



ENVIRONMENTAL IMPACTS ASSESSMENT
On
The Construction and Operation of
Fiber Cement Board Factory
by
Sann Shinn & Brothers Co., Ltd



(Myanmar Environment Sustainable Conservation)

June, 2023



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ACRONYMS AND ABBREVIATION

ADB	Asian Development Bank
ASEAN	Association of South-East Asian Nations
BAT	Best Available Technology
BOD	Biochemical Oxygen Demand
CHS	Community Health and Safety
CGM	Complaints and Grievances Mechanism
CIA	Cumulative Impact Assessment
CIM	Cumulative Impact Management
COD	Chemical Oxygen Demand
CSR	Corporate Social Responsibility
dBA	Decibel A- weighting
ECD	Environmental Conservation Department
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EITI	Extractive Industry Transparency Initiative
EMP	Environmental Management Plan
EPS	Environmental Performance Standards
EU	European Union
FGD	Focal Group Discussion
GDP	Gross Domestic Products
GHGs	Green House Gases (Glass House Gases)
GIS	Geographic Information System
ID	Identity Card
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IEA	International Energy Agency
ILO	International Labour Organization
ISO	International Standard Organization
IUCN	International Union for Conservation of Nature and Natural Resources
KII	Key Informant Interview
kWh	Kilo Watt Hour
L&FS	Life & Fire Safety

MESC	Myanmar Environment Sustainable Conservation
MIC	Myanmar Investment Commission
MMSP	Management and Monitoring Sub-Plans
MOECAF	Ministry of Environmental Conservation and Forestry
MONREC	Ministry of Natural Resources and Environmental Conservation
MP	Monitoring Plan
NCEA	National Commissions of Environmental Affairs
NECC	National Environmental Conservation Committee
NECCCCC	National Environmental Conservation and Climate Change Central Committee
NEQ	National Environmental Quality
NGO	Non-Government Organization
NO ₂	Nitrogen Dioxide
OEHD	Occupational Environmental Health Division
OHS	Occupational Health and Safety
PEB	Payment for Ecosystem Benefits
PES	Payment for Ecosystem Services
PM	Particulate Matter
PM _{2.5-10}	Particulate Matter between 2.5-10 microns
PPE	Personnel Protection Equipment
RSPM	Respiratory Suspended Particulate Matter
5Rs	Reduce, reuse, recover, recycle and redesign
SIA	Social Impact Assessment
SO ₂	Sulphur Dioxide
SPM	Suspended Particulate Matter
SS	Secondary Source
STD	Sexually Transmitted Diseases
TDS	Total Dissolved Solids
TSS	Total Suspended Solid
VESC	Valued Environmental and Social Component
WHO	World Health Organization

အကျဉ်းချုပ်အစီရင်ခံစာ

ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း(EIA) အစီရင်ခံစာသည် Sann Shinn & Brothers ကုမ္ပဏီလီမိတက် မှ ဆယ်လူလို့စ် ဖိုင်ဘာဘိလပ်မြေပြားစက်ရုံ၏ တည်ဆောက်ခြင်းနှင့် စီမံကိန်းလည်ပတ်ခြင်းအား အတွက် ဖြစ်သည်။

ရည်ရွယ်ချက်များ

- အရည်အသွေးရှိသော ဖိုင်ဘာဘိလပ်မြေပြားများကို တိုင်းပြည်တွင် ရောင်းချခြင်းအတွက် ထုတ်လုပ်ရန်
- သဘာဝနှင့်လိုက်လျောညီထွေရှိသော ဖိုင်ဘာဘိလပ်မြေပြားများကို အများပြည်သူ သင့်တော်သော ဈေးနှုန်းဖြင့် အသုံးပြုနိုင်ရန်
- တိုင်းပြည်အတွက် ဖိုင်ဘာအဆောက်အအုံများ ဖွံ့ဖြိုးတိုးတက်စေရန်နှင့်
- တိုင်းပြည်၏ တည်ဆောက်ရေးကဏ္ဍဖွံ့ဖြိုးတိုးတက်စေရန် တို့ဖြစ်ပါသည်။

ယခင်ပတ်ဝန်းကျင်ဆိုင်ရာလေ့လာမှု

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း(EIA) အတွက် နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း လေ့လာမှုကို ၂၀၁၉ ခုနှစ်တွင် လုပ်ဆောင်ခဲ့ပါသည်။ နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း အစီရင်ခံစာကို သက်ဆိုင်သော လုပ်ပိုင်ခွင့်ရှိသူ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန (ECD) မှ စာအမှတ်-အီးအိုင်အေ-၁/၄ ဆ(၂၂၇၈/၂၀၂၀)၊ ရက်စွဲ။ ၂၀၂၀၊ စက်တင်ဘာလ၊ ၁၅ ရက်နေ့တွင် အတည်ပြုပြီးဖြစ်ပါသည်။

နောက်ခံသမိုင်း

ဆယ့်ကိုးရာစု အလယ်ပိုင်းလောက်ကတည်းက ကျောက်ဂွမ်းဖိုင်ဘာဘိလပ်မြေပြားကို ကမ္ဘာတစ်ဝှမ်းတွင် တွင်ကျယ်စွာ သုံးစွဲနေကြပါသည်။ ကျောက်ဂွမ်းဖိုင်ဘာပြားကို တားမြစ်ပြီးနောက်တွင် ဆယ်လူလို့စ် ဖိုင်ဘာဘိလပ်မြေပြားသည် အဆောက်အအုံ ပစ္စည်းအဖြစ် ကမ္ဘာတစ်ဝှမ်းတွင် တွင်ကျယ်စွာ အသုံးပြုလာကြပါသည်။

စီမံကိန်းအဆိုပြုတင်ပြသူ Sann Shinn & Brothers ကုမ္ပဏီလီမိတက်သည် ဆယ်လူလို့စ် ဖိုင်ဘာဘိလပ်မြေပြားကို ထုတ်လုပ်ရောင်းချရန် ဆန္ဒရှိပါသည်။

Sann Shinn & Brothers Co., Ltd သည် ၃-၉-၂၀၁၉ တွင် တရားဝင်မှတ်ပုံတင်ထားသော ကုမ္ပဏီတစ်ခု ဖြစ်သည်။ (ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ် အမှတ်- ၁၂၂၀၀၂၆၂၄ ရင်းနှီးမြှုပ်နှံမှုနှင့် ကုမ္ပဏီများ ညွှန်ကြားမှုဦးစီးဌာန)။ ကုမ္ပဏီသည် ၁၀၀ ရာခိုင်နှုန်း အမျိုးသားပိုင်ဖြစ်သည်။

ကုမ္ပဏီသည် မြန်မာ့ရင်းနှီးမြှုပ်နှံမှုကော်မရှင် (MIC) မှ ခွင့်ပြုချက်ရရှိပြီးဖြစ်ပါသည်။ (စာအမှတ် ၂၄၇/၂၀၂၀၊ ရက်စွဲ။ ၂၀၂၀၊ ဇပြီလ၊ ၆ ရက်)

ကုမ္ပဏီသည် ဆယ်လူလို့စ် ဖိုင်ဘာဘိလပ်မြေပြားကို ထုတ်လုပ်ရန် အဆိုပြုစီမံကိန်းကို ဒေသအတွင်းရှိ နေရာ (၃) နေရာတွင် စဉ်းစားခဲ့ပါသည်။ ဤအဆိုပြုစီမံကိန်းနေရာသည် တောင်ရင်းကျေးရွာအနီး၊ စဉ့်ကိုင်မြို့နယ်တွင် အောက်ပါအကျိုးကျေးဇူးများ ရှိသည်ဟု နောက်ဆုံးရွေးချယ် ခဲ့ပါသည်။

စီမံကိန်းနေရာသည် အလွယ်တကူကားဖြင့်သွားလာနိုင်ခြင်း၊ အစိုးရလှုပ်စစ်မီးရရှိခြင်း၊ မြေအောက်ရေ (အနက် ပေ၂၇၀) တွင် ရရှိခြင်း၊ ကုန်ကြမ်းဖြစ်သော ဘိလပ်မြေကို ၎င်း၏မိခင်ကုမ္ပဏီ ဖြစ်သော ငွေရည်ပုလဲ crown ဘိလပ်မြေစက်ရုံမှ အလွယ်တကူရရှိခြင်း၊ အခြား ကုန်ကြမ်း (၂)မျိုးဖြစ်သော သဲ၊ ထုံးတို့ကိုလည်း အလွယ်တကူဝယ်ယူနိုင်ခြင်းတို့ကြောင့်ဖြစ်သည်။

စီမံကိန်းအကြောင်းအရာအသေးစိတ်အချက်အလက်

အဆိုပြုတင်ပြသော ဖိုင်ဘာဘိလပ်မြေပြားစက်ရုံသည် တောင်ရင်းကျေးရွာအနီး၊ စဉ့်ကိုင်မြို့နယ်၊ မန္တလေးတိုင်းဒေသကြီးတွင် တည်ရှိပါသည်။ စက်ရုံ၏ဧရိယာသည် ၁၀.၁၁ဧက ဖြစ်သည်။

အဆိုပြုတင်ပြသော စက်ရုံသည် ဦးပိုင်အမှတ် ၉၀/ခ၊ ၉၇၊ ၉၈၊ ၉၉/၁၊ ၉၉/၂၊ ၁၀၀၊ ၁၀၁၊ ၁၀၂ နှင့် ၁၄၃၊ တောင်ရင်းကျေးရွာအုပ်စု၊ စဉ့်ကိုင်မြို့နယ်၊ ကျောက်ဆည်ခရိုင်၊ မန္တလေးတိုင်းဒေသကြီးတွင် တည်ရှိပါသည်။ ကိုဩဒိနိတ်များမှာ မြောက်လတ္တီကျု ၂၁ ဒီဂရီ ၄၀ မိနစ် ၂၇.၁၇ စက္ကန့်နှင့် အရှေ့လောင်ဂျီကျု ၉၆ ဒီဂရီ ၀၈ မိနစ် ၁၉.၁၉ စက္ကန့် ပင်လယ်ရေမျက်နှာပြင်အထက် ၂၉၇ ပေ ဖြစ်ပါသည်။

၂၄၄၀ x ၁၂၂၀ x ၆ မီလီမီတာ အရွယ်အစားရှိသော ဖိုင်ဘာဘိလပ်မြေပြားဖြစ်၍ ထုတ်လုပ်မှု လျာထားချက်မှာ တစ်နှစ်လျှင် စတုရန်းမီတာ ငါးသန်း ဖြစ်ပါသည်။ တံဆိပ်အမည်မှာ "Target" ဖြစ်ပါသည်။

ဘတ်ဂျက်မှာ ကျပ်သန်းပေါင်း ၁၉၉၃၁.၃၁ ဖြစ်သည်။

ဖိုင်ဘာဘိလပ်မြေပြားစက်ရုံ၏ အဓိကအဆောက်အဦဆိုင်ရာများ

ဆက်စပ်ပစ္စည်းများမှာ- ထိန်းချုပ်ခန်း၊ သဲသိုလှောင်ခန်း၊ ပျော့ဖတ်ဖျော်ဌာန၊ ဘိလပ်မြေနှင့် အခြားပစ္စည်းသိုလှောင်ခြင်းဌာန၊ သဲဖျော်သိုလှောင်နေရာ၊ ပျော့ဖတ်ဖျော်သိုလှောင်နေရာ၊ ဘိလပ်မြေဖျော်ခြင်းနေရာ၊ ဘုတ်ပြားများလုပ်ဆောင်သည့်နေရာ၊ လက်ခံနေရာ၊ အစုအပုံနေရာ၊ ဖိခြင်းနေရာ၊ ချွေးပေါင်းခံသည့်နေရာ၊ အခြောက်ခံသည့်နေရာ၊ အထူအပါးညှိသည့်နေရာ၊ ချောသည့်နေရာ၊ အစွန်းဖြတ်သည့်နေရာတို့ဖြစ်သည်။

ထို့အပြင် ဘွိုင်လာစနစ်၊ လေအေးပေးစနစ်၊ သန့်စင်ခြင်းနှင့်ပြန်လည်အသုံးပြုသောရေကန်များ၊ ကြိတ်ခြေခြင်းစနစ်၊ စွန့်ပစ်ပစ္စည်းစနစ်နှင့် သန့်စင်ခြင်းနှင့် ဆီဖယ်ထုတ်ခြင်းစနစ်တို့ပါဝင်ပါသည်။ အဆောက်အဦနှင့် တည်ဆောက်မှုမှာ-

ရှည်လျားသော အဓိကစက်ရုံ (ထုတ်လုပ်မှု)၊ ပြင်ဆင်ခြင်းအပိုင်း၊ ထိန်းချုပ်ခန်း၊ သိုလှောင်ခန်းများ၊ ရုံးခန်း၊ အဆောင် (၄) ဆောင် (လူပျိုဆောင်၊ မိသားစုဆောင်၊ အရာရှိရိပ်သာနှင့် နိုင်ငံခြားသား ပညာရှင်ဆောင်)၊ မီးဖိုနှင့် ထမင်းစားဆောင်၊ ဘွိုင်လာအဆောက်အဦ၊ မီးခိုးခေါင်းတိုင်၊ မီးစက်၊ ထရပ်စမော်ဗာ၊ ဒီဇယ်သိုလှောင်ရုံနှင့် အမျိုးမျိုးသော တိုင်ကီများ တို့ဖြစ်ကြသည်။

ကုန်ကြမ်းပစ္စည်းများမှာ ဘိလပ်မြေ၊ သဲ၊ ပျော့ဖတ်နှင့် ထုံးတို့ဖြစ်ပါသည်။ သူတို့ကို ဖျော်ကန်ထဲတွင် ရောမွှေ၍ အဆိုပါအနည်အနှစ်များကို ဖိုင်ဘာဘိလပ်မြေပြားလုပ်ခြင်းဖြစ်သည်။

လက်ရှိအခြေအနေ

စီမံကိန်းသည် တည်ဆောက်ရေးကာလ နောက်ဆုံးအဆင့်ကို ရောက်ရှိနေပါသည်။ အမှန်တစ်ကယ်တွင် အဆောက်အဦနှင့် တည်ဆောက်မှုများအားလုံး ပြီးဆုံးနေပါသည်။ အချို့စက်ယန္တရားနှင့် ကိရိယာတန်ဆာပလာများ တပ်ဆင်ခြင်း ကျန်ရှိနေသေးသည်။

လုပ်ဆောင်ခြင်းအချိန်ဇယား

- (က) အကြိုတည်ဆောက်ခြင်းကာလ : ၁ နှစ် (၂၀၁၉) |ပြီးဆုံး
- (ခ) တည်ဆောက်ခြင်းကာလ : ၁ နှစ် (၂၀၂၀)၊ သို့ပေမယ့် ကိုဗစ်-၁၉ ကပ်ရောဂါကြောင့် တည်ဆောက်ဆဲ။ ၎င်းကို ၂၀၂၃ နှစ်အလယ် စီမံကိန်းစနစ်မည်ဟု မျှော်လင့်ပါသည်။
- (ဂ) စီမံကိန်းလည်ပတ်ခြင်းကာလ : ၃၀ နှစ် (၂၀၂၃-၂၀၅၃)၊ မျှော်လင့်
- (ဃ) စီမံကိန်းပိတ်သိမ်းခြင်းကာလ : ၁ နှစ် (၂၀၅၄)

- အကြိုတည်ဆောက်ခြင်းကာလအတွင်းတွင် ဒီဇိုင်းဆွဲခြင်း၊ အစီအစဉ်ဆွဲခြင်းနှင့် စာရွက်စာတမ်း ကိစ္စများ လုပ်ဆောင်ခြင်း
- တည်ဆောက်ရေးကာလအတွင်းတွင် အဓိကလုပ်ငန်းများမှာ မြေရှင်းလင်းခြင်း၊ ခြံစည်းရိုးခတ်ခြင်း၊ ပစ္စည်းကိရိယာများ သယ်ယူပို့ဆောင်ခြင်း၊ တည်ဆောက်ရေးလုပ်ငန်းများ၊ ရေပိုက်တပ်ဆင်ခြင်းနှင့် လျှပ်စစ်မီးသွယ်တန်းခြင်း၊ နောက်ဆုံးအလုပ်ဖြစ်သော စက်ယန္တရားများ တပ်ဆင်ခြင်း၊ တည်ဆောက်ရေးလုပ်ငန်းသုံး လက်ကျန်များအားလုံးကို ဖယ်ရှားခြင်းနှင့် သန့်ရှင်းစွာ ထားရှိခြင်း တို့ဖြစ်သည်။

- စီမံကိန်းလည်ပတ်ခြင်းကာလအတွင်းတွင် အဓိကလုပ်ငန်းများမှာ စက်ရုံကို စမ်းသပ်လည်ပတ်ခြင်း၊ စီမံကိန်းပုံမှန်လည်ပတ်ခြင်းနှင့် ထုတ်လုပ်ခြင်းလုပ်ငန်းများ၊ ထုတ်ကုန်များကို သိုလှောင်ခြင်းနှင့် ရောင်းချခြင်း၊ ပုံမှန်စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်းနှင့် ထိန်းသိမ်းခြင်းလုပ်ငန်း၊ ကုန်ကြမ်းများကို ပုံမှန် ဝယ်ယူစုဆောင်းခြင်း၊ စဉ်ဆက်မပြတ်စီမံကိန်းလည်ပတ်ခြင်း/ထုတ်လုပ်ခြင်း၊ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ဆောင်ရွက်ခြင်းနှင့် ဖြေလျော့နိုင်မည့်နည်းလမ်းများကို ဆောင်ရွက်ခြင်း တို့ဖြစ်သည်။
- စီမံကိန်းပိတ်သိမ်းခြင်းကာလအတွင်းတွင် အဓိကလုပ်ငန်းများမှာ စက်ရုံကိုပိတ်သိမ်းခြင်း၊ ဖျက်သိမ်းခြင်း၊ အချို့ပစ္စည်းများကို ပြန်သုံး သို့မဟုတ် ပြန်လည်ရောင်းချခြင်း၊ အချို့ကို စွန့်ပစ်ခြင်း၊ ညစ်ညမ်းသော မြေဆီလွှာရှိလျှင် ဖယ်ရှားခြင်း၊ စီမံကိန်းနေရာကို သေသပ်စွာထားရှိခြင်း၊ နောက်ဆုံးအကြိမ် လေ၊ ရေ၊ မြေအရည်အသွေးတို့ကို စမ်းသပ်တိုင်းတာခြင်းနှင့် စီမံကိန်းနေရာကို ပြန်လည်ရှင်သန်ခြင်း/ပြန်လည်စိမ်းလန်းစေခြင်း တို့ဖြစ်ပါသည်။

အခြားဆောင်ရွက်နိုင်သောနည်းလမ်း

တည်နေရာကို အခြားဆောင်ရွက်နိုင်သောနည်းလမ်း-ဒေသတွင် အခြားစီမံကိန်း (၃) နေရာ စဉ်းစားပါသည်။ ဤနေရာကိုရွေးချယ်ခြင်းအကြောင်းအရင်းများမှာ မော်တော်ကားဖြင့် အလွယ်တကူ သွားလာနိုင်ခြင်းနှင့် အစိုးရလျှပ်စစ်မီးရရှိခြင်းတို့ဖြစ်ပါသည်။ သဲနှင့် ထုံးကိုလည်း အလွယ်တကူ ဝယ်ယူရရှိနိုင်၍ ဘိလပ်မြေကို မိခင်ကုမ္ပဏီဖြစ်သော ငွေရည်ပုလဲဘိလပ်မြေစက်ရုံ (မိုင် ၆၀ ဝေးသော)မှ အလွယ်တကူရရှိခြင်းတို့ဖြစ်သည်။ ရေကို အနက် ၂၇၀ ပေရှိ မြေအောက်ရေရရှိပါသည်။

ကုန်ကြမ်းအခြားဆောင်ရွက်နိုင်သောနည်းလမ်းများမှာ ပြည်တွင်းတွင်ရရှိသော စက္ကူအဟောင်း များမှာ အရည်အသွေးနိမ့်ခြင်းနှင့် လိုသလောက်အမြောက်အမြား ရေရှည်မရရှိသောကြောင့် စက္ကူပျော့ဖတ် ကိုအမေရိကန်နှင့် ကနေဒါမှ တင်သွင်းခြင်းဖြစ်သည်။

နည်းပညာအခြားဆောင်ရွက်နိုင်သော နည်းလမ်းမှာ ကျောက်ဂွမ်းဖိုင်ဘာသည် ကျန်းမာရေး ပြဿနာ ရှိသောကြောင့် ပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေဖြစ်သော ဆယ်လူလို့စ် ဖိုင်ဘာ နည်းပညာကို အသုံးပြုခြင်းဖြစ်သည်။

ထားသိုခြင်းအား အခြားဆောင်ရွက်နိုင်သော နည်းလမ်းမှာ ဖိုင်ဘာဘိလပ်မြေပြား ထုတ်လုပ်ခြင်းတွင် ရှည်လျားသော အပြားလုပ်ဆောင်ခြင်းစက်နှင့် ရှည်လျားသော ထရော်လီသယ်ယူ ပို့ဆောင်သည့်စနစ်၊ စက်ရုံသည် အလွန်ရှည်လျားသော စက်ရုံ (မြောက်မှတောင်သို့သွယ်တန်း၍ စီမံကိန်းဧရိယာ၏ အရှေ့ဘက်အစွန်း) ဖြစ်သည်။ ဤနည်းဖြင့် မြေလွတ်သည်နေရာ ပိုမိုရရှိ လာသောကြောင့် စိမ်းလန်းစေရန် လုပ်ဆောင်ခြင်းအတွက် သင့်တော်ပါသည်။

အလုပ်လုပ်ဆောင်ခြင်းအား အခြားဆောင်ရွက်နိုင်သော နည်းလမ်းမှာ ခက်ခက်ခဲခဲ လုပ်ဆောင်ရသည်ထက် စမတ်ကျကျလုပ်ဆောင်ခြင်းကို ပိုမိုနှစ်သက်သည်။ အမှန်တစ်ကယ်တွင် လုပ်ငန်းစဉ်အားလုံးသည် အပြည့်အဝ အော်တိုစက်များဖြစ်၍ ထုတ်လုပ်မှုတိုးမြှင့်နိုင်ခြင်း၊ လူလုပ်သားထက် စက်လုပ်သားသည် ပိုမိုကောင်းမွန်ပါသည်။ အစပိုင်းတွင် တိုးမြှင့်ထား၍ နောက်ပိုင်းတွင် လျော့ချထားမည်ဖြစ်သည်။

ဘာမျှမလုပ်လျှင် ဘာမှမဖြစ်ခြင်းကို ဤနေရာတွင် မစဉ်းစားတော့ပေ။ ဘာမျှမလုပ်လျှင် တိုင်းပြည်၏ တည်ဆောက်ရေးကဏ္ဍနှင့် အခြေခံအဆောက်အအုံတိုးတက်ခြင်း မရှိပေ။ ဘာမျှမလုပ်လျှင် ဒေသခံအလုပ်အကိုင်ရရှိမှုမတိုးမြှင့်နိုင်ပေ။ ဒေသ၏လူမှု-စီးပွားရေးလည်း မတိုးတက်နိုင်ပေ။ တိုင်းပြည်၏ GDP နှင့် အခွန်များလည်း မရှိပေ။

ပတ်ဝန်းကျင်ဆိုင်ရာ အသေးစိတ်အချက်အလက်

စီမံကိန်းသည် ဒေသခံပိုင်ရှင်များထံမှ မဖွံ့ဖြိုးသော ယာမြေများကို ဝယ်ယူခဲ့ပါသည်။

အနောက်ဘက်တွင် တောင်ရင်းနှင့် ဘယ်လင်း ကျေးရွာ (၂) ရွာရှိပါသည်။

ဧရိယာတွင် စက်ရုံ (၇) ရုံရှိပါသည်။

- အနောက်မြောက်ဘက်တွင် ငွေမိုးဟိန်း သံမဏိစက်ရုံ
- ရွှေကင်းအမွှေးတိုင်နှင့် တစ်သျှူးစက်ရုံ
- အနောက်ဘက်တွင် စိုးမိုးအမိုးအကာပြား စက်ရုံ
- နီးကပ်လျက်ရှိသော အနောက်တောင်တွင် မြန်မာလင်းကျန် ရှူးဖိနပ်စက်ရုံ
- မြန်မာ့ဦးပိုင် ကျောက်ပြားစက်ရုံ
- အရှေ့ဘက်တွင် ဦးသာ LED မီးသီးစက်ရုံနှင့်
- နောက်ထပ် အရှေ့ဘက်တွင် ဘီကာ ပလတ်စတစ်စက်ရုံ

မြောက်ဘက်တွင် အကျဉ်းဦးစီးနှင့် နီးကပ်လျက်ရှိသော တောင်ဘက်တွင် မြန်မာ့လျှပ်စစ်ဌာနမှ အလုပ်သမားအဆောင်များ ရှိပါသည်။

ပတ်ဝန်းကျင်၏ ရုပ်ပိုင်းဆိုင်ရာ

မြေမျက်နှာသွင်ပြင်အနေအထား : ဧရိယာသည် တစ်ခုလုံးသည် ချုံနွယ်များနှင့် ဆူးချုံပင်များ (သစ်တောမရှိ) သာရှိသော မြေပြန့်ဖြစ်သည်။

စီမံကိန်းနေရာသည် ဒေသခံများမှ ဝယ်ယူထား၍ ခြောက်သွေ့သော ယာမြေများဖြစ်သည်။

အနောက်ဘက်တွင် မြင့်မိုရ်တောင်နှင့် အနောက်မြောက်ဘက်တွင် ဆင်ကျောက်ကြီးတောင်ဟူ၍ တောင် (၂) တောင်ရှိပါသည်။ စီမံကိန်းနေရာ၏ ပင်လယ်ရေမျက်နှာပြင်အမြင့်မှာ ပေ ၂၉၇ ဖြစ်သည်။

ဧရိယာတွင် ရေစီးကြောင်း မရှိပေ (အပေါ်ယံရေ)။ ဘယ်လင်းကျေးရွာသူ/သားများသည် ရေပေးဝေရေးမှ ရေရယူ၍ အများစုမှာ အင်္ဂါစိတွင်းများ ရှိကြပါသည်။ တောင်ရင်းကျေးရွာသူ/သားများသည် ရေကို ၎င်းတို့၏ အင်္ဂါစိတွင်းများမှ ရယူသုံးစွဲ၍ သောက်ရေကို ရေသန့်ဝယ်သောက်ကြပါသည်။

ဒေသဘူမိပေဒ: ဧရိယာတစ်ခုလုံးသည် မြန်မာပြည်အလယ်ပိုင်း၏ ခြောက်သွေ့ဖုန်၏ အရှေ့ဘက်ပိုင်းအတွင်းတွင် ဖြစ်ပါသည်။ အနောက်ဖက်တွင် မြောက်မှ တောင်သို့ တန်းနေသော နိမ့်သည့် တောင်တန်း (အထက် Tertiary ကျောက်သား) ရှိ၍ အရှေ့ဘက်တွင် ရှမ်းကုန်ပြင်မြင့်၏ အနောက်စွန်း ရှိသည်။ ဤဧရိယာသည် နှုန်းမြေမြစ်ဝှမ်းဖြစ်၍ အဓိကအားဖြင့် သဲပါသော ရွှံ့နှင့် သဲနှင့်မြေဆွေးရောသော မြေအမျိုးအစား ဖြစ်သည်။ မြေသား၏ ဒေါင်လိုက်ဖွဲ့စည်းပုံမှာ အပေါ်ဆုံးတွင် alluvial top soil, debris deposit, gritty sand stone နှင့် အောက်ဆုံးတွင် small band of shale တို့ဖြစ်ကြသည်။

စီမံကိန်းနေရာ၊ တောင်ရင်းကျေးရွာနှင့် ဘယ်လင်းကျေးရွာတို့မှ အပေါ်ယံမြေနမူနာများကို ယူဆောင်၍ ရန်ကုန်တွင် ဓါတ်ခွဲစမ်းသပ်ပါသည်။ ရလဒ်များကို အခန်း (၅၊ ၅.၅) တွင် ဖော်ပြထားပါသည်။

စီမံကိန်းနေရာ၊ တောင်ရင်းကျေးရွာနှင့် ဘယ်လင်းကျေးရွာတို့ရှိ အင်္ဂါစိတွင်းများမှ ရေနမူနာများကို ယူဆောင်၍ ဓါတ်ခွဲစမ်းသပ်ပါသည်။ ရလဒ်များကို အခန်း (၅၊ ၅.၅) တွင် ဖော်ပြထားပါသည်။

စီမံကိန်းနေရာ၊ တောင်ရင်းကျေးရွာနှင့် ဘယ်လင်းကျေးရွာတို့၌ ထိတွေ့လေအရည်အသွေးများကို တိုင်းတာခဲ့ပါသည်။ ရလဒ်များကို အခန်း (၅၊ ၅.၅) တွင် ဖော်ပြထားပါသည်။

ရာသီဥတု

ဧရိယာသည် ခြောက်သွေ့ဖုန်တွင်ဖြစ်သောကြောင့် အပူပိုင်းခြောက်သွေ့ဖုန် ရာသီဥတုဖြစ်သည်။

မိုးလေဝသအချက်အလက်များကို စဉ်ကိုင်မြို့နယ်တွင် မရရှိသောကြောင့် ကျောက်ဆည်မြို့နယ် မိုးလေဝသနှင့် ဇလဗေဒဦးစီးဌာနမှ ရယူခဲ့ပါသည်။ မိုးရေချိန်မှလွဲ၍ အခြားမိုးလေဝသ အချက်အလက်များ ဖြစ်သော ဥပမာ-အပူချိန်၊ စိုထိုင်းစ၊ လေတိုက်နှုန်းတို့ကို မရရှိပေ။

(၇) နှစ်အကာလအတွင်း (၂၀၁၅-၂၀၂၁) အလအလိုက် မိုးရေချိန်ကို အခန်း (၅၊ ၅.၅) တွင် ဖော်ပြထားပါသည်။

ပတ်ဝန်းကျင်၏ ဇီဝပိုင်းဆိုင်ရာ

ဇီဝမျိုးစုံမျိုးကွဲဆိုင်ရာ အချက်အလက်များသည် မူရင်းအချက်အလက်များဖြစ်သည်။

အပင်

ချုံပင်များနှင့် ဆူးပင်များသားပေါက်ရောက်သော ယာမြေဖြစ်သောကြောင့် သစ်တောမရှိပေ။

အပင်ကြီးများမှာ စိုက်ပင်များဖြစ်ကြ၍ အရိပ်ရပင်များ၊ အသီးပင်များဖြစ်သည်။ သဘာဝအပင်များမှာ သေးငယ်သော ချုံပင်များနှင့် မြက်ပင်များဖြစ်သည်။

သဘာဝအပင်နှင့် စိုက်ပင် (၉၀)မျိုးကို တွေ့ရှိမှတ်တမ်းတင်ခဲ့ပါသည်။ စာရင်းကို အခန်း (၅၊ ၅.၆) တွင်ဖော်ပြထားပါသည်။

အသီးပင်များဖြစ်သော သရက်ပင်၊ မကျည်းပင်နှင့် ထန်းပင်များမှာ ပေါများပါသည်။

ထိုအရာများကို IUCN red list ၂၀၂၃ နှင့်အတူ ရှင်းပြထားပါသည်။

သားရဲတိရစ္ဆာန်

- ငှက် (၆၈) မျိုးကို ရှာဖွေတွေ့ရှိမှတ်တမ်းတင်ခဲ့ပါသည်။ စာရင်းကို အခန်း (၅၊ ၅.၆) တွင် ဖော်ပြထားပါသည်။ ငှက်များအားလုံးသည် ပုံမှန်တွေ့နေကျတောငှက်များနှင့် မြို့ငှက်များ ဖြစ်သည်။
- (ကုန်းနေရေနေတွားသွားသတ္တဝါ) ဖား ၃ မျိုးနှင့် တွားသွားသတ္တဝါ ၁၂ မျိုး ကို ရှာဖွေတွေ့ရှိ ခဲ့ပါသည်။ အများစုမှာ ပုတ်သင်များဖြစ်ကြသည်။
- ကြီးမားသော နို့တိုက်သတ္တဝါ မရှိပေ။ သေးငယ်သောနို့တိုက်သတ္တဝါ ရှဉ့်၊ ဇွေနှင့် ကြွက်တို့ကို တွေ့ရှိပါသည်။ သားရဲတိရစ္ဆာန်များကို IUCN red list ၂၀၂၃ နှင့်အတူ ရှင်းပြထားပါသည်။

ဤဒေသတွင် အပေါ်ယံရေစီးမရှိသောကြောင့် ရေနေသတ္တဝါ မလေ့လာခဲ့ပေ။

ပတ်ဝန်းကျင်၏လူမှု-စီးပွားရေးဆိုင်ရာ

အထက်မှာရှင်းပြထားသော ကျေးရွာ (၂) ရွာကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) လေ့လာသည့် ဧရိယာထဲတွင် ပါဝင်ပါသည်။

တောင်ရင်းနှင့် ဘယ်လင်း ကျေးရွာ (၂) ရွာလုံးသည် ကားလမ်းနှင့် ရထားလမ်းဖြင့် အလွယ်တကူ သွားလာနိုင်ပါသည်။ (ရန်ကုန်-မန္တလေးအဝေးပြေးလမ်းနှင့် မီးရထားလမ်း)။ ကျေးရွာ (၂) ရွာလုံးသည် အစိုးရလျှပ်စစ်မီးလည်း ရရှိပါသည်။

ရေကို ကိုယ်ပိုင်အင်္ဂါစီတွင်းများမှ ရယူသုံးစွဲ၍ သောက်ရေကို ရေသန့်များဝယ်ယူသောက်သုံး ပါသည်။ ဘယ်လင်းတွင် စိုက်ပျိုးရေးနှင့် လူသုံးအတွက် ဆည်မြောင်းရေးပေးပေးရေး ရှိပါသည်။

ဧရိယာတွင် သဘာဝမဟုတ်သော အရင်းအမြစ်များဖြစ်သော သဲနှင့် ထုံးပေါများပါသည်။

ကျေးရွာ (၂) ရွာလုံး၏ လူမှု-စီးပွားရေး အချက်အလက်များမှာ-

- ဘယ်လင်းတွင် အိမ်ခြေ ၁၆၆ အိမ်နှင့် လူဦးရေ (၉၁၈) ဦး၊ တောင်ရင်းတွင် အိမ်ခြေ ၈၀ နှင့် လူဦးရေ (၁၇၀) ဦးရှိသည်။
- ကျေးရွာ (၂) ရွာလုံးသည် ဗမာလူမျိုးများဖြစ်ကြ၍ ၁၀၀ ရာခိုင်နှုန်း ဗုဒ္ဓဘာသာဝင်များ ဖြစ်ကြသည်။
- ကျေးရွာများ၏ (၇၀) ရာခိုင်နှုန်းမှာ ဧရိယာရှိ စက်ရုံများတွင် အလုပ်လုပ်ကြပါသည်။
- ဘယ်လင်း၏ (၁၀) ရာခိုင်နှုန်းနှင့် တောင်ရင်း၏ (၃၀) ရာခိုင်နှုန်းမှာ ရာသီပေါ်အလုပ် လုပ်ကိုင်သူများဖြစ်ကြသည်။ ယခုအခါတွင် လယ်သမားအများစုမှာ စက်ရုံများတွင် လုပ်ကိုင်ကြပါသည်။
- ဘယ်လင်း၏ (၂၀) ရာခိုင်နှုန်းမှာ အစိုးရဝန်ထမ်းများဖြစ်၍ တောင်ရင်းကျေးရွာတွင် အစိုးရဝန်ထမ်း မရှိပေ။ ဧရိယာ၏ နေ့စဉ်ဝင်ငွေမှာ ကျပ် ၅,၀၀၀-၈,၀၀၀ ဖြစ်သည်။
- တိုင်းပြည်၏အခြားကျေးရွာသူ/သားများဖြစ် ယှဉ်လျှင် ယခုဒေသရှိ ဒေသခံများသည် လူနေမှု အဆင့်အတန်းပိုမြင့်ပါသည်။
- ဘယ်လင်းတွင် ကျောင်းသား/သူ (၇၅၂) ဦးနှင့် ဆရာ/မ (၂၇) ဦးရှိသော အခြေခံပညာ အထက်တန်းကျောင်းတစ်ကျောင်းနှင့် စုစုပေါင်း ကျောင်းသား/သူ (၄၁၀) ဦးနှင့် ဆရာ/မ (၁၆) ဦးရှိသော အခြေခံပညာမူလတန်းကျောင်း (၃) ကျောင်းရှိပါသည်။
- တောင်ရင်းကျေးရွာတွင် ကျောင်းသား/သူ (၁၆၃) ဦးနှင့် ဆရာ/မ (၅) ရှိသော အခြေခံပညာ မူလတန်းကျောင်း တစ်ကျောင်းသာလျှင် ရှိပါသည်။
- ဘယ်လင်းတွင် စာတက်မြောက်မှုနှုန်းမှာ (၉၅) ရာခိုင်နှုန်းနှင့် တောင်ရင်းတွင် စာတက်မြောက်မှုနှုန်း (၉၈) ရာခိုင်နှုန်းတို့ အသီးသီးဖြစ်သည်။
- ဘယ်လင်းတွင် အစိုးရဆေးပေးခန်း (၁) ခုနှင့် ကိုယ်ပိုင်ဆေးခန်း (၂) ခန်းရှိ၍ တောင်ရင်းတွင် မရှိပေ။ နေမကောင်း သို့မဟုတ် ဒဏ်ရာရသော ကျေးရွာသူ/သားအများစုမှာ တောင်ဘက် ၄.၂ မိုင်အကွာ ကျောက်ဆည်ဆေးရုံကို သွားကြပါသည်။
- ဘယ်လင်းတွင် စာကြည့်တိုက် (၁) ခုရှိ၍တောင်ရင်းတွင်မရှိပေ။
- ဘယ်လင်းရှိအိမ်အားလုံးမှာ အုတ်ဖြင့်လုပ်ထားသော အိမ်များဖြစ်၍ တောင်ရင်းတွင် အများစုမှာ သစ်သားအိမ်များဖြစ်ကြသည်။
- ဘယ်လင်းတွင် ယာဉ် (၂၀) စီးရှိ၍ တောင်ရင်းတွင် (၅) စီးသာရှိပါသည်။
- ကျေးရွာ (၂) ရွာ၏ အိမ်တိုင်းတွင် မော်တော်ဆိုင်ကယ်၊ တီဗီနှင့် ဖုန်းရှိကြပါသည်။

ပတ်ဝန်းကျင်၏ယဉ်ကျေးမှုဆိုင်ရာ

ကျေးရွာ (၂)ရွာ၏ ကျေးရွာသူ/သားများသည် ဗမာ၊ ဗုဒ္ဓဘာသာများဖြစ်ကြသည်။ ဘယ်လင်းတွင် ဘုန်းကြီးအပါး (၂၀) ရှိသော ဘုန်းကြီးကျောင်း (၄) ကျောင်းရှိပါသည်။ တောင်ရင်းတွင် ဘုန်းကြီး (၁၅) ပါး ရှိသော ဘုန်းကြီးကျောင်း (၃) ကျောင်းရှိပါသည်။

ဧရိယာတွင် ကျော်ကြားသော ဘုရားမရှိပေ။ နှစ်စဉ်ပြုလုပ်သော ဘုရားပွဲတော်များမရှိပေ။

သက်ကြီးရွယ်အိုများသည် ဥပုသ်ရက်များတွင် ဘုန်းကြီးကျောင်းများသို့ သွား၍ (၈)ပါး သို့မဟုတ် (၉) ပါးသီလစောင့်တည်ကြပါသည်။

ဘုရင်အနော်ရထာခေတ် မတိုင်မီအချိန်ကတည်းကရှိသော ရိုးရာနတ်ကိုးကွယ်ခြင်းများ ရှိနေသေးသည်။

ကျောက်ဆည်ဧရိယာသည် ယဉ်ကျေးမှုဆိုင်ရာများ၏ တစ်ခုဖြစ်သည်။ အချို့ယဉ်ကျေးမှု ဆိုင်ရာဇုန်များမှာ ပလိတ်၊ မက္ခရာ ယဉ်ကျေးမှုဇုန်များသည် စဉ်ကိုင်မြို့နယ်ဧရိယာတွင် ရှိသည်။

သက်ရောက်မှုများနှင့်ဖြေလျော့နိုင်မည့်နည်းလမ်းများ

ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများကို အမျိုးအစားခွဲခြား၍ အောက်ပါအတိုင်းဖော်ပြထားပါသည်။

အကြိုတည်ဆောက်ရေးကာလအတွင်းတွင်

- (၁) စက်ရုံတည်ဆောက်ခြင်းကြောင့် မြေဈေးအဆမတန်တက်ခြင်း၊
- (၂) တက်ကြွလှုပ်ရှားသူများကြောင့် စီမံကိန်းအား ထောက်ခံသည့်အဖွဲ့နှင့် ကန့်ကွက်သည့် အဖွဲ့ဟူ၍ နှစ်ဖွဲ့ကွဲနိုင်ခြင်း၊

မှတ်ချက်။ အကြိုတည်ဆောက်ရေးကာလသည် ပြီးဆုံးသွားပြီဖြစ်သဖြင့် ဤကဲ့သို့ သက်ရောက်မှုများ မဖြစ်တော့ပေ။

တည်ဆောက်ရေးကာလအတွင်းတွင်

- (၁) လေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု
- (၂) ဆူညံသံနှင့် တုန်ခါမှုကြောင့် သက်ရောက်မှု
- (၃) မြေပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု
- (၄) ရေပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု (အထူးသဖြင့် မြေအောက်ရေ)
- (၅) စွန့်ပစ်ပစ္စည်းများကြောင့် သက်ရောက်မှု (အစိုင်အခဲနှင့် အရည်)

- (၆) လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု
- (၇) ဖြစ်နိုင်ခြေရှိသော လူမှုရေးအပေါ် သက်ရောက်မှု
- (၈) ဖြစ်နိုင်ခြေရှိသော လုံခြုံရေးပြဿနာ

မှတ်ချက်။ သဘာဝသစ်တောမရှိဘဲ ယာနှင့် လယ်များသာရှိသည့်အတွက် ဇီဝပိုင်းဆိုင်ရာ (ဇီဝမျိုးစုံမျိုးကွဲ)အပေါ် သက်ရောက်မှု မရှိနိုင်ပေ။

စီမံကိန်းသည် တည်ဆောက်ရေးကာလကာလ ဖြစ်သည်။ သို့ပေမယ့် တည်ဆောက်ရေးကာလ ပြီးဆုံးသွားလျှင် ဤသက်ရောက်မှုများ ရပ်တန့်သွားလိမ့်မည်။

စီမံကိန်းလည်ပတ်စဉ်ကာလအတွင်းတွင်

- (၁) လေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု
- (၂) ဆူညံသံနှင့် တုန်ခါမှုကြောင့် သက်ရောက်မှု
- (၃) မြေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု (မြေတိုက်စားခံခြင်းနှင့် မြေထုဖွဲ့စည်းပုံအပေါ် သက်ရောက်မှုများ)
- (၄) ရေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု
- (၅) စွန့်ပစ်ပစ္စည်းများကြောင့် သက်ရောက်မှု (အစိုင်အခဲနှင့်အရည်)
- (၆) ဖြစ်နိုင်ခြေရှိသော ယာဉ်ကြောပိတ်ဆို့မှုအပေါ် သက်ရောက်မှု
- (၇) လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု
- (၈) ဖြစ်နိုင်ခြေရှိသော လူမှုရေးအပေါ် သက်ရောက်မှု
- (၉) ဖြစ်နိုင်ခြေရှိသော လုံခြုံရေးပြဿနာ

အချို့သက်ရောက်မှုများမှာ (ဥပမာ- ၁၊ ၂၊ ၃၊ ၄၊ ၅)တို့သည် သေချာဖြေလျော့မှုနှင့် စီမံခန့်ခွဲမှု မလုပ်လျှင် ထင်ရှားလာနိုင်ပါသည်။ သို့ပေမယ့် သက်ရောက်မှုအားလုံးကို ဖြေလျော့နိုင်ပါသည်။

စီမံကိန်းပိတ်သိမ်းချိန်/ပြန်လည်ရှင်သန်ချိန်အတွင်းတွင်

- (၁) ဖြစ်နိုင်ခြေရှိသော လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု
- (၂) ဖြစ်နိုင်ခြေရှိသော ကြွင်းကျန်သက်ရောက်မှုတို့ ဖြစ်သည်။

ဖြေလျော့နိုင်မည့်နည်းလမ်းများ

စီမံကိန်းကာလ (၄) ခုစလုံးအတွင်းတွင် ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုတစ်ခုစီတိုင်းအတွက် မတူညီသော ဖြေလျော့နိုင်မည့်နည်းလမ်းများကို အသေးစိတ် ဇယားဖြင့် အခန်း (၆၊ ၆.၂.၃.၂) တွင် ဖော်ပြထားပါသည်။ ဤအကျဉ်းချုပ်အစီရင်ခံစာတွင် အကျဉ်းချုပ်ဖော်ပြထားပါသည်။

၁။ အကြိုတည်ဆောက်ရေးကာလအတွင်းတွင် ဖြေလျော့နိုင်မည့်နည်းလမ်းများ (ဇယားဖြင့် အကျဉ်းချုပ်)

စဉ်	သက်ရောက်မှုများ	ဖြေလျော့နိုင်မည့်နည်းလမ်းများ
၁။	ဖြစ်နိုင်ခြေရှိသော မြေဈေး တက်ခြင်း	- အစောပိုင်း လူထုတွေ့ဆုံဆွေးနွေးခြင်း - ဝန်ထမ်းများကို ဈေးကစားသော စီးပွားရေးတွင် မပါဝင်စေခြင်း (ငွေကြေးဖောင်းပွခြင်းသည် ဖြစ်လေ့ဖြစ်ထရှိသဖြင့် ပြင်းထန်သော ပြဿနာတစ်ခုအဖြစ် မစဉ်းစားသင့်ပေ)
၂။	တက်ကြွလှုပ်ရှားသူများကြောင့် စီမံကိန်းအား ထောက်ခံသည့် အဖွဲ့နှင့် ကန့်ကွက်သည့် အဖွဲ့ ဟူ၍ နှစ်ဖွဲ့ ကွဲနိုင်ခြင်း၊	- အစောပိုင်း လူထုတွေ့ဆုံဆွေးနွေးခြင်း - ဒေသခံများကို ဦးစားပေး ငှားရမ်းခြင်း (ဤဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုကို အလျင်အမြန်ဖြေရှင်းနိုင်ပေ)

၂။ တည်ဆောက်ရေးကာလအတွင်းတွင် ဖြေလျော့နိုင်မည့်နည်းလမ်းများ (ဇယားဖြင့် အကျဉ်းချုပ်)

စဉ်	သက်ရောက်မှုများ	ဖြေလျော့နိုင်မည့်နည်းလမ်းများ
၁။	လေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု	- အကြိုတည်ဆောက်ရေးကာလမှာတွင် မီးခိုးထွက်ရှိမှုနည်းသော စက်ကိရိယာ၊ ယာဉ်များကို ဝယ်ယူခြင်း - စက်ကိရိယာနှင့် ယာဉ်များကို ပုံမှန်ထိန်းသိမ်းခြင်း - ထွက်ရှိမှုနည်းသော လောင်စာဆီကို အသုံးပြုခြင်း - ဟင်းလင်းပွင့်တွင် အမှိုက်သရိုက်များကို မီးရှို့ခြင်းအား ရှောင်ရှားခြင်း - လိုအပ်သည်ထက် အပင်များကို မရှင်းလင်းခြင်း - ဖုန်မှုန့်များကို ရေဖျန်းခြင်း - ယာဉ်များသွားလာမှုကို ကန့်သတ်ခြင်း၊ လမ်းကို ရှင်းလင်းစေရန် ထိန်းသိမ်းခြင်း - မြေကြီး၊ သဲများကို စုပုံသည့်အခါ အမြင့် ကန့်သတ်ခြင်း

		<ul style="list-style-type: none"> - မြေကြီး၊ သဲ သို့မဟုတ် ထုံးများကို အတင်အချပြုလုပ်သည့်အခါ အမြင့်ကို လျော့ချခြင်း - မီးခိုး သို့မဟုတ် ဖုန်မှုန့်တို့ဖြင့် အချိန်ကြာမြင့်စွာ လုပ်ကိုင် နေရသော ဝန်ထမ်းများကို PPE ထောက်ပံ့ပေးခြင်း - ဖုန်မှုန့်နှင့် မီးခိုးများနှင့် ပတ်သပ်၍ ဒေသမှ ပြဿနာ ပြောလာလျှင် ဆောင်ရွက်ပေးခြင်း
၂။	ဆူညံသံနှင့် တုန်ခါမှု	<ul style="list-style-type: none"> - အကြိုတည်ဆောက်ရေးကာလတွင် ဆူညံသံထွက်ရှိမှု နည်းသော စက်ကိရိယာနှင့် ယာဉ်များကို ဝယ်ယူခြင်း - ညအချိန်တွင် တည်ဆောက်ရေးလုပ်ငန်းများ မပြုလုပ်ခြင်း - နေ့အချိန်တွင် ဆူညံသံလုပ်ဆောင်မှုများကို အချိန်ဇယား ဆွဲ၍ သေချာစွာပြုလုပ်ခြင်း - ဆူညံသံဖြင့် အချိန်ကြာမြင့်စွာ ပြုလုပ်ရသော ဝန်ထမ်းများကို PPE ထောက်ပံ့ပေးခြင်း - စက်ယန္တရား၊ စက်ကိရိယာနှင့် ယာဉ်များကို တုန်ခါမှုမဖြစ်စေရန် စီမံဆောင်ရွက်ခြင်း - အောက်ခံဒီဇိုင်းကို တည်ငြိမ်စေရန် လုပ်ဆောင်ခြင်း - ယာဉ်များကို အမြန်နှုန်းသတ်မှတ်ခြင်း - ဆူညံသံနှင့်တုန်ခါမှုပတ်သပ်၍ ဒေသမှပြဿနာပြောလာလျှင် အဆင်ပြေစေရန် ဆောင်ရွက်ပေးခြင်း
၃။	မြေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု	<ul style="list-style-type: none"> - မည်သည့်အကြောင်းနှင့်မျှ မြေညစ်ညမ်းမှုကို တားဆီးခြင်း၊ ရှောင်ရှားခြင်း - မြေပြင်ပေါ်တွင် အစိုင်အခဲနှင့် အရည်စွန့်ပစ်ပစ္စည်းများ စွန့်ပစ်ခြင်းကို ရှောင်ရှားခြင်း - မြေဆီလွှာပျက်စီးခြင်းကို တက်နိုင်သမျှ ရှောင်ရှားခြင်း - ဓါတုဗေဒပစ္စည်းများနှင့် လောင်စာဆီလျှံကျခြင်းကို တားမြစ်ခြင်း၊ အကယ်၍လျှံကျလျှင် ရေဖြင့်မဆေးရ။ စုပ်ယူသည့်စနစ်ဖြင့် သန့်စင်ခြင်း - လောင်စာဆီနှင့် ဓါတုဗေဒပစ္စည်းများကိုင်တွယ်ခြင်းကို သေချာညွှန်ကြားခြင်း - လောင်စာဆီ သို့မဟုတ် ဓါတုဗေဒပစ္စည်းများကို လျှံကျခြင်း မရှိစေရန် သိုလှောင်ထားရှိခြင်း

		<ul style="list-style-type: none"> - ဆိုင်းဘုတ်များစိုက်ထူထားရှိခြင်း (မီးစက်၊ လောင်စာဆီကန်) - မိုးရာသီတွင် မြေဆီလွှာတိုက်စားခြင်းမှ တားဆီးရန် မြေဆီလွှာထိန်းသိမ်းခြင်းကို ဆောင်ရွက်ခြင်း - မိုးရာသီတွင် မြေပြင်အတိုင်း အချိန်ကြာမြင့်စွာ ထားရှိမှုအား ရှောင်ရှားခြင်း - စွန့်ပစ်ပစ္စည်းအားလုံးကို သတ်မှတ်ထားသော နေရာတွင် စွန့်ပစ်ခြင်း (တည်ဆောက်ရေးလုပ်ငန်းနှင့် လူသုံး) - သပ်ရပ်သန့်ရှင်းစွာထားရှိခြင်းကို ဝန်ထမ်းများအား သင်တန်းပေးခြင်း၊ အမှုကိစ္စများတွေ့သည့်နေရာတွင် မစွန့်ပစ်စေခြင်း၊ သင့်နေရာကို မညစ်ညမ်းစေခြင်း - ဒေသခံများ၏ မြေနေရာများကို သက်ရောက်မှုရှိလာ၍ ပြဿနာ ဖြစ်ပေါ်လာပါက အဆင်ပြေချောမွေ့စွာ ဖြေရှင်းဆောင်ရွက်ပေးခြင်း
၄။	<p>ရေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု (မြေအောက်ရေ)</p>	<ul style="list-style-type: none"> - တည်ဆောက်ရေးကာလအတွင်းတွင်ရေကိုလိုအပ်သည်ထက် အသုံးမပြုခြင်း - ရေထိန်းသိမ်းခြင်းအတွက် ဝန်ထမ်းများကို စည်းကမ်းချမှတ်ခြင်း - လောင်စာဆီလျှံကျလျှင် မြေဆီလွှာနှင့် မြေအောက်ရေအား ညစ်ညမ်းစေခြင်းကြောင့် လောင်စာဆီ လျှံကျခြင်းကို ရှောင်ရှားခြင်း - အကယ်၍လျှံကျလျှင် ရေဖြင့်မဆေးရ။ စုပ်ယူသည့်စနစ်ဖြင့် သန့်စင်ခြင်း - လောင်စာဆီသန့်စင်ခြင်းနှင့် ကိုင်တွယ်ခြင်းကို သေချာညွှန်ကြားခြင်း - လောင်စာဆီလျှံကျခြင်းသည် မြေအောက်ရေကို ညစ်ညမ်းစေသောကြောင့် ယာဉ်များနှင့် စက်ယန္တရားများကို ထိန်းသိမ်းခြင်း - လောင်စာဆီ သိုလှောင်ကန်ကို လောင်စာဆီလျှံကျခြင်း မဖြစ်စေရန် တားဆီးထားခြင်း - ဆိုင်းဘုတ်များစိုက်ထူထားရှိခြင်း (မီးစက်၊ လောင်စာဆီကန်) - စွန့်ပစ်ပစ္စည်း (အစိုင်အခဲနှင့် အရည်) တို့ကို မဆင်မခြင် စွန့်ပစ်ခြင်းကို ရှောင်ရှားခြင်း - အကယ်၍ ဒေသခံများ၏ သောက်သုံးရေများအပေါ် သက်ရောက်မှုနှင့် ပတ်သပ်၍ ပြဿနာပေါ်လာလျှင် အဆင်ပြေချောမွေ့စေရန် ဆောင်ရွက်ပေးခြင်း

၅။	<p>စွန့်ပစ်ပစ္စည်းများကြောင့် သက်ရောက်မှု (တည်ဆောက်ရေး စွန့်ပစ်ပစ္စည်း)</p>	<ul style="list-style-type: none"> - ဟင်းလင်းပွင့်တွင်အမှိုက်သရိုက်များကို မီးရှို့ခြင်းအား ရှောင်ရှားခြင်း - သတ်မှတ်ထားသော နေရာတွင် အမှိုက်များကို စွန့်ပစ်ခြင်း - သန့်ရှင်းသပ်ရပ်စွာထားစေရန်အတွက် ဝန်ထမ်းများကို ပညာပေးခြင်း - ပိုလျှံသောတည်ဆောက်ရေးပစ္စည်းများကို ရောင်းချခြင်း - တည်ဆောက်ရေးလုပ်ငန်းပြီးဆုံးလျှင် ကန်ထရိုက်တာတစ်ဦး ငှား၍ စီမံကိန်းနေရာအား သန့်ရှင်း စေခြင်း - တည်ဆောက်ရေးလုပ်ငန်းပြီးဆုံးလျှင် ပိုလျှံသော ပစ္စည်းများနှင့် ကြွင်းကျန်စွန့်ပစ်ပစ္စည်းများကို မကျန်ရစ် စေခြင်း
၆။	<p>လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး</p>	<ul style="list-style-type: none"> - "ဘေးအန္တရာယ်ကင်းရှင်းရေးသည်ပထမ" ဟူ၍ဝန်ထမ်းများ မြင်သာသည့် နေရာများတွင် ဆိုင်းဘုတ်တပ်ဆင်ထားရှိခြင်း - အလုပ်သမားများအားလုံးအတွက် ဘေးအန္တရာယ်ကင်းရှင်း သောအခြေအနေကို ဖန်တီးပေးခြင်း၊ မတော်တဆဖြစ်မှု ကင်းမဲ့သော ပတ်ဝန်းကျင်အဖြစ်ဖန်တီးခြင်း - တည်ဆောက်ရေးလုပ်သားများကို ကောင်းမွန်သော အလေ့ အထေ၊ ကောင်းမွန်သော အင်ဂျင်နီယာအလေ့အထ၊ ကောင်းမွန်သော ဘေးအန္တရာယ် ကင်းရှင်းစေသော အလေ့အထ များကို အလုပ်သမားများ၏ စိတ်ထဲတွင်စွဲမြဲစေရန် ပညာပေးခြင်း၊ သင်တန်းပေးခြင်း - တည်ဆောက်ရေး ဘေးအန္တရာယ်ကင်းရှင်းရေးအတွက် လိုအပ်သော မဖြစ်မနေလိုက်နာရမည့် (နည်းဥပဒေ၊ စည်းမျဉ်း၊ အလုပ်သမားအက်) လိုအပ်ချက်များကို လိုက်နာခြင်း - လိုအပ်လျှင် PPE များကို အလုံအလောက် ထောက်ပံ့ပေးခြင်း - ဆေးများအပြည့်ရှိသော ရှေးဦးသူနာပြုဆေးပုံးများ ထားရှိခြင်း - အလုပ်ချိန်တွင် အရက်သေစာသောက်စားခြင်းကို တားမြစ်ခြင်း၊ အလုပ်သမားများအကြား ဆေးသုံးစွဲခြင်းကို တားမြစ်ခြင်း - အကျိုးသက်ရောက်သော အရေးပေါ် တုန့်ပြန်မှုအစီအစဉ် စီမံဆောင်ရွက်ခြင်း - ကျန်းမာရေးနှင့် သန့်ရှင်းစင်ကြယ်ခြင်းအတွက် ဝန်ထမ်းများကို ပညာပေးခြင်း

		<ul style="list-style-type: none"> - အကျိုးသက်ရောက်၍ ဘေးအန္တရာယ်ကင်းရှင်းသော လောင်စာဆီနှင့် ဓါတုဗေဒပစ္စည်းများကို ကိုင်တွယ်ခြင်းနှင့် သိုလှောင်ခြင်းတို့ကို လုပ်ဆောင်ခြင်း - သင့်တော်သော သန့်စင်ခန်းများ၊ ရေချိုးခန်းများ ထောက်ပံ့ပေးခြင်း - အလုပ်သမားများ မြင်သာသည့်နေရာတွင် မီးသတ်လိပ်စာနှင့် ဖုန်းနံပါတ်ကို ပြသထားခြင်း
၇။	ဖြစ်နိုင်ခြေရှိသော လူမှုရေးပြဿနာ	<ul style="list-style-type: none"> - စည်းကမ်းလိုက်နာခြင်းအတွက် ဝန်ထမ်းများကို ပညာပေးခြင်း - ဒေသခံများနှင့် ကောင်းမွန်သော ဆက်ဆံရေးရရှိရန် တည်ဆောက်ခြင်း - စီမံကိန်းကို အကောင်းမြင်စေရန် ဒေသခံများနှင့် လူထုတွေ့ဆုံဆွေးနွေးခြင်းများ ပြုလုပ်ခြင်း - ဒေသခံများနှင့် ဆက်ဆံလျှင် သူတို့၏ ယဉ်ကျေးမှု၊ ရိုးရာများကို လေးစားလိုက်နာရန် ပညာပေးခြင်း - စည်းကမ်းချိုးဖောက်လျှင် အလုပ်ထုတ်ခြင်းကဲ့သို့သော ပြစ်ဒဏ်များပေးခြင်း - အလုပ်ချိန်တွင် အရက်သေစာသောက်စားခြင်းကို တားမြစ်ခြင်း၊ အလုပ်သမားများအကြား ဆေးသုံးစွဲခြင်းကို တားမြစ်ခြင်း - အဖက်ဖက်မှ ကောင်းမွန်သော အကျိုးခံစားခွင့်ရရှိစေရန် အလုပ်သမားများနှင့် ညှိနှိုင်းဆောင်ရွက်ခြင်း - အလုပ်သမားများဖြင့် မကောင်းမွန်သော ဆက်ဆံရေးကို ရှောင်ရှားခြင်း - ကုမ္ပဏီနှင့် ဒေသခံများအကြားကောင်းမွန်သော ဆက်ဆံရေးကို ထိန်းသိမ်းခြင်း
၈။	ဖြစ်နိုင်ခြေရှိသော လုံခြုံရေးပြဿနာ	<ul style="list-style-type: none"> - စက်ရုံဝန်းကို ခြံစည်းရိုးခတ်ခြင်း၊ မည်သည့်အကြောင်းနှင့်မျှ သူရိုးနှင့် နောက်ယုတ်ဖျက်ဆီးသူများကို တားဆီးခြင်း - ဂိတ်အားလုံးကို ထိန်းချုပ်ခြင်း၊ အချိန်ပြည့် လုံခြုံရေးများ ခန့်အပ်ထားရှိခြင်း - ဖြစ်နိုင်သမျှ ပစ္စည်းများကို သော့ခတ်ထားခြင်း - တည်ဆောက်ရေးကန်ထရိုက်တာကို သူတို့၏ အလုပ်သမားများကို စည်းကမ်းလိုက်နာရန်မှာ ကြားထားခြင်း - စည်းကမ်းမလိုက်နာလျှင် အလုပ်ထုတ်ခြင်းကဲ့သို့သော အပြစ်ဒဏ်ပေးခြင်း

၃။ စီမံကိန်းကာလအတွင်းတွင် ဖြေလျော့နိုင်မည့်နည်းလမ်းများ

စဉ်	သက်ရောက်မှုများ	ဖြေလျော့နိုင်မည့်နည်းလမ်းများ
၁။	လေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု	<ul style="list-style-type: none"> - ပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေရှိ၍ မီးခိုးထွက်ရှိမှု နည်းသော စက်ယန္တရားနှင့် စက်ကိရိယာများကို ဝယ်ယူခြင်း - မီးခိုးခေါင်းတိုင်အမြင့်ကို စံချိန်စံညွှန်းအတိုင်း လုပ်ဆောင်ခြင်း (မီးခိုးခေါင်းတိုင်အမြင့်မှာ ၆၀ မီတာ) - ထွက်ရှိမှုလျော့နည်းစေရန် ကျောက်မီးသွေးအား အပြည့်အဝ လောင်ကျွမ်းစေခြင်း - လေစစ်အိတ်၊ အမှုန်ဖမ်းစက်နှင့် လေစစ်များ တပ်ဆင်ခြင်း - PM₁₀၊ NO₂၊ SO₂၊ CO₂ များ လျော့ချရန် ဘွိုင်လာနှင့် မီးခိုးခေါင်းတိုင်အကြား ရေဖျန်းစနစ်တပ်ဆင်ထားရှိခြင်း - ထွက်ရှိမှုနည်းစေရန် စက်ယန္တရားနှင့် ယာဉ်များကိုပုံမှန် ထိန်းသိမ်းခြင်းနှင့် သင့်တော်သော သင်တန်းများပေးခြင်း - မီးခိုးထွက်ရှိမှု လျော့ချစေရန် ယာဉ်ယန္တရားများကို ပုံမှန် စစ်ဆေးခြင်း၊ ပုံမှန်ထိန်းသိမ်းခြင်း၊ ပုံမှန် ဆီထိုးခြင်း - အမှိုက်သရိုက်များကို ဟင်းလင်းပွင့်တွင် မီးရှို့ခြင်းအား အမြဲရှောင်ရှားခြင်း - ဖုန်ထခြင်းအတွက် ပုံမှန် ရေဖျန်းခြင်း - ယာဉ်ရွေ့လျားမှုအတွက် အမြန်နှုန်းသတ်မှတ်ချက်ကို ကန့်သတ်ထားခြင်း - သယ်ယူပို့ဆောင်စဉ်အတွင်းအတွင် သဲ၊ ဘီလပ်မြေနှင့် ထုံးမှုန့် လျှံကျခြင်းကို တားဆီးခြင်း - လမ်းမျက်နှာပြင်ကို ပုံမှန်သန့်ရှင်းစွာ ထားရှိခြင်း - သဲ၊ ဘီလပ်မြေ ရောစပ်ခြင်းနှင့် အနစ်ရောစပ်ခြင်းတွင် ဖုန်ထွက်ရှိမှုကို လျော့ချခြင်း - ဘုတ်ပြားများကို ချောခြင်းနှင့် အစွန်းဖြတ်ခြင်းများတွင် အမှုန်ထွက်ရှိမှု လျော့ချခြင်း - လိုအပ်လျှင် PPE လုံလောက်စွာ ထောက်ပံ့ခြင်း - ဇီဝနည်းဖြင့် မီးခိုးနှင့်အမှုန်ထွက်ရှိမှုကို ထိန်းချုပ်ရန် စက်ရုံဝန်း အတွင်းတွင် ကြီးမြန်ပင်များစိုက်ပျိုးခြင်း - ဒေသအတွင်းတွင် မီးခိုးနှင့်ဖုန်မှုန့်ပြဿနာ ဖြစ်ပေါ်လာလျှင် အဆင်ပြေချောမွေ့စွာဆောင်ရွက်ပေးခြင်းနှင့် သူတို့၏စကား များကို နားထောင်ပေးခြင်း

