

MYANMAR SHING SHING METAL COMPANY LIMITED

**INITIAL ENVIRONMENTAL EXAMINATION REPORT
FOR**

**Antimony Ingot Manufacturing
(Antimony Smelting and Refinery)**

Prepared by

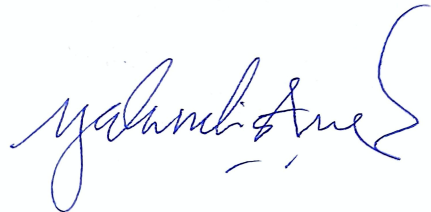
OLIVE BRIGHT ENVIRONMENTAL SOLUTIONS LIMITED



May, 2025

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ဒေါ်ရတနာလင်းအောင်
မန်းနေဂျင်းဒါရိုက်တာ
မြန်မာရှင်းရှင်းမတ်တယ်ကုမ္ပဏီလီမိတက်

CONSULTANT DECLARATION

We, Olive Bright Environmental Solutions, a local environmental consultant firm, conducted environmental impact assessment and support the professional implementation services to prepare the Initial Environmental Examination Report (IEE) for the Myanmar Shing Shing Metal Company Limited in compliance with EIA Procedure and other relevant laws/rules and formally submitted to the Environmental Conservation Department (ECD) for approval.

We do state that we intend to advance the environmental management and monitoring activities during our services provision within our sphere of influence, and make a clear statement of this commitment to our stakeholders and general public.

We shall undertake all the activities of our consultation services confirming that:

- a) the accuracy and completeness of the IEE Report;
- b) the Scoping Report has been prepared in strict compliance with applicable laws including this procedure; and
- c) the Project will at all times comply fully with the commitments, mitigation measures, stated in the IEE Report.

Sincerely,



Dr. Lai Lai Win (EIA-C 019/2023)

Director

Olive Bright Environmental Solutions Limited (EIA-CO(A)002/ 2023)

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ABBREVIATION AND ACRONYMS

AAFD	Alberta, Agriculture, Food and Development
AD	Adjuskey
ADB	Asia Development Bank
ADG	Average Daily Gain
AI	Artificial Insemination
ART	Atrophic Rhinitis
BOD5	Biological Oxygen Demand
°C	Celsius
CH4	Methane
CO	Carbon Monoxide
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
COVID-19	Coronavirus Disease 2019
CSF	Classical Swine Fever
CSR	Corporate Social Responsibility
dB	Decibels
DD	Data Deficient
DO	Dissolved Oxygen
ECC	Environmental Compliance Certificate
ECD	Environmental Conservation Department
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
EN	Endangered
ESMMP	Environmental and Social Management and Monitoring Plan
FCR	Feed Consumption Rate
FMD	Food and Mouth Disease
GAD	General Administration Department
GDU	Gilt Development Unit
GIS	Geographic Information System
GPS	Global Positioning System
Ha	Hectare
Hz	Hertz

IEC	International Electrotechnical Commission
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IGES	Institute of Global Environmental Strategies
INGO	International Non-governmental Organization
ISO	International Organization for Standardization
IUCN	International Union for Conservation of Nature
kg	Kilogram
kVA	Kilovolt-ampere
LC	Least Concern
Leq/LAeq	Equivalent Continuous Sound Level
LOD	Lower Limit of Detection
Lux	Light Intensity
µg/m ³	Micrograms Per Cubic Meter
MDH	Minnesota Department of Health
Mg/l	Milligrams Per Liter
MIMU	Myanmar Information Management Unit
Mm/s	Millimeters Per Second
MNDWQS	Myanmar National Drinking Water Quality Standard
MOECAF	Ministry of Environmental Conservation and Forestry
MONREC	Ministry of Natural Resources and Environmental Conservation
MOS	Metal Oxide Semi-conductor
MPN	Most Probable Number
MSL	Mean Sea Level
NAQQS	National Ambient Air Quality Standards
ND	Not Detected
NE	Non-Evaluated
NDIR	Non-dispersive Infrared Sensor
NECC	National Environmental Conservation Committee
NEQEG	National Environmental Quality Emission Guidelines
NG	No Guideline
NGO	Non-governmental Organization
Nm ³	Normal Cubic Meter
NO ₂	Nitrogen Dioxide
NT	Near Threatened

NTC	Negative Temperature Coefficient
O3	Ozone
OHS	Occupational Health and Safety
PAPs	Project Affected Persons
Parvo	Parvovirus
PDCA	Plan-Do-Check-Act
PM	Particulate Matter
PPAH	Pollution Prevention and Abatement Handbook
PPB	Parts Per Billion
PPE	Personal Protective Equipment
PPM	Parts Per Million
PPV	Peak Particle Velocity
PRRS	Porcine Reproductive & Respiratory Syndrome
SO2	Sulfur Dioxide
SSE	South-Southeast
SSW	South-Southwest
TBS	Total Business Solution Co., Ltd.
TDS	Total Dissolved Solids
ToR	Terms of Reference
TSS	Total Suspended Solid
USA	United States of America
USEPA	United State of Environmental Protection Agency
V	Traffic Volume
VU	Vulnerable
VOCs	Volatile Organic Compounds
WB	World Bank
WHO	World Health Organization
WWTP	Wastewater Treatment Plant

အစီရင်ခံစာအကျဉ်းချုပ်

စီမံကိန်းအကြောင်းအရာ

မြန်မာရှင်းရှင်းမီတယ်လ် ကုမ္ပဏီလီမိတက်သည် မြန်မာနိုင်ငံကုမ္ပဏီများအက်ဥပဒေ (၁၉၁၄) အရ ၁၁ ရက် မေလ ၂၀၁၇ ရက်နေ့တွင် ကုမ္ပဏီမှတ်ပုံတင်အမှတ် ၁၁၀၅၇၈၉၃ ဖြင့် အများနှင့်မသက်ဆိုင်သော ကုမ္ပဏီ အနေအဖြစ်ဖွဲ့စည်းခဲ့ပါသည်။ အဆိုပါကုမ္ပဏီသည် မော်လမြိုင်စက်မှုဇုန်တွင် တည်ရှိပြီး ခနောက်စိမ်းသတ္တုရိုင်း များအား သန့်စင်ခြင်းနှင့် အရည်ကျိုခြင်း ပြုလုပ်၍ သန့်စင်ပြီး ခနောက်စိမ်း အတုံးများအား ထုတ်လုပ်ပါသည်။ ပုဂ္ဂလိကစက်မှုလုပ်ငန်းမှတ်ပုံတင်လက်မှတ်မှာ မ/ကြီး/၃၃၈ ဖြစ်ပြီး ကနဦးရင်းနှီးမြှုပ်နှံမှုပမာဏမှာ ကျပ်သိန်း ၈၀၀ သန်း ဖြစ်ပါသည်။

ဇယား (၁) စီမံကိန်းအဆိုပြုသူ၏ အကြောင်းအရာ

စီမံကိန်းအဆိုပြုသူ	ဒေါ် ရတနာလင်းအောင် (မန်နေဂျင်းဒါရိုက်တာ) 09 450034533
မြန်မာရှင်းရှင်းမီတယ်လ် ကုမ္ပဏီလီမိတက်၏ တာဝန်ခံ	ဦးတင်ညို (စက်ရုံမှူး) 0943129102
နေရပ်လိပ်စာ	အကွက်အမှတ် (၃၂၅-၃၃၀)၊ ရွှေမြို့တော် (၁)လမ်း၊ စက်မှုဇုန်၊ ညောင်ပင်ဆိပ်ရပ်ကွက်၊ မော်လမြိုင်မြို့

အဆိုပြုစီမံကိန်း၏ နောက်ခံအကြောင်းအရာ

မြန်မာရှင်းရှင်းမီတယ်လ် ကုမ္ပဏီလီမိတက်သည် အဆိုပြု ခနောက်စိမ်း ကျိုချက်ခြင်းနှင့် သန့်စင်ခြင်းစက်ရုံအား ကောင်းကင်ကြယ်ခြောက်ပွင့် ကုမ္ပဏီထံမှ ၂၀၁၆ ခုနှစ်တွင် လက်လွှဲရယူခဲ့ပါသည်။ ထိုအချိန်မှစ၍ အဆိုပြု စီမံကိန်းသည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း အစီရင်ခံစာအား မွန်ပြည်နယ်၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ ညွှန်ကြားချက်ဖြင့် လုပ်ကိုင်လျက်ရှိပြီး ၂၀၂၃ မတ်လတွင် အဆိုပါအစီရင်ခံစာအား ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာနမှ အတည်ပြုချက် ရရှိပြီးဖြစ်ပါသည်။ ၂၀၂၄ ခုနှစ်အတွင်းတွင် အဆိုပြုစီမံကိန်းသည် ကုန်ထုတ်လုပ်ရေးလုပ်ငန်းစဉ်နှင့် ကုန်ထုတ်လုပ်ရေး ဧရိယာတိုးချဲ့မှုများ ဆောင်ရွက်ခဲ့ရာ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ လုပ်ငန်းတိုးချဲ့ဆောင်ရွက်ခြင်းနှင့်ပတ်သက်၍ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း ဆောင်ရွက်ရန် ဒီဇင်ဘာလ၊ ၂၀၂၄ ခုနှစ်တွင် ညွှန်ကြားခဲ့ပါသည်။ ထို့ကြောင့် အဆိုပါ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) နှင့်အညီ ရေးဆွဲပြုစုထားပါသည်။

ပတ်ဝန်းကျင်ဆိုင်ရာအကြံပေးပုဂ္ဂိုလ်

ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း အစီရင်ခံစာအား ဆောင်ရွက်ရန်အလို့ငှာ အဆိုပြုစီမံကိန်းအတွက် Olive Bright Environmental Solutions Limited (OBES) နှင့် ဖေဖော်ဝါရီ ၂၀၂၅ ခုနှစ်တွင် သဘောတူစာချုပ် ချုပ်ဆို ဆောင်ရွက်ခဲ့ပါသည်။ အဆိုပြု ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း အစီရင်ခံစာအား လေ့လာမည့်အဖွဲ့တွင် နည်းပညာ နယ်ပယ်အသီးသီးမှ လိုင်စင်ရ ကျွမ်းကျင်ပညာရှင်များဖြင့် ဖွဲ့စည်းထားရှိပြီး ၎င်းတို့၏ အချက်အလက် များအား ဇယား (၂) တွင် ဖော်ပြထားပါသည်။

ဆက်သွယ်ရန်ပုဂ္ဂိုလ်

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ဇယား (၂) ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအစီရင်ခံစာ (IEE) အား လေ့လာဆန်းစစ်မည့် OBES မှ ကျွမ်းကျင် ပညာရှင်များ

စဉ်	ပညာရှင်အမည်	လုပ်ငန်း လိုင်စင်အမှတ်	ကျွမ်းကျင်နယ်ပယ်များ
၁။	ဒေါက်တာလဲ့လဲ့ဝင်း	EIA-C 019/2023	ရေထုညစ်ညမ်းမှု ကြိုတင်ကာကွယ်ခြင်း၊ ထိန်းချုပ် ခြင်း၊ စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိခိုက်မှုကြိုတင် ခန့်မှန်းခြင်း ဂေဟစနစ်နှင့် ဇီဝမျိုးစုံမျိုးကွဲ စွန့်ပစ်အစိုင်အခဲနှင့်ဘေးအန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်း စီမံ ခန့်ခွဲခြင်း ဘေးအန္တရာယ်ရှိမှု ဆန်းစစ်ခြင်းနှင့် ဘေးအန္တရာယ် စီမံခန့်ခွဲခြင်း
၂။	ဦးမင်းမင်းဦး	EIA-C 020/2023	လေထုညစ်ညမ်းမှုကြိုတင်ကာကွယ်ခြင်းနှင့် ထိန်းချုပ် ခြင်း မိုးလေဝသနှင့် လေအရည်အသွေး ဆန်းစစ်ခြင်းနှင့် ကြိုတင်ခန့်မှန်းခြင်း

စဉ်	ပညာရှင်အမည်	လုပ်ငန်း လိုင်စင်အမှတ်	ကျွမ်းကျင်နယ်ပယ်များ
၃။	ဒေါ်မြတ်သစွာနိုင်	EIA-C 021/2023	လူမှုရေးဆိုင်ရာ လေ့လာခြင်းနှင့် သရုပ်ခွဲ ဆန်းစစ်ခြင်း
၄။	ဦးမျိုးသူရ	EIA-C 046/2023	ဘူမိဆိုင်ရာဆန်းစစ်လေ့လာခြင်း မြေဆီလွှာထိန်းသိမ်းခြင်း
၅။	ဒေါ်အေးအေးစိုး	EIA-C 068/2024	မြေအသုံးချမှု
၆။	ဦးကျော်ဝင်းဟန်	EIA-AC 027/2023	လေထုညစ်ညမ်းမှုစောင့်ကြပ်ကြည့်ရှုခြင်း
၇။	ဦးစည်ယံဟိန်း	EIA-AC 026/2023	ဘူမိဆိုင်ရာဆန်းစစ်လေ့လာခြင်း
၈။	ဦးထက်သီဟဖုန်းမြင့်	EIA-AC 032/2023	ဘူမိဆိုင်ရာဆန်းစစ်လေ့လာခြင်း ဆူညံသံနှင့် တုန်ခါမှု
၉။	ဦးခင်မောင်အေး	EIA-AC 018/2023	ရှေးဟောင်းသုတေသနနှင့် ယဉ်ကျေးမှု
၁၀။	ဦးခင်မောင်ဝင်း	EIA-AC 028/2023	ရေထုညစ်ညမ်းမှု ကြိုတင်ကာကွယ်ခြင်း၊ ထိန်းချုပ် ခြင်း၊ စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိခိုက်မှုကြိုတင် ခန့်မှန်းခြင်း ဇီဝဗေဒ၊ မြေပေါ်ရေနှင့် မြေအောက်ရေထိန်းသိမ်း ခြင်း အထွေထွေပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း
၁၁။	ဒေါက်တာဖြူဖြူမြင့်	EIA-AC 020/2023	ကျန်းမာရေး
၁၂။	ဒေါက်တာနီလာဝင်း	အထောက်အကူပြု ကျွမ်းကျင်ပညာရှင်	လေထုညစ်ညမ်းမှုကြိုတင်ကာကွယ်ခြင်းနှင့် ထိန်းချုပ် ခြင်း
၁၃။	ဒေါ်သက်ဝေနှင်း	အထောက်အကူပြု ကျွမ်းကျင်ပညာရှင်	သဘာဝသယံဇာတစီမံခန့်ခွဲခြင်း

မူဝါဒများ၊ဥပဒေဆိုင်ရာနှင့် ဖွဲ့စည်းဆောင်ရွက်ပုံဆိုင်ရာ လေ့လာသုံးသပ်ချက်

ဤအခန်းတွင် စီမံကိန်း၏ ပတ်ဝန်းကျင်၊ လူမှုစီးပွားရေးနှင့် သက်ဆိုင်သော မြန်မာနိုင်ငံ၏ မူဝါဒများ၊ သက်ဆိုင်သောဥပဒေများကို ဇယား ၃ တွင် အကျဉ်းချုပ်ဖော်ပြထားသည်။ စီမံကိန်းဖော်ဆောင်သူသည် ဤဥပဒေပြဋ္ဌာန်းချက်များအပြင် အခြား တည်ဆဲဥပဒေများကိုလည်း လိုက်နာကာ စီမံကိန်းကို အကောင်အထည်ဖော်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။

ဇယား ၃ သက်ဆိုင်သော မြန်မာနိုင်ငံ၏ ဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ

စဉ်	ဥပဒေနှင့် နည်းဥပဒေအမည်များ	ခုနှစ်
သာဘာပတ်ဝန်းကျင်ထိန်းသိမ်းရေး		
၁	ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၂
၂	ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း	၂၀၁၅
၃	အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ	၂၀၁၅
၄	သောက်သုံးရေအရည်အသွေးဆိုင်ရာ မြန်မာစံချိန်စံညွှန်း	၂၀၁၉
၅	အမျိုးသား မြေပေါ်ရေ အရည်အသွေး စံချိန်စံညွှန်း	၂၀၂၄
ပတ်ဝန်းကျင်ညစ်ညမ်းမှုနှင့် ကျန်းမာရေး		
၆	ပြည်ထောင်စုမြန်မာနိုင်ငံပြည်သူ့ကျန်းမာရေးဆိုင်ရာဥပဒေ	၁၉၇၂
၇	ကူးစက်ရောဂါများ နှိမ်နင်းရေး ဥပဒေ	၁၉၉၅ (၂၀၁၁ ပြင်ဆင်)
၈	ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက် ပစ္စည်းသောက်သုံးမှုထိန်းချုပ်ရေးဥပဒေ	၂၀၀၆
၉	လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ကျန်းမာရေးဆိုင်ရာဥပဒေ	၂၀၁၉
၁၀	မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ဥပဒေ	၂၀၁၅
၁၁	ဓာတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများ အန္တရာယ်မှ တားဆီးကာကွယ်ရေး ဥပဒေ	၂၀၁၃
၁၂	လုပ်ငန်းခွင်သုံး ပေါက်ကွဲစေတတ်သော ဝတ္ထုပစ္စည်းများဆိုင်ရာဥပဒေ	၂၀၁၈
၁၃	The Explosive Substances Act	၁၉၀၈
ဇီဝမျိုးစုံမျိုးကွဲများနှင့် သဘာဝအရင်းအမြစ်ထိန်းသိမ်းရေး		
၁၄	ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများ ထိန်းသိမ်းရေးဥပဒေ	၂၀၀၆ (၂၀၁၇ ပြင်ဆင်)
၁၅	ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းထိန်းသိမ်းရေးနည်းဥပဒေ	၂၀၁၃
၁၆	မြေအောက်ရေဥပဒေ	၁၉၃၀
လူ့အခွင့်အရေး		
၁၇	တိုင်းရင်းသားလူမျိုးများ၏အခွင့်အရေးကာကွယ်စောင့်ရှောက်သည့် ဥပဒေ	၂၀၁၅

စဉ်	ဥပဒေနှင့် နည်းဥပဒေအမည်များ	ခုနှစ်
၁၈	တိုင်းရင်းသားလူမျိုးများ၏အခွင့်အရေးကာကွယ်စောင့်ရှောက်သည့် နည်းဥပဒေ	၂၀၁၉
၁၉	အလုပ်သမားအဖွဲ့အစည်းဥပဒေ	၂၀၁၁
၂၀	အနည်းဆုံးအခကြေးငွေဥပဒေ	၂၀၁၃
၂၁	အခကြေးငွေပေးချေရေးဥပဒေ	၂၀၁၆
၂၂	အလုပ်သမားလျော်ကြေးအက်ဥပဒေ	၂၀၀၅
၂၃	အလုပ်သမားရေးရာ အငြင်းပွားမှုဖြေရှင်းရေးဥပဒေ	၂၀၁၂
၂၄	လူမှုဖူလုံရေးဥပဒေ	၂၀၁၂ (၂၀၂၀ ပြင်ဆင်)
ကုမ္ပဏီ		
၂၅	မြန်မာအာမခံ ဥပဒေ	၁၉၉၃ (၁၉၉၆ ပြင်ဆင်)
၂၆	မြန်မာအာမခံ လုပ်ငန်း နည်းဥပဒေ	၂၀၁၇
၂၇	မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ဥပဒေ	၂၀၁၆ (၂၀၁၉ ပြင်ဆင်)
၂၈	မြန်မာနိုင်ငံ ကုမ္ပဏီများ ဥပဒေ	၂၀၁၇
၂၉	ပုဂ္ဂလိက စက်မှုလုပ်ငန်းဥပဒေ	၁၉၉၀
၃၀	ပို့ကုန်သွင်းကုန်ဥပဒေ	၂၀၁၂
၃၁	အခွန်ဆိုင်ရာစီမံအုပ်ချုပ်မှုဥပဒေ	၂၀၁၉
ယဉ်ကျေးမှုအမွေအနှစ်များ		
၃၂	ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၉
၃၃	ရှေးဟောင်းဝတ္ထုပစ္စည်းများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၅
၃၄	ရှေးဟောင်းအဆောက်အအုံများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၅
မြို့ပြစီမံခန့်ခွဲမှု		
၃၅	မွန်ပြည်နယ်စည်ပင်သာယာရေးဥပဒေ	ဇွန်, ၂၀၁၇
၃၆	လျှပ်စစ်ဥပဒေ	၂၀၁၄
သဘာဝဘေးအန္တရာယ်		
၃၇	သဘာဝဘေးအန္တရာယ်ဆိုင်ရာစီမံခန့်ခွဲမှုဥပဒေ	၂၀၁၃

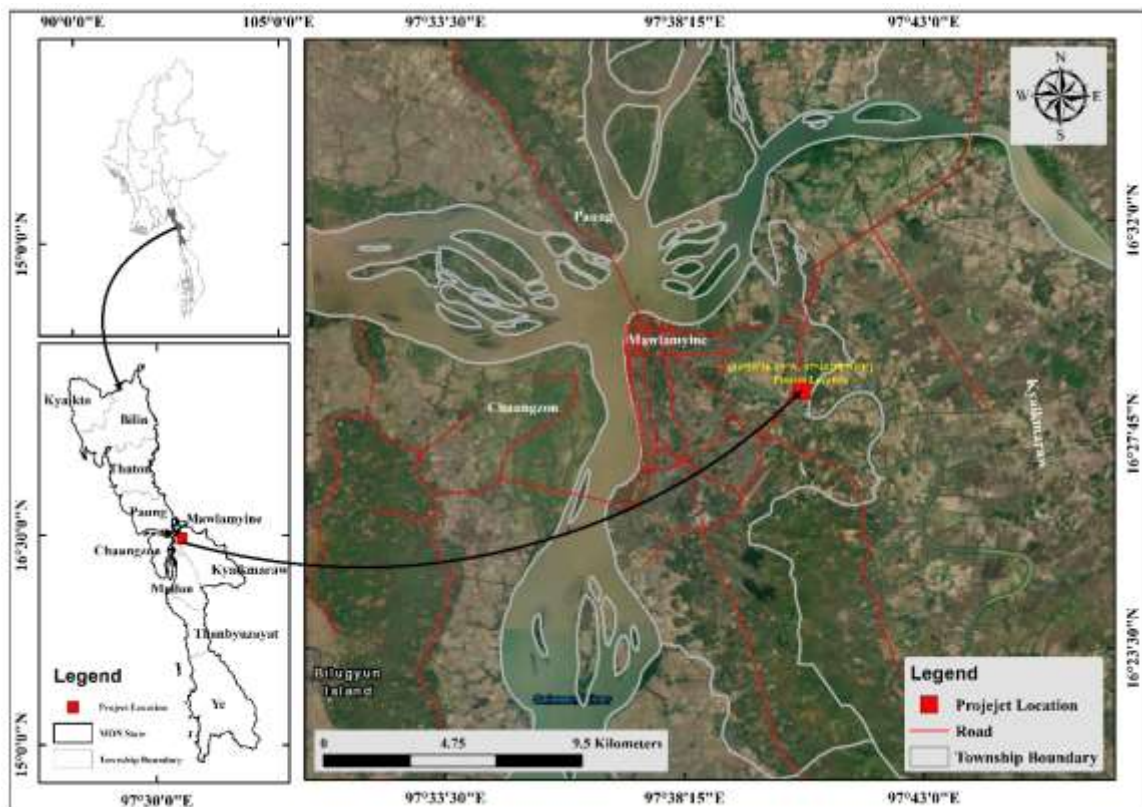
စီမံကိန်းအကြောင်းအရာအသေးစိတ်ဖော်ပြချက်

စီမံကိန်းအကြောင်းအရာ

ခနောက်စိမ်းသန့်စင်ထုတ်လုပ်သည့် စက်ရုံသည် မြန်မာနိုင်ငံတွင် ၂၀၁၈ ခုနှစ်တွင် တည်ထောင်ခဲ့ပြီး ၎င်းခုနှစ်တွင်ပင် လုပ်ငန်းစတင်လည်ပတ်ခဲ့ပါသည်။ နောက်ပိုင်းတွင် (Myanmar Shing Shing Metal Company Limited) မြန်မာရှင်းရှင်းမက်တယ် ကုမ္ပဏီလီမိတက်အား "စီမံကိန်းအဆိုပြုသူ" ဟုသုံးနှုန်းသွားပါမည်။

စက်ရုံသည် ၂၀၁၃ ခုနှစ်မှ ၂၀၁၇ခုနှစ်အထိ ကောင်းကင်ခြောက်ပွင့် ကုမ္ပဏီ အမည်ဖြင့် လုပ်ငန်းလည်ပတ်ခဲ့ပါသည်။ ၎င်းနောက် ၂၀၁၈ခုနှစ် အစောပိုင်းကာလတွင် လုပ်ငန်းပိုင်ရှင် ပြောင်းလဲ ပြီးနောက်တွင် မြန်မာရှင်းရှင်းမက်တယ်ကုမ္ပဏီလီမိတက် အမည်ဖြင့် လုပ်ငန်းလည်ပတ် ခဲ့ပါသည်။ ဤစီမံကိန်းသည် ၁၀၀ရာခိုင်နှုန်း နိုင်ငံသားပိုင် လုပ်ငန်းဖြစ်ပြီး သန်း၈၀၀ခန့် ရင်းနှီးမြှုပ်နှံကာ လုပ်ငန်းလည်ပတ်နေပါသည်။ ဂရမ်အမည် ပေါက်မြေပေါ်တွင် တည်ရှိပြီး ၁.၃၀ဧက အကျယ်အဝန်း ရှိပါသည်။ စီမံကိန်း၏ ၄၅၇၄၆.၆၂ စတုရန်းပေ ကျယ်ဝန်းသော ဧရိယာတွင် လုပ်ငန်းလည်ပတ်ရန် အတွက် အဆောက်အအုံ ထပ်မံတိုးချဲ့သွားမည် ဖြစ်ပါသည်။

အဓိကလိုအပ်သည့် ကုန်ကြမ်းကို နတ်စမ်းကျေးရွာ၊ ကျိုက်မရောမြို့နယ်၊ မွန်ပြည်နယ်နှင့် ကျောက်မီးသွေးကို ကလေးဝမြို့နယ်၊ မကွေးတိုင်း မှ ဝယ်ယူပြီး အခြားလိုအပ်သည့် ပစ္စည်းများဖြစ်သည့် ကုတ်မီးသွေးနှင့် soda ash light တို့ကို တရုတ်နိုင်ငံမှ တင်သွင်းပါသည်။ စက်ရုံသည် မြေကွက်အမှတ် ၃၂၅ မှ ၃၃၀၊ ရွှေမြို့တော် ၁လမ်း၊ မော်လမြိုင်စက်မှုဇုန်၊ ညောင်ပင်ဆိတ်ကျေးရွာ၊ မော်လမြိုင်မြို့နယ်၊ မွန်ပြည်နယ်တွင် တည်ရှိပါသည်။ အဓိကထုတ်ကုန်မှာ ခနောက်စိမ်းဘလောက်တုံးများကို ထုတ်လုပ် လျက်ရှိပြီး ဥရောပနိုင်ငံနှင့် အာရှနိုင်ငံများသို့ တင်ပို့ရောင်းချပါသည်။ စီမံကိန်းတည်နေရာကို ပုံ ၁ တွင်လည်းကောင်း အသေးစိတ်အချက်အလက်များကို အခန်း (၃) တွင် ဖော်ပြထားပါသည်။



ပုံ (၁) စီမံကိန်း တည်နေရာပြမြေပုံ

စက်ရုံလည်ပတ်ချိန်နှင့် ဝန်ထမ်းအင်အား

စက်ရုံသည် တစ်ရက်လျှင် ၂၄ နာရီ နှုန်းဖြင့် နေ့စဉ်ကာလပတ်လုံးလည်ပတ်လျက်ရှိပြီး နေ့လည် ၁၂ နာရီမှ ၁နာရီ အထိသည် ထမင်းစားနားချိန်အဖြစ် သတ်မှတ်ထားပါသည်။ စက်ရုံ၏ ရုံးပိုင်းဆိုင်ရာ အလုပ်ချိန်သည် မနက် ၈နာရီမှ ညနေ ၅နာရီ အထိသတ်မှတ်ထားပြီး ကုန်ထုတ်လုပ်မှုအား အဆိုင်း ၃ဆိုင်း ခွဲ၍ လုပ်ဆောင်ပါသည်။ လက်ရှိတွင် ဝန်ထမ်းဦးရေ ၇၀ ဦးဖြင့် ကုန်ထုတ်လုပ်ငန်းများကို ဆောင်ရွက်နေပါသည်။

ကုန်ကြမ်းရရှိပေါ်တွင် မူတည်၍ စက်ရုံကို လည်ပတ်လျက်ရှိပါသည်။ မိုးရာသီကာလ ကုန်ကြမ်း ရှားပါးချိန်၊ စက်ယန္တရားများပြုပြင်မွန်းမံချိန်စသည်တွင် ၂လ မှ ၃လအထိ လုပ်ငန်း ဆောင်ရွက်မှုကို ရပ်နားထားပါသည်။ တစ်နှစ်လျှင် လုပ်ငန်းလည်ပတ်သည့်ကာလမှာ ၂၂၃ ရက် ဖြစ်ပါသည်။

ကုန်ကြမ်းလိုအပ်ချက်

ခနောက်စိမ်းသတ္တုရိုင်းသည် အဓိကလိုအပ်သည့် ကုန်ကြမ်းအမျိုးအစားဖြစ်ပြီး နတ်စမ်း ကျေးရွာ၊ ကျိုက်မရော မြို့နယ်၊ မွန်ပြည်နယ်နှင့် အခြားသတ္တုတွင်းများမှလည်း ဝယ်ယူပါသည်။ တစ်လလျှင် ပျမ်းမျှ တန် ၆၀ခန့် အသုံးပြုပါသည်။ လောင်စာအဖြစ် အသုံးပြုသည့် ကျောက်မီးသွေးကို ကလေးဝမြို့နယ်၊ မကွေးတိုင်း မှ ဝယ်ယူပြီး ပျမ်းမျှ ၆၇ တန်ခန့် အသုံးပြုပါသည်။ တရုတ်နိုင်ငံမှ တင်သွင်းသည့် ကုတ်မီးသွေးကို လောင်စာ၏ ၅၀ မှ ၇၅ ရာခိုင်နှုန်းအထိ အသုံးပြုပါသည်။ ၎င်းတို့ကို မီးဖုတ်ခြင်းနှင့် အရည်ကျိုရာတွင် လောင်စာအဖြစ် အသုံးပြုပါသည်။ အခြားသော ဓာတ်ကူပစ္စည်းများ ဖြစ်သည့် Soda ash light နှင့် mono ammonium phosphate အရည်ကျိုသည် လုပ်ငန်းစဉ်တွင် အဓိကအသုံးပြုပြီး လစဉ်အသုံးပြုမှုမှာ ပျမ်းမျှ ၇တန် နှင့် ပျမ်းမျှ ၆တန် ခန့် အသုံးပြုပါသည်။ အသေးစိတ်ဖော်ပြချက်များကို အခန်း (၃) တွင် ဖော်ပြထားပါသည်။

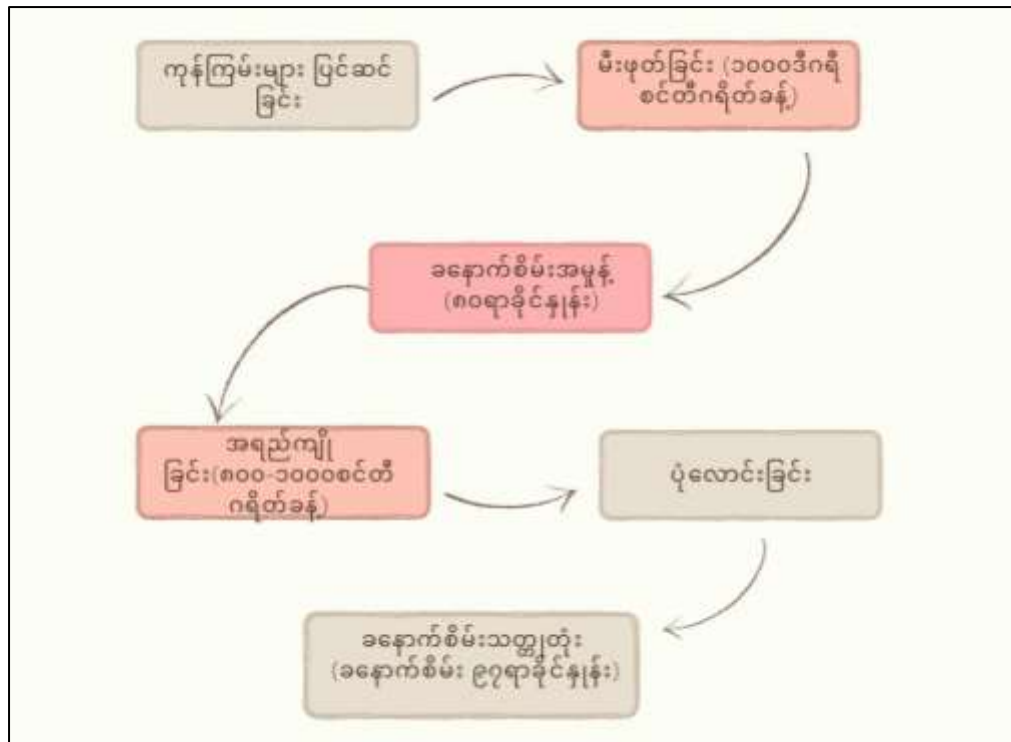
ကုန်ထုတ်လုပ်မှု အဆင့်ဆင့်

မြင့်မားသောအပူချိန်၌ သန့်စင်ထုတ်လုပ်ခြင်း သတ္တုဗေဒနည်းပညာ (Pyrometallurgy) နှင့် အရည်ပျော် ပစ္စည်းများအား အသုံးပြု၍ သန့်စင်ထုတ်လုပ်ခြင်း သတ္တုဗေဒနည်းပညာ (Hydrometallurgy) ဟူ၍ ရှိပါသည်။

ခနောက်စိမ်းသန့်စင် ထုတ်လုပ်ရာတွင် ခနောက်စိမ်းပါဝင်သည့် ရာခိုင်နှုန်း ဥပမာ ၁.၅ ရာခိုင်နှုန်းမှ ၆၀ ရာခိုင်နှုန်း နှင့်အထက် ပါဝင်သည့် ခနောက်စိမ်းသတ္တုရိုင်းကို အသုံးပြုပါသည်။ ဤစီမံကိန်းသည် ခနောက်စိမ်းသန့်စင် ထုတ်လုပ်ရာတွင် မီးဖုတ်ခြင်းနှင့် အရည်ကျိုသည့်စနစ်ကို အသုံးပြုပါသည်။

ကုန်ကြမ်းများပြင်ဆင်ပြီးနောက်တွင် မီးဖုတ်သည့်အဆင့်ကို လုပ်ဆောင်ရာတွင် ကျောက်မီးသွေးနှင့် ကုတ် မီးသွေးကို လိုအပ်သည့် အပူချိန် (၁၀၀၀ ဒီဂရီစင်တီဂရိတ်ခန့်) ရရှိရန် အသုံးပြုပါသည်။ ထို့နောက်တွင် antimony trioxideသည် အငွေ့အဖြစ်နှင့် ထွက်ရှိလာပြီး အအေးခံပိုက်များကို ဖြတ်သန်းစေပြီး ခနောက်စိမ်း ၈၀ရာခိုင်နှုန်း ပါဝင်သည့် အမှုန့်ကိုရရှိပါသည်။ ၎င်းနောက် အရည်ကျိုသည့် အဆင့်တွင် ဓာတ်ကူပစ္စည်းများ (Soda ash light နှင့် mono ammonium phosphate) ထည့်ကာ အပူချိန် ၈၀၀ မှ ၁၀၀၀ ဒီဂရီစင်တီဂရိတ်ခန့်ဖြင့် အရည်ကျိုသည့် လုပ်ငန်းစဉ်ကို လုပ်ဆောင်ပါသည်။

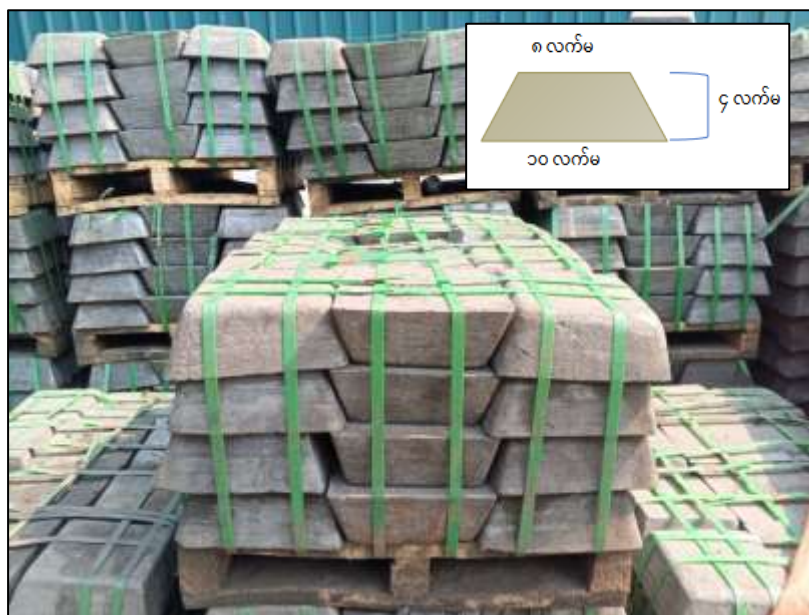
၇ ရက်မှ ၁၀ရက်ခန့် ကြာပြီးနောက်တွင် သန့်စင်ထားသည့် ခနောက်စိမ်းသတ္တုရည်ကို ရရှိပြီး မိုလောင်းသည့် အဆင့်ကို ဆောင်ရွက်ပါသည်။ ဓာတ်ခွဲခန်းတွင် ခနောက်စိမ်းပါဝင်မှု ပမာဏ၊ အရည်အ သွေး စစ်ဆေးမှုများ ပြုလုပ်ပြီးသည့်နောက်တွင် တင်ပို့ရောင်းချပါသည်။ ခနောက်စိမ်းတစ်တုံးတွင် ခနောက်စိမ်းပါဝင်မှုမှာ ၉၇ ရာခိုင်နှုန်း ပါဝင်ပါသည်။ ကုန်ထုတ်လုပ်သည့် လုပ်ငန်းစဉ်ကို ပုံ ၂ တွင် ဖော်ပြထားပါသည်။



ပုံ (၂) ခနောက်စိမ်းဘလောက်တုံး ထုတ်လုပ်ပုံ အဆင့်ဆင့်

ကုန်ချောရရှိခြင်း

သတ္တုပျော်ရည်များကို မိုလ်လောင်းပြီးနောက်တွင် ထုတ်ပိုး၍ တင်ပို့နိုင်သည့် အဆင့်ရှိသည့် ကုန်ချောရရှိပြီး ဖြစ်သည်ဟု သတ်မှတ်ပါသည်။ ခနောက်စိမ်းဘလောက်တုံးများ၏ အသားတင်အလေးချိန်သည် ၂၅ ကီလိုဂရမ်ရှိပြီး နှစ်စဉ် တန် ၅၀၀ခန့် ထုတ်လုပ်ပါသည်။ ရရှိလာသည့် ကုန်ချောများကို ဥရောပ နှင့် အာရှနိုင်ငံများသို့ တင်ပို့ရောင်းချပါသည်။ ထွက်ရှိလာသည့် ကုန်ချောများကို ထုတ်ပိုးထားရှိပုံ နှင့် ၎င်းတို့၏ အရွယ်အစားကို ပုံ ၃ တွင် ဖော်ပြထားပါသည်။



ပုံ (၃) ထွက်ရှိလာသည့် ထုတ်ပိုးထားသည့် ကုန်ချောများနှင့် အရွယ်အစား

ပတ်ဝန်းကျင်ဆိုင်ရာအခြေခံအချက်အလက်များ

စီမံကိန်း၏လေ့လာသည့် ဧရိယာအတွင်းတွင် သဘာဝပတ်ဝန်းကျင်၊ လူမှုစီးပွားပတ်ဝန်းကျင်၊ ပတ်ဝန်းကျင် အရည်အသွေးတိုင်းတာမှုနှင့် ဇီဝဗေဒဆိုင်ရာလေ့လာမှုများစသည့် ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက် များကို တိုင်းတာခဲ့ပြီး အနှစ်ချုပ်ကို ဇယား ၄ တွင်ဖော်ပြထားပါသည်။

ဇယား (၄) ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက်များ ကောက်ယူခြင်း အနှစ်ချုပ်

စဉ်	အမျိုးအစား	အကြောင်းအရာ
သဘာဝပတ်ဝန်းကျင်		
၁	ရာသီဥတု	မော်လမြိုင်မြို့နယ် ဒေသဆိုင်ရာ အစိုးရရုံးအချက်အလက်များ (၂၀၂၃) အရ ပျမ်းမျှအမြင့်ဆုံးအပူချိန်မှာ ၂၈.၃ ဒီဂရီစင်တီဂရိတ် နှင့် ပျမ်းမျှအနိမ့်ဆုံး အပူချိန်မှာ ၈.၁ ဒီဂရီစင်တီဂရိတ် ရှိပါသည်။
၂	မြေမျက်နှာသွင်ပြင်	မော်လမြိုင်မြို့နယ်သည် ပင်လယ်ရေမျက်နှာပြင်အမြင့် ၁၈ ပေ မြင့်ပြီး စတုတ္ထ အကြီးဆုံးမြို့ဖြစ်ပါသည်။ မော်လမြိုင်မြို့နယ်သည် မွန်ပြည်နယ် အလယ်တွင် တည်ရှိပြီး အရွယ်အစားအားဖြင့် သေးငယ်ပါသည်။ ၎င်းသည် မြောက်ပိုင်းတွင် ပေါင်မြို့နယ်၊ ဘားအံမြို့နယ်၊ တောင်ဘက်တွင် မုဒုံမြို့နယ်၊ အရှေ့ဘက်တွင် ကျိုက်မရောမြို့နယ် နှင့် အနောက်ဘက်တွင် ချောင်းဆုံမြို့နယ်၊ သံလွင်မြို့တို့ တည်ရှိပါသည်။
၃	ဘူမိဗေဒ၊ မြေဆီလွှာ	မော်လမြိုင်သည် သံလွင်မြစ်ဝကျွန်းပေါ်တွင် တည်ရှိသော ဒေသတစ်ခု ဖြစ်သည်။ မြစ်ပါးစပ်တွင် ဘီလူးကျွန်းသည် သံလွင်မြစ်ကို ခွဲဝိတ်ထားပြီး မုတ္တမပင်လယ်ကွေ့ အတွင်းသို့ စီးဝင်စေသည်။ ရန်ကင်းတောင်ရိုးသည် အနောက်ဘက်မြစ်ဝကျွန်းပေါ်နှင့် အရှေ့ဘက် ကပ္ပလီပင်လယ်ကြားတွင် တည်ရှိပါသည်။ ဘူမိဗေဒအရ ရန်ကင်းတောင်ရိုးအလယ်နှင့် အပေါ်ပိုင်းတွင် သလင်းဖြင့်ဖွဲ့စည်းထားရှိပါသည်။ မော်လမြိုင်မြို့နယ်တွင် ဂဝံဆန်သော ဝါညိုရောင်ရှိသည့် သစ်တောမြေ၊ ဂဝံမြေနှင့် လယ်မြေတို့အား အများဆုံး တွေ့ရပါသည်။
၄။	ဇလဗေဒ	မော်လမြိုင်မြို့နယ်သည် မြစ်ချောင်းပေါများသော ဒေသဖြစ်ပါသည်။ အတ္တရံ မြစ်၊ ကျိုင်းမြစ်နှင့် သံလွင်မြစ်တို့သည်အဓိက ရေချိုအရင်းအမြစ်များ ဖြစ်ကြ ပြီး ၎င်းတို့အား စိုက်ပျိုးရေးနှင့် အထွေထွေသုံးရေအဖြစ် အဓိက အသုံးပြု ကြသည်။
ဇီဝမျိုးစုံမျိုးကွဲများဆိုင်ရာ အစိတ်အပိုင်းများ		
၅။	အပင်များကို လေ့လာခြင်း	ကွင်းဆင်းလေ့လာချက်များအရ နေထိုင်ကျက်စားရာ အပင်မျိုးစိတ် စုစုပေါင်း ၆၂ မျိုးကို စီမံကိန်းဧရိယာ အတွင်းရှိ ဂေဟစနစ်အတွင်း တွေ့ရှိရပါသည်။
၆။	သတ္တဝါများကို လေ့လာခြင်း	ကွင်းဆင်းလေ့လာချက်များအရ ငှက်မျိုးစိတ် ၁၆ မျိုး၊ ကုန်းနေရေနေသတ္တဝါ ၇ မျိုး၊ နို့တိုက်သတ္တဝါ ၆ မျိုး၊ ငါးမျိုးစိတ် ၁၄ မျိုး နှင့် အင်းဆက်မျိုးစိတ် ၁၄ မျိုး တွေ့ရှိရပါသည်။

စဉ်	အမျိုးအစား	အကြောင်းအရာ
လူမှုစီးပွားဆိုင်ရာ ပတ်ဝန်းကျင်		
၇။	မြေအသုံးပြုမှု	မော်လမြိုင်မြို့နယ်တွင် စိုက်ပျိုးမြေအား စုစုပေါင်းမြေဧရိယာ၏ ၃၈ ရာခိုင်နှုန်းတွေ့ရှိရပါသည်။ ထို့နောက် ရေထုထည်ဧရိယာသည် ဒုတိယအများဆုံးနေရာယူထားပါသည်။ စားကျက်မြေနှင့် စက်မှုဇုန်ဧရိယာများအား လေ့လာသည့်မြို့နယ်အတွင်းတွင် အနည်းဆုံးအနေဖြင့် တွေ့ရှိရပါသည်။
၈။	လူဦးရေ	မော်လမြိုင်မြို့နယ် ဒေသဆိုင်ရာအချက်အလက်များ (၂၀၂၃) အရ လူဦးရေ စုစုပေါင်းမှာ ၂၇၂,၄၃၃ ဖြစ်ပါသည်။ အမျိုးသမီးဦးရေမှာ အမျိုးသားဦးရေထက် အနည်းငယ်ပိုများကြောင်းတွေ့ရှိရပါသည်။
၉။	လူမျိုးများနှင့် ကိုးကွယ်မှု	ဒေသဆိုင်ရာအချက်အလက်များ (၂၀၂၃) အရ မော်လမြိုင်မြို့နယ်သည် လူမျိုးစု ကွဲပြားမှုအများဆုံးဖြစ်ပါသည်။ ၎င်းတွင် ဗမာလူမျိုးများအဓိကနေထိုင်ကြပြီး စုစုပေါင်းလူဦးရေ၏ ၅၅ ရာခိုင်နှုန်း ဖြစ်ပါသည်။ ထို့နောက် မွန်လူမျိုးများအား ဒုတိယအများဆုံးတွေ့ရှိရပြီး ၂၁.၆ ရာခိုင်နှုန်းရှိပါသည်။ ထို့ပြင်အခြား လူမျိုးစုများလည်း အနည်းငယ်နေထိုင်နေကြောင်း တွေ့ရှိရပါသည်။
၁၀။	ပညာရေး	စီမံကိန်းမြို့နယ်တွင် ပညာရေးစင်တာများစွာရှိပြီး အဆင့်မြင့်ပညာအနေဖြင့် တက္ကသိုလ်/ကောလိပ် ၄ ခု၊ အထက်တန်းကျောင်း ၂၇ ကျောင်း၊ အလယ်တန်းကျောင်း ၁၀ ကျောင်း၊ မူလတန်းကျောင်း ၂၄ ကျောင်း၊ မူလတန်းကျောင်း ၈၉ ကျောင်း၊ မူကြိုကျောင်း ၅၀ ကျောင်းနှင့် ဘုန်းကြီးကျောင်းပညာရေး ၉ ကျောင်း တို့ ရှိပါသည်။ စုစုပေါင်းကျောင်းသူ/သားဦးရေမှာ ၅၈,၂၁၇ ယောက်ဖြစ်ပြီး ဆရာ၊ ဆရာမ ဦးရေမှာ ၂,၅၄၆ ဖြစ်ပါသည်။ စာတက်မြောက်မှုရာခိုင်နှုန်း မှာ ၉၉.၈% ဖြစ်ပါသည်။
၁၁။	အသက်မွေးမှု (အလုပ်အကိုင်၊ ဝင်ငွေ၊ ကျန်းမာရေး၊ အခြေခံ အဆောက်အအုံနှင့် လျှပ်စစ်)	၂၀၂၃ ခုနှစ်ဒေတာအရ နေ့စားအလုပ်သမားများအား အများဆုံးတွေ့ရှိရပြီး ဒုတိယနှင့် တတိယ အများဆုံးမှာ အစိုးရဝန်ထမ်းနှင့် ကူးသန်းရောင်းဝယ်ရေး လုပ်ငန်းဖြစ်ပါသည်။ မော်လမြိုင်မြို့နယ်သည် မွန်ပြည်နယ်၏ စီးပွားရေး အချက်အချာကျသော မြို့ဖြစ်သောကြောင့် စိုက်ပျိုးရေးနှင့် တိရစ္ဆာန်မွေးမြူရေးအား အနည်းငယ်သာတွေ့ရှိရပါသည်။ မော်လမြိုင်မြို့နယ်တွင် အလုပ်လက်မဲ့ရာခိုင်နှုန်းမှာ ၁.၁၉ % ဖြစ်ပြီး ၂၀၂၃ ခုနှစ်၏ တစ်ဦး၏ တစ်နှစ်ဝင်ငွေမှာ ၂,၉၅၀,၀၇၈ ကျပ်ဖြစ်၍ တစ်လလျှင် ၂၄၅,၀၀၀ ကျပ်ဖြစ်ပါသည်။ ဆေးရုံအနေဖြင့် အစိုးရဆေးရုံ (၆) ခုနှင့် ပုဂ္ဂလိက ဆေးရုံ (၉) ခု အား တွေ့ရှိရပါသည်။ ထို့ပြင် ကျေးလတ်ဆေးပေးခန်း ၁၆ ခု ရှိပြီး ကျန်းမာရေး အထောက်အပံ့များ ထောက်ပံ့လျက်ရှိပါသည်။ ပုဂ္ဂလိက ဆေးပေးခန်း အနေဖြင့် ၁၄၀ ခုအား တွေ့ရှိရပါသည်။
၁၂။	သယ်ယူပို့ဆောင်ရေး	မော်လမြိုင်မြို့နယ်အတွင်းတွင် နီးကပ်မြို့နယ်များအား ဆက်သွယ်ရန် လမ်း၊ တံတားတို့ကို အမြောက်အများတွေ့ရှိရပြီး အဓိက လမ်း ၇ စင်း၊ တံတား ၄ စင်း

စဉ်	အမျိုးအစား	အကြောင်းအရာ
		ရှိပါသည်။ မော်လမြိုင်မြို့နယ်အတွင်းတွင် ကားလမ်းနှင့် မီးရထားလမ်းအား သွားလာရလွယ်ကူမှုကြောင့်သော်လည်းကောင်း၊ ငွေကြေးသက်သာမှုကြောင့် သော်လည်းကောင်း အများဆုံးအသုံးပြုကြပါသည်။ လေကြောင်းသယ်ယူ ပို့ဆောင်ရေးလမ်းကြောင်းများလည်းရှိပါသည်။
ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအရည်အသွေး တိုင်းတာမှု		
၁၃	လေထုအရည်အသွေး	<p>O3, NO2, SO2, PM2.5, PM10, TSP, and CO ဓာတ်ငွေ့များအား စီမံကိန်းဧရိယာအတွင်းရှိ နေရာ ၅ ခု တွင်တိုင်းတာခဲ့ပြီး ရလဒ်များအား အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး ထုတ်လုပ်မှု လမ်းညွှန်ချက်များ (၂၀၁၅) နှင့် နှိုင်းယှဉ်ခဲ့သည်။</p> <p>စီမံကိန်းဧရိယာအတွင်းတွင် လေထုအရည်အသွေးအနေဖြင့် SO2 နှင့် အမှုန်အမွှားများမှာ သတ်မှတ်စည်းကမ်းချက်ထက် ကျော်လွန်နေသော်လည်း ကျန်ပါရာဇီတာများမှာ သတ်မှတ်စည်းကမ်းချက်အတွင်း ဝင်ရောက်နေကြောင်း တွေ့ရှိရပါသည်။</p>
၁၄	လေတိုက်နှုန်းနှင့် လေတိုက်ရာအရပ်	<p>စီမံကိန်းဧရိယာအနီးရှိ နေရာ ၅ ခုတွင် လေတိုက်နှုန်းနှင့် လေတိုက်ရာ အရပ်တို့ကို တိုင်းတာခဲ့ပါသည်။</p> <p>တိုင်းတာရာအမှတ်အားလုံးအတွက် ပျမ်းမျှလေတိုက်နှုန်းမှာ ၀.၀၃ မှ ၂.၄၅ m/s ဖြစ်ပြီး လေတိုက်ရာအရပ်မှာ တောင်၊ အနောက်မြောက်နှင့် အရှေ့တောင် တို့ဖြစ်ပါသည်။</p>
၁၅	ရေအရည်အသွေး	<p>ရေအရည်အသွေးအား စီမံကိန်းအတွင်းရှိ မြေအောက်ရေ ၁ နေရာ၊ စွန့်ပစ်ရေ ၁ နေရာနှင့် မြေပေါ်ရေ (၂) နေရာတွင် တိုင်းတာခဲ့ပါသည်။</p> <p>ရလဒ်များအရ အများစုမှာ သတ်မှတ်စည်းကမ်းချက်အတွင်း ကျရောက်သော်လည်း စွန့်ပစ်ရေရှိ chromium (hexavalent) မှာ အနည်းငယ် ပိုများနေကြောင်း တွေ့ရှိရပါသည်။ ထိုသို့များနေခြင်းမှာ အတ္တရံမြစ်မှ ရေအား သန့်စင်ခြင်းမရှိဘဲ အသုံးပြုခြင်းကြောင့်ဖြစ်ကြောင်း တွေ့ရှိရပါသည်။</p>
၁၆	ဆူညံသံ	<p>ဆူညံသံကို စီမံကိန်းဧရိယာအတွင်း ၅ နေရာခွဲ၍ တိုင်းတာခဲ့ပါသည်။</p> <p>တိုင်းတာမှု ရလဒ်များအနေဖြင့် နေ့အချိန် N1 and N2 ရလဒ်များမှာ ကျော်လွန်နေပြီး ညအချိန်ရလဒ်များအနေဖြင့် N1 ရလဒ်မှာ ကျော်လွန်နေကြောင်းတွေ့ရှိရပါသည်။ ထိုသို့များပြားခြင်းမှာ မီးစက်လည်ပတ်ခြင်းနှင့် ကုန်ကြမ်းပစ္စည်းများ ကိုင်တွယ်ခြင်းကြောင့်ဖြစ်ပြီး ၎င်းလုပ်ငန်းစဉ်များအား တစ်နေ့လုံး ဆောင်ရွက်ခြင်းမရှိပါ။</p>
၁၇	တုန်ခါမှု	<p>တုန်ခါမှုကို စီမံကိန်းဧရိယာအတွင်း ၂ နေရာခွဲ၍ တိုင်းတာခဲ့ပါသည်။</p> <p>ရလဒ်များမှာ သတ်မှတ်တုန်ခါမှုစံနှုန်းအတွင်း ကျရောက်လျက်ရှိပါသည်။</p>

စဉ်	အမျိုးအစား	အကြောင်းအရာ
၁၈	အနံ့	အနံ့တိုင်းတာခြင်းကို လုပ်ငန်းလည်ပတ်သည့် ၅ နေရာ တွင် တိုင်းတာခဲ့ပြီး NEQEG နှင့် နှိုင်းယှဉ်ခဲ့ပါသည်။ ရလဒ်များမှာ စံနှုန်းအတွင်း ကျရောက်လျက်ရှိကြောင်း တွေ့ရှိရပါသည်။
၁၉	မြေအရည်အသွေး	အနံ့တိုင်းတာခြင်းကို လုပ်ငန်းလည်ပတ်သည့် နေရာ တွင် တိုင်းတာခဲ့ပါသည်။ မြေအရည်အသွေးများဖြစ်သည့် pH, Zn, Cu, Pb and As များမှာ သတ်မှတ်စံချိန်စံညွှန်းအတွင်း ကျရောက်လျက်ရှိကြောင်း တွေ့ရှိရပါသဖြင့် စီမံကိန်း၏မြေအရည်အသွေးမှာ ကောင်းမွန်သော အနေအထားတွင် ရှိနေပါသည်။

ဖြစ်နိုင်ချေရှိသော သဘာဝပတ်ဝန်းကျင်ထိခိုက်နိုင်မှုနှင့်လျော့ချခြင်း

ထိခိုက်မှုဆန်းစစ်ခြင်း

အမျိုးသား သဘာဝပတ်ဝန်းကျင်မူဝါဒ (၁၉၆၉) အရ ဖြစ်နိုင်ခြေရှိသော ပတ်ဝန်းကျင်ထိခိုက်မှု အန္တရာယ်ကို ဆန်းစစ်လေ့လာရာတွင် ယေဘုယျအားဖြင့် အဆိုပြုထားသော စီမံကိန်း၏ ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားအပေါ် အခြေခံ၍ ဆန်းစစ်တွက်ချက်ရပါမည်။ အဆိုပါလေ့လာဆန်းစစ်မှုတွင် ကာလတို၊ ကာလရှည်ဖြစ်နိုင်ချေရှိသော လေထုညစ်ညမ်းမှု၊ ရေထုညစ်ညမ်းမှုနှင့် အသံဆူညံမှုစသော အချက်များ၊ ဒေသခံပြည်သူများအပေါ် သက်ရောက်မှု၊ အသက်ရှင်နေထိုင်မှုနှင့် ကျန်းမာရေး စံချိန်စံညွှန်းများအပြင် အခြားသောစိတ်ပိုင်းဆိုင်ရာအပေါ် သက်ရောက်မှု အချက်အလက်များ ပါဝင်ပါသည်။

စီမံကိန်းဖော်ဆောင်မှုများကြောင့် ပတ်ဝန်းကျင်အပေါ် ကောင်းကျိုးသက်ရောက်မှုနှင့် ဆိုးကျိုး သက်ရောက်မှု များတွက်ချက်ရာတွင် ရုပ်ပိုင်းဆိုင်ရာ၊ လူမှုစီးပွား၊ ဇီဝမျိုးစုံမျိုးကွဲ၊ ကျန်းမာရေး စသည်တို့ အပေါ် အခြေခံပါသည်။ စီမံကိန်းလုပ်ငန်းစဉ်များနှင့် လိုအပ်ချက်များသည် ပတ်ဝန်းကျင်၏ အရင်းအမြစ်များကို သုံးစွဲသောကြောင့် ပတ်ဝန်းကျင်အပေါ် ထိခိုက်မှုများ ဖြစ်ပေါ်စေသည်။

သိသာသော သက်ရောက်မှု အကဲဖြတ်ခြင်း



ဇယား (၅) သိသာသော သက်ရောက်မှု အကဲဖြတ်ခြင်း

အုပ်စု	အမျိုးအစား	အဆင့်	ဖော်ပြချက်
က	ပြောင်းလဲနိုင်ချေ	၄	အပြည်ပြည်ဆိုင်ရာ
		၃	နိုင်ငံလုံးဆိုင်ရာ
		၂	မြို့နယ်ဆိုင်ရာ (စီမံကိန်း ပြင်ပ)

အုပ်စု	အမျိုးအစား	အဆင့်	ဖော်ပြချက်
		၁	စီမံကိန်း အနီးအဝိုက်
		၀	ပြောင်းလဲနိုင်ခြင်း မရှိသော
	ပမာဏ	+၃	များစွာသော အကျိုးသက်ရောက်မှု
		+၂	သိသာသော ကောင်းကျိုးရှိခြင်း
		+၁	ကောင်းကျိုးရှိခြင်း
		၀	ပြောင်းလဲနိုင်ခြင်း မရှိသော
		-၁	ဆိုးကျိုးရှိခြင်း
		-၂	သိသာသော ဆိုးကျိုးရှိခြင်း
		-၃	များစွာသော ဆိုးကျိုးသက်ရောက်မှု

၅.၃. ဖြစ်နိုင်ချေများကို အကဲဖြတ်ခြင်း



ဇယား (၆) ဖြစ်နိုင်ချေများကို ဆန်းစစ်ခြင်း

အုပ်စု	အမျိုးအစား	အဆင့်	ဖော်ပြချက်
ခ	အချိန်ကာလ	၁	ပြောင်းလဲခြင်း မရှိသော
		၂	ယာယီ
		၃	ရေရှည်
	ပြန်လည်ထူထောင်ခြင်း	၁	ပြောင်းလဲခြင်း မရှိသော
		၂	ပြန်လည်ထူထောင်နိုင်သော
		၃	ပြန်လည်ထူထောင်၍ မရနိုင်သော
	စုပေါင်းသက်ရောက်နိုင်ချေ	၁	ပြောင်းလဲခြင်း မရှိသော
		၂	စုပေါင်းသက်ရောက်ခြင်း မရှိသော
		၃	စုပေါင်းသက်ရောက်မှု ရှိခြင်း

၅.၄. သက်ရောက်မှု အဆင့်သတ်မှတ်ခြင်း

အဆင့်သတ်မှတ်ချက် = (သိသာထင်ရှားသည့် သက်ရောက်မှု) (ဖြစ်နိုင်ချေ)

ဇယား (၇) ပတ်ဝန်းကျင်သက်ရောက်မှုအဆင့် သတ်မှတ်ခြင်း

အဆင့်သတ်မှတ်ချက်	အဆင့်သတ်မှတ်ချက်ရလဒ်	အဆင့်သတ်မှတ် ချက်ရလဒ် (ကိန်းဂဏန်း)	ဖော်ပြချက်များ
၁၀၈ မှ ၇၂	+c	+5	များစွာသော အကျိုးသက်ရောက်မှု
၃၆ မှ ၇၁	+ဃ	+4	သိသာသော ကောင်းကျိုးသက်ရောက်မှု
၁၉ မှ ၃၅	+ဂ	+3	ကောင်းကျိုးသက်ရောက်မှု (အသင့်အတင့်)
၁၀ မှ ၁၈	+ခ	+2	ကောင်းကျိုးသက်ရောက်မှု (အနည်းငယ်)
၁ မှ ၉	+က	+1	ကောင်းကျိုးသက်ရောက်မှု (လျော့နည်းလာခြင်း)
၀	မျှချေ	0	ပြောင်းလဲမှု မရှိခြင်း
- ၁ မှ - ၉	- က	-1	ဆိုးကျိုးရှိခြင်း (လျော့နည်းလာခြင်း)
-၁၀ မှ -၁၈	- ခ	-2	ဆိုးကျိုး အနည်းငယ်ရှိခြင်း
- ၁၉ မှ - ၃၅	- ဂ	-3	ဆိုးကျိုးသက်ရောက်မှု (အသင့်အတင့်)
- ၃၆ မှ - ၇၁	- ဃ	-4	သိသာသော ဆိုးကျိုးသက်ရောက်မှု
- ၇၂ မှ - ၁၀၈	- c	-5	များစွာသော ဆိုးကျိုးသက်ရောက်မှု

ဇယား (၈) စီမံကိန်းတည်ဆောက်ချိန်ကာလတွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု ဖြစ်နိုင်ချေများအားဆန်းစစ်ခန့်မှန်းခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက် ရောက်မှု အဆင့်	အဆင့် အမျိုး အစား	ဖော်ပြချက်
၁	လေအရည်အသွေး	မြေတူးဖော်ခြင်း	ဖုန်နှင့် အမှုန်များ	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
		စက်ယန္တရားများအသုံးပြုခြင်း	CO ₂ , NO _x , PMs, VOCs, CO and CH ₄ , C ₆ H ₆ and CH ₂ O					
		သယ်ယူပို့ဆောင်ရေးယာဉ်များ	CO ₂ , PM ₁₀ , PM _{2.5} , CO ₂ , SO _x , NO _x , CO and GHG					
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း	NO _x , SO ₂ , CO ₂ , PM, HC, etc.					
၂	ဆူညံသံနှင့် တုန်ခါမှု	စက်ယန္တရားများအသုံးပြုခြင်း	ဆူညံသံနှင့် တုန်ခါမှု	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း						
၃	ရေအရည်အသွေး	သဲမှုန့်များပါဝင်သည့် ရေများ စီးဆင်းခြင်း	သဲနှင့် အနည်များပါဝင်မှု	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
		ဓာတုပစ္စည်းများ ယိုဖိတ်/ စိမ့် ခြင်း	အန္တရာယ်ရှိ ဓာတုပစ္စည်းများ ပါဝင်မှု					
		ဝန်ထမ်းယာယီ အဆောင်များမှ ရေဆိုးထွက်ရှိခြင်း						
၄	အထွေထွေ စွန့်ပစ်အမှိုက်	ဆောက်လုပ်ရေးဆိုင်ရာ စွန့်ပစ် အမှိုက်များ	သဲ, ကျောက်၊ မဆလာ၊ အလူမီနီယံ၊ သံ/ သစ်/ စတီးနှင့် ပိုက် စသည်	-၁	၆	-၆	-၁	ဆိုးကျိုး သက်ရောက်မှု

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက် ရောက်မှု အဆင့်	အဆင့် အမျိုး အစား	ဖော်ပြချက်
		အိမ်သုံးစွန့်ပစ် ပစ္စည်းများ	မီးဖိုဆောင်မှအမှိုက်များ၊ စားကြွင်းစားကျန် များ၊ ပလပ်စတစ်အမှိုက်များ စသည်					လျော့နည်း လာခြင်း
၅	အန္တရာယ်ရှိပစ္စည်းများ	ဆောက်လုပ်ရေးဆိုင်ရာ ပစ္စည်းများ	ဘိလပ်မြေ၊ အိမ်သုတ်ဆေး၊ တင်နာ စသည်	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
၆	မြေဆီလွှာ	မြေဆီလွှာ ပျက်ဆီးခြင်း	အပေါ်ယံ မြေဆီလွှာဆုံးရှုံးခြင်း၊ အဏုဇီဝ ပိုးမွှားများဆုံးရှုံးခြင်းနှင့် အာဟာရ လျော့နည်းလာခြင်း	-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
၇	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းမှု	လုပ်ငန်းစဉ်များ အားလုံး	အနည်းငယ်မှ ကြီးမားသော ထိခိုက်မှု/ ဒဏ်ရာ	-၃	၇	-၂၁	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
၈	ဂေဟစနစ်	ဆောက်လုပ်ရေး လုပ်ငန်းများ	ဂေဟစနစ် ပျက်စီးခြင်း	-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
၉	လူမှု-စီးပွား	ဆောက်လုပ်ရေး လုပ်ငန်းများ	အလုပ်အကိုင် အခွင့်လမ်းများ (ယာယီ)	၂	၇	၁၇	+၂	အနည်းငယ် ကောင်းကျိုး သက်ရောက်မှု

ဇယား (၉) စီမံကိန်းလည်ပတ်ချိန်ကာလတွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု ဖြစ်နိုင်ချေများအားဆန်းစစ်ခန့်မှန်းခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စုက	အုပ်စုခ	သက်ရောက်မှုအဆင့်	အဆင့်အမျိုးအစား	ဖော်ပြချက်
၁	လေအရည်အသွေး	ကျောက်မီးသွေး ကြိတ်ခွဲခြင်း	ဖုန်နှင့် အမှုန်များ	-၆	၈	-၄၈	-၄	ထင်ရှားသည့် ဆိုးကျိုး သက်ရောက်မှု
		မီးဖုတ်ခြင်း	SO2 (major gas)					
		အရည်ကျိုခြင်း	Sb2O3 and its compounds					
		သယ်ယူပို့ဆောင်ရေးယာဉ်များ	CO2, PM10, PM2.5, CO2, SOx, NOx, CO and GHG					
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း	SO2 (major gas)					
၂	ဆူညံသံနှင့် တုန်ခါမှု	ဒီဇယ်မီးစက် အသုံးပြုခြင်း	ဆူညံသံနှင့် တုန်ခါမှု	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
၃	ရေအရည်အသွေး	စွန့်ပစ်ရေများကို အအေးခံသည့်ကန်	Chromium (VI)	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
		ဝန်ထမ်းယာယီ အဆောင်များသုံးရေ နှင့် ရေဆိုးထွက်ရှိခြင်း	BOD and COD နှင့် အန္တရာယ်ရှိ ခြပ်ပေါင်းများ					
၄	အနံ့	ခနောက်စိမ်းဘလောက်တုံးများ ထုတ်လုပ်ခြင်း (မီးဖုတ်ခြင်းနှင့် အရည်ကျိုခြင်း)	အဆိပ်သင့်စေသည့်အငွေ့များ	-၆	၈	-၄၈	-၄	ထင်ရှားသည့် ဆိုးကျိုး သက်ရောက်မှု
		အိမ်သုံးစွန့်ပစ်ပစ္စည်းများ	H2S, DMS, mercaptants နှင့် အမှိုက်မှ စိမ့်ထွက်သည့် အရည်များ					

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စုက	အုပ်စုခ	သက်ရောက်မှုအဆင့်	အဆင့်အမျိုးအစား	ဖော်ပြချက်
၅	အထွေထွေ စွန့်ပစ်အမှိုက်	အိမ်သုံးစွန့်ပစ် ပစ္စည်းများ	မီးဖိုဆောင်မှ အမှိုက်များ၊ စားကြွင်း စားကျန်များ၊ ပလပ်စတစ် အမှိုက်များ စသည်	-၁	၆	-၆	-၁	ဆိုးကျိုး သက်ရောက်မှု လျော့နည်း လာခြင်း
၆	အန္တရာယ်ရှိပစ္စည်းများ	ထုတ်လုပ်ရေးလုပ်ငန်းစဉ်များမှ ဓာတု ပစ္စည်းပါဝင်သည့် အကြွင်းအကျန်များ	ခနောက်စိမ်းနှင့် ၎င်း၏ ဒြပ်ပေါင်းများ	-၂	၆	-၁၂	-၂	ဆိုးကျိုး သက်ရောက်မှု လျော့နည်း လာခြင်း
		လျှပ်စစ်ဆိုင်ရာ ပစ္စည်းများ	ဘက်ထရီ၊ လောင်စာ/ ပုံးခွံများ၊ လျှပ်စစ် မီးချောင်းများမှအန္တရာယ်ရှိ ဓာတုပစ္စည်း များ စိမ့်ထွက်ခြင်း					
၇	မြေဆီလွှာ	သယ်ယူပို့ဆောင်ရေး ယာဉ် များ	လောင်စာနှင့် ဆီ ယိုဖိတ်/ စိမ့်ခြင်းမှ အန္တရာယ်ရှိ ဓာတုပစ္စည်းများ ပါဝင်မှု	-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
		စွန့်ပစ်ရေ အအေးခံသည့်ကန်မှ စွန့်ပစ် ရေ စီးဆင်းမှု	အပေါ်ယံ မြေဆီလွှာ ဆုံးရှုံးခြင်း၊ အဏုဇီဝ ပိုးမွှားများ ဆုံးရှုံးခြင်းနှင့် အာဟာရ လျော့နည်းလာခြင်း					
၈	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းမှု	လုပ်ငန်းစဉ်များ အားလုံး	အနည်းငယ်မှ ကြီးမားသော ထိခိုက်မှု/ ဒဏ်ရာ	-၃	၇	-၂၁	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စုက	အုပ်စုခ	သက်ရောက်မှုအဆင့်	အဆင့်အမျိုးအစား	ဖော်ပြချက်
၉	လူမှု-စီးပွား	စက်ရုံလည်ပတ်ခြင်း	အလုပ်အကိုင် အခွင့်လမ်းများနှင့် ကျွမ်းကျင် လုပ်သားများ	၄	၈	၃၂	+၃	အလယ်အလတ် ကောင်းကျိုး သက်ရောက်မှု

ဇယား (၁၀) စီမံကိန်းပိတ်သိမ်းချိန်တွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု ဖြစ်နိုင်ချေများအားဆန်းစစ်ခန့်မှန်းခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စုက	အုပ်စုခ	သက်ရောက်မှုအဆင့်	အဆင့်အမျိုးအစား	ဖော်ပြချက်
၁	လေအရည်အသွေး	အဆောက်အဦ ဖြိုဖျက်ခြင်း	ဖုန်နှင့် အမှုန်များ	-၆	၈	-၄၈	-၄	ထင်ရှားသည့် ဆိုးကျိုး သက်ရောက်မှု
		စက်ယန္တရားများအသုံးပြုခြင်း	CO ₂ , NO _x , PMs, VOCs, CO and CH ₄ , C ₆ H ₆ and CH ₂ O					
		သယ်ယူပို့ဆောင်ရေး ယာဉ်များ	CO ₂ , PM ₁₀ , PM _{2.5} , CO ₂ , SO _x , NO _x , CO and GHG					
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း	NO _x , SO ₂ , CO ₂ , PM, HC, etc.					
၂	ဆူညံသံနှင့် တုန်ခါမှု	စက်ယန္တရားများအသုံးပြုခြင်း	ဆူညံသံနှင့် တုန်ခါမှု	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း						

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စုက	အုပ်စုခ	သက်ရောက်မှုအဆင့်	အဆင့်အမျိုးအစား	ဖော်ပြချက်
၃	ရေအရည်အသွေး	အဆောက်အဦ ဖြိုဖျက်ခြင်း၊ ဘိလပ်မြေပါဝင်သည့် အုတ်ခဲကြိုးအပိုင်းအစများ	သဲနှင့် အနည်များပါဝင်မှု၊ pH ပြောင်းလဲခြင်း	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
၄	အထွေထွေ စွန့်ပစ်အမှိုက်	အဆောက်အဦ ဖြိုဖျက်ခြင်း	အုတ်ကျိုးပဲ့စာများ၊ သစ်သားအပိုင်းအစများ၊ ပိုက်များနှင့် မှန်များ	-၁	၆	-၆	-၁	ဆိုးကျိုး သက်ရောက်မှု လျော့နည်း လာခြင်း
	အိမ်သုံးစွန့်ပစ် ပစ္စည်းများ		မီးဖိုဆောင်မှ အမှိုက်များ၊ စားကြွင်း စားကျန်များ၊ ပလပ်စတစ်အမှိုက် များ စသည်					
	အန္တရာယ်ရှိ ပစ္စည်းများ	အဆောက်အဦ ဖြိုဖျက်ခြင်း	ဓာတုပစ္စည်းပါဝင်သည့် အကြွင်း အကျန်များ၊ ဘက်ထရီ၊ လောင်စာ/ပုံးခွံများ၊ လျှပ်စစ်မီးချောင်းများမှ အန္တရာယ်ရှိ ဓာတုပစ္စည်းများ စိမ့်ထွက်ခြင်း					
၅	မြေဆီလွှာ	အဆောက်အဦ ဖြိုဖျက်ခြင်း	မြေဆီလွှာသိပ်သည်းဆများလာခြင်း၊ လောင်စာနှင့် ဆီများယိုဖိတ်/စိမ့်ခြင်း မှ ဓာတုပစ္စည်း ထွက်ရှိလာခြင်း	-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု
၆	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့်	လုပ်ငန်းစဉ်များ အားလုံး	ဓာတုပစ္စည်းများနှင့် ထိတွေ့နိုင်ချေ၊ ရုပ်ပိုင်းဆိုင်ရာ ထိခိုက်မှုများနှင့် ကူးစက်ရောဂါများ	-၃	၇	-၂၁	-၃	အလယ်အလတ် ဆိုးကျိုး သက်ရောက်မှု

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက် ရောက်မှု အဆင့်	အဆင့် အမျိုး အစား	ဖော်ပြချက်
	ဘေးအန္တရာယ် ကင်းရှင်းမှု							
၇	ပြန်လည်ထူထောင် ခြင်း	ဖြိုဖျက်ရေးလုပ်ငန်းစဉ်များပြီးဆုံး ခြင်း	ဒေသမျိုးရင်း/မျိုးစိတ်များကို ပြန်လည် ထိန်းသိမ်းခြင်း (အပင်နှင့် တိရစ္ဆာန်))	၆	၈	၄၈	+၄	ထင်ရှားသည့် ကောင်းကျိုး သက်ရောက်မှု

ဘေးအန္တရာယ် ဆန်းစစ်ခြင်း

ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနည်းလမ်းအား International Civil Aviation Organization-ICAO (2013) မှ ကိုးကားဆန်းစစ်ထားပါသည်။ ပတ်ဝန်းကျင်ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းသည် သဘာဝပတ်ဝန်းကျင်နှင့် လူသားတို့၏ လုပ်ဆောင်မှုတို့ကြောင့် ဘေးအန္တရာယ်ဖြစ်ပွားမှုတို့ကြောင့် လူမှုအသက်မွေး ဝမ်းကြောင်းအပေါ် ဆိုးကျိုးများအား လေ့လာဆန်းစစ်ခြင်းလုပ်ငန်းစဉ် ဖြစ်ပါသည်။ ဘေးအန္တရာယ် အမျိုးအစားခွဲခြားခြင်း လုပ်ငန်းစဉ်ဖြစ်သည့် ဘေးအန္တရာယ်သတ်မှတ်ခြင်း၊ ဘေးအန္တရာယ် ဖြစ်နိုင်ချေ၊ ဘေးအန္တရာယ် ပြင်းထန်မှု၊ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှုတို့အပေါ် မူတည်၍ ဘေးအန္တရာယ် ဆန်းစစ်ခြင်းအား တွက်ချက် ထားပါသည်။ သတ္တုသန့်စင်ခြင်း လုပ်ငန်း၏ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းအား တည်ဆောက်စဉ်နှင့် လည်ပတ်စဉ် လုပ်ငန်းစဉ်တွင် ဖြစ်ပေါ်လာနိုင်သော ဘေးအန္တရာယ်များအပေါ် အခြေခံ၍ ဆန်းစစ်ဖော်ထားပါသည်။ ဘေးအန္တရာယ် ဆန်းစစ်ခြင်းနှင့် စီမံခန့်ခွဲမှုအစီအစဉ်အား ပုံ ၄ တွင် ဖော်ပြထားပါသည်။

ဘေးအန္တရာယ် သတ်မှတ်ခြင်း	ဘေးအန္တရာယ် ဖြစ်နိုင်ချေ	ဘေးအန္တရာယ် ပြင်းထန်မှု	ဘေးအန္တရာယ် ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှု	ဘေးအန္တရာယ် ထိန်းချုပ်ခြင်းနှင့် လျော့ချခြင်း
<ul style="list-style-type: none"> သဘာဝဘေးအန္တရာယ်(မုန်တိုင်းနှင့် ရေကြီးမှုနှင့် ငလျင်) လူပယောဂကြောင့် ဖြစ်ပေါ်သော ဘေးအန္တရာယ် (ရုပ်ပိုင်းဆိုင်ရာဘေးအန္တရာယ်၊ လျှပ်စစ်ဘေးအန္တရာယ်၊ ဓာတုဘေးအန္တရာယ်နှင့် မီးဘေးအန္တရာယ်) 	<ul style="list-style-type: none"> လူမှုဘဝနေထိုင်မှုများကြောင့် ဖြစ်ပေါ်လာသော ဘေးအန္တရာယ်အား ဆန်းစစ်ခြင်း 	<ul style="list-style-type: none"> ဖြစ်ပေါ်လာနိုင်သော ဘေးအန္တရာယ် အကြောင်းအရင်း၏ ပြင်းထန်မှုအား သတ်မှတ်ခြင်း 	<ul style="list-style-type: none"> ဖြစ်ပေါ်လာသော ဘေးအန္တရာယ်သည် လက်ခံနိုင်မှုရှိခြင်း (သို့) မရှိခြင်း 	<ul style="list-style-type: none"> ဘေးအန္တရာယ် အဆင့်အား လက်မခံနိုင်ပါက လက်ခံနိုင်သည့် အဆင့် ရောက်ရှိစေရန် ထိန်းချုပ်ခြင်း

ပုံ (၄) ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် စီမံခန့်ခွဲမှုလုပ်ငန်းစဉ်

ဘေးအန္တရာယ်သတ်မှတ်ခြင်း

Canadian Centre for Occupational Health and Safety အရ မည်သည့်တည်နေရာ၊ အရာဝတ္ထုပစ္စည်း တစ်ခုခုသည် ဘေးအန္တရာယ်ကျရောက်နိုင်သော အလားအလာရှိပါက ဘေးအန္တရာယ် သတ်မှတ်ခြင်းအား လုပ်ငန်းစဉ်တစ်ခုအနေဖြင့် ဆောင်ရွက်ရပါသည်။ လူတို့၏ လုပ်ဆောင်ချက် ကြောင့်ဖြစ်စေ သဘာဝကြောင့် ဖြစ်စေ ဖြစ်ပေါ်လာသော ဘေးအန္တရာယ်အား ဖြေရှင်းရာတွင် ပြည့်စုံသော ဘေးဒုက္ခ ကာကွယ်မှုနှင့် ဘေးအန္တရာယ် လျော့ပါးသက်သာမှုများမှာ အရေးပါပါသည်။ သဘာဝဘေး အန္တရာယ် (ရုပ်ပိုင်းဆိုင်ရာ ဘေးအန္တရာယ်) ဖြစ်သည့် ရေကြီးခြင်း၊ မုန်တိုင်းထန်ခြင်းနှင့် ငလျင်လှုပ်ခတ်ခြင်းနှင့် လူပယောဂကြောင့်ဖြစ်သည့် လုပ်ငန်းခွင်ဆိုင်ရာ ဓာတုဘေးအန္တရာယ်၊ ရုပ်ပိုင်းဆိုင်ရာ ဘေးအန္တရာယ်နှင့် ဇီဝဘေးအန္တရာယ်တို့သည် ယခုစီမံကိန်းအတွက် အဓိက စဉ်းစားထားသည့် အရာများဖြစ်သည်။ ဘေးအန္တရာယ်ဖြစ်နိုင်ချေ (ICAO) ဖော်ပြချက်အရ ဘေးအန္တရာယ် ဖြစ်နိုင်ချေမှာ ဘေးအန္တရာယ် ဖြစ်ပေါ်စေနိုင်သော အကြိမ်အရေအတွက်ကို ကိုယ်စားပြုပါသည်။

ဘေးအန္တရာယ်ဖြစ်နိုင်ချေ

ICAO ဖော်ပြချက်အရ ဘေးအန္တရာယ်ဖြစ်နိုင်ချေမှာ ဘေးအန္တရာယ်ဖြစ်ပေါ်စေနိုင်သော အကြိမ်အရေအတွက်ကို ကိုယ်စားပြုပါသည်။ ဘေးအန္တရာယ်ဖြစ်နိုင်ချေအဆင့်အား အောက်ဖော်ပြပါ ဇယား ၁၁ တွင် ဖော်ပြထားပါသည်။

ဇယား ၁၁ ဘေးအန္တရာယ်ဖြစ်နိုင်ချေရှိမှုအဆင့်

ဖြစ်နိုင်ခြေ	အဓိပ္ပါယ်ဖွင့်ဆိုချက်	ကိန်းဂဏန်း
မကြာခဏ	ဘေးအန္တရာယ် ဖြစ်နိုင်ခြေ အလွန်များပါသည်။	၅
ရံဖန်ရံခါ	ဘေးအန္တရာယ် တစ်ခါတစ်ရံသာ ဖြစ်နိုင်ပါသည်။	၄
ခဲယဉ်းသော	ဘေးအန္တရာယ်ဖြစ်နိုင်ခြေမရှိသော်လည်း ချွင်းချက်အခြေအနေမျိုးတွင် ဖြစ်နိုင်ပါသည်။	၃
ဖြစ်နိုင်ခြေမရှိသော	ဘေးအန္တရာယ်မှာ အလွန် ဖြစ်နိုင်ခြေမရှိပါ။	၂
အလွန် ဖြစ်နိုင်ခြေမရှိသော	ဘေးအန္တရာယ်ဖြစ်နိုင်ခြေမှာ စိတ်ကူး၍ပင် မရနိုင်အောင် နည်းပါးပါသည်။	၁

ဘေးအန္တရာယ် ပြင်းထန်မှု

ဘေးအန္တရာယ်ပြင်းထန်မှုမှာ ဘေးအန္တရာယ်နှင့် ထိတွေ့ကြုံတွေ့လာခြင်းကြောင့် ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှု (သို့မဟုတ်) ဆိုးကျိုးသက်ရောက်မှုအဆင့်ဖြင့် လေ့လာနိုင်ပါသည်။ ဘေးအန္တရာယ် ပြင်းထန်မှုအား အဆင့် ၅ ဆင့်ဖြင့် ဖော်ပြထားပါသည်။ ၎င်းအား ဇယား ၁၂ တွင်ဖော်ပြထားပါသည်။

ဇယား ၁၂ ဘေးအန္တရာယ် ပြင်းထန်မှုပြဇယား

ပြင်းထန်မှု	အဓိပ္ပါယ်ဖွင့်ဆိုချက်	ကိန်းဂဏန်း
ကပ်ဘေး	စက်ကိရိယာများ ပျက်စီးစေနိုင်ခြင်း သေဆုံးမှုအများအပြား ဖြစ်နိုင်ခြင်း	က
အန္တရာယ်ရှိသော	ပြင်းထန်သော ဒဏ်ရာရရှိမှု အဓိက စက်ကိရိယာများ ပျက်စီးခြင်း	ခ
အဓိကဖြစ်သော	ပြင်းထန်သော အခြေအနေဖြစ်ပွားခြင်း လူအများကို ထိခိုက်ဒဏ်ရာ ဖြစ်စေနိုင်ခြင်း	ဂ
အသေးအဖွဲ့	စိတ်အနှောက်အယှက်ဖြစ်ခြင်း လည်ပတ်မှုကန့်သတ်ချက်များ အရေးပေါ်လုပ်ငန်းစဉ်များ အသုံးပြုခြင်း အသေးအဖွဲ့ အခြေအနေဖြစ်ပွားခြင်း	ဃ
မပြောပလောက်သော	အကျိုးဆက်နည်းခြင်း	င

ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှု

ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းအား ဆောင်ရွက်ရာတွင် ဘေးအန္တရာယ်ဖြစ်နိုင်ချေရှိမှုနှင့် ဘေး အန္တရာယ်ပြင်းထန်မှု အပေါ်မူတည်၍ ဆန်းစစ်ပါသည်။ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှုအား ဇယား ၁၃ တွင် လေ့လာ အကဲဖြတ်ထားပါသည်။

ဇယား ၁၃ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှုပြဇယား

ဘေးအန္တရာယ် ဖြစ်နိုင်ခြေ	ဘေးအန္တရာယ် ပြင်းထန်မှု				
	ကပ်ဘေး (က)	အန္တရာယ်ရှိသော (ခ)	အဓိကဖြစ်သော (ဂ)	အသေးအဖွဲ့ (ဃ)	မပြော ပလောက်သော (င)
မကြာခဏ-၅	၅ (က) (ခံနိုင်ရည်မရှိသော)	၅ (ခ) (ခံနိုင်ရည်မရှိသော)	၅ (ဂ) (ခံနိုင်ရည်မရှိသော)	၅ (ဃ) (ခံနိုင်ရည်ရှိသော)	၅ (င) (ခံနိုင်ရည်ရှိသော)
ရံဖန်ရံခါ-၄	၄ (က) (ခံနိုင်ရည်မရှိသော)	၄ (ခ) (ခံနိုင်ရည်မရှိသော)	၄ (ဂ) (ခံနိုင်ရည်ရှိသော)	၄ (ဃ) (ခံနိုင်ရည်ရှိသော)	၄ (င) (ခံနိုင်ရည်ရှိသော)
ခဲယဉ်းသော-၃	၃ (က) (ခံနိုင်ရည်မရှိသော)	၃ (ခ) (ခံနိုင်ရည်ရှိသော)	၃ (ဂ) (ခံနိုင်ရည် ရှိသော)	၃ (ဃ) (ခံနိုင်ရည်ရှိသော)	၃ (င) (လက်ခံနိုင်သော)
ဖြစ်နိုင်ခြေ မရှိသော-၂	၂ (က) (ခံနိုင်ရည် ရှိသော)	၂ (ခ) (ခံနိုင်ရည်ရှိသော)	၂ (ဂ) (ခံနိုင်ရည်ရှိသော)	၂ (ဃ) (လက်ခံနိုင်သော)	၂ (င) (လက်ခံနိုင်သော)
အလွန် ဖြစ်နိုင်ခြေ မရှိသော-၁	၁ (က) (ခံနိုင်ရည် ရှိသော)	၁ (ခ) (လက်ခံနိုင်သော)	၁ (ဂ) (လက်ခံနိုင်သော)	၁ (ဃ) (လက်ခံနိုင်သော)	၁ (င) (လက်ခံနိုင်သော)

ဘေးအန္တရာယ် ထိန်းချုပ်ခြင်းနှင့် လျော့ချခြင်း

ထိန်းချုပ်ခြင်းသည် မလိုလားအပ်သည့် သတ်မှတ်ထားသော အကြောင်းအရာ၏ ဖြစ်နိုင်ချေရှိမှု သို့မဟုတ် ဖြစ်ပွားမှုအကြောင်းအရင်းအား လျော့ချခြင်းဟု သတ်မှတ်နိုင်ပါသည်။ ထိခိုက်မှုလျော့နည်းခြင်းအား သတ်မှတ် ထိန်းချုပ်မှု စနစ် (post control actions) ဖြင့် ဆောင်ရွက်နိုင်ပါသည်။ ထိန်းချုပ်ခြင်းနှင့် ကာကွယ်ခြင်းဆိုင်ရာ လုပ်ငန်းများ ဆောင်ရွက်ပြီးသော်လည်း ၎င်းထိခိုက်မှုမှာ လူမှုပတ်ဝန်းကျင်နှင့် သဘာဝပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှု ရှိနိုင်ပါသေးသည်။ ဘေးအန္တရာယ် ထိန်းချုပ်ခြင်းနှင့် လျော့နည်းသက်သာစေရေးအစီအစဉ်များမှာ အမျိုးမျိုးသော ဘေးအန္တရာယ်အမျိုးအစားအပေါ် မူတည်၍ ပြောင်းလဲမှု ရှိနိုင်ပါသည်။

ပတ်ဝန်းကျင်နှင့် လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့်ဆိုင်သော ဘေးအန္တရာယ်ဆန်းစစ်ခြင်း အနှစ်ချုပ်

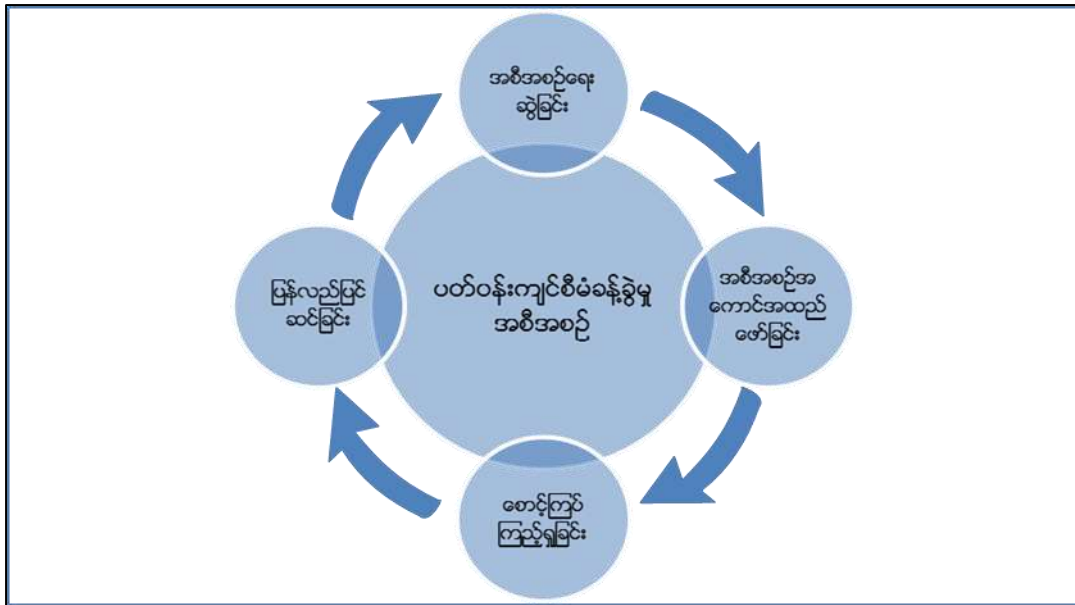
ပတ်ဝန်းကျင်နှင့် လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့်ဆိုင်သော ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့်ဆိုင်သည့် ဘေး အန္တရာယ်ဆန်းစစ်ခြင်း အကျဉ်းချုပ်အား ဇယား ၁၄ တွင် ဖော်ပြထားပါသည်။

ဇယား ၁၄ လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး နှင့်သက်ဆိုင်သည့် ဘေးအန္တရာယ် ဆန်းစစ်ခြင်း အကျဉ်းချုပ်

စီမံကိန်း အခြေအနေ	ဘေးအန္တရာယ်	ဖြစ်ပေါ်နိုင်သည့် ဘေးအန္တရာယ်	ဘေးအန္တရာယ် အဆင့် သတ်မှတ်ချက်	
			လျော့ပါးရေး အစီအစဉ်များ မလုပ်ဆောင်မှီ	လျော့ပါးရေး အစီအစဉ်များ လုပ်ဆောင်ပြီး
တည်ဆောက်နေစဉ်/ ပိတ်သိမ်းစဉ်	လေထုညစ်ညမ်းမှု	ဓာတုဆိုင်ရာ	၃ (က) (ခံနိုင်ရည်မရှိသော)	၃ (ဂ) (ခံနိုင်ရည်ရှိသော)
	ရေထုညစ်ညမ်းမှု		၃ (က) (ခံနိုင်ရည်မရှိသော)	၃ (ဃ) (ခံနိုင်ရည်ရှိသော)
	အန္တရာယ်ရှိ စွန့်ပစ်အစိုင်အခဲ		၃ (က) (ခံနိုင်ရည်မရှိသော)	၂ (ဃ) (လက်ခံနိုင်သော)
လည်ပတ်စဉ်	လေထုညစ်ညမ်းမှု		၅ (ဂ) (ခံနိုင်ရည်မရှိသော)	၃ (ခ) (ခံနိုင်ရည်ရှိသော)
	ရေထုညစ်ညမ်းမှု		၄ (ခ) (ခံနိုင်ရည်မရှိသော)	၃ (ဂ) (ခံနိုင်ရည်ရှိသော)
	အန္တရာယ်ရှိ စွန့်ပစ် အစိုင်အခဲ		၃ (က) (ခံနိုင်ရည်မရှိသော)	၃ (ခ) (ခံနိုင်ရည်ရှိသော)
တည်ဆောက်နေစဉ်/ ပိတ်သိမ်းစဉ်	ဖုန်မှုန့်၊ ဆူညံသံအရည်အသွေး၊ လျှပ်စစ်၊ အထွေထွေ ထိခိုက်မှု	ရူပဆိုင်ရာ	၃ (က) (ခံနိုင်ရည်မရှိသော)	၃ (ခ) (ခံနိုင်ရည်ရှိသော)
လည်ပတ်စဉ်	အသံ၊ အပူလွန်ကဲခြင်း၊ မီးဖို ပေါက်ကွဲနိုင်ချေ၊ လျှပ်စစ် မတော်တဆ		၅ (ဂ) (ခံနိုင်ရည်မရှိသော)	၃ (ဂ) (ခံနိုင်ရည်ရှိသော)
တည်ဆောက်နေစဉ်/ ပိတ်သိမ်းစဉ်	ကူးစက်စေနိုင်သည့် ရောဂါများ နှင့်ပိုးမွှားများမှ တစ်ဆင့် ကူးစက် သည့် ရောဂါများ	ဇီဝဆိုင်ရာ	၃ (ခ) (ခံနိုင်ရည်ရှိသော)	၂ (ဃ) (လက်ခံနိုင်သော)
လည်ပတ်စဉ်	ဘက်တီးရီးယား၊ ဗိုင်းနှင့် ပိုးမွှား များမှ တစ်ဆင့် ကူးစက်သည့် ရောဂါများ (ကြွက်၊ ခြင်နှင့် ပိုးဟပ်စသည်)		၃ (က) (ခံနိုင်ရည်မရှိသော)	၂ (ဃ) (လက်ခံနိုင်သော)

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်သည် စီမံကိန်း၏ထုတ်လုပ်မှုလုပ်ငန်းကြောင့် ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု မရှိစေရန် သက်ဆိုင်ရာ အာဏာပိုင် အဖွဲ့အစည်းများ၏ ချမှတ်ထားသော သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ဥပဒေ၊ စည်းမျဉ်းများနှင့်အညီ သင့်လျော်သော လျှော့ချရေးအစီအစဉ်များကို အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်း ဖြစ်ပါသည်။ ထိုသို့ အကောင်အထည်ဖော် ဆောင်ရွက်ရာ၌ အောက်တွင် ဖော်ပြထားသော ပုံ ၅ စက်ဝိုင်းအတိုင်း စီမံခန့်ခွဲမှုအစီအစဉ် Plan-Do-Check-Act (PDCA) အချက်လေးချက် ပေါ်မူတည်ပြီး ပြုလုပ်ရပါမည်။



ပုံ (၅) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ပြပုံ

Plan (P) - အစီအစဉ်ရေးဆွဲခြင်း

စီမံကိန်းကြောင့် ပတ်ဝန်းကျင်အပေါ်ထိခိုက်မှု ဖြစ်စေနိုင်သော လေထုညစ်ညမ်းမှု၊ အသံဆူညံမှု၊ ရေဆိုးစွန့်ပစ်မှု၊ အမှိုက်စွန့်ပစ်မှု၊ ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှု စသော ထိခိုက်မှုများ လျော့ပါးရေး အတွက် အချိန်ဇယား အစီအစဉ်များ ရေးဆွဲရပါမည်။

Do (D) - အကောင်အထည်ဖော်ဆောင်ခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှု အတွက် ရေးဆွဲထားသော လျှော့ချရေး အစီအစဉ်များကို စီမံကိန်းမှ တာဝန်ရှိသူများက အကောင်အထည်ဖော် ဆောင်ရွက်ရပါမည်။

Check (C) - စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့်စစ်ဆေးခြင်း

လျှော့ချရေး အစီအစဉ်များ အကျိုးသက်ရောက်မှု ရှိ/ မရှိကို စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် စစ်ဆေးခြင်းများ ပြုလုပ်ရပါမည်။ စောင့်ကြည့်မှုအတွက် စီမံကိန်းဖော်ဆောင်သူ အပါအဝင် သက်ဆိုင်ရာ အနီးပတ်ဝန်းကျင်ရှိ ပုဂ္ဂိုလ်များ၊ အုပ်ချုပ်ရေးပိုင်းဆိုင်ရာ ပုဂ္ဂိုလ်များအစရှိသော သက်ဆိုင်ရာ အဖွဲ့အစည်းများ စုပေါင်း၍ လေ့လာ စောင့်ကြည့်မှု ပြုလုပ်ရပါမည်။ ၎င်းစောင့်ကြည့်မှုကိုလည်း အစီရင်ခံစာ ပြုစုပြီး သက်ဆိုင်ရာ ဝန်ကြီးဌာနသို့ တင်ပြရမည်ဖြစ်သည်။

Act (A)- ပြန်လည်ပြင်ဆင်ခြင်း

စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်တွင် လက်ရှိဖြစ်ပေါ်သော ပတ်ဝန်းကျင် ထိခိုက်မှုများနှင့် ကိုက်ညီမှု မရှိခဲ့လျှင် လျော့ချရေး အစီအစဉ်များကို ပြန်လည်ပြင်ဆင်ခြင်းများ ပြုလုပ်ရပါမည်။

ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့နည်းသက်သာစေရေးအစီအစဉ်

ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့နည်းသက်သာစေရေး အစီအစဉ်အား စီမံကိန်းလည်ပတ်စဉ်ကာလ၊ တည်ဆောက်စဉ်၊ ပိတ်သိမ်းစဉ် ဟူ၍ ခွဲခြား၍ အောက်ဖော်ပြပါ ဇယား ၁၅ နှင့် ဇယား ၁၆ တွင် ဖော်ပြထားပါသည်။

ဇယား ၁၅ လည်ပတ်စဉ်ကာလအတွင်း ပတ်ဝန်းကျင်ထိခိုက်မှုအား လျော့နည်းသက်သာစေရေးအစီအစဉ်အကျဉ်းချုပ်

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
၁။	လေထုအရည်အသွေး	အမှုန်အမွှားများ (PM2.5 & PM10), SO2, CO2, NOx, CO and VOCs များအား လေထုအတွင်းသို့ ထုတ်လွှတ်မှု	အပူပေးခြင်းနှင့်အရည်ကျိုခြင်း ဆိုင်ရာ မီးဖိုများ လည်ပတ်ခြင်း	<p>အမှုန်အမွှားနှင့် အန္တရာယ်ရှိ ဓာတ်ငွေ့များ အား ဖမ်းယူနိုင်ရန် လေအိတ်၊ လေဇကာနှင့် wet scrubbers များအား တပ်ဆင်ခြင်း။</p> <p>ဝန်းကျင်လေထုညစ်ညမ်းမှုအား တားဆီးနိုင် ရန်အတွက် ၁၂၀ ပေမြင့်သော မီးခိုးခေါင်းတိုင် အား တပ်ဆင်ခြင်း</p> <p>ဆာလဖာပါဝင်မှု နည်းသော ကုတ်မီးသွေးအား ရွေးချယ် အသုံးပြုခြင်း။</p> <p>ကုန်တင်ခြင်း၊ ကုန်ချခြင်းနှင့် ရောနှောခြင်း လုပ်ငန်းစဉ်များမှ ဖုန်မှုန့်များ ပျံ့လွင့်မှုမရှိစေ ရန် ကုန်ကြမ်းများ (ကုတ်မီးသွေး၊ ခနောက် စိမ်းသတ္တု ရိုင်းနှင့် အခြားကြိတ်ချေထားသည့် ကုန်ကြမ်း များ) အား ဂရုပြုကိုင်တွယ်ခြင်း။</p> <p>ကြိတ်ချေထားသော ကုန်ကြမ်းများအား လေ ထန်သော မြေကွက်လပ်များတွင် အမြောက် အများ သိုလှောင်ခြင်း၊ စုပုံခြင်းအား ကန့်သတ် ခြင်းနှင့် သင့်တော်သော အဖုံးအကာများအား လုပ်ငန်းဆောင်ရွက်နေစဉ်တွင် အသုံးပြုခြင်း။</p>	HSE Team	၂,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
				ပျံ့လွင့်မှုများအား ရှောင်ရှားနိုင်ရန် ပြာအား ပြာစုဆောင်းကန်တွင် စုဆောင်း သိမ်းဆည်း ခြင်း။ မီးဖို၏လည်ပတ်မှုစနစ်နှင့် လုပ်ဆောင်မှုများ အား ပုံမှန် ဆန်းစစ်ခြင်းနှင့် လိုအပ်ပါက ထိန်းသိမ်းခြင်း လုပ်ငန်းစဉ်များအား ဆောင် ရွက်ခြင်း။		
		SO2, ခနောက်စိမ်းအမှုန့် နှင့်အမှုန့်အမွှားများ (PM10 and PM2.5) ထွက်ရှိခြင်း။	ခနောက်စိမ်း သတ္တုရိုင်းအား အပူပေးခြင်း	wet scrubber၏ pH level, ဆေးဖြန်း ပေါက်များ၊ လေလှည့်ပတ်မှု အစရှိသည့် အဓိကပစ္စည်းများ အား ပုံမှန်စစ်ဆေးခြင်းနှင့် သန့်ရှင်းခြင်းတို့ကို ဆောင်ရွက်ခြင်း။ လည်ပတ်မှုစနစ်နှင့် ဖြစ်နိုင်ချေရှိသော ပြဿနာ များအား ဖော်ထုတ်နိုင်ရန်အတွက် wet scrubber ၏ လည်ပတ်မှု မှတ်တမ်းအား ထိန်းသိမ်းခြင်း။ တိုက်စားမှုနှင့် ဖုန်မှုန့်များနှင့် အခြားပစ္စည်း များ ယိုစိမ့်မှုမှ တားဆီးနိုင်ရန်အတွက် wet scrubber အား သတ်မှတ် စည်းမျဉ်းများ အတိုင်း ဂရုပြု ကိုင်တွယ်ခြင်း။ ခနောက်စိမ်းအမှုန့်များအား မြေကွက်လပ်တွင် စုဆောင်းမည့်အစား အလုံပိတ်သတ္တုကန်များကို အသုံးပြု၍ စုဆောင်းခြင်း	HSE Team	

