaire and social data are gathered from respective villages. Qualitative interpretation and examination are applied to assess socio-economy of villagers in the project area.

Public consultation sessions were systematically organized during this study. The approaches of public consultation are as follow:

- Target area: Three villages of Dahattaw village tract and Tanug Gan village tract which are assumed as project affected area
- Target group: related village heads, villagers, members of health services, monks and elderly group
- Methodology: visit, consultation and surveying, etc.

The information about a wide variety of them in affected area is collected with the help of questionnaire survey. The questionnaires are divided into three parts as

- Household survey
- Health Services Provider In-depth Interview
- Key Informant Interview

Direct conversation, photograph records and consultation with local villagers were made during field observation from 26th to 30th March 2023. Basic household information, socio-economic information, housing information, health, cultural heritage, traffic in the community, personnel, general facts, employment, gardens and livestock, water and sanitation, education, development and leadership are studied through questionnaire. Total of 100 households in affected area are interviewed through questionnaire survey.

Total of three villages distributed in two village tracts are located around 3-km radius from the cement plant. The list of villages is presented below:

- Aung Tha Pyay (Dahat Taw village tracts)
- Htone Bo (Taung Kan Village tracts)
- Pyi Tha Yar (Taung Kan Village tracts)

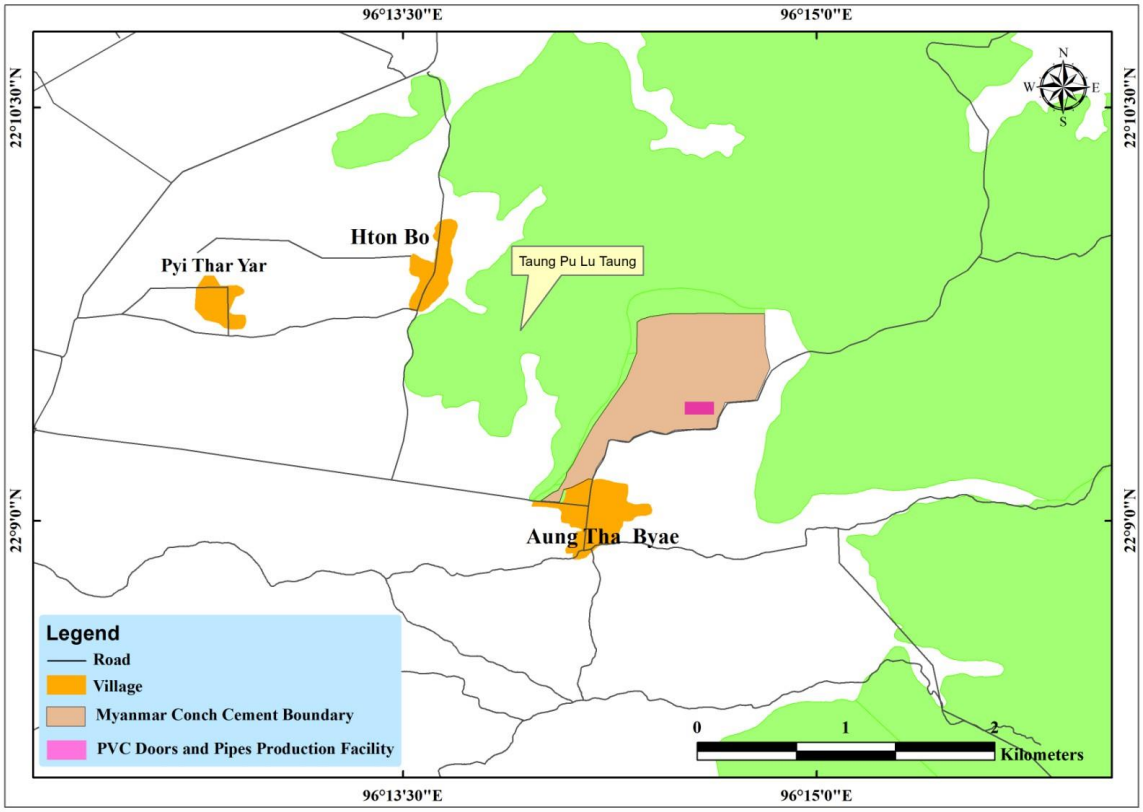


Figure 4-29 Social Area of Influence

4.4.1 Area of Influence (AOI)

The socio-economic area of influence includes project site and temporal limits of individual environmental components outside the Project Area boundaries which is likely to be affected by the project activities during the pre-construction, construction and operation phases.

The socioeconomic baseline status is mostly focused on the local level within Patheingyi Township and Madaya Township located in Mandalay Region. Because the proposed project has a direct impact on local socioeconomics, it will result in macroeconomic benefits at the national level. The socioeconomic area of influence encompasses the project site and temporal limits of particular

environmental components outside the Project area boundaries that are anticipated to be impacted by project activities during the pre-construction, construction, and operation stages. The consequences can be beneficial or negative, short or long term or permanent, as well as direct and in-direct. Pyi Tha Yar Village, Htone Bo Village and Aung Tha Pyay Village situated as nearest receptor of the proposed project and these villages are considered as the social receptor of the proposed project.

4.4.2 Administrative Structure

Myanmar is located in the western portion of mainland Southeast Asia. The country is bordered by China to the north and northeast, Laos to the east, Thailand to the southeast, the Andaman Sea and Bay of Bengal to the south and southwest, Bangladesh to the west, and India to the northwest. The country is divided administratively into;

- seven states; largely on the basis of ethnicity which are Chin, Kachin, Kayin, Kayah, Mon, Rakhine and Shan
- seven regions; Ayeyarwady, Magway, Mandalay, Bago, Sagaing, Tanintharyi and Yangon
- five self-administered zones;
- one self-administered division; and
- one union territory.

These states and divisions are subdivided further into districts, townships, towns, urbans wards, village tracts, villages and rural wards. The administrative structure of the states, regions and self-administering bodies is defined in the Constitution. There has a Regional/State Government, consisting of a Chief Minister, Ministers and an Advocate General in each region and state. Legislative authority resides with the State/Regional “Hluttaw” (a parliament or legislative body), which are made up of elected civilian members and representatives of the military.

Patheingyi Township and Madaya Township are situated in Mandalay District, Mandalay Region. Mandalay Region is one of Myanmar’s central Regions, sharing borders with Sagaing, Shan, Kayin, Bago, Naypyitaw and Magway. Mandalay covers 29,686km^2, and consists of 28 townships. The capital city of Mandalay Region is Mandalay City. It is the second largest city of Myanmar located on the east bank of Ayeyarwady River and it is also where the Royal Palace of the Konbaung Dynasty is located which was the last monarchy and independent kingdom of Burma.

Mandalay Region is under the administration of Mandalay Regional Government. Regional administrative structure is divided into districts, townships, village tracts and villages. Patheingyi Township is under the direct administration of Mandalay District and at the same time Madaya Township is directly administered by Pyin Oo Lwin District. All districts and townships are situated in Mandalay region. The studied areas are under the administration of Patheingyi Township and Madaya Township. Villages are in the control of village tract administration, which is direct administered by townships.

Table 4.25 Administrative District, Township, Town, Village Tract and Village in Mandalay Region

No	District	Township	Sub-Twonship	Twon	In the Township of		
					Ward	Village-Tract	Village
1	Naypyitaw North - District	Oktarathiri		Oktarathiri	5	8	37
		Pobbathiri		Pobbathiri	1	15	70
		Zeyathiri		Zeyathiri	4	12	54
		Tatkon		Tatkon	5	47	171
2	Naypyitaw South -District	Dakkhinathiri		Dakkhinathiri	6	6	24
		Zabuthiri		Zabuthiri	5	3	13
		Lewe		Lewe	6	59	225
		Pyinmana		Pyinmana	5	33	163
3	Mandalay	Aungmyaythazan		Mandalay	19		
		Chanayetharzan			20		
		Chanmyatharzi			13		
		Mahaaungmye			18		
		Pyigidagon			16		
		Amarapura		Amarapura	8	42	166
				Myitnga	1		
		Patheigyi		Patheigyi	1	58	133
4	Kyaukse	Kyaukse		Kyaukse	10	86	207
		Myittha		Myittha	6	82	227
		Singaing		Singaing	4	48	158
		Tada-U		Tada-U	3	61	167
5	Meikhtila	Meikhtil		Meikhtil	14	58	380
		Mahlaing		Mahlaing	4	52	247
		Thazi		Thazi	7	80	242
		Waundwin		Waundwin	6	69	218
6	Myingyan	Myingyan		Myingyan	19	66	185
		Kyaukpadaung		Kyaukpadaung	12	109	335
		Nahtogyi		Nahtogyi	6	64	286
		Ngazun		Ngazun	4	44	160
		Taungtha		Taungtha	6	77	244
7	Nyaung-U	Nyaung-U	Ngathayuk	Nyaung-U	7	74	206
				Bagan	6		
				Ngathayuk	4		
8	Pyinoolwin	Pyinoolwin		Pyinoolwin	21	37	116
		Madaya		Madaya	5	83	255
		Mogok		Mogok	5	30	132
		Singu		Singu	2	37	108
		Thabeikkyin	Tagaung	Thabeikkyin	2	19	46
				Tagaung	3		
9	Yemethin	Yemethin		Yemethin	5	63	234
		Pyawbwe		Pyawbwe	8	75	315

Source: Myanmar Travels and Tours Directory

4.4.3 Demographic Profile

The 2014 Myanmar Population and Housing Census states that as of March 29, 2014, there were 51,486,253 people living in Myanmar. There were 26,661,667 females and 24,824,586 males among them. As of March 29, 2014, the Mandalay Region had 6,165,723 residents in total. There were 3,237,356 females and 2,928,367 males among them. The Mandalay Region's entire population represent about 12% of Myanmar's overall population.

Myanmar Population and Housing Census show that Patheingyi Township had a total population of 263,725 persons as of October 2017. Of these 129,004 were males and 134,721 were females. Then, total population of Madaya Township was 258,001 persons as of October 2017 with 122,878 males and 135,122 females.

The results of the survey indicate that total population of the studied area is 2,231 persons. Of these, 1,044 are males and 1,187 are females. The total population of studied area represents 0.4 % of the total population of Patheingyi and Madaya Townships. The following table shows the distribution of the total population by age, gender, and households.

Table 4.26 Population and Households in Townships

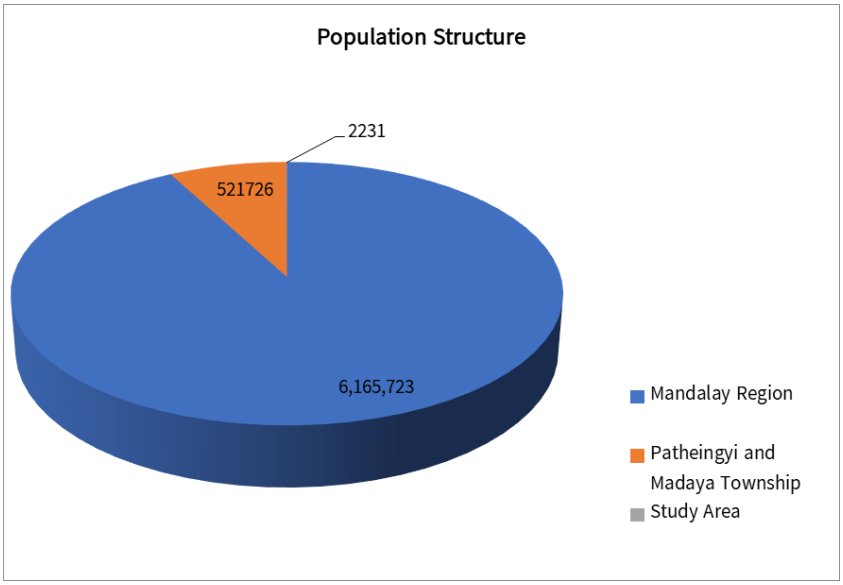
Sr.	Township	Household	Population		
			Male	Female	Total
1	Patheingyi Township	52,990	129,004	134,721	263,725
2	Madaya Township	58,645	122,878	135,122	258,001
Total		**111,635**	**251,882**	**269,843**	**521,726**

Source: Township profile by General Administrative Department

Table 4.27 Population and Households in Affected Villages

Sr.	Township	Village Tract	Village	Houses	Population			
					Household	Male	Female	Total
1	Patheingyi	Dahat Taw	Aung Tha Pyay	300	300	600	700	1300
2	Maddaya	Taung Kan	Htone Bo	85	85	114	117	231
3			Pyi Thar Yar	171	171	330	370	700
Total				556	556	1044	1187	2231

Source: Interview survey, SEM



Source: SEM

Figure 4-30 Population Structure

4.4.4 Ethnicity and Religion

With at least 135 different ethnic groups officially recognized by the government, Myanmar is a multiethnic nation. The majority ethnic group of Myanmar, comprising 68% of the population, is the Bamar people. The remaining 32 percent of the population is made up of various ethnic minorities. Kachin, Kayar, Kayin, Chin, Bamar, Mon, Rakhine, and Shan are the principal ethnic groupings. In general, a person's ethnic roots and religion are connected.

According to the data from Township Administration Departments, the ethnic races inhabiting in Patheingyi and Madaya Townships include Kachin, Kayah, Kayin, Chin, Bamar, Mon, Rakhine and Shan. The largest ethnic group is formed by Burmese. Kayin, Rakhine and Shan are also observed. In the study area, Burmese is the majority. Moreover, Kachin, Kayin and Shan are also found.

In Myanmar, religion plays a crucial role in daily life and is fundamental to conceptions of individual identity. The vast majority of people in Myanmar identify as Buddhists, with the other populations practicing Christianity, Islam, Hinduism, Animism, and other faiths in order of prevalence. Everyone has the same right to openly declare their faith and engage in discrimination-free religious practice.

The majority of the population of Madaya and Patheingyi Township is Buddhist, based on data from the Township Administration Department. Islam is the second-largest religion, behind Christianity, Hinduism, and every other religion. Buddhism is dominant in the studied area.

Table 4.28 Township Level Religions

Sr.	Township	Buddhist	Christian	Hindu	Islam	Other
1	Patheingyi Township	211916	205	88	305	12
2	Madaya Township	243321	148	19	313	-
	Total	**455237**	**353**	**107**	**618**	**12**

Source: Township profile by General Administrative Department

Source: Field survey, SEM

Figure 4-31 Religious Building in the study area

4.4.5 Socio-Economic Structure

With a population of over 6 million, Mandalay is the second-biggest city in Myanmar and serves as a significant hub for trade and communication in the country's north and center. The Mandalay Investment Commission's Mandalay Investment Opportunity Survey report states that there is a great deal of opportunity for development and investment in the Mandalay Area, which includes manufacturing, agro/food processing, agricultural, and other economic ventures, all within a 20-mile radius around Mandalay. With 392 heavy enterprises, 304 middle-sized enterprises, 596 small-scale enterprises, and 13 kinds of manufacturing businesses, the No. 1 and No. 2 industrial zones are also located in the Mandalay region. Agriculture, forestry, industry, mining, and tourism are the primary economic activities.

Agriculture makes up the majority of Madaya Township's economic activity. The main agricultural products are rice and beans, which are largely sold in Mandalay and Sagaing. In Patheingyi Township, agriculture is the main economic activity, with rice as the main production. The rice from Patheingyi Township is sold in Mandalay. At the same time, agriculture is the primary economic activity in the study area.

4.4.6 Economy and Livelihood

The Mandalay Region contributes to employment and economic development since it is one of the major hubs for trade and investment in the nation. The economy of the Mandalay Region is diverse, with industrial production, trade, tourism, and agriculture serving as the main sources of income for the vast majority of its citizens. At the township level, livestock is less common than agriculture. The majority of activity in both townships is related to agriculture.

Agriculture and livestock are the main businesses in the surveyed villages. Some people run their own businesses, such as shops, sewing, hairdressing, restaurants, grocery stores, and carpenters. Very few people pursue a career in government. Many people are engaged at industries like Alpha Cement and PVC Pipe Production Factory. Many people have orchards and farms. The most commonly grown crops are peas, bananas, mangoes, and tomatoes. Livestock is also used for farming, domestic consumption, and sale. Cattle, pigs, and poultry are frequently raised in the villages.

4.4.6.1 Agriculture

Agriculture is the main economic source of income in the Mandalay region. Rice, wheat, maize, peanuts, sesame, cotton, legumes, tobacco, chili, and vegetables are the main crops cultivated in Mandalay Region. According to the township profiles, the crops developed in Pathengyi Township and Madaya Township include rice, legumes such as Pe-di-sein, Mat-pe, Pe-sin-gon, and peanut, sesame, crane, maize, and cotton. Furthermore, mango, coconut, lime/lemon, orange, and guava are frequently grown as long-term plantations.

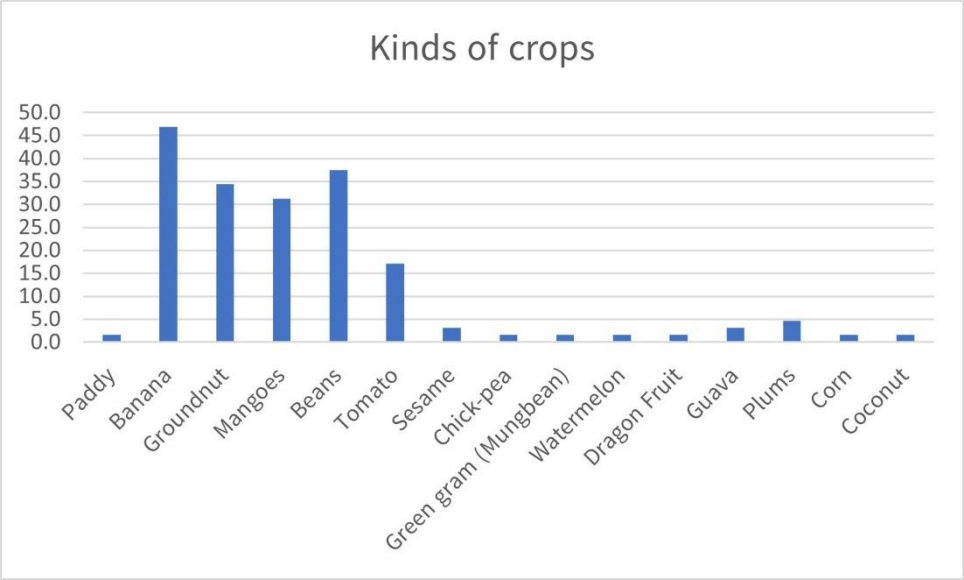
Agriculture is prevalent in the three surveyed villages. The locals grow permanent trees as well as seasonal crops. Main cash crops and fruits are Banana, Groundnut, Beans, Chick-pea, Green gram

(Mungbean), Sesame, Watermelon, Tomato, Corn, Cucumber and Dragon fruit. Perennial trees include mangoes, dragon fruit, plums, and guava. Paddy, groundnut, beans, chickpea, green gram (mungbean), sesame, and maize are seasonal crops. Among these, different kinds of peas, banana, watermelon, mangoes, dragon fruit, and guava are the main cash crops and fruits of these settlements. The majority of the household own orchards and farms. These agricultural items are sold in the Mandalay market. Products are transported from Mandalay Market to other places. The household income from agriculture and type of plantation are mentioned in the following table and figure. The village agriculture practices are shown in the following figure.

Table 4.29 Income from Agriculture

Sr.	Township	Village Tract	Village	High	Low	Average
1	Patheingyi	Dahat Taw	Aung Tha Pyay	8,000,000	200,000	1,853,947
2	Maddaya	Taung Gan	Htone Bo	50,000,000	300,000	6,653,846
3			Pyi Thar Yar	5,400,000	500,000	1,585,000

Source: Interview survey, SEM



Source: Interview survey, SEM

Figure 4-32 Agricultural Products by the studied households


Source: Field survey, SEM

Figure 4-33 Village Agricultural Practices

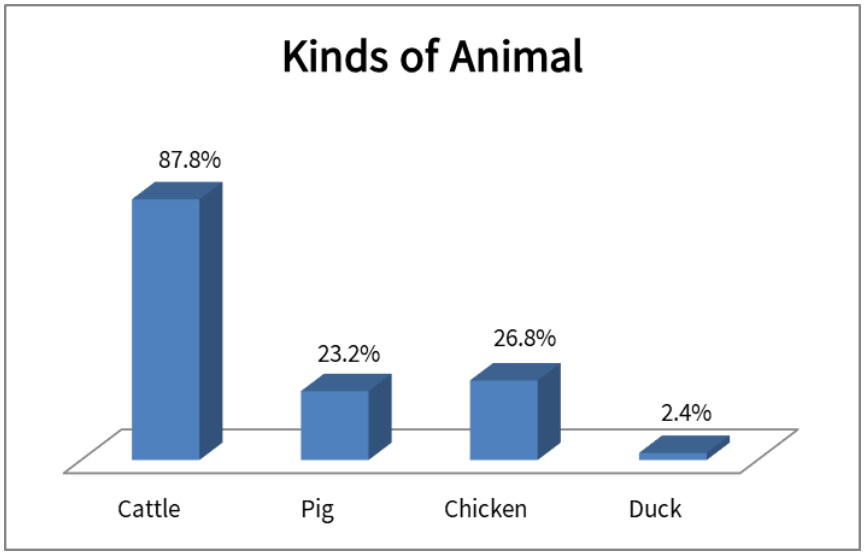
4.4.6.2 Livestock

After agriculture, the livestock industry is crucial to meeting population demands, improving food security, and creating jobs for rural areas in Myanmar. The national GDP is primarily derived from the cattle and fishery sectors. Animal husbandry is practiced extensively in the Mandalay Region. The production of meat, dairy products, and eggs for human use is the main reason that cattle and poultry husbandry are so popular.

According to the township profiles, cow, buffalo, goat and sheep are found as cattle farming. Pigs are also raised for meat. As poultry farming, duck, chicken and quail are observed in making meat and eggs. Moreover, fishery business is also found in it.

In the study area, pigs are raised for meat. Cattles get involved in farming activities, with some being used to produce meat and dairy products such as milk. Some breed cattle for commercial purposes. Goat farming is also a viable economic option there. Most breed chickens and ducks for meat and eggs, which are intended for domestic consumption and occasional sale. Cattle and goats are sold within communities, with some being transported to Mandalay.

The common livestock in the villages and their practices are shown in the following figures.



Source: Interview survey, SEM

Figure 4-34 Livestock in the study area

Source: Field survey, SEM

Figure 4-35 Livestock practice within the study area

4.4.7 Community Health

Health and well-being are critical components of communal life. So, health facilities are critical to the community. The impacted area is in Mandalay Region, and the township hospital, which reports to Mandalay General Hospital, will provide health services in the affected area. The examined villages are close to Mandalay City, and most health services can be easily evaluated at Mandalay General Hospital. The community's health is measured by surveys of Health Services, Village Heads, Village Representatives, and local residents living near the project region. The rated villages are described in the table below.

No.	Township	Village Tract	Villages
1	Patheingyi	Dahat Taw	Aung Tha Pyay
2	Madaya	Taung Kan	Htoen Bo
3	Madaya	Taung Kan	Pyi Thar Yar

In Patheingyi and Madaya townships, malaria, diarrhea, dysentery, TB and hepatitis are mostly occurred. According to health assistants, seasonal fever was mostly occurred last year in the studied areas. Seasonal flu is commonly observed. Rural Health Care center, Sub-rural health care center and private clinics have been existed around the studied area.

According to the survey, most people go to a private clinic in Mya Kan Thar village. If there is an emergency, the locals normally head to Mandalay General Hospital. All villages have ambulances for emergency situations. Township Medical Officers established Community Health Clinics in villages to provide treatment in areas where access to health care institutions is limited. In the villages, midwives or auxiliary midwives assist with homebirths. Otherwise, they use RHC for delivery. If there is insufficient health care at RHC, locals have to go to Township Hospital. The most frequent diseases and key health indicators are listed below.

Table 4.30 Key health indicators within Townships

No	Township	No of maternal	No of Child (Under 1 year)	Rate per 1000			
				Rate of Live Birth	Maternal mortality by live births	Infant mortality by live births	Rate of abortions
1	Patheingyi	4903	4638	22.84	0.23	3.39	1.45
2	Madaya	5890	4803	22.83	0.84	7.1	2.5
Total		**0793**	**9441**	**45.67**	**1.07**	**10.49**	**3.95**

Source: Township Profile by General Administration Department

4.4.7.1 Morbidity

In Patheingyi and Madaya townships, malaria, diarrhea, dysentery, TB and hepatitis are mostly occurred. In the three studied villages, seasonal fever was occurred last year according to health assistants. Seasonal flu is commonly observed. Based on the survey result, seasonal flu, hypertension, heart attack and appendicitis are commonly occurred in that area. Hypertension and diabetes are mostly found in female.

	Malaria	Diarrhea	TB	Dysentery	Hepatitis
Morbidity	14	1875	314	642	3
Mortality	-	-	20	-	-

Source: Township Profile by General Administration Department

4.4.7.2 Mortality

According to the Myanmar Population and Census Report, for every 100,000 live births in Mandalay Region, 280 women die during pregnancy/delivery or within 42 days following termination of pregnancy. The maternal mortality rate in Mandalay Region is lower than at the Union level. The infant and under-5 mortality rates in Mandalay District are lower than the Union average. In Mandalay

District, infant mortality is 34 deaths under the age of one per 1,000 live births, and under-five mortality is 39 deaths per 1,000 live births.

Madaya Township has lower infant and under-five mortality rates than Mandalay Region and Pyin Oo Lwin District. Infant mortality in Madaya is 49 per 1,000 live births, while under-five mortality is 57 per 1,000 live births. Patheingyi Township has lower infant and under-five mortality rates than Mandalay Region, but higher than Mandalay District. Infant mortality in Patheingyi is 47 per 1,000 live births, while under-five mortality is 55 per 1,000 live births.

According to health assistants in the studied area, crude birth rates are 2 per 1,000 births. Hypertension is mostly found in mortality.

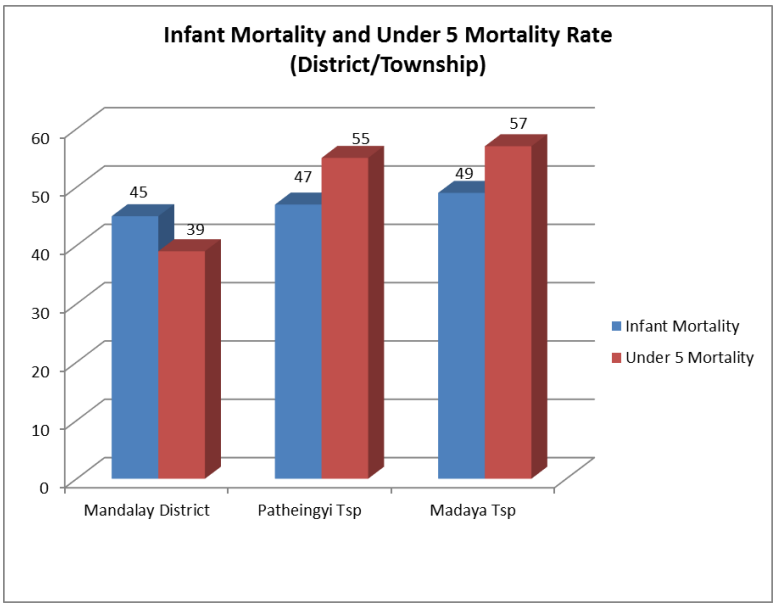


Figure 4-36 District/Township Level Infant Mortality and Under 5 Mortality Rate

4.4.7.3 Access to Water and Sanitation

According to the Madaya Township Census Report, 79.3 percent of Madaya Township households use improved sources of drinking water, including tap water/piped, tube well, borehole, protected well/spring, and bottled water/water purifier. Approximately 69.5% of homes get their water from tube wells or boreholes, while 17.1% get it from rivers, streams, or canals. Approximately 20.7% of households utilize unimproved water sources. In rural areas, 22.7% of households utilize unimproved sources for drinking water.

Approximately 66.4 percent of houses in Madaya Township have upgraded sanitation facilities (flush toilet (1.5%), water seal (improved pit latrine) (64.9%)). Approximately 21.7% of the township's households lack access to a toilet. It is 15.7% across the entire Mandalay Region. In the rural sections of Madaya Township, 23.6% of families lack access to a toilet.

According to the Patheingyi Township Census Report, 88.7% of households use improved drinking water sources such as tap water/piped, tube well, borehole, protected well/spring, and bottled water/water purifier. Approximately 60.4% of homes use water from a tube well or borehole, while

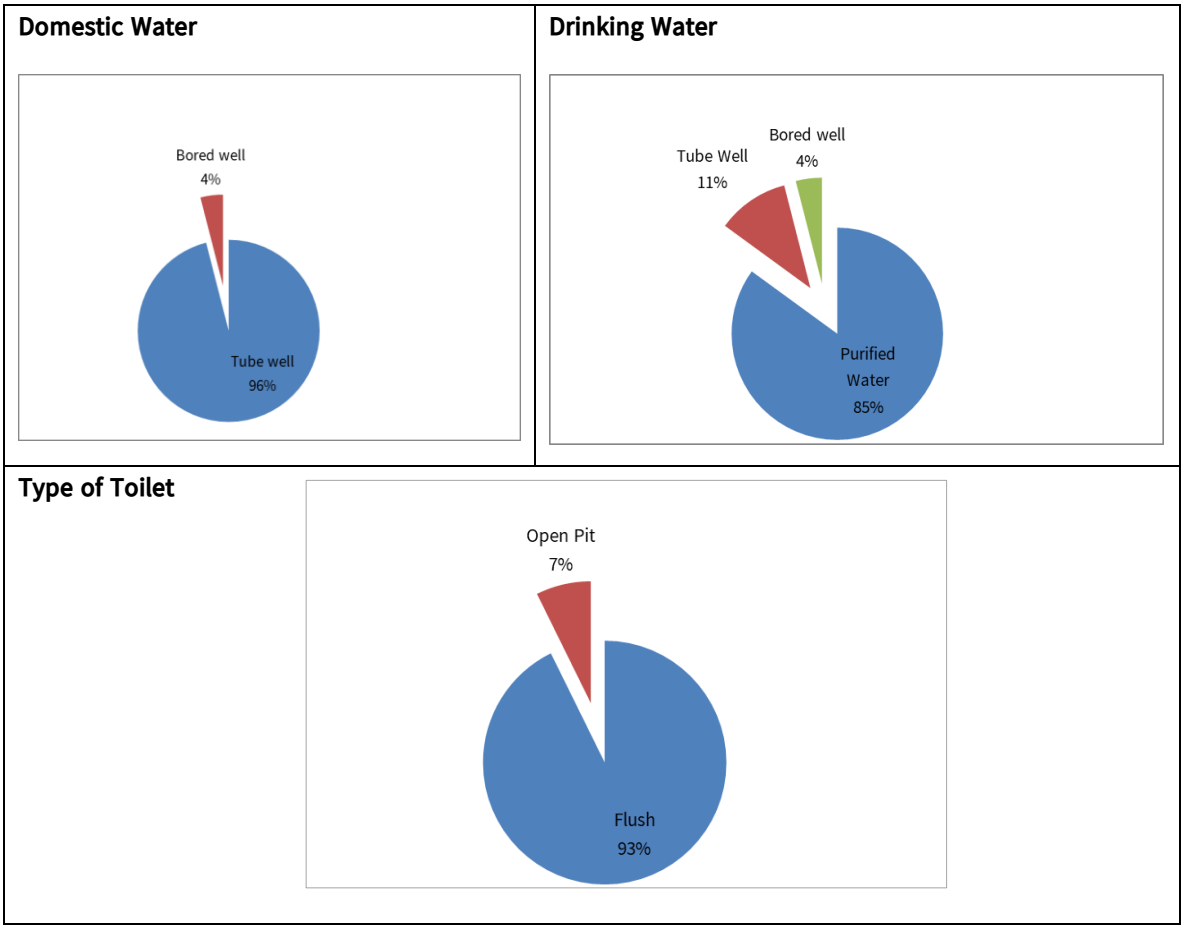
14.2% use water from a protected well or spring. About 11.3% of households utilize unimproved water sources. In rural areas, 11.9% of households utilize unimproved sources for drinking water.