၂။	ဆူညံသံနှင့် တုန်ခါမှု	<ul style="list-style-type: none"> - ပတ်ဝန်းကျင်နှင့်လိုက်လျောညီထွေဖြစ်သော ဆူညံသံထွက်ရှိမှု နည်းသော စက်ယန္တရားနှင့် စက်ကိရိယာအသစ်များကို ဝယ်ယူခြင်း - စက်ကိရိယာ/စက်ယန္တရားများကို ပုံမှန်ပြုပြင်၊ ပုံမှန်ထိန်းသိမ်း၊ ပုံမှန်ဆီထိုးခြင်း - လိုအပ်လျှင် ဆူညံသော စက်ယန္တရားအတွက် ဆူညံမှု စုပ်ယူသော ကိရိယာများတပ်ဆင်ခြင်း - ဆူညံသံနှင့် တုန်ခါမှုလျော့ချစေရန် စက်ယန္တရားကြီးများနှင့် ထရပ်ကားများကို အမြန်နှုန်းသတ်မှတ်ခြင်း - ဖြစ်နိုင်လျှင် တုန်ခါမှုလျော့ချစေရန် insulator များတပ်ဆင်ခြင်း - စက်ယန္တရားများအတွက် ပထမအချိန်ကတည်းက အောက်ခြေကို တည်ငြိမ်စေရန် ဒီဇိုင်းဆွဲခြင်း - ကြီးမြန်ပင်များစိုက်ပျိုးခြင်း၊ ပတ်ဝန်းကျင်အတွက် ဆူညံမှု သက်သောစေရန် အစိမ်းရောင်အတန်းများ ဖန်တီးခြင်း - လိုအပ်လျှင် PPE ထောက်ပံ့ခြင်း - ဒေသအတွင်းတွင် ဆူညံသံပြဿနာ ဖြစ်ပေါ်လာလျှင် အဆင်ပြေချောမွေ့စွာဆောင်ရွက်ပေးခြင်းနှင့် သူတို့၏စကား များကိုနားထောင်ပေးခြင်း
၃။	မြေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု	<ul style="list-style-type: none"> - မည်သည့်အကြောင်းနှင့်မျှ မြေညစ်ညမ်းစေရန် ရှောင်ရှားခြင်း - ဝန်ထမ်းများ၏ စိတ်ထဲတွင် သန့်ရှင်းသောအကျင့်၊ ကောင်းမွန်သောအလေ့အကျင့်များ စွဲမြဲထင်ကျန်စေရန် ပညာပေးခြင်း၊ သင်တန်းပေးခြင်း - ကုန်ကြမ်းများဖြစ်သော သဲ၊ ဘီလပ်မြေ၊ ပျော့ဖတ်၊ ထုံး အစရှိသည်တို့ကို စနစ်တကျသိုလှောင်ခြင်းနှင့် ကိုင်တွယ်ခြင်း - ပျော့ဖတ်ပြုလုပ်သောနေရာများတွင် မြေညစ်ညမ်းခြင်း မဖြစ်စေရန် ဆောင်ရွက်ခြင်း - စက်မှုဆိုင်ရာနှင့် လူသုံးစွန့်ပစ်ပစ္စည်းများ (အစိုင်အခဲနှင့် အရည်) တို့ကို စနစ်တကျဆောင်ရွက်ခြင်းနှင့် သတ်မှတ် ထားသော နေရာတွင် စွန့်ပစ်ခြင်း - မြေပြင်ပေါ်သို့ လောင်စာဆီလျှံကျလျှင် ရေဖြင့်ဆေးချခြင်း မပြု၍ စုပ်ယူနိုင်သော ဥပမာ-လွှစာမှုန့်၊ အဝတ်စုတ်တို့ဖြင့် ချက်ချင်းစုပ်ယူခြင်း

		<ul style="list-style-type: none"> - အကြောင်းအမျိုးမျိုးဖြင့် မြေတိုက်စားခြင်းနှင့် အနည်ကျခြင်းကို တားဆီးခြင်း - တက်နိုင်သမျှ မြေပြောင်လွတ်ဧရိယာကို လျော့ချခြင်း
၄။	<p>ရေပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု (မြေအောက်ရေ)</p>	<ul style="list-style-type: none"> - ဆယ်လူလို့စ်ဖိုင်ဘာ ဘိလပ်မြေပြားထုတ်လုပ်ခြင်းကြောင့် မြေအောက်ရေကို ဆိုးရွားစွာထိခိုက်မှုမဖြစ်စေရန် ရေသုံးစွဲမှုကို လျော့ချခြင်း - ရေသုံးစွဲမှုကို ဘောင်အတွင်း (၆၀ တန်/ရက်) ဝင်စေခြင်း - ရေသုံးစွဲမှုကို နေ့စဉ် သို့မဟုတ် အပတ်စဉ် စောင့်ကြပ်ကြည့်ရှု စစ်ဆေးခြင်း - ဖြစ်နိုင်လျှင် ရေသုံးစွဲမှုလျော့ချနိုင်ရန် ဝန်ထမ်းများကို ရေထိန်းသိမ်းခြင်းအား ပညာပေးခြင်း - တက်နိုင်သမျှ ရေကို ပြန်လည်သုံးစွဲခြင်း (သန့်စင်သောရေနှင့် ပြန်လည်အသုံးပြုသောရေအတွက် ကန်ကြီး (၂) ကန်ရှိပါ သည်) - လောင်စာဆီ သို့မဟုတ် ဓါတုဗေဒပစ္စည်းများ မြေပြင်ပေါ်သို့ လျှံကျလျှင် မြေအောက်ရေထဲသို့ စိမ့်မဝင်စေရန် ချက်ချင်း ဖယ်ရှားခြင်း - လောင်စာဆီ သို့လျှင်ကန်မှ မတော်တဆလျှံကျမှုမဖြစ်စေရန် ကြမ်းခင်းကို ကွန်ကရစ်ခင်းခြင်း နှင့် ကာရန်ထားခြင်း - လောင်စာဆီ စနစ်တကျသိုလှောင်ခြင်း၊ ကိုင်တွယ်ခြင်းနှင့် အသုံးပြု ခြင်းတို့ကို ဝန်ထမ်းများအား ပညာပေးခြင်း - စက်ယန္တရားနှင့် ယာဉ်များမှ လျှံကျမှုမဖြစ်စေရန် လုံလောက်သော ပုံမှန် ထိန်းသိမ်းခြင်းများ ပြုလုပ်ခြင်း - ဖြစ်နိုင်ခြေရှိသော လျှံကျနိုင်သည့် ဧရိယာများကို သတိပေး ဆိုင်းဘုတ်များတပ်ဆင်ခြင်း (လောင်စာဆီသိုလှောင်ကန်၊ မီးစက်)
၅။	<p>စွန့်ပစ်ပစ္စည်းများကြောင့် သက်ရောက်မှု (အစိုင်အခဲနှင့် အရည်)</p>	<p><u>အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများ</u></p> <ul style="list-style-type: none"> - လေစစ်အိတ်များနှင့် အမှုန်ဖမ်းစနစ်များ တပ်ဆင်ခြင်းကြောင့် ကြွင်းကျန်ပစ္စည်းများကို စနစ်တကျစုဆောင်း၍ စွန့်ပစ်ခြင်း - ဖြတ်ခြင်းမှ ထွက်လာသော အစိုဖိုင်ဘာဘိလပ်မြေပြားများကို ပြန်လည်အသုံးပြုခြင်း

		<ul style="list-style-type: none"> - ပျက်စီးသွားသော ဘုတ်ပြားများကို စုဆောင်း၍ သတ်မှတ်ထားသောနေရာတွင် စွန့်ပစ်ခြင်း - အချောသတ်ခြင်း၊ အစွန်းညှိခြင်းတို့မှ ထွက်လာသော ဖုန်မှုန့်နှင့် အပိုင်းအစများကို စနစ်တကျစုဆောင်းခြင်း - စက်မှုဆိုင်ရာ အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများဖြစ်သော ပါကင်ပစ္စည်းများ၊ ဘီလပ်မြေအိတ်များ၊ ပျော့ဖတ်ထုတ်ပိုးလာသော ပါကင်ပစ္စည်းများနှင့် အခြားပါကင်ပစ္စည်းများကို ဒေသခံများသို့ ပေးသင့်သည့်အရာပေး၊ ပြန်သုံးသင့်သည့်အရာသုံး၊ စွန့်ပစ်မည့်အရာများကို သတ်မှတ်ထားသော နေရာတွင် စွန့်ပစ်ခြင်း - ဤစွန့်ပစ်ပစ္စည်းများကို ဟင်းလင်းပွင့်တွင် မီးရှို့ခြင်းအား ရှောင်ရှားခြင်း - လူသုံးအစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများကို ပြန်လည်အသုံးပြုနိုင်သောနှင့် ပြန်လည်အသုံးမပြုနိုင်သော အမှိုက်ပုံးဟူ၍ အနည်းဆုံး (၂) မျိုးခွဲထားခြင်း၊ ပြန်လည်အသုံးမပြုနိုင်သော ပစ္စည်းများကို သတ်မှတ်နေရာတွင် စွန့်ပစ်ခြင်း - မီးဖိုချောင်ထွက် အော်ဂဲနစ်စွန့်ပစ်ပစ္စည်းများကို စိမ်းလန်းခြင်းအတွက် မြေဩဇာအဖြစ် ပြန်လည်သုံးစွဲခြင်း <p><u>အရည်စွန့်ပစ်ပစ္စည်း</u></p> <ul style="list-style-type: none"> - အစပိုင်းကတည်းက မြောင်းစနစ်တည်ဆောက်ခြင်း - ရေထိန်းသိမ်းခြင်းကို ဝန်ထမ်းများအား ပညာပေးခြင်း၊ ရေသုံးစွဲမှုအား ဘောင်အတွင်း (၆၀တန်/ရက်) ဝင်စေခြင်း - ရေကိုအသုံးမပြုမီ သဲ၊ ကာဗွန်ဇကာတို့ဖြင့် သန့်စင်စေခြင်း - အသုံးပြုပြီးသော ရေကို ပြန်လည်အသုံးပြုခြင်း (စက်ရုံတွင် သန့်စင်သောနှင့်ပြန်လည်အသုံးပြုသော ရေကန် (၂) ကန် ရှိပါသည်) - ပြာရေများသည် ကန်ထဲသို့စီးဝင်စေ၍ နောက်ပိုင်းတွင် လူဖြင့် ဆယ်ယူခြင်း - အပြားပြုလုပ်သည့်စက်ပေါ်မှ အနည်အနှစ်များသည် hopper ထဲသို့ကျ၍ မြောင်းစနစ်ဖြင့် စီးဆင်းစေ၍ အနည်အနှစ်များ စုဆောင်း ပြန်လည်အသုံးပြုခြင်း - ဆီနှင့် ချောဆီများကို ဖယ်ရှားခြင်း (စက်ရုံတွင် သန့်ရှင်းခြင်းနှင့် ဆီဖယ်ရှားခြင်းလုပ်ဆောင်ပါမည်)
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		<ul style="list-style-type: none"> - အစောပိုင်းတွင် စွန့်ပစ်ရေ/အသုံးပြုပြီးသောရေ ကို အထူးသန့်စင်စေရန် မလိုအပ်ပေ။ - မီးဖိုချောင်၊ ထမင်းစားဆောင်နှင့် ရေချိုးခန်းတို့မှ ထွက်ရှိသော လူသုံးစွန့်ပစ်ရေများသည် မြောင်းအတိုင်းစီးဆင်း၍ စက်ရုံ၏ အနောက်ဘက် အဆုံးသတ်သွားခြင်း - သန့်စင်ခန်းများမှ ရေများသည် မိလ္လာကန်ထဲသို့ စီးဝင်ခြင်း
၆။	<p>ဖြစ်နိုင်ခြေရှိသော ယာဉ်ကြောပိတ်ဆို့မှု သက်ရောက်ခြင်း</p>	<ul style="list-style-type: none"> - စက်ရုံတွင် မော်တော်ယာဉ် (၅) စီးသာရှိပါသည်။ သို့ပေမယ့် ကုန်ကြမ်းနှင့် ကုန်ချောများသယ်ယူပို့ဆောင်ခြင်းအတွက် ကားများ ငှားရမ်းရမည်။ ထို့ကြောင့် ယာဉ်မောင်းများကို မည်သည့်အကြောင်းကြောင်းနှင့်မျှ ယာဉ်ကြောပိတ်ဆို့မှု မဖြစ်စေခြင်း - သွားလာမှုကို အချိန်ဇယားဆွဲထားခြင်း၊ အမြန်ခိုင်းစေမှုများ ရှောင်ရှားခြင်း၊ ဖြစ်နိုင်လျှင် ယာဉ်ကြောပိတ်ဆို့နိုင်သည့် လမ်းများကို ရှောင်ရှားခြင်း - ယာဉ်မောင်းများကို အမြန်နှုန်းလျော့ချစေခြင်း - စက်ရုံနှင့် လမ်းမ၊ ဘယ်လင်း-ရဲရွာလမ်းတို့ဆုံသည့်နေရာတွင် ဆိုင်းဘုတ်များတပ်ဆင်ခြင်း - ထရပ်ကား၊ မည်သည့်ယာဉ်မဆို ပိုလျှံစွာ တင်ဆောင်ခြင်းအား ရှောင်ရှားခြင်း - ကားများနှင့် မော်တော်ဆိုင်ကယ်များအား ပုံမှန်ထိန်းသိမ်းခြင်း - စက်ရုံ၏ဝင်ပေါက်နှင့် ကားရပ်သည်ဧရိယာများတွင် ယာဉ်ကြောပိတ်ဆို့မှုကို ထိန်းချုပ်နိုင်ရန် ဝန်ထမ်းခန့်အပ် ထားရှိခြင်း - ကားအားလုံးအတွက် လုံလောက်သော ကားရပ်စရာ နေရာထားရှိခြင်း - ယာဉ်ကြောပိတ်ဆို့မှုပြဿနာနှင့် ကြုံလာ၍ ဒေသမှ ပြောဆို လာလျှင် အဆင်ပြေချောမွေ့စေရန် ဆောင်ရွက်ပေးခြင်း
၇။	<p>လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး</p>	<ul style="list-style-type: none"> - ဘေးအန္တရာယ်ကင်းရှင်းသော အလုပ်ခွင်နေရာဖန်တီးပေးခြင်း၊ လုပ်ငန်းခွင်တွင် မတော်တဆမှု မဖြစ်ပေါ်စေရေး ကြိုးစားဆောင်ရွက်ခြင်း - စက်ရုံအက်ဥပဒေ၊ ၁၉၇၄၊ ဘွိုင်လာဥပဒေ၊ ၂၀၁၅၊ လူမှုလုံခြုံရေးဥပဒေ၊ ၂၀၁၂နှင့် အလုပ်သမားလျော်ကြေး ပေးချေရေး အက်ဥပဒေ၊ ၁၉၂၃ တို့ကိုလိုက်နာခြင်း

		<ul style="list-style-type: none"> - ဝန်ထမ်းများကို ကောင်းမွန်သော အလုပ်လုပ်ခြင်းအလေ့အထ၊ ကောင်းမွန်သော ဘေးအန္တရာယ်ကင်းရှင်းခြင်း အလေ့အထ၊ သန့်ရှင်းသော အလေ့အထ၊ အဆိုပါအလေ့အထများကို စိတ်ထဲစွဲမြဲစေရန် ပညာပေးခြင်း၊ သင်တန်းပေးခြင်း - စက်ကိရိယာတန်ဆာပလာများ ကိုင်တွယ်ခြင်းနှင့် လည်ပတ်ခြင်း၊ ဓါတုဗေဒပစ္စည်းများ ကိုင်တွယ်ခြင်းနှင့် အသုံးပြုခြင်းတို့ကို ကျွမ်းကျင်စေရန် ပညာပေးခြင်း၊ သင်တန်း ပေးခြင်း - ပတ်ဝန်းကျင်နှင့်ဆိုင်သော အသိပညာများနှင့် လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး အန္တရာယ်များ အတွက် ပညာပေးခြင်း၊ သင်တန်းပေးခြင်း - စက်ယန္တရားနှင့် စက်ကိရိယာများအားလုံးကို ပုံမှန်ထိန်းသိမ်း၊ ပုံမှန်လည်ပတ်နှင့် ပုံမှန်ဆီထိုးခြင်းတို့ကို ပြုလုပ်ခြင်း - လုံလောက်သော PPE ထောက်ပံ့ပေးခြင်း - ပုံမှန်ဖြစ်နေကျ မတော်မတမှုများအားလုံးကို သတိထားခြင်း၊ ကာကွယ်ခြင်းနှင့် ဖြေလျော့ခြင်း - ဝန်ထမ်းအချို့ကို ရှေးဦးသူနာပြုသင်တန်းနှင့် မီးသတ်သင်တန်း ပေးခြင်း - လုံလောက်သော ဆေးဝါးများနှင့် ရှေးဦးသူနာပြုဆေးပုံးများ ထောက်ပံ့ခြင်း - လုံလောက်သော မီးသတ်ဆေးဗူး၊ မီးသတ်ကိရိယာနှင့် အခြားဆက်စပ်ပစ္စည်းများ ထောက်ပံ့ခြင်း၊ မီးဘေးအန္တရာယ် အတွက် ရေကန်တွင် ရေအမြဲပြည့်နေခြင်း - လိုအပ်လျှင် သက်ဆိုင်သော PPE များ ထောက်ပံ့ခြင်း - အချိန်နှင့်အမျှ အရေးပေါ်တုန့်ပြန်မှု အစီအစဉ် စမ်းသပ် လေ့ကျင့်ခြင်း - အများမြင်သာသောနေရာများတွင် ကြတ်ခြေနီအဖွဲ့အစည်း၊ အရေးပေါ်ဝန်ဆောင်မ၊ မီးသတ်တပ်ဖွဲ့၊ ရဲစခန်းနှင့် စဉ်းကိုင်မြို့နယ် ဆေးရုံဖုန်းနံပါတ်တို့ကို ပြသထားခြင်း - နာမကျန်း သို့မဟုတ် ဒဏ်ရာရသောအလုပ်သမားကို ရှေးဦးသူနာပြုပေးခြင်း၊ ချက်ချင်းစဉ်းကိုင် သို့ ကျောက်ဆည် ဆေးရုံ ပို့ပေးခြင်း - စက်ရုံအတွက် အာမခံနှင့် မီးအာမခံထားရှိခြင်း
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၈။	ဖြစ်နိုင်ခြေရှိသော လူမှုရေးပြဿနာ	<ul style="list-style-type: none"> - ဒေသခံများ၏လူမှုစီးပွားရေးဘဝအပေါ် သက်ရောက်မှုများကို တားဆီးခြင်း သို့မဟုတ် လျော့ချခြင်း - ဒေသခံများနှင့် ကောင်းမွန်သော ဆက်ဆံရေးကို တည်ဆောက်ခြင်းနှင့် ထိန်းသိမ်းခြင်း - ကုမ္ပဏီနှင့် ဒေသခံများဖြင့်ဆက်ဆံရန် ဆက်ဆံရေးအရာရှိ တစ်ဦးခန့်ထားခြင်း - အချိန်နှင့်အမျှ လူထုတွေ့ဆုံပွဲပြုလုပ်ခြင်း - ဝန်ထမ်းများကို ဒေသခံများ၏ ဓလေ့၊ ထုံးတမ်းနှင့် ရိုးရာကို လေးစားလိုက်နာရန် သင်ကြားပေးခြင်း - ဝန်ထမ်းများ၏ လူမှုရေး မကောင်းမွန်သော အပြုအမူများကို စီမံဆောင်ရွက်ခြင်း - လူပျိုနှင့် အပျိုဆောင်ကို သီးခြားထားရှိခြင်း - လုပ်ငန်းခွင်စည်းမျဉ်းများကို သင်တန်းထောက်ပံ့ပေးခြင်း - လူမှုဖူလုံရေး အစီအစဉ်များ ဆောင်ရွက်ပေးခြင်း - ဝန်ထမ်းများကို စည်းကမ်းလိုက်နာရန် ပညာပေးခြင်း - ဝန်ထမ်းများကို အရမ်းခိုင်းစေခြင်း၊ လုပ်ခလစာမပေးခြင်းတို့ကို မပြုလုပ်၍ နှစ်ဦးနှစ်ဖက်အကျိုးအမြတ်ရှိစေရန် ဆောင်ရွက်ခြင်း - စည်းကမ်းချိုးဖောက်လျှင် အရေးယူခြင်း - ဒေသခံများ၏အမြင်သဘောထားများ၊ အကြံဉာဏ်များ ရှိလျှင် လိုက်နာဆောင်ရွက်ပေးခြင်း
၉။	ဖြစ်နိုင်ခြေရှိသော လုံခြုံရေးပြဿနာ	<ul style="list-style-type: none"> - စီမံကိန်းကို အကျိုးသက်ရောက်သော ခြံစည်းရိုးခတ်ခြင်း - လုံခြုံရေးဂိတ်များ ထားရှိခြင်းနှင့် လုံခြုံရေးများ ခန့်အပ်ထားရှိခြင်း - ဝန်ထမ်းများအား ဒေသခံများနှင့် ရောနှောမနေစေခြင်း - ဝန်ထမ်းများကိုလည်း အနီးနားရှိကျေးရွာများသို့ ခွင့်ပြုချက် မရှိလျှင် မဝင်ရောက်စေခြင်း - ပစ္စည်းကိရိယာများကို သော့ခတ်ထားခြင်း - စည်းကမ်းချိုးဖောက်လျှင် အလုပ်မှ ထုတ်ပယ်ခြင်း - ဝန်ထမ်းအားလုံးကို အလွယ်တကူခွဲခြားနိုင်ရန် ID ကဒ်များ ထောက်ပံ့ပေးခြင်း - ဝန်ထမ်းအားလုံးကို ယူနီဖောင်းများ ထောက်ပံ့ပေးခြင်း

၄။ စီမံကိန်းပိတ်သိမ်းချိန်ကာလအတွင်းတွင် ဖြေလျော့နိုင်မည့်နည်းလမ်းများ

စဉ်	သက်ရောက်မှုများ	ဖြေလျော့နိုင်မည့်နည်းလမ်းများ (စီမံကိန်းပိတ်သိမ်းမှု ပြုလုပ်လျှင်)
၁။	ဖြစ်နိုင်ခြေရှိသော လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး	<ul style="list-style-type: none"> - စီမံကိန်းနေရာရှိ အဆောက်အဦနှင့် စက်ကိရိယာတန်ဆာ ပလာများကို ဖြိုဖျက်ခြင်းအတွက် ကန်ထရိုက်တာ ငှားရမ်း ဆောင်ရွက်ခြင်း - အချို့ပစ္စည်းကိရိယာများကို ရောင်းလိုရသည့်အရာရောင်း၍ ပြန်လည်အသုံးပြုလိုရသည့်အရာ ပြန်လည်အသုံးပြုခြင်း - အသုံးပြု၍မရသော ပစ္စည်းများအား စွန့်ပစ်ခြင်း - အိုဟောင်းသော စက်ယန္တရားနှင့် ကိရိယာတန်ဆာပလာများကို အရည်ကျိုစက်ရုံသို့ ပို့ဆောင်ခြင်း - ညစ်ညမ်းသော မြေဆီလွှာရှိလျှင် ဖယ်ရှားခြင်း - နောက်ဆုံးအကြိမ် မြေဆီလွှာအခြေအနေကို စမ်းသပ်တိုင်းတာခြင်း - နောက်ဆုံးအကြိမ် လေနှင့်ရေ အရည်အသွေးကိုလည်း စမ်းသပ်တိုင်းတာခြင်း - စီမံကိန်းနေရာအား မြေပြင်ကို ညှိ၍အပင်စိုက်ခြင်းနှင့် ယခင်အခြေအနေအတိုင်းပြန်လည်ရရှိစေရန် လုပ်ဆောင်ခြင်း
၂။	ဖြစ်နိုင်ခြေရှိသော ကြွင်းကျန်သက်ရောက်မှု	<ul style="list-style-type: none"> - ညစ်ညမ်းသော မြေကို ဖယ်ရှားခြင်း - ညစ်ညမ်းသော အရာအားလုံးကို ဖယ်ရှား ရှင်းလင်းခြင်း - နောက်ဆုံးအကြိမ် မြေဆီလွှာကို ဓါတုဗေဒစမ်းသပ်တိုင်းတာခြင်း - တက်နိုင်သမျှ မြေပြင်ကို ယခင်သဘာဝအတိုင်း ပြန်လည် လုပ်ဆောင်ပေးခြင်း - စီမံကိန်းနေရာ၏ ဂေဟဗေဒများကိုလည်း ယခင်သဘာဝ အတိုင်း ပြန်လည်လုပ်ဆောင်ပေးခြင်း - စီမံကိန်းနေရာအား လေ၊ မြေ၊ ရေတို့ကို မညစ်ညမ်းစေ၍ ဒေသခံများအတွက် ဘေးအန္တရာယ်ကင်းရှင်းစေရန် လုပ်ဆောင် ပေးခြင်း

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

တရားရေးရာလိုအပ်ချက် (ဥပဒေများ၊ နည်းဥပဒေများ၊ စည်းမျဉ်း)

သက်ဆိုင်သော ဥပဒေများ၊ နည်းဥပဒေများနှင့် စည်းမျဉ်းများ (၃၂) ခုတို့မှ သက်ဆိုင်သော ပုဒ်မများကို ကောက်နုတ်၍ အခန်း (၃၊ ၃.၂) တွင်ဖော်ပြထားပါသည်။

ဤအကျဉ်းချုပ်အစီရင်ခံစာတွင် အချို့ဥပဒေများ၊ နည်းဥပဒေများနှင့် စည်းမျဉ်းများ၏ အမည်များကို ရှင်းပြထားပါသည်။

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၁၂၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေများ၊ ၂၀၁၄၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ ၂၀၁၅၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ၊ ၂၀၁၅၊ မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ဥပဒေ၊ ၂၀၁၆၊ မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု နည်းဥပဒေ၊ ၂၀၁၇၊ ပုဂ္ဂလိကစက်မှုလုပ်ငန်း ဥပဒေ၊ ၁၉၉၀၊ လျှပ်စစ်ဥပဒေ၊ ၂၀၁၄၊ မြန်မာ့အာမခံဥပဒေ၊ ၂၀၁၅၊ ဘျိုင်လာ ဥပဒေ၊ ၂၀၁၅၊ အလုပ်သမားအငြင်းပွားမှု ဖြေရှင်းရေးဥပဒေ၊ ၂၀၁၂၊ အလုပ်အကိုင်နှင့် ကျွမ်းကျင်မှုဖွံ့ဖြိုးတိုးတက်ရေးဥပဒေ၊ ၂၀၁၃၊ လူမှုဖူလုံရေးဥပဒေ၊ ၂၀၁၂၊ အလုပ်ရုံများ အက်ဥပဒေ၊ ၂၀၁၆၊ မြန်မာနိုင်ငံအမျိုးသားအဆင့် စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှု မဟာဗျူဟာနှင့် ပင်မလုပ်ငန်းအစီအစဉ် (၂၀၁၈-၂၀၃၀)၊ ပြည်သူ့ကျန်းမာရေးဆိုင်ရာ ဥပဒေ၊ ၁၉၇၂၊ လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ကျန်းမာရေးဆိုင်ရာဥပဒေ၊ ၂၀၁၉၊ မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ဥပဒေ၊ ၂၀၁၅၊ ဓါတုနှင့်ဆက်စပ်ပစ္စည်းများအန္တရာယ် တားဆီးကာကွယ်ရေးဥပဒေ၊ ၂၀၁၃ တို့ဖြစ်ကြပါသည်။

ဖြေလျော့နိုင်မည့်နည်းလမ်းများ

စီမံကိန်းကာလ (၄) ခုစလုံးအတွင်းတွင် ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုတစ်ခုစီတိုင်းအတွက် မတူညီသော ဖြေလျော့နိုင်မည့်နည်းလမ်းများကို အသေးစိတ် ဇယားဖြင့် အခန်း (၆၊ ၆.၂.၃.၂) တွင် ဖော်ပြထားပါသည်။ ဤအရာများကို အကျဉ်းချုပ်ဖော်ပြထားပြီးဖြစ်ပါသည်။

စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း အစီအစဉ်

ပြီးပြည့်စုံသော စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်းအစီအစဉ် ကို အခန်း (၆၊ ၆.၂.၅) တွင် အသေးစိတ်ဖော်ပြထားပါသည်။ ဤနေရာတွင် စီမံကိန်းလည်ပတ်ခြင်းကာလနှင့် စီမံကိန်းပိတ်သိမ်းခြင်း ကာလအတွက် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်းအစီအစဉ် ကိုဖော်ပြထားပါသည်။

စီမံကိန်းလည်ပတ်ခြင်းကာလအတွက် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်းအစီအစဉ် အကျဉ်းချုပ် (ဇယားပုံစံ)

စဉ်	အစိတ်အပိုင်း	စောင့်ကြပ်ကြည့်ရှုလေ့လာရမည့် ပါရာမီတာ	စောင့်ကြပ်ကြည့်ရှုလေ့လာရမည့် နေရာ	အကြိမ်အရေအတွက်	တာဝန်ရှိပုဂ္ဂိုလ်	ကုန်ကျစရိတ် (တစ်ခါ)
၁။	လေအရည်အသွေး	- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ်ထားသော အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် မှ လေအရည်အသွေးအတွက် အမှတ် ၁.၁ ပါ ပါရာမီတာများ (NO ₂ ၊ O ₃ ၊ PM ₁₀ ၊ PM _{2.5} ၊ SO ₂) အားလုံးကို စောင့်ကြပ်ကြည့်ရှုလေ့လာမည်	စီမံကိန်းနေရာ: N 21° 40' 25.79", E 96° 8' 21.84" တောင်ရင်းကျေးရွာ: N 21°40'16.65", E 96° 7'58.78" ဘယ်လင်းကျေးရွာ: N 21°40'23.82", E 96° 7'40.34"	- ခြောက်လတစ်ကြိမ်	ပညာရှင်ငှားရမ်း	ကျပ် ၃,၀၀၀,၀၀၀
၂။	စွန့်ထုတ်ရေ	- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ်ထားသော အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် မှ လေအရည်အသွေးအတွက် အမှတ် ၁.၂ ပါ (BOD၊ Ammonia၊ Arsenic၊ Cadmium၊ COD၊ Chlorine၊ Chromium၊ Copper၊ Cyanide၊ Fluoride၊ Iron၊ Lead၊ Mercury၊ Nickel၊ Oil and grease၊ P ^H ၊ Sulphide၊ Temperature၊ Total coliform bacteria၊ Total phosphorus၊ Total suspended solids၊ Zinc)	N 21°40'27.88" E 96° 8'23.60"	- ခြောက်လတစ်ကြိမ်	ပညာရှင်ငှားရမ်း	ကျပ် ၃၀၀,၀၀၀

၃။	မြေအောက်ရေ	- OEHD မှုချမှတ်ထားသော အမျိုးသား သောက်သုံးရေ အရည်အသွေး ဆိုင်ရာ စံချိန်စံညွှန်းမှ ပါရာမီတာအားလုံး (Total coliforms၊ Fecal coliforms၊ Taste၊ Odor၊ Color၊ Turbidity၊ Arsenic၊ Lead၊ Nitrate၊ Manganese၊ Chloride၊ Hardness၊ Iron၊ P ^H ၊ Sulphate၊ TDS) တို့ကိုစောင့်ကြပ်ကြည့်ရှု လေ့လာပါမည်။	စီမံကိန်းနေရာ: N 21° 40' 21.51", E 96° 8' 22.06" တောင်ရင်းကျေးရွာ: N 21°40'16.43", E 96° 7'59.40" ဘယ်လင်းကျေးရွာ: N 21°40'23.26", E 96° 7'39.34"	- ခြောက်လ တစ်ကြိမ်	ပညာရှင်ငှားရမ်း	ကျပ် ၆၀၀,၀၀၀
၄။	မြေဆီလွှာ	- ပါရာမီတာများအားလုံး(pH, Texture, Moisture, Nitrogen) တို့ကိုစောင့်ကြပ်ကြည့်ရှု လေ့လာပါမည်။	စီမံကိန်းနေရာ: N 21° 40' 23.30", E 96° 8' 21.20" တောင်ရင်းကျေးရွာ: N 21°40'16.01", E 96° 7'58.79" ဘယ်လင်းကျေးရွာ: N 21°40'23.75", E 96° 7'38.91"	- ခြောက်လ တစ်ကြိမ်	ပညာရှင်ငှားရမ်း	ကျပ် ၁၅၀,၀၀၀

၅။	ဆူညံသံနှင့် တုန်ခါမှု	<ul style="list-style-type: none"> - ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ်ထားသော အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် မှ ဆူညံသံအတွက် အမှတ် ၁.၃ ပါ ပါရာမီတာတို့ကို စောင့်ကြပ်ကြည့်ရှုလေ့လာပါမည်။ - PPE ဝတ်မဝတ် စောင့်ကြပ်ကြည့်ရှုလေ့လာမည်။ 	<p>စီမံကိန်းနေရာ: N 21° 40' 25.79", E 96° 8' 21.84"</p> <p>တောင်ရင်းကျေးရွာ: N 21°40'16.65", E 96° 7'58.78"</p> <p>ဘယ်လင်းကျေးရွာ: N 21°40'23.82", E 96° 7'40.34"</p> <ul style="list-style-type: none"> - ဆူညံသံစက်နားရှိ အလုပ်ခွင်နေရာ 	<ul style="list-style-type: none"> - သုံးလ တစ်ကြိမ် - အချိန်နှင့်အမျှ 	<p>ပညာရှင်ငှားရမ်း</p> <p>EMP အဖွဲ့ဝင်များ</p>	<p>ကျပ် ၃၀၀,၀၀၀</p> <p>အခမဲ့</p>
၆။	အစိုင်အခဲစွန့်ပစ်ပစ္စည်း	<ul style="list-style-type: none"> - ပါကင်ပစ္စည်းများကို စုဆောင်းခြင်းနှင့် စွန့်ပစ်ခြင်းကို စောင့်ကြပ်ကြည့်ရှုလေ့လာပါမည်။ - ထွက်ရှိသော အမှိုက်သရိုက်များကို စုဆောင်းခြင်းနှင့် စွန့်ပစ်ခြင်းကို စောင့်ကြပ်ကြည့်ရှုလေ့လာပါမည်။ 	<p>N 21° 40' 21.03", E 96° 8'24.56"</p> <p>N 21° 40' 22.40", E 96° 8'18.87"</p>	<ul style="list-style-type: none"> - နေ့စဉ် - အပတ်စဉ် 	<p>EMP အဖွဲ့ဝင်များ</p> <p>အဖွဲ့ဝင်များ</p>	<p>အခမဲ့</p> <p>အခမဲ့</p>
၇။	စွန့်ပစ်ရေ	<ul style="list-style-type: none"> - လူသုံးစွန့်ပစ်ရေကို စီမံခန့်ခွဲခြင်းအား စောင့်ကြပ်ကြည့်ရှုလေ့လာပါမည်။ 	<p>N 21°40'22.62", E 96° 8'18.66"</p>	<ul style="list-style-type: none"> - နေ့စဉ် 	<p>EMP အဖွဲ့ဝင်များ</p>	<p>အခမဲ့</p>

စီမံကိန်းလည်ပတ်ခြင်းအတွက် စောင့်ကြပ်ကြည့်ရှုလေ့လာမည့် အစီအစဉ် အကျဉ်းချုပ် (ဇယားပုံစံ)

စဉ်	အစိတ်အပိုင်း	စောင့်ကြပ်ကြည့်ရှုလေ့လာရမည့် ပါရာမီတာ	စောင့်ကြပ်ကြည့်ရှုလေ့လာရမည့် နေရာ	အကြိမ်အရေ အတွက်	တာဝန်ရှိပုဂ္ဂိုလ်	မှတ်ချက်
၁။	ပိတ်သိမ်းခြင်းနှင့် ပြန်လည်ရှင်သန်ခြင်း	<ul style="list-style-type: none"> - စီမံကိန်းပိတ်သိမ်းခြင်းတွင် ကြွင်းကျန် သက်ရောက်မှုများ ရှိလျှင် စောင့်ကြပ် ကြည့်ရှုလေ့လာပါမည်။ - ပြန်လည်ရှင်သန်ခြင်းလုပ်ငန်းစဉ်ကို စောင့်ကြပ်ကြည့်ရှုလေ့လာပါမည်။ 	<ul style="list-style-type: none"> - စက်ရုံဝန်းအတွင်း - စက်ရုံဝန်းအတွင်း 	<ul style="list-style-type: none"> - အပတ်စဉ် - လစဉ် 	<ul style="list-style-type: none"> - EMP အဖွဲ့ဝင်များ - EMP အဖွဲ့ဝင်များ 	<ul style="list-style-type: none"> - အခမဲ့ - အခမဲ့

မှတ်ချက်: ECD မှညွှန်ကြားချက်အတိုင်း စီမံကိန်းလည်ပတ်စဉ်ကာလတစ်လျှောက် ရုပ်ပိုင်းဆိုင်ရာဖြစ်သော လေ၊ ရေ၊ မြေတို့ကို ခြောက်လတစ်ကြိမ် တိုင်းတာပါမည်။ ဤလုပ်ငန်းအတွက် ပညာရှင်များငှားရမ်း၍ ECD သို့ခြောက်လတစ်ကြိမ် အစီရင်ခံတင်ပြပါမည်။

EMP ဆောင်ရွက်ခြင်းအတွက် ရန်ပုံငွေ

စီမံကိန်းအတွက်ဘတ်ဂျတ်သည် ကျပ်သန်းပေါင်း ၁၉၉၃၁.၃၁ ဖြစ်သည်။ စီမံကိန်းဘတ်ဂျတ်၏ (၅) ရာခိုင်နှုန်း (ကျပ် ၉၉၆,၅၆၅,၅၀၀) ကို EMP ရန်ပုံငွေအဖြစ် ထားရှိပါမည်။ ခွဲဝေထားသော EMP ရန်ပုံငွေမှာ အောက်ပါအတိုင်းဖြစ်သည်။

- EMP အဖွဲ့ ဖွဲ့စည်းရန်အတွက် ကုန်ကျစရိတ်	၂ ရာခိုင်နှုန်း	(ကျပ် ၁,၉၉၃,၃၀၀)
- EMP အတွက် အမှန်တကယ် ကုန်ကျမည့် ကုန်ကျစရိတ်		
(က) ဖြေလျော့နိုင်မည့် နည်းလမ်းများအတွက်	၃၀ ရာခိုင်နှုန်း	(ကျပ် ၂၇၈,၉၆၉,၆၅၀)
(ခ) စောင့်ကြပ်ကြည့်ရှု လေ့လာခြင်းအတွက်	၃၀ ရာခိုင်နှုန်း	(ကျပ် ၂၇၈,၉၆၉,၆၅၀)
- ပစ္စည်းကိရိယာဝယ်ယူမှုအတွက် ကုန်ကျစရိတ်	၁၀ ရာခိုင်နှုန်း	(ကျပ် ၉၉,၆၅၆,၅၅၀)
- စွမ်းဆောင်ရည်မြှင့် သင်တန်းများအတွက် ကုန်ကျစရိတ်	၇ ရာခိုင်နှုန်း	(ကျပ် ၆၉,၇၅၉,၅၅၅)
- အရေးပေါ် အစီအစဉ်အတွက် ကုန်ကျစရိတ်	၁၀ ရာခိုင်နှုန်း	(ကျပ် ၉၉,၆၅၆,၅၅၀)
- အစီရင်ခံတင်ပြခြင်း လုပ်ငန်းအတွက် ကုန်ကျစရိတ်	၇ ရာခိုင်နှုန်း	(ကျပ် ၆၉,၇၅၉,၅၅၅)
- အထွေထွေ ကုန်ကျစရိတ် (EMPအဖွဲ့ဝင်ဖြစ်သော ရွာသား နှစ်ယောက်အတွက် အပါအဝင်)	၄ ရာခိုင်နှုန်း	(ကျပ် ၃၉,၈၆၂,၆၂၀)

၎င်း EMP ရန်ပုံငွေကို စီမံကိန်းကာလတစ်လျှောက်အတွက် လုံလောက်မည်ဟု ခန့်မှန်းရပါသည်။ သို့ပေမယ့် မလောက်လျှင် ရန်ပုံငွေထပ်ထည့်ပါမည်။ ဤ EMP ရန်ပုံငွေ၏ အဓိကအပိုင်းသည် ဖြေလျော့နိုင်မည့်နည်းလမ်းများနှင့် စောင့်ကြည့်ရှုလေ့လာခြင်းဖြစ်သည်။

မြန်မာနိုင်ငံတွင် EMP ကန်ထရိုက်တာ ငှားရမ်း၍မရနိုင်သေးပေ။ ထို့ကြောင့် EMP ဆောင်ရွက်ခြင်းအတွက် ဝန်ထမ်းများကို သင်တန်းပေးပါမည် (EMP အဖွဲ့ခေါင်းဆောင်နှင့် EMP အဖွဲ့ဝင်များ)။ သူတို့သည် အချိန်ပြည့်ဝန်ထမ်းများဖြစ်သောကြောင့် ဤ EMP အဖွဲ့ဝင်များအတွက် ကုန်ကျစရိတ်မရှိတော့ပေ။

စီမံကိန်းပိတ်သိမ်းခြင်းအတွက် EMP ရန်ပုံငွေကို ထပ်မံဖြည့်မည်။ ဤအရာသည် နှစ် (၃၀) ပြီးမှ ဖြစ်မည်ဖြစ်သဖြင့် စီမံကိန်းပိတ်သိမ်းခြင်းလုပ်ငန်းအတွက် သီးသန့်မခွဲထားပေ။

စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း အစီအစဉ်ခွဲ

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာနမှ ချမှတ်ထားသော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ် ၆၁၆/၂၀၁၅ အရ စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှု လေ့လာခြင်း အစီအစဉ်ခွဲတို့ကို ဤ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် အခန်း (၈၊ ၈.၅) တွင် အသေးစိတ် ဖော်ပြထားပါသည်။

စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း အစီအစဉ်ခွဲတို့မှာ ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း ပြဿနာများဖြစ်သော ဆူညံသံ၊ တုန်ခါမှု၊ စွန့်ပစ်ပစ္စည်း၊ ဘေးအန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်း၊ စွန့်ပစ်ရေနှင့် စီးဆင်းရေ၊ လေအရည်အသွေး၊ အနံ့၊ ဓါတုဗေဒပစ္စည်း၊ ရေအရည်အသွေး၊ တိုက်စားခြင်းနှင့် အနည်ကျခြင်း၊ ဇီဝမျိုးစုံမျိုးကွဲ၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး၊ ယဉ်ကျေးမှုအမွေအနှစ်၊ အလုပ်အကိုင်ရရှိမှုနှင့် သင်တန်းပေးခြင်း၊ အရေးပေါ်တုန့်ပြန်မှု တို့ဖြစ်ကြပါသည်။

အစီအစဉ်ခွဲတစ်ခုစီကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်း၊ ၂၀၁၅ မှာပါရှိသည့် အတိုင်း ဖော်ပြထားပါသည်။

လူထုတွေ့ဆုံဆွေးနွေးခြင်း

လူထုတွေ့ဆုံဆွေးနွေးခြင်းကို (၂) ကြိမ်ပြုလုပ်ခဲ့ပါသည်။ နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း လေ့လာချိန်အတွင်း (ဖေဖော်ဝါရီလ၊ ၂၀၂၀) တွင်တစ်ကြိမ်နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လေ့လာချိန်အတွင်း (နိုဝင်ဘာလ၊ ၂၀၂၂) တွင်တစ်ကြိမ် ကျင်းပခဲ့ပါသည်။

(၁) နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း လေ့လာချိန်အတွင်းပြုလုပ်သော လူထုတွေ့ဆုံဆွေးနွေးခြင်း

- ရက်စွဲ : ၂၀-၂-၂၀၂၀
- အချိန် : ၀၉:၃၀ - ၁၀:၃၅
- နေရာ : စက်ရုံဝန်းအတွင်းရှိအပင်အောက်
- တက်ရောက်သူဦးရေ: ၄၈ ဦး

(အိမ်ထောင်ဦးစီးများကို ဖိတ်ကြားခဲ့ပါသည်)

ကိုဗစ် ၁၉ ကမ္ဘာ့ကပ်ရောဂါဖြစ်နေသော အချိန်ဖြစ်သောကြောင့် အစည်းအဝေးတွင် လူဦးရေ သတ်မှတ်ခဲ့ပါသည်။

Sann Shinn & Brothers ကုမ္ပဏီလီမိတက်မှ တာဝန်ရှိသူသည် အဆိုပြုတင်ပြသော စီမံကိန်းအကြောင်းအရာကို ရှင်းပြ၍ နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း အဖွဲ့ခေါင်းဆောင်သည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လေ့လာမှုအကြောင်းကို ရှင်းပြခဲ့ပါသည်။

လူထုတွေ့ဆုံပွဲအတွင်းတွင် ဒေသခံ (၄)ဦးမှ မေးခွန်းများ နှင့် အမြင်သဘောထားများကို ပေးခဲ့ပါသည်။ ဒေသခံ (၂)ဦးတို့မှ စီမံကိန်းကို ထောက်ခံပါသည်။ ဒေသခံတစ်ဦးမှ စက်ရုံလည်ပတ်လျှင် အနံ့ဆိုးထွက်မထွက် သိချင်ပါသည်။ တာဝန်ရှိသူမှ ဤစက်ရုံသည် အစားအသောက်စက်ရုံ မဟုတ်သောကြောင့် အနံ့ဆိုး မထွက်ပေဟု ဖြေကြားခဲ့ပါသည်။

ဒေသခံတစ်ဦးသည် လေအရည်အသွေးကို ဘာကြောင့်တိုင်းတာသနည်းကို သိချင်ပါသည်။ အဆိုပါလေအရည်အသွေးသည် စက်ရုံအတွက်လား (သို့မဟုတ်) ဒေသအတွက်လားဟု မေးမြန်းခဲ့ပါသည်။ အဖွဲ့ခေါင်းဆောင်မှ လေအရည်အသွေးသည် အခြေခံအချက်အလက်ကို တိုင်းတာခြင်း ဖြစ်သည်။ ကျွန်တော်တို့ စက်ရုံမလည်ပတ်မီအချိန်နှင့် စက်ရုံလည်ပတ်ချိန်အတွင်းတွင် ဖြစ်ပေါ်သောအဖြေများကို နှိုင်းယှဉ်နိုင်ရန် ဖြစ်ပါသည်။ ဤအရာသည် စက်ရုံအလုပ်သမားများနှင့် ဒေသခံအားလုံးအတွက် ကောင်းပါသည်ဟု ပြန်လည်ဖြေကြားခဲ့ပါသည်။

အစည်းအဝေးကို ရင်းရင်းနှီးနှီးပြီးဆုံးခဲ့ပါသည်။ ကုမ္ပဏီသည် တည်ဆောက်ရေးကာလအတွင်းတွင် ဒေသခံများကို အလုပ်အကိုင်များပေးခဲ့ပါသည်။ စီမံကိန်းလည်ပတ်စဉ်ကာလအတွင်းတွင်လည်း ဒေသခံများကို ဦးစားပေး အလုပ်ခန့်အပ်ပါမည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လေ့လာချိန်အတွင်းတွင်ပြုလုပ်သော လူထုတွေ့ဆုံခြင်း

- ရက်စွဲ : ၂-၁၁-၂၀၂၂
- အချိန် : ၁၀:၀၀ - ၁၁:၀၀
- နေရာ : စက်ရုံ
- တက်ရောက်ဦးရေ: ၇၄ ဦး

ကုမ္ပဏီလီမိတက်မှ တာဝန်ရှိသူသည် စီမံကိန်းအကြောင်းအရာကို ရှင်းပြ၍ EIA အဖွဲ့ခေါင်းဆောင်သည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လေ့လာမှုအကြောင်းကို ရှင်းပြခဲ့ပါသည်။

ဘယ်လင်းကျေးရွာအုပ်ချုပ်ရေးမှူးမှ စီမံကိန်းကို ဆန့်ကျင်လိုခြင်းမရှိပါ။ စီမံကိန်းမှ တာဝန်ရှိသူများ အနေဖြင့် ဝန်ထမ်းများခန့်အပ်ရာတွင် အချက်အလက်များပြည့်စုံစွာ စစ်ဆေး၍ လက်ခံပေးကြပါရန် ပြောကြားချင်ပါသည်။ အခြားမှ ယာယီပြောင်းရွှေ့လုပ်သားများ အများအပြားရှိပါသည်။ ကျေးရွာတွင်

အစကတည်းက နေထိုင်သော ဒေသခံများလည်း အလုပ်အကိုင်ရသင့်ပါသည်။ သူနှင့် သူ၏အုပ်ချုပ်ရေး အဖွဲ့ဝင်များသည် သူတို့၏တရားဝင်နေထိုင်သော ကျေးရွာသူ/သားများကိုသာလျှင် ထောက်ခံစာ ပေးမည်ဖြစ်ပါသည် ဟုပြောကြားခဲ့ပါသည်။

တောင်ရင်းအုပ်ချုပ်ရေးမှူးသည်လည်း ရွှေ့ပြောင်းလုပ်သားများနှင့် ပတ်သပ်သော တူညီသည့် သဘောထားများကို ပြောကြားခဲ့ပါသည်။ ကျွန်တော်တို့ ဌာနေပြည်သူများ အလုပ်လာလျှောက်သည့်အခါ ဦးစားပေး ခန့်အပ်ပေးပါရန် ပြောကြားချင်ပါသည်ဟု ပြောကြားခဲ့ပါသည်။

လူမှုကူညီရေးအသင်း ဥက္ကဋ္ဌ မှ သူသည် လူထုတွေ့ဆုံဆွေးနွေးပွဲကို တက်ရောက်ရသည်မှာ ဝမ်းသာပါသည်။ ကျွန်တော်တို့ဒေသတွင် စက်ရုံပေါင်း ၅၀ ကျော်ရှိသော်လည်း ယခုကဲ့သို့ လူထုတွေ့ဆုံပွဲပြုလုပ်သည့် စက်ရုံမှာ ဒီစက်ရုံတစ်ခုသာရှိပါသည်။ ထို့နောက် စီမံကိန်းမှ တာဝန်ရှိသူများ အနေဖြင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးလုပ်ငန်းများကို အထူးလုပ်ဆောင်ပေးကြပါရန် တောင်းဆိုချင်ပါသည်။ ယခုလို စက်ရုံအသစ်တစ်ခု တည်ဆောက်လာသည့်အတွက် ဝမ်းသာပါသည်။ ၎င်းမေးသည် လူငယ်တွေ အတွက် အလုပ်အကိုင်များပေါများလာမည်ဖြစ်သည်ဟု ပြောကြားခဲ့ပါသည်။

စက်ရုံမန်နေဂျာမှ ကျွန်တော်တို့စက်ရုံသည် Chemical (၂) မျိုးသာအသုံးပြု၍ အနည်းငယ်သာ သုံးမည်ဖြစ်သည်။ တစ်ခါတစ်ရံမှသာ အသုံးပြုမည်ဖြစ်သည့်အတွက် ဘေးထွက်ဆိုးကျိုးလည်း အလွန်နည်းပါး၍ ဖြေလျော့နိုင်ပါသည် ဟုရှင်းပြခဲ့ပါသည်။

EIA အဖွဲ့ခေါင်းဆောင်သည် စက်ရုံလည်ပတ်လျှင် ကုမ္ပဏီအား CSR အစီအစဉ်များ ဆက်လက် လုပ်ဆောင်ပေးရန် တိုက်တွန်းခဲ့ပါသည်။

အစည်းအဝေးသည် ရင်းနှီးဖော်ရွေစွာ ပြီးဆုံးခဲ့ပါသည်။ ဒေသခံများသည် စက်ရုံမှ လူပေါင်းများစွာကို အလုပ်အကိုင်ပေးမည်ဟု သိရှိသွားပါသည်။

အစည်းအဝေးမှတ်တမ်းကို စီမံကိန်းအဆိုပြုတင်ပြသူ၏ ရုံးခန်းနှင့် MESC ၏ရုံးခန်းတွင် ထားရှိပါမည်။ EIA အစီရင်ခံစာအတည်ပြုပြီးလျှင် အစီရင်ခံစာ၏ အစိတ်အပိုင်းကို ဥပမာ အကျဉ်းချုပ်အစီရင်ခံစာကို ကုမ္ပဏီနှင့် MESC ၏ ဝတ်ဆိုင် တွင်လွှင့်တင်ပါမည်။

နိဂုံး

ဤ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန မှ ချမှတ်ထားသော ဥပဒေများ၊ စည်းမျဉ်းများ၊ လမ်းညွှန်ချက်များအရ ပြင်ဆင်ရေးဆွဲထားပါသည်။

အစီရင်ခံစာကို ကြိုးစားအားထုတ်မှု၊ အရည်အချင်း၊ ဂရုတစိုက်ရှိမှုနှင့် လုပ်ငန်းအပ်နှံသူနှင့် ချုပ်ဆိုထားသော စာချုပ်အတိုင်းပြင်ဆင်ရေးသားထားပါသည်။

ယခုကဲ့သို့သော ဆယ်လူလို့စိုဗိုဗိဗိဘာ ဘိလပ်မြေပြားထုတ်လုပ်ခြင်းသည် တိုင်းပြည်၏ တည်ဆောက်ရေးအခန်းကဏ္ဍတွင် ဖွံ့ဖြိုးမှုကြီးတစ်ခုဖြစ်သည်။

ပတ်ဝန်းကျင်အသိပညာနှင့်ပတ်သက်သော ယနေ့ခေတ်တွင် တားဆီးခြင်း သို့မဟုတ် ဖြေလျော့နိုင်မည့်နည်းလမ်းများ အတွက် လမ်းညွှန်ချက်များကို ထုတ်ဖော်ထားပါသည်။ သင့်တော်သော ဖြေလျော့နိုင်မည့်နည်းလမ်းများ (ဖြေလျော့ခြင်း၊ အမှားမှအမှန်သို့ရောက်ရှိစေခြင်း၊ ကုစားခြင်း) သည် သက်ရောက်မှုကို အနည်းဆုံးဖြစ်စေခြင်းနှင့်ပတ်ဝန်းကျင်အား ရေရှည်ထိန်းသိမ်းခြင်းအတွက် တို့ဖြစ်သည်။

အနှစ်ချုပ်တွင် Sann Shinn & Brothers ကုမ္ပဏီလီမိတက်မှ

- ဥပဒေများ၊ စည်းမျဉ်းများ၊ မဖြစ်မနေ လိုက်နာရမည့် လိုအပ်ချက်များကို လိုက်နာခြင်း
- အစီရင်ခံစာတွင် ဖော်ပြထားသော သက်ရောက်မှုများ/ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများ အားလုံးကို လေ့လာခြင်းနှင့် အစီရင်ခံစာတွင် ရှင်းပြထားသော ဖြေလျော့နိုင်မည့် နည်းလမ်းများအားလုံးကို လိုက်နာခြင်း
- EMP ကို အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်း၊ အထူးသဖြင့် အစီရင်ခံစာတွင် ဖော်ပြထားသော စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်ခွဲများကို ဆောင်ရွက်ခြင်း
- စီမံကိန်းပြီးဆုံးချိန်တွင် ပြန်လည်ရှင်သန်ခြင်းလုပ်ငန်းကို လိုက်နာဆောင်ရွက်ခြင်း တို့ဖြစ်ပါသည်။

Sann Shinn & Brothers ကုမ္ပဏီလီမိတက်မှ ပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေရှိသော ကုမ္ပဏီအများကြီးထဲမှ ဥပမာပေးရသော ကုမ္ပဏီဖြစ်ရန် အကောင်းဆုံးကြိုးစားသွားပါမည်။

တတိယအဖွဲ့အစည်း၏အမြင်သဘောထား

တတိယအဖွဲ့အစည်းဖြစ်သော မြန်မာ့ပတ်ဝန်းကျင်ရေရှည်တည်တံ့ရန် ထိန်းသိမ်းရေး (MESCS) ကုမ္ပဏီလီမိတက်သည် EIA များကို လေ့လာ၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ် ၆၁၆/၂၀၁၅ အတိုင်း ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကို ပြင်ဆင်ရေးသားခဲ့ပါသည်။

တတိယအဖွဲ့အစည်းသည် စီမံကိန်းအဆိုပြုတင်ပြသူကို အဓိပ္ပာယ်ရှိသော EMP ဆောင်ရွက်ရန်နှင့် ဖြေလျော့နိုင်မည့်နည်းလမ်း၊ စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်းအားလုံးကို လိုက်နာဆောင်ရွက်ရန် တိုက်တွန်းထားပါသည်။

တတိယအဖွဲ့အစည်းသည် ဤဆယ်လူလို့စိုဗိုဗိဗိဘာဘိလပ်မြေပြားစီမံကိန်းမှာ ဧရိယာ၏ ရုပ်ပိုင်းဆိုင်ရာ၊ ဇီဝပိုင်းဆိုင်ရာ၊ လူမှု-စီးပွားရေးဆိုင်ရာ၊ ယဉ်ကျေးမှုနှင့် မျက်စိပဒေသာဖြစ်သော ရှုခင်းရှုကွက်ဆိုင်ရာများကို မည်သည့်ဆိုးကျိုးမှ မဖြစ်စေ၍ အကျိုးသက်ရောက်စွာ လုပ်ဆောင်နိုင်မည်ဟု ယုံကြည်ပါသည်။

1. EXECUTIVE SUMMARY

This is the Environmental Impacts Assessment (EIA) report for the construction and operation of a Fiber Cement Boards Factory by Sann Shinn & Brothers Co., Ltd.

Objectives

- To produce quality fiber cement boards for marketing in the country.
- To make available ecofriendly cellulose fiber cement boards for the people at a reasonable price
- To contribute to the development of fabricated building materials for the country, and
- To contribute to the development of the construction sector of the Nation.

Previous environmental study

A scoping and Term of Reference (TOR) study for Environmental Impact Assessment (EIA) has been conducted in 2019. The scoping report (and Term of Reference) was submitted to the authority concerned in March 2020. The scoping report was approved by the relevant authority, the Environmental Conservation Department (ECD); Document: eia-1/4 Hsa (2278/2020), dated: 15-9-2020.

Background

Since the mid-nineteen century asbestos fiber cement boards were widely used worldwide. After asbestos fiber was banned (asbestos was considered carcinogenic) the ecofriendly cellulose fiber cement boards have become one of the most widely used building materials word wide.

The project proponent, Sann Shinn & Brothers Co., Ltd has the desire to manufacture, produce and market cellulose fiber cement boards in Myanmar.

Sann Shinn & Brothers Co., Ltd was registered as a limited company by shares on 3.9.2019 (Document: Certificate of Incorporation No-122002624; Directorate of Investment and Company Administration).The company is 100% nationals owned.

The company has already obtained the permit from MIC; document no.247/2020, dated: 6-4-2020.

As the company has the capacity and technology to manufacture cellulose fiber cement boards it has considered three sites in the region for implementation of the proposed project. This proposed site near Taung Yinn village, Sint Kaing Township, was finally selected, as this site has the following advantages:

The site has easy access to motor road; access to gridline electricity; access to ground water (at 270 feet depth); the raw material cement is readily available from its parent company, Ngwe Yi Pale' crown cement plant, and two other raw materials, sand, quick lime, can be procured locally.

Description of the project

The proposed fiber cement board factory is located near Taung Yinn Village, Sint Kaing Township, and Mandalay Region. The site has an area of 10.11 acres.

The proposed factory is located at U Paing Plot No.90/b, 97, 98, 99/1, 99/2, 100, 101, 110 and 143, Taung Yinn Village Tract Area, Sint Kaing Township, Kyaukse District, Mandalay Region. The coordinates are N. Lat. 21° 40' 27.17" and E. Long. 96° 08' 19.19" and the elevation is 297 ft. asl.

The production capacity is 5 million square meters/year of 2440 × 1220 × 6 mm fiber cement boards. The brand is "Target".

Budget : Ks – 19931.31 millions

The main components of the fiber cement board factory:

The facilities comprise: central control room; sand preparation section; pulp preparation section; cement and auxiliary materials storage; sand slurry storage; pulp slurry storage; batching section; board forming section; receiving section; stacking section; press section; pre-curing section; re-stacking section; auto clove system; de-stacking system; drying system; thickness sorting system; sanding section; edging and chamfering section and thickness sorting section.

In addition there are: boiler system; air compressor system; clean and recycled water tanks; flocculants system; waste materials system and cleaning and oiling section. The buildings and structures include:

the main long linear factory (production); preparation factory; control room, warehouses and silos; office, 4 housings (bachelors, family line, for officers, for foreign technicians); kitchen & messing hall, and others such as boiler house and stack; generator house; transformer; diesel storage, a variety of tanks, etc.

The raw materials are: cement, sand, pulp and quicklime. They are prepared into mixture slurry and the slurry is made into fiber cement boards.

The project is in the final stage of Construction Phase. Virtually the construction of all the buildings and structures are completed. Some machinery and equipment are in the process of installation.

Implementation schedule -

- (i) Pre-construction phase : 1 year (2019); already completed.
- (ii) Construction phase : 1 year (2020); however still in process of construction due to outbreak of COVID-19 pandemic and other issues. It is expected that operation will commence in mid-2023.
- (iii) Operation Phase : 30 years (2023-2053), (expected)
- (iv) Decommissioning Phase : 1 year (2054).

- Works during the Pre-construction Phase: design, planning and all paper works.
- The main tasks during Construction Phase: Clearing the land; fencing; mobilization of materials; construction works; plumbing and electricity; final touch; installation of some machinery; removal of all construction tailings; tidy up.
- The main tasks during the Operations Phase: test running the factory; routine operation and production works; storage and marketing of products; regular monitoring and maintenance works; regular recruitment of raw materials and continual operation/production works; implementation of EMP and taking mitigation measures.
- Main works during Decommissioning Phase: isolation and shutdown of the factory; dismantling works; reuse or put up for sale for some materials and disposal for some; removal of contaminated soil; if any; tidy up the site; test air, water and soil quality for the last time and rehabilitation/reforestation of the site.

Alternative:

Location alternative: formerly three sites in the region were taken into consideration. This site is selected because it has access to motor road and gridline electricity: Sand and quick lime can be easily procured locally, and cement is readily available from the parent company, Ngwe Yi Pale' cement factory, 60 miles away. Water is sourced from underground water, at 270 feet depth.

Raw materials alternative: Paper pulp has to be imported from USA and Canada because locally available old paper card boards are of low quality and not available in large quality in the long term.

Technology alternative: asbestos fiber has health issue (carcinogenic) and therefore ecofriendly cellulose (pulp) fiber technology is applied.

Orientation alternative: Since the manufacturing of fiber cement boards involved long sheet making machine and very long trolley conveyors the factory has to be a long linear factory (running from north to south in the eastern portion of the site. In this way more land space are available for greening and landscaping).

Work performance alternative: work smarter alternative is preferred to work harder alternative. Virtually all process is fully automated, enhancing production efficiency, mechanical labour is preferred to manual labour; the former is maximized while the later is minimized.