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
				လေအိတ်နှင့် လေစကားများအား ပုံမှန်ရှင်းလင်း ပေးခြင်း။		
		CO2, NO2, SO2 နှင့် အမှုန် အမွှားများ (PM10, PM2.5) ထွက်ရှိခြင်း	အထောက်အကူပြုလုပ်ငန်းစဉ် များလည်ပတ်ခြင်း (မီးစက်နှင့် သယ်ယူပို့ဆောင်ရေးယာဉ်များ)	ဆာလဖာပါဝင်မှုနည်းသော ဒီဇယ် လောင်စာအား အသုံးပြုခြင်း။ စက်ရုံ၏ စက်ပစ္စည်းများနှင့် အစိတ်အပိုင်းများ အား စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိန်းသိမ်း ခြင်း။ ကုန်တင်စဉ်တွင် လမ်းပေါ်၌ ရေဖြန်းပေးခြင်း နှင့် ရွံ့များ ဖြစ်ပေါ်စေနိုင်သည့် ရေ အများအပြား ဖြန်းခြင်းအား တားမြစ်ခြင်း။	HSE Team	
၂။	ဆူညံသံနှင့် တုန်ခါမှု	အနီးပတ်ဝန်းကျင်သို့ ဆူညံသံများ ပျံ့နှံ့ခြင်း။ တုန်ခါမှုများကြောင့် လုပ်ငန်းခွင် ထိခိုက်မှုများ နှင့် အဆောက်အအုံများ ပျက်စီးမှု	စီမံကိန်း လည်ပတ်မှုများ လုပ်ငန်းများဖြစ်သည့် လေမှုတ် စက်၊ မီးစက်နှင့် ကုန်ကြမ်း ကိုင်တွယ်သည့် နေရာ (မီးသွေး ကြိတ်ခွဲသည့် နေရာ) ကုန်ကြမ်းပစ္စည်းများနှင့် ထွက်ကုန်များ သယ်ယူသည့် ယာဉ်များ	လေမှုတ်စက်များမှ ထွက်ရှိလာသည့် ဆူညံ သံများအား ဖယ်ရှားနိုင်ရန် ဆူညံသံ နည်းပါး သည့် ပန်ကာများ သို့မဟုတ် အလုံပိတ်စနစ်အား အသုံးပြုခြင်း။ လေမှုတ်စက်နှင့် ၎င်း၏ ဆက်စပ်ပစ္စည်းများ အား ကောင်းမွန်သော လည်ပတ်မှု ရရှိစေရန်နှင့် ဆူညံသံ ထွက်ရှိမှု နည်းပါးစေရန် ပုံမှန် စစ်ဆေး ခြင်း နှင့် ထိန်းသိမ်းခြင်း။ ဆူညံသံ နည်းပါးသည့် ကြိတ်ခွဲစက်များအား ကုန်ကြမ်း ပြင်ဆင်ခြင်းနှင့် ကိုင်တွယ်ခြင်း လုပ်ငန်းများတွင် ဦးစားပေး အသုံးပြုခြင်း	HSE Team	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
				<p>ဆူညံသံထွက်ရှိမှု များပြားသည့် နေရာတွင် လုပ်ကိုင်လျက်ရှိသည့် အလုပ်သမားများအား နားကြပ်များ ထောက်ပံ့ပေးခြင်း။</p> <p>ဆူညံသံနှင့် တုန်ခါမှုများသည့် နေရာများတွင် လုပ်ကိုင်သော အလုပ်သမားများအား အလှည့်ကျ တာဝန်ထမ်းရွက် စေခြင်း။</p> <p>မော်တော်ယာဉ်များ၏ အရှိန်အား ကန့်သတ်ခြင်း နှင့် ကျွမ်းကျင် ဝန်ထမ်းများအား ကုန်တင်ခြင်း လုပ်ငန်းစဉ်များတွင် ခန့်အပ်ထားရှိခြင်း။</p>		
၃။	ရေအရည်အသွေး	စွန့်ပစ်ရေအတွင်း ဆိုင်းကြွ အနည်ပါဝင်မှုပမာဏ များပြားခြင်း။	ငွေ့ရည်ဖွဲ့ပိုက်လိုင်းဖြင့် ဓာတ်ငွေ့အအေးခံခြင်း လုပ်ငန်းစဉ်	<p>အအေးခံခြင်းလုပ်ငန်းစဉ်မှ ထွက်ရှိသော ရေပူများ အား အအေးခံရန် လုံလောက်သော ရေကန်များ ထားရှိခြင်းနှင့် ၎င်းရေများအား တူညီသော လုပ်ငန်းစဉ် (အအေးခံခြင်း) တွင် ပြန်လည် အသုံးပြုခြင်း။</p> <p>အအေးခံကန်ရှိ ရေပူများအား အပူချိန် ၃၀. °C အောက်ရှိမှသာ ပြင်ပသို့ စွန့်ထုတ်ခြင်း။</p> <p>ဘေးပတ်ဝန်းကျင်သို့ ရေပူများ စိမ့်ထွက်ခြင်း အား တားမြစ်ခြင်း။</p> <p>ရေပိုက်လိုင်းများနှင့် အပူချိန်ထိန်းညှိသည့် စနစ် အား ပုံမှန်စစ်ဆေးခြင်းနှင့် ထိန်းသိမ်းခြင်း။</p>	HSE Team	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
		scrubbing liquid (wet scrubber တွင် အသုံးပြုသော သတ္တုရည်) များ အသုံးပြုခြင်းကြောင့် ရေထုထည်အား ထိခိုက်စေခြင်း	Wet scrubber လည်ပတ်ခြင်း	the wet scrubber လည်ပတ်ရန် အတွက် အသုံးပြုသော သတ္တုရည်များ ပြင်ပသို့ စွန့်ထုတ်ခြင်းအား တားမြစ်ခြင်း။ မမျှော်လင့်ထားသည့် စိမ့်ထွက်မှုများ ဖြစ်ပေါ်မှု မရှိစေရန် wet scrubber ၏ ရေပိုက် လိုင်းများ အား ပုံမှန် စစ်ဆေးခြင်း။ အနည်အနှစ်များ စုဆောင်းသည့် အချိန်တွင် စွန့်ပစ်ရေများ စွန့်ထုတ်မှု မရှိစေရန် ဆောင်ရွက်ခြင်းနှင့် ကန်အတွင်းရှိ စွန့်ထုတ် ရေများအား အခြားကန်တွင် ထိန်းသိမ်းထားခြင်း	HSE Team	
		ခနောက်စိမ်းအမှုန့်များ ကြောင့် ရေထုညစ်ညမ်းမှု ဖြစ်ပေါ် စေခြင်း။	လေစစ်စကာများ ဆေးကြောသန့်စင်ခြင်းလုပ်ငန်း	အနည်ထိုင်ကန်များပြုလုပ်၍ စွန့်ပစ်ရေရှိ ဆိုင်းကြွ အစိုင်အခဲများအား အနည်ထိုင် စေခြင်း။ ပြင်ပ ရေနုတ်မြောင်းသို့ မထုတ်လွှတ်မီ အနည်ထိုင်ကန်များတွင် စွန့်ပစ်ရေများ ထားရှိသည့် အချိန်အား လုံလောက်စွာ ထားရှိခြင်း အုတ်ရေနုတ်မြောင်းသို့ ကွန်ကရစ် ရေနုတ်မြောင်းအား စီမံကိန်းဧရိယာအတွင်း တည်ဆောက်ခြင်း။ မိုးရေနှင့် စီးဆင်းရေများအတွက် သင့်လျော်သော ရေနုတ်မြောင်းများအား ထောက်ပံ့ခြင်း။	HSE Team	

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
				အဆိုပြု စီမံကိန်းမှ ထွက်ရှိလာသော စွန့်ပစ် ရေများအား ပုံမှန်စောင့်ကြပ် ကြည့်ရှုခြင်း။		
၄။	မြေအရည်အသွေး	စွန့်ပစ်အမှိုက်များစုပုံခြင်းမှ ထွက်ရှိလာသော စိမ့်ထွက်ရည်များကြောင့် မြေညစ်ညမ်းခြင်း။	စီမံကိန်းဧရိယာအတွင်းတွင် အမှိုက်များ စုပုံထားရှိခြင်း။	wet scrubber နှင့် အနည်ထိုင်ကန်များမှ ထွက်ရှိလာသော အနည်အနှစ်များအား မြေပြင် ပေါ်တွင် စုပုံခြင်းအား တားမြစ်ခြင်း။ အမှိုက်သိုလှောင်ကန်အား စီမံခန့်ခွဲခြင်း မရှိသည့် ကြမ်းခင်းနှင့် အမိုးအကာ အောက်တွင် ထားရှိခြင်း အမှိုက်များအား ၎င်းတို့၏ ကိုင်တွယ်မှု နည်းလမ်း များအတိုင်း ကောင်းမွန်စွာ ထုတ်ပိုး၍ စုဆောင်း ခြင်း။	HSE Team	၁,၅၀၀,၀၀၀
		မြေအရည်အသွေးတွင် ဓာတု ပစ္စည်းပါဝင်မှုများ မြင့်တက်ခြင်း။	ကုန်ထုတ်လုပ်ရေးလုပ်ငန်းမှ ထွက်ရှိသည့် စွန့်ပစ်ပစ္စည်း (slag) များအား လမ်းခင်းခြင်း	စွန့်ပစ်ပစ္စည်း (slag) များအား သက်ဆိုင်ရာ ဌာန၏ စည်းကမ်းချက်များနှင့်အညီ သတ်မှတ် အမှိုက်ပုံတွင် စွန့်ပစ်ခြင်း။ အပူပေးခြင်းနှင့် အရည်ကျိုခြင်း လုပ်ငန်းစဉ်မှ ထွက်ရှိသော စွန့်ပစ်ပစ္စည်း (slag) များအား အောက်ခင်း မပါသော မြေပေါ်တွင် စုပုံခြင်းအား ရှောင်ရှားခြင်း။အောက်ခင်း သို့မဟုတ် စိမ့်ထွက် ရည် စုဆောင်းသည့် စနစ်အား အမှိုက် စွန့်ပစ် သည့်နေရာတွင် အသုံးပြုခြင်း။	HSE Team	

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
				အမှိုက်ပုံမှ စိမ့်ထွက်ရည်များအား သတ်မှတ် စည်းကမ်းချက်အတွင်း ရရှိစေရန် ပုံမှန် စောင့် ကြပ်ကြည့်ရှုခြင်း။		
		မြေအရည်အသွေးနှင့် မြေဂေဟစနစ်အား ညစ်ညမ်းခြင်း	လောင်စာ၊ ကုန်ကြမ်းပစ္စည်းနှင့် ဒီဇယ် သိုလှောင်ခြင်းနှင့် အသုံးပြုခြင်း။	လောင်စာနှင့် ကုန်ကြမ်းပစ္စည်းများအား ၎င်းတို့၏ သတ်မှတ်ချက်အတိုင်း ဂရုပြု ကိုင်တွယ်ခြင်းနှင့် သိုလှောင်ခြင်း။ လောင်စာနှင့် ကုန်ကြမ်းပစ္စည်းများ ကိုင်တွယ် ခြင်းဆိုင်ရာ သင်တန်းများ ပို့ချခြင်း။ မမျှော်လင့်ထားသော ဖိတ်စင်မှုများ ရှိပါက ချက်ချင်း ညစ်ညမ်းသော မြေအား ဖယ်ရှားခြင်း။ ကုန်ကြမ်း ပစ္စည်းများ ပြင်ဆင်ခြင်းနှင့် သိုလှောင် သည့်နေရာများတွင် မယိုစိမ့်နိုင်သော အခင်းများ ထားရှိခြင်း။	HSE Team	
၅။	အစိုင်အခဲအမှိုက်များ	အမှိုက်စွန့်ပစ်နေရာမှ အန္တရာယ်ရှိသော ဓာတု ပစ္စည်းများ ပါဝင်သည့် စိမ့်ထွက်ရည်များကြောင့် မြေနှင့်ရေထုအား ညစ်ညမ်း စေခြင်း။	စက်ရုံလည်ပတ်ခြင်းမှ အန္တရာယ်ရှိသော အမှိုက်များ ထွက်ရှိခြင်း	စွန့်ပစ်အမှိုက် (ပစ်စာ) များအား ကွန်ကရစ်နှင့် တည်ဆောက်ခြင်း လုပ်ငန်းစဉ်များသို့ ပြန်လည် ရောင်းချခြင်း။ သတ်မှတ်ထားသော ဥပဒေ၊ စည်းကမ်းချက် များနှင့်အညီ ကျိုက်မရော မြို့နယ် အတွင်းရှိ နတ်စံမိုင်းသို့ အန္တရာယ်ရှိ အမှိုက်များအား စွန့်ပစ် ခြင်း	HSE Team	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
		စနစ်မကျသော အမှိုက် စွန့်ပစ်မှုကြောင့် အနံ့ဆိုး နှင့် ကူးစက်ရောဂါများ ဖြစ်ပွားခြင်း။	စက်ရုံအလုပ်သမားများမှ အန္တရာယ်မရှိသော အမှိုက်များ ထွက်ရှိခြင်း။	စက်ရုံအမှိုက်များအား မြေပြင်ပေါ်တွင် စွန့်ပစ် ခြင်းအား ရှောင်ရှားခြင်း အန္တရာယ်မရှိသော အမှိုက်များအား ပြန်လည် အသုံးပြုနိုင်ရန်အတွက် ခွဲခြားစွန့်ပစ်ခြင်းအား အားပေးခြင်း။ အမှိုက်ခွဲခြားစွန့်ပစ်နိုင်ရန် အမှိုက်ပုံးများအား လုံလောက်စွာထောက်ပံ့ပေးခြင်း။ အမှိုက်စွန့်ပစ်ခြင်း မပြုမီ အမှိုက်ယာယီ သိုလှောင် နေရာအား သတ်မှတ်ထားခြင်း။ မြို့နယ်စည်ပင်သာယာရေးနှင့် ချိတ်ဆက်၍ ပုံမှန် အမှိုက်သိမ်းစနစ်နှင့် အမှိုက်စွန့်ပစ်သည့် စနစ်အား ဆောင်ရွက်ခြင်း။ စက်ရုံအတွင်း အမှိုက်မီးရှို့ခြင်းအား တားမြစ် ခြင်း	HSE Team	
၆။	အနံ့	အနံ့ဆိုးများကြောင့် ယာယီ စိတ် အနှောင့်အယှက် ဖြစ်ပေါ်ခြင်းမှစ၍ ပြင်းထန်သော အသက်ရှူ လမ်းကြောင်းဆိုင်ရာ ကျန်းမာရေး ထိခိုက်မှုများ။	အပူပေးခြင်းနှင့် အရည်ကျိုခြင်း လုပ်ငန်းစဉ်များ	အပူပေးခြင်းနှင့် အရည်ကျိုခြင်း လုပ်ငန်းရှိ ဓာတ်ငွေ့ပိုက်လှိုင်းများမှ ယိုစိမ့်မှု မဖြစ်ပေါ် စေရန် ဂရုတစိုက် အလုံပိတ်ခြင်းနှင့် တပ်ဆင် ခြင်း။ wet scrubbers အား အနံ့ဖြစ်ပေါ်စေ သော ဓာတုပစ္စည်းများ (SO2) အား မီးခိုးအတွင်းမှ ဖမ်းယူနိုင်ရန် တပ်ဆင်ခြင်း။	HSE Team	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
				ကုန်ထုတ်လုပ်ရေး ဧရိယာတွင် အနံ့ဆိုး ထွက်ရှိမှု လျော့နည်းစေရန်နှင့် လေအရည် အသွေးကောင်းမွန်စေရန် လေအဝင်အထွက် ကောင်းမွန်စေရန် ဆောင်ရွက်ခြင်း။ လေအိတ်အတွင်းရှိလေစကားများ ပျက်စီးမှု ရှိပါက ချက်ချင်းပြင်ဆင်ခြင်း။ အလုံပိတ်စနစ်ဖြစ်သည့် အပူပေးခြင်းနှင့် အရည်ကျိုခြင်း လုပ်ငန်းစဉ်မှ ဓာတ်ငွေ့ ယိုစိမ့်မှုအား ပုံမှန် စောင့်ကြပ် စစ်ဆေးခြင်း။		
၇။	လူမှုစီးပွားရေးနှင့် ရိုးရာယဉ်ကျေးမှု ဆိုင်ရာ အကြောင်းအရာများ	လူမှုပြဿနာများနှင့် ဒေသ တွင်း ကိုးကွယ် ယုံကြည်မှု ဆိုင်ရာ ပြဿနာများ ဖြစ်ပေါ်ခြင်း။	စက်ရုံလည်ပတ်ခြင်း။	ရွှေ့ပြောင်းအလုပ်သမားများအား ဒေသတွင်း ယုံကြည်မှုနှင့် ရိုးရာဓလေ့များအား တန်ဖိုး ထားရန် ဟောပြောပွဲများ ဆောင်ရွက်ခြင်း။ ဒေသခံပြည်သူများ၏ နေရပ်ဒေသများသို့ သွားလာမှုအား ကန့်သတ်ခြင်း။ အနီးပတ်ဝန်းကျင်နှင့် စက်ရုံအတွင်းမှ မကျေနပ် မှုများအား စုဆောင်းနိုင်ရန် အကြံပေးစာများ ထားရှိခြင်း။ မကျေနပ်ချက်များအား ဖြေရှင်းသည့် နည်းလမ်း များအား ထားရှိ၍ စီမံကိန်း ပိုင်ရှင်နှင့် ထိခိုက်	HSE Team	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
		ရေချိုအရင်းအမြစ် ကုန်ဆုံးခြင်း	အတ္တရံမြစ်မှ မြေပေါ်ရေအား အသုံးပြုခြင်း။	သက်ရောက်သူများကြား တွင် ကောင်းမွန်သော ဆက်ဆံရေး ထားရှိခြင်း။ ကုန်ထုတ်လုပ်ရေး လုပ်ငန်းစဉ်အတွင်း အသုံးပြု သော ရေများအား အအေးခံ၍ ပြန်လည် အသုံးပြုခြင်း ရေသိုလှောင်ကန်များ ဖြည့်တင်းရာတွင် ရေဖိတ် လျံကျမှုအား တားမြစ်ခြင်း။ စက်ရုံအလုပ်သမားများအား အထွေထွေရေ ထိန်းသိမ်းခြင်းဆိုင်ရာအပြုအမူများအားဝေငှခြင်း။		
၈။	လုပ်ငန်းခွင်ကျန်းမာ ရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းမှု	စနစ်မကျသော စီမံခန့်ခွဲမှုများ ကြောင့် အသက်ရှူ လမ်းကြောင်းဆိုင်ရာ ပြဿနာများနှင့် ထိခိုက်ဒဏ်ရာ ရရှိခြင်း	အပူပေးခြင်းနှင့် အရည်ကျိုခြင်း လုပ်ငန်းစဉ် မီးဖိုလည်ပတ်ခြင်း	ဓာတ်ငွေ့အခိုးငွေ့ စိမ့်ထွက်မှု မရှိစေရန် ဓာတ်ငွေ့ပိုက်လိုင်းများနှင့် ၎င်းအဆက်များ အား တင်းကျပ်စွာ အလုံပိတ် တပ်ဆင်ခြင်း။ အပူပေးခြင်းနှင့် အရည်ကျိုခြင်း လုပ်ငန်း နေရာ၌ ဓာတ်ငွေ့ယိုစိမ့်မှုအား ပုံမှန် စောင့်ကြပ် စစ်ဆေး ခြင်းနှင့် မှတ်တမ်းထားရှိခြင်း။ အပူခံလက်အိတ်၊ အရေပြား အကာအကွယ်နှင့် မျက်လုံအကာအကွယ်များအား အပူချိန်မြင့်မား သည့်နေရာတွင် လုပ်ကိုင်သော အလုပ်သမားများ သို့ ထောက်ပံ့ခြင်း။	HSE Team	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန် ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျ စရိတ် (ကျပ်)
				<p>ပုံမှန် ဆေးစစ်ပေးခြင်းနှင့် ရာသီတုပ်ကွေး ကာကွယ်ဆေးများအား ဝန်ထမ်းများကို ထောက်ပံ့ပေးခြင်း။</p> <p>ရှေးဦးသူနာပြု ဆေးသေတ္တာများအား ကုန် ထုတ်လုပ်ရေးလုပ်ငန်းစဉ်တိုင်းတွင် ထားရှိ၍ အသိအမှတ်ပြု လိုင်စင်ရ ဆေးဝန်ထမ်းအား ထားရှိခြင်း။</p> <p>တစ်ကိုယ်ရည်သုံး အကာအကွယ်ပစ္စည်းများ အား ထိရောက်စွာ အသုံးပြုနိုင်ရန် သင်တန်းများ စီမံဆောင်ရွက်ခြင်း</p>		

ဇယား ၁၆ လုပ်ငန်းတည်ဆောက်စဉ်နှင့် ပိတ်သိမ်းစဉ်ကာလအတွင်း ပတ်ဝန်းကျင်ထိခိုက်မှုအား လျော့နည်းသက်သာစေရေးအစီအစဉ် အကျဉ်းချုပ်

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက်များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
၁။	လေထုအရည်အသွေး	အမှုန်အမွှား (PM2.5 & PM10), SO2, CO2, NOx, CO နှင့် VOCs စသော ဓာတ်ငွေ့များ ထွက်ရှိခြင်း	ပြန်လည် တည်ဆောက်ခြင်းနှင့် စက်ရုံဖျက်သိမ်းခြင်းဆိုင်ရာ လုပ်ဆောင်ချက်များ	တည်ဆောက်ခြင်းနှင့် ဖျက်သိမ်းခြင်း မစခင် အန္တရာယ်ဖြစ်စေနိုင်သော တည်နေရာများအား သတ်မှတ်ခြင်းနှင့် အသိပေး ဆိုင်းဘုတ်များ၊ အတားအဆီးများ ထားရှိခြင်း။ လုပ်ငန်းဆောင်ရွက်နေစဉ်အတွင်း အမှုန်အမွှားများ ပျံ့လွင့်မှုနည်းပါးစေရန် ရေဖြန်းပေးခြင်း။ လမ်းပေါ်သို့ရေအမြောက်အများဖြန်းပေးခြင်းအား တားမြစ်ခြင်း။ အဆောက်အအုံများဖြိုဖျက်ရာတွင် ပြန်လည်အသုံးပြုနိုင်သော ပစ္စည်းများ ရရှိနိုင်ရန်နှင့် အမှုန်အမွှား ထွက်ရှိမှု နည်းပါးစေရန် ဂရုပြုဆောင်ရွက်ခြင်း တည်ဆောက်ရေးနှင့် ဖြိုဖျက်ခြင်းမှ ထွက်ရှိလာသော ပြန်လည်အသုံးပြုနိုင်သည့် ပစ္စည်းများအား ၎င်းတို့၏ ကြံ့ခိုင်အား ပေါ်မူတည်၍ ပြန်လည် အသုံးပြုခြင်း။	စက်ရုံ၏ HSE အဖွဲ့ နှင့် ကန်ထရိုက်တာ	၂,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
				<p>ကုန်ကြမ်းပစ္စည်းများအား လေဟာပြင်တွင် စုပုံထားရှိခြင်း အား ကန့်သတ်ခြင်း။</p> <p>တည်ဆောက်ရေး ကုန်ကြမ်းများနှင့် ဖြိုဖျက်ပြီး ပစ္စည်းများအား သယ်ယူရာတွင် လုံခြုံရေးသုံး ကွန်ရက်နှင့် အမိုးအကာများ အသုံးပြုခြင်း။</p> <p>သယ်ယူပို့ဆောင်ရေး ယာဉ်များအား ပုံမှန် စစ်ဆေးခြင်းနှင့် လိုအပ်ပါက ထိန်းသိမ်းရေးလုပ်ငန်းစဉ်များ ဆောင်ရွက်ခြင်း။</p> <p>သယ်ယူပို့ဆောင်ရေးအတွက် သင့်တော်သော လမ်းကြောင်းများ သတ်မှတ်၍ အကွာအဝေးအား လျော့ချခြင်း။</p> <p>ဆာလဖာပါဝင်မှုနည်းသော လောင်စာအား မီးစက်နှင့် သယ်ယူ ပို့ဆောင်ရေးယာဉ်တွင် ဦးစားပေးအသုံးပြုခြင်း။</p> <p>တည်ဆောက်ရေးနှင့် ဖြိုဖျက်ခြင်းသုံး စက်ပစ္စည်းများအား ပုံမှန် စစ်ဆေးခြင်းနှင့် လိုအပ်ပါက ထိန်းသိမ်းရေးလုပ်ငန်းစဉ်များ ဆောင်ရွက်ခြင်း။</p>		

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
၂။	ဆူညံသံနှင့် တုန်ခါမှု	အနီးပတ်ဝန်းကျင်သို့ ဆူညံသံ ထွက်ရှိခြင်း တုန်ခါမှုများကြောင့် လုပ်ငန်းခွင် အန္တရာယ်နှင့် အဆောက်အဦများထိခိုက် ခြင်း။	တည်ဆောက်ရေးနှင့် ဖြိုဖျက်ရေး လုပ်ငန်းခွင်သုံး စက်ပစ္စည်းများ လည်ပတ်ခြင်း	ဆူညံသံနှင့် တုန်ခါမှု ထွက်ရှိမှု နည်းပါးသည့် ခေတ်မီစက်ပစ္စည်းများအား အစားထိုး အသုံးပြုခြင်း။ စက်ပစ္စည်းများအား ဆူညံသံနှင့် တုန်ခါမှု နည်းပါးစေရန် ကောင်းမွန်စွာ ထိန်းသိမ်း ပြုပြင်ပေးခြင်း။ ဆူညံသံနှင့် တုန်ခါမှု နည်းပါးစေသော လုပ်ငန်းခွင်သုံးနည်းလမ်းနှင့် အပြုအမူများ (သင့်တော်သောအမြင့်ဖြင့် ကုန်ချခြင်း) များ ပြုလုပ်ခြင်း။ အနီးပတ်ဝန်းကျင် နေထိုင်သူများနှင့် လုပ်ငန်းများအား ဖြစ်ပေါ်နိုင်သော ထိခိုက် နိုင်မှုပမာဏနှင့် ဆောင်ရွက်မည့်အချိန် ဇယားအား အကြောင်းကြားခြင်း။ ဆူညံသံနှင့် တုန်ခါမှုပမာဏအား ပုံမှန် စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် မှတ်တမ်း ထားရှိ ခြင်း။	စက်ရုံ၏ HSE အဖွဲ့ နှင့် ကန်ထရိုက်တာ	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
			မီးစက်နှင့် သယ်ယူပို့ဆောင်ရေး ယာဉ်အသုံးပြုခြင်း။	မီးစက်နှင့် သယ်ယူပို့ဆောင်ရေးယာဉ်များ အား ပုံမှန် စစ်ဆေးခြင်းနှင့် ထိန်းသိမ်းခြင်း အသံလုံသည့် မီးစက်နှင့် အင်ဂျင်စက်အား အသုံးပြုခြင်း။ အင်ဂျင်စက်အား မလိုအပ်ပါက အရှိန် မြင့်တင်ခြင်းအား တားဆီးခြင်း။ ကုန်တင်၊ ကုန်ချ လုပ်ငန်းစဉ်များအတွက် လမ်းကြောင်းအကွာအဝေးအား လျော့ချ နိုင်ရန် ဆောင်ရွက်ခြင်း။ ညစ်ညမ်းမှုဖြစ်ပေါ်စေသည့်နေရာတွင် အသံနှင့် ဆူညံသံလျော့ချနိုင်သည့် အခင်း နှင့် အတားအဆီးများ ပြုလုပ်ခြင်း။ ဆူညံသံ ဖြစ်ပေါ်စေသည့် မီးစက်အား ဆူညံသံ လျော့ချမည့် အတားအဆီးများ ပြုလုပ်၍ လူနေမှုပတ်ဝန်းကျင်နှင့် ဝေးကွာ သည့်နေရာတွင် ထားရှိခြင်း။		
၄။	ရေအရည် အသွေး	စီးဆင်းရေနှင့် မိုးရေများသည် လုပ်ငန်းစဉ်အတွင်းရှိ အနည်အနှစ် ဓာတုပစ္စည်းနှင့်	တည်ဆောက်ခြင်းနှင့် ဖြိုဖျက် ခြင်းမှ ထွက်ရှိသည့် အုတ်နှင့် အခြားပစ္စည်းများ	တည်ဆောက်ရေး လုပ်ငန်းစဉ်သုံး ပစ္စည်း များအား လေဟာပြင်တွင် စုပုံ ထားရှိခြင်း		၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
		အမှိုက်များအား သယ်ဆောင် သွားခြင်းဖြင့် ရေအရည်အသွေး ကျဆင်းစေ ခြင်း	ဖြစ်သည့်များ စုပုံထားရှိ ခြင်း။	အား ကန့်သတ်ခြင်းနှင့် အမိုးအကာ များဖြင့် ထားရှိရန်။ လုံလောက်သော အမှိုက်ပုံးနှင့် ယာယီ အမှိုက် သိုလှောင်ကန်ထားရှိ၍ အမှိုက်စိမ့် ထွက်ရည်အား ထိန်းချုပ်ခြင်း။ အနည်အနှစ်အား ပြန်လည်ဆယ်ယူနိုင် သည့် စနစ်ပါဝင်သော ရေနုတ်မြောင်းအား တပ်ဆင် ခြင်း။ .ရေအရည်အသွေးနှင့် ရေစီးဆင်းမှုပုံစံအား ပုံမှန်စစ်ဆေးခြင်း။	စက်ရုံ၏ HSE အဖွဲ့ နှင့် ကန်ထရိုက်တာ	
		စနစ်မကျသော စီမံခန့်ခွဲမှုကြောင့် ရေထုအား ညစ်ညမ်းခြင်း	စီမံကိန်းလုပ်သားများ၏ တစ်ကိုယ်ရေ အထွေထွေ လုပ်ငန်းများ	သန့်ရှင်း၍ ကျန်းမာရေးနှင့် ညီညွတ်သော သန့်စင်ခန်းနှင့် မိလ္လာကန်များ ထောက်ပံ့ ခြင်း။ မိလ္လာကန်များမှ အနည်အနှစ်များအား ပုံမှန် ဖယ်ရှားခြင်းနှင့် စိမ့်ထွက်မှုမရှိစေရန် ဆောင်ရွက်ခြင်း။		

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
				စီမံကိန်း ရေနုတ်မြောင်းများအား ရေစီး ရေလာကောင်းမွန်စေရန် ပုံမှန် စစ်ဆေး ခြင်းနှင့် သန့်ရှင်းခြင်း။ သဘာဝရေစီးဆင်းမှုနှင့် ရေသွားလာ လမ်းကြောင်းများအား အနှောင့်အယှက် ဖြစ်စေသည့် အပြုအမူများအား တားမြစ်ခြင်း။		
၄။	မြေအရည်အ သွေး	မြေတိုက်စားခြင်းနှင့် မြေအရည်အသွေး ကျဆင်းခြင်း	တည်ဆောက်ခြင်းနှင့် ဖြိုဖျက်ခြင်း လုပ်ငန်းစဉ်သုံး စက်ယန္တရားများ လည်ပတ်ခြင်း။	ရေဖြန်းသည့်နေရာတွင် ယာယီ နှုံးတား များ ထားရှိခြင်း။ လောင်စာ၊ ချောဆီနှင့် အမဲဆီတို့အား ကောင်းမွန်စွာကိုင်တွယ်အသုံးပြုခြင်း။ ဆီယိုဖိတ်မှုဖြစ်ခဲ့ပါက ညစ်ညမ်းမြေအား ချက်ချင်း ဖယ်ရှားခြင်း။ ကောင်းမွန်သော လည်ပတ်နှုန်းရရှိစေရန် စက်ပစ္စည်းများအား ပုံမှန်စစ်ဆေး၍ ထိန်းသိမ်းရေးလုပ်ငန်းစဉ်များ ဆောင်ရွက် ခြင်း။	စက်ရုံ၏ HSE အဖွဲ့ နှင့် ကန်ထရိုက်တာ	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
				<p>.အသုံးပြုပြီးသော အင်ဂျင်ပိုင်နှင့် ချောဆီ တို့အား လုံခြုံသောဗူးတွင် ထည့်သွင်း၍ သတ်မှတ်စည်းကမ်းအတိုင်း စွန့်ပစ်ခြင်း။</p> <p>ယာယီအမှိုက်သိုလှောင်ကန်အား မစိမ့်ဝင်နိုင်သော ကြမ်းခင်းနှင့် အမိုးအကာ များ ထားရှိခြင်း။</p> <p>မြေတိုက်စားမှုလျော့ချစေရန် အပင်များ စိုက်ပျိုးခြင်း။</p>		
၅။	စွန့်ပစ်အမှိုက်	သင့်တော်မှုမရှိသော သိုလှောင်မှု ကြောင့် ပတ်ဝန်းကျင်နှင့် ကျန်းမာရေးအပေါ် ထိခိုက်ခြင်း။	တည်ဆောက်ခြင်းနှင့် ဖြိုဖျက်ခြင်း လုပ်ငန်းစဉ်မှ ထွက်ရှိခြင်း	<p>လုပ်ငန်းမစခင်၊ အမှိုက်ထွက်ရှိမှုပမာဏ၊ အမျိုးအစားတို့အား တွက်ချက် စီစဉ်ထား ရှိခြင်း။</p> <p>ထွက်ရှိသော အမှိုက်များအား အမျိုးအစား အလိုက် ခွဲခြားစုဆောင်းခြင်း။</p> <p>ပြန်လည်အသုံးပြုနိုင်သော အမှိုက်များအား စီမံကိန်းအတွင်းတွင် ပြန်လည် အသုံးပြု ခြင်းနှင့် ပြန်လည် ရောင်းချခြင်း။</p>	စက်ရုံ၏ HSE အဖွဲ့ နှင့် ကန်ထရိုက်တာ	၁,၅၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
				<p>ပြန်လည်အသုံးပြုနိုင်သော အမှိုက်များ အား သတ်မှတ်စည်းကမ်းချက်များနှင့်အညီ စွန့်ပစ်ခြင်း။</p> <p>အန္တရာယ်ရှိအမှိုက်များနှင့် လျှပ်စစ် ပစ္စည်းများအား ခွဲခြားထားရှိ၍ မြို့နယ် စည်းကမ်းချက်များနှင့်အညီ စွန့်ပစ်ခြင်း။</p> <p>အမှိုက်များအား လေဟာပြင်တွင် မီးရှို့ခြင်း အား တားမြစ်ခြင်း။</p>		
		စနစ်မကျသော အမှိုက်စီမံခန့်ခွဲမှုကြောင့် အနံ့ဆိုးများနှင့် ကူးစက်ရောဂါများ ဖြစ်ပွားနိုင်ခြင်း။	နားနေဆောင်နှင့်လူနေ ဆောင်တို့မှ စက်ရုံအလုပ်သမားများ၏ အထွေထွေအမှိုက်များ	<p>လုံလောက်သော အမှိုက်ပုံးများအား စီမံကိန်း ဧရိယာအနှံ့ ထောက်ပံ့ပေးခြင်း</p> <p>မြို့နယ်စည်ပင်သာယာရေးနှင့် ချိတ်ဆက်၍ ပုံမှန် အမှိုက်စုဆောင်း၍ စွန့်ပစ်ခြင်း။</p> <p>အနံ့ဆိုးထွက်ရှိမှုနည်းပါးစေရန် အဖုံးပါသည့် အမှိုက်ပုံးများဖြင့် အသုံးပြုခြင်း။</p> <p>ပြန်လည်အသုံးပြုနိုင်သော အမှိုက်များအား ခွဲခြား၍ မြို့နယ် စည်ပင်သာယာရေးနှင့် ချိတ်ဆက်၍ စွန့်ပစ်ခြင်း။</p>		

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
၆။	လူမှုစီးပွားရေး နှင့် ရိုးရာ ယဉ်ကျေးမှု ဆိုင်ရာ အကြောင်း အရာများ	လူမှုစီးပွားရေးအပေါ် သက်ရောက်မှုများ	တည်ဆောက်ရေးနှင့် ဖြိုဖျက်ခြင်းဆိုင်ရာ လုပ်ငန်းများ ဆောင်ရွက်ခြင်း	ဘေးပတ်ဝန်းကျင်သို့ သက်ရောက်နိုင်သည့် ဖြစ်နိုင်ချေရှိသော အန္တရာယ်များအား နည်းပါးအောင်ဆောင်ရွက်ခြင်း (တည်ဆောက်ရေးပစ္စည်းများ ပြုတ်ကျခြင်းနှင့် ဖုန်မှုန့်ပျံ့လွင့်ခြင်း) လုပ်ငန်း လည်ပတ်စဉ်အတွင်း ဒေသခံ ပြည်သူများအား အလုပ်အကိုင်နှင့် စီးပွားရေး ဆိုင်ရာအခွင့်အလမ်းများ ဖန်တီး ပေးခြင်း။ အလုပ်သမားများအား ဒေသအယူအဆ များ၊ ရိုးရာယဉ်ကျေးမှုများအား လေးစားမှု ရှိစေ ရန်နှင့် တန်ဖိုးထားတက်စေရန် အသိပညာ ပေးခြင်း	စက်ရုံ၏ HSE အဖွဲ့ နှင့် ကန်ထရိုက်တာ	၁,၀၀၀,၀၀၀
၇။	လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် ဘေး အန္တရာယ် ကင်းရှင်းရေး	လုပ်ငန်းခွင်ထိခိုက်ဒဏ်ရာ ရရှိမှုနှင့်လုပ်ငန်းခွင် ကျန်းမာရေး	တည်ဆောက်ရေး လုပ်ငန်းစဉ်သုံး စက်ပစ္စည်းများ အသုံးပြုခြင်း (မြေတူးစက်၊ ဝန်ချီစက်)	လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေး အသိပညာပေးခြင်းများ ဆောင်ရွက်ခြင်း၊ (၎င်းတွင် စက်ပစ္စည်းများနှင့် အရေးပေါ် ပစ္စည်းများ ကိုင်တွယ်ပုံပါဝင်ပါသည်) ကျွမ်းကျင် ဝန်ထမ်းများအား ၎င်းတို့ ကျွမ်းကျင်သည့်နေရာ၌ ခန့်အပ်ထားရှိခြင်း။	စက်ရုံ၏ HSE အဖွဲ့ နှင့် ကန်ထရိုက်တာ	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
				စက်ရုံ ဝန်ထမ်းများအား သန့်ရှင်း၍ ကျန်းမာရေးနှင့် ညီညွတ်သော ရေ ရရှိရန် ဆောင်ရွက်ခြင်း။ လုပ်ငန်းခွင်နေရာတွင် ရှေးဦးသူနာပြု ဆေး သေတ္တာများ ထောက်ပံ့ထားရှိ၍ လိုင်စင်ရ ဆေးဝန်ထမ်းအား ခန့်အပ်ခြင်း။ ဝန်ထမ်းများအား ပုံမှန်ဆေးစစ်ပေးခြင်းနှင့် ရာသီတုပ်ကွေးကာကွယ်ဆေးများ ထောက်ပံ့ ပေးခြင်း။		
၈။	ဂေဟစနစ်နှင့် သဘာဝပတ်ဝ န်းကျင်	ဖွံ့ဖြိုးခြင်းလုပ်ငန်းစဉ် ကြောင့် သဟဇာတ ဖြစ်နေ သော ဂေဟစနစ်အား ပျက်ယွင်းစေခြင်း	တည်ဆောက်ခြင်း၊ ဖွံ့ဖြိုးခြင်းနှင့် ဝန်ထမ်းများ အသက်ရှင်နေထိုင်ခြင်း။	မြေတိုက်စားမှု လျော့နည်းစေရန်နှင့် မြေဆီလွှာဖြစ်ပေါ်မှု ရှိစေရန် သစ်ပင်များ အား ပြန်လည်စိုက်ပျိုး ထားရှိခြင်း။ ဒေသရင်းမျိုးစိတ်များ ပြန်လည်စိုက်ပျိုး ထားရှိပြီး လိုအပ်သည့် ထိန်းသိမ်းမှုများ ပြုလုပ်ခြင်း။ မလိုအပ်ပါက သစ်ပင်များ ခုတ်လဲမှုကို ရှောင်ရှားခြင်း။	စက်ရုံ၏ HSE အဖွဲ့ နှင့် ကန်ထရိုက်တာ	၁,၀၀၀,၀၀၀

စဉ်	ထိခိုက်နိုင်မှု	ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှုများအပေါ် ဆန်းစစ်ခြင်း	စီမံကိန်းဆောင်ရွက်ချက် များ	ထိခိုက်မှုလျော့နည်းသက်သာစေသည့် နည်းလမ်းများ	တာဝန်ရှိသည့် အဖွဲ့အစည်း	နှစ်စဉ် ကုန်ကျစရိတ် (ကျပ်)
				သဘာဝရေစီးကြောင်းများအား အနှောင့် အယှက်ပေးခြင်း၊ ဟန့်တားခြင်းတို့ကို တားမြစ်ခြင်း။		

စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်

စီမံကိန်း လည်ပတ်စဉ်၊ တည်ဆောက်စဉ်နှင့်ပိတ်သိမ်းစဉ်အတွက် ရေးဆွဲထားသော စောင့်ကြပ်ကြည့်ရှုရေး အစီရင်ခံစာအား ဇယား ၁၇ နှင့် ၁၈ တွင် အသီးသီး ဖော်ပြထားပါသည်။

ဇယား ၁၇ စီမံကိန်းလည်ပတ်စဉ်ကာလအတွင်း ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်များ

ပတ်ဝန်းကျင် အရည်အသွေး	စောင့်ကြပ်ကြည့်ရှုမည့် ပါရာမီတာ	စောင့်ကြပ်ကြည့်ရှုမည့် တည်နေရာ	အကြိမ် အရေအတွက်	တာဝန်ရှိ အဖွဲ့အစည်း	နှစ်စဉ် ခန့်မှန်းကုန်ကျစရိတ်
လေအရည်အသွေး	Ozone, Nitrogen Dioxide, Sulphur Dioxide, Particulate Matter (PM 2.5 and PM10), Total Suspended Particles, Carbon Monoxide	အပူပေးခြင်းလုပ်ငန်းစဉ်နှင့် မီးစက်အနီး 16° 28.588'N, 97° 40.557'E	တစ်နှစ်လျှင် နှစ်ကြိမ်	HSE အဖွဲ့	၆,၀၀၀,၀၀၀
		အရည်ကျိုခြင်းလုပ်ငန်းစဉ် 16° 28.576'N, 97° 40.618'E			
		ဝန်းကျင်လေထု 16° 28.462'N, 97° 40.612'E			
ရေအရည်အသွေး	pH, Color, Turbidity, TDS, Hardness, Chloride, Nitrate, Arsenic, Iron, Lead, Manganese, Sulfate, Total-Coliform	စီမံကိန်း၏ မြေအောက်ရေ 16°28'34.99"N 97°40'33.04"E	တစ်နှစ်လျှင် နှစ်ကြိမ်	HSE Team	၃,၀၀၀,၀၀၀
	pH, Temperature, TSS, Ammonia, BOD, COD, Total Chlorine, Cyanide, Total Phosphorous, Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Nickel, Mercury, Chromium (Hexavalent), Sulfide, Phenol, Fluoride, Oil & Grease, Total-Coliform	စီမံကိန်း၏စွန့်ပစ်ရေ 16°28'37.40"N 97°40'35.25"E			

ပတ်ဝန်းကျင် အရည်အသွေး	စောင့်ကြပ်ကြည့်ရှုမည့် ပါရာမီတာ	စောင့်ကြပ်ကြည့်ရှုမည့် တည်နေရာ	အကြိမ် အရေအတွက်	တာဝန်ရှိ အဖွဲ့အစည်း	နှစ်စဉ် ခန့်မှန်းကုန်ကျစရိတ်
	Total Suspended Solids, BOD, COD, DO, pH, Ammonium nitrogen, Oil and grease, E.coli, Copper	အတ္တရံမြစ်၏ မြေပေါ်ရေ 16°28'18.31"N 97°40'29.21"E			
ဆူညံသံ	နေအချိန်နှင့် ညအချိန်ဆူညံသံ ထွက်ရှိမှုနှုန်း	အပူပေးခြင်းလုပ်ငန်းစဉ်နှင့် မီးစက်အနီး 16° 28.588'N, 97° 40.557'E	တစ်နှစ်လျှင် နှစ်ကြိမ်	HSE Team	၁,၈၀၀,၀၀၀
		အရည်ကျိုခြင်းလုပ်ငန်းစဉ် 16° 28.576'N, 97° 40.618'E			
		စီမံကိန်းအနီးမြေကွက်လပ် 16° 28.462'N, 97° 40.612'E			
မြေအရည်အသွေး	pH, Zinc, Copper, Lead, Arsenic	စီမံကိန်းဧရိယာအတွင်း 16°28'37.32"N, 97°40'36.17"E	တစ်နှစ်လျှင် နှစ်ကြိမ်	HSE Team	၆,၀၀၀,၀၀၀
အနံ့ထွက်ရှိမှု	အနံ့ပါရာမီတာ	အရည်ကျိုခြင်းလုပ်ငန်းစဉ် 16°28'36.66"N, 97°40'33.16"E	တစ်နှစ်လျှင် နှစ်ကြိမ်	HSE Team	၃,၀၀၀,၀၀၀
		ကုန်ကြမ်းသိုလှောင်ခြင်း 16°28'36.10"N, 97°40'33.69"E			
		မီးသွေး သိုလှောင်သည့်နေရာ 16°28'36.19"N, 97°40'35.95"E			
တုန်ခါမှု	Radial, Transverse, Vertical	အပူပေးခြင်းလုပ်ငန်းစဉ်နှင့် မီးစက်အနီး 16° 28.588'N, 97° 40.557'E	တစ်နှစ်လျှင် နှစ်ကြိမ်	HSE Team	၂,၀၀၀,၀၀၀
		အသစ်တိုးချဲ့ထားသည့်နေရာ 16° 28.576'N, 97° 40.618'E			

ပတ်ဝန်းကျင် အရည်အသွေး	စောင့်ကြပ်ကြည့်ရှုမည့် ပါရာမီတာ	စောင့်ကြပ်ကြည့်ရှုမည့် တည်နေရာ	အကြိမ် အရေအတွက်	တာဝန်ရှိ အဖွဲ့အစည်း	နှစ်စဉ် ခန့်မှန်းကုန်ကျစရိတ်
စွန့်ပစ်အစိုင်အခဲ	အမှိုက်ထွက်ရှိမှုအမျိုးအစားနှင့်ပမာဏ	ယာယီအမှိုက်သိုလှောင်ကန်နှင့် အနီးဝန်းကျင်	အပတ်စဉ်	HSE Team	၁,၀၀၀,၀၀၀
လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းမှု	မတော်တဆ ထိခိုက်ဒဏ်ရာ ရရှိမှု	စီမံကိန်းအနီးပတ်ဝန်းကျင်	လစဉ်	HSE Team	၁,၀၀၀,၀၀၀
ဂေဟစနစ်နှင့် သဘာဝပတ်ဝန်းကျင်	အပင်ပေါက်ရောက်မှုပုံစံနှင့် ပျံ့နှံ့မှုပုံစံ သဘာဝရေထုထည်နှင့် တိရစ္ဆာန်များ၏ သွားလာရာလမ်းကြောင်းများ တည်ဆောက်ခြင်းလုပ်ငန်းစဉ်များနှင့် အမှိုက်များကြောင့်တောရိုင်းတိရစ္ဆာန်များ အပေါ် ထိခိုက်မှုများ ဖြစ်ပေါ်ခြင်း The potential impacts on natural habitat of biodiversity due to construction activities and wastes.	စီမံကိန်းဧရိယာအနီးပတ်ဝန်းကျင်	လစဉ်	HSE Team	၁,၀၀၀,၀၀၀

ဇယား ၁၈ စီမံကိန်းတည်ဆောက်စဉ်နှင့်ပတ်သိမ်းစဉ်ကာလအတွင်း ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်များ

ပတ်ဝန်းကျင် အရည်အသွေး	စောင့်ကြပ်ကြည့်ရှုမည့် ပါရာမီတာ	စောင့်ကြပ်ကြည့်ရှုမည့် တည်နေရာ	အကြိမ်အရေအတွက်	တာဝန်ရှိ အဖွဲ့အစည်း	နှစ်စဉ် ခန့်မှန်း ကုန်ကျစရိတ်
လေအရည်အသွေး	Ozone, Nitrogen Dioxide, Sulphur Dioxide, Particulate Matter (PM 2.5 and PM10), Total Suspended Particles, Carbon Monoxide,	အပူပေးခြင်းလုပ်ငန်းစဉ်နှင့် မီးစက်အနီး 16° 28.588'N, 97° 40.557'E	တည်ဆောက်စဉ်/ ပိတ်သိမ်းစဉ် လျှင် တစ်ကြိမ်	HSE အဖွဲ့	၁,၀၀၀,၀၀၀
ရေအရည်အသွေး	pH, Color, Turbidity, TDS, Hardness, Chloride, Nitrate, Arsenic, Iron, Lead, Manganese, Sulfate, Total-Coliform	စီမံကိန်း၏ မြေအောက်ရေ 16°28'34.99"N 97°40'33.04"E	တည်ဆောက်စဉ်/ ပိတ်သိမ်းစဉ် လျှင် တစ်ကြိမ်	HSE အဖွဲ့	၁,၀၀၀,၀၀၀
	pH, Temperature, TSS, Ammonia, BOD, COD, Total Chlorine, Cyanide, Total Phosphorous, Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Nickel, Mercury, Chromium (Hexavalent), Sulfide, Phenol, Fluoride, Oil & Grease, Total-Coliform	စီမံကိန်း၏စွန့်ပစ်ရေ 16°28'37.40"N 97°40'35.25"E			
ဆူညံသံ	Day time and Night time Noise Level	အပူပေးခြင်းလုပ်ငန်းစဉ်နှင့် မီးစက်အနီး 16° 28.588'N, 97° 40.557'E	တည်ဆောက်စဉ်/ ပိတ်သိမ်းစဉ် လျှင် တစ်ကြိမ်	HSE အဖွဲ့	၃၀၀,၀၀၀
မြေအရည်အသွေး	pH, Zinc, Copper, Lead, Arsenic	စီမံကိန်းဧရိယာအတွင်း 16°28'37.32"N, 97°40'36.17"E	တည်ဆောက်စဉ်/ ပိတ်သိမ်းစဉ် လျှင် တစ်ကြိမ်	HSE အဖွဲ့	၃၀၀,၀၀၀

ပတ်ဝန်းကျင် အရည်အသွေး	စောင့်ကြပ်ကြည့်ရှုမည့် ပါရာမီတာ	စောင့်ကြပ်ကြည့်ရှုမည့် တည်နေရာ	အကြိမ်အရေအတွက်	တာဝန်ရှိ အဖွဲ့အစည်း	နှစ်စဉ် ခန့်မှန်း ကုန်ကျစရိတ်
အနံ့ထွက်ရှိမှု	Odor Value	အရည်ကျိုခြင်းလုပ်ငန်းစဉ် 16°28'36.66"N, 97°40'33.16"E	တည်ဆောက်စဉ်/ ပိတ်သိမ်းစဉ် လျှင် တစ်ကြိမ်	HSE အဖွဲ့	၅၀၀,၀၀၀
တုန်ခါမှု	Radial, Transverse, Vertical	အပူပေးခြင်းလုပ်ငန်းစဉ်နှင့် မီးစက်အနီး 16° 28.588'N, 97° 40.557'E	တည်ဆောက်စဉ်/ ပိတ်သိမ်းစဉ် လျှင် တစ်ကြိမ်	HSE အဖွဲ့	၅၀၀,၀၀၀
စွန့်ပစ်အစိုင်အခဲ	အမှိုက်ထွက်ရှိမှုအမျိုးအစားနှင့်ပမာဏ	ယာယီအမှိုက်သိုလှောင်ကန်နှင့် အနီးဝန်းကျင်	အပတ်စဉ်	HSE အဖွဲ့	၅၀၀,၀၀၀
လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းမှု	မတော်တဆ ထိခိုက်ဒဏ်ရာ ရရှိမှု	စီမံကိန်းအနီးပတ်ဝန်းကျင်	လစဉ်	HSE အဖွဲ့	၅၀၀,၀၀၀
ဂေဟစနစ်နှင့် သဘာဝပတ်ဝန်းကျင်	အပင်ပေါက်ရောက်မှုပုံစံနှင့် ပျံ့နှံ့မှုပုံစံ သဘာဝရေထုထည်နှင့် တိရစ္ဆာန်များ၏ သွားလာရာလမ်းကြောင်းများ တည်ဆောက်ခြင်းလုပ်ငန်းစဉ်များနှင့် အမှိုက်များကြောင့် တောရိုင်းတိရစ္ဆာန်များအပေါ် ထိခိုက်မှုများ ဖြစ်ပေါ်ခြင်း	စီမံကိန်းဧရိယာအနီးပတ်ဝန်းကျင်	လစဉ်	HSE အဖွဲ့	၅၀၀,၀၀၀

အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း

လူထုတွေ့ဆုံပွဲအကျဉ်းချုပ်

အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးပွဲကို မနက် ၁၀ နာရီ မှ ၁၁ နာရီ ၃၀ မိနစ် တွင် မော်လမြိုင် စက်မှုဇုန်ခန်းမတွင် ဆောင်ရွက်ခဲ့ပါသည်။ လူထုတွေ့ဆုံပွဲ အခမ်းအနားသို့ စုစုပေါင်း ၆၂ ဦး တက်ရောက် ခဲ့ပြီး အစည်းအဝေး တက်ရောက်သူများမှာ ဌာနဆိုင်ရာ အဖွဲ့အစည်းများ၊ ဒေသခံပြည်သူများ၊ အဆိုပြုစီမံကိန်းနှင့် တတိယ အဖွဲ့အစည်း အကြံပေးပုဂ္ဂိုလ်တို့ဖြစ်ပါသည်။

လူထုတွေ့ဆုံပွဲကို စီမံကိန်းအကြောင်းအရာ တင်ပြရှင်းလင်းချက်များဖြင့် စတင်ခဲ့ပြီးနောက် အမေးအဖြေ ကဏ္ဍတွင် တက်ရောက်လာသူများနှင့် အပြန်အလှန် ဆွေးနွေးခဲ့ကြပါသည်။ OBES ၏ ဒါရိုက်တာ ဒေါ်လဲ့လဲ့ဝင်း မှ လက်ရှိပတ်ဝန်းကျင်အခြေအနေနှင့် ပတ်ဝန်းကျင်အရည်အသွေးဆိုင်ရာ တွေ့ရှိချက်များ တင်ပြဆွေးနွေးခဲ့ ပါသည်။ အကြံပြုချက်များဆွေးနွေးရာတွင် ဌာနဆိုင်ရာမှ အကြီးအကဲများ၊ အဆိုပြု စီမံကိန်းမှ တာဝန်ရှိသူများ၊ ဒေသခံပြည်သူများနှင့် တတိယအကြံပေး ပုဂ္ဂိုလ်များမှ တက်ကြွစွာ ပါဝင်ဆောင်ရွက်ခဲ့ကြပါသည်။ လူထု တွေ့ဆုံပွဲ၏ အကြံပြုချက်များအား အခန်း (၇) တွင်အသေးစိတ် ဖော်ပြထားပါသည်။

နိဂုံးချုပ်နှင့် အကြံပြုခြင်း

နိဂုံးချုပ်

ဤကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း အစီရင်ခံစာသည် အဆိုပြုစီမံကိန်း၏ တည်ဆောက်စဉ်၊ လုပ်ငန်း လည်ပတ် စဉ်နှင့် ပိတ်သိမ်းစဉ်ကာလများတွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်၊ လူမှုရေးနှင့် ကျန်းမာရေး ဆိုင်ရာ သက်ရောက်မှုများကို အကဲဖြတ်ဆန်းစစ်ခြင်းများ ဆောင်ရွက်ထားပါသည်။ လေ့လာချက်များကို စီမံကိန်း အကြောင်းအရာ၊ သက်ဆိုင်ရာ အရင်းအမြစ်မျိုးစုံမှ သတင်းအချက်အလက် များ၊ စီမံကိန်း ဧရိယာရှိ ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဆိုင်ရာ ကွင်းဆင်းဖော်ပြချက်များ၊ စီမံကိန်းအတွင်းနှင့် အနီးနားရှိ အစိုးရကဏ္ဍများနှင့် အဖွဲ့အစည်းများတွင် ပါဝင်သော ဆက်စပ်ပတ်သက်သူများနှင့် ဆွေးနွေး တင်ပြချက် များနှင့် အဆိုပြုစီမံကိန်းနှင့် ပတ်သက်သော ပတ်ဝန်းကျင်နှင့် နည်းပညာဆိုင်ရာ အတွေ့အကြုံ ရှိသော အကြံပေးပုဂ္ဂိုလ်များအပေါ် အခြေခံ၍ ပြင်ဆင်ရေးဆွဲထားပါသည်။ ရရှိလာသော လေ့လာချက်များအရ အဓိကကျသော အကြောင်းအရာများကို အခန်းလိုက်ကို အပိုဒ် ၉.၁ နှင့် ဤအစီရင်ခံစာ အကျဉ်းချုပ်ကို အပိုဒ် ၉.၃ ပါအတိုင်း နိဂုံးချုပ် ဖော်ပြထား ပါသည်။

အကြံပြုချက်များ

ဤကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းလေ့လာခြင်းသည် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ပြဿနာများ၊ လျှော့ချရေးနည်းလမ်းများနှင့် စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်များကို ရှင်းလင်းစွာ ဖော်ပြထား ပါသည်။ စီမံကိန်းအဆိုပြုသူသည် ဤအစီရင်ခံစာတွင် ဖော်ပြထားသော လျှော့ချရေးအစီအစဉ်များ၊ စီမံခန့်ခွဲမှု အစီအစဉ်များနှင့် စောင့်ကြပ်ကြည့်ရှုရေးအစီအစဉ်များအားလုံးကို အကောင်အထည်ဖော် ဆောင်ရွက်ရမည် ဖြစ်သည်။ ထို့အပြင် စီမံကိန်းအကောင်အထည် ဖော်ဆောင်သူသည် ပတ်ဝန်းကျင်ဆိုင်ရာ လမ်းညွှန်ချက် များ၊ ဥပဒေအတိုင်း ရေးဆွဲရန်လိုအပ်သော လျှော့ချရေးနည်းလမ်း ဆောင်ရွက်ခြင်းနှင့် အခြားသော သက်ဆိုင်ရာ လိုအပ်ချက်များကို အစဉ်မပြတ်လိုက်နာရမည်ဖြစ်သည်။

EXECUTIVE SUMMARY

1. Profile of Project Proponent

Myanmar Shing Shing Metal Company Limited (hereinafter referred to as MSS) was incorporated under the Myanmar Companies Act (1914) on 22 May 2017 in the Republic of the Union of Myanmar with the company registration no. 111057893 as a private company limited. MSS Antimony Smelting and Refinery factory, located inside the Mawlamyine Industrial Zone, is manufacturing antimony ingots by refining and smelting antimony ore. The registration number of private industry is Ma/Gyi/338. The investment amount is about 800 million of Myanmar Kyat. The information of proposed project is mentioned in Table 1.

Table 1: Contact of Project Proponent

Project Proponent	Daw Yadanar Lin Aung (Managing Director) 09 450034533
Contact of MSS Factory	U Tin Nyo (Factory Manager) 0943129102
Address	Plot No. (325, 326, 327, 328, 329, 330), Shwe Myo Taw 1 st Street, Mawlamyine Industrial Zone, Naune Pin Seik Village Track, Kyiek Mayaw Township, Mon State

1.1. Background of Proposed Project

MSS has handed the the proposed antimony smelting and refinery factory from Kaung Kin Chout Pwint Company Limited in 2016. Meanwhile, the proposed factory had conducted the initial environmental examination report (IEE) due to the instruction of Mon ECD and then, in March 2023, IEE of proposed project had been approved from ECD. In fourth quarter of 2024, the proposed project has arranged to exaggerate the production process and area. Therefore, ECD instructed the proposed project to prepare the new IEE report for the whole project expansion in December, 2024. Therefore, this report is conducted according to the instructions of EIA procedure (2015).

1.2. IEE Consultant

To study the initial environmental examination (IEE) of the project, the proposed factory has engaged with the Olive Bright Environmental Solutions Limited (OBES), on February, 2025. The proposed IEE study team of OBES has instituted with the qualified and licensed professionals in various technical areas of environmental and social study. The information about the IEE study team of OBES is shown in the Table 2.

Name of Organization:	Olive Bright Environmental Solutions Limited (OBES)
License No.	EIA-CO(A)002/2023
Contact Person:	Dr. Lai Lai Win (Managing Director)

Address: No.394, Maggin Residence, Wartayar 3rd
Street, Kabaraye, Mayangone Township,
Yangon Region, Myanmar.

Phone No. +959797241421

Email: service@uniquenviron.com

Table 2: IEE Study Team

No	Name of Consultants	Registration number	Specialized Fields
1.	Dr. Lai Lai Win	EIA-C 019/2023	<ul style="list-style-type: none"> • Water Pollution Prevention, Control and Prediction of Impacts • Ecology and Biodiversity • Solid Waste and Hazardous Waste Management • Risk Assessment and Hazard Management
2.	Mr. Min Min Oo	EIA-C 020/2023	<ul style="list-style-type: none"> • Air Pollution Prevention, Monitoring and Control • Meteorology, Air Quality Modeling and Prediction
3.	Ms. Myat Thitsar Naing	EIA-C 021/2023	<ul style="list-style-type: none"> • Social Study and Analysis
4.	Mr. Myo Thura	EIA-C 046/2023	<ul style="list-style-type: none"> • Geological Assessment • Soil Conservation
5.	Ms. Aye Aye Soe	EIA-C 068/2024	<ul style="list-style-type: none"> • Land Use
6.	Mr. Kyaw Win Han	EIA-AC 027/2023	<ul style="list-style-type: none"> • Air Quality Monitoring
7.	Mr. Si Yan Hein	EIA-AC 026/2023	<ul style="list-style-type: none"> • Geological Assessment
8.	Mr. Htet Thiha Phone Myint	EIA-AC 032/2023	<ul style="list-style-type: none"> • Geological Assessment • Noise and Vibration
9.	Mr. Khin Maung Aye	EIA-AC 018/2023	<ul style="list-style-type: none"> • Archaeological Impact Assessment
10.	Mr. Khin Maung Win	EIA-AC 028/2023	<ul style="list-style-type: none"> • Water Pollution Prevention, Control and Prediction of Impacts • Hydrology, Surface Water and Groundwater • General Environmental Management
11.	Dr. Phyu Phyu Myint	EIA-AC 020/2023	<ul style="list-style-type: none"> • Health Impact and Study
12.	Dr. Nilar Win	Supportive Member	<ul style="list-style-type: none"> • Air Quality Monitoring

13.	Ms. Thet Wai Hnin	Supportive Member	• Natural Resources Management
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2. OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The activities carried out under the project are subject to these legal requirements. Summarized relevant laws and regulations for the project are expressed in Table 3. It is sure that the project proponent will comply with all the following laws and regulations.

Table 3 Relevant Laws and Regulations

No.	Name of Laws and Regulations	Year
Environmental Conservation		
1.	Environmental Conservation Law	2012
2.	Environmental Impact Assessment Procedure	2015
3.	National Environmental Quality (Emission) Guidelines	2015
4.	National Drinking Water Quality Standards	2019
5.	National Surface Water Quality	2024
Pollution Health		
6.	The Union Myanmar Public Health Law	1972
7.	The Prevention and Control of Communicable Diseases Law	1995, amended in 2011
8.	The Control of Smoking and Consumption of Tobacco Product	2006
9.	Occupational Safety and Health Law	2019
10.	Myanmar Fire Brigade Law	2015
11.	Prevention of Hazard from Chemical and Related Substances Law	2013
12.	The Industrial Explosive Materials Law	2018
13.	The Explosive Substances Act	1908
Resources Conservation		
14.	Conservation of Water Resources and River Law	2006, amended in 2017
15.	Conservation of Water Resources and River Rules	2013
16.	Underground Water Act	1930
Human Rights		
17.	The Ethnic Rights Protection Law	2015
18.	The Ethnic Rights Protection Rule	2019
19.	Labour Organization Law	2011
20.	The Minimum Wage Law	2013

No.	Name of Laws and Regulations	Year
21.	The Payment of Wages Law	2016
22.	The Workers' Compensation Act	1923
23.	The Settlement of Labour Dispute Law	2012
24.	Social Security Law	2012, amended in 2020
Company		
25.	Myanmar Insurance Law	1993, amended in 1996
26.	Myanmar Insurance Rule	2017
27.	Myanmar Investment Law	2016, amended in 2019
28.	Myanmar Companies Law	2017
29.	The Private Industrial Enterprise Law	1990
30.	The Export and Import Law	2012
31.	The Union Tax Law	2019
Cultural Heritages		
32.	The Protection and Preservation of Cultural Heritage Region Law	2019
33.	The Protection and Preservation of Antique Object Law	2015
34.	The Protection and Preservation of Ancient Monument Law	2015
Urban Development and Management		
35.	Mon State Municipal Law	June, 2017
36.	The Electricity Law	2014
Disaster Management		
37.	Natural Disaster Management Law	2013

3. DETAILED PROJECT DESCRIPTION

3.1.1. Project Description

MSS Factory, Myanmar Shing Shing Antimony Smelting & Refinery Factory (will use ‘The project proponent’ in later Sections) has been manufacturing Antimony ingot since 2018. The project was running with the name ‘Kaung Kin Chout Pwint, Co. Ltd’ in 2013 until 2017. After that, early 2018 was completely finished the conveyance of ownership process. It is 100% local investment and the project is running with the amount of 800 million (eight hundred million). Total area was 1.30 Acre wide but the factory will be extended around 45746.62 sq ft in the near future.

The essential raw material is purchased from the Natt Sann Village, Kyaikmaraw Township, Mon State and coal purchasing from Kalawa, Sagaing and Magway. The other supported items such as coke, soda ash light, etc., is imported from China. The factory is situated at the plot No. 325 to 330, Shwe Myo Taw 1st Street, Mawlamyine Industrial Zone, Nyaung Pin Seik Village Tract, Mawlamyine Township, Mon State as mentioned in Figure 1. The main product of the factory is antimony ingot which is exported to Europe and Asian countries.

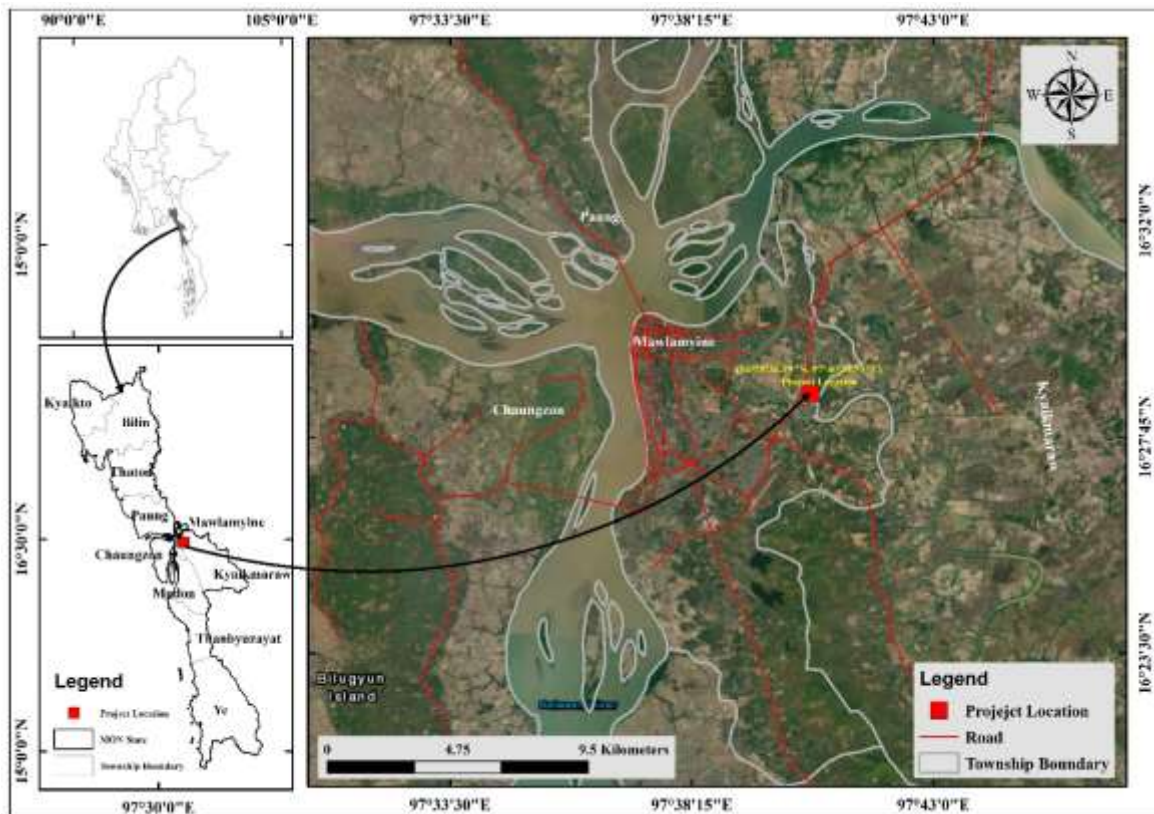


Figure 1 The Project Location

3.2. Operation Hour and Workforce

The proposed project is running all the production processes in 24 hours and 7 days and the break time is 12:00pm to 1:00 pm. The working hour especially office hour is 8am to 5pm. The workers have to assign dependant on the day and night shift which has altogether 3 shifts per day. Currently, the production is operating with the 70 workers. Approximate Maximum

Annual Operation Days = 190 to 220 Days per year. Generally, factory operation is annually paused in rainy season (about two to three months) for factory maintenance.

3.3. The Requirement of Raw Materials

Antimony ore is one of the main raw materials with various crystalline form – soil, granular and solid stone. Other essential inputs are mentioned in Table 3-6. Raw materials such as antimony ore, coal and coke are placed both in the factory compound and at the outside of factory. 10-wheeled trucks are used for coal purchasing from Kalawa and Sagaing to factory by overlaid with the tarpaulin. Not only shipping and vehicle transportations are applied for importing coke from China. Production Process Step by Step

3.4. Production Process

Pyrometallurgy and hydrometallurgy methods are prior to the antimony ingot manufacturing. Extreme high temperature (about 1000°C) is to refine the undesirable antimony metals to the useful ones at the liquefied state during the pyrometallurgy technique. While applying a high temperature in pyrometallurgy practice, aqueous solutions (acidic or alkaline) are used for separating the desirable metal in hydrometallurgy procedure. Normally, hydrometallurgy also needs the temperature which can work under 300°C. The production method varies the types of ore such as sulfide, an oxide or a complex and the grade which depends on the weight of antimony composition for example 1.5% to more than 60%. The roasting and smelting systems play the key role in the pyrometallurgy procedure which is the basic technique for manufacturing the product in this factory. The production process flow chart is shown in Figure 2.

Once the raw materials are well-organized, roasting stage will be occurred by using coke and coal with the high temperature, around 1000°C at the roasting furnace. The components are oxidized by producing the volatile antimony trioxide where stibnite is heated. It can be regarded as the semi-metal antimony which is purified with the bag filter and bag houses through the condensing pipe. As a consequence approximately 80% of antimony metal is accumulated in the antimony trioxide powder.

Following the roasting process, smelting will be performed with adding the fluxing agents namely soda ash light as well as mono ammonium phosphate which are melted using the temperature about 800°C to 1100°C. 7 to 10 days later, smelted metals are molding then they are delivered to the laboratory to analyze the quality and antimony content. The qualified product, each of the ingot possesses 97% antimony which can be exportable. Throughout the production stages, roasting and smelting that emit the flue gas is caught by the bag filter and bag houses. The stored gas is passed through the wet scrubber, the clean and treated gas is released via the smoke stack after that.

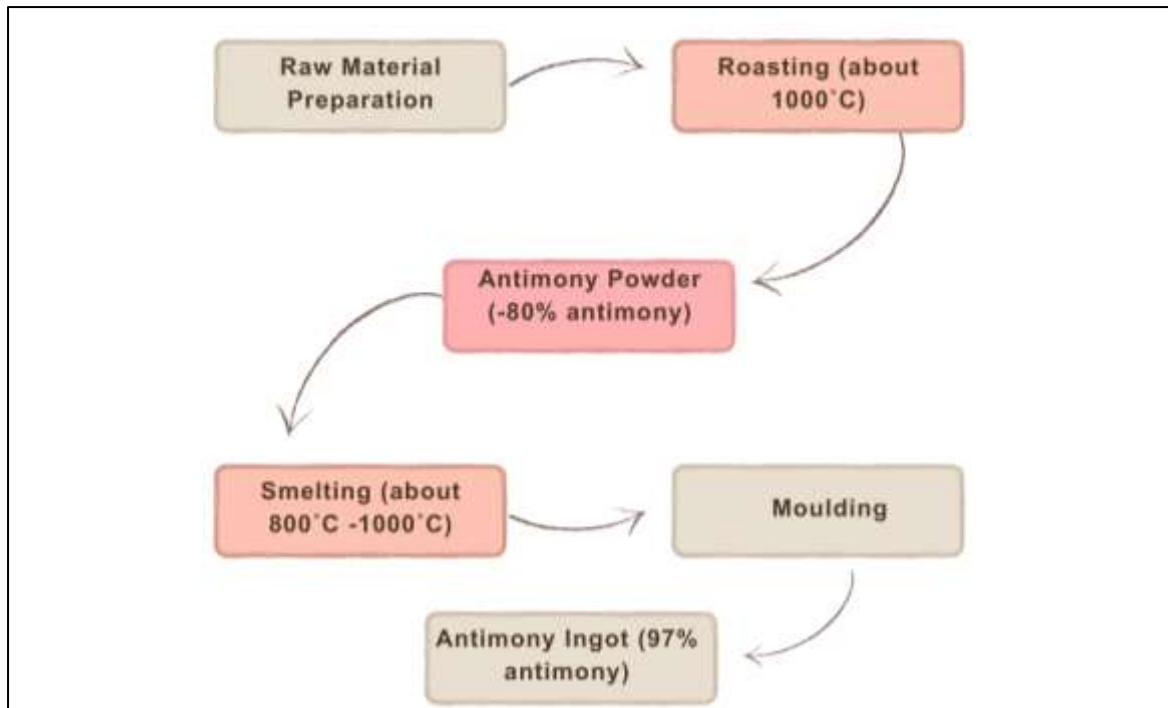


Figure 2 Antimony Ingot Production Step by Step

3.5. Final Product

Once the casting phase is ended, the refined antimony metal can be regarded as ready to export. The net weight of each ingot is 25kg, which is manufactured about 500 tons annually. The end products are directly sold to European and Asian countries for the use of flame retardants, batteries, plastics, glass, semiconductors and alloys. The pure ingot is generally contained 97.27% of antimony (Sb), then some of the trace amount of metals can be included, in Figure 3.



Figure 3 The Size and Well-packed Final Product

4. Description of Surrounding Environment

The surrounding environment were conducted the condition of natural environment, socio-economic environment, environmental baseline survey and biological environment in the study area as presented in Table 4.

Table 4 Current Environmental and Social Condition in the Study Area

No.	Item	Description
Natural Environment		
1.	Climate	This data was provided from GAD (2023), Mawlamyine Township. During the course of a year, the average maximum temperature is 28.3 °C and the average minimum temperature is 8.1°C.
2.	Topography	Mawlamyine Township is only 18 feet above the sea level and it is the fourth largest city in Myanmar. Mawlamyine Township is the smallest size and situated in the centre of Mon State. It is bounded on the north by Paung and Hpa-an Township, on the South by Mudon Township, on the east by Kyaikmaraw Township and on the west by Chaungzon Township and Thanlwin River.
3.	Geology, and soil condition	Mawlamyine is in the Thanlwin River delta, where the mouth of the Salween is sheltered by Bilugyun Island as it enters the Gulf of Martaban and the Andaman Sea. Yankin ridge lies between river-plain in the west and Attaran River in the east. Geologically there are exposures of quartzite in the middle of Yankin range and upward to the top. Three types of soil; lateritic yellow brown forest soil, lateritic soil and meadow gleyey soil are commonly found in the study Township
4.	Hydrology	Mawlamyine Township is well-known for the plenty of rivers and streams. The Ataran River, Gyaing River, Zarmi Stream and Thanlyin River are the main fresh water resources in Mawlamyine Township, which are mainly used for multi-purposes such as irrigation and domestic uses.
Biological Components		
5.	Floral survey	A total of 62 species had been recorded regarding with habitat types in core zone and secondary impact area.
6.	Fauna survey	Biodiversity survey team had recorded 16 species of birds, 7 species of amphibians and reptiles, 6 species of mammals, 14 species of fishes and 25 species of insects.
Socio-economic environment		
7.	Land use	In Mawlamyine Township, the agriculture lands occupy the 38% of total land area. Afterwards, the area of water bodies

No.	Item	Description
		is followed up. The grazing land and Industrial area are found as the smallest portion in the study township.
8.	Population	The population in Mawlamyine Township are 272,433 according to GAD 2023 data. The female population are slightly higher than the male population for all age groups (below 18 years and above 18 years).
9.	Ethnicity and Religious	<p>According to (2023) data, the highest ethnicity diversity is found in Mawlamyine Township. Among them, Bamar is the dominant ethnic group, having 55% of total population. Afterwards, Mon people are found as the second largest community with 21.6%. The other ethnic groups are still living in the study township.</p> <p>The main religion in Mawlamyine Township is the Buddhism and other Christian, Hindu and Muslim are also found in small numbers.</p>
10.	Education	There are 4 numbers of universities for higher education, 27 numbers of high schools (BEHS and BEHS (branch)), 10 numbers of middle schools (BEMS and BEMS (branch)), 24 numbers of post primary schools, 89 numbers of primary schools (BEPS), 50 numbers of pre primary schools and 9 numbers of Monestry Education, enrolling 58,217 numbers of students with 2,546 numbers of teachers. The literacy rate of Mawlamyine Township is 99.8%.
11.	Livelihood (employment, income, health, infrastructure)	<p>According to GAD 2023 data, the wage workers are mostly found in Mawlamyine Township and then, followed by the governmental staffs and trading works. As Mawlamyine is the commercial city of Mon state, agriculture and livestock farming are found as the small portion.</p> <p>In Mawlamyine Township, the unemployment rate is about 1.19 % of total workable population. The individual income in Mawlamyine Township for 2023 is about 2,950,078 MMK per year and the basic salary is about 245,000 MMK per month.</p> <p>As per General Administration Department, there are 6 numbers of governmental hospitals and 9 numbers of public hospitals in Mawlamyine Township. In additions, 16 numbers of rural health care departments are instituted at the villages in order to achieve the emergency health care facilities and medical provisions. As the private health care services, there are 140 numbers of clinics found in the Mawlamyine Township.</p>
12.	Transportation	In Mawlamyine Township, many road and bridges are constructed to commute the neighboring townships. There are seven asphalt main roads and four main bridges. In Mawlamyine Township, the road and railway transports are

No.	Item	Description
		mostly used due to be more convenient and less expensive. The air transportation service can also be observed.
Environmental Baseline Survey		
13.	Air Quality	Air quality monitoring such as O ₃ , NO ₂ , SO ₂ , PM _{2.5} , PM ₁₀ , TSP, and CO were measured at 5 stations around project site. The results were compared with the emission values of NEQEG (2015). All air quality results for station A1, A2 and A3 are within the standard of NEQEG (2015).
14.	Wind Speed and Direction	Wind speed and direction were measure at 5 stations, where is same as the air monitoring stations. The average wind speed for all station are 0.03 to 2.45 m/s and the predominant wind direction is south, northwest and southeast.
15.	Water Quality	Water Quality assessment were conducted at 4 locations within the project area; one point for ground water and wastewater in each and two points for surface water. According to the water results, although all water parameters are within the acceptable limit of related guidelines, chromium (hexavalent) in factory wastewater is slightly higher than the NEQEG (2015) since the proposed factory directly use the surface water from Attran river without treating.
16.	Noise Level	Noise level measurement was conducted at five stations. According to the noise results, the average day time noise level at N1 and N2 are slightly higher than the NEQEG guidelines (2015), while night time results of N1 station does still exceed the acceptable noise limit. The main causes are the operation of generators and raw material handling process in proposed area, however, this processes do not operate throughout the day.
17.	Vibration	Vibration measurement was conducted at two stations and compared with applicable vibration level guidelines. All vibration results of all stations are within the guideline standard.
18.	Odour	Odour measurement was conducted at five stations in operation area and compared with NEQEG guideline. All of results are observed within the guideline.
19.	Soil	Odour measurement was conducted in operation area. The pH, Zn, Cu, Pb and As are significantly within the guideline standards, assuming that the soil condition in proposed area are in favourable condition.

5. Potential Environmental Impact and Mitigation Measurement

5.1. Impact Analysis

According to National Environmental Policy Act (1969), an environmental impact analysis is generally conducted to assess the potential impact of a proposed project on the natural and social environment. This may include an assessment of both the short-term and long-term effects on the physical environment, such as air, water and noise pollution; as well as effects on local services, living and health standards, and aesthetics.

The impact analysis is the identification or assessing of potential positive and negative impacts on the environment (physical, socio-economic, biodiversity, health, etc.) based on the project activities. Project activities and requirements consume environmental resources and produce nuisances to the surrounding environment. They are the sources, or root causes of environmental impacts, if not adequately controlled or managed, certainly cause significant changes to the environmental components

5.2. Significance of the Impact

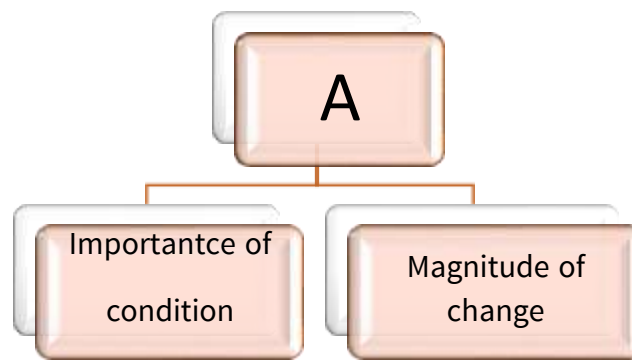


Table 5 Significant Impact Assessment

Criteria/Group	Category	Scale	Description
A	A ₁	4	International importance
		3	National importance
		2	Outside (near) of local condition
		1	Local condition
		0	Not important
	A ₂	+3	Major importance benefit/ Major positive benefit
		+2	Meaningful benefit of the quo status/ Significant improvement
		+1	Improvement in 'status quo'/ Benefit of the status quo
		0	No change/ 'Status quo'/Lack of change/ No influence
		-1	Negative change of 'status quo'/
		-2	Significant negative effect/ Significant negative changes
		-3	Major negative effect/ Major disadvantages or changes

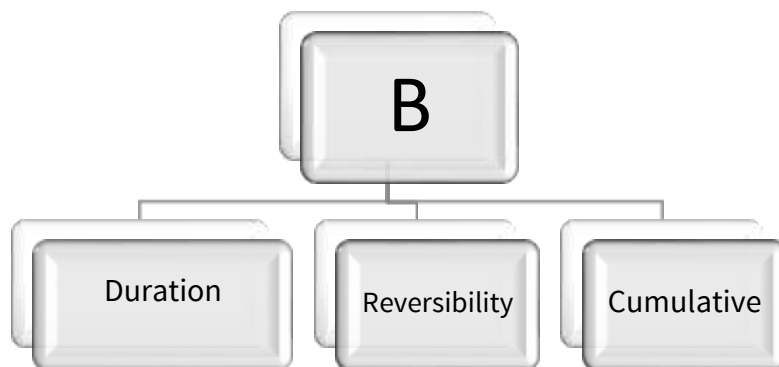
5.3. The Assessment of Probability

Table 6 The Assessment of Probability

Criteria/Group	Category	Scale	Description
B	B₁	1	No changes/ Not applicable
		2	Temporary
		3	Permanent
	B₂	1	No changes/ Not applicable
		2	Reversible
		3	Irreversible
	B₃	1	No changes/ Not applicable
		2	Non-cumulative/Unique/Single
		3	Cumulative/ Synergetic

5.4. Environmental Score

$$\text{Environmental Scores (ES)} = \text{Significant Impact (A group)} \times \text{Probability (B group)}$$

Table 7 The Conversion of the Environmental Scores in Categories

Environmental Score	Class	Class (Numerical)	Description
108 to 72	+E	+5	Major positive change/impact
36 to 71	+D	+4	Significant positive change/impact
19 to 35	+C	+3	Moderately positive impact
10 to 18	+B	+2	Less positive impact
1 to 9	+A	+1	Reduced positive impact
0	N	0	No alteration/changes
-1 to -9	-A	-1	Reduced negative impact
-10 to -18	-B	-2	Less negative impact
-19 to -35	-C	-3	Moderately negatively impact
-36 to -71	-D	-4	Significantly negative impact
-72 to -108	-E	-5	Extremely negative impact

Table 8 Evaluation and Prediction of Significant Impact for Construction Phase

No .	Potential Impacts on the Media	Activities and Source	Components	Group A A ₁ x A ₂	Group B B ₁ +B ₂ +B ₃	Environmental Score	Class	Description
1.	Air	Earth works	Dust and PMs	-4	8	-32	-3	Moderately negative impact
		Heavy duty machines	CO ₂ , NO _x , PMs, VOCs, CO and CH ₄ , C ₆ H ₆ and CH ₂ O					
		Diesel generator	NO _x , SO ₂ , CO ₂ , PM, HC, etc.					
2.	Noise Vibration	Heavy duty machines	High intensity of noise and vibration	-4	7	-28	-3	Moderately negative impact
		Diesel generator						
		Rock blasting and piling						
3.	Water	Silty runoff	Silt and sand	-4	8	-32	-3	Moderately negative impact
		Chemical spilling and leakage	A compound of hazardous substances					
		Sewer from temporary camp						
4.	General Waste	Construction wastes	Masonry, sand, stone, slab, aliminium frame, iron/ wood/ steel, PVC	-1	6	-6	-1	Reduced negative impact
		Domestic waste	Kitchen waste, food waste, plastic and so on					

No .	Potential Impacts on the Media	Activities and Source	Components	Group A A ₁ x A ₂	Group B B ₁ +B ₂ +B ₃	Environmental Score	Class	Description
5.	Hazardous Material	Construction wastes	Cement waste, paints, thinner, vanish removers, etc	-4	7	-28	-3	Moderately negative impact
6.	Soil	Soil disturbance	Loss of topsoil, lack of the microorganism and low nutrients	-4	8	-28	-3	Moderately negative impact
7.	Occupational Health and Safety	Every stage of construction work	Minor to major injuries	-3	7	-21	-3	Moderately negative impact
8.	Ecosystem	Construction work	Loss of ecosystem	-4	8	-28	-3	Moderately negative impact
9.	Socio-economic	Construction work	Job opportunities (temporarily)	2	7	17	+2	Less positive impact

Table 9 Evaluation and Prediction of Significant Impacts for Operation Phase

No.	Potential Impacts on the Media	Activities and Source	Components	Group A A ₁ x A ₂	Group B B ₁ +B ₂ +B ₃	Environmental Score	Class	Description
1.	Air	Crushing coal	Airborne dust and PMs	-6	8	-48	-4	Significantly negative impact
		Roasting	SO ₂ (major gas)					
		Smelting	Sb ₂ O ₃ and its compounds					
		Transportation diesel vehicles and generator	CO ₂ , PM ₁₀ , PM _{2.5} , CO ₂ , SO _x , NO _x , CO and GHG					
2.	Noise Vibration	Generator	High intensity of noise and vibration	-4	8	-32	-3	Moderately negative impact
3.	Water	Wastewater from cooling tank	Chromium (VI)	-4	7	-28	-3	Moderately negative impact
		Gray and black water	BOD and COD content and hazardous compounds					
4.	Odor	Ingot processing (roasting and smelting)	Strong fume gas	-6	8	-48	-4	Significantly negative impact
		Domestic waste	H ₂ S, DMS, mercaptants, and leachate					

No.	Potential Impacts on the Media	Activities and Source	Components	Group A A ₁ x A ₂	Group B B ₁ +B ₂ +B ₃	Environmental Score	Class	Description
5.	General Waste	Domestic waste	Kitchen waste, food waste, plastic and so on	-1	6	-6	-1	Reduced negative impact
6.	Hazardous Material	Slag and sludge, by-products of ingot processing (roasting and smelting)	Sb and its compound	-2	6	-12	-2	Less negative impact
		A few of electrical wastes	Batteries, fuel container, fluorescent lamp, etc					
7.	Soil	Transportation vehicles	Fuel leakage or spill	-4	7	-28	-3	Moderately negative impact
		Overflow wastewater	Slow the plant growth rate, photosynthesis and nutrient uptake					
8.	Occupational Health and Safety	Every stage of factory operation	Minor to major injuries	-3	7	-21	-3	Moderately negative impact
9.	Socio-economic	Factory operation	Stable job opportunities and skilled workers	4	8	32	+3	Moderately positive impact

Table 10 Evaluation and Prediction of Significant Impacts for Demolition Stage

No.	Potential Impacts on the Media	Activities and Source	Components	Group A A ₁ x A ₂	Group B B ₁ +B ₂ +B ₃	Environmental Score	Class	Description
1.	Air	Demolition the structure	Dust and PMs	-6	8	-48	-4	Significantly negative impact
		Heavy duty machines	CO ₂ , NO _x , PMs, VOCs, CO and CH ₄ , C ₆ H ₆ and CH ₂ O					
		Transportation vehicles	CO ₂ , PM ₁₀ , PM _{2.5} , CO ₂ , SO _x , NO _x , CO and GHG					
		Diesel generator	NO _x , SO ₂ , CO ₂ , PM, HC, etc.					
2.	Noise Vibration	Heavy duty machines	High intensity of noise and vibration	-4	7	-28	-3	Moderately negative impact
		Diesel generator						
3.	Water	Demolition the structure, cement-contained rubbles	Silty runoff, fluctuate the pH level	-4	8	-32	-3	Moderately negative impact
4.	General Waste	Demolition the structure	Aggregate, wood, metal, PVC, and glass	-2	6	-12	-2	Less negative impact

No .	Potential Impacts on the Media	Activities and Source	Components	Group A A ₁ x A ₂	Group B B ₁ +B ₂ +B ₃	Environmental Score	Class	Description
		Domestic waste	Kitchen waste, food waste, plastic and so on					
	Hazardous Material	Demolition the structure	Electrical waste, cables and concrete					
5.	Soil	All demolition works	Soil compaction, spilled or leaked fuels and oils	-4	7	-28	-3	Moderately negative impact
6.	Occupational Health and Safety	All demolition works	Chemical exposure, physical injuries, communicable diseases	-3	7	-21	-3	Moderately negative impact
7.	Rehabilitation	After demolition works	Restoration the native species (flora and fauna)	6	8	48	+4	Significant positive change

5.5. Risk Assessment

Methodology

Risk assessment methodology is adopted by International Civil Aviation Organization-ICAO (2013)¹. Environmental risk assessment is the process of evaluating the likelihood of adverse effects on, or transmission through, the natural environment, as well as the hazards associated with human activities. The risk assessment will be evaluated based on hazard identification, risk analysis probability, risk analysis severity, risk assessment and tolerability. The risk assessment of metal smelting and refinery is performed based on the potential hazards happened in construction, and operation activities. The risk assessment and management process will be performed as shown in Figure 4.

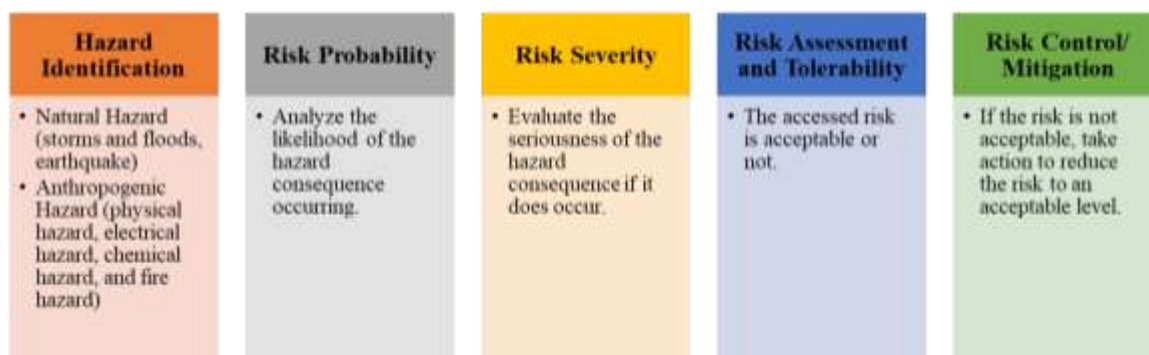


Figure 4 Risk Assessment and Management Process

5.6. Hazard Identification

According to Canadian Centre for Occupational Health and Safety, hazard identification is the part of the process used to evaluate if any particular situation, item, thing, etc. may have the potential to cause harm. Addressing both anthropogenic and natural hazards is crucial for comprehensive disaster preparedness and risk mitigation. This project considers natural hazards (physical hazards) such as floods and storms, and earthquake as well as major anthropogenic hazards including occupational (chemical, physical, and biological) hazard.

5.7. Risk Probability

ICAO states that the risk probability is the likelihood or frequency that a hazard may exist. The risk probability range is shown in Table 11.

Table 11 Risk Probability Range

Likelihood	Definition	Value
Frequent	❖ The hazard is likely to occur many times.	5
Occasional	❖ The hazard is likely to occur sometimes.	4
Remote	❖ The hazard is unlikely to occur, but possible.	3
Improbable	❖ The hazard is very unlikely to occur.	2

¹ International Civil Aviation Organization (ICAO) (3rd edition, 2013), Safety Management Manual

Extremely improbable	❖ The hazard is almost inconceivable that the event will occur.	1
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5.8. Risk Severity

The risk severity is the potential harm or adverse effect that may occur due to exposure to the risk. The risk severity is determined by five levels as described in Table 12.

Table 12 Risk Severity

Severity	Definition	Value
Catastrophic	❖ Equipment destroyed ❖ Multiple deaths	A
Hazardous	❖ Serious injury ❖ Major equipment damage	B
Major	❖ Serious incident ❖ Injury to persons	C
Minor	❖ Nuisance ❖ Operating limitations ❖ Use of emergency procedures ❖ Minor incident	D
Negligible	❖ Few consequences	E

5.9. Risk Assessment and Tolerability

The risk assessment is performed based on the risk analysis probability and risk analysis severity. The risk assessment and tolerability is evaluated as shown in Table 13.

Table 13 Risk Assessment and Tolerability

Risk Probability	Risk Severity				
	Catastrophic-A	Hazardous-B	Major-C	Minor-D	Negligible-E
Frequent-5	5A (Intolerability)	5B (Intolerability)	5C (Intolerability)	5D (Tolerable)	5E (Tolerable)
Occasional-4	4A (Intolerability)	4B (Intolerability)	4C (Tolerable)	4D (Tolerable)	4E (Tolerable)
Remote-3	3A (Intolerability)	3B (Tolerable)	3C (Tolerable)	3D (Tolerable)	3E (Acceptable)
Improbable-2	2A (Tolerable)	2B (Tolerable)	2C (Tolerable)	2D (Acceptable)	2E (Acceptable)
Extremely Improbable-1	1A (Tolerable)	1B (Acceptable)	1C (Acceptable)	1D (Acceptable)	1E (Acceptable)

5.10. Risk Control and Mitigation

Control can be regarded as the reduction the likelihood or consequences from the unwanted and or tragedy event. Mitigation will be continued as the post-control actions. Even though all

the controlling /preventative measures completed, it may still harm to the human or environment and both. Risk control can be varying depend on the types of risks and so does mitigation.

Table 14 Summary of the Occupational Health and Safety Risk

Phases of Project	Risk	Hazard	Risk Index	
			Before Mitigation Measure	After Mitigation Measure
Construction/ Decommission	Air pollution	Chemical	3A (Intolerability)	3C (Tolerable)
	Water pollution		3A (Intolerability)	3D (Tolerable)
	Hazardous solid waste		3A (Intolerability)	2D (Acceptable)
Operation	Air pollution		5C (Intolerability)	3B (Tolerable)
	Water pollution		4B (Intolerability)	3C (Tolerable)
	Hazardous solid waste		3A (Intolerability)	2B (Tolerable)
Construction/ Decommission	Dust Pollution, Noise, Electricity, General accidents	Physical	3A (Intolerability)	2B (Tolerable)
Operation	Noise, heat, furnace explosion and electrical accidents		5C (Intolerability)	3C (Tolerable)
Construction/ Decommission	Communicable diseases and vector-borne diseases	Biological	3B (Tolerable)	2D (Acceptable)
Operation	Bacteria, viruses and vector-borne diseases		3A (Intolerability)	2D (Acceptable)

6. Environmental Management Plan

The objective of the environmental management plan is to manage potential environmental issues by implementing proper mitigation measures and monitoring plan in compliance with the relevant laws and regulations stipulated by national authorities. Environmental management plan based on the basic principles of management is known as the P.D.C.A cycle (see Figure 6-1 14). Environmental management plan consists of four related tasks as described below:

6.1. Environmental Impact Mitigation Measures

The possible environmental impact mitigation measures for operation phase and construction/decommission is shown in Table 15 and Table 16.

Table 15 Environmental Impact Mitigation Measures during Operation Phase

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1.	<u>Air Quality</u>	Emission of particulate matter (PM2.5 & PM10), SO ₂ , CO ₂ , NO _x , CO and VOCs to the atmosphere.	Operation of Roasting and Smelting Furnace	<ul style="list-style-type: none"> - To capture the particulate matters and toxic gases, bag house, bag filters and wet scrubber are installed. - Around 120 ft stack height arranges to avoid the ambient air emission. - The low sulfur content of coke or coal are selected to be used. - Carefully handling of raw materials, coal, coke, antimony ore and grinded matters not to emit dust from loading, unloading and mixing activities. - Avoid storing or piling the grinded raw materials in open airy area with large amount and use the appropriate covers while operation. - Collect the ash and storage in the ash box to avoid the dispersion. - Regular check up the performance and operation system of furnace and perform maintenance if necessary. 	HSE Team	2,000,000
		Releasing of SO ₂ , Antimony powder and Particulate Matters (PM10 and PM2.5)	Roasting of Antimony Ore	<ul style="list-style-type: none"> - Conducting the regular inspections, cleaning and monitoring of key parameters (pH levels, spray nozzle conditions, 	HSE Team	

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<p>airflow etc.) of wet scrubber to ensure optimal performance and longevity.</p> <ul style="list-style-type: none"> - Maintaining the operation record of wet scrubber to track performance and identify potential issues. - Carefully handling the wet scrubber as per recommendation given in SOP to avoid corrosion and leakage in dusts and other components. - The closed storage container should be used to collect the antimony oxide powder from condensing pipes instead of gathering in open space. - The regular cleaning activities of bag house and bag filters should be conducted to block in the gas the pipelines. 		
		Emission of CO ₂ , NO ₂ , SO ₂ and particulate matters (PM ₁₀ , PM _{2.5})	Operation of Supporting Facilities (Generators, logistic vehicles, etc)	<ul style="list-style-type: none"> - Using the low sulphur content of fuel. - Adopting the monitoring and maintenance system of factory's equipment and mechinaries. - Sprinkling the water on street when loading with restriction of 	HSE Team	

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				overwatering, which cause muddy road.		
2.	Noise and Vibration	Noise exposure to the surrounding environment Occupational hazards and structural damage due to vibration exposure	Operation processes; especially blower, geerators and raw material preparation (crushing and grinding of coal) Logistic vehicles for transporting raw materials and products.	<ul style="list-style-type: none"> - Installing a fan silencer or keeping enclosed system to mitigate the high level of noise emission from blower. - Regularly inspecting and maintaining the he blower and its associated components to ensure optimal performance and minimize noise generation. - Giving the priority in using of sound proof crushers for raw material preparation and handling section. - Applying the anti-vibration mat at the potential point sources, i.e generators, and crushing machines. - Providing the adequate earplugs and earmuffs to workers in excessive noisy area. - Assigning the alternative shift to factory workers in excessive noise areas and on a vibrating surface. - Limiting the speed of vehicles and appointing the skillful workers for loading of raw materials. 	HSE Team	1,000,000
3.	Water Quality	Increasing the content of suspended solids in water quality	Gas Cooling system with condensing tubes	<ul style="list-style-type: none"> - Installing the adequate overflow water tanks to decline the temperature of hot water released 	HSE Team	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<ul style="list-style-type: none"> from cooling process and recycling them in the similar process. - Reducing the temperature of hot water to <30 °C in cooling tank before discharging. - Restricting the leakage of hot water into the surrounding environment. - Regular inspecting and maintaining the water pipelines and temperature control system. 		
		Causing significant impact on the water body due to using of scrubbing liquid.	Wet scrubber operation	<ul style="list-style-type: none"> - Restricting the discharge of wastewater from the wet scrubber operation such as spent scrubbing liquid to the environment. - Carefully inspecting the water pipeline for wet scrubber operation not to cause the unexpected leakage. - Ensuring that no wastewater is discharged during the time of sludge collection, effluents from each tank shall be detained in others. 	HSE Team	
		Causing the contamination of water due to containing the antimony powders	Cleaning and Washing Air bag Filters	<ul style="list-style-type: none"> - Setting up the sedimentation tanks to collect the suspended solids in the wastewater. - Keeping the certain detention time for sedimentation tanks to overflow the water into the earth drain. 	HSE Team	

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<ul style="list-style-type: none"> - Constructing the brick drainage or concrete drainage throughout the factory area. - Ensuring the proper drainage lines provision for storm/ rain water as well. - Monitoring annually the quality of all types of wastewater discharged from MSS. 		
4.	<u>Soil Quality</u>	Causing the soil contamination due to leachate from waste pilling	Storing of Wastes at the project site	<ul style="list-style-type: none"> - Avoiding to pile the sediments wastes released from wet scrubber and sedimentation tanks on the ground. - Keeping the waste collection site with impermeable flooring and shelters. - Storing the wastes with well packing in accord with their safety handling actions of SOP. 	HSE Team	1,500,000
		Rising the content of chemicals concentration in soil quality	Using the waste slag in land fill process	<ul style="list-style-type: none"> - Disposing the waste (slag) to the designated dumping site in lined with stipulated guidelines and procedures of relevant departments. - Avoid the filling of waste slag from roasting and smelting lines on the bare land without any liner system - Applying the liner or leachate collection system in the waste 	HSE Team	

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<p>disposing area to prevent the leachate migration into surrounding soil and water body.</p> <p>Regular Monitoring of leachate quality to ensure that the concentration of chemical pollutants remain below the regulatory limits.</p>		
		Polluting the soil qualities and soil ecosystem	Storing and handling of fuel, raw material and utilization of fuel	<p>Carefully handling and storing of fuel oil and raw material in line with their SOP.</p> <p>Giving the training to workers who handle with fuel and raw material not to cause the leakage to the environment.</p> <p>Promptly removing of polluted soil when occurring the unexpected spillage or leakage.</p> <p>Providing the impermeable floor to the raw material preparing or storing area.</p>	HSE Team	
5.	<u>Solid Waste</u>	Leading to soil and water pollution due to the leachage containing toxic chemicals from dumping site.	Releasing of hazardous waste from factory operation process	<p>Arranging to resell the slag (Pyit Sar) to the local buyers (cement and construction industry).</p> <p>Disposing the hazardous waste slag at the Nat San mine, which is located in Kyaikmayaw Township in accord with updated regulated laws and procedures.</p>	HSE Team	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<ul style="list-style-type: none"> - Prohibiting to direct dispose the industrial wastes on the ground. 		
		Releasing the offensive odor and causing the outbreak of infectious disease due to improper waste management actions.	Generating of non-hazardous wastes from factory staffs	<ul style="list-style-type: none"> - Encouraging to segregate non-hazardous waste to reuse and recycle within the factory. - Providing the adequate numbers of segregated dust bins. - Setting up the waste storage area to collect temporarily before discharging. - Creating the regular waste collection system and waste disposing method in collaboration with Township Municipal. - Avoiding the open burning of wastes in factory area. 	HSE Team	
6.	<u>Odor</u>	Offensive odor can impact on the human health, ranging from temporary discomfort to more serious respiratory problem	Releasing from Roasting and Smelting Process	<ul style="list-style-type: none"> - Carefully sealing and installing the gaseous pipelines in roasting line and smelting line to avoid the leakage of flue gases. - Installing the wet scrubbers to absorb or capture odor-causing compounds from a gas stream, mainly SO₂. - Creating the proper ventilation system in production area to dilute odor concentrations and improve air quality. - Immediate response for fixing the damage filter bags inside the bag 	HSE Team	1,000,0000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<ul style="list-style-type: none"> house as soon as the leakage is detected. Regularly monitoring the leakage of flue gas from the enclosed roasting and smelting line. 		
7.	<u>Socio-economic and cultural component</u>	Causing the social conflicts and disrespect in regional beliefs.	Factory operation process	<ul style="list-style-type: none"> Providing the knowledge sharing programme to immigrant workers to respect regional beliefs and spiritual monuments. Restricting to access the residential area of indigenous people. Creating the suggestion box to collect the compliants from surrounding environments and also within the factory. Building the positive relationships between project proponents and affected communities by adopting the formal grievance redress mechanisms. 	HSE Team	1,000,000
		Causing the depletion of fresh water resources.	Using surface water from Attaran River	<ul style="list-style-type: none"> Circulating the used water after treating in the production processes. Inhibiting the spillage of water when filling the water storage tanks. Sharing the domestic water conservation behaviors to all staffs. 		