In Patheingyi Township, 76.2 percent of houses have improved sanitary facilities. 17.7% of the township's houses lack toilet facilities. It is 15.7% across the entire Mandalay Region. In Patheingyi Township's rural sections, 18.5% of families do not have access to toilet facilities.

According to the interview surveys with village heads, tube wells are mainly found as water source followed by bored well. The depth of bored well is commonly about 20 feet 60 feet. Purified water is mostly used for drinking. Although domestic water is used from tube well, there are the households which are still using the same resource for drinking and domestic water. But, the method of filtering is used for drinking water.

In the three surveyed villages, 96% of houses use tube wells for residential water, with 4% using dug wells. Purified drinking water is used by 85% of the investigated houses in the three communities, with tube wells discovered in 11% of them. Approximately 4% of homes use bored wells for drinking water.

In general, Pour Flush Latrine is used typically in these villages and open defecation is also observed. While 97% of households in three villages are using pour flush latrine, using open defecation is found in some 3 % of households.



Source: Interview survey, SEM

Figure 4-37 Water and Sanitation of studied area

Source: Field survey, SEM

Figure 4-38 Water and Sanitation Condition within the study area

4.4.7.4 Healthcare Facilities

Ministry of health is the major provider of comprehensive health care in Myanmar. Health care is structured and delivered by both public and private sources. According to the township profile, Patheingyi township has one Township Hospital, one Station Hospital, two 16-bed hospitals at the University of Technology and the University of Computer Studies, one 200-bed Lung Specialist Hospital, one Private Cancer Foundation, one Private Specialist Hospital, and one Private Eye Hospital. Five Rural Health Care Centers and twenty-five Sub-Rural Health Care Centers also exist. Thirty-five private clinics are also present.

According to township profile in Madaya Township, one Township Hospital, one Leprosy Hospital, Five Station Hospitals and one Private 16 Bedded Hospitals are observed. Six Rural Health Care Centers and Thirty-Seven Sub-Rural Health Care Centers are also existed. Fifteen private clinics are also found.

There are no health care centers in the three villages. Most people go to Mya Kan Thar village for health care. Three private clinics are located in Mya Kan Thar village. Htone Bo Village and Pyi Thar Yar Village are under the control of Kim Sub-Rural Health Center, supervised by Kyauktatar Rural Health Centre. Aung Tha Pyay village is included in Mya Kan Thar Sub-Rural Health Centre's supervision. Mya Kan Thar Sub-Rural Health Centre is under Dahattaw Health Centre. One Public Health Supervisor-2, one Midwife and one Auxiliary Midwife are provided in Mya Kan Thar Sub-RHC. Most of local people in three villages commonly go to private clinic which is located in Mya Kan Thar Village although Htone Bo Village and Pyi Thar Yar Village are under the control of Kim Sub-Rural Health Center.

According to Midwife at Mya Kan Thar, Doctor visits to the villages two times per year especially in June and November. Vaccination date is identified and performed in every month. There is free treatment service on Wednesday and Friday. In Kim Sub-RHC, treatment service is available on every Monday, Tuesday and Wednesday. In accordance with midwife at Kim Sub-RHC, vaccination and

treatment are carried out 2 times per year in the villages. Public health officer also visits to the villages two times per month. Deliveries are carried out in Kim Sub-Rural Health Centre or with Midwife of Kim Sub-RHC.

According to household surveys conducted in three villages, 26.3% of households visit a private clinic, while 36.8% receive treatment at Sub-Rural Health Centre. The remaining 31.6% of households go to the hospital, while 5.3% receive treatment in the Rural Health Centre.

Table 4.31 Township Level Healthcare Facilities

Township	Government			Sub- Rural Health	
	Hospital	Private Hospital	Rural Health Care	Care	Clinic
Madaya Township	7	1	6	38	15
Patheingyi Township	5	3	5	25	35
Total	12	4	11	63	50

Source: Field survey, SEM

Table 4.32 Healthcare Facilities within studied area

Type of healthcare facilities			Study Area	Private Clinic
Patheingyi Township Hospital	Dahattaw Rural Health Care	Mya Kan Thar Sub- Rural Health Care	Aung Tha Pyay	-
Madaya Township Hospital	Kyauktatar Rural Health Care	Kim Sub-Rural Health Care	Htone Bo	-
			Pyi Thar Yar	-

Source: Field survey, SEM

Source: Field survey, SEM

Figure 4-39 Health care facilities

4.4.8 Infrastructure and Social Facilities

Patheingyi Township is located in Mandalay District, whilst Madaya Township is in Pyin Oo Lwin District. Both districts are located in Mandalay Region. Patheingyi and Madaya towns are home to township-level government organizations from different sectors such as general administration, education, and health, as well as religious buildings, schools and hospitals.

In the studied villages, religious building, school and village head office are observed as following.

Table 4.33 Infrastructure and Social Facilities

Villages	Infrastructure and Social Facilities							
	Village Administrative office	Education Facilities			Health Facilities		Religious building	
		High School	Middle School	Primary School	Sub-rural health center	Private Clinic	Monastery	Pagoda
Aung Tha Pyay	1	-	-	1	-	-	1	1
Htone Bo	1	-	-	1	-	-	1	1
Pyi Thar Yar	1	-	-	1	-	-	1	1

Source: Field survey, SEM

4.4.13 Non-Governmental Organization

The following tables present the local NGOs and social organizations based in the three villages. No data are available regarding the presence of international NGOs in the studied area.

Table 4.34 Non-Governmental Organization

No	Organization Type	Villages
1	Sein Yaung So	Aung Tha Pyay Village
2	Natural Resource Lover	Aung Tha Pyay Village

Source: Field survey, SEM

4.4.9 Education

Township-level data indicates that school attendance declines in Patheingyi Township after age 13 for males and age 12 for females, and in Madaya Township after age 11 for both genders. 16.4% of people in the 25+ age group report never having attended school. 17.3% of people in rural areas who are over 25 have never attended school. About 12.6% of people in Patheingyi Township who are over 25 have never attended school. Thirteen percent of those over 25 who live in rural areas have never attended school.

Madayar Township has 13 basic education high schools, 27 basic education middle schools, 156 basic education elementary schools, 11 kindergartens, and 12 monastic education institutions. Patheingyi township has 5 universities, 2 collages, 3 basic education high schools, 3 sub-basic education high schools, 6 basic education middle schools, 6 sub-basic education middle schools, 18 basic education elementary schools, 75 basic education primary schools, and 29 monastic educations.

The majority of primary schooling is found in the three villages under study, according to the survey data. Middle education is the second most common level of education in the area according to the study. Graduated persons are also observed in those villages.

Table 4.35 Education Structure in three studied villages

Village	Type of Schools	No. of School	No. of Teacher	No. of Student
Aung Tha Pyay	Post-primary School	1	8	204
Htone Bo	Primary School	1	4	28

Pyi Thar Yar	Affiliated Primary School	1	4	40
	Monastic School	1	5	180

Source: Field survey, SEM

The following figure presents the education level in the seven villages.

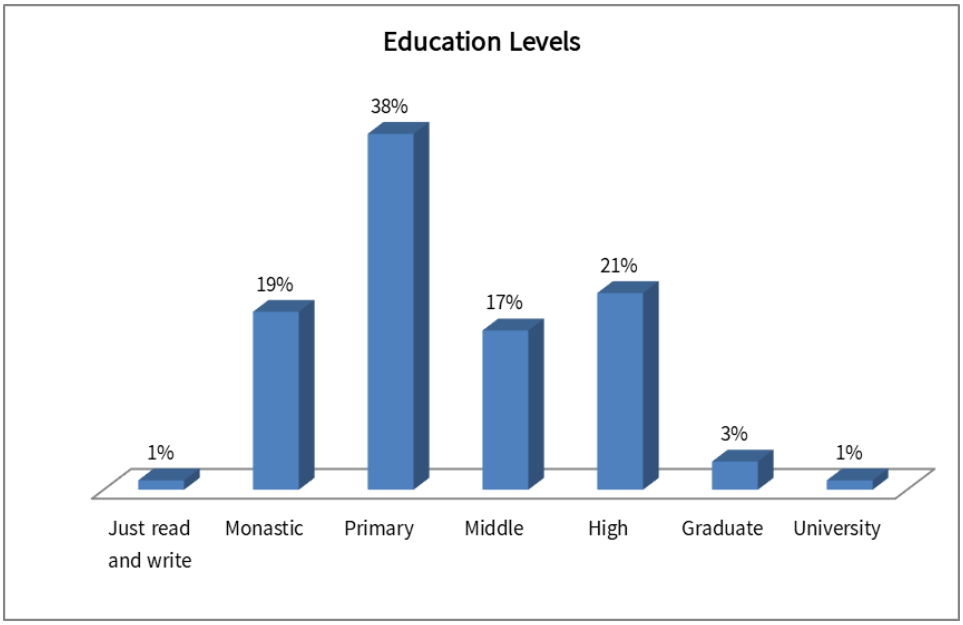


Figure 4-40 Education Level

Source: Field survey, SEM

Figure 4-41 Education facilities in study area

4.4.10 Waste Management

In terms of waste management, the studied area lacks any operation system and waste collection system. Practices of burning the solid waste and domestic waste within the compound, outside the village, landfill and throwing into the stream near their villages are also observed in these areas. Moreover, there is no drainage system for waste water management in the villages.

Wastes and trash are tossed into the compounds, into the farm, and outside the villages. Additionally, common disposal sites are observed. Some people disposed at their own farm. 60% of the

surveyed households in the three villages make burning. About 28% of respondents dispose of their waste at the farm, whereas 8% of surveyed household dispose the waste at common dump site while the other 28% of households are throwing at the farm. Some 9% of household throw within the compound.

Source: Field survey, SEM

Figure 4-42 Waste Management Practices

4.4.11 Electricity and Energy

The most common energy source in the Mandalay region is electricity. The second most common use is batteries; other common uses include candles, generators, solar power, water mills, and kerosene. The most common fuel used for cooking is firewood, while other fuels include electricity, charcoal, coal, biogas, LPG, and straw.

According to township report by Myanmar Population and Census, in Patheingyi Township, 48.5 per cent of the households use electricity for lighting. In rural areas, 46.2 per cent of the households mainly use electricity for lighting. Households in the township mainly use wood-related fuels for cooking with 45.3 per cent using firewood and 26.0 per cent using charcoal. Only 27.6 per cent of households use electricity for cooking. Some 47.2 per cent of households in rural areas use firewood and 26.3 per cent use charcoal.

Based on the township report by Myanmar Population and Census, 24.3 per cent of the households use electricity for lighting in Madaya Township. The use of battery for lighting is the highest in the township with 30.4 per cent. In rural areas, 32.8 per cent of the households mainly use battery for lighting. Households in the township mainly use wood-related fuels for cooking with 80.5 per cent using firewood and 9.6 per cent using charcoal. Only 9.0 per cent of households use electricity for cooking. Some 84.6 per cent of households in rural areas use firewood and 8.6 per cent use charcoal.

15% of respondents in the study area primarily use solar power for lighting. The government provides access to power. 75% of those surveyed said they use electricity. There is also the use of candles and batteries for lighting. A few people utilize generators. Using electricity in cooking is also observed. Firewood is only used as cooking fuel when the electricity is out. 225 % of respondents are found in

using firewood to cook while 75 % of respondents are utilizing electricity to cook. Charcoal is also found as fuel for cooking.

Source: Field survey, SEM

Figure 4-43 Electricity and Energy

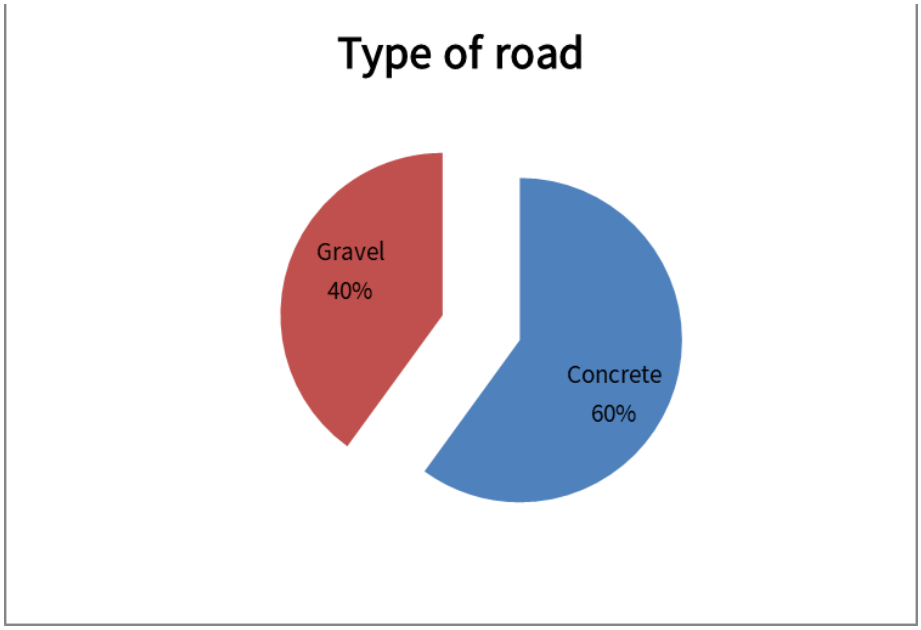
4.4.12 Transportation

Transportation is one of the most important facilities for regional development. According to the Asian Development Bank's Myanmar Transport Sector report, motorbikes dominate transportation in Mandalay. Urban bus services have a minor role. While the city has a train line and a central train station, the train line serves no use for urban transportation and, due to its slow and uncompetitive service times, serves only regionally or nationally. As a result, the only mode of public transportation is via the 57 bus routes served by a fleet of 817 vehicles.

According to township report by Myanmar Population and Census, 68.5 per cent of the households have motorcycle/moped as a means of transport and it is the highest proportion, followed by 50.3 per cent of households having bicycle in Patheingyi Township. Likely, in Madaya Township, 48.9 per cent of the households have motorcycle/moped as a means of transport and it is the highest proportion, followed by 41.9 per cent of households having bicycle. Analysis by urban/rural residence, the majority of the urban households mainly use bicycles and rural households use motorcycle/moped as a means of transport.

The study area's village access roads are passable. The settlements' main roads are constructed of concrete, however there are also occasional signs of dirt and gravel roads. The motorbike is the primary mode of mobility in the area of study place. Public transportation shuttle buses are not observed. The majority of respondents said they travel between villages or outside of them on motorbikes. Some people use cars. 96 % of the respondents said they commute by motorcycle. The rest 4 % use car.

The common roads accessed by the respondents in the project area is shown in the following figure.



Source: Interview survey, SEM

Figure 4-44 Type of Road

Source: Field survey, SEM

Figure 4-45 Transportation and road condition within the study area

4.4.13 Cultural Heritage

Mandalay is known for its cultural legacy. Mandalay was the final capital of the Third Myanmar Empire. Mandalay is the home and custodian of Myanmar's best music and dance traditions. Symbols of religion are richer in Mandalay than in any of the living Myanmar city.

Buddhism is the prevalent religion in the studied area, and there are pagodas and monasteries. Every village has a cemetery. If historical, archeological, and cultural heritage are found within the project's scope of influence, project activities may have a negative impact on those places. The areas which have cultural heritage are not observed in the project area of influence. The cultural and religious resources are presented in Figure.

Source: Field survey, SEM

Figure 4-46 Cultural Buildings of the project area

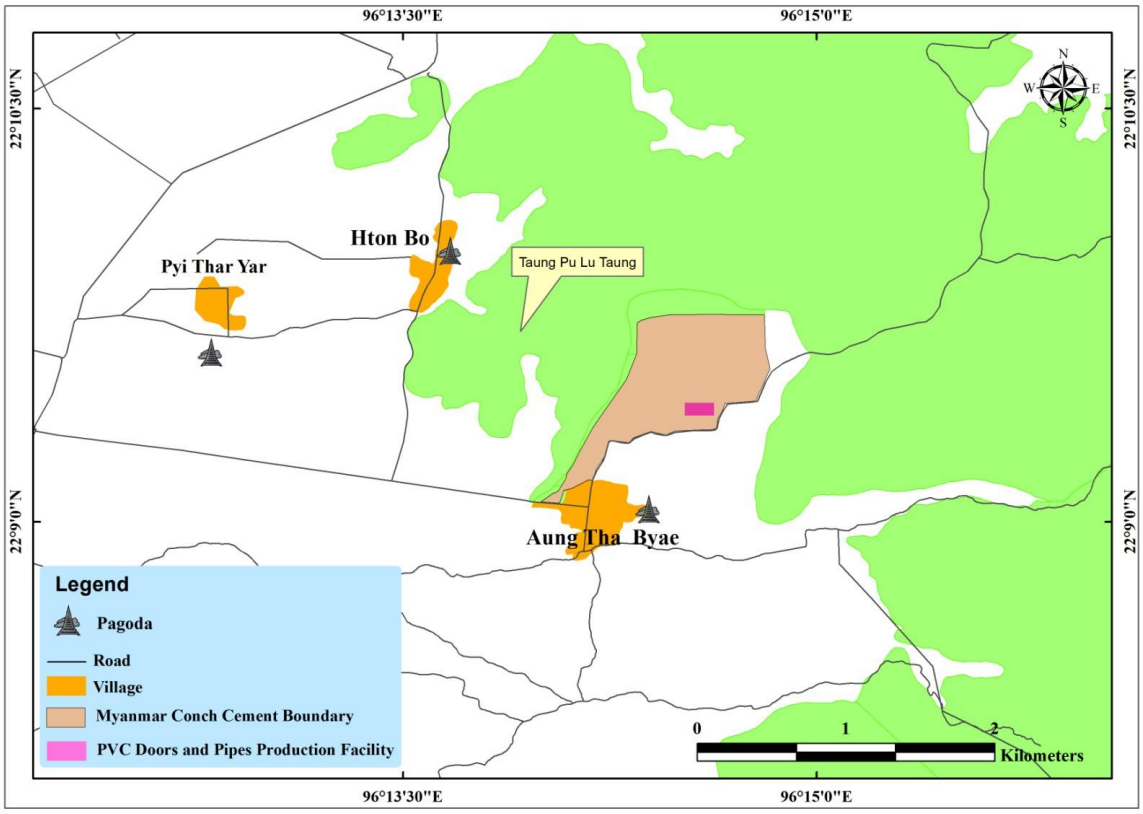


Figure 4-47 Cultural Setting of the project area

4.4.14 Land Use

Patheingyi Township's land use classification is as follows:

No.	Type	Area (Acres)
1	Agricultural Land	58477
2	Vacant Land	2351
3	Industrial land	1474

4	Urban	3448
5	Rural	4074
6	Other	20330
7	Belt Zone Protected Forest	35179
8	Wild Forest	3198
9	Non-cultivable area	18166

Source: Government Administration Department

4.4.15 Visual Components

For the studied area, factories, mining, mountains, and forest are existed together with villages in this region. Therefore, natural, and manmade landscape can be seen at the same place within the studied area.

Figure 4-48 View of the project area

5. IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 Impact Assessment Methodology

To prepare the impact assessment, the EIA study team referred to the project developer's information, as well as available secondary data, site observations, primary data collecting, public consultation, and professional judgements. Taking into account the Project description and the biophysical baseline results, this section presents the environmental and biodiversity impacts potentially generated by the Project during both the construction, operation and decommissioning phases and indicate the mitigation measures to be adopted for avoiding or reducing such impacts.

The impact assessment was done according to the following methodology.

- **Magnitude** is a measure of the degree of change in a measurement or analysis (e.g., the concentration of a metal in water compared to the water quality guideline value for the metal) and is classified as non/negligible, low, moderate or high. The categorization of the impact magnitude may be based on a set of criteria (e.g., health risk levels, ecological concepts and/or professional judgment) pertinent to each of the discipline areas and key questions analyzed. The specialist study must attempt to quantify the magnitude and outline the rationale used. Appropriate, widely recognized standards are used as a measure of the level of impact.
- **Duration** refers to the length of time over which an environmental impact may occur: i.e., transient (less than 1 year), short-term (0 to 5 years), medium-term (5 to 15 years), long-term (greater than 15 years with impact ceasing after closure of the project) or permanent.
- **Scale/Geographic** extent refers to the area that could be affected by the impact and is classified as site, local, regional, national or international.
- **Probability of occurrence** is a description of the probability of the impact actually occurring as improbable (less than 5% chance), low probability (5% to 40% chance), medium probability (40% to 60% chance), highly probable (most likely, 60% to 90% chance) or definite (impact will definitely occur).

Impact significance was rated by using the scoring system shown in the below.

Table 5.1 Scoring System for Assessment of Significance

Magnitude		Duration		Scale		Probability	
10	Very high	5	Permanent	5	International	5	Definite
8	High	4	Long-term	4	National	4	High probable
6	Moderate	3	Medium-term	3	Regional	3	Medium probability
4	Low	2	Short-term	2	Local	2	Low probability
2	Minor	1	Transient	1	Site only	1	Improbable
1	None					0	None

After ranking these factors for each impact, the significance was assessed using the following formula:

SP (significance points) = (magnitude + duration + scale) x probability

The maximum value is 100 significance points (SP). The potential environmental impacts were then rated as of High (SP > 75), Moderate (SP 30 – 75) or Low (SP < 30) significance, both with and without mitigation measures on the following basis:

SP > 75	Indicates high environmental significance	Where it would influence the decision regardless of any possible mitigation. An impact which could influence the decision about whether or not to proceed with the project.
SP 30 - 75	Indicates moderate environmental significance	Where it could have an influence on the decision unless it is mitigated. An impact or benefit which is sufficiently important to require management. Of moderate significance - could influence the decision about the project if left unmanaged.
SP < 30	Indicates low environmental significance	Where it will not have an influence on the decision. Impacts with little real effect and which should not have an influence on or required modification of the project design or alternative mitigation.
+	Positive impact	An impact that is likely to result in positive consequences/ effects.

5.2 Impact on Air Quality

5.2.1 Construction Phase

The construction activities include preparation works and excavation, concrete works, structure installation, and assembling and commissioning. During the construction phase, air pollution emissions at the project site are mostly caused by transportation (i.e., vehicle movement), site clearance, earthworks, and construction operations. These activities are planned to take place over a period of approximately 24 months.

Dust generation is primarily caused by construction activities. These sources include on-site excavation and civil works such as compaction and trenching, construction machinery interaction with uncovered soil, and wind exposure of soil piles.

Mitigation Measures

- Machines and equipment will be periodically checked and maintained to ensure their good working condition.
- Water spraying work areas
- Restricting the speed limits of vehicles during movement on unpaved roads; and

- Covering of vehicles carrying loose soil/construction material.

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1
	Air emission will be limited to construction area and will not influence local community.					
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	The duration of the impacts is short-term.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	
	The Impact is expected to be site only for air quality.					
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The impact on air quality high probability because the usage of equipment and transportation activities during construction is unavoidable.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 28					
Residual Impacts	The residual impacts on air quality during construction phase will be insignificant after the application of proposed mitigation above.					

5.2.2 Operation Phase

Dust is mainly emitted during raw material unloading, warehouse, and metering processes. PVC resin molding produces a little amount of hydrogen chloride gas during the extrusion process due to the addition of stabilizers to the ingredients.

Mitigation Measures

- Materials are transported via an airtight pipe chain (or vacuum), which does not generate dust.
- The raw material warehouse, metering process, and main equipment utilize a dust removal system.
- The workshop is provided with mechanical ventilation systems.
- The heating temperature and time are controlled, and closed manufacturing technology is utilized.

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1

	Only the volatile trace of hydrogen chloride gas is through the workshop ventilation equipment. Emission of dust and will have a minor impact to the surrounding environment.				
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1
	Potential impacts to air quality will occur throughout the operation phase and can therefore be described as long term in nature.				
Scale	International 5	National 4	Regional 3	Local 2	Site 1
	Dust and volatile trace gas emissions are considered local.				
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The potential impact on air quality due to emission of dust and volatile trace of gas will be low probability because mitigation measures are technically feasible.				
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 20				
Residual Impacts	The residual impacts on air quality during construction phase will be insignificant after the application of proposed mitigation above.				

5.3 Noise and Vibration Impact

5.3.1 Construction Phase

During the construction phase, noise will be generated by using heavy equipment and machinery such as car crane, loader, tower crane, back-hole, excavator and dozer for site preparation/clearance and earthworks.

Mitigation Measures

The protection and mitigation measures in order to minimize and reduce the identified potential impacts related to the noise emissions during the construction phase are:

- Maintain machinery and equipment in good conditions;
- Erect temporary noise barriers;
- Maintain an active community consultation and positive relations with local residents that will assist in alleviating concerns that might arise and resolve any potential noise complaints;
- Post warning signs within the vicinity of the impact and all personnel shall be provided with personal protective equipment; and

- Restrict the construction activities that will generate disturbing sounds to normal working hours.

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1
	The construction phase is characterized by intermittent noise emissions and they generally not expected to be continuously during the entire construction period.					
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	The potential noise emission resulting from the construction activities will be only in construction phase.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	
	Noise emission from construction activity is limited to the construction site.					
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The potential noise emission will be low probability because mitigation measures are technically feasible and effective.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 14					
Residual Impacts	The nature of construction noise impacts is characterized by temporary short-term reversible impacts as they cease when the construction activities will complete. There are no residual impacts will be expected after completion of construction period.					

5.3.2 Operation Phase

Noise impacts on environment during operation phase potentially generated by the activities of the production process. The noise of the production line mainly comes from air compressors, packers, pumps and the transport vehicles.

The following table shows the result of noise level obtained from baseline data that recorded during the operation phase.

A Weighted Loudness Equivalent (LAeq) Level						
Result	**N-1**		**N-2**		**N-3**	
	Day	Night	Day	Night	Day	Night

	49	45	45	42	50	39
NEQG	55	45	55	45	55	45

By means of the baseline results, daily noise level result of the nearest noise receptor from project site are within the national standard so that noise emission from project site will not effect on these receptors.

Mitigation Measures

In order to control the noise emission, the project is designed to:

- Select low noise equipment
- Install mufflers at air inlets and outlets of the fans and air compressors
- Install sound insulation cover (room) for equipment with higher noise
- Build sealed or semi-sealed workshops for noisier production processes
- Regular equipment maintenance schedule is to be practiced.

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1
	The noise emission is well below the relevant standards for the nearest two receptors and it is also stated that the noise emission from project may not be affected on the nearest receptors.					
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	Potential impacts of noise emission will occur throughout the operation phase and can therefore be described as long term in nature.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	
	Noise emission from construction activity is limited to the project site.					
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The potential noise emission will be low probability because mitigation measures are technically feasible and effective.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 10					

Residual Impacts	In conclusion the residual impact on this component can be considered as low, in consideration of the relevant mitigation measures reported in the above mitigation section.

5.4 Water Quality

5.4.1 Construction Phase

Water consumption for construction purpose such as cement mixing, dust suppression and vehicle wash down will be around 200 m^3/day. The water supply for construction workers will be 100 m^3/day. The following item is considered as a potential impact on water quality during construction phase.

- The muddy water caused by the construction activities especially during rainy season
- Sewage and sanitary water from worker's camp
- Water consumption for construction purpose and domestic water for construction workers

There is no large streams or rivers around the project area except Mandalay Canal in the west located about 6 km distance and there is no plan to discharge wastewater into it. During heavy rainy days the muddy water (storm water) will collect in the sedimentation pond. Another source of water pollution can be of the spill of fuel used for construction equipment and generators.

Mitigation measures

- Sewage from the construction of staff quarters and toilets flows directly into the domestic sewage pool.
- Create a storage for fuel and lubricants/oil. The storage is a closed building and it is protected from rain water.
- Regular maintenance and checking of all vehicles and machinery to minimize the risk of fuel or lubricant leakages.
- Collection of generate disturbed soil, concrete fines, oils and other waste and settling of storm water

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1
	The amount of water used in construction purpose and domestic use are low and within the construction period only.					
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	The construction phase will take about 24 months.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	
	The impact from construction activity is limited to the project site.					

Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The impact on water consumption and contamination water quality is low probability because the mitigations for these impacts are technically feasible.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 14					
Residual Impacts	Additionally, impacts from water consumption can be further reduced to as low as reasonably practicable by adopting water control and saving measures. The impact significant is low and mitigation measures are technically feasible. Therefore, there is no residual impacts after construction period.					

5.4.2 Operation Phase

Cooling water is utilized during the production process, but no waste water is produced. The wastewater comes from sewage. The project uses a circulation supply and return system, and a small amount of cooling water enters natural ponds, part of it is used for watering roads.

The following potential impacts will be predicted during operation phase.

- Cooling water consumption for production process
- Domestic wastewater discharge generated from the workforce at office and staff dormitory.

Mitigation Measures

The mitigation measures of reducing the impact to the water quality is considered as followings.

- Water management system of the project is recirculated without discharging from the plant.
- Wastewater generated from offices, canteens, and staff accommodation is treated by a sewage treatment system.