The no go alternative/no project alternative: This is not considered. The no go alternative will not contribute to development of infrastructure and the construction sector of the nation. The no go alternative will not contribute to more local employments, and will not contribute to the socio-economic development of the local area and the nation; and will not contribute to the increase in GDP and increase in earnings for the nation (in the forms of a taxes, duties, revenues etc.).

Description of the surrounding environment:

The project was formerly unproductive farm lands purchased from the local owners.

There are two villages, Taung Yinn and Bellin, in the west.

There are 7 other factories in the area:

- Ngwe Moe Hein metal refinery in the north west
- Shwe Nagar Joss sticks and tissue paper factory and
- Soe Moe awning/sheet factory both in the west
- Myanmar Linn Kyan shoe factory in the adjacent south west
- MEC stone slab factory and
- U Thar LED lamps/lighting bulbs factory, both in the east, and
- Be Ka plastics factory further east.

In the north is the Prison Department facility and is the adjacent south is the housing complex for Myanmar Electric Power Enterprise (MEPE) employees.

The physical components of the surround environment

Topography: The area on the whole is a flat terrain with only shrubs and scrubs (no forest).

The site was formerly dry farm lands purchased from the local owners.

There are two hills, namely Myint Mo Taung in the west and Sin Kyauk Gyi Taung in the north west. The elevation at the site is 297 feet asl.

There are no water courses or water body in the area, (no surface water). Villagers of Bellin source water from the canal but many have tube wells. The villagers of Taung Yinn source water from their tube wells; many purchase bottled water for drinking.

Local geology: the region is within the eastern periphery of the Dry Zone of Central Myanmar. The area is bounded in the west by north-south trending low flat range of upper tertiary bed and in the east by the western limit of Shan Plate. The area is alluvial valley mainly made up of sandy clay and loam. Geological components distributed at the site generally from top to bottom are alluvial top soil, debris deposit, gritty sand stone and small band of shale.

Surface soil sample from the project site, Taung Yinn Village and Bellin Village were taken and analysed in Yangon. The results are shown in Chapter 5 (5.5).

Water samples from tube wells were taken from the project site, Taung Yinn Village and Bellin Village and analyzed in Yangon. The results are shown in Chapter 5 (5.5).

Ambient air qualities were tested at the project site, Taung Yinn Village and Bellin Villages. The results are shown in Chapter 5 (5.5).

Noise levels were measured at the project site, Taung Yinn Village and Bellin Villages. The results are shown in Chapter 5 (5.5).

Climate

The area being in the Dry Zone has tropical dry zone climate.

Meteorological data were not available at Sint Kaing Town and, therefore, were taken from Kyaukse Meteorological Department (secondary data). Except rainfall, other meteorological data, e.g. temperature, humidity, wind speed are not available.

The monthly rainfall in Kyaukse District over periods of 7 years (2015 - 2021) is shown in Chapter 5 (5.5).

Biological components of the surrounding environment

All data on biodiversity are primary data.

Flora

There are no forest, only shrubs and scrub land and predominantly dry farm land.

All large trees are artificial vegetation (cultivated plants/trees) such as shade trees, and fruits trees. The natural vegetation is small shrubs and grass.

90 species of natural vegetation (natural biodiversity) and artificial vegetation (artificial biodiversity) were found and recorded. The lists are shown in Chapter 5 (5.6).

Fruit trees, namely, mangos, tamarinds and toddy palms are dominant.

Those that are in the IUCN Red List (2023) are mentioned.

Fauna

- Avianfauna (birds): 68 species are found and recorded. The list is shown in Chapter 5 (5.6). All birds are commonly found birds such as forest birds and city birds.
- Herpetofauna (amphibians and reptiles): 3 species of amphibian and 12 species of reptiles are found and recorded. Most are house lizards.
- There are no big wild mammal only small mammals such as Ayeyarwaddy squirrel, Northern tree shrew, rat and mouse. Fauna that are in IUCN Red list (2023) are mentioned.

As these are no surface water course and water body there are no aquatic floras or fauna to be studied.

Socio-economic component of the surrounding environment

The two above-mentioned villages are incorporated into EIA study area.

Both Taung Yinn and Bellin village have easy access to road and railway (The Yangon - Mandalay Highway and Railway). Both also have access to National Gridline electricity.

Water is mainly sourced from own tubes wells and bottled water, purchased. Bellin has also access to irrigation canal water for cultivation and domestic uses.

Non-living natural resources such as sand and lime are quite abundant in the area.

Facts and figures on the socio-economic feature of the two villages:

- Bellin has 166 houses and a population of 918; while Taung Yinn has 80 houses and a population of 170.
- Both villages have Bamar ethnic (100%) and Buddhist religion (100%).
- 70% of both villages' households work in factories in the region.
- 10% of Bellin's households and 30% of Taung Yinn's households works as vendors, seasonal jobs and odd jobs. Many farmers now work in factories.
- 20% of Bellin's households work in government service; there are none at Taung Yinn Villages. The daily wages of the area range from Ks 5000 - Ks 8000.
- When compared with the other far flung dirt poor rural villages of the country the locals here are better off and the living condition relatively higher.
- Bellin Village has one BEHS with 752 students and 27 teachers; 3 BEPS with a total of 410 students and 16 teachers.
- Taung Yinn Village has only one BEPS with 163 students and 5 teachers.
- Adult literacy rate is 95% and 98% for Bellin and Taung Yinn, respectively.
- Bellin has 1 public clinic and 2 private clinics; Taung Yinn has none. Sick or injured villagers mostly go to Kyaukse District hospital, 4.2 miles away in the south.
- Bellin has one village library; Taung Yinn has none.
- Virtually all houses in Bellin are made of bricks while at Taung Yinn virtually all are wooden houses.
- There are 20 vehicles at Bellin while Taung Yinn has only 5.
- All households at both villages have one motorcycle, one television set and hand phone for each household.

Cultural components of the surrounding environment

All villagers of both villages are Bamar Buddhists. Bellin has 4 monasteries with 20 monks while Taung Yinn has 3 monasteries with 15 monks.

There is no famous pagoda in the area; any annual pagoda festivals or grand religious festival.

The elders go to the monastery during the Sabbath Days (full moon day, new moon day, and the two 8th days of Burmese Calendar months); take refuge and observe the 8 or 9 precepts administered by the abbot monks.

Many still worship or propitiate the "nats" or guardian spirits, a tradition that originated in ancient time before the era of King Anaw-ra-hta, in ancient time (late Bagan Dynasty)

Kyaukse area was one of the centers of civilization and some cultural zones such as, the Paleik culture zone and Mec-hka-yar culture zone are in the Sint Kaing Township area.

Impacts and mitigation measures

The potential impacts envisaged, identified and assessed are as following.

During the Pre-construction Phase

- (1) The potential hiking of land and property prices due to the establishment of the fiber cement board.
- (2) The probable polarization of the locals into pro-project and anti -project groups due to the instigation of by environmental activists.

Note - The pre construction phase had already ended and no such impacts have occurred.

During the Construction Phase

1. Impact on air environment
2. Noise and Vibration
3. Impact on land environment
4. Impact on water environment (especially underground water)
5. Impact of wastes (solid and liquid)
6. Occupational health and safety issue
7. Potential social issue
8. Potential security issue

Note: Impact on biological component (biodiversity) not anticipated as. There is no natural forest to be impacted; only farms and fields.

The project is in the final stage of construction; but after completion of construction work, all these impacts will be ceased.

During the Operation Phase

1. Impact on air environment
2. Noise and Vibration
3. Impact on land environment
4. Impact on water environment
5. Impact of waste (solid and liquid)
6. Potential impact on traffic
7. Occupational health and safety issue
8. Potential social issue
9. Potential security issue

Some of the impacts (e.g. 1, 2, 3, 4, 5) can be quite significant, if not mitigation and well-managed. But all can be mitigated.

During the Decommissioning Phase/Rehabilitation Phase

1. Potential occupational health and safety issue
2. Potential residuals impacts.

Mitigation measures

Different options of mitigation measures to be taken for each and every potential negative impact during the 4 phases of the project are described in technical details in tabulated forms in Chapter 6 (6.2.3.2). These will be only summarized in the executive summary.

I. Mitigation measures to be taken during the Preconstruction Phase (summarize in tabulated forms)

Sr. No.	Impacts	Mitigation measures
1.	Potential hiking of price of land and property	<ul style="list-style-type: none">- Early public meeting and consultation.- Staff shall not get involved themselves in speculative business. <p>(inflation is a common phenomenon and shall not be considered a serious issue)</p>
2.	Potential polarization of the local community into pro-project and anti-project groups due to instigation by activists.	<ul style="list-style-type: none">- Early public meetings and consultations.- Prioritize hiring locals over hiring personnel from beyond. <p>(no quick fix solution for this potential impact)</p>

II. Mitigation measures to be taken during the Construction Phase (summarize in tabulated form)

Sr. No.	Impacts	Mitigation measures
1.	Impact on air environment	<ul style="list-style-type: none"> - Plan in the Pre-construction Phase for the procurement of equipment, vehicles that emit less smoke (to be certified for emission compliance). - Keep equipment and vehicles well-maintained. - Use fuel with low emission rate. - Avoid open burning of debris. - Do not clear vegetation more than necessary. - Spray water for suppression of dust - Restrict vehicular movement; maintain road clear of mud and dirt. - Limit open stockpile of earth, sand etc - Minimize drop height during loading and unloading of earth, sand or lime. - Provide PPE to workers who are exposed to smoke or dust for long period. - The local community should be able to file complaints regarding dust and smoke.
2.	Noise and vibration	<ul style="list-style-type: none"> - Plan in the Pre-construction Phase for procurement of equipment, and vehicles that emit lower noise level. - Switch off or throttle down equipment during idle period - Avoid construction work at night. - Schedule high noise activity only during day time hours. - Provide PPE to workers exposed to prolonged high noise level. - Manage vibration of machine, equipment and vehicle - Design for stable foundation, even for temporary purpose. - Limit the speed of vehicles. - The local community should be able to file complaints regarding noise and vibration.

3.	Impact on land environment	<ul style="list-style-type: none"> - Avoid, prevent the contamination of land by all means. - Avoid discriminate dumping of solid and liquid waste on ground. - Try to avoid potential destruction of soil profile. - Prevent spill of fuel oil and chemicals; clean up spill with absorbent promptly (do not wash down with water). - Properly instruct workers with respect to handling of fuel and chemical and cleanup of spills. - Bund fuel or chemical depot to prevent spreading of spill. - Display warning signs; identify high risk spill area (generator, fuel tank). - Implement soil conservation techniques to prevent soil erosion (during rainy season). - The ground should not be laid bare for long period during the rainy season. - Dispose all waste materials (from construction work and from domestic use) at approved land fill. - Train workers for good housekeeping; do not litter; do not dirty your place. - The local community should be able to file complaints if their lands are impacted.
4.	Impact on water environment (ground water)	<ul style="list-style-type: none"> - Do not use water more than necessary during the Construction Phase. - Discipline workers for the conservation of water. - Avoid the spillage of fuel oil which will contaminate the soil and eventually ground water. - If there is spillage clean up spill with absorbent promptly (do not wash down with water). - Properly train workers with respect to handling of fuel oil and cleanup of accidental spill. - Adequately maintain vehicles and machinery to prevent spillage resulting to ground water contamination. - Bund fuel depot to prevent spreading of fuel oil - Display warning signs; identify high spill areas (generator, fuel tank etc). - Avoid indiscriminating disposing of waste (solids and liquids). - The local community should be able to file complaint, if there is any impact on their drinking water.

5.	Impact of waste (construction waste)	<ul style="list-style-type: none"> - Avoid open burning of debris - Dump waste at approved landfills - Educate and train workers for good housekeeping - Put up left over construction materials for sale - Hire a contractor for tidying up the site after completion of construction work - Ensure that no left over material or residual waste remain after the construction work
6.	Occupational health and safety	<ul style="list-style-type: none"> - Set up "Safety First" sign boards at places where workers can see easily. - Create safety condition for all workers; create accidents free environment. - Educate, train and supervise construction workers for good working practice, good engineering practice, good safety practice and good housekeeping practice so that these good practices will be ingrained in each and every worker's mind. - Try to meet all statutory requirement for safety construction (rules, regulation, labour Act). - Provide adequate Personal Protection Equipment (PPE) where necessary. - Keep first aid kits well-stocked with medicine and drugs. - Prohibit the drinking of alcohol during working hours; ban the use of narcotics among workers. - Plan and manage for effective emergency response. - Educate and train workers for health education and hygiene - Installation of lightning rods and arresters to avoid or prevent lightning strikes - Apply safe and effective procedure for storage and handling of fuel and chemicals - Provide proper sanitary facility eg. toilets, bathrooms - Display addresses/phone numbers of Fire Brigade, worker can see easily

7.	Potential social issue	<ul style="list-style-type: none"> - Educate and train workers on discipline and code of conduct. - Try to build good relation with the locals. - Conduct public consultation so that the locals will have a positive perception on the project. - Educate the workers for appropriate behavior when dealing with locals; to respect their culture and tradition. - Apply punitive measures such as suspension of the wrong doer. - Strictly prohibit the drinking of alcohol during working hours; ban the use of narcotics and stimulants. - Deal with workers on a fair and square basis. - Avoid unhealthy relationship with workers; they should not be over worked and underpaid. - Maintain the good relation between the company and the locals.
8.	Potential security issue	<p>Fencing or walling of the factory compound; prevent theft and vandalism by all means.</p> <ul style="list-style-type: none"> - Control all access gates; deploy security personals gate full time. - Keep materials under lock and key where possible. - Ask the construction contractor to discipline his workers. - Take punitive measures (suspension or termination of employment) for wrong doer.

III. Mitigation measures to be taken during the Operation Phase

Sr. No.	Impacts	Mitigation measures
1.	Impact on air environment	<ul style="list-style-type: none"> - Procure ecofriendly machinery and equipment that generate less smoke – (equipment with air emission specification/equipment that are brand new). - Ensure that the height of the stack is up to standard (the stack height will be 60 m). - Ensure for complete combustion of coal to reduce emission; if possible use coal will low sulphur content. - Apply bag filter, dust collector; also install air compressor filters.

		<ul style="list-style-type: none"> - Install water sprinkler system between boiler (combustion chamber, furnace) and the stack to mitigate PM and also NO₂, SO₂, CO₂. - Minimize gas emission by proper training, operation and maintenance of machinery and vehicles. - Regularly check all machinery vehicle well-operate, well-maintained, well-lubricant machinery reduce smoke emission. - Always avoid open burning of trash and debris - Regularly spray water for dust suppression - Restrict vehicular movement, set up speed limit - Prevent spillage of sand, cement, and lime powder during transportation. - Regularly clean road surface. - Minimize dust emission at sand, cement, preparation section, slurry preparation. - Also minimize dust emission at stacking, smoothing sanding and edging of the boards. - Provide adequate PPE (face masks, nose and mouth covers) where necessary. - Control smoke and dust biologically (plant fast growing trees inside the compound) - The local community should be able to file complaint regarding smoke and dust; heed to their complaint.
2.	Noise and vibration	<ul style="list-style-type: none"> - Procure machinery/equipment that are brand new and ecofriendly that emit lower noise level. - Keep equipment/machinery well-operated, well-maintained and well-lubricated - If necessary install noise containment/sound insulation for noisy machinery. - Limit the speed of truck and heavy machinery to reduce noise and vibration. - Install insulator or shock absorber, if possible, to mitigate vibration. - Design for stable foundation in the first place for machinery that vibrates. - Plant fast growing trees; create green belt to abate noise for the environment. - Provide PPE (ear muffs, ear protections) where necessary. - The local community should be able to file complaints regarding high noise level; heed to their complaints.

3.	Impact of land environment	<ul style="list-style-type: none"> - Avoid prevent by all means that will cause land pollution. - Educate, train and supervise workers for good working practice and good housekeeping practice until these practices have ingrained in their mind set and become good habit, (do not litter, do not dirty your place). - Systematic storage and handling of raw materials – sand, cement, soft wood pulp, lime etc. is imperative. - Ensure that activities at quarts sand section, pulp section, slurry preparation section do not result in land contamination. - Ensure that industrial and domestic wastes (both solid and liquid) are systematic collected and disposed (at the landfill approved by the authority). - Avoid spillage of fuel on the ground (should spillage occur do not wash down with water but immediately removed using absorbent – e.g. rags, saw dust). - Prevent erosion and sedimentation by all means (network of sound drainage system is imperative). - Minimize the area of bare soil exposed as practical as possible.
4.	Impact on water environment (ground water)	<ul style="list-style-type: none"> - Ensure that the use of water for the manufacturing of cellulose fiber cement board do not have adverse impact on ground water, especially the quantity of ground water. - The use of water should be within the stated work frames (not more than 60 tons/day) - Monitor the consumption of water daily or weekly. - Educated and train workers for conservation of water or if possible minimization of water uses. - Recirculate and reuse water as much as possible (there are two large tanks for clean and recycled water). - Avoid spillage of fuel oil or chemical on ground which will eventually percolate to ground water (immediately remove all accidents oil spill). - Ensure that accidental spill or leak from fuel oil depot do not eventually impact ground water (seal the ground floor and bund the fuel depot to prevent spreading of fuel oil).

		<ul style="list-style-type: none"> - Educate and train workers for systematic storage, handling and uses of fuel oils. - Adequate maintain machinery and vehicles to prevent spillage, resulting to ground water contamination. - Display warning signs; identify potential high spill areas (fuel depot, generators).
5.	Impact of waste (solid and liquid)	<p><u>Solid wastes</u></p> <ul style="list-style-type: none"> - Install bag filter, dust collector to systematic collect combustion residuals. - Reuse the rejects, (wet slab) resulting from water jet cutting of wet fiber cement boards (there is a waste materials recycle system). - Collect the reject (destroyed boards) and discard them at the landfill. - Systematically collect dust and small bits and pieces of board resulting from smoothing, sanding, edging and chamfering activities. - Industrial solid waste in the form of packing materials (cement bags, packing materials for imported pulp, and all other packing materials) that are generated from time to time to be reused or given away to locals or discard at land fill. - Avoid open burning of these wastes. - Collect domestic solid waste in at least two kinds of bins (recyclable and non-recyclable); reuse or put up for sale the recyclable one while discard the non-recyclable one at the landfill. - Make organic waste (kitchen waste) into compost for greening. <p><u>Liquid waste</u></p> <ul style="list-style-type: none"> - Construct sound drainage network in the first place. - Educate and train workers for conservation of water; water consumption should be within the stated work frame (60 tons/day). - Treat raw water before use; apply conventional sand and carbon filter, and water softness. - Recycle the used water/processed water for reuse apply circulating water vacuum pump; (the factory have two large clean and recycled water tanks). - Drain ash water into collector pond and later manually discard.

		<ul style="list-style-type: none"> - Apply defoaming agent to tackle foam issue. - Set up a flocculants system to tackle the suspended particles issue; - Collect slurry discharge from flow on sheet making machine into hopper and discharge at drainages system. - Remove oil and grease (the factory has cleaning and oiling section to do this). - No special waste water/used water treatment in early phase but later will install waste water treatment equipment. - As regards domestic waste water from kitchen, messing hall and bath will flow into the drain and end up in waste water sink, west of the factory. - Sanitary water from toilet will end up in septic tank and soak pit.
6.	Potential impact on traffic	<ul style="list-style-type: none"> - The factory has only 5 office vehicles but trucks have to be hired for transportation of raw materials and finished products; educate all drivers not to cause traffic congestion by any means. - Schedule the logistics; avoid rush hours; if possible avoid road with heavy traffic. - Educate drivers, staffs (motorists and motorcyclists) for defensive driving; drive at reduced speed. - Most of all educate them for observing strict traffic rules. - Set up signage at the intersection of the factory and access road and Bellin-Ye-ywar Road. - Avoid overloading of truck, or any vehicles. - Regular maintenance of cars and motor bikes. - Deploy traffic control staffs at the entrance of the factory and at the parking area; systematically control the parking area. - Provide enough parking spaces for all cars (the company has enough parking lot for many cars). - Local community should be able to file complaints regarding traffic issue.
7.	Occupational health and safety	<ul style="list-style-type: none"> - Create a safety work place and try to achieve zero accidents at the work place. - Comply with Factory Acts 1974; Boiler Law, 2015; the Social Security Law, 2012 and Workmen's Compensation Act, 1923.

		<ul style="list-style-type: none"> - Educate train and supervise workers for good working practice, good safety practice, good house-keeping practice and good health and hygiene practice until all these practices are ingrained in their mindsets and become good habits. - Especially educate, train and supervise them for skill, for handling and operation of equipment, handling and application of chemicals. - Educate and train them for environmental awareness and OHS hazards. - Keep all machinery and equipment well-maintained, well-operated and well-lubricated (regular check necessary). - Provide adequate PPEs eg. outfit, boots, helmet, gloves, face mask, goggles, ear muff etc where necessary. - Beware of all the common accidents that used to happen and implement prevention, protection and mitigation measures. - Organize first aid training and firefighting training for some workers. - Provide adequate First Aid Kits well-stocked with medicines and drugs. - Provide adequate Fire Extinguisher, firefighting equipment and other associated device; keep water tank always full for firefighting. - Provide relevant PPEs where necessary (boots, helmet, gloves, outfit, face mask, ear muffs etc.) - For emergency response organize mock drill and rehearsal from time to time. - Phone numbers and addresses of Red Cross Society, Ambulance Service, Fire Brigade, Police Station, and Sint-kaing Hospital must be displayed so that everyone can see easily. - Give treatment to sick or injured workers with First Aid Treatment; immediately admit to Sint Kaing Township Hospital or Kyaukse District Hospital for serious sickness or injury. - Take out insurance for the factory; and also take out fire insurance
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8.	Potential social issue	<ul style="list-style-type: none"> - Prevent or minimize negative impact on socio-economic life of the local. - Build and maintain good relation with locals. - Appoint an affable staff as a liaison officer of the company to deal with the local in an affable manner. - Hold public consultation from time to time. - Educate the workers for etiquette, and respect the custom and tradition of the locals, - Manage misbehaviors and social illness of workers. - Keep separate housing for bachelor and female line - Provide proper training on work place regulation and code of conducts. - Provide welfare programme (The company has a good programme). - Educate and discipline workers for conducts. - Deal with workers on a fair and square basis; not to overwork and underpaid; need to overtime works, if any, and duly pay them. - Take punitive action on wrong doer, eg sacking, dismissal. - Heed to the voice of the locals, their view, and concern, if any.
9.	Potential security issue	<ul style="list-style-type: none"> - Effective fencing/walling of the site. - Control all accesses; set up security gates; deploys guards. - Do not let workers mingle freely with locals. - Do not let the workers enter the neighbouring village without pre-authorization. - Put certain materials under lock and key. - Apply punitive measures to wrong doer. - Provide ID cards for all for easy identification. - Provide uniform for all.

IV. Mitigation measures to be taken during the Decommissioning Phase

Sr No.	Impacts	Mitigation measures (if decommissioning has to be undertaken)
1.	Potential occupational health and safety issue	<ul style="list-style-type: none"> - Hire a decommissioning contractor and party for the demolition of the building, dismantling of equipment and tidying up the site. - Reuse or put up for sale some materials that are still usable and saleable. - Dispose those that are no longer usable. - Send old obsolete machinery and equipment to smelting mill. - Remove all contaminated soil, if any. - Test the condition of the soil for the last time. - Also test the quality of air and water for the last time. - Level the ground, plant trees and commence rehabilitation work and restore the site to its original condition.
2.	Potential residuals impact	<ul style="list-style-type: none"> - Remove and dispose contaminated soil. - Ensure that all contaminated are removed and cleared. - Conduct final chemical testing of soil. - Restore the soil to its natural condition as far as possible - Ensure that the ecology of the site is restored to its quasi-original condition. - Ensure that in the aftermath of the project the site is safe for the local people; that the air, land and ground water are not polluted.

Environmental Management Plan

Legal requirement (laws, rules, regulations)

36 relevant laws, rules, and regulations are listed and relevant sections and rules from each law, rule and regulation are excerpted and reproduced in Chapter 3 (3.2).

In this executive summary, only some of the names or titles of laws, rules and regulations are mentioned:

The Environmental Conservation Law, 2012; The Environmental Conservation Rules, 2014; Environmental Impact Assessment Procedure, 2015; National Environmental Quality (Emission) Guideline, 2015; Myanmar Investment Law, 2016; Myanmar Investment Rules, 2017;; Private Industrial Enterprise Law, 1990; Electricity Law, 2014;; Myanmar Insurance Law, 1993; Boiler Law, 2015; Settlement of Labour Disputes Law, 2012; Employment and Skill Development Law, 2013; The Social Security Law, 2012; The Factories Act, 2016; National Waste Management Strategy and Action Plan (2018-2030); Myanmar Public Health Law, 1972; Occupational Health and Safety law, 2018; Fire Brigade Law, 2015; The Prevention of Hazards from Chemical Substances Law, 2013,

among others.

Mitigation measures

Different options of mitigation measures to be taken for each and every impact during the 4 phase of the projects are described in technical details in tabulated form in Chapter 6 (6.2.3.2). These are already summarized earlier.

Monitoring programme

Comprehensive monitoring plan is described in relative details in Chapter 6 (6.2.5). For the chapter on EMP purpose monitoring plan for the Operating Phase and Decommissioning Phase are reproduced here.

Summary of monitoring programme for Operation Phase (tabulated form)

Sr. No.	Components	Parameters to be monitored	Monitoring place/spot	Frequency	Responsible persons	Costs (once off cost)
1.	Air quality	- monitor all the parameters for air quality for comparison with NEQEG emission guideline values prescribed by ECD Code no.1.1 (PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , VOC)	Project site: N 21° 40' 25.79", E 96° 8' 21.84" Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78" Bellin Village: N 21°40'23.82", E 96° 7'40.34"	- Every six months	- Hired technicians	- Ks 3,000,000
2.	Effluent	- monitor all the parameters for effluent for comparison with NEQEG effluent guideline values prescribed by ECD Code no. 1.2 (BOD, Ammonia, Arsenic, Cadmium, COD, Chlorine, Chromium, Copper, Cyanide, Fluoride, Iron, Lead, Mercury, Nickel, Oil and grease, P ^H , Sulphide, Temperature, Total Coliforms bacteria, Total phosphorus, TSS, Zinc)	N 21°40'27.88" E 96° 8'23.60"	- Every six months	- Hired technicians	- Ks 300,000
3.	Underground water	- monitor all the parameters for myanmar drinking water standards by OEHD (total coliforms, taste, odor, color, turbidity, arsenic, lead, nitrate, manganese, chloride, hardness, iron, pH, sulphate, total dissolved solids)	Project site: N 21° 40' 21.51", E 96° 8' 22.06" Taung Yinn Village: N 21°40'16.43", E 96° 7'59.40" Bellin Village: N 21°40'23.26", E 96° 7'39.34"	- Every six months	- Hired technicians	- Ks 600,000

4.	Soil	- monitor all the parameters (P ^H , Texture, Moisture, Nitrogen)	Project site: N 21° 40' 23.30", E 96° 8' 21.20" Taung Yinn Village: N 21°40'16.01", E 96° 7'58.79" Bellin Village: N 21°40'23.75", E 96° 7'38.91"	- Every six months	- Hired technicians	- Ks 150,000
5.	Noise and vibration	- monitor the noise level for comparison with the NEQEG noise level values prescribed by ECD Code no. 1.3. - monitor the wearing of PPE	Project site: N 21° 40' 25.79", E 96° 8' 21.84" Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78" Bellin Village: N 21°40'23.82", E 96° 7'40.34" - At work place near noisy machine	- Quarterly - From time to time	- Hired technicians - EMP cell members	- Ks 300,000 - Free of charge
6.	Solid waste	- monitor the packing materials collection and disposal - monitor trash/garbage generated, collection and disposal	N 21° 40' 21.03", E 96° 8'24.56" N 21°40'22.40" E 96° 8'18.87"	- Daily - Weekly	- EMP cell members - EMP cell members	- Free of charge - Free of charge
7.	Waste water	- monitor the management of domestic waste water	N 21°40'22.62", E 96° 8'18.66"	- Daily	- EMP cell members	- Free of charge

Summary of monitoring programme for Decommissioning Phase (tabulated form)

Sr. No.	Components	Parameters to be monitored	Monitoring place/spot	Frequency	Responsible persons	Remarks
1.	Decommissioning and Rehabilitation	<ul style="list-style-type: none"> - monitor the Decommissioning process including the removal of all residuals, if any - monitor rehabilitation process 	<ul style="list-style-type: none"> - Inside the compound - Inside the compound 	<ul style="list-style-type: none"> - Weekly - Monthly 	<ul style="list-style-type: none"> - EMP cell members - EMP cell members 	<ul style="list-style-type: none"> - Free of charge - Free of charge

Note: There will be specific regular monitoring on physical components, namely, air, water, soil quality on a semi-annually basis throughout the whole long Operation Phase, as instructed by the environmental authority, the ECD. Technicians will be hired for this task and the semi-annual report will be duly submitted to ECD.

Fund for implementation of EMP

The budget for the project is Ks 19931.31 million. 5% of the project (Ks 996,565,500) is set aside for EMP fund. Allotment of EMP fund is as follow:

- cost of organization EMP - 2 % of EMP fund (Ks 19,931,310)
- cost for capacity building and training - 7 % of EMP fund (Ks 69,759,585)
- cost for procurement of specific equipment and material for EMP - 10 % of EMP fund (Ks 99,656,550)
- cost for taking mitigation measures - 30 % of EMP fund (Ks 278,969,650)
- cost for monitoring actions - 30 % of EMP fund (Ks 278,969,650)
- cost for emergency/contiguous - 10 % of EMP fund (Ks 99,656,550)
- cost for reporting, documentation - 7 % of EMP fund (Ks 69,759,585)
- Miscellaneous including casual fees for two villagers who are part time EMP cell members - 4 % EMP fund (Ks 39,862,620)

It is estimated that the EMP fund is adequate for the whole life of the project. But if not, more money will be added to the fund. The main portion of this EMP fund will be on mitigation and monitoring activities.

There is no EMP contractor in Myanmar yet. Therefore, the staff will be trained for implementation of EMP. (EMP cell leader and members). Since they are full time well-paid employees there will be no extra expense for these EMP cell members.

There will be addition EMP fund for execution of Decommissioning. Since this will happen only after 30 years from now, no exact amount of money is set aside for Decommissioning works.

Management and monitoring sub-plans

As prescribed by ECD in Environmental Impacts Assessment Procedure, Notification No.616/2015 management and monitoring sub-plans are described in relative details in tabulated forms in this EMP Chapter, (Chapter 8, 8.5).

The management and monitoring sub-plans have addressed the environmental and social management and monitoring issues such as: noise, vibration, waste, hazardous waste, waste water and storm water, air quality, odour, chemical, water quality, erosion and sedimentation, biodiversity, occupational health and safety, cultural heritage, employment and training and emergency response .

Each sub-plan is described in the accordance with the contents format prescribed in EIA procedure, 2015.

Public consultation

Two public consultation meetings have been held; the first one during the scoping study period, (February, 2020) and the second or during the EIA study period (November, 2022).

(1) Public consultation meeting during the scoping study trip

Date : 20-2-2020

Time : 09:30 - 10:35 hrs.

Venue : in the factory compound underneath trees

Attendees : 48 persons.

(All heads of households were invited)

Due to the prevailing condition of COVID - 19 pandemic the meeting was limited.

The responsible officer of Sann Shinn & Brothers Co., Ltd explained in relative details about the proposed project and the leader of Scoping Team explained about the EIA study to be conducted.

Four locals asked question and gave comments. Two locals have spoken in support of the project, while one local asked whether there will be any bad odour from the proposal factory. The responsible officer replied that there will be an odour (unlike food factory fiber cement boards factory does not generate bad odour).

One local wanted to know why air quality will be test. Is it for the factory or for the local community? The Scoping Team Leader replied that air quality will be tested for the good of all; it will be base line data to be compared later with the later data when the factory is in operation.

The meeting has ended in a cordial and friendly manner. The company has employed many locals during the Construction Phase and will prioritize employing the locals during the long Operation Phase.

Public consultation meeting during the EIA study trip

Date : 2-11-2022

Time : 10:00 - 11:00 hrs.

Venue : at the factory

Attendees : 74 persons

First of all the responsible officer of the company explained to the attendance regarding the project. Then the leader of EIA team explained to them about the EIA study.

The Administrator of Bellin Village said that he has nothing to say against the project. He asked the factory authority to carefully scrutinize. The locals who will be applying for jobs at the factory. He said that there are many temporary migrants coming from elsewhere and live in the village, and that only the original villagers should be employed. He and members of village administration will give letters of recommendation to only our bona fide villagers.

The Administrator of Taung Yinn Village also expressed the same concerns regarding migrants, and asked the factory officer to prioritize employing only the true local villagers.

The chairman of the local social welfare association said that he was delighted to attend such public consultation meeting. He said there are over 50 factories operating in the region but only this factory so far is holding such a consultation meeting.

He then urged the factory authority to seriously consider and undertake environmental protection.

Finally he said he was glad to see the emergencies of a new factory because it will bring jobs for our youths.

The factory manager explained to the attendances about the uses of two chemicals in very small quantity, only occasionally and that any minor effect can be mitigated.

The leader of EIA urged the company to continue and carry on CSR programme when the factory is in full operation.

The meeting has ended in a cordial and friendly manner. The locals people very well realize that the factory will provide permanent and steady jobs for many of them.

Copies of minutes of meeting were made available at the office of the project proponent and that of MESC. When the EIA report is approved part of the report, for instance, Executive Summary will be launched of websites of the company and MESC consultant firm.

Conclusion

This EIA report has been organized, prepared and written in accordance with the rules, regulations guidelines and most of all, the format for EIA prescribed by the Environmental Conservation Department (ECD) of the Ministry of Natural Resources and Environmental Conservation (MONREC).

The report has been prepared with utmost effort with all reasonable knowledge, skill, care and diligence within the term of contract with the client. Recommendations are based on our experience, using professional judgement and based on available information.

For a Least Developed Country (LDC) like Myanmar with infrastructure lagging behind the development and production of new sound building materials like cellulose fiber cement boards is a real development for the nation Construction Sector.

In this era of environment awareness there are now many well-established guidelines for the prevention or mitigation measures which can more or less eliminate or minimize all or most of the undesirable impacts resulting from the execution of a project. There are also appropriate measures (mitigation, corrective, remedial) that can limit or minimize the impacts as well as measures for maintaining the long term well-being of the environment.

To sum up, Sann Shinn & Brothers Co., Ltd will:

- comply with all the rules, regulation and statutory requirements
- study and heed to all the impacts/potential impacts addressed in the report and duly carry out all the mitigation/corrective measures prescribed in the report
- implement the EMP, especially all the management and monitoring sub-plans prescribed in the report
- duly undertake the rehabilitation task after the completion of the project

Sann Shinn & Brothers Co., Ltd will do its best and try to become an outstanding and exemplary company among other companies in doing environmentally sound business.

Third party's comment

The third party, that is, the Myanmar Environment Sustainable Conservation (MESC) consultant firm, has conducted EIA studies and has prepared and written this EIA report, strictly complying with the Environmental Impact Assessment procedure, Notification No.616/2015.

The third party urges the project proponent to duly undertake all the mitigation measures and monitoring to be taken and also execute the EMP in a meaningful and effective way.

The third party really believes that, if all the required measures and taken this cellulose fiber cement boards project will be effectively implemented without any serious adverse impact on the physical, biological, socio-economic, cultural and visual components of the area.

2. INTRODUCTION

2.1 Presentation of the project proponent

As mentioned earlier Sann Shinn & Brothers Co., Ltd was registered as a limited company in 2019. It is a subsidiary of Ngwe Yi Pale' Group of Companies, a conglomerate involves in a variety of big business.

The company has already obtained the permit from MIC; document no.247/2020, dated: 6-4-2020.

About the project proponent, Sann Shinn & Brothers Co., Ltd

Name of the project proponent	: Sann Shinn & Brothers Co., Ltd
Address (Head office) Mandalay	: No. 27, 78 th Street (between 26 th x 27 th Street), Chan Aye Thar Zan Township, Mandalay Region
Telephone	: 09 877150456, 09 259996990
E-mail	: hilltribe12@gmail.com
Contact person	: U Lin Thein Aung (Admin Manager)
Phone	: 09 977150336, 09 444002600
E-mail	: lintheinaung777@gmail.com
Location of project site	: U Paing Plot No. 90/8, 97, 98, 99/2, 100, 101, 110, 143, Bellin Village, Taung Yinn Village Tract, Sint Kaing Township, Kyaukse District, Mandalay Region

The company has one managing director, U Thein Myint @ Chaung Hpin and 8 directors.

The company is 100% owned by nationals.

Particulars of executive and administrative body

Name	Nationality & National Registration Card No.	Address of resident	Designation
U Thein Myint @ Chaung Hpin	Myanmar 13/Na Kha Na (Ei)000017	No.(415), S2, Pyay Gyi Yan Lon Quarter, Aung Myay Thar Zan Township, Mandalay	Managing Director
U Win Win Hlaing @ Aye Lyan	Myanmar 13/Na Kha Na (N)018914	No. 5/Kha, 26 th Street, Between 63 rd & 64 th Street, Mahar Zay Yar Bone Quarter, Aung Myay Thar Zan Township, Mandalay	Director

U Kyaw Myint Oo	Myanmar 9/Ah Ma Za (N)022665	No. 5/Kha, 26 th Street, Between 63 rd & 64 th Street, Mahar Zay Yar Bone Quarter, Aung Myay Thar Zan Township, Mandalay	Director
U Kyaw Win Soe	Myanmar 9/Ah Ma Sa (N)024847	No. 5/Kha, 26 th Street, Between 63 rd & 64 th Street, Mahar Zay Yar Bone Quarter, Aung Myay Thar Zan Township, Mandalay	Director
U Myo Myint Aung	Myanmar 13/La Ya Na (Ei)000608	Building (A), Room (G-3), Shwe Gone Thu Housing, Pan Hlaing Quarter, Kyimyindaing Township, Yangon	Director
U Sein Myo Aung	Myanmar 9/Ma Na Ma (N)098578	No.561, Bet: (33 th x 34 th) Street, Pyay Gyi Yan Lon Quarter, Aung Myay Thar Zan Township, Mandalay	Director
U Tun Win	Myanmar 9/Ma Ya Ma (N)053811	No.76, Pyay Gyi Yan Lon Quarter, Aung Myay Tharzan Township, Mandalay	Director
U Soe Moe Aung @ Kyan Pyin	Myanmar 13/Ka Kha Na (N)062819	No. 607, 78 th Street, Between 26 th & 27 th Street, Hay Mar Zala Quarter, Chan Aye Thar San Township, Mandalay	Director
Daw Yin Yin Khine	Myanmar 9/Ah Ma Sa (N)014886	No. 5/Kha, 26 th Street, Between 63 rd & 64 th Street, Mahar Zay Yar Quarter, Aung Myay Thar Zan Township, Mandalay	Director

Number of the shares so allotted payable in cash - 80,000 Shares

Nominal amount of the shares so allotted - 8,000,000,000 Kyats

Amount paid or due and payable on cash such share - 10,000 Kyats

Share members have taken the number of shares as follow:-

U Thein Myint @ Chaung Hpin has taken - 19,000 number of shares

U Win Win Hlaing @ Aye Lyan has taken - 18,000 number of shares

U Kyaw Myint Oo has taken - 10,000 number of shares

U Kyaw Win Soe has taken - 10,000 number of shares

U Myo Myint Aung has taken - 5,000 number of shares

U Tun Naing - 8,000 number of shares

Daw Yin Yin Khine - 10,000 number of shares

80,000 number of shares



ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်
Certificate of Incorporation

SANN SHINN & BROTHERS COMPANY LIMITED
Company Registration No. 122002624

မြန်မာနိုင်ငံကုမ္ပဏီများဥပဒေ ၂၀၁၇ အရ
SANN SHINN & BROTHERS COMPANY LIMITED
အား ၂၀၁၉ ခုနှစ် စက်တင်ဘာလ ၃ ရက်နေ့တွင်
အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ
အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့်ပြုလိုက်သည်။

This is to certify that
SANN SHINN & BROTHERS COMPANY LIMITED
was incorporated under the Myanmar Companies Law 2017 on 3
September 2019 as a Private Company Limited by Shares.

ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ
Registrar of Companies

ရင်းနှီးမြုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန
Directorate of Investment and Company Administration



Figure-1: Certificate of Incorporation



Form (3)

P000214

THE REPUBLIC OF THE UNION OF MYANMAR

Myanmar Investment Commission

PERMIT

Permit No. 247/2020 Dated 6 April 2020

This Permit is issued by the Myanmar Investment Commission in accordance with Section 25 (c) of the Myanmar Investment Law.

- (1) Investor Name U THEIN MYINT
- (2) Citizenship MYANMAR
- (3) Residential Address NO. 5/KHA, 26 STREET, BETWEEN 63 STREET AND 64 STREET, CHAN AYE THAR ZAN TOWNSHIP, MANDALAY
- (4) Name and Address of Principal Organization SANN SHINN & BROTHERS COMPANY LIMITED, NO. 607, 78 STREET, BETWEEN 26 STREET AND 27 STREET, CHAN AYE THAR ZAN TOWNSHIP, MANDALAY REGION
- (5) Place of Incorporation MYANMAR
- (6) Type of Business MANUFACTURING AND SALES OF FIBER CEMENT BOARD
- (7) Place(s) of Investment Project HOLDING NO. 97,98,99/1,99/2,101,143, KWIN NO. 117/TAUNG YIN, TAUNG YIN VILLAGE TRACT, SINTGAING TOWNSHIP, MANDALAY REGION
- (8) Foreign Capital Amount NIL
- (9) Period for Foreign Capital to be brought in NIL
- (10) Total Amount of Capital (Kyat) KYAT 19,931,310,000 (NINETEEN BILLION NINE HUNDRED THIRTY-ONE MILLION THREE HUNDRED TEN THOUSAND KYAT, INCLUDING US\$ 7.16 MILLION)
- (11) Construction/Preparation Period 3 YEARS
- (12) Validity of Permit 50 YEARS
- (13) Form of Investment WHOLLY MYANMAR OWNED
- (14) Name of Company Incorporated in Myanmar SANN SHINN & BROTHERS COMPANY LIMITED



(Thaung Tun)
Chairman

Figure-2: MIC permit

2.2 Presentation of the environmental and social experts

About the consultant firm, Myanmar Environment Sustainable Conservation Co., Ltd (MESC)

Myanmar Environment Sustainable Conservation, MESC is a consultant firm officially registered in 2014 as a limited company (a consultant/service company) at the Ministry of National Planning and Economic Development. Document: YaKa-8(Ga) 001/2014(004720), dated: 6th June, 2014. Registration No. 830/2014-2015, (20-5-2014). The new company registered number is 110649193.

The Transitional Registration/License No. of the consultant firm, MESC is No. 0003, ECD, Dated 1st July 2017.

Contact Address : Room No. (B-5), Building No.67/69, Parami Road, 16 Ward, Hlaing Township, Yangon Region

Contact person : Myint Kyaw Thura
95 9 420105071

Contact number : 95 9 73044903

E-mail : myanmar.esc@gmail.com

Facebook website : www.myanmar.environment.sustainable.conservation.com

Members of MESC who are IEE/EIA appraisers, or IEE/EIA practitioners or who are involved in this IEE/EIA project are as follows:

Name	Nationality & National Registration Card No.	Registration/license No. by ECD	Designation
U Myint Kyaw Thura M.Sc (Zoology)	Myanmar 12/Da Ga Ta (N)028349	0006	Managing Director, Biodiversity Specialist (Fauna), EIA practitioner and EIA Appraiser
U Saw Han Shein B.Sc (Botany) M.Sc (Marine Biology)	Myanmar 10/Ma La Ma(N)008173	0007	Retired Professor, EIA Practitioner and Appraiser
U Tin Tun Aung B.Sc (Engineering)	Myanmar 12/U Ka Ma (N)172111	0009	Engineer and EIA practitioner

U Than Soe Oo M.Sc (Forestry)	Myanmar 9/Ma Na Ma (N) 050808	00011	EIA practitioner
U Oakka Kyaw Thu B.Sc (Geology)	Myanmar 7/Ya Ta Ya (N) 090371	00012	Geologist
Daw Thin Thin Yee B.Sc (Chemistry)	Myanmar 12/Tha Ga Ka (N)039292	00013	Chemical Environment Researcher, Computer Programmer
U Thura Ko B.A (History)	Myanmar 12/Ka Ma Na (N) 124824	00277	Socio-economic expert

- U Myint Kyaw Thura is involved in flora and fauna study, EIA practicing and appraising and writing of report, in part.
- U Saw Han Shein is involved in EIA practicing appraising and report writing (chief report writer).
- U Tin Tun Aung is involved in the EIA practicing and aspects of the report and provision of information, data and facts and writing part of the report.
- U Than Soe Oo is involved in EIA practicing and part of the report writing especially on the socio-economic aspect,
- U Oakka Kyaw Thu is involved in the geological and geographical aspects by conduction desktop survey and gathering of secondary information on local geology.
- Daw Thin Thin Yee is involved in the physical aspects, especially ambient air, water quality, noise and vibration and soil etc and compilation of data on the physical components; including secondary information on weather.
- U Thura Ko is involved in the socio-economic aspects of EIA study.

Actually members of MESC always work together wholly as a tight-knit group in writing of each and every EMP/IEE/EIA report.

In preparation and writing the report MESC group works in a well-coordinated manner with a close-knit mentality. Serious discussions and deliberations are the norm of the day. Internationally accepted methodology and practice are applied such as desktop survey; site visiting and conduction visual inspections and investigations of physical, biological, socio-economic, cultural and visual components; collection and documentation of primary and

secondary data and information; interviews through structured questionnaires, and holding public consultation meeting to ensure transparency and to assess public opinions, views etc. Experts Judgment or Experts Consensus or Ad hoc method is applied.

MESC has also part time members working as free lances.

The firm is not in a position to employ all its part time members on a permanent basis.

These are botanists, zoologists, ornithologists, ecologists, aquatic ecologists, social scientists, engineers, geologists as well as legal experts and medical officers (doctor) working with this firm.

For the physical and chemical environmental studies MESC has to hire experts, from registered laboratory in Yangon. Experts from registered laboratories were hired for the analysis of water (or samples have to be sent to the laboratory) and soil.

Members of MESC have quite a lot of experiences with IEE, EIA and SIA works.



REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION



(ကြားကာလအကြိမ်းပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. ၇၈၀၃ Date ၀၅.၀၃.၁၈

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)

- (a) Name of Organization (အဖွဲ့အစည်းအမည်) Myanmar Environment Sustainable Conservation-MESC
- (b) Name of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ အမည်) U Myint Kyaw Thura
- (c) Citizenship of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ နိုင်ငံသား) Myanmar
- (d) Identity Card /Passport Number of the representative person in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်) 12/ Da Ga Ta (N) 028349
- (e) Address of organization (ဆက်သွယ်ရန်လိပ်စာ) Room No. B-5, Building No.72, Marlar Myaing 6th street, 16 Ward, Hlaing Township, Yangon. myanmar_esc@gmail.com , 09 73044903
- (f) Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) Organization
- (g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်) 31 March 2018



EXTENSION
 သက်တမ်းတိုးကြိုခြင်း
 The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
 ဤလက်မှတ်အား (၁-၄-၂၀၁၈) မှတ်ပုံတင် (၃၁.၃.၂၀၁၉) ရက်နေ့အထိ သက်တမ်းတိုးကြိုသည်။
 See Nang
 13.9.2018
 For Director General
 (See Nang, Director)
 Environmental Conservation Department

See Nang
13.9.2018

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

Areas of Expertise Permitted
(ဇွန်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control
2. Ecology and Biodiversity
3. Facilitation of Meeting
4. Geology and Soil
5. Land use
6. Modeling for Water Quality
7. Socio-Economy
8. Water Pollution Control



Figure-3: Certificate of consultant firm



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
 သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
 ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
 ညွှန်ကြားရေးမှူးချုပ်ရုံး

စာအမှတ်၊ အီးအိုင်အေ-၁/၄ ဆ (၂၂၇၆၇/၂၀၂၀)
 ရက်စွဲ၊ ၂၀၂၀ ပြည့်နှစ် စက်တင်ဘာလ ၁၅ ရက်

ဦးစိန်မျိုးအောင်
 Executive Director
 Sann Shinn & Brothers Co., Ltd.

အကြောင်းအရာ။ Sann Shinn & Brothers Co., Ltd. ၏ ဖိုင်ဘာဘီလပ်မြေပြား ထုတ်လုပ်မည့် စက်ရုံစီမံကိန်းလုပ်ငန်းအတွက် တင်ပြလာသည့် နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာ (Scoping Report) အပေါ် စိစစ်ပြန်ကြားခြင်း

ရည်ညွှန်းချက်။ Sann Shinn & Brothers Co., Ltd. ၏ ၂၄-၄-၂၀၂၀ ရက်စွဲပါ စာအမှတ်၊ ဆရည/၂၀၂၀ (၁၇)/ဌာန-၂၀(၁)

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ Sann Shinn & Brothers Co., Ltd. သည် မန္တလေးတိုင်းဒေသကြီး၊ ကျောက်ဆည်ခရိုင်၊ စဉ့်ကိုင်မြို့နယ်၊ တောင်ရင်းကျေးရွာအုပ်စု၊ ကွင်းအမှတ် (၁၁၇)၊ ကွင်းအမည် (တောင်ရင်း)၊ ဦးပိုင်အမှတ်- (၉၇၅၉၈၂၉၉/၁၉၉၇/၂၀၀၁၊ ၁၄၃)၊ စုစုပေါင်းမြေဧရိယာ (၁၀.၁၁) ဧကတွင် ဖိုင်ဘာဘီလပ်မြေပြားထုတ်လုပ်မည့်စက်ရုံ စီမံကိန်းလုပ်ငန်းအတွက် နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာ (Scoping Report) ကို စိစစ်နိုင်ပါရန် ရည်ညွှန်းပါစာဖြင့် တင်ပြလာပါသည်။

၂။ အဆိုပါ နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း အစီရင်ခံစာ(Scoping Report) အား တတိယအဖွဲ့အစည်း Myanmar Environmental Sustainable Conservation Co., Ltd. မှ ရေးသားပြုစုခဲ့ပြီး အစီရင်ခံစာတွင် အကျဉ်းချုပ်အစီရင်ခံစာ၊ မူဝါဒ၊ ဥပဒေနှင့်အဖွဲ့အစည်း ဆိုင်ရာမူဘောင်၊ စီမံကိန်းအကြောင်းအရာဖော်ပြချက်နှင့် အခြားဆောင်ရွက်နိုင်သော နည်းလမ်းများ၊ လက်ရှိပတ်ဝန်းကျင်အခြေအနေ၊ ဖြစ်နိုင်သောအဓိကပတ်ဝန်းကျင် ထိခိုက်မှုများနှင့် ထိခိုက်နိုင်မှုလျော့ပါးစေရေးနည်းလမ်းများ၊ အများပြည်သူသဘောထား ရယူခြင်းနှင့် သတင်းထုတ်ပြန်ခြင်း စသည့်အချက်များတွင် ပူးတွဲပါအချက်များကို ဖြည့်စွက် ဖော်ပြရန် လိုအပ်ကြောင်း စိစစ်တွေ့ရှိရပါသည်။

၃။ သို့ဖြစ်ပါ၍ Sann Shinn & Brothers Co., Ltd. ၏ ဖိုင်ဘာဘီလပ်မြေပြား ထုတ်လုပ်မည့် စက်ရုံစီမံကိန်းလုပ်ငန်းအတွက် နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း

၂

အစီရင်ခံစာ (Scoping Report) အပေါ် စိစစ်သုံးသပ်ချက်အရ ပူးတွဲပါအချက်များကို ထပ်မံဖြည့်စွက် ရေးသားပြုစု၍ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ ပြန်လည်တင်ပြရန် လိုအပ်ပါကြောင်း အကြောင်းပြန်ကြားအပ်ပါသည်။

၂၀၂၁.၀၂.၂၅

(လှမောင်သိန်း)

ညွှန်ကြားရေးမှူးချုပ်

မိတ္ထူကို

ပြည်ထောင်စုဝန်ကြီးရုံး၊ သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၊
ရုံးအမှတ် (၂၈)

ညွှန်ကြားရေးမှူးရုံး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ မန္တလေးတိုင်းဒေသကြီး
ရုံးလက်ခံ၊ မျှောစာတွဲ

Figure-4: Approval of scoping report by ECD

2.3 Presentation of the Health Experts for projects with Health Impacts

As regards health expert the Consultant Firm (MESC) is not in a position yet, to employ a permanent health experts for EIA.

The consultant firm (MESC) has one part time medical officer (MBBS), who cannot be called an HIA expert yet.

One of the senior members, U Myint Kyaw Thura is the General Secretary of Myanmar Environmental Assessment Association (MEAA) and holds an HIA certificate. (Online training on HIA cosponsored by IFC, Australia Aid and MEAA, Oct 2010. One junior member has attended special lecture classes provided by HIA experts from MEAA.

One day when Health Impact Assessment (HIA) becomes mandatory the company and consultant firm will hire health experts, for this matter.

3. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Corporate Environmental and Social Policies of Sann Shinn & Brothers Co., Ltd

Sann Shinn & Brothers Co., Ltd has environmental policy of its own. The first and foremost policy is to obey, abide and comply with all laws and rules relating to physical and social environment. Most of all, it will follow all the rules and regulations set up by the Environmental Conservation Department, the main agency responsible for environmental management in Myanmar. The company pledges to operate a cellulose fibre cement boards factory that will be environmentally sound as far as possible.

The company will endeavor to:

- operate the cellulose fibre cement boards factory with an environmentally and socially responsible manner and to comply with laws and regulations
- prevent pollution of surrounding area; monitoring and adopting suitable measures for environment protection
- implement EMP effectively to mitigate pollution of water, land, air, noise and dust and proper disposal of waste
- planting plants in available space
- conserve natural resources and energy as far as possible
- recycling of waste through the principles of 5Rs (reduce, reuse, recover, recycle, redesign), and
- create environmental awareness among employees and local community through education and training, and
- implement CSR programme in a meaningful way.

Corporate Social Responsibility (CSR) and community development

The company very well realizes that the ethic code of 21th century big business is not to make profit at the expense of the environment and the local community. And that the big business should not focus only on economically viable venture but also on environmentally and functionally sound, ecologically viable as well as socially sustainable venture.

CSR has become mandatory in many countries and it is also now an official policy of most big companies. Sann Shinn & Brothers Co., Ltd had already implemented CSR programmes as far as possible and will continue to do so and carry out community assistance and community development. Generous compensation would be provided if there is any loss or damage due to the implementation of this project. Moreover charity works and donation works had been carried out and this trend will be continued. The company has renovated the community water pond of Taung Yinn Village and has constructed new roofing. The company has already spent Ks 7,500,000 for CSR programme.

3.2 Policy and legal frame work

Section 42 of Myanmar Constitution (2008) clearly states that "The Union shall protect and conserve natural environment".

Environmental conservation is an obligation of every citizen of Myanmar as per the Myanmar Constitution (2008), Chapter 8, Section 390 of the Constitution states that: "Every citizen has the duty to assist the Union in carrying out the following matter:

(b) Environmental conservation

The National Environmental Policy (2019) is:

- to achieve harmony and balance between socio-economic, natural resources and environment through the integration of environmental considerations into the development process enhancing the quality of life of all its citizens

There were/are several laws or Acts since the colonial days which were/are in one way or another pertaining to the environmental and social elements of the country.

The conservation of the environment was/is one of the priorities of successive governments.

Applicable laws and rules

Sann Shinn & Brothers Co., Ltd will comply with the following laws relating to environmental, socioeconomic and health affairs.

1. The Environmental Conservation Law, 2012
2. The Environmental Conservation Rules, 2014
3. Environmental Impact Assessment Procedure, 2015
4. National Environmental Quality (Emission) Guideline, 2015
5. Myanmar Investment Law, 2016
6. Myanmar Investment Rules, 2017
7. The Burma Companies Act, 1914
8. Private Industrial Enterprise Law, 1990 The Private Industrial Enterprise Law, 1990
9. Electricity Law, 2014 The Electricity Law, 2014
10. Myanmar Insurance Law, 1993 The Myanmar Insurance Law, 1993
11. Boiler Law, 2015
12. Labour Organization Law, 2011 The Labour Organization Law, 2011
13. Settlement of Labour Disputes Law, 2012 The Settlement of Labour Dispute Law, 2012
14. Employment and Skill Development Law, 2013

15. Minimum Wages Law, 2013
16. **Payment and Wages Law, 2016** The Payment of Wages Law, 2016
17. Leaves and Holidays Act, 1951 (Amended 2014)
18. **Workmen's Compensation Act, 1923** The Workmen's Compensation Act, 1923
19. The Social Security Law, 2012
20. The Factories Act, 2016
21. National Waste Management and Strategy and Action Plan, (2018-2030)
22. Myanmar Public Health Law, 1972
23. **Occupational Health and Safety Law, 2019** The Occupational Health and Safety Law, 2019
24. Prevention and Control of Communicable Diseases Law, 1995
25. The Control of Smoking and Consumption of Tobacco Product Law, 2016
26. The Protection and Preservation of Cultural Heritage Region Law, 1998
27. Protection and Preservation of Antique Objects Law, 2015
28. The Protection and Preservation of Ancient Monument Law, 2015
29. Farmland Law, 2012
30. **Fire Brigade Law, 2015** The Myanmar Fire Brigade Law, 2015
31. Prevention of Hazards from Chemical Substances Law, 2013
32. The related laws enacted by Mandalay Region Hlutaw and rules issued by Mandalay Region Government, if any.

The above-mentioned directly or indirectly related to the project. The company will comply with all these laws. Since these laws cover a very wide spectrum and various aspects, the company is not in a position to read and study all these laws. The company, therefore, has hired a legal expert to deal with the details of these laws.

When implementing the project the company authority will apply the common sense and simple logics not to pollute the air, water, land and the community. When it comes to details the legal expert hired by the company will assist the company to comply with these laws, accordingly.

Staffs will be educated and trained for environmental awareness and for maintenance of environmental performance during the entire life of the project.

Sr. No.	Laws and Regulations	Relevant Articles	Commitments
1	The Environmental Conservation Law, 2012	Section-7 (d):	Project Proponent commits to: The ministry prescribes environmental quality standards including standards on emission, effluents, solid wastes, production procedures, processes and products for conservation and enhancement of environmental quality;
		Section-14:	A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.
		Section-15:	The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods.
		Section-24:	The Ministry may, in issuing the prior permission, stipulate terms and conditions relating to environmental conservation. It may conduct inspection whether or not it is performed in conformity with such terms and conditions or inform the relevant Government departments, Government organization to carry out inspections.
		Section-29:	No one shall violate any prohibition contained in the rules, notification, orders, directives and procedures issued under this Law.

		Section-32:	Whoever violates any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law shall, on conviction, be punished with imprisonment for a term not exceeding one year, or with fine, or with both.
2.	The Environmental Conservation Rules, 2014	Rule-69 (a):	Project Proponent commits to: (a) Any person shall not emit, cause to emit, dispose, cause to dispose, pile and cause to pile, by any means, the pollutants to environment and hazardous waste or hazardous material stipulated by notification under the Law and any these rules at any place which may affect the public directly or indirectly. (b) Any person shall not carry out the action which can be damaged to natural environment which is changing due to ecosystem and such system, except the permission of the relevant Ministry in order to the interest of the public.
3.	Environmental Impact Assessment Procedure, 2015	Article -102:	Project Proponent commits to: The project Proponent shall bear full legal and financial responsibility for: (a) All of the Project Proponent's actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting (b) PAPs until they have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the Project, and shall support programs for livelihood restoration and resettlement in consultation with the PAPs, related government agencies, and organizations and other concerned persons for all Adverse Impacts.

	Atricle -103:	The project proponent shall fully implement the EMP, 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 condition when providing services to the project.
	Atricle -104:	The project proponent shall be responsible for and shall fully and effectively implement, all requirements set forth in ECC, applicable laws, the rules, this procedure and standards.
	Atricle -105:	The project proponent shall timely notify and identify in writing to the ministry, providing detailed information as the proposed project's potential adverse impacts.
	Atricle -106:	The project proponent shall, during all phase of the project (Preconstruction, Construction, Operation, Decommissioning, Closure and Post-closure) engage 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 procedure, standards, the ECC and the EMP.
	Atricle -107:	The project proponent shall notify and identify in writing to the ministry any breaches of its obligations or other performance failures or violations of the ECC and the 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 or the ministry is or may be required, within not later than twenty-four (24) hours, and in all cases within seven (7) days the project proponent becoming aware of such accidents.

	Atricle -108:	The project proponent shall 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.
	Atricle -109:	<p>The monitoring reports shall include:</p> <ul style="list-style-type: none"> a) Documentation of compliance with all conditions b) Progress made to date on implementation of the EMP against the submitted implementation schedule c) Difficulties encountered in implementing EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties d) Number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation e) Accidents or incidents relating to the occupational and community health and safety, and the environment, and f) Monitoring data of environmental parameters and conditions as committed in the EMP or otherwise required.
	Atricle -110:	Within ten(10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the Project Proponent shall make such report (except as relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g libraries, community halls) and at the Project offices. Any organization or person may request a digital copy of a monitoring report and the Project shall, with ten (10) days of receiving such request, submit a digital copy via email or as may otherwise be agreed upon with the requestor.

		Atricle -113:	For purpose of monitoring and inspection, the Project Proponent: (a) Shall grant to the Ministry and/or its representatives, at any time during normal working hours, access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed; and (b) From time to time as and when the Ministry may reasonably require, shall grant the Ministry access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed.
		Atricle -115:	In the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements, the Project shall grant full and immediate access to the Ministry at any time as may be required by the Ministry.
		Atricle -117:	The Project Proponent shall further ensure that the Ministry's rights of access hereunder shall extend to access by the Ministry to the Project's contractors and information storage, and persons.
4.	National Environmental Quality (Emission) Guideline, 2015		Project Proponent commits to: All the guidelines that are of relevance for this project are shown under a separate section of this report.
5	Myanmar Investment Law, 2016	Section-50:	Project Proponent commits to: (e)The Government may grant more favorable terms and conditions for the lease of land and the use of land by Myanmar citizeninvestors.

		Section-51:	<p>The investor:</p> <p>(a) May appoint any citizen who is a qualified person as senior manager, technical and operational expert, and advisor in his investment within the union in accordance with the law.</p>
		Section-65:	<p>The investor:</p> <p>(f) Shall not make any significant alternation of topography or elevation of the land on which he is entitled to lease or to use, without the approval of the commission.</p> <p>(g) Shall abide by applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage;</p> <p>(i) Shall close and discontinue the investment only after payment of compensation to employees in accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce;</p> <p>(j) Shall pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason;</p> <p>(k) Shall pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease and death due to the work;</p>

			<p>(l) Shall supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar;</p> <p>(m) Shall respect and comply with the labor laws;</p> <p>(o) Shall pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement.</p> <p>(p) Shall allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment;</p> <p>(q) Shall take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.</p>
		Section-73:	The investor shall insure the types of insurance stipulated in the provision of the rules at any insurance enterprise which is entitled to carry out insurance businesses within the Union.

6	Myanmar Investment Rules, 2017	Section -202:	Project Proponent commits to: The Investor must comply with the conditions of the Permit and other applicable laws when making an Investment.
		Section-203:	The investor shall fully assist the negotiating processes with the relevant government departments and government organizations for the affected persons due to investment plans.
		Section -206:	It the Investor is desirous to appoint a foreigner as senior management, technician expert or consultant according to section 51(a) of the law, it shall submit such foreigner's passport, expertise evidence or degree and profile to the Commission Office for approval.
		Rules-212:	Every Investor that 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.
7	The Burma Companies Act, 1914	Part II; Section-4 (1):	Project Proponent commits to: No company, association or partnership consisting of more than ten persons shall be formed for the purpose of carrying on the business of banking unless it is registered as a company under this Act.