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
8.	<u>Occupational Health and Safety</u>	Casuing the respiratory heath problems and also physical damages due to improper management system.	Roasting and Smelting Process Operation of furnanes	<ul style="list-style-type: none"> - Strictly sealing the gas pipelines and conjunctions not to cause the gas leakage - Regularly monitoring and recording the gas leakage in roasting and smelting area. - Providing the heat resistant gloves, skin cover and eyes cover to factory staffs who are working with high temperature. - Regularly conducting the medical check up and providing the seasonal vaccines to workers. - Providing first aid boxes in each production line and assigning the certified medical staff if possible. - Arranging and training to effectively use the personal protective equipments, like anti gas mask, N95 mask, heat resistant gloves in accord with their works. 	HSE Team	1,000,000

Table 16 Environmental Impact Mitigation Measures during Construction and Decommission Phase

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1.	<u>Air Pollution</u>	Emission of air pollutant such as particulate matter (PM2.5 & PM10), SO ₂ , CO ₂ , NO _x , CO and VOCs to the atmosphere	Operation of Construction and Demolition process	<ul style="list-style-type: none"> • Before starting the construction and demolition process, the risk hazard area are set up and declared by the notice signs and barriers. • The water sprays are employed to minimize the airborne particulate matter during process. • Avoid the overwatering to the surrounding, which causes muddy ground. • Carefully dismantling a structure to salvage reusable materials, reducing dust emission and preserving valuable resources. • Adopting the sustainable manners by recycling materials from wastes from construction or demolition, such as concrete and metal after examination of their strength. • Prohibiting to heap the raw materials in the open space. 	HSE Team and Contractor	2,000,000
			Using transportation vehicles and generators	<ul style="list-style-type: none"> • Using the safety nets and shelters when transportation of raw materials and demolished structures. • Regularly checking all logistic vehicles and conducting the maintenance actions if necessary. 		

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<ul style="list-style-type: none"> Minimizing the travel distance and choosing the proper routes for transportation. Giving a priority to use low sulphur content fuel for generator and transportation vehicles. Conducting the regular inspection on the construction and demolition mechaneries and maintenance works if required. 		
2.	<u>Noise and Vibration</u>	Noise exposure to the surrounding environment Occupational hazards and structural damage due to virbration exposure	Operation of Construction and Demolition mechines	<ul style="list-style-type: none"> Substitute with the modern machines with low sound level and vibration proof system. Ensuring the well maintained equipments, which produce the less noise and vibration. Adopting the construction or demolition techniques and actions, producing the less noise and vibration such as mitimizing the drop heights when unloading material. Making the schedules or plans at appropriate times and informing nearby residents and businesses about potential noise and vibration level. Regular monitoring and recording of the noise and vibration level. 	HSE Team and Contractor	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
			Using generators and vehicles	<ul style="list-style-type: none"> • Conducting a regular investigation and maintenance activities to the generators and transportation machines. • Using the sound proof generators and engines if possible. • Avoid unnecessary revving of the engines • Preparing the short routs for loading and unloading materials. • Using the mat and fences or walls to absorb the vibration and noise level at point source • Placing the noise sources (generators) away from the residential area, with noise barriers. 		
3.	<u>Water Quality</u>	The surface runoff and storm water can carry the sediment particles, chemicals and debris from construction or demolition site, declining the water quality and negatively impacts on aquatic animals and plants	Heaping the demolished or construction debris, bricks and other materials.	<ul style="list-style-type: none"> • Prohibiting the piling of building materials on the open space, placing with shelters and cover. • Adopting the proper waste disposal techniques with the control of leachate, providing the adequate dust pins and safe temporary waste dumping site • Conducting the effective drainage system, embedding the erosion control measures such as sediment barrier etc. 	HSE Team and Contractor	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<ul style="list-style-type: none"> Assessing the water quality status and water flowing patters to consider the factory's management action. 		
		Causing the negative impact on water bodies without having proper management	Daily routines of factory workers	<ul style="list-style-type: none"> Providing the hygienic toilet or restroom with adequate septic tanks. Regular removing of sludges from septic tanks and making secure not to cause the leakage. Checking and cleaning the drainage channels to avoid the blockage of water flow. Preventing to make disturbance on natural water flow and water channels. 		
4.	Soil Quality	Causing the soil erosion and impact on soil quality.	Operation of construction or demolition machines	<ul style="list-style-type: none"> Installing the temporary silt fence at the water spraying area. Ensuring proper handling and storing the fossil fuel, lubricant oil and grease. Removing the polluted soil immediately after spillage of oil. Investigating the machines and providing the preservation activities to ensure the better performance. Collecting the used engine oil and lubricants with safty containers and disposed as per their SOP. 	HSE Team and Contractor	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<ul style="list-style-type: none"> • Arranging the impermeable floor with shelter at the temporary waste storage site • Creating the vegetation cover to avoid the soil erosion. 		
5.	Solid Waste	Impacting the environment and public health due to improper storage system.	Released from the Construction or Demolition process	<ul style="list-style-type: none"> • Before starting, planning and analyzing the type and quantity of waste generated during the process. • Segregating the waste types (eg. Wood, concrete, metal) at pollution sources and heaping as per composition materials. • Encouraging the reusable materials to reuse in the project site or resell to the local buyers • Disposing the waste that cannot be recycled or reused in accordance with local regulations and environmental guidelines. • Separating the hazardous and e-wastes from the usable waste, storing and disposing in accord with regional guidelines. • Forbidding the open burning of wastes. 	HSE Team and Contractor	1,500,000
		Releasing the offensive odor and causing the outbreak of infectious disease due to	Released from factory workers and dormitory	<ul style="list-style-type: none"> • Arranging the adequate numbers of waste bin throughout the project site. 		

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		improper waste management actions.		<ul style="list-style-type: none"> • Adapting the regular waste collection system with helps of township municipals. • Ensuring all dust bins with the covers not to release offensive odor and leachate. • Segregating the wastes to be reused and recycled, regularly disposing with the Township Municipal as per national guidelines. 		
6.	Socio-economic and cultural component	Causing the socio-economic impacts on surrounding residents	Operation of construction or demolition process	<ul style="list-style-type: none"> ☐ Performing to minimize the potential hazards (falling construction materials, dust dispersion, etc) to surrounding environment. ☐ Providing and creating the job vacancies and economic opportunities to local residents during project. ☐ Providing the knowledge sharing programme to factory workers to respect the regional beliefs and spiritual monuments. 	HSE Team and Contractor	1,000,000
7.	Occupational Health and Safety	Causing the workplace accidents such as physical injuries, occupational diseases, etc	Applying the construction machines such as excavators, cranes, bulldozers etc.	☐ Providing the workplace safety training programme to ensure the safe handling and operation of heavy machines and emergency equipments	HSE Team and Contractor	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<ul style="list-style-type: none"> ☐ Assigning the skillful workers in the specialized works (crane operator, drivers, etc) ☐ Arranging to achieve the clean and hygienic water to factory workers ☐ Providing the first aid boxes in working site and assigning the certified medical staff if possible. ☐ Regularly conducting the medical check up and providing the seasonal vaccines to workers. 		
8.	Ecosystem and natural environment	The overall impact of demolition stage can disrupt the delicate balance of ecosystems, leading to a decline in biodiversity and a loss of ecosystem services	Operation of construction or demolition process and livelihood of factory workers	<ul style="list-style-type: none"> ☐ Recreating the vegetative covers for all season to avoid soil erosion and enhance the soil fertility. ☐ Replanting the local plants and conducting the regular maintenance activities for planting. ☐ Avoiding to cut down the tree if possible. ☐ Prohibiting to disturb the natural water flow. 	HSE Team and Contractor	1,000,0000

6.1. Environmental Monitoring Plan

The summary of environmental monitoring plans for operation phase and construction/ decommission are shown in Table 17, and Table 18.

Table 17 Environmental Monitoring Plan for Operation Phase

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
Air Quality	Ozone, Nitrogen Dioxide, Sulphur Dioxide, Particulate Matter (PM 2.5 and PM10), Total Suspended Particles, Carbon Monoxide	<u>Near Roasting Furnance and Generator</u> 16° 28.588'N, 97° 40.557'E	Twice in a year	HSE Team	6,000,000
		<u>Near Smelting Process</u> 16° 28.576'N, 97° 40.618'E			
		<u>Ambient Air Quality</u> 16° 28.462'N, 97° 40.612'E			
Water Quality	pH, Color, Turbidity, TDS, Hardness, Chloride, Nitrate, Arsenic, Iron, Lead, Manganese, Sulfate, Total-Coliform	<u>Groundwater from Project Site</u> 16°28'34.99"N 97°40'33.04"E	Twice in a year	HSE Team	3,000,000
	pH, Temperature, TSS, Ammonia, BOD, COD, Total Chlorine, Cyanide, Total Phosphorous, Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Nickel, Mercury, Chromium (Hexavalent), Sulfide, Phenol, Fluoride, Oil & Grease, Total-Coliform	<u>Wastewater from Discharged Point</u> 16°28'37.40"N 97°40'35.25"E			
	Total Suspended Solids, BOD, COD, DO, pH, Ammonium nitrogen, Oil and grease, E.coli, Copper	<u>Surface Water from Attran River</u> 16°28'18.31"N 97°40'29.21"E			
Noise level	Day time and Night time Noise Level	<u>Near Roasting Furnance & Generator</u> 16° 28.588'N, 97° 40.557'E	Twice in a year	HSE Team	1,800,000

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
		<u>Near Smelting Process</u> 16° 28.576'N, 97° 40.618'E			
		<u>Ambient Quality</u> 16° 28.717'N, 97° 40.613'E			
Soil Quality	pH, Zinc, Copper, Lead, Arsenic	<u>Within the project site</u> 16°28'37.32"N, 97°40'36.17"E	Twice in a year	HSE Team	600,000
Odor Level	Odor Value	<u>Smelting Furnance</u> 16°28'36.66"N, 97°40'33.16"E	Twice in a year	HSE Team	3,000,000
		<u>Raw Material Piling</u> 16°28'36.10"N, 97°40'33.69"E			
		<u>Charcoal Storage Area</u> 16°28'36.19"N, 97°40'35.95"E			
Vibration	Radial, Transverse, Vertical	<u>Near Roasting Furnance & Generator</u> 16° 28.588'N, 97° 40.557'E	Twice in a year	HSE Team	2,000,000
		<u>New Extension Area</u> 16° 28.576'N, 97° 40.618'E			
Solid Waste	Amount and type of solid waste	Temporary waste storage area and around the project site	Weekly	HSE Team	1,000,000
Occupational Health and Safety	Incident/ accident records	Around the project site	Monthly	HSE Team	1,000,000

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
Ecosystem	<p>The number of species composition and its distribution.</p> <p>The existence of natural water bodies, waterway and animals pathways.</p> <p>The potential impacts on natural habitat of biodiversity due to construction activities and wastes.</p>	Around the project site	Monthly	HSE Team	1,000,000

Table 18 Environmental Impact Mitigation Measures during Construction and Decommission Phase

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
Air Quality	Ozone, Nitrogen Dioxide, Sulphur Dioxide, Particulate Matter (PM 2.5 and PM10), Total Suspended Particles, Carbon Monoxide,	<u>Near Roasting Furnance and Generator</u> 16° 28.588'N, 97° 40.557'E	Once in construction and decommission phase	HSE Team	1,000,000
Water Quality	pH, Color, Turbidity, TDS, Hardness, Chloride, Nitrate, Arsenic, Iron, Lead, Manganese, Sulfate, Total-Coliform	<u>Groundwater from Project Site</u> 16°28'34.99"N 97°40'33.04"E	Once in construction and decommission phase	HSE Team	1,000,000
	pH, Temperature, TSS, Ammonia, BOD, COD, Total Chlorine, Cyanide, Total Phosphorous, Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Nickel, Mercury, Chromium (Hexavalent), Sulfide, Phenol, Fluoride, Oil & Grease, Total-Coliform	<u>Wastewater from Discharged Point</u> 16°28'37.40"N 97°40'35.25"E			
Noise level	Day time and Night time Noise Level	<u>Near Roasting Furnance and Generator</u> 16° 28.588'N, 97° 40.557'E	Once in construction and decommission phase	HSE Team	300,000
Soil Quality	pH, Zinc, Copper, Lead, Arsenic	<u>Within the project site</u> 16°28'37.32"N, 97°40'36.17"E	Once in construction and decommission phase	HSE Team	300,000
Odor Level	Odor Value	<u>Smelting Furnance</u> 16°28'36.66"N, 97°40'33.16"E	Once in construction and decommission phase	HSE Team	500,000

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
Vibration	Radial, Transverse, Vertical	<u>Near Roasting Furnance & Generator</u> 16° 28.588'N, 97° 40.557'E	Once in construction and decommission phase	HSE Team	500,000
Solid Waste	Amount and type of solid waste	Temporary waste storage area and around the project site	Weekly	HSE Team	500,000
Occupational Health and Safety	Incident/ accident records	Around the project site	Monthly	HSE Team	500,000
Ecosystem	The number of species composition and its distribution. The existence of natural water bodies, waterway and animals pathways. The potential impacts on natural habitat of biodiversity due to construction activities and wastes.	Around the project site	Monthly	HSE Team	500,000

7. Public Consultation

7.1. Summary of Public Consultation

Public consultation was conducted on 18th March, 2025 Mawlamyine Industrial Zone Hall, from 10:00 AM to 11:30 PM. The total of 62 participants joined the meeting. The participants include representatives from governmental officials, local residents, project proponents and consultants.

Public consultation was started with a presentation to describe the project development, followed by questions, answers and discussion. Director Dr. Lai Lai Win from third party (OBES) explained about the existing condition and the findings of environmental quality about the project that have to be undertaken. Opinions, suggestions and recommendations are discussed at the meeting with actively participation of Government Authorities, local people, project proponent and third party in the meeting activities. Project proponent discussed with the issues upon the project and third party expressed the works of Initial Environmental Examination. The detailed discussion and comments in PCM are shown in Chapter 7.

8. Conclusions and Recommendations

8.1. Conclusions

This IEE report has provided an assessment of the potential environmental, social and health impact associated with the construction, operation and decommissioning phases of the proposed project. This study was prepared on the basis of the project information, relevant information from various sources, surveys of environmental and socio-economic setting of the project area, rounds of consultations with stakeholders in the government sector and communities in and around the vicinity of the project site, and experiences of the consultant in technical and environmental aspects of the proposed projects. Based on the study results, the major factors are concluded as shown in Section 8.1 for each chapter and IEE Report summary is mentioned in Section 8.3 as well.

8.2. Recommendations

This IEE study has clearly identified the environmental and social issues, mitigation measures and monitoring plan. It is recommended that the project proponent must implement all the mitigation measures, management plan and monitoring plan described in this report. In addition, the project proponent must continuously follow the requirements of the environmental guidelines, applying mitigation measures to ensure the compliance with the legal requirements and other relevant recommended criteria. Far more detailed is described in Section 8.4

1. INTRODUCTION

1.1 PROJECT PROFILE

Myanmar Shing Shing Metal Company Limited (hereinafter referred to as MSS) was incorporated under the Myanmar Companies Act (1914) on 22 May 2017 in the Republic of the Union of Myanmar with the company registration no.: 111057893 as a private company limited. MSS Antimony Smelting and Refinery factory, located inside the Mawlamyine Industrial Zone, is manufacturing antimony ingots by refining and smelting antimony ore. The registration number of private industry is Ma/Gyi/338. The investment amount is about 800 million of Myanmar Kyat. The information of the project proponent is mentioned in Table 1-1, Table 1-2 and Figure 1-1.

Table 1-1 Contact of Project Project

Project Proponent	Daw Yadanar Lin Aung (Managing Director) 09 450034533
Contact of MSS Factory	U Tin Nyo (Factory Manager) 0943129102
Address	Plot No. (325, 326, 327, 328, 329, 330), Shwe Myo Taw 1 st Street, Mawlamyine Industrial Zone, Naune Pin Seik Village Track, Mawlamyine Township, Mon State

Table 1-2 Board of Director List

No.	Name	Designation	Nationality	NRC
1	Daw Eain Dra Lin Aung	Director	Myanmar	9/MAKANA (N) 116931
2	Daw Yadana Lin Aung	Director	Myanmar	9/MAKANA (N) 106928

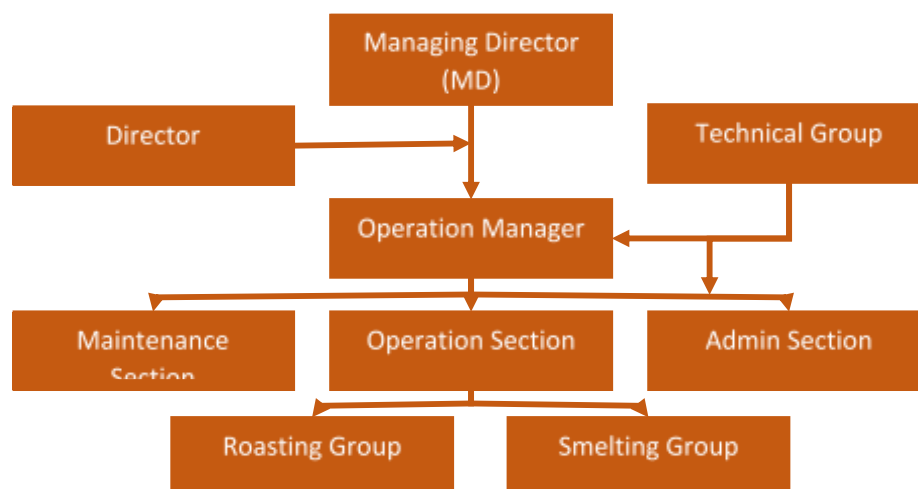


Figure 1-1 Organization Chart of the Manufacturing Antimony Ingots

1.2 BACKGROUND AND OBJECTIVE OF IEE REPORT

Myanmar Shing Shing Metal Co., Ltd. (MSS) has handed the proposed antimony smelting and refinery factory from Kaung Kin Chout Pwint Company Limited in 2016. Meanwhile, the proposed factory had conducted the initial environmental examination report (IEE) due to the instruction of Mon ECD and then, in March 2023, IEE of proposed project had been approved from ECD. In fourth quarter of 2024, the proposed project has arranged to exaggerate the production process and area. Therefore, ECD instructed the proposed project to prepare the new IEE report for the whole project expansion in December, 2024. Therefore, this report is conducted according to the instructions of EIA procedure (2015).

The main objective of IEE report is to establish a solid preliminary work for environmental and social management of the project during its construction, operation, and decommission. To achieve this objective, the IEE will:

- Identify and quantify environmental and social stresses that will be created by the project during its construction, operation, and decommission;
- Evaluate the significance of environmental and social impacts of the potential environmental and social stresses;
- Propose applicable measures for mitigating negative environmental and social impacts; and
- Present results of the planning study in various documents required by the MONREC for environmental and social review of the Project, including: (i) main IEE report; (ii) Environmental and Social Management and Monitoring Plan (ESMMP); and (iii) other documents as necessary during the course of the IEE.

1.3 IEE CONSULTANT

Olive Bright Environmental Solutions Limited (OBES) acts as a third-party consultant firm, bringing together professionals and experts from a variety of fields to carry out the Environmental Impact Assessments (EIAs), Initial Environmental Examinations (IEEs), Environmental Management Plans (EMPs), and Environmental Monitoring Reports (EMoPs) regarding the environmental and social impacts of the development projects under the contract agreement of project proponents in accordance with Article 76 of the Environmental Impact Assessment Procedure (2015).

The information of the consultant organization is described in the following.

Name of Organization: Olive Bright Environmental Solutions Limited (OBES)

License No. EIA-CO(A)002/2023

Contact Person: Dr. Lai Lai Win (Managing Director)



Address: No.394, Maggin Residence, Wartayar 3rd Street, Kabaraye, Mayangone Township, Yangon Region, Myanmar.

Phone No. +959797241421

Email: service@uniquenviron.com

Table 1-3 IEE Study Team

No	Name of Consultants	Registration number	Specialized Fields
1.	Dr. Lai Lai Win	EIA-C 019/2023	<ul style="list-style-type: none"> • Water Pollution Prevention, Control and Prediction of Impacts • Ecology and Biodiversity • Solid Waste and Hazardous Waste Management • Risk Assessment and Hazard Management
2.	Mr. Min Min Oo	EIA-C 020/2023	<ul style="list-style-type: none"> • Air Pollution Prevention, Monitoring and Control • Meteorology, Air Quality Modeling and Prediction
3.	Ms. Myat Thitsar Naing	EIA-C 021/2023	<ul style="list-style-type: none"> • Social Study and Analysis
4.	Mr. Myo Thura	EIA-C 046/2023	<ul style="list-style-type: none"> • Geological Assessment • Soil Conservation
5.	Ms. Aye Aye Soe	EIA-C 068/2024	<ul style="list-style-type: none"> • Land Use
6.	Mr. Kyaw Win Han	EIA-AC 027/2023	<ul style="list-style-type: none"> • Air Quality Monitoring
7.	Mr. Si Yan Hein	EIA-AC 026/2023	<ul style="list-style-type: none"> • Geological Assessment

8.	Mr. Htet Thiha Phone Myint	EIA-AC 032/2023	<ul style="list-style-type: none"> • Geological Assessment • Noise and Vibration
9.	Mr. Khin Maung Aye	EIA-AC 018/2023	<ul style="list-style-type: none"> • Archaeological Impact Assessment
10.	Mr. Khin Maung Win	EIA-AC 028/2023	<ul style="list-style-type: none"> • Water Pollution Prevention, Control and Prediction of Impacts • Hydrology, Surface Water and Groundwater • General Environmental Management
11.	Dr. Phyu Phyu Myint	EIA-AC 020/2023	<ul style="list-style-type: none"> • Health Impact and Study
12.	Dr. Nilar Win	Supportive Member	<ul style="list-style-type: none"> • Air Quality Monitoring
13.	Ms. Thet Wai Hnin	Supportive Member	<ul style="list-style-type: none"> • Natural Resources Management

1.4 SCOPE OF INITIAL ENVIRONMENTAL EXAMINATION (IEE)

The scope of an initial environmental examination (IEE) report encompasses the assessment of environmental and social impacts of a project, primarily focusing on identifying and mitigating negative impacts. It includes the nature of proposed project, its components, the environmental baseline qualities, the impact assessments, its management plan and monitoring activities. This IEE is a plan that is outlining measures to not only minimize the negative impacts but also monitor the project performance with proper implementation of adaptive management strategies.

The structure of IEE report is shown in the below, but not be limited to;

Chapter (1) Introduction

Chapter (2) Overview of the Policy, Legal and Institutional Framework

Chapter (3) Project Description

Chapter (4) Existing Environmental and Social Condition

Chapter (5) Potential Environmental Impact and Mitigation Measurement

Chapter (6) Environmental Management Plan

Chapter (7) Public Consultation and Disclosure

Chapter (8) Conclusion and Recommendation

1.5 IEE STUDY TIMELINE

The overall IEE study takes about 6 months in total, in which the field observation and collection of environmental and social data started at the beginning of the month. At the same time, the report preparation is also conducted with the information provided by the project

proponent and desktop survey results. Afterwards, the environmental baseline surveys and PCM are conducted. The detailed timeframe of IEE study is described in the Table 1-4.

Table 1-4 Timeframe of IEE Study

No.	Tasks of IEE Study	1 st Month of Study		2 nd Month of Study		3 rd Month of Study		4 th Month of Study		5 th Month of Study		6 th of Month of Study	
1.	Observation of production processes and surround area.	—											
2.	Desktop survey for study area.	—	—										
3.	Identification of study area and baseline monitoring station			—									
4.	Data collection for environmental and social baseline data				—								
5.	Potential Impact Assessment					—	—						
6.	Public Consultation Meeting and collecting the public interest and concerns.							—					
7.	Preparation of IEE report			—	—	—	—	—	—	—	—	—	—
8.	Report Submission												—

2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS

2.1 NATIONAL ENVIRONMENTAL POLICY

The Policy provides long-term guidance for government organizations, civil society, the private sector and development partners on the achievement of environmental protection and sustainable development objectives in Myanmar. This Policy builds on Myanmar's 1994 National Environment Policy, the 1997 Myanmar Agenda 21, the 2009 National Sustainable Development Strategy, the 2008 Constitution of the Republic of the Union of Myanmar, the 2012 Environmental Conservation Law, the 2015 National Comprehensive Development Plan and the 2018 Myanmar Sustainable Development Plan.

National Environmental Policy Vision and Mission

Vision

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

Mission

To establish national environmental policy principle for guiding environmental protection and sustainable development and for mainstreaming environmental consideration into all policies, laws, regulation, plans, strategic, programs and projects in Myanmar.

This chapter contains information on relevant policies, legislations and institutional framework of Myanmar that are relevant to the environmental and socio-economic aspects of the project. The activities carried out under the project are subjected to these legal requirements.

Environmental and Social Policies of Proposed Factory

The Proposed project impose the economic and social disciplines to achieve the sustainability development goals. The basic policy complied by the proposed project is described in the following;

The company contributes the scope of its capabilities to improve economic, environmental and social conditions through its business activities.

Worker's safety and health is the top priority of the company and every worker shall strictly follow the specified regulations in every stage of the production.

The by-effects of factory shall not disturb or interrupt the surrounding environment especially including nearby factories and residents, and the worker's accommodations.

The company shall always give precedence to the concerns and complaints raised by the local community, arrange methods to receive and solve understandably in a timely manner.

The company shall reduce negative loads on the environment in every stage of the production starting from raw materials intake till the final product export.

The company shall follow the environmental related regulations, environmental standards and instructions by implementing the continuous improvement in environmental performance of the factory.

The company shall respect the national laws concerning with forced labor and ensure that there is no child labor in its value chain.

The factory shall respect all the rules and regulations enacted by the Union Government and the Mon State Government.

2.2 LAWS RELATED TO THE PROPOSED PROJECT AND COMMITMENTS

Policies, legislation and guidelines in Myanmar that are of relevance to the project are listed in Table 2-1. The project proponent will comply with all the following laws and regulations.

Table 2-1 Relevant Laws and Regulations

No.	Name of Laws and Regulations	Year
Environmental Conservation		
	Environmental Conservation Law	2012
	Environmental Impact Assessment Procedure	2015
	National Environmental Quality (Emission) Guidelines	2015
	National Drinking Water Quality Standards	2019
	National Surface Water Quality	2024
Pollution Health		
	The Union Myanmar Public Health Law	1972
	The Prevention and Control of Communicable Diseases Law	1995, amended in 2011
	The Control of Smoking and Consumption of Tobacco Product	2006
	Occupational Safety and Health Law	2019
	Myanmar Fire Brigade Law	2015
	Prevention of Hazard from Chemical and Related Substances Law	2013
	The Industrial Explosive Materials Law	2018
	The Explosive Substances Act	1908
Resources Conservation		
	Conservation of Water Resources and River Law	2006, amended in 2017
	Conservation of Water Resources and River Rules	2013
	Underground Water Act	1930
Human Rights		
	The Ethnic Rights Protection Law	2015
	The Ethnic Rights Protection Rule	2019
	Labour Organization Law	2011
	The Minimum Wage Law	2013
	The Payment of Wages Law	2016
	The Workers' Compensation Act	1923
	The Settlement of Labour Dispute Law	2012
	Social Security Law	2012, amended in 2020

No.	Name of Laws and Regulations	Year
Company		
	Myanmar Insurance Law	1993, amended in 1996
	Myanmar Insurance Rule	2017
	Myanmar Investment Law	2016, amended in 2019
	Myanmar Companies Law	2017
	The Private Industrial Enterprise Law	1990
	The Export and Import Law	2012
	The Union Tax Law	2019
Cultural Heritages		
	The Protection and Preservation of Cultural Heritage Region Law	2019
	The Protection and Preservation of Antique Object Law	2015
	The Protection and Preservation of Ancient Monument Law	2015
Urban Development and Management		
	Mon State Municipal Law	June, 2017
	The Electricity Law	2014
Disaster Management		
	Natural Disaster Management Law	2013

Related Laws, Rules and Regulation of Proposed Project

The proposed project commits to obey the following laws, rules and regulation, described in **Error! Reference source not found.**

Table 2-2 *List of Legal Commitments*

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
	Environmental Conservation	
	Environmental Conservation Law (2012)	<p>In accordance with Section 7 (o)</p> <p>The Project Proponent commits to compensate for environmental impact and to contribute a part of the benefit from the business which explore, trade and use the natural resources in environmental conservation works.</p>
	Environmental Impact Assessment Procedure (2015)	<p>In accordance with Article 102 (a)</p> <p>The Project Proponent commits to complying with the requirements actions, and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting for or on behalf of the Project, in carrying out work on the Project.</p> <p>In accordance with Article 102 (b)</p> <p>The Project Proponent complies with supporting programs for livelihood restoration and resettlement in consultation with the PAPs, related government agencies, and organizations and other concerned persons for all Adverse Impacts until PAPs have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the Project</p> <p>In accordance with Article 103,</p> <p>The Project Proponent commits to all Project commitments, and conditions, and is liable to ensure that all contractors and subcontractors of the Project comply fully with all applicable Laws, the Rules, this Procedure, the EMP, Project commitments and conditions when providing services to the Project shall include a full implementation the EMP</p> <p>In accordance with Article 104,</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>The Project Proponent commits to take a responsible for, and shall fully and effectively implement, all requirements set forth in the ECC, applicable Laws, the Rules, this Procedure and standards.</p> <p>In accordance with Article 105,</p> <p>The Project Proponent commits for monitoring and reporting to comply with the requirements such as notify and identify in writing to the Ministry, providing detailed information as to the proposed Project's potential Adverse Impacts</p> <p>In accordance with Article 106,</p> <p>The Project Proponent commits for engaging in continuous, proactive and comprehensive self-monitoring of the Project and activities related thereto, all Adverse Impacts, and compliance with applicable laws, the Rules, this EIA Procedure, standards, the ECC, and the EMP during all phases of the Project (pre-construction, construction, operation, decommissioning, closure and post-closure)</p> <p>In accordance with Article 107,</p> <p>The Project Proponent commits to notify and identify in writing to the Ministry for any breaches of his obligations or other performance failures or violations of the ECC and EMP as soon as reasonably possible and in any event, in respect of any breach which would have a serious impact or where the urgent attention of the Ministry is or may be required, to undertake within not later than twenty-four (24) hours, and in all other cases within seven (7) days of the Project Proponent becoming aware of such incident.</p> <p>In accordance with Article 108,</p> <p>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.</p>
	Public Health	

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
	The Union Myanmar Public Health Law (1972)	<p>In accordance with Section 5,</p> <p>Project Proponent commits to comply that Organizations formed under this law, those assigned by these groups, Government departments and subordinate agencies assigned under this law, Issues related to environmental health, Food issues, Matters relating to home appliances and cosmetics for the general public, Issues related to infectious diseases, Matters related to private clinic, For matters relating to medicines used by the working people, factories, business departments, shops, the fronts of the building have the right to inspect and instruct the buildings at any time.</p>
	The Prevention and Control of Communicable Diseases Law (1995, amended in 2011)	<p>In accordance with Section 3 (a),</p> <p>The project proponent commits to comply with the following requirement of immunizations and health education activities related to communicable diseases, published by the Department of Health;</p> <p>immunization of children by injection or orally;</p> <p>immunization of those who have attained majority, by injection or orally, when necessary;</p> <p>carrying out health educative activities relating to Communicable Disease.</p> <p>carrying out the activities of surveillance, prevention and control concerning communicable disease;</p> <p>carrying out the activities of medical examination for prevention of communicable disease in crossborder entrance and exit of the country, international airport, seaport, other necessary airport, seaport and bus terminal;</p> <p>prohibition or restriction of movements at home, hotel, motel and guest house;</p> <p>isolation of infected person of communicable disease or suspect of being infected therewith;</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>carrying out the activities of spraying, immunization by injection or orally and environmental sanitation necessary for prevention and control according to communicable diseases;</p> <p>giving advice to and coordinating with relevant Government departments, organizations and nongovernmental organizations for construction of healthy housing, obtaining safe drinking water and fresh water for use, proper waste disposal in order to prevent occurrence of communicable disease for workers who are carrying out activities of social and economic development;</p> <p>carrying out other functions prescribed by the Ministry of Health, from time to time.</p> <p>In accordance with Section 9,</p> <p>The project proponent shall obey the following;</p> <ul style="list-style-type: none"> (a) rat fall; (b) outbreaks appear to be exacerbated during pregnancy and in children. (c) outbreak of a communicable disease.
	The Control of Smoking and Consumption of Tobacco Product (2006)	<p>In accordance with Section 9 (a) to 9 (b);</p> <p>The Project Proponent commits to comply with the requirements,</p> <ul style="list-style-type: none"> (a) keep the caption and mark referring that it is a non-smoking area at the place mentioned in Section 6 in accordance with the stipulations; (b) arrange the specific place where smoking is allowed; (c) supervise and carry out measures so that no one shall smoke at the non-smoking area; and; (d) accept inspection when the supervisory body comes to the place for which he is responsible

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
	Occupational Health and Safety	
	Occupational Safety and Health Law (2019)	<p>In accordance with Section 12;</p> <p>The Project Proponent commits to follow the following conditions;</p> <p>(a) In accordance with the stipulations of the Ministry, the person in charge of occupational safety and health shall be appointed to closely monitor the safety and health of the workers according to the type of work.</p> <p>(b) The same number of employers according to the type of business in the business not less than the number of workers prescribed by the Ministry to make the workplace safe and healthy; Each occupational safety and health committee, consisting of workers' representatives, shall be formed in accordance with the provisions of the Ministry. This should take into account the occupational safety and health of women due to the nature of the workplace.</p> <p>In accordance with Section 14,</p> <p>The Project Proponent commits to comply with this law and rules, orders, directives and procedures issued under this law to be safe and healthy workplace</p> <p>In accordance with Section 16,</p> <p>The Project Proponent commits to permit that inspection officers shall inspect the safety and health conditions of the workplaces related to this Law and instruct the relevant employer to follow the instructions and report to the Chief Inspector</p> <p>In accordance with Section 17,</p> <p>The Project Proponent commits to follow the following actions;</p> <p>(a) showing any identification card of the Inspector General of any workplace related to this Law and entering at any time without a warrant; The right to inspect and inquire;</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>(b) workplace and process records; Documents Access to evidence; Copying rights; If necessary, the right to keep as evidence;</p> <p>(c) working conditions that may endanger occupational safety and health; Access to photos and video of the process;</p> <p>(d) noise; light, heat, cold, particles. The right to assess the amount and time of exposure to fumes and hazardous materials in the work environment with the assistance of an expert in the relevant field; Access to records;</p> <p>(e) the right to inquire during the working hours of any person working in the workplace with the assistance of a recognized doctor in connection with the occurrence or availability of occupational diseases;</p> <p>(f) due to work injury; Medical information about a worker receiving medical treatment or death due to occupational disease; To submit the information requested by the Department in the prescribed form from the report of the autopsy with the specified security level. Right to request from the person in charge of the clinics.</p>
	Myanmar Fire Brigade Law (2015)	<p>In accordance with Section 25,</p> <p>The project proponent shall, in accord with the directive of the Department of Fire Services:</p> <p>(a) not fail to form the Reserve Fire Brigade;</p> <p>(b) not fail to provide fire safety equipment.</p>
	Prevention of Hazard from Chemical and Related Substances Law (2013)	<p>In accordance with the Section 17,</p> <p>The Project Proponent commits to obtain a license shall put the insurance in accordance with the prescriptive stipulations to be able to pay the compensation, if the impact and damage is occurred on the Human Being and Animals or the environment in respect of the chemical and related substances businesses</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>In accordance with the Section 22,</p> <p>The Project Proponent commits to a person who has obtained the registration certificate shall abide the regulations consisted in the registration certificate furthermore shall also abide the order and instructions issued occasionally by the Central Supervisory Board</p>
	The Industrial Explosive Materials Law (2018)	<p>In accordance with Section 6 (c),</p> <p>The Project Proponent commits to follow that the chief inspector shall notify the applicant to construct a magazine with specified features on the approved plot on receipt of the direction from the Ministry described in sub-section (b).</p> <p>In accordance with Section 7 (c),</p> <p>The Project Proponent commits to follow that if the office of the Commander-in-Chief (Army) found that the finding and remark of the sub committee for procurement, provision, storage and distribution of explosives is in conformity with the specifications, the office shall grant permission to the applicant to carry out any one or more of import, transport, store, manufacture, use, process or transfer of industrial explosive materials. A copy of permission shall be sent to the Ministry</p> <p>In accordance with Section 11 (b),</p> <p>The Project Proponent commits to follow that when the application for a licence under section 10 is received, the Chief Inspector shall inspect whether the magazine is constructed in specified features and; grant a licence to the applicant with the approval of the Ministry if the magazine is constructed in specified features</p> <p>In accordance with Section 13,</p> <p>The Project Proponent commits to apply to renew the licence, 30 days before expiration to the Chief inspector in accordance with the stipulations, if he wishes to continue to store industrial explosive materials</p> <p>In accordance with Section 14 (b),</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>The Project Proponent commits to follow that when the application for renewal of the licence under section 13 is received, the chief inspector shall inspect the magazine of the applicant and may renew the licence with the approval of the Ministry if the magazine is constructed in specified features.</p>
	The Explosive Substances Act (1908)	<p>In accordance with Section 3,</p> <p>The Project Proponent commits to follow that any person who unlawfully and maliciously causes by any explosive substance an explosion of a nature likely to endanger life or to cause serious injury to property shall, whether any injury to person or property has been actually caused or not, be punished with transportation for life or any shorter term, to which fine may be added, or with imprisonment for a term which may extend to ten years, to which fine may be added</p> <p>In accordance with Section 5,</p> <p>Project Proponent commits to follow that any person who makes or knowingly has in his possession or under his control any explosive substance, under such circumstances as to give rise to a reasonable suspicion that he is not making it or does not have it in his possession or under his control for a lawful object, shall, unless he can show that he made it or had it in his possession or under his control for a lawful object, be punishable with transportation for a term which may extend to fourteen years, to which fine may be added, or with imprisonment for a term which may extend to five years, to which fine may be added</p>
	Resources Conservation	
	The Law relating to Aquaculture (1989)	<p>In accordance with Section 29 (b);</p> <p>The Project proponents shall not obstruct navigation and water flow or polluted water within fisheries waters or abet such acts.</p>
	Conservation of Water Resources and River Law (2006, amended in 2017)	In accordance with Section 8 (a);

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>The Project Proponent commits not to carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks</p> <p>In accordance with Section 19;</p> <p>The Project Proponent commits not to dispose of any substance into the river-creek that may cause damage to waterway or change of watercourse from the bank or vessel, which is plying, vessel which has berthed, anchored, stranded or sunk.</p> <p>In accordance with Section 21 (b);</p> <p>The Project Proponent commits not to drill well or pond or dig earth without the permission of the Directorate.</p> <p>In accordance with Section 22,</p> <p>The Project Proponent commits not to pile sand, shingle and other heavy materials for business purposes in the bank area and waterfront area without the permission of the directorate</p> <p>In accordance with Section 24 (b),</p> <p>The Project Proponent commits not to shall violate the conditions prescribed by the Directorate so as not to cause water pollution and change of watercourse in rivers and creeks</p> <p>In accordance with Section 30,</p> <p>The Project Proponent commits to carry out the desirous of constructing drainage, utilizing river water intake, constructing bridges spanning rivers, connecting underground pipe, connecting underground electric power cable, connecting underground telecom cable or digging in rivers and creeks, bank boundary and waterfront boundary, under the requirement of work, shall in order not to adversely affect the water resources and rivers and creeks after obtaining the approval of the Ministry of Transport.</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
	Conservation of Water Resources and River Rules (2013)	<p>In accordance with Rule 8 (c),</p> <p>The Project Proponent commits to construct the toilets far away from the river bank and sewage discharge to septic tank.</p> <p>In accordance with Rule 8 (d),</p> <p>The Project Proponent commits to avoid discharging sewage, engine oil, chemical, poisonous material, hazardous materials and other materials which may cause water pollution</p> <p>In accordance with Rule 9,</p> <p>The Project Proponent commits to pay to prevent water pollution and to conserve the environment if water pollution and environmental impact is generated as a result of the project.</p>
	Underground Water Act (1930)	<p>In accordance with Section 3,</p> <p>Project Proponent commits not to sink a tube for the purpose of obtaining underground water except under and in accordance with the terms of a license granted by the water officers</p> <p>In accordance with Section 5,</p> <p>Project Proponent commits to obtain or attempt to obtain underground water shall supply the water officer with such information as the Governor may by rule prescribe</p>
	Human Rights	
	The Ethnic Rights Protection Law (2015)	<p>In accordance with Section 5,</p> <p>The Project Proponent commits to inform, coordinate and perform the matters of project with the relevant local ethnic groups in the case of development works, major projects, businesses and extraction of natural resources will be implemented within the area of ethnic groups</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
	The Ethnic Rights Protection Rule (2019)	<p>In accordance with Rule 20,</p> <p>The Project Proponent commits to the following statements;</p> <p>(a) in order to understand the benefits and harms of the project to the local ethnic groups in the area where the project will be implemented, the language and methods that they can understand must be fully and accurately explained in advance.</p> <p>(b) the policy directions of Myanmar's sustainable and balanced development plan; strategies; It must be done according to the process.</p> <p>(c) in order to find out whether there is any impact on the environment and socio-economic life in the area, the environmental impact analysis and the impact analysis on the socio-economic development must be carried out in accordance with the guidelines of the relevant department.</p> <p>(d) at all stages of the environmental impact assessment and socio-economic development impact assessment process, dialogue and negotiation with local ethnic groups must be carried out in an open and transparent way.</p> <p>In accordance with Rule 21,</p> <p>The project proponent commits the following statements;</p> <p>a. according to rule 20, the project proponent must report all compliance to the Ministry and receive their comments and feedbacks before implementation of project.</p> <p>b. after project implementation, the pre arranged activities and completion conditions must be submitted to the Ministry.</p>
	Labour	
	Labour Organization Law (2011)	<p>In accordance with Section 18,</p> <p>The Project Proponent commits to follow that the labour organization has the right to demand the relevant employer to re-appoint a worker if the employer dismisses such worker</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>and if there is cause to believe that the reasons of such dismissal were based on labour organization membership or activities, or were not in conformity with the labour laws</p> <p>In accordance with Section 19,</p> <p>The Project Proponent commits to follow that The labour organizations have the right to send representatives to the Conciliation Body in settling a dispute between the employer and the worker. Similarly, they have the right to send representatives to the Conciliation Tribunals formed with the representatives from the various levels of labour organizations</p> <p>In accordance with Section 20,</p> <p>The Project Proponent commits to discuss with the government, the employer and the complaining workers in respect of worker's rights or interests contained in the labour laws, the representatives of the labour organization also have the right to participate and discuss</p> <p>In accordance with Section 21,</p> <p>The Project Proponent commits to follow that the labour organizations have the right to participate in solving the collective bargains of the workers in accord with the labour laws,</p> <p>In accordance with Section 22,</p> <p>The Project Proponent commits to follow that the labour organizations shall carry out peacefully in carrying out holding of meetings, going on strike and carrying out other collective activities in accord with their procedures, regulations, by-laws and any directives prescribed by the relevant Labour Federation</p>
	The Minimum Wage Law (2013)	<p>In accordance with Section 12,</p> <p>The Project Proponent commits to follow the following duties</p> <p>shall not pay wage to the worker less than the minimum wage stipulated under this Law;</p> <p>may pay more than the minimum wage stipulated under this Law;</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;</p> <p>shall pay the minimum wage to the workers working in the commerce, production business and service in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash in accord with the stipulations or jointly in some cash and in some produce prescribed in local price according to the desire of the worker;</p> <p>may pay jointly in some cash and some produce prescribed in local price according to the local custom or desire of the majority of workers or collective agreement in paying the minimum wage to the workers and working in the agriculture and livestock breeding business. Such payment shall be for any personal use and benefit of the worker and his family and the value shall also be considerable and fair.</p>
	The Payment of Wages Law (2016)	<p>In accordance with Section 5,</p> <p>The Project Proponent commits that the employer may be subject to unforeseen circumstances, including natural disasters. If it is difficult to pay in accordance with the provision of sub-section (c), it shall be submitted to the Department with good reason as to when the wages will be changed with the consent of the workers</p> <p>In accordance with Section 14,</p> <p>The Project Proponent commits to support the following right to enjoy overtime wages stipulated by the law if he works over time</p> <p>In accordance with Chapter 3 Section (8),</p> <p>The Project Proponent commits not to deduct for any purpose except deduction from wages in accordance with the provisions of section 7 and section 11</p>
	The Workers' Compensation Act (1923)	In accordance with Chapter (2).

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		The Project Proponent commits to follow that If personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation
	The Settlement of Labour Dispute Law (2012)	<p>In accordance with Section 39,</p> <p>Project Proponent commits not to alter the conditions of service relating to workers concerned in such dispute at the consecutive period before commencing the dispute within the period under investigation of the dispute before the Arbitration Body or Tribunal, to affect the interest of such workers immediately</p> <p>In accordance with Section 40,</p> <p>Project Proponent commits to follow that no party shall proceed to lock-out or strike without accepting negotiation, conciliation and arbitration by Arbitration Body in accord with this law in respect of a dispute</p>
	Social Security Law (2012, amended in 2020)	<p>In accordance with Section 15(b),</p> <p>Project Proponent commits to pay contributions after effecting compulsory registration to the fund contained in clauses (i), (iii), (iv) and (v) of sub-section (a)</p> <p>In accordance with Section 18(b),</p> <p>Project Proponent commits to deduct contributions to be paid by worker from his wages together with contribution to be paid by him and pay to the social security fund. The employer shall also incur the expense for such contribution,</p> <p>In accordance with Section 48(b),</p> <p>Project Proponent commits to effect insurance by registering voluntarily for the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system and by paying stipulated contribution to employment injury benefit insurance fund.</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
	Company	
	Myanmar Insurance Law (1993, amended in 1996)	<p>In accordance with Section 15,</p> <p>The project Proponent commits to make an insurance for motor vehicles shall affect compulsory Third Party Liability Insurance with the Myanmar Insurance</p> <p>In accordance with Section 16,</p> <p>The project Proponent commits to operate an enterprise which may cause loss to State-owned property or which may cause damage to the life and property of the public or which may cause pollution to the environment shall affect compulsory General Liability Insurance with the Myanmar Insurance under this law</p>
	Myanmar Insurance Rule (2017)	<p>In accordance with Rule 203,</p> <p>The project proponent commits to comply with the conditions of the Permit and other applicable laws when making an Investment and shall fully assist while negotiating with the Authority for settling the grievances of the local community that have been affected</p> <p>In accordance with Rule 206,</p> <p>The project proponent commits to appoint a foreigner as senior management, technician expert or consultant</p> <p>In accordance with Rule 73,</p> <p>The project proponent commits to holds the permit or tax incentives must have taken out the relevant insurance out of the following types of insurance at any insurance business that holds the license in the Union based on the nature of the business: (a) Property and Business Interruption Insurance; (b) Engineering Insurance; (c) Professional Liability Insurance; (d) Professional Accident Insurance; (e) Marine Insurance; and, (f) Workmen Compensation Insurance</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
	Myanmar Investment Law (2016, amended in 2019)	<p>In accordance with Section 50 (a),</p> <p>The Project Proponent commits to have the right to obtain a long-term lease of land or building from the owner if it is private land or building, or from the relevant government departments or government organizations after obtaining permit or endorsement in accordance with the stipulations in order to do investment</p> <p>In accordance with Section 50 (b)</p> <p>If the Project Proponent is foreign investor, he commits to lease land or building either from the government or government organizations or from owners of private land or building from commencing on the date of receipt of the permit or endorsement of the Commission up to an initial period of (50) year in accordance with the stipulation</p> <p>In accordance with Section 50 (c)</p> <p>The Project Proponent commits that after the expiry of the term of the right to use land or building or the period of right to lease of land or building permitted under subsection (b), a consecutive period of (10) year and a further consecutive period of (10) year extension to such period of lease of land or building may be obtained with the approval of the Commission,</p> <p>In accordance with Section 50 (d)</p> <p>The Project Proponent commits to register the land lease contract at the Office of Registry of Deeds in accordance with the Registration Act.</p> <p>In accordance with Section 50 (e),</p> <p>The Project Proponent commits that the Government may grant more favorable terms and conditions for the lease of land and the use of land by Myanmar citizen investors,</p>
	Myanmar Companies Law (2017)	<p>In accordance with Section 11 (a),</p> <p>The Project Proponent commits to have a constitution the effect of which is to bind, in accordance with its terms, the company and the members thereof to the same extent as if</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>they respectively have been signed by each member and contained a covenant on the part of each member, the member's heirs, and legal representatives, to observe all the provisions of the constitution, subject to the provisions of this law,</p> <p>In accordance with Section 11 (b),</p> <p>The Project Proponent commits to have the rights, powers, duties and obligations set out in this law except to the extent that they are modified, in accordance with this law, by the constitution,</p> <p>In accordance with Section 28 (a),</p> <p>The Project Proponent commits to follow that without limiting any provision of this law, no act of a company and no transfer of property to or by a company is invalid merely because the company does not have the capacity, the right, or the power to do the act or to transfer or take a transfer of the property,</p> <p>In accordance with Section 28 (b),</p> <p>The Project Proponent commits to follow that an act may not be considered in the best interests of a company does not affect the capacity of the company to do the act, under the Section 28 (b) of Myanmar Companies Law.</p>
	The Private Industrial Enterprise Law (1990)	<p>In accordance with Section 27 (a),</p> <p>The Project Proponent commits not to sell or distribute the goods without a trade mark</p> <p>In accordance with Section 27 (b),</p> <p>The Project Proponent commits not to violate any provision of section</p> <p>In accordance with Section 27 (c),</p> <p>The Project Proponent commits not to fail to comply with any order or decision passed by the Minister and the Director General</p>
	The Export and Import Law (2012)	In accordance with Section 7 ,

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		Project Proponent commits to comply with a person who obtained any license not to violate the conditions contained in the license.
	The Union Tax Law (2019)	<p>In accordance with Section 16 ,</p> <p>The project proponent commits to , if he receives foreign currency from producing and selling any type of goods chargeable to the commercial tax, provide any service chargeable to the commercial tax and trading under this Law, pay the commercial tax in kyats on such sale proceeds or proceeds of service in foreign currency in accordance with the Commercial Tax Regulations calculated at the relevant tax rates in this Law</p> <p>In accordance with Section 17 ,</p> <p>The project proponent commits to follow that if the income is earned in the foreign currency for other income heading except the heading of capital gains from assets, the income tax shall, in accordance with the provisions of regulation 8 of the Income Tax Regulations, be calculated, on such income and the income tax shall be charged in kyats on citizens and foreigners residing in the country and shall be charged in the type of currency earned on a non-resident foreigner</p>
	Cultural Heritages	
	The Protection and Preservation of Cultural Heritage Region Law (2019)	<p>In accordance with Section 21 (b),</p> <p>The Project Proponent commits to the state that no person shall, without prior permission granted under this law, carry out any of the following in the cultural heritage region,</p> <p>(a) carrying out archeological excavation;</p>
	The Protection and Preservation of Antique Object Law (2015)	<p>In accordance with Section 12,</p> <p>The Project Proponent commits to comply with any object which has no owner or custodian, needs to inform the relevant Ward or village-tract administrator if he knows or it seems reasonable to assume that the said object is an antique object</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
	The Protection and Preservation of Ancient Monument Law (2015)	<p>In accordance with Section 12,</p> <p>The Project Proponent commits to comply with the ancient buildings over 100 years on the ground or under the ground or on the water or under the water to the owner or without maintained person that buildings may be known or assumed the ancient buildings must inform early to the respective ward administrator or village administrator</p> <p>In accordance with Section 20 (f)</p> <p>The Project Proponent commits to discard chemical substance and rubbish which can affect an ancient monument and the environment</p>
	Urban Development and Management	
	Mon State Municipal Law (June, 2017)	<p>In accordance with the Chapter (9),</p> <p>The Project Proponent commits to submit the regulated taxation to the Township Municipal Committee as per Section 29 and 30.</p> <p>In accordance with Section 91,</p> <p>The Project Proponent commits not to conduct the following production process within the area administered by Township Municipal,</p> <p>Not to carry out the hazardous works without having permission</p> <p>Not to sell or storage the goods related to the hazardous works without having permission.</p> <p>Not to perform the hazardous works after terminating the permission.</p>
	The Electricity Law (2014)	<p>In accordance with Section 20,</p> <p>The Project Proponent 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</p> <p>In accordance with Section 21 (a),</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		<p>The Project Proponent commits to compensate for causing damages and losses to any person and entity for failing to abide by this laws, rules, procedures, regulations, bye-laws, order and directives and failing to abide by the prescribed qualities and standardization, be liable</p> <p>In accordance with Section 24,</p> <p>The Project Proponent commits to be that if damages or losses arise to any other electric power user or any electrical business due to negligence of any electric power user, the calculated compensation in accord with the method prescribed by the Ministry for the value of damage or loss shall be paid.</p> <p>In accordance with Section 27,</p> <p>The Project Proponent commits to inform in the event of electricity hazard occurs in respect of generation, transmission, distribution and utilization of electric power, the permit holder and the electrical authorized person shall report to the Chief Inspector and in charge of the relevant department as soon as possible</p> <p>In accordance with Section 29,</p> <p>The Project Proponent commits to inspect by the ministry, the specification of quality and standardizations in respect of the factories, equipments installed to them, business buildings, and electrical equipment which are manufactured, imported and sold from the local and foreign country</p> <p>In accordance with Section 33,</p> <p>The Project Proponent commits to allow the inspection by the chief inspector, inspectors and persons conferred duty by them have the right to enter and inspect any place or building to perform their duties</p> <p>In accordance with Section 40,</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		The Project Proponent commits to permit holders shall carry out in accord with the rules, standardizations and procedures issued by the Ministry and shall be subjected to necessary inspection of relevant Government department and organization,
	Disaster Management	
	Natural Disaster Management Law (2013)	<p>In accordance with Section 14 (a),</p> <p>The Project Proponent commits to follow the prioritization of the natural disaster risk reduction by the National Committee and the local Body respectively;</p> <p>In accordance with Section 14 (b)</p> <p>The Project Proponent commits to carry out better improvement on early warning system of natural disaster;</p> <p>In accordance with Section 14 (c)</p> <p>The Project Proponent commits to apply knowledge and innovation to be a habit of safety and resilience at every level from the National Level to the ward or village tract level;</p> <p>In accordance with Section 14 (d),</p> <p>The Project Proponent commits to carry out together with the measures of natural disaster risk reduction in development plans of the State</p> <p>In accordance with Section 14(e),</p> <p>The Project Proponent commits to establish sound preparations to resolve the natural disaster at every level from the National Level to the ward or village tract level.</p> <p>In accordance with Section 16,</p> <p>The Project Proponent commits to follow the preventive measures to be carried out in the area where is likely to strike natural disaster before the natural, shown in following; (a) Building cyclone shelters and life-saving hillock-sanctuaries in the area where is not easy to evacuate; (b) Constructing embankments along the coast and in the flooded area; (c)</p>

No.	Name of Laws, Rules, Procedure and Regulations	Related Sections, Articles and Rules for Proposed Proponent
		Preservation of mangroves along the coast and planting fast-growing trees; (d) Taking preventive measures according to the type of natural disaster; (e) Performing other duties assigned by this law in respect of the preventive measures.

2.2.1 IFC'S STANDARDS AND GUIDELINES

IFC's standards and guidelines relevant to this project are described as follows;

- ✓ Performance Standards (PS) on Environmental and Social Sustainability (January 1, 2012)
- ✓ Environmental, Health and Safety-General Guidelines (April 30, 2007)

IFC describes eight PS on Environmental and Social Sustainability which Project proponent needs to comply throughout the IFC investment life. The eight PS are;

- ✓ 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: Ethnic people/ ethnic group
- ✓ PS 8: Cultural Heritage

All the environmental and social aspects of development projects will be covered by the above eight PS.

2.2.2 WORLD BANK'S POLLUTION PREVENTION AND ABATEMENT HANDBOOK (1988)

Toward Clear Production

The WB's Pollution Prevention and Abatement Handbook (PPAH) is a comprehensive document providing guidelines for industrial pollution control, and it recommends emission and ambient quality standards to be applied in environmental management. These recommends standards have taken into account the standards enforced by U.S.EPA and those recommended by WHO. They are referred to in the IFC's EHS Guidelines.

2.2.3 INTERNATIONAL CONVENTIONS

In the following section, only those international conventions relevant to the proposed project are described as follows.

Vienna Convention for the Protection of the Ozone Layer (1985)

The Vienna Convention for the Protection of the Ozone Layer is a treaty on the framework for international cooperation concerning the protection of the ozone layer. This is a framework convention that lays out principles agreed upon by many parties. It does not require countries to take control actions to protect the ozone layer. This would come later in the form of the Montreal Protocol.

This Convention was adopted in 1985 following international discussion of scientific discoveries in the 1970s and 1980s highlighting the adverse effect of human activity on ozone levels in the stratosphere and the discovery of the 'ozone hole'. Its objectives are to promote cooperation on the adverse effects of human activities on the ozone layer.

Myanmar ratified Vienna Convention for the protection of Ozone Layer on 24 November, 1993. Country Programme preparation was approved in 1994.

Today, the Vienna Convention is still making progress. The countries involved meet once every three years to make decisions on important issues including on Research and Systematic observations as well as financial and administrative matters.

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The Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol) is an international agreement made in 1987 and entered into force in 1989. It was designed to stop the production and import of ozone depleting substances and reduce their concentration in the atmosphere to help protect the earth's ozone layer. This Protocol sits under the Vienna Convention for the Protection of the Ozone Layer.

The parties to the Protocol meet once a year to make decisions aimed at ensuring the successful implementation of the agreement. These include adjusting or amending the Protocol, which has been done six times since its creation. The most recent amendment, the Kigali Amendment, called for the phase-down of hydrofluorocarbons (HFCs) in 2016. These HFCs were used as replacements for a batch of ozone-depleting substances eliminated by the original Montreal Protocol. Although they do not deplete the ozone layer, they are known to be powerful greenhouse gases and, thus, contributors to climate change.

Myanmar ratified the Montreal Protocol on 24 November, 1993. Country Programme preparation was approved in 1994.

The Montreal Protocol provided a set of practical, actionable tasks that were universally agreed on. The Protocol has successfully met its objectives thus far and continues to safeguard the ozone layer today. The ozone layer is well on its way to recovery because of the collaborative effort of nations around the world.

Kyoto Protocol

The Kyoto Protocol, also known as the Kyoto Accord, is an international treaty among industrialized nations that sets mandatory limits on greenhouse gas emissions.

The greenhouse effect is the warming effect of the sun on greenhouse gases, such as carbon dioxide, that act to trap this heat in our atmosphere. The more of these gases that exists, the more heat is prevented from escaping into space and, consequently, the more the earth heats.

Although the greenhouse effect is necessary for survival on earth, an overabundance of greenhouse gas emissions increases global warming beyond what is desirable. The purpose of the Kyoto Protocol is to stabilize human-generated emissions at a level that will not inflict further harm on the atmosphere.

The initial treaty was signed in Kyoto, Japan in 1997. That agreement outlined emissions targets. Implementation required participating members to create policies and measures to reduce and offset domestic emissions and increase absorption of greenhouse gases. Other specifications included requirements for accountability, compliance and reporting. That agreement expired at the end of 2012. Members agreed upon an extension of the protocol, effective from 2013 to 2020.

The Kyoto Protocol is overseen by the United Nations Framework Convention on Climate Change (UNFCCC). As of late 2013, all UN member states except for Andorra, Canada, South Sudan and the United States had signed and ratified the treaty. All 28 nations in the European Union have also signed the accord.

United Nations Framework Convention on Climate Change (UNFCCC)

Climate change is widely recognized as one of the greatest global threats that the planet faces today. In an effort to address this threat, the international community negotiated and adopted the United Nations Framework Convention on Climate Change (UNFCCC) on 9th May 1992 and it entered into force on 21st March 1994. UNFCCC was signed by Myanmar on 12th June 1992. Moreover, Myanmar ratified the UNFCCC on 25th November 1994 and it entered into force in Myanmar on 23rd February 1995.

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The ultimate goal of the UNFCCC is to stabilize “greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”. Article 3 of the UNFCCC establishes a set of foundational principles that should guide Parties in achieving this goal. Notably for Myanmar, Article 3(1) states that the Parties “should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities”. Article 3(2) then states that “the specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration”. Accordingly, the UNFCCC divides countries into two separate groups – Annex I includes developed countries, and Annex II includes developing countries.

Solving the climate change problem is the responsibility of not only global but also the local governments, businesses, citizens and civil society. Therefore, it is necessary to coordinate and cooperate to achieve the purpose of this Convention and the relevant legal information in accordance with the relevant provisions.

2.3 INTERNATIONAL TREATIES AND CONVENTIONS

Myanmar has also committed to the following international agreements and protocols on environmental, social, safety, and occupational issues, as shown in Table.

Table 2-2 International Environmental Convention/Protocol/Agreement

No	International Environmental Convention/Protocol/Agreement	Date of Signature	Date of Rectification	Date of Member	Cabinet Approval Date
1	United Nations Framework Convention on Climate Change, New York, 1992 (UNFCCC)	11-06-1992	25-11-1994 (Ratification)		41/94 (09-11-1994)

2	Convention on Biological Diversity, Rio de Janeiro, 1992	11-06-1992	25-11-1994 (Ratification)		41/94 (09-11-1994)
3	Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985		24-11-1993 (Rectification)	22-2-1994	46/93
4	Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987		24-11-1993 (Rectification)	22-2-1994	46/93
5	London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London, 1990		24-11-1993 (Rectification)	22-2-1994	46/93
6	The Convention for the Protection of the World Culture and Natural Heritage, Paris, 1972		29-4-1994 (Acceptance)		6/94
7	ASEAN Agreement on the Conservation of Nature and Nature Resources, Kuala Lumpur, 1985	16-10-1997			
8	Kyoto Protocol to the Convention on Climate Change, Kyoto, 1997		13-8-2003 (Accession)		26/2003 (16-07-2003)

2.4 NATIONAL ENVIRONMENTAL QUALITY (EMISSION) GUIDELINES

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

The Standards and Guidelines relevant to the proposed Project

The national and international guideline values that are considered relevant to the proposed project are presented below.

National Environmental Quality (Emission) Guidelines (2015)

Project Proponent commits to be specified in the EIA Procedure, all projects are obliged to use, comply with and refer to applicable national guidelines or standards or international standards adopted by the Ministry. In NEQEG (2015), there is no stipulated standards for antimony smelting and refinery process so that the general guidelines for air emissions and wastewater should be followed by the proposed factory.

2.4.1 AIR EMISSION

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 Guidelines² 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.

The NEQEG requires that “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”. As national ambient quality guidelines and standards have not been established as of November 2016, the standards required to be met in Myanmar is equivalent to the values set in WHO Air Quality Guidelines. NEQEG also require that contribution concentration of emissions from each project does not exceed 25 percent of the applicable air quality standards. **Table 2-3.** shows the general ambient standards concerning air quality applicable to the project.

Table 2-3 General and Specific Guideline Values for Air Quality

Parameters	Unit	Averaging Period	NEQEG
General Guideline Values for all Projects			
Nitrogen dioxide	µg/m ³	1-year	40
		1-hour	200
Ozone	µg/m ³	8-hour daily maximum	100
Particulate Matter PM10a	µg/m ³	1-year	20
		24-hour	50
Particulate Matter PM2.5b	µg/m ³	1-year	10
		24-hour	25
Sulfur dioxide	µg/m ³	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 Air quality guidelines global update. 2005. World Health Organization.

³ During the EIA preparation, the predicted contribution concentration will be calculated with a simulation model and the obtained results will be compared with the amount equalling 25 percent of the applicable air quality standard

2.4.2 WATER QUALITY

The site runoff and wastewater discharges during construction phase is shown in **Table 2-4**. General guideline values of operation phase are shown in **Table 2-5**.

Table 2-4 Site Runoff and Wastewater Discharges (Construction Phase)

Parameter	Unit	Guideline Value ^a
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 ⁴	100 mL	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

Source: NEQEG (2015)

^a Standard unit

Table 2-5 Wastewater, Effluent, Sanitary Discharges and Storm Water Runoff (General Application)

Parameter	Unit	Guideline Value ^a
5-day Biochemical oxygen demand	mg/l	50
Ammonia	mg/l	10
Arsenic	mg/l	0.1
Cadmium	mg/l	0.1
Chemical Oxygen Demand	mg/l	250
Chlorine (total residual)	mg/l	mg/l
Chromium (hexavalent)	mg/l	mg/l
Chromium (total)	mg/l	mg/l
Copper	mg/l	mg/l
Cyanide (free)	mg/l	0.1

⁴ Coliforms refer to a group of bacteria which are found in the intestines of warm blooded animals and therefore are present in sewage, and on/in soils, surface waters and vegetation. Total coliforms is an indicator organism which, although by itself is not considered to cause disease in man or animals, usually indicates the presence of pathogenic or disease-causing organisms. By measuring the number of total coliforms present in a sample a judgment can be made as to the water's usability for a given purpose.

Parameter	Unit	Guideline Value a
Cyanide (total)	mg/l	1
Fluoride	mg/l	20
Heavy Metals (total)	mg/l	10
Iron	mg/l	3.5
Lead	mg/l	0.1
Mercury	mg/l	0.01
Nickel	mg/l	0.5
Oil and grease	mg/l	10
pH	S.U.a	6-9
Phenols	mg/l	0.5
Selenium	mg/l	0.1
Silver	mg/l	0.5
Sulfide	mg/l	1
Temperature increase	°C	<3b
Total coliform bacteria	100 ml	400
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50
Zinc	mg/l	2

Source: NEQEG (2015)

a Standard Unit

b At the edge of 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 the point of discharge

Table 2-6 National Drinking Water Quality Standards, Ministry of Health (MOH), 2019

The project will comply with the National Drinking Water Quality Standards, as stated below. Drinking water standards include a wide range of parameters that involve microbiological, physical, and chemical factors.

Table 2-7 National Drinking Water Quality Standards

Parameters	Units of Measurement	Value
Color	TCU (True Color Unit)	15
Turbidity	NTU Nephelometric Turbidity Units	5
Cadmium	mg/L	0.003
Chromium	mg/L	0.05

Parameters	Units of Measurement	Value
Cyanide	mg/L	0.07
Fluoride	mg/L	1.5
Lead	mg/L	0.01
Nickel	mg/L	0.07
Nitrate	mg/L	50
Nitrite	mg/L	3
Copper	mg/L	2
Manganese	mg/L	0.4
Ammonia Nitrogen	mg/L	1.5
Chloride	mg/L	250
Hardness	mg/L as CaCO ₃	500
Iron	mg/L	1
pH	mg/L	6.5 to 8.5
Sulphate	mg/L	250
Total Dissolved Solid (TDS)	mg/L	1000
Zinc	mg/L	3

National Surface Water Quality (2024)

Priority waterbodies shall be classified from Class I to Class V based on its intended water use. Table 2-8 sets out the corresponding water use in the respective water class. Different standards shall apply to different water classes. Different standards shall apply to different water classes.

Table 2-8 Classification and Use of Surface Water

Water Class	Water use
Class I	Conservation of the natural environment Water supply Grade 1 (conventional treatment) Water uses listed in Class II to V
Class II	Water Supply Grade 2 (pre-treatment and conventional treatment) Fisheries Grade 1 Bathing and Swimming Water Uses Listed in Class III to V
Class III	Water Supply Grade 3 (advance treatment) Fisheries Grade 2 Industrial Water Grade 1 Agricultural Water Grade 1

Water Class	Water use
	Water Uses Listed in Class IV to V
Class IV	Industrial Water Grade 2 Agricultural Water Grade 2 Water Uses Listed in Class V
Class V	Navigation / Transportation Environmental Conservation

Parameters for Environmental Conservation

Parameters mainly important for the conservation of the aquatic ecosystem and the living environment are group as parameters for environmental conservation. Different standard values are applied to respective water classes, taking into account desirable levels of surface water quality according to the intended use of the waterbodies. The standard values of respective parameters are given in Table 2-9.

Table 2-9 Standard Values of Parameters for Environmental Conservation

Parameter	Unit	Class I	Class II	Class III	Class IV	Class V
Physical Parameter						
Total Suspended solids	mg/L	25	50	75	100	150
Chemical Parameter						
BOD	mg/L	2	3	8	25	30
COD	mg/L	5	8	13	50	100
DO	mg/L	>6	>5	>4	>3	>2
pH	S.U	6.5-	6.5-8.5	6-9	5-9	-
Ammonium nitrogen	mg/L	0.2	0.3	0.5	0.8	0.9
Organics						
Oil and grease		No noticeably seen				
Biological Parameter						
Escherichia coli (E. coli)	MPN/100ml (or) CFU/100ml	20	300	1000	1000	-
Heavy Metals						
Copper	mg/L	0.1	0.3	0.5	-	-

*Standard Values are recommended to be expressed as daily average concentrations.

2.4.3 NOISE LEVELS

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 2-10 Applicable 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

2.4.4 VIBRATION STANDARD

There are no specific guideline standards for vibration in NEQEG (2015), so that the Vibration Emitted from Specified Construction Works will be adopted for the proposed project. The guideline standard is shown in **Table 2-11**.

Table 2-11 Applicable Vibration Level Guidelines

Type of Restriction	Area Classified	
Standard value	I & II	85dB
Work prohibited time	I	7 p.m. - 7 a.m.
	II	10 p.m. - 6 p.m.
Maximum Working duration	I	10 hours per day
	II	14 hours per day
Maximum consecutive working days	I & II	6 days
Work prohibited days	I & II	Sundays and holidays
Classification of Area	Description	
Area I	<p>Areas where maintenance of quiet is particularly needed to preserve the residential environment.</p> <p>Areas which require maintenance of quiet since they are used for residential purposes.</p> <p>Areas used for commercial and industrial as well as residential purpose which are in need of measures to prevent vibration pollution since a considerable number of houses are located.</p>	

	The neighborhood of schools, hospitals.
Area II	Areas where there is a need to preserve the living environment of inhabitants and other than Area I

*Notes: Vibration level shall be measured at the boundary line of the specified construction work site.

2.4.5 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.

General guideline values for odor are described in **Table 2-12**. According to NEQEG, odor level in the populated areas should not exceed 5 to 10 odorant units.

Table 2-12 General Guideline Values for Odor

Parameter	National Guideline Values (NEQEG)
Odor Level	should not exceed 5 to 10 odorant units at the edge of populated areas in the vicinity of a project

*Source: NEQEG (2015)

2.5 IFC EHS GUIDELINES

The EHS Guidelines by International Finance Cooperation (IFC)⁵ are technical reference documents with general and industry-specific examples of Good International Industry practice (GIIP), as defined in IFC's Performance Standard 3: Resources Efficiency and Pollution Prevention. The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology.

There are two kinds of guidelines, General EHS Guidelines and Industry Sector Guidelines. The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors in the following section: (1) Environment, (2) Occupational Health and Safety, (3) Community Health and Safety and (4) Construction and Decommissioning. The contents of the Community Health and Safety section is described below.

⁵ IFC, Environmental, Health, and Safety (EHS) Guidelines, General EHS Guidelines: Community Health and Safety (April 30.20070)

Contents	Brief Description
Water Quality and Availability	<p>Drinking water sources should at all times be protected so that they meet or exceed applicable national acceptability standards or in their absence the current edition of WHO Guidelines for Drinking-Water Quality.</p> <p>Project activities should not compromise the availability of water for personal hygiene needs and should take account of potential future increases in demand. The overall target should be the availability of 100 liters per person per day.</p>
Structural Safety of Project Infrastructure	<p>Reduction of potential hazards is best accomplished during the design phase when the structural design, layout and site modifications can be adapted more easily. The following issues should be considered and incorporated as appropriate into the planning, siting, and design phases of a project (1) 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 (2) incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, tsunamis, wind, flooding, landslides and fire, and (3) application of locally regulated or internationally recognized building codes, standards and regulations, and mitigation measures.</p>
Traffic Safety	<p>Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents.</p>
Transport of Hazardous Materials	<p>Projects should have procedures in place that ensure compliance with local laws and international requirements applicable to the transport of hazardous materials.</p>
Disease Prevention	<p>Recommended interventions against the communicable diseases at the project level include (1) providing surveillance and active screening and treatment of workers, (2) preventing illness among workers in local communities by undertaking health awareness and education initiatives, training health workers in disease treatment and conducting immunization programs for workers, and (3) providing treatment through standard case management in on-site or community health care facilities.</p>

Emergency preparedness and Response	All projects should have an Emergency preparedness and Response Plan that is commensurate with the risks of the facility and that includes the following basic elements: (1) Administration (policy, purpose, distribution, definitions, etc.) (2) Organization of emergency areas (command centers, medical stations, etc. (3) Roles and responsibilities, (4) Communication systems, (5) Emergency response procedures, (6) Emergency resources, (7) Training and updating, (8) Checklists (role and action list and equipment checklist), and (9) Business Continuity and Contingency.
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2.5.1 WORLD BANK'S POLLUTION PREVENTION AND ABATEMENT HANDBOOK (1988)

Toward Clear Production

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2.6.2 MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER (1987)

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The Kyoto Protocol is overseen by the United Nations Framework Convention on Climate Change (UNFCCC). As of late 2013, all UN member states except for Andorra, Canada, South Sudan and the United States had signed and ratified the treaty. All 28 nations in the European Union have also signed the accord.

2.6.4 UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

Climate change is widely recognized as one of the greatest global threats that the planet faces today. In an effort to address this threat, the international community negotiated and adopted the United Nations Framework Convention on Climate Change (UNFCCC) on 9th May 1992 and it entered into force on 21st March 1994. UNFCCC was signed by Myanmar on 12th June

1992. Moreover, Myanmar ratified the UNFCCC on 25th November 1994 and it entered into force in Myanmar on 23rd February 1995.

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The ultimate goal of the UNFCCC is to stabilize “greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”. Article 3 of the UNFCCC establishes a set of foundational principles that should guide Parties in achieving this goal. Notably for Myanmar, Article 3(1) states that the Parties “should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities”. Article 3(2) then states that “the specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration”. Accordingly, the UNFCCC divides countries into two separate groups – Annex I includes developed countries, and Annex II includes developing countries.

Solving the climate change problem is the responsibility of not only global but also the local governments, businesses, citizens and civil society. Therefore, it is necessary to coordinate and cooperate to achieve the purpose of this Convention and the relevant legal information in accordance with the relevant provisions.

3. PROJECT DESCRIPTION

3.1 BACKGROUND OF THE PROJECT

MSS Factory, Myanmar Shing Shing Antimony Smelting & Refinery Factory (will use “The project proponent” in later Sections) has been manufacturing Antimony ingot since 2018. The project was running with the name ‘Kaung Kin Chout Pwint, Co. Ltd’ in 2013 until 2017. After that, early 2018 was completely finished the conveyance of ownership process. It is 100% local investment and the project is running with the amount of 800 million (eight hundred million). Total area was 1.30 Acre wide but the factory will be extended around 45746.62 sq ft in the near future.

The essential raw material is purchased from the Natt Sann Village, Kyaikmaraw Township, Mon State and the other supported items such as coke, soda ash light, etc., is imported from China. The factory is situated at the plot No. 325 to 330, Shwe Myo Taw 1st Street, Mawlamyine Industrial Zone, Nyaung Pin Seik Village Tract, Kyaikmaraw Township, Mon State as mentioned in Figure 3-1. The main product of the factory is antimony ingot which is exported to Europe and Asian countries.

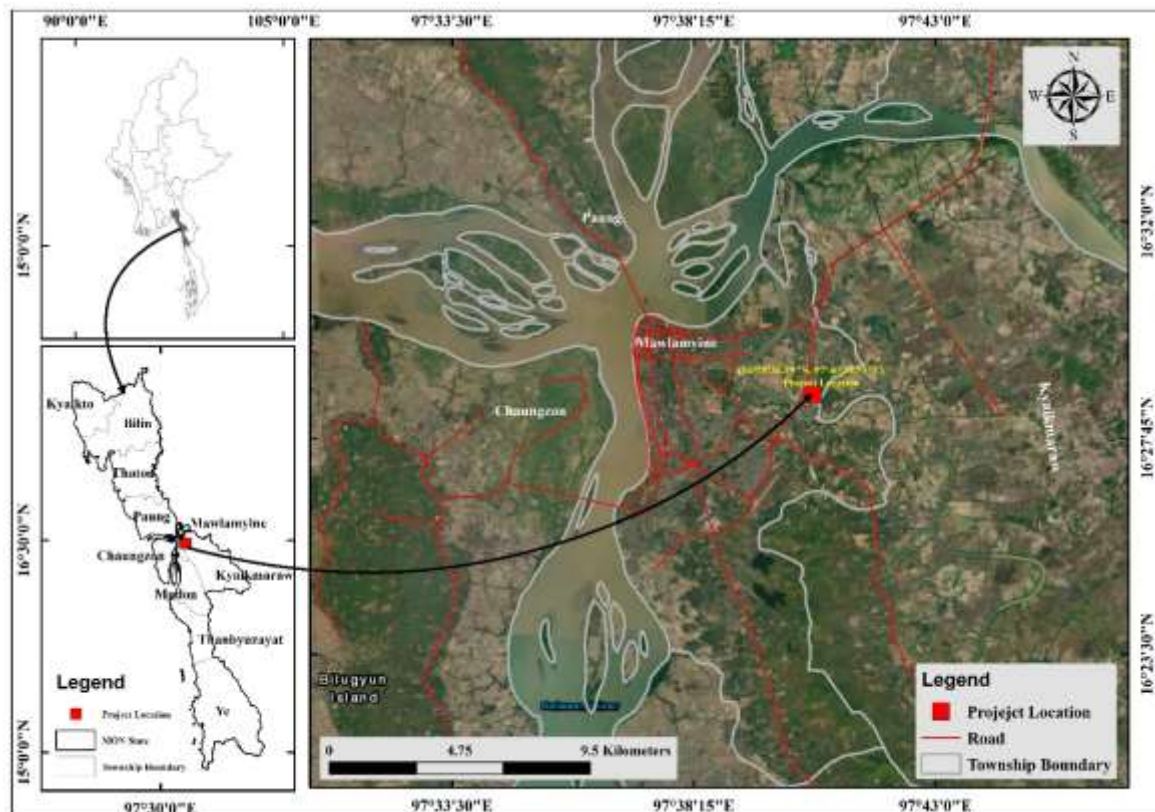


Figure 3-1 Location Map of the Project Site

3.2 WORKPLACE AREA EXPANSION

It is estimated that a new production area will be expanded in the near future. Therefore, all the construction works will be finished in September this year (if possible). An extended area will be occupied 45746.62 sq ft and its layout plan is mentioned in Figure 3-2. Almost all the operation activities ranging from roasting until obtaining final product will be conducted, excluding the raw material preparations, a miniature of operation activities is illustrated in

Figure 3-3. It is expected that the factory will operate 200 days per year and 22 working days per month (the rest period will be temporarily postponed due to scarcity of raw material, especially in rainy season). The production process will be continued with the experienced factory workers (in total 70 workers) because of no new hires.

The production related machines will be installed together with the two transformers (500 kVA and 400 kVA) which is connect with the national grid lines or the old factory. During power outage and in case of emergency, three generators (350 kVA for each) will be retrieved. Raw materials will be required 2.35 tons for 24 hours operation with the two furnaces. The finished product will be manufactured approximately 0.8 tons per day and 158.4 tons in a year from the smelting furnace. Water will be conduit from Attran River through the existing factory.

The negative environmental impacts might be found across the operation processes thus the systematic management plans will be implemented for single source of pollutions (air, water and solid wastes, etc.) as the same features of previous factory.

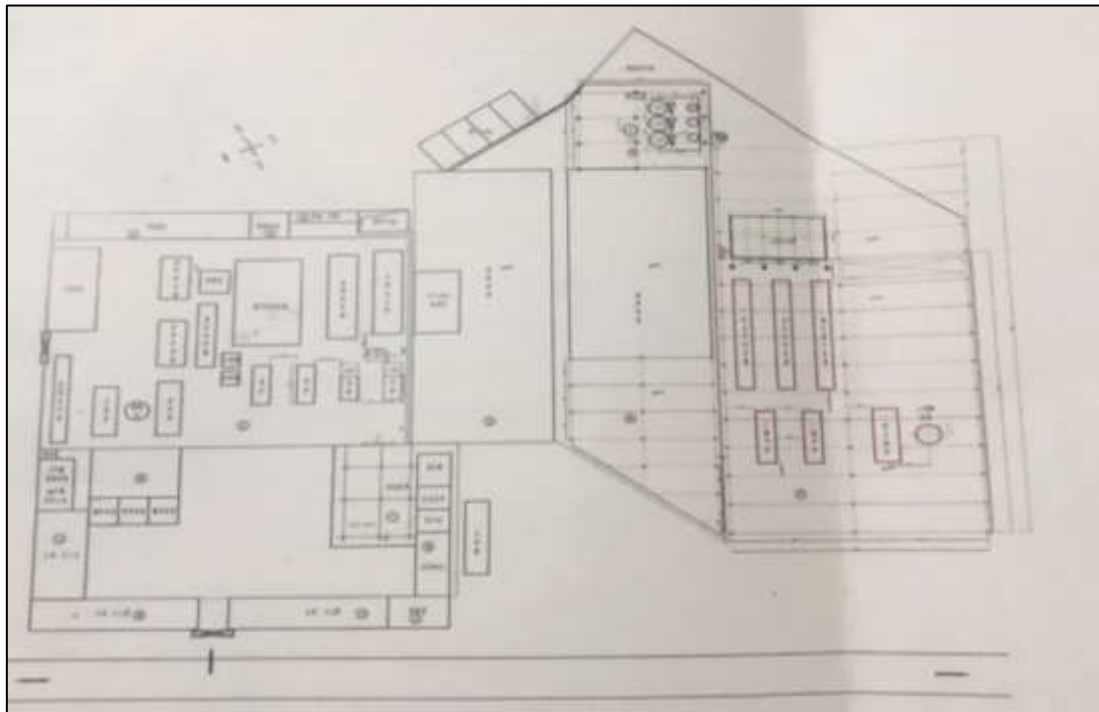


Figure 3-2 The Layout Plan of New Project Area

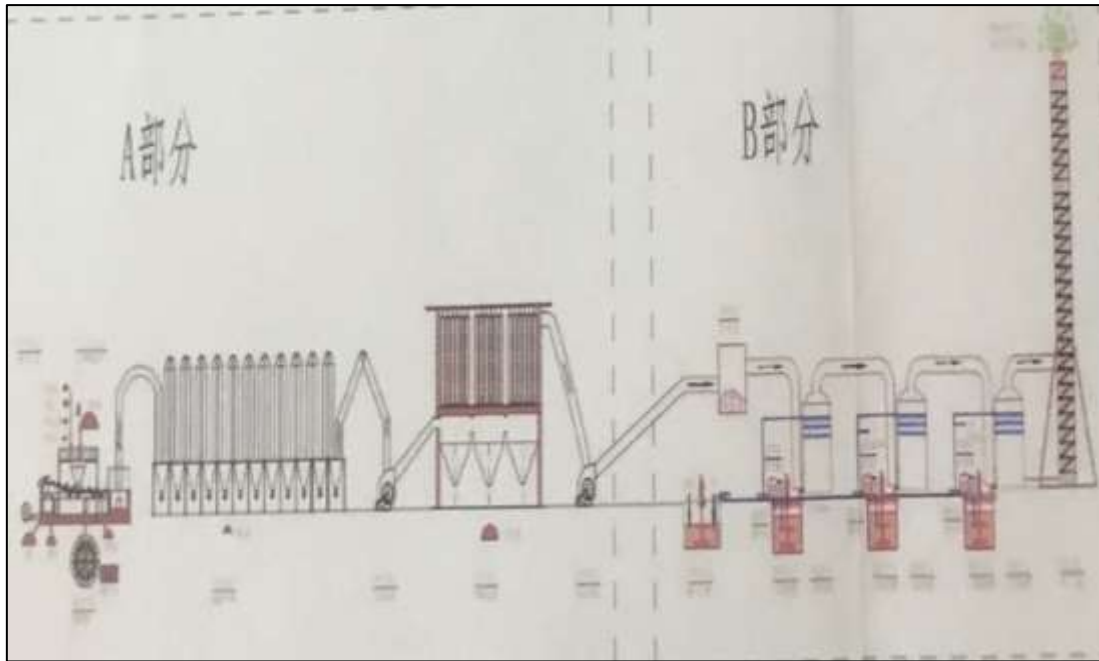


Figure 3-3 The Activities at the Expanded Workplace

3.3 LAND USE OF THE PROJECT AREA

Land use can be divided into five types (shown in Figure 3-4) which are water body, farmland, industrial, residences and rubber plantation areas. The project site is located at the industrial zone. The water body, Attayan River is situated the southern part of the project. The farmland covers the largest area where rubber plantation area is also located.

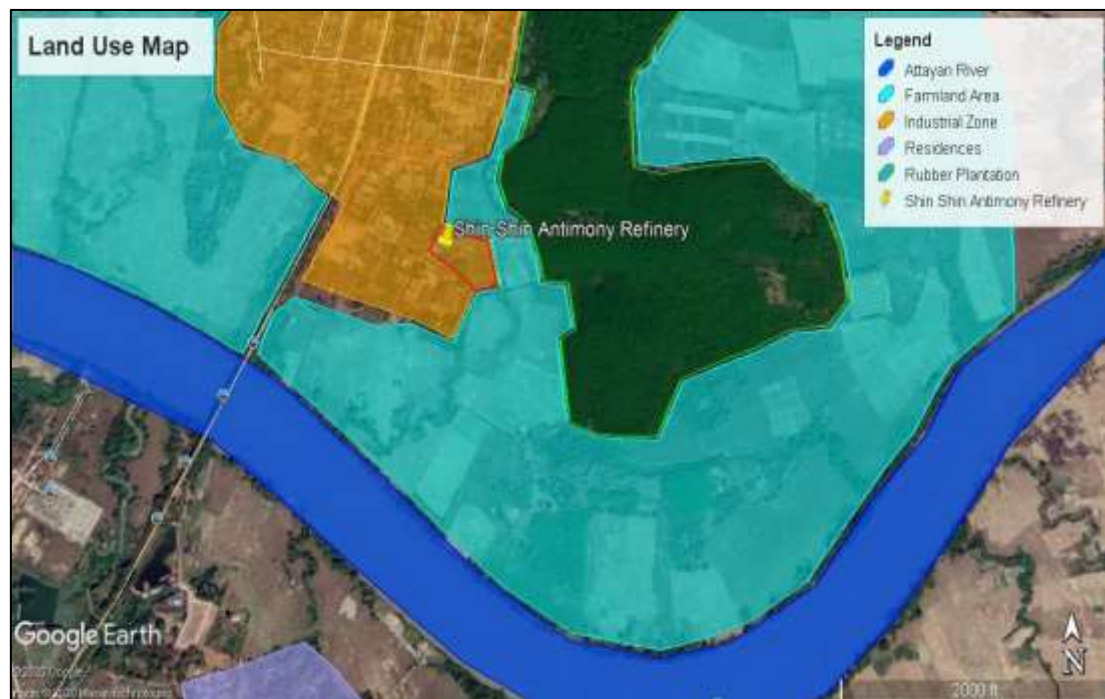


Figure 3-4 Landse of the Study Area

3.4 PROJECT ALTERNATIVES

Considering about project alternatives of proposed project, there may be three scenarios;

1st Scenario

Regarding the first scenario, if the proposed project, antimony ingot manufacturing (antimony smelting and refinery) is implemented on this area, the expected environmental and social impacts, mentioned in this report will be occurred from its operation process. These impacts can be reduced by practicing and adopting the impacts assessments and managements, fully described in this report.

2nd Scenario

In this Scenario, if the project proponent had not operated the proposed project on such area, it would have been the vacant land. As the economic point of view, existing the vacant land without having appropriate land utilization and management plan can reduce the land profits and economic value in long time, leading to significant impacts on country tax revenues.

3rd Scenario

If the other development projects (not proposed project) had developed and implemented on this area, air pollution, water pollution and soil pollution would have expected and its impact intensity can vary depending on project types. For sustainable development, it is required to identify and adopt the suitable impact assessment and management plan for this project. Considering the above project alternatives scenarios, the environmental, social and economic degradation can be expected from all transformations and its impact can varies from small to large scale depending on the factory's management system. In current situation, the project proponent has arranged and installed all required infrastructures and facilities in the proposed land area for pig farming project. Moreover, the suitable environmental impact assessment and management plans are identified and formulated, in line with environmental laws and regulations to operate the proposed project with the minimal impacts. Therefore, performing the proposed project, antimony ingot manufacturing is the best and suitable option for this area from economical and socio-environmental aspect.

3.5 OPERATION HOUR AND WORKFORCE

The proposed project is running all the production processes in 24 hours and 7 days and the break time is 12:00pm to 1:00 pm. The working hour especially office hour is 8am to 5pm. The workers have to assign dependent on the day and night shift which has altogether 3 shifts per day. Currently, the production is operating with the 70 workers. The expected operation schedule for the proposed project is shown in Table 3-1.

Table 3-1 Expected Employment Schedule

Types of work	Working days	Working Hours	Provided Holidays	Notes
Office and administration	From Monday to Saturday	8 am to 5 pm	4 days per month + Deserted Holidays	Overtime fees are provided as per government's regulations.
Factory operation	Weekdays and weekends*	8 hours for each shift (3 shifts per day)		
Approximate Maximum Annual Operation Days = 190 to 220 Days per year Generally, factory operation is annually paused in rainy season (about two to three months) for factory maintenance.				

3.6 DESCRIPTION OF THE PROJECT

3.6.1 PROJECT IMPLEMENTATION SCHEDULE

MSS Co., Ltd was incorporated under the Myanmar Companies Act (1914) on 22nd May 2017 with the company registration No. 111057893. There are three stages to initiate the project, they are construction, operation and decommission stages. The MSS Co., Ltd. had acquisition the already established factory from the former owner for the current operation, therefore the construction stage will not be included in mean time. The estimated project implementation schedule covering all stages is shown in Table 3-2.

Table 3-2 Expected Project Implementation Schedule for All Stages (For New Building)

No	Description	2025				2025-2054								2055-			
A.	Construction Stage																
	Site clearing																
	Demolition, Excavation and Site preparation																
	Infrastructures construction																
	The required facilities installation																
B.	Operation Stage																
	Labour recruitment																
	Pre-operation																
	Commercial operation																

C.	Decommission Stage															
	Demolition, Site preparation															
	Site clearing															

3.6.2 PHYSICAL INFRASTRUCTURE OF THE PRODUCTION AREA

A main building is included for the antimony ingot production where consists of six-room partition as bag house, store room, hot water tank, cooling tanks, sedimentation tanks and wet scrubbing towers. Apart from that, there are total eight rooms to support the production process such as warehouse, chemical storage room, mini-laboratory, generator room, and so on, far more detail is mentioned in Table 3-3 and layout plan is shown in Figure 3-5.

Table 3-3 The Size and Number of Workplace Area

No.	Description of the Rooms	Area (sqm)	Quantity
	Antimony Ingot Production Area		
	Bag house	223.10	3
	Store room	22.29	1
	Hot water tank	41.11	1
	Cooling tanks	176.68	4
	Sedimentation tanks	754.88	3
	Wet scrubbing towers	23.94	6
	Product storage area	316.52	1
	Raw material storage area	678.28	3
	Raw material temporary storage area	1311.46	3
	Chemical storage room	89.13	3
	Mini-laboratory room	63.94	1
	Workshop	63.28	2
	Coal temporary storage area	379.54	1
			Note: At the time of IEE preparation, the low-laying open up area is filling with slags generated from the production process.
	Breaker room	44.20	1
	Office	29.75	1

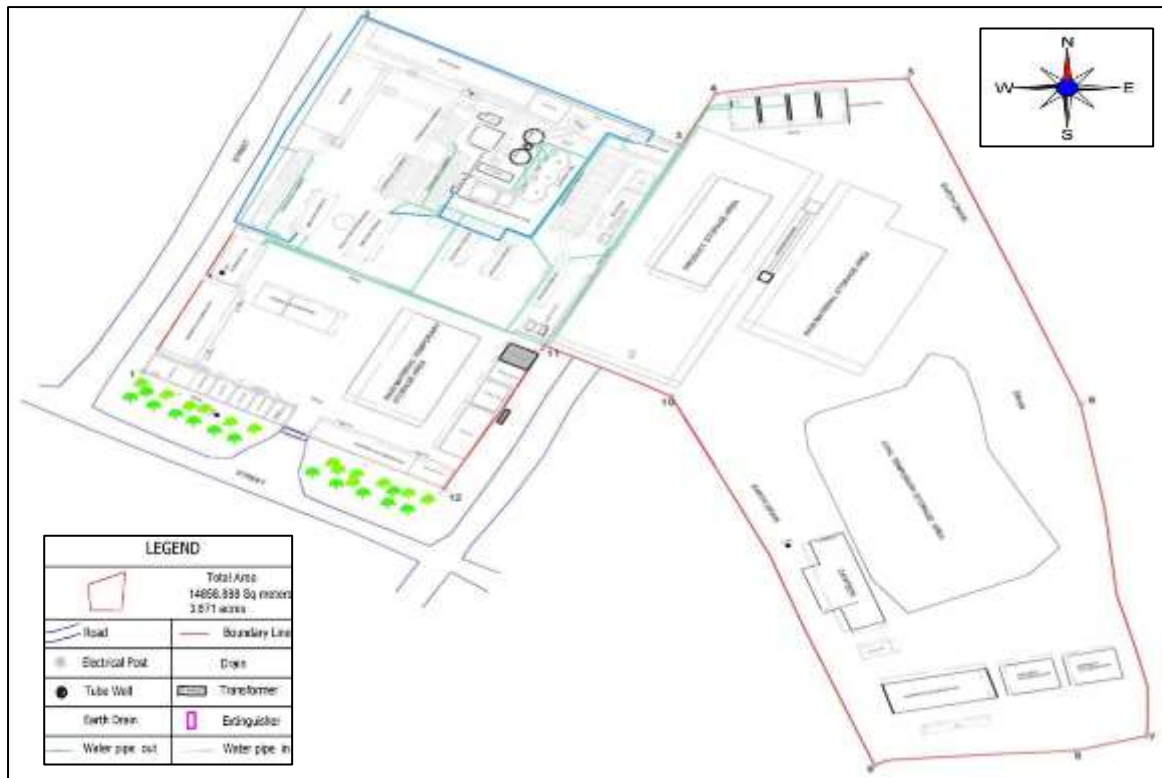


Figure 3-5 Layout Plant of the Existing Project

3.6.3 NECESSARY EQUIPMENT FOR OPERATION PROCESS

A wide range of tools play a key maker of every production step from the raw material preparation until the end product is ready to ship. Further detailed essential equipment list is shown in Table 3-4.

Table 3-4 Essential Equipment for Operation Process

No.	Item	Specification	Quantity
Raw Material Preparation			
	Crushing Machine	Capacity -2 tons/hr	2
Roasting Process			
	Shaft Furnace	Roasting capacity – 2.5 tons/batch Material consumption (approximately) - 1.4 tons/batch (coke) - 0.7 tons\batch (coal) - 0.5 ton/batch (Antimony Ores)	3
	Condensing Pipes	Diameter – 900 cm Height – 3 m (10 ft)	3
	Blower	Air Flow Rate – 1440 rpm	16
	Bag Houses	Numbers of Filter Bags – 484 + 400 = 884 bags Filter Materials – Fabric	2

No.	Item	Specification	Quantity
		Filtration Capacity – > 99%	
		Height – 3.7 m (12 ft)	
	Bag Filter	Filter Materials – Fabric Filtration Capacity – > 99%	1
Smelting Process			
	Smelting Furnace	Smelting capacity – 50 tons/batch (antimony oxide powder) Fuel consumption – 1000 gal/batch (Diesel)	1
Vehicles used for Transportation and Operation			
	Forklift	(1) Small (24 Load Center) – 2.475 tons (2) Big (24 Load Center) – 3.5 tons	2
	Wheel Loader	(1) Small – 1 to 3 tons (2) Big – 2.5 to 3.5 tons	2
	Excavator	HITACHI ZAYIS 210 – 0.7 tons	1
	Generator	500 kW, 250 kW, 250 kW, 150 kW	4
	Transformer	500 kW, 250 kW	2
	Grinder	(1) Small – 2 tons/hr (2) Big – 0.5 ton/hr	2

Note: * Smelting process take place 7 to 10 days and only two batches are running in a month.

Source: Project Proponent

3.7 THE REQUIREMENTS OF THE PRODUCTION

3.7.1 RAW MATERIALS

Antimony ore is one of the main raw materials with various crystalline form – soil, granular and solid stone. Other essential inputs are mentioned in Table 3-5. Raw materials such as antimony ore, coal and coke are placed both in the factory compound and at the outside of factory where illustrated in Figure 3-6. 10-wheeled trucks are used for coal purchasing from Kalewa, Magway to factory by overlaid with the tarpaulin. Not only shipping and vehicle transportations are applied for importing coke from China. Conversely, the ores are available at the local markets, Nat San village, Kyaikmayaw carried with 40kg bags by trucks.

Table 3-5 The List of Raw Materials

No.	Raw materials	Applications	Availability	Average amount (ton per month)	Characteristics		
1	Coal (Anthracite Coal)	Use as fuel in roasting furnace (25%-50% of fuel)	Kalaewa Township, Magway Region China Import	67	Sulphur content – 0.5%		
2	Coke	Use as fuel in roasting furnace (50%-75% of fuel)	China Import	133	Sulphur content – 0.73%		
3	Antimony ore	Major raw material for production, use in roasting furnace	Near Nat San Village, Kyeikmayae Township, Mon State and others	60	The following 3 Types of Antimony ore are used in accordance with the availability of each material. Sulphur content in antimony ore is about 0.8%.		
				No	Type	Grade	Form
				1.	Yellowish antimony rich soil (around 20-30% of antimony)	Medium	Soil
				2.	Antimony ore (around 15% of antimony)	Madium	Granular
				3.	Antimony ore (around 25% of antimony)	High	Soild stone
	Soda Ash Light	Used as fluxing agent in smelting process	China and India import	6		Soda ash light contains sodium carbonate which is white granular solid with no odor.	
		Used as fluxing agent in smelting process		0.9**			
	Mono Ammoniu m Phosphate	Used as fluxing agent in smelting process	China import	6	It is whit power solid with odorless. It is soluble in water and stable under normal handling and storage.		

Note: * Local coal from Kalewa Mine is currently unused and only the hard coal (anthracite coal) from china import is in use. ** 0.9 ton per month of Soda Ash is used when the operation is running with full capacity. (Source: Project Proponent)



Figure 3-6 The Location of Raw Materials Storage Area

3.7.2 THE CHEMICAL ADDITIVES

Soda ash light and mono ammonium phosphate, chemicals are mainly applied at the operation process, smelting and wet scrubber. Those are separately stored at the chemical storehouse within the factory where is mentioned in Figure 3-7.



Figure 3-7 The Location of Chemical Storage Room

3.8 QUALITY CONTROL

As soon as the raw ores were at the factory, analyze their components for instance the sulfur concentration along with the proportion of Sb. It is also checked the carbon contents of the coal and coke. The percentage of constituents are greatly influence on the quality of final product.

During the manufacturing, the ratio of Sb accumulation will be tested through the slag of the roasting furnace. Sodium fluoride (NaF), Potassium Sulphate (K_2SO_4), Cerium (IV) Sulfate ($CeSO_4$), Methyl Orange Indicator Solution ($C_{14}H_{14}N_3NaO_3S$), Hydrochloric Acid (HCl) and Sulfuric Acid, concentrated (H_2SO_4) are essential for being analysis the composition of antimony (Sb) percentage in ingot as well as Sb recovering in the slag. The detail interpretation of such chemicals and its safety measures (MSDS) is mentioned in APPENDIX B.

Perhaps, Sb contents is more than 0.01%, those have to roasted again. When skimmed layer is any Sb present, smelted stage has to reattempt. Another controlling factors such as temperature, and volume of air are dominant on the quality of the products. All of these activities are conducted at the laboratory of the factory by technicians, mentioned in Figure 3-8.



Figure 3-8 Quality Control at the Laboratory

3.9 THE PRODUCTION PROCESSES

3.9.1 PRODUCTION PROCESS

The manufacturing of antimony ingots primarily relies on two metallurgical methods: pyrometallurgy and hydrometallurgy, chosen based on the ore type and its antimony concentration.

Pyrometallurgy is the predominant method used in the facility. This process involves applying extremely high temperatures (approximately $1000^{\circ}C$) to separate and refine antimony from undesirable materials in its molten (liquefied) state. It is particularly suitable for treating sulfide ores, where roasting and smelting are key subprocesses to oxidize the ore and extract antimony metal.

In contrast, hydrometallurgy uses aqueous chemical solutions (either acidic or alkaline) to leach and extract antimony from the ore. Although it operates at lower temperatures—typically below $300^{\circ}C$ —this method is more applicable to oxide ores or complex ores where thermal processing may be less efficient.

The selection of method depends significantly on Ore type (sulfide, oxide, or complex), Grade of the ore, which ranges from as low as 1.5% to more than 60% antimony content. In this facility, pyrometallurgical techniques: roasting followed by smelting are the core processes, reflecting the traditional and efficient approach to producing high-purity antimony ingots from the available ore sources.