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1
	Cooling water is utilized during the production process, but no waste water is produced. The wastewater comes from sewage. It can be discharged into a sewage treatment facility via municipal pipelines for centralized treatment.					
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	The potential impact can be considered as long term.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	

	The Impact is expected to be site only.					
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The impact on water consumption and contamination water quality is low probability because the mitigations for these impacts are technically feasible.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 18					
Residual Impacts	As conclusion, it is evaluated that the water pollution during operation would be well controlled and managed and would not cause any significant impacts on water quality around the project site.					

5.5 Waste

5.5.1 Construction Phase

The construction phase will be carried out through different activities as civil, mechanical, electrical installation operations which in turn will generate volumes of waste with typology characteristic of the nature of each activity. solid wastes will be generated during the construction phase, including:

- Hazardous waste (such as used oil and oil filters)
- Metal and wood scrap
- Domestic waste

In order to minimize potential negative impacts on environment and community health the following mitigation measures.

- All types of waste generated during the construction phase should be inventoried and scheduled
- Metal and wood scrap are sold directly to recycle market
- Disposal of waste and hazardous materials will be coordinated with township development committee
- Maximization of reuse and recycle, returning the materials to the original vendor for commercial regeneration.

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1
	Waste generated during construction could be managed through proper collection of waste, waste minimization, reuse and recycling and disposal of. So, the impact magnitude will be minor.					

Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	The potential adverse impacts resulting from the generation of waste during the construction phase only.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	
	The potential impacts resulting from the generation of waste during the construction phase will be at site only.					
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The potential impacts will be low probability because mitigation measures are technically feasible and effective.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 10					
Residual Impacts	In any case, taking into account the proposed measures to ensure proper handling and disposal of generated solid waste, and if all the potentially hazardous waste is disposed of correctly can be reduced to the absolute minimum, the residual impact associated with waste generated during the construction phase will be low significance and of a short-term duration.					

5.5.2 Operation Phase

This project yields approximately 98%, with some defective and residual cutting materials being crushed and reused. Staff working on site will also generate general domestic waste (i.e., food and packaging) and office waste (paper, etc.). The hazardous waste such as used oils filters, could result in potential contamination for surface water and soil.

Mitigation Measures

- all hazardous materials shall be stored in clearly labelled containers;
- storage and handling of hazardous materials should be in accordance with national and local regulations appropriate to their hazard characteristics
- spent oils (including transformer oil) shall be recycled
- all waste from temporary dump site shall be transported with the management of township development committee.

	Very High	High	Moderate	Low	Minor	None

Impact Magnitude	10	8	6	4	2	1
	Waste generated during operation could be managed through proper collection of waste, waste minimization, reuse and recycling and disposal of. So, the impact magnitude will be low.					
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	The potential impacts resulting from the generation of waste during the operation phase is long term.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	
	The potential impacts resulting from the generation of waste during the operation phase will be at site only.					
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The potential impacts will be low probability because mitigation measures are technically feasible and effective.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 18					
Residual Impacts	In any case, taking into account the proposed measures to ensure proper handling and disposal of generated solid waste, and if all the potentially hazardous waste is disposed of correctly can be reduced to the absolute minimum, the residual impact associated with waste generated during the operation phase will be low significance.					

5.6 Soil

5.6.1 Construction Phase

Also considering that the construction works will be within the boundary of the project, the construction works related to the excavation of the ground, as well to the presence of mechanization units and workers on the construction site will cause appearance of certain negative impacts on soil. Pollution could affect soil in case of accidental spillage of oil from vehicles used for transportation of construction material and accidental spillage from the building material used for construction purposes. Impacts which result from the presence of mechanization units, vehicles and workers on the construction sites might be mitigated with good working practices.

Mitigation Measures

The following environmental protection and mitigation measures will be implemented in order to reduce or prevent potential impacts on soil:

- Leak proof containers should be used for storage and transportation of oil/grease
- Construction waste and debris shall be collected on a regular basis and covered by roof
- Prohibited to operate with equipment and vehicles outside the designated work areas and roads.

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1
	These accidental events could be considered remote if specific maintenance activities and safety procedures will be correctly implemented.					
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	The potential impacts will be in construction period only.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	
	The impact is expected to be site only.					
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The impact on soil quality is low probability because the mitigations for these impacts are technically feasible.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 14					
Residual Impacts	In conclusion, the impact significant reported above has to be considered as low because the impact magnitude is minor, duration is short-term and area of influence is at site only and low probabilities.					

5.6.2 Operation Phase

Contamination of soil and subsoil is expected during the operation phase due to possible small leaks or spills from equipment containing lubricating oil used in the production process.

Mitigation Measures

The following environmental protection and mitigation measures will be implemented to reduce or prevent potential impacts on soil:

- Lubricating oil used in the process of operation will be utilized with proper precautions to avoid soil contamination from oil or grease spills, leaks, or releases.
- Lubricating oil used in the plant/maintenance process will be stored in a workshop or enclosed premises.

Impact Magnitude	Very High 10	High 8	Moderate 6	Low 4	Minor 2	None 1
	These accidental events could be considered remote if specific maintenance activities and safety procedures will be correctly implemented.					
Impact Duration	Permanent 5	Long-term 4	Medium-term 3	Short-term 2	Transient 1	
	The potential impacts will be in operation period.					
Scale	International 5	National 4	Regional 3	Local 2	Site 1	
	The impact is expected to be site only.					
Probability	Definite 5	High Probability 4	Medium Probability 3	Low Probability 2	Improbable 1	None 0
	The impact on soil quality is low probability because the mitigations for these impacts are technically feasible.					
Impact Significant	SP (significance points) = (magnitude + duration + scale) x probability 18					
Residual Impacts	The residual impact associated with soil during the operation phase will be low significance.					

5.7 Biodiversity

5.7.1 Construction Phase

The following items are considered as a potential impact on Flora, Fauna & Biodiversity during construction phase. There is no forest land within the project site. The project site does not form a part of national park, wildlife sanctuary. No stream is crossing the project site. Proposed plant site does not have any major vegetation. As construction activity will be confined within the project site for the proposed project, impact on the ecology will be minimal due to the project.

The project area is not protected area and environmental sensitive area. The project site is located more than 20 km far away from the protected areas. These area's main habitat is cement plant factory

area. 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.

The project activities will be performed within the project boundary. Thus, in general, all the impacts during the construction works will be temporary, reversible and susceptible to moderation by means of adequate and good working practices.

Loss of Important Species and Their Habitats

During Construction phase, traffic disturbance may potentially deter faunal species from moving through or inhabiting the area. During construction phase, direct ecological impact resulting from the construction phase of the project is the loss of vegetation and habitat associated with site clearance. The impact on the surrounding ecology during the operation of the project will mainly occur on noise impact on biodiversity. The economically important fauna species were not observed. 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.

The summary of fauna and flora survey showed that 49 plant species, 4 species of Mammals, 5 species of reptiles and amphibian, 35 species of Birds, 19 species of Butterflies and Dragonfly were recorded in project foot print area. In this survey area, there were no globally threatened species of bird, reptiles and amphibian, butterfly and dragonfly according to the IUCN Red List of threatened species (2023-2). Two plant species of threatened species in this area, two endangered species of plant.

Mitigation Measures

- Plan and manage for the protection and conservation of the biological component of the environment.
- Do not clear threatened species (Htan and Thit padauk) and other vegetation than necessary for the construction of proposed project; restrict the removal of vegetation as far as possible the cutting of big trees.
- Restrict the collection of fire wood, do not cut trees for fuel wood but collect fuel wood from fallen tree dried logs of branches or use charcoal for cooking.

5.7.2 Operation Phase

During the operational phase of the project, smaller fauna such as many reptiles would be affected by noise from operation, but it is investigated that this impact will be negligible given that the majority of the species would have already migrated away from the area. During operation phase of the project, impacts on Flora/Fauna & Biodiversity will be minimal.

Threatened Species in Their Habitat

Htan or Palmyrah palm (Borassus flabelifer) is identified as Endangered on IUCN Red List and is found in India and Myanmar and Cambodia. It is economically important flora species and the part of the plant such as root, leaves, seeds and fruit are used for various purpose. The exploration of natural

resources and expansion of agricultural and human settlement are the main threats to the species. This species was common in this central area.

Thit Padauk (Pterocarpus macrocarpus) is a species of family Fabaceae. This species is a tree native to the seasonal tropical forests of Southeast Asia, Myanmar, Laos, Cambodia, Thailand and Vietnam. It has been naturalized in India and Caribbean. It is deciduous in the dry season. This species was not found project boundary area, but this species was found 3km buffer area.

Mitigation Measures

- No disturbance to vegetation outside project area.
- Commitment will be made to raise awareness of values of natural habitat areas and arrangement will be made for restriction of poaching and forest product collections.
- Hunting wild animal and threatened plant species will be strictly prohibited to apply for all staff.

5.8 Socioeconomic Impact Assessment

Social impact assessment identifies and assesses the potential impacts on the existing socio-economic environment arising from Project-related activities. Information within Project Description and the baseline socio-economic characteristics have been used to assist the evaluation of the potential impacts and their significance. Social impacts will be considered on the interaction between the project activities and receptors in project's social area of influence. Project activities include the followings:

- Construction
- Raw Material Preparation
- Molding
- Packing & Storing
- Distribution

The villages (local community) located within the area of influence that may be impacted or influenced by the Project (as a result of their proximity to the Project site and/ or Project associated infrastructure) are:

- Aung Tha Pyay,
- Htone Bo, and
- Pyi Thar Yar.

The objective of a Social Impact Assessment (SIA) is to assess the possible social impacts that may be brought about by a development project, to understand, manage and control changes, to formulate, implement mitigation measures to minimize adverse social impacts or prevent from extension. In this chapter, the anticipated impacts induced from the project on the social environment (i.e., local community) will be focused as the main receptor. The assessment of socio-economic impacts has been undertaken with respect to the receptors across natural capital, human capital,

social capital, economic capital, and physical capital to have a significant interaction with the activities linked to the project across its lifecycle. For beneficial impacts, the beneficial nature of the impact has been noted and the context of the potential benefit will be discussed.

5.8.1 Socioeconomic Components

Based on the project activities, the socioeconomic components will be considered as the followings:

1) Land Use and Landscape
2) Social Component
3) Gender
4) Economic Component
5) Health and Safety
6) Cultural Components
7) Aesthetic views

5.8.1.1 Land Use and Landscape

The potential impacts on land component during construction and operation phases are assessed, together with the related protection and mitigation measures to be adopted in order to avoid or minimize the related potential impacts.

The PVC Doors and Pipes Production Facility will require total of 8.3 acres land area. and allocated inside the compound of Myanmar Conch Cement (Mandalay) Company Limited. Land lease agreement was made between project proponent and Myanmar Conch Cement (Mandalay) Co., Ltd. for 49 years.

Therefore, involuntary resettlement due to permanent acquisition or temporary occupation is not assumed. As general landscape, the project site is within the cement plant factory, therefore there is no important landscape near the development area.

5.8.1.2 Social Components

According to the project activities, start from site preparation to production stage, workforce is needed. Therefore, the local labor employment is affected to the social components within the social area of influence. Other few technicians from China also involved in labor workforce. Although, based on the survey results, there is not any concerns and complaints about labor workforce, proper measures should be prepared to avoid conflicts and misunderstanding.

Mitigation and Enhancement Measures

- Special talk or training event of Myanmar Etiquettes to Foreign workers and sexual education to both local and foreign workers, labor skill trainings
- Set up security guards and no harassment policy and Notices and punishment on violation
- Recruitment should be prioritized on local sources

- Project should prepare appropriate ratio of employment between local people and the ones from other areas.
- For the labor workforce, the site responsible persons ensure the labors to follow the instructions mentioned in occupational health and safety policies. Besides, the project proponent should have stipulations of rules and regulations for the labors to avoid conflicts within the project site.

5.8.1.3 Gender

According to the gender survey result in the studied three villages in 2023, gender is almost equally distributed with 46.8 % male and 53.2 % in female among the total population of 2,231 people.

There have different roles and responsibilities of men and women in society. According to the nature of the project or the socio-cultural and economic context of a society, men's and women's social and economic roles are differently experienced on who takes leading role. However, for pre-construction and construction phase of the project, the company will recruit local workforce based on the skills and types of work.

A few impacts on gender equity are subjects to consideration in the planning and implementation of the proposed project.

- Business opportunities –In case there are existing business or production activities by women along within the villages such as small-scaled shops, any measures to respect and maintain them during and beyond the construction timeline should be sought. The construction activities should ensure the community continue to carry out their economic activities and are asked to hire general workers based on their skills. It is desirable that the GRM-related to the blockage and interruption of the project-related economic activities would be actively responded by the Project Proponent.
- In addition to the above-mentioned financial intelligence and ownership training, economic empowerment for women in the project region can be realized through their participation in the project-related works. Based on the fact that more women successfully finish a higher degree or education today, it is recommended for setting a certain quota of local employment for Myanmar women in the construction and other project-related works.
- Prevention of sexual harassment: A sudden inflow of construction-related employees from outside may produce cultural conflict and stress, while also exposing women in project host communities to sexual abuse and sexually transmitted diseases such as HIV/AIDS. The prevention plan should include sexual crime education, particularly for on-site workers, as well as sexual disease education for both construction workers and the host community.

5.8.1.4 Economic Component

5.8.1.4.1 Employment

According to the project activities, job opportunities can be occurred. In accordance with the requirements of the project, labor recruitment may be different. Conflicts may occur in the case of recruitment.

Mitigation and Enhancement Measures

- To avoid the disputes through employment and to enhance the project benefits, the project will implement the following mitigation measures:
- To have clear stipulation of using local labor in accordance with the needs of the project
- If the requirement of recruitment meets the capacity of local people, local labors should be prioritized
- To ensure that the project site responsibilities liaise closely with local village leaders and local government authorities to agree on appropriate procedures for recruitment and hiring
- To track and monitor concerns associated with project employment or workforce recruitment

5.8.1.4.2 Household Income

Because of the project activities, local labor employment will be carried out at the project site. Therefore, the households which have the persons working at the project site can get monthly income from the project. It is considered to be beneficial to the local community.

5.8.1.4.3 Local Business

According to the nature of project activities, except distribution, all the activities are carried out at the project site and the workers have to stay at the site. The project prepares accommodation and food for operation workers. It can affect the local market positively with daily demand for kitchen. Employment for operation works support the local business as monthly income.

5.8.1.4.4 Agriculture and Livestock

No project activity is included that can affect on local economic activities, such as agriculture and livestock.

5.8.1.5 Health and Safety

At the operational level, occupational health and safety is the most important fact to pay attention to by the project. With the good guidance of project management, the workers need to follow the instructions and cooperate with the actions mentioned in the policy.

For community health and safety, the workers are provided accommodation, food and health facilities at the project compound. Therefore, there is not significant impacts on existing heath facilities and safety of the local community.

Mitigation and Enhancement Measures

- To avoid accidents and communicable diseases and enhance the health and safety of workers and local communities, the project proponent should perform the followings:
- To recruit the workers with medical recommendation letters including medical history record
- To provide medical check-up for workers
- To have effective occupational health and safety policies
- To have a health and safety officer
- To ensure that the workers at the facility follow each instruction mentioned in health and safety guidelines
- To have security guards in the site
- To cooperate with public police force and local community-based security.
- To make rules and restrictions to avoid criminal cases in the local area committed by the project workers.

5.8.1.6 Cultural Components

Mandalay Region where the project area is situated at the place where most of the cultural heritage in Myanmar exist. Mandalay is famous for its cultural heritages. Buddhism is dominant in the studied area, and pagodas and monasteries are existed in every village. All the cultural buildings are not existed within the immediate area of physical/mechanical project influence. Based on the site assessment, local shrines, graveyards, and other places of community worship or cultural attachment could not be identified to be getting impacted. There is no Impact to a tangible human right infringement of access to basic life necessities (education, livelihood, cultural, economic, natural and social infrastructure/assets, etc.)

5.8.1.7 Aesthetic Views

The proposed area is not related with the tourism sites or there has no recreational activities nearby the plant boundary. The project area is already situated within the Alpha Cement Factory Compound. Except from the workers, there is not any reason for the residents to get the project site and any disturbance to the aesthetic view. Therefore, such kind of activities are used to the locals before. Therefore, there is not any significant impact on visual components.

5.9 Occupational Health and Safety

The project may also impact human health through exposure to respiratory diseases, burns, allergies and industrial accidents. The most significant occupational health and safety impacts occurring during the construction and operational phase of the project include dust, noise and vibrations, physical hazards, chemical hazards and other industrial hygiene issues.

The occupational health and safety impacts primarily include the following:

- Dust
- Heat

- Noise and vibrations
- Physical hazards
- Chemical hazards and other industrial hygiene issues

5.9.1.1 Dust

Methods to prevent and control exposure to dust include the following:

- Control of dust through implementation of good housekeeping and maintenance.
- Use of dust extraction and recycling systems to remove dust from work areas.
- Use of PPE, as appropriate (e.g., masks and respirators).
- Use of mobile vacuum cleaning systems to prevent dust buildup on paved area.

5.9.1.2 Heat

The principal exposures to heat in this sector occur during operation and maintenance of hot equipment. Recommended prevention and control techniques include the following:

- Shielding surfaces where workers' proximity and close contact with hot equipment is expected, using personal protective equipment (PPE), as needed (e.g., insulated gloves and shoes).
- Minimizing the work time required in high temperature environments by implementing shorter shifts at these locations.

5.9.1.3 Noise and Vibrations

Exhaust fans are the main sources of noise and vibrations in factory. Control of noise emissions may include the use of silencers for fans, room enclosures for operators, noise barriers, and, if noise cannot be reduced to acceptable levels, provide personal hearing protection equipment.

5.9.1.4 Physical hazards

Injuries during factory operations are typically related to slips, trips, and falls; contact with falling / moving objects; and lifting / over-exertion. Other injuries may occur due to contact with, or capture in, moving machinery (e.g., dump trucks, front loaders, forklifts). Activities related to maintenance of equipment, including fans, coolers, and belt conveyors, represent a significant source of exposure to physical hazards.

5.10 Community Health and Safety

The impact which may affect local communities residing close to the Project areas is related to the increase in the heavy vehicle traffic, risk of communicable diseases from workers (influx of workers) and emission of air pollutants and noise from vehicles. The main sources of the proposed project that can impact on community health include:

- Physical trauma associated with failure of building structures
- Burns and smoke inhalation from fires

- Injuries suffered as a consequence of falls or contact with heavy equipment
- Respiratory distress from dust, fumes, or noxious odors
- Exposure to hazardous materials.

Health and well-being play an important role in community. So, health facilities are vital to community. The affected area is located in Mandalay Region and the township hospital under Mandalay General Hospital head to supply the health activities in affected area. The studied villages are close to Mandalay City and most health services can be assessed easily in Mandalay General Hospital.

Mitigation Measures

- use advanced modernized machines and equipment to reduce dust and noise generation
- Buildings should be structurally safe, provide appropriate protection against the climate, and have acceptable light and noise conditions.
- Regularly medical check-up of onsite workers.
- Providence of clinic facilities and regular check up to community whose living around the project area.
- Inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors, or other emissions.
- Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, wind, flooding, landslides and fire.

5.11 Risk Assessment

The principal objective of the risk assessment study is to identify and quantify the major hazards and the risk associated with various operations of the proposed project, which may lead to emergency consequences (disasters) affecting the public safety and health. Based on this information, an emergency preparedness plan is to be prepared to mitigate the consequences. Industrial accidents result in great personal and financial loss. Many facilities involve various manufacturing processes that have the potential for accidents which may be catastrophic to the plant, work force, environment, or public.

5.11.1 Risk Assessment during Construction Phase

5.11.1.1 General workplace health and safety

Inhalation of dust may cause respiratory tract irritation. Adverse symptoms may include respiratory tract irritation and coughing. Noise exposed workers are more likely to experience speech interference, disturbed sleep interference, excess stress, and decreased work performance.

The construction phase is characterized by intermittent noise and dust emissions and unlikely to be continuously during the entire construction period. The specified noise mitigation measures will be implemented, and the consequences will be low.

No	Hazard Identification		Likelihood	Consequence	Risk Rating
1	General workplace health and safety	Dust and noise exposed to workers.	Unlikely	Low	Low Risk

5.11.2 Risk Assessment during Operation Phase

5.11.2.1 Electrical Risks

Electrical hazards leading to fire and explosion in switchgear and other equipment mainly due to failure of circuit breakers, insulators, fuses, and poor maintenance etc. Nevertheless, all these hazards lead to localized accidents only.

Electrical hazards will have a very low probability of occurring if appropriate protective measures are implemented, such as controls, awareness, procedures, and personal protective equipment, and the consequences will be minimal.

No	Hazard Identification		Likelihood	Consequence	Risk Rating
1	Electrical Risks	Electrical hazards to operational workers	Rare	Low	Low Risk

5.11.2.2 Fire Risks

There could be other areas in the plant that have a potential for fire hazard and require adequate firefighting equipment for example, the raw material storages. These are considered here since uncontrolled fire may trigger the above emergencies due to domino effect.

Movable and portable fire extinguishers are set in main building. Portable dry powder fire extinguishers are also set in building and electric devices to extinguish fire caused by electricity or oil which cannot be extinguished by water. When electrical equipment in the electrical distribution room is caught fire, use to dry powder fire extinguishers to put out the fire. The occurrence of a fire risk event is unlikely, and the consequences are minor.

No	Hazard Identification		Likelihood	Consequence	Risk Rating
1	Fire Risks	Fire risks to operational workers and community	Unlikely	Low	Low Risk

5.11.2.3 Risk of Natural Disasters

Component	Potential Impacts	Mitigation Measures
Cyclone	Strong wind causes damage to infrastructure.	- Prepare emergency response/rescue plan

		- Frequently watch local weather news and disaster notices by the relevant media
Flood	Impact on the cement plant and nearby community due to increase of water level	- Prepare emergency response/rescue plan - Frequently watch local weather news and disaster notices by the relevant media
Fire	Impact on the community around the project site by increasing of risk of fire	- Installation of the fire hydrants in and around the cement plant and offices in sufficiently. - Implementation of emergency drill - Cooperation with Fire Brigade

6. Cumulative Impact Assessment

6.1 Objectives

The objectives of the cumulative impact assessment are as follows:

- Assess the cumulative impacts of construction and operation of the proposed project in accordance with environmental impact assessment procedure.
- Prepare management actions to be implemented by the proponent and other related parties to minimize cumulative impacts.

6.2 Methodology

The cumulative impact assessment has been developed in line with the guidance provided in IFC's "Good Practice Handbook: Cumulative Impact Assessment and Management: Guidance for the Private Sector Emerging Markets (2013)". As such, it follows a six-step process:

Step 1 – Determination of spatial and temporal boundaries;

Step 2 – Identification of Valued Environmental and Social Components (VECs) and identification of all developments and external natural and social stressors affecting the VECs;

Step 3 – Assessment of present condition of VECs;

Step 4 and 5 – Assessment of cumulative impacts and their significance over VECs predicted future conditions; and

Step 6 – Definition of management strategies to address impacts.

6.2.1 Spatial and Temporal Boundaries

The proposed project is associated with some of the fully operation facilities within the project boundary such as Myanmar Conch Cement plant. For this assessment, the temporal boundary has been set as the life cycle for the project operation (this includes construction and operation period).

The spatial boundary varies with each VEC considered. The VECs identified below are all components that the proposed project is either know to affect or there is a perception that it could affect. Based on the EIA, five VECs were selected to evaluate cumulative impacts of proposed project.

6.2.2 Other Activities and Social and Environmental Stressors

The table below demonstrates additional project activities in the proposed project area. They are, however, associated with industrial activities such as proposed project, cement production and limestone quarrying. It was found that there are no other planned development activities in the project area.

Table 6.1 Other Industrial Development Activities in The Proposed Project Area

No.	Activity	Location	Project Operator

1	Myanmar Conch Cement (Mandalay) Cement Plant	Myanmar Conch Cement (Mandalay) Cement Plant is located about 23 km northeast of the Mandalay city and 20 km northeast of Patheingyi Township, Mandalay Region. The proposed captive power plant is inside the Myanmar Conch Cement Plant Project compound.	Myanmar Conch Cement (Mandalay) Co., Ltd.
2	Limestone Mine	The Limestone Mine Site is located about 23 km northeast of the Mandalay city and 20 km northeast of Patheingyi Township, Mandalay Region, which is located near the cement plant.	Myint Investment Group Co., Ltd.

6.2.3 Baseline Status of the VECs

The baseline status of the VECs identified in Table has been presented throughout this EIA in the Chapter 4. For the purposes of this cumulative impact assessment, a brief summary of the status of the VECs and their sensitivity to change are provided in Table.

Table 6.2 Baseline Status of the VECs

VEC	Baseline Condition	Resilience to Stress
Air Quality	Average values of ambient gaseous levels of all air quality monitoring results are within the National Environmental Quality (Emission) Guideline. The air quality is adaptable, and can maintain or restore acceptable levels of pollutants even under adverse conditions.	High
Noise	Only one location's baseline measured results exceeded the limit value, while the other two locations were within the guideline. The ambient noise level in the project	Medium

	area is medium, meaning that it does not interfere with normal communication or concentration.	
Water Quality	The water quality results are well within the water quality guidelines. The water quality has a good status and a high capacity to cope with stress.	High
Biodiversity	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. The project area is not a special area in terms of biodiversity and ecosystem.	High

6.3 Cumulative Impacts on VECs

Table 6.3 Magnitude of Cumulative Impact

VECs	Cumulative Impacts	Magnitude of Impact
Air Quality	The proposed project, cement plant and the limestone quarry are located in the same area and share the same airshed. The main sources of air pollution from these facilities are particulate matter (PM), nitrogen oxides (NOx) and sulfur dioxide (SO_2). According to the assessment, the air quality will not be significantly affected by the combined operation of the proposed project, the cement plant and the limestone quarry.	Minor to Moderate
Noise	The environmental impact assessment report has concluded that the proposed project will not have a significant effect on the noise level in the surrounding area. The cumulative noise impact of the operation of the project area is minor and	Minor

	does not pose a significant risk to the health or well-being of the nearby residents.	
Water Quality	The proposed project, the cement plant and the limestone quarry are expected to have a minor cumulative water quality impact in the same area. This is because the project will use a closed-loop cooling system that minimizes water withdrawal and discharge, the cement plant will implement water management plan that includes monitoring and mitigation measures. The three projects will also comply with the relevant environmental regulations and standards, and coordinate with each other to avoid or reduce potential impacts. Therefore, the cumulative water quality impact of the operation of the proposed project, the cement plant and the limestone quarry in the same area are minor.	Minor
Biodiversity	The project area is located near the village communities' area and the areas have been already cleared for agricultural purpose and transportation purpose therefore there is no important wildlife in the project footprint area. Some birds, insects, mammals, reptiles and amphibian were only living in the area. The proposed project, cement plant and limestone quarry are expected to have minor cumulative biodiversity impacts in the area where they will operate. This is because the projects have been designed to avoid or minimize the disturbance of habitats and species, and to implement mitigation measures to reduce the potential effects of noise, dust and water pollution. The projects will also contribute to the conservation of biodiversity through the restoration of degraded areas and the support of local environmental initiatives.	Minor

The potential significance of a cumulative impact has been determined using Figure 6-1 as a guide. Impacts have been defined as significant, potentially significant or not significant through consideration of the resilience of the VEC (Table 6.2) and the magnitude of the impact (Table 6.3). The results of this assessment are described in Table 6.4.

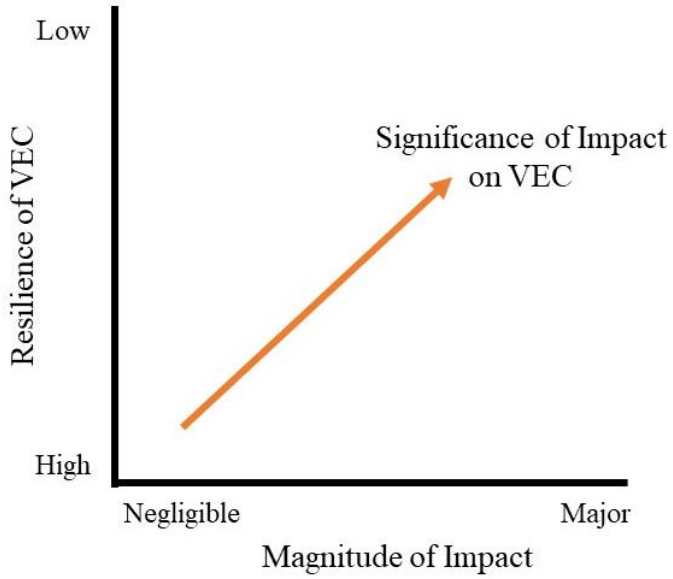


Figure 6-1 Significance of Impact

Table 6.4 Significance of Cumulative Impacts

VECs	Resilience of VEC	Magnitude of Impact	Impact Significance on VEC
Air Quality	High	Minor to Moderate	Potentially Significant
Noise	Medium	Minor	Potentially Significant
Water Quality	High	Minor	Not Significant
Biodiversity	High	Minor	Not Significant

6.4 Mitigation Measures for Cumulative Impact

6.4.1 Air Quality

The proposed project, the cement plant and the limestone quarry are expected to have potentially significant air quality impacts in the same area, due to the emissions of particulate matter. To mitigate these impacts, the following measures are recommended:

- Installing dust removal system to capture and remove particulate matter and gaseous pollutants from the proposed project and cement plant.
- Implementing dust suppression measures such as water spraying, paving or covering of roads and stockpiles to reduce fugitive dust emissions from transportation and storage activities.
- Conducting regular monitoring and reporting of air quality parameters and emissions to ensure compliance with environmental standards and regulations. Emission monitoring and control plans involve measuring the ambient air, reporting the results to the relevant authorities, and taking corrective actions if the emission limits are exceeded.
- Establishing a grievance mechanism to address any complaints or concerns from the affected communities or individuals. A grievance mechanism is a formal or informal process that allows the affected parties to raise their issues, receive a response, and seek a resolution.

In conclusion, the proposed project has a potential to affect the air quality in the same area, but it can be mitigated by implementing various measures that reduce the emissions, monitor the air quality, coordinate among the facilities and communicate with the public. Therefore, it is recommended that the project proponents adopt these measures as part of their environmental management plan and commit to their implementation and evaluation throughout the project life cycle.