		Part IV; Section-72 (1):	A company shall as from the day on which it begins to carry on business, or as from the twenty-eighth day after the date of its incorporation, whichever is the earlier, have a registered office to which all communications and notices may be addressed.
		Form I; Section-27 (A):	<p>(1) Name of the company.</p> <p>(2) Country of incorporation of the company.</p> <p>(3) Location of the company's Head Office and/or principal office in the Union of Burma.</p> <p>(4) The objects for which the company is formed (field of business).</p> <p>(5) (a) The amount of Capital and the number of shares into which the Capital is divided.</p> <p>(b) If more than one class of shares is authorized, the description of each class.</p> <p>(6) The names, addresses and nationality of the directors.</p> <p>(7) The maximum amount of indebtedness which may be incurred by the company and also a prohibition against the contracting of debts in excess of that amount.</p> <p>(8) Period of validity of permit.</p> <p>(9) Statement of compliance with legal requirements for issue of Capital including the amount to be paid in before business is commenced.</p> <p>Statement of compliance with such conditions as may be prescribed.</p>

8	Private Industrial Enterprise Law, 1990	<u>Section-4:</u>	<p>Project Proponent commits to:</p> <ul style="list-style-type: none"> (a) Any person desirous of conducting any private industrial enterprise; (b) Any person conducting any private industrial enterprise on the day this Law is enacted; by using any type of power which is three horsepower and above or manpower of ten wage-earning workers and above shall register under this Law.
		<u>Section-13:</u>	<p>The duties of the entrepreneur are as follows:-</p> <ul style="list-style-type: none"> (a) Shall pay the registration fees, fees for the renewal of registration and other payable duties and taxes prescribed by the Directorate; (b) Shall abide by the terms and conditions of the registration certificate; (c) Shall conduct the enterprise by opening an account with the relevant bank in the name of its registered enterprise; (f) Shall shift the place of enterprise, change the nature of enterprise, amalgamate enterprises and split up enterprises only with the approval of the Directorate; (g) Shall abide by the orders and directives issued from time to time by the Ministry and the Directorate; (h) Shall also abide by the existing laws.

		Section-15:	<p>The entrepreneur has the right to carry out the followings:-</p> <ul style="list-style-type: none"> (a) appointing foreign experts and technicians with the approval of the Ministry; (b) carrying out change of the name of enterprise, transfer of ownership, temporary suspension or permanent closing down of the enterprise in the manner prescribed and with the approval of the Directorate.
		Section-16:	<p>The Director General shall, in order that entrepreneurs may, have the right to enjoy, submit to the Private Industrial Enterprise Co-ordination Body and carry out in respect of the following matters:-</p> <ul style="list-style-type: none"> (a) land, water, power, communication and transport et cetera required for use in his enterprise; (b) exemptions and reliefs from taxes; (c) loans for fixed capital and working capital; (d) raw materials, machinery and spare parts required locally and from abroad for his enterprise; (e) local and foreign technical know-how for enhanced production of goods and for improvement in the quality of finished goods; (f) to acquire local and foreign markets; (g) to acquire industrial areas and leased land for industrial enterprises.
		Section-26:	<p>No one shall conduct a private industrial enterprise contained in section ~ without obtaining registration under this Law.</p>

		Section-27:	<p>An entrepreneur:</p> <ul style="list-style-type: none"> (a) In distributing and selling the goods he has produced shall not sell without a trade mark; (b) Shall not violate any provision of section 13; (c) Shall not fail to comply with any order or decision passed by the Minister and the Director General.
		Section-28:	<p>Whoever violates the provision of section 26 shall, on conviction:-</p> <ul style="list-style-type: none"> (a) in the case of conducting a small scale private industrial enterprise, he punished with fine which may extend from a minimum of kyats 5,000 to a maximum of kyats 10,000; (h) in the case of conducting a medium scale private industrial enterprise, he punished with fine which may extend from a minimum of kyats 10,000 to a maximum of kyats 20,000; (c) in the case of conducting a large scale private industrial enterprise be punished with fine which may extend from a minimum of kyats 20,000 to a maximum of kyats 50,000.
		Section-29:	<p>If a person who is convicted of an offence under Section 28 continues in the commission of such offence, he shall be punished with fine at the following rate for each day of the extent of the period of continuance thereof: -</p> <ul style="list-style-type: none"> (a) in the case of a small scale private industrial enterprise, at the rate of kyats 100; (h) in the case of a medium scale private industrial enterprise, at the rate of kyats 150; (c) in the case of a large scale private industrial enterprise, at the rate -. of kyats 200.

9	Electricity Law, 2014	Section-20:	Project Proponent commits to: The license holder must abide by the rules, regulations, notifications, orders, directives and procedures issued by the relevant ministry relating to the licensed electricity activities.
		Section-21:	(a) The license holder shall, if he fails to comply with the law, rules, regulations, procedures, orders and directions or the specified quality, standards and norms, be responsible in accordance with the law if any person or organization is affected or suffers a loss as a result.
		Section-24:	A power consumer must, if damage or loss occurs to other electric power consumers or any electricity activities due to his negligence, pay compensation calculated in accordance with the specified method of the ministry.
		Section-27:	The license holder and the authorized person must inform the chief inspector and the relevant department in charge immediately if an electrical hazard has accidentally occurred when generating, transmitting, distributing or consuming electric power.
		Section-29:	The relevant ministry must inspect quality and norm specifications relating to factories and workshops, machineries and equipment installed in such factories and workshops, commercial buildings, imported electrical appliances and equipment which are sold locally.
		Section-33:	The chief inspector, the inspector and the persons assigned by them, shall have the right to enter into any place and any building in the performance of their duties.

		Section-40:	The license holders comply with the rules, norms and procedures issued by the ministry and must accept necessary inspections by the relevant government departments and organizations.
		Section-68:	<p>If the negligence or irresponsibility of the license holder or of persons assigned by him has caused injury, disability or death by electrocution or fire, the aggrieved person has the right to request compensation from the license holder as follows-</p> <p>(a) If the aggrieved person is entitled to compensation according to the existing labour compensation law, the compensation specified in this law;</p> <p>(b) If the aggrieved person is not entitled to compensation according to the existing labour compensation law, the compensation specified in the rules, issued under this law</p>
10.	Myanmar Insurance Law, 1993		<p>Project Proponent commits to:</p> <p>Purpose: The project can cause the damages to the environment and injuries to public. Therefore, the project owner shall take out insurance for the factory and for fire insurance. This law focuses on the following matters:</p> <ul style="list-style-type: none"> - Under Section-15: of the project owner uses the owned vehicles he or she has to insure the insurance for injured person. - Under Section-16: An entrepreneur or an organization operating 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 effect compulsory General Liability Insurance with the Myanmar Insurance.

11	Boiler Law, 2015	Section-5:	Project Proponent commits to: Any person desirous to use a boiler for any enterprise shall register under this law.
		Section-6:	A boiler shall be manufactured in accord with Myanmar standards and international standards.
		Section-7:	The documents and certificates relating to the boiler shall be attached to the application and submitted to the inspector when applying for the registration of the boiler under section-5.
		Section-12:	The owner shall: (a) Apply to the respective inspector to obtain certificates in accord with the prescribed manner. (b) Apply to register only for the boiler constructed in accord with Myanmar standards or international standards.
		Section-14:	The owner shall apply to the respective inspector in advance in order to obtain permission though he or she has obtained the certificate or the provisional order if desirous to carry out any of the following matters: (a) Using the boiler at more than allowable pressure (b) Repairing, altering adding or renewing any steam-pipe, pipe or any mounting or other fitting attached such steam pipe, feed-pipe or mounting or other fitting attached to the boiler.
		Section-15:	The owner shall submit the certificate or provisional order when so requested by the respective government department and organization as may be necessary.
		Section-18:	The owner shall inform immediately to the inspector if any accident occurs.

		Section-19:	<p>The owner shall not:</p> <ul style="list-style-type: none"> (a) use a boiler at a pressure higher than allowable pressure; (b) repair and alter or force to repair and alter the safety valve to exceed allowable pressure; (c) do any act contained in sub-section (b) of section 14 without permission.
		Section-20:	<p>The owner shall not use the following boiler:</p> <ul style="list-style-type: none"> (a) Boiler without certificate or provisional order (b) Boiler of which certificate or provisional order is void (c) Boiler of which certificate or provisional order is revoked.
		Section-21:	<p>The owner shall engrave the register number specified by the chief inspector in accord with the prescribed manner.</p>
		Section-22:	<p>The owner:</p> <ul style="list-style-type: none"> (a) has the right to use a boiler in accord with the prescribed manner if he or she obtains certificate or provisional order; (b) may, if desirous to alter the term of the certificate or provisional order, apply in advance for inspection before the expiry of the term of such certificate or provisional order.
		Section-24:	<p>The owner shall not:</p> <ul style="list-style-type: none"> (a) Carry out with the person who has not boiler repairer certificate on the receipt of notice to repair, alter, add or renew any boiler, steam pipe, feed pipe or any mounting or other fitting attached to such boiler, steam-pipe and feed pipe. (b) Assign any person to charge the boiler used in the work except the person who operates and maintains the boiler

		Section-29:	(a) Any person desirous to obtain a boiler attendant certificate may apply to the respective inspector in accord with the stipulations;
		Section-30:	The boiler attendant shall: (a) have the right to operate the boiler which is issued certificate or provisional order with the approval of the owner;
		Section-31:	The boiler attendant shall not use the boiler at more than allowable pressure.
		Section-38:	The inspector, in accord with the prescribed manners, shall: (a) Inspect the boiler existing within the area where he is responsible, (b) Inspect any boiler existing anywhere according to the assignment of the Chief Inspector.
		Section-40:	During performing under section 38, an inspector may enter and inspect any place or building in which he has reason to believe that a boiler is in use.
		Section-59:	No one shall amend, alter, deface, destroy the form and make invisible the register number engraved under section 21.
		Section-62:	No one shall adjust and alter the safety valve in order to exceed the allowable pressure on his volition or under the instruction of the owner.
12	Labour Organization Law, 2011	Section-17:	Project Proponent commits to: The labour organization shall have the right to carry out freely in drawing up their constitution and rules, in electing their representatives, in organizing their administration and activities or in formulating their programmes the labour organization has the right to

			negotiate and settle with the employer if the workers are unable to obtain and enjoy the right of the workers contained in the labour laws and to submit demands to the employer claim in accord with the relevant law if the agreement cannot be reached
		Section-18:	The labour organizations have the right to demand the relevant employer to re-appoint a worker if such worker is dismissed by the employer and if there is cause to believe that the reason of such dismissal were based on labour organization membership or activities, or were not in conformity with the labour law.
		Section-19:	The labour organizations have the right to send representation to the Conciliation Body in settling the dispute between the employer and the worker. Similarly, they have the right send representatives to the Conciliation Tribunal formed with the representatives from the various levels of labour organization.
		Section-20:	In discussing with the Government the employer and the complaining workers in respect of workers' right or interests contained in the labour laws, the representative of the labour organization also have the right to participate and discuss.
		Section-21:	The labour organizations have the right to participate in solving the collective bargains of the workers in accord with the labour laws.
		Section-22:	The labour organizations shall carry out peacefully in carrying out holding meetings, going on strike and carrying out other collective activities in accord with the procedure, regulations, by-law and any directives prescribed by the relevant labour Federation ship.

13	The Settlement of Labour Dispute Law, 2012	<u>Section-38:</u>	Project Proponent commits to: No employer shall fail to negotiate and coordinate in respect of the complaint with the prescribed period without sufficient cause
		<u>Section-39:</u>	No employer shall alter the condition of service relating to workers concerned in such dispute at the consecutive period before commencing the dispute within the period under the investigation of the dispute before the Arbitration Body or Tribunal, to affect the interest of such workers immediately.
		<u>Section-40</u>	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.
		<u>Section-51</u>	It an employer in the course of settlement of dispute commits any action omission without sufficient case, which by causing reduction in production resulting so as to reduce the workers' benefits shall be liable to pay full compensation in the amount determined by the Arbitration Body or Tribunal. Such money shall be recovered as the arrear of land revenue.
14	Employment and Skill Development Law, 2013	Section-5:	Project Proponent commits to: (a) (1) If the employer has appointed the employee to work for an employment, the employment agreement shall be made within 30 days. But it shall not be related with government department and organization for a permanent employment. (2) If pre training period and probation period are stipulated before the appointment the said trainee shall not be related with the stipulation of sub-section (1).

			<p>(b) The following particulars shall be included in the employment agreement:</p> <ol style="list-style-type: none"> (1) The type of employment; (2) The probation period; (3) Wage, salary; (4) Location of the employment; (5) The term of the agreement; (6) Working hour; (7) Day off, holiday and leave; (8) Overtime; (9) Meal arrangement during the work hour; (10) Accommodation; (11) Medical treatment; (12) Ferry arrangement to worksite and travelling; (13) Regulations to be followed by the employees; (14) If the employee is sent to attend the training, the limited time agreed by the employee to continue to work after attending the training; (15) Resigning and termination of service; (16) Termination of agreement; (17) The obligations in accord with the stipulation of the agreement;
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			<p>(18) The cancellation of employment agreement mutually made between employer and employee;</p> <p>(19) Other matters;</p> <p>(20) Specifying the regulation of the agreement, amending and supplementing;</p> <p>(21) Miscellaneous.</p> <p>(c) The worksite regulations contained in the employment agreement shall be in compliance with any existing law and the benefits of the employee shall not be less than those of the any existing law.</p> <p>(d) According to the employment agreement, the Ministry shall issue the notification for paying the stipulated compensation to the employee by the employer, if the work is completed earlier than the stipulated period or the whole work or any part of it have to be terminated due to unexpected condition or the work has to be terminated due to various conditions.</p> <p>(e) The employment agreement made under sub-section (a) shall be related with daily wage workers, piece rate workers who are appointed temporarily in the government department and organization.</p> <p>(f) The worksite regulations and benefits contained in the employment agreement mutually made between the employer and employee or among the employees shall be amended as necessary, in accord with the existing law.</p>
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			<p>(g) The employer shall send a copy of the employment agreement made between the employer and employee, to the relevant employment and labour exchange office within the stipulated period and shall get the approval of it.</p> <p>(h) The employment agreement made before the enforcement of this law shall be confirmed up to the end of the term of the original agreement.</p>
		Section-14:	The employer shall carry out the training program in accord with the work requirement in line with the policy of the skill development team to develop the skill relating to the employment for the workers who are proposed to appoint and working at present.
		Section-30:	<p>(a) The employer of the industry and service business shall put in to the fund monthly as put in fees without fail for the total wages of the subordinates and the supervisors' salary for not less than 0.5%;</p> <p>(b) Put in money paid under sub-section (a) shall not be deducted from the wage and salary of the employees</p>
15	Minimum Wages Law, 2013	Section-12:	<p>Project Proponent commits to:</p> <p>The employer:</p> <p>(a) Shall not pay wage to the worker less than the minimum wage stipulated under this Law;</p> <p>(b) May pay more than the minimum wage stipulated under this Law;</p> <p>(c) 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>(d) Shall pay the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;</p> <p>(e) In paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. 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>
		Section-13:	<p>The employer:</p> <p>(a) Shall inform the workers the rates of minimum wage relating to the business among the rates of minimum wage stipulated under this Law and advertise it at the workplace to enable to be seen by the relevant workers;</p> <p>(b) Shall prepare and maintain the lists, schedules, documents and wages of the workers correctly;</p> <p>(c) Shall report the lists, schedules and documents prepared and maintained under sub-Section (b) to the relevant department in accord with the stipulations;</p> <p>(d) Shall accept the inspection when summoned by the inspection officer. Moreover, he shall produce the said lists and documents upon asking to submit;</p>

			<p>(e) Shall allow the entry and inspection of the inspection officer to the commercial, production and service businesses, agricultural and livestock breeding workplaces and give necessary assistances;</p> <p>(f) If the workers cannot work due to sickness, shall give them holiday for medical treatment in accord with the stipulations;</p> <p>(g) If the funeral matter of the member of the family of worker or his parent occurs, shall give holiday without deducting from the minimum wage, in accord with the stipulations.</p>
		Section-18:	<p>The inspection officer:</p> <p>(a) Has the right to enter and inspect the relevant commercial, production and service workplaces, agricultural and livestock breeding workplaces and inspect whether or not they comply with and carry out in accord with the rules, notifications, orders, directives and procedures under this Law, whether or not the lists, schedules and documents, wages relating to the workers are prepared correctly, and whether or not such lists, schedules and documents are reported to the Department in accord with the stipulations;</p> <p>(b) May summon, inspect the relevant persons under the assignment of duty by the Department, asking and copying for the relevant lists, schedules and documents.</p> <p>(c) If there are outside workers at employer, has the right to inspect information relating to such outside workers, their names and addresses and the right to ask for and copy their lists and documents and lists relating to minimum wage;</p>

			<p>(d) In carrying out under sub-section (a), (b) and (c) relating to inspection, if required by the employer to produce the document, shall show the civil service identify card issued by the relevant department;</p> <p>(e) Report to the Department in accord with the stipulations relating to the finding under sub-sections (a), (b) and (c), and documents and papers called for.</p>
16	Payment and Wages Law, 2016	Section-3:	<p>Project Proponent commits to:</p> <p>The employer must...</p> <p>(a) Pay in local currency or foreign currency recognized by the Central Bank of Myanmar. This may be in cash, check or deposit into the bank account of Employee.</p> <p>(b) Moreover, pay can be in the means of...</p> <p>(1) Totally in cash OR half the cash and half in things set according to the local price to those employees working in trade, manufacturing and service sectors.</p> <p>(2) Totally in cash OR half the cash and half in things set as local price according to local traditions or common agreement to those working in agriculture and livestock sectors. But, this must be for the sake of the employees and their families. And, it also must be reasonable/fair.</p> <p>(3) An employee shall receive the payment for 60 days when he/she is in Alternative Civil Service</p>

		Section-4:	<p>An employer must pay for...</p> <ul style="list-style-type: none"> (a) Part-time, daily, weekly or other part-time job, temporary or piecework when the work is done OR at the agreed time. (b) According to the Article (a), the time frame shall not exceed one month. (c) Wages for the permanent work must pay per monthly basis. If so... <ul style="list-style-type: none"> (1) Must pay at the end of the payment period when there are not more than 100 workers. (2) If there are 100 workers and above, pay must not be administered later than 5 days after the end of the payment period. (d) Upon termination, wages must be paid within 2 days from the date of termination. (e) If a resignation letter is submitted, wages must be paid at the ending day of the payment period. (f) If an employee dies, wages must be paid to the legally recognized heir within 2 working days after the day he/she has died. (g) All wages must be paid during the working day.
		Section-5:	<p>If the owner encounters difficulty to pay the wages according to Section 4 sub-section (c) because of significant happenings, including natural disaster, the employer must report to the Department with solid evidence that wages will be paid at the mentioned day upon the workers' agreement.</p>

		Chapter-III: (7)	<p>The Employer...</p> <p>(a) Can deduct from wages for absences except when such absence is during a public holiday or entitled leave, according to the law.</p> <p>(b) Accommodation charges and transportation charges, meal allowances, charges for water and electricity, taxes and errors in payment shall be allowed for deduction.</p> <p>(c) Can deduct from pre-issued, expensed and saved (or) contributed amount according to the law upon the employee contract.</p> <p>(d) The Employer can deduct with the judgment of the Court of Arbitrator Jury Council.</p>
		Chapter-III: (8)	The Employer cannot deduct except the deduction in accordance with Section 7 and Section II.
		Chapter-III: (9)	The total amount of other deductions, except when the employee fails to perform their duties, shall not be more than 50% of the employee's wages.
		Chapter-III: (10)	<p>The Employer must...</p> <p>(a) According to Section 11 of this Act, get permission from the Department concerning "why" and "how" prior to making deductions from wages.</p> <p>(b) Permissions stated in sub-section (a) shall be publicly posted.</p> <p>(c) Fines must not exceed the value of damage caused by the action or cost of performance failure of the employee.</p>

			<p>(d) According to Section 4 of this Act, when making a specific deduction...</p> <p>(1) Do not deduct without allowing an appeal from the Employee.</p> <p>(2) Do not deduct more than 5% of the monthly wages.</p> <p>(e) No deduction is allowed from a worker under 16 years old.</p> <p>(f) The timeframe for deductions shall be set upon an agreement from both sides.</p> <p>(g) Deductions shall be carried out within the limited timeframe upon the agreement of the Township Arbitration Council set in accordance with Law.</p> <p>(h) Every deduction must be well documented.</p> <p>(i) You must submit a monthly report to the Department concerning deductions.</p> <p>(j) Fines deducted according to Section 11 sub-section (b) must be used for the social welfare of the employees upon discussion with a registered labor organization.</p>
		Chapter-III: (11)	<p>Employers shall fine for the following actions or performance failure by the employees...</p> <p>(a) Direct damage which is either intentional or due to negligence or due to the failure of the employee concerned with company property to take proper care.</p> <p>(b) A breach of the employment contract or breach of any rules for which a fine had been previously set.</p>

		Chapter-III: (12)	<p>If a worker...</p> <p>(a) Encounters any one of the following situations, he/she shall ask directly or via a registered Labor Organization or by the in-house Workplace Coordination Committee to the Employer:</p> <p>(1) Any unreasonable deduction from wages</p> <p>(2) Payment which is not made by the due date.</p> <p>(b) If the Employer takes no action, although asked in accordance with Section 12 Sub-Section (a), the Employee can present this to the Inspector within 6 month from the date of the deduction or from the date of the failure to render payment.</p>
		Chapter-III: (13)	<p>(a) The Inspector shall issue a decree after reviewing the case presented in accordance with Section 12 Sub-Section (b).</p> <p>(b) Not only the Employee, but also the Employer, has 30 days to appeal to the Chief of Inspector if they are not satisfied with the order.</p> <p>(c) The Chief of Inspector shall decree after reviewing the appeal applied in accordance with Sub-Section (b).</p> <p>(d) The Chief of Inspector's decision will be the final decision</p>
		Section-14:	If a worker has worked overtime he has the right to be paid according to the rate of payment designated.
		Section-22:	No employer shall not violate sections 4, 5, 8, 9 and 11 regarding payment and term and rate of payment.

		Section-23:	<p>No employer shall violate the rules, decrees and prohibition regarding payment to its employees.</p> <p>Chapter-8 deals with penalties for violation of the law. The penalties range from:</p> <ul style="list-style-type: none"> - Imprisonment of no more than 3 months and fine not more than Ks 500,000. - Imprisonment of no more than 3 months and fine at least Ks 2,000,000. - Imprisonment of up to 6 months and fine at least Ks 5,000,000.
17	Leaves and Holiday Act, 1951		<p>Project Proponent commits to:</p> <p>The law contains 18 sections and the purpose is for regulating the taking of leaves and holidays, covering the hours of work, weekly rest and paid leave. Three types of leaves, namely Earned leave, casual leave and leave on Medical Certificate are stipulated. The holidays during that period (the 1950s) include: Independence Day, Fullmoon of Tabaung, Thingyan, Burmese New Year, May Day, Full Moon of Kason, Resistance Day, beginning of Buddhist Lent, Martyrs' Day, End of Buddhist Lent, Full Moon of Tansaungmone, and National Day. One Islam Holiday and Hindu Holiday are official but are not written in the Act, but are notified in short advance.</p>
18	Workmen's Compensation Act, 1923		<p>Project Proponent commits to:</p> <p>It was/is an Act to provide for the payment by certain classes of employers to their workmen of compensation for injury by accidents.</p> <p>This law was amended in 2005 by chairman of the State Peace and</p>

			Development Council. Since the rate in kyats for compensation during the 1920s are no longer applicable (workable) the rate for compensation are increased. The rate shall be according to the Notification by the existing Ministry of Labour. eg. fine which may extend to “Ks 100” is substituted by “Ks 10,000”.
		Section-13:	Compensation shall be paid in line with the provision of the said law.
19	Social Security Law, 2012	Section-11:	Project Proponent commits to: (c) The project owner will register to the respective social security office.
		Section-15:	(a) The project owner will pay the social security fund for four types of social security
		Section-18:	(b) The project owner will pay the fund which have to be paid by himself together with the fund which have to be paid from the salaries of the employees.
		Section-48:	The project owner will pay the fund for accident, (but it is not related to workmen’s compensation)
		Section-75:	The project owner will submit the lists and records, provided in article 75, to related social security office.
20	The Factories Act, 2016		Project Proponent commits to: The law contains 10 Chapters and 109 articles. Purpose: to ensure the health, safety, welfare, fair working time the clean environment for the employees working inside a factory. This law focuses on all stipulation for the employer (project owner). The project owner should abide by nearly all sections in this Act. The

			<p>project owner has to abide by all provisions for healthy, safety, welfare, (Chapter 3, 4, 5 respectively) working-hours and other needs. The project owner shall ask its legal expert to study this Act in details for his advice.</p> <p>This Act also contains the provision for chemicals management and storage. The chemicals use in the manufacturing of motorcycle, paints, thinners, varnishes etc, may not require permits. Since iron smelting will not be involved permit for "hot work" may not be also necessary.</p> <p>Chapter-8 is on the employment of young person.</p> <p>Chapter-9 deals with punishment and procedure for employer who violates this law.</p> <p>This factories Acts requires all factories to have proper pollution control measures such as air pollution, sewage and waste water treatment system and solid waste management system.</p>
21	Myanmar National Waste Management Strategy and Master Plan (2018-2030)		The project proponent already studied this Myanmar National Waste Management Strategy and Master Plan (2018-2030) in general. The project proponent will do its best to follow this master plan as far as possible.
22	Myanmar Public Health Law, 1972	Section-3:	<p>Project Proponent commits to:</p> <p>The company shall cooperate with the authorized person or organization in line with the law and shall abide by any instruction or stipulation for public health.</p>
		Section-5:	The company shall accept any inspection anytime and anywhere if it is needed.

23	Occupational Health and Safety, 2019	Section-12:	<p>Project Proponent commits to:</p> <p>The Employer shall, in accordance with the stipulations of the Ministry:</p> <p>(a) appoint the Person In-charge for Occupational Safety and Health to closely supervise safety and health of Workers in line with the type of Industry/Business; and</p> <p>(b) form the respective Occupational Safety and Health Committee in line with the type of Industry/Business comprising equal number of Employer and Worker representatives to become safe and healthy Workplace on condition that the number of Workers in his/her Industry/Business exceeds the number determined by the Ministry for that purpose. The Occupational Safety and Health of female Workers shall be considered according to the nature of Industry/Business when forming such Occupational Safety and Health Committee.</p>
		Section-14:	<p>Persons In-charge for Occupational Safety and Health shall comply with this Law and rules, orders, directives and procedures made under this Law to make the Workplace to be a safe Workplace that is good for health.</p>
		Section-16:	<p>Inspection Officers shall enter the Workplaces to which this Law applies and inspect Occupational Safety and Health conditions and direct Employers for their compliance and report the findings to the Chief Inspection Officer.</p>
		Section-17:	<p>Inspection Officers have the powers to perform the following for Occupational Safety and Health in accordance with their codes of conduct:-</p>

			<ul style="list-style-type: none"> (a) the power to enter, inspect and inquire at any Workplaces related to this Law at any time by showing the Inspection Officer's identity without warrant; (b) the power to look at, make copies of and seize as evidence as required documents and records in connection with Workplaces and Processes; (c) the power to take photos and record videos in connection with Workplaces and Processes that may be harmful to Occupational Safety and Health; (d) the power to assess and measure and take records of the extent of impairment and duration caused to the environment of the Workplace due to loudness, light, heat, coldness, particles, gas and Hazardous Materials, and obtain the assistance of the expert in the relevant field of study if required; (e) the power to inquire of any person in the Workplace during working hours with the assistance of the Recognised Doctor to check any conditions that put or are likely to put Workers in contact with Occupational Disease; and (f) the power to require responsible persons at clinics or hospitals to deliver, with the stipulated security grade, medical treatment records of the Worker who is under treatment or information relating to death due to Occupational Accident or Occupational Disease, or autopsy results asked by the Department in the stipulated form.
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		Section-18:	<p>Inspection Officers shall, with the approval of the Chief Inspection Officer, order the Employer to temporarily close a whole or part of the Workplace, and notify the relevant Departments if required, if they believe that an Occupational Accident, Occupational Disease, Hazardous Event or Major and Serious Occupational Accident occurs or is likely to occur because:</p> <ul style="list-style-type: none"> (a) it is not appropriate to continue doing the Industry/Business due to dangerous Workplace condition, or unsafe operation carried by Workers, or existence of Hazardous Materials and Hazardous Machines, or layout and function of Workplace, part of the machine or equipment; (b) it is not appropriate to continue doing the Industry/Business due to breach or incompliance with any of the provisions of this Law; (c) it deems that Workers in the Workplace are in danger due to acts, omissions, negligence or carelessness; or (d) it needs to evacuate Workers from hazards because an Occupational Accident or accident is about to occur.
		Section-26:	<p>The Employer shall be responsible to: -</p> <ul style="list-style-type: none"> (a) arrange as required to assess the risks of Workplace, Process and machines and materials used thereat; (b) arrange as required to assess the likelihood of occurrence of hazards at the Workplace and to the environment; (c) arrange to have Workers medical checked-up by the Recognized Doctor in accordance with stipulations whether they suffer from any Occupational Disease; (d) arrange to improve the Workplace until it is safe and good for health based on the findings as per sub-sections (a), (b) and (c)

			<ul style="list-style-type: none"> (e) provide Workers with sufficient number of personal protective clothing, materials and facilities prescribed and approved by the Department on free of charge basis and cause Workers to wear them while working; (f) prescribe precautionary plans and plans for emergency; (g) provide a clinic, appoint the Registered Doctors and nurses and provide medicines and supporting equipment for any Industry/Business where the number of Workers is not less than the number determined by the Ministry; (h) make necessary arrangements for managers, Workers and members of the Occupational Safety and Health Committee including (Employer) himself/herself to attend Occupational Safety and Health training courses stipulated by the Ministry in accordance with their departments or types of work; (i) make necessary arrangements to enable immediate reporting to the Person In-charge for Occupational Safety and Health or manager in case where a Worker suffers an Occupational Accident or his/her life or health is likely to be in danger; (j) arrange to prevent any persons in the Workplace from Occupational Safety and Health risks occurred due to materials, machines or wastes used in the Workplace or Process; (k) immediately stop the Process, evacuate Workers and conduct necessary rescue plans if any Occupational Accident is about to occur. If possible, Workers will be relocated to another appropriate safe Workplaces; (l) display Occupational Safety and Health instructions, danger signs, notices, posters and signage for directions in accordance with stipulations;
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			<p>(m) arrange to be complied with precautions when entering restricted hazardous Workplaces;</p> <p>(n) arrange to disseminate Occupational Safety and Health manuals and guidelines issued by the relevant Ministries for knowledge, technology, information and skills not only to Workers but also to related persons or raise their awareness or knowledge thereof;</p> <p>(o) lay down the fire safety plan, perform fire drilling and train Workers to use fire extinguishers systematically;</p> <p>(p) allow the Chief Inspection Officer and Inspection Officers to enter Workplaces, inquire, request documents and information or seize exhibits;</p> <p>(q) cause Workers to work only for the specified working hours if they have to work in Hazardous Industry/Business and Workplace; and</p> <p>(r) Incur the expenses for Occupational Safety and Health matters.</p>
		Section-27:	<p>No Employer shall dismiss or demote a Worker: -</p> <p>(a) during any period before a medical certificate is issued by the Registered Doctor for occupational injury or by the Recognized Doctor for contact with Occupational Disease;</p> <p>(b) because the said Worker has addressed a complaint for hazardous or health detrimental condition;</p> <p>(c) because the said Worker has conducted the responsibilities of Occupational Safety and Health Committee; or</p> <p>(d) because the said Worker has refused to work in any condition where an Occupational Accident or Occupational Disease is about to occur.</p>

		Section-34:	The Employer is responsible to undertake the following in accordance with the stipulations: - (a) informing the Department in case of an Occupational Accident, Hazardous Event or Major and Serious Occupational Accident; (b) if a Worker is in contact with a stipulated Occupational Disease or contaminated or likely to be contaminated due to materials or Process used, sending a report to the Department together with a medical report prepared by the Recognized Doctor.
		Section-36:	(a) Inspection Officers must perform inspection as required if any Occupational Accident, Hazardous Event, Occupational Disease or Occupational Contamination breaks out.
			No one shall, without consent of the Chief Inspection Officer, remove, conceal, add or change a whole or part of the materials, machines, equipment, layout, documents or signs relating to the occurrence of an Occupational Accident, Hazardous Event, Occupational Disease or Occupational Contamination.
24	Prevention and Control of Communicable Diseases Law, 1995	Section-3:	Project Proponent commits to: In order to prevent the outbreak of Communicable Diseases the Department of Health shall implement the following project activities. (a) Immunization of children by injection or orally.
		Section-4:	When a principal epidemic disease of a notifiable disease occurs:- (a) Immunization and other necessary measures shall be undertaken by the Department of Health, in order to control the spread thereof (b) The public shall abide by the measures undertaken by the Department of Health under sub-section (a)

		Section-9:	The head of the household or any member of the household shall report immediately to the nearest health department or hospital when any of the following events occur:- (a) Rat fall (b) Outbreak of a principal epidemic disease (c) Outbreak of a noticeable disease
		Section-11:	In order to prevent and control the spread of a principal disease the health officer may undertake the following measures:- (a) Investigation of a patient or any other person required (b) Medical examination (c) Causing laboratory examination of stool, urine, sputum and blood sample to be carried out (d) Causing investigation by injection to be carried out (e) Carrying out any other investigation.
25	The Control of Smoking and Consumption of Tobacco Product Law, 2016	Section-9:	Project Proponent commits to: The person in charge at the factory shall:- (a) Keep the caption and mark referring that it is a non-smoking area the place mentioned.
		Section-6:	In accordance with stipulation. (b) Arrange the specific place where smoking is allowed as mentioned in section-7 and keep the caption and mark also referring that it is a specific place where smoking is allowed, in accordance with the stipulation

			<p>(c) Supervise and carry out measures so that no one shall smoke at the non-smoking area.</p> <p>(d) Accept the inspection when the supervisory body comes to the place for which he is responsible.</p>
26	Protection and Preservation of Cultural Heritage Regions Law, 2019	Section-13:	<p>Project Proponent commits to:</p> <p>A person desirous of carrying out one of the following shall abide by the provisions of other existing laws and also apply to the Department in accordance with stipulation to obtain prior permission under this law:-</p> <p>(a) Within the ancient monumental zone or the ancient site zone</p> <ol style="list-style-type: none"> (1) Construction or extending a building (2) Renovating the ancient monument or extending the boundary of its enclosure; <p>(b) Within the preserved or protected zone, constructing extending, renovating a hotel, motel, guest house, lodging house or industrial building or extending the boundary of its enclosure</p> <p>(c) Within the culture heritage region:</p> <ol style="list-style-type: none"> (1) Carrying out the renovation and maintenance work of the ancient monument without altering the original ancient form and structure or original workmanship; (2) Carrying out archeological excavations; (3) Building road, constructing bridge, irrigation canal and embankment or extending the same

		Section-21:	No person shall, without prior permission granted under this Law, carry out an-of the following in the cultural heritage region. (b) carrying out archeological excavation.
		Section-22:	No person shall construct a building which is not in conformity with the conditions prescribed region wise by The Ministry of Culture in the cultural heritage region.
27	Protection and Preservation of Antique Objects Law, 2015	Section-12:	Project Proponent commits to: A person who finds any object which has no owner or custodian shall promptly inform the relevant Ward or Village-Tract Administration if he known or it seems reasonable to assume that the said object is an antique object.
28	Protection and Preservation of Ancient Monuments Law, 2015	Section-12:	Project Proponent commits to: Anyone who has found an ancient building of 100 years or more of age without owner on the ground, underground above the water or under the water has to inform, if the building is recognized as or believed to be an ancient monument , the nearest village or township administration department.
		Section-15:	Every person desirous to engage in the following within the area of certain ancient monuments has to apply for the permission of the administration department: (b) Constructing industrial building (e) Digging a well, pond (h) Constructing buildings near an ancient monument if this violets the structural rules approved by the ministry. The administration development can approve or reject an application submitted under section 14 or 15 after having analyzed it.

		Section-20:	No one is allowed to do any of the following acts likely to cause damage to an ancient monument within the boundary without prior written permission of the administration department (b) Using and driving heavy machines and vehicles which may cause vibration within the area of an ancient monument (f) Releasing of chemical waste which can cause pollution of ancient monument and the natural environment
29	Farmland Law, 2012`	Chapter III, section-9	Project Proponent commits to: The person who has the right to use the farmland shall have the following rights: (a) right to have the farmland in possession, right to use the farmland, right to enjoy the benefit arises from this right; (b) right to sell, mortgage, lease, exchange and gift on the whole or part of the right to use the farmland in accord with the stipulated terms and conditions;
		Chapter IV, section-12	The person who has the right to use the farmland: (a) shall carry out the farmland as prescribed in this Law; (b) shall pay land revenue and other taxes levied by the Ministry relating to the farmland;
		Chapter X, section-30	In respect of the application to utilize farmland for other purposes in the interest of the public: (a) The respective Region or state Government shall give permission to utilize the farmland for other purposes except paddy land, with the recommendation of the Region or State Farmland Management Body. (b) The relevant Region or State Government Organization may permit to use the farm land by other means except low land (paddy land) with the recommendation of the Region or State Administrative Body of the farmland.

		Chapter XII, section-35	Any person who has the right to use the farmland fails to comply with the order passed under Section 19 or the order or decision passed in the dispute of the right to use the farmland under this Law shall, on conviction, be punished with imprisonment for a minimum of six months to a maximum of two years and shall also be liable to fine for a minimum of three hundred thousand kyats to a maximum of five hundred thousand kyats.
30	Fire Brigade Law, 2015	Section-24:	Project Proponent commits to: No person shall fail to abide by the directives in respect of fire precaution and prevention issued under section -16 by the Township Fire Service Department.
		Section-25:	The owner or manager of the factory, workshop, work site or business exposed to fire hazard shall: (a) Not fail to form the reserve fire bridge (b) Not fail to provide materials and apparatus for fire precaution and prevention, in conformity with the directive of the Fire Service Department
31	The Prevention of Hazard from Chemical Substances Law, 2013	Section-15:	Project Proponent commits to: A person who has obtained a licence, before starting the respective chemical and related substances business:- (a) Shall be inspected for the safety and the power of resistance of the machinery and equipments by the respective Supervisory Board and Board of Inspection; (b) Shall be attended the person who serve in the work to the respective foreign trainings or the training and the expert trainings on prevention of hazard from the chemical and related substances opened by the government department and the government organizations.

		Section-16:	<p>A person who has obtained a license:-</p> <ul style="list-style-type: none"> (a) Shall abide by the license regulation; (b) Shall perform to abide strictly the instructions for being safety in using the chemical and related substances by himself and also the persons who serve the work; (c) Shall keep the required safety equipment enough in the chemical and related substances businesses, furthermore shall grant the personal protection equipment and dresses free of charge to the working persons; (d) Shall make the course of training and study and instruction if necessary to the working persons for using the occupational safety equipment, the personal protection equipment and the dresses systematically in the chemical and related substances business; (e) Shall be inspected by the respective Supervisory Board and Board of Inspection in respect of whether or not the hazard may impact on the Human Being and Animals' health and the environment; (f) Shall make medical checkup the working persons who will work in the chemical and related substances business and shall permit to serve in that work after obtaining the recommendation that his health is suitable for that work. This medical checkup records shall be kept systematically;
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			<p>(g) Shall send the copy of informative letter of the permission to the respective Department of Township Administration, if the hazardous chemical or related substances are permitted to store;</p> <p>(h) Shall acquire in advance the guidance and agreement of the respective Department of Fire Brigade, if the business that is worried to fire hazard is operated by using the fire hazard substances or the explosive substances;</p> <p>(i) Shall transport only the permitted amount of the chemical and related substances in accordance with the prescriptive stipulations, if they are transported in local;</p> <p>(j) Shall take the permission from the Central Supervisory Board if the chemical and related substance is altered and transferred from one place to any other place which contained in the license;</p>
		Section-17:	A person, who has obtained a license, shall put the insurance in accordance with 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.
		Section-22:	A person who has obtained the registration certificated shall abide the regulations consisted in the registration certificate furthermore shall also abide the order and instructions issued occasionally by the Central Supervisory Board.

		Section-27:	<p>A person who has obtained the license to be complied the following matters to control and decrease the hazard of the chemical and related substances:-</p> <ul style="list-style-type: none"> (a) Classifying the hazard level to protect in advance the hazard according to the properties of the chemical and related substances; (b) Expressing the Material Safety Data Sheet and Pictogram; (c) Providing the safety equipment, the personal protection equipment to protect and decrease the accident and attending to the training to be used systematically; (c) Performing in accordance with the stipulations in respect of transporting, possessing, storing, using, discharging the chemical and related substances; (d) Not being imported or exported the chemical and related substances banned by the Central Supervisory Board and the machinery and equipment which are used them.
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International conventions treaties and agreement (concerning environmental affairs)

Myanmar has either signed or ratified no less than thirty treaties, conventions and protocols concerning environment, it is learnt.

Some of the regional conventions or protocols signed or ratified by Myanmar are:

- (1) ASEAN Agreement on Conservation of Nature and Natural Resources. Kuala Lumpur, 1985
- (2) Agreement on Aquatic Centre in Asia and Pacific Bangkok, 1988
- (3) ASEAN Agreement on Tran-boundary Haze Pollution, 2002
- (4) Establishment of ASEAN Regional Centre for Biodiversity, 2005

Some of the international conventions and protocol which are of importance are:

- (1) Convention on Wetlands of internationally importance, RAMSAR 1971 and amended, 1987
- (2) Convention for the protection of World Culture and National Heritages. Paris, 1972.
- (3) Convention on International trade in Endangered Species of wild Fauna and Flora. Washington, 1973, and amended, Bonn, 1979.
- (4) Convention on conservation of migratory species of wild animals. Bern, 1983.
- (5) Vienna convention for the protection of Ozone Layer. Vienna, 1985.
- (6) Convention on Biological Diversity. Rio-de-Janero, 1992
- (7) U N Frame work Convention on Climate Change, 1992.
- (8) Kyoto Protocol on the frame work convention on climate change. Kyoto, 1998
- (9) Protocol on Bio safety. Cartagena, 2000
- (10) Convention on Persistent Organic Pollution (POP). Stockholm, 2004

Recently the country has participated in:

- (1) UN Climate Change Conference, COP (conference of the parties) 21, Paris, 2015
- (2) UN Climate change conference, COP 22, Marrakesh, 2016
- (3) UN Climate change conference, COP 23, Colombo, Sirilinka, 2017
- (4) UN Climate change conference, COP 24, Katowice, Poland, 2018
- (5) UN Climate change conference, COP 25, Madrid, Spain, 2019
- (6) UN Climate change conference, COP 26, Glasgow, England, 2021
- (7) UN Climate change conference, COP 27, Sharm El Sheikh, Egypt, 2022

National and International standards and guideline

The National guideline to be complied with National Environmental Quality (emission) Guideline by Environmental Conservation Department (ECD).

(a) Air quality

Sann Shinn & Brothers Co., Ltd will follow the general National Environmental Quality Emission Guideline values (Code no. 1.1) for air emission (NEQEG guidelines) as prescribed by the Environmental Conservation Department (from Notification No. 615/2015, December 2015, by ECD, then under the Ministry of Environmental Conservation and Forestry (MOECAF), now MONREC.

Parameter	Averaging Period	Guideline Value µg/m ³
Nitrogen dioxide	1-year	40
	1-hour	200
Ozone	8-hour daily maximum	100
Particulate matter PM ₁₀ ^a	1-year	20
	24-hour	50
Particulate matter PM _{2.5} ^b	1-year	10
	24-hour	25
Sulfur dioxide	24-hour	20
	10-minute	500

^a Particulate matter 10 micrometers or less in diameter

^b Particulate matter 2.5 micrometers or less in diameter

Note: This project is not the manufacturing of cement but only the production of Fiber Cement Board. The general guideline is applied.

(b) Myanmar drinking water standards (2019)

Parameters	Unit	Standard values*	WHO Guideline Values [□]
Total Coliforms	Acceptable/No objectionable	3	None specified (recommended median value – 0 per 100 ml)
Fecal Coliforms	Acceptable/No objectionable	0	Must not be detectable in any 100 ml sample (recommended median value - 0 per 100 ml)
Taste	Acceptable/No objectionable taste		Non set (recommended median value - 3 DN)
Odor	Acceptable/No objectionable odor		Non set (recommended median value - 3 DN)
Color	True Color Unit (TCU)	15	Non set (recommended median value - 15)

Turbidity	Nephelometric Turbidity Unit (NTU)	5	Non set (recommended median value - 5)
Arsenic	mg/L	0.05	0.01 mg/l
Lead	mg/L	0.01	0.01 mg/l
Nitrate	mg/L	50	50 mg/l
Manganese	mg/L	0.4	0.4 mg/l
Chloride	mg/L	250	Non set (recommended median value - 250)
Hardness	mg/L as CaCO ₃	500	Non set (recommended median value - 500)
Iron	mg/L	1	Non set (recommended median value - □.□)
pH	-	6.5 to 8.5	Non set (recommended median value – 6.5-8.5)
Sulphate	mg/L	250	Non set (recommended median value - 250)
Total Dissolved Solid (TDS)	mg/L	1,000	Non set (recommended median value -1,000)

(c) Waste water

Sann Shinn & Brothers Co., Ltd will follow the general guideline values (Code no. 1.2) (from Notification No.615/2015, December 2015, by ECD, then under the Ministry of Environmental Conservation and Forestry (MOECAAF), now MONREC.

(Waste water, storm water runoff, effluent and sanitary discharges (general application))

Parameter	Unit	Guideline value
5 day biochemical oxygen demand	mg/l	50
Ammonia	mg/l	10
Arsenic	mg/l	0.1
Cadmium	mg/l	0.1
Chemical oxygen demand	mg/l	250
Chlorine (total residual)	mg/l	0.2
Chromium (hexavalent)	mg/l	0.1

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

(d) Noise level

Sann Shinn & Brothers Co., Ltd will follow the general National Environmental Quality Emission guideline values (Code no. 1.3) for noise, NEQEG Guideline as prescribed by the Environmental Conservation Department (from Notification No. 615/2015, December 2015, by ECD, then under the Ministry of Environmental Conservation and Forestry (MOECA), now MONREC.

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

Note: Noise level at work place must not exceed 85-90dBA. (Provide PPE, ear muff, ear protection for workers exposed to high noise level for long period. The ideal level not interfere with health is 45dBA.)

(e) Odour

NEQEG Standard Guideline for odorant unit is between 5 and 10.

International standard and guideline

1. Cellulose fiber cement board introduction. www.hoire.com>cellulosefiber
2. Cellulose modified fiber is cement based composite. www.science.direct.com>article
3. Composition of cellulose fiber reinforced cement. www.researchgate.net>fig
4. Fiber cements board manufacturing. m.youtube.com>patent
5. ISO. 8636.2017. Fiber cements flat sheets production specification. www.iso.org.standards.
6. Mechanical and physical properties of natural fiber cement board for building. www.net.journal.org>PSRI
7. Natural fiber reinforced concrete, IJMETMR. www.ijmetmr.com>
8. Technology used in fiber cement manufacturing. <https://www.miroslav.asloupova.org>.

3.3 Contractual and other commitments

Sann Shinn & Brothers Co., Ltd is a subsidiary of the parent company, The Ngwe Yi Pale Group of Companies. The construction of the factory is implemented with the aid of the parent company (No other construction companies were contracted).


Commitments made by the project proponent

- (a) First of the entire project proponent Sann Shinn & Brothers Co., Ltd declares that the information in the report is, to the best of its knowledge, true, accurate and complete.
- (b) The EIA report has been prepared in strict compliance with applicable laws, rules, regulations, guidelines and procedures.
- (c) The project proponent will at all times comply fully with the commitments, mitigation measures, and plans in the EIA Report. (Re: EIA Procedure; Notification No.616/2015; Section 62, a-c)

Sann Shinn & Brothers Co., Ltd has made a sincere commitment to comply with law, rules and regulation and will do a business that is environmentally sound.

Sann Shinn & Brothers Co., Ltd commits to create a healthy and safe working place and working condition. First priority will be given to the Occupational Health and Safety of the workers and the Environmental, Health and Safety of all workers and the community. Sann Shinn & Brothers Co., Ltd will strictly follow the National Environmental Quality (air emission and effluent) Guidelines prescribed by ECD.

The company pledges not to pollute the air, water and land environment as practical as possible throughout the entire life of the project from the Construction Phase through the Operation Phase to the Decommissioning and Rehabilitation Phase. The Company will monitor and adopt suitable measures for environmental protection. And the company will follow all at the mitigation measures to be taken and the EMP implemented as prescribed in this EIA report.



U Kyaw Myint Oo
Director
Sann Shinn & Brothers Co., Ltd.

Commitments by the consultant firm, MESC

The consultant firm has made a sincere commitment and confirmed that:

- (a) the information and data in this EIA report are true and accurate and that the report is complete, and
- (b) that the EIA has been prepared in strict compliance with applicable laws including EIA procedure and with the ToR for the EIA (EIA procedure 616/2015, section-62 (a, b)).

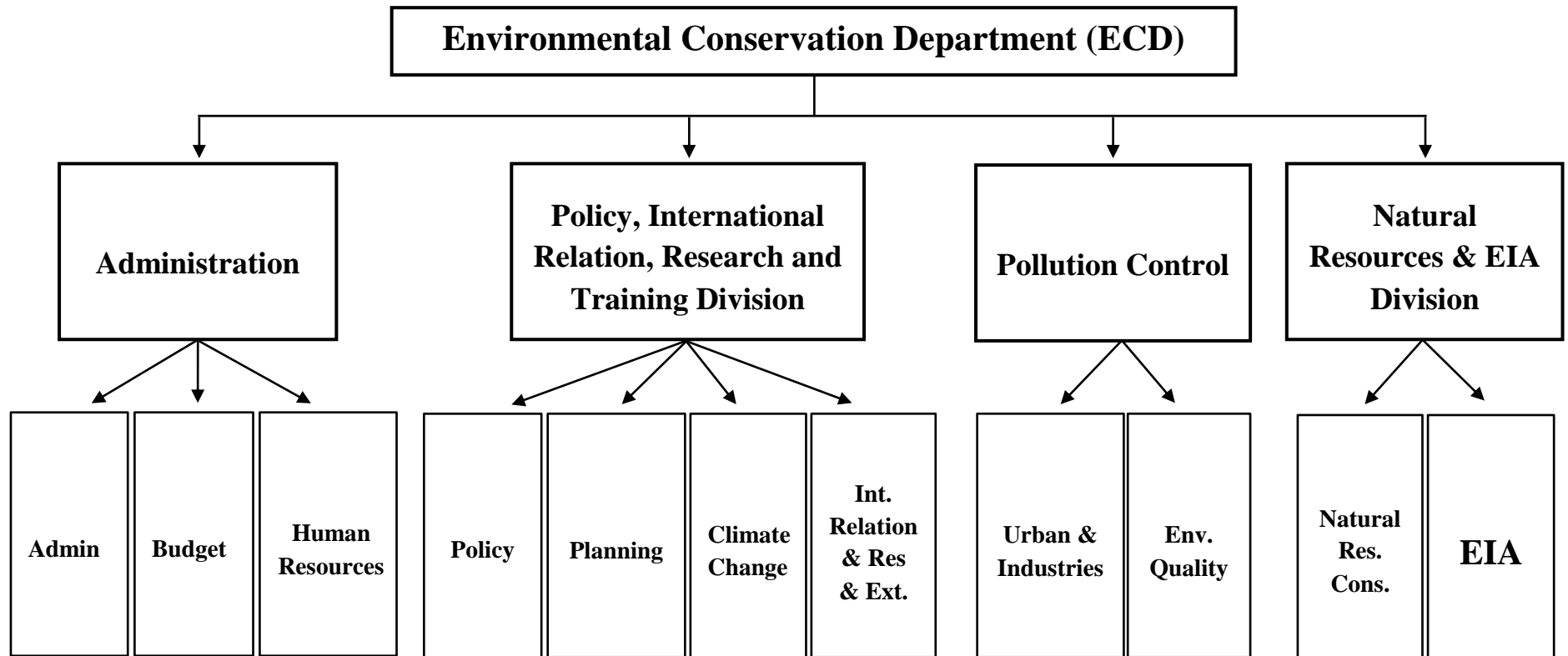
The report has been prepared by MESC with utmost effort with all reasonable skills, care and diligence within the term of contract with the client Sann Shinn & Brothers Co., Ltd. Recommendations are based on our experience, using professional judgment and based on the information that is available to us.



Myint Kyaw Thura
Managing Director
Myanmar Environment Sustainable
Conservation

Institutional organization of ECD

ECD is a major department under MONREC and is headed by a director general. Under the Director General are one Deputy Director General and 4 Directors at the directorate. ECD is the focal and coordinating agency for the overall environmental management of the country. It is also directly responsible for all the management of IEE, EIA, EMP etc. activities taking places all over the country. ECD has responsibility for the administration on the environmental impact assessment process. It has responsibility for the developing EIA regulations, guidelines and procedures. It also has responsibility for the review of environmental assessment documents. It also has responsibility for the supervision and monitoring compliance with environmental management plans associated with environmental impact assessments.



The main tasks of ECD include:

- implementing environmental conservation policy
- designing and implementing monitoring programmes
- prescribing environmental quality standards and,
- conducting activities relating to waste management and conducting environmental impacts assessments

Recently various Environmental Conservation Departments at States and Regional levels under the Directorate were established in all the 14 States and Regions of the nation. This will surely greatly enhance the conservation of the environment and especially the management of the environment of the country.

The Occupational and Environmental Health Division (OEHD) – under the Ministry of Health and Sports is the focal department involved in environmental and health affairs.

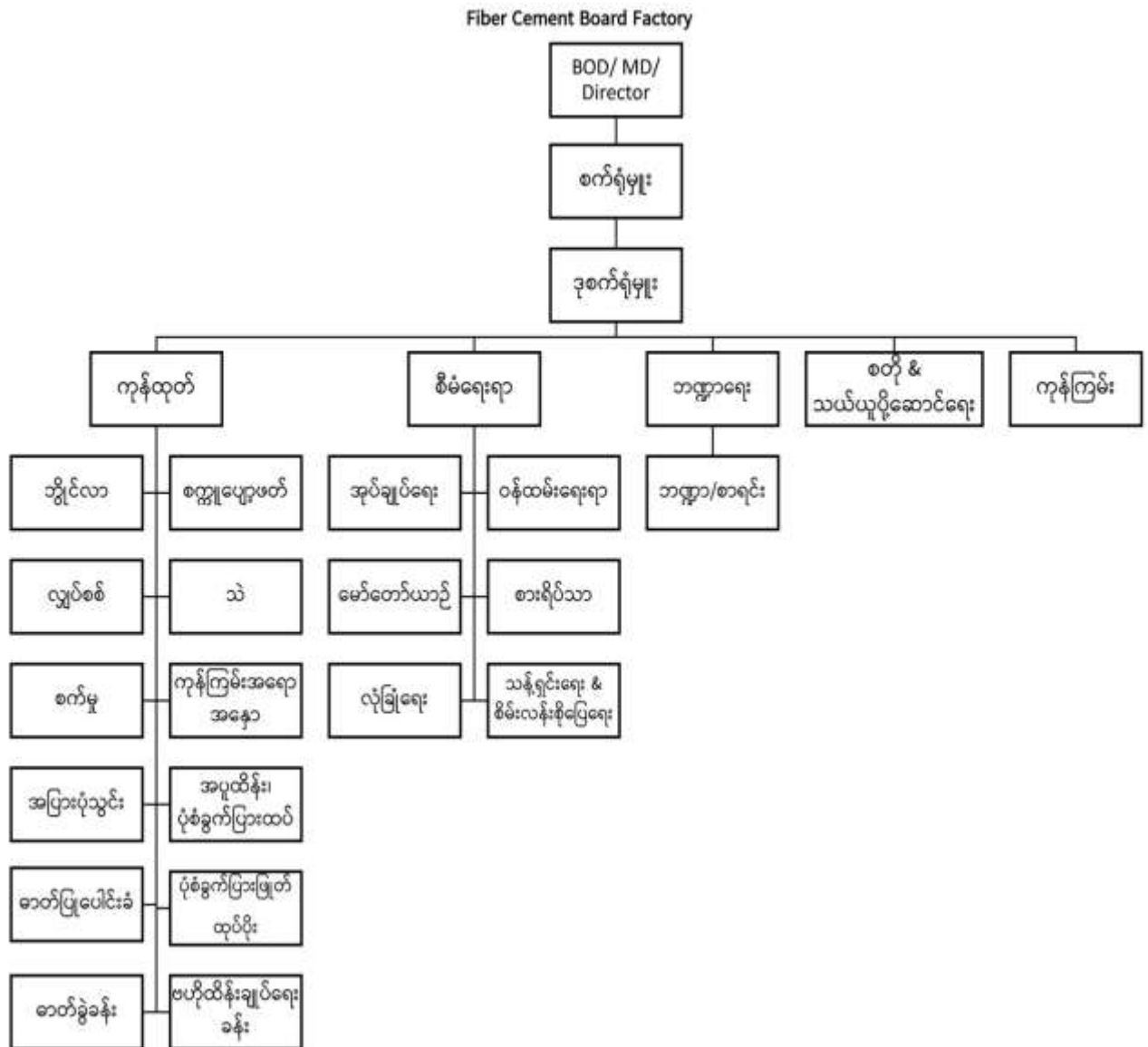
OEHD is involved in implementing Environmental Health Programme in the country.

At the moment it is involved in:

- Environmental monitoring: on air quality and water quality
- Medical monitoring: health assessment on workers (periodic medical examination, performing physical examination, chest X-ray, biomarker survey on workers.
- Work place assessment: on air quality, solid waste and waste water, heat stress and light, noise level, soil quality, water sanitation and hygiene etc. in certain factories.
- Assessment of environmental health probably related to climate change and general health impact.

Institutional arrangement of the project proponent

Organizational Chart of Sann Shinn & Brothers Company Limited



As regards environmental management and implementation of mitigation measure a small nucleus organization, EMP cell, with five staff and 2 locals is formed. More staff will be added to the EMP member list when necessary.

3.4 Project environmental and social standards

The International Finance Corporation (IFC) has developed a policy on Environmental and Social Sustainability (2012). That includes eight Environmental and Social Performance standards for a big company to do business in a new area. These are:

I) Assessment and Management of Environmental and Social Risks and Impacts

- identify and evaluate environmental and social risks and impacts of the project
- adopt mitigation measures to avoid, or if avoidance is not possible, minimize or mitigate the impact; compensate for the impacts on people and on the environment
- promote improved environmental and social performance through the effective use of management system
- ensure that grievances from the effected people are responded and managed appropriately
- promote and provide means for adequate engagement with the community throughout the project period

II) Labour and Working Conditions

- promote the fair treatment, non-discrimination and equal opportunity of workers
- establish, maintain and improve the worker-management relationship
- promote compliance with national employment and labour laws
- promote safe and healthy working conditions and the health of workers
- avoid the use of forced labour and child labour

III) Resource Efficiency and Pollution Prevention

- avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities
- promote more sustainable use of resources, including energy and water
- reduce project-related GHG emissions

IV) Community Health, Safety and Security

- avoid adverse impact on the health and safety of the community during the project life
- ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the community

V) Land Acquisition and Involuntary Resettlement

- avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs
- avoid forced eviction
- avoid, or where avoidance is not possible, minimize social and economic impacts from land acquisition or restriction on land use by
 - (i) providing compensation for loss of assets at replacement cost (value of asset plus transaction costs), and
 - (ii) ensure that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those effected
- improve or restore, the livelihoods and standards of living of displaced persons

VI) Biodiversity Conservation and Sustainable Management of living Natural Resources

- protect and conserve biodiversity
- maintain the benefits from ecosystem services
- promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities

VII) Ethnic Peoples

- ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of ethnic peoples
- avoid adverse impacts of project on ethnic people, or when avoidance is not possible, minimize and/or compensate for such impacts
- promote sustainable development benefits and opportunities for indigenous people in a culturally appropriate manner
- establish and maintain an ongoing relationship with these people throughout the project period
- respect and preserve the culture, knowledge and practices of ethnic peoples

VIII) Cultural Heritage

- protect cultural heritage from the adverse impacts of project activities and support its preservation
- promote the equitable sharing of benefits from the use of cultural heritage

3.5 Health Standards for project with health impacts

Environmental Health and Safety (EHS) aspects

This main section includes:

- a) air emission and ambient air quality
- b) energy conservation
- c) waste water and ambient water quality
- d) water conservation
- e) hazardous materials management
- f) waste management
- g) noise management and
- h) contaminated land management

Occupation Health and Safety (OHS) aspects

The Occupation Health and Safety guideline by IFC encompasses:

- general facility design and operation
- physical hazards
- chemical hazards
- biological hazards
- radiological hazards
- Personal Protective Equipment (PPE)
- special hazard environments
- communication, training and monitoring

Community Health and Safety (CHS) aspects

The Community Health and Safety guideline by IFC encompasses:

- water quality and availability
- structural safety of project infrastructure
- life and fire safety L&FS
- traffic safety
- transport of hazardous materials and disease prevention
- emergency preparedness and response

3.5.1 Occupational Health and Safety (OHS) by ILO

OHS is defined by International Labour Organization (ILO) as:

- The science of the anticipation, recognition, evaluation and control of hazards arising in or from the work place that could impair the health and well-being of workers taking into account the possible impact on the surrounding communities and the general environment.

Some core principles of OHS

- All workers have rights and employers must ensure that:
 - work should take place in a safe and health working environment;
 - condition of work should be consistent with worker's well-being and human dignity;
- Occupational safety and health policy must be established
- Social partners (employers and employees) and other stakeholders must be consulted
- OHS programmes and policies must aim at both prevention and protection
- Continuous improvement of OHS must be promoted
- Health promotion is a central element of OHS practices
- Compensation, rehabilitation and curative services must be made available to workers who suffer occupational injuries, accidents and work related diseases
- Education and training are vital components of safe, healthy working environment
- OHS policy must be enforced

Commitment

The project proponent, Sann Shinn & Brothers Co., Ltd, has made a sincere commitment to comply with all the relevant laws, rules, regulation, guidelines as far as possible.

U Kyaw Myint Oo

Director

Sann Shinn & Brothers Co., Ltd.

4. PROJECT DESCRIPTION AND ALTERNATIVE SELECTION

4.1 Project background

Since the mid-nineteen century asbestos fiber cement boards were widely used as building materials in western developed nations. After asbestos fiber was banned due to serious health issue (asbestos was known as cariogenic) the eco-friendly cellulose fiber cement boards have become one of the most widely used building materials worldwide.

The project proponent, the Sann Shinn and Bothers Co., Ltd has a desire to manufacture and produce cellulose fiber cement board in Myanmar.

Sann Shinn and Brothers Co., Ltd was therefore, registered as a limited company by shares on 3-9-2019 (Document; Certificate of Incorporation; Company Registration No.122002624; Directorate of Investment and Company Administration). The company has proposed for the construction and operation of fiber cement boards factory. As the company has the capacity and technology to produce cellulose fiber cement boards. This proposed project site near the Taung Yinn Village, Sint Kaing Township, Kyaukse District, and Mandalay Region was selected.

The proposed site has many advantages for the company.

The site is accessible by motor road (The Bellin-Ye-ywar Road, and Yangon-Mandalay Highway); it has access to electricity (at Bellin Sub-station); and water can be sourced from ground water at a depth of 270 feet.

The raw material portends cement is readily available from its parent company, The Ngwe Yi Pale' Crown Cement plant at Naunghkio Township in the northeast. Other raw materials, Sand and quick line can be reading procured from this area.

Only paper pulp (natural fiber) has to be imported from USA or Canada. Locally available old paper boards can be used, but the quality is law and not available for the long term. (Of course machinery, equipment and other materials will have to be imported).

The objectives -

- to produce eco-friendly cellulose fiber cement boards in Myanmar.
- to produce quality building materials at reasonable price for the people.
- to contribute to the development of fabricated building materials for the country, and
- to contribute to the development of Construction sector of the country.

The estimated budget is Ks 19931.31 million. The production target is 5,300 pieces (boards) per day, and 1,249,000 pieces of per year (300-320 working days). (The dimension of fiber cement board: 2440 x 1220 x 6 mm).

4.2 Project location, overview map and site layout maps

The proposed project site is 0.68 miles east of Bellin village and 0.35 mile east Taung Yinn village, Sint Kaing Township, Kyaukse District, and Mandalay Region. (There are no other villages in the vicinity)

The site in 4.5 miles southeast of Sint Kaing Town; 4.2 miles north of Kyaukse City; 20 miles south of Mandalay City and 315 miles north of Yangon City.

The Kyaukse University is about 1½ miles in the north.

The Yangon-Mandalay Highway and the Yangon-Mandalay Railway (which runs parallel to the highway) are 0.75miles in the west.