The production process flow chart is shown in Figure 3-9. **Error! Reference source not found.**

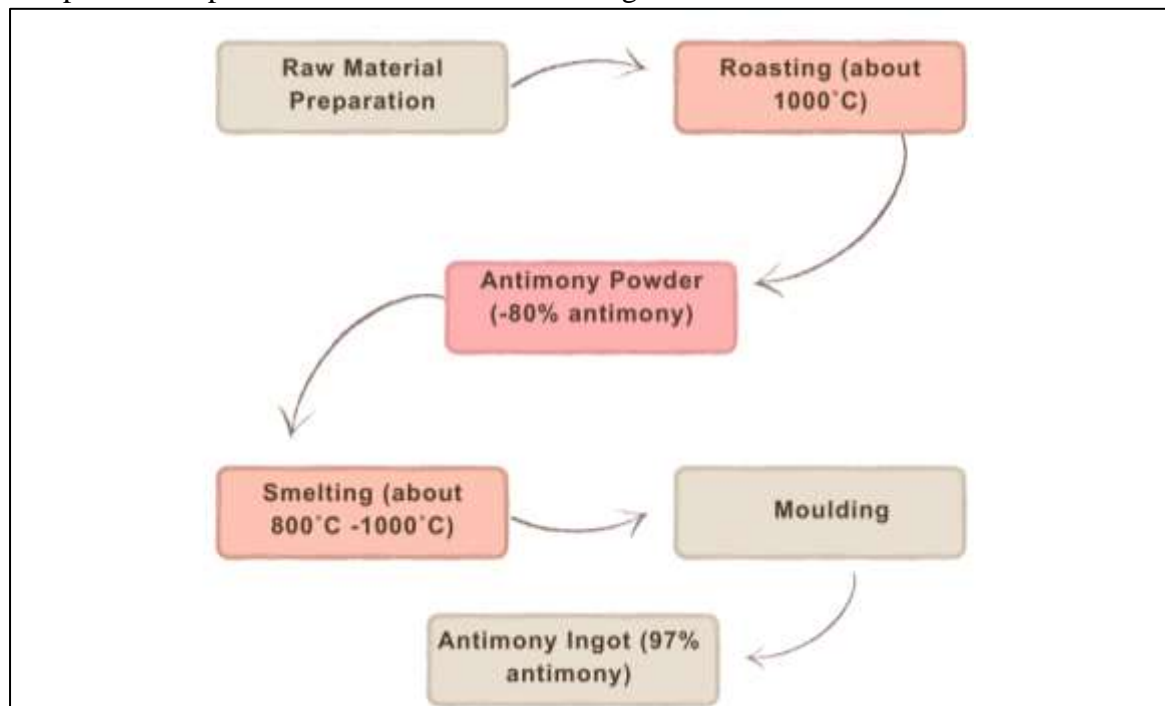


Figure 3-9 Production Process

Once the raw materials are properly sorted and prepared, the antimony ingot production process begins with roasting, followed by smelting and moulding. The major steps are as follows:

Roasting: The raw materials are subjected to a roasting process in a furnace at a high temperature of approximately 1000°C, using a fuel mixture of coke and coal. During this process, the stibnite ore (Sb_2S_3) is oxidized, producing volatile antimony trioxide (Sb_2O_3). This transformation occurs as the sulfur component is removed and the antimony is converted into a more extractable form.

The volatilized antimony trioxide is then captured and purified through a condensing system, which includes bag filters and bag houses, effectively removing particulate matter from the gas stream. This purification process allows for the recovery of approximately 80% of the total antimony content in the form of antimony trioxide powder, a semi-metallic compound that serves as a key intermediate for further refining.

Smelting: Following the roasting stage, the smelting process is conducted by introducing fluxing agents, specifically soda ash (sodium carbonate) and monoammonium phosphate, into the roasted material. This mixture is melted at high temperatures ranging from 800°C to 1100°C, facilitating the separation of metallic antimony from residual impurities.

After a smelting period of approximately 7 to 10 days, the molten metal is cast into ingot molds. These ingots are then sent to the quality control laboratory for analysis of purity and antimony content. Only those ingots meeting the required 97% antimony content standard are deemed export-quality and proceed for packaging and shipment.

Throughout the roasting and smelting operations, flue gases are generated. These emissions are captured by a system comprising bag filters and bag houses, which collect particulates and airborne contaminants. The captured gases are then treated in a wet scrubber to further remove

pollutants. Only cleaned and treated emissions are released into the atmosphere through the smoke stack, ensuring compliance with environmental standards.

3.9.2 SPECIFIC PRODUCTION PROCESSES

3.9.2.1 RAW MATERIAL PREPARATION

Prior to the roasting stage, various types of antimony ores are manually combined in specific proportions, as shown in Figure 3-9(a). The composition and ratio of the mixture are critical to the efficiency and effectiveness of the roasting process. Since certain mineral components react differently at high temperatures, the process temperature must be precisely controlled, and the mixing ratios are determined under the supervision of experienced Chinese technicians.

To ensure efficient combustion and heat transfer, coal is crushed into smaller fragments. These coal pieces are then mixed with coke, which acts as both a reducing agent and a source of additional thermal energy, to achieve the desired temperature within the roasting and smelting furnaces. The controlled mixture of raw materials, coal, and coke ensures optimal conditions for the conversion of stibnite and other antimony compounds during the roasting phase. The raw material preparation is shown in Figure 3-9.



(a) Mixture of Antimony Ores



(b) Crushing Coal

Figure 3-9 Raw Material Preparation

3.9.2.2 ROASTING

The roasting stage represents the initial phase of the pyrometallurgical process, where high temperatures play a critical role in driving off volatile components and reducing sulfur content in the form of sulfur dioxide (SO_2) gas. Achieving and maintaining a consistent and intense heat level is essential for the effective oxidation of the ore, primarily stibnite (Sb_2S_3).

To sustain the required temperature, the fuel mixture typically coal and coke is maintained at a specific ratio, commonly 1:1 or 2:1, depending on the calorific value and combustion efficiency. After 2 to 3 hours of preheating, the furnace reaches the target temperature of approximately $1,000^\circ\text{C}$, at which point the roasting process can begin.

Once adequately heated, the processed raw materials are gradually fed into the shaft furnace, where oxidation occurs, converting stibnite into volatile antimony trioxide (Sb_2O_3) and releasing SO_2 gas. This step is fundamental in preparing the ore for subsequent smelting and

refining operations., shown in Figure 3-11 and 3-12 supported by coal and coke, the extreme temperature contributes to react the mixture of raw ores, Sb_2S_3 with the air.

As a result of the roasting process, antimony trioxide (Sb_2O_3) is volatilized along with sulfur dioxide (SO_2). The coke used in the furnace serves a dual purpose not only as a heat source but also as a chemical reducing agent, facilitating the efficient extraction and transformation of stibnite (Sb_2S_3) into the desired oxide form.

The volatilized Sb_2O_3 gas is directed through condensing tubes, where it begins to cool and condense. Bag filters and bag houses are employed to capture the condensed antimony trioxide in powder form, a process that typically completes within five hours of roasting.

To ensure environmental compliance and worker safety, residual gases are treated in a wet scrubber system. This final treatment step effectively removes any remaining particulate matter and neutralizes harmful emissions before safe discharge into the atmosphere.

Although the filtration system is highly effective, trace amounts of Sb_2O_3 dust may accumulate over time. Therefore, each pipeline and filtration unit must undergo thorough cleaning on a bi-weekly basis to maintain optimal performance and prevent contamination or buildup.

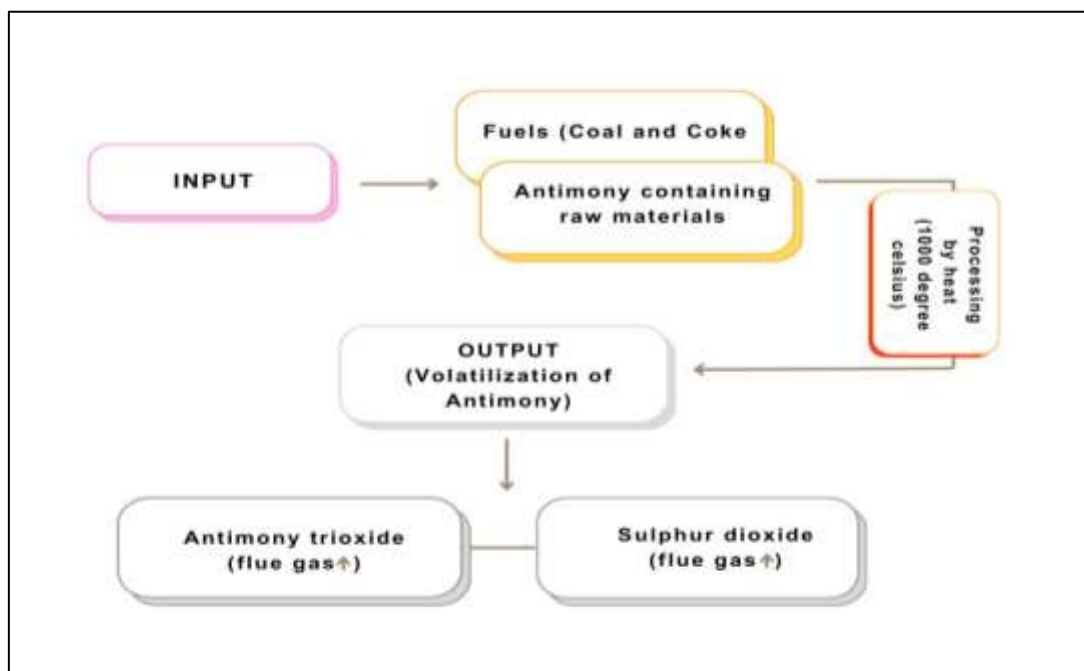


Figure 3-10 Structural Outline of the Roasting Method



Figure 3-11 Roasting Process

3.9.2.3 SMELTING

In the smelting phase, the captured antimony trioxide (Sb_2O_3) powder is melted at a temperature range of approximately 800°C to 1000°C , transforming it into a molten state suitable for further refinement. During this stage, coal and coke are used both as fuel sources and as chemical reducing agents, providing the necessary thermal energy and supporting the reduction process.

Although in a molten state, the antimony ore still contains impurities and unwanted mineral content. To purify the product, fluxing agents such as Soda Ash Light (Na_2CO_3) and Mono Ammonium Phosphate ($\text{NH}_4\text{H}_2\text{PO}_4$) are added. These agents play a crucial role in removing metallic impurities, particularly iron, if present, by forming slag or soluble compounds that can be separated from the refined antimony metal. seen in Figure 3-12 and the material safety information (MSDS) is in APPENDIX B.

In the final stage of the smelting process, a second fluxing agent solution is introduced drop by drop, specifically aimed at eliminating residual lead (Pb) from the molten antimony. This step is critical for achieving the desired product purity. The entire smelting cycle typically spans 7 to 10 days, after which the process is considered complete.

The resulting molten antimony, now refined, is poured into moulds to form the final product: antimony ingots. Throughout the smelting process, the condensing tubes of the bag house are employed to capture fine antimony powder carried in the hot exhaust air. Similar to the roasting stage, a wet scrubber system is used to filter out toxic gases and particulate matter before the treated air is safely released into the atmosphere.

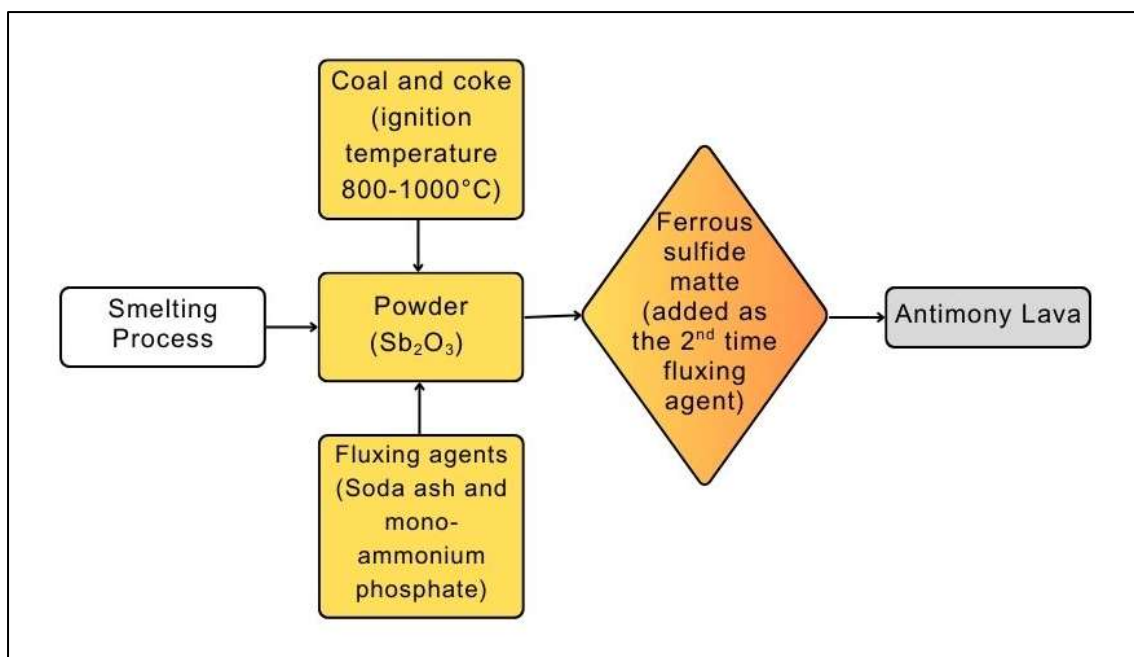


Figure 3-12 Smelting Process Flow Chart

3.9.2.4 MOULDING

After 7 to 10 days of smelting, the liquid antimony reaches a fully refined state and becomes ready for casting. It is then poured into rectangular ingot shapes using a circular pivot casting mould. Each circular pivot mould is designed with 34 rectangular cavities, allowing the simultaneous casting of 34 antimony ingots in one batch as shown in Figure 3-13.



Figure 3-13 Activities of Moulding

3.10 FINAL PRODUCT

Once the casting phase is completed, the refined antimony metal ingots are considered ready for export. Each ingot has a net weight of 25 kg, and the facility has an annual production capacity of approximately 500 tons. These final products are exported primarily to European and Asian markets, where they are utilized in a wide range of applications including flame retardants, batteries, plastics, glass manufacturing, semiconductors, and metal alloys. Each ingot typically contains 97.27% pure antimony (Sb), with trace amounts of other metals present as impurities. The percentage of the component metals are listed in Table 3-6 and the final product is depicted in Figure 3-14.

Table 3-6 The Constituents of Metal in Antimony Ingot

Constituents	Percentage (%)									
	Sb	Pb	As	Cu	Fe	Bi	Ag	Sn	Se	Te
Antimony ingot	97.27	1.90	0.81	0.004	0.004	0.001	0.007	0.0008	0.0008	0.0008

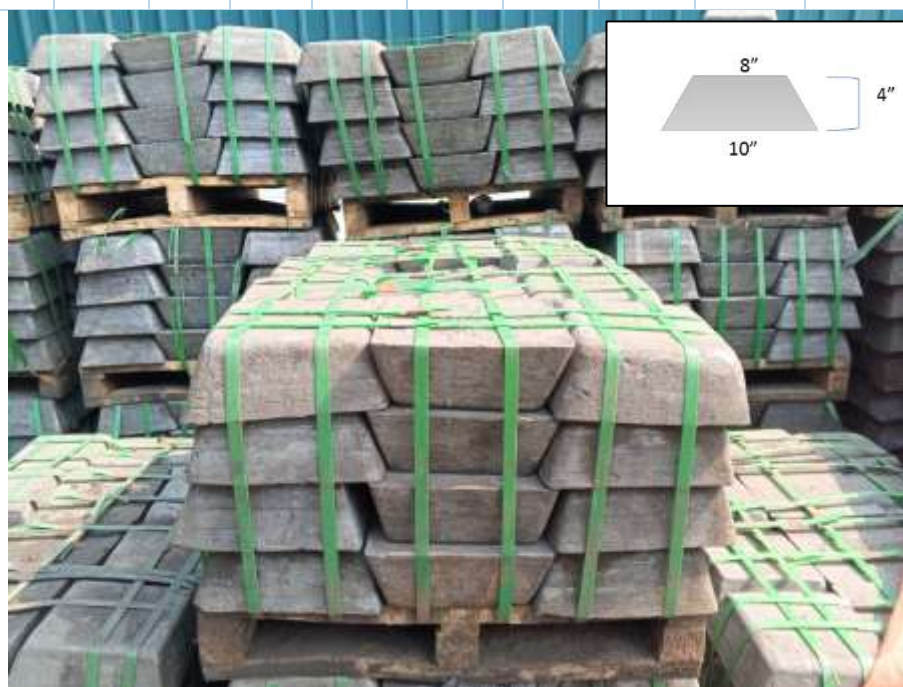


Figure 3-14 The Size and Well-packed Final Product

3.11 THE SUPPORTING FACILITIES FOR PRODUCTION PROCESS

3.11.1 WATER CONSUMPTION

Although water is not used directly in the antimony production process, it plays a crucial role in cooling systems, particularly for condensing pipes and the wet scrubber. Water is sourced from the Attaran River and conveyed to the facility via a water pump, then distributed through pipelines. The pumped water is stored in a dedicated water tank, which also supports operational needs such as washing and cleaning the filter bags.

In addition to surface water, groundwater is extracted from three tube wells located within the factory compound. This groundwater is primarily used for domestic purposes, including

sanitation and general usage for workers. The average amount of water consumption per month is mentioned in Table 3-7 and Figure 3-15.

According to description of YCDC6, 0.11 cubic meters per person per day of water will be required. For domestic usage of factory workers, the average water consumption is estimated as follows;

Water consumption for a person = 0.11 m³ per day

Number of factory workers = 80 workers

Estimated water consumption = 0.11 x 80

= 8.8 m³ per day

Table 3-7 The amount of Water Consumption

Items	Water Consumption (gal/month)
Use in the factory operation	
Cooling the condensing pipes	600
Wet scrubber	
General purposes	
Domestic Water (Tube-well)	
General purposes	Average 80 workers



Figure 3-15 Water Intake Area and Water Motor

6 Mr. Kyaw Thar Sein (6-8 March, 2012). Water and Sanitation Requirements for Environmentally Sustainable Yangon City. 3rd High Level Seminar on Environmentally Sustainable Cities Angkor Era Hotel, Siem Reap, Cambodia.

3.12 UTILITIES OF ENERGY

3.12.1 ELECTRICITY

The electricity supply was received from the township main grid line which connected with two transformers. The capacities of two transformers are 250kV and 500kV receptively, which is situated within the factory compound. For operation process, the electricity is mainly used for blower of the furnace and running the wet scrubber. The power is still inaccessible at the Mawlamye Industrial Zone for this reason two generators (300kV for each) have to be retrieved for factory operation and in case of the emergency, Figure 3-16.



Figure 3-16 Transformer and generator

3.13 FUEL CONSUMPTION AND STORAGE SYSTEM

The fuel consumption of the proposed factory is around 2,600 gallon per month and the status of storage system of fuel is presented in Table 3-8 and Figure 3-17. The diesel is applied for smelting furnace, generators and motor vehicles (wheel loaders, forklifts and so on).

Table 3-8 Diesel Consumption Rate of Particular Devices

Devices	Consumption Rate (gal/month)
Smelting Furnace	2,000
Generators	100
Vehicles	500
Total	2,600

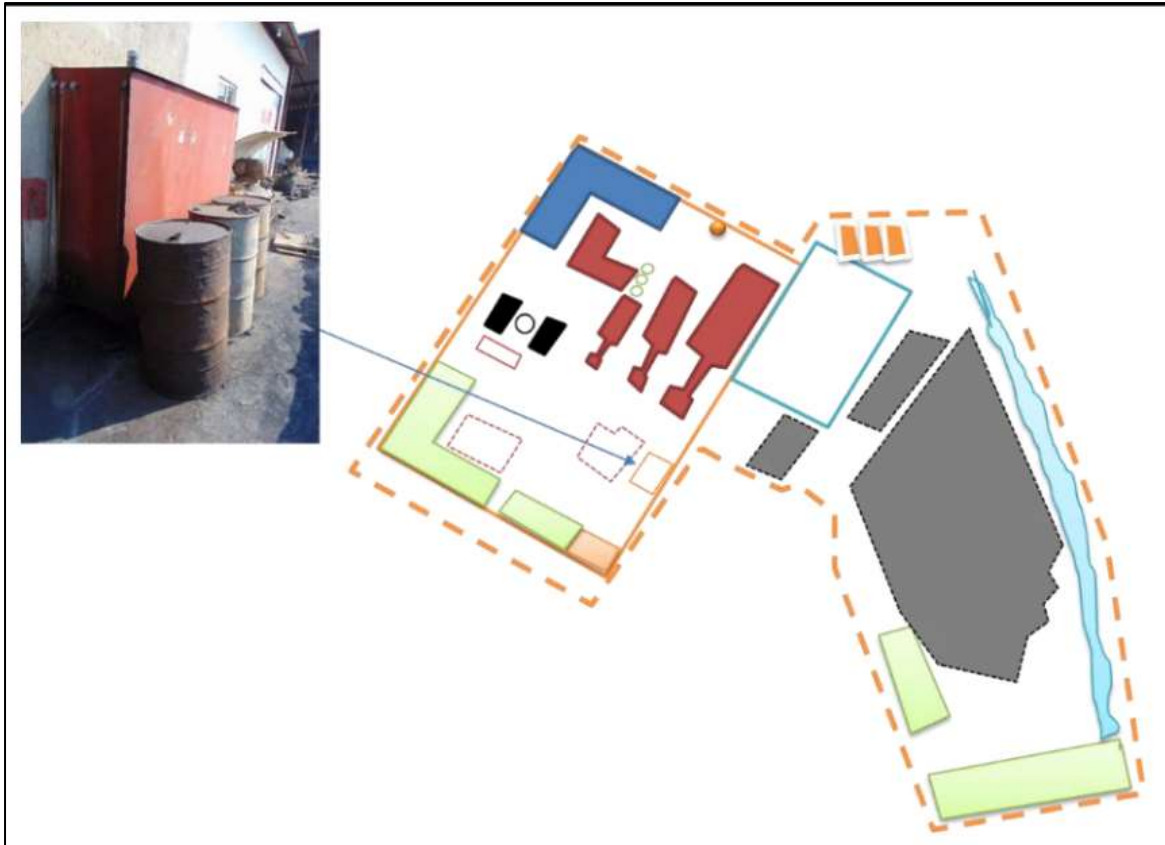


Figure 3-17 Fuel Storage System and Its Location

3.14 CONTAMINANTS FROM THE PRODUCTION PROCESS

3.14.1 GASES EMISSION

The major sources of gases emission were from the operation process of both roasting and smelting. The Sulphur dioxide (SO_2) gas was emitted during the operation process and altogether with small amount of particulate matters (PMs). Additional gases emission was the combustion of fossil fuels (coal and coke) during the processing of metal. It mainly contributes the green house (GHGs - CO_2 and CH_4) effect on the atmosphere. The combustion of coke is more likely to produce GHGs to the environment than coal because of the intensive extreme temperature. However, the combustion of coke can be more clean and emitted the less smoke properties but it can release the carbon monoxide unless it was completely burned throughout the process. Air emissions is controlled by two bag houses and a bag filter are installed to trap the antimony trioxide (Sb_2O_3) itself and its compound gases (SO_2 , NO_x and others). The air management system of the factory is mentioned in Figure 3-18.



Figure 3-18 Air Emission Management

3.14.2 WASTEWATER DISCHARGE

Wastewater from the manufacturing process is generated from the condensing pipe which serves as reducing the temperature. Additional function of these pipes was converted the flue gas antimony (Sb) to antimony trioxide powder (Sb_2O_3). About 3,500 gallons of hot water was released from the pipe. Wastewater were cool down at the cooling tank to reduce the temperature and retain the antimony dust. The cooling water is more likely to dissolve with antimony and that compound can be a hazardous. After 12 hours, thoroughly cool down water will be reapplied to the production process and the cooling tanks are shown in Figure 3-19. Additional factor of wastewater generation was cleaning the wet scrubber in which sludge are sedimented at the settling tank. The sludge was dried to test Sb content at the factory's laboratory. If the content of sludge were contained with certain amount of Sb, it was reused in the roasting line.



Figure 3-19 Wastewater Management System of Factory

3.14.3 SOLID WASTES GENERATION

3.14.3.1 GENERAL WASTES

The general wastes can be generated from both staff housing areas and factory compound. Generally, these types of wastes were regarded as the non-hazardous. The systematic disposal system is shown in Figure 3-20. The wastes were contained ranging from the kitchen wastes (food scrapes, foam, plastic bag and bottles, etc) and office wastes to personal hygiene care items. The estimated maximum domestic waste generation were 960 kg⁷ per month. As a part of waste management system, the trash bins were placed around the factory compound and staff housing. The wastes were temporarily stored and disposed at the waste dump site (piled with elongated hole) and buried.

⁷ Waste generation per capita per day is approximated 0.4kg per person and 960kg per month estimated for average 80 workers for a month.



Figure 3-20 Temporary Storage System for Domestic Wastes

3.14.4 HAZARDOUS MATERIALS

The hazardous wastes were generated throughout the operation processes such as heavy metal components and roasting waste (pyit-sar). The skimmed-layer of slag (chor khal) from the smelting may contain a high level of antimony (Sb) and arsenic (As). These slag compositions can be released the other toxic chemical substances and heavy metals to the environment. The sediments from the scrubbing liquid which is recirculated and used to wash the gases, can be contained with Sb and other pollutants. The sediments were dehydrated to form sludge wastes. Besides, scrubbing process designs to remove contaminants from gases, can gather Sb and heavy metals, resulting in sludge may have significant content of heavy metals and toxicity.

If the residual concentration of Sb in the waste slags were high, it is possible to recycle the sludge as a raw material. With this purpose, sludges were tested the content of Sb at the laboratory. If the Sb contained a considerable amount (greater than 0.01%), the wastes were reused at the roasting stage as the recovery materials. The component of Sb is less than 0.01%, the waste slags were compacted and well-packed and temporarily keep at the designated area of the factory. After that they were disposed at Nat San Mine. The amount of waste generation is mentioned in Table 3-9. The cleaning processes of both scrubbing towers and settling tanks were performed once in every two months. The collected sludges were dried and deliver to the laboratory in order to test the Sb concentration. The waste management and disposal system are shown in Figure 3-21 and Figure 3-22.

Table 3-9 The amount of Waste Generation

No.	Type	Amount (per month)	Source
	Slag (pyit sar)	4.5 ton	Roasting stage
	Slag (chor khal)	2.5 ton	Smelting stage
	Sludge from scrubbing processes	1.8 ton	Wet scrubber
	Filter bags	<10 bags	Bag houses and bag filter

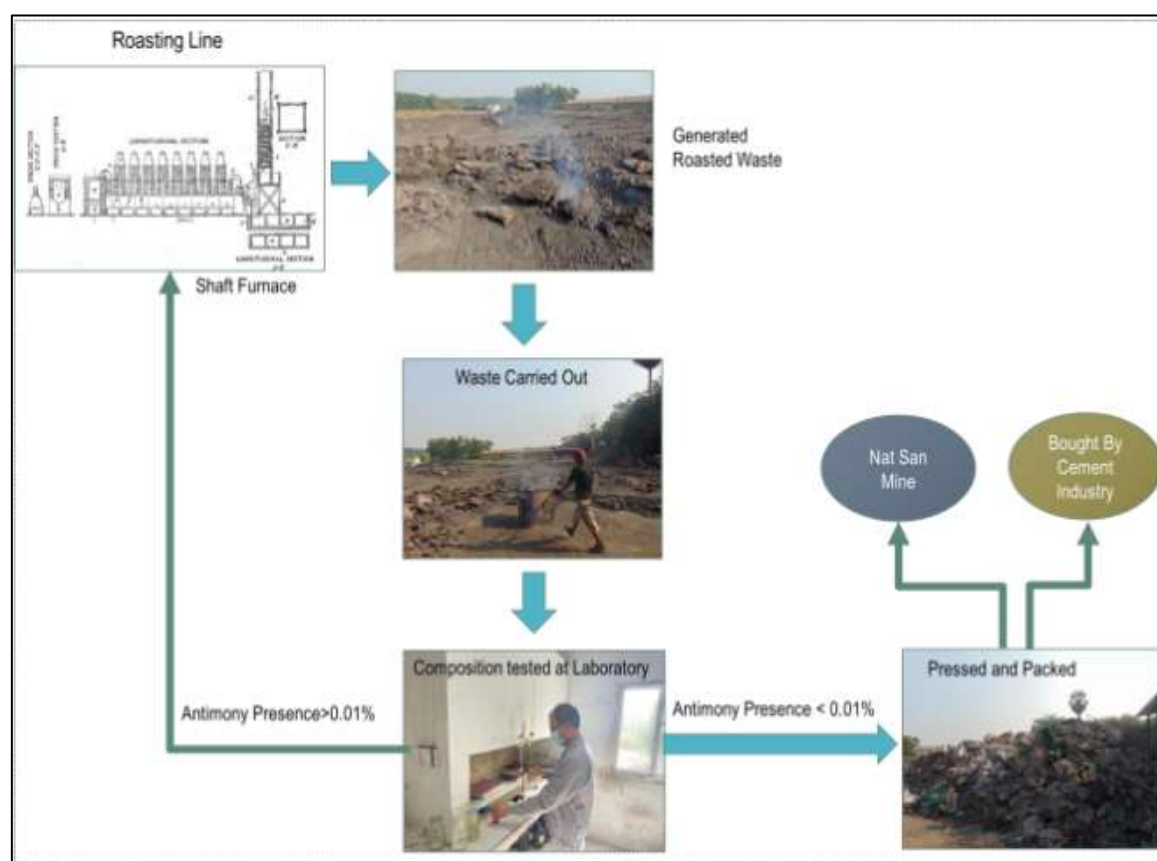


Figure 3-21 Roasting Waste Management of the Factory



Figure 3-22 Smelting Waste Management of Factory

3.15 SUPPORT FACILITIES FOR WORKERS

3.15.1 STAFF WELFARE

Housings are provided for all workers within the factory compound. Meals are arranged by the factory, there is a separate kitchen for preparation the food and a canteen for dining area. For the drinking water, there is 800 liters purified water tank is placed beside the canteen. A row of lockers are supported for those who can keep their properties safely. There is a common bathing area with the ground tank and toilets are situated in front of the staff's accommodation area, as shown in Figure 3-23.

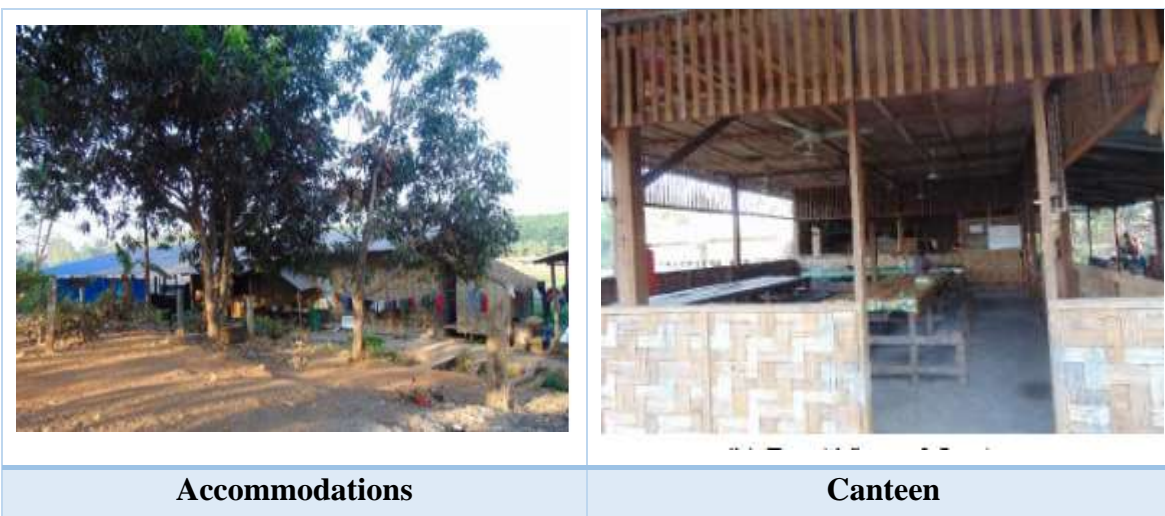




Figure 3-23 The Facilities for Staff Welfare

3.16 OCCUPATIONAL HEALTH AND SAFETY FACILITIES

Cooling fan were provided at the temporary resting camp where is located near the exposed extreme heat working lines (roasting and smelting). In addition, PPE especially respirators are provided each of the mechanics and labors who take the responsibilities for bag house maintenance and other purposes. Electrolyte sachets are provided with the unlimited access.

For the general safety, the work place was monitored through the eight CCTVs. The devices are installed at every corner (for eg., main gate, office, smelting and roasting) of the workplace of the factory. There are eight fire extinguishers were placed at office, canteen and worker's accommodation areas, in Figure 3-24.

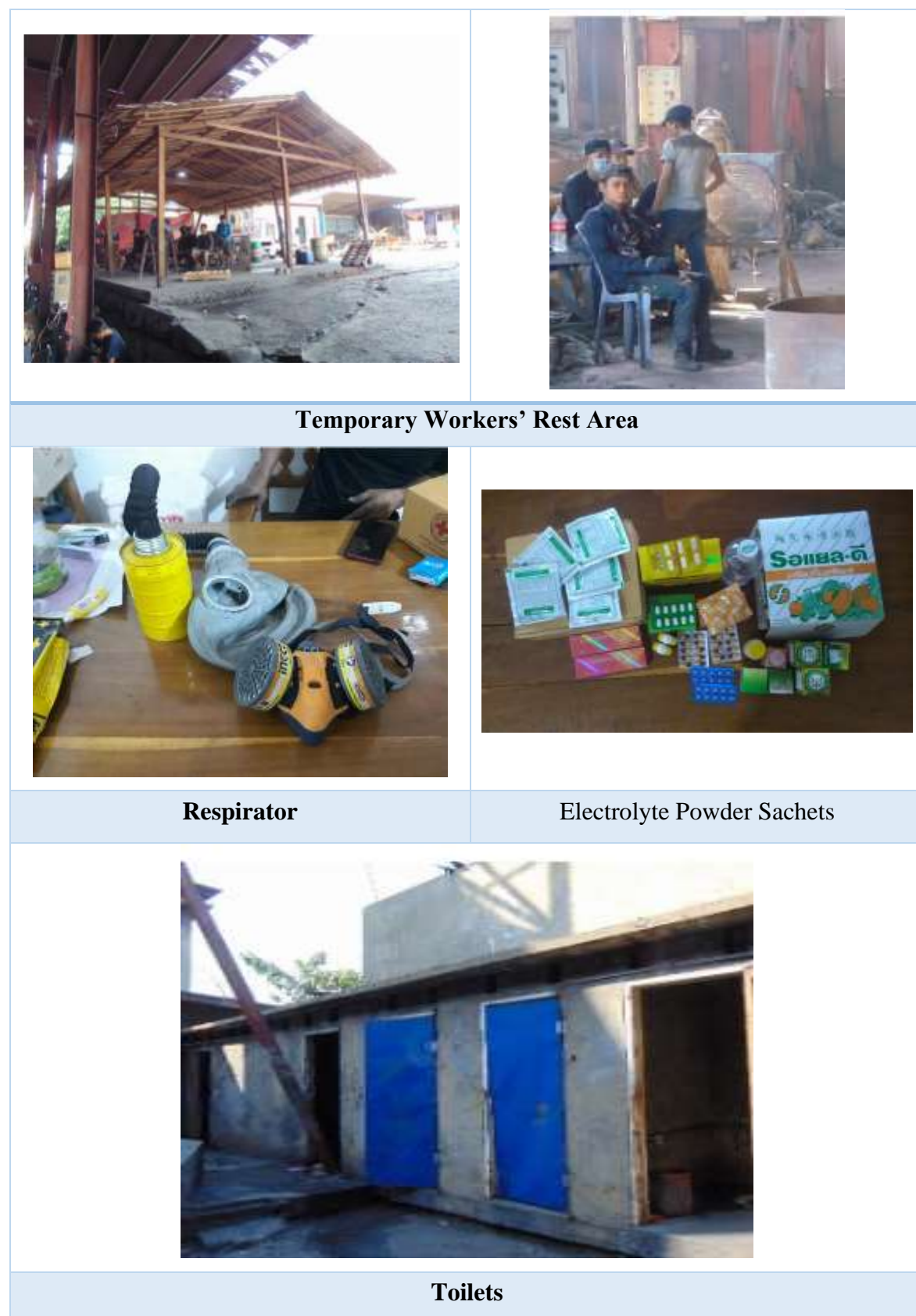


Figure 3-24 Occupational Health and Safety Facilities

4. EXISTING ENVIRONMENT

4.1 METHODOLOGY APPROACH

The proposed project is located in Mawlamyine Industrial Zone, Nyaung Pin Seik Village Tract, Mawlamyine Township, Mon State. The township data of socio-environmental conditions including the physical components, natural hazards and the socio-economic environment of Mawlamyine Township, Mon state are referenced from the General Administration Department of Mawlamyine Township and other relevant departments. In addition, the published secondary data from reliable resources are also outlined in this section.

4.2 OVERVIEW OF THE STUDY AREA

Mawlamyine Township, is located between North latitude of 16° 22' and 16° 30', and between East Longitude of 97° 35' and 97° 42'. The Mawlamyine Township has 7 miles from East to West and 17 miles from South to North. The total area of Mawlamyine is about 88.82 square miles. A brief regional profile is presented in Table 4-1.

Table 4-1 Mawlamyine Township Brief Regional Data

Township	Quarter
Number of wards	29
Number of village tracts	13
Total population	272,433
Area	88.82 square miles
Latitude	Between 16° 22' N and 16° 30'N
Longitude	Between 97° 35' N and 97° 42'N
Ethnicities	Kachin, Kayar, Kayin, Chin, Mon, Bamar, Rahine, Shan, PaO
Main economic activities	Industrial works and Trading

*Source: General Administration Department of Mawlamyine Township (2023)

*Source: General Administration Department of Mawlamyine Township (2023)

Figure 4-1 The Location Map of Mawlamyine Township

4.3 DESCRIPTION OF THE PHYSICAL COMPONENT

4.3.1 CLIMATIC CONDITIONS OF THE PROJECT TOWNSHIP

The Mawlamyine Township has tropical climate with a lower humidity. The summer season normally begins in March to May. The rainy season normally begins in June to October. The winter season follows the rainy season, normally from November to February. References from 2019 to March, 2023 of yearly temperature and rainfall data are presented in **Table 4-2**. This data was provided from GAD (2023), Mawlamyine Township. During the course of a year, the highest temperature is 29.3 °C and the lowest temperature is 8.1 °C. The rainfall and temperature graph for 2019 to March, 2023 is shown in Figure 4-2.

Table 4-2 Temperature and Rainfall Data in Project Township (2019-2023)

No.	Year	Rainfall		Temperature	
		Raining day	Total rainfall (Inches)	Summer season (Max °C)	Winter season (Min °C)
1.	2019	102	57.28	34.2	6.2
2.	2020	97	52.72	32.6	4.2
3.	2021	116	54.17	32.3	5.0
4.	2022	118	61.42	31.3	6.5
5.	March, 2023	4	1.02	30.3	6.9

*Source: General Administration Department of Mawlamyine Township (2023)

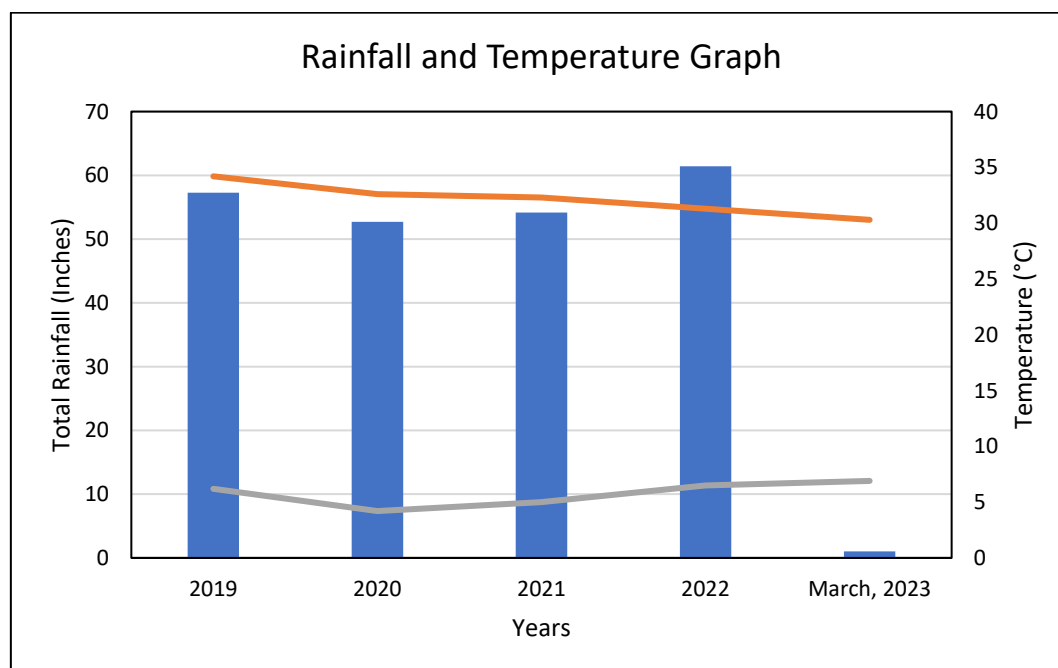


Figure 4-2 Rainfall and Temperature Graph (2014-2022)

4.3.2 TOPOGRAPHY

Mawlamyine Township is only 18 feet above the sea level and it is the fourth largest city in Myanmar. Mawlamyine Township is the smallest size and situated in the centre of Mon State. It is bounded on the north by Paung and Hpa-an Township, on the South by Mudon Township, on the east by Kyaikmaraw Township and on the west by Chaungzon Township and Thanlwin River. Mawlamyine is in the Thanlwin River delta, where the mouth of the Thanlwin is sheltered by Bilugyun Island as it enters the Gulf of Mottama and Andaman Sea. It is flanked by low hills dotted with ancient pagodas to the east and west. Mawlamyine is the main gateway to South- East Myanmar. 8

4.3.3 GEOLOGY AND SOIL CONDITION

Mawlamyine is in the Thanlwin River delta, where the mouth of the Salween is sheltered by Bilugyun Island as it enters the Gulf of Martaban and the Andaman Sea. Yankin ridge lies between river-plain in the west and Attaran River in the east. Geologically there are exposures of quartzite in the middle of Yankin range and upward to the top. Mon State mainly consists of Gleisil which normally occurs on wide range of unconsolidated materials, mainly fluvial, marine and lacustrine sediments of Pleistocene or Holocene age.

There are three types of soil; lateritic yellow brown forest soil, lateritic soil and meadow gleyey soil. Lateritic yellow brown forest soil occupies transitional area between lateritic soils and yellow brown forest soils, where on the Yankin and Taungwaing Hill and are classified as garden lands of good fertility. Lateritic soil is mainly found in the uplands and foot hill areas, especially in the transitional area between uplands and the plains. The soil profile is characterized by the presence of iron concretions in a loamy matrix showing different shades of yellow brown color. Meadow gleyey soil is found along the coastal plains of the city and the Attaran River valley. Paddy is the typical plant grown on this soil type.

4.3.4 HYDROLOGY

Mawlamyine Township is well-known for the plenty of rivers and streams. The Attaran River, Gyaing River and Thanlyin River are the main fresh water resources in Mawlamyine Township, which are mainly used for multi-purposes such as irrigation and domestic uses. All creeks in this area are tidal, and most of them are perennial streams.

Natural Hazards

According to the Township Disaster Management Plan, one significant hazard “Flood” and one considerable hazard “Fire” were identified respectively as regular threats to the community in the past likely in the future. The township is not exposed to hazards which are usually associated with meteorological or geological risks as it is relatively distance from the coast line.

4.3.5 FLOOD

At the mouth of the Thanlwin river where it discharges into the Andaman sea, sits the city of Mawlamyine, the main trading centre and seaport in south eastern Myanmar. The Mawlamyine is suffered from an alluvial floodplain, flanked by the Thanlwin and Attaran rivers which are fed in part, by rainfall from the Yankin mountain range to the north and Taungnyo range to the

8 Mawlamyine as a commercial city in greater Mekong Subregion, Yin Min Paik and Wyityi Win

southeast. During the rainy season between June and October, floods and landslides are common occurrences in the city.

In June 2018, the city received 13.70 inches of rainfall, resulting in the worst flash-floods in 50 years. Over 5,600 people were evacuated from their homes and landslides caused extensive structural damage to the city's historic Kyeikthalan Pagoda.

4.3.6 FIRE

According to the Fire Department, the Fire hazard is the most frequent hazard in terms of frequency, which accounts for 71 percent of the disasters in Myanmar. The main causes of fire are kitchen related fires and negligence which accounts for 83 percent of the fire cases and period from January to May is the high season for fires. The average annual fire cases are about 900. The period from January to May is the high season for fires and secondary period is during dry winter season from mid-October to mid-February as per the Fire Services Department. According to the Hazard Profile of Myanmar, Mon state including Mawlamyine Township is ranked as the Medium Risk Zones (between 100 and 50 average annual fire cases) based on the fire incidents from 1983-2007.

According to GAD 2023, located at the junction area of Thanlwin river, Gyaing river and Attaran river, and also situated at the Gulf of Mottama, Mawlamyine Township is suffered from the natural disasters such as flooding and storms. The danger water mark of Thanlwin is 750 cm. Regarding the occurrence of natural disasters from 2022-2023, 10 times of fire hazard, 6 times of flooding and 4 times of wind storm.

Table 4-3 The Natural Hazards in Proposed Village

No.	Types of Disasters	Frequency	Mortality/ Disapper	Assets Destruction	Loss Value
1.	Cyclone	-	-	-	-
2.	Tsunami	-	-	-	-
3.	Earthquake	-	-	-	-
4.	Flooding	6	5	4 numbers	0.9
5.	Wind Strom	10	2	5 numbers	7.21
6.	Fire	4	-	2 numbers	0.03

*Source: General Administration Department of Mawlamyine Township (2023)

4.3.7 SOCIO ECONOMIC CONDITION

4.3.7.1 LAND USE

The agriculture lands occupy the 38% of total land area in Mawlamyine Township, standing the dominant acre in all land use type. Afterwards, the area of water bodies is followed up. The grazing land and Industrial area are found as the smallest portion in the study township. The classification of land use pattern is shown in Table 4-4 and Figure 4-3.

Table 4-4 The Classification of Land Use Pattern in Mawlamyine Township

No.	Type of Land	Land Use Distribution by Acre	% of Land
1	Agricultural Land	21981	38%
2	Forest Land	1101	2%
3	Grazing Land	350	1%
4	Road area	1438	3%
5	Water Body	15379	27%
6	Industrial	549	1%
7	Residential Area	9018	14%
	Religious Land	4145	7%
	Other Land	2878	5%
Total		343,483	100%

Source: General Administration Department of Mawlamyine Township (2023)

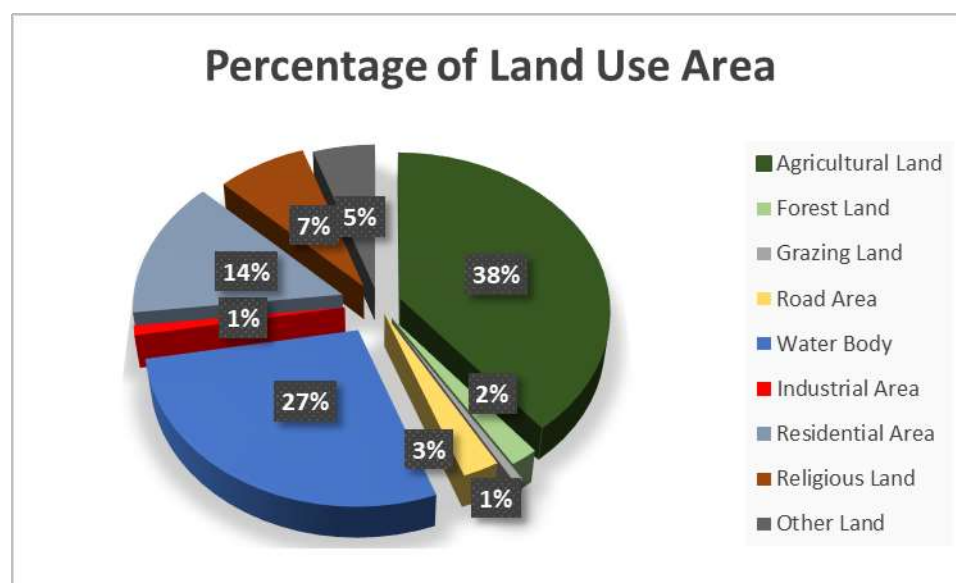


Figure 4-3 Pie-Chart for Land Use in Mawlamyine Township

4.4 DEMOGRAPHY

4.4.1 POPULATION

The population in Mawlamyine Township are 272,433 according to GAD 2023 data. The female population are slightly higher than the male population for all age groups (below 18 years and above 18 years). The information about population status of Mawlamyine is shown in **Table 4-5.** and Table 4-6.

Table 4-5 Housing and Household in Mawlamyine Township

No.	Description	Housing	Household	Ward	Village Tract	Village
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1.	Urban	40,783	46,886	29	-	-
2.	Village	7,733	8,040	-	13	32
	Total	48,516	54,926	29	13	32

Source: General Administration Department of Mawlamyine Township (2023)

Table 4-6 Population in Mawlamyine Township

No.	Description	Above 18 years Old		Below 18 Years Old		Total	
		Male	Female	Male	Female	Male	Female
1.	Urban	63,894	79,673	44,083	46,628	107,977	126,301
2.	Village	10,308	12,218	7,507	8,122	17,815	20,340
	Total	74,202	91,891	51,590	54,750	125,792	146,641

Source: General Administration Department of Mawlamyine Township (2023)

4.4.2 ETHNICITY

According to (2023) data, the highest ethnicity diversity is found in Mawlamyine Township. Among them, Bamar is the dominant ethnic ground, having 55% of total population. Afterwards, Mon people are found as the second largest community with 21.6%. The other ethnic groups are still living in the study township. The distribution pattern of ethnicity in Mawlamyine Township is shown in Table 4-7.

Table 4-7 Ethnicity in the Project Township

N o.	Township	Kachin	Kaya	Ka Yin	Chin	Mon	Bamar	Rakine	Shan	PaO	Other	Total
1.	Mawlamyine	12	59	3,071	23	58,854	151,506	233	648	95	57,785	272,286

Source: General Administration Department, Mawlamyine Township, 2023

4.4.3 EMPLOYMENT AND INCOME RATE

According to GAD 2023 data, the wage workers are mostly found in Mawlamyine Township and then, followed by the governmental staffs and trading works. As Mawlamyine is the commercial city of Mon state, agriculture and livestock farming are found as the small portion. The occupational status of Mawlamyine Township is shown in Table 4-8.

Table 4-8 The Occupational Status in Mawlamyine Township

Township	Governmental Staffs	Service Industry	Agriculture	Livestock	Trading	Industries	Fishery		Wage Workers	Others	Total
Mawlamyine	13,116	1,900	450	600	4,900	1,800	100		136,606	1,200	160,672

Source: General Administration Department of Mawlamyine Township (2023)

In Mawlamyine Township, the unemployment rate is about 1.19 % of total workable population. The individual income in Mawlamyine Township for 2023 is about 2,950,078 MMK per year and the basic salary is about 245,000 MMK per month. The table showing unemployment rate is shown in Table 4-9.

Table 4-9 The Unemployment Rate in Mawlamyine Township

Township	Workable Population	Working People	Unemployed People	Unemployed Rate
Mawlamyine	24,066	24,066	4,587	1.19 %

Source: General Administration Department of Mawlamyine Township (2023)

4.4.4 PUBLIC HEALTH CONDITION

The most common diseases in Mawlamyine Township are Diarrhea, Tuberculosis and Dysentery without no death cases. The occurrence of common diseases are shown in Table 4-10.

Table 4-10 Common Diseases in Mawlamyine Township

Township	Malaria	Diarrhea	Tuberculosis	Dysentery
Mawlamyine	67	989	514	3

Source: General Administration Department of Mawlamyine Township (2023)

4.4.5 NUMBER OF HOSPITALS AND HEALTH CENTERS

As per General Administration Department, there are 6 numbers of governmental hospitals and 9 numbers of public hospitals in Mawlamyine Township. In additions, 16 numbers of rural health care departments are instituted at the villages in order to achieve the emergency health care facilities and medical provisions. As the private health care services, there are 140 numbers of clinics found in the Mawlamyine Township.

4.4.6 BASIC INFRASTRUCTURE

4.4.6.1 TRANSPORTATION NETWORKS

Mawlamyine City is also a road hub and the terminus of roads leading to Yangon, Mandalay, Dawei and also Thailand. After completion of Thanlwin Bridge (Mawlmayine), Sky Bridge Bridge for railway, new railway station and new highway bus station, the city has become the transportation node of lower Myanmar.

High-speed public coastal passenger crafts are available from Yangon to Mawlamyine, Dawei, Myeik, and Kawthaung in the south. In addition, cooperative and privately owned schooners carry goods and passengers along the Yangon, Mawlamyine, Myeik, and Kawthaung coastal route. The road and railway transports are mostly used in Mawlamyine Township due to be more convenient and less expensive. The air transportation service can also be observed.

In Mawlamyine Township, there are 14 roads including 7 main road and 7 township approach road to commute the neighboring townships, whereas the stony road and dirt road are still

observed in some village tracts. The main road and road types of Mawlamyine Township is shown in Table 4-11.

Table 4-11 The Description of Main road and Road types in Mawlamyine Township

No.	Routes (Main Road)	Road Type	Length of Road
1.	Yangon-Myeik Road (BOT)	Asphalt Road	7 miles 2 furlong
2.	Mawlamyine- City Boundary Road	Asphalt Road	7 miles
3.	Mawlamyine – Kyaikmaraw Road	Asphalt Road	2 miles 3 furlong
4.	Mawlamyine- ZarthaPyin-Indu Road	Asphalt Road	9 miles 3 furlong
5.	Mawlamyine – City Bypass Road	Asphalt Road	5 miles 5.5 furlong
6.	Nyaung Pin Seik Village Road	Asphalt Road	2 miles
7.	Thanlwin Bridge (Chaungzone) Approach Road	Asphalt Road	1 miles 7 furlong

Source: General Administration Department of Mawlamyine Township (2023)

4.4.6.2 BRIDGES

There are numerous bridges observed within the Mawlamyine Township. Most bridges having above 180 ft in length are constructed over the Thanlwin river, Attaran river and Gyaing river. Moreover, other bridges which having below 180 ft are widely found across the Mawlamyine Township. The detailed information about the above 180 ft bridge is shown in Table 4-12.

Table 4-12 The Description of Main Bridge above 180 ft in length

No.	Bridge	Bridge Type	Length of Road
1.	Thanlwin Bridge	Reinforced Concrete	11,575 ft
2.	Attaran Bridge	Steel Cable-stayed Bridge	1,420 ft
3.	Gyaing-ZathaPyin Bridge	Steel Cable-stayed Bridge	2,900 ft
4.	Thanlwin Bridge (Chaungzone)	Steel stone framed bridge	5,203 ft

Source: General Administration Department of Mawlamyine Township (2023)

4.4.6.3 EDUCATIONAL INSTITUTION

There are 4 numbers of universities for higher education, 27 numbers of high schools (BEHS and BEHS (branch)), 10 numbers of middle schools (BEMS and BEMS (branch)), 24 numbers

of post primary schools, 89 numbers of primary schools (BEPS), 50 numbers of pre primary schools and 9 numbers of Monestry Education, enrolling 58,217 numbers of students with 2,546 numbers of teachers. As per GAD data, the literacy rate of Mawlamyine Township is 99.8%. The detailed information of public education is shown in Table 4-13.

Table 4-13 The Numbers of Schools, Teachers and Students in Mawlamyine Township

No.	Name	Numbers of Schools	Numbers of Teacher	Numbers of Students
1.	University and Colledges	4	506	9,203
2.	BEHS	20	803	20,209
3.	BEHS (branch)	7	201	4,279
4.	BEMS	7	121	2,662
5.	BEMS (branch)	3	48	1,191
6.	Post Primary Schools	24	291	8,208
7.	BEPS	89	477	10,415
8.	Pre Primary Schools	50	25	413
9.	Monestry Education	9	74	1,637
	Total	213	2,546	58,217

Source: General Administration Department of Mawlamyine Township (2023)

4.4.6.4 SOURCES OF DRINKING WATER

The main source of drinking water is from tube wells. Public water supply based on tube wells serves about 500 households with the supply capacity of 35,000 gallon per day by Development Affairs Department. Small scale water supply is available by the private sector Rainwater is also the another source of drinking water, collected and stored with tanks pots and earthen-jars during wet seasons.

Regarding the water treatment system, the filtering with microfabrics and boiling are common traditional treatment method for drinking water. At the same time, the purified drinking water bottles manufactured by local drinking water company are widely found in Mawlamyine Township. The township has quite sufficient drinking water all around the year.

4.4.7 ENERGY SOURCE

4.4.7.1 ELECTRICITY

Mawlamyine uses electricity from Ngan Tay Electric Power Plant. It is situated on Kyaik-mayaw road. Now, new private electric power plant is establishing in NganTay to support electricity to Mon state, Kayin state and Thanintharyi division.

4.4.7.2 SOURCE OF COOKING

Most inhabitants in Mawlamyine use electricity for cooking (49%). Some use charcoal (13%) and firewood (35%). comparison to other townships of BRACED program, Mawlamyine has the highest users of electricity for cooking among the project townships.

4.4.8 RELIGIOUS INFORMATION

4.4.8.1 RELIGION

Buddhism are mostly observed in Mawlamyine Township and other religion such as Christian, Hindu, Muslim are stayed together. The religion status is shown in Table 4-14.

Table 4-14 Religion Status of Mawlamyine Township

No.	Township	Buddhism	Christian	Hindu	Muslim	Other
1.	Mawlamyine	218,470	1,797	11,329	39,875	962

Source: General Administration Department of Mawlamyine Township (2023)

4.4.8.2 RELIGIOUS BUILDING

Despite being the buddhism as dominant religion, religious infrastructures of Christian, Hindu and Muslim are observed in Mawlamyine Township, shown in Table 4-15.

Table 4-15 Religious Buildings in Mawlamyine Township

No.	Township	Religious Infrastructures				
		Buddhism	Christian	Hindu	Muslim	Chinese Temple
1.	Mawlamyine	532	11	75	35	25

Source: General Administration Department of Mawlamyine Township (2023)

4.5 ENVIRONMENTAL BASELINE DATA

4.5.1 GEOGRAPHICAL STUDY LIMIT

The geographical extent of the project's potential impacts on both environmental and social is assessed to define the Area of Influence (AOI) where baseline information were collected. The project is located at Plot Numbers (325, 326, 327, 328, 329, 330), Shwemyotaw 1st Road, Mawlamyine Industrial Zone, Nyaungpinseik Village Tract, Mawlamyine Township, Mon State. The area of influence (AoI) of the project is shown in Figure 4-4. As shown in Figure 4-4, the project size of 1 km radius is defined as the potential direct impact influence zone in which the potential direct negative impact such as air pollution, noise, water pollution, and soil contamination, and their effect on human and ecosystem can occur. In addition, it is considered that the area between 1 km and 3 km is the potential indirect impact influence zone. The AoI for a particular resource/ 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 area within which it is likely that impacts could result.

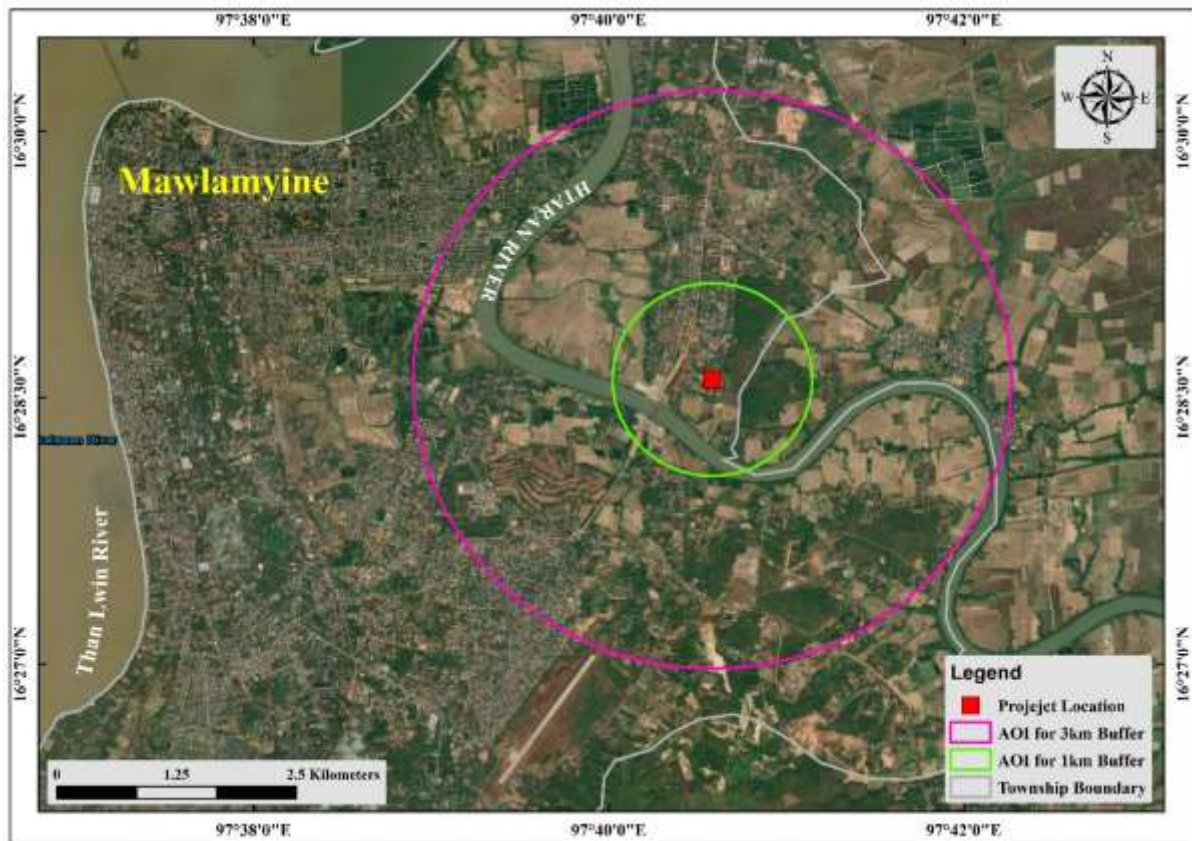


Figure 4-4 Area of Influence (AoI) for the project

4.5.2 AIR QUALITY MEASUREMENT

4.5.2.1 SURVEY ITEM

The survey area of the air quality parameters was determined by referring environmental quality standard in National Environmental Quality (Emission) Guidelines 2015, were announced on 29th December 2015.

4.5.2.2 SURVEY PERIOD

Air quality monitoring was conducted 24 hours during 15th March, 2025 – 17th March, 2025. The measurement duration is shown Table 4-16.

Table 4-16 Air Quality Survey Period

Sampling Point	Period	Remark
AQ-1	15th – 16th March, 2025	Air and Noise Station is Same Location
AQ-2	15th – 16th March, 2025	Air and Noise Station is Same Location
AQ-3	15th – 16th March, 2025	Air and Noise Station is Same Location
AQ-4	16th – 17th March, 2025	Air and Noise Station is Same Location
AQ-5	16th – 17th March, 2025	Air and Noise Station is Same Location

Survey Location

There are five locations for air quality monitoring were conducted around the project site within 1 km areas of interest. The detailed information of air quality monitoring points are shown in Table 4-17.

Table 4-17 Air Quality Monitoring Points

Sampling Point	Description of Sampling Point	Coordinates
AQ-1	Near Roasting Furnace & Generator	16° 28.588'N, 97° 40.557'E
AQ-2	Near Smelting Process	16° 28.576'N, 97° 40.618'E
AQ-3	New Extension Area	16° 28.576'N, 97° 40.618'E
AQ-4	Ambient Air Quality	16° 28.717'N, 97° 40.613'E
AQ-5	Ambient Air Quality	16° 28.462'N, 97° 40.612'E

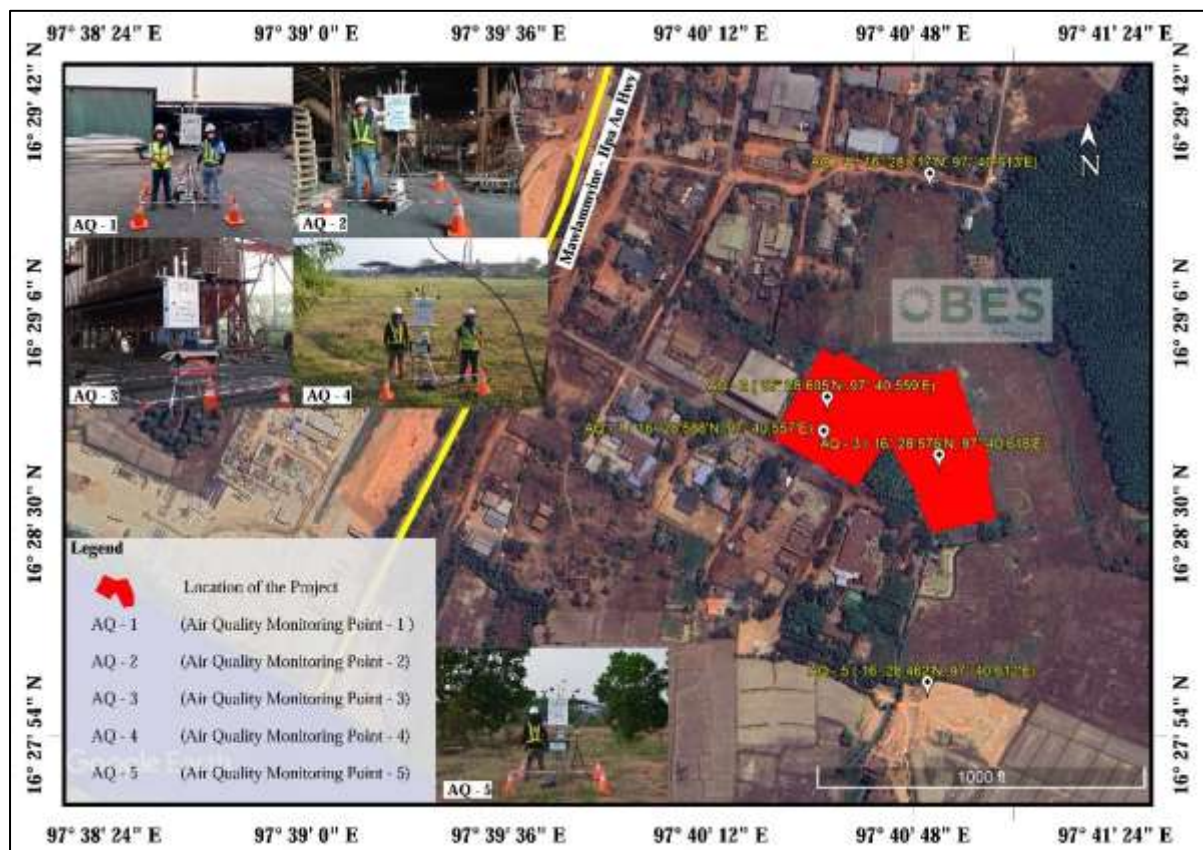


Figure 4-5 Location Map of Air Quality Monitoring Points

4.5.2.3 AIR QUALITY MONITORING POINT-1

The air quality station AQ-1 was surveyed at the project area in near roasting furnace & generator. It was measured at the project site and knowing the ambient level of the air quality around the project site. The survey activities of AQ-1 are shown in Figure 4-6.



Figure 4-6 Air Quality Monitoring Activities at AQ-1

4.5.2.4 AIR QUALITY MONITORING POINT-2

The air quality station AQ-2 was surveyed at the project area in near smelting process. The main reason was to assess the composition of toxic chemicals and particulate matters in the ambient air quality due to operation of smelting. The survey activities of AQ-2 are shown in Figure 4-7.



Figure 4-7 Air Quality Monitoring Activities at AQ-2

4.5.2.5 AIR QUALITY MONITORING POINT-3

The air quality station AQ-3 was surveyed at the project site in new extension area in order to assess the status of air quality in workplace area. The survey activities of AQ-3 are shown in Figure 4-8.



Figure 4-8 Air Monitoring Activities at AQ-3

4.5.2.6 AIR QUALITY MONITORING POINT-4

The air quality station AQ-4 was surveyed about 0.23 km northeast of the project site Nyaung Pin Seik Village, Mawlamyine Industrial Zone, Mawlamyine Township. The main reason to measure at the station AQ-4 is to study the impact on air quality in surrounding area. The survey activities of AQ-4 are shown in Figure 4-9.



Figure 4-9 Air Monitoring Activities at AQ-4

4.5.2.7 AIR QUALITY MONITORING POINT-5

The air quality station AQ-5 was surveyed about 0.30 km southeast of the project site Nyaung Pin Seik Village, Mawlamyine Industrial Zone, Mawlamyine Township. It was measured to know the contamination of air pollutants in the ambient air quality due to factory operation. The survey activities of AQ-5 are shown in Figure 4-10.



Figure 4-10 Air Monitoring Activities at AQ-5

4.5.3 METHODOLOGY

AQM-09 air quality monitoring system is used to measure the gases (SO₂, NO₂, O₃, etc.) and particulate matter PM₁₀, PM_{2.5} and TSP. Meteorological parameters such as temperature, humidity, wind speed and wind direction can measure at the same time. This monitoring system, along with gas sensors, can detect maximum, minimum, and time-weighted average levels continuously per second up to the duration concerned (e.g., 1 day) with high sensitivity (ppb & µg/m³ level).

4.5.4 AIR QUALITY RESULTS

The average values of ambient gaseous levels of all air quality monitoring for 24 hours show in **Table 4-18**. According to the survey results, although the ambient air qualities in surrounding project area, which are at A4 and A5, are met with the NEQEG (2015), the SO₂, PM_{2.5} and PM₁₀ at A1, A2 and A3 are slightly higher than regulated guidelines. As being a antimony refinery and smelting factory, the sulphur dioxide is naturally released from the roasting of antimony ore with the coal mixture at the temperature of 1000°C and they are captured by installing the wet scrubber at the end of chimney. Another pollution point source is the combustion of fossil fuel in generators and transportation vehicles, which contributes to SO₂ emission in workplace area significantly. The main cause of increasing PM₁₀ and PM_{2.5} at A1 and A2 is to carry out the raw material preparation, in which the grinded coal and coke are mixed in the stipulated ration in order to get the target furnace temperature. Moreover, the renovation activities of factory will be contributed the insignificant impacts on the content of particulate matter in surrounding atmosphere. The 24 hour air results are shown in Appendix D.

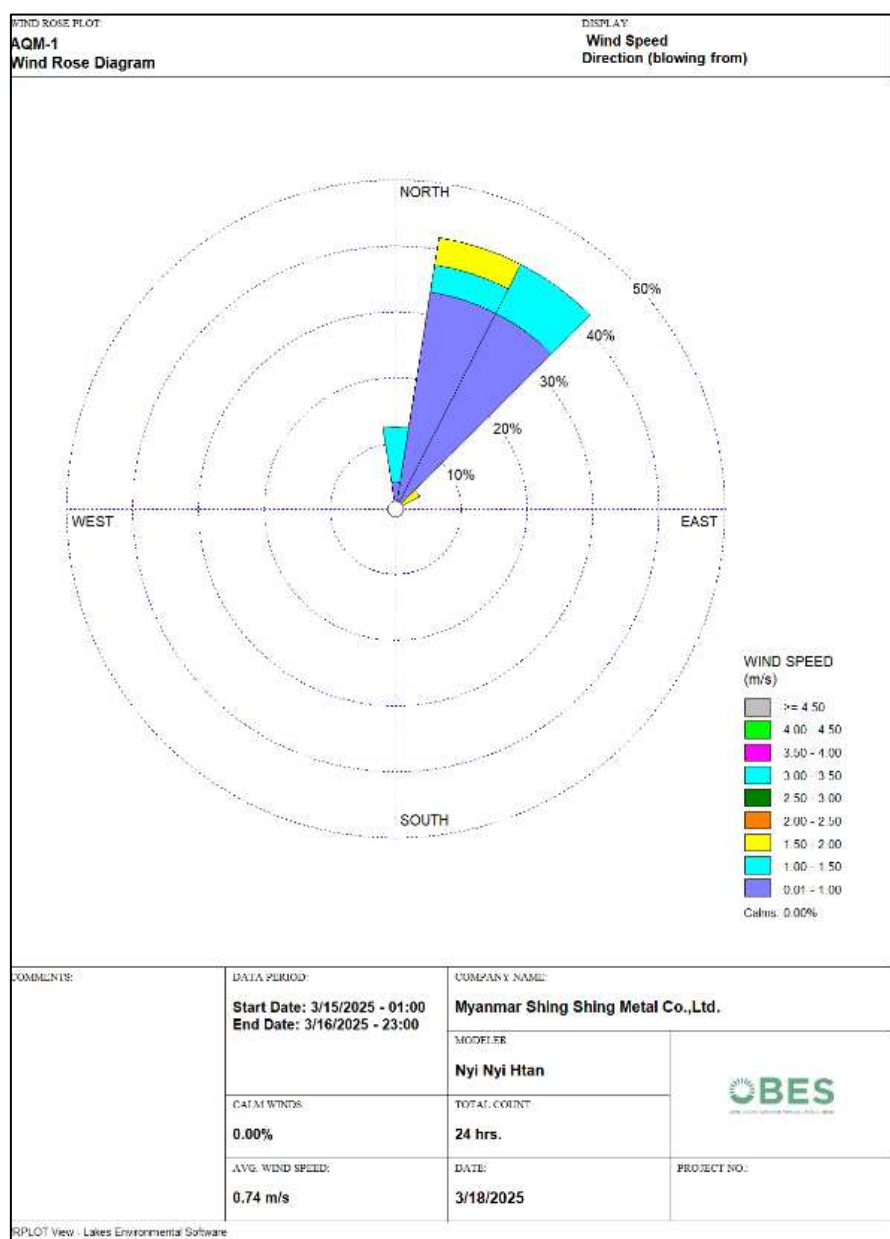
Table 4-18 Air Quality Monitoring Result

Parameters	Air Monitoring Result					Unit	Guideline	Avg. Period
	A1	A2	A3	A4	A5			
Ozone (O ₃)	97	96	91	84	78	µg/m ³	100	8-hour
Nitrogen Dioxide (NO ₂)	98	99	89	69	78	µg/m ³	200	1-hour
Sulphur Dioxide (SO ₂)	24.1	28.8	26.1	18.3	17.8	µg/m ³	20	24-hour
Particulate Matter (PM _{2.5})	31.45	34.13	23.34	17.1	15.11	µg/m ³	25	24-hour
Particulate Matter (PM ₁₀)	60.1	59.11	48.11	39.11	31.1	µg/m ³	50	24-hour

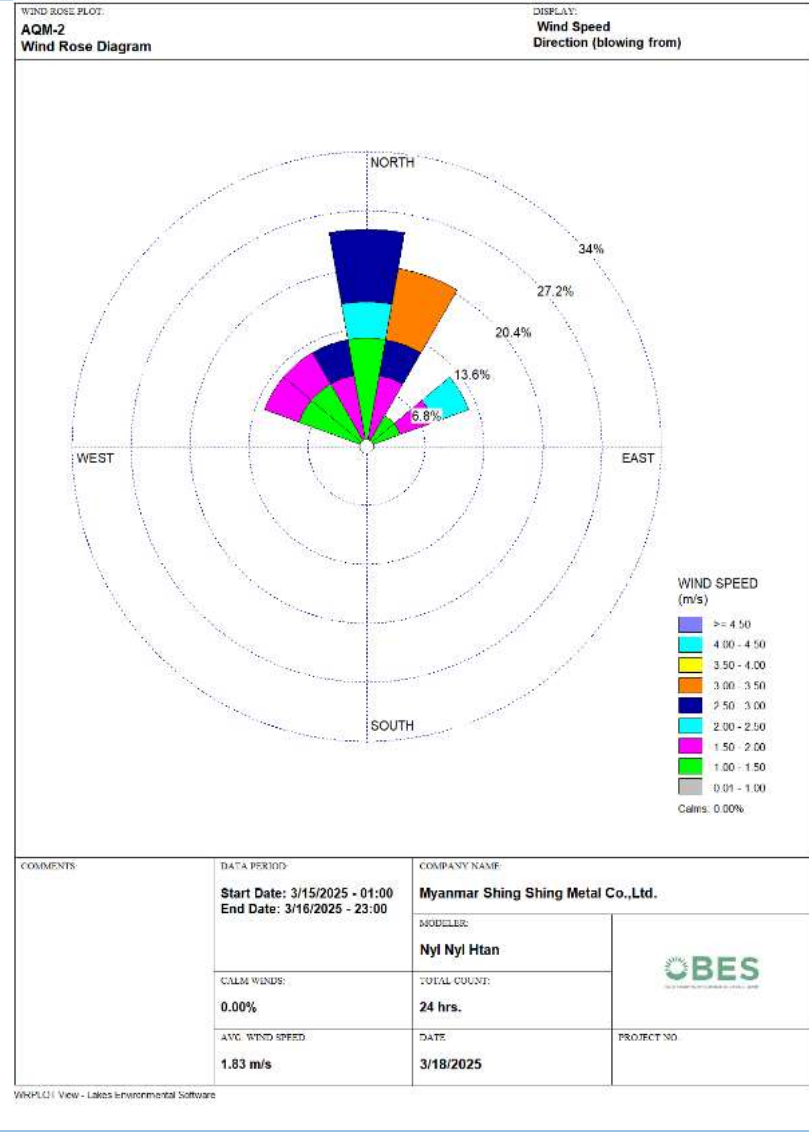
Parameters	Air Monitoring Result					Unit	Guideline	Avg. Period
	A1	A2	A3	A4	A5			
Total Suspended Particles (TSP)	79	76	65	54	41	-	-	24-hour
Carbon Monoxide (CO)	1.81	1.79	1.68	1.31	1.21	µg/m ³	9	8-hour
Relative Humidity (RH)	66.60	62.76	61.14	59.64	60.24	%	-	-
Temperature	30.56	30.26	29.58	28.58	29.38	°C	-	-

4.5.5 WIND SPEED AND DIRECTION

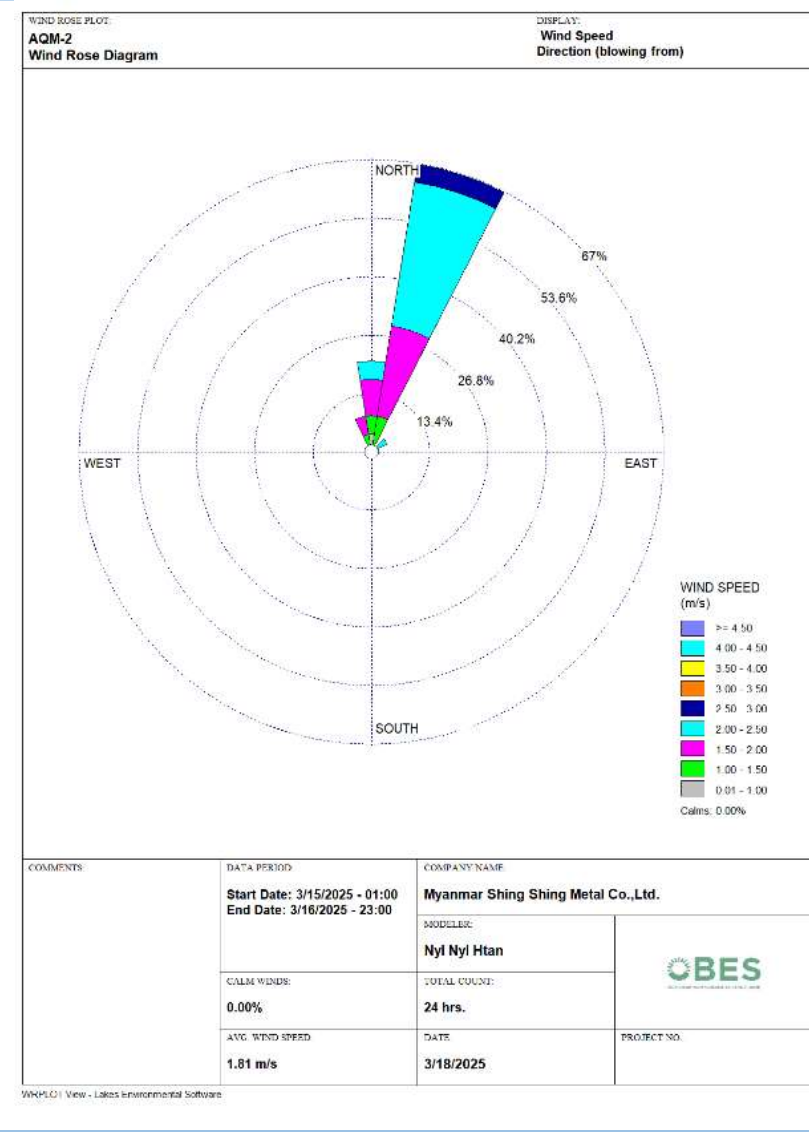
According to the wind rose diagram, the average wind speed is 0.03 to 2.45 m/s at all stations. The predominant wind direction is south, northwest and southeast. The wind rose diagrams of the air quality station are Figure 4-11.



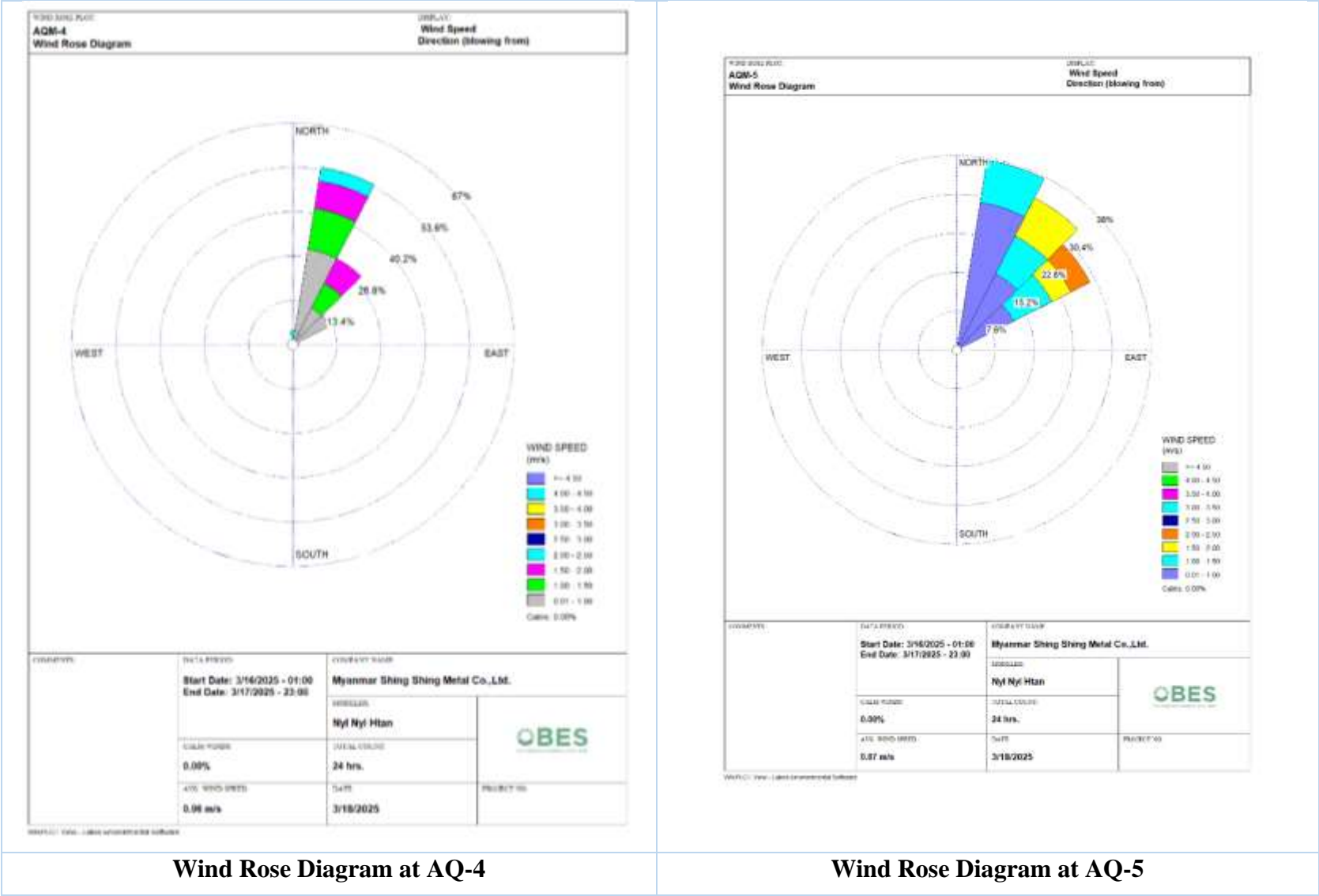
Wind Rose Diagram at AQ-1



Wind Rose Diagram at AQ-2



Wind Rose Diagram at AQ-3



4.5.6 SURFACE AND GROUNDWATER QUALITY

4.5.6.1 SURVEY ITEM

Parameters for water quality survey are determined to cover the parameters of environmental standards of Myanmar. The results of water quality measurements will be compared with National Environmental Quality (Emission) Guidelines, 2015, the National Surface Water Quality Standard, 2024 and National Drinking Water Quality Guidelines, MOH (2019), depending on the types of water. The parameters will be analyzed in a certified laboratory.

4.5.6.2 SURVEY PERIOD

The water quality samples were collected on 18th March, 2025 from the identified survey points.

4.5.6.3 SURVEY LOCATION

Total of four monitoring points were set up for water quality sampling within 1 km areas of interest. The detailed information about survey location is shown in Table 4-19 and location map is shown in Figure 4-12.

Table 4-19 The Location Points of Water Sampling Area.

Categories	Sampling Point	Latitude/ Longitude	Description of Sampling Points
Ground Water	GW	16°28'34.99"N 97°40'33.04"E	Factory Compound
Waste Water	WW	16°28'37.40"N 97°40'35.25"E	Discharged Point
Surface Water	SW-1	16°28'18.31"N 97°40'29.21"E	Up Stream of Attran River
Surface Water	SW-2	16°28'22.76"N 97°40'23.83"E	Down Stream of Attran River



Figure 4-12 Location Map of the Water Quality Sampling Points

4.5.6.4 WASTEWATER

The waste water sampling point WW was collected at the overflow cooling waste water drain of project site. The color of water is light-gray. The transparency of water is low. The monitoring activity is shown in Figure 4-13.



Figure 4-13 Water Quality Survey Activities at WW

4.5.6.5 GROUND WATER

The ground water sampling point GW is taken within the project site. It is tube well and about 130 m depth. The transparency of water is high and colorless. It is utility for domestic use. The monitoring activity is shown in Figure 4-14.



Figure 4-14 Water Quality Survey Activities at GW

4.5.6.6 SURFACE WATER-1 (UP STREAM)

The surface water sampling point SW-1(up-stream) was collected at the Attran River near Mawlamyine Township. It is located about 0.56 kilometers south of the project site. The color of water is yellowish brown. The transparency of water is very low. The monitoring activity is shown in Figure 4-15.



Figure 4-15 Water Quality Survey Activities at SW-1

4.5.6.7 SURFACE WATER-2 (DOWN STREAM)

The surface water sampling point SW-2(down-stream) was collected at the Attran River near Mawlamyine Township. It is located about 0.49 kilometers southwest of the project site. The color of water is yellowish brown. The transparency of water is very low. The monitoring activity is shown in Figure 4-16.



Figure 4-16 Water Quality Survey Activities at SW-2

4.5.7 SURVEY METHOD

Water samples were collected in plastic and sterilized glass sample containers. All samplings was analyzed in accordance with recognized standard procedures. The parameters as pH, temperature including the odor and color in visual analyzing were measured at each site concurrently with sample collection. All samples were kept in iced boxes and were transported to the laboratory within 24 hours.

4.5.8 SURVEY RESULTS

4.5.8.1 LABORATORY ANALYSIS RESULTS OF WASTEWATER RESULTS

The wastewater samples were collected from the overflow point of cooling tanks and they were analyzed at the Alarm Ecological Laboratory. All the results are compared with the general effluent standards of National Environmental Quality (Emission) Guidelines, shown in Table 4-20. According to the laboratory results, most wastewater parameters are within the regulatory guidelines, however, the chromium is slightly higher than the standards since the proposed factory use the Attarn river as the raw water. According to the surface water results of Attaran river, the chromium (hexavalent) has been tested 0.31 mg/L at upstream and 0.23 mg/L at downstream, shown in Table 4-20, showing the higher value of chromium content than the emission guideline of NEQEG (2015). The main occurrence of chromium (hexavalent) in surface water of Attaran river is the fertilizers and soil amended substances used in the agricultural farmings along the river bank. The laboratory results are shown in Table 4-20 and the laboratory results are shown in Appendix E.

Table 4-20 Discharged Water Results

No.	Parameter	Results WW	Units	Emission Standards	Remark
1	pH	8.7	S.U	6.0 – 9.0	Normal
2	Temperature	28	°C	±3	-
3	TSS	23	mg/L	≤50	Normal
4	Ammonia	0.36	mg/L	≤10	Normal

No.	Parameter	Results WW	Units	Emission Standards	Remark
5	BOD	38	mg/L	≤50	Normal
6	COD	81	mg/L	≤250	Normal
7	Total Chlorine	0.18	mg/L	-	-
8	Cyanide	0.069	mg/L	0.1	-
9	Total Phosphorous	0.95	mg/L	≤2	Normal
10	Arsenic	0.005	mg/L	≤0.1	Normal
11	Cadmium	0.01	mg/L	≤0.1	Normal
12	Copper	0.06	mg/L	≤0.5	Normal
13	Iron	0.32	mg/L	≤3.5	Normal
14	Lead	ND	mg/L	≤0.1	LOD=0.1 mg/L
15	Zinc	<0.02	mg/L	≤2	Normal
16	Nickel	0.32	mg/L	≤0.5	Normal
17	Mercury	0.001	mg/L	≤0.01	Normal
18	Chromium (Hexavalent)	0.21	mg/L	≤0.1	Above the Limit
19	Sulfide	0.316	mg/L	≤1	Normal
20	Phenol	<0.1	mg/L	≤0.5	Normal
21	Fluoride	0.1	mg/L	≤20	Normal
22	Oil & Grease	6	mg/L	≤10	Normal
23	Total-Coliform	0	(MPN/100 ml)	400	Normal

Source: Source water quality results of ALARM Ecological Laboratory

4.5.8.2 LABORATORY ANALYSIS RESULTS OF GROUND WATER

In comparison with National Drinking Water Quality Standards (2019), all ground water results are met with the stipulated standards. The groundwater quality results are shown in Table 4-21 and the laboratory results are shown in Appendix E.

Table 4-21 Groundwater Quality Results

No.	Parameter	Results GW	Units	National Drinking Water Quality Standards, 2019	Remark
1	pH	6.7	S.U	6.5-8.5	Normal
2	Colour	<5	HU	≤15	Normal
3	Turbidity	<5	FAU	≤5	Clear
4	TDS	69	mg/L	≤1000	Normal
5	Hardness	14	mg/L	≤500	Normal
6	Chloride	7.1	mg/L	≤250	Normal
7	Nitrate	1.21	mg/L	≤10	Normal
8	Arsenic	0.005	mg/L	≤0.05	Normal
9	Iron	0.26	mg/L	≤1	Normal
10	Lead	ND	mg/L	≤0.01	LOD=0.1mg/L
11	Manganese	0.26	mg/L	≤0.4	Normal
12	Sulfate	10	mg/L	≤250	Normal
13	Total-Coliform	23	(MPN/100 ml)	-	-

Source: Source water quality results of ALARM Ecological Laboratory

“ND”=Not Detected
Standard

“LOD”=Lower limit of detection

“-”=No Reference

4.5.8.3 LABORATORY ANALYSIS RESULT OF SURFACE WATER QUALITY

The surface water samplings of Attaran River were sent to the Alarm Ecological Laboratory and the results were compared with the National Surface Water Quality Standard, 2024 (Class V), shown in Table 4-22. According to the results, the surface water results are lower than the applicable guidelines. The laboratory analysis results are attached in Appendix E.

Table 4-22 Surface Water Quality Results

No.	Parameter	Water Results		Units	National Surface Water Quality Standard, 2024 (Class V)	Remark
		SW-1	SW-2			
	pH	6.4	6.8	S.U.	5-9	Within the guidelines
	TSS	46	86	mg/L	150 mg/l	
	Cyanide	0.068	0.059	mg/L	-	-
	Nitrate-Nitrogen	3.3	3.4	mg/L	-	-
	Nitrite	0.12	0.11	mg/L	-	-
	Arsenic	0.005	0.005	mg/L	-	
	Lead	ND	ND	mg/L	-	LOD=0.1 mg/l
	Cadmium	ND	ND	mg/L	-	LOD=0.1 mg/l
	Nickel	0.31	0.25	mg/L	-	
	Chromium (Hexavalent)	0.31	0.23	mg/L	-	
	Phenol	<0.1	<0.1	mg/L	-	
	Boron	1.2	1.5	mg/L	-	
	Fluoride	0.1	0	mg/L	-	

Source: Surface water quality results of ALARM Ecological Laboratory

“ND”=Not Detected

“LOD”=Lower limit of detection

“-”=No Reference Standard

4.5.9 NOISE MEASUREMENT

4.5.9.1 SURVEY ITEM

The average daytime and nighttime noise levels were measured in accord with National Environmental Quality (Emission) Guidelines.

4.5.9.2 SURVEY PERIOD

Noise levels were monitored 24 hours from 15th – 17th March, 2025. The measurement duration is shown in Table 4-23.

Table 4-23 The Measurement Period for Noise Monitoring

Sampling Point	Period	Remark
N-1	15th – 16th March, 2025	Air and Noise Station is Same Location
N-2	15th – 16th March, 2025	Air and Noise Station is Same Location
N-3	15th – 16th March, 2025	Air and Noise Station is Same Location
N-4	16th – 17th March, 2025	Air and Noise Station is Same Location
N-5	16th – 17th March, 2025	Air and Noise Station is Same Location

4.5.9.3 SURVEY LOCATION

There are four locations for noise level monitoring set up within 1 km areas of interest for noise monitoring. The detailed information is shown in Table 4-24.

Table 4-24 The Location Points of Noise Monitoring

Sampling Point	Coordinates	Description of Sampling Point
N-1	16° 28.588'N, 97° 40.557'E	Near Roasting Furnace & Generator
N-2	16° 28.576'N, 97° 40.618'E	Near Smelting Process
N-3	16° 28.576'N, 97° 40.618'E	Extension Area
N-4	16° 28.717'N, 97° 40.613'E	Nyaung Pin Seik Village
N-5	16° 28.462'N, 97° 40.612'E	Nyaung Pin Seik Village



Figure 4-17 Location Map of Noise Monitoring Points



Noise Quality Monitoring Point (N-1)



Noise Quality Monitoring Point (N-2)



Noise Quality Monitoring Point (N-3)



Noise Quality Monitoring Point (N-4)



Noise Quality Monitoring Point (N-5)

Figure 4-18 Noise Quality Survey Activities

4.5.9.4 SURVEY METHOD

Sampling and monitoring of surrounding sound were conducted by using following instrument for 24 hours/1-day measurement. The instrumentation used for noise quality survey is shown in the following figure. Noise meter was set up to record the log as ten minutes intervals during an hour for one consecutive day. 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.

Table 4-25 Instrument for Noise Survey

Instrumentation	Description
Sound level meter	Digital Sound Level Meter (GM1356-0/GM1356)

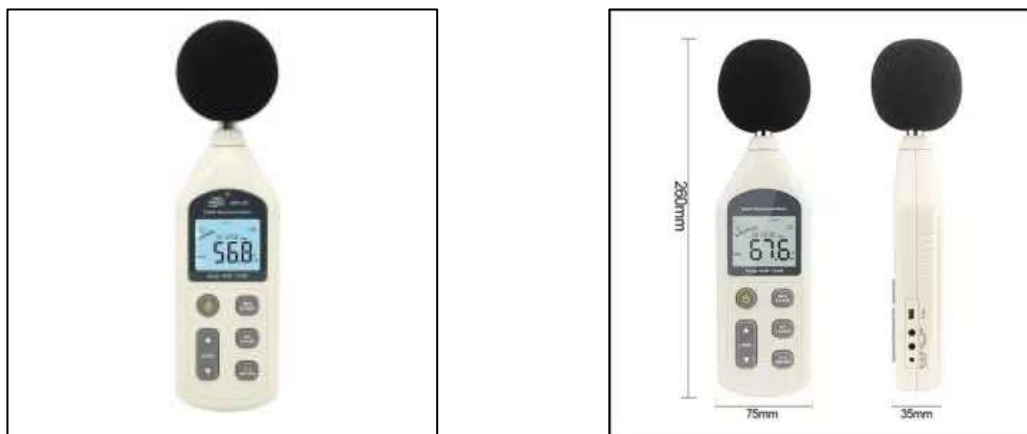


Figure 4-19 Digital Sound Level Meter (GM 1356)

4.5.9.5 SURVEY RESULT

4.5.9.5.1 DAYTIME AND NIGHTTIME NOISE RESULTS

The average 24 hours noise qualities of N-1, N-2, N-3, N-4 and N-5 are presented in Table 4-26 and the results are compared with the National Environmental Quality (Emission) Guidelines (NEQEG, 2015). According to the noise results, the average day time noise level at N1 and N2 are slightly higher than the NEQEG guidelines (2015), with 79 LAeq (dBA) and

72 LAeq (dBA) respectively as opposed to 70 LAeq (dBA). At nighttime, N1 station does still exceed the acceptable noise limit of 70 LAeq (dBA), resulting 72 LAeq (dBA). The main noise sources in the proposed factory are the operation of generator and raw material handling process (crushing of coal and mixing of raw materials), which noise generation rate is about 81 dBA and 71 dBA respectively based on the noise spot check results, shown in Table 4-26. Despite of running the factory in 24 hours, the noise emission processes will not operate throughout the day; the crushing of raw materials will be conducted in the day time by shifted schedules and the generators will be operated in case of emergency electricity run off.

Table 4-26 Noise Quality Results for N-1, N-2, N-3, N-4 and N-5

Time	Receptor					Noise Level (NEQEG, 2015)		Remarks
	One Hour LAeq (dBA)					Residential	Industrial	
	N 1	N 2	N 3	N 4	N 5			
7:00-8:00	86	74	59	61	56	55	70	Locating within the industrial zone, the noise level will compared with the industrial standards
8:00-9:00	85	75	53	63	58			
9:00-10:00	84	79	67	69	64			
10:00-11:00	81	76	64	66	60			
11:00-12:00	62	49	51	52	55			
12:00-13:00	71	66	54	56	52			
13:00-14:00	83	78	66	66	61			
14:00-15:00	85	80	68	70	65			
15:00-16:00	84	79	67	67	62			
16:00-17:00	75	80	68	78	65			
17:00-18:00	72	41	49	71	58			
18:00-19:00	81	76	64	66	61			
19:00-20:00	84	79	67	62	62			
20:00-21:00	81	76	64	69	64			
21:00-22:00	74	77	65	65	60			
22:00-23:00	67	77	63	56	54			
23:00-24:00	70	65	55	59	56	45	70	Locating within the industrial zone, the noise level will compared with the industrial standards
24:00-1:00	83	78	68	67	60			
1:00-2:00	81	76	66	62	59			
2:00-3:00	67	82	52	53	56			
3:00-4:00	59	41	45	49	51			
4:00-5:00	63	58	48	56	53			
5:00-6:00	74	79	69	57	61			
6:00-7:00	83	78	68	67	67			

Average (Day Time)	79	72	62	65	60	55	70	N1 and N2 are relatively higher than the standard
Average (Night Time)	72	70	59	58	57	45	70	N1 is relatively higher than the standard

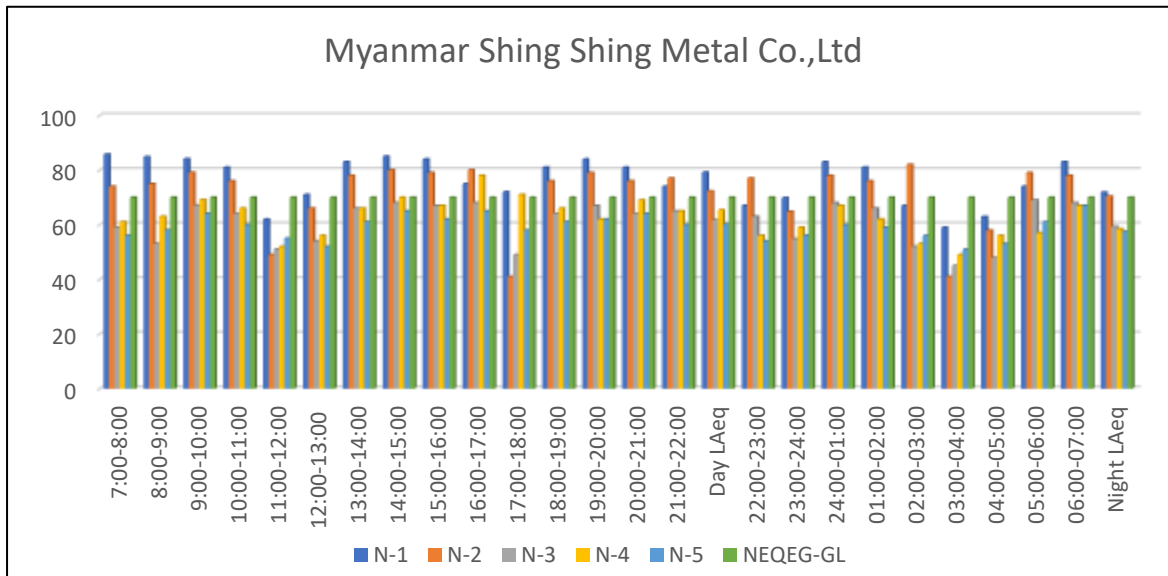


Figure 4-20 24 Hr Noise Graph for N-1, N-2, N-3, N-4 and N-5

4.5.9.5.2 NOISE LEVEL SPOT CHECK MEASUREMENT RESULTS

To assess the noise point sources, the spot check measurements were conducted within the factory and the results are compared with the industrial, commercial noise standards of NEQEG (2015), shown in Table 4-27. According to the results, most operation machines in factory are met with the regulatory noise guideline, while the generator and raw material pilling are relatively higher than the guideline standard. Despite exceeding the standards, these machines do operate for a certain period without running throughout the day. Regarding the impacts, the generator room should be modified by placing noise insulators or installing the sound proof system to control the frequency of noise wave in workplace area even when providing the ear plug to the workers.