6.4.2 Noise

The proposed project, the cement plant and the limestone quarry are expected to generate noise during their operation, which may have cumulative effects on the surrounding environment and communities. Therefore, it is important to implement mitigation measures to reduce the cumulative noise impact of these activities. The mitigation measures are:

- Applying noise reduction technologies or devices to the equipment and machinery, such as mufflers, silencers, dampers, etc.
- Implementing operational controls and management practices to limit the noise generation and duration, such as scheduling the noisy activities during daytime or off-peak hours, restricting the speed and frequency of vehicles, enforcing noise regulations and standards, etc.
- Conducting regular noise monitoring to evaluate the effectiveness of the mitigation measures and identify any areas for improvement or adjustment.

6.4.3 Water Quality

The operation of the proposed project, the cement plant and the limestone quarry in the same area may have a cumulative water quality impact on the nearby surface and groundwater resources. To mitigate this impact, the following measures are recommended:

- Implementing a water management plan that includes monitoring, reporting and corrective actions for any deviations from the baseline water quality parameters.

- Minimizing the use of water for cooling and maximizing the reuse and recycling of water within each facility.
- Implementing stormwater management and spill prevention and response to prevent or reduce the potential contamination of water resources from runoff, leachate and accidental releases.
- Conducting regular inspections of the water management systems and facilities to ensure their proper operation and maintenance and to identify and address any issues or risks.

6.4.4 Biodiversity

The biodiversity of the area where the proposed project, the cement plant and the limestone quarry are to be located is of low richness, but still requires mitigation measures to reduce the cumulative impact of the project activities. The following measures are suggested:

- Conducting a baseline survey of the flora and fauna in the area before the commencement of the project activities, and monitoring their status during and after the operation of the facilities.
- Implementing effective measures for the design, construction and operation of the facilities to minimize land disturbance, noise, dust, water pollution and waste generation.
- Restoring and rehabilitating the disturbed areas after the completion of the project activities, using native species and appropriate techniques.
- Establishing a biodiversity management/ green belt development plan, in consultation with the relevant authorities and stakeholders.
- Enhancing the awareness and capacity of the project staff on the importance of biodiversity conservation and the mitigation measures to be implemented.

7. PUBLIC CONSULTATION AND DISCLOSURE

7.1 Public Consultation and Disclosure

According to Environmental Impact Assessment Procedure, Chapter 5, Section 50, the project proponent shall ensure public consultation / participation process and disclose information about the proposed project to the public and civil society as part of the Scoping of EIA study. As part of EIA investigation, it is also mentioned in Section 61, Chapter 5 of Environmental Impact Assessment Procedure that the project proponent should undertake consultation process involving project affected persons, authorities, community-based organizations and civil society and disclosure of all relevant information about the proposed project. Consultations should be carried out on a continuous basis starting as early as possible in the EIA process.

Involving the public in the EIA preparation is fundamental to increasing the understanding on how the project may affect or improve their living conditions and acceptance of the project. It is also a way to identify and act upon impacts and issues that are not immediately obvious to the EIA preparation team. So, to build a trusting relationship and make useful recommendations, public participation plays a crucial role not only in the earlier stage of project preparation process but also EIA investigation stage

For Building Materials Production Facility, Myanmar Conch (Mandalay) Green Building Materials Co., Ltd conducted public consultation and disclosure process in scoping phase, the early stage of EIA process, with the help of third party, Sustainable Environment Myanmar Co., Ltd (SEM) in June, 2020. For EIA investigation, public consultation and disclosure process were conducted on 9th January of 2024.

7.2 Methodology and Approach

At project scoping phase, as preliminary identification, relevant main stakeholders to the project and project's affected groups were identified. Government authorities, other interested organizations like NGOs and local public are included as the stakeholders in the consultation process. Next, the identified persons and groups were informed to participate in consultation and their opinions are recorded. The proposed project information is disclosed through meetings and putting the documents of project information and feedback forms at the respected villages.

At EIA investigation stage, firstly consultations with concerned government organizations including Environmental Conservation Department (Mandalay) and General Administrative Departments were conducted. Then village level consultations and social surveys are carried to inform project information and get concerns/opinions of the villagers. After that, all relevant information of the project and its potential impacts were disclosed again to the project affected persons and civil society through consultation meetings.

7.2.1 Identification of stakeholders and groups affected by the project

Main stakeholders and project affected groups are preliminary to identify. The Building Materials Production Facility, proposed project is located in the Patheingyi Township. The three villages closely related to the project area are identified to study as social area of influence and they are Aung Tha Pyay village, Htone Bo village and Pyi Thar Yar village. Although the project area is situated in the Patheingyi Township, it is found that Htone Bo village and Pyi Thar Yar village are located within the Madaya Township.

Village heads, 100 household leaders, representatives of those villages and villagers are taking part an important role of stakeholders. Moreover, respective government authorities are involved as the stakeholders of the consultation. Other civil society is also included in it. Other interested organizations like NGOs are able to participate this activity.

7.3 Conducting Public Consultations

Table 7.1 shows the public consultation activities that have been done during scoping phase.

Table 7.1 Activities during Scoping Stage

No.	Date	Activities	Participants	Location
1.	16-June-2019	Kick of Meeting for EIA preparation of PVC Doors and Pipes Production Facility, Myanmar Conch Cement (Mandalay) Green Building Materials Co., Ltd	EIA Consultants and Developers	Sustainable Environment Myanmar Office, Yangon
2.	19-20-November-2019	Preliminary Field Visit	EIA Consultants and Developers	Project Site, Patheingyi Township
3.	12-June-2020	Pre-engagement for Public Consultation Activities	EIA Consultants and Developers	Via Zoom
Public Consultation Meetings at Scoping Stage				
5.	17-June-2020	Consultation with Township Administrator, Madaya	Township Administrators, EIA Consultants and Developers	General Administrative Department, Madaya Township
		• Delivering project information through GAD • Collect feedbacks	• Department of Power Transmission and System Control	General Administrative Department, Madaya Township

			• Department of Agricultural Land Management and Statistics • Department of Public Health and Medical Services • Department of Building • Department of Immigration • Fire Force Department	
		 		
6.	17-June-2020	Consultation with Village Head	Village Head, EIA Consultants and Developers	Htone Bo Village
		• PowerPoint • Pamphlet Distribution • Feedback Forms delivering	Via Village Head	Htone Bo Village
		 		

7.	17-June-2020	Consultation with Village Head	Village Head, EIA Consultants and Developers	Pyi Thar Yar Village
		• PowerPoint • Pamphlet Distribution • Feedback Forms delivering	Via Village Head	Pyi Thar Yar Village
		 		
8.	18-June-2020	Consultation with Township Administrator, Patheingyi	Township Administrators, EIA Consultants and Developers	General Administrative Department, Patheingyi Townsip
		• Delivering project information through GAD • Collect feedbacks	• Department of Power Transmission and System Control • Department of Agricultural Land Management and Statistics • Department of Public Health and Medical Services • Department of Building • Department of Immigration	General Administrative Department, Patheingyi Townsip

			• Fire Force Department	
		 		
9.	18-June-2020	Consultation with Village Head	Village Head, EIA Consultants and Developers	Aung Tha Pyay Village
		• Powerpoint • Pamphlet Distribution • Feedback Forms delivering	Via Village Head	Aung Tha Pyay Village
		 		
10.	10-August-2020	Final Scoping Report Submission		
10	11-November-2022	Scoping Report Approval from Ministry of Natural Resources and Environmental Conservation		

7.3.1 Public Consultation Meetings at Scoping Stage

Myanmar Conch (Mandalay) Green Building Materials Co., Ltd conducted consultation activities concerned with Building Materials Production Facility at Township General Administrative Departments, Environmental Conservation Department and respected three villages namely Aung Tha Pyay, Htone Bo and Pyi Thar Yar. The consultation activities were conducted in June, 2020.

Firstly, township level consultation was carried out at respective township administrative departments namely Patheingyi and Madaya. Project information was delivered to respective departments namely Department of Agricultural Land Management and Statistics, Electricity Supply Enterprise, Department of Public Health and Medical Services, Department of Immigration, Department of Building and Fire Force Department, then comments and suggestions are collected via

google documents. Secondly, as village level consultation, project information and EIA process were consulted with village heads from Aung Tha Pyay, Htone Bo and Pyi Thar Yar. With the help of village heads, project information was delivered to the villagers and feedbacks were collected and recorded.

7.3.1.1 Information Disclosure at Scoping Stage

At the time of conducting information disclosure at Scoping Stage, the novel human coronavirus disease COVID-19 is outbreak and there is a lot of restrictions. According to the instruction of Environmental Conservation Department, the disclosure process has conducted. Disclosure process is carried out in terms of consultation activities, posting project information around the project area and delivering document of project summary at respective villages. Project information and EIA process were consulted with village heads from Aung Tha Pyay, Htone Bo and Pyi Thar Yar. Discussion, suggestions and recommendation were performed effectively. With the help of village heads, project information was delivered to the villagers and feedbacks were collected. Project information sign boards were placed at the project area and contact numbers are attached to reply the inquiry of project information.

7.3.1.2 Results of Consultation during Project Scoping

As mentioned in above, according to the meetings held on 17th and 18th, June, 2020, some issues were raised during discussions and suggestions at the meeting.

No.	Comments & Suggestion	Response
Township Level		
1.	Patheingyi Township Administrator said; ▪ Adverse impacts are not expected because of high technology. ▪ Is there any smoke emission from the plant?	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd said; ▪ Raw materials are imported from foreign country, best technology is used and there is no smoke emission.
2.	Madaya Township Administrator said; ▪ To prepare fire safety and fire protection equipment such as balloons, fire extinguishers, car etc., and give training for fire protection ▪ Living status can be improved because of the factory. ▪ Wood will be saved because of PVC products and on the other hand, environment is automatically conserved.	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd said; ▪ Fire protection plan is well prepared and suggestions are recorded.
Village Level		

3.	Aung Tha Pyay Village ▪ To perform the project with best technology not to damage the environment ▪ To make green environment and provide wells ▪ To create job opportunities for the young people in the village ▪ To help the local development such as health, education, etc;	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd said; ▪ Well recorded and all the matters will be considered and planned to implement.
4.	Htone Bo Village a) To conduct the project with less impacts to the environment b) To protect the local environment from the side effects of the project c) To suggest the project not to make negative impacts on the environment and society d) To welcome the project if the project does not have side effects to the local and the country e) To welcome the project because of the developments of local and country f) To create job opportunities for locals as social supports g) To construct the concrete road h) To support education, health care services and other related assistances within the villages around the project area i) To help the local developments such as transportation, health and education as much as possible	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd said; ▪ Well recorded and all the matters will be considered and planned to implement.
5.	Pyi Thar Yar Village ▪ To conduct the project without making population to the local residence and environment, ▪ To make the villages not to be influenced by the side effects of the project	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd said; ▪ Well recorded and all the matters will be considered and planned to implement.

	▪ To consider the wishes of the locals as priority by the proponent ▪ To sell PVC pipes and doors for the locals with fair price ▪ To support village developments and educate the locals ▪ To create job opportunities for locals as social supports ▪ Not to make any loss to the locals by the project ▪ To cooperate with project by creating job opportunities for the locals ▪ To consider the side of locals and avoid coercion against the will of locals	

Table 7.2 Activities during EIA Investigation

No.	Date	Activities	Participants	Location
1.	26-March-2023	Consultation with Environmental Conservation Department	• Officer • Project Manager, Myanmar Conch (Mandalay) Green Building Materials Co.,Ltd • Consultants, SEM	Environmental Conservation Department, Mandalay
1.	27-March-2023	Consultation with village heads	• Village heads • 10 households' leaders • 100 households' leaders • Representatives of the village	Aung Tha Pyay Village, Htone Bo Village, Pyi Thar Yar Village
2.	2-10-May-2023	Social Surveys via Phone	• Aung Tha Pyay Village • Htone Bo Village • Pyi Thar Yar Village	Patheingyi and Madaya Township
3.	28-December-2023	Pre-engagement for Public Consultation Activities	EIA Consultants and Developers	Via Zoom
4.	9-January-2024	Second Public Consultation Activities	EIA Consultants, Developers, Locals, Government Authorities,	Patheingyi Township

5.	Final Environmental Impact Assessment Report Submission

7.3.2 Public Consultation Meetings at EIA Investigation Stage

Myanmar Conch (Mandalay) Green Building Materials Co., Ltd conducted EIA stage meetings concerned with Building Materials Production Facility in Patheingyi Township. Meetings are carried out in accordance with the situation happening in the Patheingyi township. Public consultation meeting at EIA stage is arranged in accordance with Myanmar regulatory requirements from the EIA procedure. After scoping stage public consultation meetings, village level consultations and social survey were conducted to inform project information and get concerns/opinions which will be considered in EIA preparation.

According to the situation of the villages, as village level consultations, consultation with village heads, 10 household leaders, 100 household leaders, representatives of the villages has been carried out and summary of the project is distributed and feedbacks forms are delivered at three villages. Project information, production process, implementation process, and environmental and social impact assessment process were attached in the project summary. Opinions, concerns and suggestions are discussed at the meeting. All the opinions in the meetings were recorded. Social survey was carried out in term of phone in Aung Tha Pyay village, Htone Bo village and Pyi Thar Yar village with the help of village heads in May, 2023. Socio-economic surveys were also carried out to investigate the current socio-economic conditions of project affected persons and give the awareness and understanding upon the project.

On 9th January 2024, according to the situation of the villages, second public consultations were conducted in Patheingyi Township. Second public consultations were implemented with the purpose of dissemination of the results of the Project's draft environmental, social and health impact assessment and getting concerns and suggestions regarding the Project's mitigation measures and monitoring program. Patheingyi Township Government authorities, village heads, representatives of the villages are participated in the meetings. The copy of presentation and feedback forms are distributed to the related villages with the help of village heads. All the concerns, comments and suggestions are recorded.

Table 7.3 Public Consultation Meetings at EIA Investigation Stage

No.	Date	Activities	Location
Village Level Consultation and Social Survey			
1.	27-March -2023	Consultation	Htone Bo Village
2.	27-March -2023	Consultation	Pyi Thar Yar Village
3.	27-March -2023	Consultation	Aung Tha Pyay Village
4.	2-March -2023	Health facilities survey via phone	Mya Kan Thar Village
5.	2 to10-May-2023	Social survey via phone	Aung Tha Pyay Village Htone Bo Village Pyi Thar Yar Village

Second Public Consultation Meeting			
1.	9-January-2024	Consultation Meeting	Patheingyi Town

7.3.2.1 Information Disclosure at EIA Investigation Stage

By making consultation meeting activities and delivering project information, production process, implementation process, and environmental and social impact assessment process, results of the Project's draft environmental, social and health impact assessment at respective villages, disclosure process was implemented.

Project information and environmental impact assessment is disclosed and consulted with related stakeholders. Meetings are conducted at Township Administrative Department, Environmental Conservation Department and related three villages namely Aung Tha Pyay village, Htone Bo village and Pyi Thar Yar village and disclosed about the project and environmental impact assessment. PowerPoint presentation is used at the meeting and delivered at the villages attached the executive summary. Discussion, suggestions and recommendation are recorded at the meetings and for the villagers who cannot join the meeting, feedback forms are delivered and opinions and suggestions are collected.

7.3.2.2 Results of Consultation during EIA Investigation

As mentioned in above, consultation, social survey and second public consultation were carried out and concerns, comments and opinions were raised during the consultation process. The followings are recorded as main issues, concerns and comments.

Table 7.4 Result Summary of Social survey

No.	Location	Respondent	Survey Period	Main concerns, comments and opinions
1.	Aung Tha Pyay Village	45	2 to10-May-2023	• To operate the project with less impacts on the surrounding environment. • To create job opportunities • To consider the locals first when there is employment • To sell the pipes within the villages
2.	Htone Bo Village	25		
3.	Pyi Thar Yar Village	30		

Table 7.5 Result Summary of Public Consultation Meeting

No.	Date	Stakeholder	Main Concerns, Comments and Opinions	Response
1.	26-March-2023	• Officer, ECD	• According to the situations happening in the village, to	• Well recorded and follow the

		• Myanmar Conch (Mandalay) Green Building Materials Co.,Ltd • SEM	make consultation activities and social survey in a proper way • As project proponent, to follow the specifications of the EIA • As third party, to develop the EIA report in accordance with related guidelines and procedures	instructions (Myanmar Conch (Mandalay) Green Building Materials Co.,Ltd, SEM)
		 		
2.	27-March-2023	• Village heads, 10 household leaders, 100 household leaders, representatives of the villages (Aung Tha Pyay Village Htone Bo Village Pyi Thar Yar Village) • Myanmar Conch (Mandalay) Green Building Materials Co.,Ltd • SEM	• To create job opportunities • To consider the locals for employment • To implement the project with less impacts on the environment	Well recorded and developed (Mandalay) Green Building Materials Co.,Ltd)
		 		
3.	9 January 2024	• Administrator, Patheingyi Township	• To implement the project following the mitigations measures	• The instructions will be followed.

		• Village heads, 10 household leaders, 100 household leaders, representatives of the villages (Aung Tha Pyay Village Htone Bo Village Pyi Thar Yar Village) • Myanmar Conch (Mandalay) Green Building Materials Co.,Ltd • SEM	• To cooperate with township administration departments if it is necessary • As village, to inform and ask the GAD if there are issues with project activities • To make employment within the related villages	• The project has hired the villagers. (Myanmar Conch (Mandalay) Green Building Materials Co.,Ltd)
		 		

7.4 Grievance Redress Mechanism

The purpose of grievance mechanism is to ensure that all requests and complaints from individuals, groups and local communities throughout the Project life, from planning and design through construction and operations, are dealt with systematically in a timely manner with appropriate corrective actions being implemented and the complainant being informed of the outcomes.

All complaints will be logged and processed and addressed within a fixed time, communicated to the complainant, as shown in Figure 7-1 by the processing grievances flowchart.

7.4.1 Grievance Redress System (GRS)

Grievance Redress System is an effective instrument to tackle the various complaints receiving from the PAP and community in such a way that elevate the process of finding solution to reach the satisfaction and mutual agreement in a timely fashion and transparent manner.

The framework for grievance redress mechanism for the projects has been established to address the complaints and concerns that must be raised by PAP about project activities or performance during the construction and operation period. That shall act as a tool for execution within a set time period, purpose and detail out a systematic process against several documents.

The site-specific procedure shall be developed for receiving complaints, logging in the GRS log book for recording and registering purpose, investigation, analysis and responding to the PAP.

7.4.1.1 Grievance Focal Person (GFP)

Grievance focal person shall be appointed from Myanmar Conch (Mandalay) Green Building Materials Co., Ltd to implement the GRS procedure effectively. The nominated person for role should have sound and broad experience within the social region and acting within such a role previous.

He will receive the complaints in verbal or with letter from the PAP through site construction team or village head or PAP himself. The complaint shall be recorded and registered accordingly and deliver the message to Site Grievance Redress Team promptly.

7.4.1.2 Site Grievance Management Committee

Site grievance redress team shall be established and headed by village administrator, liaison officer from third party, representative from the project team and authorities concerned in local and village level. Site Grievance Committee will review any complaints and concerns and find a solution to cease the degree of complaints which will be agreed and accepted by the PAP. Site Grievance Committee shall address the issue within (14) days. In this stage, many issues shall be resolved as possible locally.

The grievance focal person of the Myanmar Conch (Mandalay) Green Building Materials Co., Ltd, site grievance committee and Myanmar Conch (Mandalay) Green Building Materials Co., Ltd shall coordinate all actions with the complainants. Myanmar Conch (Mandalay) Green Building Materials Co., Ltd should immediately carry out a review and assessment of the validity of the complaints and seek measures to redress valid grievances. If it is determined that the complaint is not connected to a project activity or that the project is being carried out in full compliance with applicable national and international standards, Myanmar Conch (Mandalay) Green Building Materials Co., Ltd should explain the circumstances to the complainant and the village head.

If the case is not addressed to the satisfaction of PAP within the given time frame, Site Grievance Committee shall proceed to submit the issue to Township Grievance Management Committee for further review.

7.4.1.3 Township Grievance Management Committee

Township Grievance Management Committee is the higher authority to make proper decision within project specific Grievance Redress System on the received issues which Site Grievance Management Committee cannot sort it out alone. Township Grievance Management Committee headed by Township General Administrator with the members of relevant government bodies.

7.4.1.4 Unsolved Issue

If the case is still not resolved by Township Grievance Management Committee, PAP can proceed through juridical system such as appealing on court for final resolution starting from township level jurisdiction.

A Public Grievance Sample Form is presented in Appendix-D. The GRM will address all grievances raised by PAPs across the Project, including a grievance raised by stakeholders located along the transmission line corridor.

The GRM, in the first instance, seeks to resolve disagreements or stakeholder concerns before they evolve into grievances. This is done through ongoing engagement with stakeholders throughout the Project, particularly the PAPs.

The resulting informal negotiations and discussions will be conducted in a transparent manner and will be appropriately documented. This includes agreements that are reached, which will be voluntarily signed by all parties involved in the negotiation.

In cases where concerns or conflicts cannot be resolved through consultation and / or discussions, the GRM has established a hierarchy of grievance committees and procedures to receive and resolve grievances. These committees and procedures are summarized below.

Table 7.6 Grievance Redress Committee Members

Committee	Committee Members
Site Grievance Management Committee	- The village administrator (Chairperson) - Member of village administration office - Village elders and representatives of village community - Representative from the Project Team - Liaison officer from third party
Township Grievance Management Committee	- Township Administrator (Chairperson) - Representative from Environmental Conservation Department - Representative from Township Land Record Department - Representative from Township Development Committee - Representative from Township Electricity Supply Corporation - Representative from Township Rural Road Development - Representative from the Project Team

Regional Grievance Management Committee	- Village Leaders - Village elders and representatives of village community - Minister of Security and Border Affairs -Members of different government bodies

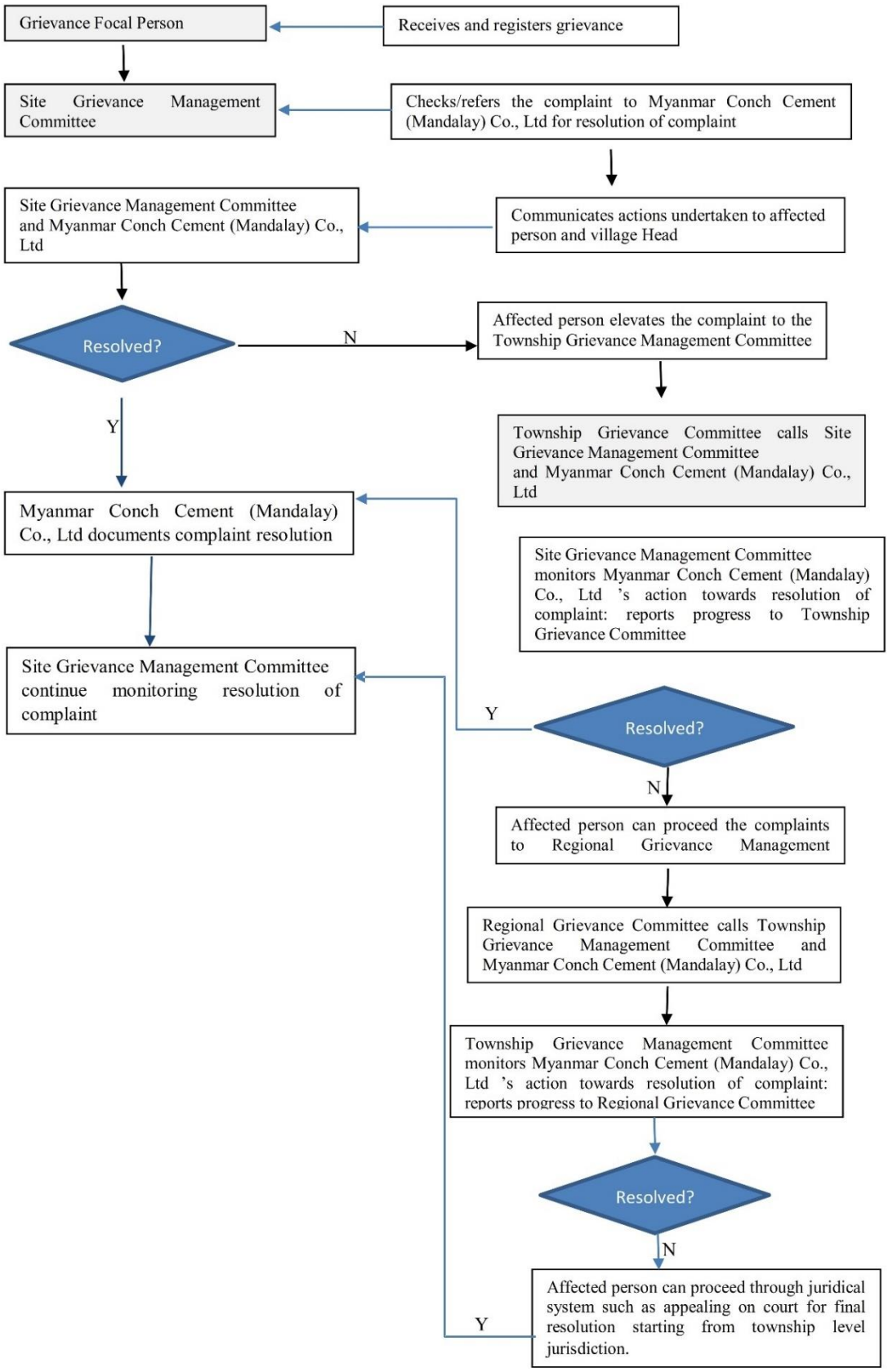


Figure 7-1 Flowchart for Processing Grievances

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Introduction

The purpose of the Environmental Management Plan (EMP) is to ensure that the mitigation and monitoring measures are identified and the conditions of consent are adhered to during construction and operation phases of the project. This will ensure the project is constructed in accordance with the relevant applicable planning conditions; legal requirements and environmental standards.

The objectives of the EMP are;

- to identify current environmental conditions
- to compare the potential environmental changes of construction and operation activities
- to ensure compliance with current legislation
- to minimize any potential environmental impacts during construction and operation phases
- to provide stakeholder's requirements
- to keep sustainable development

8.2 Roles and Responsibilities for Implementation of EMP

Myanmar Conch (Mandalay) Green Building Materials Company Limited will hold ultimate responsibility and shall fully exercise in developing, reviewing, updating and effective implementing of this document. If the measures set up in it does not meet or follow accordingly, company will redefine as necessary until full satisfaction is achieved.

Finding from the continuous monitoring of environmental management plan is subject to be reviewed periodically and as deemed necessary by management. Based on the result, management shall be able to take necessary remedial actions and to enforce to adopt adequate performance strategy toward the continual improvement of the environmental management system.

The EMP provide a guide on project impacts that will need monitoring both for corrective action and learning purposes. Implementation of the EMP will primarily be the responsibility of the Project Manager assisted by the Environmental Officer and the Site Supervisor. However, site specific management interventions will be the responsibility of each respective Head of Department and specific individuals identified in the EMP for each specific intervention who will ensure that all the staff under their supervision work towards realization of the objectives set out in the management plan.

Position	Responsibilities
Project Manager	Environmental responsibilities of the Project Manager are given below; - Establish Environmental policy, objectives, targets and Environment Management Plans available for the site.

	- Ensure that all activities are carried out in compliance with relevant laws and regulations. - Identify potential risk from the environment section and establish and implement the preventive actions in a bid to curb environmental impacts. - Control the training, recognition and competency.
Environmental Officer	Responsibilities of Environmental Officer are listed below: - Assist Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. assigned Environmental Staff in managing stipulated environmental requirements. Coordinate with Environmental Division to address environmental issues related to the contract and ensure compliance with environmental regulations/procedures - Prepare and impact trainings (including tool box talks) to contract personnel on various environment related topics like Environmental awareness, Solid waste management etc. - Prepare and assist in implementation of site-specific environmental documents for activities carried out by contractor. - Arrange & conduct environmental campaign on environmental topics.
Site Supervisor/s	Environmental responsibilities of the Site Supervisor/s are given below; - Implement and follow the Environmental policy, objectives, targets and Environment Management Plans available for the site. - Ensure that all activities are carried out in compliance with relevant laws and regulations. - Identify potential risk from the environment section and establish and implement the preventive actions in a bid to curb environmental impacts. - Control the training, recognition and competency.

8.3 Air Quality Management Plan

8.3.1 Objectives

To reduce the sources and amounts of pollutants responsible for the loss of ambient air quality and to improve the quality of life of the communities, protecting their health risks from air pollution.

8.3.2 Legal Requirements

Applicable legislation and guidelines include:

- Environmental Conservation Law, 2012
- Environmental Conservation Rules, 2014
- National Environmental Quality (Emission) Guidelines, 2015
- International Finance Corporation Environmental, Health, and Safety Guidelines

8.3.3 Implementation Schedule

Construction and Operation Phase

8.3.4 Management Actions

Environmental Impact Assessment - Construction Phase			
1. Air Quality	1.1. Construction equipment and vehicles use	1.1.1. Deterioration of air quality due to dust	1.1.1.1. Implement construction phase mitigation measures in section 5.2.1
	1.2. Construction equipment and vehicles use	1.2.1. Deterioration of air quality due to vehicle emission	1.2.1.1. Implement construction phase mitigation measures in section 5.2.1
Environmental Impact Assessment - Operation Phase			
1. Air Quality	1.1. Building materials production	1.1.1. Deterioration of air quality due to emission	1.1.1.1. Implement operation phase mitigation measures in section 5.2.2

8.3.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Air Quality	▪ NO_2 ▪ SO_2 ▪ CO ▪ $PM_{2.5}$ ▪ PM_{10} ▪ Total Particulate Matter	Measurement/ Sampling (Haz Scanner EPAS)	Duration ▪ 1 day continuously (24 hrs) Frequency ▪ Once during construction phase	▪ Project Compound ▪ Nearest Sensitive Receptors (Htone Bo and Aung Tha Pyay Village)

			▪ 2 times a year during operation phase	

8.3.6 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.4 Noise and Vibration Management Plan

8.4.1 Objectives

To control and limit noise emissions and vibration levels, at residential properties and other sensitive receptors in the vicinity of the Project.

8.4.2 Legal Requirements

Applicable legislation and guidelines include:

- Environmental Conservation Law, 2012
- Environmental Conservation Rules, 2014
- National Environmental Quality (Emission) Guidelines, 2015
- International Finance Corporation Environmental, Health, and Safety Guidelines

8.4.3 Implementation Schedule

During Construction and Operation Phase.