The surrounding area is rather like a mini-industrial zone. There are 7 other project sites (factories) in the vicinity, namely: Myanmar Linn Kyan Shoe Factory in the adjustment southwest; Shwe Na Gar incense sticks (joss stick) and tissue paper roll factory and Soe Moe Awning (sheet) factory in the adjacent west; Ngwe Moe Hein Metal Refining factory in the northwest; MEC stone slab (ornamental stone slab)factory in the east; LED Oo Thar Lamp/ Lighting bulb factory further east and Beka Plastics Factory (owned by MEC) a little further southeast.

North of the site is the Prison Department facility and in the adjacent south is the Housing Complex for Myanmar Electric Power Enterprise (MEPE) employees.

In the south in the Bellin Ye Ywar Road running west to east linking Bellin Village in the west and Ye Ywar Village (Hydroelectric Project) in the east.

The area of the site is 10.11 acres. The coordinates are: N.21 40' 27.14" and E 96 08' 19.19" and the elevation in 297 ft asl.

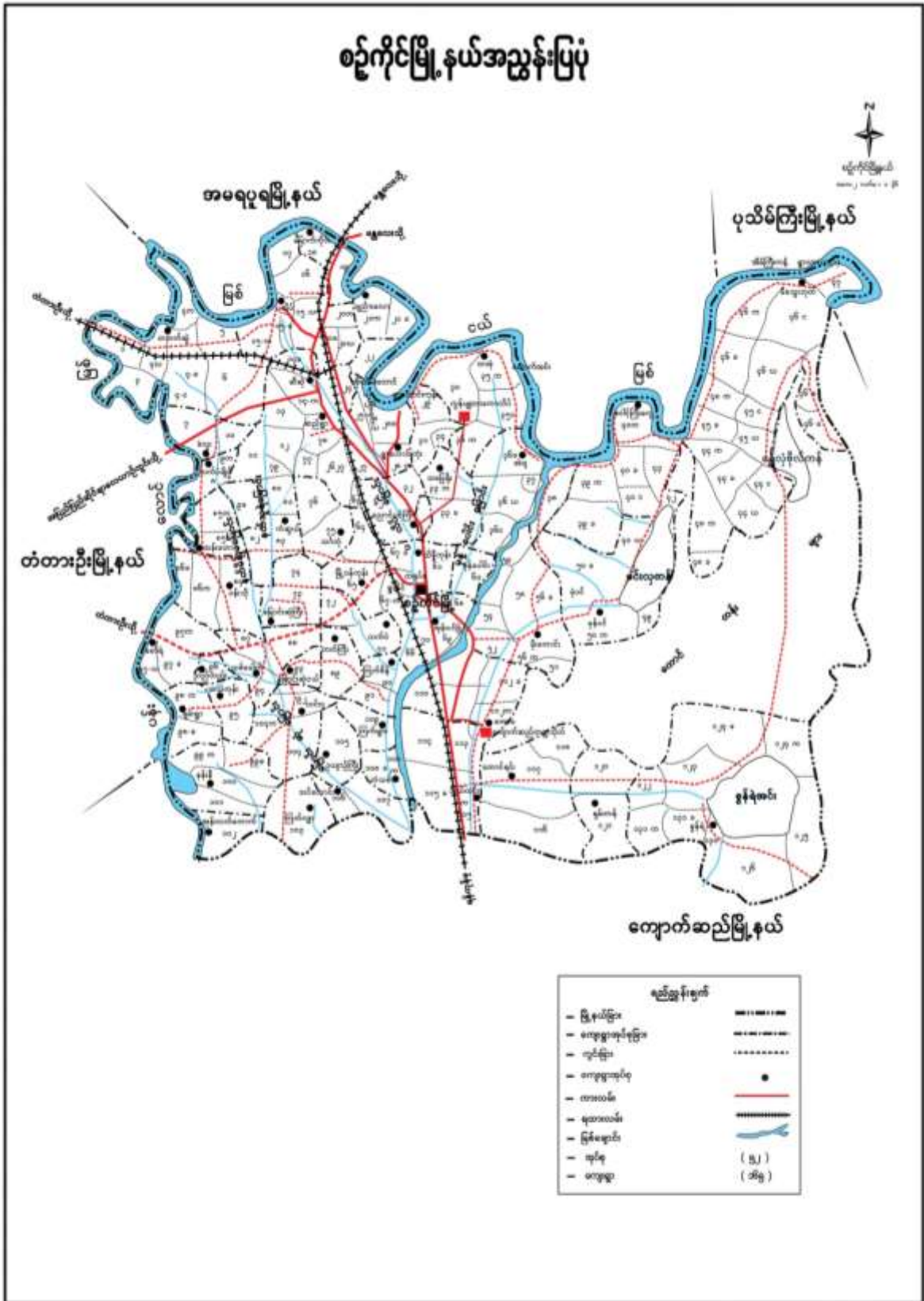
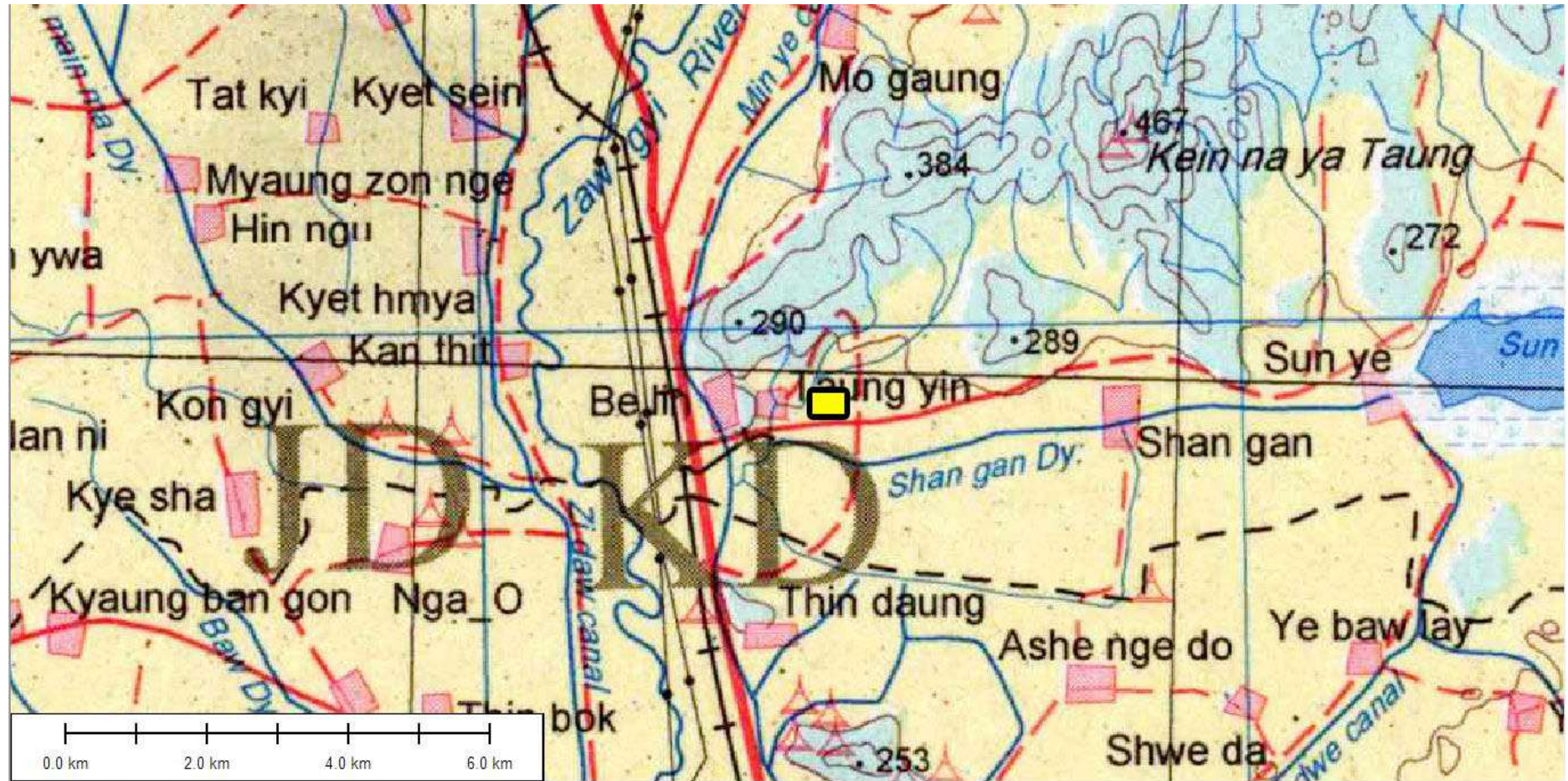