Table 4-27 Noise Level Spot Check Measurement Results

Monitoring Points	Nearby Description	Noise Level	Guideline Values (NEQG)
NS-1	Smelting Furnace	57.11	70
NS-2	Office	59.16	70
NS-3	Factory Gate	58.34	70
NS-4	Generator Room	81.44	70

Monitoring Points	Nearby Description	Noise Level	Guideline Values (NEQG)
NS-5	Raw Material Pilling	71.11	70
NS-6	Cooling Pipe Area	56.31	70
NS-7	RF (Near Blower)	63.41	70
NS-8	By Product Pilling	51.66	70
NS-9	Charcoal Storage Area	67.71	70
NS-10	Coal Ash Temporary Storage Area	63.19	70
NS-11	Cooling Water Storage Tank	57.34	70
NS-12	New Extension Area	59.67	70
NS-13	Temporary Accommodation	59.66	70

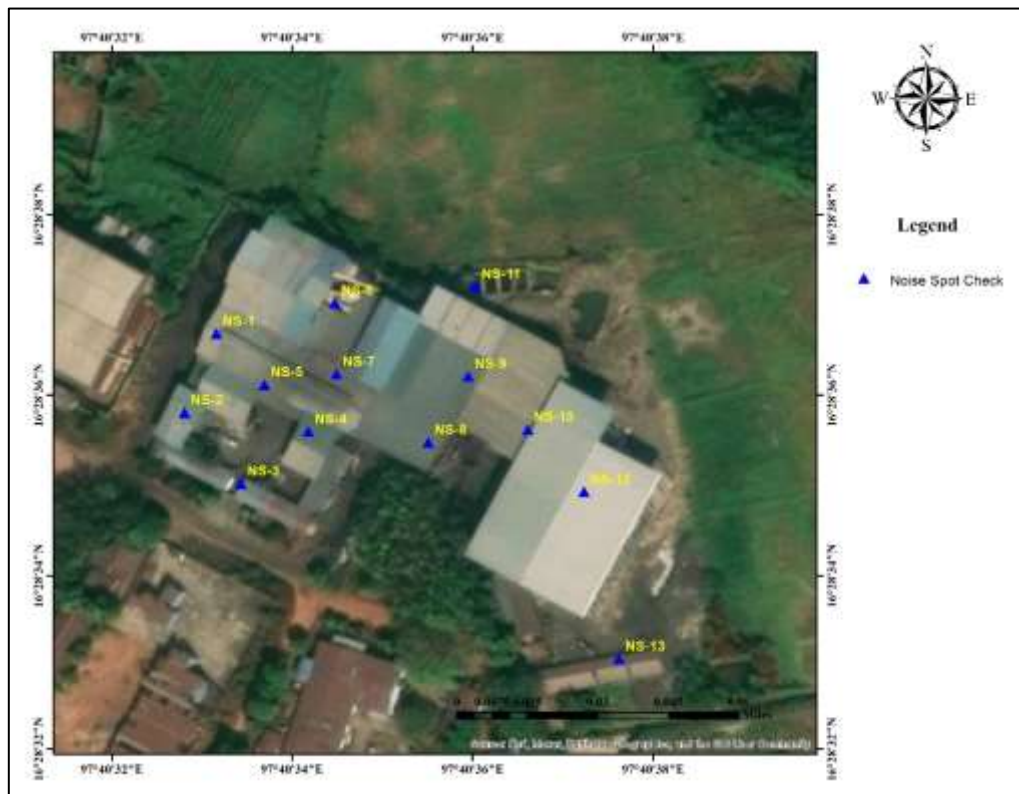


Figure 4-21 Noise Spot Check Measurement Points

4.5.10 SOIL SAMPLING

4.5.10.1 SOIL BASELINE SURVEY

Parameters for soil quality survey are determined to cover the parameters of existing available environmental standards. Soil sample was taken by the manual hand auger.


4.5.10.2 SURVEY PERIOD

Soil quality survey was conducted on 16th – 17th March, 2025 at project site.

4.5.10.3 SURVEY METHOD

For soil sampling, the standard environmental sampler (soil auger) was applied. The sampler is a stainless-steel tube that is sharpened on one end and fitted with a long, T-shaped handle. This tube is approximately three inches inside diameter. In order to refrain from contamination, about 00-30 cm of top soil was removed by the sampler before sampling. Most of samples were taken and collected from 30-50 cm depth. During sample collection, wear the glove, rinse glove and soil auger with clean water. Then sample was taken and collected in cleaned plastic bag. Field equipment used on site also show in the Table 4-28.

Table 4-28 Field Equipment for Soil Quality Survey

Equipment	Originate Country	Model
Soil Auger (Hand held) 	U. S. A	AMS

4.5.10.4 SURVEY LOCATION

The soil sampling was conducted with the project site and the detailed information is shown in Table 4-29.

Table 4-29 The Location Point of Soil Sampling

Sample ID	Latitude	Longitude	Description of Sampling Point
SQ	16°28'37.32"N	97°40'36.17"E	Within the project site



Figure 4-22 Soil Survey Points

4.5.10.5 SOIL QUALITY SAMPLING

The soil sample was taken at the project boundary area. When the soil samples collected, three locations as the triangle shape were taken by composite sampling method. The top soil was removed 00-30cm and taken from 30-50 cm. The soil monitoring activities are shown in Figure 4-23.



Figure 4-23 Soil Survey Activities at SQ

4.5.10.6 SURVEY RESULTS

Chemical analysis for soil quality was tested in the laboratory of Land Use Department of Yangon Region. The soil results were compared with available international guidelines, which are shown in Table 4-30. All results are within the acceptable limit of international guidelines and laboratory analysis results is attached in Appendix-F.

Table 4-30 Soil Survey Results

Parameter	Unit	Result	Guidelines		
		SQ	Japan	Thailand	Vietnam
pH	-	4.34	-	-	-
Zinc (Zn)	ppm	0.5118	150	-	300
Copper (Cu)	ppm	1.1072	125	-	100
Lead (Pb)	ppm	3.1416	150	750	300
Arsenic (As)	ppm	3.36	150	27	12

Source: Japan: Ministry of Environment, Government of Japan (2002), “Regulation for Implementing the Law on Soil Contamination Countermeasures”

Thailand: Notification of National Environmental Board No.25, B.E. Thailand (2004), “other purpose”

Vietnam: QCVN 03:2008/BTNMT, Applied “industrial land”, Vietnam.

4.5.11 ODOR MEASUREMENT

4.5.11.1 SURVEY ITEM

The survey area of the odor level was determined by referring Myanmar National Environmental Quality (Emission) Guidelines, were announced on 29th December 2015. Generally, odor levels should not exceed five to ten odorant units⁹ 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.

4.5.11.2 SURVEY PERIOD

Odor level survey was conducted on 17th March, 2025 at project site.

4.5.11.3 SURVEY LOCATION

There are 5 locations for odor sampling were conducted and shown in Table 4-31.

⁹The detectability of an odor is a sensory property that refers to the minimum concentration that produces an olfactory response or sensation. An odorant unit is defined as the amount of odorant mixtures which distributed in one cubic meter of air results in odor intensities corresponding to a defined threshold value. The odorant unit is therefore defined by a physiologically measured amount of substance. In practice, offensive odor can only be judged by public reaction to the odor, with the nuisance level being as low as two odorant units and as high as ten odorant units for less offensive odors. An odor assessment criteria of five to ten odorant units is likely to represent the level below which offensive odors should not occur.

Table 4-31 Odor Monitoring Location Points

Survey Points	Coordinate Points	Description of Survey Points
OD-1	16°28'36.66"N, 97°40'33.16"E	Smelting Furnace
OD-2	16°28'35.79"N, 97°40'32.80"E	Office
OD-3	16°28'36.10"N, 97°40'33.69"E	Raw Material Pilling
OD-4	16°28'36.19"N, 97°40'35.95"E	Charcoal Storage Area
OD-5	16°28'34.91"N, 97°40'37.23"E	New Extension Area



Figure 4-24 Odor Sampling Locations

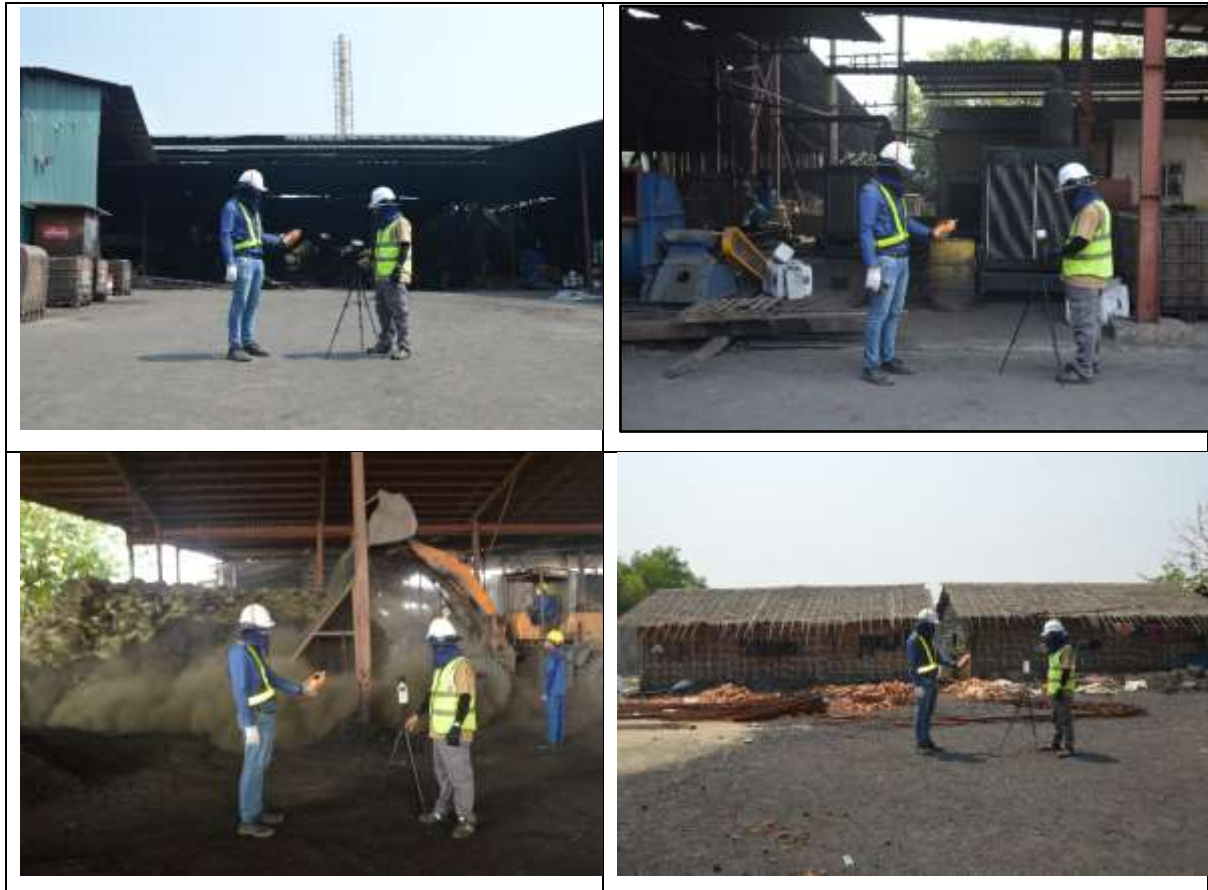



Figure 4-25 Odor Sampling Activities within the Project Site

4.5.11.4 SURVEY METHOD

The Sky 2000-Odor Gas Detector was the instruments used for the odor level survey. The SKY2000-Odor Gas Detector is a portable, high-accuracy, fast-reaction gas measurement tool that can be used for direct measurement. The instrument used for the odor level survey was described in the following table.

Instrumentation	Photo
Sky 2000-Odor Gas Detector	

4.5.11.5 SURVEY RESULTS

According to the sampling results, the odor level values were lower than the National Environmental Quality (Emission) Guidelines, 2015's permissible limits. This suggests that the levels of odor are within permissible limits and are within the regulatory guidelines. The odor level monitoring results were described in the Table 4-32.

Table 4-32 Odor Results

No.	Sample ID	Mean Value (ppm)	NEQEGs (2015) Values
1	Odor Sampling Point - O1	4.6	5-10 ppm
2	Odor Sampling Point - O2	0.46	
3	Odor Sampling Point - O3	1.14	
4	Odor Sampling Point - O4	4	
5	Odor Sampling Point - O5	0.87	

4.5.12 VIBRATION

4.5.12.1 SURVEY ITEM

Vibration was measured at same location at air quality monitoring station. The vibration level results were measured on sensitive receptors such as Church, Monastery, and house near the vibration source which results were referenced by the Vibration Emitted from Specified Construction Works. Vibration meter was set up to record the log as ten minutes intervals during an hour for one consecutive day.

Table 4-33 Applicable Vibration Level Guidelines

Type of Restriction	Area Classified	
Standard value	I & II	85dB
Work prohibited time	I	7 p.m. - 7 a.m.
	II	10 p.m. - 6 p.m.
Maximum Working duration	I	10 hours per day
	II	14 hours per day
Maximum consecutive working days	I & II	6 days
Work prohibited days	I & II	Sundays and holidays
Classification of Area	Description	
Area I	<p>Areas where maintenance of quiet is particularly needed to preserve the residential environment.</p> <p>Areas which require maintenance of quiet since they are used for residential purposes.</p>	

	Areas used for commercial and industrial as well as residential purpose which are in need of measures to prevent vibration pollution since a considerable number of houses are located. The neighborhood of schools, hospitals.
Area II	Areas where there is a need to preserve the living environment of inhabitants and other than Area I

Notes: Vibration level shall be measured at the boundary line of the specified construction work site.

4.5.12.2 SURVEY PERIOD

Vibration level monitoring was conducted 24 hours from 29th November to 1st December, 2024. The detailed measurement duration is shown in Table 4-34.

Table 4-34 Measurement Period of Vibration Monitoring

Sampling Point	Period	Remark
V-1	15th – 16th March, 2025	Air and Noise Station is Same Location
V-2	16th – 17th March, 2025	Air and Noise Station is Same Location

4.5.12.3 SURVEY LOCATION

There are two locations for vibration level monitoring were conducted around the project site within 1 km areas of interest. The vibration monitoring location is shown in Table 4-35.

Table 4-35 Monitoring Location for Vibration

Sampling Point	Coordinates	Description of Sampling Point
V-1	16° 28.588'N, 97° 40.557'E	Near Roasting Furnace & Generator
V-2	16° 28.576'N, 97° 40.618'E	New Extension Area



Figure 4-26 Vibration Level Survey Activities

4.5.12.4 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.

Table 4-36 Instrumentation for Vibration Survey

Instrumentation	Description
Vibration meter	Rion VM55 with SD Card



Figure 4-27 Vibration Meter Rion VM55

4.5.12.5 SURVEY RESULTS

Average vibration level results of all points for 24-hours are presented in Table 4-37 and Figure 4-28. The vibration level results were not exceeding the standard.

Table 4-37 Vibration Level Results for All Stations

Result	V-1		V-2	
	Day	Night	Day	Night
	17	13	20	19
Ministry of Environment, Japan Vibration Guideline	85		85	

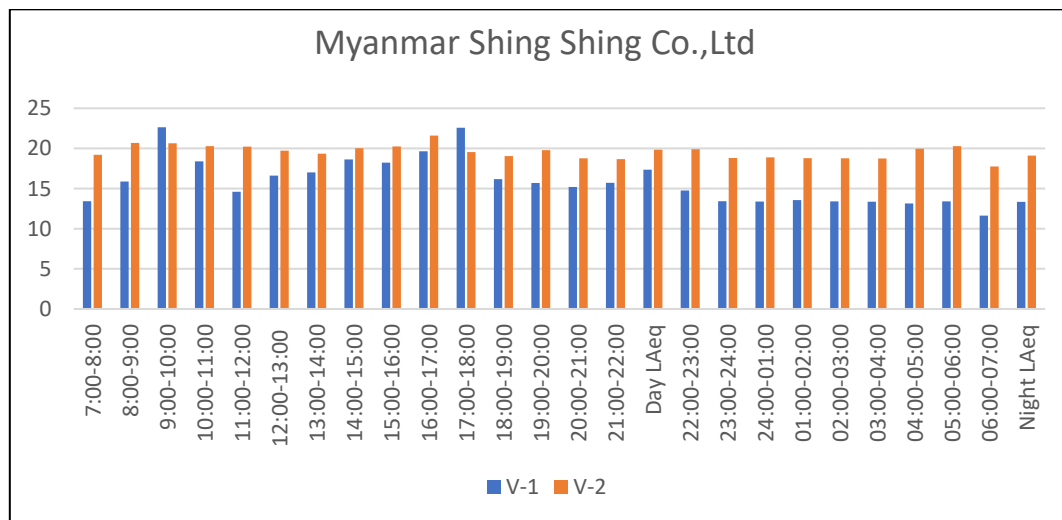


Figure 4-28 Vibration Level Guideline Value and Results

4.6 BIOLOGICAL CHARACTERISTICS

4.6.1 SURVEY ITEM

Biodiversity survey items are listed as below,

- Flora
- Trees
- Climbers
- Shrubs
- Herbs
- Bamboos
- Fauna
- Avifauna (Birds)
- Herpetofauna (Amphibians and Reptiles)
- Butterflies
- Mammals
- Aquatic Fauna

4.6.2 SURVEY PERIOD

The flora and fauna survey were conducted within the 3 km radius of project area. Field survey was observed from 15th to 16th March, 2025. On 15th March 2025, flora field survey was conducted and fauna field survey was conducted on 16th March 2025.

4.6.3 SURVEY METHODOLOGY

During the field survey period, flora and fauna field survey were conducted in each day. As the field equipment, camera, field notebook and guidebooks were taken into the field. In the field, some species are directly identified and some are recorded photos. After arriving the office, the photo recorded species are identified with assistance of a checklist of tree, shrubs, herbs and climbers of Myanmar and references such as standard nomenclature of Forest Plants, Myanmar, 2017 Jan 2nd edit, U Hoke Lin and International Plant Name index websites. Birds species are check listed with Birds of Myanmar 2003 and Birds of Thailand.

The recorded flora and fauna species are compared and checked with the International Union for Conservation of Nature's Red List of Threatened Species (IUCN) (version with 2023-1). In IUCN Red List, species are categorized by not evaluated (NE), data deficient (DD), least concern (LC), near threatened (NT), vulnerable (VU), endangered (EN), critically endangered (CR), extinct in the wild (EW) and Extinct (EX).

4.6.3.1 FLORA METHODOLOGY

Flora survey was conducted by setting up the transect line and it was surveyed 2 m wide in each side of the transect line. All species such as trees, climbers, herbs, shrubs and bamboo are recorded with not only camera but also note book. Some specimens had been carried for further identification with the references.

4.6.3.2 FAUNA METHODOLOGY

Fauna surveys were conducted at the fauna watching points and aquatic fauna were collected at the roadside ditches and wetland water bodies within the 3 km of the project area. Fauna survey methods are as followed,

Birds	Point count method was used for the bird survey and took the photograph of birds. Birds were observed with binocular and camera for identify. Some species are identified with the guide book. Nocturnal birds were observed when it becomes dusk.
Amphibians and Reptiles	Amphibian and reptiles specesi are recorded in transect lines and points and observed under old logs, big stones and under litters throughout the study area. Herpetofauna were documented by photograph.
Mammals	Mammals surveys were conducted through transect count during daytime survey. Information are gathered and noted by interviewing with skillful local people. Secondary datas are collected from township profile of country.
Aquatic fauna	Fishes and crabs were collected with the help of local fisherman within the project area by using local fishing gears (e.g. fish trap and gill net, etc) to obtain fish species list. The species which collected from the field were taken a photograph to identify and check.
Insects	Insects are surveyed using point count method subject to the on-site conditions. Insect species were identified in field and took photograph.

4.6.4 SURVEY RESULTS

4.6.4.1 FLORA SPECIES






As per General Administration Department (GAD), there are valuable hardwood tree species and bamboo species mainly observed in Mawlamyine Township. Most tree species are Pyi Kadoe, In, Htauk Kyant, Pyin Ma, Na Bae, Thit Yar, Thet Yin, Ye Mein, Let Pan, Na kyai and Mya Yar. As bamboo species, Wa Pyu, Wa New and Wa Kote are widely found. In addition, 62 floral species are recorded in Mawlamyine Township, which are referenced from the flora field survey. The recorded flora species are shown in Table 4-38.

Table 4-38 List of Recorded Flora Species

No.	Scientific Name	Common Name	Family	Habitat	IUCN Red List
	Chromolaena odorata	Bisat	Asteraceae	Shrub	-
	Premna serratifolia	Headache tree	Lamiaceae	Shrub	LC
	Hibiscus surattensis	Chin-baung	Malvaceae	Shrub	-
	Tadehagi triquetrum	Louk thay	Fabaceae	Shrub	LC
	Clerodendrum indicum	Ngar yanpatu	Verbenaceae	Shrub	LC
	Sesbania bispinosa	Nyan Pin	Fabaceae	Shrub	LC
	Asparagus sprengeri	Taung war	Asparagaceae	Shrub	LC
	Hibiscus panduriformis	Yone padi	Malvaceae	Shrub	-
	Dregea volubilis	Gway tauk	Asclepiadaceae	Climber	-
	Ipomoea aquatica	Kazun-galay	Convolvulaceae	Climber	LC
	Acacia concinna	Kinmunchin	Mimosaceae	Climber	-
	Acacia intsia	Suboke	Mimosaceae	Climber	-
	Erythralium scandens	Le lu	Oleaceae	Climber	LC
	Jasminum rottlerianum	Taw sabai	Oleaceae	Climber	-
	Connarus paniculatus	Taw-danyin	Connaraceae	Climber	LC
	Calamus erectus	Thaing-kyein	Arecaceae	Climber	-

No.	Scientific Name	Common Name	Family	Habitat	IUCN Red List
	Bambusa burmanica	Hnee War	Poaceae	Bamboo	-
	Dendrocalamus brandisii	War boe	Poaceae	Bamboo	-
	Borassus flabellifer	Htan	Arecaceae	Tree	LC
	Erythrina arborescens	Kathit	Fabaceae	Tree	LC
	Albizia lebbek	Kokko	Mimosaceae	Tree	LC
	Oroxylum indicum	Kyaung-sha	Bignoniaceae	Tree	LC
	Barringtonia acutangula	Kyee	Lecythidaceae	Tree	LC
	Bombax ceiba	Latpan	Bombacaceae	Tree	LC
	Bouea burmanica	Mayan	Anacardiaceae	Tree	LC
	Homalium tomentosum	Myauk chaw	Flacourtiaceae	Tree	LC
	Ficus spp.	Naung	Moraceae	Tree	-
	Artocarpus heterophyllus	Pain Ngel	Moraceae	Tree	-
	Cycas siamensis	Mon Daing	Cycadaceae	tree	VU
	Neolamarckia cadamba	Ma U	Rubiaceae	Tree	-
	Senna timoriensis	Malzali	Caesalpiniaceae	tree	LC
	Xylia xylocarpa	Pyin Kado	Mimosaceae	Tree	LC
	Tectona grandis	Kyun	Lamiaceae	Tree	EN
	Acacia mangium	Manjansha	Fabaceae	Tree	LC
	Areca Catechu	Areca palm	Arecaceae	Tree	-
	Swietenia macrophylla	Mahogany	Meliaceae	Tree	EN
	Ceiba pentandra	Silk Cotton tree	Malvaceae	Tree	LC
	Lagerstroemia speciosa	Pyin ma	Lythraceae	Tree	LC
	Clausena excavata	Pyin taw thein	Rutaceae	tree	LC

No.	Scientific Name	Common Name	Family	Habitat	IUCN Red List
	<i>Streblus asper</i>	Sayyoe(Ohn nel)	Moraceae	tree	LC
	<i>Livistona speciosa</i>	Taung Htan	Arecaceae	Tree	LC
	<i>Garcinia cowa</i>	Taung thale	Hypericaceae	Tree	LC
	<i>Tristaniaopsis burmanica</i>	Taung Thapyay	Myrtaceae	Tree	-
	<i>Ficus glomerata</i>	Tha pan	Moraceae	Tree	-
	<i>Eugenia bracteolata</i>	Tha pyay	Myrtaceae	Tree	-
	<i>Dillenia indica</i>	Thabyu	Dilleniaceae	Tree	LC
	<i>Dracaena multiflora</i>	Thanat-kha-ayine	Asparagaceae	Tree	LC
	<i>Mangifera caesia</i>	Thatyet phyu	Anacardiaceae	Tree	NT
	<i>Mangifera indica</i>	Thayet	Anacardiaceae	Tree	DD
	<i>Carica papaya</i>	Thin baw	Caricaceae	tree	DD
	<i>Albizia procera</i>	Thit phyu	Fabaceae	Tree	LC
	<i>Ziziphus jujuba</i>	Zi	Rhamnaceae	Tree	LC
	<i>Ziziphus rugosa</i>	Taw Zi	Rhamnaceae	tree	LC
	<i>Durio mansonii</i>	Taw Durin	Bombacaceae	Tree	VU
	<i>Morinda angustifolia</i>	Yeyo	Rubiaceae	tree	LC
	<i>Plumeria rubra</i>	Tayok-saga	Apocynaceae	tree	LC
	<i>Musa sapientum</i>	Nget pyaw	Musaceae	Herb	LC
	<i>Calanthe triplicata</i>	Panhtain ngo yeil	Orchidaceae	Herb	-
	<i>Costus speciosus</i>	Phalan taung Way	Costaceae	Herb	-
	<i>Heliotropium indicum</i>	Sin hna maung	Boraginaceae	Herb	-
	<i>Musa laterita</i>	Taw-nget-pyaw	Musaceae	Herb	-
	<i>Amorphophallus paeoniifolius</i>	Wa U	Araceae	Herb	LC

	
Tectona grandis	Mangifera indica
	
Areca catechu	Swietenia macrophylla
	
Lagerstroemia speciosa	Albizia procera

	
Ziziphus jujuba	Ficus benghalensis
	
Ceiba pentandra	Albizia lebbeck
	
Bambusa burmanica	Acacia mangium
	
Terminalia catappa	Clerodendrum indicum

Figure 4-29 Record of Flora Species in Study Area

4.6.4.2 FAUNA

In Mawlamyine Township, wild boar, wild cat, gazelle, barking deer and monkey are recorded in GAD data. According to the fauna survey, the biologists have registered 68 species of fauna, grouped into mammals, birds, reptiles, crustaceans, amphibians, fishes and insects. The detailed information of recorded fauna found in study area are described in Table 4-39.

Table 4-39 List of Recorded Fauna in Mawlamyine Township

No.	Groups	Scientific Name	Common Name	IUCN
	Birds	Corvus macrorhynchos	Jungle Crow	LC/R
		Columba livia	Pigeon	LC/R
		Apus sp.	Common Swift	LC/R
		Acridotheres tristis	Common Myna	LC/R
		Pycnonotus melanicterus	Black-capped bulbul	LC/R
		Spilopelia chinensis	Spotted Dove	LC/R
		Phaenicophaeus tristis	Green-billed malkoha	LC/R
		Anastomus oscitans	Asian openbill	LC/R
		Phyllergates cucullatus	Mountain tailorbird	LC/R
		Centropus sinensis	Crow Pheasant	LC/R
		Pycnonotus atriceps	Black-headed bulbul	LC/R
		Coracias benghalensis	Indian roller	LC/R
		Dendrocygna javanica	Fulvous whistling duck	LC/R
		Hypsipetes sp.	Black Bulbul	LC/R M
		Ploceus hypoxanthus	Common Weaver	LC/R
		Cosychus saularis	Oriental magpie robin	LC/R
	Amphibians and Reptiles	Duttaphrynus melanostictus	Common Toad	LC
		Fejervarya sp.	Frog	LC
		Python bivittatus	Python	VU
		Montivipera xanthine	Viper	VU
		Calotes mystaceus	Common Garden Lizard	LC
		Ophiophagus hannah	Cobra	VU
		Cyrlodactylus pulc7 sphellus	Gecko	LC
	Manmmals	Felis chaus	Jungle Cat	LC
		Unidentified	Monkey	-
		Macaca mulatta	Rhesus Macaque	LC
		Calloscriurus erythreus	Pallas's Squirrel	LC
		Craseonycteris thonglongyai	Bumblebee Bats	LC

No.	Groups	Scientific Name	Common Name	IUCN
		Rousettus amplexicaudatus	Geoffroy's Rousette	LC
	Fishes	Polynemus paradiseus	Paradise threadfin	NE
		Johnius macropterus	Croaker	NE
		Tenualosa ilisha	Hilsa Shad	NT
		Exocoetus volitans	Tropical two-wing flyingfish	LC
		Chanana striata	Snakehead Murrel	NE
		Clarias batrachus	Walking Catfish	LC
		Puntius chola	Swamp Barb	LC
		Mastacembelus unicolor	Colorful Eel	NE
		Anabas testudineus	Perch	DD
		Notopterus notopterus	Featherback	LC
		Oreochromis niloticus	Nile Tilapia	LC
		Chana sp.	Murrel	NE
		Mystus mystus	Striped Dwarf Catfish	NE
		Wallago attu	Wallago	NT
	Insects	Phalanta phalantha	Leopard or spotted rustic	NE
		Danaus genutia	Common tiger	NE
		Eurema hecabe	Common grass yellow	NE
		Trithemis festiva	Black stream glide	LC
		Orthetrum sabina	Slender skimmer	LC
		Euploea core godarti	Common crow	NE
		Aricia agestis	Brown argus	NE
		Papilio memnon agenor	Great Mormon	NE
		Parthenos Sylvia apicalis	Clipper	NE
		Papilio polytes romulus cramer	Common Mormon	NE
		Eurema pallida	Common Mormon	NE
		Neurothemis tullia	Pied paddy skimmer	LC
		Orthetrum pruinatum	Crimson-tailed marsh hawk	LC
		Danaus chrysippus	The plain tiger	NE
		Potamarcha congener	Dragonfly	LC
		Gerridae	Pond Skaters	-

No.	Groups	Scientific Name	Common Name	IUCN
		<i>Locusta migratoria</i>	Locust	-
		<i>Omocestus viridulus</i>	Common Green Grasshopper	NE
		<i>Rhagonycha</i> sp.	Common red soldier beetle	-
		<i>Chrysomela</i> sp.	Bug	-
		<i>Dolichovespula</i> spp.	Wasp	NE
		<i>Coccinella septempunctata</i>	Seven-spot ladybird	NE
		<i>Distoleon tetragrammicus</i>	Antlion Lava	NE
		<i>Cethosia cyane euanthes</i>	Fruhstorfer	NE
		<i>Brachythemis contaminata</i>	Small Dragonfly	NE

**Phyllergates cucullatus****Dendrocygna javanica****Cosychus saularis****Acridotheres tristis**







	
<p>Calloscriurus erythreus</p>	<p>Tenuialosa ilisha</p>
	
<p>Clarias batrachus</p>	<p>Omocestus viridulus</p>
	
<p>Dolichovespula spp.</p>	<p>Parthenos Sylvia apicalis</p>

Figure 4-30 Fauna Records in Study Area

5. IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 INTRODUCTION

This chapter provides an assessment of potential impacts which may be either positive or negative arising from the project. According to EIA Procedure (2015) by MONREC, IEE reports requires to include impact and risk assessment and mitigation measures covering each project phase such as construction, operation and decommissioning phases.

The methodological approach used for the project impact assessment is adapted from the impact assessment methods recommended by the Canadian Environmental Assessment Agency (1990), by the World Bank (1991) and by the International Finance Corporation (Dec. 1998).

5.2 SCOPE OF IMPACT ASSESSMENT

In addition, the identification and assessment of potential environmental impacts should include potential impacts on physical, biological, social, socio-economic, health, cultural, and visual impacts. Appropriate management plans have to be considered so as to control and or at least mitigate the environmental impacts during three phases (construction, decommission and operation).

It should be noted that the term environmental impact is now generally used to cover not only natural environmental but also social environment or social impacts as well as occupational health and safety. This scope of environmental impacts is adopted from EIA procedure.

Environmental impact means the probable effects or consequence on the natural and built environment, and people and communities of a proposed project or businesses or activities or undertaking. Impacts can be direct or indirect, cumulative, and positive or adverse or both. For purposes of this procedure, environmental impacts include occupational, social, cultural, socio-economical, public and community health, and safety issues.

5.3 POTENTIAL IMPACTS ANALYSIS OF THE PROJECTS

The analysis is the identification or assessing of potential positive and negative impacts on the environment (physical, socio-economic, biodiversity, health, etc.) based on the project activities. The project implementation phases can be divided into three stages namely construction, operation and decommission for this reason the impacts will be assessed on each of the stage. Normally, construction and decommission phases might be take a year or less than to complete the activities therefore the impact might be existed in a short-term. The production will be operated for a long-term thus, both positive as well as negative impacts will have a long time.

According to National Environmental Policy Act (1969), an environmental impact analysis is generally conducted to assess the potential impact of a proposed project on the natural and social environment. All the project phases might have the same environmental and social criteria such as air pollution, noise and vibration qualities, water contamination and; solid wastes (general and hazardous), soil degradation linked with the ecosystem, occupational health and safety as well as cultural heritage. Although the themes of pollution may be the same, the adversities and the existence of the impacts will be different rely on the period of the project phases and the activities of the operation.

Project activities and requirements consume environmental resources and produce nuisances to the surrounding environment. They are the sources, or root causes of environmental impacts, if not adequately controlled or managed, certainly cause significant changes to the environmental components.

5.4 METHODOLOGY OF IMPACT ASSESSMENT

5.4.1 METHODOLOGY OF SIGNIFICANT IMPACT ASSESSMENT

The project activities are considered as sources that are capable of changing one or more environmental or social components. The assessment of impacts from the project activities includes the identification of the potential significant environmental impacts of the project. The evaluation of significant impact assessment considers four major factors such as probability, magnitude, extent and duration of impacts on the environment with the consideration of potential positive or negative impact.

5.4.2 THE IMPORTANCE OF THE CONDITION (A1)

The existing state of an environmental or social factor that could be affected by a proposed project or action and its important lies in identifying which aspects of environmental are most vulnerable to change, allowing for a focus analysis of potential impacts and prioritizing mitigation strategies based on severity of potential damage to those conditions. The description of the A1 scale can be noted as Table 5-1.

Table 5-1 Description of A1 Scales

Criteria/Group	Category	Scale	Description
A	A1	4	International importance
		3	National importance
		2	Outside (near) of local condition
		1	Local condition
		0	Not important

5.4.3 THE MAGNITUDE OF CHANGING/ EFFECT (A2)

A measure of the scale of benefit/ dis-benefit of an impact or a condition, can be categorized as Table 5-2.

Table 5-2 Description of A2 (Scales)

Criteria/Group	Category	Scale	Description
A	A2	+3	Major importance benefit/ Major positive benefit
		+2	Meaningful benefit of the quo status/ Significant improvement
		+1	Improvement in 'status quo'/ Benefit of the status quo
		0	No change/ 'Status quo'/Lack of change/ No influence

Criteria/Group	Category	Scale	Description
		-1	Negative change of 'status quo' /
		-2	Significant negative effect/ Significant negative changes
		-3	Major negative effect/ Major disadvantages or changes

5.4.4 METHODOLOGY OF THE IMPACT PROBABILITY

5.4.4.1 PERMANENCE (B1)

Represent as the duration of the impacts affected by the project implementation as Table 5-3.

Table 5-3 Description of B1 (Scales)

Criteria/Group	Category	Scale	Description
B	B1	1	No changes/ Not applicable
		2	Temporary
		3	Permanent

5.4.4.2 REVERSIBILITY (B2)

Refers to a particular environmental impact caused by a project which can be reversed or restored to its original state after the project is completed. It can be classified as Table 5-4.

Table 5-4 Description of B2 (Scales)

Criteria/Group	Category	Scale	Description
B	B2	1	No changes/ Not applicable
		2	Reversible
		3	Irreversible

5.4.4.3 CUMULATIVE (B3)

Refers to the combined effect of multiple impacts from different projects or activities occurring over time, essentially meaning the total impact is greater than the sum of each individual impact when considered separately; it looks at how the impacts of one project add to the existing impacts from other projects in the same area, potentially leading to a more significant overall environmental or social effect, shown in Table 5-5.

Table 5-5 Description of B3 (Scales)

Criteria/Group	Category	Scale	Description
B	B3	1	No changes/ Not applicable
		2	Non-cumulative/Unique/Single
		3	Cumulative/ Synergetic

5.4.4.4 ENVIRONMENTAL SCORES (ES)

Refers to a numerical rating assigned to a project or activity based on its potential environmental impacts. ES can be determined the multiplication of significant impact and probability of the impact, can be noted as follows. The scores can be altered into the description through the numerical classification to easily understand the impacts intensity or the types of impacts (positive or negative) which is grouping in Table 5-6.

Environmental Scores (ES)

$$= \text{Significant Impact (A group)} \times \text{Probability (B group)}$$

Table 5-6 The Conversion of the Environmental Scores in Categories

Environmental Score	Class	Class (Numerical)	Description of the Category
108 to 72	+E	+5	Major positive change/impact
36 to 71	+D	+4	Significant positive change/impact
19 to 35	+C	+3	Moderately positive impact
10 to 18	+B	+2	Less positive impact
1 to 9	+A	+1	Reduced positive impact
0	N	0	No alteration/changes
-1 to -9	-A	-1	Reduced negative impact
-10 to -18	-B	-2	Less negative impact
-19 to -35	-C	-3	Moderately negatively impact
-36 to -71	-D	-4	Significantly negative impact
-72 to -108	-E	-5	Extremely negative impact

5.5 POTENTIAL ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT AND MITIGATION MEASURES DURING CONSTRUCTION PHASE

During the construction stage a considerable amount of potential environmental related issues can be found. Majority of the impacts created in construction phase will be transient in nature. The construction site mostly contributes the negative affect such as air pollution, noise and vibration intensity, water contamination, solid wastes (domestic and hazardous materials), soil degradation, along with the occupational health and safety issues. The project location is at the industrial zone thereby, the affected on the cultural heritage might be low or can be neglected. Among a wide range of negative measures, the livelihoods or benefit consequences may have on the communities. The summary of the potential impacts under the construction phase is shown in Figure 5-1. The potential environmental and social impacts is mentioned in Table 5-7.

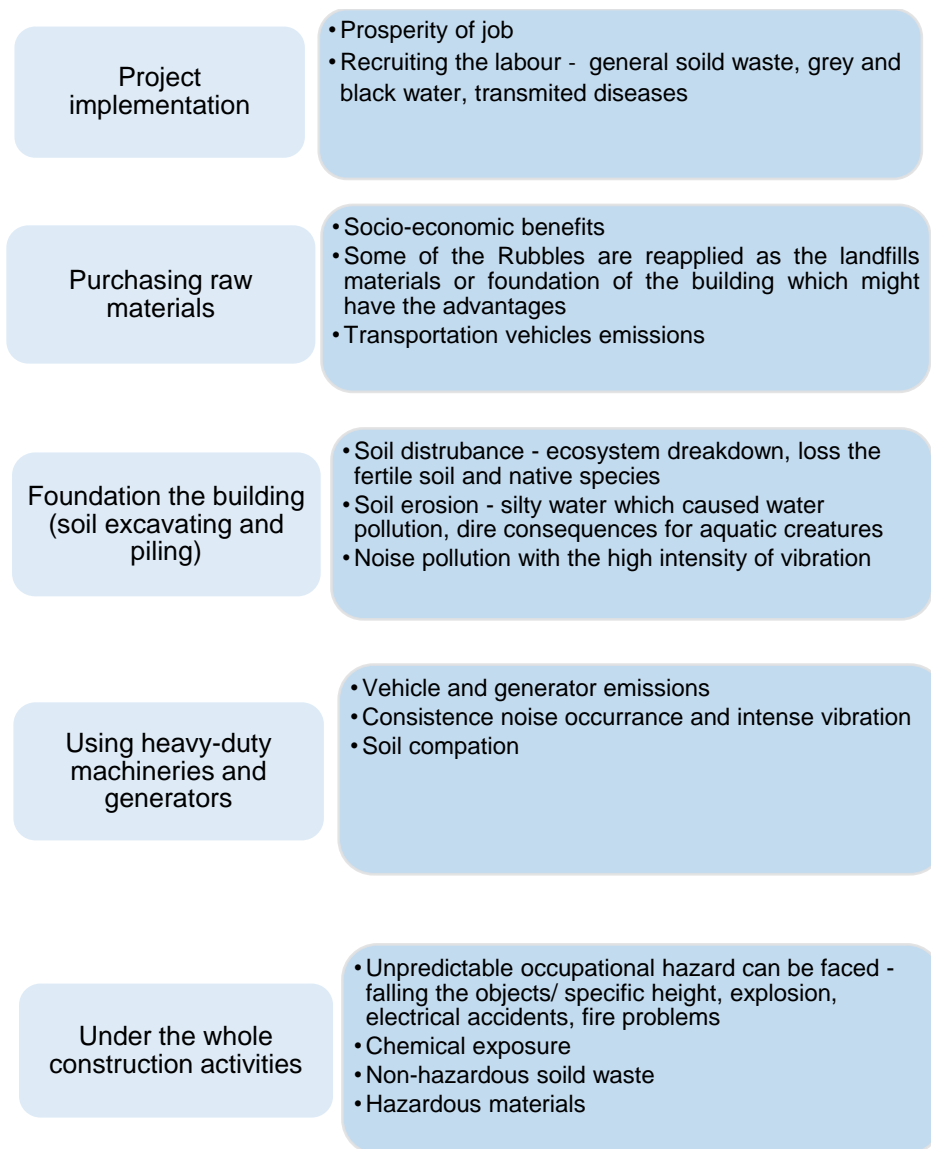


Figure 5-1 Impacts Summary of the Construction Phase

5.5.1 AIR QUALITY

Impact Assessment

In construction, several factors may cause the air pollution among them dust emission will be a great issue owing to soil excavation, loading and unloading the materials, cement, concrete mixing and piling activities. The toxic gases will be releasing from the heavy machines (excavators and backhoe, etc.), vehicles on site, and diesel generator and so on. When operating equipment, those generate CO₂, NO_x, PMs, VOCs, CO and CH₄, C₆H₆ and CH₂O. Moreover, the diesel generator for emergency use can emit air pollutants (NO_x, SO₂, CO₂, PM, HC, etc.) to the surrounding environment.

On the other hand, this construction size may be ranging from small to medium, the construction period would be short-term. For this reason, the negative impacts could be under the control and management. As a consequence, the gas and dust emission might not be a remarkable issue to the environment.

Mitigation Measures

- ✓ Materials handling system and stockpiling of materials will be minimized exposure to wind (hold systematically at the specific area).
- ✓ When conveying sand and gravel or dust generating materials in the on and off-site, vehicles should cover with tarpaulin, then check to ensure the cover are properly in place.
- ✓ Install the water spinkler or spraying should be used as required especially in dry and windy periods.
- ✓ The engine of the vehicles should be checked and maintain regularly for reducing the gases emission.
- ✓ Instead of using pure diesel generators, retrofit emission devices or diesel fuel with lower sulfur content should be utilized in order to reduce the emission of air pollutants from the diesel generators.

5.5.2 NOISE AND VIBRATION

Impact Assessment

Using heavy machinery such as concrete mixer generates approximately 85 dB that noise level should be not exceeded 1-hour period by WHO. The operator may experience the consistence loud noise which has the high chance to face hearing impairment, besides noise threads are cumulative. Generator noise levels can range from 60 dB to over 100 dB, depending on the model and size of the generator. In case of using generators, the constant exposure is more likely to suffer hearing loss problems.

The lack of regular maintenance the heavy machinery can be the source of vibration at the site. Vibrating machinery can create noise, cause safety problems and lead to degradation in plant working conditions. Rock blasting, deep pile foundation and soil compacting equipment are other drivers of the vibration. A high level of prolonged exposure to vibrations triggers short-term health problems (e.g. migraine, difficulty concentrating, dizziness and pain). The workers who runs such machine are more likely to experience nerves, muscles, the dislocation of joints of backbone/ hand/ wrist/ arm causing hand-arm vibration syndrome (HAVS).

Despite the fact that it was occupational health problems and environmental impacts, the construction and decommission phases will be last a short time. Moreover, the activites have been set the exact timeline. It can be considered as the negative impact would not have much effected to the environment or local communities because of the Project location, industrial zone.

Mitigation Measures

- ✓ Placing the generator in a well-insulated room or enclosed area can help to reduce noise levels, as can storing the generator on a soundproofing mat or pad.
- ✓ Low-noise level generator should be selected in order to reduce impact from the diesel engine generators.
- ✓ Proper maintenance of the generator can also help to reduce noise levels.
- ✓ Regularly checking and replacing worn or damaged parts, exhaust pipes, can help to reduce the amount of noise and vibration generated by the heavy machines.
- ✓ Civil work generating high noise levels should be carried out only at daytime.

- ✓ Civil work that is necessary to be carried out at nighttime need to have proper noise control equipment or facilities.
- ✓ Workers in excessive noise areas are needed to be provided with adequate earplugs or ear muffs.
- ✓ Consider/substitute alternative methods of construction to reduce noise, such as using drill piling instead of percussion piling.
- ✓ Rest and rotate workers – limit the task to the workers, exposed to vibration for long, continuous periods.

5.5.3 WATER QUALITY

Impact Assessment

Removing topsoil and vegetation renders silt immediately vulnerable to surface water runoff in the construction state. If soil particles remain suspended in the surface water and are carried off site, they can have significant impacts on the quality of local watercourses. In the same way, silt can destroy the harmony of ecosystem of the aquatic plants and animals by silt accumulated in the fish gill and fill up with gravel beds, it means cannot be used by fish spawning.

Some suspended solid, concrete and silt may runoff with water course which ends in poor surface water quality can be seen both in construction and decommission phases. For the operational requirement, fuel need to retain on-site. Oil, fuel and chemical spill from the storage tank, vehicles and heavy machinery is another factor of water pollution. Diesel spillages spread very rapidly, killing fish as well as plant life and invertebrates in streams and rivers, triggered with the groundwater pollution. When locals consume polluted water may suffer minor to major causes namely diarrhea, cholera, dysentery, and adverse health problems.

Polluted storm water runoff from the construction site and improper discharge of domestic wastewater from the worker camp can deteriorate the surrounding water bodies such as surface water and groundwater. The amount of water usage and wastewater generation mainly depend on the number of construction workers during day shift. The domestic wastewater generated from the construction site will be from toilet and washing activities of the workers. However, the impact on water quality will be low since the domestic wastewater from the worker camp will be properly treated or discharged with the help of underground septic tank, good housekeeping and proper equipment usage will be practiced to prevent leakage of chemical and oil in storm water runoff.

Mitigation Measures

- ✓ Control of sediment and use of cement while making concrete.
- ✓ Having separate drainage channel for on-site waste water.
- ✓ Waste water should be kept in the sedimentation pond before discharging off-site. The characteristic of the pond must be involve with the slowing down the speed of water flow so that it has the sufficient time for deposition.
- ✓ Management of Vehicles and Plant, including refuelling and wheel wash facilities (if necessary).
- ✓ Construction compound management including the storage of fuels and materials are in designated impermeable areas that are isolated from the surrounding area.
- ✓ Sufficient number of toilets and bathing facilities for construction workers must be provided.

- ✓ Sewage and grey water should be collected into septic tanks and treated properly.
- ✓ Systemic solid waste dump site then dispose them with city municipal weekly.
- ✓ Monitoring along with the specific mitigation measures which the appointed contractor will implement in relation to surface water quality.

5.5.4 GENERAL SOLID WASTE

Impact Assessment

A huge amount of wastes such as masonry, sand, stone, slab, aluminium frame, iron/ wood/ steel from the scaffolding activities are common waste of the construction site. Plastic waste from the PVC, water plumbing, plastic sheet, and potable wall covering, plastic sheet as well. Glass materials include waste from glass windows or door panels, glass from sky lighting or glass shelves. Most of these materials when untreated or uncontaminated are non-hazardous but sometimes they may contain hazardous substances. Although they are less likely to have impact on the environment, they can block the water drainage channels, and minor accidents in the working areas. It can be noticed that the wastes may introduce the flash flood within the construction phase.

Sometimes pieces of bricks, and tiles wastes can also produce resulting from the changing the designs and mistakes in workmanship. Dining area and temporary accommodation sites are notably occurred the leftovers, food scrapes, plastics, food containers, tissues and sanitation items from the toilets. A long-time storage of those wastes may be smelling to environment, may encourage the breeding the insects, fly and mouse which exacerbate the negative impacts on the surrounding areas and public health issues.

Mitigation Measure

- ✓ If some kind of wastes (sand, bricks) can be used as landfill from the end-product of construction and decommission phases.
- ✓ Other wastes such as plastic, containers, aluminum and steel can be resold or reused.
- ✓ The fundamental and the easiest method for domestic waste management method is place the enough amount of colour bins around the dining are and temporary workers' housing area.
- ✓ Educate the workers how to separate the trash and disposal system.

5.5.5 HAZARDOUS MATERIALS

Impact Assessment

Cement waste under the construction state is one of the hazardous wastes. Paint cans, paint removers, thinner, vanish removers, adhesive containers contribute the extremely risky to the public health via the environment. Electrical appliances, fluorescent tubes, electric cables and wires are discharging the heavy metal to the environment. Paint remover or paint stripping, as an instance, in which the chemicals can irritate the skin and eyes, or cause headaches. Breathing high level of these chemicals can suffer drowsiness, nausea, dizziness, or loss of coordination. Some may cause cancer, reproductive problems, or damage the liver, kidney, or brain. Others are able to evaporate with the higher chance to catch fire easily then have very flammable property. Once it encroaches the environment, it destructures the entire ecosystem functioning.

However, the construction project team will manage solid wastes properly during construction stage in accordance with the approval of city municipal. Therefore, the potential negative

impacts will be low since the solid wastes are treated by refuse compaction system during construction stage.

Mitigation Measures

- ✓ When disposing the cement, the contractor should discard accordance with the city municipal guidelines and regulations.
- ✓ Hazardous waste disposal in or off the construction site should be prohibited.
- ✓ Segregation will protect workers and members of the public from accidents.
- ✓ Hazardous waste management systems include waste classification, separation, collection, storage, transfer and disposal in compliance with applicable regulations of the government, if any.
- ✓ Hazardous wastes should be disposed of at a designated site inside or outside the project area where appropriate.
- ✓ The method of disposal needs to follow the best international practices.
- ✓ Solid waste from the removal of top soil and old structures and faulty construction activities will be disposed at a suitable landfill site in accordance with the approval of city municipal.
- ✓ Establish and operate an efficient waste management system.
- ✓ Classified and sorted out construction wastes at sources for disposal. The disposal methods will depend on the types of wastes: direct reuse in the construction, sell as recycle materials, landfill for inert materials and specific treatment method for each type of hazardous materials.

5.5.6 SOIL DEGRADATION

Impact Assessment

Firstly, topsoil is disrupted because of the excavating with tractors and back holes therefore, the fertile surface layer is removed during the construction. While implementing the project, the seepage or leakage the fuel, oil and other chemicals onto the soil. Discharge the leachates from the temporary damp site. That actions create reduction the soil quality, compact the soil, lack of the microorganism, plasticity the soil, all of them lead to the low nutrient and infertile soil. In addition, the temporary solid waste disposal site can cause leakage of leachate to the surrounding soil at the project site.

Mitigation Measures

- ✓ Doing the earth work at topsoil in the meanwhile excavate the soil layer by layer, store as the sequence systematically.
- ✓ After completing the construction works, restore and replace the soil in accordance with its sequence.
- ✓ Check and monitor the fuel and toxic chemical storeroom regularly without having any spilling onto the soil in the construction and decommission phases.
- ✓ Inspect the temporary sewage tank and pipe lines so as not to flow onto the soil occasionally.
- ✓ Maintain the construction vehicles or machineries regularly in order to prevent leakage of fuel and oil to the soil.
- ✓ Construct the temporary solid waste disposal site properly in order to prevent leakage of leachate to the surrounding soil.
- ✓ Contact the city municipal to dispose solid wastes whenever it is necessary.

5.5.7 OCCUPATIONAL HEALTH AND SAFETY

Impact Assessment

Construction stage the worker can face limitless dangers and risky conditions. The painters at the construction phase may get a great risk to contact with the heavy metals (lead, arsenic and chromium, etc.). Long-term exposure may have a problem at the respiratory system, skin diseases and carcinogens. The worker who work at the specific height can slip and fall because of the problems in strength and poor resistance of materials, sometimes do the duty with absentminded. The zones where accumulative with the dust and smoke, the worker can get the lung related diseases.

The general hazards such as electric shock, noise, vibration, work under the high temperature, materials and manual handling may introduce the common occupational health issues - musculoskeletal disorders, respiratory diseases, noise-induced hearing loss, and dermatitis. Infectious diseases (Hepatitis A/B/C, influenza, HIV/AIDS) may be found at the temporary accommodation area.

However, the impact on occupational health and safety of the project will be low since the project will manage properly associated with the occupational health and safety of workers. The potential activities to cause infectious disease are also not expected since construction workers will be hired mostly from the local community.

Mitigation Measures

- ✓ A well-organized the site will produce less tragic conditions and safety plan of the contractor will be advantage.
- ✓ Provision of safety gadgets to the workers and make sure equipped the PPE during the task.
- ✓ Raising awareness of safety guidelines to the workers.
- ✓ Allocate the duties who serves under the unsafe and high temperature circumstances.
- ✓ Should have a safety officer/manager to control the hazard along with the emergency response preparedness in addition, team members should follow rules and regulations.
- ✓ Incentives to workers who obey the safety practices.
- ✓ Penalty to workers who disobey the safety practices.

However, the impact on occupational health and safety of the project will be low since the project will manage properly associated with the occupational health and safety of workers. The potential activities to cause infectious disease are also not expected since construction workers will be hired mostly from the local community.

5.5.8 CULTURAL HERITAGE

Impact Assessment

The project is located at Mawlamyine Industrial Zone therefore, the activities that can cause potential negative impacts on cultural heritage especially visual aspect and vibration impacts on nearby existing building are not expected during construction stage.

Mitigation Measures

Since no potential negative impact on cultural heritage are expected, no mitigation measures is proposed.

5.5.9 ECOSYSTEM

Impact Assessment

There may be no significant impacts on surrounding ecosystem since the project is located in Mawlamyine Industrial Zone and there are no protected areas, reserved forests and wetlands, threatened species and national parks near the project area. Although civil works from the construction activity of the project may generate impacts on fauna and flora, the scale of impact is expected to be negligible.

The clearing of the site in preparation for the construction phase represents a permanent and irreversible commitment of land resources and eliminating biodiversity. The land use of the project may lose the vegetative coverage of weeds and small herbs in the construction area. The major threats of the project may be the habitats of insect including butterflies, dragonflies and damselflies because of the clearance of weeds and small vegetation such as shrubs and herbs.

The use of heavy construction equipment during transportation of the building materials and site clearance will make noise and dust. Noise and dust emission made by heavy vehicles and machinery are inevitable during the site clearance and construction phases.

Mitigation Measures

- ✓ Cutting tree and clearance of vegetation will be at a minimum and replantation is mandatory.
- ✓ Store oil, grease and hazardous waste properly to prevent the leakage on the ground or water bodies.

5.6 LOCAL ECONOMY SUCH AS EMPLOYMENT AND MEANS OF LIVELIHOOD

There will be positive impacts on local economy due to job opportunities. Moreover, the necessary materials and equipment may be purchased from local shops during construction phase of the project. Therefore, potential positive impacts on their job opportunities and livelihood are expected.

5.7 PROBABILITIES OF RESIDUAL IMPACT AFTER MITIGATION MEASURES

Firstly, it is reminded that the impact prediction and evaluation was focused on the actual environmental impacts before conducting any management and mitigation measures, in Table 5-7. Following managements (in Chapter 6) and mitigation actions in this Chapter, the negative impacts could be improved the alleviation. Perhaps, the residual impacts can be existed but, the significant impacts become low level and or ignored.

Table 5-7 Evaluation and Prediction of Significant Impacts for Construction Phase

No.	Potential Impacts on the Media	Activities and Source	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
	Air	Earth works	Dust and PMs	-4	8	-32	-3	Moderately negative impact
		Heavy duty machines	CO2, NOx, PMs, VOCs, CO and CH4, C6H6 and CH2O					
		Diesel generator	NOx, SO2, CO2, PM, HC, etc.					
	Noise Vibration	Heavy duty machines	High intensity of noise and vibration	-4	7	-28	-3	Moderately negative impact
		Diesel generator						
		Rock blasting and piling						
	Water	Silty runoff	Silt and sand	-4	8	-32	-3	Moderately negative impact
		Chemical spilling and leakage	A compound of hazardous substances					
		Sewer from temporary camp						
	General Waste	Construction wastes	Masonry, sand, stone, slab, aliminium frame, iron/ wood/ steel, PVC	-1	6	-6	-1	Reduced negative impact
		Domestic waste	Kitchen waste, food waste, plastic and so on					

No.	Potential Impacts on the Media	Activities and Source	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
	Hazardous Material	Construction wastes	Cement waste, paints, thinner, vanish removers, etc	-4	7	-28	-3	Moderately negative impact
	Soil	Soil disturbance	Loss of topsoil, lack of the microorganism and soil nutrients	-4	8	-28	-3	Moderately negative impact
	Occupational Health and Safety	Every stage of construction work	Minor to major injuries	-3	7	-21	-3	Moderately negative impact
	Ecosystem	Construction work	Loss of ecosystem	-4	8	-28	-3	Moderately negative impact
	Socio-economic	Construction work	Job opportunities (temporarily)	2	7	17	+2	Less positive impact

5.8 POTENTIAL ENVIRONMENTAL, SOCIAL AND HEALTH IMPACTS AND MITIGATION MEASURES DURING OPERATION PHASE

The antimony ingot manufacturing will be performed as a long-time business thus the impacts both positive and negative measures can be detected as long as the factory is existed. The adverse consequences on the environment can be noted as air pollution, noise, vibration. For this reason, the harmful effects of the operation can be reduced with the further mitigation measures. On the other hand, there are some benefits on the socio-economic and government. Only negative but also positive impacts is summarized as illustrated in Figure 5-2 and impact assessment in Table 5-8.

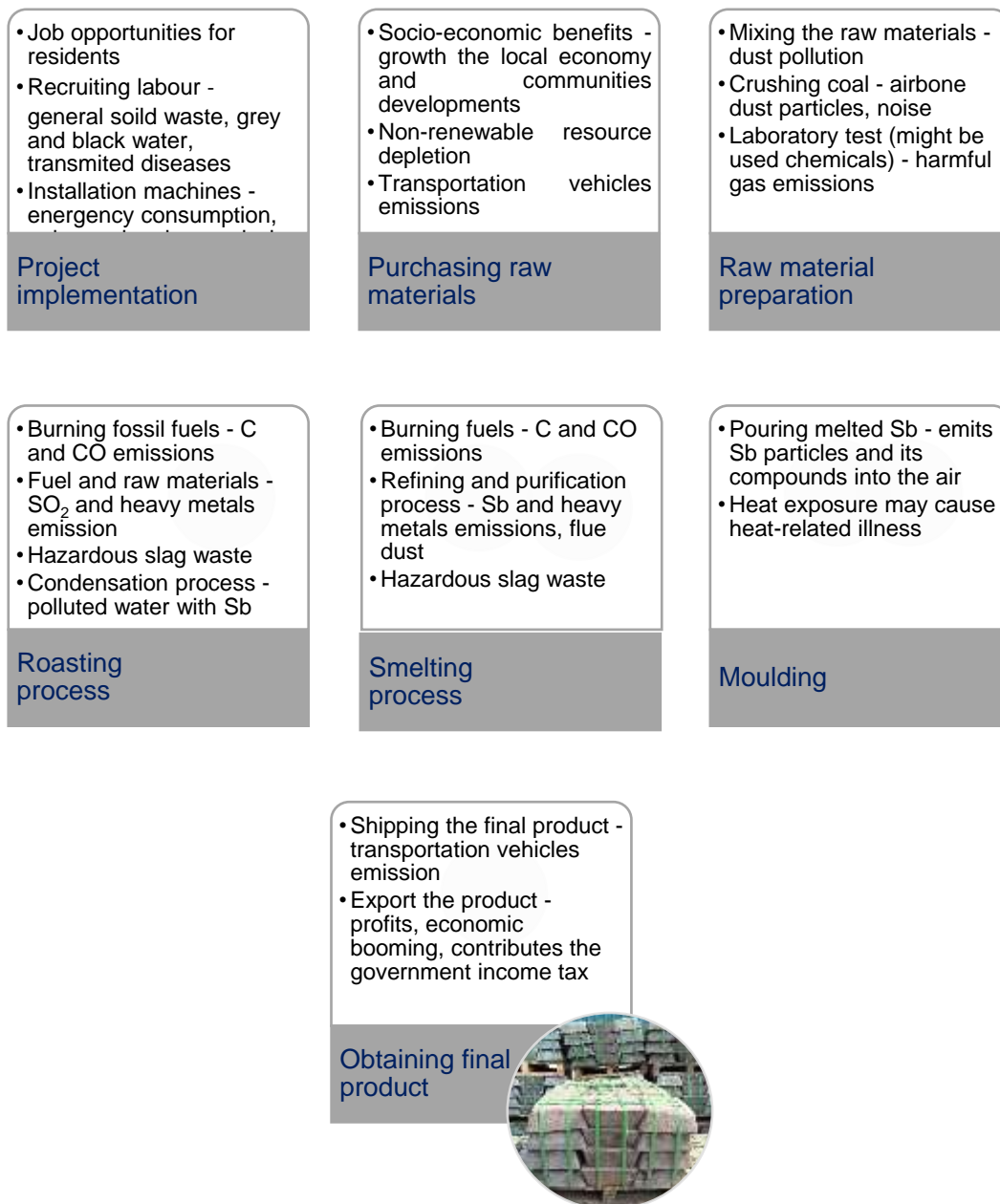


Figure 5-2 Impacts Summary of the Operation Process

5.8.1 AIR QUALITY

Impact Assessment

Toxic fume gases are one of the majors concerned from the initial stage until the final product. The transportation diesel vehicles along with generator may bring the CO₂, particulate matters (PM₁₀, PM_{2.5}), CO₂, SO_x, NO_x, CO and GHG into the atmosphere. The stage to get the right blending ratios of materials (raw materials preparation) may introduce the dust and airborne particles to the environment. When crushing the coal to suit the furnace, the process also releases the fine particles (for eg., PM₁₀ and PM_{2.5}). Once PM₁₀ and PM_{2.5} is in the surrounding, they have an ability to deposit into the lung leading the chronic respiratory problems even could be carcinogenic affect on the lung. Similarly, they can accumulate on leaves which may hinder the photosynthesis activities, and absorption the CO₂. Switching the nutrients balance of the soil can leave failure the ecosystem, infertile soil, insufficient nutrient uptake becomes shriveling leaves then the plant can die as a result.

The main operation processes namely roasting and smelting in which roasting process noticeably release SO₂ as a consequence of oxidation between reducing agents (coal and coke) and raw materials. In this section, SO₂ is the main pollutant and combining with heavy metals (As, Pb, and Ca) are projected to be noxious effect on both human and environment. Additionally, SO₂ is a substantial gas for acid rain occurrence which threaten by habitat loss. Among the various harmful substances, Sb, As and PM_{2.5} emission are key issues of the smelting. The toxic metal fumes may pose the range of diseases likes pneumoconiosis, cardiovascular, gastrointestinal, cancer, neurological damages as well as skin problems.

The combination of fluxing agents (soda ash light and mono ammonium phosphate) and antimony contained raw materials, the reaction produces antimony trioxide (Sb₂O₃). Sb₂O₃ released into the air can contribute to air pollution, potentially impacting human health (carcinogens) and ecosystem. In the final stage, the liquid solution of Sb is poured to be casting into the desire mould. The step can drive the high concentration Sb dust and its compound can travel a long distance which alter the ecology, food chain and experienced the plant toxicity.

Moreover, according to the air quality measurement, the SO₂ and PM at Near Roasting Furnace & Generator, Near Smelting Process and New Extension Area were higher than the guidelines due to the operation processes. These all activities were created throughout the life of the factory. Conversely, it has been systematic controlling methods (Described in Chapter 6) through the wet scrubber, bag houses and a bag filter since the operation process was started. However, it still requires to conduct a mitigation actions with the aim of eliminating or at least mitigating the disastrous effects on the environment.

Mitigation Measures

- ✓ It needs to be crushed the coal within the enclosed or partially confined place which is the environmentally friendly way to mitigate the hazardous dust generation.
- ✓ Take an advantage of modern technology for instance dust suppression additives including foam dust control might be another solution for minimizing the dusty area.
- ✓ Careful operation and regular maintenance of furnaces, condensing pipes, blowers, bag filters and wet scrubber with record and recommendation provided in SOP of wet scrubber.
- ✓ Vehicles exhaust must be ensured in a well-maintained condition with the sufficient engine operation and detailed inspect exhaust pipe altogether.

- ✓ Regularly changing oil or replace filters to retain the fuel clean for improve emissions.
- ✓ Occasionally, check the air filter route so as not to block or clog along the way of air can travel.
- ✓ Must be balance the used of load and the generator capacity for preventing soot buildup and keep the engine temperature.
- ✓ Low Sulphur content diesel fuel should be used for the operation of generators, and vehicles in order to reduce gaseous emission.

5.8.2 NOISE AND VIBRATION

Impact Assessment

Noise and vibration impacts are inextricable link through the single activity. The area where noise is acceptable, vibration can be ignored. As a result of noise measurements at work site within the factory, the values are agreed with the NEQEG (2015) except the power generation area (generator). Not only noise but also vibration can travel a long distance. Continuous noise together with the vibration occurrence may negatively effect on human and environmental. Health issues related to these exposures include annoyance, sleep disturbance, cardiovascular and metabolic issues, nerves, blood vessels, muscles and joints of the hand, arm, wrist and arm causing Hnad-Arm Vibration Sydrome (HAVS). It can also affect children's ability to learn. Noise and vibration pollution also affect wildlife, caused by various physical and behavioural disorders in animals and increase their stress. Decrease growth rate and development is one of the responses of the plants on the noise as well as vibration impacts.

Mitigation Measures

- ✓ In spite of the result is acceptable, withstand and well-equipped the devices that should be checked and maintained regularly.
- ✓ The soundproof generators or low noise generators should be used for emergency use.
- ✓ The engine room must be covered with the sound proof materials for eg., sheets of pressed wood.
- ✓ Flooring the plywood and medium density fiberboard can be applied for vibration barriers where the generators are existed.
- ✓ Another reason for excess noise experience might be low efficieny of engine exhaust therefore cleaned and removed the dirt frequently.

5.8.3 WATER QUALITY

Impact Assessment

High-temperature application processes such as roasting and smelting in which water plays the key role to cool down the temperature along the gas stream. These processing waters is storing the at the cooling tanks. Then, the water is reused as the cooling at the same functions in roasting and smelting. Cooling processing water might be a concentration of hazardous chemical compounds which contain antimony and its related heavy metals. Despite the water is utilized again, the project has a well-planned to recover antimony already. This action could be regarded as safer than the directly used without capturing antimony in the processing water. According to the laboratory test result, the component of toxic materials are under the NEQEG Standard. Nevertheless, the content of chromium hexavalent Cr(VI) is moderately higher than the guideline. Perhaps, surface water (Attran River) might be a source of Cr(VI) contributions

in water based on the laboratory analysis of river water. The metal contamination in water can extend the massive health issues like cancer, respiratory problems and skin irritation.

Cr(VI) greatly influences the soil fertility, enzyme activity, halts the plant metabolism and growth of plants. It has the bioaccumulation property thus it deposits on the tissues and organs which will be rooted of severe health effects, rise the lethal effect on fish. Bag filter cleaning water is initially stayed at the settling tank then seizes the Sb particles from water once in three months. The water from the deposition tank can be noted as Sb metal or its related compound will be disappeared. Afterwards, the water as well as some of the overflow from cooling tank will be discharged to the municipal drainage channel.

Domestic wastewater (all purposed water) is more likely to include high BOD and COD levels, which might be stimulus to be eutrophication can be regarded as full of nutrients, nitrogen, phosphate and organic materials involve in the wastewater as a consequence depletion of oxygen, increase the harm to the survival of the aquatic communities.

Although wastewater from the cooling process is reused, small amount of Cr(VI) should be eliminated to prevent the metal intruded the environment by overflowing or worker can interact. Thus, following mitigation measures are taken into account.

Mitigation Measures

- ✓ While standing wastewater at the cooling tank, biochar has to be put into the tank.
- ✓ Biochar is easily reliable with reasonable prices and effectively addresses the heavy metal polluted water.
- ✓ Before adding biochar into the wastewater, pH level of the wastewater should be acidic condition (2 to 4). This pH level will encourage to be doubled the efficiency of biochar.
- ✓ Rely on the concentration of the Cr(VI) in the water, the amount of biochar has to be adjusted. In this case, the metal is only 0.11 mg/L higher than the standard guideline thereby biochar can be added in an equitable amount.
- ✓ The type of biochar and the concentration of metal will influence the processing time. The treatment process may take 1hr to 3hr, it can be considered as the water is thoroughly treated after that.
- ✓ It had better implement a new cooling tank with the aim of practically tackling the high-temperature and wastewater treatment system.
- ✓ The treated water can directly apply at the desired process without having any retention time.
- ✓ Must be monitored the wastewater level from cooling tank not to be spilled or overflowed into the environment or public drainage channels.
- ✓ Conducting sludge removal and cleaning the tanks, the possibilities of all discharge sources have to be stopped temporarily.
- ✓ Wastewater from the workers might be contained cleaning agent, surfactants. Prior to release the domestic wastewater, it must be treated by using hydrophilic silica nanoparticles or chitosan.
- ✓ Chitosan powder (rich the source of fibers made from the scales aquatic animals) can be directly mixed with the wastewater existing tank, then stir the solution about 5 minutes. Leave them 48hrs, the water can be safely discharged to the municipal drain channels.

- ✓ Insept the septic tanks and sewer pipeline so as not have any damages and leakages.

5.8.4 ODOR

Impact Assessment

The main two processing stages (roasting and smelting) might be a source of odor throughout the manufacturing activities. SO₂ is the fundamental gas emissions from the oxidation result. Naturally, Sb gas is odorless, SO₂ gas has strong smell that is resembles the smell of burning matches. It introduces the ranges of health problems started with disorder the lung function through the respiratory system. It irritates the skin and mucous membranes of the eyes, nose, throat, and lungs. High concentrations of SO₂ can create the damaging foliage, stopped the growth rate, injured the plant tissues, alter the colour of the leaves or discolouration, yellow spot.

Generator exhaust might be another issue of the odor generation. It designs a large amount of combustion exhaust gas, such as CO₂, CO, water vapor, NO_x, etc. When it is completely burned in the combustion chamber, it will only produce CO₂ and water vapor, plus excess oxygen and residual nitrogen. There are incomplete combustion in diesel engine exhaust, mainly including CO, HC, SO₂, NO_x and PM, etc. But most of them are harmful, or have a strong pungent odor, and some also have carcinogenic and mutagenic (mutation) effects, so they are classified as harmful emissions.

A long time storing the domestic waste might be a host of odorous area, including H₂S (hydrogen sulfide), DMS (dimethyl sulfide) and sulfur-containing organic compound (mercaptants) which create a strong “rotten egg” smell. Some compounds released from waste, likes dioxin and furans, are known as carcinogens. The decomposition of waste not only produce harmful gases but also release the leachate into the soil and water. The pollutant can affect the plant growth and development, extinct the plant species due to the ecosystem breakdown, biodiversity loss, even it may contain heavy metals.

The evidence of the odor analysis result showed that the values are acceptable with the NEQEG (2015). This is not because the roasting and smelting stages are lack of smell production but because the project has installed the apparatus (bag houses and filter) for odor reduction. In spite of a good provision for odor, it is necessary to perform some measures as follows.

Mitigation Measures

- ✓ Consistenly check maintenance must be done the area of the blowers, ducts, condensing tube plus pipeline segments with the bag house, wet scrubber and smoke stack, make sure to keep the normal conditions.
- ✓ Occasionally inspect the whole air controlling systems.
- ✓ Follows the SOP of the wet scrubber operation to cover the entire procedure and maintenance for efficient operation.
- ✓ Planting the trees, shrubs and other vegetative plants around the project is further solution to neutralize the scent.
- ✓ Strict regulations linked with the systematic disposal methods – segaration, and 4Rs especially staff housing and the areas where the domestic waste can be found.
- ✓ The waste must be disposed with the city municipal at least once a week or depends on the amount of waste generation.

5.8.5 GENERAL SOLID WASTE

Impact Assessment

General wastes such as kitchen wastes, food scrapes, paper, plastic bag and plastic bottles, glass, aluminum cans and tin cans, food wastes, rubber, etc. will be generated. Improper disposal of the solid wastes can cause negative impact on the environment. This concerned lead to substantial environmental impacts and adversely impacted on the public health owing to infected disease transmission zone.

Mitigation Measures

- ✓ Strictly banning the waste combustion regardless the area.
- ✓ Follow the regulations linked with the systematic disposal methods – separation, and 4Rs especially staff housing and the areas.
- ✓ The wastes (kitchen wastes and food scrape) must not stored for a long time.
- ✓ Solid waste will be collected separately with different types of waste bins and the collected waste will be kept before collecting by city municipal.
- ✓ Monitor the amount and type of waste regularly to maintain the capacity of temporary wastes storage area.
- ✓ Some waste such as aluminum and tin can, plastic bottles, etc. will be recycled or reused for the same purpose or in different ways to reduce the amount of waste.

5.8.6 HAZARDOUS MATERIAL

Impact Assessment

Almost all the production activities may generate the hazardous materials ranging from roasting to the air management system (scrubber). Firstly, slag can be occurred in the roasting and smelting processes. It may involve a high a level of Sb and As which can leach from the slag, exceed landfilling limits. High consists of Sb itself and its compounds can be a potential of carcinogenic and genotoxic effects. Heavy metal contamination attracts the other harmful metal accumulations. Secondly, scrubbing process may cause the sludge which is a agregation of Sb and its compounds are classified as hazardous. They may diaganoize the carcinogenic effect on the public health. Sb and heavy metal are considered a toxic element for plants, even at low to moderate concentrations, causing growth retardation, reduced biomass, and hindered the photosynthesis.

Small amount of hazardous wastes from workplace and housings such as dry cells, batteries, fuel container, fluorescent lamp, chemicals residue and its container will be generated. For the operation wastes, all the slag and sludge are recovered and captured if they posses more than 0.01% Sb in the wastes. If not, they will be disposed at the Nat San Mine or resell to the other business (cement, abrasive and construction related materials manufacturing, etc).

Mitigation Measures

- ✓ As mentioned before, the content of Sb in the slag is enough to reuse the production process, if not they have to store at the temporary waste disposal site.
- ✓ Flooring with the concrete layer of High-Density Polyethylene (HDPE) or fiberglass flooring at the temporary waste site in order to control the seepage of heavy metals.

- ✓ Fiberglass flooring is one of the effective for providing the resistance to corrosive materials and it also helps to directly spills into the sum, if the toxic materials are leached.
- ✓ Obey the regulations the method of hazardous metal handling while conveying temporary waste storage site to final discharge point (Nat San Mine and resell).
- ✓ For those common wastes as batteries, chemical containers, etc., must be disposed with the city municipal, once a month or depends on the amount of wastes.

5.8.7 SOIL QUALITY

Impact Assessment

The fuel leakage or spill is a common scenario for the industrial operations. The transportation vehicles used for loading and unloading of materials including generator can cause leakage of fuel and oil and other various wastes on the ground, which lead to soil contamination. Crushing coal is one of the segments of the operation process. Once the coal dust is sedimented onto the soil, it has a huge negative impact on the soil health, water holding capacity, permanent wilting point, and moisture evaporation rate. The toxic metals can accumulate in soils and interfere with the morphological structure and physiological processes of plants, photosynthesis and nutrient absorption. Overflown wastewater and sludge residues are another criteria of hazardous substances intruded into the soil.

The wastewater is more likely to contain antimony (Sb) and its compound which are onto the soil, can reduce the plant growth, photosynthesis and nutrient uptake, leading to oxidative stress and other physiological issues. The aggregation of the Sb element on the soil may threaten the public health through the food chain. The people can be experienced to nausea, diarrhea, skin rashes and respiratory malfunction.

Mitigation Measures

- ✓ It must be forbidden the slag is utilized at the landfill processes.
- ✓ A fuel leak can be an easy fix if it involves minor issues like a worn hose or a faulty petrol cap. However, more severe leaks, such as those requiring tank replacement or extensive repairs.
- ✓ Transportation vehicles should be examined or maintained regularly.
- ✓ Oil leaks at the generator can prevent adding a layer of double-sided lubricated thin plastic gaskets on both ends of the leak-proof gaskets and tighten them firmly.
- ✓ Install the wastewater treatment systems (mentioned in Section 5.6.3) with respect to eliminate the wastewater overflow.
- ✓ Conduct good sanitation facilities including proper sewage disposal system.
- ✓ Install solid waste management system properly in order to prevent improper waste disposal. Therefore, the potential negative impact on soil contamination will be low.
- ✓ Provide cover and linear foundation at the temporary solid wastes and sludge storage areas.

5.9 OCCUPATIONAL HEALTH AND SAFETY

Impact Assessment

Physical hazards such as electrical hazards from the use of electrical equipment, fall on slippery floors, improper product loading and unloading of material may occur in the proposed project.

activities. However, the potential negative impact on occupational health and safety can be moderate with the help of proper management plan.

Temperature

The worker who employs at the high temperature area in a long hour, he can encounter the occupational illness and injuries. Heat stress is another common risk in the high temperature workplace, as a result heat stroke, heat exhaustion, heat cramps or heat rushes. Constant high temperature also increases the risk of injuries in workers as in sweaty palms, fogged-up safety glasses and dizziness.

Physical injuries

The workers whose task will be moulding, they are more likely to suffer muscle pain, numbness, or tingling neck, shoulder, back and hand because of holding the hot solution of metals with the specific weight throughout the casting process. Coal crushing and generator operation can be noise producing sources which can get the hearing-loss problem. The staff who has experienced uncomfortable working position can face musculoskeletal disorder in their joint and tissues in the upper/lower limbs or back. Loading and unloading materials stage, the workers can slip when carry heavy weight packaging. Repetitive tasks for a long time increase the microscopic tissue damage, stress, ergonomic hazard lead to the musculoskeletal problem in related body parts.

Electrical and Fire Accidents

Unsystematic handling and storage the fuel may be primary source of the fire hazard. The factory has been existence over a decade therefore, the electrical items (cables, cord and flex, etc.) may be damaged or broken effortlessly. Fire hazard via electrical shocks are the major cause of old wiring at the industry.

Mitigation Measures

Temperature

- ✓ The workers who employ under the relatively high temperature, those should be provided with the electrolyte water to save from the heat stress.
- ✓ Provide adequate purified drinking water near the area where they work and should wear the light-weighted clothing
- ✓ Rotate the work schedule appropriately especially the worker at the boiler room.
- ✓ Heat generated area should be monitored every day.

Physical Injuries

- ✓ Make sure doing the physical exercises at the workplace for those who work at the repetitive tasks.
- ✓ Having the fix time to do exercises.
- ✓ Using the warning signs relevant to the dangerous area (fall/slip or electrocuted risky conditions).
- ✓ Improve the environment – more space, better flooring, extra lighting or changing the air temperature can make manual handling easier and safer.
- ✓ Understanding the workers about the meaning of safety signs.

Electrical and Fire Hazard

- ✓ Replace old wiring and cable with new ones.
- ✓ Hanging the firefighting equipment and fire horse around the indoor area and factory compound especially near the fuel storage tank.
- ✓ Stick the evacuation map on every corner of the workplace.
- ✓ Arrange the fire fighting/safety training and all the staffs need to participate to learn how to use the equipment and response the emergency situation.
- ✓ Hire the certified fire safety manager for overall safety of the fire hazard.
- Personal Protective Equipment (PPE) must be provided to the workers during working hours and enforced to wear them.

5.10 LOCAL ECONOMY SUCH AS EMPLOYMENT AND MEANS OF LIVELIHOOD

The socio-economic impacts are considered as positive because more jobs opportunities are created during operation phases of the project. The employees both skilled and unskilled for the metal smelting and refinery will be mostly recruited from the local community. The project proponent will implement the following practices during operation phase:

- ✓ Promote the fair treatment, non-discrimination and equal opportunity for workers;
- ✓ The project proponent plans to increase the production capacity and nearby communities will get benefit by being the source of work force for the project;
- ✓ Ensure total compliance with national labor and employment laws;
- ✓ To avoid exploitation of child labor by contractor, sub-contractor and supply chain;
- ✓ Promote safe and healthy working conditions;
- ✓ Project proponent should try to mitigate or minimize negative impacts while enhancing and maximizing the positive impacts to their optimum.

5.11 PROBABILITIES OF RESIDUAL IMPACT AFTER MITIGATION MEASURES

Firstly, it is reminded that the impact prediction and evaluation was focused on the actual environmental impacts before conducting any management and mitigation measures, in Table 5-7. The project has been set up as an instance, scrubber, bag houses and filter to control air emission (detailed in Chapter 6) and mitigation actions in this Chapter, the environmental drawbacks of manufacturing processes could be effectively minimized. Perhaps, the residual impacts can be existed but, the significant impacts become subordinate and or ignored.

Table 5-8 Evaluation and Prediction of Significant Impacts for Operation Phase

No.	Potential Impacts on the Media	Activities and Source	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
	Air	Crushing coal	Airborne dust and PMs	-6	8	-48	-4	Significantly negative impact
		Roasting	SO ₂ (major gas)					
		Smelting	Sb ₂ O ₃ and its compounds					
		Transportation diesel vehicles and generator	CO ₂ , PM ₁₀ , PM _{2.5} , CO ₂ , SO _x , NO _x , CO and GHG					
	Noise Vibration	Generator	High intensity of noise and vibration	-4	8	-32	-3	Moderately negative impact
	Water	Wastewater from cooling tank	Chromium (VI)	-4	7	-28	-3	Moderately negative impact
		Gray and black water	BOD and COD content, heavy metal contents					
	Odor	Ingot processing (roasting and smelting)	Strong fume gas	-6	8	-48	-4	Significantly negative impact
		Domestic waste	H ₂ S, mercaptants, and leachate					

No .	Potential Impacts on the Media	Activities and Source	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
	General Waste	Domestic waste	Kitchen waste, food waste, plastic and so on	-1	6	-6	-1	Reduced negative impact
	Hazardous Material	Slag and sludge, by-products of ingot processing (roasting and smelting)	Sb and its compound	-2	6	-12	-2	Less negative impact
		A few of electrical wastes	Batteries, fuel container, fluorescent lamp, etc					
	Soil	Transportation vehicles	Fuel leakage or spill	-4	7	-28	-3	Moderately negative impact
		Overflow wastewater	Slow the plant growth rate, photosynthesis and nutrient uptake					
	Occupational Health and Safety	Every stage of factory operation	Minor to major injuries	-3	7	-21	-3	Moderately negative impact
	Socio-economic	Factory operation	Stable job opportunities and skilled workers	4	8	32	+3	Moderately positive impact

5.12 POTENTIAL ENVIRONMENTAL, SOCIAL AND HEALTH IMPACTS AND MITIGATION MEASURES DURING DECOMMISSION STAGE

If the project would be terminated due to the various circumstances such as low demand, not easily reliable the raw materials, and then political situation may lead to cease the project. There are four possible scenarios when the permission for factory operation is due-

Scenario i: If the project proponent extent/renew the permission to continue the manufacturing antimony ingot or other metal smelting/ refinery, the environmental impact evaluation and management plan would be identical to the operation phase.

Scenario ii: The project proponent would not extent/renew the permission. The new proponent would apply for permission and resume the factory operation. For this case, the environmental impact evaluation and management plan would be identical to the operation phase.

Scenario iii: If the project proponent doesn't extent/renew the permission, the structures of the factory's buildings would be left in its original form and no business activities would be performed. For this case, the proponent is recommended to follow the procedures guided by the relevant authority. Moreover, the proponent needs to inform the factory workers about the decommission plan, clear all the payment payable to workers, and compensate them-if necessary.

Scenario iv: The project proponent would not extent/renew the permission. The structures of the project's buildings would be partially or wholly demolished for new business activity. For this case, the environmental impact evaluation would be identical to construction phase and the demolition contractor is advised to follow the management plan described in construction phase.

If the project meet the 4th scenario, the potential impacts such as air, noise/vibration, water, soil and solid wastes, occupational health and safety as well as rehabilitation after closure the project are taken into account in this section. The impacts assessment concerned with the demolition or decommission stage is mentioned in Table 5-9.

5.12.1 AIR QUALITY

Impact Assessment

Although three kinds of demolition stages can be found, the process may apply partially manual and mechanical demolition methods. The most noticeable impact will be placed by the dust and particulate emissions. When demolition the structure (especially wall- brick, cement, and block), the activity may generate respirable crystalline silica dust. Those particles are able to travel and deposit on the lung, causing the permanent damage and serious illness such as silicosis and lung cancer or even death. Some building materials namely plaster wall and ceilings may contain asbestos fibers which are emitted by destructuring them. Inhaling the fiber may increase the chance of suffering lung cancer. Then, greenhouse gases and other toxic gaseous (CO₂, CH₄, CO, HC, NO_x, SO_x, PM_{2.5}, PM₁₀, VOCs and so on) are released by using the heavy machineries in the demolition progress. Among them hydrocarbon (HC) is one of the source of carcinogens prone gas, contribute to the environment.

In spite of the demolition period will be estimated as the short-termed, airborne dust and gases are more likely to have tragic effect on the environment and communities. Therefore, several actions should be taken with the aim of mitigating the impact.

Mitigation Measure

- ✓ Wet method is the most effective way with the reasonable charges to control the silica dust emission during a mass generation of dust.
- ✓ When application the wet method, time and activity performed as the key player for example timing the application of the water.
- ✓ Water must be adjusted the flow rates, sufficient to minimize the release of visible dust then necessary to make sure controlling the volume of water neither too much water nor too little water.
- ✓ In the same way, controlled dust suppression can be undertaken by water spray and misting systems for limiting the asbestos exposure to the environment.
- ✓ This should continue be targeted on fresh, dry surfaces uncovered during demolition.
- ✓ Asbestos fiber contains debris should be transport through covered lorries.

5.12.2 NOISE AND VIBRATION

Impact Assessment

Excess noise will occur during the demolition stage as same as the construction phase. Structural demolition stage may involve the help of heavy machineries, contribute to the intense ground vibration can be faced. During the progress, generator may run for efficient and effective advancement. Minor cause of noise and vibration can be seen the use of vehicles and other transporting items (motorcycles, ect.,). Construction related noise may impact not only on the workers but also on the environment. Once high intensity of noise is transmitted to the surrounding area, the high potential to disrupt neighbouring residents' activities. Likewise, the terms of vibration may influence with noise generation sources. The animals behaviours such as mating, predatory, nagivating, extend to the permanent hearing loss may be affected due to the intense noise level. Furthermore, low-level whole-body vibration causes cardiovascular effects in dogs and swine.

Demolition stage will last short-term but deafening sound without interruption even in the daytime may deter the mental health alignments. Even though the process produces excessive noise, the activities need to proceed with consistency in the working hours especially in daytime. By doing this, the duration of impacts on the environment will be minimized. Based on the facts, mitigation must be taken into an action, intends to create the healthy environment.

Mitigation Measure

- ✓ Substitute with the modern machineries which have sound and vibration proof systems, if possible.
- ✓ Occasionally monitored heavy machineries and vehicles.
- ✓ Install the noise barriers where excessive noise generation area.
- ✓ Flooring with the anti-vibration mat or carpet under the instruments or devices to decelerate the vibration.
- ✓ The source of noise should be isolated to give an instance generator and heavy-duty equipment should be kept in quite distance.

5.12.3 WATER QUALITY

Impact Assessment

While controlling dust emission by using wet method within project site, it is possible to flow huge amount of water. If runoff may swipe away the soil, it tends to accumulate suspended soil in water body. Increasing temperature, reduce the dissolved oxygen and turbid water as a result. Naturally, rubbles are consisted of cement thus, there is a great chance to dissolve with chemicals of cement with the alkaline pH water. Then, asbestos fiber may easily flow with water which deposited beneath the water bed. Those sediments mainly attack the benthic fish species by developing epidermal tumors, thickened epidermal tissue, increase mucous cell density in the intertinal tract and so on. When the communities consume infected fish and or marine products, for those may be rendered the victim of adverse health problems. A few volumes of domestic wastewater may discharge from the temporary camping site, toilets and general sanitary water (heavy metals, coliform, oil and grease, etc.,) and spilling fuel and oils from the vehicles and machineries.

Mitigation Measure

- ✓ The time of application wet method, take a caution to apply water or spray to be just enough for dust control, if too much water will become slurry and carry the soil particles.
- ✓ Install the temporary silt fence at the water spraying area.
- ✓ After that it must have the temporary drainage channel which may be neither not too straight nor too meander like channel. As a consequence, it allow enough time for deposition.
- ✓ If possible, Oil Water Separators can be used to treat oil and chemical pollution, of which there are several different types depending upon water volume, flow rate, concentration of pollutant and required discharge concentration.
- ✓ Chemical Dosing – use of dosing systems to introduce coagulants, flocculants and pH regulators.
- ✓ The method is the effective and reliable, often used in conjunction with other technologies, but requires power and knowledge regarding the correct use of chemicals.
- ✓ The discharge must not contain sewage, result of discolouration, foaming or growth sewage fungus for this reason, regularly checked the sewer pipelines (previous and temporary ones) and septic tanks.

5.12.4 SOLID WASTE

Impact Assessment on Hazardous and Non-hazardous Wastes

Demolition phase generates both hazardous and non-hazardous wastes in single each of the task. Hazardous wastes were produced by the structural destruction in which rubbles (mainly composed of concrete), trace amount of asbestos, fluorescence light, electric cables and wires, rechargeable batteries. Those wastes release toxic chemicals (heavy metals – Hg, Cd, and toluene, etc) which contribute to attack the nerve system, immune system, memory loss, flu-like symptom, respiratory problem, reproduction system, liver and kidney damages. However, stainless steel is another kind of hazardous chemical discharging waste like chromium (Cr) which can deter the liver and kidney functions, asthma, respiratory irritation as well as cancer diseases.

Normally, non-hazardous waste can be produced by the workers and their temporary camps. Food scraps, water bottle, plastics, tissue, paper, personal care products and various sanitary items can be considered as the general wastes. Other demolition waste as PVC pipe, wood, aluminum, Domestic wastes are less dangerous than the hazardous wastes. However, they can be harborage zone of the bacteria, and fungi without having systematic waste management method in the project site. Therefore, several actions need to control not only the hazardous but also non-hazardous waste.

Mitigation Measure

- ✓ Rubbles and bricks can be used as the recycled concrete aggregate for a base of road and pavement as well as a drainage material for underground pipes and lines.
- ✓ Resell to the renovation or renew construction projects the things namely steel, copper, pipe, aluminium, glass and wood.
- ✓ Some hazardous wastes for example broken fluorescence lamps must be dispose at the designated damp site with well-packed during handling the workplace.
- ✓ In the same way, domestic wastes are packed with the black plastic bags and store at the temporary damping site.
- ✓ If it contains sharp materials, wraps them well in newspaper or use sharp bins.
- ✓ For all the waste (hazardous and general wastes), their final discharge point must be the city municipal's waste disposal site.

5.12.5 SOIL QUALITY

Impact Assessment

Since commencing the construction phase, soil has been disturbance by biological, chemical and physical manners. Soil quality of the demolition phase still degrade as same as the construction stage. Operating the heavy-duty equipment and vehicles within project site will attempt to be the soil compaction as a result deplete the water absorption by soil. Perhaps, flash flood will be frequently faced at the project site during heavy rain event. Soil compaction and increasing rate of soil density is the directly propotional to each other therefore, plant roots cannot eaily penetrate into the soil. In some cases, fuels (petrol and diesel), lubricating oil and engine oil from the heavy machineries and vehicles can be spilled or leaked onto the soil. It seems to have dire consequences for soil chemistry, structure, properties of soil and reduce soil fertility and arable value.

Despite the soil is one of the renewable resource, it must be required a particular attention to preserve and conserve. Thus, mitigation measure will play a main role to retain the soil quality.

Mitigation Measure

- ✓ Pass through the machineries and vehicles over the dry soil which means wet soil is able to easily compact than the dry sand so as to prevent the soil compaction.
- ✓ Completely demoliation the site, soil must be added organic matter in order to improve the microorganism populations and aeration the soil.
- ✓ If fuels, oil and grease are spilled onto the ground, carefully removed the affected soil from such area then store them separately.

5.12.6 OCCUAPTIONAL HEALTH AND SAFETY

Impact Assessment

Single each of the demolition process, workers can be encountered chemical exposure, physical injuries and biological substances. During the structural demolition, chemical agents (toxic gases – HC, Mg, CH₄, CO and so on) were emits which projected causing diseases ranging from mild to major health issues. Physical injuries likes dust emission and particles, falling from the specific height, electrical accidents (flash fire, electrocuted), high intense of noise exposure are the common scenarios at the demolition site. Communication problems in usually very unclear sites can put workers at high risk of falling from height, being hit by objects, getting buried by collapsing elements etc.

Some of the physical damages may lead to the minor problems but unpredictably, those can drive chronic diseases and fatal injuries. Long time handling of domestic waste can be a prone area of bacteria, mold, fungi, insects, household pests (mouse, fly and cockroach) breeding ground. Through the contamination of food and surfaces, they become carriers of various pathogens, including polio, hepatitis, salmonella, hookworm, and tapeworm.

Mitigation Measure

- ✓ Competent wokers or skilled workers must be participated in the demolition works.
- ✓ Wet the surface before conducting the structural demolition in order to control dust emissions and particles.
- ✓ Work with the modern heavy equipment which typically contain enclosed, filtered cab with the purpose of minimizing the dust exposure.
- ✓ For the toxic gas emissions, the workers must wear respective PPE – respiratory protector and eye shield.
- ✓ The workers who serve at the specific height must wear Personal Fall Arrest (PFAS).
- ✓ Fire prvention and evacuation plan then train the workers how to response at the time of emergency occurs.
- ✓ Finally, all the workers within the working area especially at the noise causing zone who must wear headphones and earplugs mandatory.
- ✓ Finally, occupational impacts at the demolition site are unpredictable therefore every workers must wear PPE depends on the types of duty.

5.12.7 REHABILITATION AFTER DEMOLITION WORKS

Completion the demolition process, the management of debris clearance is the main key. Most of the debris can be recycled and resold according to the kind of wastes. If the land will be intended to plan a new building, some mitigation measures and impact control procedures must be applied as the construction phase. On the other hand the land will not have any arrangement for a new structure, rehabilitation must be administered with the specific attention.

Firstly, soil quality recovery will be priority concern for the restoration strategy of the abandoned land. Thereby, some additives or organic matters will be added for the soil improvement so as to make a home for soil microbes. Then, make sure the soil must have a good aeration and relied the soil compaction. The health of the soil is fully recovered then the next step will be replantation the native plants. The most crucial point is that vegetations and plants must be the native species to protect the encroaching the invasive species.

Probabilities of Residual Impact After Mitigation Measures

Firstly, it is reminded that the impact prediection and evaluation was focused on the actual environmental impacts before conducting any management and mitigation measures, in Table

5-7. Following managements (in Chapter 6) and mitigation actions in this Chapter, the negative impacts could be improved the alleviation. Perhaps, the residual impacts can be existed but, the significant impacts become low level and or ignored.

Table 5-9 Evaluation and Prediction of Significant Impacts for Demolition Stage

No.	Potential Impacts on the Media	Activities and Source	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
	Air	Demolition the structure	Dust and PMs	-4	8	-32	-3	Moderately negative impact
		Heavy duty machines	CO ₂ , NO _x , PMs, VOCs, CO and CH ₄ , C ₆ H ₆ and CH ₂ O					
		Diesel generator	NO _x , SO ₂ , CO ₂ , PM, HC, etc.					
	Noise Vibration	Heavy duty machines	High intensity of noise and vibration	-4	7	-28	-3	Moderately negative impact
		Diesel generator						
	Water	Demolition the structure, cement-contained rubbles	Silty runoff, fluctuate the pH level	-4	8	-32	-3	Moderately negative impact
	General Waste	Demolition the structure	Aggregate, wood, metal, PVC, and glass	-2	6	-12	-2	Less negative impact
		Domestic waste	Kitchen waste, food waste, plastic and so on					
	Hazardous Material	Demolition the structure	Electrical waste, cables and concrete					
	Soil	All demolition works	Soil compaction, spilled or leaked fuels and oils	-4	7	-28	-3	Moderately negative impact

No.	Potential Impacts on the Media	Activities and Source	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
	Occupational Health and Safety	All demolition works	Chemical exposure, physical injuries, communicable diseases	-3	7	-21	-3	Moderately negative impact
	Rehabilitation	After demolition works	Restoration the native species (flora and fauna)	6	8	48	+4	Significant positive change

5.13 RISK ASSESSMENT OF THE OCCUPATIONAL HEALTH AND SAFETY

5.13.1 METHODOLOGY

Risk assessment methodology is adopted by International Civil Aviation Organization-ICAO (2013)¹⁰. Environmental risk assessment is the process of evaluating the likelihood of adverse effects on, or transmission through, the natural environment, as well as the hazards associated with human activities. The risk assessment will be evaluated based on hazard identification, risk analysis probability, risk analysis severity, risk assessment and tolerability. The risk assessment of metal smelting and refinery is performed based on the potential hazards happened in construction/decommission (where the risk in demolition state is as same as the constructin), and operation activities. The risk assessment and management process will be performed as shown in Figure 5-3.

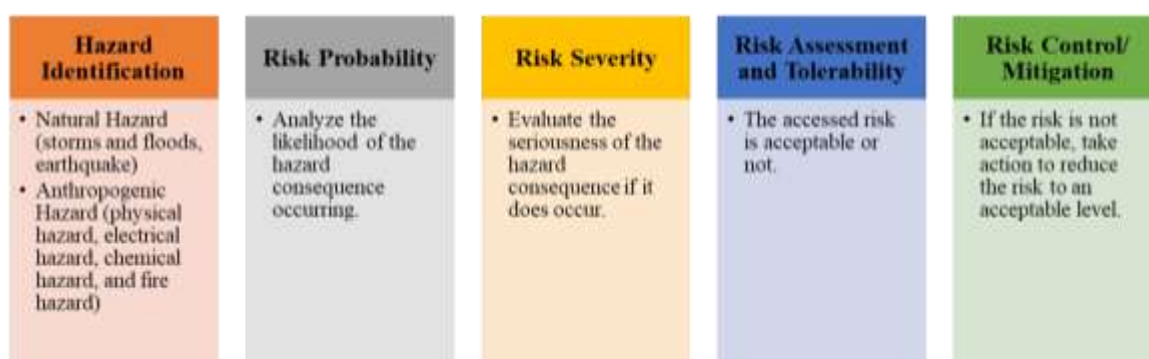


Figure 5-3 Risk Assessment and Management Process

5.13.2 HAZARD IDENTIFICATION

According to Canadian Centre for Occupational Health and Safety, hazard identification is the part of the process used to evaluate if any particular situation, item, thing, etc. may have the potential to cause harm. Addressing both anthropogenic and natural hazards is crucial for comprehensive disaster preparedness and risk mitigation. This project considers natural hazards (physical hazards) such as floods and storms, and earthquake as well as major anthropogenic hazards including occupational (chemical, physical, and biological) hazard.

5.13.3 RISK PROBABILITY

ICAO states that the risk probability is the likelihood or frequency that a hazard may exist. The risk probability range is defined by five level of likelihood such as frequent, occasional, remote, improbable and extremely improbable. The risk probability range is shown in Table 5-10.

¹⁰ International Civil Aviation Organization (ICAO) (3rd edition, 2013), Safety Management Manual

Table 5-10 Risk Probability Range

Likelihood	Definition	Value
Frequent	The hazard is likely to occur many times.	5
Occasional	The hazard is likely to occur sometimes.	4
Remote	The hazard is unlikely to occur, but possible.	3
Improbable	The hazard is very unlikely to occur.	2
Extremely improbable	The hazard is almost inconceivable that the event will occur.	1

5.13.4 RISK SEVERITY

The risk severity is the potential harm or adverse effect that may occur due to exposure to the risk. The risk severity is determined by five levels as described in Table 5-11.

Table 5-11 Risk Severity

Severity	Definition	Value
Catastrophic	Equipment destroyed Multiple deaths	A
Hazardous	Serious injury Major equipment damage	B
Major	Serious incident Injury to persons	C
Minor	Nuisance Operating limitations Use of emergency procedures Minor incident	D
Negligible	Few consequences	E

5.13.5 RISK ASSESSMENT AND TOLERABILITY

The risk assessment is performed based on the risk analysis probability and risk analysis severity. The risk assessment and tolerability is evaluated as shown in Table 5-12. If the assessed risk index is in intolerable region, the risk is unacceptable under the existing circumstance and it need to perform priority risk mitigation. In addition, the kind of risk should be ceased or cut back if necessary. If the assessed risk is in the tolerable region, the risk is acceptable based on the risk mitigation and it may require management decision. If the risk is acceptable region, the risk is acceptable and no further risk mitigation might not require.

Table 5-12 Risk Assessment and Tolerability

Risk Probability	Risk Severity				
	Catastrophic-A	Hazardous-B	Major-C	Minor-D	Negligible-E
Frequent-5	5A (Intolerability)	5B (Intolerability)	5C (Intolerability)	5D (Tolerable)	5E (Tolerable)
Occasional-4	4A (Intolerability)	4B (Intolerability)	4C (Tolerable)	4D (Tolerable)	4E (Tolerable)
Remote-3	3A (Intolerability)	3B (Tolerable)	3C (Tolerable)	3D (Tolerable)	3E (Acceptable)
Improbable-2	2A (Tolerable)	2B (Tolerable)	2C (Tolerable)	2D (Acceptable)	2E (Acceptable)
Extremely Improbable-1	1A (Tolerable)	1B (Acceptable)	1C (Acceptable)	1D (Acceptable)	1E (Acceptable)

5.13.6 RISK CONTROL AND MITIGATION

Control can be regarded as the reduction the likelihood or consequences from the unwanted and or tragic event. Mitigation will be continued as the post-control actions. Even though all the controlling /preventative measures completed, it may still harm to the human or environment and both. Risk control can be varies depend on the types of risks and so does mitigation. In general, there are six steps to control the risk. Elimination the hazard from the receptors while the substitution with minor or less hazard substances with the aim of minimizing the risk.

Moreover, isolation the hazard is the another option of the risk control factor which can help without having directly impacted on the receivers or merging one or more risk to become a bigger ones. Changes the performance or designing the process, engineering controls will be followed by the isolation the hazard. Next, administrative controls include accept the standard procedures or safe work practices or providing appropriate training, instruction or information to outweigh the risk. Finally, using the personal protective equipment (PPE) may exist the last line of the protection or defence from the harmful situation.

5.13.7 TYPE OF RISKS

- ✓ Natural Disasters
- ✓ Floods and Storms

Potential risks

Flood hazard assessment estimates the probability of different magnitudes of damaging flood conditions, such as the depth of inundation, duration of inundation, velocity of moving water, quality of water, debris content of water, or the wave height in addition to still water level.

According to Figure 5-4, the project is located at the Kyiek Mayaw Township, Mon State where exists at the flood prone area but the risk of storm is less likely to be faced the project. The area is in need of a proper flood control system and infrastructure. Occasionally, the dwellers has experienced about the spread the diseases and loss of properties by the flash flood, the risk assessment is mentioned in Table 5-13.