8.4.4 Management Actions

Environmental Impact Assessment - Construction Phase			
1. Noise and Vibration	1.1. Construction equipment and vehicles use	1.1.1. Noise emission	1.1.1.1. Implement construction phase mitigation measures in section 5.3.1 1.1.1.2. Avoid construction processes at night time except for emergency cases and exercise the best mechanism to minimize the noise emitting.
Environmental Impact Assessment - Operation Phase			

1. Noise and Vibration	1.1. Cement plant operation	1.1.1. Noise emission	1.1.1.1. Implement operation phase mitigation measures in section 5.3.2 1.1.1.2. Machinery and equipment will be periodically inspected and maintained to keep in good operational conditions and reduce noise from machine operation. 1.1.1.3. Provide the personnel protective equipment (PPE) to the employees and strictly enforce PPE usage.

8.4.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Noise and Vibration	▪ Sound level (dBA)	Measurement	Duration ▪ 1 day continuously (24 hrs) Frequency ▪ Once during construction phase ▪ 2 times a year during operation phase	Project Compound and Nearest Sensitive Receptors (Htone Bo and Aung Tha Pyay Village)

8.4.6 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.5 Water Quality Management Plan

8.5.1 Objectives

To reduce discharge of waste water that impact water quality and to determine if additional implementation of management practices is necessary to improve and/or protect water quality.

8.5.2 Legal Requirements

Applicable legislation and guidelines include:

- Environmental Conservation Law, 2012
- Environmental Conservation Rules, 2014
- National Environmental Quality (Emission) Guidelines, 2015
- The Conservation of Water Resources and Rivers Law, 2006
- The Conservation of Water Resources and Rivers Rules, 2013
- Freshwater Fisheries Law, 1991
- International Finance Corporation Environmental, Health, and Safety Guidelines

8.5.3 Implementation Schedule

During Construction and Operation Phase

8.5.4 Management Actions

Environmental Impact Assessment - Construction Phase			
1. Water Quality	1.1. Construction activities and domestic water (non-drinking) use	1.1.1. Impacts on water quality due to discharge water from construction activities	1.1.1.1. Implement construction phase mitigation measures in section 5.4.1.
Environmental Impact Assessment - Operation Phase			
1. Water Quality	1.1. Storm water runoff area	1.1.1. Impacts on water quality due to storm water runoff	1.1.1.1. Implement the runoff water drainage system to prevent flood 1.1.1.2. The site drainage regularly inspected and clean up.
	1.2. Production process & Utilities	1.2.1. Industrial water discharge from	1.2.1.1. Implement operation phase mitigation measures in section 5.4.2

		manufacturing process	
	1.3. Office and staff dormitory	1.3.1. Impact on water quality domestic wastewater discharge	1.3.1.1. Wastewater generated from offices, canteens, and staff accommodation is treated by a sewage treatment system.

8.5.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Surface and Groundwater	▪ BOD ▪ COD ▪ Water Temperature ▪ pH ▪ Salinity ▪ Electrical Conductivity ▪ Dissolved Oxygen ▪ Total Dissolved Solid ▪ Turbidity ▪ Colour	Sampling and Laboratory Analysis	▪ Bi-annual in construction phase ▪ 3 times a year in operation phase	▪ Surface water 1 point near production area ▪ Groundwater 2 points at Aung Tha Pyay and Htone Bo Village

8.5.6 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.6 Waste Management Plan

8.6.1 7.7.1 Objectives

To implement integrated waste management in ways that is protective to human health and the environment.

8.6.2 Legal Requirements

Applicable legislation and guidelines include:

- Environmental Conservation Law, 2012
- Environmental Conservation Rules, 2014
- Prevention of Hazard from Chemicals and Related Substances Law, 2013
- International Finance Corporation Environmental, Health, and Safety Guidelines

8.6.3 Implementation Schedule

During Construction and Operation Phase

8.6.4 Management Actions

Environmental Impact Assessment - Construction Phase			
1. Waste	1.1. Construction activities	1.1.1. Impacts on the environment and community health due to waste generated from construction activities	1.1.1.1. Implement construction phase mitigation measures in section 5.5.1 1.1.1.2. Arrange garbage bin for general waste and hazardous waste separately 1.1.1.3. General waste will be clean out once per week and hazardous waste will be clean out once per month 1.1.1.4. Complying with waste management rule under township development committee for disposing waste at disposal site
Environmental Impact Assessment - Operation Phase			
1. Waste	1.1. Building materials production operation	1.1.1. Impacts on the environment and community health due to waste generated from cement manufacturing process	1.1.1.1. Implement operation phase mitigation measures in section 5.5.2 1.1.1.2. Adopted the 3Rs Program (Reduce, Reuse, and Recycle) in waste management in order to maximize resource utilization. 1.1.1.3. Recyclable waste e.g., plastic, wood scrap,

			metal scrap, paper etc. should reused/recycled as much as possible.

8.6.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Waste	▪ Non-Hazardous Waste ▪ Hazardous Waste	Direct Observation	Monthly	Storage & Handling Area

8.6.6 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.7 Soil Management Plan

8.7.1 Objectives

To maintain soils in a physical, chemical and biological condition, minimizing the risks to the environment.

8.7.2 Legal Requirements

Applicable legislation and guidelines include:

- Environmental Conservation Law, 2012
- Environmental Conservation Rules, 2014
- International Finance Corporation Environmental, Health, and Safety Guidelines

8.7.3 Implementation Schedule

During Construction and Operation Phase

8.7.4 Management Actions

Environmental Impact Assessment - Construction Phase			
1. Soil	1.1. Mechanization units and vehicles use	1.1.1. Impacts on soil due to the excavation activities	1.1.1.1. Implement construction phase mitigation measures in section 5.6.1
	1.2. Fuel-oil (heavy and light fuel oil)	1.2.1. Impacts on soil due to leakage	1.2.1.1. Leak proof containers will be used for storage

			and transportation of oil/grease 1.2.1.2. Prohibited to operate with equipment and vehicles outside the designated work areas and roads
Environmental Impact Assessment - Operation Phase			
1. Soil	1.1. Lubricating/Fuel oil and/or chemical additives use	1.1.1. Impacts on the environment and community health due to waste generated from manufacturing process	1.1.1.1. Lubricating oil used in the plant/maintenance process will be stored in a workshop or enclosed premises. 1.1.1.2. Leak proof containers will be used for storage of fuel

8.7.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Soil	▪ pH ▪ Cadmium (Cd) ▪ Copper (Cu) ▪ Zinc (Zn) ▪ Manganese (Mn) ▪ Lead (Pb) ▪ Arsenic (As) ▪ Iron (Fe) ▪ Chromium (Cr) ▪ Mercury (Hg) ▪ Nickel (Ni)	Sampling and Laboratory Analysis	▪ Once in during construction phase ▪ 2 times a year in operation phase	Chemical Storage & Fuel Tank

8.7.6 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.8 Biodiversity Management Plan

8.8.1 Objectives

To avoid and minimize impacts to biodiversity within the vicinity of project area.

8.8.2 Legal Requirements

Applicable legislation and guidelines include:

- Environmental Conservation Law, 2012
- Environmental Conservation Rules, 2014
- The Conservation of Biodiversity and Protected Areas Law, 2018

8.8.3 Implementation Schedule

During Construction and Operation Phase

8.8.4 Management Actions

Environmental Impact Assessment - Construction Phase			
1. Biodiversity	1.1. Construction activities	1.1.1. Impacts on biodiversity due to the construction activities	1.1.1.1. Implement construction phase mitigation measures in section 5.7.1 1.1.1.2. Works area in temporarily affected areas shall be reinstated with tree/ shrub/ grass etc.
Environmental Impact Assessment - Operation Phase			
1. Biodiversity	1.1. Cement Plant Operation	1.1.1. Impacts on biodiversity due to cement manufacturing activities	1.1.1.1. Implement operation phase mitigation measures in section 5.7.2 1.1.1.2. Tree plantation will be provided along the project boundary.

8.8.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Biodiversity	General condition of the floral cover	Visual inspection and photographic documentation	Yearly	Project Area

8.8.6 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.9 Socio-economic Management Plan

8.9.1 Objectives

To describe the project's commitments in managing and mitigating social impacts raise from the existence of project in defined location and in enhancing identified benefits to communities and stakeholders.

8.9.2 Legal Requirements

Applicable legislation and guidelines include:

- Social Security Law, 2012
- The Ethnic Rights Protection Law, 2015
- The Ethnic Rights Protection Rules, 2019
- The Myanmar Investment Law, 2016

8.9.3 Implementation Schedule

During Construction and Operation Phase

8.9.4 Management Actions

Environmental Impact Assessment - Construction and Operation Phase			
1. Socioeconomic	1.1. Land acquisition/ Resettlement	1.1.1. No involuntary resettlement is included.	1.1.1.1. No mitigation measure is needed.
	1.2. Gender	1.2.1. Gender discrimination	1.2.1.1. All working on and visiting the project will not discriminate based on gender, age, colour, race, language, culture. political affiliation, religious belief, disability and other related factors.
	1.3. Local Economy	1.3.1. Impact on local economy due to project development	1.3.1.1. Implement mitigation measures in section 5.8.1.4 1.3.1.2. Job creation will be made especially to

			individuals or families that may be negatively affected to provide the local community residing in the vicinity of project area. 1.3.1.3. Notify local people of job openings through local advertising, information centre, project notice boards to place in office or road junctions of each village.
	1.4. Existing Social Infrastructure and Service	1.4.1. Impact on local infrastructure due to project development	1.4.1.1. Infrastructure development such as development of village network road (widening, new access, bridges construction and upgrade), and development of education facilities will be provided through CSR program.
	1.5. Social Conflicts	1.5.1. Concerns of local community	1.5.1.1. Project work force shall respect for the religious, values and moral codes of local communities. 1.5.1.2. Any complaints of communities concerning unacceptable behaviour conducted by project workforce shall be seriously taken into consideration attention in with local residents 1.5.1.3. Use complaints log and grievance mechanism to ease the concerns of

			local residents by tracking, assessing and managing the performance of project workforces. 1.5.1.4. Village level grievance committee shall be organized to establish an effect channel and appropriate mechanism in communicating local residents and gain the feedback of project related community issues. 1.5.1.5. Communicate with Investigation/Grievance Committee formed by Mandalay Regional Government lead by Minister of Ministry of Security and Border Affairs to dispute with local residents. 1.5.1.6. Adopting monitoring plan, the effectiveness of managing community expectations and addressing their concerns during construction and operation phase. 1.5.1.7. Committing to the publishing of data and reports on environmental performance.

8.9.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Socio-economic	▪ Complaint Logs ▪ Employment records	Complaints Interviews	Monthly	Communities

8.9.6 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.10 Cultural Management Plan

8.10.1 Objectives

To safeguard the area's historical and cultural heritage.

8.10.2 Legal Requirements

Applicable legislation and guidelines include:

- The Protection and Preservation of Cultural Heritage Regions Law, 2019
- The Protection and Preservation of Antique Objects Law, 2015
- The Protection and Prevention of Ancient Monuments law, 2015

8.10.3 Implementation Schedule

During Construction and Operation Phase.

8.10.4 Management Actions

Environmental Impact Assessment - Construction and Operation Phase			
1. Cultural	1.1. Project Activities	1.1.1. Impact on cultural buildings due to project activities	1.1.1.1. Cultural heritage is not existed within the area of project site. 1.1.1.2. Relevant authorities such as the local authority will be informed whenever findings of heritage significance are found.

8.10.5 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.11 Emergency Response Plan

8.11.1 Objectives

The purpose of Emergency Response is to ensure that all potential emergency situations that might arise during the Project are properly identified, reported and dealt with in a safe and effective manner.

8.11.2 Legal Requirements

Applicable legislation and guidelines include:

- Environmental Conservation Law, 2012
- The Myanmar Fire Brigade Law, 2015
- Social Security Law, 2012
- Prevention of Hazard from Chemicals and Related Substances Law, 2013

8.11.3 Implementation Schedule

During Construction and Operation Phase.

8.11.4 Emergency Response Actions

8.11.4.1 Emergency Event Classification

Events shall be considered in Emergency Response:

- Personnel injuries
- Electrical
- Fire/Explosion (involving fuels, gases and other materials)
- Hazardous Chemical Release
- Natural Disaster

8.11.4.2 Emergency Contacts

Name	Position	Phone	e-mail
U Myo Win	Project Manager	+959 780877887	**MDLconch@gmail.com**
U Aung Myint	Site Supervisor	+959 762003180	**MDLconch@gmail.com**
U Chit Htwe Lay	Environmental Officer	+959 265244698	**MDLconch@gmail.com**

External emergency service contacts such as the Fire Brigade, Township Police, and Township Hospitals.

8.11.4.3 Means of Communication

The primary means of communication shall be:

- Telephone;

- Mobile (only in authorized area)

The information must be delivered clearly with specific message on time, location, and its current situation. Update and post all Safety Notice Boards in various sections of the Plant with:

- Emergency Plans which will clearly indicate exit routes, location of first aid boxes, fire extinguishers and Assembly Points.
- Emergency Tool boxes/rescue equipment.
- Company Ambulance contact numbers.

Vehicles are arranged in the event of an emergency to transport the patient as soon as possible.

8.11.4.4 Emergency Assembly Points and First Aid Room

There will be clearly marked and designated Emergency Assembly Points and first aid room in the Plant areas.

8.11.4.5 Emergency Drill

Periodic testing of response procedures (Mock Drill Exercises for emergencies)

8.11.4.6 Personnel Injuries

Apply appropriate First Aid and take to hospital if necessary. Investigate causative factor and institute. Prepare appropriate measures to prevent similar occurrences.

Emergency Situation	Cause	Proposed Response	Respondents
Staff Injury	- Unskilled labor - Neglect of safety procedures - Faulty equipment and tools	- Apply Appropriate First Aid - Take to hospital if necessary - Document incidence - Investigate causative factor and institute appropriate measures to prevent similar occurrences	**Key Respondents:** - Person first arriving at accident scene - Site Supervisor - Environmental Officer **Other Respondents:** - Project Manager - First Aid Attendant on Duty

8.11.4.7 Fire/Explosion (involving fuels, gases and other materials)

Myanmar Conch (Mandalay) Green Building Materials Company will institute the following measures in order to enhance fire safety preparedness:

- All offices shall be fitted with smoke detectors to offer early warning to employees in case of fire. The workplaces will be provided with fire alarms which will be activated in case of fire.

- Electrical substations and other critical installations such as the cement packing plant, poly-bag warehouses, etc. shall be equipped with specialized automatic fire protection and control systems to detect and trigger the fire extinguishing agent.
- All working areas will be provided with suitable fire extinguishers which shall be mounted in easily accessible locations.
- At least a square meter of the area where a fire extinguisher has been mounted shall be kept clear.
- Fire Extinguisher locations shall be posted with ''Fire Extinguisher'' signs and will be mounted at eye level.
- In addition to fire extinguishers, there shall be designated points for connecting fire hoses around the plant. These points shall be regularly serviced as per fire regulatory requirements.

Emergency Situation	Cause	Proposed Response	Respondents
Fire Outbreak	- Neglect of safety procedures - Faulty equipment and tools	- Sound alarm and instruct all to assemble at Assembly point - Conduct roll Call - Fight the fire using appropriate tools (fire extinguisher, sand, water) - Inform Fire Brigade and Police - Document incidence	**Key Respondents:** - Fire Discoverer - Supervisor - Environmental Officer **Other Respondents:** - Project Manager - Emergency Response Team.

8.11.4.8 Hazardous Chemical Release

Emergency Situation	Cause	Proposed Response	Respondents
Chemicals and other material spillage	- Neglect of safety procedures - Poor containment/storage facilities	- Contain material by bunding around with sand or any other suitable material to stop material flow and spread - Clean up affected areas - Document incidence	**Key Respondents:** - Supervisor - Environmental Officer **Other Respondents:** - Project Manager - Emergency Response Team

8.11.4.9 Natural Disaster

Disaster management is defined as the discipline of avoiding and dealing with natural risks. Disaster Management Plan should include Emergency Response and Rescue Plan.

Emergency Situation	Cause	Proposed Response	Respondents
On-site Disaster Management			
Earthquake	- Earthquake causes damage to infrastructure	- Implement emergency response/rescue plan - Implementation of emergency drill - Frequently watch local weather news and disaster notices by the relevant media	**Key Respondents:** - Supervisor - Environmental Officer **Other Respondents:** - Project Manager - Emergency Response Team
Cyclone	- Strong wind causes damage to infrastructure	- Implement emergency response/rescue plan - Implementation of emergency drill - Frequently watch local weather news and disaster notices by the relevant media	**Key Respondents:** - Supervisor - Environmental Officer **Other Respondents:** - Project Manager - Emergency Response Team
Flood	- Impact on the factory and nearby community due to increase of water level	- Implement emergency response/rescue plan - Implementation of emergency drill - Frequently watch local weather news and disaster notices by the relevant media	**Key Respondents:** - Supervisor - Environmental Officer **Other Respondents:** - Project Manager - Emergency Response Team
Off-site Disaster Management			
Natural Disaster (Earthquake, Cyclone, Flood etc.)	- Impact on the factory and nearby community due to natural disaster	- As the magnitude of an emergency increases, so will the need for multi-agency support from within the community.	**Key Respondents:** - Supervisor - Environmental Officer **Other Respondents:** - Project Manager - Emergency Response Team

		- Based on the type and seriousness of the event, appropriate personnel are notified of the current or imminent situation. - Upon notification of an imminent or actual emergency, the emergency response team will initiate the notification of key personnel and agencies.	**External Emergency Contacts:** - Police - Fire Brigade - Township Hospitals

8.11.5 Responsibilities

All supervisors are responsible for ensuring effective implementation of the Emergency Response Plan and will act as key respondents. Designated assistants will act in the absence of supervisors and will act as key respondents in that case.

8.12 Occupational Health and Safety Plan

8.12.1 Objectives

To prevent industrial accidents and work-related illnesses.

8.12.2 Legal Requirements

Applicable legislation and guidelines include:

- Occupational Safety and Health Law, 2019
- The Prevention and Control of Communicable Diseases Law, 1995
- The Control of Smoking and Consumption of Tobacco Product Law, 2006

8.12.3 Implementation Schedule

During Construction and Operation Phase.

8.12.4 Management Actions

Environmental Impact Assessment - Construction and Operation Phase			
1. Occupational Health and Safety	1.1. Dust-generating stages of cement manufacturing	1.1.1. Dust	1.1.1.1. Implement mitigation measures in section 5.9.1.1

			1.1.1.2. Warning sign will be posted at dusty areas. 1.1.1.3. Personnel protective equipment (PPE) will be provided to the employees. 1.1.1.4. Provide orientation, EHS and other trainings to employees. 1.1.1.5. Medical check-up
	1.2. Exhaust fans	1.2.1. Noise	1.2.1.1. Implement mitigation measures in section 5.9.1.3 1.2.1.2. Warning sign will be posted at high noise areas. 1.2.1.3. Personnel protective equipment (PPE) will be provided to the employees. 1.2.1.4. Provide orientation, EHS and other trainings to employees. 1.2.1.5. Medical check-up
	1.3. Chemical use	1.3.1. Hazardous Substances and Chemicals	1.3.1.1. Personnel as part of the HSE Induction/Orientation will receive training for handling of hazardous materials. 1.3.1.2. Additional information will be given to personnel through pre-task instruction, method statements and material safety data sheets (MSDS).
	1.4. Manufacturing operations	1.4.1. Physical hazards	1.4.1.1. Implement emergency response plan

			1.4.1.2. First-aid boxes/kits will be provided in work site. 1.4.1.3. Personnel protective equipment (PPE) will be provided to the employees. 1.4.1.4. Provide orientation, EHS and other trainings to employees.

8.12.4.1 Pre-Placement and Periodic Medical Examination

The company has arrangements with Mandalay hospitals to undertake medical examinations prior to work. A medical examination will be conducted once a year for workers who work in dusty areas. Hearing examination for workers in noisy environments will be included in regular medical examinations. Additionally, the company will perform yearly environmental monitoring activities such as measuring particulates, noise, and vibration in the workplace.

8.12.4.2 Personal Protective Equipment (PPE)

The company will provide adequate training for the correct usage of the type of mask to be used in the workplace in order to prevent respiratory health issues that may be caused by particles.

8.12.4.3 Accommodation for Worker

The company has provided spacious and clean accommodation for its employees. Water and sanitation measures have also been developed in the dormitories. As a preventive measure against infectious diseases, disinfectant spraying is carried out on a regular basis.

8.12.4.4 Factory Clinic

Regarding the clinic, there is a clinic inside the factory, and a nurse is assigned to work there. In the present situation, a doctor from a nearby village has been temporarily hired to work in the clinic three days a week to provide medical care to the employees.

8.12.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Occupational Health and Safety	▪ Proper use of PPE ▪ Presence of safety signs ▪ First aid kit	Health and Safety surveys	Monthly	Project Area

	▪ Injury/ illness records ▪ Training Program			
Employee health check-up	▪ Lung function test ▪ Hearing ability test	Medical examination	Yearly	Workers working in dusty and noisy workplaces

8.12.6 Responsibilities

Roles and Responsibilities for Implementation of EMP are described in section 8.2.

8.13 Community Health and Safety Plan

8.13.1 Objectives

To establish the prevention and control management network for infectious diseases, improve the report system for infectious diseases, provide necessary fund, transport and communication.

8.13.2 Legal Requirements

Applicable legislation and guidelines include:

- The Public Health Law, 1972
- The Prevention and Control of Communicable Diseases Law, 1995
- The Control of Smoking and Consumption of Tobacco Product Law, 2006

8.13.3 Implementation Schedule

During Construction and Operation Phase.

8.13.4 Management Actions

Environmental Impact Assessment - Construction and Operation Phase			
1. Community Health and Safety	1.1. Water Quality	1.1.1. Impacts on community health due to degradation of water quality	1.1.1.1. Implement water quality management plan
	1.2. Structural Safety of Project Infrastructure	1.2.1. Infrastructure failures due to natural risks	1.2.1.1. Implement emergency response plan
	1.3. Traffic	1.3.1. Traffic accidents	1.3.1.1. Implement traffic management plan

8.13.5 Monitoring Plan

Factors	Index/Parameter	Procedure/Method	Proposed Duration and Frequency	Location
Community Health and Safety	▪ Presence of safety signs ▪ Injury/ illness records	Health and Safety surveys	Monthly	Community living surrounding of the project

8.14 Corporate Social Responsibility

The annual report must contain a section on CSR activities detailing activities, spent amounts, impact and a sustainability assessment. Management should set out a strategy or an annual plan, through which it will deliver the company's CSR philosophy, policies, and community-based principles. The strategy must outline:

- Allocated budget
- Available support and ways to participate
- The values and principles the company wants to establish and spread
- The community segments and social fields to be targeted

8.14.1 CSR Program

Expecting part of the profit of the project to share the social benefit of the community, the project company "Myanmar Conch (Mandalay) Green Building Materials Co., Ltd." would manage to fulfil the following request of the local residents during stakeholder meetings.

The CSR program planned by the project included following components;

1. Improve local medical service conditions
2. Donate to monastery
3. Improve education (repair schools)
4. Broaden knowledge (donate/build library)
5. Increase job opportunity
6. Other charitable activities

Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. plan and reserve for cooperate social responsibility (CSR) (during operation period), two percent (2%) of yearly net profit of the project.

8.15 Decommissioning and Closure Plan

Decommissioning and Closure Plan will be developed as part of the overall Environmental Management Plan for Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. in line with the

company's Environmental, Health and Safety (EHS) Policy. The Plan covers a description of all activities that need to be carried out to effect decommissioning and closure in an environmentally friendly and socially acceptable manner. To this effect work standard have been stipulated to achieve the decommissioning and closure objectives in line with the overall EHS policy.

8.16 Estimated Budget for Environmental Management Plan

Table 8.1 Estimated Budget for each Sub-Plan

No	Plan	Estimated Budget (USD)
1	Air Quality Management Plan	5,000
2	Noise and Vibration Management Plan	5,000
3	Water Quality Management Plan	5,000
4	Waste Management Plan	3,000
5	Soil Management Plan	2,000
6	Biodiversity Management Plan	5,000
7	Socio-economic Management Plan	2,000
8	Cultural Management Plan	1,000
19	Emergency Response Plan	5,000
10	Occupational Health and Safety Plan	3,000
11	Community Health and Safety Plan	2,000
	Total	**38,000**

8.17 Environmental Monitoring

8.17.1 Monitoring Report

In the monitoring report that will be submitted to the Environmental Conservation Department, photos of each monitoring point, photos of sample collection, and photos of surveying will all be described. If survey findings are compared with applicable guidelines, the explanation will be provided together with supporting documentation in the monitoring report, which will be submitted to the MONREC and Environmental Conservation Department. Analysis on the survey results will be presented in the monitoring report by comparing the baseline or previous survey data. The traffic situation around the project will be surveyed at least once a year, and measures taken to reduce traffic issues will be included in the monitoring report. Every six months or as otherwise instructed by the ministry, the project proponent will submit a monitoring report.

Table 8.2 Estimated Budget for Environmental Monitoring Plan

No	Monitoring Plan	Estimated Budget (USD)

1	Air Quality Monitoring	2,000
2	Noise and Vibration Monitoring	1,000
3	Water Quality Monitoring	2,000
4	Waste Management Monitoring	500
5	Soil Management Monitoring	500
6	Biodiversity Management Monitoring	500
7	Socio-economic Management Monitoring	1,000
8	Occupational Health and Safety Monitoring	1,000
9	Community Health and Safety Monitoring	500
	Total	**9,000**

9. CONCLUSION AND RECOMMENDATION

9.1 Conclusion

In order to support the sector of building within the country, Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. is set up between Myint Investment Group Co., Ltd. (45%) and Wuhu Conch Profiles and Science Co., Ltd (55%) as a Joint Venture Company to build, operate and distribute building materials such as uPVC profiles, PVC pipes, PVC pipe fitting, plastic doors and windows. The expected total investment for the proposed project is 13.24 million dollars.

The project site is located 26 miles (41.84 Km) away from Mandalay where Myanmar Conch Cement (Mandalay) Company Limited existed. Land lease agreement was made between project proponent and Myanmar Conch Cement (Mandalay) Co., Ltd. for 49 years. It is 8.3 acres wide and allocated inside the compound of Myanmar Conch Cement (Mandalay) Company Limited. Total PVC pipes, Doors and Profiles production capacity of the project will be approximately 10,000 tons per year. 70% of the product is planned to distribute in the domestic and the other 30% is intended for export. 85.6 % of workforce is expected from the local.

For the Project, an EIA report has been prepared in compliance with the 2015 Myanmar EIA Procedures. Through a structured scoping process, the EIA identified potential impacts by taking into account how the Project's operations would interact with social and natural resources or receptors. The EIA has further evaluated interactions that could have major effects on the environment and society, and it has recommended suitable mitigation and enhancement strategies to lessen potential negative effects or increase potential positive effects from the Project.

It is concluded in the EIA that with proper implementation of the recommended mitigation measures. Conch Profile as the world’s largest production and marketing enterprises, the product itself has insulation, soundproofing, other environmental protection and energy-saving characteristics.

9.2 Recommendation

- Findings and suggestion of EIA study in project planning, design and operation should be considered and implemented with strong monitoring.
- Environmental Management Plan and Monitoring Program and, Hazard and Safety Management Plan should be implemented at every suggested step of project such as pre construction, construction and operation.
- Establishing Institutional arrangement with proper logistic and training for Environment, Health and Safety during pre-construction, construction and operation phases of the project.

Implementing this project will also have the positive effects such as providing employment to local people. The project activity will not have any major impact on the environment. In addition, the

Company's CSR initiatives will have a positive indicator for the regional environments to improve socioeconomic and health status.

9.3 List of Commitments

A consolidated summary list of environmental and social impacts and mitigation measures commitments that Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. will be expected to adopt in order to manage and mitigate potential impacts associated with the project development is provided below in Table 9.1.

Table 9.1 Project Key Commitments

Commitment Source	Commitment
ESIA Report, Chapter 2, Environmental Related Applicable Legislations and Guidelines of Myanmar	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. will comply these laws and regulation during construction, operation and decommissioning phase of the proposed project.
ESIA Report, Chapter 2, Standards and Guidelines	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. will follow National Environmental Quality Standards for the ambient air quality, noise levels and effluent discharge.
ESIA Report, Chapter 3, Section	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. has always been adhering to the concept of recycling economy, energy-saving and environmental protection and green development.
ESIA Report, Chapter 7, Environmental Management Plan	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. will implement the Environmental Management Plan and Monitoring Program for Plant and Facilities.
Overall Commitment	Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. will - Strictly carry out the relevant local standards and guidelines in areas of environmental protection, labor safety, and industrial hygiene etc., and in comparison, with China relevant standards and guidelines, the company adopts advanced technologies and equipment, so as to make sure every index is better than Myanmar local standards; - The architectural design is fully integrated with the local climate characteristics and cultural styles of Myanmar; pay attention to architectural aesthetics and environmental design under the premise of meeting the functional requirements; - The project team has blend in the local society and carry out its social responsibility, expand and maintain its relations with social organizations and neighboring villagers. It has gained wide recognition and praise.