Figure-5: Map of Sint Kaing Township



Figure-6: Satellite image of the proposed project and its environs



Legend

- - - motor road
- ~~~~~ river/stream
- township/village
- project site

Figure-7: Map of part of Sint Kaing Township showing proposed project site



ဦးပိုင်တစ်ခု၏ရာဇဝင်

မြေစာရင်းပုံစံ - ၁၀၆
ခရိုင် - ကျောက်ဆည်

မြို့နယ် - ဧရာဝတီ

မြေတိုင်းစာရင်းအုပ်စု - ၆၀၀၀၀၇၆

တွင်း/အတွက်အမှတ်နှင့်အမည် - ၁၁၇ / ၆၀၀၀၀၇၆

ခုနှစ်	ဦးပိုင်	အခွန်စည်းကြပ်ခံရသူ/ ပိုင်ရှင်အမည်/လရန်ရှင် အငွေစရန်ရှင်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့်အတန်း	ဧရိယာ(ဧက)	အခွန်တော်သင့်ငွေ (ပိုင်ကြေးအပါအဝင်) (ကျပ်)	မည်ကဲ့သို့ပြောင်းလဲသည့်ညွှန်ပြချက်	မှတ်ချက်
၁	၂	၃	၄	၅	၆	၇	၈	၉
၂၀၁၁/၂၀	၈၈%	ဦးပိုင်ကျေး		၁၀၀-၂	၀.၂၂		-	
	၁၀၀	"		"	၀.၃၃		-	
	၁၀၁	"		"	၀.၅၉		-	
	၈၈%	"		ခက်ကွဲ၆၆	၁.၆၄	} ၈/၃ - ၃၉ ကျ မြို့		
	-	"		"	၀.၄၆		"	

ဦးစီးအရာရှိ
မြို့နယ်မြေစာရင်းဦးစီးဌာန
ဧရာဝတီမြို့

လျှောက်ထားသူအမည် - ဦးပိုင်ကျေး
လျှောက်လွှာတင်သည့်ရက်စွဲ - ၂၆.၇.၂၀၁၂
လျှောက်သူသို့လက်ခံပေးအပ်သည့်ရက်စွဲ - ၂၆.၇.၂၀၁၂
နေရာပေးသည့်အကြောင်းအရာ - ဧရာဝတီမြစ်ဝကျွန်းပေါ်
(ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်။)

အသက်ပါနေကူးဖော်ပြသော အကြောင်းအရာတို့မှာ ၂၀၁၁/၂၀ ခုနှစ်အတွက် နှစ်စဉ်နောက်ဆက်တွဲတိုင်းတာခြင်းမြေပုံနှင့် မှတ်ပုံတင်စာရင်းများတွင် ပါရှိသည့်အတိုင်း အမှန်လက်ခံနေကူးကြောင်း သက်သေခံပါသည်။

အမှုတွဲထိန်း/မြေတိုင်းစာရင်းအုပ်စု
ဦးစီး - ၂၆.၇.၂၀၁၂
မြေတိုင်း - ၄ တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည်
မြို့နယ်မြေစာရင်းဦးစီးဌာန လက်ထောက်ဦးစီးမှူးလက်မှတ်
ဧရာဝတီမြို့ နေ့စွဲ - ၂၆.၇.၂၀၁၂

လက်ထောက်ဦးစီးမှူး
ဧရာဝတီမြို့

Figure-9: Form 106 concerning land use

မန္တလေးတိုင်းဒေသကြီးအစိုးရအဖွဲ့

လယ်မြေမှတစ်ပါး လယ်ယာမြေအား အခြားနည်းအသုံးပြုရန် ခွင့်ပြုမိန့်

မန္တလေးတိုင်းဒေသကြီး၊ မန္တလေးခရိုင်၊ အောင်မြေသာစံမြို့နယ်၊ ပြည်ကြီးရန်လုံရပ်ကွက်နေ ဦးသိန်းမြင့်၏ သား ဦးကျော်မြင့်ဦး၊ ၉/မခန(နိုင်)၀၂၂၆၆၅ အား လယ်ယာမြေ ၂ပဒေ ပုဒ်မ ၂၉ နှင့် ၃၀ တို့အရ အောက်ဖော်ပြပါ လယ်မြေမှတစ်ပါး လယ်ယာမြေကို သတ်မှတ်ထားသည့် စည်းကမ်းချက် များနှင့်အညီ အခြားနည်းအသုံးပြုခွင့် ပြုလိုက်သည်။

အခြားနည်းအသုံးပြုခွင့်ပြုသည့် လယ်မြေမှတစ်ပါး လယ်ယာမြေအကြောင်းအရာ
မန္တလေးတိုင်းဒေသကြီး၊ ကျောက်ဆည်ခရိုင်၊ စဉ့်ကိုင်မြို့နယ်

စဉ်	ရပ်ကွက်/ ကျေးရွာ အုပ်စု	ကွင်း/ အကွက် အမှတ်နှင့် အမည်	ဦးပိုင် အမှတ်	မြေမျိုး	ခွင့်ပြုသည့် ဧရိယာ		ခွင့်ပြုသည့်နည်းလမ်း	မှတ်ချက်
					ဧက	ဒဿမ		
၁	၂	၃	၄	၅	၆	၇	၈	၉
၁	တောင်ရင်း	၁၁၇၊ တောင်ရင်း	၉၇၊ ၉၈၊ ၉၉/၁၊ ၁၀၁၊ ၁၄၃	ယာ	၁	၂၇	သံရည်ကျိုစက်ရုံ မြေနေရာအဖြစ်	ခွင့်ပြုသည့် နေ့မှ(၆)လ အတွင်း အသုံးမပြု လျှင် ပြန် လည်သိမ်း ယူနိုင်သည်။
				ပေါင်း	၈	၀၁		

သက်သေခံမြေပုံပူးတွဲထားပါသည်။

မန္တလေးတိုင်းဒေသကြီးအစိုးရအဖွဲ့၏ (၆ - ၁၂ - ၂၀၁၉)ရက်နေ့ အစည်းအဝေး အမှတ်စဉ်(၂၀/ ၂၀၁၉)ဆုံးဖြတ်ချက်အပိုဒ် - ၃၇ အရ လက်မှတ်ရေးထိုး ထုတ်ပေးခြင်းဖြစ်သည်။



စာအမှတ်၊ ၂ / ၃ - ၃ / ၇ ဦး ၆ (၁၂၇၁)
ရက်စွဲ၊ ၂၀၁၉ ခုနှစ်၊ ဒီဇင်ဘာလ ၂၃ ရက်

(မြင့်လွင်)
အတွင်းရေးမှူး
မန္တလေးတိုင်းဒေသကြီးအစိုးရအဖွဲ့
မန္တလေးမြို့

Figure-10: Document for other uses of land

4.3 Project Development and Implementation Time Schedules

The budgets is : Ks. 19931.31 million

The estimated duration of the whole project life:

(Tentative schedule)

- i) Pre-construction phase : 1 year (2019); already completed.
- ii) Construction phase : 1 year (2020); however still in process of construction due to outbreak of COVID-19 pandemic and other issues. It is expected that operation will commence in mid-2023.
- iii) Operation Phase : 30 years (2023-2053), (expected)
- iv) Decommissioning Phase : 1 year (2054).

Preconstruction Phase	Construction Phase	Operation Phase	Decommissioning Phase
← 1 year →	← 1 year →	← 30 years →	← 1 year →

(Not in same scale)

The project is still in the Construction Phase and if things progress smoothly it is expected that the Operation Phase can commence in the middle of 2021.

However, due to the outbreak of the COVID-19 pandemic most activities have to be suspended for several months. Works have resumed just recently and it is expected that Operation Phase can be commenced in the middle of 2023. (The duration of the Operation Phase will be 2023-2053).

The task during each plan

- During the Preconstruction Phase (already completed) the main tasks are merely paper work, planning and designing.

During the Construction Phase

- Clearing the land; fencing; mobilization of building materials; earth work (foundation); actual construction works; installation of plumbing and electricity; finishing work (final touches); removal of all construction tailings and tidy up the site.

During the Operation Phase

- Test running the factory; routine operation works and production works; storage and marketing of final products; regular monitoring and maintenance works; regular recruitment/replenishment of raw materials and continual operation/production works.
- Implementation of EMP and taking mitigation measures.

During the Decommissioning Phase

- Isolation and shutdown of the factory; dismantling of machinery and buildings/structures; reused or put up for sale for these that are still usable; disposal of unwanted materials at approved landfill; removal of contaminated soil; tidy up the site; testing air, water and soil for the last time and subsequent rehabilitation of the site to its quasi-original condition as far as possible.

Note: There is no other associated project or development project by Sann Shinn & Brothers Co., Ltd, only production of fiber cement boards.

4.4 Description of the project

4.4.1 Size

- The project site has an area of 10.11 acres.

4.4.2 Installation -

The proposed cellulose fiber cement boards factory has the following facilities: which are shown in the following schematic layout plan (Schematic model).



Figure-11: Schematic layout plan inside the factory

Legend

01	Sand preparation section	15	Re-stacking section
02	Pulp preparation section	16	Cleaning and oiling section
03	Cement and auxiliary material silo	17	Autoclave system
04	Sand slurry storage tank	18	De-stacking section
05	Pulp slurry storage pool	19	Drying system
06	Batching section	20	Thickness sorting system
07	Clean and recycle water tank	21	Sanding section
08	Board forming section	22	Edging and chamfering section
09	Flocculant system	23	Thickness sorting system
10	Receiving section	24	Boiler system
11	Stacking section	25	Air compressor system
12	Waste material recycle system	26	Central control room
13	Press system		
14	Pre-curing section		

Note – In order to visualize all the facilities in one page the model is schematic. Actually the factory is a long linear factory with almost all facilities inside the factory. Long flow on sheeting machine and very long roller conveyors are involved and therefore the factory has to be a long linear factory running from north to south along the eastern periphery of the project site.

The following satellite image show the actual shape and layout plan of the factory and associated building and structure.

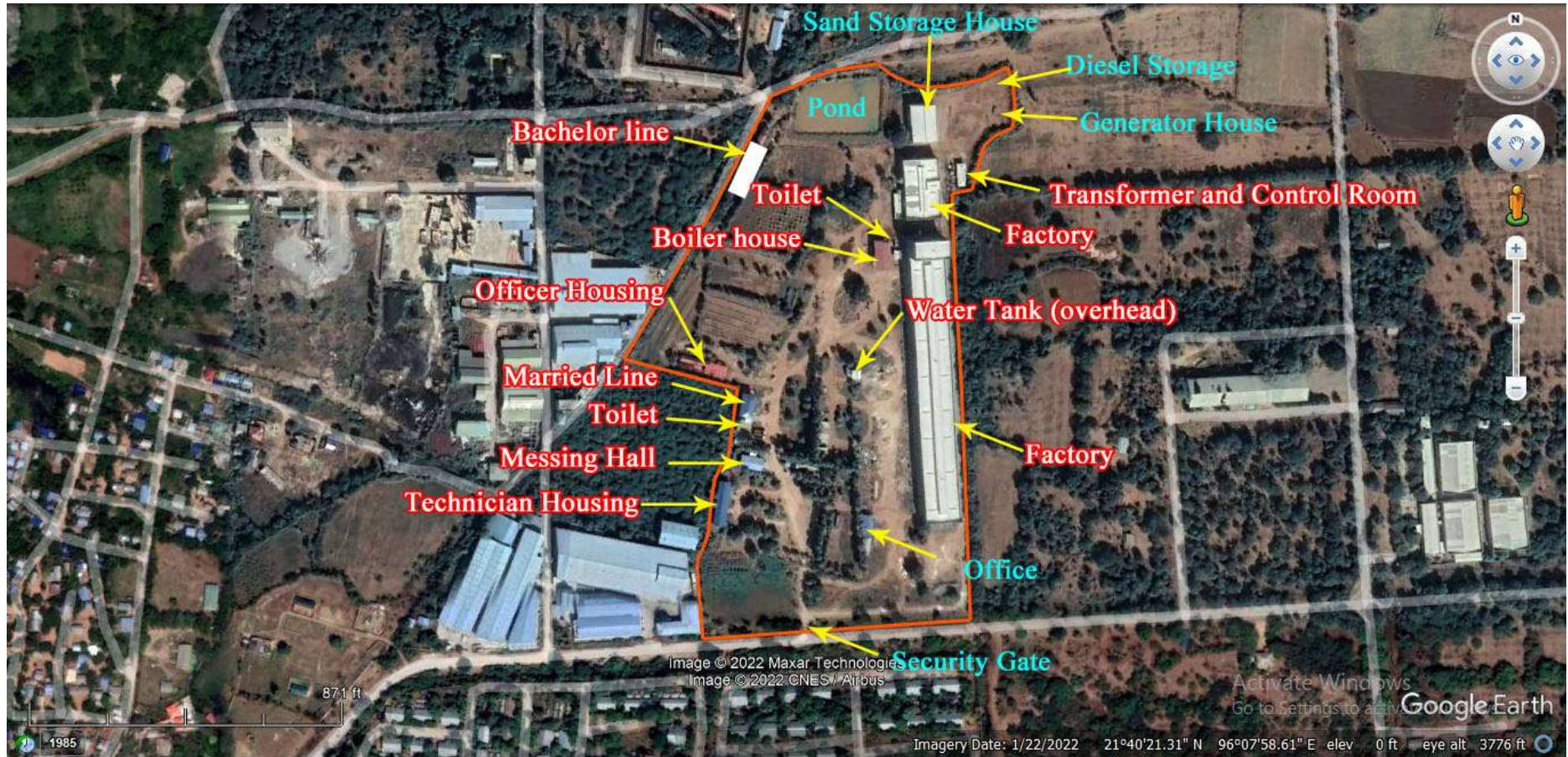


Figure-12: Satellite image showing the factory and associated buildings/structures (some are still in the process of construction)

The long linear factory and associated buildings/structures are in the eastern part of the site. The residential area is in the western part. The main overhead tank is in the center. Spaces are left for greening and landscaping.

The main buildings

The main buildings in the premise are:

1. The office : dimension 45' x 60'
2. The factory (preparation unit) : dimension 98.5' x 790'
3. The factory (manufacturing and production units) : dimension 60' x 100'
4. Warehouse (for raw materials) : dimension 100' x 200'
5. Warehouse (finished products) : dimension 30' x 60'
6. Boiler unit : dimension 30' x 60'
7. Housing for employees : dimension 30' x 70'
8. Housing for officers : dimension 30' x 50'
9. Messing hall : dimension 30' x 50'

4.4.3 Infrastructure

- The industrial infrastructure comprise the main factory and all the facilities inside (e.g. a variety of machinery and equipment); associated buildings/structures including office, control room, fuel depot, boiler house, overhead tank, transformer and generators, storage sheds (silos) for raw materials, were house for finished products etc.
- The residential infrastructure comprises housings for employees (with separate bachelor line and family line), housing for officers, and housing for foreigner engineers and technicians, kitchen and messing room etc.
- For transportation the factory has 5 office vehicle and 5 motorcycles; one loader and one forklift. Heavy trucks will be hired for transportation of raw materials and finished products. (During Construction Phase 2 wheel loaders, 1 excavator, 2 dump trucks and 2 craves are deployed).
- As regards basic infrastructure the factory has easy access to motor road (The Bellin - Ye Ywar Road and Yangon - Mandalay Highway).
- Ground Water is sourced from a depth of 270 (two tube wells).
- The factory has access to gridline electricity; electricity is sourced from Bellin Sub-station, 2 miles away in the south west.



Figure-13: Office



Figure-14: Aerial view of project site with main factory in the fore ground



Figure-15: Warehouse for raw material



Figure-16: Boiler unit and stack



Figure-17: Housing for technicians



Figure-18: Housing for company's officers



Figure-19: Housing, family line



Figure-20: Messing hall

4.4.4 Technology

The technology is cellulose fiber cement board technology where cellulose fibers (paper pulp natural fiber) together with cement, sand, quick lines are mixed to form fiber cement board.

(It was invented during the late 19th century by an Austrian named Ludwig Hatschek).

Formerly asbestos fiber cement boards were widely used in developed and industrialized countries. However during this era of environmental awareness asbestos was found out to be of serious health issue, (it is carcinogenic).

Now the environmental friendly cellulose fiber cement boards are the most widely used cement boards globally. (Steel fiber and synthetic fibers are also used).

Cellulose fiber cement boards have the following advantages;

- They are environmentally sound building materials.
- They are light weight but strong and durable (long lasting building materials)
- They are fire resistant, water tight and termite proof and
- Due to light weight they are easy to handle, install and maintain (low maintenance costs)

They are, therefore, widely used in walling, roofing and facading.

In this project context felt is applied and autoclaving is done to improve the quality of the fiber cement boards. This is also called Autoclaved Cellulose Fiber Cement Boards.

4.4.5 Production process

The main simplified steps in processing include:

- Sand preparation (grinding with ball mill), liquefied to sand slurry)
- Cellulose preparation (Liquefying , crushing , pulp slurry)
- Mixture slurry preparation (mixing , blending)
- Sheeting or board/sheet making (flow-on sheeting machine)
- Cutting and trimming (powerful water jet/water cutter)
- Stacking (template stacking, stacker)
- Pre-drying
- autoclaving
- cooling
- destacking
- sanding/smoothing, edging and chamfering
- final product
- storage for marketing.

In all processes mechanical labour is applied and all processes are fully automated.

The process in details

1. Sand preparation (made into sand slurry)

The sand from storage shed is transported by wheel loader. The wheel loader put the sand into hopper and then conveyed by conveyor belt to ball mill for grinding. Sand is mixed with water first and ground to a fineness of 0.02 mm. The ground liquefied sand slurry is temporarily stored in sand slurry tank.

2. Cellulose preparation (made into pulp slurry)

The soft wood pulp from the warehouse is transported by forklift to the mixer pond. It is then crushed and mixed with water and made into slurry until a standard viscosity is achieved. The slurry is then conveyed into slurry pond No.1 and thoroughly mixed and passed through a series of ponds (pond No 2, 3, 4 and 5) for further mixing/blending and then pumped into pulp slurry tank and temporarily stored.

3. Mixture slurry preparation (mixing, blending)

The ratio of mixing/blending raw materials:

- sand - 48.6 % by weight
- cement - 33.2 % by weight
- pulp - 9.7 % by weight
- quick lime - 8.5 % by weight

The cement loaded on a cement bowser is conveyed into the cement slurry tank through two holes in the wall of the factory. The quick lime powder is also conveyed to the slurry tank.

Sand slurry, pulp slurry, cement slurry and quick lime and water (from a water tank) separately flow into the mixing device and one mixed and blended.

After mixing and blending the mixed (combined) slurry is pumped into the mixture slurry container, the silo.

(Bag filters are installed at mixing device to remove and collect dust, and slags separator are installed at the said silo to separate and remove slag.

4. Board/Sheet making (on flow-on sheeting machine)

The mixture slurry is pumped into pre-mixing tank; it is then applied onto the flow-on sheeting machine with the aid of propeller and the wet sheet, board is initially formed. (The water moister that generated is removed with water air separator and then pumped into clean water tank for reuse. The foam generated during the process is eliminated by applying a small quantity of deforming agent. Precipitate from deforming is collected in the sieve below and manually removed.

The wet sheet/board is rolled with forming machine and the required thickness is gauged by laser gauge and then detached. The detached forming sheet/board fall onto the green board receive conveyer (roller conveyer).

5. Cutting and trimming

The long wet board (green board) is cut and trimmed with high pressure water cutter into 4 feet breadth board. In the next step it is cut and trimmed into 8 feet length.

(The off cuts/rejects from water either fall onto the return conveyer below, crush in double screw and return to mixing machine and, all are reused.)

6. Stacking

With the aid of vacuum stacker the 8' x 4' boards are stacked onto the mold plate (iron plate) placed on roller conveyer. The mold plate is greased in order that the board is not stuck to the mold plate.

7. Re-stacking, polishing and Pre-drying stacking

The boards are than restacked and placed on polishing machine. After polishing the boards are placed on trolley conveyor by template stacker (for template stacking).

The boards are kept on the trolley conveyor for a while for Pre-drying, naturally.

8. Autoclaving

With the aid of winch the boards are put into the autoclave chamber and autoclaved by the hot steam from boiler (8 tons boiler) for 4-6 hours for curing/autoclaving. (The temperature is 190°C and the working pressure is 1.2).

After autoclaving the stacks are removed by winch and placed, de-stacked on trolley conveyor for cooling and drying, naturally.

9. Sanding, edging and chamfering and polishing

The surface of each board is smoothed with machine operated abrasive belt. Afterwards edging and chamfering are done with the aid of machine and final polishing is carried out.

10. Branding and labeling

The boards are then placed on label stacking conveyor for labeling. The brand name "Tiger" is labeled with an automatic machine.

11. Palletizing and storage

The labeled boards are then conveyed with forklift to the auto palletizing system and mechanically stacked. Each stack or bundle comprises 100 boards and they are packed manually and stored in finished products warehouse for marketing.

Later a quality control room will be set up to test the quality of the cellulose fiber cement boards. In addition the testing of the quality of raw materials, quality of water and the strength (pressure stress) of the fiber cement boards will be conducted regularly.

12. Factory production capacity

The factory can produce 5 million square meters of fiber cement board per year. The dimension of a board is 2440 × 1220 × 6 mm. The daily production is 5,300 pieces (boards) while the maximum annual production is 1,249,000 pieces (boards).

Operation days : 300 - 320 days/year

4.4.6 Uses of materials and resources

Machinery and equipment

All machinery and equipment are brand new and imported from abroad.

The list of machinery and equipment to be imported are shown in **ANNEX**. (Machinery and equipment for the central control and for various sections and systems together with quantity required and individual H.S Code, are listed).



Figure-21: Sand feeder hopper



Figure-22: Conveyor line



Figure-23: Ball mill



Figure-24: Slurry mixing tank



Figure-25: Water pulper



Figure-26: Water tank for pulping



Figure-27: Slurry tanks



Figure-28: Pulp pumps



Figure-29: Agitators



Figure-30: Pulp and sand tanks



Figure-31: Cement silos



Figure-32: Waste water agitators



Figure-33: Clean water return tank



Figure-34: Sand, pulp and cement tanks (From left to right)



Figure-35: Bag filter unit



Figure-36: Cement and auxiliary materials silos



Figure-37: Slag separator



Figure-38: Pre-mixing tank



Figure-39: Flow-on sheet machine



Figure-40: Water, air separators



Figure-41: Forming machine



Figure-42: Green receiving board machine



Figure-43: High pressure water cutter



Figure-44: Stacker



Figure-45: Roller conveyor



Figure-46: Restacker



Figure-47: Template stacker



Figure-48: Autoclaves



Figure-49: Spacer restacker



Figure-50: Label stacking conveyor rack



Figure-51: Plate carrier



Figure-52: Auto palletizing system



Figure-53: Final products: the brand name (Target) and bundles of fiber cement boards

Raw Materials and annual requirement

1. Cement will be procured from the parent company, the Ngwe Yi Pale' Crown Cement Factory, at Lauk Hpan Village, Naungkhio Township, Shan State, 60 miles in the north east. The quality is strength Grade 42.5 Portland Cement. The annual requirement is 15,600 tons
2. Sand (quartz sand 90% silica) will be procured from sand mines/sand quarries in Kyaukse Township area. The annual requirement is 22,800 tons.
3. Paper pulp (natural fiber; soft wood Kraft Pulp; fiber length more than 2.5 mm) will be imported from USA and Canada. (HS. Code 4703). The annual requirement is 4,560 tons.
4. Quick lime (local) will be procured from any local wholesalers in the region. The annual requirement is 3,960 tons.
5. Felt (to be embedded in cement boards) (HS. Code 5602). Annual requirement is 24 pieces and will be imported from China.
6. Abrasive belt (for smoothing fiber cement boards); (HS. Code 6805). Annual requirement is 300 pieces and will be imported from China.
7. Chemicals (Deforming agent JY-FS817. (HS. Code 3402); 500kg/year and will be imported from China.

Resources

Water

Water is sourced from underground water at a depth of 270. There will be two tube wells.

The annual requirement is estimated at 20,000 tons. (Daily requirement is about 60 tons).

There will be an underground concrete tank with a capacity of 10,000 gallons; one overhead tank, capacity, 5,000 gallons, for the factory and elevated 4,000 gallons tank for office and domestic uses.



Figure-54: Elevated tank (for office and domestic uses)



Figure-55: Ground concrete tank and overhead tank for industrial use

Raw water will be treated applying conventional method: Sand and Carbon filter, and water softener. This treated water will be used as water cutter. The pH will be maintained at 7.



Figure-56: Water treatment unit

Electricity

Electricity will be sourced from a gridline Bellin Sub-station two mile away in the south west with 33 KV cable line. The 33 KV will be stepped down to 11 KV by 33/11 KV 20 MVA transformer. The 11 KV cable line will be connected to the grinding machine unit. Then the 11 KV will be stepped down again to 0.4 KV by 11/0.4 KV 20 MVA transformer and connected to various parts of the factory.



Figure-57: Bellin Sub-station

The annual electricity requirement is estimated at 6 million KW hr

Three diesel generators, comprising one 2,200 KVA generator, two 1000 KVA generators and one 200 KVA generator will be installed as back up generators for use in case of power outage or power failure.



Figure-58: Control room and transformer station

Fuel Oils

Annual fuel requirement : Diesel 480,000 litres
Petroleum/gasoline 2,000 gallons
Engine oil/lubricant 100 gallons

There will be a diesel fuel tank, capacity: 7,000 gallons



Figure-59: Fuel depot

Fuel oil can be procured from fuel stations in Kyaukse City or Mandalay City.

Coal

Annual coal requirement : 10,800 tons (sub-bituminous coal)

Coal is used as burner in the 8 tons boiler, and the hot steam produced from boiler is used for curing and autoclaving the fiber cement boards.

Coal will be procured from the coal mines owned by the parent company, the Ngwe Yi Pale' Group of Company at Yatsauk, and Mawkmei coal will be stored in a coal shed with concrete floor and roofing, beside the boiler unit.

Human resources

Staff strength

- | | |
|-----------------------|--|
| Construction Phase | : 120 construction workers |
| Operation Phase | : 86 staffs locals; 5 Chinese technicians (for installation and test running only; not for long term employment) |
| Salaries | : Range from Ks 150,000 to Ks 650,000 |
| Working hours | : 8 hrs/day, 40 hrs/week (3 shifts of 24 hours). Annual working days (factory operation days): 300-320 days/year |
| Housings for employee | : Housings are provided for all employees who want to live in the factory premise. Housings include bachelor line, family line, officers housing and housing for foreigner technicians. Some local employees will commute to the factory for daily work. |

4.4.7 Generation of wastes, emissions and disturbances and their management and controls.

I. wastes (solid wastes)

Large quantity of solid wastes in the form of construction tailings will be generated during the construction but the impact will be ceased after construction work. The solid wastes mentioned here is industrial waste and domestic wastes during the Operation Phase only.

(a) Industrial solid wastes and management

- One of the main industrial solid waste will be the combustion residues (PM, fly ash and down ash) from the boiler unit.
- Water sprinkling system (dozing, wet scrubber) is installed and the fly ash is forcefully sprinkled down with water. All PM and ash settle down on the collector at the bottom. It is estimated that 50 Kg of ash will be generated per day. They are mechanically conveyed to the ash pond and a series of sedimentation tanks and regularly removed mechanically (excavator).

- Ash will be reused at the slurry to reduce cement consumption or sold to concrete brick manufacturers as an additive for making brick. Or ash will be used for refilling holes, dents and depressions in the factory premise or along the road.
- The cutting and trimming of wet cellulose fiber cement boards by water jet (water cutter) generates large quantity of off cuts (wastes). It is estimated that 2400 kg of off cuts are generated per day. However all are reused (the off cuts are returned to the slurry preparation unit and reused).
- Small quantity of solid water in the form of dust and small bits and piece are generated from the smoothing, sanding, edging and chamfering of fiber cement boards. They will be regularly collected and disposed at a landfill. The factory authority has liaised with Sint Kaing Town Development Committee to tackle this issue when the factory is in full operation.
- Finally the industrial solid wastes in the forms of packaging materials (cement bags, packing material for imported pulp or other packing materials or containers). These are not generated or a daily basic but only from time to time. It is estimated that roughly 125 Cu feet of packing materials will be generated per month.
- Some of these packing materials will be either sold or given away to anyone who needs them. The remainders will be systematically discarded at the approved landfill (by Township authority).

Note - Mitigation measures to be taken for industrial solid wastes are also described later in Chapter 6, (6.2.3).



**Figure-60: Ash pond
(ash together with sprinkle water will flow down the pipe into the pond)**

(b) Domestic solid wastes and management

These are in the form of debris, trash, garbage office waste, and organic wastes (from kitchen, messing hall).

When the factory is in full operation there will be 91 employees (including 5 foreigners) and housing are provided.

The generation of domestic solid wastes is estimated at 18 kg per day (from formula).

These domestic solid wastes will be collected in two types of bins (for the recyclables and non-recyclable solid wastes). The recyclable waste (glass, plastic, metal etc.) will be recycled or reused and the non-recyclable will be disposed at the approved landfill. Portion of organic wastes will be composted and used as fertilizer (for greening and landscaping).

(At the moment there is a temporary landfill/pit inside the premise for the disposal of domestic solid waste).

There will be solid was in the form of fallen leaves, dried grass and other debris. These will be regularly cleared and removed.

Note – Mitigation measures to be taken are also described later in Chapter 6 (6.2.3).



Figure – 61: Land fill

II. Liquid Wastes (effluent)

(a) Industrial Liquid Waste (used water/processed water/waste water)

Cellulose fiber cement boards manufacturing requires large quantity of water. Daily water consumption is estimated at 60 tons/day. Most of the water is used at sand slurry preparation, cellulose (pulp) slurry preparation, mixture slurry preparation, mixing blunting, felt washing, mold plates washing etc.

Water is also used at boiler unit (for boiler and for sprinkling system).

There will be also occasional washing of machinery and vehicles; and also watering plants and dust suppression.

There will be slurry discharge from sheet/board making machine.

Most of the water (60 tons) is used up and a small percentage is evaporated (from autoclave, from curing).

However most of the water is recirculates and reused.

It is estimated the total quantity of waste water (used water/ processed water/ washed water) generated will be 130 gallons day only and 50 kg of sludge (wet sludge) will be generated per day.

Waste water from boiler blow down is estimated at 300 gallons per month.

The liquid waste also include grease and oil, used fuel oil, engine oil etc.

The industrial liquid wastes contain: SiO_2 , CaO , Al_2O_3 , FeO_3 , Cellulose ($\text{C}_6\text{H}_{10}\text{O}_5$), Carbohydrate, other organic substance, oil and grease.

Control and management in brief

- The processed water/used water/waste water is effectively recirculated and reused, (involving used water tank, underground tank, sedimentation tanks, sediment removal, recirculating pumps, cooling tower and clean and recycled water tanks); there are 4 sedimentation tanks and 4 steps is sedimentation process and two large clean and recycled water tanks. Recirculating is done on a daily basis.
- Boiler blow down is discharged into the drainage line once a month.
- Wet sludge and slurry discharge from flow-on sheeting making machine are collected into hopper and discharged at drainage system.
- Deforming agent is applied to tackle foam.
- The condensed water from autoclave flows by gravity flow into used water tank, pump up to cooling tower (2 steps in cooling) and return to clean and recycled water tanks.
- Oil and grease are removed at cleaning and oiling section.
- No special waste water treatment needed.



Figure-62: Waste water collection tank (used water/condense water from autoclaves flows into this pond)



Figure-63: Four sedimentation tanks, waste water from waste water agitator tanks flows into this series of pond



Figure-64: Cooling tower

(b) Domestic liquid waste(domestic effluent)

There will be 91 employees, including 5 Chinese technicians, temporarily employed.

The domestic waste water is estimated at 730 gallons/day. (From formula for developing countries)

The domestic waste water from the kitchen, messing hall from bath will flow into the drain and dry up. No special treatment will be made in the phase of operation.

The sanitary waste water from the toilet will flows into the septic tanks and soak pits.

Rainwater from factory roof is connected with duct pipe to the drain surrounded in building. The drain is connected to outside drainage with a small canal.

As for control of storm water the main drain around the periphery and a network of drainage system will be constructed inside the factory compound. The area being in the Dry Zone has little rainfall; but storm water or rainwater influxes can be expected during certain period of the rainy season.

Management

- The factory has sound drainage system and septic tank system. No special management or treatment in the Operation Phase.



Figure-65: Drainage

III. Emission

The cellulose fiber cement board factory has to use coal as burner for its 8 tons boiler as hot steam is used for curing and autoclaving.

It is estimated that 8-10 tons of coal has to be incinerated per day.

The emissions from the proposed project site will be:

- point source emission (stationary emissions) from the stack of boiler
- fugitive emission from equipment, vehicle, minor emission from curing, drying process
- fugitive dust emission from raw material preparation area, (mixing, blending), from sanding, edging area, and also from vehicular movement inside the factory premise.

(a) Point source emission (stationary emission)

Air pollutants from the burning of coal mostly contain SO₂, NO₂, CO₂, PM₁₀, PM_{2.5} and PM, ash. In addition heavy metals, organic toxic, dioxin, furans etc., VOC and unburned hydrocarbon etc., theoretically the burning of 8 tons of coal per day will generate 1.9 tons of CO₂, 240kg of SO₂ and 72kg of NO₂ per day. (That is if mitigation measures are not taken)

Excessive emission of CO₂ can contribute to global warming and climate change.

Control management in brief

- Stack will be of standard height: The stack is 60 m high.
- Complete combustion is applied; This greatly reduces CO, CO₂, NO₂, SO₂ and also PM. Coal with low sulphur content and low moisture content will be used.
- Water sprinkler system will be installed between the boiler (combustion chamber) and the stack.
- The smoke and PM are sucked out by fan and pressurized and flow through venture pipe towards dust/PM collector. On the way smoke and PM are forcefully sprinkled down with water from nozzles. The heavier PM/down ash settles at the collector bottom.
- NO_x, SO₂, CO₂, CO etc either react with water or dissolved in water and settle down together with PM/down ash. The ash water is drained into the ash water pond (collector pond).
- The lighter/finer PM or fly ash that are propelled upwards together with the hot gases are removed by high efficient dust collector (bag filters) and removed. It is estimated that 98% of all PM can be removed. The final smoke that spewing out of the stack will be white in colour (or merely water vapour).
- Emission is biologically controlled by planting fast growing trees inside the premise; trees reduce CO₂ emission and produce O₂; (simply applying photo synthetic activities of plants)
- Since emission will be controlled and managed it is expected that it will not have negative impact on the villager and people living in the nearby residential area: The company will heed to the voice of the locals.

(b) Fugitive dust emission

Sources of fugitive dust emissions are from vehicular movements, and transportation of loose raw materials (sand, cement, quick line powder)

There are also fugitive dust emissions from storage of sand, cement, quick limes (silos and sheds) and from sand preparation section, pulp preparation section (from grinding, ball milling, mixing and blending activities). Dust can also generate from conveying activities, also fugitive dust emission from smoothing, edging, conferring section and minor emission along the long trolley conveyors etc.

Fugitive dust contains larger PM (PM_{2.5}), silica, CaO, and Cellulose (pulp) dust etc.

Fugitive dust is mainly generated from the daily activities of raw materials (sand, cement, line powder, pulp) handling and preparation including grinding, ball milling, mixing and blending.

The maximum daily productions target is 5300 fiber cement board per day. 47 tons of cement, 69 tons of sand, 13 tons of wood pulp and 12 tons of quick line powder will be consumed per day. Since these raw materials will be all used up no substantial wastes are envisaged. However, the handling, grinding, mixing and preparation of these raw materials will generate fugitive dust which is estimated at 20 kg per day.

The smoothing of fiber cement board with abrasive belt and the edging and chamfering activities will also generates dust, estimated at 5 kg/day.

It is difficult to estimate fugitive dust emission from transportation by vehicles and the fugitive dust generated from vehicular movements (from wheel revolutions).

Control and management in brief

During transportation by trucks all raw materials will be covered with tarpaulin sheets. Any vehicular movements will be limited and restricted inside the factory premise.

All warehouses for raw materials, including coal, have concrete floors, walls and iron roots to prevent dispersal of loose materials to the surrounding.

During unloading loose materials, water mist is applied to minimize the emissions of dust. In order to control the dust in silo all silos are fitted with dust collectors (bag filters) at tops. Bag filters are also installed at grinders/mixers and production line.

All conveying equipment are sealed or covered, to minimize dust emissions.

Workers exposed to dust will be provided with face masks, mouth and nose covers; the wearing of masks will be mandatory for workers who are exposed to long hours of dust.

Fast growing trees are planted in the premise; trees sequester CO₂, produce O₂ and trap dust. So far the company has planted various fruit trees, shade tree and flowering plants inside the compound.

IV. Disturbance (Noise and Vibration)

The cellulose fiber cement board factories are a relatively noisy factory. The raw materials preparation processes (grinding, mixing, blending, conveying etc.) and manufacturing processes (the moving flow-on sheet/board making machine and a trolley conveyers, the smoothing (abrasion), trimming, edging etc.) and the packing and storage of finished products all generate noise to a certain extent. Relatively high level noise is generated from the boiler unit.

The operation of other equipment or devices (generators, pumps, compressors etc.) and vehicular movement also generate noise.

Virtually all operating machinery, equipment and vehicle generate vibration.

Since the factory will be running day and night continuously there will be noise and vibration throughout 24 hrs period.

Management and control in brief

- Procure brand new ecofriendly machinery and equipment (That emit lower noise level) in the first place
- Install silencers, mufflers and sound insulators where necessary - (may not be necessary because none of these machinery/equipment emit very high level noise)
- Ensure for stable foundations for all machinery and equipment in the first place.
- Install vibration absorbers where necessary.
- Protect workers from body vibration and/or arm vibration as practical as possible.
- Provide PPE, (ear muffs, ears protectors) to workers exposed to long hours of high noise level.

Since the factory will be in operation day and night the factory authority will be careful with noise level especially at night; will ensure that noise will not become a nuisance for the villagers and people in the residential once nearby.

The factory authority will heed to the voice of the locals.

Control & Management in brief (in tabulated form)

Sr. No.	Solid waste	Management/mitigation
I.	(a) Industrial solid waste	<ul style="list-style-type: none"> - collection and removal of ash (ash pond); reuse ash - reuse off cuts (from water jet cutting) - dust, bits and pieces from smoothing, edging etc. – collect, dispose - old packing materials – put up for sale or dispose at approved landfill. - slag separator – separate, remove - liaise with authority for landfill
	(b) Domestic solid waste	<ul style="list-style-type: none"> - collection (separate waste bins) reuse, recycle, disposal at landfill - made into compost - liaise with authority for landfill
II.	Liquid wastes (effluent)	
	(a) Industrial waste water	<ul style="list-style-type: none"> - raw water treatment (sand and carbon filters, softener). - recycle used water; series of sedimentation tanks, recirculating pumps, cooling tower, clean and recycled water tank, - reuse some for watering plants dust suppression - final discharge - slag separator, oil filter - grease and oil separator - defoaming
	(b) Domestic waste water	<ul style="list-style-type: none"> - sound drainage system, final discharge, waste water sink - sanitary water from toilets flows into septic tank
III.	Emission	
	(b) Point source emission/ stationary emission	<ul style="list-style-type: none"> - stack 60 feet high - complete combustion, dry coal - induced fans - sprinkler system - bag filters/dust collectors - ash removal, ash pond - provision of PPEs (face mask) - procure brand new ecofriendly machinery/equipment with less emission, in the first place

	(c) Fugitive emission	<ul style="list-style-type: none"> - bag filters/dust collector - provision of PPE (face mask) - cover with tarpaulin during transportation - restrict vehicular movements - cover conveyer
IV.	Disturbance	
	Noise and vibration	<ul style="list-style-type: none"> - exhaust silencer and other silencer, where necessary - provision of ear muffs/ears protectors - restrict vehicular movement - stable foundation - vibration absorber where necessary - procure brand new ecofriendly machinery equipment that emit lower noise level, in the first place

4.5 Description of the selected alternative

Location alternatives

There are two alternative locations one in the north and another in the south which have been considered for the establishment of the factory. But land is not available in the two alternative locations. Although the availability of land is quite limited in this Taung Yinn Village Tract Area the company was able to purchase the land officially.

There are no issues such as national park, protected area, wildlife sanctuary, bird sanctuary etc. in the vicinity. There is also no water reservoir, wetland, major farms in the vicinity. Socio-economically there is no issue of land grabbing, land disputes, forced eviction and forced relocation. The area is also not prone to major floods and major earth quake.

The cost benefit analysis will also favour this site than an alternative site.

Accessibility alternative

When compared with the other two alternatives this site has better accessibility by motor road. (It is near the motor road linking Yangon---Mandalay Highway and Ye Ywar Road. The site is also indirectly accessible by Yangon---Mandalay rail way.)

Alternative access to water resource

The site being in the Dry Zone area, water is quite an issue. The locals of the nearby Taung Yinn Village have sourced water from the irrigation system existing in the area. However as the factory has to use large quantity of water (60 tons/day) the alternative source is from ground water (at a depth of 270 feet). Two tube wells are bored and from primary result the availability of water is not an issue.

Access to electricity and alternative

Electricity will be sourced from gridline at Bellin sub-station 2 miles away. As an alternative energy during power outage 4 diesel generators (ranging from 200 KVA to 2200 KVA) will be installed as backup generators.

Supply alternatives

For the consumption of water, fuel and energy the company will adhere to the principle of conservation rather than conventional way of consumption; conservation is preferred to the old conventional way of doing things.

Employees will be educated to conserve water, fuel and energy as practical as possible.

Technology alternatives

Originally asbestos was widely used for making fiber board, but it has health safety concern (known as carcinogens). As an alternative technology only cellulose fiber is used (e.g. paper pulp, natural fiber, soft wood Kraft pulp).

The technology for the manufacturing of fiber boards applied in USA and China is basically the same. As China is much closer and the technologically, cheaper, China is a better alternative than USA. Autoclaving is undertaken to enhance the quality of the board. The technology is up to date one; all processes and activities are fully automated. Mechanical labour is maximized while manual labour is minimized.

Raw materials alternatives

Cement

Cement can be readily purchased from any nearby markets in the region. But as an alternative source cement will be procured from the Crown Cement Factory in Lauk-hpan Village, Naungkhio Township. As Crown Cement is owned by the parent company, Ngwe Yi Pale', it is a better alternative than any other cement markets.

Sand and quick lime

The sand available are of fresh water origin, from river and streams.

These are readily available nearby, either in Sint Kaing Township or Kyaukse Township. Consideration for alternative is not necessary. Raw sand has to be purified and ground to fine powder will ball mill.

Paper pulp (soft wood Kraft pulp)

Soft wood Kraft pulp is not available in Myanmar. It can be imported from China. But as an alternative it will be imported from USA and Canada. Both countries have huge quantity of soft wood pulp of high quality for export. Soft wood pulp has quality cellulose. Locally available paper card boards and all kinds of paper are also cellulose but the qualities are not up to standards. In addition they are not available for large production of fiber cement boards in the long run. Therefore, this alternative is not considered.

Felt and abrasive belt

These will be imported from China, and no other alternative are taken into consideration. Felt and abrasive belt produce in China are of high quality.

Orientation alternative

Regarding the alternative plan for relocation or reorientation of the components of the project no better alternative can be also seen. The layout plan provided by the proponent is probably the best plan, given the fact that the factory compound will occupy the whole eastern part leaving wide space for greening and landscaping.

As long line of trolley conveyors have to be applied the shape of the factory is long and linear with relatively narrow width. This results in more available spaces for greening and landscaping.

Activities alternative

The company will encourage its employees to walk or ride bicycles rather than ride cars or motorcycles. This is to conserve fuel and to reduce emission.

Work performance alternative

The company prefers the "work smarter" alternative than the "work harder" alternative. Workers will be educated and trained to worker smarter rather than work harder in order to gain proficiency in production work. As the factory is fully automated manual labour is minimized as practical as possible. Every activity is automatically controlled and regulated.

"No go alternative" or " no project alternative"

No project alternative will mean there can be no chance for increasing the production of fiber cement board in Myanmar. Ready-made building materials or fabricated building materials such as fiber cement boards are new in Myanmar. It has great advantages in construction due to easy and quick installation and construction of buildings. It is light and strong and durable. It takes much less time and man power to build a building than the conventional building with cement and sand.

The no go alternative will not contribute to the development of infrastructure and the construction sector of the nation.

This "no project alternatives" will also mean no more development in the socio-economic aspect of the local area and the region.


As the project can boost the local economy in many ways all these chances will be lost if the "no project alternative" happen. The 86 people to be employed will lose their employment opportunities.

The direct investment of Ks. 19931.31 million by Sann Shinn & Brothers Co., Ltd will not be materialized and this cannot contribute to the increase in GDP of the nation if the "no project alternative" prevails. There will be also no chance for an increase in earning for the nation in form of taxes, duties, royalties, revenues etc if the "no project alternative" happens.

The company will be prepared for any better alternative in the future, e.g. mitigation alternative or EMP alternative. Moreover as new technologies are emerging quite rapidly the company will be ready to adapt to any state-of-the-art technology or better technology.

Commitment

The project proponent, Sann Shinn & Brothers Co., Ltd, has made a commitment to implement the project in an environmentally sound, economically viable and socially sustainable manner as far as possible.



U Kyaw Myint Oo
Director
Sann Shinn & Brothers Co., Ltd.

5. DESCRIPTION OF THE SURROUNDING ENVIRONMENT

5.1 Setting the study limit

The designated EIA study area is the proposed fiber cement board factory premise and the neighborhood within a 1 mile radius. The surrounding area consists of 7 other factories,

- Ngwe Moe Hein metal refining factory in the northwest
- Shwe Na Gar incense sticks (joss sticks) and tissue paper rolls factory and
- Soe Moe awning (sheet)factory in the adjacent west
- Myanmar Linn Kyan shoe factory in the adjacent south west
- MEC stone slab/ornamental stone slab factory and
- U Thar LED lamps/lighting bulbs factory in the east, and
- Be Ka plastics factory (by MEC Co., Ltd) further east.

In the north is the Prison Department facility and in the adjacent south is housing complex of MEPE (Myanmar Electric Power Enterprise) employees.

South west of Myanmar Linn Kyan shoe factory is Taung Yinn Village and further west is Bellin Village.

A hill, Myint-mo taung is between the two villages while another hill, Sin Kyauk Kyi Taung is in the north west. (These are already shown earlier in Chapter-4)

The one mile radius area is designated as impact study area because the impact can be seen and felt within ½ mile radius area (potential direct impact area). The outer ½ mile can be regarded as potential indirect impact area or buffer zone. Because complete combustion of coal will be undertaken and emission control equipment/devices such as water sprinkle system, dust/PM collectors system, filter bags system will be installed emission will be minimized. The fiber cement board factory is a relatively noisy factory; but mitigation measures will be taken and the nearest village is ½ mile away. Because effluent issue will be also tackled, e.g. sedimentation and removal process; later waste water treatment equipment the impact can be minimized or at least mitigated.

However the study on biology component will be conducted both inside the outside the 1 mile radius.

There is no reserved forest nearby.

As there are no forest or any significant biological component any impact by the project can be termed insignificant.

The impact on the socio-economic and cultural components will be minor. There are no cultural and religious monuments to be impacted by the project.

As a part of social impact assessment Bellin Village and Taung Yinn Village are incorporated into the study area.

The environmental study area covers an area of 3.2 sq miles which is occupied mostly by the above-mentioned components and neighboring fields, farms and the two villages.

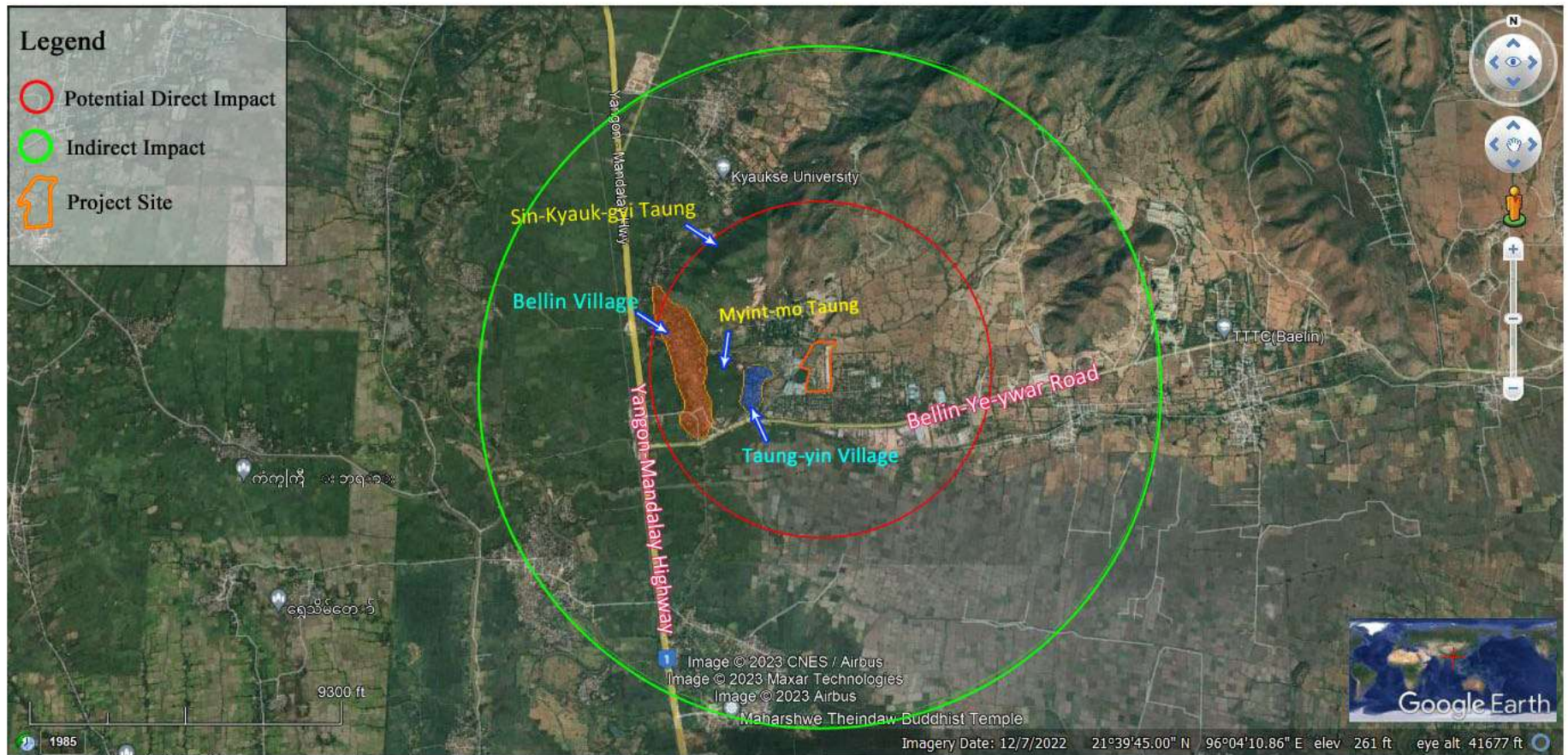


Figure-66: Satellite image showing study area

5.2 Methodology and objectives

EIA work involved the visual inspection of the area, the surveying work and collection of baseline environmental and social data.

The methodology comprises desktop survey, field study, consultation meeting and the gathering of information and data and report writing.

(a) Physical parameters

The physical data such as air quality, particulate matter (PM), SO₂, NO₂ and noise were all primary data, collected through field survey. The data for water analysis were also primary data. Basic geological data is secondary data from a previous geological data.

All geological data are secondary information from the findings of geologists in previous study by geologists.

All meteorological data, monthly rainfall, monthly maximum and minimum temperature, humidity, wind speed etc. were secondary data. They were obtained from Kyaukse District Meteorology Department.

(b) Biological parameters

The data on the biological components particularly flora were all primary data. All data on flora, birds, reptiles, amphibian as well as the large majority of aquatic organisms, if present, were collected through this field surveys.

As wildlife are non-existence in this cultivated area the flora remain the main biological component for study. The flora study involved the overall view of the forest and classification of forest type; distribution pattern, if possible, transect walk through the forest and on the spot identification of species. However in this study there was no forest in the vicinity to study.

(c) Socio-economic parameters

As regards socio-economic data most were secondary data. These were gathered by means of conducting Key Informant Interview (KII) and also from certain Secondary Source (SS). Certain primary data were acquired by means of visual observation, inspection, transect walks and focal group discussion (FGD).

Desktop survey is also sometimes applied if there are previous data and information regarding the socio-economic aspects of the area.

(d) Cultural/religion parameter

In ancient time Kyaukse area was one of the centres of civilization during the late period of the Bagan Dynasty, Particularly during the reigns of King Anaw-ra-hita and his descendants King Kyan-Sit-Thar, King Alaung-Si-Thu etc. Some cultural, religious, historical and archeological sites still remain today. For instance, the Pa Leik Cultural Zone at Paleik village, and Mac-hka-yar ancient city (culture zone) at At-pyat village both in the far vicinity (9.3 miles) are designated as cultural zones in Sint Kaing Township, Kyaukse District.

(e) Visual component parameter

In the case of visual component there is no visual component to be impacted by the project.

There are no outstanding landmark and site of aesthetic beauty and scenic spots to be impacted. However when all the 8 factories are in full operation the area will look a small industrial zone.

Tools, instruments, data and information

As for pragmatic approach the testing and measurement of air quality, ambient air, PM, SO₂ and NO₂ involved the use of relatively sophisticated and bulky equipment and so technicians have to be hired. The portable air test kits has the advantage of measuring the in situ (on the spot) condition but not so reliable.

Advanced tools such as EPAS air sampler and EPAS Haz scanner with auto sensors are used. The EXTECH Sound Level Meter is used for measuring sound level. The BEME-TECH Vibration Meter is used for measuring vibration.

Portable water test kits are not so reliable and water samples have to be brought back to Yangon for analysis at a registered private laboratory. The technicians at this laboratory carried out the analysis work.

All geological data are secondary information from the findings of geologists in previous study.

As regards meteorological data only data on rainfall is not available at Sint Kaing Town but only at Kyaukse City. Secondary data for rainfall was obtained from Kyaukse District Meteorology Department.

The essential tool for EIA biological survey work include computer, GPS, camera, telescopes (especially for birds) binoculars, hand lens, compass, herbarium press, measuring tapes, ropes, pruners and cutter, tool for catching and trapping wild life (snare, trap, scoop, nets stakes etc.), lamp and torch for night survey for nocturnal animals. Chemical preservatives (alcohol, formalin) together with plastic containers of various sizes for the preservation of specimens (especially those that could not be identified during the survey trip but to be identified later) were also necessary.

In this case there are mostly shrub and scrub in the flat plain area and sparse vegetation on the two hills.

Objective

The main objective is the collection, recording and documentation of all baseline data on the physical, biological, socio-economic, cultural and visual components of the area for the preparation of EIA report.

Another objective is the gathering of all available secondary information and data as practical as possible.

5.3 Public Administration and planning

Both villages have the status of village tract. Both villages are under the jurisdiction of Sint Kaing Township, under Kyaukse District, Mandalay Region.

The area has now become a mini-industrial zone with 8 factories; most are not operational yet. This will contribute to industrial development of the area.

There may be other industrial development plan for the area or the region but not known yet.

This mini-industrial zone will contribute to rural development plan for the two villages and others in the far vicinity.

The establishment of MEPE housing complex has also contributes to residential area development to a certain extent.

There is no known agricultural development plan yet.

5.4 Legally protected area

Formerly the proposed project site and the surrounding area were farm land and shrub/scrub land, but no green forest.

The project site was dry farm lands owned by U Naing Win, U Khaing Htoo and U Thin Khaing (totaling 10.11 acres) and were officially purchased by Sann Shinn and Brothers Co., Ltd.

There area is within the Dry Zone of Myanmar and there are no protected areas such as Wildlife Sanctuary (WS), Wildlife Park (WP), Bird Sanctuary (BS), National Park (NP), Nature Reserve (NR), Protected Area (PA), etc. in the near and for vicinity. However there are three Bird Sanctuaries, the Taung Tha Man Inn (lake), Ye Myat Inn (lake) and Pa-leik Inn (lake) with are all outside the area.

Son Ye Inn is about 5 miles in the east but it is not a Bird Sanctuary yet; a few bird watchers usually come to this lake.

There is one key Biodiversity Area, The Paung Laung Catchment Area in the south, far away.

5.5 Physical components of the surrounding area

Topography

The area on the whole is a flat terrain area with dry farms and scrub lands. The elevation at the site is 297 feet asl.

In the near north, east and south are all flat land terrain with farm land especially in the north east. (The vicinity of the project was already transformed into a mini-industrial zone) and residential area)

There are two hills, Myint-mo Taung in the west and Sin-Kyauk-gyi Taung in the North West.

Further in the north east are small mountain ranges, the highest peak is Kain Na Ya Taung (467 feet) most ranges are relatively dry ranges, except certain patches with cultivated trees.

Water sources

There are no water course or water body in the near and far vicinity (The area being in the central part of the Dry Zone).

The Zawgyi River flowing from north to south is about two and half miles in the west. There is a canal system near the Yangon-Mandalay High Way, near Bellin village. There is a relatively large water body, the Son Ye Inn (lake) about 5 miles in the east.

All the villagers of Taung Yinn Village source their water from tube wells; the water level of the area is rather deep, at 270-300 feet. Most of the villagers of Bellin Village however source their water from an irrigation canal for domestic uses. (Kyaukse area is well-known for the ancient irrigation system, constructed since the region of King Anawra-hta almost a thousand years ago). Many have also tube wells. Many villagers of both villages also use bottled water for drinking.

Geology and soils, hydrology/hydrogeology

The area is within the central-eastern part of the Dry Zone of central Myanmar. It is inside the alluvial valley which is bounded in the west by north-south trending low flat ridge of upper tertiary bed and in the east by the western limit of Shan plateau. The area is typical alluvial valley mainly made up of sandy clay and loam.

The alluvial soils of the region can be classified (according to FAO classification) into meadow alluvial soils, brown meadow slightly compact soils, brown compact savanna soils and cinnamon soils.

Geological components distributed at the project site generally from top to bottom are: alluvial top soil, debris deposit, gritty sand stone and small band of shale. (From secondary data).

(Sources: Searle, M.P, 2007; Khin Zaw et al, 2017; FAO, soil type and formation, 2016.)

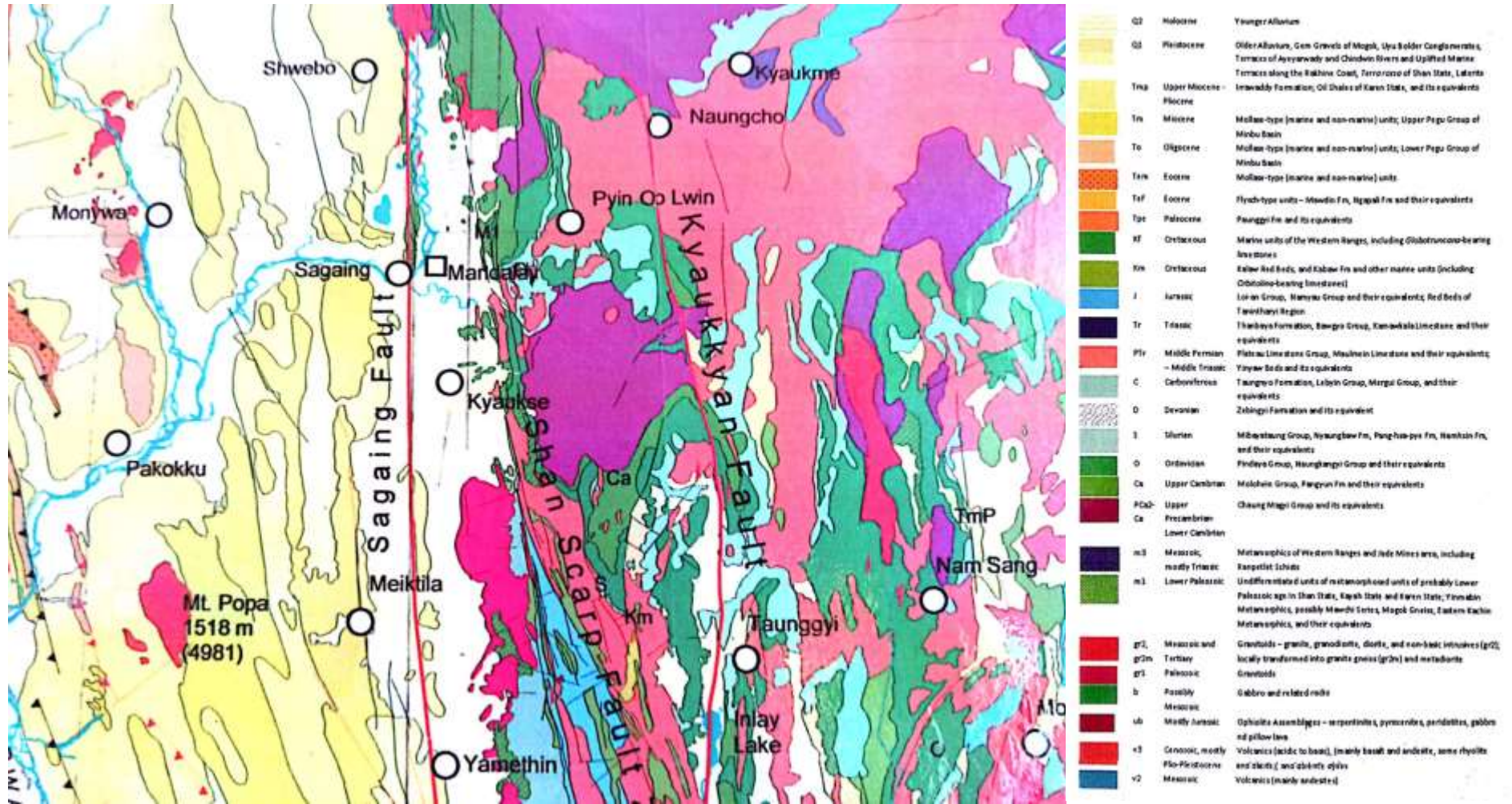


Figure-67: General geology of the region

Soil samples (surface soil)

Surface soil samples were collected from three sites, namely; the project site, Taung Yinn village and Bellin village on 4-11-2022.

The collecting points, Coordinate are:

- Project site : N. Lat. 21°40'23.30" and E. Long. 96° 8'21.20"
- Bellin Village : N. Lat. 21°40'23.75" and E. Long. 96° 7'38.91"
- Taung Yinn Village : N. Lat. 21°40'16.01" and E. Long. 96° 7'58.79"

The collected soil samples were brought back to Yangon and analysed at the Department of Land Use laboratory, Ministry of Agriculture and Irrigation.

Table-1: Soil analytical data sheet (3 places)

Sr. No	Sample plot	Moisture %	pH soil: Water 1: 2.5	Texture				Total N %	Available Nutrient P ppm (Olsen)
				Sand %	Silt %	Clay %	Total %		
1.	At the project site	1.705	9.02	72.34	12	15.66	100	0.195	5.289
2.	At the Taung Yinn Village	5.673	8.72	55.34	18	26.66	100	0.185	20.36
3.	At the Belln Village	3.08	9.68	42.34	31	26.66	100	0.198	11.97

Table-2: Soil test results

Sr. No	Sample plot	pH Soil : Water 1 : 2.5	Texture	Total N %	Available Nutrients
					P
1.	At the project site	Extremely Alkaline	Sandy Loam	Low	Low
2.	At the Taung Yinn Village	Strongly Alkaline	Sandy Loam	Low	Very High
3.	At the Belln Village	Extremely Alkaline	Loam	Low	Medium

Contaminants: The top soils are not contaminated by fuel oil or any other chemicals compounds, or radioactive substance.



Figure – 68: Taking soil sample from the project site



Figure – 69: Taking soil sample from the Bellin Village



Figure – 70: Taking soil sample from the Taung Yinn Village

Environmental quality

(a) Water quality

Water samples (tube well water) were collected from three sites, namely, project site, Taung Yinn Village and Bellin village on 4-11-2022.

The coordinates are:

- Project site : N. Lat. 21°40'21.51" and E. Long. 96° 8'22.06"
- Bellin Village : N. Lat. 21°40'23.26" and E. Long. 96° 7'39.34"
- Taung Yinn Village : N. Lat. 21°40'16.43" and E. Long. 96° 7'59.40"

Water samples were brought back to Yangon and analysed at a registered laboratory, ISO TECH laboratory, Insein, Yangon. (See also ANNEX).



Figure – 71: Water sample taken from project site



Figure – 72: Water sample taken from Bellin Village



Figure – 73: Water taken from Taung Yinn Village

Table-3: Water quality

Sr.	Parameters	Unit	Project Site	Taung Yinn Village	Bellin Village	WHO guideline values
1	pH	-	8.6	8.3	7.3	6.5 – 8.5
2	Turbidity	NTU	3	3	48	5 NTU
3	Total Hardness	mg/l	56	92	288	500 mg/l
4	Iron	mg/l	0.26	0.25	1.41	0.3 mg/l
5	Chloride	mg/l	40	60	60	250 mg/l
6	Sulphate	mg/l	108	97	52	500 mg/l
7	Total Solids	mg/l	863	650	513	1500 mg/l
8	Total Dissolved Solids	mg/l	856	645	463	1000 mg/l
9	Zinc	mg/l	Nil	Nil	Nil	3 mg/l
10	Copper	mg/l	Nil	Nil	Nil	2 mg/l
11	Nitrate (N.NO ₃)	mg/l	Nil	0.1	0.5	50 mg/l

Note - The proposed factory is not yet in operation and, therefore, there is no effluent to be tested. Employees are also not fully employed yet; just a few at the moment, (no domestic waste water for testing yet).

(b) Ambient air quality

The ambient air at the project site, Taung Yinn Village and Bellin Village are measured. From 29.10.2022 to 1.11.2022.

The coordinates are:

- Project site : N. Lat. 21°40'25.79" and E. Long. 96° 8'21.84",
Date - (29.10.2022 – 30.10.2022)
- Bellin Village : N. Lat. 21°40'23.82" and E. Long. 96° 7'40.34"
Date - (30.10.2022 – 31.10.2022)
- Taung Yinn Village : N. Lat. 21°40'16.65" and E. Long. 96° 7'58.78"
Date - (31.10.2022 – 1.11.2022)



Figure – 74: Measuring air quality at proposed site



Figure – 75: Measuring air quality at Bellin village



Figure – 76: Measuring air quality at Taung Yinn village

Table – 4: Ambient air quality at 3 sites.

Sr. No	Parameters	At the proposed site	Bellin Village	Taung Yinn Village	NEQE guideline values
1	PM ₁₀	33.08 µg/m ³	17.41 µg/m ³	17.76 µg/m ³	50 µg/m ³ (24 hrs)
2	PM _{2.5}	15.09 µg/m ³	7.94 µg/m ³	8.10 µg/m ³	25 µg/m ³ (24 hrs)
3	NO ₂	76.33 µg/m ³	34.70 µg/m ³	33.55 µg/m ³	200 µg/m ³ (1 hr)
4	SO ₂	0 µg/m ³	0 µg/m ³	0 µg/m ³	20 µg/m ³ (24 hrs)
5	Ozone (O ₃)	0.8 µg/m ³	0.80 µg/m ³	0.79 µg/m ³	100 µg/m ³ (8 hrs)
6	Ammonia	0.54 ppm	0.22 ppm	0 ppm	NA
7	Carbon Dioxide	299.76 ppm	285.49 ppm	291.20 ppm	NA
8	Carbon Monoxide	1.58 ppm	1.44 ppm	0.48 ppm	NA
9	Volatile Organic Compound	0 ppb	0 ppb	0 ppb	NA
10	Oxygen	20.04 %	20.24 %	20.44 %	NA
11	Wind Direction	232 Deg.	193.29 Deg.	189.50 Deg.	-
12	Wind Speed	1.12 mph	0.72 mph	0.78 mph	-

Wind Rose Map



Wind Speed & Wind Direction (29.10.2022 – 30.10.2022 blowing from)

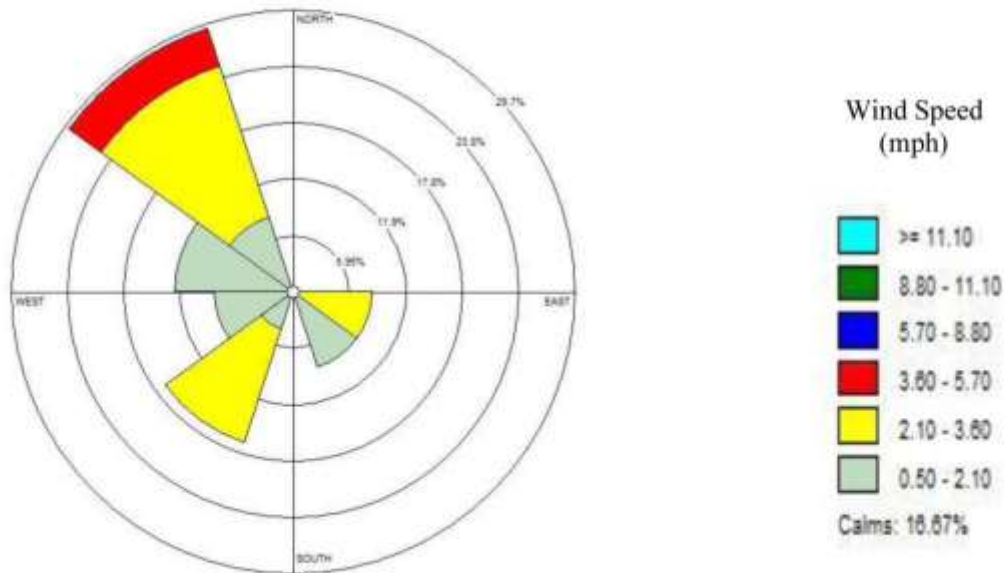


Figure – 77: Wind rose map for one day at project site

Wind Rose Map



Wind Speed & Wind Direction (30.10.2022 – 31.10.2022 blowing from)



Figure – 78: Wind rose map for one day at Bellin Village

Wind Rose Map



Wind Speed & Wind Direction (31.10.2022 – 1.11.2022 blowing from)

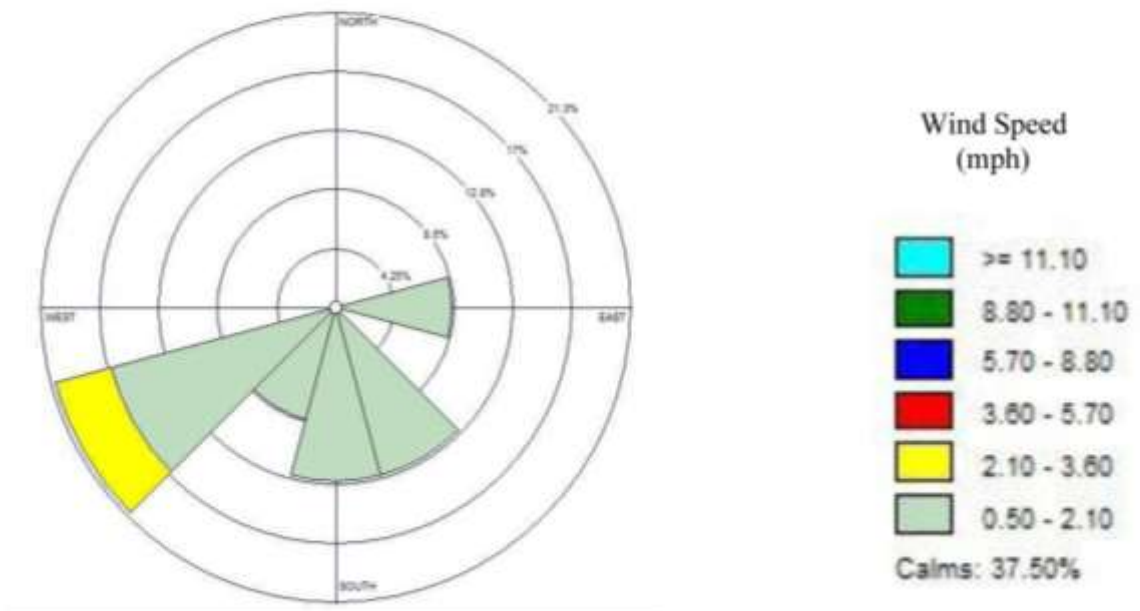


Figure – 79: Wind rose map for one day at Taung Yinn Village

(c) Noise level parameter

The noise levels (sound levels) are also measured at 3 sites, namely, the project site, Taung Yinn Village and Bellin Village on 1.11.2022.

The coordinates are:

- Project site : N. Lat. 21°40'25.79" and E. Long. 96° 8'21.84"
- Bellin Village : N. Lat. 21°40'23.82" and E. Long. 96° 7'40.34"
- Taung Yinn Village : N. Lat. 21°40'16.65" and E. Long. 96° 7'58.78"

Table – 5: Ambient noise levels at three sites

Site Name /Time and Date to start	dBA		NEQE guideline	
	Day	Night	Day	Night
Project site (29.10.2022) 9:30 AM to (30.10.2022) 9:30 AM	47.51	44.59	55	45
Bellin village (30.10.2022) 11:00 AM to (31.10.2022) 11:00 AM	55.51	45.54	55	45
Taung Yinnn village (31.10.2022) 15:00 PM to (1.11.2022) 15:00 PM	46.32	46.78	55	45

Ambient Noise Measurement Record

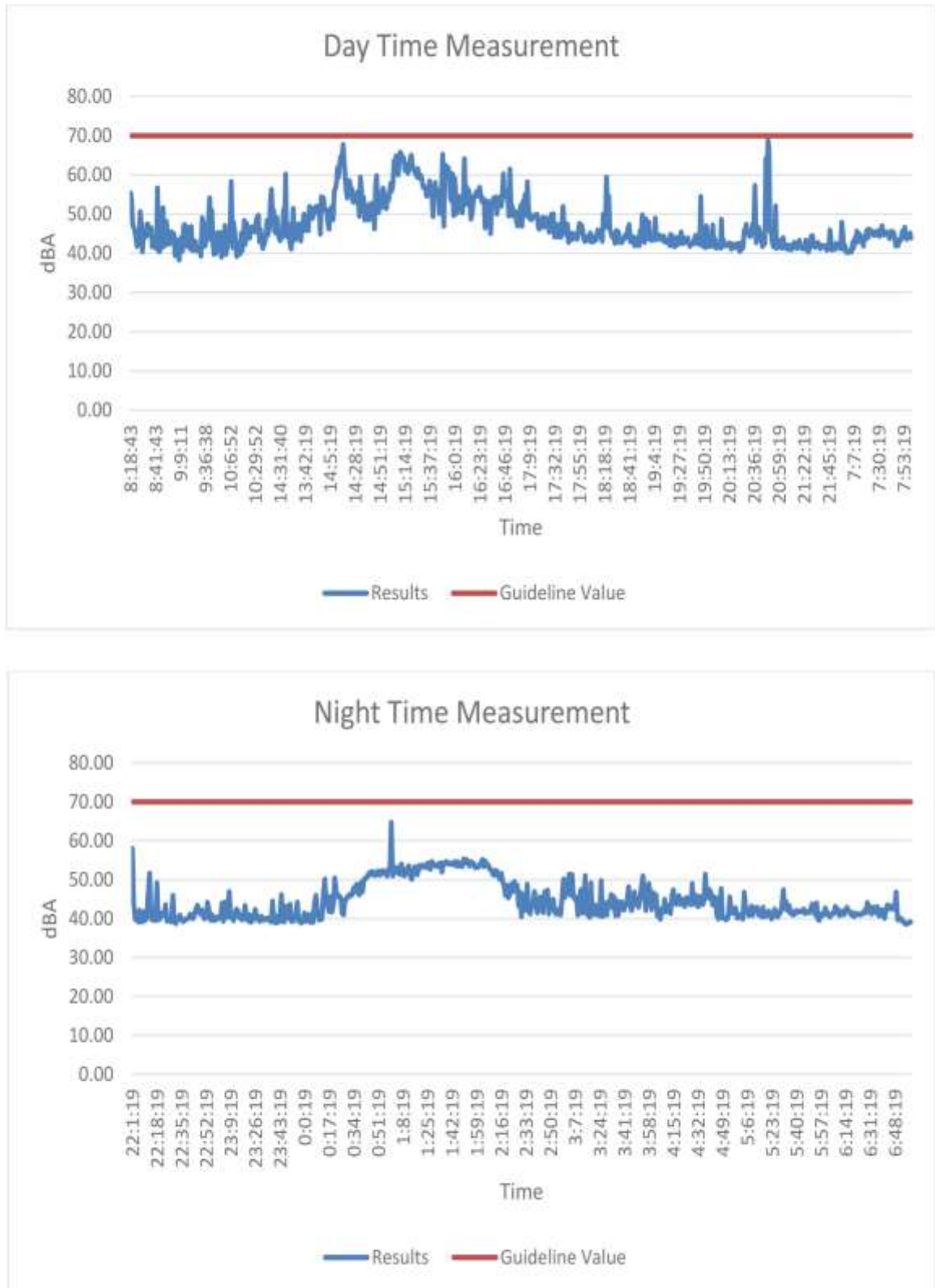


Figure – 80: Graph showing noise level at project site

Ambient Noise Measurement Record

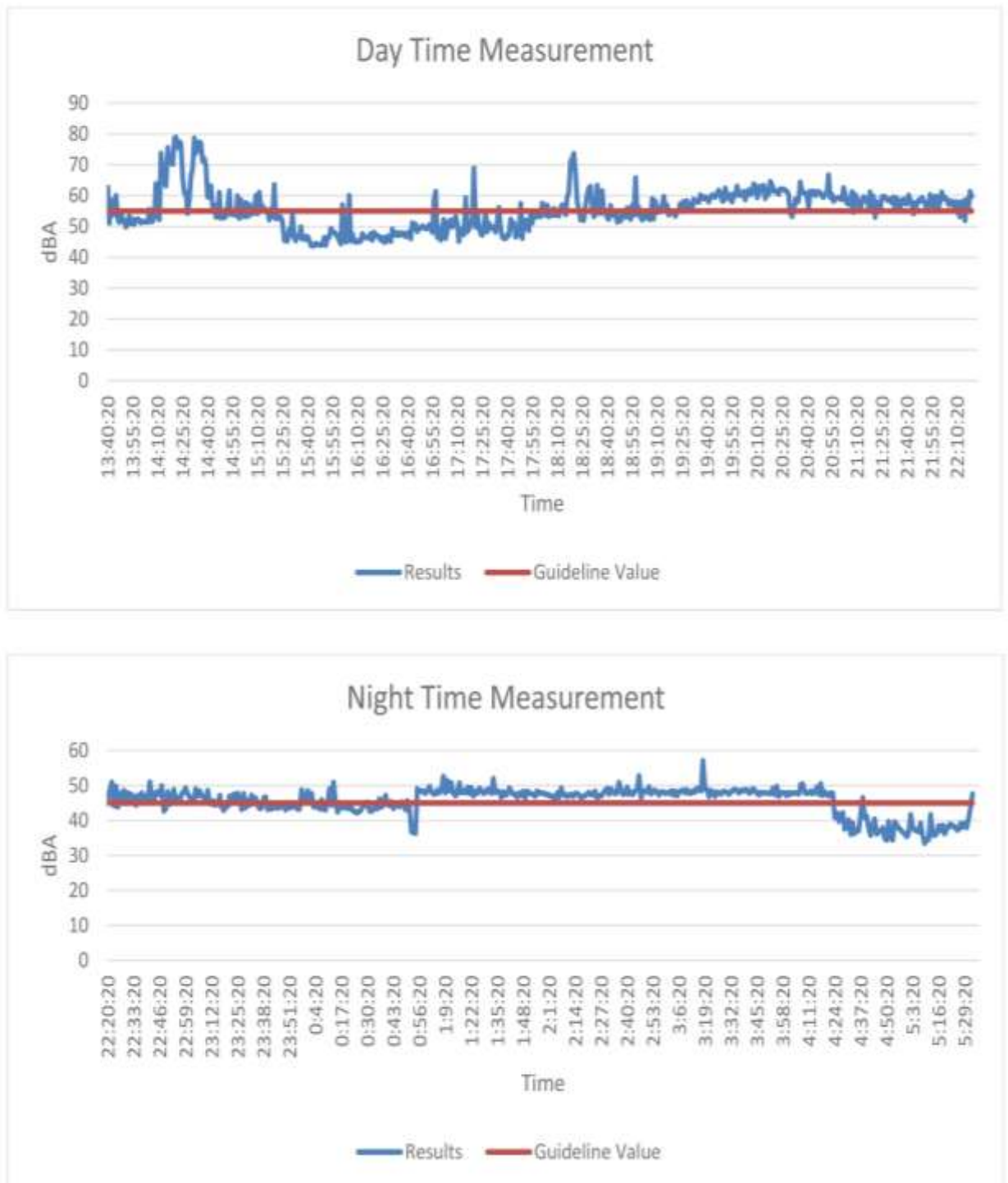


Figure – 81: Graph showing noise level at Bellin Village

Ambient Noise Measurement Record

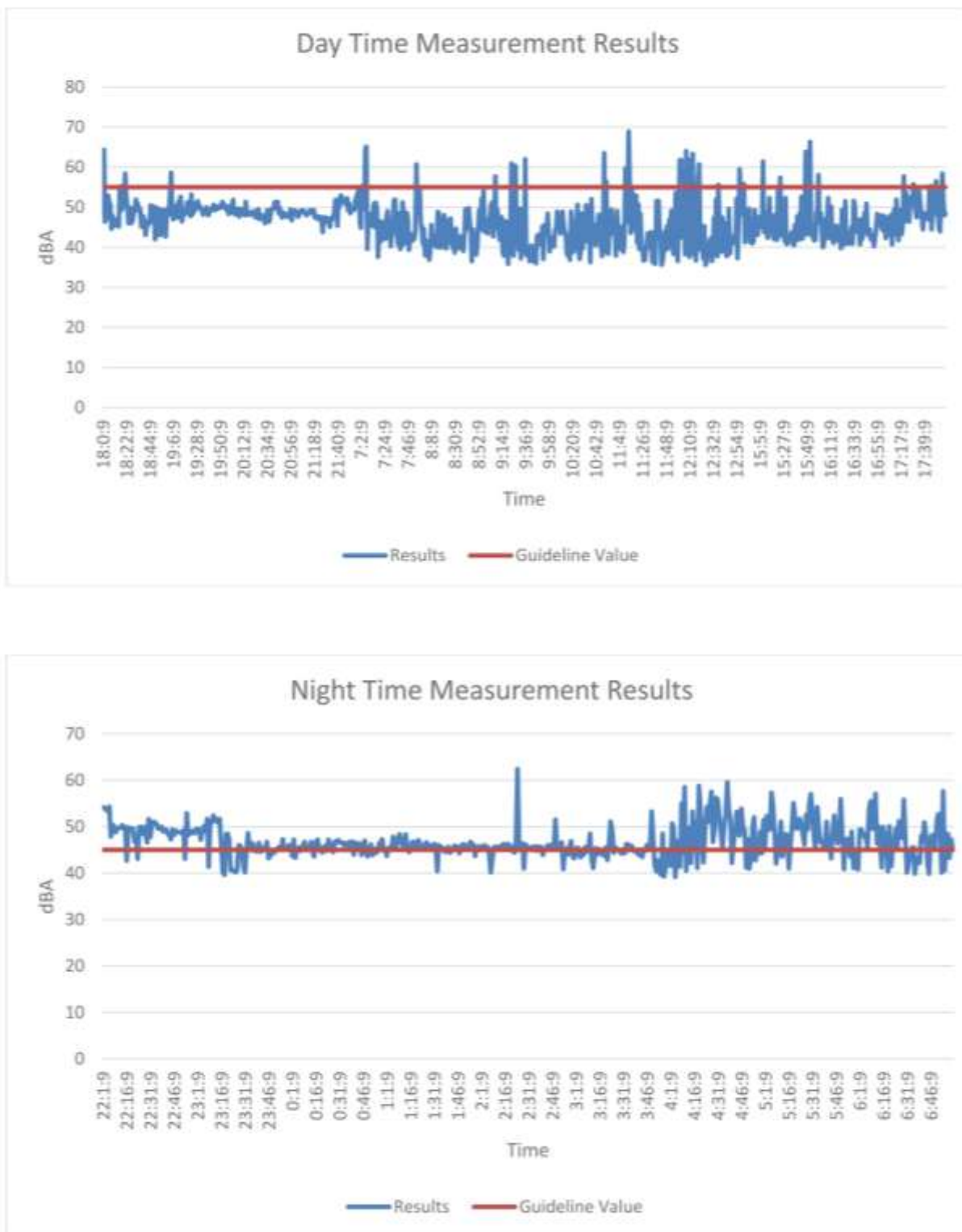


Figure – 82: Graph showing noise level at Taung Yinn Village

(d) Vibration

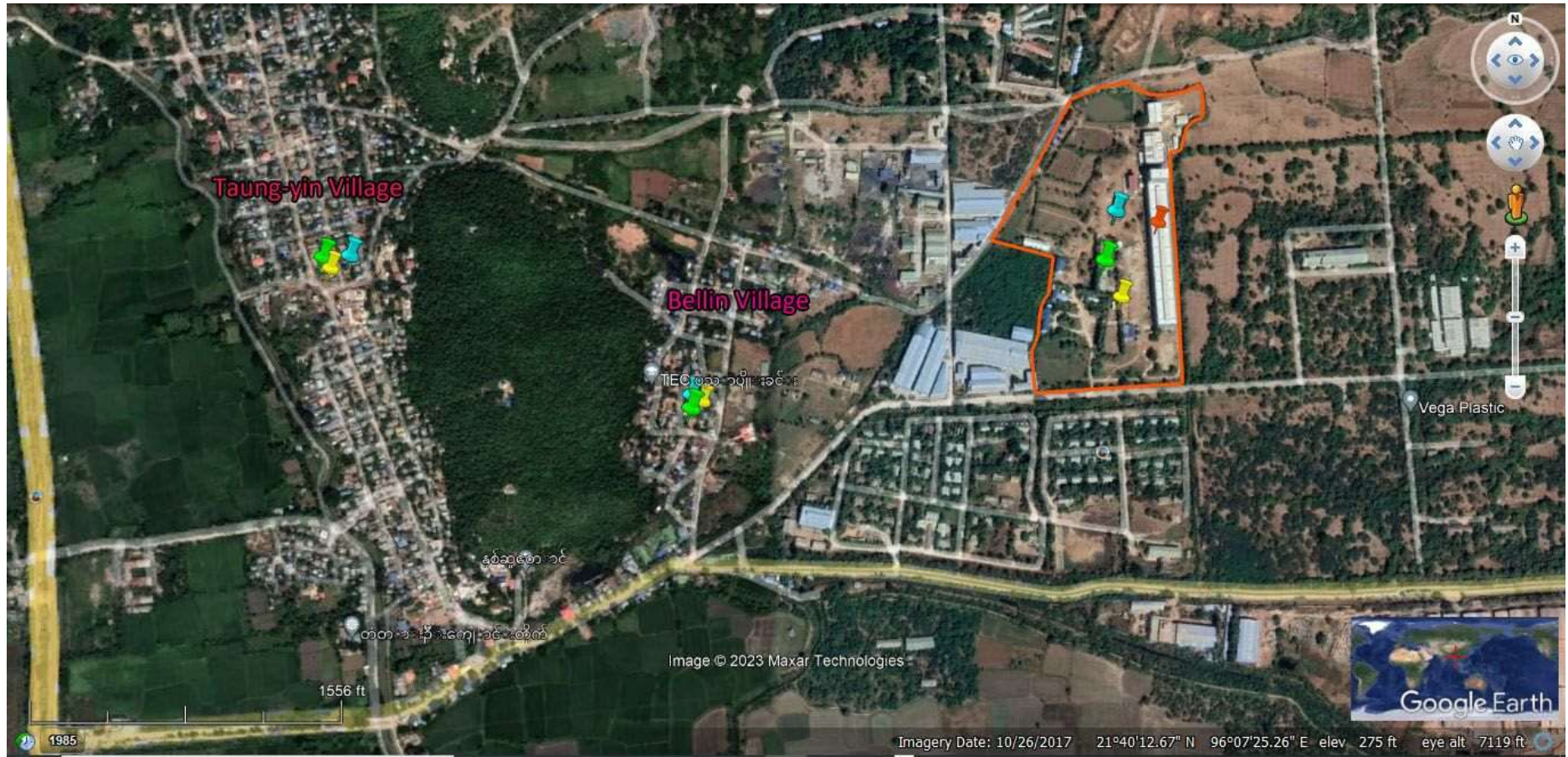
The vibration is measured at the project site near generator. The vibration value is 45.7 m/s^2 .

The coordinates are:

- Project site : N. Lat. $21^\circ 40' 23.59''$ and E. Long. $96^\circ 08' 24.23''$



Figure – 83: Measuring vibration at project site



Legend



Noise and Air



Soil



Water



Vibration



Project Site

Figure – 84: Satellite image showing points where air, noise and vibration were measured and water and soil samples were taken

Climate

The climate is tropical monsoon with a dry season (pre-monsoon), a rainy season with low rainfall (monsoon) and a cool season (post-monsoon). As the area is in the Dry Zone of Myanmar it has a typical dry zone climate high temperature and low rainfall.

The hot dry season is from March to June; the rainy season is from June to September and the cool season is from November to the end of February. This is just the generalized picture of the climate of Myanmar.

At Kyaukse only data on rainfall are available (temperature, humidity, wind speed are not available).

Table – 6: Shows the monthly rainfall and total rainfall of Kyaukse Township during the last eight years (2015-2022)

Years and Month	2015	2016	2017	2018	2019	2020	2021	2022
January	0.76	-	-	1.24	1.96	-	-	0.46
February	-	-	-	-	-	-	-	-
March	0.20	-	-	-	-	-	-	4.38
April	1.84	0.88	9.20	1.96	-	-	1.04	2.04
May	9.60	4.88	9.58	6.32	2.73	8.98	3.64	13.04
June	0.84	2.41	0.84	2.46	7.58	3.28	0.38	2.13
July	3.26	0.96	2.86	0.52	2.34	4.06	6.34	3.76
August	7.36	5.84	7.02	3.28	6.54	4.26	6.42	6.20
September	6.56	12.54	5.86	1.98	1.49	0.56	7.02	3.86
October	14.60	2.82	6.56	4.32	4.08	6.14	5.56	5.62
November	-	3.66	2.08	-	1.97	-	-	-
December	-	-	-	1.02	-	-	0.46	-
Total	45.02	33.99	44.00	23.10	28.69	27.28	30.86	41.49

Vegetation cover

Probably the original forests were cleared many centuries ago (the area was once the center of civilization of Myanmar). Farm lands (mostly dry farms have also existed in the area probably many centuries ago. The area nowadays is a flat terrain of farm lands and shrub or scrub land. There is certain vegetation here and there and on the two hills, but no actual green forest exists. On the whole the area is sparsely vegetated, mostly by shrubs.

There are artificial vegetation (fruit bearing trees and shade trees) in village area and some other spots. These fruit trees and shade tree dominate the landscape.

Natural hazards

Generally Myanmar is prone to earthquakes. The major fault line, the Sagaing fault line runs from the north to south along the entire length of the county passes through the area.

But there was no precedent of major earthquake in this area within memories, it is learnt. There used to be only a few minors tremors during the last decade.

The recent Mandalay (Tadar Oo) earthquake, 2022, was not felt here.

Myanmar is also prone to tropical violent storms (cyclones) that originate from the central part of the Bay of Bengal. The large majority of major cyclone land falls were made in Rakhine State Coastal area.

There was also no precedent of major cyclone making landfall in the area as the area is away from the coast.

The most devastating cyclone Nargis (2008) was not felt in this area, it is learnt (from interviewers)

There were also no precedents of floods, drought, and wild fire.

The devastating flood (2016) that had effected 11 states/regions of the nation was also not felt here; no damage or casualty.

The area is the Dry Zone area, but there was no precedent of severe drought within memory. There was also no case of wild fire in this area within memory.

5.6 Biological component of the surrounding environment

(1) Floral Species

The vegetation within the 1 mile radius area as well as beyond is studied in relative details.

As regard natural vegetation shrub and herb and dry forest (on two hills) dominate the area.

As regards artificial vegetation large fruit trees and shade trees are found in the villages areas and along the sides the roads.

Diversity

A total of 90 species of plant (mostly Angiosperms) are recorded. (The data are primary data) there are only natural shrubs, scrub and dry forest, the floral biodiversity is relatively low. Actually all big trees are artificial/cultivated vegetation.

The inventory of plant species recorded is shown in the following table.

Table – 7: List of plant species found and recorded

No.	Scientific Name	Myanmar Name	Family	Habit	IUCN 2023
1	<i>Acacia concinna</i> DC.	Kin-pon	Mimosaceae	S	
2	<i>Acacia leucophloea</i> (Roxb.) Willd.	Hta-naung	Mimosaceae	T	
3	<i>Albizia lebbek</i> Benth.	Ko-ko (anyar)	Mimosaceae	T	
4	<i>Aloe vera</i> L.	Shar-saung-lat-pat	Aloaceae	H	
5	<i>Alysicarpus vaginalis</i> (L.) DC.	Than-ma-naing-kyaut-ma-naing	Fabaceae	G	
6	<i>Annona squamosa</i> L.	Aw-zar-thee	Annonaceae	ST	LC
7	<i>Argyrea nervosa</i> Sweet.	Ka-zun-kyi	Convolvulaceae	C/C	
8	<i>Aristida depressa</i> Retz.	Thamin-mwe	Poaceae	G	
9	<i>Artocarpus heterophyllus</i> Lam.	Pein-ne	Moraceae	T	
10	<i>Azadirachta indica</i> A. Juss.	Tamar	Meliaceae	T	LC
11	<i>Bambusa vulgaris</i> Schard. ex J.C Wendl.	Shwe-war-war	Poaceae	B	
12	<i>Barassus flabellifer</i> L.	Htan	Arecaceae	T	
13	<i>Bougainvillea glabra</i> Choisy.	Set-ku-pan	Nyctaginaceae	C/C	LC
14	<i>Calotropis procera</i> (Ait.) R. Br.	Ma-yoe	Asclepiadaceae	ST	LC
15	<i>Calophyllum inophyllum</i> L.	Pone-nyat	Hypericaceae	T	LC
16	<i>Cardiospermum halicacabum</i> L.	Kala-myat-si	Sapindaceae	C/C	LC
17	<i>Carica papaya</i> L.	Thin-baw	Caricaceae	ST	DD
18	<i>Cassia alata</i> L.	Mal-za-li	Caesalpiniaceae	ST	
19	<i>Cassia javanica</i> L.	Ngu-set	Caesalpiniaceae	T	LC
20	<i>Chromolaena odorata</i> L.	Bi-zet	Asteraceae	S	
21	<i>Citrus aurantifolium</i> (Christm) Sw.	Than-pa-yar	Rutaceae	S	
22	<i>Citrus maxima</i> (Burm.) Merr.	Kywe-gaw	Rutaceae	ST	LC
23	<i>Clitoria ternatea</i> L.	Aung-pan-nyo	Fabaceae	C/C	
24	<i>Cocos nucifera</i> L.	Ohn	Arecaceae	T	
25	<i>Cynodon dactylon</i> (L.)Pers.	Myay-sar-myet	Poaceae	G	
26	<i>Cyperus compressus</i> L.	Wetlar-myet	Cyperaceae	H	
27	<i>Dactyloctenium aegyptium</i> (L.) Willd.	Byaik	Poaceae	S	
28	<i>Dalbergia spinosa</i> Roxb.	Yay-chin-ya	Fabaceae	S	
29	<i>Delonix regia</i> (Bjer.ex HK.) Raf.	Sein-pan	Caesalpiniaceae	T	LC
30	<i>Digera muricata</i> (L.) Mart.	Sein-na-pan	Amaranthaceae	H	
31	<i>Diospyros malabarica</i> (Desr.)	Te-pin	Enbennceae	T	
32	<i>Dracaena trifasciata</i> Hort. Ex Prain	Naga-set	Dracaenaceae	H	
33	<i>Dregea volubilis</i> (L.f.) Benth.	Gwe-dauk	Apocynaceae	C/C	
34	<i>Dyopsis lutescens</i> H.Wendl.	Yellow palm	Arecaceae	T	NT

35	<i>Embllica officinalis</i> Gaertn.	Zi-phyu	Euphorbiaceae	T	
36	<i>Eichhornia crassipes</i> (Mart.) Solms	Beda	Pontederiaceae	Aquatic	
37	<i>Ficus religiosa</i> L.	Nyaung	Moraceae	T	LC
38	<i>Ficus retusa</i> L.	Nyaung-oat	Moraceae	T	
39	<i>Hibiscus esculentus</i> L.	Yone-pa-tay	Malvaceae	H	
40	<i>Hibiscus sabdariffa</i> L.	Chin-baung	Malvaceae	S	
41	<i>Laburnum anagyroides</i> Medik, 1787	Ngu	Fabaceae	T	
42	<i>Lagenaria sicerraria</i> (Molina) Standl.	Bu	Cucurbitaceae	C/C	
43	<i>Lantana camara</i> L.	Hin-nyunt-nadaung	Verbenaceae	S	
44	<i>Lagerstroenia speciosa</i> (L.)Pers.	Pyinma	Lythraceae	T	
45	<i>Leea aequata</i> L.	Na-gar-mauk-thee	Leeaceae	C/C	
46	<i>Leucaena leucocephala</i> (Lam.) De wit.	Baw-sa-gaing	Mimosaceae	T	
47	<i>Leucas cephalotes</i> Spreng.	Pingu-hteik-pan	Lamiaceae	S	
48	<i>Luffa acutangula</i> (L.) Roxb.	Kha-wal	Cucurbitaceae	C/C	
49	<i>Jacaranda acutifolia</i> Humb. & Bonpl.	Sein-pan-pyar	Bignoniaceae	T	
50	<i>Jasminum sambac</i> (L.) Ait.	Sa-pal	Oleaceae	S	
51	<i>Jatropha curcas</i> (L.)	Kyat-su	Euphorbiaceae	ST	
52	<i>Mangifera indica</i> L.	Tha-yet	Anacardiaceae	T	
53	<i>Melissa officinalis</i> L.	Kalar-pin-sein	Lamiaceae	H	
54	<i>Merremia emarginata</i> (Brum.f.) Hallier f.	Say-myin-kwar	Convolvulaceae	S	
55	<i>Mimosa rubicaulis</i> Lam.	Kone-hti-kayone	Mimosaceae	H	
56	<i>Mimosa pudica</i> L.	Htika-yone	Mimosaceae	H	
57	<i>Mirabilis jalapa</i> L.	Lay-nar-yi-pan	Nyctaginaceae	S	
58	<i>Morinda citrifolia</i> L.	Ye-yo	Rubiaceae	ST	
59	<i>Moringa oleifera</i> Lam.	Dan-da-lun	Moringaceae	T	
60	<i>Mimusops elengi</i> L.	Kha-yay	Sapotaceae	T	
61	<i>Musa sapientum</i> L.	Nget-pyaw	Musaceae	H	
62	<i>Musa rubra</i> Wall. ex Kurz.	Nget-pyaw	Musaceae	H	
63	<i>Ocimum americanum</i> L.	Pin-sein	Lamiaceae	H	
64	<i>Oroxylum indicum</i> (L.)Kurz.	Kyaung-sha	Bignoniaceae	T	
65	<i>Phyllanthus urinaria</i> L.	Myay-zi-phyu	Euphorbiaceae	H	
66	<i>Plumeria alba</i> L.	Tayote-sakar-aphyu	Apocynaceae	ST	
67	<i>Plumeria rubra</i> L.	Tayote-sakar-ani	Apocynaceae	ST	
68	<i>Prunus armeniaca</i> L.	Tayoke-zi	Rosaceae	T	
69	<i>Psidium guajava</i> L.	Guava	Myrtaceae	ST	
70	<i>Pterocarpus indicus</i> Willd.	Padauk	Fabaceae	T	
71	<i>Punica granatum</i>	Tha-le-thee	Punicaceae	ST	
72	<i>Samanea saman</i> (Taeq.)Merr.	Ko-kko	Mimosaceae	T	
73	<i>Setaria pumila</i> (Pir).	Chot-thee-pane	Poaceae	G	

74	<i>Sida acuta</i> Burm.	Tabyet-si-ywet-chon	Malvaceae	S	
75	<i>Sterculia versicolor</i> Wall.	Shaw-phyu	Sterculiaceae	T	
76	<i>Swietenia macrophylla</i> King	Mahogany	Meliaceae	T	
77	<i>Syzygium campanulatum</i>	Asian-tha-pyay	Myrtaceae	T	
78	<i>Syzygium grande</i> (Wt.) Walp.	Tha-pyay-kyi	Myrtaceae	T	
79	<i>Tabebuia heterophylla</i> (DC.) Britton.	Unknown	Bignoniaceae	T	
80	<i>Tabernaemontana coronaria</i> L.	Za-lat	Apocynaceae	S	
81	<i>Tamarindus indica</i> L.	Magyi	Caesalpiniaceae	T	
82	<i>Tectona grandis</i> L.	Kyun	Verbenaceae	T	
83	<i>Terminalia bellerica</i> Roxb.	Thit-seint	Combretaceae	T	
84	<i>Terminalia mantaly</i> H.perris	Taiwan-banda	Combretaceae	T	
85	<i>Tribulus alatus</i> Delile.	Su-lay	Zygophyllaceae	H	
86	<i>Vigna catjang</i>	Pe-daunt-shal	Fabaceae	S	
87	<i>Wedelia calendulaceae</i> Nees.	Nay-kyar-kalay	Asteraceae	H	
88	<i>Ziziphus oenoplia</i> (L.) Mill.	Zi-pin	Rhamnaceae	T	
89	<i>Zyzygium jambos</i> L.	Hnin-thi	Myrtaceae	T	
90	<i>Ziziphus rugosa</i> Lam.	Zi	Rhamnaceae	T	

Abundance/dominance general pattern

Overall large tree such as mangoes and toddy plants (both cultivated trees) dominate the landscape. Tamarind (ma-gyi), rain tree (kokko) and coconut are also large cultivated trees. Those are also prominent large trees.

Rare and vulnerable species:

There is no natural big trees, but only cultivated large fruit trees and shade trees.

The above-mentored species in the IUCN Red List are indeed vulnerable species.

Species of economic interest

There is no natural green forest (only dry forest on two hills) and dry shrub land on natural plants that are of economic interest are not found.

Regarding artificial (cultivated plants) all fruit trees are of economic importance.

Many natural plant species of the Dry Zone are known to be of medicinal values. However no such species are found in this area.

(2) Fauna

Avian fauna (birds)

Birds in the designated 1 mile radius area and beyond are studied. Birds found during this EIA study are mostly beyond the 1 mile radius area; on shade trees, fruit trees; small number are found in the shrub land in the adjacent west of the project site.

Diversity

A total of 68 species of birds belonging to 37 families are found and recorded. (The data are primary data). (Domesticated birds, e.g. chicken, ducks are not taken into account). The inventory of bird species recorded is shown below.

Table – 8: List of birds species recorded

Sr. No.	Common New Name	Scientific name	Individual	IUCN 2023
	PHASIANIDAE: PHASIANINAE			LC
1	Red Junglefowl	<i>Gallus gallus</i>	1	LC
	THRESKIORNITHIDAE: THRESKIOGNITHINAE			LC
2	Glossy Ibis	<i>Plegadis falcinellus</i>	2	LC
	ARDEIDAE: ARIDEINAE			LC
3	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	12	LC
4	Chinese Pond-Heron	<i>Ardeola bacchus</i>	4	LC
5	Eastern Cattle Egret	<i>Bubulcus coromandus</i>	25	LC
	FALCONIDAE: FALCONINAE			LC
6	Common Kestrel	<i>Falco tinnunculus</i>	2	LC
7	Amur Falcon	<i>Falco amurensis</i>	1	LC
8	Eurasian Hobby	<i>Falco subbuteo</i>	1	LC
	FALCONIDAE: ACCIPITRINAE			LC
9	Oriental Honey-Buzzard	<i>Pernis ptilorhynchus</i>	1	LC
10	Shikra	<i>Accipiter badius</i>	2	LC
11	Himalayan Buzzard	<i>Buteo burmanicus</i>	3	LC
	TURNICIDAE			LC
12	Barred Buttonquail	<i>Turnix suscitator</i>	1	LC
	VANELLIDAE			LC
13	Red-wattled Lapwing	<i>Vanellus indicus</i>	4	LC

	SCOLOPACIDAE: TRINGINAE			LC
14	Green Sandpiper	<i>Tringa ochropus</i>	6	LC
	COLUMBIDAE: COLUMBINAE			LC
15	Rock Pigeon	<i>Columba livia</i>	21	LC
16	Spotted Dove	<i>Streptopelia chinensis</i>	6	LC
	CUCULIDAE: CUCULINAE			LC
17	Plaintive Cuckoo	<i>Cacomantis merulinus</i>	1	LC
18	Asian Koel	<i>Eudynamys scolopacaceus</i>	2	LC
	CUCULIDAE: PHAENICOPHAEINAE			LC
19	Green-billed Malkoha	<i>Rhopodytes tristis</i>	1	LC
	CUCULIDAE: CENTROPODINAE			LC
20	Greater Coucal	<i>Centropus sinensis</i>	2	LC
	STRIGIDAE			LC
21	Asian Barred Owlet	<i>Glaucidium cuculoides</i>	2	LC
22	Spotted Owlet	<i>Athene brama</i>	3	LC
	APODIAE: APODINAE			LC
23	Asian Palm-Swift	<i>Cypsiurus balas</i>	12	LC
24	House Swift	<i>Apus affinis</i>	6	LC
	CORACIIDAE			LC
25	Indian Roller	<i>Coracias benghalensis</i>	2	LC
	ALCEDINIDAE: HELCYONINAE			LC
26	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	2	LC
	ALCEDINIDAE: ALCEDININAE			LC
27	Common Kingfisher	<i>Alcedo atthis</i>	1	LC
	MEROPIIDAE			LC
28	Little Green Bee-eater	<i>Merops orientalis</i>	14	LC
	UPUPIDAE			LC
29	Common Hoopoe	<i>Upupa epops</i>	2	LC
	PICIDAE: JYGNINAE			LC
30	Eurasian Wryneck	<i>Lynx torquilla</i>	2	LC

	CAMPEPHAGIDAE			LC