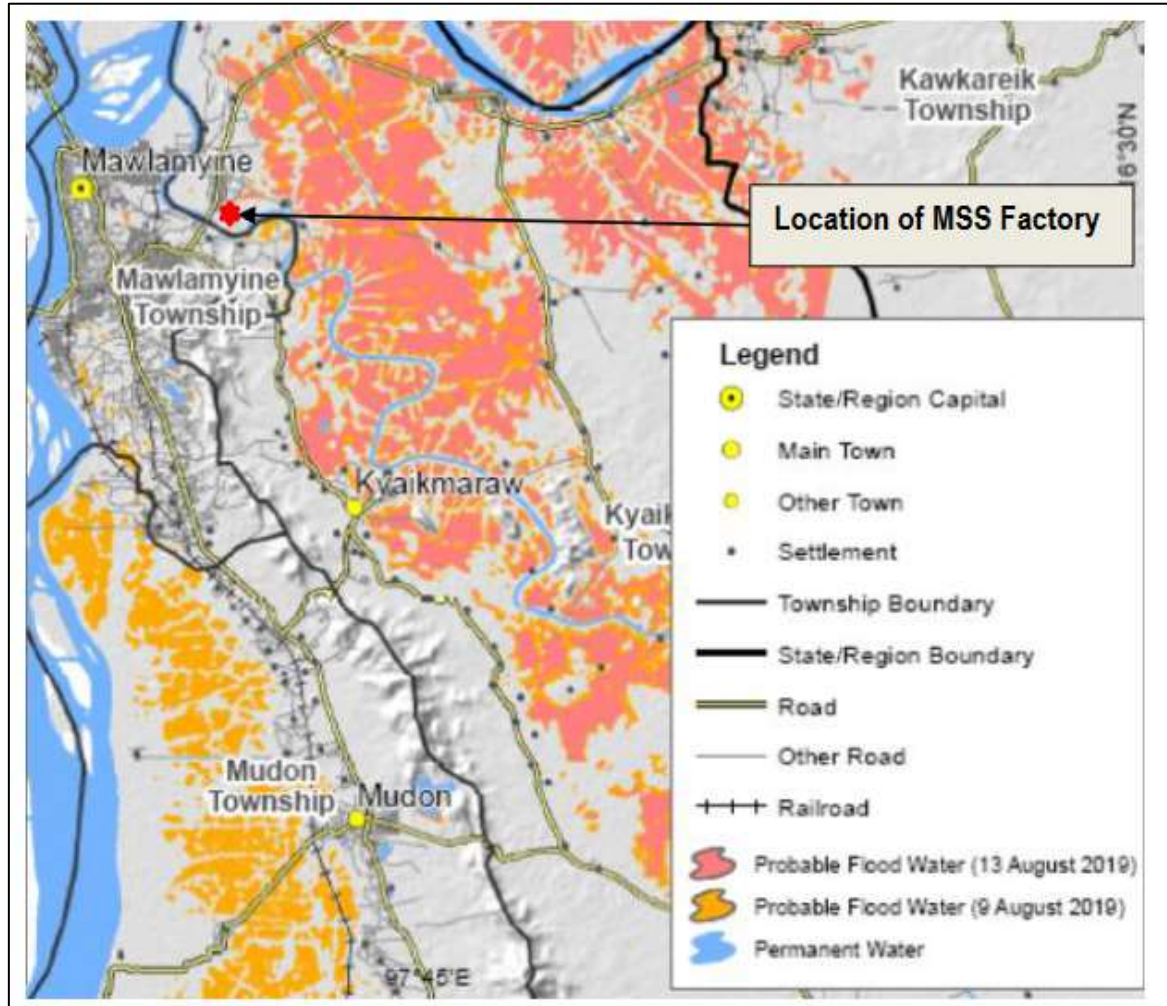


Figure 5-4 Storm Surge Hazard and Flood Hazard Map of Myanmar

Mitigation Measure

- ✓ The effective mitigation methods may weaken or protect the overall flood hazards, will discuss as follows;
- ✓ Even in the normal situation, systematically construct the channels drain within the factory compound.
- ✓ Cleaning the drain esures to collect plastic, bottles, and non-biodegradable materials with the prupose of being well-drained.
- ✓ If the factory compound had still left bare soil or vacant area, created the greenspace in such area with natural vegetation and plants which can absorb the runoff quickly from the roots.
- ✓ Regularly maintenance the infrastructure and factory building without any structural damages.
- ✓ Keep the chemicals and fuels must be stored at the robust or approved safety cans.

- ✓ All the staffs along with the people at the management level must be familiar and participate the training program concerned with the emergency response action plans.
- ✓ Therefore, evacuation maps together with the emergency contact lists must be attached on every corner of the working area. Then, emergency assembly point must be designated which may be occupied at the large open space, big enough to safely assemble as well as risk-free distance from the disaster prone area.
- ✓ Must have emergency exit doors where sufficient wide, unobstructed with materials and doors should be easy opening and closing.
- ✓ Aware the weather forecasting news, government websites such as www.moezala.gov.mm and others, as well as through radio and television news.

5.13.8 EARTHQUAKE

Potential Hazard

In east Myanmar, there is the Sagaing Fault, which is the boundary between the Burma Plate and Sunda Plate. Hence, a magnitude 7.0+ earthquake has occurred more than 16 times, and six earthquakes of around magnitude 7.0 hit the main cities along the Sagaing Fault such as Yangon, Bago, and Mandalay from 1930 to 1956. The national emergency plan for earthquakes and related disasters is in need, which should also include operating procedure for disaster preparedness and mitigation with strong support of scientific foresight. Earthquakes can cause extensive damage to infrastructure, including airports, railroads and bridges, potentially leading to ruptured gas lines, sparking fires that can engulf extensive grounds, damages to the infrastructures, and chemical spill. The risk assessment is mentioned in Table 5-13.

Mitigation Measure

- ✓ Regularly maintenance the infrastructure and factory building without any structural damages.
- ✓ Keep the chemicals and fuels must be stored at the robust or approved safety cans.
- ✓ All the staffs along with the people at the management level must be familiar and participate the training program concerned with the emergency response action plans.
- ✓ Therefore, evacuation maps together with the emergency contact lists must be attached on every corner of the working area. Then, emergency assembly point must be designated which may be occupied at the large open space, big enough to safely assemble as well as risk-free distance from the disaster prone area.
- ✓ Must have emergency exit doors where sufficient wide, unobstructed with materials and doors should be easy opening and closing.
- ✓ Set the earthquake early warning system thus the negative impacts can be eliminated or at least minimized.
- ✓ Aware the the information about natural disasters such as earthquake on the government websites such as www.moezala.gov.mm and others, as well as through radio and television news.

5.13.9 CLIMATOLOGICAL HAZARD

Potential Risk

Generally, climatic hazard can be considered that a wide range of environmental pollutions (especially atmospheric pollution) merge as long-lived weather change event. Human activities are the main drivers of the climate change such as burning fossils fuel and destroying rainforests, have an increasing influence on the climate and Earth's temperature. This adds huge quantities of greenhouse gases to those naturally present in the atmosphere, increasing the greenhouse effect and global warming. The destruction of forests also causes substantial damage the harmony of the climate. It will bring various climate-related disaster ranging from cyclone, drought, flood, heatwave, infectious diseases, sea level rise and wildfire.

Mitigation Measure

- ✓ Introduce as possible as the clean atmosphere by choosing environmental-friendly cars (electric vehicles) over the fossil fuel or diesel-powered vehicles.
- ✓ If it difficult to change from fuel to electric ones immediately, driving at a moderate speed for the first five miles or not abusing the air conditioning are ways to reduce fuel consumption, which also saves money.
- ✓ Trees help regulate the climate by absorbing carbon dioxide from the atmosphere, so if they are destroyed, this beneficial effect is diminished and the carbon stored in those trees is emitted into the atmosphere, adding to the greenhouse effect.

Table 5-13 Risk Assessment of Natural Disaster

Disasters	Risk Index	
	Before Mitigation Measure	After Mitigation Measure
Flood and storm	3A (Intolerability)	3C (Tolerable)
Earthquake	3A (Intolerability)	3C (Tolerable)
Climatological	3A (Intolerability)	3C (Tolerable)

5.14 OCCUPATIONAL, HEALTH AND SAFETY HAZARD

5.14.1 CHEMICAL HAZARD

The chemical risk can be determined as the one who dealing with handling or taking a task under chemical producing activities. It can be considered that chemical spilling /leakage is not only event for the chemical hazard, but every chemical releasing processes are align with this hazard for example, air pollution and so on. All the dimensions of risk assessment linked with the occupational, health and safety risk is mentioned in Table 5-14.

5.14.2 POTENTIAL RISK IN CONSTRUCTION/ DEMOLITION PHASES

Construction works can be triggered off adverse circumstances since initial stage until achieve the target and so do decommission phase. The most significant hazard may be noted as the air pollution, may emit chemical elements such as toxic gases (CO₂, CO, NO_x, VOCs, PM_{2.5} and PM₁₀) and heavy metals (mercury (Hg), lead (Pb) and dioxins) while doing the earth works and using the heavy machineries, loading and unloading vehicles, and the releasing the toxic

metals is largely dependent on the type of fuel consumption. Transporting vehicles (diesel engine) emits benzene and 1,3 butadiene both of them can be faced carcinogens, a subsequent of chemical hazard at the workplace. Those chemicals and toxin may introduce hay fever as a result of short-term exposure, on the other hand chronic obstructive pulmonary disease, respiratory tissues damages, heart problem, asthma, lung cancer can be suffered from the constant exposure.

Heavy toxin may be dissolved or carried by the polluted water under progressing the construction/decommission activities. Failure to place the fuel tanks at appropriate points away from vehicle routes (to minimize the risk of collisions) and access points (to minimize the risk of vandalism) can result in accidental spillages. Other chemicals present, such as those used in the cement making process and solvents, can also harm the environment if accidentally released. Moreover, lead (pb), mercury (Hg), Cadmium (Cd) and Arsenic (As) which are commonly found in the industrial paints, may disperse the surface runoff. If people drank heavy metal polluted water, they might be experienced about the neuro toxin lead to the disordered the nervous system, kidney diseases, and cancer, etc. Furthermore, sewer water from the temporary restrooms are the another contaminated metal such as Cd, Cr, Cu, Zn, Pb and Ni mostly accumulated sewage water and sludge. Most of them may cause the allergic dermatitis, liver, kidney, affected the density of bones and disrupt the bone composition.

Hazardous solid wastes are the common source of chemical hazard in the construction / decommission sites. Fuel and paint containers, electrical wastes (electric buds, fluorescent lights and batteries) which can be considered as one of the chemical sources, expose to the workers. When people have a great potential to contact with heavy metal substances. Additionally, a temporary waste dump site is a home for the hazardous chemicals due to the seepage of leachate. Once those metals encroach the soil, surface water and groundwater, the locals as well as the workers have a higher chance to diagnose minor to major health problems (fatal diseases) linkage with this chemical hazard.

Mitigation Measure

- ✓ In spite of being the contruction and decommission stages may take place about one or two years, it requires some actions to take a step to mitigate the negative impacts, are as followed:
- ✓ Regularly checked the engine and exhaust of the vehicles so as not to excessive emission the toxic fumes.
- ✓ Changing the fuel for vehicles and machineries to the better quality (premium) ones which can produce the high efficiency and reduce the emissions.
- ✓ If possible, it should be minimized the usage of vehicles during the peak hours and stock the necessary materials at the construction site to reduce transportation times.
- ✓ If the project compound had still left bare soil or vacant area, developing such area with the natural vegetation and plants which can absorb toxic chemical gases.
- ✓ One of the most effective preventative measure for chemical hazard through air pollution is using the PPE to the workers.
- ✓ Must keep the fuel, paint and chemical container systematically at the designated storage room which area should have an appropriate distance to the water resources or drainage drain.
- ✓ Store fuel and engine oil at a leak-proof container, then checked them without any spilling or leakage after each use.

- ✓ Flooring the chemical warehouse with the impermeable or oil absorbent material.
- ✓ Occasionally, monitored the sewer pipeline not having any hole or leakage into the surrounding environment.
- ✓ Damaged electrical equipment and fluorescent light/bulb should be maintained separated area while handling within the factory compound. Should not contact those with rain or any liquid.
- ✓ Among the hazardous waste, some can be sold or reuse that kind of waste should be managed properly for eg., engine oil.
- ✓ If not, it should be disposed accordance with the regulation of the township municipal.
- ✓ Afterwards above mitigation methods have been implemented, such chemical hazard at the workplace can nearly eliminate or lessen the risk, impacted on the workers.

5.14.3 POTENTIAL RISK IN OPERATION PHASE

Generally, metal smelting and refinery work is the most serious and growing concerns about air pollution problems among the workers. The initial step of processing for example preparation for production (crushing coal) until the end stage (casting) which could release airborne dust, antimony (Sb) particles and its compound. Such exposures are associated with the development of occupational respiratory diseases, including simple coal workers' pneumoconiosis (CWP), progressive massive fibrosis (PMF), and chronic obstructive pulmonary disease (COPD). Partial combustion of fossil fuels (coal and coke) may emit carbon monoxide (CO), however, all processing acquire very high temperature (approximately 1000°C) can completely burn these fuels.

During the first stage of ingot processing, roasting process may produce a noticeable amount of SO₂ gas. At high concentrations, it can cause life-threatening accumulation of fluid in the lungs (pulmonary edema). Symptoms may include coughing, shortness of breath, difficult breathing and tightness in the chest. A single exposure to a high concentration can cause a long-lasting condition like asthma. The gas irritates or burns the skin. Permanent scarring can result. Direct contact with the liquefied gas can chill or freeze the skin (frostbite). Symptoms of mild frostbite include numbness, prickling and itching.

Some chemicals such as Na₂CO₃ and NH₄H₂PO₄ are added to improve the efficiency of the melting purification in smelting process. Both have common health symptoms and a potential health issue. The responsible ones have to be dealing with skin irritation, redness, dryness, and cracking, irritate the eyes or pain, excessive tearing if he has an experience with prolonged contact. While they are reacting together to be purified metal, the toxic chemicals like Sb and its compound especially arsenic (As) are emitted as a result. These metal fumes introduce respiratory irritation, pneumoconiosis, and potential carcinogenicity. Antimony, particularly antimony trioxide, has been linked to lung cancer. As fumes may be a root of acute poisoning, leading to nausea, vomiting, diarrhea, and even death.

The exposure to these compounds are associated with a wide range of airways diseases, involving mucous membrane irritation, bronchitis, asthma, asthma like syndrome and chronic obstructive pulmonary disease (COPD) which diagnosis in metalworkers. Transporting vehicles (diesel engine) emit benzene and 1,3 butadiene both of them can be faced carcinogens, a subsequent of chemical hazard at the workplace. Over-spilling of wastewater from cooling tank can encourage having a high chance of chemical hazard in the work site. Contact with both Sb and As in water can cause skin lesions, and long-term exposure can lead

to cancer, cardiovascular disease, and other health problems. Furthermore, sewage water from the toilets is the another point source of the hazardous chemical contained in water bodies. Normally, it involves Cd, Cr, Cu, Zn, Pb and Ni mostly accumulated sewage water and sludge.

The domestic wastewater byproducts of soap especially used with the personal cleaning purpose such disinfected water consist of nitrogen and phosphorus in water. Common health issues are raise the risks of heart rate, nausea, headaches and abdominal cramps. Phosphates are generally not toxic to all living organisms if not contain high levels of phosphate. If extremely exceed in concentration may stem from the digestive problem and changes calcium level in bones and make them weak. High phosphorus and calcium levels also lead to dangerous calcium deposits in blood vessels, lungs, eyes, and heart. Unsystematic storage and handling methods of chemicals / fuels can spill onto the ground and water which is seemed to be a further chemical hazard.

The operational hazardous materials – slag and sludge have similar health problems and symptoms with the wastewater owing to consist of Sb and its compound. Besides, electrical waste is usually found at the any working areas, regarded as the hazardous because of being seepage heavy metal (mercury, Hg) from the fluorescent light or bulb. Thus, the surrounding or neighbor is more likely to meet the chemical hazard from the soil and water (both runoff and groundwater) through the electrical waste. A long-time storing the domestic waste dumping site is the prone area of hazardous chemical concentration. The waste excretes the leachate onto the soil and infiltrate into the water bodies as a consequence the victims will have medical alignments ranging from mild to major cases such as the deadly diseases.

Mitigation Measure

- ✓ Upgrade the indoor ventilation system with natural wind flow and sometimes combination with automatic or mechanical ventilation technique which contributes improving air quality for occupational safety.
- ✓ Bag houses and bag filter have been installed already for effective reduction of chemical exposure in the working area. But, it a good indoor air circulation system is needed for additional safeguard.
- ✓ Switching the diesel for better performance and reduction the carcinogenic metals.
- ✓ If the project compound had still left bare soil or vacant area, developing such area with the natural vegetation and plants which can absorb toxic chemical gases.
- ✓ Store fuel and engine oil at a leak-proof container, then checked them without any spilling or leakage after each use.
- ✓ Flooring the chemical warehouse with the impermeable or oil absorbent material.
- ✓ Occasionally, monitored the sewer pipeline not having any hole or leakage into the surrounding environment.
- ✓ Should have a treatment pond for each of the domestic wastewater and commercial wastewater.
- ✓ Obviously labelled on each of the hazardous wastes with detailed handling instruction and precautions.
- ✓ Damaged electrical equipment and fluorescent light/bulb should be maintained separated area while handling within the factory compound. Should not contact those with rain or any liquid.
- ✓ If possible, the hazardous wastes (electrical waste) should be disposed accordance with the regulation of the township municipal.

- ✓ Whenever the workers are in charge in a particular work condition, the workers must wear PPE based on the type of duty for further protections.
- ✓ Above these advancements can enhance the antimony ingot production industry along with the designing to be human well-beings and sustainability in business.

5.15 PHYSICAL HAZARD

5.15.1 POTENTIAL RISK IN CONSTRUCTION/DEMOLITION PHASES

Construction and decommission works is the inextricably linked with the health hazard among the workers. There are many contaminants which lead to minor to major problems since the commence of construction projects until complete all the processes. Both construction and decommission phases the possibility of having the physical harm may occur in every single task. The construction dust including PMs cannot be avoidable as an example the operator whose duty is grinding and cutting materials, silica dust could easily pass through the respiratory tract of the worker. Thereby, he may diagnose the malfunction of lungs then scar the tissue, disabling, or even fatal diseases (cancer). Working at the significant height is one of the most common risks ranging from less severe injury to fatal accidents. The operator who handles the heavy machineries and piling activity has a great chance to continuous exposure to high noise level. Consequently, not only the operators but also the neighbours can suffer disordered in their sleeping patterns, sudden hearing loss, stress, headaches, high blood pressure with respect to temporary exposure with high noise level.

On the other hand, consistent noisy environment creates permanent hearing loss, heart problem and type 2 diabetes, may the experience to the one who is working under that condition. Next, hazardous vibration is the second most physical impairment to the workers. Short duration exposure to whole body and or to hand-arm vibration may result in temporary disability, but repeated exposure leads to chronic musculoskeletal disorder, nerve problems, blood vessels, dislocation of joints and spinal cord. Working under the open or unshaded space is more likely to face with extreme heat as a result dehydration, headache, conscious, fatigue are the sign of short-term exposure. Otherwise, cardio-vascular issues, respiratory disorders and serious illness linked with the excessive high temperature can be faced.

Electrical hazard is more or less arose at construction and demolition stages. Due to the unskilled workers, damage the equipment, cables and devices, workers can be suffered electrocution, burns, shock, fall, life-changing injuries or death. In some serious condition, the electrical danger is indirectly initiate the fire hazard. General physical hazard will extend in various situations such as wet floors, poor equipment, uneven walkways and other structural issues can cause slip, trips and fall which is an array of adverse scenario including; broken bones, traumatic brain injury, shoulder/joint dislocation or muscle pain and strain. Besides, the person whose duty is associated with the sedentary lifestyle, repetitive job and poor posture such stationary position will bring the ergonomic hazard which increases the potential health issues in muscle, tendons, nerves, and tissues.

Mitigation Measure

- ✓ Switch the duties or minimize the exposure of potential dust inhalation for those who operate grinding and cutting materials.
- ✓ Let them use respirator or face-mask and if possible ensure the working space is well ventilated.

- ✓ Even if the operator is wearing respiratory protection, he must require to limit the work in a dusty atmosphere.
- ✓ Before working at specific height, the worker should be a professional or competent with skillful, having a knowledge and experience how to response when the accident happens.
- ✓ Ensure the access equipment (ladder, scaffold and trestle) is suitable, stable and strong enough for the job, maintained and checked them regularly.
- ✓ Do pay the attention the labels' instruction on those work platforms with the aim of avoiding the overload on ladder.
- ✓ Make sure the ground level is even and take additional protection measures when working on or near the fragile surfaces.
- ✓ The construction site must have the rescue plan and additional precautions from the sudden fall the objects at height.
- ✓ Replace with the quiet power tool and equipment or modern construction devices to manage the noise pollution.
- ✓ Set up the noise barriers within the sound producing devices as an example acoustic flooring has been designed specifically for less noise.
- ✓ If the engines and motors of the equipment were required some maintenance, they would create a noisy environment. Therefore, frequently inspect them with the proficient technician.
- ✓ As soon as mitigating the noise impacts, the source of vibration would be moderately control.
- ✓ Covering the anti-vibration isolator should be placed at the rotating machines and make a seat for the vehicles.
- ✓ The vibration isolator should be flooring where people stand and work for a long time.
- ✓ Provide the electrolyte to the worker for rehydration during the daytime.
- ✓ If possible, arrange a shady area like a shelter let the workers hold meetings, prepare tools or mix materials.
- ✓ A permanent umbrella provides excellent shade for workers who are spending a long time working in a particular area, workers who are moving more frequently may benefit from a portable shade umbrella.
- ✓ Keep dry the area where electrical accessories and wiring are mostly installed.
- ✓ Should be balance with the out voltage of the current and the load of electrical appliances.
- ✓ Change the new cables and wires instead of the old ones. Whenever maintenance is needed, checked the electrical currents and panels with the certified electrician.
- ✓ Fire safety equipment should be installed at the every working areas together attached with the evacuation map.
- ✓ All the workers even the staffs at the management level must participate in the awareness program and fire drilling training.
- ✓ Restrict access to smooth wet floor by using barriers, locking doors and or immediately cleaning should be done.
- ✓ Alternatively, use the mat in wet floor that can reduce the slickness of a surface and reduce the risk of people slipping and falling.
- ✓ Clear any obstacles such as electrical cables and wires at the walkway.

- ✓ Stand the safety sign especially at the risky area (wet floor, the potential of slip or trip) to raise the awareness to all the workers.
- ✓ Provide comfortable chair, table and also adjust the height of working surfaces to avoid poor postures.
- ✓ Rotation the work schedule with different motions.
- ✓ Having exact time for taking muscle relaxation exercises to those who do the repetitive task and sedentary lifestyle which regulate to health care practice.
- ✓ Rotate the work schedule and assigning tasks which is intensionally relieve the prolong exposure and improving occupational safety.
- ✓ Finally, the most important fact in this section is all the workers regardless their duties, the contractor must provide PPE and force them to wear for general safety measures depend on the type of their responsibilities.
- ✓ The physical risks cannot be terminated thoroughly, however, mentioned the mitigation methods discuss above will be minimized the potential hazardous conditions.

5.15.2 POTENTIAL RISK IN OPERATION PHASE

Noise pollution can be occurred at the operation area due to various operation of the machineries at the same time. Hearing damaged noise level might be in the generator, crushing coal and blower area. Crushing machine, especially areas with crushers, can generate noise levels exceeding 85 dB(A), which is considered a dangerous level for prolonged exposure. Repeated exposures to loud noise can lead to permanent, incurable hearing loss or tinnitus. Hazardous noise exposure can also occur during power washing within closed environment. The project will exist in long-term, thereby constant exposure of noise pollution will bring tinnitus and permanent hearing loss or deafening. Otherwise, cardio-vascular issues, respiratory disorders and serious illness linked with the excessive high temperature can be encountered.

Intense heat has been designed in roasting and smelting areas where temperature is a key performance for achieving the processes. The body's inability to regulate internal temperature and eliminate heat gain in such conditions increases the risk of heat exhaustion and heatstroke. The strain put on the body as it tries to cool itself also stresses the heart and kidneys. As a result, heat extremes can worsen health risks from chronic conditions (cardiovascular, mental, respiratory and diabetes related conditions) and cause acute kidney injury. Heat will reduce working productivity and increases the risk of accidents. It is difficult to complete work under very hot condition.

The presence of flammable gases, vapors, or dust within the furnace can also lead to explosions if ignited. Factors like overloading the furnace, forming a crust on the load, or improper handling of materials can also contribute to furnace explosions. Inhaling hot gases and combustion byproducts can lead to inflammation and damage of the respiratory tract, causing long-term respiratory issues. Furnace may release toxic fumes and gases that can cause respiratory problems, poisoning, and even death. Furnace explosions can expose individuals to live electrical wires, increasing the risk of electric shock.

The electrical accident will embrace minor to a mass destruction the properties as well as introduce the fire hazard at the workplace. Workers can be suffered electrocution, burns, shock, fall, life-changing injuries or death. Currently, lumbar pain is considered the main cause of

occupational absenteeism. The mechanical accidents are those that can cause punctures, cuts, lacerations, crushing, electrical shock, and falls, among others.

Mitigation Measure

- ✓ If possible, avoid to work the employees the duration the time and situations of high noise level is excessive.
- ✓ Rotate the work schedule and assigning tasks which is intensionally relieve the prolong exposure and improving occupational safety.
- ✓ Use the foam earplugs and then put the headphones or the earmuffs over and it becomes much more protective in those environments.
- ✓ Engineering controls such as air conditioning, with cooled air, and increased air flow, leading to increased evaporative cooling, can make the workplace safer.
- ✓ Other options for keeping body temperatures down in warm environments include making changes to workload and schedules.
- ✓ Supervisors can encourage workers in warm environments to drink hydrating fluids.
- ✓ At a minimum, all supervisors and workers should receive training about heat-related symptoms and first aid.
- ✓ Furnance must be done the regular maintenance with the technicians and clean the debris frequently.
- ✓ Always remind to follow the safe operating procedures, and various safety features like purge cycles, flame rollout switches, and safety valves.
- ✓ Maintain the correct fuel/air ratio as specified by the manufacturer.
- ✓ Electricity should be established the adoption of preventive actions, such as renovations, repairs and inspection of the electrical network to ensure the safety and health of workers.
- ✓ To mitigate the mechanical accident, the use of improvised accessories to assist in the work - using a wooden handle to push the material into the crusher, to speed the process.
- ✓ Clear any obstacles such as electrical cables and wires at the walkway.
- ✓ Stand the safety sign especially at the risky area (wet floor, the potential of slip or trip) to raise the awareness to all the workers.

Therefore, the potential impairment of hearing among the metalworkers can be achieved by systematically used of personal protective equipment (PPE). The facts mentioned above can be approached with the cost-effective, simple procedures and understandable methods to embrace the safe and sound workplace.

5.16 BIOLOGICAL HAZARD

5.16.1 POTENTIAL RISK IN CONSTRUCTION PHASE

To accomplish the project installation and deconstructing stages, a lot of workforce is key maker to proceed the limited duration. Otherwise, infectious (hepatitis B/C, HIV and AIDS), bacteria (tuberculosis, cholera) and viruses (Covid 19, influenza and so on) etc., can be seen at that sites. They can adversely affect human health in a variety of ways, ranging from relatively mild allergic reactions to serious medical conditions, even death. Many microbes reproduce rapidly and require minimal resources for survival, they are a potential danger in a wide variety of occupational settings. Secondly, breeding the disease vectors (mosquitoes, rats, and cockroaches) at the temporary housing camp will infected dengue fever, malaria, plague, rat-bite fever and some intestinal diseases.

Mitigation Measure

- ✓ Recruit or hire people who only vaccinated associated with the communicable diseases.
- ✓ Clean the surrounding of temporary accommodation by using pesticide and insecticide, are used to control a particular type of pest and insect, make certain the labeled for that use.
- ✓ Apply the them only in accordance with the directions on the label.

5.16.2 POTENTIAL RISK IN OPERATION PHASE

Temporary domestic waste handling area (bins from dining area) and temporary housing camp which can become the vectors prone (mosquitoes, rats, and cockroaches) areas, will be infected dengue fever, malaria, plague, rat-bite fever and some intestinal diseases.

Mitigation Measure

- ✓ If possible, dispose or cleaned trash bins at the dinning area daily with the purpose of controlling the insects and rats breeding.
- ✓ Appropriate use of PPE includes following appropriate donning, removal and disposal procedures.
- ✓ Workers should be provided with and advised to use handwashing facilities after leaving the swine housing area and must be encouraged to not touch
- ✓ their nose/face until after their hands have been thoroughly cleaned.

It can be concluded that the mentioned above all the facts are reflected simple measures with resonable investments. For this reason, it can be properly implemented and reduced the time-consuming process. In spite of the risk mitigation measures (elimination, substitution, engineering controls, etc) are described above, the workers must wear PPE for additional occupational safety measure. One of the most effective preventative measures for chemical hazard through air pollution is using the PPE to the workers. It could effectively contribute to minimize the risks that affect health and safety in the workplace and improving the quality and productivity of the work performance.

Table 5-14 Risk Assessment in Occupational, Health and Safety Hazard

Phases of Project	Risk	Hazard	Risk Index	
			Before Mitigation Measure	After Mitigation Measure
Construction/ Decommission	Air pollution	Chemical	3A (Intolerability)	3C (Tolerable)
	Water pollution		3A (Intolerability)	3D (Tolerable)
	Hazardous solid waste		3A (Intolerability)	2D (Acceptable)
Operation	Air pollution		5C (Intolerability)	3B (Tolerable)
	Water pollution		4B (Intolerability)	3C (Tolerable)
	Hazardous solid waste		3A (Intolerability)	2B (Tolerable)
Construction/ Decommission	Dust Pollution, Noise, Electricity, General accidents	Physical	3A (Intolerability)	2B (Tolerable)
Operation	Noise, heat, furnace explosion and electrical accidents		5C (Intolerability)	3C (Tolerable)
Construction/ Decommission	Communicable diseases and vector-borne diseases	Biological	3B (Tolerable)	2D (Acceptable)
Operation	Bacteria, viruses and vector-borne diseases		3A (Intolerability)	2D (Acceptable)

6. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

6.1 INTRODUCTION

This chapter presents the Environmental Management Plan (EMP) of manufacturing antimony ingots. The EMP will be implemented during the construction phase and operation phase to ensure that the environmental condition is acceptable. This EMP provides the procedures and processes, which will apply to the project production activities to check and monitor compliance and effectiveness of the mitigation measure to MSS has committed. In addition, this EMP was prepared in line with applicable environmental laws and regulations.

6.2 SCOPE OF THE ENVIRONMENTAL MANAGEMENT PLAN

The objective of the environmental management plan is to manage potential environmental issues by implementing proper mitigation measures and monitoring plan in compliance with the relevant laws and regulations stipulated by national authorities. Environmental management plan based on the basic principles of management is known as the P.D.C.A cycle (see Figure 6-1). Environmental management plan consists of four related tasks as described below:

Plan (P): What need to be done

The planning phase includes reviewing applicable environmental policies (see Chapter 2), identifying the project activities that can cause adverse effects on the environment (see Chapter 5), implementing mitigation measures to manage the impacts of those activities and designing effective programs of proper environmental management plan.

Do (D): Implement the plan

MSS as described in this chapter will implement the monitoring measures based on the mitigation plan and environmental management plan for the potential environmental impacts appropriately.

Check (C): Monitor and evaluate the results of implementation

The effectiveness of the mitigation measures will be monitored, evaluated and documented.

Act (A): Taking corrective actions to improve the results, if found inadequate

If nonconformities or weakness in the environmental management plan were benchmarked, corrective actions are needed to plan for mitigating the existing environmental impacts.

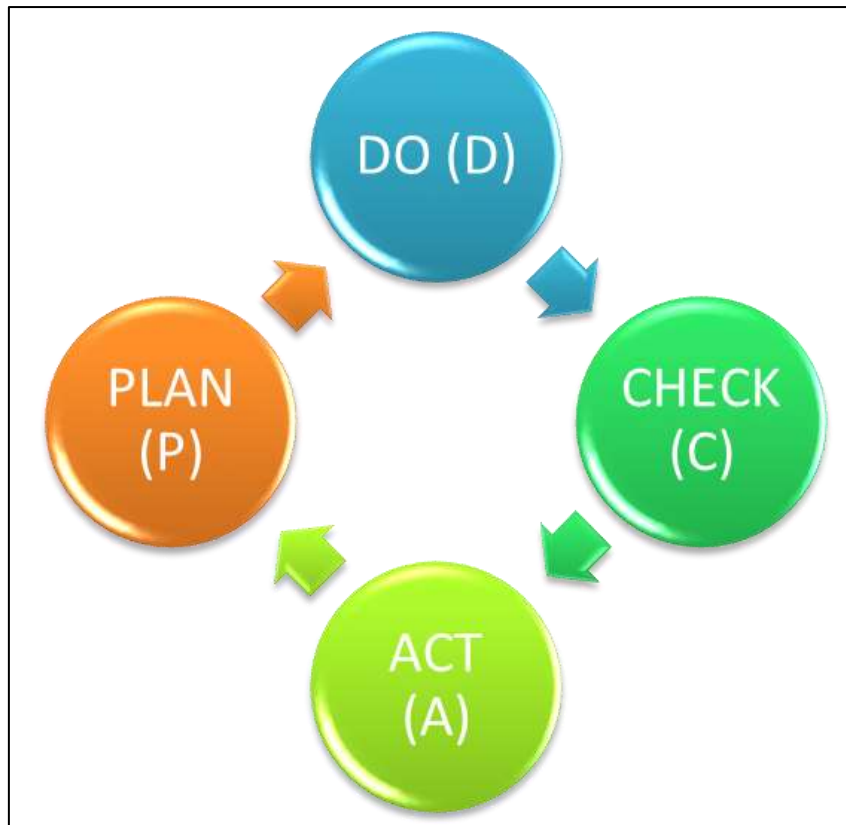


Figure 6-1 P.D.C.A. Cycle

6.3 INSTITUTIONAL REQUIREMENT

The Health, Safety and Environment (HSE) team has been instituted under the direct supervision of Director of MSS. The HSE manager is appointed to lead the entire HSE unit and conduct the factory safety procedures. To implement day to day safety actions and conduct risk assessments, a competent person will be also assigned as a HSE advisor. Moreover, trained safety professionals may be hired as additional specialized personnel such as industrial hygienists, environmental officers, fire safety experts if possible. Finally, the supporting members are selected from each operation section in order to ensure the effective collaboration and communication of working staffs. The HSE team will assign the HSE staffs at each shift of work duty for monitoring and reporting the environmental related problems happened at the respective. The terms of reference (TOR) of HSE team members are described in

HSE team is responsible for implementation and monitoring of EMP and monitoring plan as well as coordination with local authorities and the nearby communities. In addition, HSE team will adopt the emergency response actions for potential natural and anthropogenic hazards, ensuring the sustainable development of workplace area. The main responsibilities of HSE team is shown in Table 6-1, organization structure is in Figure 6-2 and their responsibilities in Figure 6-3.

Table 6-1 TOR of HSE Team

No.	HSE Team Member	Duties and Responsibilities
1.	HSE Manager	<p>Being responsible for overseeing the entire unit, making the environmental and factory safety protocols and guidelines.</p> <p>Regularly upgrading and modifying the existing factory management system</p> <p>Redressing the social problems and environmental issues in workplace area.</p> <p>Arranging and monitoring the socio-environmental condition of within and around the proposed project.</p> <p>Ensuring adherence to safety protocols, and liaising with factory management.</p>
2.	HSE Advisor	<p>Implementing day-to-day safety procedures</p> <p>Conducting risk assessments of workplace area.</p> <p>Ensuring the employee compliance with safety protocols</p> <p>Strictly monitoring the staffs to follow the factory management actions</p>
3.	Trained Safety Professional	<p>Following the stipulated factory management plans and safety procedures.</p> <p>Proper handling of safety equipments and emergency response functions of factory.</p> <p>Keeping the safety working space and working communities to redress the potential accidents and risks.</p> <p>Providing the training and knowledge sharing program related to first-aid tools, firefighting equipments and emergency response plan to working staffs.</p>
4.	Supporting Members	<p>Coordinating the policy markers and working staffs.</p> <p>Ensuring the compliance with the staff on the environmental management plans.</p> <p>Conduct the regular site inspections and investigate the potential hazards.</p> <p>Regularly reporting and informing the environment, health and safety condition of workplace and factory workers to the HSE advisor.</p>

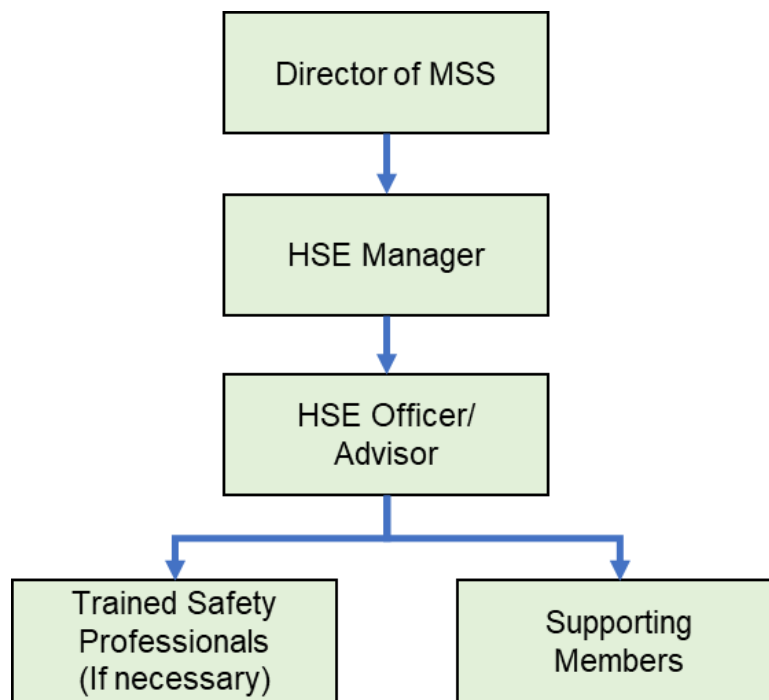


Figure 6-2 Organization Structure of the EMP Team



Figure 6-3 The Duties and Responsibilities of HSE Team

6.4 MITIGATION MEASURES OF POTENTIAL IMPACTS

In consideration of the mitigation measures for potential impacts, MSS has handed the the proposed antimony smelting and refinery factory from Kaung Kin Chout Pwint Company Limited in 2016 and the commercial production process has started since 2018. Therefore, mitigation measures of potential impacts in construction phase has not considered in this section.

Table 6-2 Summary of Impacts and Mitigation Measures during Operation Phase

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1.	Air Quality	Emission of particulate matter (PM2.5 & PM10), SO ₂ , CO ₂ , NO _x , CO and VOCs to the atmosphere.	Operation of Roasting and Smelting Furnace	<p>To capture the particulate matters and toxic gases, bag house, bag filters and wet scrubber are installed.</p> <p>Around 120 ft stack height arranges to avoid the ambient air pollution.</p> <p>The low sulfur content of coke or coal are selected to be used.</p> <p>Carefully handling of raw materials, coal, coke, antimony ore and grinded matters not to emit dust from loading, unloading and mixing activities.</p> <p>Avoid storing or pilling the grinded raw materials in open airy area with large amount and use the appropriate covers while operation.</p> <p>Collect the ash and storage in the ash box to avoid the dispersion.</p> <p>Regular check up the performance and operation system of furnance and perform maintenance if necessary.</p>	HSE Team	2,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Releasing of SO ₂ , Antimony powder and Particulate Matters (PM ₁₀ and PM _{2.5})	Roasting of Antimony Ore	<p>Conducting the regular inspections, cleaning and monitoring of key parameters (pH levels, spray nozzle conditions, airflow etc) of wet scrubber to ensure optimal performance and longevity.</p> <p>Maintaining the operation record of wet scrubber to track performance and identify potential issues.</p> <p>Carefully handling the wet scrubber as per recommendation given in SOP to avoid corrosion and leakage in dusts and other components.</p> <p>The closed storage container should be used to collect the antimony oxide powder from condensing pipes instead of gathering in open space.</p> <p>The regular cleaning activities of bag house and bag filters should be conducted to block in the gas the pipelines.</p>	HSE Team	

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Emission of CO ₂ , NO ₂ , SO ₂ and particulate matters (PM ₁₀ , PM _{2.5})	Operation of Supporting Facilities (Generators, logistic vehicles, etc)	Using the low sulphur content of fuel. Adopting the monitoring and maintenance system of factory's equipment and mechinaries. Sprinkling the water on street when loading with restriction of overwatering, which cause muddy road.	HSE Team	
2.	Noise and Vibration	Noise exposure to the surrounding environment Occupational hazards and structural damage due to vibration exposure	Operation processes; especially blower, geerators and raw material preparation (crushing and grinding of coal) Logistic vehicles for transporting raw materials and products.	Installing a fan silencer or keeping enclosed system to mitigate the high level of noise emission from blower. Regualrly inspecting and maintaining the he blower and its associated components to ensure optimal performance and minimize noise generation. Giving the priority in using of sound proof crushers for raw material preparation and handling section. Applying the anti-vibration mat at the potential point sources, i.e generators, and crushing machines.	HSE Team	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<p>Providing the adequate earplugs and earmuffs to workers in excessive noisy area.</p> <p>Assigning the alternative shift to factory workers in excessive noise areas and on a vibrating surface.</p> <p>Limiting the speed of vehicles and appointing the skillful workers for loading of raw materials.</p>		
3.	Water Quality	Increasing the content of suspended solids in water quality	Gas Cooling system with condensing tubes	<p>Installing the adequate overflow water tanks to decline the temperature of hot water released from cooling process and recycling them in the similar process (cooling stage of condensing tubes).</p> <p>Reducing the temperature of hot water to <30 °C in cooling tank before discharging.</p> <p>Restricting the leakage of hot water into the surrounding environment.</p> <p>Regular inspecting and maintaining the water pipelines and temperature control system.</p>	HSE Team	1,000,000
		Causing significant impact on the water body	Wet scrubber operation	Restricting the discharge of wastewater from the wet scrubber	HSE Team	

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		due to using of scrubbing liquid.		<p>operation such as spent scrubbing liquid to the environment.</p> <p>Carefully inspecting the water pipeline for wet scrubber operation not to cause the unexpected leakage.</p> <p>Ensuring that no wastewater is discharged during the time of sludge collection, effluents from each tank shall be detained in others.</p>		
		Causing the contamination of water due to containing the antimony powders	Cleaning and Washing Air bag Filters	<p>Setting up the sedimentation tanks to collect the suspended solids in the wastewater.</p> <p>Keeping the adequate detention time for sedimentation tanks to overflow the water into the outside drain.</p> <p>Constructing the brick drainage or concrete drainage throughout the factory area.</p> <p>Ensuring the proper drainage lines provision for storm/ rain water as well.</p>	HSE Team	

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				Monitoring annually the quality of all types of wastewater discharged from MSS.		
4.	Soil Quality	Causing the soil contamination due to leachate from waste pilling	Storing of Wastes at the project site	<p>Avoiding to pile the sediments wastes released from wet scrubber and sedimentation tanks on the ground.</p> <p>Keeping the waste collection site with impermeable flooring and shelters.</p> <p>Storing the wastes with well packing in accord with their safety handling actions of SOP.</p>	HSE Team	1,500,000
		Rising the content of chemicals concentration in soil quality	Using the waste slag in land fill process	<p>Disposing the waste (slag) to the designated dumping site in lined with stipulated guidelines and procedures of relevant departments.</p> <p>Avoid the filling of waste slag from roasting and smelting lines on the bare land without any liner system</p> <p>Applying the liner or leachate collection system in the waste disposing area to prevent the leachate migration into surrounding soil and water body.</p>	HSE Team	

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				Regular Monitoring of leachate quality to ensure that the concentration of chemical pollutants remain below the regulatory limits.		
		Polluting the soil qualities and soil ecosystem	Storing and handling of fuel, raw material and utilization of fuel	<p>Carefully handling and storing of fuel oil and raw material in line with their SOP.</p> <p>Giving the training to workers who handle with fuel and raw material not to cause the leakage to the environment.</p> <p>Promptly removing of polluted soil when occurring the unexpected spillage or leakage.</p> <p>Providing the impermeable floor to the raw material preparing or storing area.</p>	HSE Team	
5.	Solid Waste	Leading to soil and water pollution due to the leachate containing toxic chemicals from dumping site.	Releasing of hazardous waste from factory operation process	<p>Arranging to resell the slag (Pyit Sar) to the local buyers (cement and construction industry).</p> <p>Disposing the hazardous waste slag at the Nat San mine, which is located in Kyaikmayaw Township in accord with updated regulated laws and procedures.</p>	HSE Team	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				Prohibiting to direct dispose the industrial wastes on the ground.		
		Releasing the offensive odor and causing the outbreak of infectious disease due to improper waste management actions.	Generating of non-hazardous wastes from factory staffs	<p>Encouraging to segregate non-hazardous waste to reuse and recycle within the factory.</p> <p>Providing the adequate numbers of segregated dust bins.</p> <p>Setting up the waste storage area to collect temporarily before discharging.</p> <p>Creating the regular waste collection system and waste disposing method in collaboration with Township Municipal.</p> <p>Avoiding the open burning of wastes in factory area.</p>	HSE Team	
6.	Odor	Offensive odor can impact on the human health, ranging from temporary discomfort to more serious respiratory problem	Releasing from Roasting and Smelting Process	<p>Carefully sealing and installing the gaseous pipelines in roasting line and smelting line to avoid the leakage of flue gases.</p> <p>Installing the wet scrubbers to absorb or capture odor-causing compounds from a gas stream, mainly SO₂.</p> <p>Creating the proper ventilation system in production area to dilute</p>	HSE Team	1,000,0000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				<p>odor concentrations and improve air quality.</p> <p>Immediate response for fixing the damage filter bags inside the bag house as soon as the leakage is detected.</p> <p>Regularly monitoring the leakage of flue gas from the enclosed roasting and smelting line.</p>		
7.	Socio-economic and cultural component	Causing the social conflicts and disrespect in regional beliefs.	Factory operation process	<p>Providing the knowledge sharing programme to immigrant workers to respect regional beliefs and spiritual monuments.</p> <p>Restricting to access the residential area of indigenous people.</p> <p>Creating the suggestion box to collect the compliants from surrounding environments and also within the factory.</p> <p>Building the positive relationships between project proponents and affected communities by adopting the formal grievance redress mechanisms.</p>	HSE Team	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Causing the depletion of fresh water resources.	Using surface water from Attaran River	<p>Circulating the used water after treating in the production processes.</p> <p>Inhibiting the spillage of water when filling the water storage tanks.</p> <p>Sharing the domestic water conservation behaviors to all staffs.</p>		
8.	Occupational Health and Safety	Casuing the respiratory heath problems and also physical damages due to improper management system.	<p>Roasting and Smelting Process</p> <p>Operation of furnanes</p>	<p>Strictly sealing the gas pipelines and conjunctions not to cause the gas leakage</p> <p>Regularly monitoring and recording the gas leakage in roasting and smelting area.</p> <p>Providing the heat resistant gloves, skin cover and eyes cover to factory staffs who are working with high temperature.</p> <p>Regularly conducting the medical check up and providing the seasonal vaccines to workers.</p> <p>Providing first aid boxes in each production line and assigning the certified medical staff if possible.</p>	HSE Team	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
				Arranging and training to effectively use the personal protective equipments, like anti gas mask, N95 mask, heat resistant gloves in accord with their works.		

Table 6-3 Summary of Impacts and Mitigation Measures during Construction and Decommission Phases

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1.	Air Pollution	Emission of air pollutant such as particulate matter (PM2.5 & PM10), SO2, CO2, NOx, CO and VOCs to the atmosphere	<p>Operation of Construction and Demolition process</p> <p>Using transportation vehicles and generators</p>	<p>Before starting the construction and demolition process, the risk hazard area are set up and declared by the notice signs and barriers.</p> <p>The water sprays are employed to minimize the airborne particulate matter during process.</p> <p>Aviod the overwatering to the surrounding, which causes muddy ground.</p> <p>Carefully dismantling a structure to salvage reusable materials, reducing dust emission and preserving valuable resources.</p> <p>Adopting the sustainable manners by recycling materials from wastes from construction or demolition, such as concrete and metal after examination of their strength.</p> <p>Prohibiting to heap the raw materials in the open space.</p> <p>Using the safety nets and shelters when transportation of raw</p>	HSE Team and Contractor	2,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
2.	Noise and Vibration	Noise exposure to the surrounding environment Occupational hazards and structural damage due to vibration exposure	Operation of Construction and Demolition machines	<p>materials and demolished structures.</p> <p>Regularly checking all logistic vehicles and conducting the maintenance actions if necessary.</p> <p>Minimizing the travel distance and choosing the proper routes for transportation.</p> <p>Giving a priority to use low sulphur content fuel for generator and transportation vehicles.</p> <p>Conducting the regular inspection on the construction and demolition mechineries and maintenance works if required.</p> <p>Substitute with the modern machines with low sound level and vibration proof system.</p> <p>Ensuring the well maintained equipments, which produce the less noise and vibration.</p> <p>Adopting the construction or demolition techniques and actions, producing the less noise and</p>	HSE Team and Contractor	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
			Using generators and vehicles	<p>vibration such as mitimizing the drop heights when unloading material.</p> <p>Making the schedules or plans at appropriate times and informing nearby residents and businesses about potential noise and vibration level.</p> <p>Regular monitoring and recording of the noise and vibration level.</p> <p>Conducting a regular investigation and maintenance activities to the generators and transportation mechnes.</p> <p>Using the sound proof generators and engines if possible.</p> <p>Avoid unnecessary revving of the engines</p> <p>Preparing the short routs for loading and unloading materials.</p> <p>Using the mat and fences or walls to absorb the vibration and noise level at point source</p>		

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
3.	Water Quality	<p>The surface runoff and storm water can carry the sediment particles, chemicals and debris from construction or demolition site, declining the water quality and negatively impacts on aquatic animals and plants</p> <p>Causing the negative impact on water bodies without having proper management</p>	<p>Heaping the demolished or construction debris, bricks and other materials.</p> <p>Daily routines of factory workers</p>	<p>Placing the noise sources (generators) away from the residential area, with noise barriers.</p> <p>Prohibiting the piling of building materials on the open space, placing with shelters and cover.</p> <p>Adopting the proper waste disposal techniques with the control of leachate, providing the adequate dust pins and safe temporary waste dumping site</p> <p>Conducting the effective drainage system, embedding the erosion control measures such as sediment barrier etc.</p> <p>Assessing the water quality status and water flowing patterns to consider the factory's management action.</p> <p>Providing the hygienic toilet or restroom with adequate septic tanks.</p>	HSE Team and Contractor	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
4.	Soil Quality	Causing the soil erosion and impact on soil quality.	Operation of construction or demolition machines	<p>Regular removing of sludges from septic tanks and making secure not to cause the leakage.</p> <p>Checking and cleaning the drainage channels to avoid the blockage of water flow.</p> <p>Preventing to make disturbance on natural water flow and water channels.</p> <p>Installing the temporary silt fence at the water spraying area.</p> <p>Ensuring proper handling and storing the fossil fuel, lubricant oil and grease.</p> <p>Removing the polluted soil immediately after spillage of oil.</p> <p>Investigating the machines and providing the preservation activities to ensure the better performance.</p> <p>Collecting the used engine oil and lubricants with safety containers and disposed as per their SOP.</p>	HSE Team and Contractor	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
5.	Solid Waste	Impacting the environment and public health due to improper storage system.	Released from the Construction or Demolition process	<p>Arranging the impermeable floor with shelter at the temporary waste storage site</p> <p>Creating the vegetation cover to avoid the soil erosion.</p> <p>Before starting, planning and analyzing the type and quantity of waste generated during the process.</p> <p>Segregating the waste types (eg. Wood, concrete, metal) at pollution sources and heaping as per composition materials.</p> <p>Encouraging the reusable materials to reuse in the project site or resell to the local buyers</p> <p>Disposing the waste that cannot be recycled or reused in accordance with local regulations and environmental guidelines.</p> <p>Separating the hazardous and e-wastes from the usable waste, storing and disposing in accord with regional guidelines.</p>	HSE Team and Contractor	1,500,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Releasing the offensive odor and causing the outbreak of infectious disease due to improper waste management actions.	Released from factory workers and dormitory	<p>Forbidding the open burning of wastes.</p> <p>Arranging the adequate numbers of waste bin throughout the project site.</p> <p>Adapting the regular waste collection system with helps of township municipals.</p> <p>Ensuring all dust bins with the covers not to release offensive odor and leachate.</p> <p>Segregating the wastes to be reused and recycled, regularly disposing with the Township Municipal as per national guidelines.</p>		
6.	Socio-economic and cultural component	Causing the socio-economic impacts on surrounding residents	Operation of construction or demolition process	<p>Performing to minimize the potential hazards (falling construction materials, dust dispersion, etc) to surrounding environment.</p> <p>Providing and creating the job vacancies and economic opportunities to local residents during project.</p>	HSE Team and Contractor	1,000,000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
7.	Occupational Health and Safety	Causing the workplace accidents such as physical injuries, occupational diseases, etc	Applying the construction machines such as excavators, cranes, bulldozers etc.	<p>Providing the knowledge sharing programme to factory workers to respect the regional beliefs and spiritual monuments.</p> <p>Providing the workplace safety training programme to ensure the safe handling and operation of heavy machines and emergency equipments</p> <p>Assigning the skillful workers in the specialized works (crane operator, drivers, etc)</p> <p>Arranging to achieve the clean and hygienic water to factory workers</p> <p>Providing the first aid boxes in working site and assigning the certified medical staff if possible.</p> <p>Regularly conducting the medical check up and providing the seasonal vaccines to workers.</p>	HSE Team and Contractor	1,000,000
8.	Ecosystem and natural environment	The overall impact of demolition stage can disrupt the delicate balance of ecosystems, leading to a decline in	Operation of construction or demolition process and	Recreating the vegetative covers for all season to avoid soil erosion and enhance the soil fertility.	HSE Team and Contractor	1,000,0000

No.	Impact Category	Potential Impact Assessment	Project Activities	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		biodiversity and a loss of ecosystem services	livelihood of factory workers	<p>Replanting the local plants and conducting the regular maintenance activities for planting.</p> <p>Avoiding to cut down the tree if possible.</p> <p>Prohibiting to disturb the natural water flow.</p>		

6.5 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring plan is important for the effective execution and successful implementation of EMP. Environmental monitoring is a tool to judge environmental conditions and trends which support the proposed project's implementation, and develop information for reporting to national policymakers and the public. According to article 108 of EIA procedure (2015), the project proponent shall submit monitoring reports to the Ministry not less frequently than every six months, as provided in a schedule in the EMP. The HSE team was instituted to be responsible for environmental monitoring plan and the detailed information such as location of monitoring points, frequency and monitoring parameters are shown in Table 6-4 and Table 6-5.

Table 6-4 Environmental Monitoring Plan during Operation Phase

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
Air Quality	Ozone, Nitrogen Dioxide, Sulphur Dioxide, Particulate Matter (PM 2.5 and PM10), Total Suspended Particles, Carbon Monoxide	Near Roasting Furnance and Generator 16° 28.588'N, 97° 40.557'E	Twice in a year	HSE Team	6,000,000
		Near Smelting Process 16° 28.576'N, 97° 40.618'E			
		Ambient Air Quality 16° 28.462'N, 97° 40.612'E			
Water Quality	pH, Color, Turbidity, TDS, Hardness, Chloride, Nitrate, Arsenic, Iron, Lead, Manganese, Sulfate, Total-Coliform	Groundwater from Project Site 16°28'34.99"N 97°40'33.04"E	Twice in a year	HSE Team	3,000,000
	pH, Temperature, TSS, Ammonia, BOD, COD, Total Chlorine, Cyanide, Total Phosphorous, Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Nickel, Mercury, Chromium (Hexavalent), Sulfide, Phenol, Fluoride, Oil & Grease, Total-Coliform	Wastewater from Discharged Point 16°28'37.40"N 97°40'35.25"E			
	Total Suspended Solids, BOD, COD, DO, pH, Ammonium nitrogen, Oil and grease, E.coli, Copper	Surface Water from Attran River			

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
		16°28'18.31"N 97°40'29.21"E			
Noise level	Day time and Night time Noise Level	Near Roasting Furnance & Generator 16° 28.588'N, 97° 40.557'E	Twice in a year	HSE Team	1,800,000
		Near Smelting Process 16° 28.576'N, 97° 40.618'E			
		Ambient Quality 16° 28.717'N, 97° 40.613'E			
Soil Quality	pH, Zinc, Copper, Lead, Arsenic	Within the project site 16°28'37.32"N, 97°40'36.17"E	Twice in a year	HSE Team	600,000
Odor Level	Odor Value	Smelting Furnance 16°28'36.66"N, 97°40'33.16"E	Twice in a year	HSE Team	3,000,000
		Raw Material Piling 16°28'36.10"N, 97°40'33.69"E			
		Charcoal Storage Area 16°28'36.19"N, 97°40'35.95"E			

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
Vibration	Radial, Transverse, Vertical	Near Roasting Furnance & Generator 16° 28.588'N, 97° 40.557'E	Twice in a year	HSE Team	2,000,000
		New Extension Area 16° 28.576'N, 97° 40.618'E			
Solid Waste	Amount and type of solid waste	Temporary waste storage area and around the project site	Weekly	HSE Team	1,000,000
Occupational Health and Safety	Incident/ accident records	Around the project site	Monthly	HSE Team	1,000,000
Ecosystem	The number of species composition and its distribution. The existence of natural water bodies, waterway and animals pathways. The potential impacts on natural habitat of biodiversity due to construction activities and wastes.	Around the project site	Monthly	HSE Team	1,000,000

Table 6-5 Environmental Monitoring Plan during Construction and Decommissioning Phases

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
Air Quality	Ozone, Nitrogen Dioxide, Sulphur Dioxide, Particulate Matter (PM 2.5 and PM10), Total Suspended Particles, Carbon Monoxide,	Near Roasting Furnance and Generator 16° 28.588'N, 97° 40.557'E	Once in construction and decommission phase	HSE Team	1,000,000
Water Quality	pH, Color, Turbidity, TDS, Hardness, Chloride, Nitrate, Arsenic, Iron, Lead, Manganese, Sulfate, Total-Coliform	Groundwater from Project Site 16°28'34.99"N 97°40'33.04"E	Once in construction and decommission phase	HSE Team	1,000,000
	pH, Temperature, TSS, Ammonia, BOD, COD, Total Chlorine, Cyanide, Total Phosphorous, Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Nickel, Mercury, Chromium (Hexavalent), Sulfide, Phenol, Fluoride, Oil & Grease, Total-Coliform	Wastewater from Discharged Point 16°28'37.40"N 97°40'35.25"E			
Noise level	Day time and Night time Noise Level	Near Roasting Furnance and Generator 16° 28.588'N, 97° 40.557'E	Once in construction and decommission phase	HSE Team	300,000
Soil Quality	pH, Zinc, Copper, Lead, Arsenic	Within the project site 16°28'37.32"N, 97°40'36.17"E	Once in construction and	HSE Team	300,000

Monitoring Item	Monitoring Parameter	Monitoring Location	Frequency	Responsible Organization	Annual Estimated Cost (MMK)
			decommission phase		
Odor Level	Odor Value	Smelting Furnance 16°28'36.66"N, 97°40'33.16"E	Once in construction and decommission phase	HSE Team	500,000
Vibration	Radial, Transverse, Vertical	Near Roasting Furnance & Generator 16° 28.588'N, 97° 40.557'E	Once in construction and decommission phase	HSE Team	500,000
Solid Waste	Amount and type of solid waste	Temporary waste storage area and around the project site	Weekly	HSE Team	500,000
Occupational Health and Safety	Incident/ accident records	Around the project site	Monthly	HSE Team	500,000
Ecosystem	The number of species composition and its distribution. The existence of natural water bodies, waterway and animals pathways. The potential impacts on natural habitat of biodiversity due to construction activities and wastes.	Around the project site	Monthly	HSE Team	500,000

6.6 SUB PLAN FOR ENVIRONMENTAL MANAGMENT PLAN

According to Article 63, Section 8, Sub-section 8.6 of EIA Procedure (2015), the environmental management Sub-Plan is required to include in EMP implementation. Each monitoring Sub-Plan shall include objectives, legal requirement, overview maps, implementation schedule, management actions, monitoring plans, projected budgets and responsibilities. The environmental monitoring Sub-Plan for air quality, water quality, noise and vibration, solid waste management as well as occupational health and safety are as follows.

6.6.1 AIR QUALITY MANAGEMENT SUB PLAN

Objectives

The main objectives are to establish a framework for planning and managing air quality in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goad is to protect human health and the environment from the negative impacts of air pollution.

Relevant Law and Regulation

The air quality management is conducted by referring ambient air quality standards in National Environmental Quality (Emission) Guidelines 2015, were announced on 29th December 2015.

Management Actions

Operation Phase

Existing Factory Management Actions for Air Quality

Being a antimony smelting and refinery factory, the sulphur dioxide and particulate matters are mainly released from the production process. In the factory, the wet scrubber is installed to react the sulphur dioxide, nitrogen oxide and other minor contaminants in emission gas released from roasting and smelting process in order to achieve the acceptable limit. In addition, the stack having 120 ft height is installed at the factory to avoid the ambient air pollution. Regarding the particulate matters and dust, the enclosed production systems are adopted with two bag houses and one bag filter to capture the volatized antimony oxide which is attached with particulate matters in the flue gas, in Figure 6-4.





Figure 6-4 Installed Air Quality Management Actions

Management Actions

Regarding the production process, the installed bag houses, bag filters and wet scrubbers are regularly investigated and carried out the required maintenance activities as per their standard operation procedures.

The gas leak detection system must be conducted within the factory to trace the gas leaks from joints or connections of pipeline in wet scrubber and bag house. In collection of antimony oxide, the enclosed containers have to be used, especially at the area where the antimony powders are collected through open pipe. In addition, the protective covers have to be installed at sieving area for coal and coke in the raw material handling section. Moreover, the grinded coal and coke should be stored with covers, not heaping on the open airy area with large amount, which can be easily dispersed by wind. The workers are assigned with the alternative shift and trained to wear the personal protective equipments, especially anti-gas mask, N95 mask who are working in the raw material handling section, smelting and roasting lines. The ambient air quality in workplace area must be monitored regularly.

Construction and Decommission Phase

During construction and decommission phase, water sprays are used to avoid the dispersion of airborne particulate matters, however, the overwatering should be avoid. Before starting the process, the planned schedules and expected impacts have to be informed to the surrounding area. The piling of raw materials in open space is prohibited and the safety nets or covers should be applied when transporting of goods. To minimize dust emission, the wind breakers or fences must be installed around the project site. The N 95 masks are provided to all workers throughout their working period.

Monitoring Actions

The monitoring actions for air quality is shown in Table 6-6 and .

Table 6-6 Air Monitoring Plan

	Operation Phase	Construction and Decommission Phase
Monitoring Parameter	O3, NO2, SO2, PM2.5, PM10, TSP, CO	O3, NO2, SO2, PM2.5, PM10, TSP, CO

Monitoring Frequency	Twice a year (dry and wet seasons)	Once in Construction and Decommission
Estimated Annual Budgets	6,000,000 MMK	1,000,000 MMK
Responsible Team	HSE Team of Proposed Project	HSE Team of Proposed Project
Monitoring Location	Near Roasting Furnance and Generator, (A1) 16° 28.588'N, 97° 40.557'E	Near Roasting Furnance and Generator (A1) 16° 28.588'N, 97° 40.557'E
	Near Smelting Process, (A2) 16° 28.576'N, 97° 40.618'E	
	Ambient Air Quality (A3) 16° 28.462'N, 97° 40.612'E	

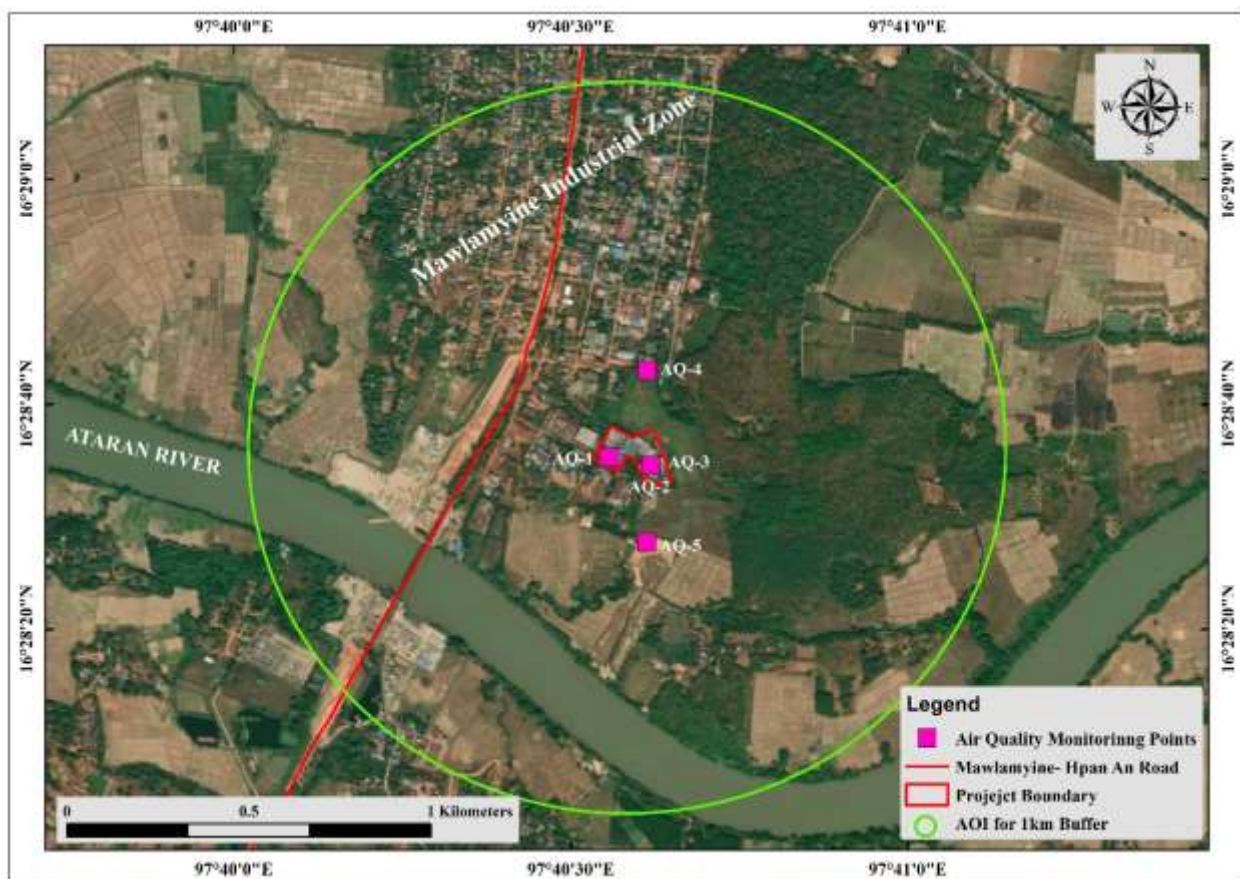


Figure 6-5 Location Map of Air Quality Monitoring Stations for Operation Phase

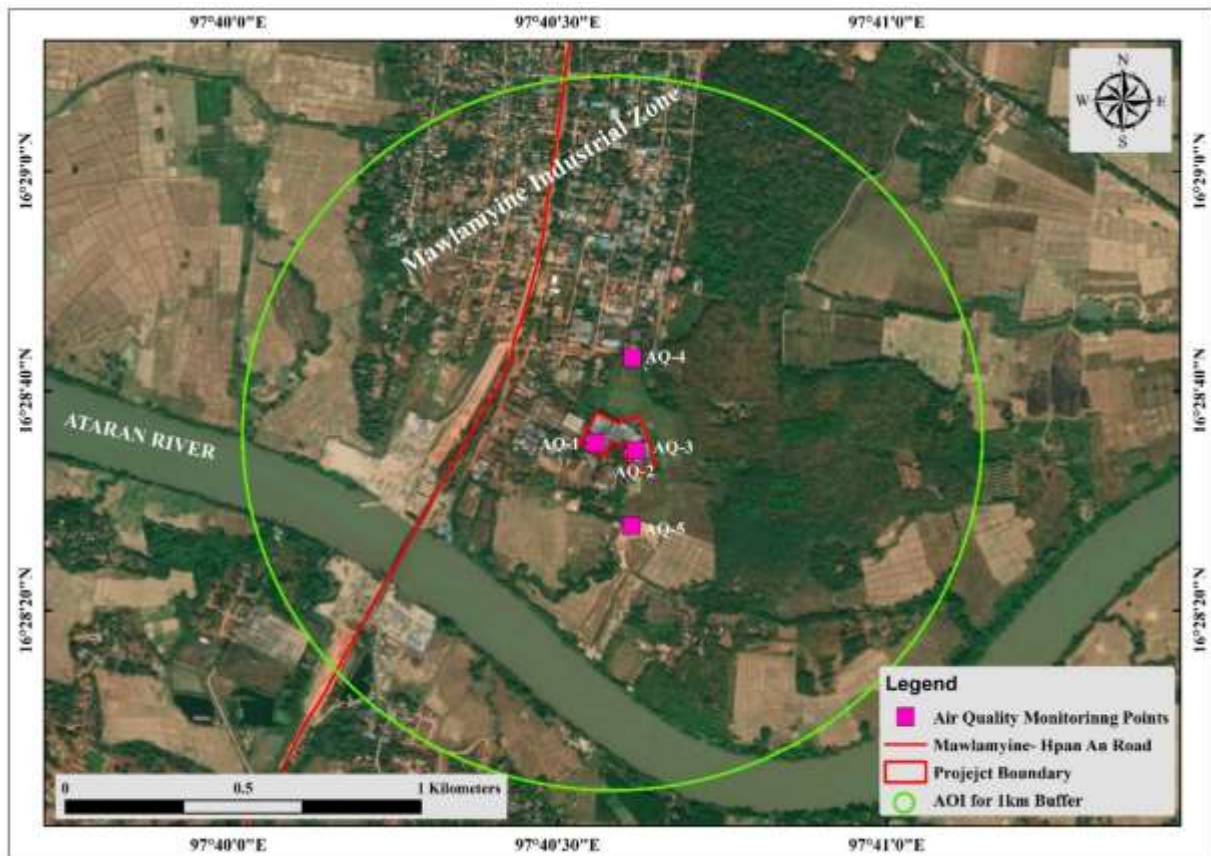


Figure 6-6 Location Map of Air Quality Monitoring Station for Construction and Decommission Phase

6.6.2 WATER QUALITY MANGEMENT SUB PLAN

Objectives

The main objectives are to establish a framework for planning and managing water quality in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to protect human health and the environment from the negative impacts of water pollution.

Relevant Laws and Regulations

The proposed project will comply with the general application from effluent guidelines of NEQEG (2015), National Drinking Water Quality Guidelines (2019) and National Surface Water Quality Standards (2024).

Management Actions

Operation Phase

Existing Factory Management Actions for Water Quality

The proposed factory use water for cooling the condensation tubes to produce antimony oxide. The wastewater generated from cooling process of condensation tubes are about 3,500 gallons per day, which are flowing into the four series of water cooling tanks to reduce the water temperature. The cooling tanks have 22ft × 14 ft × 19 ft in dimension and their total storage capacities are around 44,000 gallons. To be reused in the condensation tubes, the wastewater are cooled in the cooling tanks for 12 hours. In this cooling tanks, the overflow point is installed

at the final tank. The wastewater in cooling tanks are mostly reused in the production process of cooling condensation tubes. Another wastewater generation source is the washing of bag filters and cleaning of working area and all of them are treated in the sedimentation tanks (which has 22ft × 14 ft × 18.6 ft in dimension) to recover the antimony dust and settle down the suspended solids before discharging into the drain. The process of removing sludge from sedimentation tank is carried out once in every 3 months and the estimated sludge generation capacity is about 8 tonnes per once. All sludges which are settled in settling tanks are tested for the presence of antimony. If antimony is found, they are reused in the roasting lines and if not, they are dried and disposed as the solid waste. Regarding the operation of wet scrubber, the scrubbing liquids are completely reused in the wet scrubber without discharging to the surrounding. The wastewater expected from a small testing laboratory is very limited and disposed to the factory drainage, generating 10-100 ml of cleaning water from laboratory.

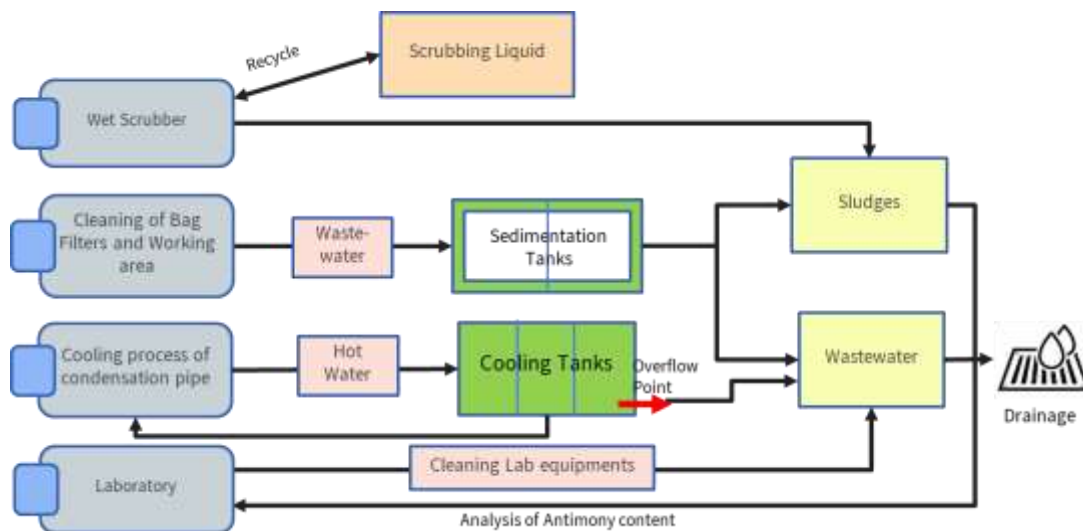


Figure 6-7 Flow Chart of Factory Wastewater Management System



Figure 6-8 Factory Wastewater Management Actions

Regarding the domestic wastewater and storm water, the drainage channels with 1.5 ft in width and 3 ft in depth are installed around the project site to prevent the seasonal flooding. All drainage lines are directly joined to the municipal drainage channel. The layout of stormwater drainage is described in.



The cooling water for condensation pipes are arranged to be completely reused in similar manners within the factory. The water level and the retention time of treatment tanks (cooling and sedimentation tanks) have to be regularly monitored to control water temperature and water spillage. Moreover, the roof system should be constructed over the ponds not to cause the water flooding from tanks during rainy season. In addition, the water storage capacity of treatment tanks have to be extended, aligned with the water usage in new production lines. To control the antimony content, the wastewater released from washing activities of bag filters and working area must be kept in the sedimentation tanks with enough water retention time for settling the suspended matters and the discharged water must be analyzed and treated to meet with regulated standards.

Construction and Decommission Phase

The purified and hygienic water resources are distributed throughout the project site. The systematic drainage systems are conducted, installed with the sediment control measures such as sediment barriers in drainage. The proper handling of fuel oil and other lubricants should be adopted within the workplace area and if pollution occurs, the urgent remediation actions must be planned, such as by removing the polluted water or using oil absorbing papers. The adequate septic tanks with clean toilets or rest rooms are provided to the factory workers throughout the project timeline.

Monitoring Actions

The monitoring actions for water quality is shown in Table 6-7.

Table 6-7 Water Monitoring Plan

	Operation Phase	Construction and Decommission Phase
Monitoring Parameter	Groundwater pH, Color, Turbidity, TDS, Hardness, Chloride, Nitrate, Arsenic, Iron, Lead, Manganese, Sulfate, Total-Coliform	Groundwater pH, Color, Turbidity, TDS, Hardness, Chloride, Nitrate, Arsenic, Iron, Lead, Manganese, Sulfate, Total-Coliform
	Wastewater pH, Temperature, TSS, Ammonia, BOD, COD, Total Chlorine, Cyanide, Total Phosphorous, Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Nickel, Mercury, Chromium (Hexavalent), Sulfide, Phenol, Fluoride, Oil & Grease, Total-Coliform	Wastewater pH, Temperature, TSS, Ammonia, BOD, COD, Total Chlorine, Cyanide, Total Phosphorous, Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Nickel, Mercury, Chromium (Hexavalent), Sulfide, Phenol, Fluoride, Oil & Grease, Total-Coliform
	Surfacewater Total Suspended Solids, BOD, COD, DO, pH, Ammonium nitrogen, Oil and grease, E.coli, Copper	
Monitoring Frequency	Twice a year (dry and wet seasons)	Once in Construction and Decommission
Estimated Annual Budgets	3,000,000 MMK	1,000,000
Responsible Team	HSE Team of Proposed Project	HSE Team of Proposed Project
Monitoring Location	Groundwater from Project Site (GW)	Groundwater from Project Site 16°28'34.99"N 97°40'33.04"E

	16°28'34.99"N 97°40'33.04"E	
	Wastewater from Discharged Point (WW))	Wastewater from Discharged Point(WW)
	16°28'37.40"N 97°40'35.25"E	
	Surface Water from Attran River(SW)	16°28'37.40"N 97°40'35.25"E
	16°28'18.31"N 97°40'29.21"E	

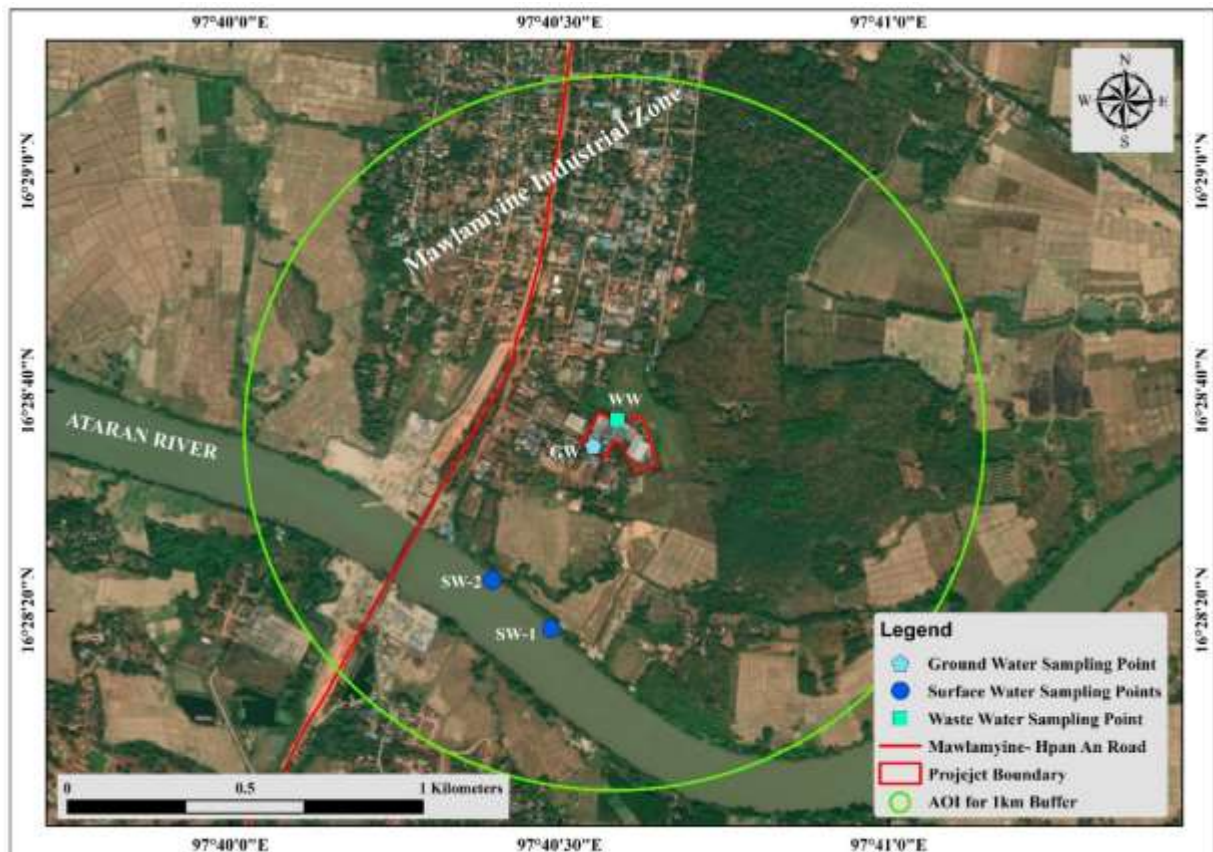


Figure 6-10 Location Map of Water Monitoring Stations for Operation Phase

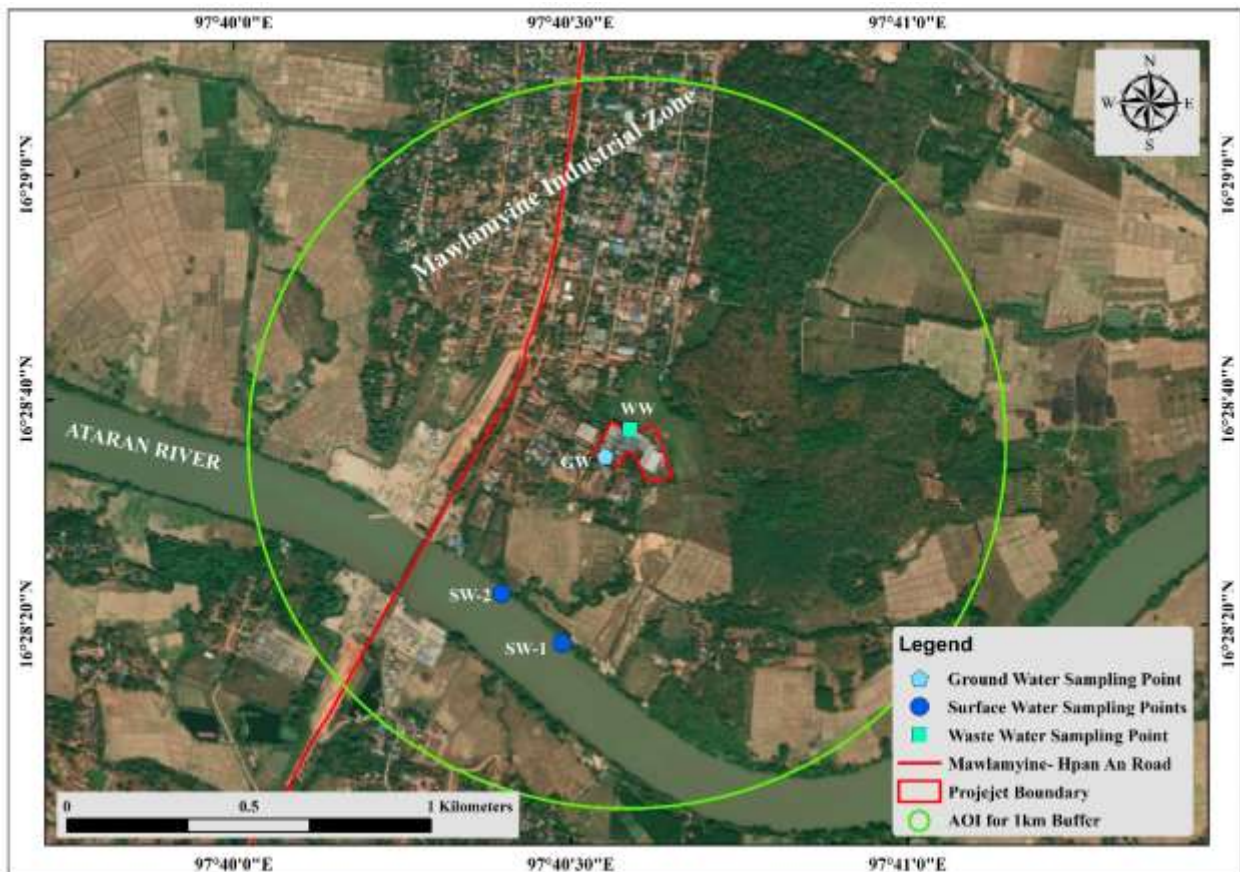


Figure 6-11 Location Map of Water Monitoring Station for Construction and Decommission Phase

6.6.3 NOISE AND VIBRATION LEVEL MANAGEMENT SUB PLAN

Objectives

The main objectives are to establish a framework for planning and managing noise and vibration level in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to protect human health and the environment from the negative impacts of noise and vibration pollution.

Relevant Laws and Regulations

The proposed project will comply with the National Environmental Quality (Emission) Guidelines for noise level and the Vibration Emitted from Specified Construction Works for vibration level.

Operation Phase

Existing Factory Management Actions for Noise and Vibration Level

Regarding noise and vibration, the pollution sources such as generators are located away from the workers and residential area. Moreover, the blowers are installed in the enclosed system to mitigate the high level of noise emission from fans. The green belts are created around the project site to control the noise pollution. The work schedules are planned within the factory, in which the noisy and vibration works such as grinding process of raw materials and the operation of generators etc are conducted at the day time with short time intervals.

Recommended Management Actions

The blowers and crushing machines for raw material preparation are regularly investigated and maintained their components and performance. The sound proof crushers and generators should be used if possible and if not, the noise barriers or anti-vibration mats have to applied at the pollution source to minimize the potential impacts on surrounding area. The earplugs and earmuffs should be provided sufficiently to the workers in excessive noisy area. Regular monitoring of noise level should be conducted not to exceed the 85 dB (A) for a duration of more than 8 hours per day as per IFC guideline.

Construction and Decommission Phase

All construction and decommission machines such as backholes, soil excavators, are regularly investigated their joints of components and conducted with the maintenance activities as per their standard operation guideline. The modern technique and machines with low sound and vibration level should be prioritized to adopt in the workplace area. Not only provision of personal protective equipments (ear plugs, gloves, etc) to workers but also the regular monitoring and recording of the noise and vibration level have to be conducted.

Monitoring Actions

The monitoring actions for noise and vibration level is shown in Table 6-8 and **Error! Reference source not found..**

Table 6-8 Monitoring Plan for Noise Level

	Operation Phase	Construction and Decommission Phase
Monitoring Parameter	Day time and Night time Noise Level	Day time and Night time Noise Level
Monitoring Frequency	Twice a year (dry and wet seasons)	Once in Construction and Decommission
Estimated Annual Budgets	1,800,000 MMK	300,000
Responsible Team	HSE Team of Proposed Project	HSE Team of Proposed Project
Mornitoring Location	Near Roasting Furnance & Generator(N1) 16° 28.588'N, 97° 40.557'E	Near Roasting Furnance and Generator (N1) 16° 28.588'N, 97° 40.557'E
	Near Smelting Process(N2) 16° 28.576'N, 97° 40.618'E	
	Ambient Quality(N3) 16° 28.462'N, 97° 40.612'E	

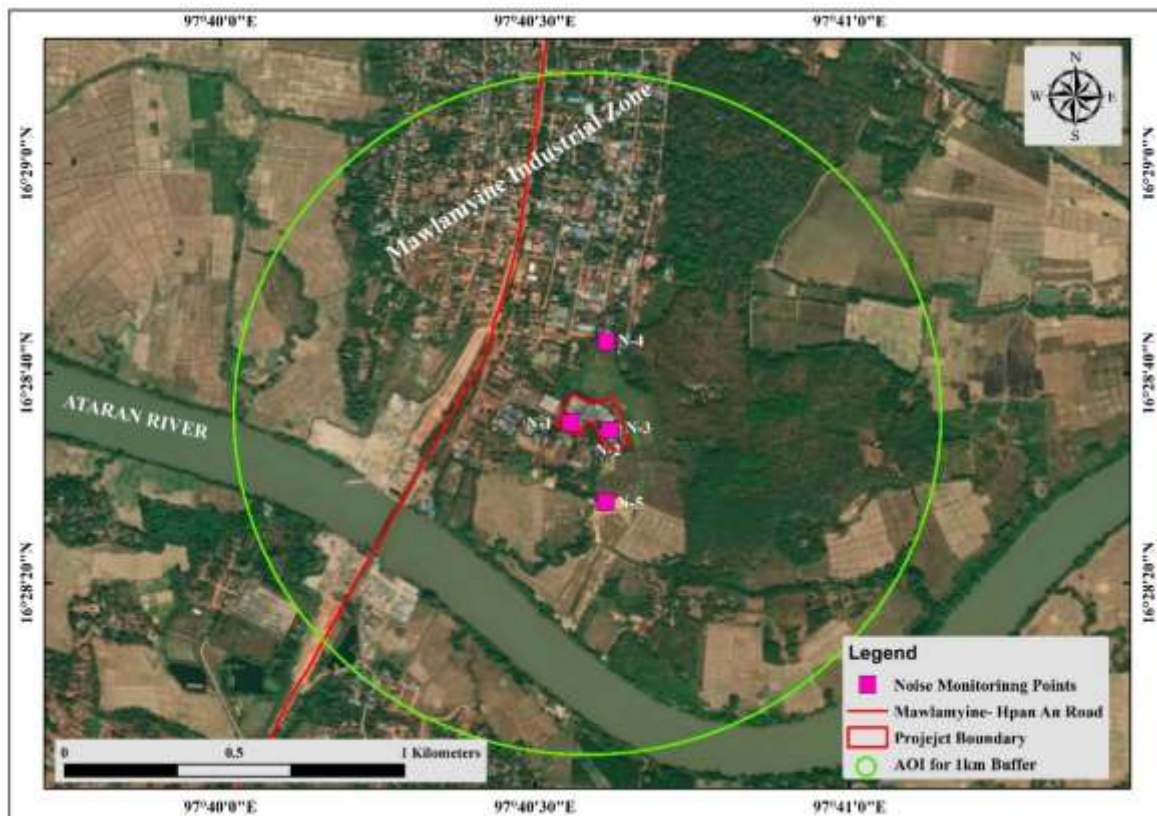


Figure 6-12 Location Map of Noise Monitoring Points for Operation Phase

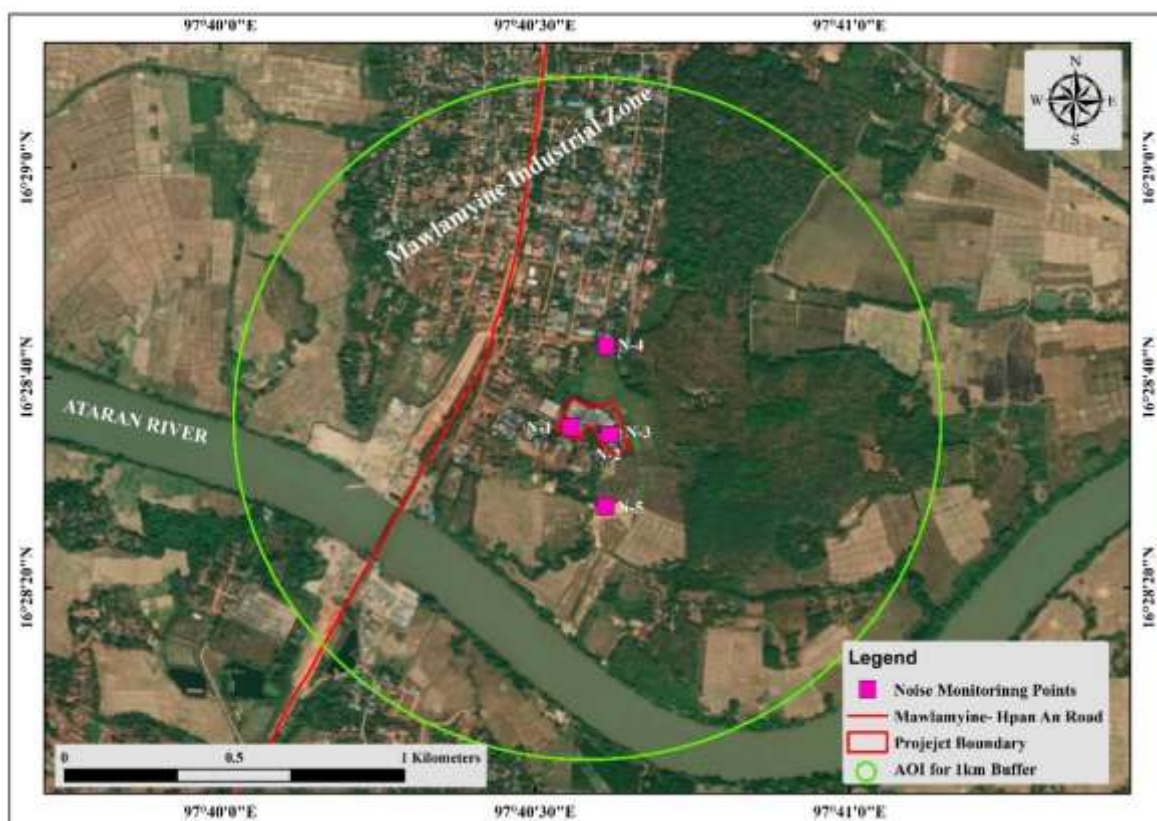


Figure 6-13 Location Map of Noise Monitoring Point for Construction and Decommission Phase

Table 6-9 Monitoring Plan for Vibration Level

	Operation Phase	Construction and Decommission Phase
Monitoring Parameter	Radial, Transverse, Vertical for vibration	Radial, Transverse, Vertical for vibration
Monitoring Frequency	Twice a year (dry and wet seasons)	Once in Construction and Decommission
Estimated Annual Budgets	2,000,000 MMK	500,000
Responsible Team	HSE Team of Proposed Project	HSE Team of Proposed Project
Monitoring Location	Near Roasting Furnance & Generator (V1) 16° 28.588'N, 97° 40.557'E	Near Roasting Furnance & Generator(V1) 16° 28.588'N, 97° 40.557'E
	New Extension Area (V2) 16° 28.576'N, 97° 40.618'E	



Figure 6-14 Location Map of Vibration Monitoring Points for Operation Phase

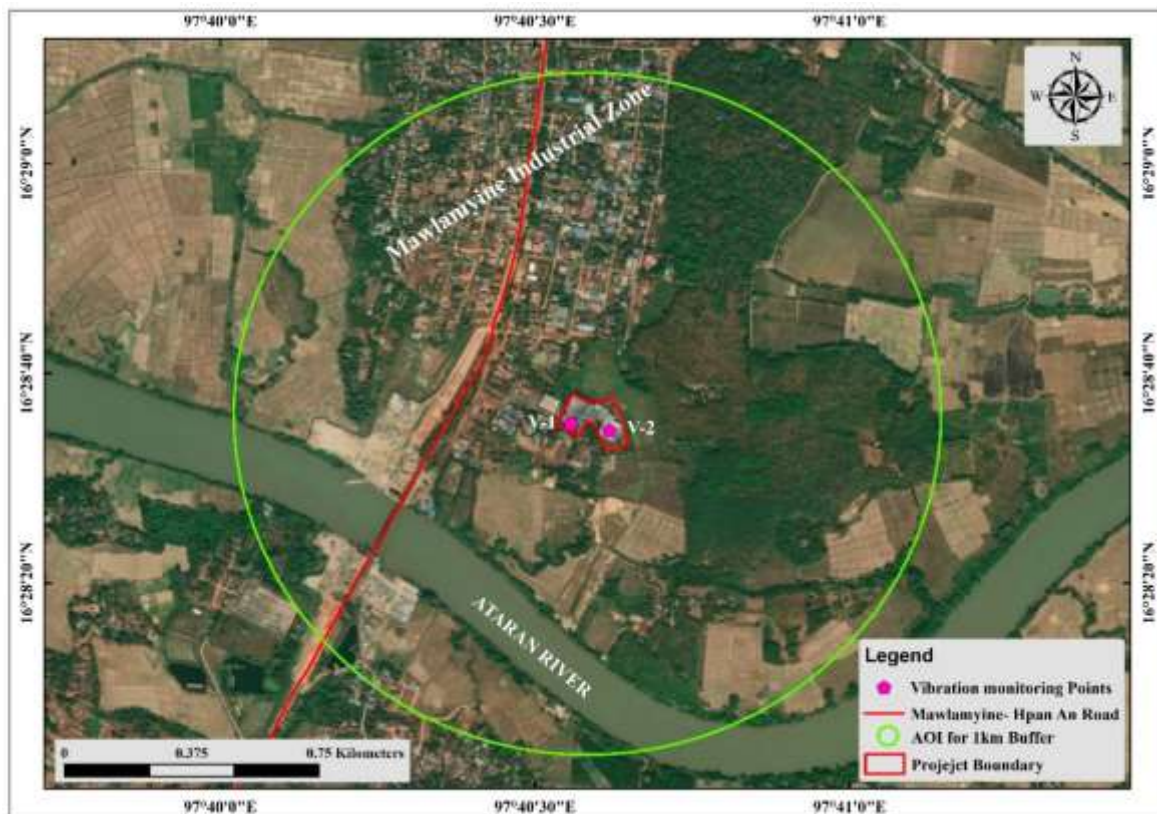


Figure 6-15 Location Map of Vibration Monitoring Points for Construction and Decommission Phase

6.6.4 SOLID WASTE MANAGEMENT SUB PLAN

Objectives

The main objectives are to establish a framework for planning and managing solid waste in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to protect human health and the environment from the negative impacts of waste pollution.

Relevant Laws and Regulations

The proposed project will comply with the general guidelines of NEQEG (2015) and Mon State Municipal Law.

Management Actions

Operation Phase

Existing Factory Management Actions for Waste Management

Domestic Waste Management

Within the factory, all domestic wastes are collected by the waste bins and then all the wastes are temporarily piled at the pit hole in front of the factory compound. Afterwards, they are burnt in the hole after filling.

6.6.5 INDUSTRIAL WASTE MANAGEMENT

The slag wastes are mainly released from the roasting and smelting line, which are known as Pyit Sar and Chor Khal respectively. In addition, the sludges are also generated from the wet scrubber operation. All Pyit Sar and Chor Khal released from the roasting and smelting lines are cooled, in which hot pyit sar are kept in the open yard of factory and chor khal are cooled in iron cart. When temperature decreases, all pyit sar and chor khal are tested the antimony concentration. If the antimony content is still greater 0.01% in the wastes, pyit sar are reused in roasting stage and chor khal are added in smelting line to recover the antimony. In the similar manner, the sludges released from the wet scrubber are reused back in the roasting line by mixing with the antimony ores based on the laboratory test of antimony concentration.

Being composed with burnt coke and coal, the final waste of pyit sar, which has less than 0.01% of antimony content are heaped and they are reused as the base layer for concreting ground in land filling and road upgrading process. At the time of IEE preparation, the proposed factory is arranging pyit sar to produce the commercial brick by using brick making machines.

The chor khal and sludges from wet scrubber with less than 0.01% of antimony content are well pressed and packed to dispose at the Nat San Mine in line with instructions and guidelines of relevant department and local authorities.

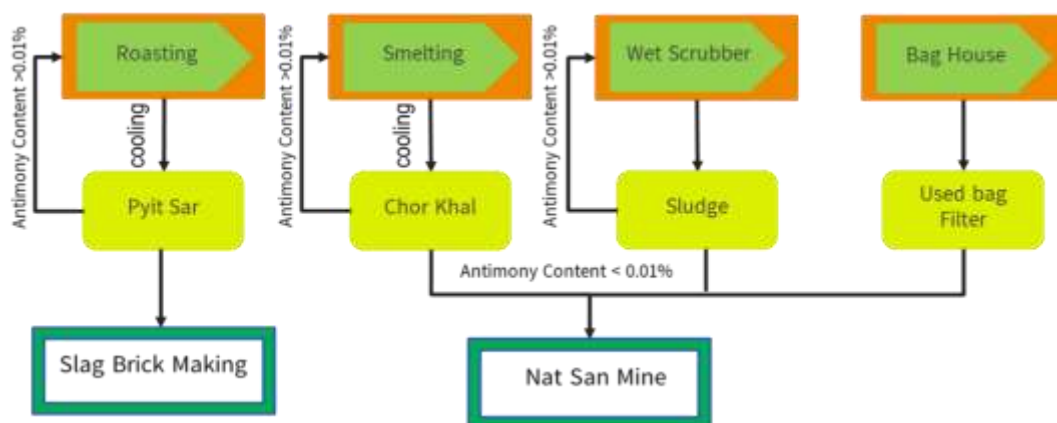


Figure 6-16 The Flow Chart of Solid Waste Management Action of Proposed Factory



Figure 6-17 Removing Sludges from the Base of Wet Scrubber



Figure 6-18 Temporary Storage Area of Waste Slags

Recommended Management Actions

Before making bricks, Pyit Sar have to be tested their composition structures at the laboratory and reused under the permission of Environmental Conservation Department, Mining Department and other local authorities. The Chor Khal and Sludges from the wet scrubber have to be disposed appropriately at Nat San Mine in accord with the regulations/ guidance of respective department. The hazardous waste slag; Chor Khal and Sludges from wet scrubbers must not be disposed on the ground without having any liner layer. It is prohibited to pile the Pyit Sar slag directly on the ground without having paved platform or liner layer. Moreover, open burning of domestic wastes must be prohibited and all of them should be disposed by contacting local municipal in line with the regulatory guidelines.

Construction and Decommission Phase

The wastes released from construction and decommission process must be segregated at the pollution sources based on criteria of recyclables, hazardous wastes and organic wastes. The recyclable wastes are encouraged to be reused in the project site or resell to the local buyers, while hazardous wastes must be disposed under the regulation of Township Municipal. The temporary storage area of wastes should not be open airy space and near to the natural water bodies. For domestic wastes from construction workers, the hygienic waste bins should be provided and regularly disposed with Township Municipals. The open burning of wastes must be avoided.

Monitoring Actions

The monitoring actions for solid waste management is shown in Table 6-10.

Table 6-10 Monitoring Plan of Solid Waste

	Operation Phase	Construction and Decommission Phase
Monitoring Parameter	Amount and type of solid wastes Disposal method	Amount and type of solid wastes Disposal method
Monitoring Frequency	Weekly	Weekly

Estimated Annual Budgets	1,000,000 MMK	500,000 MMK
Responsible Team	HSE Team of Proposed Project	HSE Team of Proposed Project
Monitoring Location	Temporary waste storage area and around the project site	Temporary waste storage area and around the project site

6.6.6 SOIL QUALITY MANAGEMENT SUB PLAN

Objectives

The primary objective of soil quality management plan is to ensure that long-term health and productivity of the soil, while also protecting its resources and minimizing environmental impacts. This involves optimizing soil conditions for plant growth, improving agricultural productivity and safeguarding ecosystems.

Relevant Laws and Regulations

The proposed project will comply with the international guidelines; “Regulation for Implementing the Law on Soil Contamination Countermeasures, Japan (2022)”, Notification of National Environmental Board No.25, B.E. Thailand (2004) and QCVN 03:2008/BTNMT, Applied “industrial land”, Vietnam.

Management Actions

Operation Phase

Existing Factory Management Actions for Soil Quality

The waste slags are temporary stored at the steel structure building with concrete floor in the factory compound before disposal to the Nat San Mine. The fossil fuel are stored with barrels at the fuel storage area with concrete floor. Moreover, the flooring of raw materials handling area are made of concrete and piling and preparation of raw materials are performed on the paved platform. Regarding the soil quality, in around 2020, the proposed factory had already used the waste slag (mainly pyit sar) in the land filling process in the factory compound, without any liner layer at the base, contributing the soil pollution. In recent 2025, it will be arranging to make the bricks by using the granulated blast furnace slag, mixing it with lime and sand and pressing it into the molds. The Chor Khal and sludges from wet scrubber are collected and temporarily stored at the storage site of project site before discharging to the Nat San Mine.

Recommended Management Actions

The waste slags (Pyit Sar) have to be analyzed their composition structures, which are composed of heavy metals or not and got a legal permission from relevant departments such as Environmental Conservation Department and Mining Department, before making a slag bricks. It is strictly prohibited from heaping the waste slag directly on the open ground without any liner system. The released Chor Khal from smelting process and sludges from wet scrubber must be disposed at the designated area of Nat San Mine, where should be clay layer or concrete lining not to allow the leachate into the soil. The general and domestic wastes generated from the dormitory must be disposed to the designated collection points or final disposal site by complying with the regulation of the local municipal instead of open burning. The storage,

handling and disposal of used chemical containers must be conducted in accordance with their guidelines without spillage, and leakage.

Construction and Decommission Phase

The segregated safety waste pins are provided throughout the project site with shelters and covers. The temporary waste storage area should be set up on the concrete area under roof, far from the natural water bodies and windy open space. The occurrence of leachate generated from waste storage area should be monitored by making the impermeable layer or collection system not to penetrate into the soil. The construction waste such as concrete, iron and steel should be reused or resold to the local buyers and non-recyclable wastes should be disposed to the designated dumping site in accord with regulated laws. The paints, oil and grease should be stored at the safety containers and carefully handled with their guidelines not to cause spillage or leakage. When the unexpected spillage or leakage occurs, the immediate removal of polluted soil should be carried out as soon as possible.

Monitoring Actions

The monitoring actions for soil quality is shown in Table 6-11.