Appendix A

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

စိုက်ပျိုးရေး၊ မွေးမြူရေးနှင့် ဆည်မြောင်းဝန်ကြီးဌာန

စိုက်ပျိုးရေးဦးစီးဌာန

(မြေအသုံးချရေးဌာနခွဲ)

ရန်ကုန်မြို့

စာအမှတ်- ဓခ- ၂(၁)/၂၀၂၃-၂၀၂၄ (၀၁၅)

နေ့စွဲ၊ ၂၀၂၃ ခုနှစ်၊ ဧပြီလ (၂၇) ရက်

အကြောင်းအရာ။ မြေနမူနာ ဓာတ်ခွဲအဖြေများပေးပို့ခြင်း။

ရည် ညွှန်း ချက် ။ **Sustainable Environment Myanmar** မှ (31.3.2023)နေ့ တွင် ပေးပို့သော နမူနာ။

အထက်အကြောင်းအရာပါ ကိစ္စနှင့်ပတ်သက်၍ ရည်ညွှန်းစာဖြင့် ပေးပို့လာသော မြေနမူနာ (၂-မျိုး) အား ဓာတ်ခွဲစစ်ဆေးပြီးဖြစ်၍ ဓာတ်ခွဲတွေ့ရှိချက် အဖြေများကို ဤစာနှင့်အတူ ပူးတွဲပေးပို့ပါသည်။

(ဒေါက်တာသန္တာညီ)
ဒုတိယညွှန်ကြားရေးမှူး
ဓာတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာနခွဲ

မိတ္တူကို-

ရုံးလက်ခံ

DEPARTMENT OF AGRICULTURE (LAND USE)

SOIL ANALYTICAL DATA SHEET AND SOIL INTEPRETATION OF RESULTS

Sustainable Enviromnent Myanmar (31.3.2023)

Division - မန္တလေးတိုင်းဒေသကြီး။ Sheet No. 1

Township - မတ္တရာမြို့နယ်။ Sr No. S 1-2 /2023

Sr No.	Sample	pH Soil:Water 1:2.5	pH
1	S -1	7.15	Slightly Alkaline
2	S -2	5.77	Moderately Acid

(ဒေါက်တာသန္တာညီ)
ဒုတိယညွှန်ကြားရေးမှူး
ဓာတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာနခွဲ

Appendix A

DEPARTMENT OF AGRICULTURE (LAND USE)

SOIL ANALYTICAL DATA SHEET

Sustainable Enviromnent Myanmar (31.3.2023)

ivision - မန္တလေးတိုင်းဒေသကြီး။

ownship - မတ္တရာမြို့နယ်။

Sheet No. 2

Sr No. S 1-2 /2023

Sr No.	Sample	Zinc (Zn) ppm	Copper (Cu) ppm	Iron (Fe) ppm	Manganese (Mn) ppm	Lead (Pb) ppm	Cadmium (Cd) ppm	Nickle (Ni) ppm	Chromium(Cr) ppm
1	S -1	0.2112	0.618	4.159	37.82	0.22	Not Detected	0.586	Not Detected
2	S -2	0.0482	0.944	9.314	30.96	0.06	Not Detected	0.386	Not Detected

မှတ်ချက်။ ။မြေနမူနာ ဓာတ်ခွဲအဖြေများ၏ ပါဝင်မှုသည် MPL(Maximum permissible Limit) ထက် မကျော်လွန်ပါ။ (FAO)

(ဒေါက်တာသန္တာညီ)
ဒုတိယညွှန်ကြားရေးမှူး
ဓာတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာနခွဲ

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TESTING
No.0063

ANALYSIS REPORT

PROJECT NAME : EIA FOR MYANMAR CONCH (MANDALAY) GREEN BUILDING MATERIALS CO., LTD.
CUSTOMER NAME : SUSTAINABLE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 799855808 e-mail : toetoehlaing@rem-uaeconsultant.com
SAMPLING SOURCE : -

SAMPLE TYPE : GROUNDWATER
SAMPLING DATE : MARCH 30, 2023
SAMPLING TIME : 08:15 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NADNAPA KAMOLBOON

RECEIVED DATE : APRIL 10, 2023
ANALYTICAL DATE : APRIL 10-25, 2023
REPORT NO. : 2023-U031639
WORK NO. : 2023-003227
ANALYSIS NO. : T23AG459-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT GW-1 T23AG459-0001	DETECTION LIMIT
FREE CYANIDE [c]	mg/L CN^-	CYANIDE-ION SELECTIVE ELECTRODE METHOD (SM: PART 4500-CN^- F)	ND	0.05
PHENOLS [c]	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: PART 5530 B AND PART 5530 C)	ND	0.005
METALS				
ALUMINUM [c]	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.029	0.005
CADMIUM [c]	mg/L Cd	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.002
HEXAVALENT CHROMIUM [c]	mg/L Cr^{6+}	COLOURIMETRIC METHOD (SM: PART 3500-Cr B)	ND	0.006
LEAD [c]	mg/L Pb	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.003
MERCURY [b]	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	0.0010	0.0001
NICKEL [c]	mg/L Ni	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.005
SILVER [c]	mg/L Ag	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	ND	0.003
TRIHALOMETHANE				
CHLOROFORM [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
BROMODICHLOROMETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
DIBROMOCHLOROMETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
VOLATILE ORGANIC COMPOUNDS				
CARBON TETRACHLORIDE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,2-DICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002

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TESTING
No.0063

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT GW-1 T23AG459-0001	DETECTION LIMIT
cis-1,2-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
trans-1,2-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
DICHLOROMETHANE (METHYLENE CHLORIDE) [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
TETRACHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
TRICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1,1-TRICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1,2-TRICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
VINYL CHLORIDE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			WHITE	

[a] : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
[b] : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
[c] : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23 rdEDITION, 2017.
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23 rdEDITION, 2017.
ND : NON-DETECTABLE.

*United Analyst Engineering Consultant Co.,Ltd is Sub-contractor ofr REM-UAE Laboratory and Consultant Co.,Ltd.

Wilailak Srisuk.

(MISS WILAILAK SRISUK)
LABORATORY SUPERVISOR

MAY 2, 2023

2023-U031639

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

TESTING
No.0063

ANALYSIS REPORT

PROJECT NAME : EIA FOR MYANMAR CONCH (MANDALAY) GREEN BUILDING MATERIALS CO., LTD.
CUSTOMER NAME : SUSTAINABLE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 799855808 e-mail : toetoehlaing@rem-uaeconsultant.com
SAMPLING SOURCE : -

SAMPLE TYPE : SURFACE WATER
SAMPLING DATE : MARCH 30, 2023
SAMPLING TIME : 09:30 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NADNAPA KAMOLBOON

RECEIVED DATE : APRIL 10, 2023
ANALYTICAL DATE : APRIL 10-25, 2023
REPORT NO. : 2023-U031640
WORK NO. : 2023-003227
ANALYSIS NO. : T23AG459-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT SW-1 T23AG459-0002	DETECTION LIMIT
FREE CYANIDE [c]	mg/L CN^-	CYANIDE-ION SELECTIVE ELECTRODE METHOD (SM: PART 4500-CN^- F)	ND	0.05
PHENOLS [c]	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: PART 5530 B AND PART 5530 C)	ND	0.005
METALS				
ALUMINUM [c]	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.126	0.005
CADMIUM [c]	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.002
HEXAVALENT CHROMIUM [c]	mg/L Cr^{6+}	EXTRACTION AND AIR-ACETYLENE FLAME METHOD (SM: PART 3111 C)	ND	0.001
DISSOLVED CHROMIUM HEXAVALENT [c]	mg/L Cr^{6+}	EXTRACTION AND AIR-ACETYLENE FLAME METHOD (SM: PART 3111 C)	ND	0.001
LEAD [c]	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.003
MERCURY [b]	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	0.0041	0.0001
NICKEL [c]	mg/L Ni	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.005
SILVER [c]	mg/L Ag	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	ND	0.003
TRIHALOMETHANE				
CHLOROFORM [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
BROMODICHLOROMETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
DIBROMOCHLOROMETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
VOLATILE ORGANIC COMPOUNDS				
CARBON TETRACHLORIDE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002

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PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT SW-1 T23AG459-0002	DETECTION LIMIT
1,2-DICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
cis-1,2-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
trans-1,2-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
DICHLOROMETHANE (METHYLENE CHLORIDE) [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
TETRACHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
TRICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1,1-TRICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1,2-TRICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
VINYL CHLORIDE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			WHITE	

[a] : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
[b] : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
[c] : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23 rdEDITION, 2017.
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23 rdEDITION, 2017.
ND : NON-DETECTABLE.

*United Analyst Engineering Consultant Co.,Ltd is Sub-contractor ofr REM-UAE Laboratory and Consultant Co.,Ltd.

Wilailak Srisuk.
(MISS WILAILAK SRISUK)
LABORATORY SUPERVISOR

MAY 2, 2023

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TESTING
No.0063

ANALYSIS REPORT

PROJECT NAME : EIA FOR MYANMAR CONCH (MANDALAY) GREEN BUILDING MATERIALS CO., LTD.
CUSTOMER NAME : SUSTAINABLE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 799855808 e-mail : toetoehlaing@rem-uaeconsultant.com
SAMPLING SOURCE : -
SAMPLE TYPE : SURFACE WATER
SAMPLING DATE : MARCH 30, 2023
SAMPLING TIME : 10:45 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NADNAPA KAMOLBOON

RECEIVED DATE : APRIL 10, 2023
ANALYTICAL DATE : APRIL 10-25, 2023
REPORT NO. : 2023-U031641
WORK NO. : 2023-003227
ANALYSIS NO. : T23AG459-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT SW-2 T23AG459-0003	DETECTION LIMIT
FREE CYANIDE [c]	mg/L CN^-	CYANIDE-ION SELECTIVE ELECTRODE METHOD (SM: PART 4500-CN^- F)	ND	0.05
PHENOLS [c]	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: PART 5530 B AND PART 5530 C)	ND	0.005
METALS				
ALUMINUM [c]	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.127	0.005
CADMIUM [c]	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.002
HEXAVALENT CHROMIUM [c]	mg/L Cr^{6+}	EXTRACTION AND AIR-ACETYLENE FLAME METHOD (SM: PART 3111 C)	ND	0.001
DISSOLVED CHROMIUM HEXAVALENT [c]	mg/L Cr^{6+}	EXTRACTION AND AIR-ACETYLENE FLAME METHOD (SM: PART 3111 C)	ND	0.001
LEAD [c]	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.003
MERCURY [b]	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	0.0037	0.0001
NICKEL [c]	mg/L Ni	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	0.005
SILVER [c]	mg/L Ag	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	ND	0.003
TRIHALOMETHANE				
CHLOROFORM [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
BROMODICHLOROMETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
DIBROMOCHLOROMETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6232 C)	< 0.0010	0.0010
VOLATILE ORGANIC COMPOUNDS				
CARBON TETRACHLORIDE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002

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PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT SW-2 T23AG459-0003	DETECTION LIMIT
1,2-DICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
cis-1,2-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
trans-1,2-DICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
DICHLOROMETHANE (METHYLENE CHLORIDE) [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
TETRACHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
TRICHLOROETHYLENE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1,1-TRICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
1,1,2-TRICHLOROETHANE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
VINYL CHLORIDE [c]	mg/L	PURGE AND TRAP GAS CHROMATOGRAPHIC/MASS SPECTROMETRIC METHOD (SM: PART 6200 B)	< 0.0002	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			WHITE	

[a] : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
[b] : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
[c] : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23 rdEDITION, 2017.
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23 rdEDITION, 2017.
ND : NON-DETECTABLE.

*United Analyst Engineering Consultant Co.,Ltd is Sub-contractor ofr REM-UAE Laboratory and Consultant Co.,Ltd.

Wilailak Srisuk.
(MISS WILAILAK SRISUK)
LABORATORY SUPERVISOR

MAY 2, 2023

REM-UAE LABORATORY AND CONSULTANT COMPANY LIMITED

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www.rem-uaeconsultant.com E-mail: contact@rem-uaeconsultant.com

ANALYSIS REPORT

PROJECT : EIA FOR MYANMAR CONCH (MANDALAY) GREEN BUILDING MATERIALS CO.,LTD.

CUSTOMER NAME : SUSTAINABLE ENVIRONMENT MYANMAR

ADDRESS : B-306, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR

SAMPLING SOURCE : GW-1

SAMPLE TYPE : GROUNDWATER

SAMPLING DATE : MARCH 30, 2023

SAMPLING TIME : 08:15 HOUR

SAMPLING METHOD : -

SAMPLING BY : CUSTOMER

SUBMITTAL/ RECEIPT NO. : 5/3/2023

RECEIVED DATE : MARCH 31, 2023

ANALYSIS DATE : MARCH 31 – APRIL 7, 2023

ANALYSIS NO. : LAA027/2023

REPORT NO. : L00027/2023

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			GW-1	
			LAA027/2023	
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105°C (SM : 2540 D)	ND	5.0
TOTAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 B)	1,300	1.8
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLORLESS / CLEAR	
SEDIMENT			-	

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23RD EDITION, 2017

ND : NON-DETECTABLE

Toe Toe Hlaing

(MS TOE TOE HLAING)

GENERAL MANAGER

DATE APRIL 7, 2023

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- **REPORTED ANALYSIS REFERS TO SUBMITTED SAMPLE ONLY.**

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ANALYSIS REPORT

PROJECT : EIA FOR MYANMAR CONCH (MANDALAY) GREEN BUILDING MATERIALS CO.,LTD.
CUSTOMER NAME : SUSTAINABLE ENVIRONMENT MYANMAR
ADDRESS : B-306, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR
SAMPLING SOURCE : SW-1
SAMPLE TYPE : SURFACE WATER
SAMPLING DATE : MARCH 30, 2023
SAMPLING TIME : 09:30 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
SUBMITTAL/ RECEIPT NO. : 5/3/2023
RECEIVED DATE : MARCH 31, 2023
ANALYSIS DATE : MARCH 31 – APRIL 7, 2023
ANALYSIS NO. : LAA028/2023
REPORT NO. : L00028/2023

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SW-1	
			LAA028/2023	
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105°C (SM : 2540 D)	ND	5.0
TOTAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 B)	2,200	1.8
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			LIGHT GREY / LITTLE TURBID	
SEDIMENT			GREY	

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23RD EDITION, 2017

ND : NON-DETECTABLE

Toe Toe Hlaing

(MS TOE TOE HLAING)
GENERAL MANAGER
DATE APRIL 7, 2023

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ANALYSIS REPORT

PROJECT : EIA FOR MYANMAR CONCH (MANDALAY) GREEN BUILDING MATERIALS CO.,LTD.
CUSTOMER NAME : SUSTAINABLE ENVIRONMENT MYANMAR
ADDRESS : B-306, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR
SAMPLING SOURCE : SW-2
SAMPLE TYPE : SURFACE WATER
SAMPLING DATE : MARCH 30, 2023
SAMPLING TIME : 10:45 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
SUBMITTAL/ RECEIPT NO. : 5/3/2023
RECEIVED DATE : MARCH 31, 2023
ANALYSIS DATE : MARCH 31 – APRIL 7, 2023
ANALYSIS NO. : LAA029/2023
REPORT NO. : L00029/2023

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SW-2	
			LAA029/2023	
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105°C (SM : 2540 D)	ND	5.0
TOTAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 B)	4,700	1.8
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			LIGHT GREY / LITTLE TURBID	
SEDIMENT			GREY	

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23RD EDITION, 2017

ND : NON-DETECTABLE

Toe Toe Hlaing

(MS TOE TOE HLAING)
GENERAL MANAGER
DATE APRIL 7, 2023

- **DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL.**
- **REPORTED ANALYSIS REFERS TO SUBMITTED SAMPLE ONLY.**

ORIGINAL

SGS

Report No. : **23520-00027**
Job Ref. : 5000248
Date : 06-Apr-23

TEST REPORT

CLIENT NAME : SUSTAINABLE ENVIRONMENT MYANMAR CO.,LTD

ADDRESS : B-306. DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON

The following sample was submitted and identified by client and analysed at our lab with the following results.

Sample Description : EIA For Myanmar Conch (Mandalay) Green Building Material Co.,Ltd (Surface Water - 2)

Sampling Date : 30-Mar-23

Sample Condition : Glass and Plastic Bottle at Ambient Temperature

Lab Code : W-026

Date Sample(s) Received : 31-Mar-23

Testing Period : 31-Mar-23 TO 04-Apr-23

No.	Test Items	Methods	Results	Units
1	Nitrogen(Kjeldahl)	APHA 4500-NorgB (Macro Kjeldahl Method) (23rd Edition) (In-house Method)	<1	mg/L
2	Sulfide	APHA 4500-S2- A&F (Iodometric Method) (23rd Edition)	<2	mg/L
3	Phosphorus	APHA 4500-P E (Ascorbic Acid Method) (23rd Edition)	<0.01	mg/L
4	Oil & Grease	APHA 5520 B (Partition-Gravimetric Method) (23rd Edition)	<5	mg/L
5	Tin	APHA 3030 &3111B (Direct Air Acetylene Flame Method) (23rd Edition)	<0.1	mg/L

********** End of Report **********

MCZ

SGS (Myanmar) Limited

(Thin Thin Maw)
Laboratory Manager

ORIGINAL

SGS

Report No. : 23520-00026
Job Ref. : 5000248
Date : 06-Apr-23

TEST REPORT

CLIENT NAME : SUSTAINABLE ENVIRONMENT MYANMAR CO.,LTD

ADDRESS : B-306. DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON

The following sample was submitted and identified by client and analysed at our lab with the following results.

Sample Description : EIA For Myanmar Conch (Mandalay) Green Building Material Co.,Ltd (Surface Water - 1)

Sampling Date : 30-Mar-23

Sample Condition : Glass and Plastic Bottle at Ambient Temperature

Lab Code : W-025

Date Sample(s) Received : 31-Mar-23

Testing Period : 31-Mar-23 TO 04-Apr-23

No.	Test Items	Methods	Results	Units
1	Nitrogen(Kjeldahl)	APHA 4500-NorgB (Macro Kjeldahl Method) (23rd Edition) (In-house Method)	<1	mg/L
2	Sulfide	APHA 4500-S2- A&F (Iodometric Method) (23rd Edition)	<2	mg/L
3	Phosphorus	APHA 4500-P E (Ascorbic Acid Method) (23rd Edition)	<0.01	mg/L
4	Oil & Grease	APHA 5520 B (Partition-Gravimetric Method) (23rd Edition)	<5	mg/L
5	Tin	APHA 3030 &3111B (Direct Air Acetylene Flame Method) (23rd Edition)	<0.1	mg/L

********** End of Report **********

M.C.Z

SGS (Myanmar) Limited

(Thin Thin Maw)
Laboratory Manager

ORIGINAL

Report No. : 23520-00025
Job Ref. : 5000243
Date : 06-Apr-23

TEST REPORT

CLIENT NAME : SUSTAINABLE ENVIRONMENT MYANMAR CO.,LTD

ADDRESS : B-306. DELTA PLAZA, SHWEGONDAING ROAD,
BAHAN TOWNSHIP, YANGON

The following sample was submitted and identified by client and analysed at our lab with the following results.

Sample Description : EIA For Myanmar Conch (Mandalay) Green Building Material Co.,Ltd
(Ground Water - 1)

Sampling Date : 30-Mar-23

Sample Condition : Glass and Plastic Bottle at Ambient Temperature

Lab Code : W-024

Date Sample(s) Received : 31-Mar-23

Testing Period : 31-Mar-23 TO 04-Apr-23

No.	Test Items	Methods	Results	Units
1	Nitrogen(Kjeldahl)	APHA 4500-NorgB (Macro Kjeldahl Method) (23rd Edition) (In-house Method)	<1	mg/L
2	Sulfide	APHA 4500-S2- A&F (Iodometric Method) (23rd Edition)	<2	mg/L
3	Phosphorus	APHA 4500-P E (Ascorbic Acid Method) (23rd Edition)	<0.01	mg/L
4	Oil & Grease	APHA 5520 B (Partition-Gravimetric Method) (23rd Edition)	<5	mg/L
5	Tin	APHA 3030 &3111B (Direct Air Acetylene Flame Method) (23rd Edition)	<0.1	mg/L

********** End of Report **********

MCZ

SGS (Myanmar) Limited

(Thin Thin Maw)
Laboratory Manager

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2015 Cert. No.688283

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0323 794

WATER QUALITY TEST RESULTS FORM

Client: SEM
Nature of Water: Surface Water (1)
Location: Medaya
Date and Time of collection: 30.3.2023
Date and Time of arrival at Laboratory: 31.3.2023
Date and Time of commencing examination: 1.4.2023
Date and Time of completing: 6.4.2023

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
pH			6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron	0.47	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	30	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature: Heine
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist
(a division of WEG Co.,Ltd.) ISO Tech Laboratory

Approved by
Signature:
Name: Thinzar Theint Theint
B.E (Civil)
Assistant Technical Officer
ISO Tech Laboratory

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2015 Cert. No.688283

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0323 794

WATER QUALITY TEST RESULTS FORM

Client	SEM
Nature of Water	Surface Water (1)
Location	Medaya
Date and Time of collection	30.3.2023
Date and Time of arrival at Laboratory	31.3.2023
Date and Time of commencing examination	1.4.2023
Date and Time of completing	6.4.2023

Results of Water Analysis			**WHO Drinking Water Guideline (Geneva - 1993)**
Temperature (°C)		°C	
Fluoride (F)	0.7	mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia Nitrogen (NH_3)	Nil	mg/l	
Ammonium Nitrogen (NH_4)		mg/l	
Dissolved Oxygen (DO).		mg/l	
Chemical Oxygen Demand (COD)	64	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	8	mg/l	
Cyanide (CN)	Nil	mg/l	0.07 mg/l
Zinc (Zn)	Nil	mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (SiO_2)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist
ISO Tech Laboratory

Approved by
Signature:
Name: Thinzar Theint Theint
B.E (Civil)
Assistant Technical Officer
ISO Tech Laboratory

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2015 Cert. No.688283

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0323 795

WATER QUALITY TEST RESULTS FORM

Client	SEM
Nature of Water	Surface Water (2)
Location	Medaya
Date and Time of collection	30.3.2023
Date and Time of arrival at Laboratory	31.3.2023
Date and Time of commencing examination	1.4.2023
Date and Time of completing	6.4.2023

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH			6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron	0.33	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	12	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist
ISO Tech Laboratory

Approved by
Signature:
Name: Thinzar Theint Theint
B.E (Civil)
Assistant Technical Officer
ISO Tech Laboratory

ISO TECH LABORATORY

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ISO 9001:2015 Cert. No.688283

W0323 795

WATER QUALITY TEST RESULTS FORM

Client	SEM
Nature of Water	Surface Water (2)
Location	Medaya
Date and Time of collection	30.3.2023
Date and Time of arrival at Laboratory	31.3.2023
Date and Time of commencing examination	1.4.2023
Date and Time of completing	6.4.2023

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)	0.4	mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia Nitrogen (NH_3)	Nil	mg/l	
Ammonium Nitrogen (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	4	mg/l	
Cyanide (CN)	Nil	mg/l	0.07 mg/l
Zinc (Zn)	Nil	mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (SiO_2)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist
ISO Tech Laboratory

Approved by
Signature:
Name: Thinzar Theint Theint
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Assistant Technical Officer
ISO Tech Laboratory

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ISO 9001:2015 Cert. No.688283

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0323 796

WATER QUALITY TEST RESULTS FORM

Client: SEM
Nature of Water: Ground Water (1)
Location: Medaya
Date and Time of collection: 30.3.2023
Date and Time of arrival at Laboratory: 31.3.2023
Date and Time of commencing examination: 1.4.2023
Date and Time of completing: 6.4.2023

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
pH			6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron	0.20	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	5	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist
ISO Tech Laboratory

Approved by
Signature:
Name: Thinzar Theint Theint
B.E (Civil)
Assistant Technical Officer
ISO Tech Laboratory

ISO TECH LABORATORY

ISO-TECH LABORATORY

ISO 9001:2015 Cert. No.688283

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

W0323 796

WATER QUALITY TEST RESULTS FORM

Client: SEM

Nature of Water: Ground Water (1)

Location: Medaya

Date and Time of collection: 30.3.2023

Date and Time of arrival at Laboratory: 31.3.2023

Date and Time of commencing examination: 1.4.2023

Date and Time of completing: 6.4.2023

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)	0.2	mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia Nitrogen (NH_3)	Nil	mg/l	
Ammonium Nitrogen (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	2	mg/l	
Cyanide (CN)	Nil	mg/l	0.07 mg/l
Zinc (Zn)	Nil	mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (SiO_2)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc.(Chemistry)
Sr.Chemist
ISO Tech Laboratory

Approved by
Signature:
Name: Thinzar Theint Theint
B.E (Civil)
Assistant Technical Officer
ISO Tech Laboratory

ALPHA CONSTRUCTION MATERIAL
build your dream

MYANMAR CONCH (MANDALAY) GREEN BUILDING MATERIALS COMPANY LIMITED

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့်
အများပြည်သူ တိုင်ပင်ဆွေးနွေးခြင်း လုပ်ငန်းစဉ်

PVC profiles များ၊ ပိုက်များ၊ ပိုက်ဆက်များ၊ တံခါးရွက်နှင့် ပြတင်းတံခါးများ ဖြန့်ချိရေး စီမံကိန်း

၂၀၂၄ ခုနှစ်၊ ဇန်နဝါရီလ ၉ ရက်#

ပုသိမ်ကြီးမြို့နယ်

SEM

အကြောင်းအရာ

1. စီမံကိန်းအကောင်အထည်ဖော်ဆောင်သူ
2. စီမံကိန်း သတင်းအချက်အလက်များ
3. ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်
   - ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားရေးဆိုင်ရာ အခြေခံအချက်အလက်များ ကောက်ယူခြင်း
   - ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ
   - ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှုရေးအစီအစဉ်
4. ဆက်လက်ဆောင်ရွက်မည့်အစီအစဉ်များနှင့် ဆက်သွယ်ရန်လိပ်စာ

စီမံကိန်းအကောင်အထည်ဖော်ဆောင်သူ

Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. သည် စီမံကိန်း အဆိုပြုသူဖြစ်ပြီး Myint Investment Group Co., Ltd. မှ (45%) နှင့် Wuhu Conch Profiles and Science Co., Ltd. မှ (55%) ဖြင့် ဖက်စပ်စီးပွားရေးလုပ်ငန်းအဖြစ် တည်ထောင်ထားပါသည်။

စီမံကိန်းအဆိုပြုသူ	မြန်မာကွန်ချ် (မန္တလေး) Green Building Materials ကုမ္ပဏီလီမိတက်
ကုမ္ပဏီမှတ်ပုံတင်အမှတ်	၁၁၃၃၀၅၅၈၆၂
ဆက်သွယ်ရမည့်ပုဂ္ဂိုလ်	ဦးမျိုးဝင်း
အီးမေးလ်	unplugged07@gmail.com
လိပ်စာ	အမှတ်-၄၆၅(ခ/၂)၊ ဒဟတ်တောကျေးရွာအုပ်စု၊ ဆူးခေါက်နက်အရှေ့၊ ပုသိမ်ကြီးမြို့နယ်၊ မန္တလေးတိုင်းဒေသကြီး။
ဆက်သွယ်ရမည့် ဖုန်းနံပါတ်	၀၉၇၈၀၈၇၇၈၈၇
အင်တာနက်စာမျက်နှာ	http://pvc.conch.cn

စီမံကိန်းသတင်းအချက်အလက်များ

စီမံကိန်းသတင်းအချက်အလက်များ

- အဆိုပြုစီမံကိန်းမှာ ဆောက်လုပ်ရေးပစ္စည်းများဖြစ်သည့် PVC profiles များ၊ ပိုက်များ၊ ပိုက်ဆက်များ၊ တံခါးရွက်နှင့် ပြတင်းတံခါးများ ထုတ်လုပ် သည့် စက်ရုံတည်ဆောက်လည်ပတ်ရေးနှင့် ဖြန့်ချိရေး ဖြစ်ပါသည်။
- အဆိုပြုစီမံကိန်းသည် မန္တလေးမြို့မှ ၂၆ မိုင် အကွာ ဒဟတ်တောကျေးရွာအုပ်စု၊ ဆူးခေါက်နက်အရှေ့၊ ပုသိမ်ကြီးမြို့နယ်တွင် တည်ရှိပါသည်။
- စုစုပေါင်း PVC ပိုက်များ၊ တံခါးများနှင့် PVC profiles (ထုတ်လုပ်မည့် ကုန်ချောများ) ထုတ်လုပ်နိုင်စွမ်းမှာ တစ်နှစ်လျှင် ခန့်မှန်းခြေတန် ၆၂၀၀ ရှိမည် ဖြစ်ပါသည်။
- ၄င်းစက်ရုံသည် ပြည်တွင်းတွင် ၇၀% ဖြန့်ဖြူးရန် နှင့် ပြည်ပသို့ ၃၀% တင်ပို့ရန် လျာထားပါသည်။
- မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်မှလည်း ခွင့်ပြုမိန့်အမှတ် ၀၈၅/၂၀၁၈ ဖြင့် ၂၀၁၈ ခုနှစ်၊ မေလ ၃၀ ရက်နေ့တွင် ခွင့်ပြုထားပြီး ဖြစ်ပါသည်။

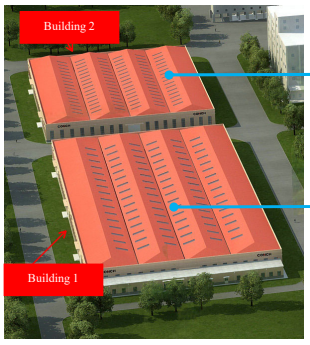
စီမံကိန်းသတင်းအချက်အလက်များ

- ၄င်းစီမံကိန်းအား မြန်မာကွန်ချ် ဘိလပ်မြေ (မန္တလေး) ကုမ္ပဏီ လိမိတက် ဝန်းအတွင်းရှိ မြေဧက (၈.၃) ဧက ပေါ်တွင် တည်ဆောက်မည် ဖြစ်ပါသည်။ မြေယာဌားရမ်းခြင်း သဘောတူညီချက်ကို စီမံကိန်း အဆိုပြုသူနှင့် မြန်မာကွန်ချ် ဘိလပ်မြေ (မန္တလေး) ကုမ္ပဏီလိမိတက်တို့ အကြားတွင် ၄၉ နှစ်စာ အတွက် သဘောတူ လက်မှတ်ရေးထိုးပြီးဖြစ်ပါသည်။

စီမံကိန်းသတင်းအချက်အလက်များ

တည်ဆောက်ရေးအဆင့်

စက်ရုံမြေဧရိယာပေါ်တွင် PVC profile ပုံသွင်းကုန်ထုတ်လိုင်း ၅ ခု၊ UPVC ပုံသွင်းကုန်ထုတ်လိုင်း ၄ ခု၊ UPVC ပိုက်ပုံလောင်းသည့် ကိရိယာ ၆ စုံ ပါဝင်သည့် အဆောက်အဦးဧရိယာ ၁၅၁၂၀ စတုရန်းမီတာရှိသည့် အသေးစား စတီးလ်အဆောက်အအုံစက်ရုံ ၁ ခု တည်ဆောက်ရေးနှင့် မြေဧရိယာ ၉၀၇၂ စတုရန်းမီတာပေါ်၌ ပလပ်စတစ်နှင့် စတီးလ်အရောတံခါးရွက်နှင့် ပြတင်းရွက်များ ကုန်ထုတ်လိုင်း ၂ ခု တည်ဆောက်ရေးစသဖြင့် တည်ဆောက်ရေး အဆင့် နှစ်ခုပါဝင်ပါသည်။



တံခါးရွက်နှင့် ပြတင်းရွက်များ ကုန်ထုတ်လိုင်း
၃.၇ ဧက/၁၅၁၂၀ စတုရန်းမီတာ

ပုံသွင်းကုန်ထုတ်လိုင်း၊ ကုန်ကြမ်းပစ္စည်း သိုလှောင်ရုံနှင့် ထုတ်ကုန်များ သိုလှောင်ရုံ
၂.၂ ဧက/၉၀၇၂ စတုရန်းမီတာ