31	Indochinese Cuckooshrike	<i>Coracina polioptera</i>	1	LC
	ARTAMIDAE			LC
32	Ashy Woodswallow	<i>Artamus fuscus</i>	4	LC
	GENERA INCERTAE SEDIS			LC
33	Large Woodshrike	<i>Tephrodornis gularis</i>	1	LC
	AEGITHINIDAE			LC
34	Common Iora	<i>Aegithina tiphia</i>	3	LC
	DICRURIDAE			LC
35	Black Drongo	<i>Dicrurus macrocercus</i>	4	LC
36	Bronzed Drongo	<i>Dicrurus aeneus</i>	2	LC
	CORVIDAE			LC
37	House Crow	<i>Corvus splendens</i>	8	LC
38	Hooded Treepie	<i>Crypsirina cucullata</i>	1	NT
	LANIIDAE			LC
39	Burmese Shrike	<i>Lanius colluriooides</i>	2	LC
	DICAEIDAE			LC
40	Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum</i>	2	LC
	ESTRILDIDAE: ESTRILDINAE			LC
41	White-rumped Munia	<i>Lonchura striata</i>	16	LC
42	Scaly-breasted Munia	<i>Lonchura punctulata</i>	8	LC
	PASSERIDAE			LC
43	House Sparrow	<i>Passer domesticus</i>	38	LC
44	Plain-backed Sparrow	<i>Passer flaveolus</i>	40	LC
	MOTACILLIDAE			LC
45	Olive-backed Pipit	<i>Anthus hodgsoni</i>	4	LC
46	White Wagtail	<i>Motacilla alba</i>	3	LC
47	Grey Wagtail	<i>Motacilla cinerea</i>	5	LC
	EMBERIZIDAE			LC
48	Yellow-breasted Bunting	<i>Emberiza aureola</i>	2	CR

	STURNIDAE: STURNINAE			LC
49	Jungle Myna	<i>Acridotheres fuscus</i>	18	LC
50	Common Myna	<i>Acridotheres tristis</i>	24	LC
51	Vinous-breasted Myna	<i>Acridotheres burmannicus</i>	48	LC
52	Chestnut-tailed Starling	<i>Sturnus malabaricus</i>	6	LC
	MUSCICAPIDAE: SAXICOLINAE			LC
53	Siberian Rubythroat	<i>Luscinia calliope</i>	3	LC
54	Blue Rock-Thrush	<i>Monticola solitarius</i>	1	LC
55	Pied Bushchat	<i>Saxicola caprata</i>	4	LC
	MUSCICAPIDAE: MUSCICAPINAE			LC
56	Taiga Flycatcher	<i>Ficedula albicilla</i>	2	LC
57	Oriental Magpie-Robin	<i>Copsychus saularis</i>	3	LC
	ALAUDIDAE			LC
58	Burmese Bushlark	<i>Mirafra microptera</i>	9	LC
	PYCNONOTIDAE:			LC
59	Streak-eared Bulbul	<i>Pycnonotus blanfordi</i>	8	LC
60	Red-vented Bulbul	<i>Pycnonotus cafer</i>	5	LC
	HIRUNDINIDAE: HIRUNDININAE			LC
61	Barn Swallow	<i>Hirundo rustica</i>	6	LC
	PHYLLOSCOPIDAE			LC
62	Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	2	LC
63	Dusky Warbler	<i>Phylloscopus fuscatus</i>	2	LC
	TIMALIIDAE			LC
64	White-throated Babbler	<i>Turdoides gularis</i>	14	LC
	ACROCEPHALIDAE			LC
65	Thick-billed Warbler	<i>Acrocephalus aedon</i>	3	LC
	CISTICOLIDAE			LC
66	Common Tailorbird	<i>Orthotomus sutorius</i>	5	LC
67	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	8	LC
68	Plain Prinia	<i>Prinia inornata</i>	2	LC

Species of economic interest

Dove and barbet one priced for their meat; in fact the local people consume any available birds, big and small (sparrow). But they are of no significance in term of economic importance. (In certain parts of Myanmar shore birds are caught and sold as raw-individual or an fried food)

Herpetofauna (amphibians and reptiles)

Herpetofauna are rare in this environment of dry shrub and dry forest.

Diversity

A total of 15 species of amphibians and reptiles species are recorded (3 amphibians; 12 reptiles).

The data are primary data.

The inventory of list of herpetofauna species is shown below.

Table – 9: Herpetofauna species recorded in the area

No.	Family Name	Scientific Name	Common Name	IUCN 2023
1.	Bufo	<i>Duttaphrynus melanostictus</i>	Common Toad	
2.	Dicroglossidae	<i>Fejervarya limnocharis</i>	Paddy Frog	LC
3.	Microhylidae	<i>Microhyla fissipes</i>	Narrow-mouthed Frog	
4.	Agamidae	<i>Calotes veriscolor</i>	Garden Fence Lizard	
5.		<i>Calotes mystaceus</i>	Blue Crested Lizard	
6.	Gekkonidae	<i>Hemidactylus brookii</i>	Brook's House Gecko	
7.		<i>Hemidactylus frenatus</i>	Asian House Gecko	
8.	Scincidae	<i>Eutropis multifasciata</i>	Common Sun Skink	
9.		<i>Eutropis macularia</i>	Little Ground Skink	
10.	Colubridae	<i>Ahaetulla nasuta</i>	Vine Snake	
11.		<i>Oligodon splendidus</i>	Splendid Kukri Snake	
12.	Viperidae	<i>Crptelytrops albolabris</i>	White-lipped Pit Viper	
13.	Elapide	<i>Naja mandalayensis</i>	Mandalay Cobra	
14.	Natricidae	<i>Amphiesma stolata</i>	Buff-striped Keelback	
15.		<i>Flowea piscator</i>	Chequered Keelback Water Snake	

Species of economic interest

The local people consume the meat of frog and also snake, if they are available. But they are of no significance in term of economic importance.

Mammalian fauna (mammals)

There are no large wild animal, but only small mammals such as Ayeyarwaddy squirrel (*Callosciurus pygerythrus*), Northern tree shrew (*Tupaia belangeri*), rat (*Rattus rattus*) and mouse (*Mus musulentus*).

(Big Mammals found are only the domesticated animals; dog, cat, goats, cattle) but are not taken into account).

Aquatic fauna

There are no water courses or water bodies in the vicinity.

There is no likelihood of biological component to be impacted by the activities of the fiber cement board factory.

5.7 Infrastructure and service

The site is easily accessible but motor road. The Yangon-Mandalay High Way running from south to north is 1 mile in the west. Kyaukse city is in the south and Sint Kaing town is in the north.

Bellin Village is on this high way and the project site is on the adjacent of Bellin-Yeywar Road (from west to east).

The factory has its own access road to Bellin-Yeywar Road and Yangon-Mandalay High way.

Taung Yinn village, east of Bellin is also on this said road.

The Yangon-Mandalay railway runs parallel to the Yangon-Mandalay Highway. The project site as well as the two villages also has access by railway.

Both villages have good access to gridline electricity. There is a sub-station at Bellin Village, and the factory has sourced electricity from the said sub-station.

As regards natural resources non-living resources such as sand and limestone are exploited (limestone mainly for making lime powder).



Figure-85: Yangon-Mandalay Highway



Figure-86: Yangon-Mandalay railway



Figure-87: At the entrance of Bellin Village



Figure-88: At the entrance of Taung Yinn Village

Table-10: Data on infrastructure and services

No	Infrastructure and Services	Bellin Village	Taung Yinn Village
1.	Accessibility		
	Motor road	- On Yangon-Mandalay Highway between Kyaukse and Sint Kaing.	- Close to Yangon-Mandalay Highway between Kyaukse and Sint Kaing.
	Railway (Yangon-Mandalay)	√	√
	Water way	-	-
2.	Access to National Gridline electricity	100%	100%
3.	Education facilities		
	- Basic Education High School	1	
	Number of students	752	-
	Number of teachers	27	-
	- Basic Education Primary School	3	1
	Number of students	410	163
	Number of teachers	16	5
- Adult literacy rate %	95%	98%	
4.	Health facilities		
	- Village clinic (public)	1	x
	- Private clinic (Patients mostly go to Kyaukse District Hospital, 4.2 miles away)	2	x
5.	Village library	√	x
6.	Source of water	Tube wells/bottle water	irrigation water/bottle water



Figure-89: B.E.H.S Bellin Village



Figure-90: B.E.P.S Taung Yinn Village



Figure-91: Bellin Village clinic (public)



Figure-92: Bellin Village clinic (private)



Figure-93: Bellin Village library

5.8 Socio-economic components of the surrounding environment

During the EIA study an assessment of the socio economic aspects of the two villages, Bellin and Taung Yinn were carried out.

The assessment was conducted applying desktop survey (from available information), transect walking through the two villages and doing visual inspection, photographing and most of all conducting interviews (Key Information Interview, KII and Focal Group Discussion (FGD)). Predesigned questionnaires were applied.

The population of Bellin village and Taung Yinn village are 918 and 547, respectively, while the numbers of houses are 166 and 80 respectively. 100% of the population is Bamar and Buddhists.

As the small industrial zone with 8 factories is established nearby the majority of households are working in these factories, mostly blue collar jobs. Their salaries range for Ks 150,000 to Ks 500,000.

The minority of households are farmers (small scale cultivators) cultivating rice and pulse. There are only small fields and farms (mostly dry farms). A few are exploiting sand and limestone.

10% of the households are working as vendors, seasonal jobs and odd jobs.

The daily wages of the local area range from Ks 5,000 to Ks 8,000.

When compared with the far flung dirt poor rural villages of the country the locals here are better off and the living standard, relatively higher. The area on the whole is a relatively developed area.

The following table summarized the socio-economic attributes of the two villages.

Table-11: Social economic attributes (facts and figures) of two villages

No.	Attributes	Bellin Village	Taung Yinn Village
1	Houses	166	80
2	House holds	176	170
3	Population	918 (Male 419, Female 499)	547 (Male 239, Female 308)
4	Ethnicity (%)		
	Bamar	100%	100%
	Others	0%	0%
5	Religion		
	Buddhist	100%	100%
	Christian	0%	0%
6	Main occupation (% of house hold)		
	Working in factories	70%	70%
	Others (vendors, seasonal and odd jobs)	10%	30%
7	Government employees	20%	-
8	Daily wages	Ks-8000	Ks-5000-7000

Regarding living condition (materials possession/lifestyle) it is summarized in tabulated form below.

Table-12: Materials possession/life style

No	Materials possession	Bellin Village	Taung Yinn Village
1.	- Three-storeyed brick houses and corrugated iron roofing (%)	1 %	-
	- Two-storeyed brick houses and corrugated iron roofing (%)	29 %	-
	- One-storeyed brick houses and corrugated iron roofing (%)	70 %	-
	- Two-storeyed wooden wall, corrugated iron roofing (%)	-	20 %
	- One-storeyed wooden wall, corrugated iron roofing (%)	-	30 %
	- One-storeyed wooden houses, bamboo wall corrugated iron roofing (%)	-	50 %
2.	- Car (number)	20	5
	- Motorcycle (%)	100%	100%
	- Television (%)	100%	100%
	- Hand phone (%)	100%	100%

As regards land use the whole area was once a shrub land and dry forest land, small cultivated areas (mostly small farms) and the residential areas (of two villages).

As the quasi mini-industrial zone is established the land use area now includes the industrial zone, about 60 acres.

The new residential area (housing complex for MEPE employees) about 10 acres is also now in existence.

The survey team has heard or found no issue of land disputes, land grabbing, forced eviction and forced relocation. There was/is no precedents of public outcry or mass protest by the locals due to the implementation of a developmental project, it is learnt.

5.9 Public health component

The larger Bellin Village has one village clinic (public clinic) and two private clinics.

Taung Yinn village has no village clinic yet.

However both villages have good access to health services. The Sint Kaing Township Hospital is only about 4 miles in the north while the Kyaukse District Hospital is also about 4 miles in the south.

The following table shows the number of cases and patients given treatment at Sint Kaing Township Hospital (2018-2019).

Sr.	Township	Diseases											
		Malaria		Diarrhea		Tuberculosis		Dysentery		Hepatitis		HIV/AIDS	
		Incident	Mortality	Incident	Mortality	Incident	Mortality	Incident	Mortality	Incident	Mortality	Incident	Mortality
1.	Sint-kaing	7	-	944	-	154	-	202	-	-	-	29	-

Sources: Sint Kaing Township Health Department

5.10 Cultural components of the surrounding environment

100% of the villagers of these two villages are Bhamar and also 100% are Buddhists. (No Hindu, Christians or Muslims).

Bellin Village has 4 Buddhist monasteries with 20 monks and 5 novices.

Taung Yinn village has 3 Buddhist monasteries with 15 monks.

With the exception of these monasteries there is no other religious monument, such as village pagoda and other religions shrine.

There is no famous pagoda in the area (there are some famous pagodas in Kyaukse district area but not here).

There is no annual pagoda festival or grand religion festival.

The villagers, particularly the elders, go to the village monasteries during the Sabbath Days (the full moon day, new moon day, and the two 8th days, of the Burmese calendar months). They take refuge and observe the 8 or 9 precepts (thi-la) administered by the abbot monk.

Many local people still worship the "Nats" or guardian spirits. The Myanmar Buddhists believe in the 31 abodes (realms) of life. The lowest abode of nat (safe-mahar-rit) is close to that of the human abode and these "nats" are worshipped or propitiated. Even though Buddhist had prevailed in this area since the reign of King Anaw-ra-hita (almost 1000 years ago) the old traditions of worship of "nat" still exist today. Offertory (Hnget-pyaw-pwei, Ohn-pwei) are propitiated to the "nat" spirits.

Many Myanmar Buddhist villages usually have a big sacred tree with a "nat" shrine, for the village guardian spirit. There is no such shrine at these two villages.

In ancient time Kyaukse area was one of the centres of civilization during the late period of the Bagan Dynasty, Particularly during the reigns of King Anaw-ra-hita and his descendants

King Kyan-Sit-Thar, King Alaung-Si-Thu etc. Some cultural, religious, historical and archeological sites still remain today. For instance, the Pa Leik Cultural Zone at Paleik village, and Mac-hka-yar ancient city (culture zone) at At-pyat village both in the far vicinity (9.3 miles) are designated as cultural zones in Sint Kaing Township, Kyaukse District.

There can be no negative impact on these cultural zones due of the activities of the fiber cement board factory.

5.11 Visual components of the surrounding environment

Once the whole wide landscape of the area comprised two villages, (Bellin in the west and Taung Yin in the east) and two hills (Myint-mo-taung in the south and Sin-kyauk-gyi taung in the north), large area of shrub land and cultivated land with numerous small farms.

The shrub or bushes are dry bush, and the forests on the hill are dry forest (relatively green during rainy season only).

With the establishment of a mini-industrial zone (comprising 8 factories) and a new residential area (the housing complex for MEPE employees) the landscape has changed drastically. Bush and shrub were cleared and buildings and structures have emerged. The formerly shrub land area was transformed into a mini-industrial zone.

Virtually all buildings are one-storeyed buildings and none of them stand out prominently as prominent landmark when view from a far. The creations of green zone (with shade trees, fruit trees, ornamental plant) at each factory will one day conceal many of the buildings, and there building will no longer stand out in contrast with the natural environment.

The said two hills are quite prominent natural landscape in the area. Apart from these two hills there are no other outstanding natural landmarks, and no sites of scenic beauty or aesthetic beauty for tourists attraction.



Figure-94: Panoramic view of the area north of the project site

Landscaping and greening

To harmonize the landscape regarding the factory complex and its surrounding and also to enhance the aesthetics of the area landscaping and greening have been undertaken by the project proponent.

There are available spaces west of the factory and the company has taken advantages of this situation and have already planted 51 varieties of plants - comprising fruit trees, shade trees, flowering plants/trees and ornamental plants and one type of bamboo.

The list of plants together with the number planted so far is given below.


Table-13: List of plants

Sr. No.	Plant Name	Quantity
1	Ficus	9
2	Star flower	38
3	Papaya	23
4	Alexandrian laurel	11
5	Morinda	1
6	Taung Mayoe	16
7	Golden bamboo	1
8	Red gold mohur	60
9	Blue gold mohur	4
10	Rain tree	26
11	Pomegranate	4
12	Cassia (laburnum)	14
13	Taiwan almond	43
14	Mahogany	2
15	Chaste tree	3
16	Frangipani	12
17	Mango	97
18	Sweet carambola	5
19	Guava	17
20	Litchi	8
21	Padauk	7
22	Citrus	12
23	Pamelo	4
24	Sweet tamarind	5
25	Acacia intsia	1
26	Soap acacia	3
27	Thai lychee	2
28	Plum	5
29	Yellow cassia	5
30	White plant fibre	205
31	Banana	100
32	Ornamental coconut palm	7
33	Eugenic	32
34	Jack fruit	15

35	Sweet sop	2
36	Lagerstroemia	11
37	Coconut	21
38	Thai coconut	42
39	Bamboo	38
40	White rhododendron	8
41	Cassia siamea	12
42	Taiwan madhuca	9
43	Tulip	9
44	Bougainville	3
45	Neem	2
46	Teak	4
47	Mulberry	14
48	ASEAN eugenia	2
49	Cassia glauca	1
50	Nga-gar mauk	10
51	Persimmon	3

Commitment

The project proponent, Sann Shinn & Brothers Co., Ltd, commits to undertake the project with no or little negative impacts on the physical, biological, socio-economic, cultural and visual components as practical as possible if there is any damage or loss due to the implementing of the project generous compensation will be provided in a meaningful way.



U Kyaw Myint Oo
 Director
 Sann Shinn & Brothers Co., Ltd.

6. IMPACTS AND RISKS ASSESSMENT AND MITIGATION MEASURES

6.1 Impacts and risk assessment methodology

The basic methodology comprises desktop survey (literature survey, if any), actual field and inspection, consultation meeting for gathering data and information and report writing.

The assessments are based from previous personal experience and also from theoretical knowledge from literature. Consideration, prediction, anticipation and identification of risks and impacts and subsequent assessment are made after visual inspection, testing and comprehension group discussions among EIA practitioners and appraisers.

In short the methodology is Experts Consensus method (Ad hoc method) in combination with matrix risks/impacts rating method. Risk/impact assessment for all impact are summarized at the end of impact and mitigation measure (at the end of section 6.2.1) later.

The tools and equipment used for assessment of impact on the physical components are the same as those mentioned earlier in Chapter 5. E.g. EPAS air sampler, EPAS Haz Scanner, EXTECH Sound Level meter, BEME-TECH Vibration Meter and Portable Water Test Kit.

Water samples and soil samples were collected and analyzed at registered laboratories in Yangon.

Meteorological data/information are secondary data gathered from Township Meteorological department to investigation if there is any trend of increase in temperature and rain fall etc. over the years.

Visual inspection is an essential methodology for identifying all the impacts on the physical, biological, socio-economic, cultural and visual components of the environment. Therefore visual inspection and information/data gathering are the only effective tools.

The baseline data or background data for the physical, biological, socio-economic, cultural and visual components of environment were carried out. (These were already mentioned in **Chapter-5**). These baseline/background data could be one day in the future compared with the actual impacts during the Construction and Operation Phases.

Prediction, anticipation, identification and assessment of impacts/potential impacts are extrapolated from all the main activities involve in fiber cement project. The main activities such as clearing of vegetation for site and access road, the construction activities during the whole Construction Phase and most of all operation activities during the whole long Operation Phase and lastly all activities during the Decommissioning Phase.

Since impacts are the resultants of the above-mentioned activities each and every activity and the resultant impacts are considered, predicted, identified and assessed. Mitigation measures for each and every impact/potential impact are then prescribed.

6.2 Impact and risk identification, assessment and mitigation measures for each project phase

To uphold a standard EIA report the impacts assessment are made encompassing all the four phases, namely, Preconstruction, Construction, Operation and Decommissioning Phases. The assessments also cover all the five environmental components of the surrounding environment, namely, the physical, biological, socio-economic, cultural and visual components.

Impacts can be negative or positive, direct or indirect. The magnitude of each impact can be termed:

- Significant or insignificant (minor/negligible)
- Temporary or permanent
- Short term or long term
- Specific/localized or widespread and
- Reversible or irreversible.

6.2.1 Identification and assessment of potential environmental impacts

6.2.1.1 During the Preconstruction Phase

Generally speaking there should be no negative impact during the Preconstruction Phase. However impacts of socio-economic aspects can happen if not well-managed in the first place.

(1) The potential hiking of the price of land and property

Even rumors of the project can lead to the hiking of price of land and property by greedy speculators. But this phenomenon is quite common in Myanmar and at the regional level.

(2) Potential polarization of local community into pro-project and anti-project groups due to instigation by activists and radical environmentalists

Activists and radical environmentalists usually have anti-development, anti-big business, anti-corporate and anti-class mind sets. Their instigation can polarize the locals. This can lead to public outcry, protest and political instability of the region.

6.2.1.2 During the Construction Phase

(1) Impacts on air environment

During the Construction Phase vegetation clearing, land leveling, removal of top soil, digging, and all kinds of earth works for construction and all construction works lead to the generation of dust.

The operations of machinery and vehicles also lead to the generation of smoke (gas emission) from the exhaust systems.

Dust of PM₁₀ is nuisance but that of PM_{2.5} and PM₁ are of serious health concern. Smoke and its constituent CO are hazardous to human.

(a) Nature of impact: dust

Dust is the main issue during Construction Phase. Wind direction plays an important role in the impact. The clearing of land and earth works such as excavation, digging and refilling of earth greatly generate dust.

Vehicular movements as well as operations of other equipment, engines and pumps emit lot of dust.

These processes together with wind erosion of open or disturbed ground would generate dust and could have quite a severe impact. Nuisance and health impact are associated with increased level of dust. The air dust pollution could cause eye problem, allergy, skin disease, respiratory and lung diseases.

Dust of PM₁₀, and above are a nuisance, but PM_{2.5}, PM₁ are of serious health concern.

(b) Nature of impact: smoke (fugitive emission)

Smoke generated during Construction Phase will be low. The source of emission is from vehicles and some machines used during construction works, such as engines and pumps.

Health impact associated with smoke increased with level of smoke. The emission of Green House Gas can lead to global climate change.

(2) Impact: noise and vibration

Noise and vibration are generated during all kind of construction works: at the construction of access road and civil works at the site.

Movement of heavy machinery and heavy trucks generated loud noise and vibration. Gravel roads produce more noise and vibration than tarred ones.

The loading and unloading of materials also generate noise and vibration.

Normal civil works such as carpentry works involve noisy saws and planes, noisy drilling machine and also sound of hammer etc.

Environmental noise level that is acceptable rating level for noise (NEQEG) is 70dBA during daytime and night. Internationally accepted noise level in the work place should not exceed 85dBA.

Pump and generator are also sources of noise. Prolonged exposure above 85 dBA can impair hearing and can be a major health impact. Noise generally causes nuisance and disturbance to the community. Noise would scare away all the wildlife animals if any, including birds. High noise level can cause high blood pressure and heart attack.

Vibration is generated from machinery or mechanical operation during construction work and also from heavy vehicles on the access road. Vibration is usually associated with loud noise; it can damage machines and equipment and also buildings or structures. On the whole vibration during the Construction Phase will be low. However vibration can occur due to heavy machinery and heavy trucks.

(3) Impacts on land environment

The impacts on land and soil are due to:

- The construction of access road involving land clearing, land cuts, digging and excavation and other earth works.
- The construction of the facility at the site that include the factory and all its facilities, buildings and structures involving land clearing, digging, excavation and other earth works.

The impact on the land and soil will be in the forms of:

- Destruction of original soil.
- Destruction of soil profile and soil structure.
- Soil impacted due to heavy machinery movement erosion and sedimentation.
- Soil contamination and subsequent ground water contamination due to oil spill and/or chemical spill.
- Soil pollution and subsequent ground water pollution due to unmanaged domestic wastes disposal.

(4) Impact on water environment

The company sources ground water; there are two tube wells. Although the demand for water during the Construction Phase may not be as high as during the Operation Phase the need for water during the Construction Phase is not so low either. Relatively large quantity of water has to be used in mason work or concrete work such as the mixing of cement, sand, lime with water. The domestic consumption of the water by 120 workers can also have impact on the quantity of available water.

Water has to be used in occasional suppression of dust and washing of vehicles and machinery. The potential impacts on surface water and ground water can be:

Ground water

- Potential groundwater contamination due to percolation of hydrocarbons, drill fluids and chemically contaminated water.
- Potential contamination due to seepage of ablutions and domestic wastes.
- Impact on the level of groundwater if tube well has to be used and large quantity of underground water have to be utilized.

(5) Impact of wastes

The waste here refers to construction tailings and debris and domestic waste (solid and liquid) generated by construction workers during the Construction Phase.

Solid waste generated during the construction phase will be large quantity of debris in the form of bits and pieces of building materials, iron materials, timber, and soft wood, left over construction tailings.

Many of the leftover materials are unused or surplus materials because even well-experienced planning and design engineers may not be able to estimate the exact quantity of building materials to be used. There will always be unused or surplus timbers and other building materials. Unless systematically resold, reused and recycled and systematically disposed these materials can pose a great impact on the area. After one year of construction work, ill-disciplined workers without good house-keeping practice can also litter the site to a great extent.

Domestic waste (solid and liquid) comes from office; housings for workers, kitchen, messing hall etc.

The waste can be in the form of solid waste, waste water and spill or leak that contaminated the soil.

The spill or leakage of fuel oil, and grease etc. could be also substantial if there is a lack of discipline among the workers.

(6) Occupational health and safety issue

Accidents can occur from time to time during construction work either to construction workers or neighbours if they are close to construction site. This can also happen to passers-by near the construction site.

The slipshodness of the construction workers and the falling of bits and pieces of construction materials or tools from above can cause minor or major injury to other workers or passers-by.

Certain accidents can be fatal.

The 10 most common construction site accidents worldwide are:

- fall from heights (scaffolding); slip and fall; electrocution; falling debris, materials and objects; getting caught-in between objects and materials; fire and explosion; over exertion; machinery accidents; getting hit by a vehicle; and trench (for wiring and pipes) collapses.

Accidents in the workplace or at the site can happen due to unskilled workers or careless workers during the Construction Phase. Construction work is hectic in nature and so it is quite difficult to create an accident free (zero accident) working environment during the Construction Phase.

The potential for fire breakout cannot be totally ruled out. So too is the potential for vehicular accident and electrocution.

There is also occupational health issue due to smoke, dust, (asthma, respiratory ailments, lung disease) and high noise level (impairment of hearing or deafness).

The lack of emergency and health service can be a constraint regarding provision of health care for workers in potential emergency. If an accident that effect many people occurs the available service in the area may be prone to inadequate. The township hospital at Sint Kaing, of course, cannot solve such a serious problem. Most of the serious health cases are to be referred to the main District Hospital in Kyaukse in the south.

(7) Potential social impacts

As the proposed project site is near Taung Yinn village and Bellin village potential social impact can occur from time to time.

Theoretically, the potential impacts include:

- Physical displacement (of land, property, people etc.).
- Loss of livelihood, mental agony, changes in social structure.
- People are affected due to pollution (air, water, land) as a result of the project.

In the fiber cement board project the practical impacts are:

- Potential damage to existing road caused by movement of heavy trucks and machinery.
- Continual uses of vehicles moving to and from the site impacting the safety of people and domestic animals.
- Generation of dust, noise and vibration causing potential disturbance or nuisance to the locals.
- Potential contamination of water; particularly during the rainy season.
- Frictions can occur between construction workers and local people.

Serious social issue can occur due to ill-social behaviour of workers or locals. Construction workers working during the short Construction Phase are usually not as well-disciplined as permanent workers during the long Operation Phase.

Quarrels and brawls, misappropriation of money and materials, vandalism, theft, unethical sexual practices or sexual offensives, and spread of Sexually Transmitted Diseases (STD) can happen during the Construction Phase.

All these have the potential to hinder or even jeopardize to smooth progress of the project.

Note – After Construction Phase all the said impacts potential impacts will be ceased. All impacts are mitigable.

(8) Positive (beneficial) impacts during the Construction Phase

The positive or beneficial impacts during the Construction Phase are in socio-economic aspects. The economic benefits to the region were substantial.

The proposed project will invigorate and boost the local economy and brought economic benefits to people who are involved in extraction/production and sale of building materials of all sorts, both raw materials and manufactured goods.

Contractors of raw materials such as sand, gravel and bricks will get the chance for doing lucrative and brisk business in providing these raw materials for sales. The extraction or production of these raw materials shall also provide jobs for many locals.

Timber merchants and merchants of soft wood and as well as merchants of construction merchandize such as iron rods, bars, iron works and nails, roofing, aluminum sheet, glass panels, cement and so on will promote their sales. At the same time more jobs for the locals will be provided by these merchants; small business men and small sub-contractors will be also benefited by the production, extraction and sale of these building merchandize.

The proposed project will provide jobs for about 120 construction workers for three years. Many workers including engineers and technicians will get technology and skill transfer from foreign engineers and technicians.

The access hard top road built by the company has greatly contributed to community's transportation and development.

The project will lead to the provision of market for food vendors and owners of nearby business premises. The food vendors will have the chance to increase their sales and income as a result of selling food to the company's workers. The owners of the nearby business premises will benefit as a result of the company's workers purchasing the items from their shops.

On the national level the benefits will accrue to the country in the form of direct investment of Ks 19931.31 million; an increase in Gross Domestic Product (GDP) of the nation and also in the form of increase tax, duty and revenue for the national economy.

Sann Shinn & Brothers Co., Ltd will bear in mind that while negative impacts will be mitigated or minimized positive impacts will be promoted or enhanced.

6.2.1.3 During the Operation Phase

1. Impact on air environment

Fiber cement board factory has to use coal as burner for the 8 tons boiler and the hot steam is used for curing board and autoclaving.

It is estimated that 8-10 tons of coal has to be burnt per day.

Emissions from the project site will be:

- Point source emission from stack of boiler which is the main emission and
- Fugitive emission from equipment and vehicles; minor emissions from drying, curing process
- Fugitive dust emission from sand, cement, and pulp mixing, blending preparation area, from sanding, edging chamfering activities and also from vehicular movements inside the factory compound

Air pollutants from the burning of coal contains SO₂, NO₂, CO₂ and PM₁₀, PM_{2.5}. In addition heavy metal (mercury, lead, chromium etc.) and organic toxic pollutant (dioxin, furans etc.), VOC, unburned hydrocarbon etc. are generated PM such as fly ash and down ash are generally generated from boiler. Theoretically the incinerations of 8 tons of coal generate 1.9 tons of CO₂, 240 kg of SO₂ and 72 kg of NO₂. That is if no mitigation measures are taken.

Excessive emission of CO₂ into the atmosphere can contribute to global warming and eventually lead to climate change. However when compared with large industries in Developed Industrialized countries the impact from this factory is minor.

Smoke and dust are health hazards for workers and neighbours. e.g. - diseases associated with respiratory dust and lung. The impact is not only in the foot print of the factory but beyond. Strong wind can spread smoke and dust to the neighbourhood and onto agricultural land.

However smoke and dust can be mitigated.

2. Impact: noise and vibration

Noise and vibrations result from a different of sources inside and outside the fiber cement board factory. E.g. from sand and cement preparation areas and cellulose (pulp) preparation area. The mixing/blending of slurry generate relatively high level noise. Noise is generated also from boiler unit.

The fiber cement board factory is fully automated and machinery and devices are moving, rotating, rolling continuously. For example: The movement of the flow on sheet making machine, traction machine, cross move machine, the trolley conveyors, water jet cutting, stacking and destocking generate noise all the time.

The smoothing (sanding) and edging (chamfering) activities generate relatively high level noise. The movement of forklift inside and vehicular movement outside also generate noise; and also vibration from heavy truck. The operation of generator and pump also generate high level noise.

Increase of ambient noise level will cause disturbance or nuisance for the employees but working in noisy work place for long hours can impair hearing or in severe case can lead to deafness.

Vibration can cause body vibration or arm vibrations which are also health hazard.

However, in this fully automated factory where manual labour is minimized and mechanical labour is maximized the impacts are not so serious. Anyway mitigation measures are necessary.

3. Impact on land environment

This is in the form of land contamination, potential erosion and impact on soil structure and quality.

This can happen inside the factory compound where raw materials such as sand, cement and cellulose are stored and prepared. Good working practice and good housekeeping are necessary; do not litter the ground and not to dirty the place.

Indiscriminate dumping of solid and liquid wastes can have serious impact on land environment.

Accidental fuel oil leakage or spilling can contaminate the ground. Erosion and sedimentation can have impact on land; soil quality and structure should be kept to remain intact as practical as possible.

All these potential impact on land/soil can be managed on mitigated.

4. Impact on water environment

The impact refers to the ground water environment only as there is no stream, water course or water body impact on surface water is not an issue.

The fiber cement board factory will have to use 60 tons of water as the manufacturing of fiber cement board requires large quantity of water. Water will be sourced from two tube wells each with a depth of 270 feet.

The factory can have potential impact on the quantity of ground water, reducing it and lowering water level. This can have impact on the natural water sources for the local community.

The used water/waste water or effluent can have adverse effect on the environment (both soil and ground water) if not well-managed; such as contamination of soil and eventually ground water.

Mitigation measures are necessary and the project proponent has definite plan for tackling this issue.

5. Impact of wastes (solid and liquid)

(a) Solid waste

Large quantity of coal combustion residuals (fly ash and bottom ash) are generated from boiler unit. It is estimated that 50 kg of combustion residues, (fly ash and down ash) are generated from the burning of 8 tons of coal per day, if mitigation measures are taken. The factory will install filter bags dust collector and manual handling and removing of these residues.

Small quantity of solid wastes in the form of dust and pieces and bit, generated from smoothing, edging/chamfering of fiber cement board.

The cutting of wet fiber cement board by powerful water jet generates off cuts (wet slabs) but all are recycled and reused. Substantial quantities of destroyed boards are also generated. All are generated daily. It is estimated that 2,400 kg of wet sheet (off cut) are generated per day.

Finally industrial solid waste in the form of packing materials e.g. cement bags, packing materials for imported pulp or other packing materials etc. (These are not generated on a daily basis but only from time to time. It is estimated that roughly 125 cubic feet of packing materials will be generated per month).

Domestic solid wastes

These are in the form of debris, trash, garbage, office waste and organic waste (from kitchen and messing room).

There will be 91 employee (including 5 foreigners); housing is provided. The generation of domestic solid waste per day is estimated at 18 kg (from formulae).

(b) Liquid wastes (effluents)

Industrial liquid waste (used water, processed water/waste water)

Fiber cement board manufacturing requires large quantity of water. Daily water consumption is estimated at 60 tons. Most of the water is used at sand slurry preparation, cellulose (pulp) slurry preparation, mixing/blending, board making, felt washing, mould plates washing and also at the boiler unit (for boiler and sprinkler). There will be also occasional washing of some machinery and vehicle. There is also slurry discharge from sheeting machine.

Most of the water is used up and a small percentage is evaporated. However, most of the water is recirculated and reused.

It is estimated that the total quantity of waste water (used water/processed water, washed water) generated will be 130 gallons/day.

Waste water from boiler will be only 300 gallons per month.

Grease has to be applied on mould plates and there is a cleaning and oiling section where grease and oil are removed. Industrial liquid waste contains S_1O_2 , CaO, Al_2O_3 , Fe_2O_3 , cellulose ($C_6H_{10}O_5$), carbohydrate, other organic substance, oil and grease.

Domestic liquid waste

There will be 91 employees (including 5 foreigners); and housing is provided for them. The domestic waste water (domestic effluent) is estimated at 730 gallons/day. (Formulae for developing countries).

The domestic waste water (brown water) from the kitchen, messing hall, and bath will flow into the drain and end up in waste water pond (sink).

The sanitary waste water (black water) from the toilet will flows into the septic tank and soak pit.

Domestic effluent from kitchen and messing contain food particles, oil, grease, soap, salt, metals, detergent, grit etc.

Domestic effluent from toilet and bath contains soaps, detergents, urine, faces etc.

Mitigation is necessary.

6. Potential impact on traffic/traffic congesting

The Yangon-Mandalay High Way with heavy traffic is just 0.75 mile in the west; the Bellin-Ye-ywar Road not heavy with traffic is in the adjacent south. The access road from the site to the Yangon-Mandalay High Way is relatively heavy with traffic.

The company has 5 office vehicles and 5 motorcycles. But for the procurement of raw materials (sand, cement, pulp, lime etc.) trucks have to be used for transportation. In the same way the transportation of finished products (5,300 fiber cement boards can be produced per day) have to use trucks.

Therefore, the factory will contribute to more traffic volume on the access road and the main High Way.

The whole area is rather like industrial zone with some other factories in operation or in the process of operation. The Prison Department and Housing for Construction (Electric) employee are also in the vicinity.

Therefore, the vehicles from the nearby factories and governmental departments will surely increase the traffic flow on the Bellin-Ye-ywar Road and most of all, on the Yangon High Way.

Mitigation measures for traffic are necessary.

7. Occupational Health and Safety

Common serious safety hazards in the work place of a fiber cement board factory are:

- Falls, slips, trips (due to spillage of water or oil on floor; uneven floor).
- Machinery/equipment hazards (due to carelessness or lack of good training).
- Chemical hazards (due to inhalation and dermal contact of lime, sulphur etc.).
- Fire hazard (from engine, welding equipment, electrical equipment)
- Heat hazards (from boiler, heaters, hot equipment --- etc.) and
- Working at height (fall)

As regards occupational health and hazards most of the industrial disease in factories are caused by dust, chemical and fumes. Common industrial diseases are: occupational asthma, occupational dermatitis, industrial deafness, hand-arm-vibration syndrome and allergies.

Working in a modern cellulose fiber cement factory is relatively safe. The factory is an automation factory; all activities are automatically/remotely controlled and regulated. But when working for long hours over a long period unexpected occupational hazards and accident can happen. Shared dining, shared hygiene facility (e.g. toilet, bath) and crowded condition can contribute to spreading of diseases. Monotones nature of work at a work place can lead to psychological disorder, e.g. outbreak of hysteria.

Workers who are working standing up for long hours can suffer from stress and strain, sore feet, swelling of legs, general muscular fatigue, lower back pain etc. Minor injuries known as repetitive strain injuries can happen when a worker is doing the same movement over and over wearing out bones, ligaments, cartilages, nervous system and muscles. Working repetitive work for long hours can lead to carelessness and slackness of attention resulting in accidents.

However, as mechanical labour is maximized and manual labour is minimized as practical as possible the above-mentioned issue is not a serious issue in this automated factory.

Occupational health and safety issues associated with cellulose fiber cement manufacturing operations are as follow:

Physical hazards

The most common risks are trips and falls caused by slippery floor, stairs and platforms (e.g. packing and transport equipment); contact with process equipment (e.g. milling machine); accidents involving conveyor belts and explosion. (E.g. fuel storage and boiler)

Dust and biological hazards

Workers are exposed to dust (including microbiological agents) during sand, cement, cellulose preparation works. Also during stacking, sanding, edging, chamfering etc.

Heat

Workers can be exposed to heat such as from boiler or autoclave, dryer or hot equipment.

Noise and vibration

Noise and vibration from internal and external transportation, flow in pipe lines, roller conveyers, sand ball milling, slurry mixing, blending, rotating machinery, pumps compressor, generators etc.

The occupational health and safety (OHS) impact can be two ways. OHS can impact the workers while the impacted workers (in the form of sick leave, worker turnover) can have negative impact on the project (decline in productivity).

8. Potential social impacts and mitigation measure to be taken

These are already mentioned in the Construction Phase. Such cases are unlikely to occur during the Operation Phase as all workers are handpicked by the executive members of the factory. Unlike the blue collar construction workers who are employed for short term (one year) the workers in the Operation Phase are permanent workers. It is expected that they are better well-disciplined than the construction workers.

Any way the authority of the factory has to deal with these workers on a long term basis. Measures for creating a peaceful and productive atmosphere should be taken into account.

Impacts on the socio-economic component of the area can be in the form of:

- Continual uses of vehicles moving to and from the sites can impact the safety of people and domestic animals.
- Generation of dust, and noise causing potential disturbance or nuisance to the local people.
- Friction can happen between workers and locals.
- Ill-social behavior of workers or locals can lead to quarrels and brawls among themselves or with locals; theft, misappropriation of materials and money, vandalism, unethical sexual practice or sexual offences, spread of Sexually Transmitted Diseases (STD) and so on (as the site is near two villages and there are other factories and government department in the vicinity). These can have also certain negative impact on the project.

9. Potential security issue and mitigation measure to be put in place

Security issue can be in the form of theft, vandalism and sabotage. This is already mentioned in the Construction Phase. Unlike the hectic nature of works during the Construction the working atmosphere during the Operation Phase is stable.

However, security tends to slacken when fiber cement board factory is going on for several years. So for the long term Operation Phase the plan for security should be more practical. It is expected that the permanent employees hand-picked by the company's authority will not pose any security threat to the mining site. But outsiders, the locals, can at one time or another can cause security issues such as theft and vandalism.

Fiber cement board factory can become soft target for sabotage by terrorists.

10. Positive (beneficial) impacts during the Operation Phase

During the Construction Phase of the major project 120 workers are employed for 1 year. The project will boost the local economy and bring economic benefit to the locals who are involved in extraction/production of building materials – e.g. sand, gravel, bricks. Timber merchants and merchant of construction merchandize – e.g. iron rod, bar, roofing, aluminum sheet, glass panel, cement etc. will be able to promote their sales. Many jobs associated with construction sector will be created.

The food, goods and services needed during the project activities (both Construction and Operation Phase) will be purchased from the local markets. Therefore trade in the area will increase; there will be a significant increase in the economy of the area. In addition, transportation infrastructure for project activities within the area will be improved and this will allow the locals to reach easily to towns and cities. The access road already built by the factory has additionally given rise to a more dynamic social structure; within and across region interaction has been increased; improved social relation has been positively influenced the region.

The agricultural land loss due to project activities constitutes a very small percentage of the agricultural lands (just a few small unproductive farms). All land property damaged or loss has been compensated. There was/is no case of land grabbing, forced eviction and relocation. No one living in the area has lost his/her house, job and social networks because of project activities.

During the Operation Phase of the project 91 staff (including 5 foreigners) jobs will be provided. More workers will be employed when the project progress smoothly. The Sann Shinn & Brothers Co., Ltd commits 2% of its net profit for the effective implementation of CSR programme. (The company has so far spent Kyats 7,500,000 for CSR and community assistance and development at Taung Yinn village. The company will continue to implement more CSR programmes for this area when the project commence).

The company has employed many villagers during the Construction Phase and more will be employed when this proposed factory has materialized.

On national level this proposed project will bring to the country in the form of direct investment of Ks 19,931.31 million.

These investments will contribute to the increase in GDP of the nation. The country will benefit from increase in investment, increase in employment, increase in earning, increase in taxes, duties and revenue etc.

While Sann Shinn & Brothers Co., Ltd will try to mitigate or minimize negative impacts it shall, on the other hand, enhance and maximize the positive impacts to their optimum.

6.2.1.4 During the Decommissioning Phase

At the end of the long Operation Phase (30 plus years) the project will be terminated and decommissioning task will have to be undertaken. The decommissioning task, in brief, includes:

- Isolation of the site and shutdown.
- Dismantling and demolition of the buildings and structures.
- Put up machinery and equipment that is still useable for sale or send to smelting mill as iron scrape.
- Put up old construction materials for sale or disposed of at appropriate dump site.
- Restoration of the ecology of the site.

(In this proposed project context the fiber cement factory can probably be still operational after 30 plus years of operation. Sann Shinn & Brothers Co., Ltd will then decide if the plant will be redeployed or decommissioned.)

The two impacts anticipate and identify during the Decommissioning Phase are:

1) Occupational health and safety issue

As in the case during the Construction Phase the impact such as accidents in work place, due to lack of management and training, can occur. The issues are the same as during the Construction Phase. It should be noted that dismantling and demolition of old buildings post health and safety hazard. This can be prevented and/or mitigated.

2) Potential residual impacts

After 30 plus years of operation the soil can be contaminated by fuel spills or residual chemicals including those that are hazardous. The contaminated soil has to be removed and disposed off to an approved landfill. The last chemical testing may be required. The soil structure/profile has to be restored to its quasi-original condition as practical as possible.

The overall qualitative impact assessment for the Construction Phase and Operation Phase are shown in table.

Table-14: Overall qualitative of impacts assessment during the Construction Phase

Sr. No.	Nature of impacts	Extent	Duration	Level of impact	Intensity	Frequency	Significance	Probability	Remarks
1.	Impact on air environment	Foot print	Short term (Construction Phase only)	Level-1	L	OI	IS	D	Intermittant
2.	Noise and vibration	Foot print	Short term (Construction Phase only)	Level-1	L	OI	IS	D	Intermittant
3.	Impact on land environment	Foot print	Short term (Construction Phase only)	Level-1	L	OI	IS	D	-
4.	Impact on water environment	Under ground water	Short term (Construction Phase only)	Level-1	L	OI	IS	D	-
5.	Impact of waste (construction waste)	Foot print	Short term (Construction Phase only)	Level-3	M	OI	IS-Sg	D	-
6.	Occupational health and safety	Foot print	Short term (Construction Phase only)	Level-2	L	R	IS-Sg	IP	-
7.	Potential social issue	Foot print	Short term (Construction Phase only)	Level-1	L	R	IS	VIP	-
8.	Potential security issues	Foot print	Short term (Construction Phase only)	Level-1	L	R	IS	VIP	-

Note: (1) Situation without mitigation measures; situation will improve if effective mitigation measure taken.

(2) Impact on biodiversity not envisaged as there is no forest or bush to be cleared.

(3) All impacts are temporary (short term) and impacts will cease after construction works.

Table-15: Overall qualitative of impacts assessment during the Operation Phase

Sr. No.	Nature of impacts	Extent	Duration	Level of impact	Intensity	Frequency	Significance	Probability	Remarks
1.	Impact on air environment	Foot print	Long term (during Operation Phase)	Level 3-4	M	O	IS	D	-
2.	Noise and vibration	Foot print	Long term (during Operation Phase)	Level-1	L	O	IS	D	-
3.	Impact on land environment	Foot print	Long term (during Operation Phase)	Level-1	L	OI	IS	D	
4.	Impact on water environment	Under ground water	Long term (during Operation Phase)	Level-2	L-M	OI	IS-Sg	HP	-
5.	Impact of waste (solid and liquid)	Foot print	Long term (during Operation Phase)	Level-3	M	O	Sg	D	-
6.	Potential impact on traffic	On the road	Long term (during Operation Phase)	Level-1	L	S	IS	IP	
7.	Occupational health and safety	Foot print	Long term (during Operation Phase)	Level-2	L	R	IS	IP	-
8.	Potential social issue	Foot print & beyond	Long term (during Operation Phase)	Level-1	L	R	IS	VIP	-
9.	Potential security issues	Foot print	Long term (during Operation Phase)	Level-1	L	R	IS	IP	-

Note: (1) Situation without mitigation measures; situation will improve if effective mitigation measure taken and well-managed.

(2) Impacts can be minimized or at least mitigated.

Explanation

Level of impacts

Level 1 = Very low

Level 2 = Low (can have impact on biodiversity and environment to certain extent)

Level 3 = Medium

Level 4 = High (short duration)

Level 5 = Very high (long duration)

Frequency of impacts

F : Frequently

O : Often

OI : Often (isolated case)

S : Seldom

R : Rarely

Intensity

VH = Very high

H = High

M = Medium

L = Low

Probability

VIP = Very improbable

IP = Improbable

P = Probable

HP = Highly probable

D = Definite

Significance

IS = Insignificant

IS-S = Insignificant to significant

S = Significant

6.2.2 Identification and assessment of natural and industrial hazards relevant to the project

(1) Natural hazards

Earthquake

Myanmar is prone to earthquake. Myanmar's major fault line, the Sagaing Fault line runs from north to south along the entire length of Myanmar down to the Andaman Sea in the south.

The project site is actually on the Sagaing Fault; but there was no known major or medium earthquake in the area within memories of 50 years (from interviews during consultation meeting).

The strong earthquake such as Tachileik (Tar Lay) earthquake 2011, Monywa earthquake 2011, and Shwe Bo earthquake 2012, are not felt here, it is learnt. The recent Mandalay (Tadar-oo) earthquake was not also felt here, it is learnt.

Therefore, the likelihood of major or medium earthquake is quite remote.

The project does not involve the construction of high buildings or structures. The only high structure is the stack, 60 m tall. 3 silos are also relatively tall but can withstand normal tremors and small to medium earthquake.

Cyclone and Storm

The coastal strip of Rhakhine State is prone to strong cyclones and storm.

The cyclone Nargis 2008, Giri 2010, Phailin 2014 and Mora 2017 were strong cyclones. Komen 2015, Diannu 2016, Mearutha 2017 was tropical storms. The effects of these cyclones were not felt at this area. Even the most devastating Nargis cyclone which killed more than 140,000 was not felt here (from interviews); as the area is far away from the coast.

There are no precedent of natural hazards such as land slide, flood and drought and wild fire in the area, it is learnt. The devastating 2015 floods that wreaked havoc to 11 states/regions was not felt here.

Therefore, it can be stated that the likelihood and severity of natural hazards occurring in this project site is not envisaged.

(2) Industrial hazards

Certain large factories/plants that are known to have the likelihood and severity of industrial hazards are:

- Nuclear power plant, explosives manufacturing plant, oil refinery, chemical plant, and to a lesser extent coal fired thermal plant, cement plant, food processing plant, distillery, animal feeds plant etc.

Even in such large plants/factories the likelihood and severity of natural hazards can be diminished if they are well-managed in the first place.

In this cellulose fiber cement factory which is a modern factory fully automated and applying latest technology (as well as ecofriendly) the likelihood of industrial hazards is remote.

First and foremost the authority of this factory will implement the project with environmental awareness always in mind and health and safety will be always the first priority: all mitigation measures to be put in places will be implemented.

To avoid and prevent industrial hazards the factory must be well-managed, well-operated and well-maintained. The company is committed to doing these.

It can be stated that there will be no likelihood and severity of industrial hazard, if the factory is well-operated, well-maintained and well-managed and above all, if all the mitigation measures to be taken are duly taken.

6.2.3 The design, layout, function, management and implementation of appropriate impact and risk mitigation measures

6.2.3.1 Design, layout and functioning

The theoretical aspects of impact and risk assessment and management are depicted in designs and figures:

(a) Risk rating matrix

Actual risk outcome						
		Likelihood				
Consequence		Rare 1	Unlikely 2	Possible (moderate) 3	Likely 4	Almost certain 5
Catastrophic (Extreme) 5	5	10	15	20	25	
Major (High) 4	4	8	12	16	20	
Moderate (Medium) 3	3	6	9	12	15	
Minor (Low) 2	2	4	6	8	10	
Negligible 1	1	2	3	4	5	

- Red: avoid, control, mitigate;
- Yellow and orange: control, mitigate;
- Green: accept/assume

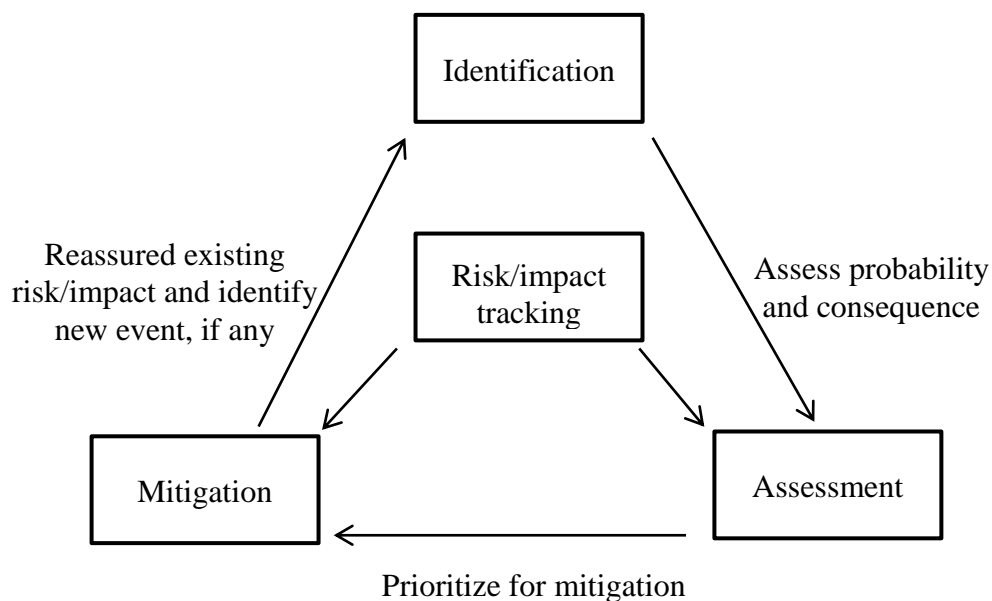
Actual risk outcomes are categorized into 4 levels:

- Low - (Scoring 1-3)
- Moderate - (Scoring 4-6)
- High - (Scoring 8-12)
- Extreme - (Scoring 15-25)

Note: - Consequence x Likelihood = actual outcome

Note: - This simple, pragmatic and straight forward matrix method is selected for assessment of impact and risk. Moderation is undertaken applying Experts Consequences Method (Ad hoc method). (From Internet).

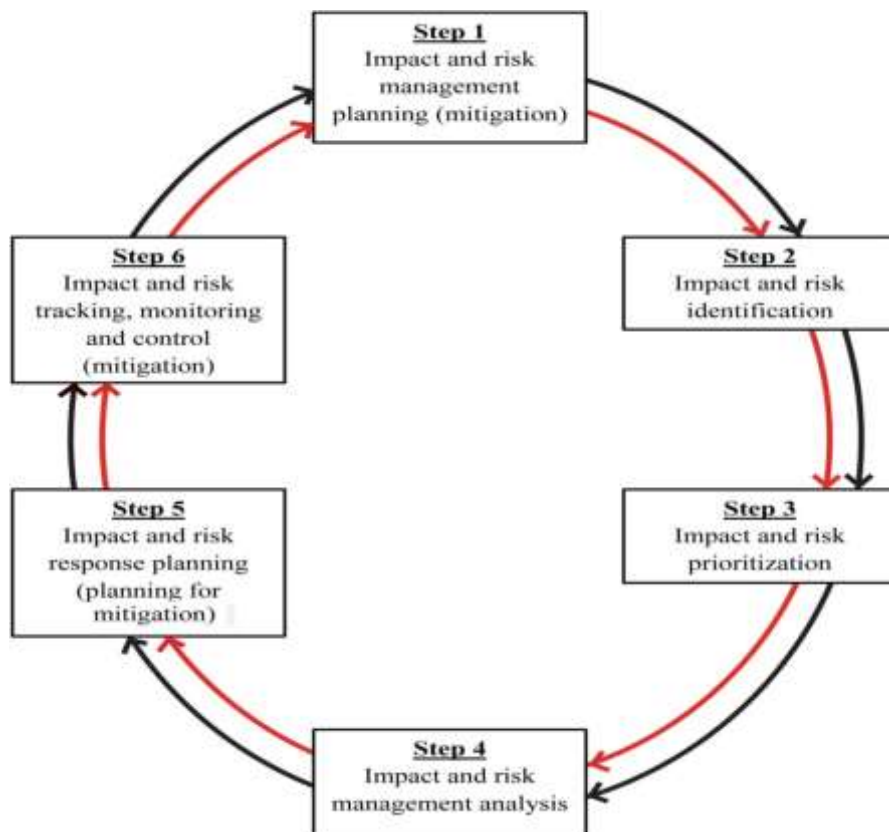
(b) Risk and impact management (3 fundamental steps)



(From Internet)

(c) Impact and risk management methodology

(From Currie and Brown-2017)



Risk and impact assessment and outcome

During the Construction Phase

Sr. No	Impact	Likelihood	Consequence	Outcome	Mitigation/mitigable	Expected outcome after mitigation
1	Impact on air environment	5	2	10 high	mitigable	low
2	Noise and vibration	5	2	10 high	mitigable	low
3	Impact on land environment	5	2	10 high	mitigable	low
4	Impact on water environment (ground water)	2	1	2 low	mitigable	low
5	Impact on waste (construction waste)	5	4	20 extreme	mitigable	low

6	Occupational health and safety issue	1	2	2 low	mitigable	low
7	Potential social issue	1	2	2 low	mitigable	low
8	Potential security issue	2	3	6 moderate	mitigable	low

Note – All impact are of short duration (only during Construction Phase). Extent of impact will be within the foot print of the project site and sometime, near vicinity. Social issue and traffic issue can be beyond the foot print. Social issue is unpredictable.

- Positive impacts are simply narrated in the report text.

During the Operation Phase

Sr. No	Impact	Likelihood	Consequence	Out come	Mitigation/mitigable	Expected outcome after mitigation
1	Impact on air environment	5	3	15 extreme	mitigable	low
2	Noise and vibration	5	2	10 high	mitigable	low
3	Impact on land environment	3	2	6 moderate	mitigable	low
4	Impact on water environment (ground water)	3	1	3 low	mitigable	low
5	Impact of waste (solid and liquid)	4	2	8 high	mitigable	low
6	Potential impact on traffic	3	1	3 low	mitigable	low
7	Occupational health and safety issue	1	3	3 low	mitigable	low
8	Potential social issue	1	1	1 low	mitigable	low
9	Potential security issue	1	2	2 low	mitigable	low

Note – All impact are long duration (during the long Operation Phase) within site and sometime, near vicinity. Social issue and traffic issue can be beyond the foot print. Potential social and security issue are unpredictable visual impact will be irreversible.

- Positive impacts are simply narrated in the report text.

During the Decommissioning Phase

Sr. No	Impact	Likelihood	Consequence	Out come	Mitigation/mitigable	Expected outcome after mitigation
1	Potential occupational health and safety issue	1	3	3 low	mitigable	low
2	Potential residual impacts	2	2	4 moderate	mitigable	low

Note – The impacts will be short-lived (during short Decommissioning Phase). All are easily mitigable.

6.2.3.2 Management and implementation of appropriate impact and risk mitigation measure

Management and implementation of appropriate impact and risk mitigation measures for Preconstruction Phase, Construction Phase, Operation Phase and Decommissioning Phase are summarized in tabulated forms.

Table-16: Mitigation measures to be taken during the Preconstruction Phase (outline in tabulated forms)

Sr. No.	Impacts	Mitigation measures
1.	Potential hiking of price of land and property	- Early public meeting and consultation. - Staff shall not get involved themselves in speculative business. (inflation is a common phenomenon and shall not be considered a serious issue)
2.	Potential polarization of the local community into pro-project and anti-project groups due to instigation by activists.	- Early public meetings and consultations. - Prioritize hiring locals over hiring personnel from beyond. (no quick fix solution for this potential impact)

Table-17: Mitigation measures to be taken during the Construction Phase (outline in tabulated form)

Sr. No.	Impacts	Mitigation measures
1.	Impact on air environment	<ul style="list-style-type: none"> - Draw up a plan for air quality management to meet statutory requirement (NEQEG guideline values prescribed by ECD). - Plan in the Pre-construction Phase for the procurement of equipment, vehicles that emit less smoke (to be certified for emission compliance). - Keep equipment and vehicles well-maintained. - Use fuel with low emission rate. - Avoid open burning of debris. - Do not clear vegetation more than necessary. - Spray water for suppression of dust - Restrict vehicular movement; maintain road clear of mud and dirt. - Limit open stockpile of earth, sand etc - Minimize drop height during loading and unloading of earth, sand or lime. - Provide PPE to workers who are exposed to smoke or dust for long period. - The local community should be able to file complaints regarding dust and smoke.
2.	Noise and vibration	<ul style="list-style-type: none"> - Plan in the Pre-construction Phase for procurement of equipment, and vehicles that emit lower noise level. - Plan for noise management, to meet statutory requirement (rules, regulations, NEQEG guideline values prescribed by ECD). - Install silencers and mufflers, where possible. - Switch off or throttle down equipment during idle period - Avoid construction work at night. - Schedule high noise activity only during day time hours. - Provide PPE to workers exposed to prolonged high noise level. - Manage vibration of machine, equipment and vehicle - If possible install vibration absorbers - Design for stable foundation, even for temporary purpose. - Limit the speed of vehicles. - The local community should be able to file complaints regarding noise and vibration.

3.	Impact on land environment	<ul style="list-style-type: none"> - Avoid, prevent the contamination of land by all means. - Avoid discriminate dumping of solid and liquid waste on ground. - Draw up a plan for management of soil. - Try to avoid potential destruction of soil profile. - Draw up a plan for prevention and mitigation of contamination of soil. - Manage to meet statutory requirement (rules, regulations, Municipal Act). - Prevent spill of fuel oil and chemicals; clean up spill with absorbent promptly (do not wash down with water). - Properly instruct workers with respect to handling of fuel and chemical and cleanup of spills. - Bund fuel or chemical depot to prevent spreading of spill. - Display warning signs; identify high risk spill area (generator, fuel tank). - Implement soil conservation techniques to prevent soil erosion (during rainy season). - Prevent wash water from carrying earth and materials into drainage system. - Resurface and stabilize the exposed ground surface after earth work. - The ground should not be laid bare for long period during the rainy season. - Dispose all waste materials (from construction work and from domestic use) at approved landfill. - Train workers for good housekeeping; do not litter; do not dirty your place. - The local community should be able to file complaints if their lands are impacted.
4.	Impact on water environment (ground water)	<ul style="list-style-type: none"> - Plan and manage to prevent the pollution of ground water. - Do not use water more than necessary during the Construction Phase. - Discipline workers for the conservation of water. - Monitor the daily use of water for construction. - Avoid the spillage of fuel oil which will contaminate the soil and eventually ground water. - If there is spillage clean up spill with absorbent promptly (do not wash down with water). - Properly train workers with respect to handling of fuel oil and cleanup of accidental spill. - Adequately maintain vehicles and machinery to prevent spillage resulting to ground water contamination. - Bund fuel depot to prevent spreading of fuel oil - Display warning signs; identify high spill areas (generator, fuel tank etc).

		<ul style="list-style-type: none"> - Avoid indiscriminating disposing of waste (solids and liquids). - The local community should be able to file complaint, if there is any impact on their drinking water.
5.	Impact of waste (construction waste)	<ul style="list-style-type: none"> - Plan and execute the management of waste especially construction tailings. - Comply with rules and regulations - Avoid open burning of debris - Dump waste at approved landfills (city landfill) - Educate and train workers for good housekeeping - Put up left over construction materials for sale - Hire a contractor for tidying up the site after completion of construction work - Ensure that no left over material or residual waste remain after the construction work
6.	Occupational health and safety	<ul style="list-style-type: none"> - Plan and manage for zero accident. - Set up "Safety First" sign boards at places where workers can see easily. - Create safety condition for all workers; create accidents free environment. - Educate, train and supervise construction workers for good working practice, good engineering practice, good safety practice and good housekeeping practice so that these good practices will be ingrained in each and every worker's mind. - Try to meet all statutory requirement for safety construction (rules, regulation, labour Act). - Provide adequate Personal Protection Equipment (PPE) where necessary. - Keep first aid kits well-stocked with medicine and drugs. - Accidents or near-missed to be duly reported. - Prohibit the drinking of alcohol during working hours; ban the use of narcotics among workers. - Plan and manage for effective emergency response. - Cover the whole structure during the Construction Phase with nylon lace or netting to prevent accidental falling of debris and tools etc (a common engineering practice implement in construction work). - Educate and train workers for health education and hygiene - Train a few for First Aid Training and some for Fire Fighting - Organize mock drills; keep the firefighting ponds, always full of water at the nearby

		<ul style="list-style-type: none"> - Installation of lightning rods and arresters to avoid or prevent lightning strikes - Apply safe and effective procedure for storage and handling of fuel and chemicals - Provide proper sanitary facility eg. toilets, bathrooms - Accidents and near miss to be duly reported - Display addresses/phone numbers of Fire Brigade, worker can see easily - Take out insurance for the shopping complex and also fire insurance.
7.	Potential social issue	<ul style="list-style-type: none"> - Draw up a plan for management of social illness and anti-social behavior. - Educate and train workers on discipline and code of conduct. - Try to build good relation with the locals. - Conduct public consultation so that the locals will have a positive perception on the project. - Educate the workers for appropriate behavior when dealing with locals; to respect their culture and tradition. - Apply punitive measures such as suspension of the wrong doer. - Strictly prohibit the drinking of alcohol during working hours; ban the use of narcotics and stimulants. - Deal with workers on a fair and square basis. - Avoid unhealthy relationship with workers; they should not be over worked and underpaid. - Maintain the good relation between the company and the locals.
8.	Potential security issue	<ul style="list-style-type: none"> - Draw up a plan and implement security management Fencing or walling of the factory compound; prevent theft and vandalism by all means. - Control all access gates; deploy security personals gate full time. - Keep materials under lock and key where possible. - Do not let the employees freely mingle with the locals – (also do not let employees entering nearby village preauthorization from the company.) - Ask the construction contractor to discipline his workers. - Take punitive measures (suspension or termination of employment) for wrong doer. - Ensure that the factory does not become soft target for terrorists.

Table-18: Mitigation measures to be taken during the Operation Phase

Sr. No.	Impacts	Mitigation measures
1.	Impact on air environment	<ul style="list-style-type: none"> - Comply with NEQEG guideline for emission - Procure ecofriendly machinery and equipment that generate less smoke – (equipment with air emission specification/equipment that are brand new). - Ensure that the height of the stack is up to standard (the stack height will be 60 m). - Ensure for complete combustion of coal to reduce emission; if possible use coal will low sulphur content. - Apply bag filter, dust collector; also install air compressor filters. - Install water sprinkler system between boiler (combustion chamber, furnace) and the stack to mitigate PM and also NO₂, SO₂, CO₂ and CO (which react with and dissolve in water and settle down together with PM/down ash). - Minimize gas emission by proper training, operation and maintenance of machinery and vehicles. - Regularly check all machinery vehicle well-operate, well-maintained, well-lubricant machinery reduce smoke emission. - If possible, use fuel with low sulphur content. - Always avoid open burning of trash and debris - Regularly spray water for dust suppression (water spraying can reduce 75% emission). - Restrict vehicular movement, set up speed limit (speed reduction from 30 km/hr to 15 km/hr will reduce 50% of dust emission). - Prevent spillage of sand, cement, and lime powder during transportation; cover with tarpaulin. - Regularly clean road surface. - Minimize dust emission at sand, cement, preparation section, sherry preparation. - Also minimize dust emission at stacking, smoothing sanding and edging of the boards. - Provide adequate PPE (face masks, nose and mouth covers) where necessary.

		<ul style="list-style-type: none"> - Control smoke and dust biologically (plant fast growing trees inside the compound; trees are efficient dust trappers and controllers; they also sequesterate CO₂ and produce O₂). - The local community should be able to file complaint regarding smoke and dust; heed to their complaint.
2.	Noise and vibration	<ul style="list-style-type: none"> - Comply with NEQEG guidelines. - Procure machinery/equipment that are brand new and ecofriendly that emit lower noise level. - Keep equipment/machinery well-operated, well-maintained and well-lubricated (can reduce noise level by more than 50%). - If possible install mufflers or silencers at air inlet/outlet of the fan and air compressor to reduce noise. - If necessary install noise containment/sound insulation for noisy machinery. - Limit the speed of truck and heavy machinery to reduce noise and vibration; ensure that the road surface is smooth to reduce vibration. - Install insulator or shock absorber, if possible, to mitigate vibration. - Design for stable foundation in the first place for machinery that vibrates. - Plant fast growing trees; create green belt to abate noise for the environment (trees act is noise pollution sink). - Provide PPE (ear muffs, ear protections) where necessary. - The local community should be able to file complaints regarding high noise level; heed to their complaints.
3.	Impact of land environment	<ul style="list-style-type: none"> - Avoid prevent by all means that will cause land pollution. - Ensure that the activities at the factory do not cause land pollution. - Educate, train and supervise workers for good working practice and good housekeeping practice until these practices have ingrained in their mind set and become good habit, (do not litter, do not dirty your place). - Systematic storage and handling of raw materials – sand, cement, soft wood pulp, lime etc. is imperative. - Ensure that activities at quartz sand section, pulp section, slurry preparation section do not result in land

		<p>contamination (tidy up the work place after activities stop) or after each batching.</p> <ul style="list-style-type: none"> - Ensure that industrial and domestic wastes (both solid and liquid) are systematic collected and disposed (at the landfill approved by the authority). - Avoid spillage of fuel on the ground (should spillage occur do not wash down with water but immediately removed using absorbent – e.g. rags, saw dust). - Prevent erosion and sedimentation by all means (network of sound drainage system is imperative). - Minimize the area of bare soil exposed as practical as possible.
4.	Impact on water environment (ground water)	<ul style="list-style-type: none"> - Ensure that the use of water for the manufacturing of cellulose fiber cement board do not have adverse impact on ground water, especially the quantity of ground water. - The use of water should be within the stated work frames (not more than 60 tons/day) - Monitor the consumption of water daily or weekly. - Educated and train workers for conservation of water or if possible minimization of water uses. - Recirculate and reuse water as much as possible (there are two large tanks for clean and recycled water). - Avoid spillage of fuel oil or chemical on ground which will eventually percolate to ground water (immediately remove all accidents oil spill). - Ensure that accidental spill or leak from fuel oil depot do not eventually impact ground water (seal the ground floor and bund the fuel depot to prevent spreading of fuel oil). - Educate and train workers for systematic storage, handling and uses of fuel oils. - Adequate maintain machinery and vehicles to prevent spillage, resulting to ground water contamination. - Display warning signs; identify potential high spill areas (fuel depot, generators).