Table 6-11 Monitoring Plan of Soil Quality

	Operation Phase	Construction and Decommission Phase
Monitoring Parameter	pH, Zinc, Copper, Lead, Arsenic	pH, Zinc, Copper, Lead, Arsenic
Monitoring Frequency	Twice a year (dry and wet seasons)	Once in Construction and Decommission
Estimated Annual Budgets	600,000 MMK	300,000 MMK
Responsible Team	HSE Team of Proposed Project	HSE Team of Proposed Project
Mornitoring Location	Within the project site 16°28'37.32"N, 97°40'36.17"E	Within the project site 16°28'37.32"N, 97°40'36.17"E

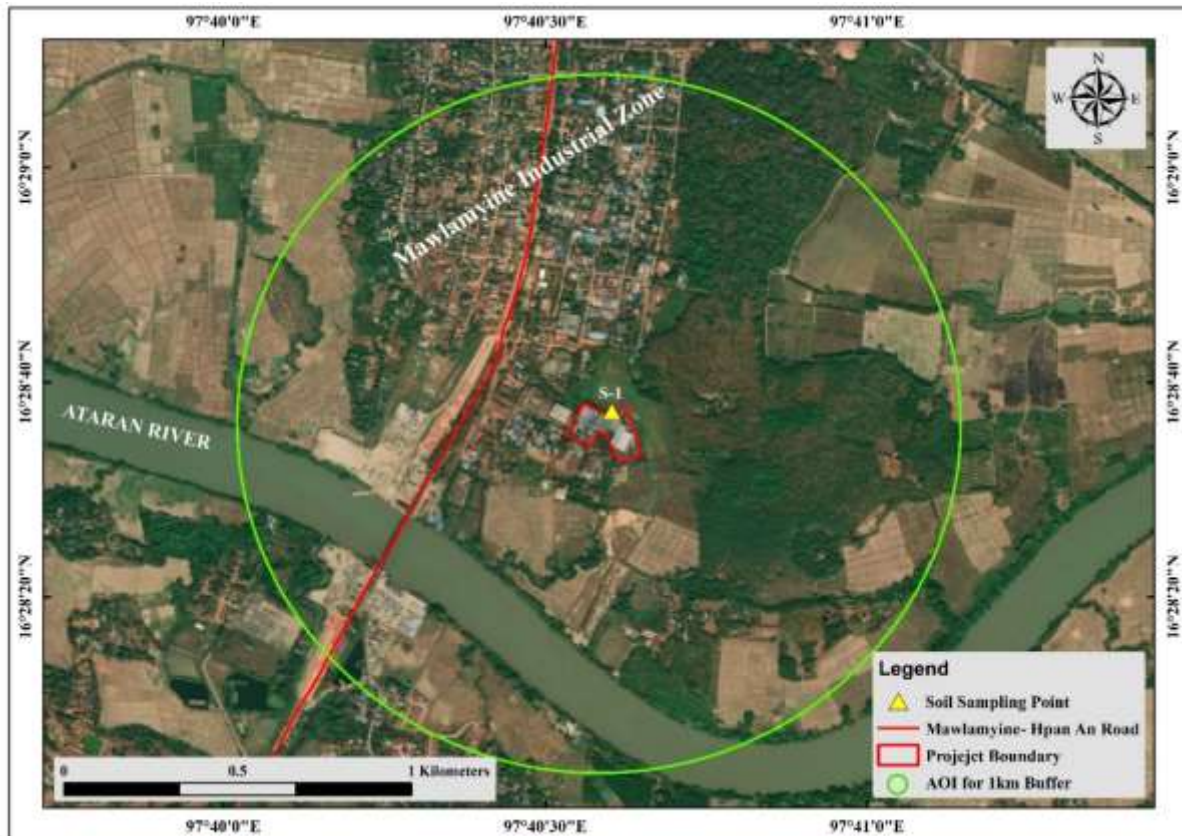


Figure 6-19 Location Map of Soil Quality Monitoring Stations

6.6.7 ODOR LEVEL MANAGEMENT SUB PLAN

Objectives

The main objectives are to establish a framework for planning and managing odor in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to protect human health and the environment from the negative impacts of offensive odor.

Relevant Laws and Regulations

The proposed project will comply with the odor guideline of National Environmental Quality (Emission) Guidelines (2015).

Management Actions

Operation Phase

Existing Factory Management Actions for Odor Management

Being an antimony refinery factory, the SO₂ and other flume gas are released from the roasting and smelting processes, releasing the offensive odor to the community. To minimize the odor dispersion, the blowers and enclosed pipelines are installed to move the odorous gas to the wet scrubber, where SO₂, NO_x and other pollutants are reacted with the scrubbing liquid, forming the sludges at the base of scrubbing towers and clarifier tanks. Moreover, 120 height of stack is installed in the factory to emit the treated gases away from the nearby resident areas. In addition, the technicians are always checking and monitoring the filter bags not to cause the leakage of gases, which have the metallic smell.

Recommended Management Actions

The blowers, condensing tubes and gas pipelines connected with the bag house, wet scrubbers have to be investigated not to leak gas through the connection. The regular cleaning activities and inspecting the scrubbing fluids should be carried out to achieve its maximum performance based on its SOP. The damaged filter bags in bag house have to be repaired as soon as the leakage is detected. The potential odor emission sources should be inspected and immediately responded with the mitigation actions.

Construction and Decommission Phase

The systematic provision of septic tanks, toilets and dust bins should be provided within the project site. The regular waste collection system should be applied and all wastes should be disposed under the regulations of Township Municipal. Some odorous construction materials such as paint, sealants and coating have to be firmly covered not to release the offensive odor. The workplace area should be prioritized proper ventilation system by allowing the fresh air to create the air circulation. Moreover, the provision of face masks to workers handling with odorous materials for a certain period should be performed.

Monitoring Actions

The monitoring actions for odor level is shown in Table 6-12.

Table 6-12 Monitoring Plan for Odor Level

	Operation Phase	Construction and Decommission Phase
Monitoring Parameter	Odor value	Odor value
Monitoring Frequency	Twice a year (dry and wet seasons)	Once in Construction and Decommission
Estimated Annual Budgets	3,000,000 MMK	500,000 MMK
Responsible Team	HSE Team of Proposed Project	HSE Team of Proposed Project
Monitoring Location	Smelting Furnance 16°28'36.66"N, 97°40'33.16"E	Smelting Furnance 16°28'36.66"N, 97°40'33.16"E
	Raw Material Piling 16°28'36.10"N, 97°40'33.69"E	
	Charcoal Storage Area 16°28'36.19"N, 97°40'35.95"E	

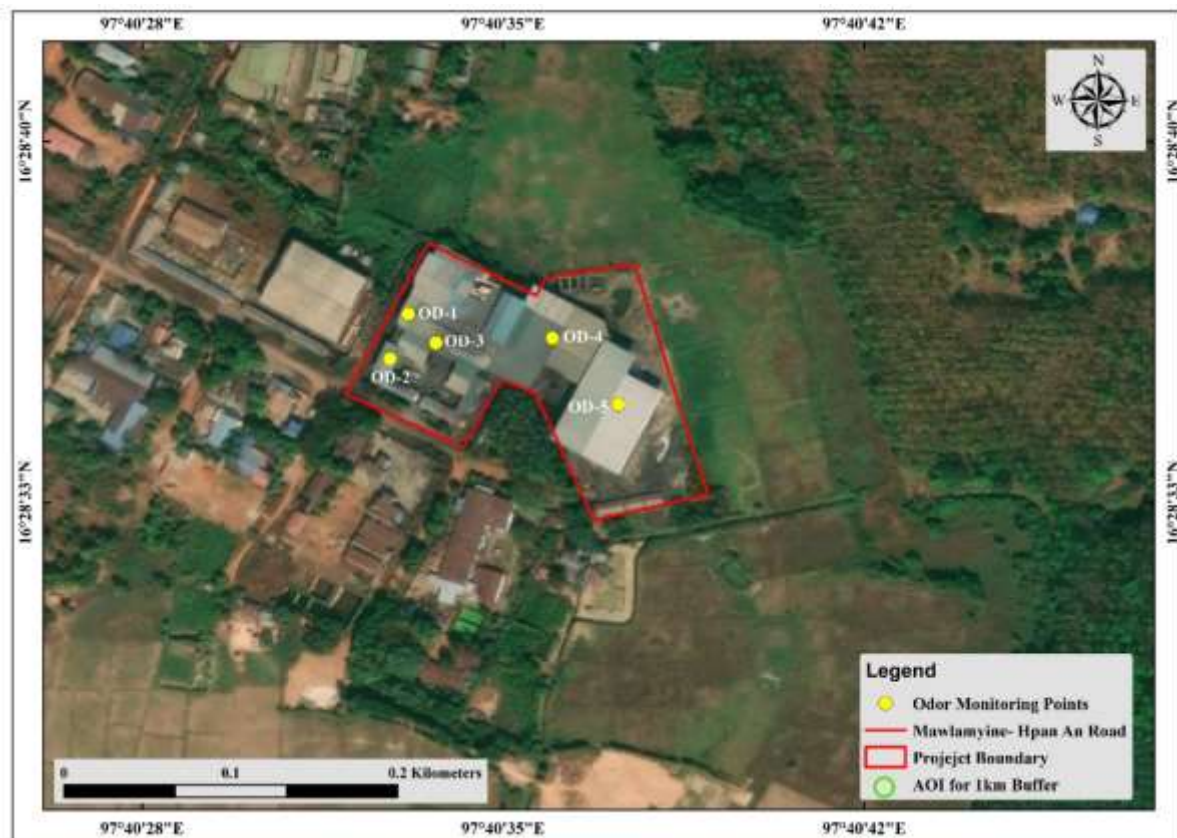


Figure 6-20 Location Map of Odor Monitoring Points for Operation Phase

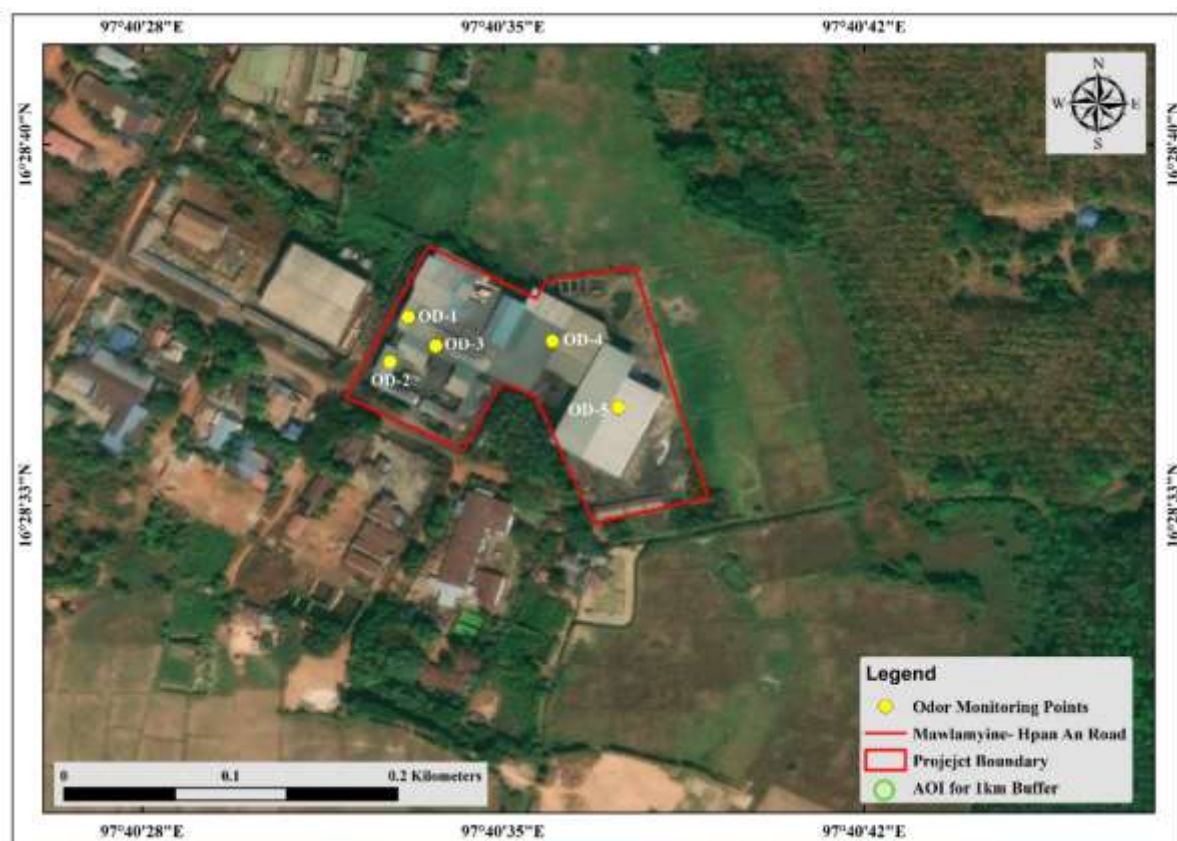


Figure 6-21 Location Map of Odor Monitoring Points for Construction and Decommission Phase

6.6.8 OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SUB PLAN

Objectives

The main objectives of occupational health and safety management plan is to prevent workplace injuries, illnesses, and deaths. It aims to create a safe and healthy working environment by minimizing risks and promoting a proactive approach to safety and well-being.

Relevant Laws and Regulations

The proposed project will comply with the Occupational Safety and Health Law (2019), The Union Myanmar Public Health Law (1972) and Prevention of Hazard from Chemical and Related Substances Law (2013).

Management Actions

Operation Phase

Existing Factory Management Actions for Occupational Safety and Health

The Health, safety and Environment team is instituted under the supervision of MSS, are responsible to explore the potential hazard point sources and set up the effective remediation actions. Regarding the fire hazard, around 6 numbers of 50 kg fire extinguishers and 20 numbers of 2 kg fire extinguishers are mounted at around the production area of the factory and they are repaired and renewed according to the instructions of Township Level Fire Service Departments twice a year. Moreover, the diesel fuel are stored with the enclosed barrel at the fuel storage area. Concerning about the workers' health and safety, the workplace area are arranged to get the proper air ventilation and install the dust removing facilities such as air bags, bag houses and filter system. Moreover, the medical first aid kits and emergency drug boxes are provided within the factory. The personal protective equipments such as face masks, ear plugs and gloves etc are provided to the workers.



Fire Extinguishers

	
<p style="text-align: center;">Respirators</p>	<p style="text-align: center;">Medicines</p>
	
<p style="text-align: center;">Toilets</p>	<p style="text-align: center;">Drinking Water</p>

Figure 6-22 Existing Actions for Health, Safety and Environment

Recommended Management Actions

The HSE team leader should train and encourage all workers to wear the PPE with the safety manners during working, especially in roasting, smelting and molding process. The heat resistance gloves and face masks should be provided to the workers in molding lines. The designated locations for coal stockpiles should be free of moisture and water with limited exposure to wind. Moreover, there should be sufficient spacing between stockpiles to allow access in case of emergency and to help prevent the spread of fire. This spacing is at least equal to the height of the stockpile or adequate for vehicle access. In additions, the height of stockpile should be limited between 5 ft (1.5m) to 6 ft (1.8m), which is convenient for firefighting procedures. For preventing the combustion of coal, “first in first out” system should be practiced by recording the date of stacking and not storing for a long time. The temperature of stockpile should be measured twice a week and maintained below 60°C. If temperature is above 60°C, the coal use immediately or move to another location and allow to cool down.

Regarding the Diesel storage, the storage drum should be kept the air space by filling below 95% capacity. The storage area should be free of weeds and other combustible material. The drums should be maked with the name of fuel content and warning sign. The storage area is recommended to conduct the roof structure to reduce evaporation and condensation effects and to minimize the amount of solar radiation the drum receives. All workers have to provided the essential training such as fire safety and first aids.

Construction and Decommission Phase

The identification of potential hazards on the site, such as falls, electrical hazards, etc should be carried out and installed the warning signs to limit the access. The work schedules and activities, including material handling, using equipments and working at heights should be established with clearly documented procedures and informed to all working staffs and surrounding residents before starting project. The work trainings for workers have to be established, including the correct use of appropriate PPE according to the specific hazards present and their maintenance. The HSE team should develop an emergency response plan, which outlines procedures for handling accidents, injuries and other emergencies and this plan should include the evacuation procedures, communication protocols and contact information for emergency services. Moreover, HSE team leader has to regularly inspect the site to ensure not only the safety procedures but also the identification and controlling of potential hazards.

Monitoring Actions

The monitoring actions for occupational health and safety is shown in

Table 6-13 Monitoring Plan for Occupational Health and Safety

	Operation Phase	Construction and Decommission Phase
Monitoring Parameter	Incident/ accident records Potential hazard and risk source	Incident/ accident records Potential hazard and risk source
Monitoring Frequency	Monthly	Monthly
Estimated Annual Budgets	1,000,000 MMK	500,000
Responsible Team	HSE Team of Proposed Project	HSE Team of Proposed Project
Monitoring Location	Around the project site	Around the project site

6.6.9 RECORDING AND REPORTING

Keeping records and reporting are important management tools for ensuring sustainable operation.

There will be two types of monitoring reports after environmental monitoring and site inspection. The first type is for internal use to provide feedback to the Environmental Management system. Finally, annual review should be prepared and an environmental monitoring report should be submitted to the MONREC/ECD every 6 month under the EIA Procedure (2015).

Internal Monitoring and Inspection Report

The EMP responsible cell members may conduct daily, weekly or monthly general inspections of the project area and facilities. The objectives are to identify non-compliances to EMP.

Incident, Accident and Emergency Report

In cases of incident and accident, prompt reporting has been carried out. This must be in the form of verbal reporting followed by written statement, after emergency and contingency procedures have been undertaken. The written statement should be more comprehensive and should be included the location and cause of accident, the time, extent and intensity and how actions for emergency and contingency procedures taken. Reporting on incidents may not be necessary; it is actually the duty of the security staff to take action.

6.6.10 REPORTING ON TRAINING PROGRAM

There must be a regular monitoring and inspection of all training programs provided such as firefighting training, first aid training and training for quick response and preparedness such as drills and mock drills.

HSE cell members conducting monitoring and inspection works must be able to interpret and assess the overall condition of the training processes especially assessment of the effectiveness and applicability of each training.

A report on the training program including assessment on its effectiveness must submit at the end of each training program.

6.6.11 EMP FOR GOOD WORKING PRACTICES AND GOOD SAFETY PRACTICES

The factory shall follow, as practical as possible environmental health and safety standard and guidelines. The factory has own program for capacity building and training covering good working practices and good safety practices. The factory shall also follow EHS guidelines and international standards for the ecofriendly operation of the factory as already mentioned earlier.

6.7 CORPORATE SOCIAL RESPONSIBILITY PROGRAMME

The purposes of implementing CSR program are to develop good relations between the public and project proponents as well as to promote high standard of living near the project area. MSS will provide CSR fund which is (2%) of the net profit to following sections. The detailed contribution for CSR fund is shown in **Error! Reference source not found.**

Table 6-14 CSR Fund Contribution

No	Partial	Contribution%
1.	Education	0.5%
2.	Health	1%
3.	Regional Development	0.5%

6.7.1 CSR IMPLEMENTATION TEAM

There are three main components in the CSR Implementation Team. They are financial support team, management team and CSR program implementation team members. Propose CSR Implementation Team Structure is shown in **Error! Reference source not found.**

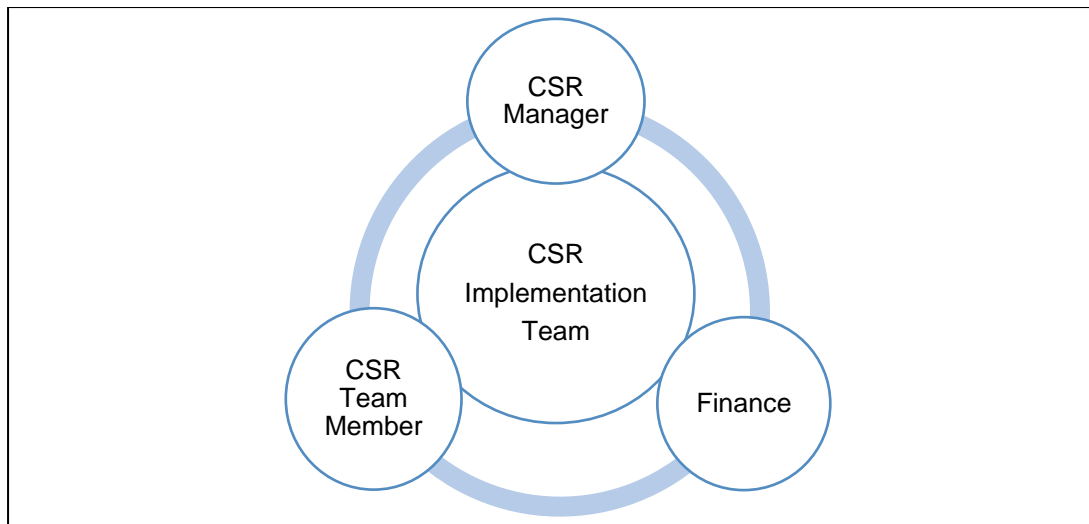


Figure 6-23 Propose CSR Implementation Team

CSR Manager

To become more efficient and affective CRS program, CSR Manager is required. The manager can be arranging the CSR program and can suggest to donate in required places. He may be checked out the amount of using CSR fund that the factory really follows as their commitment.

Finance

Finance department require to management the fund of CSR.

CSR Team Member

All employees from the factory can be the member of CSR Team. Members can be participated in every CSR activity and can give advices to improve CSR activities. CSR Program of the Proposed Project is shown in Table 6-15.

Table 6-15 CSR Program of the Proposed Project

Item	Activities	Expected Budget	Objectives
Health	<ul style="list-style-type: none"> • Providing medical supplyment for staff and their families • Providing the employees' health examination • To support the protection of the environment as well as from the fire around the Factory 	1 %	To ensure that workers working in the workplace and their families are in good health
Education	<ul style="list-style-type: none"> • Promoting the awareness of education and human right 	0.5 %	To become a better society To improve the education level of the workers' families

	<ul style="list-style-type: none"> • Providing educational grand for the employee's children • Providing the support in education sector around the project area 		To develop the skill of the employees
Regional Development	<ul style="list-style-type: none"> • Doing donation clothes and money to local organizations and poor people nearby project area 	0.5 %	<p>To enable local charitable organizations to operate well,</p> <p>To enable employees to cooperate actively in the common work that is being done in the region,</p> <p>To avoid and understand human rights among workers</p> <p>To prevent sexual harassment and oppression in the workplaces</p>



Figure 6-24 Donation for the Development of Basic Education High School in Mon State



The budget for EMP fund will cover the initial cost and recurring expenses for implementation of EMP. Table 6-16 shows annual budget allocation for proposed environmental, health and safety management plan. The project proponent will create the bank account for environmental management plan and will spend on the additional costs in the future, if the budget amount is insufficient. The bank account is shown in Figure 6-26.

Table 6-16 Overall Budget for Implementation of the EMP

No	Proposed EMP	Estimated Annual Budget (MMK)
Environmental Works		
1	The mitigation and management measures for Operation Phase (especially air, noise, vibration, water, soil, odor)	6,500,000
2.	The mitigation and management measures for construction and decommission phase (especially air, noise, vibration, water, soil, odor)	5,000,000
3.	Environmental monitoring program for operation phase (especially air, noise, vibration, water, soil, odor)	16,400,000
4.	Environmental monitoring program measures for construction and decommission phase (especially air, noise, vibration, water, soil, odor)	3,600,000
5.	Solid waste management during project operation	1,000,000
6.	Occupational Health and Safety program during project operation	1,000,000
7.	Socio economic and cultural component for operation phase	1,000,000



Figure 6-26 The Bank Account for Environmental Management Plan

6.9 EMERGENCY RESPONSE PLAN

An effective Emergency Response Plan (ERP) for the Nyaung Na Pin Livestock Zone in Hmawbi Township must address both industrial and natural hazards to ensure the safety of workers, the community, livestock, and the environment. The plan should integrate strategies for responding to a wide range of potential hazards, including environmental pollution, fire, disease outbreaks, flooding, cyclones, and heatwaves. Below is a comprehensive approach that combines both industrial and natural hazard preparedness.

6.9.1 EMERGENCY RESPONSE TEAM (ERT) AND ROLES

An Emergency Response Team (ERT) should be formed, consisting of trained personnel with clearly defined roles for both industrial and natural hazard scenarios. This includes:

- **Industrial Hazard Response:** Coordinators for chemical spill containment, fire safety officers, and pollution control managers.
- **Natural Hazard Response:** Coordinators for flood evacuation, storm preparedness, water resource management, and heatwave response. The team should be capable of responding to both types of hazards simultaneously if they overlap during an emergency.

6.9.2 STANDARD OPERATING PROCEDURES (SOPs)

Develop Standard Operating Procedures (SOPs) for both industrial and natural hazards. These SOPs should cover:

- **Industrial Hazards:** Procedures for containing chemical spills, managing air and water pollution, dealing with outbreaks of zoonotic diseases, and responding to fires and explosions. The plan should include protocols for using safety equipment, isolating hazardous areas, and conducting evacuations.
- **Natural Hazards:** Guidelines for evacuating livestock and personnel during floods and cyclones, reinforcing infrastructure against storm damage, managing water resources during droughts, and providing cooling systems for livestock during heatwaves. SOPs should also address waste management and pollution control during floods or storms.

6.9.3 RESOURCE INVENTORY AND ACCESSIBILITY

An up-to-date inventory of emergency resources is essential for responding to both industrial and natural hazards. Resources should include:

- **For Industrial Hazards:** Firefighting equipment, spill containment kits, first aid supplies, personal protective equipment (PPE), and communication devices.
- **For Natural Hazards:** Emergency shelters, sandbags for flood containment, backup power systems, water storage solutions, and cooling systems for heat stress. These resources should be easily accessible and regularly inspected to ensure their functionality during emergencies.

6.9.4 TRAINING AND DRILLS

Regular training and drills are essential for ensuring that all employees understand how to respond to both industrial and natural hazards. This includes:

- **Industrial Hazards Drills:** Simulated chemical spills, fire evacuation, and disease outbreak containment.
- **Natural Hazards Drills:** Flood evacuation, cyclone preparedness, and heat stress management for livestock. Training should be conducted regularly, and drills should involve the whole team, ensuring that everyone knows their roles and can react swiftly and effectively.

6.9.5 COMMUNICATION AND COORDINATION

Effective communication is vital during an emergency. The ERP should include:

- **Internal Communication:** Clear communication channels to notify staff about industrial accidents or natural disasters and provide instructions on emergency procedures.
- **External Communication:** Protocols for notifying local authorities, emergency services, and the public about potential or ongoing hazards. Coordination with external agencies such as environmental authorities, fire departments, and health services will ensure a unified response.

6.9.6 WASTE MANAGEMENT AND POLLUTION CONTROL

Industrial hazards often involve contamination of air, water, and soil, while natural disasters such as floods can exacerbate pollution risks. To mitigate these impacts:

- **For Industrial Hazards:** Establish proper waste disposal systems, ensure containment of hazardous materials, and deploy water treatment technologies.
- **For Natural Hazards:** Floodwater can carry contaminants, so post-disaster cleanup should focus on removing waste and preventing further pollution. Water filtration systems should be in place to address contamination after flooding.

6.9.7 HEALTH AND SAFETY FOR WORKERS

The health and safety of workers must be prioritized during both industrial and natural hazard events. This includes:

- **For Industrial Hazards:** Providing appropriate PPE to prevent exposure to hazardous chemicals, ensuring proper training in handling dangerous materials, and setting up decontamination procedures.
- **For Natural Hazards:** Ensuring workers have access to first aid, treating injuries related to floods, cyclones, or heatwaves, and providing cooling systems during extreme heat to prevent heat stress.

6.9.8 CONTINUOUS IMPROVEMENT

An ERP is a living document that should be regularly reviewed and updated. After each drill or actual incident, a review session should be conducted to evaluate the response, identify gaps, and implement improvements. The ERP should be adapted based on new risks, emerging hazards, technological advances, and feedback from stakeholders.

In conclusion, an integrated Emergency Response Plan for the Nyaung Na Pin Livestock Zone must prepare for both industrial and natural hazards. By focusing on risk assessment, training,

resource management, and coordination with external agencies, the ERP will ensure a swift and effective response to protect workers, livestock, the community, and the environment from the impacts of these hazards. Regular updates and continuous improvement will help build resilience and reduce the vulnerability of the zone to both industrial and natural disaster

7. COMMUNITY ENGAGEMENT AND DISCLOSURE

7.1 REGULATORY REQUIREMENT OF PUBLIC CONSULTATION MEETING

According to the Paragraph 36 (xii) of Environmental Impact Assessment Procedure (2015), stakeholder meeting is one of the necessities processes to perform IEE study. Public disclosure is required to hold in the IEE process through the local media and public notification at the project site and arrangements for consultation meetings with all project stakeholders. The public consultation indicated the transparency of proposed project to local people.

The OBES consultant team conducted a pre-engagement meeting with representatives from Myanmar Shing Shing Metal Company Limited for the proposed project to discuss the Initial Environmental Examination process. During this meeting, the representatives from the proposed project were given information about the processes of the project, and the consultant team was briefed on the initial environmental examination procedures, baseline survey, and public consultation meetings.

The Antimony Refinery and Smelting Project by Myanmar Shing Shing Metal Company Limited, conducted a public consultation and disclosure process on 18th March, 2025 with the help of third party, Olive Bright Environmental Solutions Limited (OBES).

7.2 OBJECTIVE OF PUBLIC CONSULTATION

Public consultation and information disclosure concerning with the environmental and social impact assessment (ESIA) for the proposed project. The main objective of the Public Consultation Meeting (PCM) is to incorporate the opinion and suggestions of the all stakeholders including but not limited to potential Project Affected Persons (PAPs), government officials, local communities, NGOs, and other interested persons. The key objectives of the PCM are as follows:

- 1) To disclose and inform well about the project information, potential positive and negative impacts due to project activities to the stakeholder in the earliest stage of the implementation of the project
- 2) To ensure that consultation meetings are undertaken in a meaningful, effective way by actively participation of PAPs, stakeholders and local communities.
- 3) To ensure that the concerns of, and issues raised by the PAPs, stakeholders and local communities are incorporated and adequately addressed in the further ESIA study.

7.3 METHODOLOGY AND APPROACH

At the project environmental impact assessment phase, as preliminary identification, relevant main stakeholders to the project and project's affected groups were identified. Government authorities and departments are included as the stakeholders in the consultation meeting and their opinions are recorded. The proposed project information is disclosed through consultation meetings and putting the documents of the project information and suggestion forms.

7.4 IDENTIFICATION OF PROJECT STAKEHOLDER

Public Consultation meeting will be held at Mawlamyine Industrial Zone Hall, Mawlamyine Township, Mon State with various stakeholders including the representatives from the government organizations, administrative and local people. Considering the project scope, the legal and institutional framework for environmental and social impact management applicable to the project, the following project stakeholders were invited:

- (1) Township General Administrative Department
- (2) Environmental Conservation Department,
- (3) Department of Public Health
- (4) Fire Services Department
- (5) Forest Department
- (6) Township Management Board
- (7) Department of Agriculture
- (8) Department of Fisheries
- (9) Ward Administrators
- (10) Interested person from local
- (11) Local People

7.5 PRE- ENGAGEMENT MEETING

On 14th July, 2024 and 18th February, 2025, the OBES consultant team conducted a pre-engagement meeting for PCM with representatives from Antimony Refining Project by Myanmar Shing Shing Metal Company Limited for the proposed project to discuss the environmental impact assessment process. During this meeting, representatives from the proposed project were given information about the processes of the project, and the consultant team was briefed on the environmental impact assessment procedures, baseline survey, and public consultation meetings.

7.6 PUBLIC CONSULTATION MEETINGS (PCM)

On 18th, March 2025, Myanmar Shing Shing Metal Company Limited has conducted the consultation meeting regarding the IEE for the proposed project, Antimony Refining Project. Meeting has been carried out at the meeting Mawlamyine Industrial Zone Hall, Mawlamyine Township, Mon State.

The consultation meeting includes Mawlamyine Township Government authorities and local public. As local public, representatives of the Mawlamyine Township such as elders, merchants, have participated at the consultation meeting. As government authorities, Department of Workshop and Labour Law Inspection, Environmental Conservation Department, Industrial Inspection Department, and Fire Services Department have attended the meeting and there were 62 attendees in total.

On 18th March 2025, Myanmar Shing Shing Metal Company Limited has conducted the consultation meeting regarding the IEE for the proposed Antimony Refining project. Meeting has been carried out at Mawlamyine Industrial Zone Hall, Mawlamyine Township, Mon State. The consultation meeting involves government officials, members of the Charity Aid Society, industrial zone staff, and local people from Nyaung Pin Seik village. As local people, representatives of Mawlamyine Township such as general workers have participated at the consultation meeting. As government authorities, Department of Workshop and Labour Law Inspection, Environmental Conservation Department, Industrial Inspection Department, and Fire Services Department have attended the meeting.

The project information, infrastructure buildings, water and land use, and implementation process of Antimony Refining Project are presented by Project in Charge, U Tin Nyo from Myanmar Shing Shing Metal Company Limited. The Initial Environmental Examination, the existing condition and the findings of environmental quality about the project that have to be undertaken are explained by Director Dr. Lai Lai Win from third party, Olive Bright Environmental Solutions Limited (OBES). Opinions, suggestions and recommendations are discussed at the meeting. Government Authorities, local people, project proponent and third party all participated in the meeting activities. Project proponent discussed with the issues upon the project and third party expressed the works of Initial Environmental Examination. After the presentation, meeting has carried out based on the issues of local people. All the opinions in the meetings have been recorded. PCM attendant list and Power Point presentation are described in Appendix-G. The meeting details are as the followings.

Table 7-1 Meeting Agenda

Venue:	Mawlamyine Industrial Zone Hall, Mawlamyine Township, Mon State
Date:	18-3-2025
Time:	10:00 AM – 11:30 PM
Attendees:	62 persons
Agenda:	<ul style="list-style-type: none"> i. Greeting and introduction ii. Presentation of project information iii. Presentation of project process iv. Presentation of IEE process by third-party consultant v. Q&A session vi. Closure

There were 62 attendees in total, and the attendant lists are described in the following table.

Table 7-2 Attendant List of Governmental Organizations

Governmental Organization			
No.	Name	Position	Department
1.	U Phay Nyein	Secretary	Industrial zone Management Committee
2.	Daw Su Wai Wai Phyo	District Commander	Department of Workshop and Labor Law Inspection
3.	U Ye Naing Oo	Deputy Fire Chief	Fire Services Department
4.	U Phyo Wai	Fire Sergeant	Fire Services Department
5.	U Tun Tun Oo	Deputy Director	Environmental Conservation Department
6.	Daw Thae Cho Aye	Assistant Director	Environmental Conservation Department
7.	Daw Yamone Phoo	Deputy Staff Officer	Environmental Conservation Department
8.	U Htet Aung	Assistant Director	Industrial Inspection Department
9.	Daw Win Win Soe	Supervisor	Industrial Inspection Department

Table 7-3 Attendant list of Local Stakeholders

Local Stakeholders			
No.	Name	Employment	Address
1.	U Nyunt Wai	Charity Aid Society	Nyaung Pin Seik Village
2.	U Tin Htay	Charity Aid Society	Nyaung Pin Seik Village
3.	U Hla Myint	Charity Aid Society	Nyaung Pin Seik Village
4.	U Aung Lwin Oo	Charity Aid Society	Nyaung Pin Seik Village
5.	U Aung San Oo	Charity Aid Society	Nyaung Pin Seik Village
6.	U Than Zaw	Charity Aid Society	Nyaung Pin Seik Village
7.	U Thein Hla	Charity Aid Society	Nyaung Pin Seik Village
8.	U Aung Naing Moe	Charity Aid Society	Nyaung Pin Seik Village
9.	U Thant Zin Oo	Charity Aid Society	Nyaung Pin Seik Village
10.	Daw Kyal Sin Oo	General Worker	Industrial Zone
11.	Daw Thiha Kyaw	General Worker	Industrial Zone
12.	U Htay Lwin	General Worker	Nyaung Pin Seik Village

Local Stakeholders			
No.	Name	Employment	Address
13.	U Thurein	Lathe operator	Industrial Zone
14.	U Tun Myint	Lathe operator	Industrial Zone
15.	U Hla Myint @ Bo Lone Sai	PC	Noble Heart organization
16.	U Chit Win Ko	Staff	Industrial Zone
17.	U Aung Myo Tun	Staff	Industrial Zone
18.	U Aung Tun Lin	Staff	Industrial Zone
19.	U Ye Yint Aung	Staff	Industrial Zone
20.	U Myo Htet Thu	Staff	Industrial Zone
21.	U Nyi Min Naing	Staff	Industrial Zone
22.	U Kyaw Oo	Staff	Industrial Zone
23.	Daw Sandar Moe	Causal Worker	Industrial Zone
24.	U Pyae Lwin Oo	Staff	Industrial Zone
25.	U Oakkar Kyaw	Staff	Industrial Zone
26.	U Kyaw Thiha	Staff	Industrial Zone
27.	U Sithu Htet	Staff	Industrial Zone
28.	U Sithu Htwe	Staff	Industrial Zone
29.	U Min Thu Aung	Staff	Industrial Zone
30.	U Kyaw Naing Soe	Staff	Industrial Zone
31.	U Kyaw Min Htet	Staff	Industrial Zone
32.	U Ko Paing	Staff	Industrial Zone
33.	U Win Htut	Staff	Industrial Zone
34.	U Win Moe Kyaw	Staff	Industrial Zone
35.	U Wine Chit	Staff	Industrial Zone
36.	U Kyaw Thet Oo	Staff	Industrial Zone
37.	U Thaung Kyi	Staff	Industrial Zone

Table 7-4 Attendent List of Project Proponent and Third Party Organization

Project Proponent			
No.	Name	Position	Organization
1.	U Tin Nyo	-	Myanmar Shing Shing Metal Co., Ltd.
2.	Daw Moe Moe Aye	Office Clerk	Myanmar Shing Shing Metal Co.,Ltd.
3.	Daw Kalayar Soe	Office Clerk	Myanmar Shing Shing Metal Co.,Ltd.
4.	U Pyae Phyong Aung	Office Clerk	Myanmar Shing Shing Metal Co.,Ltd.
5.	U Khaing Moe	Office Clerk	Myanmar Shing Shing Metal Co.,Ltd.
Third Party			
No.	Name	Position	Organization
6.	Dr. Lai Lai Win	Director	OBES
7.	U Min Min Oo	Principal Consultant	OBES
8.	U Kyaw Win Han	Director	OBES
9.	U Nyan Lin Maung	Consultant	OBES
10.	U Htet Thiha Phone Myint	Associate Consultant	OBES
11.	U Si Yan Hein	Associate Consultant	OBES
12.	U Nyi Nyi Htan	Survey Analyst	OBES
13.	Daw Thet Wai Hnin	Operation Manager	OBES
14.	Dr. Lai Lai Win	Director	OBES

7.7 DISCUSSING AND FEEDBACKS RECEIVED

According to the activities conducted during consultation process of the IEE stage, some comments and suggestions are raised and described in the Table 7-5.

Table 7-5 Discussion and Feedbacks Received from Meeting

No.	Comment and Suggestions	Responses
1.	<p>Daw Thae Cho Aye (Assistant Director), Environmental Conservation Department, Mawlamyine Township discussed;</p> <p>☐ Upon entering the factory, a strong odor is immediately noticeable, which could potentially contribute to long-term respiratory health problems for local residents who have lived near the facility for many years.</p> <p>☐ OBES, as a professional, should prioritize the assessment of long-term impacts over immediate effects.</p> <p>☐ The sources of the impacts cannot be consistently attributed solely to this factory, as cumulative impact on air quality could also arise from other surrounding factories within the industrial zone.</p> <p>☐ The air quality results exceed the standard values due to this factory, so mitigation measures must be planned and implemented.</p> <p>☐ If these are cumulative impacts, they must be thoroughly assessed. Stack gas emissions from the new factory should be measured.</p> <p>☐ If two factories are established, it will be necessary to assess the potential increase in impacts.</p> <p>☐ Local residents should participate in</p>	<p>Dr Lai Lai Win (Director), OBES replied;</p> <p>☐ There are no emissions currently, as the new factory is only 50% complete in its construction phase.</p> <p>☐ This factory cannot be finalized until the current IEE procedures are completed.</p> <p>☐ Therefore, we will include details about the stack emissions of the new factory in the monitoring report.</p>

No.	Comment and Suggestions	Responses
	<p>discussions about their challenges.</p> <p>☐ If no challenges are identified, this will be clearly recorded in the report.</p>	
2.	<p>A Local Resident, Nyaung Pin Seik Village, Mawlamyine Township discussed;</p> <p>☐ I have noticed that roselle and water spinach have died, resulting in blackened roots without any apparent reason.</p> <p>☐ While there is no odor detected during this PCM, a strong odor emerges at midnight.</p> <p>☐ It becomes overwhelming, making it difficult for me to sleep in my house, as it negatively affects my heart condition.</p> <p>☐ The iron roofing sheets of some houses frequently deteriorate due to exposure to gases.</p> <p>☐ The odor is extremely unpleasant, especially during the rainy season.</p> <p>☐ I request the use of high-quality, standard technology to address this issue.</p>	<p>Dr Lai Lai Win (Director), OBES replied;</p> <p>☐ Rubber and plastic factories are located nearby, and their odors are particularly strong.</p>

No.	Comment and Suggestions	Responses
3.	<p>A Local Resident, Nyaung Pin Seik Village, Mawlamyine Township discussed;</p> <p>☐ Local residents are able to identify the odors of rubber, plastic, and green metal.</p> <p>☐ I only wish to minimize gas emissions as much as possible, not to suggest shutting down the factory.</p> <p>☐ There is no intention to negatively impact anyone else's business.</p> <p>☐ The interaction of sulfur gas with vapor on iron roof sheets can lead to their deterioration.</p> <p>☐ The odor is not from burning plastic but rather a chemical substance.</p> <p>☐ It spreads widely through the surroundings and reaches all the way to the village.</p>	<p>Dr. Lai Lai Win (Director, OBES) replied;</p> <p>☐ I request the project proponent to clarify the chemical purification processes that result in the release of this odor.</p>
4.	<p>A Local Resident, Nyaung Pin Seik Village, Mawlamyine Township discussed;</p> <p>☐ The odor seems to be more prominent during the nighttime compared to the daytime.</p> <p>☐ I kindly request the factory to operate more during the daytime and end operations earlier in the evening to help address this issue.</p> <p>☐ How does the factory effectively manage the profits from trading antimony metals to support local development and improve health initiatives?</p>	<p>U Tin Nyo (Project in Charge, Antimony Refining Project) replied;</p> <p>☐ The release of SO₂, CO, and CO₂ gases into the environment could be caused by an error in the stack.</p> <p>☐ The wet scrubber tube was installed to reduce SO₂ gas emission. ECD conducts stack gas emission measurements once a month, providing reports and instructions.</p> <p>☐ No operations are halted during these measurements. We also utilize a caustic soda pond to mitigate odors.</p> <p>☐ We encourage our employees to be more mindful of ensuring the safety of local communities and</p>

No.	Comment and Suggestions	Responses
		protecting the environment.
5.	<p>Member of Charity Aid Society, Nyaung Pin Seik Village, Mawlamyine Township discussed;</p> <p>☐ We request the factory's support for the charitable organization in our village, which focuses on improving health care and the well-being of the local community.</p>	<p>U Tin Nyo (Project in Charge, Antimony Refining Project) replied;</p> <p>☐ We request the factory's support for the charitable organization in our village, which focuses on improving health care and the well-being of the local community.</p> <p>☐ Our boss frequently makes donations to the Nyaung Pin Seik village monastery and is currently requesting the village head to provide a list of elders over 75 years old for an elder support donation.</p> <p>☐ If there are any additional requirements, I will inform my boss directly.</p>
6.	<p>Dr. Lai Lai Win (Director, OBES) suggested;</p> <p>☐ Are there any other suggestions and discussions?</p> <p>☐ Please share your concerns about the factory in the presence of third-party organizations, project proponents, and governmental departments.</p> <p>☐ We must add all suggestions and discussions from this meeting in the report.</p> <p>☐ We greatly appreciate your attendance and active participation in the discussions during this meeting.</p> <p>☐ Supporting to local charitable organization is one of the CSR</p>	<p>All participants replied;</p> <p>☐ No suggestions and discussions</p>

No.	Comment and Suggestions	Responses
	<p>activities, so you can ask the project proponent for help.</p> <p>☐ We will describe in the report to mitigate the odors from the factory and reduce working time at night.</p>	

There were 62 attendees in total, and 3 suggestion forms were collected. The participants made the comment and suggestions that to ensure the ongoing success of the company, and to have significantly contribution to the community and economic development.

- To compile the Mawlamyine Industrial Zone's climate data for the previous ten years and then describe it in the report.
- To create a natural disaster response plan (also known as an emergency response plan) to reduce possible natural hazards and specify the funding needed to carry it out.
- To either hold a fire safety inspection certificate, provide it if available, or apply for one if it has not yet been issued.
- To present a fire safety plan for the fuels used in the factory.
- To develop appropriate fire prevention plans for the project.
- To develop and submit a Material Safety Data Sheet (MSDS) based on the raw material lists.
- To measure the quality of air emissions and report the results
- To evaluate mitigation measures for unpleasant odor emissions and provide an explanation in the report.





Figure 7-1 Public Consultation Meeting

7.8 DISCLOSURE

Disclosure is a formal way of making information accessible to interested and affected parties. Communicating such information that is understandable to the stakeholders is an important step in the process of stakeholder engagement. According to EIA Procedure Paragraph (65), “Not later than (15) days after submission of the IEE Report to the Department, the Project Proponent shall disclose the IEE to civil society, Project Affected Persons (PAPs). Local communities and other concerned stakeholders: (i) by mean of national media (i.e., newspapers); (ii) the website(s) of the Project or Project Proponent; (iii) at public meeting palaces (e.g., libraries, community halls); and (iv) at the offices of the Project Proponent”. All other activities, from consultation and informed participation to negotiation and resolution of grievances, will be more constructive if stakeholders, including affected communities, have accurate and timely information about the project, its impacts, and any other aspects that may have an effect on them.

Disclosure process was carried out in terms of consultation. Stakeholders were informed about consultation meeting one week advance by invitation letter. PowerPoint presentation was used at the meeting, and Director of third party, Factory in Charge from Antimony Refining Project by Myanmar Shing Shing Metal Company Limited explained the project information in Myanmar Language that everyone can easy to understand. Discussion, suggestions and recommendation were performed effectively. Meeting duration was based on the comments and suggestions and attendants can participate without worrying time limitation. Feedback

forms are also delivered at the meeting for the ones who do not want to talk. Document of project summary were put the administrative offices attached with feedback forms and everyone can give feedbacks and suggestions by reading the document of project summary. Everyone can read about the project and give feedbacks on the project.

Table 7-6 The Future Actions Taken by Factory

No.	Suggestion and Comments	Actions
1.	CSR programs should be implemented in line with the commitment in EIA reports.	We will be donated in the regional development project; road infrastructures, education program and health issue as 2% of the profit by the factory.
2.	After EIA process, the monitoring plans should be implemented within the specific timeline.	We will carried out the monitoring processes; as mentioned in IEE report, after getting ECC.
3.	The public suggestions and voices of villagers living near the project site within the study area should be gathered.	It is arranged to collect the voice of villagers in Chan Thar Kone Village and Aung Myay San Village, which is situated within the 1 km radius of the project site, also known as potential direct impact influence zone.
4.	IEE report should be submitted within the short period since the IEE assessment process have time limitation for ECD department.	Negotiating with environmental consultants, the IEE report will be submitted to ECD in time in line with stipulated guidelines.
5.	In IEE reports, the impacts of local communities and their voices should be included.	We will arrange to get suggestions from non-attenders and all of comments will be described in IEE report.
6.	The village roads of Aung Myay San Village are inaccessible during rainy season. May request to conduct the road maintenance activities.	Firstly, our suppliers' and customers' trucks may not passing through the village roads, only use the Tada-U Airport Road. MSS is planning to contribute the CSR programs of villages, collaboration with regional authorities, with 2% of net profit. The regional road development will be considered.
7.	To provide the job opportunities for villagers of Chan Thar Gone Village.	We assigned the most unskilled workers not only from Sesong Village but also from the Paleik. In future, we will prioritize to the Chan Thar Gone Village.

8.	Should carefully perform not to cause the environmental impacts.	<p>The production of qualified products and environmental safety are the key statement of our company, MSS.</p> <p>We will use the modernized equipments and technique to reduce the potential environmental impacts of animal feeds factory.</p>
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7.9 GRIEVANCE REDRESS MECHANISM

7.9.1 GRIEVANCE REDRESS PROCEDURE

Consultation and participation of the PAPs should serve to minimize the occurrence of major grievances. The PAP may request the village leader or the independent monitoring agency (NGO or university) to assist in processing his complaint. Project staff will make efforts to address all complaints on site as they arise to preclude their elevation to higher level.

There are different options to raise grievance such as:

- Option 1: Filling the grievance form and submit to mailbox which is located in front of the factory
- Option 2: Email to the provided address
- Option 3: Direct call to contact number
- Option 4: Social Media

However, in order to ensure that the affected people have avenues for redressing their grievances, a three stepped procedure has been established for the Project.

- (1) As a first step, all complaints and grievances by the PAPs would be addressed through consultation and in participatory manner at the first instance they are brought to the notice of ward head or township administration. The ward head or township administration, in consultation with the project staff, will try to address complaints within 15 days.
- (2) If the complaint is not resolved within 15 days from the date it is brought to the ward head or township administration or if the PAPs is not satisfied with the response, he/she can bring the complaints to the head of the MSS. The head of MSS will address the complaint in 15 days from the time it is received.
- (3) However, if the complaint is not resolved within 15 days from the date it is brought to the head of the MSS or if the PAPs is not satisfied with the response, he/she can bring the complaints to the notice of the GRC. The GRC will address the grievances within 3 weeks from the date they are received.

In case the grievances could not be resolved at the GRC level within 3 weeks from the date they are brought to its notice, or if the PAP is not satisfied with the decision of the GRC he or she can seek legal recourse in the court of law at any time on their own will. The GRC and the procedures for resolving complaints and grievances will be made public through an effective public information campaign. The grievance redress procedure shall also be explained in the project's Public Information Booklet.

One of its roles and responsibilities of the ward heads, township administration and GRC is to ensure that any queries, or concerns made by the affected households and local communities are properly heard, logged (regardless of whether it was lodged verbally or in writing), and resolved in a transparent and timely manner. Complaints received at the ward and township levels will be documented and conveyed to the GRC in their monthly reports for their information. Documentation of grievances and complaints at the township administration level will record the date they are received,

action taken to resolve the complaint with date, and how and when the decision is conveyed to the complainant.

GRC will set up a database to manage and monitor grievances which will show name and contact details of the complainant, date and nature of complaint, any follow up actions, resolutions and how and where resolutions were communicated to the complainant, and status of actions.

This set-up aims to address any concerns promptly, effectively, and transparently and at no cost and retribution, to the affected households. All costs incurred in grievance resolution will be covered out of the project funds.

The MSS will provide the necessary training and guidance in setting up the GRC and grievance mechanism to GRC members. The formalized GRC composition with clear roles and responsibilities; procedure and process will be reflected in the Implementation Plan. Grievance redress flowchart is shown in Figure 7-2.

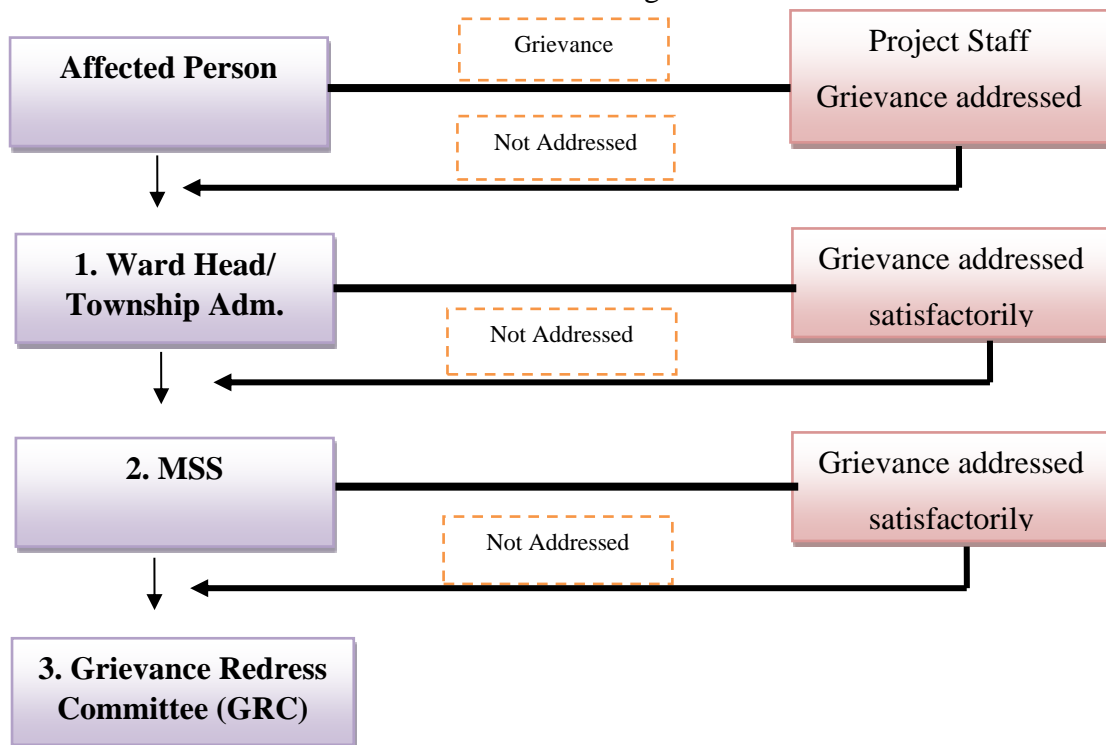


Figure 7-2 Grievance Redress Flowchart

Assigned Personel for overall grievance management - U Tin Nyo
Factory Manager
09-43129102

8. CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSIONS

This IEE report has provided an assessment of the potential environmental, social and health impact associated with the construction, operation and decommissioning phases of the proposed project. The study was prepared according to the ToR from EIA procedures, suggestions and comments from PCM, basis of the project information, relevant information from various sources, surveys of environmental and socio-economic setting of the project area, rounds of consultations with stakeholders in the government sector and communities in and around the vicinity of the project site, and experiences of the consultant in technical and environmental aspects of construction Projects.

In Chapter 1, reflects the objective of the processing the IEE Report and some necessary circumstances while completing the report. In Chapter 2, introduce the regulation and regulation from the nationally and internationally provided by laws, rules, procedures and standard guidelines for environmental baselines. Those are crucially important when implementation the project until the operation is as long as existences. The detailed description about the whole operation procedures and essential utilities (energy and machineries) are presented in Chapter 3. That chapter is also involved with waste generations and the utilization of the resources (especially water), domestic uses together with the volume of wastewater discharging to operate the entire mechanism, then water is partially utilized in the operation eg., cooling. Based on the fact, industrial wastewater does not produce from the operation, byproduct of wastewater from cooling tanks reuse in cooling process of condensation pipe.

The relevant geological features, existing biological conditions and general social related information are in the Chapter 4. Environmental quality monitoring measures such as air, water, noise and vibration, odour, soil and so on are presented. Depend on the database in air quality, odour, noise and vibration as well as soil measurement results in which all the measured parameters are inlined with the NEQEG (2015) Standard. For water quality monitoring, samples were collected from 4 monitoring points, including one point for ground water and wastewater in each and two points for surface water of attaran river. According to the results, the chromium (hexavalent) in wastewater of cooling tanks is slightly higher than the NEQEG (2015). This is because the surfacewater of attarn river is directly used as the raw water source for production process without having any treatment.

Evaluation and prediction of environmental impacts as well as risk assessments could be seen in Chapter 5. The potential impacts/risk assessments where occur at the particular operation and its negative impact control measures were provided. The results of the impact assessment can be evaluated based on the environmental baseline qualities, the factory management actions, project behaviors and the operation processures. Overall management plan were referred to Chapter 6 in which sub-plan and factory management systems were included. Sub-plan cited that estimated budget with the exact location of monitoring points, frequencies along with the parameters. All the management facilities within the factory for air, water, noise and vibration, waste, soil, odor and occupational health and safety were mentioned at the same Chapter. The estimated expenses for biannual environmental monitoring was also at the last page of the Chapter. In Chapter 7, the positive suggestions was given by the officers from the

Environmental Conservation Department (ECD) and the locals through the Public Consultation Meeting. All feedbacks together with factory response actions were reported in the same chapter. Moreover, the grievance redress mechanism and procedures was also mentioned to relief the public compliants and concerns.

8.2 RESIDUAL IMPACT FROM OPERATION PROCESS

The releasing the SO₂, NO_x and particulated matters (PM₁₀ and PM_{2.5}) from the roasting and smelting process of antimony ores are prioritized to be managed by the proposed project. Despite installing bag filters, bag houses and wet scrubbers to capture the toxic chemicals and particles in the flume gas released from the furnace, only trace amount of Sulphur and particulate matters can be dispersed through treatment facilities.

Regarding the water, the chromium (hexavalent) is tested in the surface water of Attaran river that are used as the raw water in production process without treatment, resulting the occurrence of chromium in the wastewater in cooling tanks. The wastewater from cooling tanks are not met with the effluent guidelines of NEQEG (2015), however, these wastewater are cooled and used back in cooling process.

Being an antimony refinery and smelting factory, the waste slags can be generated as the by products of roasting and smelting process and they will include the small amount of residual antimony and other metal that are naturally traced with antimony ore. The released waste slags, especially from smelting are segregated and analyzed the antimony content to conduct with disposal measures. Without having proper handling and disposing, the traced chemicals and metal can be released from the waste slags when seasonal weathering and erosion.

8.2.1 SUGGESTIONS THE MITIGATION MEASURE FOR THE RESIDUAL IMPACT

To trace the gas leak, the joints, connections and pipeline of bag house and wet scrubber should be investigated throughout operation. In addition, the bag filters should be inspected and urgently repaired if they are damaged. The adoption of gas leak detection systems can help easily detect the cracking of gaseous pipeline and take the immediate remediable actions. Besides conducting the corresponding mitigation measures, the conservation of green spaces and local vegetations will be the efficient management action to control the trace amount of chemical escaped from the filter system. Concerning about chromium content in wastewater, changing raw water sources or treating the water before using in production process will be considered to deal with wastewater problem. Moreover, it is ensured the cooling tanks not to spillage the water on the ground with regular monitoring of water levels and enhancing the tanks' capacity. Regarding the waste slags, the proposed factory should be comply with the regional regulations and laws related to the hazardous wastes. The waste slags should be temporary stored at the area with concrete floors and roof system, where is free from water and moisture. They are systematic disposed at the designated dumping area of Nat San Mine in line with the respective regulations and guidelines and if reused, their composition structures should be analyzed to meet the criteria for recycling by getting the permission and suggestion from environmental conservation and mining departments.

8.3 OVERVIEW STATEMENT OF THE PROJECT IMPLEMENTATION

According to the overall analysis and impact examination of the report, most of the environmental baseline qualities were under the respected standard guidelines. Maybe, there will be existed a trace amount of impacts as the residue. However, this might be minimized by the regular insection, biannually monitored the environmental baselines as well as the well implementation of mitigation measures and recommended management actions. As being the antimony refinery and smelting factory, the potential environmental impacts may relatively higher than the other production factory, however, the proposed factory has practiced the well management actions already and will be implemented the additional recommended measures throughout the project timeline. Resulting in the balance of economic growth with environmental and social well-being, there will be the significant impacts on economic and technological benefits due to contributing the job opportunities, technological advancement and also improving the foreign exchange. With strictly following the prescribed environmental friendly practices and regulations of relevant departments, the antimony production will support the long-term econogmic growth to minimize the negatively impact on environmental and social aspects of the community.

8.4 RECOMMENDATIONS

During the operation hours, the authorities (project proponent) should impose to wear PPE on each of the staffs depend on the particular tasks even when all the impact control methods have been implemented within the factory compound. It is ensure to arrange the job training programmes to improve not only working skill but also the sound environmental conservation manners. Moreover, the emergency response actions should be practiced and trained to the wokers in order to immediate response and make the safety manners during unexpected emergency. The planting of native fast growing species should be carried out around and outside of the factory compound as well as within the factory. The antimony production process will align with the current regulation and guidelines of related departments such as Environmental Conservation Department and Mining Department and comply with the regular inspection of local authorities.

The most important thing is the project proponent must need to have well understanding about the impact mitigation measures, management and monitoring plans that was described in this report, in complies with the EIA Procedures (2015) and legal requirements (as mentioned in Chapter 2) before taking the mitigation actions. Finally, it is strongly recommended that project proponent must submit monitoring report including environmental qualities measurements (as mentioned in Chapter 4, environmental baseline section) to the Environmental Conservation Department (ECD) once every two times a year.

APPENDIX A

Licenses and Certificates

Company Certificate



MIC Permit

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်
ဗဟိုပြည်နယ် ရင်းနှီးမြှုပ်နှံမှုကော်မတီ
အတည်ပြုမိန့်

အတည်ပြုမိန့်အမှတ် မပန- ၀၀၂/၂၀၂၀ ၂၀၂၀ ပြည့်နှစ် ဖေဖော်ဝါရီလ ၂၀ ရက်

ဗဟိုပြည်နယ်ရင်းနှီးမြှုပ်နှံမှုကော်မတီသည် မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုဥပဒေပုဒ်မ ၂၅ (ဇာ) အရ ဤအတည်ပြုမိန့်ကို ထုတ်ပေးလိုက်သည် -

(၁)	ရင်းနှီးမြှုပ်နှံသူအမည်	ဒေါ်စုတာနာလင်းအောင်
(၂)	နိုင်ငံသား	မြန်မာ
(၃)	နေရပ်လိပ်စာ	အကွက်အမှတ် (၃၂၅-၃၃၀)၊ ရွှေမြို့တော်(၁) လမ်း၊ စက်မှုနယ်၊ ညောင်ပင်ဆိပ်ရပ်ကွက်၊ မော်လမြိုင်မြို့
(၄)	ပင်မအဖွဲ့အစည်းအမည်နှင့်လိပ်စာ	-
(၅)	ဖွဲ့စည်းရာအရပ်	-
(၆)	ရင်းနှီးမြှုပ်နှံသည့်လုပ်ငန်းအမျိုးအစား	ခနောက်မိမ်းသတ္တုသန့်စင်ထုတ်လုပ် ခြင်းလုပ်ငန်း
(၇)	ရင်းနှီးမြှုပ်နှံသည့်အရပ်ဒေသ (များ)	ကွင်းအမှတ် (၃၈၆)၊ ခရံကရုတ်ကွင်း၊ ဦးပိုင်အမှတ် (၃၂၅၊ ၃၂၆၊ ၃၂၇၊ ၃၂၈၊ ၃၂၉၊ ၃၃၀)၊ ဦးပိုင်အမှတ် (၃၂၈/၂)၊ ညောင်ပင်ဆိပ်ရပ်ကွက်၊ မော်လမြိုင်မြို့
(၈)	နိုင်ငံခြားမတည်ငွေရင်းပမာဏ	-
(၉)	နိုင်ငံခြားမတည်ငွေရင်း ဟုဆောင်လာရမည့်ကာလ	-
(၁၀)	စုစုပေါင်းမတည်ငွေရင်းပမာဏ (ကျပ်)	ကျပ် ၈၀၀.၀၀၀ သန်း (ကျပ်ရှစ်ရာသန်းတိတိ)
(၁၁)	တည်ဆောက်မှု/ပြင်ဆင်မှုကာလ	-
(၁၂)	အတည်ပြုမိန့်သက်တမ်း	-
(၁၃)	ရင်းနှီးမြှုပ်နှံမှုပုံစံ	ရာနှုန်းပြည့်မြန်မာနိုင်ငံသားရင်းနှီးမြှုပ်နှံမှု
(၁၄)	မြန်မာနိုင်ငံတွင်ဖွဲ့စည်းမည့်ကုမ္ပဏီအမည်	မြန်မာရှင်းရှင်းမီတယ်လ် ကုမ္ပဏီ လီမိတက်

m:R
(ဒေါက်တာအေးစံ)
အမှုစီရင်ရေးမှူး

Private Industrial Enterprise Registration



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
စက်မှုဝန်ကြီးဌာန
စက်မှုကြီးကြပ်ရေးနှင့် စစ်ဆေးရေးဦးစီးဌာန
ပုဂ္ဂလိကစက်မှုလုပ်ငန်းမှတ်ပုံတင်လက်မှတ်

စက်မှုမှတ်ပုံတင်အမှတ် _____ မ/ကြီး/၃၃၈ _____ ရက်စွဲ _____ ၁၀ . ၄ . ၂၀၁၈ _____

လုပ်ငန်းအရွယ်အစား _____ ကြီးစား ပြည်ထောင်စုနယ်မြေ/တိုင်းဒေသကြီး/ပြည်နယ် _____ မြို့ _____

အောက်ပါလုပ်ငန်းသည် ပုဂ္ဂလိကစက်မှုလုပ်ငန်း ဥပဒေ ပုဒ်မ ၇ ပုဒ်မခွဲ (ဂ) အရ မှတ်ပုံတင်ပြီး ဖြစ်ပါသည်။

၁။ လုပ်ငန်းအမည် _____ မြန်မာရှင်းစင်းမက်တယ် ကုမ္ပဏီလီမိတက် ခနောက်စိမ်းသတ္တုသန့်စင်လုပ်ငန်း

၂။ လုပ်ငန်းအမျိုးအမည် _____ ဓါတ်သတ္တုပစ္စည်းဖြိုမြင်ထုတ်လုပ်ငန်း

၃။ အဓိကကုန်ချောပစ္စည်းအမျိုးအမည် _____ ခနောက်စိမ်းဘလောက်တုံး(၉၉.၇% ~ ၉၉.၉%)

၄။ တည်နေရာလိပ်စာ အမှတ်(၃၂၅ မှ ၃၃၀) ရွှေမြို့တော်(၁)လမ်း၊ မော်လမြိုင်စက်မှုဇုန်၊ မော်လမြိုင်မြို့နယ်၊ မော်လမြိုင်ခရိုင်

၅။ ပိုင်ဆိုင်မှုအမျိုးအစား _____ ကုမ္ပဏီပိုင်

၆။ လုပ်ငန်းရှင်အမည် _____ ဒေါ်ရတနာလင်းအောင်(M.D)

၇။ ကိုင်ဆောင်သည့်မှတ်ပုံတင်အမှတ် _____ ၉/မကန(နိုင်)၁၀၆၉၂၈

၈။ ရင်းနှီးမြှုပ်နှံမှုတန်ဖိုး(ကျပ်) _____ ၁၉၅.၁၀ သန်း တည်ထောင်သည့်ခုနှစ် _____ ၂၀၁၈

၉။ အသုံးပြုသည့်အားအမျိုးအစား ထရန်စဖော်မာ/လျှပ်ထုတ်စက် မြင်းတောင်ရေ _____ ၂၅၀ KVA

၁၀။ အလုပ်သမားဦးရေ _____ ၁၉ ဦး _____ ၁၂၅ KVA

၁၁။ မှတ်ပုံတင်သက်တမ်းကုန်ဆုံးသည့်နေ့ရက် _____ ၃၀. ၄. ၂၀၁၉ _____






အေးအေးဝင်း
ညွှန်ကြားရေးမှူးချုပ်

Registration Certificate for Chemical and its Related Substances

 ဝဇ္ဇဝါ Central Leading Board	ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများအန္တရာယ်မှ တားဆီးကာကွယ်ရေး ဗဟိုကြီးကြပ်ရေးအဖွဲ့	ပုံစံ ၂
		လုပ်ငန်း အရေအတွက် (မျိုး)
		ထက်တမ်း ၂ နှစ်

ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများဆိုင်ရာ လုပ်ငန်းလိုင်စင်

လိုင်စင်အမှတ် ၀၀၁၀၂၈

(နည်းဥပဒေ ၁၈)



ရက်စွဲ၊ ၂၀၂၃ ခုနှစ်၊ အောက်တိုဘာလ ၁ ရက်

၁။ JR-၈-၂၀၂၃ ရက်စွဲပါ လျှောက်လွှာအမှတ် ၁၄၆၂ ဖြင့် လုပ်ငန်းလိုင်စင်
 လျှောက်ထားသော Myanmar Shing Shing Metal Co., Ltd. ကုမ္ပဏီ/လုပ်ငန်းမှ
 ဦး/ဒေါ် ဒေါ်အိန္ဒြာလင်းအောင် (က) ဦးလှမွန် နိုင်ငံသား
 စိစစ်ရေးကတ်ပြားအမှတ်/နိမိတ်ခြားခွဲအမှတ်ပုံစံအမှတ် ၉/မကန(နိုင်)၁၁၆၉၃၁ အား
 ဤ လုပ်ငန်းလိုင်စင်ကို ထုတ်ပေးလိုက်သည်။

၂။ ခွင့်ပြုသည့်လုပ်ငန်းအမျိုးအစား
 မြန်မြန်ခြင်း၊ ရောင်းချခြင်း

၃။ လုပ်ငန်းလုပ်ကိုင်ခွင့်ပြုသည့် ဓာတုပစ္စည်းနှင့် အကွက်အမှတ်(၃၂၅ မှ ၃၃၀)၊ ရွှေမြွေတော်
 ဆက်စပ်ပစ္စည်းများ၏ အမျိုးအမည်များ (၁)လမ်း၊ ညောင်ပင်ဆိပ်ရပ်ကွက်၊ မော်လ
 ထားရှိမည့်နေရာ မြိုင်စက်မှုဇုန်၊ မော်လမြိုင်မြို့နယ်၊
 (ပြည့်စုံစွာဖော်ပြရန်) မွန်ပြည်နယ်

၄။ လုပ်ငန်းလိုင်စင်ထက်တမ်းကုန်ဆုံးမည့်နေ့ရက် ၁-၁၀-၂၀၂၅




 ဦးအိန္ဒြာ
 ဗဟိုကြီးကြပ်ရေးအဖွဲ့

စည်းကမ်းချက်များ

လိုင်စင်ရရှိသူသည် အောက်ဖော်ပြပါ စည်းကမ်းချက်များကို လိုက်နာဆောင်ရွက်ရမည်-

- ၁။ ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများအန္တရာယ်မှ တားဆီးကာကွယ်ရေးဥပဒေအရ ထုတ်ပြန်သော နည်းဥပဒေ၊ အမိန့်ကြော်ငြာစာ၊ အမိန့်၊ ညွှန်ကြားချက်နှင့် လုပ်ထုံးလုပ်နည်းများပါ စည်းကမ်းချက်များကို လိုက်နာဆောင်ရွက်ခြင်း၊
- ၂။ လိုင်စင်ကို လုပ်ငန်းခွင်၏ မြင်သာသည့်နေရာ၌ ချိတ်ဆွဲထားခြင်း၊
- ၃။ လုပ်ငန်းနှင့်သက်ဆိုင်သည့် သင်တန်းများ တက်ရောက်ပြီးကြောင်း အထောက်အထားများကို မြင်သာသည့်နေရာ၌ ချိတ်ဆွဲထားခြင်း၊
- ၄။ အန္တရာယ်ရှိသည့်အကြောင်းအရာများ ဖော်ပြထားသော စာတန်း သို့မဟုတ် ရုပ်ပုံအမှတ်အသား တံဆိပ်များ ချိတ်ဆွဲထားခြင်း၊
- ၅။ လုံခြုံရေးကိရိယာ၊ ကိုယ်ခန္ဓာကာကွယ်ရေးကိရိယာနှင့် ဝတ်စုံများ လုံလောက်စွာထားရှိခြင်း၊
- ၆။ မတော်တဆဖြစ်ပွားမှု လျော့နည်းစေရန်နှင့် ကင်းရှင်းစေရန် ဆောင်ရွက်ထားခြင်း၊
- ၇။ ထိခိုက်ဆုံးရှုံးမှုအတွက် လျော်ကြေးပေးနိုင်ရန် အာမခံထားခြင်း၊
- ၈။ အန္တရာယ်ကင်းရှင်းစေရေး ညွှန်ကြားချက်များ လိုက်နာခြင်း၊
- ၉။ အလုပ်လုပ်ကိုင်သူများ၏ ကျန်းမာရေးစစ်ဆေးချက်မှတ်တမ်းများ ထိန်းသိမ်းထားခြင်း၊
- ၁၀။ အန္တရာယ်ရှိသည့် ပစ္စည်းများသိုလှောင်ခွင့်ရပါက သက်ဆိုင်ရာမြို့နယ် အထွေထွေအုပ်ချုပ်ရေး ဦးစီးဌာနသို့ ခွင့်ပြုသည့်အကြောင်းကြားစာ မိတ္တူပေးပို့ခြင်း၊
- ၁၁။ မီးဘေးအန္တရာယ်ဖြစ်စေတတ်သည့်ပစ္စည်း သို့မဟုတ် ပေါက်ကွဲစေတတ်သည့်ပစ္စည်းများ အသုံးပြုသောလုပ်ငန်းဖြစ်ပါကသက်ဆိုင်ရာမီးသတ်ဦးစီးဌာန၏ လမ်းညွှန်သဘောတူညီချက် ကြိုတင်ရယူခြင်း၊
- ၁၂။ ပြည်တွင်းတွင် သယ်ယူပို့ဆောင်သည့်အခါ သတ်မှတ်ထားသည့် စည်းကမ်းချက်များနှင့်အညီ ခွင့်ပြုထားသော ပမာဏနှင့် နေရာသို့ သယ်ဆောင်ခြင်း၊
- ၁၃။ ခွင့်ပြုသည့်နေရာ ပြောင်းလဲသယ်ယူပို့ဆောင်လိုပါက ဗဟိုကြီးကြပ်ရေးအဖွဲ့ထံမှ ခွင့်ပြုချက် ထပ်မံရယူခြင်း၊
- ၁၄။ စက်ပစ္စည်းကိရိယာများ၏ လုံခြုံစိတ်ချမှု၊ ခံနိုင်ရည်ရှိမှုနှင့် ဘေးအန္တရာယ်ထိခိုက်နိုင်မှု ရှိ၊ မရှိကို သက်ဆိုင်ရာကြီးကြပ်ရေးအဖွဲ့နှင့် စစ်ဆေးရေးအဖွဲ့များ၏ စစ်ဆေးမှုခံယူခြင်း၊
- ၁၅။ စွန့်ပစ်ပစ္စည်းများကို စနစ်တကျသန့်စင်ပြီးမှ စွန့်ပစ်ခြင်း သို့မဟုတ် စနစ်တကျ စုပုံထားခြင်း၊
- ၁၆။ လုပ်ငန်းကြောင့် ပတ်ဝန်းကျင်ထိခိုက်မှုမရှိစေရန် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သက်ဆိုင်သည့် ဥပဒေများ၊ နည်းဥပဒေများနှင့်အညီ လိုက်နာဆောင်ရွက်ခြင်း၊
- ၁၇။ ထည့်သွင်းထုပ်ပိုးထားသည့် ပစ္စည်းများပေါ်တွင် အန္တရာယ်သတိပေး အမှတ်အသားတံဆိပ်ကပ်ခြင်း၊
- ၁၈။ လုပ်ငန်းလုပ်ကိုင်သည့် ဓာတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများ၏ အာနိသင်၊ အရည်အသွေးနှင့် စံချိန်စံညွှန်းတို့ကို မမှန်မကန်ကြော်ငြာ၍ မရောင်းချခြင်း။

 Central Leading Board	ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများအန္တရာယ်မှ တားဆီးကာကွယ်ရေး ဗဟိုကြီးကြပ်ရေးအဖွဲ့	<table border="1"> <tr> <td>ပုံစံ</td> <td>၈</td> </tr> <tr> <td>ဓာတုပစ္စည်းအရေအတွက် (မျိုး)</td> <td>၄</td> </tr> <tr> <td>သက်တမ်း</td> <td>၂ နှစ်</td> </tr> </table>	ပုံစံ	၈	ဓာတုပစ္စည်းအရေအတွက် (မျိုး)	၄	သက်တမ်း	၂ နှစ်
ပုံစံ	၈							
ဓာတုပစ္စည်းအရေအတွက် (မျိုး)	၄							
သက်တမ်း	၂ နှစ်							

ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများ မှတ်ပုံတင်လက်မှတ်

မှတ်ပုံတင်လက်မှတ်အမှတ်စဉ် _____ ၀၀၂၇၁၃ _____

(နည်းဥပဒေ ၂၄)



ရက်စွဲ၊ ၂၀၂၃ ခုနှစ်၊ စက်တင်ဘာလ ၅ ရက်

၁။ _____ ၂၃-၈-၂၀၂၃ _____ ရက်စွဲပါ လျှောက်လွှာအမှတ် _____ ၀၀၃၁၀၈ _____ မြင့် မှတ်ပုံတင်ခွင့်ပြုရန် လျှောက်ထားသော ဓာတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများအား မြန်မာနိုင်ငံ အတွင်း အသုံးပြုရန် မှတ်ပုံတင်ပြီးဖြစ်သည်။

၂။ တာဝန်ခံလျှောက်ထားသူ၏အမည် _____ ဒေါ်အိန္ဒြာလင်းအောင် _____

၃။ နိုင်ငံသားစိစစ်ရေးကတ်ပြားအမှတ် _____ ၉/မကန(နိုင်)၁၁၆၉၃၁ _____

သို့မဟုတ် နိုင်ငံခြားသားမှတ်ပုံတင်အမှတ် _____

၄။ အမြဲတမ်းနေရပ်လိပ်စာ _____ No(325-330), Shwe Myo Taw 1st Street, Mawlamyine Industrial Zone, Mawlamyine, Mon State. _____

၅။ ဆက်သွယ်ရန်ဖုန်းနံပါတ် သို့မဟုတ် ဖက်စ်(Fax)နံပါတ် သို့မဟုတ် e-mail လိပ်စာ _____ ၀၉၄၅၀၀၃၄၅၃၃ _____

၆။ လုပ်ငန်းလိပ်စာ _____ အကွက်အမှတ်(၃၂၅ မှ ၃၃၀)၊ ရွှေမြို့တော်(၁)လမ်း၊ ညောင်ပင်ဆိပ်ရပ်ကွက်၊ မော်လမြိုင်စက်မှုဇုန်၊ မော်လမြိုင်မြို့နယ်၊ မွန်ပြည်နယ်။ _____

၇။ ဆက်သွယ်ရန်လုပ်ငန်းဖုန်းနံပါတ် သို့မဟုတ် ဖက်စ်(Fax)နံပါတ် သို့မဟုတ် e-mail လိပ်စာ _____ ၀၉၄၅၀၀၃၄၅၃၃ _____

၈။ မှတ်ပုံတင်ခွင့်ပြုသောဓာတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများ _____ နောက်ဆက်တွဲပါအတိုင်းဖြစ်ပါသည်။ _____

(နိုင်ငံခြားသားမှတ်ပုံတင်စာရင်းအရ)

ဓာတ်ပုံနှင့် ဓာတ်ကူးတို့ကို ဖော်ပြပါအတိုင်း နေ့ရက် _____ ၅ - ၉ - ၂၀၂၅ _____




 ဗဟိုကြီးကြပ်ရေးအဖွဲ့



ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများအန္တရာယ်မှ
တားဆီးကာကွယ်ရေး
ဗဟိုကြီးကြပ်ရေးအဖွဲ့

ကုမ္ပဏီ/လုပ်ငန်းအမည်

Myanmar Shing Shing Metal Co.,Ltd.

မှတ်ပုံတင်ခွင့်ပြုသည့် ဓာတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများအမည်စာရင်း

စဉ်	ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းအမျိုးအမည်	တစ်နှစ်အသုံးပြုရန် ခန့်မှန်းပမာဏ (ကီလိုဂရမ် သို့မဟုတ် လီတာ)
1.	Mono Ammonium Phosphate	500,000 Kg
2.	Sodium Carbonate	500,000 Kg
3.	Sodium Hydroxide	500,000 Kg
4.	Lead Nitrate	500,000 Kg

မှတ်ချက်။ လုပ်ငန်းလိုအပ်ချက်အရ တစ်နှစ်အသုံးပြုရန် ခန့်မှန်းပမာဏမှာပြောင်းလဲမှုရှိနိုင်ပါသည်။



ဗဟိုပြည်နယ်
မော်လမြိုင်မြို့နယ် စည်ပင်သာယာရေးအဖွဲ့
မော်လမြိုင်မြို့နယ် စည်ပင်သာယာရေးနယ်နိမိတ်အတွင်း
ပုဂ္ဂလိကအိမ်ဆိုင်နှင့် အခြားလုပ်ငန်းများ / အန္တရာယ်ဖြစ်စေသည့်(သို့မဟုတ်)
စက်ဆုတ်ရှူရှာဖွယ်ဖြစ်စေသည့်လုပ်ငန်း စက်ရုံအလုပ်ရုံ ဖြန့်ဖြူးခြင်း၊
တည်ခင်းရောင်းချမှု၊ သိုလှောင်ရုံလုပ်ငန်းနှင့် အခြားလုပ်ငန်းလိုင်စင်
(၂၀၂၄ - ၂၀၂၅ ခု ဘဏ္ဍာရေးနှစ်)



သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာန
ပြည်ထောင်စုဝန်ကြီးရုံး



လိုင်စင်အမှတ် - 005213

ပြောဆိုသည့် - ၁၀

ရက်စွဲ - ၃ - ၇ - ၂၄

လုပ်ငန်းအမျိုးအစား - သတ္တုလုပ်ငန်း

သိုလှောင်ခြင်း ၊ ရောင်းဝယ်ခြင်း ၊ ပြုပြင်ထုတ်လုပ်ခြင်း ၊ တည်ဆောက်ခြင်း ၊ ဖြန့်ဖြူးခြင်း ၊
တည်ခင်းရောင်းချခြင်းတို့နှင့်စပ်လျဉ်း၍ မွန်ပြည်နယ်စည်ပင်သာယာရေး ဥပဒေပုဒ်မ ၂၈(၄)တို့အရ ထုတ်
ပေးသော လိုင်စင်

ဦး/ဒေါ် ဇော်နုပန်း နိုင်ငံသားစိစစ်ရေးကိစ္စအမှတ် ၉/မကန(ဒိုင်)၁၀၆၉၂
နေရပ် စက်မှုဇုန်၊ ရွာဘင်မင်အိမ် ၏ သတ္တုလုပ်ငန်း
ကျပ် ၂၀၀၀၀၀/- (စာဖြင့်) ကျပ် နှစ်သိန်း ငါးရာ ကို
ပေးသွင်းစေပြီး ရွာဘင်မင်အိမ် ရပ်ကွက်၊ စက်မှုဇုန် ဇာယိအမှတ် _____ တွင်
မွန်ပြည်နယ်စည်ပင်သာယာရေး ဥပဒေအရ အန္တရာယ်ဖြစ်စေသည့်လုပ်ငန်း စက်ရုံ ၊ အလုပ်ရုံ
ဖြန့်ဖြူးခြင်း ၊ တည်ခင်းရောင်းချခြင်း သိုလှောင်ရုံလုပ်ငန်းနှင့် အခြားလုပ်ငန်းများ ကို
သတ်မှတ်ထားရှိသော စည်းကမ်းချက်များနှင့်အညီ လုပ်ကိုင်ခွင့်ပြုလိုက်သည်။
လုပ်ငန်းလိုင်စင်သက်တမ်းအား (၁ - ၄ - ၂၀၂၄) မှ (၃ - ၃ - ၂၀၂၅) အထိ သတ်မှတ်သည်။
ဤလုပ်ငန်းလိုင်စင်အား မြင်သာသော နေရာတွင် ချိတ်ဆွဲထားရှိရမည်။


အမှုဆောင်အရာရှိ
မြို့နယ်စည်ပင်သာယာရေးအဖွဲ့
မော်လမြိုင်မြို့

မြို့နယ်စည်ပင်သာယာရေးအဖွဲ့ နယ်နိမိတ်အတွင်း

**ပုဂ္ဂလိကအိမ်ဆိုင် / ဘေးအန္တရာယ်ဖြစ်စေတတ်သော (သို့) စက်ဆုတ်ရွံ့ရှာဖွယ်ဖြစ်စေသောလုပ်ငန်းစက်ရုံ
အလုပ်ရုံ၊ ဖြန့်ဖြူးခြင်း၊ တည်ခင်းရောင်းချမှု၊ သိုလှောင်ရုံလုပ်ငန်းလိုင်စင် ၊ စားသောက်ဖွယ်ရာများ
ပြုလုပ်ခြင်းနှင့် ရောင်းချခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်နှင့် အခြားလုပ်ငန်းများ
လုပ်ကိုင်သူများ လိုက်နာရန်စည်းကမ်း**

- ၁။ အဖွဲ့မှ ထုတ်ပေးသော လိုင်စင်မရရှိဘဲ မည်သူတစ်ဦးတစ်ယောက်မျှ အဖွဲ့၏ နယ်နိမိတ်အတွင်း ပုဂ္ဂလိကအိမ်ဆိုင် / ဘေးအန္တရာယ်ဖြစ်သော လုပ်ငန်းကို မပြုရ။
- ၂။ လိုင်စင်ရရှိသောသူသည် မိမိရရှိထားသော လိုင်စင်ကို အခြားသူတစ်ဦးတစ်ယောက်သို့ တဆင့်လွှဲပြောင်းပေးခြင်း မပြုရ။
- ၃။ မိမိရရှိထားသော လိုင်စင်ကို လူအများမြင်သော နေရာတွင် ချိတ်ဆွဲထားပြီး အဖွဲ့မှ တာဝန်ပေးအပ်သူများ (သို့) တာဝန်ရှိသူများ လာရောက်စစ်ဆေးသည့်အခါတွင် တင်ပြနိုင်ရမည်။
- ၄။ လိုင်စင်ခကျသင့်ငွေကို နှစ်စဉ် ဧပြီလမှ ဩဂုတ်လအတွင်း ပေးသွင်းရမည်ဖြစ်ပြီး ၎င်းလများ ထက်ကျော်လွန်ပါက သတ်မှတ်ထားသော စီမံခန့်ခွဲရေးအဖွဲ့ကို ပေးဆောင်ရမည်။
- ၅။ လုပ်ငန်းတစ်မျိုးအတွက် လိုင်စင်တစ်ခုသာ ထုတ်ပေးရမည်ဖြစ်သည်။
- ၆။ လိုင်စင်အမျိုးအစားပြောင်းလဲလိုပါကလည်းကောင်း၊ လိုင်စင်အမည်ပြောင်းလဲလိုပါကလည်းကောင်း အဖွဲ့သို့ကြိုတင်လျှောက်ထား ရမည်ဖြစ်ပြီး လိုင်စင်အမည်ပြောင်းလဲခအား လိုင်စင်ခ တစ်နှစ်စာပေးသွင်း၍ပြောင်းလဲနိုင်သည်။
- ၇။ ကူးစက်တတ်သောရောဂါရှင်များအား လုပ်ငန်းတွင် အသုံးမပြုရ။
- ၈။ အဖွဲ့မှ ထုတ်ပေးသော လိုင်စင်ပါလုပ်ငန်းသည် လုပ်သားပြည်သူများအား အနှောင့်အယှက်တစ်စုံ ဖြစ်ပေါ်ပါက အဖွဲ့သည် လိုင်စင်ကို ရုပ်ဆိုင်းထားနိုင်သည်(သို့)ပိတ်သိမ်းနိုင်သည်။
- ၉။ လုပ်ငန်းရှင်များသည် မြို့နယ်စည်ပင်သာယာရေးအဖွဲ့မှ အခါအားလျော်စွာထုတ်ပြန်သော ညွှန်ကြားချက်များအား မပျက်မကွက် လိုက်နာနိုင်ရမည်။
- ၁၀။ အထက်ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ကို ဖောက်ဖျက်ကျူးလွန်ခဲ့သော် အဖွဲ့သည် ထုတ်ပေးသော လိုင်စင်ကို ပြန်လည်ရုတ်သိမ်းမည် ဖြစ်ပါသည်။
- ၁၁။ ဤလုပ်ငန်းလိုင်စင်ထုတ်ပေးမှုတွင် တရားမဝင် ဂိမ်းဆိုင်ဖွင့်လှစ်လုပ်ကိုင်နိုင်ရန်အတွက် ခွင့်ပြုခြင်းမဟုတ်။ အခကြေးငွေယူ၍ တရားမဝင် ဂိမ်းဆိုင်ဖွင့်လှစ်လုပ်ကိုင်ခြင်း လုံးဝမပြုလုပ်ရ။
- ၁၃။ ကျန်းမာရေးဝန်ကြီးဌာနမှ စားသုံးရန်မသင့်သော / အသုံးပြုရန်မသင့်သော တားမြစ်ဆေးဝါးများနှင့် အစားအသောက်များ၊ အလှကုန်ပစ္စည်းများအား ရောင်းချခြင်း မပြုရ။

APPENDIX B

Material Safety Data Sheets

A Brief of Material Safety Data Sheet (MSDS)

Chemicals Used in Laboratory

No.	Name of Chemicals	Use Amount	Effects on Health
1.	Sodium Fluoride F Na	< 100 ml	Skin – Cause skin irritation. Eye – cause serious eye irritation Inhalation – can irritate nose, throat and lungs
2.	Potassium Sulphate K_2O_4S	< 100 ml	Skin – Low Hazard Eye – Irritation Inhalation – Respiratory Tract Irritation
3.	Cerium (IV) Sulfate CeO_8S_2	< 100 ml	Skin – Irritation Eye – Irritation Inhalation – Respiratory Tract Irritation
4.	Methyl Orange Indicator Solution $C_{14}H_{14}N_3NaO_3S$	< 100 ml	Skin – Irritation Eye – Irritation Inhalation – Respiratory Tract Irritation
5.	Hydrochloric Acid HCl	< 100 ml	Skin – Irritation Eye – Irritation Inhalation – Respiratory Tract Irritation
6.	Sulfuric Acid (Concentrated) H_2SO_4	< 100 ml	Skin – Causes burns, and brownish or yellow stains. Concentrated solutions may cause second or third degree burns with severe necrosis. Prolonged and repeated exposure to dilute solutions may cause irritation, redness, pain and drying and cracking of the skin. Eye – immediate pain, severe burns and corneal damage, which may result in permanent blindness. Inhalation – Causes respiratory irritation and at high concentrations may cause severe injury, burns, or death. Effects of exposure may be delayed.

Chemicals Used in Smelting

No	Name of Chemicals	Use	Use Amount (Ton per Month)	Effects on Health
1.	Soda Ash Light Na_2CO_3	Smelting and Wet Scrubber Operation	6.9	Skin – Mildly irritating. Repeated or prolonged contact can cause redness, itching, dryness and cracking. Eye – Slightly irritating. Irritation accompanied by redness and tearing. Inhalation – Causes irritation to mucous membranes and upper respiratory system.
2.	Mono Ammonium Phosphate $\text{NH}_4\text{H}_2\text{PO}_4$	Smelting	6	Skin – Slightly Irritation Eye – Irritation Inhalation – Upper Respiratory Tract Irritation

APPENDIX C
Environmental Impact Assessment License



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (အဖွဲ့အစည်း)

Environmental Impact Assessment License (Organization)

Olive Bright Environmental Solutions Limited ၊ ကုမ္ပဏီမှတ်ပုံတင်အမှတ်-၁၃၁၅၈၀၂၂၃ အား အကြံပေးအဖွဲ့အမျိုးအစား(က) အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **Olive Bright Environmental Solutions Limited** ၊ Registration No.131580223 has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Consulting Organization Type (A)** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် စီမံကိန်းလုပ်ငန်းအုပ်စုများမှာ ပူးတွဲပါအတိုင်း ဖြစ်သည်။

The categories of projects, eligible to be conducted, are as attached.