စိမံကိန်းသတင်းအချက်အလက်များ

ကုန်ကြမ်းပစ္စည်း

ထုတ်လုပ်ရေးအတွက် လိုအပ်သော ကုန်ကြမ်းပစ္စည်းများကို တရုတ်နိုင်ငံနှင့် ထိုင်းနိုင်ငံတို့မှ အဓိက ဝယ်ယူမည် ဖြစ်ပြီး ပလပ်စတစ် စတီးလ် profiles ပစ္စည်းများ၊ UPVC ပိုက်များနှင့် UPVC ပိုက်ဆက်များအား ထုတ်လုပ်မည် ဖြစ်ပါသည်။

ရေသုံးစွဲမှု

PVC profile ပုံသွင်းကုန်ထုတ်လိုင်း ၅ခု၊ UPVC ပုံသွင်းကုန်ထုတ်လိုင်း ၄ခု၊ အအေးခံတာဝါ ၂ခု၏ စုစုပေါင်းစီမံကိန်းရေသုံးစွဲမှုမှာ တစ်နှစ်လျှင် ၄၁,၄၀၀ ကုဗမီတာဖြစ်ပါသည်။

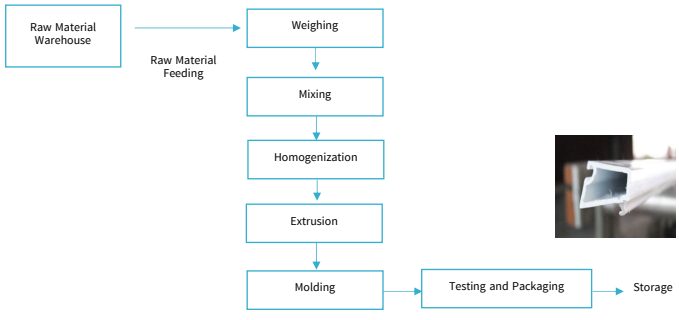
လျှပ်စစ်မီးလိုအပ်ချက်

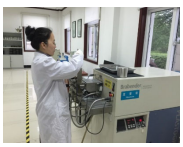
ထုတ်လုပ်မှုအတွက် ပျမ်းမျှစွမ်းအင်သုံးစွဲမှုမှာ စုစုပေါင်းနှစ်စဉ် သန်း ၄.၃၅ kwh သုံးစွဲမည် ဖြစ်ပြီး နေ့စဉ်လျှပ်စစ်သုံးစွဲမှု ၁၄၅၀၀ kwh ဖြစ်ပါသည်။

စိမံကိန်းသတင်းအချက်အလက်များ

Profile ထုတ်လုပ်ခြင်း လုပ်ငန်းစဉ်

- ကုန်ကြမ်းပစ္စည်းများ စက်ရုံသို့ရောက်လာပြီးနောက်တွင် ဓာတ်ခွဲခန်း၌ တိကျသေချာစွာစမ်းသပ်၍ ထုတ်လုပ်ရန် ကုန်လောင်ရုံသို့ တင်ပို့ပါသည်။
- သတ်မှတ်ချက်အချိုးအစားများအရ တိကျစွာ ချိန်တွယ်ပြီး နောက်တွင် ကုန်ကြမ်းအရောကို အပူပေးစနစ်ဖြင့် အပူပေးစက် ထဲတွင် ရောနှောပါသည်။
- ရောစပ်ပြီး အခြောက်ခံထားသည့် ကုန်ကြမ်းများအား ပုံသွင်းလိုင်း အတွင်းသို့ ထည့်သွင်းပြီးနောက် ရေဖြင့် အအေးခံစေကာ ဆွဲစက်ဖြင့်ဆွဲယူပြီး မိမိလိုအပ်သော အတိုင်းအတာကို အလိုအလျောက် ဖြတ်တောက်သည့် စက်ဖြင့် ဖြတ်တောက် ပါသည်။
- ဖြတ်တောက်ပြီးနောက် သတ်မှတ်သော အရွယ်အစား၊ အရည်သွေးကို စစ်ဆေးပြီး တံဆိပ်ကပ်ခြင်း၊ ထုတ်ပိုးခြင်း များကို ပြုလုပ်ပါသည်။





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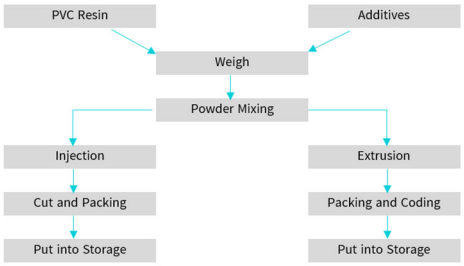
စီမံကိန်းသတင်းအချက်အလက်များ

ပိုက်ထုတ်လုပ်ခြင်းလုပ်ငန်းစဉ်

- PVC နှင့် အခြားကုန်ကြမ်းပစ္စည်းများကို အချိုးအစားအလိုက် ရောစပ်ပြီးနောက် ပုံသွင်းစက်အတွင်းသို့ထည့်၍ တစ်ဆင့်ပြီး တစ်ဆင့် ပုံသွင်းစေပါသည်။
- ပုံသွင်းပြီးပိုက်ချောင်းများကို ရေဖြင့် အအေးခံပြီးနောက် ဆွဲစက်ဖြင့်ဆွဲယူကာ ပိုက်ထုတ်လုပ်ခြင်း နောက်ဆုံးအဆင့် အနေဖြင့် ဖြတ်တောက်ခြင်းနှင့် ကုန်လျှောင်ရုံသို့ ပို့ဆောင်ခြင်းကို လုပ်ဆောင်ပါသည်။



ပိုက်ဆက်ပစ္စည်းများ ထုတ်လုပ်ခြင်း

- ပိုက်ဆက်ပစ္စည်းများ ထုတ်လုပ်ရာတွင် PVC ကုန်ကြမ်းများအား ပုံသွင်းစက်ထဲတွင် အပူချိန်နှင့် ဖိအားသုံးကာ အရည်ပျော်စေပြီးနောက် ပုံစံခွက်ထဲသို့ ထည့်၍အအေးခံ ပုံသွင်းထုတ်လုပ်ပါသည်။

SEM

စီမံကိန်းသတင်းအချက်အလက်များ

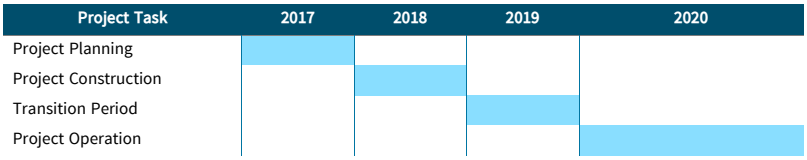
တံခါးရွက်နှင့် တံခါးထုတ်လုပ်ခြင်း

- PVC Profile ကို ဒီဇိုင်းဆွဲပြီး ဖြတ်စက်ဖြင့် လိုအပ်သည့် သတ်မှတ်ချက်များအတိုင်း တိတိကျကျဖြတ်ပါသည်။
- တံခါးဘောင်၊ တံခါးရွက်နှင့် အလယ်ဒေါက်များတွင် ရေစီးကြောင်းများနှင့် လေဖိအားပေါက်များ ပြုလုပ်ရန် ပုံဖော်စက်ကိုအသုံးပြုပါသည်။
- ပုံဖော်ပြီးသော တံခါး ပေါက်များကို V ပုံစံလွှဖြင့် ဖြတ်ပြီး အလယ်ဒေါက်ကို V-Slots ဖြင့်ဂဟေဆက်ပါသည်။
- GI Steel ချောင်းများကို PVC Profile ၏ မြောင်း (အခေါင်းပေါက်) တွင် အမာခံအနေဖြင့် ထည့်သွင်း အသုံးပြု ပါသည်။
- အပေါက်ဖေါက်စက်ကို အသုံးပြု၍ သော့ပေါက်နှင့် လက်ကိုင်ထည့်ရန် အပေါက်များ ပြုလုပ်ပါသည်။
- တံခါးနှင့်တံခါးရွက်များ၏ အမျိုးအစားအရ တံခါး၊ တံခါးရွက်၊ အလယ်ဒေါက်များကို ဂဟေဆက်ပါသည်။
- ချိတ်ဆက်ခြင်း၊ လိုအပ်သောပစ္စည်းများထည့်ခြင်း၊ မှန်ကပ်ကော်၊ အရွက်ဘေးကပ်များ၊ မှန်ထည့်ခြင်းများ စသည်ဖြင့် ပြုလုပ်ပါသည်။ အထက်ပါ လုပ်ငန်းများ ဆောင်ရွက်ပြီးနောက် ပြန်လည်စစ်ဆေးပြီး ပါကင်ပိတ်ကာ ဂိုထောင်သို့ ပို့၍ ပစ္စည်း သိမ်းဆည်းခြင်းများ ပြုလုပ်ပါသည်။

SEM

စီမံကိန်းသတင်းအချက်အလက်များ

စီမံကိန်း အကောင်အထည်ဖော်ဆောင်မှု အချိန်ဇယား



လုပ်သားအင်အားနှင့် အလုပ်ချိန်

လုပ်သားအင်းအား - ၁၀၄ ဦး

အလုပ်ချိန် - အလုပ်ချိန် တစ်ဆိုင်းလျှင် ၈ နာရီ

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်

- ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်၏ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ အပိုဒ် ၇ နှင့် နည်းဥပဒေ အပိုဒ် ၅၂၊ ၅၃ နှင့် ၅၄ အရ Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. သည် အဆိုပြုလုပ်ငန်းများအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းများကို ဆောင်ရွက်ရမည် ဖြစ်ပါသည်။
- ထို့ကြောင့် Myanmar Conch (Mandalay) Green Building Materials Co., Ltd. သည် အဆိုပြုစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ကို ဆောင်ရွက်၍ အစီရင်ခံစာအား တင်ပြသွားမည် ဖြစ်ပါသည်။
- အဆိုပါ စီမံကိန်း အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ကို အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ ဥပဒေများ၊ နည်းဥပဒေများ၊ လုပ်ထုံးလုပ်နည်းများနှင့် အညီ Sustainable Environment Myanmar (SEM) မှ ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်

❖ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၏ အပိုဒ် ၆၁ တွင် ဖော်ပြထားချက်အရ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း၏ အစိတ်အပိုင်းတစ်ရပ်အဖြစ် အများပြည်သူတိုင်ပင်ဆွေးနွေးခြင်း လုပ်ငန်းရပ်ကို ဆောင်ရွက်ရမည် ဖြစ်ပါသည်။

❖ ယခုအစည်းအဝေးပွဲကျင်းပရခြင်းသည်လည်း အများပြည်သူ တိုင်ပင်ဆွေးနွေးခြင်း လုပ်ငန်းရပ်၏ အစိတ်အပိုင်းတစ်ရပ်အဖြစ် လာရောက်တွေ့ဆုံရှင်းလင်းခြင်း ဖြစ်ပါသည်။ ဆွေးနွေးချက်များကိုလည်း အစီရင်ခံစာတွင် ထည့်သွင်း၍ ပြင်ဆင်သွားမည်ဖြစ်ပါသည်။

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စီမံကိန်းအဆိုပြုလွှာ တင်သွင်းခြင်း

လုပ်ငန်းစဉ်	လုပ်ငန်းဆောင်ရွက်နေမှု အခြေအနေ
EIA လုပ်ငန်း ဆောင်ရွက်ရန် ညွှန်ကြားမှု	လက်ခံရရှိပြီး
အဆိုပြုလွှာအား သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာနသို့ တင်ပြခြင်း။	ဆောင်ရွက်ပြီး
စီမံကိန်း အဆိုပြုသူမှ EIA ဆောင်ရွက်မည့် ကျွမ်းကျင်သူ ရွေးချယ်ခြင်း။	ဆောင်ရွက်ပြီး

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နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်း

လုပ်ငန်းစဉ်များ	လုပ်ငန်း ဆောင်ရွက်နေမှု အခြေအနေ
စီမံကိန်းဆိုင်ရာ သတင်းအချက်အလက်များ ထုတ်ဖော်ခြင်း	ဆောင်ရွက်ပြီး
နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာအတွက် လိုအပ်သော ပတ်ဝန်းကျင်ဆိုင်ရာ နှင့် လူမှုစီးပွားရေးဆိုင်ရာ ဆန်းစစ်လေ့လာမှုများ၊ စုံစမ်းစစ်ဆေးမှုများ ဆောင်ရွက်ခြင်း။	ဆောင်ရွက်ပြီး
စီမံကိန်းကြောင့် ထိခိုက်နိုင်သူများ၊ ဒေသခံပြည်သူနှင့် အုပ်ချုပ်ရေးအဖွဲ့များ၊ လူမှုရေး အဖွဲ့အစည်းများနှင့် တွေ့ဆုံဆွေးနွေး ညှိနှိုင်းမှုများ ဆောင်ရွက်ခြင်း။	ဆောင်ရွက်ပြီး
နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီအရင်ခံစာနှင့် EIA စုံစမ်းစစ်ဆေးခြင်းအတွက် ဆောင်ရွက်မည့် လုပ်ငန်းတာဝန်များ ပြုစုခြင်း/ ပြင်ဆင်ခြင်း။	ဆောင်ရွက်ပြီး
နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်း အစီရင်ခံစာအား သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာနသို့ တင်ပြခြင်း ။	ဆောင်ရွက်ပြီး
နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်း အစီအရင်ခံစာနှင့် ဆောင်ရွက်မည့် လုပ်ငန်းတာဝန်များအား သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာနမှ အတည်ပြုခြင်း။	အတည်ပြု ပြန်ကြားစာရရှိပြီး

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EIA စုံစမ်းစစ်ဆေးခြင်းနှင့် သုံးသပ်ခြင်း

လုပ်ငန်းစဉ်များ	လုပ်ငန်း ဆောင်ရွက်နေမှု အခြေအနေ
စီမံကိန်းဆိုင်ရာ အခြေခံအချက်အလက်များအား ကောက်ယူခြင်း၊ ဓါတ်ခွဲစမ်းသပ်ခြင်း။	ဆောင်ရွက်ပြီး
ပတ်ဝန်းကျင်ဆိုင်ရာနှင့် လူမှုရေးဆိုင်ရာ ထိခိုက်နိုင်မှုများကို ဆန်းစစ်လေ့လာမှုများ၊ စုံစမ်းစစ်ဆေးမှုများ ဆောင်ရွက်ခြင်း။	ဆောင်ရွက်ပြီး
EIA အစီရင်ခံစာ ပြုစုခြင်း/ ပြင်ဆင်ခြင်း နှင့် စီမံကိန်းကြောင့် ထိခိုက်နိုင်သူများ၊ ဒေသဆိုင်ရာလူထုနှင့် အုပ်ချုပ်ရေးအဖွဲ့များ၊ လူမှုရေး အဖွဲ့အစည်းများနှင့် တွေ့ဆုံဆွေးနွေး ညှိနှိုင်းမှုများ ဆောင်ရွက်ခြင်း။	ယခုလုပ်ငန်းစဉ်
EIA အစီရင်ခံစာအား သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာနသို့ တင်ပြခြင်း။	ဆက်လက်ဆောင်ရွက်ရန်
EIA အစီရင်ခံစာအား အများပြည်သူသိရှိအောင် ထုတ်ဖော်ခြင်း	ဆက်လက်ဆောင်ရွက်ရန်
ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာ အပေါ် သုံးသပ်ခြင်းနှင့် အတည်ပြုခြင်း	

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ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားရေးဆိုင်ရာ အခြေခံအချက်အလက်များ ကောက်ယူခြင်း

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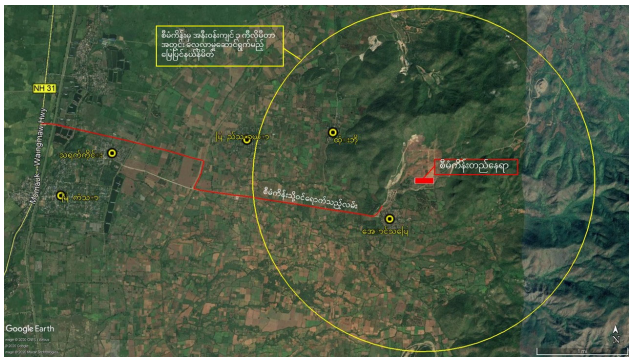
ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် ကောက်ယူသည့် ကွင်းဆင်းလေ့လာမှုများ

လေ့လာမှုအတွက် မြေပြင်နယ်နိမိတ်သတ်မှတ်ခြင်း

လေ့လာမှုဆောင်ရွက်မည့် မြေပြင်နယ်နိမိတ်အနေဖြင့် အဆိုပြုစီမံကိန်းမှ သက်ရောက်ခံရနိုင်သည့် ဇရိယာနှင့် စီမံကိန်းမှ အနီးဝန်းကျင် ၃ ကီလိုမီတာ အတွင်းရှိ ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဆိုင်ရာ အစိတ်အပိုင်းများအား လေ့လာမှုများ ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။



လေ့လာမှုအတွက် အချိန်မူဘောင်သတ်မှတ်ခြင်း

အဆိုပြုစီမံကိန်းအတွက် လေ့လာရမည့် အချိန်မူဘောင်အား (၁) တည်ဆောက်ခြင်း (၂) လုပ်ငန်းလည်ပတ်ဆောင်ရွက်ခြင်း (၃) စီမံကိန်း ပိတ်သိမ်းခြင်း စသည့် စီမံကိန်း အဆင့်များအတိုင်း လေ့လာသွားမည် ဖြစ်ပါသည်။

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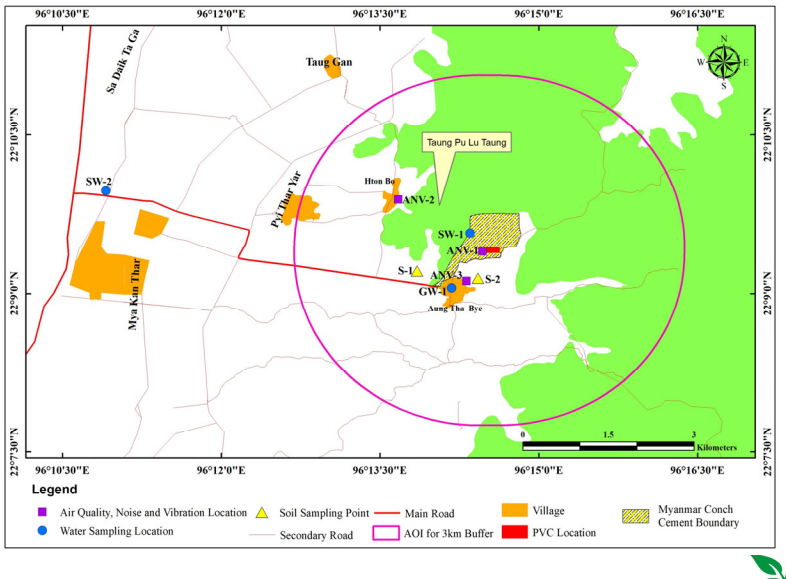
ရူပဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ ကောက်ယူခြင်း

နမူနာကောက်ယူ တိုင်းတာရာတွင် တိုက်ရိုက်တိုင်းတာခြင်းနှင့် ဓာတ်ခွဲခန်းစစ်ခြင်း နှစ်မျိုးလုံး ပါဝင်ပါသည်။

- လေအရည်အသွေး - ၃ နေရာ
- ဆူညံသံ - ၃ နေရာ
- တုန်ခါမှု - ၃ နေရာ
- မြေပေါ်ရေ အရည်အသွေး - ၂ နေရာ
- မြေအောက်ရေ အရည်အသွေး - ၁ နေရာ
- မြေအရည်အသွေး - ၂ နေရာ



SEM

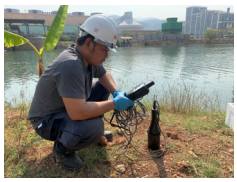
ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် ကောက်ယူသည့် ကွင်းဆင်းလေ့လာမှုများ

လေအရည်အသွေး၊ ဆူညံသံနှင့် တုန်ခါမှု၊ ရေအရည်အသွေး တိုင်းတာမှု ရလဒ်များမှာ အမျိုးသားပတ်ဝန်းကျင် ဆိုင်ရာအရည်အသွေး (ထုတ်လွှတ်မှု) စံချိန်စံညွှန်း အတွင်းတွင်သာ ရှိသည်ကို တွေ့ရှိရပါသည်။

Sampling No	Date	Time	CO	NO2	NO	PM2.5	PM10	RH	SO2	Tem °C
	D.M.Y	hours	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	%	µg/m3	°C
AQNV-1	25th-26th March	24hours	1665.30	98.74	3.53	6.78	11.42	77.67	9.97	29.25
AQNV-2	27th-28th March	24hours	413.96	46.15	1.96	6.00	27.62	26.48	11.29	24.10
AQNV-3	28th-29th March	24hours	1272.05	59.22	0.25	6.37	15.86	64.05	2.51	24.35
National Environmental Quality (Emission) Guideline			–	–	–	25	50	–	20	–

A Weighted Loudness Equivalent (Laeq) Level						
Result	N-1		N-2		N-3	
	Day	Night	Day	Night	Day	Night
	49	45	45	42	50	39
NEQG	55	45	55	45	55	45



ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် ကောက်ယူသည့် ကွင်းဆင်းလေ့လာမှုများ

ဇီဝမျိုးစုံမျိုးကွဲလေ့လာမှု

အဆိုပြုစီမံကိန်းဧရိယာအနီးတစ်ဝိုက်တွင် (၁) မြက်ခင်းများ ပေါက်ရောက်သောမြေ၊ (၂) စိုက်ပျိုးမြေ (၃) စိုက်ပျိုးခင်း (၄) အပင်ပေါက်ရောက်ခြင်း မရှိသောမြေနှင့် (၅) ချုံများပေါက်ရောက် သောမြေစသည့် အဓိက နေရင်းဒေသ ၅ မျိုးနှင့် ပင်မျိုးစိတ် ၅၈ မျိုးလည်း တွေ့ရှိရပါသည်။

ဇီဝမျိုးစုံမျိုးကွဲလေ့လာမှုများတွင် မျိုးစိတ်များကို အောက်ပါအတိုင်း တွေ့ရှိရပါသည်။

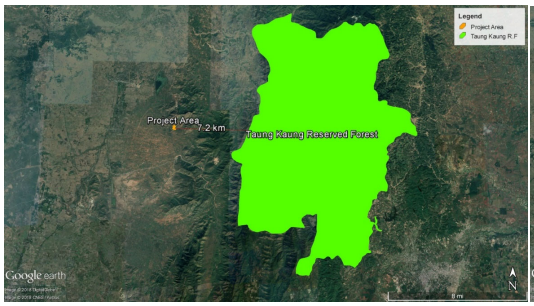
- ငှက်မျိုးစိတ် - ၄၃ မျိုး
- တွားသွားသတ္တဝါ မျိုးစိတ် - ၇ မျိုး
- နို့တိုက်သတ္တဝါ မျိုးစိတ် - ၆ မျိုး
- လိပ်ပြာမျိုးစိတ် - ၂၂ မျိုး
- ပုဇွန်မျိုးစိတ် - ၅ မျိုး

မျိုးသုဉ်းရန်အန္တရာယ်ရှိသော မျိုးစိတ်များ စာရင်း (IUCN Red List 2018-2) အရ ငှက်မျိုးစိတ်တစ်မျိုးအား လေ့လာသည့် ဧရိယာအတွင်းတွေ့ရှိခဲ့ပါသည်။ တွားသွားသတ္တဝါနှင့် ကုန်းနေရေနေ သတ္တဝါမျိုးစိတ်၊ လိပ်ပြာနှင့် ပုဇွန်မျိုးစိတ်များအား မျိုးသုဉ်းရန်အန္တရာယ်ရှိသော မျိုးစိတ်များစာရင်း (IUCN Red List) အရ တွေ့ရှိရခြင်းမရှိပါ။ ငှက်မျိုးစိတ် ၄ မျိုးမှာဒေသမျိုးရင်းဖြစ်ပြီး အခြား မျိုးစိတ်များမှာ ဒေသမျိုးရင်းများ မဟုတ်ပါ။

ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် ကောက်ယူသည့် ကွင်းဆင်းလေ့လာမှုများ

သဘာဝထိန်းသိမ်းရေးနယ်မြေများနှင့် ကာကွယ်ထားသောနေရာများ

အဆိုပြုစီမံကိန်းသည် တောင်ကောင်းကြိုးမဲ့တောမှ ၇.၂ ကီလိုမီတာအကွာနှင့် အမျိုးသားကန်တော်ကြီးဥယျာဉ် (ပြင်ဦးလွင်) မှ ၂၉ ကီလိုမီတာအကွာတွင် တည်ရှိပါသည်။



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ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် ကောက်ယူသည့် ကွင်းဆင်းလေ့လာမှုများ

လူမှုဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ ကောက်ယူခြင်း

လူမှုဝန်းကျင်လေ့လာမှုအနေဖြင့်

- ❖ အောင်သပြေ၊
- ❖ ထုံးဘိုနှင့်
- ❖ ပြည်သာယာကျေးရွာ ၃ ရွာတို့အား လေ့လာမေးမြန်းခဲ့ပါသည်။

လူမှုစီးပွားရေးဆိုင်ရာ အခြေခံအချက်အလက်များမှာ အများပြည်သူ သိရှိနိုင်ရန် ထုတ်ပြန်ထားသော အကြောင်းအရာများနှင့် ရှိနှင့်ပြီးသော အချက်အလက်များ အပါအဝင် စီမံကိန်းအတွက် ကောက်ယူထားသည့် အချက်အလက်များအပေါ် အခြေခံထားပါသည်။

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ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် ကောက်ယူသည့် ကွင်းဆင်းလေ့လာမှုများ

လူမှုစီးပွားရေး အခြေအနေ

<u>ရေအသုံးချမှု</u>

ရေသုံးစွဲမှုအနေဖြင့် အဝီစိတွင်းကိုအဓိကအသုံးပြုကြပြီး တွင်းရေအသုံးပြုမှုကိုလည်း တွေ့ရပါသည်။

<u>စွမ်းအင်</u>

လျှပ်စစ်မီးကို ချက်ပြုတ်ရာတွင်လည်းကောင်း အလင်းရောင်အတွက်သော်လည်းကောင်း အသုံးပြုကြပါသည်။ လျှပ်စစ်မီးပြတ်တောက်သည့်အချိန်တွင် ထင်းနှင့် မီးသွေးကို ချက်ပြုတ်ရာတွင် သုံးစွဲကြပါသည်။ အခြား စွမ်းအင်အသုံးပြုမှုမှာ မီးစက်နှင့် ဆိုလာတို့ ဖြစ်ပါသည်။

<u>ပညာရေး</u>

မူလွန်ကျောင်း၊ မူလတန်းကျောင်း၊ တွဲဖက် မူလတန်းကျောင်း နှင့် ဘုန်းတော်ကြီးသင် ပညာရေးကျောင်း တို့ရှိသည်ကို တွေ့ရှိရပါသည်။

<u>ဘာသာရေး</u>

ကျေးရွာများတွင် အဓိက ကိုးကွယ်သည့် ဘာသာမှာ ဗုဒ္ဓဘာသာ ဖြစ်ပါသည်။

SEM

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ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် ကောက်ယူသည့် ကွင်းဆင်းလေ့လာမှုများ

ကျန်းမာရေး

ကျန်းမာရေးအနေဖြင့် ရာသီအကူးအပြောင်းတွင် ဖြစ်တတ်သော ဖျားနာခြင်းကို အများဆုံးတွေ့ရပါသည်။ သွေးတိုး၊ နှလုံးရောဂါ များလည်း တွေ့ရှိရပါသည်။ အများစုမှာ မြကန်သာကျေးရွာရှိ ပုဂ္ဂလိက ဆေးပေးခန်းကို သွားရောက်လေ့ရှိပါသည်။ အခြားသူများမှာ မိမိရွာနှင့် နီးစပ်သည့် ဆေးပေးခန်းတို့ကို သွားရောက်သည်ကိုလည်း တွေ့ရပါသည်။

ယဉ်ကျေးမှု အမွေအနှစ်

လေ့လာခဲ့သည့် ကျေးရွာ ၃ ရွာနှင့် စီမံကိန်း၏ အနီးဝန်းကျင်တွင် ယဉ်ကျေးမှုအမွေအနှစ်စာရင်းဝင်သည့် စေတီပုထိုးများနှင့် အဆောက်အဦးများအား မတွေ့ရှိပါ။

SEM

ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် ကောက်ယူသည့် ကွင်းဆင်းလေ့လာမှုများ

အိမ်ထောင်စုစစ်တမ်းအတွင်း တွေ့ရှိခဲ့သော အဓိကစိုးရိမ်မှုများနှင့် ရလဒ်များမှာ

- စီမံကိန်းမှ အလုပ်အကိုင်အခွင့်အလမ်းများနှင့် ဖွံ့ဖြိုးတိုးတက်မှုများကို မျှော်လင့်ကြပါသည်။
- ကျေးရွာများရှိ လူမှုဖွံ့ဖြိုးရေးလုပ်ငန်းများတွင်လည်း ကူညီစေချင်ပါသည်။
- စီမံကိန်းမှ ပတ်ဝန်းကျင်ထိခိုက်မှုအစီရင်ခံစာပါ အချက်များအတိုင်း လိုက်နာဆောင်ရွက်စေချင်ပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

- စီမံကိန်းကြောင့် ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ ဆန်းစစ်ခြင်းကို သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာနမှ အတည်ပြုထားသော နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်း အစီအရင်ခံစာ အပေါ်မူတည်၍ လေ့လာ ဆန်းစစ်ထားပါသည်။#
- ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအား တည်ဆောက်ရေးအဆင့်၊ လုပ်ငန်းလည်ပတ်သည့်အဆင့်၊ လုပ်ငန်းပိတ်သိမ်းခြင်း အဆင့် စသည်ဖြင့် အဆင့်အလိုက် လေ့လာဆန်းစစ်မှုနှင့် အတူလျော့ပါးစေရေးနည်းလမ်းများ ကိုလည်း ဖော်ပြထားပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

လေထုအရည်အသွေး

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
စီမံကိန်း တည်ဆောက်ရေးအဆင့်	
• ဆောက်လုပ်ရေးသုံး စက်ကိရိယာများ၊ ယာဉ်များနှင့် သယ်ယူ ပို့ဆောင်ခြင်းမှ ဖုန်နှင့် ထုတ်လွှတ်မှုများ	• စီမံကိန်း ဆောက်လုပ်ရေးသုံးပစ္စည်းများ သယ်ယူပို့ဆောင်ရာတွင် အဖုံးအကာများဖြင့် သယ်ယူပို့ဆောင်ခြင်း • ခြောက်သွေ့ရာသီတွင် မခင်းထားသည့်လမ်းများ (မြေသားလမ်း စသည်) ပေါ်တွင် ယာဉ်များ သွားလာခြင်းမှ ဖုန်များ ထွက်ရှိမှုအား လျော့နည်းစေရန် ရေဖြန်းခြင်း • စီမံကိန်း ဧရိယာ အတွင်း ယာဉ်များမောင်းနှင်သည့် အရှိန်အား သတ်မှတ်ခြင်း • အသုံးပြုရန် မလိုအပ်သည့် အချိန်များတွင် ယာဉ်များ၊ စက်ပစ္စည်းများအား ရပ်နားထားခြင်း


ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

လေထုအရည်အသွေး

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
စီမံကိန်းလုပ်ငန်းလည်ပတ်သည့် အဆင့်	
• ကုန်ကြမ်းပစ္စည်းများ အတင်အချ ပြုလုပ်ခြင်းမှ အမှုန်များ ထွက်ရှိမှု	• ကုန်ကြမ်းပစ္စည်းများအား အတင်အချ ပြုလုပ်ရာတွင် အမှုန်များ အပြင်ဘက်သို့ ပြန့်လွင့်မှု မရှိစေရန် စက်ရုံ အဆောက်အဦး အတွင်းတွင်သာ ပြုလုပ်ခြင်း
• ကုန်ကြမ်းပစ္စည်း ချိန်တွယ်တိုင်းတာခြင်းမှ အမှုန်များ ထွက်ရှိမှု	• ကုန်ကြမ်းပစ္စည်း ချိန်တွယ်တိုင်းတာခြင်းမှ အမှုန်များထွက်ရှိမှုအား လျော့ချရန် ဖုန်/အမှုန်စုပ်စက်များ တပ်ဆင်ခြင်း
• ရောစပ်ပြီး ကုန်ကြမ်းပစ္စည်းများ စက်ရုံအတွင်း သယ်ယူပို့ဆောင်ခြင်းမှ အမှုန်များ ထွက်ရှိမှု	• ရောစပ်ပြီး ကုန်ကြမ်းပစ္စည်းများ စက်ရုံအတွင်း သယ်ယူပို့ဆောင်ရာတွင် အမှုန်များ ပြန့်လွင့်မှု မရှိစေရန် လေလုံပြီး အမှုန် မထွက်ရှိနိုင်သော ပိုက်လိုင်းများဖြင့် ပို့ဆောင်ခြင်း
• ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်မှ အခြားထုတ်လွှတ်မှု	• လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး အတွက် ထုတ်လုပ်မှုအလုပ်ရုံတွင် လေဝင်လေထွက်ကိရိယာ (ventilation equipment) များ တပ်ဆင်ခြင်း


ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

ဆူညံသံနှင့် တုန်ခါမှု

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
စီမံကိန်း တည်ဆောက်ရေးအဆင့်	
• ဆောက်လုပ်ရေးလုပ်ငန်းသုံး စက်ပစ္စည်းများနှင့် ဆောက်လုပ်ရေးလုပ်ငန်းများမှ ဆူညံသံများ	• ဆူညံသံ သက်ရောက်မှုမှ လျော့နည်းစေရန် ဆောက်လုပ်ရေးလုပ်ငန်းများ ဆောင်ရွက်မည့် အချိန် သတ်မှတ်ခြင်း • စီမံကိန်းတွင် အသုံးပြုသည့် ယာဉ်များ၊ စက်ပစ္စည်းများအား ပုံမှန် ထိန်းသိမ်းပြုပြင်ခြင်း၊ စက်ပစ္စည်းပါ သတ်မှတ်ချက်များအတိုင်း အသုံးပြုခြင်း • အသုံးပြုရန် မလိုအပ်သည့် အချိန်များတွင် ယာဉ်များ၊ စက်ပစ္စည်းများအား ရပ်နားထားခြင်း
စီမံကိန်းလုပ်ငန်းလည်ပတ်သည့် အဆင့်	
• ကုန်ထုတ်လုပ်မှု စက်ပစ္စည်းများမှ ဆူညံသံများ	• အသံဆူညံသောကိရိယာများအနီးတွင် အကာအရံများ တပ်ဆင်ခြင်း • ဆူညံသံကာကွယ်ရေးကိရိယာများ (နားကြပ် စသည်) ကို အလုပ်သမားများအား ပံ့ပိုးပေးခြင်း • ဆူညံသံထွက်ရှိမှု အဆင့်အား EQEG ပါ သတ်မှတ်ချက်များထက် ကျော်လွန်မှု မရှိစေရန် ဆောင်ရွက်ခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

ရေအရည်အသွေး

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
စီမံကိန်း တည်ဆောက်ရေးအဆင့်	
• စက်သုံးဆီများ ယိုဖိတ်ခြင်း၊ စက်ပစ္စည်းများ ဆေးကြောခြင်း	• စက်သုံးဆီများ ယိုဖိတ်ခြင်း မရှိစေရန် စက်ပစ္စည်းနှင့် ယာဉ်များအား ပုံမှန် စစ်ဆေးခြင်း၊ စက်သုံးဆီများအား ကောင်းမွန်စွာ သိုလှောင်ထားခြင်း • စက်ပစ္စည်းများအား သတ်မှတ်နေရာ (workshop) တွင်သာ ဆေးကြောသန့်စင်ခြင်း
စီမံကိန်းလုပ်ငန်းလည်ပတ်သည့် အဆင့်	
• ထုတ်လုပ်မှု လုပ်ငန်းစဉ်မှ စွန့်ပစ်ရေထွက်ရှိမှု	• ထုတ်လုပ်မှုလုပ်ငန်းစဉ်တွင် အအေးခံရန် အတွက်သာ ရေကို အသုံးပြုပြီး စွန့်ပစ်ရေထွက်ရှိမှု မရှိပါ
• အလုပ်သမားအိမ်ယာမှ မိလ္လာရေထွက်ရှိမှု	• အလုပ်သမားအိမ်ယာမှ ထွက်ရှိသည့် မိလ္လာရေများအား မိလ္လာကန် (မိလ္လာသန့်စင်စနစ်) အတွင်းသို့ ပိုက်များမှတစ်ဆင့် စွန့်ပစ်ခြင်း


Domestic Sewage Treatment Equipment

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

စွန့်ပစ်ပစ္စည်း

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
စီမံကိန်း တည်ဆောက်ရေးအဆင့်	
• ဆောက်လုပ်ရေးလုပ်ငန်းမှ စွန့်ပစ်ပစ္စည်းများ ထွက်ရှိမှု	• ဆောက်လုပ်ရေးလုပ်ငန်းမှ ထွက်ရှိသော ပြန်အသုံးပြုနိုင်သည့် ပစ္စည်းများအား ပြန်လည် အသုံးပြုခြင်း၊ ရောင်းချခြင်း • လူသုံးစွန့်ပစ်ပစ္စည်းများအား အမှိုက်ပုံးများ ထားရှိ စုဆောင်း၍ သတ်မှတ်နေရာသို့ စွန့်ပစ်ခြင်း
စီမံကိန်းလုပ်ငန်းလည်ပတ်သည့် အဆင့်	
• ထုတ်လုပ်မှုလုပ်ငန်းစဉ်မှ ကျန်ရှိသည့် ဖြတ်စများနှင့် ချွတ်ယွင်းချက်ရှိသည့် ပစ္စည်းများ	• ထုတ်လုပ်မှုလုပ်ငန်းစဉ်မှ ကျန်ရှိသည့် ဖြတ်စများနှင့် ချွတ်ယွင်းချက်ရှိသည့် ပစ္စည်းများအား ကြိတ်ခွဲ၍ ပြန်လည် အသုံးပြုခြင်း
• လူသုံးစွန့်ပစ်ပစ္စည်းများ	• လူသုံးစွန့်ပစ်ပစ္စည်းများအား အမှိုက်ပုံးများ ထားရှိ စုဆောင်း၍ သတ်မှတ်နေရာသို့ စွန့်ပစ်ခြင်း
• အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများ	• အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများအား သက်ဆိုင်ရာ လမ်းညွှန်ချက်များနှင့် အညီ စနစ်တစ်ကျ ကိုင်တွယ်၊ သိုလှောင် စွန့်ပစ်ခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

ဇီဝမျိုးစုံမျိုးကွဲ

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
စီမံကိန်း တည်ဆောက်ရေးအဆင့်	
• ဆောက်လုပ်ရေးလုပ်ငန်းများကြောင့် သဘာဝ ပေါက်ပင်များနှင့် နေရင်းဒေသများ အပေါ် သက်ရောက်မှု	• စက်ရုံဝန်းအတွင်း သစ်ပင်ကြီးများအား ထိန်းသိမ်းထားခြင်းနှင့် သစ်ပင်များပြန်လည် စိုက်ပျိုးခြင်း • ယာယီ လုပ်ငန်းဆောင်ရွက်ပြီးသည့် နေရာများအား သစ်ပင်များ ပြန်လည်စိုက်ပျိုးခြင်း • အဆိုပြုအဆောက်အဦး တည်ဆောက်ရန်အတွက် လိုအပ်သော မြေနေရာကိုသာ ရှင်းလင်းခြင်း
စီမံကိန်းလုပ်ငန်းလည်ပတ်သည့် အဆင့်	
• စီမံကိန်းလုပ်ငန်း လည်ပတ်ခြင်းကြောင့် သဘာဝ ပေါက်ပင်များနှင့် နေရင်းဒေသများ အပေါ် သက်ရောက်မှု	• သဘာဝ ပေါက်ပင်များနှင့် နေရင်းဒေသများ အပေါ် သက်ရောက်မှု မရှိစေရန် ပတ်ဝန်းကျင်ညစ်ညမ်းမှုများကို လျော့ချခြင်း သို့မဟုတ် ကာကွယ်ခြင်းနှင့် ပတ်ဝန်းကျင်အရည်အသွေးကို စောင့်ကြည့်ခြင်း • သက်ဆိုင်ရာဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများကို လိုက်နာဆောင်ရွက်ခြင်း

ALPHA CONSTRUCTION MATERIAL
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ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

လူမှုစီးပွားရေး

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
• အလုပ်အကိုင် အခွင့်အလမ်းများ ရရှိမှု	• စီမံကိန်း အနီးဝန်းကျင်ရှိ ဒေသခံများအား အလုပ်အကိုင် အခွင့်အလမ်း ဖန်တီးမှုများ ဆောင်ရွက်ပေးခြင်း
• ကျန်းမာရေးဆိုင်ရာ ဝန်ဆောင်မှုများ အပေါ်တွင် သက်ရောက်မှု	• အလုပ်ခွင် အတွင်း ကောင်းမွန်သော သန့်ရှင်းရေး အလေ့အထများ ထားရှိခြင်း၊ အရေးပေါ် ကျန်းမာရေး ကိစ္စများအတွက် ဆေးဝါး အထောက်အကူများ ထားရှိခြင်း
• ပြောင်းရွှေ့လာသော အလုပ်သမားများနှင့် ဒေသခံများ အကြား လူမှုရေးရာ ပြဿနာများ	• လုပ်ငန်းခွင်စည်းကမ်းများ ချမှတ်ခြင်းနှင့် တင်းကြပ်စွာ လိုက်နာမှုရှိစေရန် ဆောင်ရွက်ခြင်း
• အခြေခံအဆောက်အဦများနှင့် ဒေသဖွံ့ဖြိုးတိုးတက်မှုအပေါ် သက်ရောက်မှု	• CSR အစီအစဉ်များ အကောင်အထည်ဖော် ဆောင်ရွက်မှုနှင့် ဆောင်ရွက်ထားရှိသည့် CSR လုပ်ငန်းစဉ်များအား မှတ်တမ်း အထောက်အထားများ ထားရှိခြင်း
• မကျေနပ်ချက် တိုင်ကြားမှုများ	• မကျေနပ်ချက် တိုင်ကြားမှု လက်ခံဖြေရှင်းရေး လုပ်ငန်းစဉ်များ ချမှတ် အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်း

SEM

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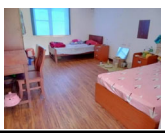
ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
• ဖုန်မှုန့်၊ အပူ၊ ဆူညံသံ၊ ရုပ်ပိုင်းဆိုင်ရာ ဘေးအန္တရာယ်နှင့် ဓါတုပစ္စည်းများကြောင့် လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးကို သက်ရောက်မှု	• ဘေးကင်းအန္တရာယ် ကင်းရှင်းရေး၊ ကျန်းမာရေးနှင့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု စနစ်ကို အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်း • ဘေးကင်းအန္တရာယ် ကင်းရှင်းရေး၊ လုံခြုံရေး၊ ကျန်းမာရေး အတွက် တစ်ကိုယ်ရည်သုံး ကာကွယ်ရေး ပစ္စည်းများအသုံးပြုစေခြင်း • အပူချိန်များသောနေရာများတွင် အလုပ် လုပ်ကိုင်ရန်ရှိပါက အလုပ်ချိန်ကို လျော့ချပေးခြင်း • လုပ်သမားများအား ဘေးကင်းအန္တရာယ် ကင်းရှင်းရေး၊ လုံခြုံရေးနှင့် ကျန်းမာရေးအတွက် စွမ်းဆောင်ရည်မြင့် သင်တန်းများပေးခြင်း • စီမံကိန်းလုပ်သားများအတွက် ကောင်းမွန်သန့်ရှင်းသောရေ၊ မိလ္လာစနစ်များပါဝင်သော နေရာထိုင်ခင်းများစီမံပေးခြင်း • အရေးပေါ် ကိစ္စရပ်များအတွက် ဆေးဝါး အထောက်အကူများ ထားရှိခြင်း • ကျန်းမာရေးအခြေအနေအား ပုံမှန် စစ်ဆေးပေးခြင်း




SEM

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

အများပြည်သူကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး

ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ	သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ
• စီမံကိန်းအဆောက်အဦများခိုင်ခန့်မှု၊ မီးလောင်ခြင်း (သို့) ပေါက်ကွဲခြင်း၊ ယာဉ်တိုက်မှုဘေးအန္တရာယ်	• စီမံကိန်းအဆောက်အဦများကို ငလျင်ဒဏ်နှင့် သဘာဝဘေးအန္တရာယ် ခံနိုင်သောဒီဇိုင်းဖြင့် ဆောက်လုပ်ထားခြင်း • မီးဘေးကာကွယ်သည့် ကိရိယာများ၊ မီးသတ်ဆေးဘူးများနှင့် မီးလောင်မှုအချက်ပြစနစ်များအား အဆောက်အဦးတွင် တပ်ဆင်ထားခြင်း • ယာဉ်သွားလာမှု စီမံခန့်ခွဲမှု စနစ်အား အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်း



ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှုရေးအစီအစဉ်

- ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် ရည်ရွယ်ချက်များ၊ ဥပဒေဆိုင်ရာ သတ်မှတ်ချက်များ၊ အဖွဲ့အစည်းဆိုင်ရာ တာဝန်ယူမှုများ၊ မြေပုံနှင့် ဓာတ်ပုံများ၊ အကောင်အထည်ဖော်မည့် စီမံခန့်ခွဲရေးလုပ်ငန်းများ၊ စောင့်ကြပ်ကြည့်ရှုရေး စီမံချက်များနှင့် ခန့်မှန်းကုန်ကျစရိတ် အစရှိသည်တို့ ပါဝင်လျက် ရေးဆွဲသွားမည် ဖြစ်ပါသည်။
- ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ခွဲများ အနေဖြင့် -
  - လေထုအရည်အသွေးစီမံခန့်ခွဲမှုအစီအစဉ်
  - ဆူညံသံနှင့်တုန်ခါမှုစီမံခန့်ခွဲမှုအစီအစဉ်
  - ရေအရည်အသွေးစီမံခန့်ခွဲမှုအစီအစဉ်
  - မြေအရည်သွေးစီမံခန့်ခွဲမှုအစီအစဉ်
  - စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ်
  - ဇီဝမျိုးစုံမျိုးကွဲဆိုင်ရာစီမံခန့်ခွဲမှုအစီအစဉ်
  - လူမှုစီးပွားရေးစီမံခန့်ခွဲမှုအစီအစဉ်
  - လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး စီမံခန့်ခွဲမှုအစီအစဉ်
  - အများပြည်သူကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး စီမံခန့်ခွဲမှုအစီအစဉ်
  - ယာဉ်သွားလာမှုနှင့် ယာဉ်မတော်တဆမှု လျော့နည်းစေရေး စီမံခန့်ခွဲမှုအစီအစဉ်
  - စက်ပစ္စည်းများ ထိန်းသိမ်းပြုပြင်ရေး အစီအစဉ်
  - အရေးပေါ်တုန့်ပြန်ရေးအစီအစဉ်
  - CSR အစီအစဉ်
  - Grievance Redress Mechanism

ဆက်လက်ဆောင်ရွက်မည့် အစီအစဉ်များနှင့် ဆက်သွယ်ရန် လိပ်စာ

ဆက်လက်ဆောင်ရွက်မည့် အစီအစဉ်များ

- ယနေ့အစည်းအဝေး၏ အကြံပြုချက်များကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းတွင် ထည့်သွင်းစဉ်းစား၍ ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့ပါးစေရေးနည်းလမ်းများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) နှင့်အတူ စောင့်ကြပ်ကြည့်ရှုရေးနည်းလမ်းများအား ရေးဆွဲဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ တင်ပြမည်ဖြစ်ပါသည်။
- စီမံကိန်းဆိုင်ရာ သတင်းအချက် အလက်များအား ထုတ်ပြန်ကြေငြာခြင်းကို မီဒီယာများနှင့် အများပြည်သူစုဝေးရာနေရာများ သို့မဟုတ် စီမံကိန်း အဆိုပြုသူ website တွင်လည်းကောင်း ထုတ်ပြန် ကြေငြာသွားပါမည်။

ဆက်သွယ်ရန် လိပ်စာ

ကုမ္ပဏီအမည်	မြန်မာကွန့်ချ် (မန္တလေး) Green Building Materials ကုမ္ပဏီလိမိတက်
လိပ်စာ	အမှတ်-၄၆၅(ခ/၂)၊ ဒဟတ်တောကျေးရွာအုပ်စု၊ ဆူးခေါက်နက်အရှေ့၊ ပုသိမ်ကြီးမြို့နယ်၊ မန္တလေးတိုင်းဒေသကြီး။
ဆက်သွယ်ရမည့်ပုဂ္ဂိုလ်	ဦးမျိုးဝင်း
ဆက်သွယ်ရမည့် ဖုန်းနံပါတ်	၀၉၇၈၀၈၇၇၈၈၇
အီးမေးလ်	unplugged07@gmail.com

ALPHA
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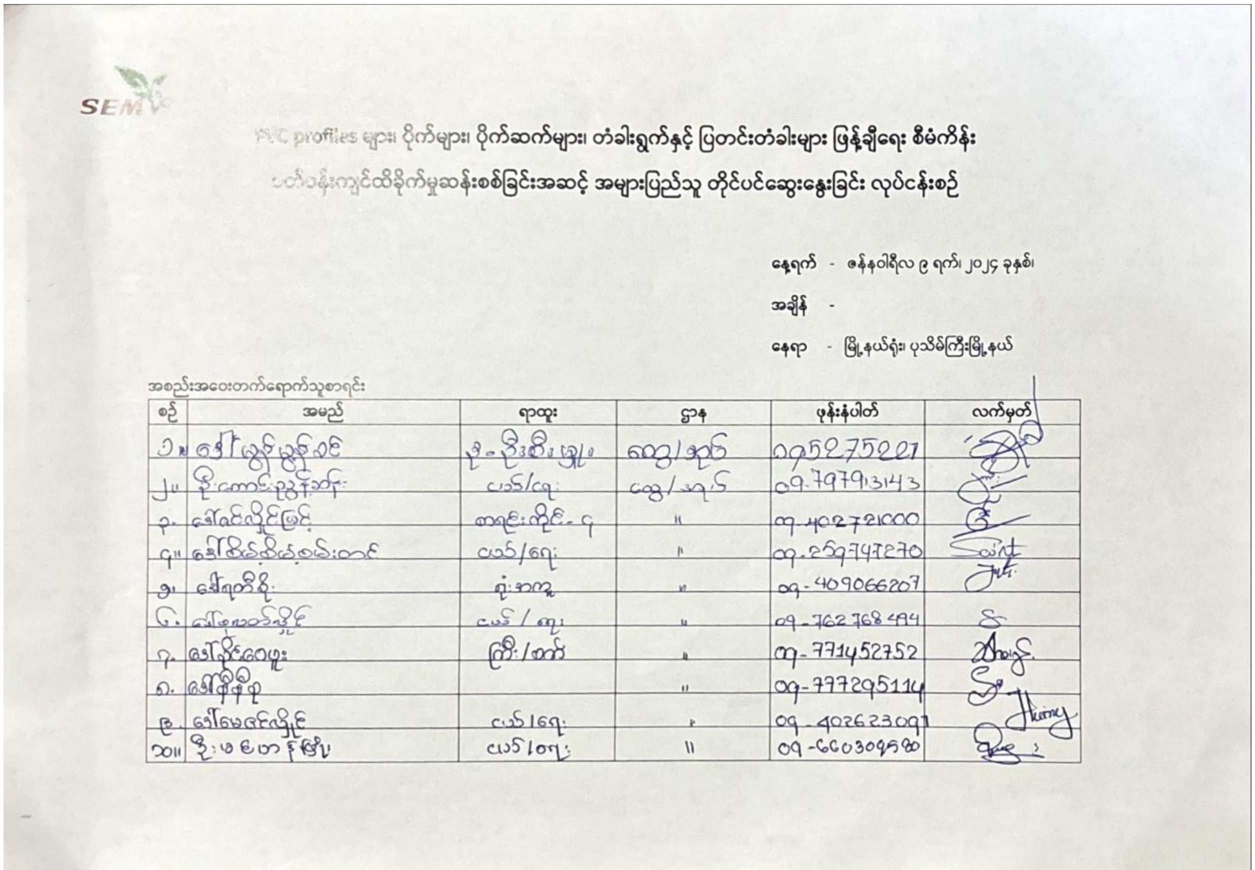
ကျေးဇူးအထူးတင်ရှိပါသည်။

SEM

Attendee List



SEM

PVC profiles များ၊ ပိုက်များ၊ ပိုက်ဆက်များ၊ တံခါးရွက်နှင့် ပြတင်းတံခါးများ ဖြန့်ချီရေး စီမံကိန်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အများပြည်သူ တိုင်ပင်ဆွေးနွေးခြင်း လုပ်ငန်းစဉ်

နေ့ရက် - ဇန်နဝါရီလ ၉ ရက်၊ ၂၀၂၄ ခုနှစ်၊

အချိန် -

နေရာ - မြို့နယ်ရုံး၊ ပုသိမ်ကြီးမြို့နယ်

အစည်းအဝေးတက်ရောက်သူစာရင်း

စဉ်	အမည်	ရာထူး	ဌာန	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဒေါ်ထွေးထွေးဝင်း	ဒု-ဦးစီးမှူး	[illegible]	0952752217	
၂။	ဦးကောင်းထွန်းဘိုး	ယာ/ရေး	[illegible]	09-797913143	
၃.	ဒေါ်ဝင်းလှိုင်မြင့်	စာရေး-ကိုင်-၄	〃	09-402721000	
၄။	ဒေါ်စိမ်းစိမ့်စမ်းတင်	ယာ/ရေး	〃	09-259747270	
၅။	ဒေါ်ရတီနိုး	ရုံးအကူ	〃	09-409066207	
၆.	ဒေါ်ရွှေသဇင်လှိုင်	ယာ/ရေး	〃	09-762768494	
၇.	ဒေါ်နိုင်ဝေဖူး	ကြီး/စာ	〃	09-771452752	
၈.	ဒေါ်ခိုခိုထူ		〃	09-777295114	
၉.	ဒေါ်မေဇင်လှိုင်	ယာ/ရေး	〃	09-402623097	
၁၀။	ဦးဖမင်းဟန်ဖြိုး	ယာ/ရေး	〃	09-660309580	

PVC profiles များ၊ ပိုက်များ၊ ပိုက်ဆက်များ၊ တံခါးရွက်နှင့် ပြတင်းတံခါးများ ပြန်ချိုရေး စီမံကိန်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အများပြည်သူ တိုင်ပင်ဆွေးနွေးခြင်း လုပ်ငန်းစဉ်

နေ့ရက် - ၉ ရက်၊ ဇန်နဝါရီလ၊ ၂၀၂၄
အချိန် -
နေရာ - မြို့နယ်ရုံး၊ ပုသိမ်ကြီးမြို့နယ်

အစည်းအဝေးတက်ရောက်သူစာရင်း

စဉ်	အမည်	အလုပ်အကိုင်	ကျေးရွာ	ဖုန်းနံပါတ်	လက်မှတ်
1	ဦးဘဇပေါက်	တောင်သူ	အောင်သာပြေ	[illegible]	[signature]
2	ဦးစိန်ခွာသစ်	"	အောင်သာပြေ	[illegible]	[signature]
3	ဦးဝေဇင်းအောင် "	"	မြသွင်သာယာ	09740806390	[signature]
4	ဦးလှဝင်း	"	ဇေတဝန်သာပြေ	09798885269	[signature]
5	ဦးခင်အေးညွန့်	"	ထုံးဘို	09.755816267	[signature]
6	" ငွေလှိုင်	"	အောင်သာပြေ	09.789194473	[signature]
7	" အောင်မြွေ	"	"	09.756335021	[signature]
8	ဦးဟန်ဇော်လင်း	မြင်ကျေးလက်	Alpha စက်ရုံ	09.740946487	[signature]

SEM

PVC profiles များ၊ ပိုက်များ၊ ပိုက်ဆက်များ၊ တံခါးရွက်နှင့် ပြတင်းတံခါးများ ဖြန့်ချီရေး စီမံကိန်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အများပြည်သူ တိုင်ပင်ဆွေးနွေးခြင်း လုပ်ငန်းစဉ်

နေ့ရက် - ဇန်နဝါရီလ ၉ ရက်၊ ၂၀၂၄ ခုနှစ်၊

အချိန် -

နေရာ - မြို့နယ်ရုံး၊ ပုသိမ်ကြီးမြို့နယ်

အစည်းအဝေးတက်ရောက်သူစာရင်း

စဉ်	အမည်	ရာထူး	ဌာန	ဖုန်းနံပါတ်	လက်မှတ်
၁၁	ဒေါ်မြမဥ[illegible]	ကြီး / ဗား	[illegible]	၀၉-၄၀၂၅၅၃၆၂၉	
၁၂	ဒေါ်[illegible]	–	〃	၀၉-၆၀၁၀၇၈၆၅၂	
၁၃	ဒေါ်[illegible]	–	〃	–	
၁၄	ဦး[illegible]	[illegible]	〃	၀၉-[illegible]	
၁၅	ဒေါ်[illegible]	[illegible]	〃	၀၉-[illegible]	

SEM

PVC profiles များ၊ ပိုက်များ၊ ပိုက်ဆက်များ၊ တံခါးရွက်နှင့် ပြတင်းတံခါးများ ဖြန့်ချီရေး စီမံကိန်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အများပြည်သူ တိုင်ပင်ဆွေးနွေးခြင်း လုပ်ငန်းစဉ်

နေ့ရက် - ဇန်နဝါရီလ ၉ ရက်၊ ၂၀၂၄ ခုနှစ်၊

အချိန် -

နေရာ - မြို့နယ်ရုံး၊ ပုသိမ်ကြီးမြို့နယ်

အစည်းအဝေးတက်ရောက်သူစာရင်း

စဉ်	အမည်	ရာထူး	ဌာန	ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦး [illegible]ဝင်း	[illegible]	Myanmar Conch	09786087787	
၂	ဦးအောင်မြင့်	[illegible]	[illegible] မြင့်	09-762003180	
၃	ဦး [illegible]	[illegible]	Myanmar Conch	771946666	
၄	ဦး ဟန်[illegible]လင်း	[illegible]	Myanar Conch	09-740946487	

Appendix – D

Grievance Sample Form

အများပြည်သူ မကျေနပ်မှုတိုင်ကြားရေး နမူနာပုံစံ

ရည်ညွှန်းနံပါတ်	
အမည်အပြည့်အစုံ	
ဆက်သွယ်ရန် အချက်အလက် ကျေးဇူးပြု၍ ဆက်သွယ်လိုသည့် ပုံစံအား ရွေးချယ်ပါ (စာ၊ တယ်လီဖုန်း၊ အီးမေးလ်)	□ စာတိုက်မှ တစ်ဆင့် - ပေးပို့ရမည့် လိပ်စာအား ဖြည့်စွက်ရန် _____ _____ _____ □ ဖုန်း _____ □ အီးမေးလ်(E-mail) _____
ဆက်သွယ်ရန် အတွက် အသုံးပြုလိုသည့် ဘာသာစကား	□ မြန်မာဘာသာ □ အင်္ဂလိပ်ဘာသာ □ အခြား
ဖြစ်စဉ် သို့မဟုတ် မကျေနပ်မှု ဖော်ပြချက်	ဘာဖြစ်တာလဲ? ဘယ်မှာ ဖြစ်တာလဲ? ဘယ်သူ့ကို ဖြစ်ပျက်ခဲ့တာလဲ? ပြဿနာရဲ့ ရလာဒ်က ဘာလဲ?
အဖြစ်အပျက်/ မကျေနပ်ချက် အကြောင်းကြားသည့် ရက်စွဲ	
	□ တစ်ကြိမ် အဖြစ်အပျက်/ မကျေနပ်ချက် (နေ့စွဲ_____) □ တစ်ကြိမ်ထက် ပိုပြီး ဖြစ်ခဲ့သည် (အကြိမ်ပေါင်း မည်မျှ?_____) □ လက်ရှိ (ကြုံနေရသော ပြဿနာ)
ပြဿနာပြေလည်စေရန် မည်ကဲ့သို့ ဖြစ်စေချင်သလဲ?	

လက်မှတ် - _____

နေ့စွဲ - _____

ပြန်လည်ပေးပို့ရန် -

ဆက်သွယ်ရန် အမည်နှင့် ရာထူး - _____

လိပ်စာ - _____

တယ်လီဖုန်း - _____

အီးမေးလ် - _____