လိုင်စင်နံပါတ် License Number

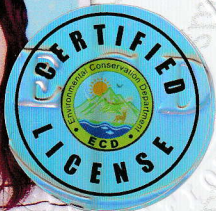
: EIA-CO(A)002/2023 (ထပ်တိုး)

ထုတ်ပေးသည့် ရက်စွဲ Date of Issue

: 1-1-2024

ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry

: 31-12-2026



(သိန်းတိုး)

ညွှန်ကြားရေးမှူးချုပ်

စည်းကမ်းချက်များ

၁။ ဤလုပ်ငန်းလိုင်စင်ကိုင်ဆောင်ထားသူသည်-

- (က) လုပ်ငန်းလိုင်စင်မိတ္တူကို လုပ်ငန်းခွင်တွင် အများမြင်သာအောင်ချိတ်ဆွဲ၍ မူရင်းကို လုံခြုံစွာထိန်းသိမ်းထားရှိရမည်။
- (ခ) လုပ်ငန်းလိုင်စင်ကို ပြင်ဆင်ခြင်းနှင့် ဖျက်ဆီးခြင်း၊ လုပ်ငန်းလိုင်စင်မူရင်း သို့မဟုတ် မိတ္တူကို မသက်ဆိုင်သူ တစ်ဦးဦးအား အခကြေးငွေဖြင့်ငှားရမ်းခြင်း၊ အမည်ခံအသုံးပြုစေခြင်းနှင့်တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်း မပြုရ။
- (ဂ) လုပ်ငန်းလိုင်စင်ပါအချက်များကို ပြုပြင်ပြောင်းလဲရန် လိုအပ်ပါက ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ ကြိုတင် တင်ပြလျှောက်ထားရမည်။
- (ဃ) လုပ်ငန်းလိုင်စင် ပျက်စီးခြင်း၊ ပျောက်ဆုံးခြင်း ဖြစ်ပွားပါက ၇ ရက်အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ အကျိုးအကြောင်းခိုင်လုံစွာ ဖော်ပြ၍ တင်ပြလျှောက်ထားရမည်။
- (င) လုပ်ငန်းလိုင်စင်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ဖြေရှင်းနိုင်ခြင်းမရှိပါက လုပ်ငန်းလုပ်ကိုင်ခွင့်ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
- (စ) လုပ်ငန်းလိုင်စင်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူ လေ့လာ ဆန်းစစ်ရေးဆွဲရမည်။
- (ဆ) အဖွဲ့အစည်းဖြစ်လျှင် အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director) ၊ အကြံပေးပုဂ္ဂိုလ်၊ အထောက်အကူပြုအဖွဲ့ဝင်များ ပြောင်းလဲမှုတစ်စုံတစ်ရာ ရှိပါက ပြောင်းလဲသည့် နေ့ရက်မှစ၍ ရက်ပေါင်း ၉၀ အတွင်း တည်ဆဲ ဥပဒေများနှင့်အညီ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ အချိန်မီ အကြောင်းကြားရမည်။
- (ဇ) အကြံပေးအဖွဲ့အမျိုးအစား (က) သို့မဟုတ် (ခ) တွင် အဓိကအကြံပေးပုဂ္ဂိုလ်အဖြစ် ဆောင်ရွက်နေသော အကြံပေးပုဂ္ဂိုလ် သို့မဟုတ် တွဲဖက်အကြံပေးပုဂ္ဂိုလ်ဖြစ်ပါက အခြားအကြံပေးအဖွဲ့အစည်းတွင် အဓိကအကြံပေးပုဂ္ဂိုလ်အဖြစ် ဖြစ်စေ၊ အဓိကမဟုတ်သော အကြံပေးပုဂ္ဂိုလ်အဖြစ် ဖြစ်စေ ပါဝင်ဆောင်ရွက်ခြင်း မပြုရ။
- (ဈ) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ၊ နည်းဥပဒေများ၊ အမိန့်၊ ညွှန်ကြားချက်နှင့် လုပ်ထုံးလုပ်နည်းများကိုလည်းကောင်း၊ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာလုပ်ထုံးလုပ်နည်း အပိုဒ် ၃၃ ပါ စည်းကမ်းချက်များကိုလည်းကောင်း၊ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလည်းကောင်း လိုက်နာရမည်။

၂။ လုပ်ငန်းလိုင်စင်သက်တမ်းတိုးခြင်းနှင့် စပ်လျဉ်း၍-

- (က) လုပ်ငန်းလိုင်စင်လုပ်ထုံးလုပ်နည်းတွင် သတ်မှတ်ထားသည့်အတိုင်း လုပ်ငန်းလိုင်စင် သက်တမ်းမကုန်ဆုံးမီ သုံးလ ကြိုတင်၍ မပျက်မကွက် လိုင်စင် သက်တမ်းတိုးရမည်။
- (ခ) လုပ်ငန်းလိုင်စင်သက်တမ်းတိုးရန် လျှောက်ထားခြင်း၊ လိုင်စင်ထုတ်ယူခြင်းကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီး ဌာနသို့ လူကိုယ်တိုင် သို့မဟုတ် အဖွဲ့အစည်းတာဝန်ခံကိုယ်တိုင် လာရောက် ဆောင်ရွက်ရမည်။
- (ဂ) လုပ်ငန်းလိုင်စင်သက်တမ်းတိုးပြီး လိုင်စင်အသစ်ထုတ်ယူရာတွင် လက်ဝယ်ရှိမူရင်းလိုင်စင်ကို ပြန်လည်အပ်နှံရမည်။

၃။ လုပ်ငန်းလိုင်စင်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း အမျိုးအစားမှအပ အခြားဆန်းစစ်ခြင်းအမျိုးအစားကို လေ့လာဆန်းစစ်ရေးဆွဲဆောင်ရွက်ခြင်း မပြုရ။

၄။ လုပ်ငန်းလိုင်စင်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်း လုပ်ငန်းများဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ်စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ် ဆုံးဖြတ်ခြင်းခံရလျှင် လုပ်ငန်းလိုင်စင် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။

၅။ လုပ်ငန်းလိုင်စင်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်၊ တွဲဖက်အကြံပေးပုဂ္ဂိုလ် များ၏ အမည်စာရင်းမှအပ အခြားပုဂ္ဂိုလ်များ၏ အမည်စာရင်းများကို တင်ပြခွင့်မရှိရ။

၆။ လုပ်ငန်းလိုင်စင်ရရှိသောအဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှုနယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် လုပ်ငန်းလိုင်စင်ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလိက လုပ်ကိုင်သူ (Freelancer) အကြံပေးပုဂ္ဂိုလ် သို့မဟုတ် တွဲဖက်အကြံပေးပုဂ္ဂိုလ်ကို သက်ဆိုင်ရာစီမံကိန်းအတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။ သက်ဆိုင်ရာစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ တတိယအဖွဲ့အစည်း အတည်ပြုချက်ရယူရာတွင် ယင်းသို့ ငှားရမ်းဆောင်ရွက်ကြောင်း နှစ်ဦးသဘောတူစာချုပ် အထောက်အထားကို တစ်ပါတည်း ထည့်သွင်းဖော်ပြရမည်။

စဉ်	အမည်	လုပ်ငန်းလိုင်စင်အမှတ်	မှတ်ချက်
၁	၂	၃	၄
(က) အကြံပေးပုဂ္ဂိုလ်			
၁	ဒေါက်တာလှလှဝင်း	EIA-C 019/2023	
၂	ဦးမင်းမင်းဦး	EIA-C 020/2023	
၃	ဒေါ်မြတ်သစ္စာနိုင်	EIA-C 021/2023	
၄	ဦးမျိုးသူရ	EIA-C 046/2023	
၅	ဒေါ်အေးအေးစိုး	EIA-C 068/2023	
(ခ) တွဲဖက်အကြံပေးပုဂ္ဂိုလ်			
၁	ဦးကျော်ဝင်းဟန်	EIA-AC 027/2023	
၂	ဦးစည်ယံဟိန်း	EIA-AC 026/2023	
၃	ဒေါ်အိသက်မွန်	EIA-AC 017/2023	
၄	ဦးခင်မောင်အေး	EIA-AC 018/2023	
၅	ဒေါ်သင်းသင်း	EIA-AC 021/2023	
၆	ဒေါက်တာ ဖြူဖြူမြင့်	EIA-AC 020/2023	
၇	ဦးစိုးပိုင်ဟိန်း	EIA-AC 019/2023	
၈	ဦးညွန့်ဦး	EIA-AC 036/2023	
၉	ဦးကောင်းကျော်ထက်	EIA-AC 049/2023	
၁၀	ဦးထက်သီဟဖုန်းမြင့်	EIA-AC 032/2023	
၁၁	ဦးခင်မောင်ဝင်း	EIA-AC 028/2023	

အဖွဲ့အစည်းက လေ့လာဆန်းစစ်ခွင့်ရှိသော စီမံကိန်းလုပ်ငန်းအုပ်စုများ

စဉ်	လုပ်ငန်းလိုင်စင်ဆိုင်ရာလုပ်ထုံးလုပ်နည်း ပုံစံ (ခ) ပါ စီမံကိန်းလုပ်ငန်းအုပ်စုများ	ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း နောက်ဆက်တွဲ (က) ပါ စီမံကိန်းနံပါတ်များ
၁။	ကုန်းတွင်းရေနံနှင့် သဘာဝဓာတ်ငွေ့စီမံကိန်းလုပ်ငန်း	(၁၂) မှ (၁၄)
၂။	ကမ်းလွန်ရေနံနှင့် သဘာဝဓာတ်ငွေ့စီမံကိန်းလုပ်ငန်း	(၁၅) မှ (၁၇)
၃။	ရေနံနှင့် သဘာဝဓာတ်ငွေ့ ပြုပြင်သန့်စင်ထုတ်လုပ်ခြင်းစီမံကိန်းလုပ်ငန်း	(၁၈) မှ (၂၀) နှင့် (၂၅)
၄။	ရေနံနှင့် သဘာဝဓာတ်ငွေ့ သယ်ယူပို့ဆောင်ခြင်း၊ သိုလှောင်ခြင်းနှင့် ဖြန့်ဖြူးခြင်း လုပ်ငန်း	(၂၁) မှ (၂၃)
၅။	ဓာတ်ငွေ့ရည် (LPG)၊ သဘာဝဓာတ်ငွေ့ (CNG) နှင့် စက်သုံးဆီအရောင်းဆိုင် လုပ်ငန်း	(၂၄)
၆။	ကျောက်မီးသွေးသုံးလျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်း	(၅)
၇။	ရေအားလျှပ်စစ်စီမံကိန်းလုပ်ငန်း	(၂)
၈။	အခြားပြန်ပြည့်မြဲစွမ်းအင် စီမံကိန်းလုပ်ငန်း	(၇)၊ (၁၀) နှင့် (၁၁)
၉။	သဘာဝဓာတ်ငွေ့သုံး သို့မဟုတ် ဇီဝဓာတ်ငွေ့သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်း လုပ်ငန်း	(၄)
၁၀။	ဓာတ်ငွေ့၊ အပူစွမ်းအင်နှင့် အပူငွေ့သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်း	(၈) နှင့် (၉)
၁၁။	စွန့်ပစ်ပစ္စည်းမှ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်း	(၆)
၁၂။	လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးခြင်းလုပ်ငန်း	(၂၆) မှ (၂၈)
၁၃။	စိုက်ပျိုးရေးထုတ်ကုန်များ ထုတ်လုပ်ခြင်းလုပ်ငန်း	(၂၉) နှင့် (၃၀)
၁၄။	မွေးမြူရေးဆိုင်ရာလုပ်ငန်း	(၃၁) မှ (၃၃)၊ (၃၇) နှင့် (၃၈)
၁၅။	ရေလုပ်ငန်းဆိုင်ရာလုပ်ငန်း	(၃၄) မှ (၃၆)
၁၆။	သစ်တောထိန်းသိမ်းအုပ်ချုပ်ခတ်လှဲထုတ်လုပ်ခြင်းဆိုင်ရာ ဖွံ့ဖြိုးရေးလုပ်ငန်း	(၃၉) နှင့် (၄၀)
၁၇။	အစားအစာ ပြုပြင်မွမ်းမံထုတ်လုပ်ခြင်းလုပ်ငန်း	(၄၂) မှ (၅၂) နှင့် (၅၇)
၁၈။	အဖျော်ယမကာ ပြုပြင်မွမ်းမံထုတ်လုပ်ခြင်းလုပ်ငန်း	(၅၃) မှ (၅၆)
၁၉။	အဝတ်အထည်၊ ချည်ထည် ထုတ်လုပ်ခြင်းနှင့် ဆေးဆိုးခြင်းလုပ်ငန်း	(၅၈) နှင့် (၅၉)
၂၀။	သားရေထည်ပစ္စည်း ထုတ်လုပ်ခြင်းလုပ်ငန်း	(၆၀) နှင့် (၆၁)
၂၁။	ပျော့ဖတ်နှင့် စက္ကူထုတ်လုပ်ခြင်းလုပ်ငန်း	(၆၄)

အဖွဲ့အစည်းက လေ့လာဆန်းစစ်ခွင့်ရှိသော စီမံကိန်းလုပ်ငန်းအုပ်စုများ

စဉ်	လုပ်ငန်းလိုင်စင်ဆိုင်ရာလုပ်ထုံးလုပ်နည်း ပုံစံ (ခ) ပါ စီမံကိန်းလုပ်ငန်းအုပ်စုများ	ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း နောက်ဆက်တွဲ (က) ပါ စီမံကိန်းနံပါတ်များ
၂၂။	ဓာတုပစ္စည်းထုတ်လုပ်ခြင်းလုပ်ငန်း	(၆၆) မှ (၇၅)
၂၃။	ပေါက်ကွဲစေတတ်သော ပစ္စည်းများထုတ်လုပ်ခြင်းလုပ်ငန်း	(၇၆) မှ (၇၈)
၂၄။	ဖန်ထည်/မှန်ထည်နှင့် ကြွေထည်ပစ္စည်းထုတ်လုပ်ခြင်းလုပ်ငန်း	(၇၉) နှင့် (၈၀)
၂၅။	ဘိလပ်မြေ၊ အခြားဆောက်လုပ်ရေးကုန်ကြမ်းပစ္စည်းများနှင့် နိုင်လွန်ကတ္တရာ ထုတ်လုပ်ခြင်းလုပ်ငန်း	(၈၁) မှ (၈၄)
၂၆။	သတ္တုပစ္စည်းထုတ်လုပ်သန့်စင်ခြင်းလုပ်ငန်း	(၈၅) မှ (၈၈)
၂၇။	သင်္ဘောကျင်း၊ သင်္ဘောနှင့် ရထားတည်ဆောက်ပြုပြင်တပ်ဆင်ခြင်းလုပ်ငန်း	(၈၉) နှင့် (၉၀)
၂၈။	ရာဘာ နှင့် စက်မှုလုပ်ငန်းသုံးကုန်ကြမ်းပစ္စည်းများ ထုတ်လုပ်ခြင်းလုပ်ငန်း	(၉၁) မှ (၉၃)
၂၉။	ဘေးအန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်း ပြန်လည် အသုံးပြုခြင်း၊ စွန့်ပစ်ခြင်းနှင့် မီးရှို့ခြင်းလုပ်ငန်း	(၁၀၃) မှ (၁၀၅)
၃၀။	ဘေးအန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း ပြန်လည်အသုံးပြုခြင်းနှင့် စွန့်ပစ်ခြင်း လုပ်ငန်း	(၁၀၆) နှင့် (၁၀၇)
၃၁။	စွန့်ပစ်ရေနှင့် ရေဆိုးများ ပြုပြင်သန့်စင်တည်ဆောက်ခြင်းလုပ်ငန်း	(၁၀၈) နှင့် (၁၀၉)
၃၂။	စက်မှုလုပ်ငန်း၊ စိုက်ပျိုးရေးလုပ်ငန်း သို့မဟုတ် မြို့ပြရေပေးဝေရေးအတွက် မြေအောက်ရေဖွံ့ဖြိုးရေးလုပ်ငန်း	(၁၁၀)
၃၃။	ဆည်၊ ရေလှောင်တံခံနှင့် ဆည်မြောင်း စနစ် တည်ဆောက်ခြင်းလုပ်ငန်း	(၄၁) နှင့် (၁၁၁)
၃၄။	အများပြည်သူကို ထိခိုက်စေနိုင်သော ရေကန်၊ မြစ်၊ ချောင်း၊ တူးမြောင်းများ မြေဖို့ခြင်းလုပ်ငန်း	(၁၁၂)
၃၅။	မြို့ပြတည်ဆောက်ရေးအတွက် မြစ်ရေ၊ ပင်လယ်ရေထိန်း နံရံတည်ဆောက်ခြင်း၊ ကမ်းလွန်ပင်လယ်ရေ တားဆီးခြင်း လုပ်ငန်း	(၁၁၃)
၃၆။	သောင်တူးခြင်းနှင့်မြစ်ကြောင်းထိန်းသိမ်းခြင်းလုပ်ငန်း	(၁၁၄)နှင့်(၁၁၅)
၃၇။	စက်မှုဇုန်တည်ဆောက်ရေးနှင့် ဖွံ့ဖြိုးရေးလုပ်ငန်း	(၁၁၈)
၃၈။	ဆေးရုံတည်ဆောက်ခြင်းလုပ်ငန်း	(၁၁၉)
၃၉။	သုသာန်၊ သင်္ချိုင်း တည်ဆောက်ခြင်းလုပ်ငန်း	(၁၂၀)
၄၀။	ဟိုတယ်နှင့် ခရီးသွားဖွံ့ဖြိုးရေးလုပ်ငန်း	(၁၂၁)
၄၁။	ဂေါက်ကွင်းတည်ဆောက်ခြင်းလုပ်ငန်း	(၁၂၂)
၄၂။	လူနေအိမ်ရာဖွံ့ဖြိုးရေး၊ ပြန်လည်နေရာချထားရေးဆိုင်ရာ မြို့ပြဖွံ့ဖြိုးရေးနှင့် မြို့သစ်တည်ဆောက်ရေး စီမံကိန်း လုပ်ငန်း	(၁၄၂)
၄၃။	မြစ်ချောင်း၊ အင်းအိုင်၊ ကမ်းရိုးတန်း၊ သဘာဝအရင်းအမြစ်များ၊ ယဉ်ကျေးမှုအမွေအနှစ်များနှင့် ဆက်စပ်သောလုပ်ငန်း	(၁၅၁)မှ (၁၅၅)

အဖွဲ့အစည်းက လေ့လာဆန်းစစ်ခွင့်ရှိသော စီမံကိန်းလုပ်ငန်းအုပ်စုများ

စဉ်	လုပ်ငန်းလိုင်စင်ဆိုင်ရာလုပ်ထုံးလုပ်နည်း ပုံစံ (ခ) ပါ စီမံကိန်းလုပ်ငန်းအုပ်စုများ	ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း နောက်ဆက်တွဲ (က) ပါ စီမံကိန်းနံပါတ်များ
၄၄။	အိပ်ဆောင်များ၊ ကွန်ဒိုမီနီယံအဆောက်အဦ တည်ဆောက်ခြင်းလုပ်ငန်း	(၁၄၃)
၄၅။	ဘက်စုံအားကစားကွင်း တည်ဆောက်ခြင်းလုပ်ငန်း	(၁၄၄)
၄၆။	အထူးစီးပွားရေးဇုန်တည်ဆောက်ရေးနှင့် ဖွံ့ဖြိုးရေးစီမံကိန်းလုပ်ငန်း	(၁၄၅)
၄၇။	ကုန်တိုက်ကြီးများ၊ ကုန်သွယ်ရေးဌာန၊ အဆင့်မြင့်ဈေးများ တည်ဆောက်ခြင်း လုပ်ငန်း	(၁၄၆)
၄၈။	မြေအောက်ထပ် တည်ဆောက်ခြင်းလုပ်ငန်း	(၁၄၇)
၄၉။	အခြေခံအဆောက်အအုံလုပ်ငန်း	(၁၄၈)
၅၀။	စားသောက်ဆိုင်လုပ်ငန်း	(၁၅၀)
၅၁။	မီးရထားနှင့် လျှပ်စစ်ရထား ပို့ဆောင်ရေးလုပ်ငန်း	(၁၂၃)
၅၂။	ကြိုးတပ်ကား တပ်ဆင်ပြေးဆွဲခြင်းလုပ်ငန်း	(၁၂၄)
၅၃။	လေဆိပ်နှင့် လေယာဉ်ပြေးလမ်း တည်ဆောက်ခြင်းလုပ်ငန်း	(၁၂၅)
၅၄။	တံတား၊ မြစ်ကူးတံတား၊ ဂုံးကျော်တံတား တည်ဆောက်ခြင်းနှင့် အဆင့်မြှင့် တင်ခြင်းလုပ်ငန်း	(၁၂၆) နှင့် (၁၂၇)
၅၅။	ဥမင်လိုဏ်ခေါင်းဖောက်လုပ်ခြင်းလုပ်ငန်း	(၁၂၈)
၅၆။	အဝေးပြေးလမ်းမအသစ် ဖောက်လုပ်ခြင်းလုပ်ငန်း	(၁၂၉)
၅၇။	လမ်းတည်ဆောက်ခြင်းနှင့် အဆင့်မြှင့်တင်ခြင်းလုပ်ငန်း	(၁၃၀) နှင့် (၁၃၁)
၅၈။	သင်္ဘောသွားလာရေးလုပ်ငန်း	(၁၁၆)
၅၉။	ဆိပ်ကမ်းတည်ဆောက်ခြင်းလုပ်ငန်း	(၁၁၇)
၆၀။	အဝေးပြေးကားဂိတ်ကြီးများ တည်ဆောက်ခြင်းလုပ်ငန်း	(၁၄၉)
၆၁။	ကျောက်၊ သဲထုတ်လုပ်ခြင်း၊ ဆောက်လုပ်ရေးလုပ်ငန်းသုံးနှင့် ကြွေထည် မြေထည်လုပ်ငန်းသုံး ကုန်ကြမ်းပစ္စည်းများ ထုတ်လုပ်ခြင်းလုပ်ငန်း	(၁၃၂) နှင့် (၁၃၃)
၆၂။	စက်မှုတွင်းထွက်ကုန်ကြမ်း တူးဖော်ထုတ်လုပ်ခြင်းနှင့် သန့်စင်ခြင်းလုပ်ငန်း	(၁၃၄)
၆၃။	မြေပေါ်နှင့် မြေအောက် သတ္တုတူးဖော်ထုတ်လုပ် ပြုပြင်သန့်စင်ခြင်းလုပ်ငန်း	(၁၃၅) မှ (၁၄၁)
၆၄။	ဆက်သွယ်ရေးကွန်ရက်ဖွံ့ဖြိုးရေးလုပ်ငန်း	(၁၅၆) နှင့် (၁၅၇)

APPENDIX D
24 Hours Air Quality Results

Air Quality Monitoring Point -1

Sensor Type		SO2	NO2	O3	CO	PM2.5	PM10	TSP	TEMPER	HUM	AIRPRE
Date	Time	ppb	ppb	ppb	ppm	ug/m3	ug/m3	ug/m3	°c	%RH	hPa
15/3/2025	12:00:15	12.29	40.50	56.60	1.68	25.08	57.30	69.12	37.98	38.40	1005.54
	13:00:15	19.50	31.50	45.60	1.40	17.14	58.40	56.00	41.06	32.93	1005.00
	14:00:15	13.00	41.30	45.30	1.00	14.80	54.40	60.00	41.96	29.93	1005.00
	15:00:15	16.40	48.10	54.30	4.00	17.47	56.40	56.50	39.95	41.58	1005.00
	16:00:15	16.13	51.53	59.40	1.00	20.87	50.40	60.40	36.86	48.92	1005.00
	17:00:15	15.30	57.86	67.50	1.00	31.47	57.92	83.90	34.35	33.90	1005.00
	18:00:15	13.10	69.58	67.10	3.00	30.93	59.00	86.60	31.96	60.23	1005.00
	19:00:15	15.40	64.13	56.70	4.00	41.53	96.50	157.40	29.96	67.63	1005.00
	20:00:15	8.30	60.96	43.10	1.00	45.20	75.63	105.90	28.79	74.05	1005.00
	21:00:15	4.00	64.49	41.10	1.00	41.47	67.75	93.50	27.95	78.70	1005.30
	22:00:15	8.39	61.80	37.40	1.00	38.73	61.25	82.40	27.11	61.80	1006.00
	23:00:15	1.00	57.94	38.10	1.00	36.93	59.00	79.70	26.70	82.55	1006.00
16/3/2025	0:00:15	5.00	55.97	45.10	1.00	38.67	57.47	77.40	25.98	83.48	1006.00
	1:00:15	1.00	52.61	40.50	1.00	38.33	57.67	77.30	25.68	83.78	1005.77
	2:00:15	4.00	51.17	41.30	1.17	35.73	55.00	72.70	25.43	84.02	1005.00
	3:00:15	5.00	50.86	43.40	1.35	33.47	52.75	70.40	24.99	85.72	1005.00
	4:00:15	3.00	55.10	45.40	1.35	33.27	54.55	73.50	24.94	86.53	1005.00
	5:00:15	1.00	52.39	44.10	1.62	31.73	51.00	68.90	24.66	85.18	1005.00
	6:00:15	6.00	49.27	45.60	1.17	34.60	57.33	80.10	24.48	81.95	1008.45
	7:00:15	5.00	48.75	49.80	1.17	38.33	62.33	89.00	25.02	76.60	1007.20
	8:00:15	9.79	47.69	45.30	2.00	32.67	56.17	80.10	27.49	69.35	1006.02
	9:00:15	15.10	42.74	56.40	4.00	27.00	57.30	67.50	30.72	63.63	1005.77
	10:00:15	14.10	34.77	55.40	3.00	24.13	58.40	61.20	33.29	37.43	1008.00
	11:00:15	11.30	36.98	58.40	3.00	23.53	54.50	61.70	35.94	50.18	1007.45
24 hr	Avg	9.29	51.96	48.45	1.43	31.11	58.53	74.39	30.56	66.60	1005.90
	Max	19.50	74.13	67.50	4.00	45.20	96.50	157.40	41.96	86.53	1008.77
	Min	1.00	31.50	37.40	1.00	14.80	50.40	56.00	24.48	29.93	1005.00
	ug/m3	24.34504	97.68164	96.93017							

Air Quality Monitoring Point -2

Sensor Type		SO2	NO2	O3	CO	PM2.5	PM10	TSP	TEMPER	HUM	AIRPRE
Date	Time	ppb	ppb	ppb	ppm	ug/m3	ug/m3	ug/m3	°C	%RH	hPa
15/3/2025	13:00:00	12.03	22.77	43.30	0.90	36.10	49.15	63.46	37.85	37.05	1005.46
	14:00:00	5.03	31.00	45.00	4.00	38.68	46.15	61.35	39.87	34.82	1005.52
	15:00:00	5.06	3.00	46.55	4.08	38.80	43.00	67.00	40.73	31.78	1004.47
	16:00:00	6.00	3.00	46.40	3.26	37.00	48.90	68.95	38.13	45.60	1004.00
	17:00:00	20.55	3.00	48.80	5.40	39.60	50.05	66.30	35.53	51.73	1004.00
	18:00:00	4.93	7.76	47.30	0.13	39.00	53.50	72.00	33.85	35.00	1004.00
	19:00:00	6.00	96.60	48.40	1.00	31.10	56.00	98.00	31.31	61.82	1004.93
	20:00:00	9.00	145.40	47.40	1.00	38.40	43.00	75.00	28.92	68.67	1005.53
	21:00:00	15.83	150.40	49.50	4.00	34.30	33.00	56.00	27.73	72.65	1006.18
	22:00:00	16.15	180.40	64.49	0.50	35.10	39.00	78.00	26.96	74.97	1007.00
	23:00:00	22.55	178.59	61.80	0.08	36.10	86.30	99.70	26.35	75.97	1007.00
	0:00:00	8.50	132.44	57.94	1.00	34.50	63.95	94.75	26.06	76.00	1007.00
16/3/2025	1:00:00	15.55	63.89	53.97	1.17	35.70	71.35	83.10	25.40	76.62	1007.00
	2:00:00	15.10	45.08	52.61	0.11	40.40	58.00	99.50	24.95	76.83	1007.00
	3:00:00	4.50	40.97	51.17	0.01	35.63	71.95	83.30	24.71	76.67	1005.68
	4:00:00	6.00	35.09	50.86	3.00	33.33	64.90	74.50	24.44	76.47	1006.30
	5:00:00	7.20	35.67	55.10	1.00	45.27	88.60	76.00	24.19	77.18	1007.00
	6:00:00	9.30	23.72	52.39	1.00	32.23	65.95	77.55	24.03	77.18	1007.05
	7:00:00	9.30	4.80	49.27	1.00	34.57	68.40	80.10	24.22	74.80	1008.00
	8:00:00	9.30	3.77	48.75	0.90	38.20	73.55	88.30	25.76	69.58	1008.75
	9:00:00	15.30	10.87	47.60	0.90	28.40	60.30	74.15	29.97	60.00	1009.43
	10:00:00	10.20	46.82	42.74	0.90	22.47	50.45	62.50	33.60	55.52	1010.00
	11:00:00	16.01	11.24	34.77	2.70	25.00	75.90	67.00	35.07	52.63	1010.17
	12:00:00	15.13	5.26	36.98	1.00	21.60	52.20	67.05	36.57	46.20	1010.00
24 hr	Avg	11.03	52.61	48.42	1.63	34.62	59.73	76.40	30.26	67.76	1006.80
	Max	22.55	180.40	64.49	5.40	45.27	88.60	99.70	40.73	77.18	1009.17
	Min	4.50	3.00	34.77	0.01	21.60	33.00	56.00	24.03	31.78	1004.00
	ug/m3	28.89491	98.89979	96.87289							

Air Quality Monitoring Point -3

Sensor Type		SO2	NO2	O3	CO	PM2.5	PM10	TSP	TEMPER	HUM	AIRPRE
Date	Time	ppb	ppb	ppb	ppm	ug/m3	ug/m3	ug/m3	°c	%RH	hPa
15/3/2025	14:00:00	12.03	22.77	43.30	1.00	36.10	49.15	47.46	35.00	37.65	1005.46
	15:00:00	15.00	43.00	35.00	1.00	38.68	46.15	45.35	37.00	34.82	1005.52
	16:00:00	13.10	45.00	46.55	1.00	38.80	43.00	51.00	37.00	31.78	1004.47
	17:00:00	13.60	45.00	46.40	3.63	37.00	48.90	52.95	38.13	45.60	1004.00
	18:00:00	13.10	56.00	48.80	1.40	39.60	50.05	50.30	35.53	51.73	1004.00
	19:00:00	14.10	45.00	47.30	0.14	39.00	53.50	56.00	33.65	55.00	1004.00
	20:00:00	8.00	96.60	35.00	1.00	31.10	56.00	82.00	31.31	61.82	1004.93
	21:00:00	9.00	45.00	47.40	1.00	38.40	43.00	59.00	28.92	68.67	1005.53
	22:00:00	7.00	34.00	49.50	1.00	34.30	33.00	40.00	27.73	66.30	1006.18
	23:00:00	5.00	56.00	64.49	0.55	35.10	39.00	92.60	26.96	64.50	1007.00
16/3/2025	0:00:00	3.00	56.00	61.80	0.09	36.10	86.30	83.70	26.35	75.97	1007.00
	1:00:00	8.50	56.00	57.94	0.36	34.50	83.95	78.75	26.06	76.00	1007.00
	2:00:00	4.00	63.89	55.97	1.30	35.70	71.35	67.10	25.40	76.62	1007.00
	3:00:00	5.00	45.00	52.61	0.12	40.70	58.00	83.50	24.95	76.83	1007.00
	4:00:00	4.50	40.97	51.17	0.01	36.63	71.95	67.30	24.71	66.00	1006.68
	5:00:00	6.00	35.09	50.86	1.00	33.33	64.90	58.60	24.44	65.00	1006.30
	6:00:00	7.20	35.67	55.10	5.60	45.27	88.60	86.15	24.19	77.18	1007.00
	7:00:00	9.30	23.72	52.39	1.00	32.23	65.95	61.55	24.03	77.18	1007.05
	8:00:00	13.00	45.00	31.00	3.00	34.57	88.40	64.10	24.22	74.80	1008.00
	9:00:00	13.00	45.00	41.00	1.00	36.20	73.55	72.30	25.76	69.58	1008.45
	10:00:00	11.00	54.00	37.00	1.00	29.40	60.30	58.15	29.97	60.00	1009.43
	11:00:00	14.00	46.82	35.00	1.00	22.47	50.45	46.50	31.30	55.52	1010.00
	12:00:00	16.01	45.00	34.77	3.00	25.00	75.90	86.65	33.10	52.63	1010.17
	13:00:00	15.11	45.00	36.98	1.00	21.60	52.20	51.05	34.10	46.20	1010.00
24 hr	Avg	9.99	46.80	46.56	1.30	34.62	59.73	64.25	28.58	67.14	1006.00
	Max	16.01	96.60	64.49	5.60	45.27	88.60	92.60	38.13	77.18	1010.17
	Min	3.00	22.77	31.00	0.01	21.60	33.00	40.00	24.03	31.78	1004.00
	ug/m3	26.18308	88.17384	91.25001							

Air Quality Monitoring Point -4

Sensor Type		SO2	NO2	O3	CO	PM2.5	PM10	TSP	TEMPER	HUM	AIRPRE
Date	Time	ppb	ppb	ppb	ppm	ug/m3	ug/m3	ug/m3	°c	%RH	hPa
16/3/2025	15:00:00	14.00	34.00	39.30	1.00	18.10	30.15	36.46	34.00	36.15	1005.46
	16:00:00	5.00	35.00	35.00	1.00	20.68	27.15	36.35	36.00	33.32	1005.52
	17:00:00	3.00	37.00	42.55	1.00	20.80	24.00	40.00	36.00	30.28	1004.17
	18:00:00	5.00	37.00	42.40	3.63	19.00	29.90	41.95	37.13	44.10	1004.00
	19:00:00	5.00	48.00	44.80	1.40	21.60	31.05	39.30	34.53	50.23	1004.00
	20:00:00	5.00	37.00	43.30	0.14	21.00	34.50	45.00	32.65	53.50	1004.00
	21:00:00	3.00	36.00	31.00	1.00	13.10	37.00	71.00	30.31	60.32	1004.93
	22:00:00	9.00	37.00	43.40	1.00	20.40	24.00	48.00	27.92	57.17	1005.53
	23:00:00	7.00	26.00	45.50	1.00	16.30	14.00	29.00	26.73	64.80	1006.18
	0:00:00	5.00	45.00	60.49	0.55	17.10	20.00	81.60	25.96	63.00	1007.00
	1:00:00	3.00	45.00	57.80	0.09	18.10	54.00	72.70	25.35	74.47	1007.00
	2:00:00	8.50	45.00	53.94	0.36	16.50	64.95	67.75	25.06	74.50	1007.00
	3:00:00	4.00	35.00	51.97	1.30	17.70	52.35	58.10	24.40	75.12	1007.00
	4:00:00	5.00	37.00	48.61	0.12	22.70	39.00	72.50	23.95	75.33	1007.00
17/3/2025	5:00:00	4.50	32.97	47.17	0.01	18.63	52.95	56.30	23.71	64.50	1006.68
	6:00:00	6.00	27.09	46.86	1.00	15.33	45.90	47.60	23.44	63.50	1006.30
	7:00:00	7.20	27.67	51.10	5.60	27.27	46.00	75.15	23.19	75.68	1007.00
	8:00:00	9.30	35.00	48.39	1.00	14.23	46.95	50.55	23.03	75.68	1007.03
	9:00:00	9.00	37.00	27.00	3.00	16.57	49.40	53.10	23.22	73.30	1008.00
	10:00:00	8.00	37.00	37.00	1.00	18.20	54.55	61.30	24.76	68.00	1008.15
	11:00:00	6.00	45.00	33.00	1.00	10.40	41.30	47.15	28.97	58.50	1009.43
	12:00:00	5.00	38.82	31.00	1.00	5.60	31.45	35.50	30.30	54.02	1010.00
	13:00:00	16.01	37.00	30.77	3.00	10.30	56.90	75.65	32.10	51.13	1010.17
	14:00:00	15.11	37.00	32.98	1.00	16.80	33.20	40.05	33.10	44.70	1010.00
24 hr	Avg	6.98	37.03	42.72	1.30	17.43	39.19	53.25	28.58	66.64	1006.80
	Max	16.01	48.00	60.49	5.60	27.27	64.95	81.60	37.13	75.68	1010.17
	Min	3.00	26.00	27.00	0.01	5.60	14.00	29.00	23.03	30.28	1004.00
	ug/m3	18.29848	69.60986	83.73668							

Air Quality Monitoring Point -5

Sensor Type		SO2	NO2	O3	CO	PM2.5	PM10	TSP	TEMPER	HUM	AIRPRE
Date	Time	ppb	ppb	ppb	ppm	ug/m3	ug/m3	ug/m3	1ae	%RH	hPa
16/3/2025	15:00:00	5.00	47.30	35.30	1.00	15.10	27.15	25.46	34.80	36.75	1006.76
	17:00:00	5.00	43.30	32.00	3.00	17.68	24.15	23.35	36.80	33.82	1005.52
	18:00:00	13.00	45.30	39.00	1.00	17.80	21.00	29.30	35.80	30.88	1004.47
	19:00:00	5.00	43.30	30.40	1.00	16.00	25.50	30.05	37.03	44.70	1004.00
	20:00:00	5.00	45.50	21.80	1.00	15.50	23.05	28.30	35.33	50.83	1004.00
	21:00:00	5.00	36.50	40.30	3.00	16.00	31.50	34.30	33.05	54.10	1004.00
	22:00:00	3.00	37.50	28.00	1.00	10.10	24.00	30.30	31.11	60.92	1004.93
	23:00:00	0.00	38.50	40.40	1.30	17.40	21.00	37.30	29.72	67.77	1005.53
17/3/2025	0:00:00	7.00	45.30	42.50	1.40	12.30	11.00	18.30	27.53	65.40	1006.16
	1:00:00	5.00	40.50	57.49	0.14	14.10	17.00	70.50	26.76	63.60	1007.00
	2:00:00	3.00	46.50	54.80	1.00	15.10	31.00	61.70	26.15	73.07	1007.00
	3:00:00	3.50	46.50	50.94	1.00	13.50	35.00	56.75	25.85	75.10	1007.00
	4:00:00	4.00	36.50	49.97	1.00	14.70	37.00	45.10	25.20	75.72	1007.00
	5:00:00	5.00	36.56	45.61	0.50	15.70	36.00	61.50	24.75	75.83	1007.00
	6:00:00	4.50	34.47	44.17	0.09	15.63	34.00	45.30	24.51	65.10	1006.68
	7:00:00	5.00	33.30	43.85	0.36	12.33	42.50	36.50	24.24	64.10	1006.30
	8:00:00	7.20	34.30	26.15	1.30	24.27	43.00	04.15	23.99	76.28	1007.00
	9:00:00	9.30	36.50	45.54	1.00	11.23	43.95	39.05	23.83	76.28	1007.00
	10:00:00	0.00	38.50	24.00	3.00	13.57	46.40	42.10	24.02	73.90	1008.00
	11:00:00	3.00	38.50	34.00	1.00	15.20	45.00	50.30	25.55	66.68	1008.75
	12:00:00	6.00	40.50	30.00	1.00	13.00	38.30	30.15	29.77	59.10	1008.43
	13:00:00	11.00	40.32	28.00	1.00	14.00	28.40	24.50	31.13	54.62	1010.00
	14:00:00	13.00	45.30	27.77	3.00	7.30	31.00	34.95	32.90	51.73	1010.17
	15:00:00	13.00	46.30	29.98	1.00	15.30	30.20	29.05	33.90	45.30	1010.00
24 hr	Avg	7.10	41.43	39.72	1.26	15.14	31.71	42.25	29.38	60.24	1006.80
	Max	13.00	49.50	57.49	3.00	24.77	46.40	70.50	37.93	76.28	1010.17
	Min	3.00	33.30	24.00	0.00	7.30	11.00	18.30	23.83	30.88	1004.00
	ug/m3	18.61277	77.89259	77.85668							

APPENDIX E

Water Quality Results by Alarm Ecological Laboratory

ALARM Ecological Laboratory
Water Testing Result Report



Report Number: EL-WR-25-04417 Date: April 11, 2025

Client Information	Sample Information
Client Name : Myanmar Shing Shing Mental Co., Ltd	Sample ID : 12548
Organization : -	Sample Name : WW - 1
Client ID : -	Sample Type / Source : Discharged Water
Registration Date & Time : 25.3.2025	Sampling Date & Time : 18.3.2025
Contact : -	Sample Location : Mawlamyine Industrial Zone, Mawlamyine Township, Mon State.
Email : -	Latitude : -
Testing Purpose : -	Longitude : -

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless stated otherwise. This report shall not be reproduced without written approval of the laboratory.

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	pH	8.7	S.U	8.0 - 8.5	Normal
2	Temperature	28	°C	≤ 25	-
3	TSS	23	mg/L	≤ 50	Normal
4	Ammonia	0.38	mg/L	≤ 1.0	Normal
5	BOD ₅	38	mg/L	≤ 50	Normal
6	COD	81	mg/L	≤ 250	Normal
7	Total Chlorine	0.18	mg/L	-	-
8	Cyanide	0.069	mg/L	-	-
9	Total Phosphorus	0.35	mg/L	≤ 0.1	Normal
10	Arsenic	0.065	mg/L	≤ 0.1	Normal
11	Cadmium	3.81	mg/L	≤ 0.1	Normal
12	Copper	0.06	mg/L	≤ 0.5	Normal
13	Iron	0.32	mg/L	≤ 0.3	Normal
14	Lead	10	mg/L	≤ 0.1	1.00-0.1 mg/L
15	Zinc	4.69	mg/L	≤ 2	Normal
16	Nickel	0.32	mg/L	≤ 0.05	Normal
17	Mercury	0.001	mg/L	≤ 0.01	Normal
18	Chromium (hexavalent)	0.21	mg/L	≤ 0.1	Above the Limit
19	Sulfide	0.318	mg/L	≤ 1	Normal
20	Fluoride	40.1	mg/L	≤ 0.5	Normal
21	Fluoride	0.1	mg/L	≤ 20	Normal
22	Oil & Grease	6	mg/L	≤ 10	Normal

ND = Not Detected

LOD = Lower Limit of Detection

-/- = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myint Khin Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myint Aye Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Aye Win Laboratory Manager Ecological Laboratory ALARM

No.121, Corner of Shu Khin Thar Street & 7 Street, (11) Block, South Dakhkapa Township, Yangon.
Tel: 09-40746076, Email: aelab.2022@gmail.com

ALARM Ecological Laboratory
Water Testing Result Report



Report Number: EL-WR-25-04416 Date: April 11, 2025

Client Information	Sample Information
Client Name : Myanmar Shing Shing Mental Co., Ltd	Sample ID : 12548
Organization : -	Sample Name : Ground - 1
Client ID : -	Sample Type / Source : -
Registration Date & Time : 25.3.2025	Sampling Date & Time : 18.3.2025
Contact : -	Sample Location : Mawlamyine Industrial Zone, Mawlamyine Township, Mon State.
Email : -	Latitude : -
Testing Purpose : -	Longitude : -

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless stated otherwise. This report shall not be reproduced without written approval of the laboratory.

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	pH	8.7	S.U	6.5 - 8.5	Normal
2	Colour	<5	PCU	≤ 15	Normal
3	Turbidity	<5	FNU	≤ 5	Clear
4	TDS	83	mg/L	≤ 1000	Normal
5	Hardness	14	mg/L	≤ 500	Normal
6	Chloride	7.1	mg/L	≤ 250	Normal
7	Sulfate	1.23	mg/L	≤ 50	Normal
8	Arsenic	0.005	mg/L	≤ 0.05	Normal
9	Iron	0.26	mg/L	≤ 1	Normal
10	Lead	10	mg/L	≤ 0.1	1.00-0.1 mg/L
11	Manganese	0.28	mg/L	≤ 0.4	Normal
12	Sulfate	18	mg/L	≤ 250	Normal

ND = Not Detected

LOD = Lower Limit of Detection

-/- = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myint Khin Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myint Aye Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Aye Win Laboratory Manager Ecological Laboratory ALARM

No.121, Corner of Shu Khin Thar Street & 7 Street, (11) Block, South Dakhkapa Township, Yangon.
Tel: 09-40746076, Email: aelab.2022@gmail.com

ALARM Ecological Laboratory

Water Testing Result Report



Report Number: EL-WR-25-04414

Date: April 11, 2025

Client Information		Sample Information	
Client Name	Myanmar Shing Shing Mental Co., Ltd	Sample ID	12646
Organization	-	Sample Name	SW- 1
Client ID	-	Sample Type / Source	-
Registration Date & Time	25.3.2025	Sampling Date & Time	18.3.2025
Contact	-	Sample Location	Mawlamyine Industrial Zone, Mawlamyine Township, Mon State.
Email	-	Latitude	-
Testing Purpose	-	Longitude	-

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client book our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory.

Sr.	Quality Parameters	Results	Units	Emission Standards	Remarks
1	TSS ¹	46	mg/L	500 ¹	Normal
2	Cyanide ²	0.068	mg/L	-	-
3	Nitrate-Nitrogen ³	3.3	mg/L	-	-
4	Nitrite-Nitrogen ³	9.12	mg/L	-	-
5	Arsenic ⁴	0.085	mg/L	≤ 0.1 ⁴	Normal
6	Cadmium ⁴	ND	mg/L	≤ 0.1 ⁴	(0.05-0.01 mg/L)
7	Lead ⁴	ND	mg/L	≤ 0.1 ⁴	(0.05-0.1 mg/L)
8	Nickel ⁴	0.31	mg/L	≤ 0.5 ⁴	Normal
9	Chromium (Hexavalent) ⁴	0.31	mg/L	≤ 0.1 ⁴	Above the Limit
10	Phenol ⁴	<0.1	mg/L	≤ 0.5 ⁴	Normal
11	Boron ⁴	1.2	mg/L	-	-
12	Fluoride ⁴	0.1	mg/L	≤ 20 ⁴	Normal

"ND" = Not Detected

"LOD" = Lower level of detection

"-/-" = No reference standard

Tested by	Checked by	Approved by
Daw Mye Mye Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Mye Myet Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Aye Win Laboratory In-Charge EcoLab ALARM

No.121, Corner of Shwabin Thar Street & 7 Street, (D) Block, South Okkalapa Township, Yangon.
Tel: 09-40749079, Email: aelab.2022@gmail.com

ALARM Ecological Laboratory

Water Testing Result Report



Report Number: EL-WR-25-04415

Date: April 11, 2025

Client Information		Sample Information	
Client Name	Myanmar Shing Shing Mental Co., Ltd	Sample ID	12647
Organization	-	Sample Name	SW- 2
Client ID	-	Sample Type / Source	-
Registration Date & Time	25.3.2025	Sampling Date & Time	18.3.2025
Contact	-	Sample Location	Mawlamyine Industrial Zone, Mawlamyine Township, Mon State.
Email	-	Latitude	-
Testing Purpose	-	Longitude	-

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client book our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory.

Sr.	Quality Parameters	Results	Units	Emission Standards	Remarks
1	TSS ¹	86	mg/L	500 ¹	Above the Limit
2	Cyanide ²	0.069	mg/L	-	-
3	Nitrate-Nitrogen ³	3.34	mg/L	-	-
4	Nitrite-Nitrogen ³	0.31	mg/L	-	-
5	Arsenic ⁴	0.068	mg/L	≤ 0.1 ⁴	Normal
6	Cadmium ⁴	ND	mg/L	≤ 0.1 ⁴	(0.05-0.01 mg/L)
7	Lead ⁴	ND	mg/L	≤ 0.1 ⁴	(0.05-0.1 mg/L)
8	Nickel ⁴	0.26	mg/L	≤ 0.5 ⁴	Normal
9	Chromium (Hexavalent) ⁴	0.23	mg/L	≤ 0.1 ⁴	Above the Limit
10	Phenol ⁴	<0.1	mg/L	≤ 0.5 ⁴	Normal
11	Boron ⁴	1.8	mg/L	-	-
12	Fluoride ⁴	1	mg/L	≤ 20 ⁴	Normal

"ND" = Not Detected

"LOD" = Lower level of detection

"-/-" = No reference standard

Tested by	Checked by	Approved by
Daw Mye Mye Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Mye Myet Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Aye Win Laboratory In-Charge EcoLab ALARM

No.121, Corner of Shwabin Thar Street & 7 Street, (D) Block, South Okkalapa Township, Yangon.
Tel: 09-40749079, Email: aelab.2022@gmail.com

APPENDIX F
Soil Results by TBS

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL ANALYTICAL DATA SHEET AND SOIL INTERPRETATION OF RESULTS

Myanmar Shin Shin Metal Co., Ltd (20.3.2025)

State - မွန်ပြည်နယ်
Township - ဓမ္မလမြို့နယ်
Sheet No. 1
Sr No. 5 1 /2025

Sr No.	Sample	pH Soil:Water 1:2.5	pH
1	Soil	4.34	Extremely Acid

(ခေါက်တာသန့်သည်)
ဒုတိယဥပဒေကြမ်းရေးမှူး
ဓာတ်ခွဲခန်းတာဝန်ခံ
ပြောဆိုသူရေရာဌာနခွဲ

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL ANALYTICAL DATA SHEET

Myanmar Shin Shin Metal Co., Ltd (20.3.2025)

State - မွန်ပြည်နယ်
Township - ဓမ္မလမြို့နယ်
Sheet No. 2
Sr No. 5 1 /2025


Sr No.	Sample	Zinc (Zn) ppm	Copper (Cu) ppm	Lead (Pb) ppm	Arsenic (As) ppm
1	Soil	0.5118	1.1072	3.1416	3.46

မှတ်ချက်။ ဤဇယားသည် ဓာတ်ခွဲခန်းမှ ရရှိသော Zn (Zn), Copper (Cu), Lead (Pb) နှင့် Arsenic (As) ပါဝင်မှုပမာဏကို ဖော်ပြပါရှိပြီး
မဲဝင်သည့် MFL (Maximum permissible Limit) ထက် မကျော်လွန်ပါ။ (Ref : FAO, WHO)

(ခေါက်တာသန့်သည်)
ဒုတိယဥပဒေကြမ်းရေးမှူး
ဓာတ်ခွဲခန်းတာဝန်ခံ
ပြောဆိုသူရေရာဌာနခွဲ

APPENDIX G
Documents and Photos Related to Public Consultation Meeting

Attendance List – Government



ပြည်ထောင်စု

မြန်မာ့ရင်းနှီးမြှုပ်နှံမှုဘဏ်လီမိတက်မှ ဆောင်ရွက်မည့် ခရောက်စီမံသတ္တုသန့်စင်စက်ရုံ လုပ်ငန်းအတွက်
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာနှင့်ပတ်သက်၍ အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရင်း


၂၀၂၅ ခုနှစ်၊ မတ်လ (၁၀) ရက်

ဆွေးနွေးပွဲကျင်းပသည့်နေရာ - မော်လမြိုင်တောမြို့နယ်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဆက်သွယ်ရန်နံပါတ်	လက်မှတ်
၁	ဦးမျိုးမိုး	စတုတ္ထအထူးအမှုဆောင်	စက်မှုနှင့် စီးပွားရေး ဦးစီးဌာန	၀၉ ၁၇၄ ၇၈၆၄၁၄	
၂	ဦးသုခလှိုင်	အထွေထွေ	စက်မှုနှင့် စီးပွားရေး ဦးစီးဌာန	၀၉ ၈၇၆၀၇၁၆၈၈	
၃	ဦးဦးမြင့်	စက်မှုနှင့် စီးပွားရေး	စက်မှုနှင့် စီးပွားရေး	၀၉ ၆၇၁ ၃၁၇ ၁၆၀	
၄	ဦးမျိုးမိုး	စက်မှုနှင့် စီးပွားရေး	စက်မှုနှင့် စီးပွားရေး	၀၉ ၇၈၆၀၇၁၆၈၈	
၅	ဦးဦးမြင့်	စက်မှုနှင့် စီးပွားရေး	စက်မှုနှင့် စီးပွားရေး	၀၉ ၈၇၆၀၇၁၆၈၈	
၆	ဦးဦးမြင့်	စက်မှုနှင့် စီးပွားရေး	စက်မှုနှင့် စီးပွားရေး	၀၉ ၈၇၆၀၇၁၆၈၈	
၇	ဦးဦးမြင့်	စက်မှုနှင့် စီးပွားရေး	စက်မှုနှင့် စီးပွားရေး	၀၉ ၈၇၆၀၇၁၆၈၈	
၈	ဦးဦးမြင့်	စက်မှုနှင့် စီးပွားရေး	စက်မှုနှင့် စီးပွားရေး	၀၉ ၈၇၆၀၇၁၆၈၈	
၉	ဦးဦးမြင့်	စက်မှုနှင့် စီးပွားရေး	စက်မှုနှင့် စီးပွားရေး	၀၉ ၈၇၆၀၇၁၆၈၈	

No. 9, Block 35, Newwaddy Garden Housing,
Yangon-Pathay Road, Hlaing Thar Yar Township,
Yangon

Attendance List - Local



ပြည်ထောင်စု

မြန်မာ့ရင်းနှီးမြှုပ်နှံမှုဘဏ်လီမိတက်မှ ဆောင်ရွက်မည့် ခရောက်စီမံသတ္တုသန့်စင်စက်ရုံ လုပ်ငန်းအတွက်
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာနှင့်ပတ်သက်၍ အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရင်း

၂၀၂၅ ခုနှစ်၊ မတ်လ (၁၀) ရက်

ဆွေးနွေးပွဲကျင်းပသည့်နေရာ - မော်လမြိုင်တောမြို့နယ်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်နံပါတ်	လက်မှတ်
၁	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	—	
၂	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	—	
၃	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	၀၉ ၇၆၁ ၄၂၅၂၅၂	
၄	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	၀၉ ၇၆၀၇၁၆၈၈	
၅	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	၀၉ ၇၆၁ ၄၂၅၂၅၂	
၆	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	၀၉ ၇၆၁ ၄၂၅၂၅၂	
၇	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	၀၉ ၇၆၁ ၄၂၅၂၅၂	
၈	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	—	
၉	ဦးဦးမြင့်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	၀၉ ၇၆၁ ၄၂၅၂၅၂	

No. 9, Block 35, Newwaddy Garden Housing,
Yangon-Pathay Road, Hlaing Thar Yar Township,
Yangon

ပြန်ဆာရှင်းရှင်းမတ်တယ်ကုမ္ပဏီလီမိတက်မှ ဆောင်ရွက်မည့် ခေ့နက်စီမံသတ္တုသန့်စင်စက်ရုံ လုပ်ငန်းအတွက်
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာနှင့်ပတ်သက်၍ အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရင်း
၂၀၂၅ ခုနှစ်၊ မတ်လ (၁၈) ရက်

ဆွေးနွေးပွဲကျင်းပသည့်နေရာ - စာလှေ ဖြူစင်ရေး လုပ်ငန်းခွင်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်နံပါတ်	လက်မှတ်
၁	ခင်ကြည်စင်	နယ်စပ်	မင်္ဂလာ	၀၉ ၆၈ ၅၁ ၉၅ ၄၇	စာ
၂	ခင်ဟန်လှိုင်	နယ်စပ်	မင်္ဂလာ	၀၉ ၆၆ ၅၅ ၇၄ ၄၆	စာ
၃	ခင်စင်စင်	နယ်စပ်	မင်္ဂလာ	-	စာ
၄	ဦးစိုးလှိုင်	စာရင်း	မင်္ဂလာ		စာ
၅	ဦးစိုးလှိုင်	စာရင်း	မင်္ဂလာ		စာ
၆	ဦးစိုးလှိုင်	စာရင်း	မင်္ဂလာ	၀၉ ၇၆ ၁၂ ၅၅ ၅၂	စာ

မြန်မာ့ရှင်းရှင်း ခန့်မှန်းစာရင်းသတ္တု သန့်စင်စက်ရုံ၏ လူထုနှင့်တွေ့ဆုံဆွေးနွေးပွဲ
မော်လမြိုင်မြို့နယ်အတွင်း တက်ရောက်သူများသမားစာရင်း ၁၈-၃-၂၀၂၅

စဉ်	အမည်	ဌာနအမည်	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁	ကျော်ကျော်စိုး	မင်းဇွန်	ဝန်ထမ်း	၀၇၇၈၄၈၇၇၈၇	Kalyan
၂	သီရိဇော်	စက်မှုဇုန်	ဝန်ထမ်း	၀၇၇၈၅၇၀၁၈၇	me
၃	ချစ်စင်လှ	"	ဝန်ထမ်း	၀၇-၆၆၀၇၃၆၁၇	၂၅
၄	အောင်မျိုးသိန်း	"	ဝန်ထမ်း		အောင်
၅	အောင်သိန်းလင်း	"	ဝန်ထမ်း	၀၇-၆၇၄၄၄၀၀၃၈	အောင်
၆	ဂျော့အောင်	"	ဝန်ထမ်း	၀၇	၃၃
၇	မျိုးထွန်းသု	"	"	၀၇-၇၇၃၅၀၄၅၇၀	ထွန်း
၈	ဦးမင်းဦး	"	"	၀၇-၆၇၇၇၆၀၈၀	ဦး
၉	ကျော်ဦး			၀၇-၇၇၃၅၃၇၆၇	ကျော်
၁၀	စန္ဒာမိုး	"	ကျပန်း	၀၇	စန္ဒာ
၁၁	မြသိန်းလွင်	"	ဝန်ထမ်း	၀၇-၇၇၃၅၇၄၃၅၇	မြသိန်း
၁၂	ဦးကျော်	"	ဝန်ထမ်း	၀၇-၆၇၇၇၃၇၆၇	ကျော်
၁၃	ကျော်သီဟ	"	ဝန်ထမ်း	၀၇-၆၆၃၇၇၈၇၇	ကျော်
၁၄	စည်သူထွန်း	"	ဝန်ထမ်း	၀၇-၆၇၅၇၈၇၅၇	စည်သူ
၁၅	စည်သူထွန်း	"	ဝန်ထမ်း	၀၇-၆၇၅၇၅၇၅၇	စည်သူ
၁၆	မင်းသိန်းအောင်	"	ဝန်ထမ်း	၀၇-၆၇၅၇၅၇၅၇	မင်းသိန်း
၁၇	မင်းသိန်းဦး	"	ဝန်ထမ်း		မင်းသိန်း
၁၈	ကျော်သိန်းအောင်	"	"	၀၇-၆၇၅၇၅၇၅၇	ကျော်သိန်း
၁၉	ကျော်သိန်းအောင်	"	"	၀၇-၇၇၅၇၅၇၅၇	ကျော်သိန်း
၂၀	ဦးဦး	"	"	၀၇-၆၇၅၇၅၇၅၇	ဦးဦး

မြန်မာရှင်းရှင်း ခနောက်စိမ်းသတ္တု သန့်စင်စက်ရုံ၏ လူထုနှင့်တွေ့ဆုံဆွေးနွေးပွဲ

မေလအတွင်းမကြာမီလုပ်ငန်း တက်ရောက်သူများသုများစာရင်း

၁၈.၂.၂၀၂၅

စဉ်	အမည်	ဌာနအမည်	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁	ဝင်းထွဋ်	စက်မှုဇုန်	ဝန်ထမ်း	၀၉၄၄၁၈၁၄၄၁၁၆	
၂	ဝင်းမျိုးကျော်	~	ဝန်ထမ်း	၀၉-၆၇၇၇၇၇၇၇၇၇၇၇	
၃	သီတာချစ်	~	ဝန်ထမ်း	၀၉-၆၇၇၇၇၇၇၇၇၇၇၇	
၄	ကျော်သက်ဦး	~	ဝန်ထမ်း		
၅	ကျော်သက်ဦး	~	ဝန်ထမ်း		
၆					
၇					
၈					
၉					
၁၀					
၁၁					
၁၂					
၁၃					
၁၄					
၁၅					
၁၆					
၁၇					
၁၈					
၁၉					
၂၀					

D:\Shing Shing - M\2025\Attend

Attendance List – Project Proponent and Third Party



ပြည်ထောင်စု၏ ဖန်တီးမှုဆောင်ရွက်မှုနှင့် ဆောင်ရွက်မှုများကို လုပ်ငန်းအတွက်
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာနှင့်ပတ်သက်၍ အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရင်း
၂၀၁၄ ခုနှစ်၊ မတ်လ (၁၈) ရက်

ဆွေးနွေးပွဲကျင်းပသည့်နေရာ - မဟာပြည် စက်မှုဇုန် ဝန်းပတ်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်နံပါတ်	ထက်မှတ်
၁	စက်ကလေးလုပ်ငန်း	မိမိလုပ်ကိုင်	၀.၆.၆.၃	၀၉၇၄၇၂၁၁၂၁	
၂	စိုက်ပျိုးရေး	စက်ကလေး	၀.၆.၆.၃	၀၉၇၇၃၀၀၆၇၃	၂၀၁၄
၃	စိုက်ပျိုးရေး	မိမိလုပ်ကိုင်	၀.၆.၆.၃	၀၉၇၅၀၀၅၅၄၄၅	၂၀၁၄
၄	စိုက်ပျိုးရေး	စက်ကလေး	၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄
၅	စိုက်ပျိုးရေး	စက်ကလေး	၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄
၆	စိုက်ပျိုးရေး		၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄
၇	စိုက်ပျိုးရေး	Summary Analyst	၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄
၈	စိုက်ပျိုးရေး	Operation Manager	၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄

No. 9, Block 36, Newway Garden Housing
Yangon-Pathein Road, Huang Thai Yar Township,
Yangon



ပြည်ထောင်စု၏ ဖန်တီးမှုဆောင်ရွက်မှုနှင့် ဆောင်ရွက်မှုများကို လုပ်ငန်းအတွက်
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာနှင့်ပတ်သက်၍ အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူစာရင်း
၂၀၁၄ ခုနှစ်၊ မတ်လ (၁၈) ရက်

ဆွေးနွေးပွဲကျင်းပသည့်နေရာ - မဟာပြည် စက်မှုဇုန် ဝန်းပတ်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်နံပါတ်	ထက်မှတ်
၁	စိုက်ပျိုးရေး		၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄
၂	စိုက်ပျိုးရေး	စိုက်ပျိုးရေး	၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄
၃	စိုက်ပျိုးရေး	စိုက်ပျိုးရေး	၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄
၄	စိုက်ပျိုးရေး	စိုက်ပျိုးရေး	၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄
၅	စိုက်ပျိုးရေး	စိုက်ပျိုးရေး	၀.၆.၆.၃	၀၉၇၇၇၇၇၇၇	၂၀၁၄

No. 9, Block 36, Newway Garden Housing
Yangon-Pathein Road, Huang Thai Yar Township,
Yangon

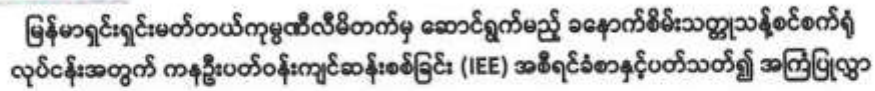
Comment form recorded from Stakholders



မြန်မာ့ရှင်းရှင်းမတ်တယ်ကုမ္ပဏီလီမိတက်မှ ဆောင်ရွက်မည့် ခနောက်စိမ်းသတ္တုသန့်စင်စက်ရုံ လုပ်ငန်းအတွက် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာနှင့်ပတ်သတ်၍ အကြံပြုလွှာ

[illegible]

No.9, block-36, Nawaday Garden Housing,
Yangon-Pathein Road, Hlaing Thar Yar Township,
Yangon



No.9, Block-36, Nawaday Garden Housing,
Yangon-Pathain Road, Hlaing Thar Yar Township,
Yangon



မြန်မာရှင်းရှင်းမတ်တယ်ကုမ္ပဏီလီမိတက်မှ ဆောင်ရွက်မည့် ခနောက်စိမ်းသတ္တုသန့်စင်စက်ရုံ လုပ်ငန်းအတွက် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာနှင့်ပတ်သတ်၍ အကြံပြုလွှာ

အကြံပြုချက်များအား အောက်တွင် ဖော်ပြပေးပါရန်နှင့် လူကြီးမင်း၏အကြံပြုချက်အား လိုက်လံစွာ ကြိုဆိုပါသည်။		
စီမံကိန်းအမည်	ခနောက်စိမ်းသတ္တုသန့်စင်စက်ရုံလုပ်ငန်း	
အမည်	မိလ္လာမုလ္လ	မိမိအမည်အား အစီရင်ခံစာတွင် ဖော်ပြလိုခြင်း ရှိ/မရှိ ရှိလျှင် (✓) မရှိလျှင် (x) (.....)
ဆက်သွယ်ရန်ဖုန်း	၀၉ - ၇၇၇၁၀၇၇၁၄	
နေရပ်လိပ်စာ	လမ်းမကြီးမြို့ -	
ရက်စွဲ	၂၈ - ၁ - ၇၀၇၄	
<p style="text-align: center;">အကြံပြုချက်</p> <p>- Air Emission ကုန်ထုတ်လုပ်မှု ဖြစ်ပေါ်လာပြီး အနံ့အနံ့ ပျံ့နှံ့နေခြင်း၊</p> <p>- ကုန်အုံတိုင်း တိုင်းကလေး လိုက်ပါနေခြင်း။</p> <p>- လေထုထဲသို့ အနံ့အနံ့ ပျံ့နှံ့နေပြီး အနံ့အနံ့ ပျံ့နှံ့နေခြင်း။</p>		

No.9, Block-36, Nawaday Garden Housing,
Yangon-Pathein Road, Hlaing Thar Yar Township,
Yangon

Presentation Slide

Myanmar Shing Shing Metal Company Limited

ခရောက်စိမ်းသန့်စင်စက်ရုံလုပ်ငန်းအတွက်
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (Initial Environmental Examination - IEE) နှင့်ပတ်သက်၍
စီမံကိန်းသက်ဆိုင်သူများနှင့် တွေ့ဆုံရင်းလင်းတင်ပြခြင်း

၁၈-၃-၂၀၂၅

မော်လမြိုင်စက်မှုဇုန်နယ်

OBES

OLIVE BRIGHT ENVIRONMENTAL SOLUTIONS LIMITED

OBES

တင်ပြမှုအစီအစဉ်

- စီမံကိန်းမိတ်ဆက်
- ပတ်ဝန်းကျင်ဆိုင်ရာအကြံပေးအဖွဲ့အစည်း
- ဆေးခန်းပွဲဆောင်ရွက်ခြင်းနှင့်လုပ်ငန်းစဉ်များ
- စီမံကိန်းအကြောင်းအရာ
- လေ့လာတွေ့ရှိချက်များ
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းနှင့်လျော့ပါးစေရေး နည်းလမ်းများ
- ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ်
- ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ်
- ရွေ့ဆက်ဆောင်ရွက်ရန်များ

OBES

စီမံကိန်းမိတ်ဆက်

- ❖ Myanmar Shing Shing Metal Company Limited မှ မွန်ပြည်နယ်၊ မော်လမြိုင်မြို့နယ်၊ ညောင်ပင်ဆိပ်ကျေးရွာ၊ မော်လမြိုင်စက်မှုဇုန်တွင် ခရောက်စိမ်းသန့်စင်စက်ရုံလုပ်ငန်းအား လုပ်ကိုင်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။
- ❖ အဆိုပါစီမံကိန်းလုပ်ငန်းအတွက် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာအား ပတ်ဝန်းကျင်ထိခိုက်မှုလျော့နည်းရေးနှင့် ပြန်လည်ထူထောင်ရေးဥပဒေ၊ ၂၀၁၅-၂၀၂၃ ရက်ခွဲပါစာအမှတ်၊ EIA-၁/၅/အတည်ပြု (IEE) (၁၁၆၈/၂၀၂၃) ခြံ အတည်ပြုခဲ့ပြီး ပတ်ဝန်းကျင်ဆိုင်ရာစောင့်ကြပ်ကြည့်ရှုမှု အစီရင်ခံစာများအား စတုတ္ထအကြိမ်အထိ တင်ပြခဲ့ပြီး ဖြစ်ပါသည်။
- ❖ စီမံကိန်းတွင် လက်ရှိလည်ပတ်ဆောင်ရွက်နေသည့် စက်ပစ္စည်းများမှာ အချိန်ကြာလာသည်နှင့်အမျှ ထုတ်လုပ်မှုအားကျဆင်းလာပါသဖြင့် စက်ပစ္စည်းအသစ်များဖြင့် ကုန်ထုတ်လုပ်မှုတစ်လျှင် တိုးမြှင့်ခြင်းနှင့်ပတ်သက်၍ စက်ရုံအသစ်တည်ဆောက်လုပ်ရန်အတွက် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အား ဆေးဆွဲဆောင်ရွက်ရန် ညွှန်ကြားရေးမှူးရုံး၊ ပတ်ဝန်းကျင်ထိခိုက်မှုလျော့နည်းရေးဦးစီးဌာန၊ မွန်ပြည်နယ်၊ မော်လမြိုင်မြို့နယ်၊ ၈-၁-၂၀၂၅ ရက်ခွဲပါစာအမှတ်၊ အီးအိုင်အေ- ၂/၆/၇ (၁၅) (၁၅၇/၂၀၂၅) ခြံ ညွှန်ကြားလာပါသည်။

OBES

စီမံကိန်းမိတ်ဆက်

- ❖ အထက်ပါညွှန်ကြားချက်၏ ရည်ညွှန်းချက်ပါ အပိုဒ် (၂) အရ လုပ်ငန်းတည်နေရာ တစ်ခုတည်းတွင် စက်ရုံနှစ်ခုဖြင့် သန့်စင်ပြီးဖြစ်သော ခရောက်စိမ်းသန့်စင်စက်ရုံလုပ်ငန်းအား ဆောင်ရွက်မည်ဖြစ်သဖြင့် အဆိုပါစက်ရုံနှစ်ခုလုံးအတွက် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာ ရေးဆွဲတင်ပြရန် နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ ကျွန်ုပ်တို့မှမူလဝယ် (၈) ခု ပါရှိသော လိုင်စင်ရ အကြံပေးများဖြင့် ဆေးဆွဲဆောင်ရွက်သွားရန် ညွှန်ကြားထားပါသည်။
- ❖ အဆိုပါ ညွှန်ကြားချက်အရ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာအား ပတ်ဝန်းကျင်ဆိုင်ရာ အကြံပေးအဖွဲ့အစည်းဖြစ်သည့် Olive Bright Environmental Solutions Limited (OBES) မှ ဆောင်ရွက်ခွင့်ပြုကြောင်းကို ၄-၃-၂၀၂၅ ရက်ခွဲပါစာအမှတ်၊ အီးအိုင်အေ- ၂/၆/၇ (၁၄) (၆၇၈/၂၀၂၅) ခြံ သဘောထား ပြန်ကြားထားပြီး ဖြစ်ပါသည်။
- ❖ အဆိုပါစီမံကိန်းနှင့်ပတ်သက်၍ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာအား ဆေးဆွဲဆောင်ရွက်ရာတွင် ယခင်အတည်ပြုထားသော အစီရင်ခံစာအပေါ်အခြေခံကာ ထိခိုက်သက်ရောက်နိုင်မှုများကို ခြုံငုံသုံးသပ်၍ လေ့လာဆန်းစစ်ပြီး အစီရင်ခံစာအသစ်အား တင်ပြသွားမည် ဖြစ်ပါသည်။
- ❖ ယခုဆေးဆွဲသည့် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) အစီရင်ခံစာအား ဆေးဆွဲပြုစုတင်ပြရန်အတွက် စီမံကိန်း သက်ဆိုင်သူများနှင့် တွေ့ဆုံရင်းလင်းတင်ပြခြင်း ဖြစ်ပါသည်။

OBES

[illegible]

Green Bright Environmental Solutions Limited (GBES) မှာ ပတ်ဝန်းကျင်အဆူအသွေး ဆန်းစစ်လျေကမှုဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းများ ဆောင်ရွက်ပေးလျက်ရှိသော အကြံပေးအဖွဲ့ အမျိုးအစား (က) လုပ်ငန်းလိုင်စင်အား ရရှိထားပါသည်။

OBS မှ ဆောင်ရွက်ပေးလျက်ရှိသော ဝန်ဆောင်မှုများမှာ -

- ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံလေ့လာမှုများ
- ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအသွေး တိုင်းတာသည့် လုပ်ငန်းများ (မြေ၊ ရေ၊ လေ၊ အသံ၊ အပူ၊ အလင်း၊ အခြေခံသဘာဝပတ်ဝန်းကျင် အခြေခံအသွေး တိုင်းတာဆန်းစစ်မှုများ)
- Drone Camera ဖြင့် မြေပြင်အခြေခံအသွေးကို စိုက်ကွမ်းခြင်း
- သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင် စစ်ဆေးကောက်ယူ လေ့လာမှုများ
- EIA/IEE/EMP အစီရင်ခံစာများ ပြုစုရေးဆွဲခြင်း
- Monitoring Report များ ပြုစုရေးဆွဲခြင်း
- စွန့်ပစ်ပစ္စည်းနှင့် စွန့်ပစ်အခြေခံစီမံခန့်ခွဲမှုနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များ သင်တန်း ပေးခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာဥပဒေတွင်လုပ်ဆောင်ခြင်း (၂၀၁၅) တွင် ဖော်ပြထားသော အခန်း (၄) အပိုဒ် ၃၆ အရ ကနဦးလက်ခံခြင်းဆန်းစစ် လေ့လာထားမှုလုပ်ငန်းများ အပြီးအောင် စီစဉ်ရန်ဆိုင်ရာ သတင်းအချက်အလက်များကို အပိုဒ် ၃၆ (ဆ) အရ အများပြည်သူသို့ ရှင်းလင်းတင်ပြခြင်း



စီမံကိန်းအကြောင်းအရာ



အမှတ် (၃၃၅၊ ၃၆၊ ၃၇၊ ၃၈၊ ၃၉၊ ၄၀) ရွှေမြို့တော် ၁ လမ်း၊ ခေတ်လမြိုင်ခက်မူနီ၊ ရွှေလင်းပင်ဆိပ်ကျေးရွာ၊
ခေတ်လမြိုင်မြို့နယ်၊ မွန်ပြည်နယ်။

မြန်မာနိုင်ငံတော် နယ်လုံးဆိုင်ရာ အစိုးရအဖွဲ့အစည်းများ၏ အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

စီမံကိန်း၏ အရွေ့ဘက်၊ မြောက်ဘက်တွင် လယ်ကွက်များ၊ တောင်ဘက်တွင် အရိပ်ရာဘာစက်ရုံနှင့် အနောက်ဘက်တွင် တွင်ခုံလုပ်ငန်း၊ ပလတ်စတစ်လုပ်ငန်းတို့ရှိပါသည်။

စီမံကိန်းအကြောင်းအရာ



စီမံကိန်းတည်နေရာပြမြေပုံ (Lat - 16° 28.601' N, Long - 97° 40.593' E)

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စီမံကိန်းအကြောင်းအရာ

စီမံကိန်းဆောင်ရွက်မည့်အကြောင်းအရာ



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စီမံကိန်းအကြောင်းအရာ

စီမံကိန်းပိုင်ရှင်	Myanmar Shing Shing Metal Company Limited
လုပ်ငန်း အမျိုးအစား	ဆေးကုသမှုဆောင်ရွက်ရန်
ရင်းနှီးမြှုပ်နှံမှု အမျိုးအစား	ရင်းနှီးမြှုပ်နှံမှုဆောင်ရွက်ရန်
ကုမ္ပဏီ မှတ်ပုံတင်အမျိုးအစား	သတင်းစာကုမ္ပဏီ
ရင်းနှီးမြှုပ်နှံမှု ပမာဏ	ကျပ် ၈၀၀,၀၀၀ (ကျပ် ငွေရသွင်း)
အမြတ်အစား အကြောင်းအရာ	၃,၆၄၀ နှစ်
စီမံကိန်းအကျိုး သက်တမ်း	၂၀၁၈
ဝန်ထမ်းအရေအတွက်	၈၀
ကွပ်ကဲရေးအဖွဲ့ အဖွဲ့အစည်း	အမျိုးသမီးအဖွဲ့
အရည်အသွေးအဆင့်	အဆင့်မြင့်ဆုံး အမြင့်ဆုံး
စီမံကိန်းအကျိုးသက်တမ်း	၃၀၀ X V - ၂ ဝင်

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စီမံကိန်းအကြောင်းအရာ

Layout Map



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စီမံကိန်းအကြောင်းအရာ



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စီမံကိန်းအကြောင်းအရာ



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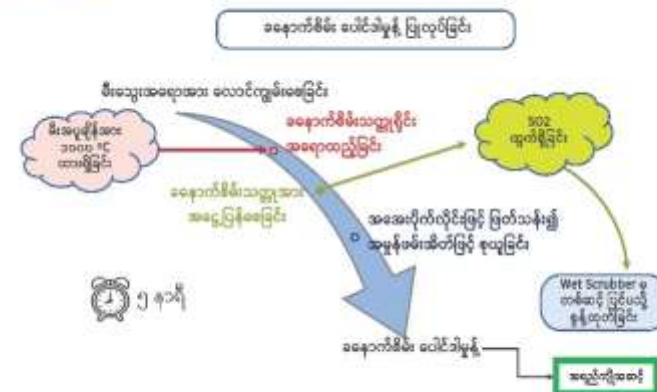
စီမံကိန်းအကြောင်းအရာ

ကုန်ကြမ်း လိုအပ်ချက်နှင့် ကုန်ချော ထွက်ရှိမှု အခြေအနေ



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စီမံကိန်းအကြောင်းအရာ



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စီမံကိန်းအကြောင်းအရာ



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စီမံကိန်းအကြောင်းအရာ

ပုံသွင်းခြင်း

- ချောကိန်းသတ္တု အရည်များအား နီလ်တွင် ထည့်၍ အဆေးခြင်းအား ပြုလုပ်ပါသည်။
- ထွက်ရှိသော - ထွက်ကုန်များအား ချောကိန်းသတ္တုကို ဆက်ခံရန်တွင် ချောကိန်း သတ္တုပေါင်းစုံ ဖြစ် ချောကိန်း ထုတ်ပေး၍ ချောကိန်း အရည်များကို တင်ပို့ပါသည်။
- သန့်စင်ပြီးချောကိန်းသတ္တုအရည်များ ထွက်ရှိမှု = တစ်နှစ်လျှင် တန် ၅၀၀ ဝန်းကျင်။

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စီမံကိန်းအကြောင်းအရာ



OBES

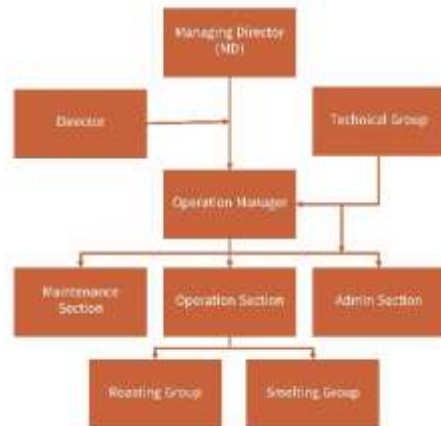
စီမံကိန်းအကြောင်းအရာ

စွမ်းအင်အရင်းအမြစ်အသုံးပြုမှု		
ရေအရင်းအမြစ်	လျှပ်စစ်ဓာတ်အား	လောင်စာဆီ
<ul style="list-style-type: none"> • အထွက်မြှင့်(တစ်လလျှင် ၆၀၀၀၀၀၀) အထွက်မြှင့် (တစ်လလျှင် ၆၀၀၀၀၀၀) Met Scrubber လုပ်ငန်းစဉ်အတွက် အထွက်မြှင့် သန့်စင်မှုအရင်းအမြစ်များ (လောင်စာဆီ အသုံးပြုခြင်း) • မြေအောက်ရေ (လုပ်သား ၈၀ စာ) အင်္ဂလိပ်လျှင် ၈၀၀၀၀ - ၉၀၀၀၀ ဝန်းကျင် အသုံးပြုရန်အတွက် 	<ul style="list-style-type: none"> • အစိုးရဓာတ်အားလိုင်းမှ ရယူ • ထရပ်စီမံစနစ် ၂၅၀ KV - ၁ လုံး ၅၀၀ KV - ၁ လုံး • မီးစက် ၃၀၀ KV - ၁ လုံး ၃၀၀ KV - ၁ လုံး 	<ul style="list-style-type: none"> • အသုံးပြုသည့်အရာ • အရည်ကျိပ် စနစ် • မီးစက် • သယ်ယူပို့ဆောင်ရေး ယာဉ်များ • နေရာဆီ

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စီမံကိန်းအကြောင်းအရာ

စီမံကိန်း၏ ဝန်ထမ်းဖွဲ့စည်းထားရှိမှုပုံစံ



ဝန်ထမ်းအင်အား
နိုင်ငံခြားသား နည်းပညာရှင် - () ဦး
ပြည်တွင်းအလုပ်သမား - () ဦး

စက်ရုံလည်ပတ်ချိန်
တစ်ရက်လျှင် (၂၄) နာရီ၊ (၃) ဆိုင်း ခွဲခြားထားရှိ၊
တစ်ဆိုင်လျှင် (၈) နာရီ၊

ဝန်ထမ်းပိတ်ရက်
တစ်လလျှင် ပိတ်ရက် (၄) ရက်နှင့် အစိုးရ
ပြန်တစ်ဆိုင် ရက်ပိတ်ရက်များ။

OB

ကုမ္ပဏီမှတ်ပုံတင်



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လုပ်ငန်းခွင်ပြုစီနီများ



OB

စာတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများဆိုင်ရာ လုပ်ငန်းလိုင်စင်



OBES

ကွင်းဆင်းလေ့လာဆောင်ရွက်မှုများ



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ကွင်းဆင်းလေ့လာဆောင်ရွက်မှုများ



ကုန်ကြမ်းများထားရှိမှု

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ကွင်းဆင်းလေ့လာဆောင်ရွက်မှုများ



စွန့်ပစ်ချောင့်များ

OBES

ကွင်းဆင်းလေ့လာဆောင်ရွက်မှုများ



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ဆေးဝါးအထောက်အကူပစ္စည်းများ



အနီးပတ်ဝန်းကျင်အကြောင်းအရာများဖော်ပြချက်နှင့် လေ့လာတွေ့ရှိချက်များ

လေ့လာမှုအတွက် ရွေးချယ်နှယ်နှိမိတ်သတ်မှတ်ခြင်း

လေ့လာမှုဆောင်ရွက်မည့် ရွေးချယ်နှယ်နှိမိတ်အနေဖြင့် အဆိုပြုစီမံကိန်းမှ သက်ရောက်ခံရနိုင်သည့် ဧရိယာနှင့် စီမံကိန်းမှ အနီးပတ်ဝန်းကျင် ၁-၃ ကီလိုမီတာ အတွင်းရှိ ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဆိုင်ရာ အစိတ်အပိုင်းများအား လေ့လာမှုများ ဆောင်ရွက်ခဲ့ပါသည်။

လေ့လာမှုအတွက် အချိန်ကာလသတ်မှတ်ခြင်း

အဆိုပြုစီမံကိန်းအတွက် လေ့လာရမည့် အချိန်ကာလအား (၁) လုပ်ငန်းလည်ပတ် ဆောင်ရွက်ခြင်း (၂) လုပ်ငန်းလည်ပတ်ပြီးနောက် အဆင့်မြှင့်တင်မှုအစီအစဉ်များ လေ့လာသွားမည့် ဖြစ်ပါသည်။



လေ့လာရမည့်အသွေးတိုင်းတာမှု



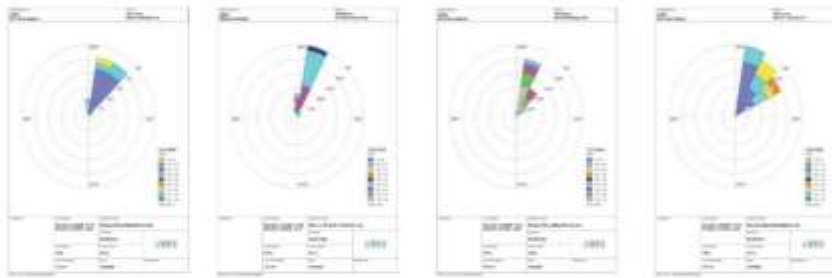
Sample ID	Survey Date	Time	CO	PM2.5	PM10	TSR	SO2	Humidity	Wind Speed	Wind Dir
AQ-1	15.3.2023	08.30	141	141	141	75	141	141	141	141
AQ-2	15.3.2023	09.30	179	179	179	76	179	179	179	179
AQ-3	15.3.2023	10.30	188	188	188	82	188	188	188	188
AQ-4	15.3.2023	11.30	151	151	151	84	151	151	151	151
AQ-5	15.3.2023	12.30	121	121	121	41	121	121	121	121
AQ-6	15.3.2023	13.30	121	121	121	41	121	121	121	121
AQ-7	15.3.2023	14.30	121	121	121	41	121	121	121	121
AQ-8	15.3.2023	15.30	121	121	121	41	121	121	121	121
AQ-9	15.3.2023	16.30	121	121	121	41	121	121	121	121
AQ-10	15.3.2023	17.30	121	121	121	41	121	121	121	121
AQ-11	15.3.2023	18.30	121	121	121	41	121	121	121	121
AQ-12	15.3.2023	19.30	121	121	121	41	121	121	121	121
AQ-13	15.3.2023	20.30	121	121	121	41	121	121	121	121
AQ-14	15.3.2023	21.30	121	121	121	41	121	121	121	121
AQ-15	15.3.2023	22.30	121	121	121	41	121	121	121	121
AQ-16	15.3.2023	23.30	121	121	121	41	121	121	121	121
AQ-17	15.3.2023	00.30	121	121	121	41	121	121	121	121
AQ-18	15.3.2023	01.30	121	121	121	41	121	121	121	121
AQ-19	15.3.2023	02.30	121	121	121	41	121	121	121	121
AQ-20	15.3.2023	03.30	121	121	121	41	121	121	121	121
AQ-21	15.3.2023	04.30	121	121	121	41	121	121	121	121
AQ-22	15.3.2023	05.30	121	121	121	41	121	121	121	121
AQ-23	15.3.2023	06.30	121	121	121	41	121	121	121	121
AQ-24	15.3.2023	07.30	121	121	121	41	121	121	121	121
AQ-25	15.3.2023	08.30	121	121	121	41	121	121	121	121
AQ-26	15.3.2023	09.30	121	121	121	41	121	121	121	121
AQ-27	15.3.2023	10.30	121	121	121	41	121	121	121	121
AQ-28	15.3.2023	11.30	121	121	121	41	121	121	121	121
AQ-29	15.3.2023	12.30	121	121	121	41	121	121	121	121
AQ-30	15.3.2023	13.30	121	121	121	41	121	121	121	121
AQ-31	15.3.2023	14.30	121	121	121	41	121	121	121	121
AQ-32	15.3.2023	15.30	121	121	121	41	121	121	121	121
AQ-33	15.3.2023	16.30	121	121	121	41	121	121	121	121
AQ-34	15.3.2023	17.30	121	121	121	41	121	121	121	121
AQ-35	15.3.2023	18.30	121	121	121	41	121	121	121	121
AQ-36	15.3.2023	19.30	121	121	121	41	121	121	121	121
AQ-37	15.3.2023	20.30	121	121	121	41	121	121	121	121
AQ-38	15.3.2023	21.30	121	121	121	41	121	121	121	121
AQ-39	15.3.2023	22.30	121	121	121	41	121	121	121	121
AQ-40	15.3.2023	23.30	121	121	121	41	121	121	121	121
AQ-41	15.3.2023	00.30	121	121	121	41	121	121	121	121
AQ-42	15.3.2023	01.30	121	121	121	41	121	121	121	121
AQ-43	15.3.2023	02.30	121	121	121	41	121	121	121	121
AQ-44	15.3.2023	03.30	121	121	121	41	121	121	121	121
AQ-45	15.3.2023	04.30	121	121	121	41	121	121	121	121
AQ-46	15.3.2023	05.30	121	121	121	41	121	121	121	121
AQ-47	15.3.2023	06.30	121	121	121	41	121	121	121	121
AQ-48	15.3.2023	07.30	121	121	121	41	121	121	121	121
AQ-49	15.3.2023	08.30	121	121	121	41	121	121	121	121
AQ-50	15.3.2023	09.30	121	121	121	41	121	121	121	121
AQ-51	15.3.2023	10.30	121	121	121	41	121	121	121	121
AQ-52	15.3.2023	11.30	121	121	121	41	121	121	121	121
AQ-53	15.3.2023	12.30	121	121	121	41	121	121	121	121
AQ-54	15.3.2023	13.30	121	121	121	41	121	121	121	121
AQ-55	15.3.2023	14.30	121	121	121	41	121	121	121	121
AQ-56	15.3.2023	15.30	121	121	121	41	121	121	121	121
AQ-57	15.3.2023	16.30	121	121	121	41	121	121	121	121
AQ-58	15.3.2023	17.30	121	121	121	41	121	121	121	121
AQ-59	15.3.2023	18.30	121	121	121	41	121	121	121	121
AQ-60	15.3.2023	19.30	121	121	121	41	121	121	121	121
AQ-61	15.3.2023	20.30	121	121	121	41	121	121	121	121
AQ-62	15.3.2023	21.30	121	121	121	41	121	121	121	121
AQ-63	15.3.2023	22.30	121	121	121	41	121	121	121	121
AQ-64	15.3.2023	23.30	121	121	121	41	121	121	121	121
AQ-65	15.3.2023	00.30	121	121	121	41	121	121	121	121
AQ-66	15.3.2023	01.30	121	121	121	41	121	121	121	121
AQ-67	15.3.2023	02.30	121	121	121	41	121	121	121	121
AQ-68	15.3.2023	03.30	121	121	121	41	121	121	121	121
AQ-69	15.3.2023	04.30	121	121	121	41	121	121	121	121
AQ-70	15.3.2023	05.30	121	121	121	41	121	121	121	121
AQ-71	15.3.2023	06.30	121	121	121	41	121	121	121	121
AQ-72	15.3.2023	07.30	121	121	121	41	121	121	121	121
AQ-73	15.3.2023	08.30	121	121	121	41	121	121	121	121
AQ-74	15.3.2023	09.30	121	121	121	41	121	121	121	121
AQ-75	15.3.2023	10.30	121	121	121	41	121	121	121	121
AQ-76	15.3.2023	11.30	121	121	121	41	121	121	121	121
AQ-77	15.3.2023	12.30	121	121	121	41	121	121	121	121
AQ-78	15.3.2023	13.30	121	121	121	41	121	121	121	121
AQ-79	15.3.2023	14.30	121	121	121	41	121	121	121	121
AQ-80	15.3.2023	15.30	121	121	121	41	121	121	121	121
AQ-81	15.3.2023	16.30	121	121	121	41	121	121	121	121
AQ-82	15.3.2023	17.30	121	121	121	41	121	121	121	121
AQ-83	15.3.2023	18.30	121	121	121	41	121	121	121	121
AQ-84	15.3.2023	19.30	121	121	121	41	121	121	121	121
AQ-85	15.3.2023	20.30	121	121	121	41	121	121	121	121
AQ-86	15.3.2023	21.30	121	121	121	41	121	121	121	121
AQ-87	15.3.2023	22.30	121	121	121	41	121	121	121	121
AQ-88	15.3.2023	23.30	121	121	121	41	121	121	121	121
AQ-89	15.3.2023	00.30	121	121	121	41	121	121	121	121
AQ-90	15.3.2023	01.30	121	121	121	41	121	121	121	121
AQ-91	15.3.2023	02.30	121	121	121	41	121	121	121	121
AQ-92	15.3.2023	03.30	121	121	121	41	121	121	121	121
AQ-93	15.3.2023	04.30	121	121	121	41	121	121	121	121
AQ-94	15.3.2023	05.30	121	121	121	41	121	121	121	121
AQ-95	15.3.2023	06.30	121	121	121	41	121	121	121	121
AQ-96	15.3.2023	07.30	121	121	121	41	121	121	121	121
AQ-97	15.3.2023	08.30	121	121	121	41	121	121	121	121
AQ-98	15.3.2023	09.30	121	121	121	41	121	121	121	121
AQ-99	15.3.2023	10.30	121	121	121	41	121	121	121	121
AQ-100	15.3.2023	11.30	121	121	121	41	121	121	121	121

လေ့လာရမည့်အသွေးအား AQM-09 Air Quality Monitoring Station ကို အသုံးပြု၍ ၂၄ နာရီ တိုင်းတာမည်။ လေ့လာရမည့်အသွေးအားအရ PM နှင့် SO2 တန်ဖိုးများမှာ AQ1 နှင့် AQ2 တို့တွင် သတ်မှတ် guideline ထက် အနည်းငယ် ကျော်လွန်နေသည်ကို တွေ့ရှိရပါသည်။



လေ့လာရမည့်အသွေးတိုင်းတာမှု

Wind Speed and Direction



ဆည်သံအရည်အသွေးတိုင်းတာမှု



N-1 (Lat - 16° 28.588'N, Long - 97° 40.537'E), Near Roadside Noise & Generator
 N-2 (Lat - 16° 28.605'N, Long - 97° 40.537'E), Near Smelting Process
 N-3 (Lat - 16° 28.576'N, Long - 97° 40.537'E), Extension Area
 N-4 (Lat - 16° 28.717'N, Long - 97° 40.537'E), Ambient Noise Level
 N-5 (Lat - 16° 28.482'N, Long - 97° 40.537'E), Ambient Noise Level

Time	N-1	N-2	N-3	N-4	N-5	NOISE (Predicted)
Day L _{max}			62	65	60	70
Night L _{max}			55	58	52	65



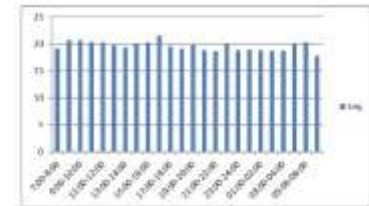
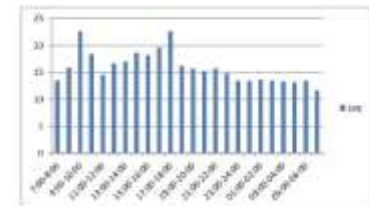
- ဆည်သံအရည်အသွေး - ၅ နေရာ
- ဆည်သံအရည်အသွေးအား BENETECH Digital Sound Level Meter တိုင်းတာသည့် ဓက်ကို အသုံးပြု၍ ၂၄ နာရီ တိုင်းတာခံပြီး ဆည်သံအရည်အသွေး စုစည်းချုပ်ချုပ် N-1 နှင့် N-2 တို့တွင် NEQEG (2015) သတ်မှတ်ချက်ထက် အနည်းဆုံး ကျော်လွန်နေသည်ကို တွေ့ရှိရပါသည်။

OBES

တုန်ခါမှုတိုင်းတာမှု

- တုန်ခါမှု - ၂ နေရာ
- တုန်ခါမှုတိုင်းတာသည့်ဓက်ကို အသုံးပြု၍ ၂၄ နာရီ တိုင်းတာခံပြီး စုစည်းချုပ်ချုပ် Ministry of Environment, Japan Vibration Guideline မြင့် နှိုင်းသည့် ဓာတ်ပြုထားပါသည်။

Time	N-1	N-2	Ministry of Environment, Japan Vibration Guideline
Day	17	20	85
Night	23	19	85



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ရေအရည်အသွေးတိုင်းတာမှု



GW-1 (Lat - 16° 26.588'N, Long - 97° 40.544'E), Factory Compound
 WW-1 (Lat - 16° 28.622'N, Long - 97° 40.614'E), Discharge Point
 SW-1 (Lat - 16° 28.299'N, Long - 97° 40.489'E), Atrrae River Up Stream
 SW-2 (Lat - 16° 28.380'N, Long - 97° 40.399'E), Atrrae River Down Stream

မြေအောက်ရေနှင့် သောက်သုံးရေအရည်အသွေးအား Myanmar National Drinking Water Quality Standards, Ministry of Health (MOH), 2019 ခွဲစိတ်ရေအရည်အသွေးအား National Environmental Quality (Emission) Guidelines 2015, General Application ၊ မြေပေါ်ရေအရည်အသွေးအား National Surface Water Quality Standard, Class V မြင့် နှိုင်းသည့် ဓာတ်ပြုထားပါသည်။

OBES

ရေအရည်အသွေးတိုင်းတာမှု

Groundwater Quality Sampling Parameters

No	Quality Parameters	Units	Myanmar National Drinking Water Quality Standards (2019) by Ministry of Health
1	pH	S. U.	6.5-8.5
2	Turbidity	NTU	5
3	Total Dissolved Solids	mg/l	1000
4	Sulphate	mg/l	250
5	Hardness	mg/l	500
6	Chloride	mg/l	250
7	Iron	mg/l	3
8	Copper	mg/l	0.01
9	Manganese	mg/l	0.4
10	Nitrate	mg/l	50
11	Ammonia	mg/l	0.05
12	Color	mg/l	15
13	Total Coliforms	MPN/100 ml	10
14	Faecal Coliforms	MPN/100 ml	1

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ရေအရည်အသွေးကိုင်တွယ်တာမှု

Discharge Water Quality Sampling Parameters

No	Quality Parameters	Units	NEQEG (2015) by MONREC
1	pH	S. U	6-9
2	Total Suspended Solids	mg/l	20
3	Cadmium	mg/l	0.05
4	COD	mg/l	50
5	Aluminum	mg/l	0.3
6	Copper	mg/l	0.1
7	Arsenic	mg/l	0.05
8	Zinc	mg/l	2
9	Nickel	mg/l	0.1
10	Nickel	mg/l	0.5
11	Fluoride	mg/l	5

No	Quality Parameters	Units	General Application NEQEG (2015) by MONREC
12	Temperature	°C	< 3
13	Hydrogen carbon	mg/l	5
14	Lead	mg/l	0.1

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ရေအရည်အသွေးကိုင်တွယ်တာမှု

Surface Water Quality Sampling Parameters

No	Quality Parameters	Units	Class - V of National Surface Water Quality Standard by MONREC
1	Boron	mg/l	2.4
2	Cyanide	mg/l	0.07
3	Fluoride	mg/l	1.5
4	Nitrate nitrogen	mg/l	10
5	Nitrite nitrogen	mg/l	1
6	Phenol	mg/l	0.05
7	Arsenic	mg/l	0.05
8	Cadmium	mg/l	0.003
9	Chromium (Hexavalent)	mg/l	0.05
10	Lead	mg/l	0.01
11	Nickel	mg/l	0.07
12	Total Suspended Solids	mg/l	150
13	BOD	mg/l	30
14	COD	mg/l	100
15	DO	mg/l	>2
16	pH	-	-
17	Oil & Grease	mg/l	-
18	E. coli	MPN/100ml	-
19	Copper	mg/l	-
20	Ammonium Nitrogen	mg/l	0.9

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လူမှုပတ်ဝန်းကျင်

- မော်လမြိုင်မြို့နယ် စရိယာမှာ စတုရန်းမိုင် ၈၈.၈၂ ကျယ်ဝန်းပါသည်။
- အီ အရှေ့ဘက်တွင် ကရင်မရေမြို့နယ် ၊ အနောက်ဘက်တွင် ချောင်းဆုံမြို့နယ် ကောင်ဘက်တွင် ဗဟိုမြို့နယ်၊ ခြောက်ဘက်တွင် ကရင်ပြည်နယ် ဘားအံမြို့နယ် ထိစပ်လျက်ရှိပါသည်။
- လူဦးရေအားဖြင့် ၂၆၉,၀၈၅ ဦးခန့်ရှိပြီး အိမ်ခြေပေါင်း ၄၇, ၇၄၅ ရှိပါသည်။
- မော်လမြိုင်မြို့နယ်သည် မွန်ပြည်နယ်တွင် စီးပွားရေးအချက်အချာကျပြီး တိုးတက်ဖွံ့ဖြိုးအားကောင်းသော မြို့နယ် ဖြစ်ပြီး ကုန်းလမ်း၊ ရေလမ်းဆုံရာ လမ်းမပေါ်တွင် တည်ရှိလမ်းပန်းဆက်သွယ်ရေးကောင်းမွန်ပါသည်။
- အသင်းများမှာ ခိုက်ဖျိုးရေးနှင့် ဝန်ဆောင်မှု လုပ်ငန်းများကို အဓိကထားလုပ်ကိုင်ကြပါသည်။
- ယခုအခါမြို့နယ်စက်နီးမှာ မော်လမြိုင်စက်မှုဇုန်အတွင်း တည်ရှိပါသည်။
- စီမံကိန်းတည်ရှိရာ မော်လမြိုင်စက်မှုဇုန်အတွင်းနှင့် ဇုန်ပတ်ဝန်းကျင်တွင် ရွှေပေးအဆောက်အအုံများနှင့် သမိုင်းဝင်အထိန်းအမှတ်များ မတွေ့ရှိရပါ။



OBES

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းနှင့်လျော့ပါးစေရေး နည်းလမ်းများ

အဆိုပြုစီမံကိန်းလုပ်ငန်း ဆောင်ရွက်ခြင်းမှ မြစ်ပေါ်လာနိုင်ခြေရှိသော ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများ ဆန်းစစ်နိုင်ရန်အတွက် ကွင်းဆင်းလေ့လာခြင်း၊ စီမံကိန်းတာဝန်ရှိသူများဖြင့် တွေ့ဆုံခြင်း၊ ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက်များ ကောက်ယူခြင်း တို့အား ဆောင်ရွက်ခဲ့ပြီး ဆန်းစစ်ခြင်းများအလိုက် လေ့လာပါးစေရေး နည်းလမ်းများအား သတ်မှတ်ဖော်ထုတ်ထားပါသည်။



OBES

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းနှင့်လေ့ကျင့်ရေးစခန်းများ

လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် သေးငယ်စွာပတ်ဝန်းကျင်ရေး

မြန်မာနိုင်ငံရှိသော သက်တောင့်သက်သာမှုများ

- အစွန်း၊ သွေးသွေးနှင့် ရုပ်ပုံဆိုင်ရာ ဆေးကုသမှုများ များပြားစွာ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဆေးကုသမှုများ ကပ်ရောင်မှုများကို သက်တောင့်သက်သာမှု

သက်တောင့်သက်သာမှုများနှင့်ဆိုင်သည့်လုပ်ငန်းများ

- ဆေးကုသမှုများကို ကပ်ရောင်မှုများ ကျန်းမာရေးနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာဆိုင်ရာများကို အသေးစား အသေးစား ဆေးကုသမှုများ
- လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို လုပ်ငန်းခွင်များ ဝတ်ဆင်မှုများ ကျန်းမာရေးနှင့် ဆေးကုသမှုများကို အသေးစား အသေးစား ဆေးကုသမှုများ
- စီမံကိန်းလုပ်ငန်းများဆိုင်ရာ ဆေးကုသမှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို အသေးစား အသေးစား ဆေးကုသမှုများ
- အစွန်း၊ သွေးသွေးနှင့် ရုပ်ပုံဆိုင်ရာ ဆေးကုသမှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို အသေးစား အသေးစား ဆေးကုသမှုများ
- လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို အသေးစား အသေးစား ဆေးကုသမှုများ

အများပြည်သူကျန်းမာရေးနှင့် သေးငယ်စွာပတ်ဝန်းကျင်ရေး

မြန်မာနိုင်ငံရှိသော သက်တောင့်သက်သာမှုများ

- စီမံကိန်းဆောင်ရွက်မှုများနှင့်ဆိုင်သည့် လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို အသေးစား အသေးစား ဆေးကုသမှုများ

သက်တောင့်သက်သာမှုများနှင့်ဆိုင်သည့်လုပ်ငန်းများ

- စီမံကိန်းဆောင်ရွက်မှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို အသေးစား အသေးစား ဆေးကုသမှုများ
- စီမံကိန်းဆောင်ရွက်မှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို အသေးစား အသေးစား ဆေးကုသမှုများ
- လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို လုပ်ငန်းခွင်များ ဆေးကုသမှုများကို အသေးစား အသေးစား ဆေးကုသမှုများ

ထိန်းချုပ်ရေးအစီအမံများ



ထိန်းချုပ်ရေးအစီအမံများ

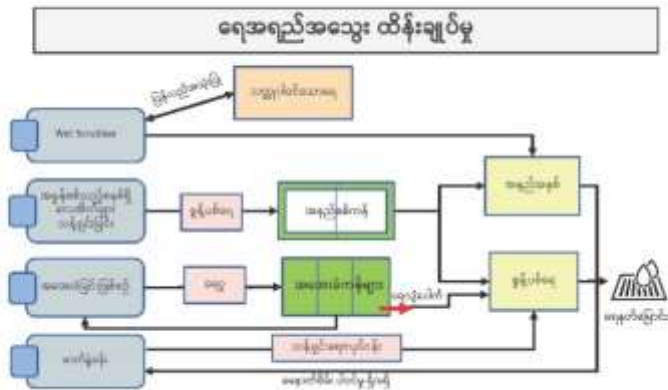
လေထုအရည်အသွေး ထိန်းချုပ်မှု			
လေထုအရည်အသွေး ထိန်းချုပ်မှု		ထိန်းချုပ်ခြင်း	
		ဘက်စုံများ	ထိန်းချုပ်မှုစနစ်
		PM	Bag House
		PM	Bag Filter
		SO2	Wet Scrubber
		အခြား ဘက်စုံများ	စီမံကိန်းဆိုင်ရာ

ထိန်းချုပ်ရေးအစီအမံများ

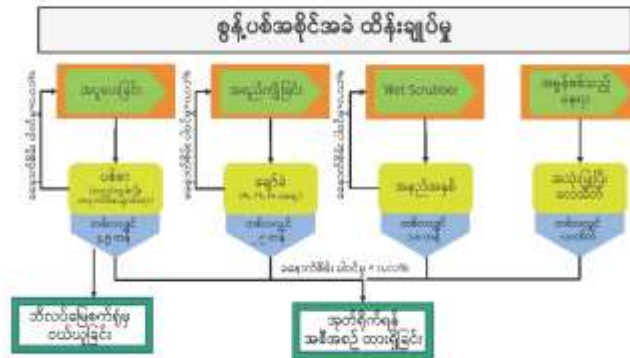
စီမံကိန်းဆိုင်ရာ



ထိန်းချုပ်ရေးအစီအမံများ



ထိန်းချုပ်ရေးအစီအမံများ



ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းနှင့်လျော့ပါးစေရေး နည်းလမ်းများ

လူမှုဝန်းကျင်

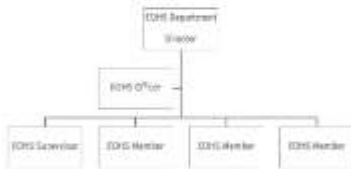
မြန်မာနိုင်ငံရှိ သက်ဆိုင်ရာများ	သက်ဆိုင်ရာများနှင့်ဆိုင်ရာများ
<ul style="list-style-type: none"> အလုပ်အကိုင် အခွင့်အလမ်းများ ရရှိမှု ကျန်းမာရေးဆိုင်ရာ ဝန်ဆောင်မှုများအပေါ်တွင် သက်ရောက်မှု ဝန်ထမ်းများနှင့် အသက်မွေးသင်္ကြာ၊ လူမှုရေးရာ ပြဿနာများ အခြေခံအဆောက်အအုံများနှင့် အသက်မွေးသင်္ကြာ၊ လူမှုရေးရာ ပြဿနာများ အကျွန်ုပ်တို့၏ ဝတ်စုံများ 	<ul style="list-style-type: none"> စီမံကိန်း အစီအစဉ်များရှိ အသက်မွေးသင်္ကြာ၊ လူမှုရေးရာ ပြဿနာများ အလုပ်အကိုင် အခွင့်အလမ်းများ အလုပ်အကိုင် အခွင့်အလမ်း ဝန်ထမ်းများ ဆောင်ရွက် ဆောင်ရွက် အလုပ်အကိုင် အခွင့်အလမ်းများ အလုပ်အကိုင် အခွင့်အလမ်း ဆောင်ရွက် ဆောင်ရွက် လုပ်ငန်းခွင်လုံခြုံရေးများ အလုပ်အကိုင် အခွင့်အလမ်း ဆောင်ရွက် ဆောင်ရွက် CSR အစီအစဉ်များ အလုပ်အကိုင် အခွင့်အလမ်း ဆောင်ရွက် ဆောင်ရွက် လုပ်ငန်းခွင်လုံခြုံရေးများ အလုပ်အကိုင် အခွင့်အလမ်း ဆောင်ရွက် ဆောင်ရွက် အကျွန်ုပ်တို့၏ ဝတ်စုံများ အလုပ်အကိုင် အခွင့်အလမ်း ဆောင်ရွက် ဆောင်ရွက်

ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာစီမံခန့်ခွဲမှုအစီအစဉ်

- ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် လုပ်ငန်းများနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ဆိုင်ရာများ အခြေခံအဆောက်အအုံများ တည်ဆောက်မှုများ ပြုပြင်မှုနှင့် ဆက်သွယ်မှု အလုပ်အကိုင်အစီအစဉ် စီမံခန့်ခွဲမှုလုပ်ငန်းများ ဆောင်ရွက်ခြင်းနှင့် ဆက်သွယ်မှုများ စီမံခန့်ခွဲမှုလုပ်ငန်းများ ဆောင်ရွက်ခြင်း
- ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များ အကျဉ်းချုပ် -
 - ✓ စတင်လုပ်ငန်းအစီအစဉ်
 - ✓ မြေသေတ္တာလုပ်ငန်းစီမံခန့်ခွဲမှုအစီအစဉ်
 - ✓ ရေအရင်းအမြစ်စီမံခန့်ခွဲမှုအစီအစဉ်
 - ✓ စာတင်စနစ်စီမံခန့်ခွဲမှုအစီအစဉ်
 - ✓ စွန့်ပစ်အပိုင်အမဲစီမံခန့်ခွဲမှုအစီအစဉ်
 - ✓ လူမှုရေးရာဆိုင်ရာစီမံခန့်ခွဲမှုအစီအစဉ်
 - ✓ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဆေးကုသမှုလုပ်ငန်းစီမံခန့်ခွဲမှုအစီအစဉ်
 - ✓ အခြေခံအဆောက်အအုံများနှင့် ဆောင်ရွက်မှုလုပ်ငန်းစီမံခန့်ခွဲမှုအစီအစဉ်
 - ✓ အလုပ်အကိုင်အခွင့်အလမ်းစီမံခန့်ခွဲမှုအစီအစဉ်
 - ✓ CSR အစီအစဉ်
 - ✓ Grievance Redress Mechanism

ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာစီမံခန့်ခွဲမှုအစီအစဉ်

ပတ်ဝန်းကျင် ကျန်းမာရေးနှင့် ဆေးယန္တရား ကာကွယ်ရေးဆိုင်ရာအဖွဲ့ (Environmental, Occupational Health and Safety - EOHSS) ဖွဲ့စည်းခြင်း



No.	EOHSS Department	Responsibility
1.	Director	To implement the EOHSS policies.
2.	EOHSS Officer	Implementation of EMP according to the EOHSS policies.
3.	EOHSS Supervisor	Monitoring and implementation of EMP Occupational Health and Safety for all staff and employees
4.	EOHSS Member	Monitoring and implementation of EMP
5.	EOHSS Member	Monitoring and implementation of EMP
6.	EOHSS Member	Monitoring and implementation of EMP

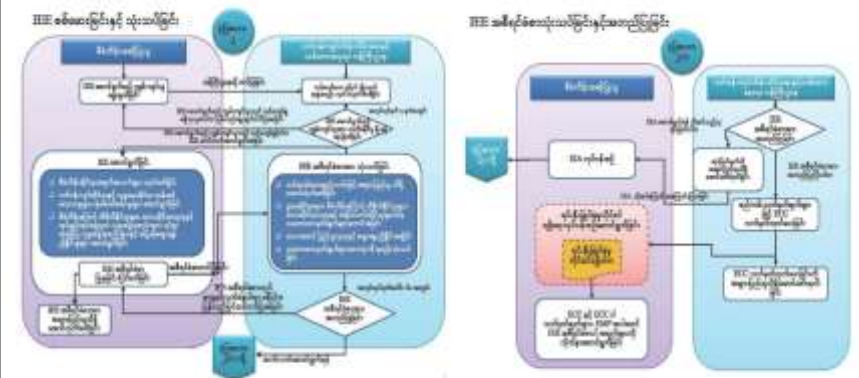
ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်

စောင့်ကြည့်ရန်ရာ	စိုက်သစ်မှုများ Parameters type	ကြိမ်နှုန်း	စစ်ဆေးမှုကြိမ်ရောက်ရှိသည့်နေရာများ	တာဝန်ယူသောစောင့်ကြည့်အဖွဲ့အစည်း	ခန့်မှန်းကျခံရမှုများ (ကျပ်)
လေထုညစ်ညမ်းမှု	SO ₂ , NO ₂ , CO, CO ₂ , PM ₁₀ , PM _{2.5}	Biannually	Factory Compound Ambient Air Quality	EOHSS Team	6,000,000 per year
ဆည်ရွက်ညစ်ညမ်းမှု	WQGS	Biannually	Factory Compound Ambient Noise Level	EOHSS Team	3,000,000 per year
ရေထုညစ်ညမ်းမှု	WQGS National Drinking Water Quality, MCH National Surface Water Quality	Biannually	Wastewater Discharge Point Groundwater Surface Water	EOHSS Team	6,000,000 per year
စွန့်ပစ်ပစ္စည်း	Solid waste, Hazardous Waste	Weekly	Waste Storage within Factory Area	EOHSS Team	1,000,000 per year
ဆွဲငင်မှုညစ်ညမ်းမှု	Applicable Parameters	Biannually	Factory Compound	EOHSS Team	2,000,000 per year
အန္တရာယ်ရှိသည့်အရာများ	Visual Inspection, Firefighting equipment	Monthly	Inside the factory	EOHSS Team	1,000,000 per year
ကျန်းမာရေးနှင့် လုပ်ငန်းဆိုင်ရာ အန္တရာယ်များ	Health issues and other accidents	Monthly	Inside the factory	Worker and EOHSS Team	2,000,000 per month
ဘေးအန္တရာယ်အန္တရာယ်	-Trainings on Occupational Health and Safety -Trainings on waste management and Environmental quality management	Biannually	-	EOHSS Team	1,000,000 per year
EMP Monitoring Report ပြုစုမှုကြိမ်ရေ	Monitoring according to EMP plan and monitoring report preparation	Biannually	-	Third Party	10,000,000 per year

ရွှေဆက်ဆောင်မှုကိရိယာများ

- လက်ရှိရှိပြင်ဆင်ထားသော IEE အစီရင်ခံစာ မူကြမ်းအား ယခုဆွေးနွေးမှုများမှ လက်ခံရရှိသော အကြံပြုချက်များအား ထည့်သွင်းပြင်ဆင်ကာ အရေသတ်ပြင်ဆင်ခြင်း
- ပတ်ဝန်းကျင်ထိခိုက်မှုလျှော့ချရေးစီမံခန့်ခွဲမှု IEE အစီရင်ခံစာအား တင်သွင်းခြင်း
- ပတ်ဝန်းကျင်ထိခိုက်မှုလျှော့ချရေးစီမံခန့်ခွဲမှု အကြံပြုကြည့်ရှုမှုလုပ်ငန်းများကို ပြန်လည်ပြင်ဆင်ကာ တင်ပြခြင်း
- IEE အစီရင်ခံစာ အတည်ပြုခြင်း

IEE အစီရင်ခံစာအတည်ပြုခြင်းလုပ်ငန်းစဉ်



အမေးအဖြေနှင့် အကြံပြုချက်

ဆက်သွယ်ရန်

နိမိတ်နံအဆိုပြုသူ	ခေါ်ရတာနာလင်းအောင်
ဆက်သွယ်ရမည့် ပုဂ္ဂိုလ်	နီးတင်ညို
လိပ်စာ	အမှတ် (၃၂၅၊ ၃၂၆၊ ၃၂၇၊ ၃၂၈၊ ၃၂၉၊ ၃၃၀)၊ ဇွန်မြို့နယ်၊ ဘ.လမ်း၊ မော်လမြိုင်၊ စက်မှုဇုန်၊ မူလတပ်ပင်မိမိမောက္ခဏာ၊ မော်လမြိုင်မြို့နယ်၊ နှစ်ခြည်နယ်။
ဖုန်းနံပါတ်	၀၉ - ၄၄၆၆၀၈၄၁၊ ၀၉ - ၄၂၉၇၇၃၃၆

အကြံပြုချက် အတည်ပြုချက် အကြံပြုချက် အတည်ပြုချက်	
အကြံပြုချက်	အကြံပြုချက် အတည်ပြုချက် အကြံပြုချက် အတည်ပြုချက်
အကြံပြုချက်	အကြံပြုချက် အတည်ပြုချက် အကြံပြုချက် အတည်ပြုချက်
အကြံပြုချက်	အကြံပြုချက် အတည်ပြုချက် အကြံပြုချက် အတည်ပြုချက်
အကြံပြုချက်	အကြံပြုချက် အတည်ပြုချက် အကြံပြုချက် အတည်ပြုချက်

ကျေးဇူးအထူးတင်ရှိပါသည်။