5.	Impact of waste (solid and liquid)	<p><u>Solid wastes</u></p> <ul style="list-style-type: none"> - Install bag filter, dust collector to systematic collect combustion residuals (fly ash, down ash) from boiler unit and dispose at the landfill; reuse some fly ash, or give away to cement brick manufacturer.

		<ul style="list-style-type: none"> - Also install dust collector inside the factory (at stacking, de-stacking unit). - Reuse the rejects, (wet slab) resulting from water jet cutting of wet fiber cement boards (there is a waste materials recycle system). - Collect the reject (destroyed boards) and reuse them. - Systematically collect dust and small bits and pieces of board resulting from smoothing, sanding, edging and chamfering activities. - Industrial solid waste in the form of packing materials (cement bags, packing materials for imported pulp, and all other packing materials) that are generated from time to time to be reused or given away to locals or discard at land fill. - Avoid open burning of these wastes. - Collect domestic solid waste in at least two kinds of bins (recyclable and non-recyclable); reuse or put up for sale the recyclable one while discard the non-recyclable one at the landfill. - Make organic waste (kitchen waste) into compost for greening. <p><u>Liquid waste</u></p> <ul style="list-style-type: none"> - Construct sound drainage network in the first place. - Educate and train workers for conservation of water; water consumption should be within the stated work frame (60 tons/day). - Treat raw water before use; apply conventional sand and carbon filter, and water softness. - Recycle the used water/processed water for reuse applying circulating water vacuum pump; (the factory have two large clean and recycled water tanks). - Drain ash water into collector pond and later manually discard. - Apply defoaming agent to tackle foam issue. - Set up a flocculants system to tackle the suspended particles issue; - Collect slurry discharge from flow on sheet making machine into hopper and discharge at drainages system.
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		<ul style="list-style-type: none"> - Remove oil and grease (the factory has cleaning and oiling section to do this). - No special waste water/used water treatment in the Operation Phase. - As regards domestic waste water from kitchen, messing hall and bath will flow into the drain and end up in waste water sink, west of the factory. - Sanitary water from toilet will end up in septic tank and soak pit.
6.	Potential impact on traffic	<ul style="list-style-type: none"> - The factory has only 5 office vehicles but trucks have to be hired for transportation of raw materials and finished products; educate all drivers not to cause traffic congestion by any means. - Draw up a traffic management plan. - Schedule the logistics; avoid rush hours; if possible avoid road with heavy traffic. - Educate drivers, staffs (motorists and motorcyclists) for defensive driving; drive at reduced speed. - Most of all educate them for observing strict traffic rules. - Set up signage at the intersection of the factory and access road and Bellin-Ye-ywar Road, e.g.- speed limits, warning signs, etc. - Avoid overloading of truck, or any vehicles. - Regular maintenance of cars and motor bikes. - Deploy traffic control staffs at the entrance of the factory and at the parking area; systematically control the parking area. - Provide enough parking spaces for all cars (the company has enough parking lot for many cars). - Local community should be able to file complaints regarding traffic issue.
7.	Occupational health and safety	<ul style="list-style-type: none"> - Plan and manage for a safe and healthy atmosphere inside the factory. - Create a safety work place and try to achieve zero accidents at the work place. - Comply with Factory Acts 1974; Boiler Law, 2015; Myanmar Labour Law, 2016; the Social Security Law, 2012 and Workmen's Compensation Act, 1923. - Comply with NEQEG guideline for emission and noise level, by ECD (Already mentioned in Chapter-3).

		<ul style="list-style-type: none"> - Educate train and supervize workers for good working practice, good safety practice, good house-keeping practice and good health and hygiene practice until all these practices are ingrained in their mindsets and become good habits. - Especially educate, train and supervize them for skill, for handling and operation of equipment, handling and application of chemicals. - Educate and train them for environmental awareness and OHS hazards. - Keep all machinery and equipment well-maintained, well-operated and well-lubricated (regular check necessary). - Provide adequate PPEs eg. outfit, boots, helmet, gloves, face mask, goggles, ear muff etc where necessary. - Beware of all the common accidents that used to happen and implement prevention, protection and mitigation measures. - Carefully plan for emergency procedure including life saving and rescue operations. - Organize first aid training and firefighting training for some workers. - Provide adequate First Aid Kits well-stocked with medicines and drugs. - Provide adequate Fire Extinguisher, firefighting equipment and other associated device; keep water tank always full for firefighting. - Provide relevant PPEs where necessary (boots, helmet, gloves, outfit, face mask, ear muffs etc.) - For emergency response organize mock drill and rehearsal from time to time. - Phone numbers and addresses of Red Cross Society, Ambulance Service, Fire Brigade, Police Station, and Sint-kaing Hospital must be displayed so that everyone can see easily. - Give treatment to sick or injured workers with First Aid Treatment; immediately admit to Sint Kaing Township Hospital or Kyaukse District Hospital for serious sickness or injury. - Take out insurance for the factory; and also take out fire insurance
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8.	Potential social issue	<ul style="list-style-type: none"> - Prevent or minimize negative impact on socio-economic life of the local. - Build and maintain good relation with locals. - Appoint an affable staff as a liaison officer of the company to deal with the local in an affable manner. - Hold public consultation from time to time. - Educate the workers for etiquette, and respect the custom and tradition of the locals, - Manage misbehaviors and social illness of workers. - Keep separate housing for male, female workers and family line - Provide proper training on work place regulation and code of conducts. - Provide welfare programme (The company has a good programme). - Educate and discipline workers for conducts. - Deal with workers on a fair and square basis; not to overwork and underpaid; need to overtime works, if any, and duly pay them. - Take punitive action on wrong doer, eg sacking, dismissal. - Prohibit the drinking of alcohol during working hours; ban the use of narcotics. - Prohibit all kinds of quarrels and brawls taking place among workers or between works and locals. - Prohibit all kinds of unethical sexual practices. - Consider for gender parity; employ women workers as much as possible. - Ensure that there is no issue of child labour as far as the project is concerned. - Heed to the voice of the locals, their view, and concern, if any.
9.	Potential security issue	<ul style="list-style-type: none"> - Manage security of the site. - Effective fencing/walling of the site. - Control all accesses; set up security gates; deploys guards. - Do not let workers mingle freely with locals. - Do not let the workers enter the neighbouring village without pre-authorization. - Put certain materials under lock and key. - Apply punitive measures to wrong doer. - Provide ID cards for all for easy identification. - Provide uniform for all.

Table-19: Mitigation measures to be taken during the Decommissioning Phase

Sr No.	Impacts	Mitigation measures (if decommissioning has to be undertaken)
1.	Potential occupational health and safety issue	<ul style="list-style-type: none"> - Plan and manage for safe and effective decommissioning. - Hire a decommissioning contractor and party for the demolition of the building, dismantling of equipment and tidying up the site. - Reuse or put up for sale some materials that are still usable and saleable. - Dispose those that are no longer usable. - Send old obsolete machinery and equipment to smelting mill. - Remove all contaminated soil, if any. - Test the condition of the soil for the last time. - Also test the quality of air and water for the last time. - Level the ground, plant trees and commence rehabilitation work and restore the site to its original condition.
2.	Potential residuals impact	<ul style="list-style-type: none"> - Plan and manage for effective removal and clearing of all residuals, if any. - Remove and dispose contaminated soil and water. - Ensure that all contaminated are removed and cleared. - Conduct final chemical testing of soil. - Restore the soil to its natural condition as far as possible - Ensure that the ecology of the site is restored to its quasi-original condition. - Ensure that in the aftermath of the project the site is safe for the local people; that the air, land and ground water are not polluted.

6.2.4 Characterization and assessment of any residual impacts and risks and comparison with applicable regulations, standards and guidelines

Residual impacts are not envisaged in this cellulose fiber cement boards factory as all kinds of waste will be controlled and managed in time. No wastes will be left unmanaged to become residue in the site and surrounding area.

Accidental fuel oil spills that will contaminate the soil and thence ground water will be immediately removed (not by washing down with water but by applying absorbent – e.g. rug, cement dust etc.) and therefore, no residual of oil will remain.

In the same way combustion residues such as fly ash, down ash, slag will be all removed in time and there will be no chances of residues remain.

There will be no discriminate dumping of soil and liquid wastes on ground that can leave residues on ground, (there is no water course or water body in the vicinity and therefore indiscriminate dumping of solid and liquid waste into the water environment is not an issue).

During the Construction Phase

During the Construction Phase large quantity of construction tailings and debris will be generated but there will be no issue of residual impact as all the debris will be removed and cleared after completion of construction.

There can be certain spills of chemical product, such as emulsion paint, varnished, sprays, epoxy resin, adhesives etc during the finishing works of construction. Such spill will be cleared after each working session; there will be no residual impact.

During the Operation Phase

During the long Operation Phase relatively large quantity of combustion residues (fly ash, down ash, slag etc.) are generated daily. As these will be managed (collect, remove, dispose) in time and no residues will remain. Fugitive dust will be generated from sand, cement, paper pulp preparation section (batching section) but after each activity dust falling on the work place will be swept clean.

There will be spill of water and slurry along the flow on sheet making machine but this will be managed; there is slurry and water discharge system with hopper to collect spill slurry for later disposal.

The wet sheet (slab) is cut with powerful water jet and large quantities of off cuts are produced; but all are reused, and nothing has to be discarded.

The procuring and autoclaving involve the use of hot steam but no residue remains there. The condensed water from autoclave is reused.

Dust and small bits and pieces of fiber cement board are generated from smoothing, sanding, edging and chamfering activities but these are systematically collected and disposed.

In short, no residues will remain from these various activities during the manufacturing of cellulose fiber cement boards.

There can be certain small oil spills at the car park, at pump house, compressor house, engine house etc. but these will be remediated immediately (the use of absorbent rather than washing down with water to prevent the small spills percolating into underground water). Accidental oil spills on the whole will be minor ones.

It is probable that pesticides, herbicides, insecticides and rodenticides may be used from time to time but always, in very small quantity. This can be easily mitigated. There can be no residual impact of these chemicals, as only small quantity will be used and only for very short periods, only on rare occasions.

During the Decommissioning

After the long Operation Phase the decommissioning process will have to be effectively implemented. Everything that remained of the fiber cement board factory has to be cleared; the soil if contaminated by fuel oils or chemicals will have to be removed and disposed at an approved landfill.

Sann Shinn & Brothers Co., Ltd believes that there is no residual impact (s) to remain during or after the project. The company also believes that all the mitigation measures prescribed earlier can mitigate or remediate all the negative impacts mentioned earlier.

Therefore, no substantial residual impacts are anticipated during the whole life of the project, from the Preconstruction Phase to the Decommissioning Phase.

However, in case there is any residual left the soil will be removed and disposed of at an approved landfill. After that the soil will be tested for the last time to ensure that there is no residual left. The general guidelines for the removal of residuals and the hence the guidelines for decommissioning are:

Towards sustainable decommissioning [sitercourse.worldbank.org>resources](http://sitercourse.worldbank.org/resources)

Decommissioning process guide [http://its.edu>...>archive](http://its.edu/...>archive)

Decommission phase procedures HUD <http://www.hud.gov>

The company will ask the decommission contractor to follow the guideline as far as possible.

During the Decommissioning Phase the air and water quality will be tested for the last time and compared with the NEQEG guideline values prescribed by ECD; every possible thing will be done to ensure that the values are within the guideline values. The soil will be tested for the last time to ensure that there is no soil pollution or soil contamination.

6.2.5 Comprehensive monitoring plan

Monitoring of physical, biological and social environments is of paramount importance for the successful implementation of a project.

First of all the working environment will be monitored for occupational hazards. But virtually all activities taken places at a project site need to be monitored for effective and successful implementation of the project.

Monitoring Plan (MP) is an essential tool for ensuring that mitigation measures for each and every negative impact is undertaken effectively throughout the life of the project. It is also an essential tool for ensuring that the positive (beneficial) impacts are enhanced, or CSR programme are effectively and meaningfully implemented. Monitoring will be planned, designed and implemented by professionals or specially trained personals e.g. EMP cell.

Monitoring Plan (MP) is actually an integral part of Environmental Management Plan (EMP); these two are the different sides of the same coin.

Monitoring Plans for Construction, Operation and Decommissioning Phases of the project are shown in tabulated forms.

Table – 20: Summary of monitoring programme for Construction Phase in tabulated form (the pragmatic approach)

Sr. No.	Components	Parameters to be monitored	Monitoring place/spot	Frequency	Responsible persons	Cost (once off cost)
1.	Air environment/ air emission	- monitor ambient air - monitor all the parameter for emission shown in the NEQ emission guideline values prescribed by ECD (Already depicted in Chapter-3)	Inside the compound (construction site)	Once during construction phase	Hired technicians	Ks 1,000,000
2.	Noise and vibration	- monitor the noise level for comparison with the NEQEG noise level values prescribed by ECD (Already depicted in Chapter-3)	Inside the compound (construction site)	Once during construction phase	Hired technicians	Ks 200,000
3.	Water environment/ effluent	- monitor all the parameters for the effluent shown in the NEQ effluent level values prescribed by ECD for construction phase (Already depicted in Chapter-3)	Inside the compound (construction site)	Once during construction phase	Hired technicians	Ks 100,000
4.	Contamination of soil and ground water	- monitor spillage of fuel oil, grease, chemical, etc, if any	Inside the compound (construction site)	Weekly	EMP cell members	Free of charges
5.	Erosion and siltation	- monitor earth work and drainage system	Inside the compound (construction site)	Weekly (especially during rainy season)	EMP cell members	Free of charges

6.	Solid waste (construction failing, debris)	- monitor type, amount generated reused, recycled, and disposed of	Inside the compound (construction site)	Weekly	EMP cell members	Free of charges
7.	Plan for prevention of fire outbreak	- monitor the plan and the readiness for prevention of fire - monitor the stock piling of building materials that can easily catch fire	Inside the compound (construction site)	Weekly	EMP cell members	Free of charges

Table – 21: Summary of monitoring programme for Operation Phase (tabulated form)

(a) The pragmatic approach

Sr. No.	Components	Parameters to be monitored	Monitoring place/spot	Frequency	Responsible persons	Costs (once off cost)
1.	Air quality	- monitor all the parameters for air quality for comparison with NEQEG emission guideline values prescribed by ECD Code no.1.1 (PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , VOC)	Project site: N 21° 40' 25.79", E 96° 8' 21.84" Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78" Bellin Village: N 21°40'23.82", E 96° 7'40.34"	- Every six months	- Hired technicians	- Ks 3,000,000

2.	Effluent	- monitor all the parameters for effluent for comparison with NEQEG effluent guideline values prescribed by ECD Code no. 1.2 (BOD, Ammonia, Arsenic, Cadmium, COD, Chlorine, Chromium, Copper, Cyanide, Fluoride, Iron, Lead, Mercury, Nickel, Oil and grease, P ^H , Sulphide, Temperature, Total Coliforms bacteria, Total phosphorus, TSS, Zinc)	N 21°40'27.88", E 96° 8'23.60"	- Every six months	- Hired technicians	- Ks 300,000
3.	Underground water	- monitor all the parameters for myanmar drinking water standards prescribed by OEHD (total coliforms, taste, odor, color, turbidity, arsenic, lead, nitrate, manganese, chloride, hardness, iron, pH, sulphate, total dissolved solids)	Project site: N 21° 40' 21.51", E 96° 8' 22.06" Taung Yinn Village: N 21°40'16.43", E 96° 7'59.40" Bellin Village: N 21°40'23.26", E 96° 7'39.34"	- Every six months	- Hired technicians	- Ks 600,000
4.	Soil	- monitor all the parameters (P ^H , Texture, Moisture, Nitrogen)	Project site: N 21° 40' 23.30", E 96° 8' 21.20" Taung Yinn Village: N 21°40'16.01", E 96° 7'58.79" Bellin Village: N 21°40'23.75", E 96° 7'38.91"	- Every six months	- Hired technicians	- Ks 150,000

5.	Noise and vibration	<ul style="list-style-type: none"> - monitor the noise level for comparison with the NEQEG noise level values prescribed by ECD Code no. 1.3. - monitor the wearing of PPE 	<p>Project site: N 21° 40' 25.79", E 96° 8' 21.84"</p> <p>Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78"</p> <ul style="list-style-type: none"> - Bellin Village: - N 21°40'23.82", - E 96° 7'40.34" - At work place near noisy machine 	<ul style="list-style-type: none"> - Quarterly - From time to time 	<ul style="list-style-type: none"> - Hired technicians - EMP cell members 	<ul style="list-style-type: none"> - Ks 300,000 - Free of charge
6.	Solid waste	<ul style="list-style-type: none"> - monitor the packing materials collection and disposal - monitor trash/garbage generated, collection and disposal 	<p>N 21° 40' 21.03", E 96° 8'24.56"</p> <p>N 21°40'22.40", E 96° 8'18.87"</p>	<ul style="list-style-type: none"> - Daily - Weekly 	<ul style="list-style-type: none"> - EMP cell members - EMP cell members 	<ul style="list-style-type: none"> - Free of charge - Free of charge
7.	Waste water	<ul style="list-style-type: none"> - monitor the management of domestic waste water 	<p>N 21°40'22.62", E 96° 8'18.66"</p>	<ul style="list-style-type: none"> - Daily 	<ul style="list-style-type: none"> - EMP cell members 	<ul style="list-style-type: none"> - Free of charge

(b) The generalized monitoring of other parameters (practiced in many countries)

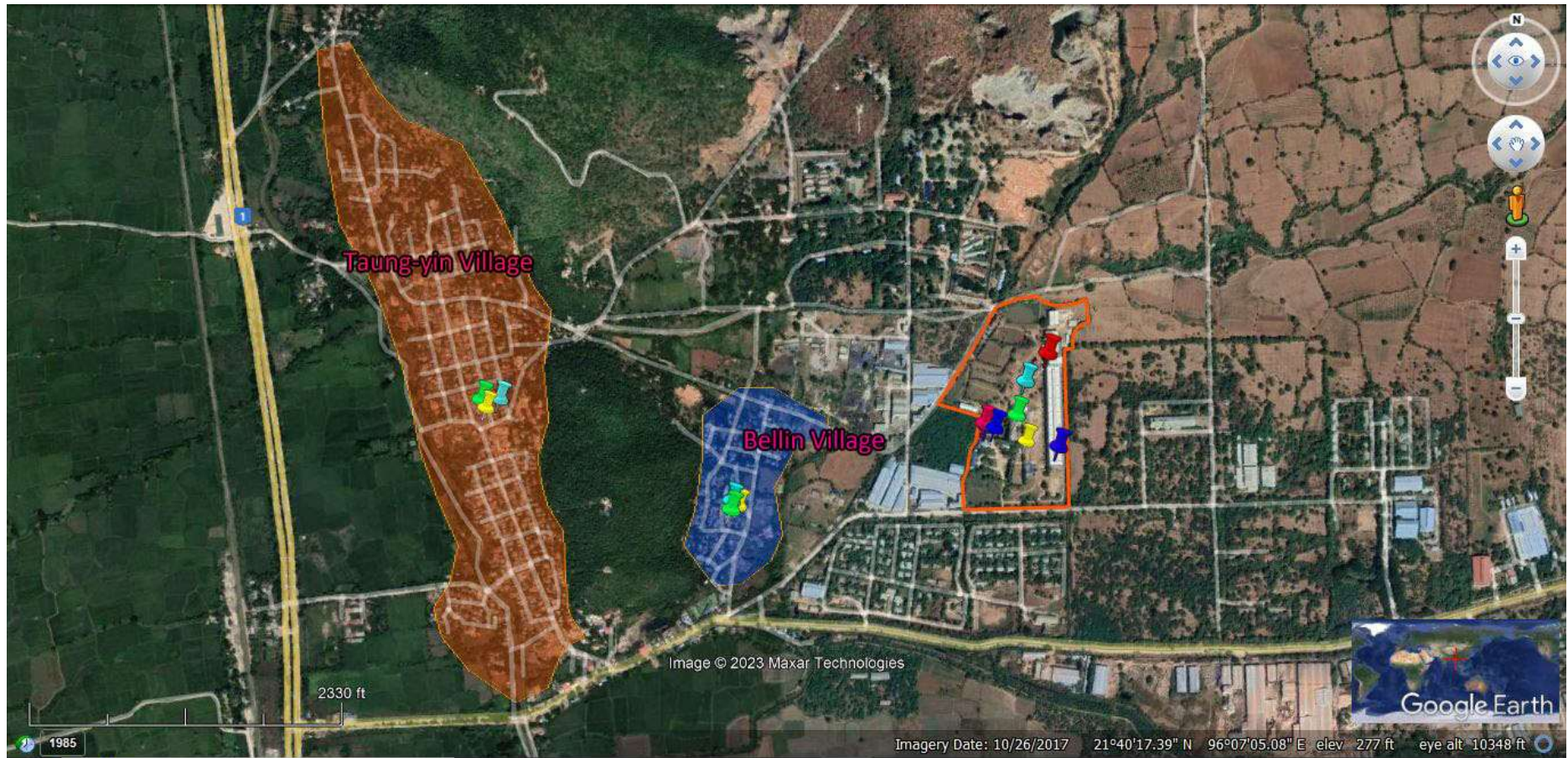
Sr. No.	Components	Parameters to be monitored	Monitoring place/spot	Frequency	Responsible persons	Remarks
1.	Weather	- monitor weather	- At the site	- Daily	- EMP cell members	- Free of charge
		- listen to weather news, fore cast	- At the site	- Daily	- EMP cell members	- Free of charge
2.	Daily activities at work places	- monitor daily activities of workers at work places	- Inside the factory and also the factory compound	- Daily	- EMP cell members	- Free of charge
3.	Water consumption	- monitor water consumption	- Inside the factory and also the factory compound	- Daily	- EMP cell members	- Free of charge
4.	Fuel consumption	- monitor fuel oil purchased, used, used oil generated, oil waste	- Inside the factory and also the factory compound	- Monthly	- EMP cell members	- Free of charge
5.	Monitor electricity consumption	- monitor electricity consumption	- Inside the factory and also the factory compound	- Weekly	- EMP cell members	- Free of charge
6.	Routine operation of machinery equipment, etc	- monitor operation hours of machinery and equipment	Inside the factory and also the factory compound	- Daily	- EMP cell members	- Free of charge
		- monitor distance travel of vehicles	- Every car	- Weekly	- EMP cell members	- Free of charge
		- monitor log books	- Every log book	- Weekly	- EMP cell members	- Free of charge
7.	Occupational health and safety measures and emergency measures	- monitor OHS measures taken	- At the work place	- Weekly	- EMP cell members	- Free of charge
		- inspect facilities for emergency preparedness	- At the work place	- Monthly	- EMP cell members	- Free of charge
		- monitor training (fire fighting and first aid) and drill	- At the f work place	- From time to time	- EMP cell members	- Free of charge
8.	Social illness, ill social behavior	- check disciplinary action taken	- At the work place	- Occasionally	- EMP cell members	- Free of charge
		- monitor conducts of workers	- At the work place	- Occasionally	- EMP cell members	- Free of charge
9.	Security	- monitor performance of security staffs	- At the site	- Monthly	- EMP cell members	- Free of charge

10.	Capacity building	- monitor effectiveness of capacity building programme and other trainings	- At the site	- From time to time	- EMP cell members	- Free of charge
11.	Compliance with regulation	- monitor all main activities to ensure compliance with legal requirements and corporate commitment	- At the site	- Monthly	- EMP cell members	- Free of charge
12.	Effectiveness of mitigation measures	- monitor mitigation measures taken and check their effectiveness	- At the site	- Weekly or monthly	- EMP cell members	- Free of charge
13.	landscaping	- monitor the flowering plants that are inside the factory compound	- Around the site	- Monthly - Monthly	- EMP cell members - EMP cell members	- Free of charge - Free of charge

Table – 22: Summary of monitoring programme for Decommissioning Phase (tabulated form)

Sr. No.	Components	Parameters to be monitored	Monitoring place/spot	Frequency	Responsible persons	Remarks
1.	Decommissioning and Rehabilitation	- monitor the Decommissioning process including the removal of all residuals, if any - monitor rehabilitation process	- Inside the compound - Inside the compound	- Weekly - Monthly	- EMP cell members - EMP cell members	- Free of charge - Free of charge

Note: There will be specific regular monitoring on physical components, namely, air, water, soil quality on a semi-annually basis throughout the whole long Operation Phase, as instructed by the environmental authority, the ECD. Technicians will be hired for this task and the semi-annual report will be duly submitted to ECD.



LEGEND








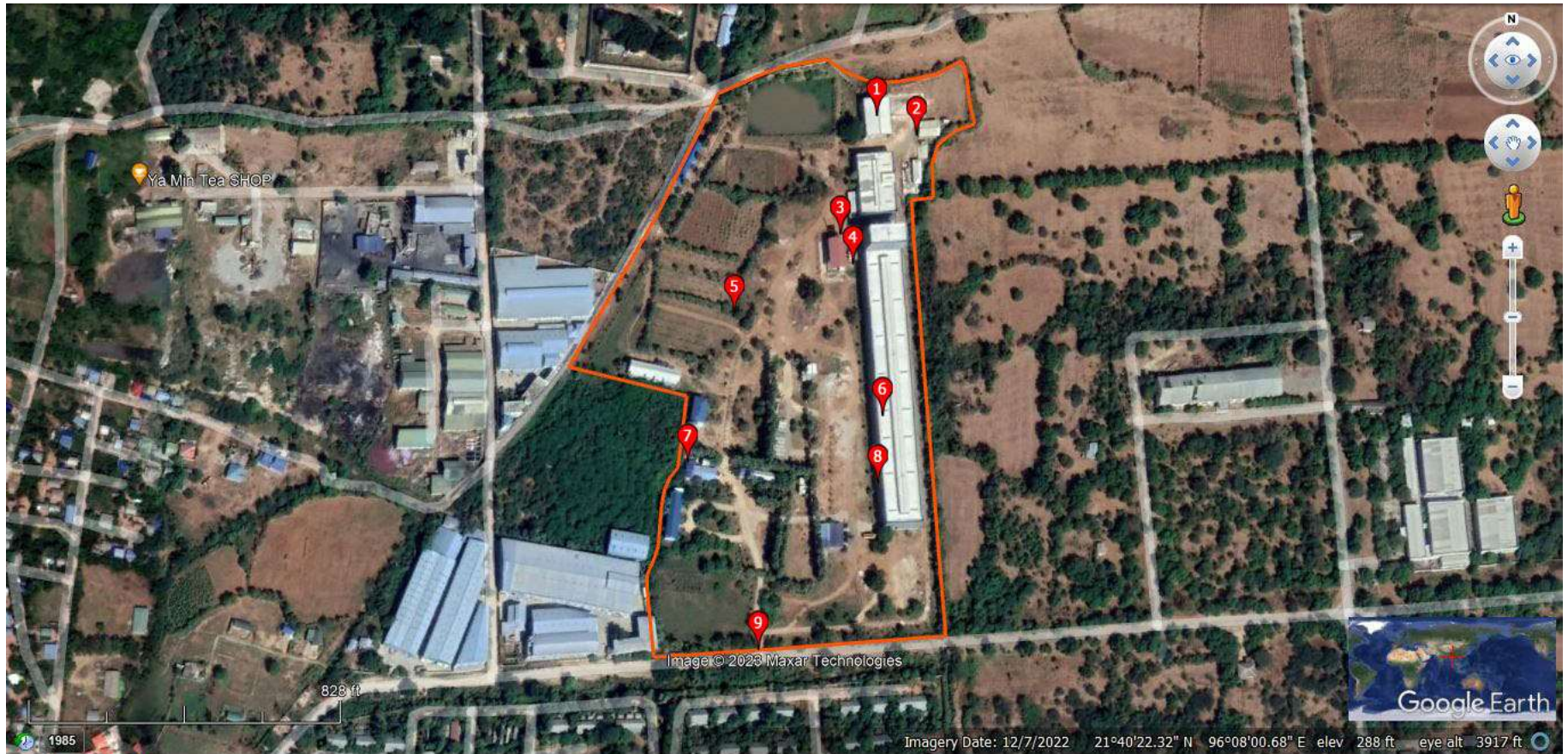
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|---|--------------------------|---|-------------------|---|-------------|---|--------------|
|  | Air, noise and vibration |  | Underground water |  | Solid waste |  | Project Site |
|  | Effluent |  | Soil |  | Waste water | | |

Figure-95: Satellite image showing monitoring points where air, noise and vibration will be measured and water and soil samples will be taken

6.3 Relevant maps, aerial photos, satellite images indicating the location and sources of adverse impacts



Legend

- | | | | | |
|---------------------|--------------------------|------------------------|-------------------------|-----------|
| 1 Dust | 3 Air pollution | 5 Domestic solid waste | 7 Domestic liquid waste | 9 Traffic |
| 2 Spill of fuel oil | 4 Waste water/used water | 6 Noise and vibration | 8 Storm water | |

Figure – 96: Satellite image showing sources of impacts

(i) Impact on air quality/air environment

Source of impact – at the stack near the boiler unit, (Stationary emission or point source emission).

8-10 tons of coal has to be incinerated per day to produce hot steam for curing, autoclaving and drying the cellulose fiber cement boards.

Theoretically the burning of 10 tons of coal can generated 20 tons of CO₂, 0.76 tons of SO₂, 0.2 tons of NO₂ (if complete combustion method is not effectively applied and most of all if mitigation measures are not taken).

In addition 330 kg (0.33 tons) of PM fly ash and down ash are produced (if mitigation measures are not taken).

However, complete combustion will be implementing and also effective mitigation measures will be taken.

The applications of water sprinkler system greatly mitigate CO₂, NO₂ and SO₂. The installation of high efficient dust collectors (bag filter) can remove 98% of all PM, including ash (already described earlier in Chapter 4, 4.4).

The final smoke (emission) that is spewing out of the stack will be no longer black smoke, but white or light brown colour (or merely water vapour).

On the whole the impact of emission can be effectively mitigated. Anyway negligible quantity of air pollutants, SO₂, NO₂ and CO₂ can be able to escape and get into the air shed above.

Spatial and temporal distribution

The project site and its environs is mainly a flat plain and the area is under the direct influence of season prevailing winds, that is, the S.W monsoon wind during the rainy season and the N.E monsoon wind during the coal season.

Therefore, during the rainy season negligible quantity of CO₂, SO₂ and NO₂ will move toward the north east while during the cool season they will move toward the south west.

During the dry hot season the wind directions are erratic (no prevailing wind) and therefore then pollutants will be distributed in the air shed above but gradually will disperse in the atmosphere.

Air pollution from this fiber cement board factory is not a serious problem. (Only a small 8 tons boiler is used and 8-10 tons of coal has to be burn a day; very different from large coal-fired thermal plant or large cement plant).

(ii) Impact of liquid waste

Actually there is no serious impact regarding industrial waste water. Used water/waste water is recirculate, stored in two large clean and recycled tanks and reused. Only small quantity of waste water has to be discharged.

Source of impact

Waste water final discharge point (including slurry waste discharge) and at the waste water sink west of the factory. The sediment at the sink will be pumped out from time to time for removal and discards at the landfill to be approved by the Sint Kaing Township Development Committee. The company has initial liaison with this authority.

Spatial and temporal distribution

There can be temporal distribution of waste water during the rainy season if there are storm waters or heavy rain water influxes. Storm water can temporarily flood the area and all waste water will flow down together with the dominant storm water to lower ground level.

However, the area being in the Dry Zone of Myanmar with little rainfall and therefore, storm water of any magnitude is not envisaged. (There can be no temporal distribution or spread of waste water during the rainy season).

(iii) Impact on ground water

Sources of impact – at the two tube wells, particularly at the ground water level.

60 tons of water will be consumed per day. Experts have calculated that ground water will be readily available throughout the year and that availability of water will not be an issue. However, this consumption of large quantity of water will surely impact the quantity of ground water to a certain extent. The impact will be more noticeable during the hot dry season.

Spatial and temporal variation in impact

There can be no spatial variation, the two tube wells are fixed at a place. There can be temporal variation or fluctuation of impact: greater impact on ground water quality during the hot dry season and lesser impact during the rainy season. Even thou there is only light rainfall there can be variation or fluctuation of ground water level, seasonally.

(iv) Impact: noise and vibration

The cellulose fiber cement board factory is a relatively noisy factory with noises emitted from many sources inside the factory. Vehicular movements emit noise outside the factory.

However, noise level can be heard only inside the factory and factory compound; it will have no impact outside the compound. Noise will be generated throughout the year every day when the factory is in operation.

(v) Impact on traffic

Source of impact: on access road, on Bellin-Ye-ywar Road and on Yangon-Mandalay High Way.

The factory has 5 office vehicles but will have to hire many heavy trucks for transportation of several tons of raw materials (cement, sand, paper pulps, quick lime, coal and fuel) and also transportation of large quantity of finished products (5300 boards/day, and 1,249,000 boards/year).

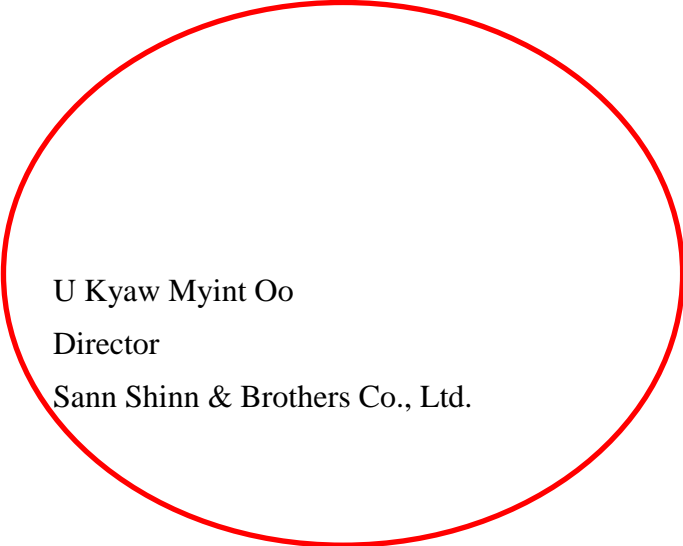
There will surely be an increase in traffic due to the operation of the factory.

Spatial and temporal distribution

There can be no variation in spatial and temporal distribution of this impact. The factory will be operational almost throughout the year; up to 320 days/year. Transportation of raw materials and finished products will go on regularly. No variation in impact on traffic anticipated.

Commitment

The project proponent, Sann Shinn & Brothers Co., Ltd has made a commitment to duly undertake all the mitigation measures for each and every negative impacts in an effective way until all the negative impacts are mitigated or minimized or eradicated.



U Kyaw Myint Oo
Director
Sann Shinn & Brothers Co., Ltd.

7. CUMULATIVE IMPACTS ASSESSMENT

The term cumulative impact refers to either:

- The addition of impacts from other sources (combined impact) at the same time (simultaneous impacts) --- Or
- Successive addition of impacts (incremental impacts) over a long period --- Or
- Both

Green House Effect that leads to global warming is the result of the accumulation of CO₂ (cumulative impacts of CO₂) in the atmosphere from all different sources all over the world both at the same time (simultaneous impacts) and over a long period (successive or incremental impacts).

It is necessary to understand and minimize cumulative environmental impacts in order to prevent “death by a thousand cuts”.

7.1 Methodology and approach

Usually cumulative effects are not considered if a project does not involve the construction and operation of a big factory or a big mill. Large quantity of industrial wastes (liquid and solid) and industrial disturbances (emission, noise, vibration) are generated at a factory/mill. When more than one factory/mill is operating in an area there will surely be simultaneous cumulative impact. And if these factories are in operation for a long time there will surely be incremental (additional) cumulative impact.

The cumulative impact from the operation of fiber cement board factory can be substantial over a long time.

The Cumulative Impact Assessment (CIA) is more or less similar to EIA but only for the long term impact assessment and/or simultaneous impact assessment.

The process of CIA can be put in this way:

- It is process of analyzing the cumulative impacts and risk,
- It is process of proposing measures to avoid reduce or mitigate such cumulative impacts and risks to the extent possible.

General process or steps for implementing CIA involves 5 steps:

- Step 1 : Scoping Phase
- Step 2 : Establish information or baseline status of Valued Environmental and Social Components (VESC)
- Step 3 : Assess CI on VESC
- Step 4 : Assess significance of predicated Cumulative Impact (CI)
- Step 5 : Cumulative Impact Management (CIM)

For CIA, specifically for fiber cement board factory project the following factors have to be considered:

- Site location, condition
- Capacity
- Wastes (solid and liquid) to be generated
- Land and/or water environment (if any) to be impacted
- Effective prevention/control/mitigation measures
- Any socio-economic impact, if any, and mitigation measures
- The predicated or anticipated environmental situation at least 10 years from now.

In developed nations the subjects of CIA and CIM have developed to an advanced phase. But these are the works of scholars or pure academicians that involve the application of computer programming, complex mathematical/computer models, complex formulae and equations, and statistical calculations and manipulations. In short, CIA is a multi-disciplinarians task that involves many scientists and social scientists and is beyond the scope of this EIA report.

7.2 Cumulative Impact Assessment (CIA)

7.2.1 Existing and future private and public projects and development

In this area context there are 7 other existing projects (some in operation, some still in the process of construction or operation) in the vicinity.

The other 7 projects are:

- Ngwe Moe Hein metal refinery factory (private) in the north east
- Shwe Nagar Joss sticks and tissue paper factory (private) in the west
- Soe Moe awning/Sheet factory (private) both in the adjacent west
- Myanmar Linn Kyan shoe factory (private) in the south west
- MEC stone slab/ornamental slab factory (private) in the east
- U Thar LED lamps/lighting bulbs factory, both in the east, and
- Be Ka plastics factory (military/public).

All these factories are within one mile radius from the cellulose fiber cement board factory.

In fact the area is more like a small industrial zone with 8 relatively large and small factories.



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|--|---|--------------------------|
| ၁။ ငွေမိုးဟိန်း သတ္တုသန့်စင် | ၆။ မြန်မာလင်းကျန်ရှူး (ရှူးဖိနပ်စက်ရုံ) | ၉။ LED (ဥသား) |
| ၂-၃။ ရွှေနဂါး (အမွှေးတိုင်နှင့် တစ်ရှူးလိပ်) | ၇။ တည်ဆောက်ရေး (လျှပ်စစ်) ဝန်ထမ်းအိမ်ယာ | ၁၀။ ဘီကာစက်ရုံ (ဦးပိုင်) |
| ၄-၅။ စိုးမိုး (မိုးကာလုပ်ငန်း) | ၈။ MEC | ၁၁။ အကျဉ်းဦးစီး |

Figure – 97: Satellite image showing the project site and other 7 projects (factories)

7.2.2 Identification and assessment of the potential cumulative impacts on the components in the surrounding environment and the project contribution to such impact

The eight factories including fiber cement board factory will be operating within the one mile radius. There will be:

- Simultaneous cumulative impacts (impact from all factories happening at the same time).
- Incremental or successive cumulative impacts over the years. (The longer the periods the higher the incremental cumulative impacts).

There will be cumulative impacts:

- On the air environment/air quality of the whole area
- Noise and vibration impact on the whole area
- On the land environment of the area
- On ground water of the area (There are no water course or water body in the area and therefore, no impact on surface water).
- (There is also no forest but only small shrub and scrub; no cumulative impact on biological component envisage). There can be cumulative impact on the traffic. The vehicle used by the 8 factories as well as those to be hired for transportation will considerably increase traffic on the Bellin-Ye-ywar Road and Yangon-Mandalay High Way.
- There are residential area – e.g. Taung Yinn village and Bellin village in the west; housing complex for MEPE employees in the south and the Prison Department in the north. As these residential areas are within the 1 miles radius, there will be cumulative impact on the socio-economic component. The influx of migrant workers of 7 factories can lead to friction between the local community and the factories. There will be pressure on the resources and a like in prices of commodity. The positive aspects are: the increase in employment for the locals, permanent and steady incomes, and infrastructure development.

If the simultaneous cumulative impacts for the whole area can be determined for one day then the incremental cumulative impacts for one month or one year or several years can be rough calculated.

The above mentioned facts are the scenario for cumulative impacts situation if no mitigation measures (preventive measures, protective measures, corrective measures, control measures, remediation measures) are not taken in time.

However, it is expected that all the project proponents (all the 8 factories) will duly take mitigation measures. Therefore, the cumulative impacts mentioned above will not be so bad and will be much lower.

Actually Sann Shinn & Brothers Co., Ltd (and its consultant firm, MESC) is not in a position to conduct cumulative impact assessment (CIA) for the whole area comprising all 8 factories. Sann Shinn & Brothers Co., Ltd (and MESC) does not have the authority to conduct CIA on all the other 7 factories. MESC on its part is hired by Sann Shinn & Brothers Co., Ltd to conduct EIA only for the cellulose fiber cement board factory. MESC dare not investigate the other 7 factories to gather data and information requisite for CIA. It is unwise and risky for MESC to pose its nose into the affairs of others, especially when it concerns environmental impacts.

Of the 8 factories only Sann Shinn & Brothers Co., Ltd has, so far, held public consultation meeting. It will be very difficult, if not impossible, to gather information and data on the other 7 factories.

According the local elders there are all together, over 50 factories (big and small) in this region, but so far Sann Shinn & Brothers factory is the only one who has held public consultation meeting.

Therefore, CIA should be conducted only by the environmental authority, ECD. Or ECD should organize and set up a commission or committee for conducting CIA for the area. Or ECD should authorize one or more consultant firm to conduct CIA on all the 8 factories. In such case the authority of each factory should be cooperative, transparent and honest in order that information and data provided are true and accurate to an extent.

The ideal solution is for all the 8 factories to conduct EIA of their own and based on the 8 EIA reports of the 8 factories, cumulative impacts assessment can be made quite accurately without difficulty.

Until then, Sann Shinn & Brothers Co., Ltd will forget the cumulative impact assessment for the whole area and focus only on the potential incremental cumulative impacts caused by its company.

In the fiber cement board factory context, the impacts/potential impacts during the Construction Phase, Operation Phase, and Decommissioning Phase are already described in relative details earlier in Chapter 6, 6.2.3. Construction Phase and Decommissioning Phase are short in duration and incremental accumulative impacts are not envisaged. Some of the impacts during the Operation Phase that can lead to incremental cumulative impacts are:

(1) Potential cumulative impact on air environment/air quality –

If effective mitigation measures are not taken in time air pollutants such as CO₂, SO₂, NO₂, smaller PM such as PM_{2.5}, PM₁ etc. will accumulate in the air shed above and eventually in any layers of the atmosphere leading air pollution in the atmosphere.

(2) Potential cumulative impact of noise –

If effective mitigation measures are not taken in time the incremental cumulative impact can have serious health issues for workers exposed to high noise levels resulting in serious hearing impairment (deafness).

(3) Potential cumulative impact on ground water –

If effective mitigation measures are not taken this incremental cumulative impact can lead to the dwindling of ground water resources.

(4) Potential cumulative impact of wastes (solid and liquid) –

If effective mitigation measures are not taken the incremental cumulative impact can lead to serious land pollution and degradation of the environment.

(5) Potential cumulative impact on traffic –

The factory has 5 office vehicles and will have to hire several heavy trucks (many trips) for transportation of raw materials as well as finished product over the year. (Impact on traffic cannot be mitigated effectively but can be only mitigated to a certain extent).

(6) Potential cumulative impact on natural resource –

Over the years million tons of sand has to be utilized and can lead to the dwindling of the sand resource in an area. (This cannot be effectively mitigated, but the only plausible way is the conservation of sand. However, this may not be a serious issue as sand is abundantly available almost everywhere).

7.2.3 Determination of the leverage and influence that the project may have over the significant and project related cumulative impacts

(1) Potential incremental cumulative impact on air environment/air quality

As already mentioned earlier in Chapter 6, (6.2.1.3) 20 tons of CO₂, 0.67 tons of SO₂, 0.2 tons of NO₂ will be generated per day (if no mitigation measures/corrective measures are taken).

Over a period of one year (320 operational days) 6,400 tons of CO₂, 243 tons of SO₂ and 64 tons of NO₂ will be generated. The incremental cumulative impact over a period of 30 years (the project life) will be 192,000 tons of CO₂; 7,290 tons of SO₂ and 1,920 tons of NO₂ (if mitigation measures are not taken in the first place).

(However when these figures are compared with those from China, U.S.A, India and Russia the four top global air polluters, the air pollution from this factory will be analogous to the burning of a joss stick.)

(2) Potential incremental cumulative impacts of noise and vibration

NEQEG guideline value for noise level is 70 dBA. Noise level higher than 85 dBA poses health issue. Workers exposed to noise level above 85 dBA over many years (incremental cumulative impacts) can have impaired hearing or even deafness.

In the same way workers exposed to high vibration over a long period can have body vibration or arm vibration (if vibrated hand device has to be handled).

Long term vibration can also cause machinery damages and structural damages.

Incremental cumulative impacts of high level noise and vibration are quite serious but not pragmatic to quantify the impact.

(3) Potential incremental cumulative impact on ground water

As already mentioned earlier in Chapter 6, (6.2.1.3) ground water is sourced from two tube wells from a depth of 270 feet.

The consumption of water is 60 tons/day. Over a period of one year (320 operation days) 19,200 tons of water will be consumed. The incremental cumulative impact on the quantity of ground water over a period of 30 years (the project life) will be 576,000 tons. (That is if mitigation measures/conservation measures are not taken).

(4) Potential incremental cumulative impact of wastes (solid and liquid)

As already mentioned earlier in Chapter 6, (6.2.1.3) 1,100 kg of combustion residues (fly ash, bottom ash are generated per day. The incremental cumulative impact over one year and over 30 years will be 498 tons) and 14940 tons, respectively. (That is if no mitigation measures are taken).

2400 kg of off cuts (wet sheets) are generated per day but all are reused (no cumulative impact).

500 kg of dust and bits and piece (from sanding, edging, etc. and rejects) are generated per day. The incremental cumulative impact over one year and over 30 years will be 181 tons and 5,430 tons, respectively (if mitigation measures are not taken).

(Domestic solid wastes are not calculated for cumulative impact as only about 18 kg will be generated and will be regularly collected in bins and disposed at the landfill).

(Packing materials are generated not regularly but only from time to time, and are either sold or given away).

Industrial liquid waste

Daily consumption of water is estimated at 60 tons/day and the large majority (about 90%) is recirculate and reused. It is estimated that only 130 gallons of used water/processed water/waste water is generated per day. (That is after mitigation measures/corrective measures such as recirculation, filtration and reused are taken).

The incremental cumulative impact over a period of one year and 30 years will be: 47,060 gallons and 1,411,800 gallons, respectively.

(5) Potential incremental cumulative impact on traffic

The factory has 5 office vehicles; it has to hire several heavy trucks for the transportation of raw materials as well as finished products. 15,600 tons of cement, 22,800 tons of sand, 45,600 tons of paper pulp, 3,960 tons of lime powder, 10,800 tons of coals has to be transported per year.

For transportation of such a huge quantity of raw materials there will be 2,886 trips (by 20 tons truck) per year. When both on going and returning trips are considered the total number of trips per year will be 5,772.

The incremental cumulative impact on traffic will be quite serious. In addition 480,000 liters of diesel and 20,000 gallons of gasoline have to be transported. A few fuel oil bowsers will have to be used (their trips not calculated).

As regard the finished products it is estimated that up to 5,300 cellulose fiber cement board will be produced per day and 1749,000 boards will be produced per year.

For transportation purpose 1,749 trips by heavy trucks is necessary. These trucks will be hired and when the return trip for each truck is considered 3,489 trips will be required, greatly increasing traffic on Yangon-Mandalay High Way. When a long period of 30 years (the project life) is taken into consideration the figure is enormous indeed).

(6) Potential incremental cumulative impact on natural resources

In this project context only sand and lime powder will be considered (other raw materials such as cement, pulp, etc. are procured from faraway places or from abroad. Sand is procured from the area).

The annual requirement for sand (quart sand 90% silica) and lime powder are 22,800 tons and 39,600 tons, respectively.

Their requirement over a period of 30 years will be 684,000 tons and 118,000 tons respectively. The incremental cumulative impact on these two natural resources can lead to dwindling or depletion or loss of natural resource in the area.

(Sand resources may not be a serious issue as sand is abundantly available the area. Lime stone is not as abundant as sand in the area). For instance, in certain developed and industrialized countries some limestone mountains/hills are already gone due to huge demand of cements; cement has to be imported even though they have the efficient skill to manufacture cement).

7.2.4 Description of measures to mitigate the projects contribution to the cumulative impacts

The mitigation measures to be taken for each and every impact/potential impact during the Construction Phase, the Operation Phase and Decommissioning/Rehabilitation Phase are already described in technical details.

The Cumulative Impact Assessment (CIA) is more or less similar to EIA, but only for the long term. Therefore, the methodology for EIA can be also applied for CIA. In other words, the mitigation measures to be put in place for each impact can be also applied for each cumulative impact.

The impacts and subsequent mitigation measures are already described in **Chapter-6** and, therefore, will not be repeated here.

As regards the Construction Phase there will be no impact or cumulative impact after the Construction Phase. Since all the wastes (construction tailings, construction wastes, debris etc.) were already cleared and the place tidied up after the Construction Phase there were/are no wastes that resulted from construction works remain and accumulate inside the project premise.

During the Operation Phase the five or six impacts, namely, impact on traffic, impact on existing infrastructure (water, electricity etc.), impact of solid wastes, impact of liquid wastes, and to a lesser extent, impact on air environment will occur day after day. The impacts mentioned earlier will occur daily.

Mitigation measures to be put in place for each and every impacts are already mentioned in Chapter 6, (6.2.3).


If mitigation measures to be put in place for each and every impact mentioned in **Chapter-6** are timely and effectively undertaken then there can be no cumulative impact occurring inside the project site. Sann Shinn & Brothers Co., Ltd will do its utmost to mitigate these impacts and prevent cumulative impact happening inside the project compound in a timely manner.

If different option of mitigation measures/corrective measures for each and every impact are duly taken, effectively and meaningfully and timely taken there will be no need for any specific mitigation measures to be taken for the cumulative impacts.

Effective and timely taking mitigation measures for any impacts are tantamount to taking pre-emptive mitigation measures for the anticipated cumulative impact. Of course, it will be too late to take mitigation measures only when cumulative impacts have already occurred. A lot of time, money, resources and effort will be needed to take such belated mitigation measures.

Commitment

The project proponent, Sann Shinn & Brothers Co., Ltd will do its best not to have any cumulative impacts on the surrounding environment. All mitigation measures will be duly taken in time so that there will be no chance of cumulation of impacts.



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8. ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan (EMP) is the key to ensure that the environmental quality of the area does not deteriorate due to the implementation of a project. EMP involves the management of the overall environmental issue including the physical, biological, socio-economic, cultural and visual issues. EMP is a long term systematic approach from planning, development, implementation, monitoring and feedback. EMP also involves management for quality of the project.

The overall EMP includes planning and design for the construction and operation of an ecofriendly cellulose fiber cement boards factory that fully utilized eco-friendly machinery, equipment and vehicles that emit less smoke, lower noise level, and those that are fuel and energy efficient; and also the conservation of water and recycling of water and waste as far as possible. EMP covers so many aspects of the project it is difficult to consider all the aspects of EMP.

The EMP is an essential tool for ensuring that mitigation of the negative impacts and enhancement of the positive impacts is undertaken effectively throughout the life of the project. An EMP should ensure the best available technologies (BATs) and best environmental management practices are pragmatically, efficiently and cost-effectively implemented.

8.1 Project description by project phase

Project description has been already described in details earlier in Chapter 4. It will be summarized as follow:

The project is for the construction and operation of cellulose fiber cement board factory to be implemented by Sann Shinn & Brothers Co., Ltd.

The proposed project site is located in Taung Yinn Village tract area, Sint Kaing Township, Mandalay Region.

The coordinates are: N. Lat. 21° 40' 27.17" and E. Long. 96° 08' 19.19" and the elevation is 207 ft. asl.

The area of the site is 10.11 acres.

The budget is Ks 19931.31 million.

The production capacity is 5 million sq.m/year of 2440 mm x 1200 mm x 60 mm cellulose fiber cement boards. The brand is "Target".

The raw materials are: cement, sand, paper pulp, lime powder, felt, abrasive belt and chemical (The de-foaming agent).

Coal will be used as burner.

The main components include.

The office, production building, the main factory (manufacturing unit), warehouse for materials and finished products, boiler unit, housing for employees, messing hall and kitchen and other lesser component.

Water will be sourced from ground water, at a depth of 270 feet.

Electricity will be sourced from gridline Bellin sub-station two miles away, with 33 KV cable line.

Staff strength	: 120 construction workers (during Construction Phase)
	: 86 staffs nationals; 5 Chinese engineers and technicians
Working hours	: 8 hrs/day, 40 hrs/week (3 shifts of 24 hours)
Operation day	: 300-320 days/year
Salaries	: From Ks 150,000 to Ks 650,000

Project phase

Preconstruction Phase	: 1 year (already completed, 2019)
Construction Phase	: 1 year (2020) but still in the process of construction due to outbreak of COVID-19 pandemic
Operation Phase	: 30 years (2023 – 2053)
Decommissioning Phase	: 1 year (2053 – 2054)

Note – Due to delay caused by the COVID-19 pandemic, it is expected that the factory will be in operation in middle part of 2023.

8.2 Project's environmental, socio-economic, and where relevant, Health policies and commitments, legal requirements and institutional arrangements

The project environmental and socio-economic policies are already described in detail in Chapter 3 and will not be repeated here. (This is not a standalone EMP separate report). Only Health Policy, legal requirement and institutional arrangement are described below:

8.2.1 Health policy

The health policy of the Nation is "Health for All".

The policy guidelines for health service provision and development have been provided in the constitution. **Article-28** of the constitution of the Republic of Union of Myanmar (2008) States that:

The Union shall:

- i) earnestly strive to improve education and health of the people

Article 367:

Every citizen shall, in accord with the health policy laid down by the Union, have the right to health care.

National Health Policy (1993)

The National Health Policy was developed with the guidance of the National Health Committee in 1993.

The National Health Policy has placed "Health for All" goal as a prime objective. There are 15 main points regarding the National Health Policy (1993). The first main point No.1 is:

- to raise the level of health of the country and promote the physical and mental well-being of the people with the objective of achieving "Health for All"

The main point, No.9 concerns environment which states:

- to intensify and expand environmental health activities including prevention and control of air and water pollution

Health Legislation

Certain portion of health legislation also addresses environmental sanitation and communicable disease prevention, as far as environmental affair is concerned. That includes the control of disposal of human and other wastes, concerns for water purity and hygiene of housing and food sanitation.

Certain health legislation that are relating in one way or another, to environmental affairs are:

- The Public Health Law (1972)

Which includes environmental sanitation and cleanliness of food, among others

- Prevention and control of communicable Diseases Law (1995) (Revised 2011)

This law describes measures to be taken in relation to environmental sanitation, among others.

- The control of smoking and consumption of Tobacco Product Law (2006)

This law describes the creation of tobacco smoke free environment, among other. This is of relevant at the work place and project site where many employees are working.

Health Development Plan and Myanmar Health Vision 2030

This long term plan has been drawn up to meet any future health challenge. This plan has 9 main objectives and one of them is:

- to develop a health system in keeping with the changing political, socio-economic and environmental situations

National Environmental Health Agenda

Environmental Health is actually one of the integral parts of Environmental Protection and Conservation aspect. EIA, IEE and EMP works normally encompass the physical, biological, socio-economic, cultural and visual components of the surrounding environment. The third component that is, socio-economic, includes public health component, (mortality and morbidity, diseases, accident and injuries etc.).

The Occupational and Environmental Health Division under the Department of Public Health is the focal point agency concerning Occupational and Environmental Health aspects.

This Department (Division) is involved in:

- environmental monitoring eg- air quality, water quality
- work place assessment eg- air quality, waste and water quality, heat stress, light, noise level

Health Impacts Assessment (HIA) and Social Impacts Assessment (SIA) are actually important parts of environmental protection and conservation works.


Commitments

The project proponent, Sann Shinn & Brothers Co., Ltd has made a sincere commitment to operate the proposed fiber cement board factory in an ecofriendly manner as practical as possible.

The company will comply with the NEQEG guidelines (2018) as prescribed by ECD.

The company will duly implement the Environmental Management Plan (EMP) and Monitoring Plan (MP) as far as possible.

The company will do its best to take all pragmatic mitigation measures prescribed in this EIA report.



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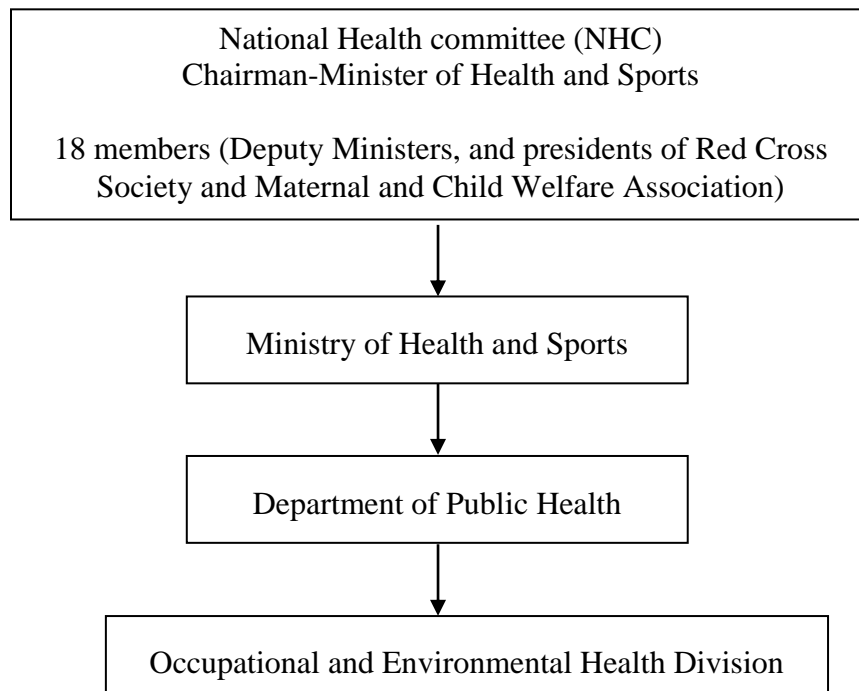
8.2.2 Legal requirement

These are already described in detail in Chapter-3 and will not be repeated here. This is briefly summarized as below:

35 laws, rules, regulation are listed together with excerpts from relevant articles/sections are reproduced; national environmental quality (emission) guideline, 2015 are reproduced in Chapter 3. In addition corporate environmental and social policies are enumerated including environmental social standards as prescribed by IFC are reproduced.

8.2.3 Institutional Arrangement

Institutional Arrangement (organization)



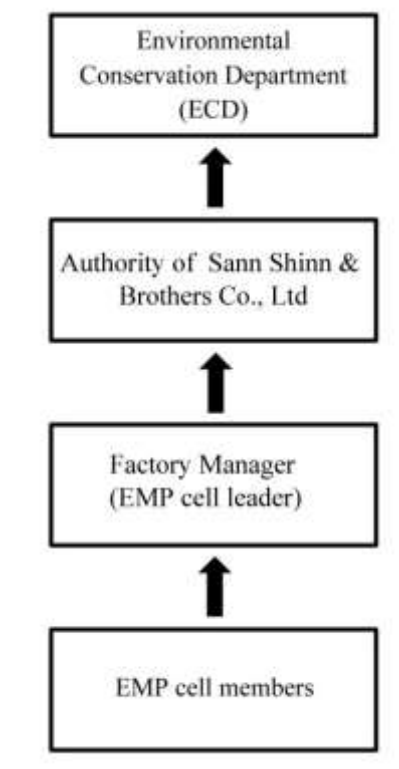
The National Health Committee (NHC) is an umbrella organization comprising 18 members from 9 ministries and one member of Nay Pyi Taw Council, and presidents of Red Cross Society and Maternal and Child Welfare Association.

The Chairman of NHC is the Union Minister of Health and Sports while the Vice Chairman is the Union Minister of Labour. 9 deputy ministers under 9 ministries, a member of Nay Pyi Taw Council, the president of Red Cross Society, and the presidents of Maternal and Child Welfare Association are also members of NHC.

The Deputy Minister of Health and Sports is the secretary while the Director General of Department of Health Planning, is the Joint secretary.

The Occupational and Environmental Health Division (OEHD) under the Department of Public Health is the focal agency involves in environmental and health affairs.

Institutional arrangement of the company for implement of EMP



The execute EMP and nucleus organization (EMP cell) is organized as follows:

The EMP cell members include the manager, who is the EMP cell lead and other staff members. To assist in community monitoring two villagers are added into the list of EMP cells which is tentatively setup.

Sann Shinn & Brothers Co., Ltd has tentatively formed the EMP cell as follow:

Sr no.	Name	Designation	Responsibility
1.	U Aung Myo Tun	Factory Manager	EMP cell leader
2.	U Aung Kyaw	Engineer (EP)	Cell member
3.	U Thet Lwin Oo	Engineer (Mechanical)	Cell member
4.	U Kyaw Zin Tun	Engineer (EP)	Cell member
5.	U Aung Zaw Linn	Engineer (Mechanical)	Cell member
6.	U Tun Myint	Village administrator (Taung Yinn)	Cell member
7.	U Tin Nyunt	Village administrator (Bellin)	Cell member

As project progress, more staffs will be added to the list of EMP cell.

The EMP cell leader and members are responsible for the implementation of EMP and MP. They will be specially trained for this task. They will also take part in training and supervision of other staffs for execution of monitoring plan and implementation of mitigation measures. Most, if not all, staffs will be made familiar with mitigation activities. While the effective operation of the fiber cement board factory, that is, the production works will be the main task many staffs will have also to participate in mitigation, EMP and MP activities.

Management action by these EMP cell members will have to be taken on regular or routine basis, daily, weekly, monthly, bi-monthly and from time to time, depending on situation.

From time to time, or semi-annually or annually, experts and technicians will have to be hired for testing and monitoring works – eg- testing of air, water, soil qualities etc.

EMP and environmental monitoring is a new subject even in developed countries. EMP cell leader and members shall try to be aware of the latest information regarding environmental activities carried out in developed countries. As work progresses the small nucleus EMP cell organization will be reorganized into a bigger and probably more efficient organization.

The present approach is a pragmatic one based on the availability of qualified personal and materials and equipment. Capacity building and training for EMP cell members mentioned earlier will be an integral part of execution of EMP and MP.

8.3 Summary of impacts and mitigation

These have been already described earlier in Chapter 6, (6.2.3) but will be only summarized in tabulated forms.

Mitigation measures to be taken during the Preconstruction Phase (outline in tabulated forms)

Sr. No.	Impacts	Mitigation measures
1.	Potential hiking of price of land and property	<ul style="list-style-type: none"> - Early public meeting and consultation. - Staff shall not get involved themselves in speculative business. (inflation is a common phenomenon and shall not be considered a serious issue)
2.	Potential polarization of the local community into pro-project and anti-project groups due to instigation by activists.	<ul style="list-style-type: none"> - Early public meetings and consultations. - Prioritize hiring locals over hiring personnel from beyond. (no quick fix solution for this potential impact)

Mitigation measures to be taken during the Construction Phase (outline in tabulated form)

Sr. No.	Impacts	Mitigation measures
1.	Impact on air environment	<ul style="list-style-type: none"> - Draw up a plan for air quality management to meet statutory requirement (NEQEG guideline values prescribed by ECD). - Plan in the Pre-construction Phase for the procurement of equipment, vehicles that emit less smoke (to be certified for emission compliance). - Keep equipment and vehicles well-maintained. - Use fuel with low emission rate. - Avoid open burning of debris. - Do not clear vegetation more than necessary. - Spray water for suppression of dust - Restrict vehicular movement; maintain road clear of mud and dirt. - Limit open stockpile of earth, sand etc - Minimize drop height during loading and unloading of earth, sand or lime. - Provide PPE to workers who are exposed to smoke or dust for long period. - The local community should be able to file complaints regarding dust and smoke.
2.	Noise and vibration	<ul style="list-style-type: none"> - Plan in the Pre-construction Phase for procurement of equipment, and vehicles that emit lower noise level. - Plan for noise management, to meet statutory requirement (rules, regulations, NEQEG guideline values prescribed by ECD). - Install silencers and mufflers, where possible. - Switch off or throttle down equipment during idle period - Avoid construction work at night. - Schedule high noise activity only during day time hours. - Provide PPE to workers exposed to prolonged high noise level. - Manage vibration of machine, equipment and vehicle - If possible install vibration absorbers - Design for stable foundation, even for temporary purpose.

		<ul style="list-style-type: none"> - Limit the speed of vehicles. - The local community should be able to file complaints regarding noise and vibration.
3.	Impact on land environment	<ul style="list-style-type: none"> - Avoid, prevent the contamination of land by all means. - Avoid discriminate dumping of solid and liquid waste on ground. - Draw up a plan for management of soil. - Try to avoid potential destruction of soil profile. - Draw up a plan for prevention and mitigation of contamination of soil. - Manage to meet statutory requirement (rules, regulations, Municipal Act). - Prevent spill of fuel oil and chemicals; clean up spill with absorbent promptly (do not wash down with water). - Properly instruct workers with respect to handling of fuel and chemical and cleanup of spills. - Bund fuel or chemical depot to prevent spreading of spill. - Display warning signs; identify high risk spill area (generator, fuel tank). - Implement soil conservation techniques to prevent soil erosion (during rainy season). - Prevent wash water from carrying earth and materials into drainage system. - Resurface and stabilize the exposed ground surface after earth work. - The ground should not be laid bare for long period during the rainy season. - Dispose all waste materials (from construction work and from domestic use) at approved landfill. - Train workers for good housekeeping; do not litter; do not dirty your place. - The local community should be able to file complaints if their lands are impacted.
4.	Impact on water environment (ground water)	<ul style="list-style-type: none"> - Plan and manage to prevent the pollution of ground water. - Do not use water more than necessary during the Construction Phase. - Discipline workers for the conservation of water.

		<ul style="list-style-type: none"> - Monitor the daily use of water for construction. - Avoid the spillage of fuel oil which will contaminate the soil and eventually ground water. - If there is spillage clean up spill with absorbent promptly (do not wash down with water). - Properly train workers with respect to handling of fuel oil and cleanup of accidental spill. - Adequately maintain vehicles and machinery to prevent spillage resulting to ground water contamination. - Bund fuel depot to prevent spreading of fuel oil - Display warning signs; identify high spill areas (generator, fuel tank etc). - Avoid indiscriminating disposing of waste (solids and liquids). - The local community should be able to file complaint, if there is any impact on their drinking water.
5.	Impact of waste (construction waste)	<ul style="list-style-type: none"> - Plan and execute the management of waste especially construction tailings. - Comply with rules and regulations - Avoid open burning of debris - Dump waste at approved landfills (city landfill) - Educate and train workers for good housekeeping - Put up left over construction materials for sale - Hire a contractor for tidying up the site after completion of construction work - Ensure that no left over material or residual waste remain after the construction work
6.	Occupational health and safety	<ul style="list-style-type: none"> - Plan and manage for zero accident. - Set up "Safety First" sign boards at places where workers can see easily. - Create safety condition for all workers; create accidents free environment. - Educate, train and supervise construction workers for good working practice, good engineering practice, good safety practice and good housekeeping practice so that these good practices will be ingrained in each and every worker's mind. - Try to meet all statutory requirement for safety construction (rules, regulation, labour Act).

		<ul style="list-style-type: none"> - Provide adequate Personal Protection Equipment (PPE) where necessary. - Keep first aid kits well-stocked with medicine and drugs. - Accidents or near-missed to be duly reported. - Prohibit the drinking of alcohol during working hours; ban the use of narcotics among workers. - Plan and manage for effective emergency response. - Cover the whole structure during the Construction Phase with nylon lace or netting to prevent accidental falling of debris and tools etc (a common engineering practice implement in construction work). - Educate and train workers for health education and hygiene - Train a few for First Aid Training and some for Fire Fighting - Organize mock drills; keep the firefighting ponds, always full of water at the nearby - Installation of lightning rods and arresters to avoid or prevent lightning strikes - Apply safe and effective procedure for storage and handling of fuel and chemicals - Provide proper sanitary facility eg. toilets, bathrooms - Accidents and near miss to be duly reported - Display addresses/phone numbers of Fire Brigade, worker can see easily - Take out insurance for the shopping complex and also fire insurance.
7.	Potential social issue	<ul style="list-style-type: none"> - Draw up a plan for management of social illness and anti-social behavior. - Educate and train workers on discipline and code of conduct. - Try to build good relation with the locals. - Conduct public consultation so that the locals will have a positive perception on the project. - Educate the workers for appropriate behavior when dealing with locals; to respect their culture and tradition. - Apply punitive measures such as suspension of the wrong doer. - Strictly prohibit the drinking of alcohol during working hours; ban the use of narcotics and stimulants.

		<ul style="list-style-type: none"> - Deal with workers on a fair and square basis. - Avoid unhealthy relationship with workers; they should not be over worked and underpaid. - Maintain the good relation between the company and the locals.
8.	Potential security issue	<ul style="list-style-type: none"> - Draw up a plan and implement security management Fencing or walling of the factory compound; prevent theft and vandalism by all means. - Control all access gates; deploy security personals gate full time. - Keep materials under lock and key where possible. - Do not let the employees freely mingle with the locals – (also do not let employees entering nearby village preauthorization from the company.) - Ask the construction contractor to discipline his workers. - Take punitive measures (suspension or termination of employment) for wrong doer. - Ensure that the factory does not become soft target for terrorists.

Mitigation measures to be taken during the Operation Phase

Sr. No.	Impacts	Mitigation measures
1.	Impact on air environment	<ul style="list-style-type: none"> - Comply with NEQEG guideline for emission - Procure ecofriendly machinery and equipment that generate less smoke – (equipment with air emission specification/equipment that are brand new). - Ensure that the height of the stack is up to standard (the stack height will be 60 m). - Ensure for complete combustion of coal to reduce emission; if possible use coal will low sulphur content. - Apply bag filter, dust collector; also install air compressor filters. - Install water sprinkler system between boiler (combustion chamber, furnace) and the stack to mitigate PM and also NO₂, SO₂, CO₂ and CO (which react with and dissolve in water and settle down together with PM/down ash).

		<ul style="list-style-type: none"> - Minimize gas emission by proper training, operation and maintenance of machinery and vehicles. - Regularly check all machinery vehicle well-operate, well-maintained, well-lubricant machinery reduce smoke emission. - If possible, use fuel with low sulphur content. - Always avoid open burning of trash and debris - Regularly spray water for dust suppression (water spraying can reduce 75% emission). - Restrict vehicular movement, set up speed limit (speed reduction from 30 km/hr to 15 km/hr will reduce 50% of dust emission). - Prevent spillage of sand, cement, and lime powder during transportation; cover with tarpaulin. - Regularly clean road surface. - Minimize dust emission at sand, cement, preparation section, sherry preparation. - Also minimize dust emission at stacking, smoothing sanding and edging of the boards. - Provide adequate PPE (face masks, nose and mouth covers) where necessary. - Control smoke and dust biologically (plant fast growing trees inside the compound; trees are efficient dust trappers and controllers; they also sequesterate CO₂ and produce O₂). - The local community should be able to file complaint regarding smoke and dust; heed to their complaint.
2.	Noise and vibration	<ul style="list-style-type: none"> - Comply with NEQEG guidelines. - Procure machinery/equipment that are brand new and ecofriendly that emit lower noise level. - Keep equipment/machinery well-operated, well-maintained and well-lubricated (can reduce noise level by more than 50%). - If possible install mufflers or silencers at air inlet/outlet of the fan and air compressor to reduce noise. - If necessary install noise containment/sound insulation for noisy machinery. - Limit the speed of truck and heavy machinery to reduce noise and vibration; ensure that the road surface is smooth to reduce vibration.

		<ul style="list-style-type: none"> - Install insulator or shock absorber, if possible, to mitigate vibration. - Design for stable foundation in the first place for machinery that vibrates. - Plant fast growing trees; create green belt to abate noise for the environment (trees act is noise pollution sink). - Provide PPE (ear muffs, ear protections) where necessary. - The local community should be able to file complaints regarding high noise level; heed to their complaints.
3.	Impact of land environment	<ul style="list-style-type: none"> - Avoid prevent by all means that will cause land pollution. - Ensure that the activities at the factory do not cause land pollution. - Educate, train and supervise workers for good working practice and good housekeeping practice until these practices have ingrained in their mind set and become good habit, (do not litter, do not dirty your place). - Systematic storage and handling of raw materials – sand, cement, soft wood pulp, lime etc. is imperative. - Ensure that activities at quartz sand section, pulp section, slurry preparation section do not result in land contamination (tidy up the work place after activities stop) or after each batching. - Ensure that industrial and domestic wastes (both solid and liquid) are systematic collected and disposed (at the landfill approved by the authority). - Avoid spillage of fuel on the ground (should spillage occur do not wash down with water but immediately removed using absorbent – e.g. rags, saw dust). - Prevent erosion and sedimentation by all means (network of sound drainage system is imperative). - Minimize the area of bare soil exposed as practical as possible.

4.	Impact on water environment (ground water)	<ul style="list-style-type: none"> - Ensure that the use of water for the manufacturing of cellulose fiber cement board do not have adverse impact on ground water, especially the quantity of ground water. - The use of water should be within the stated work frames (not more than 60 tons/day) - Monitor the consumption of water daily or weekly. - Educated and train workers for conservation of water or if possible minimization of water uses. - Recirculate and reuse water as much as possible (there are two large tanks for clean and recycled water). - Avoid spillage of fuel oil or chemical on ground which will eventually percolate to ground water (immediately remove all accidents oil spill). - Ensure that accidental spill or leak from fuel oil depot do not eventually impact ground water (seal the ground floor and bund the fuel depot to prevent spreading of fuel oil). - Educate and train workers for systematic storage, handling and uses of fuel oils. - Adequate maintain machinery and vehicles to prevent spillage, resulting to ground water contamination. - Display warning signs; identify potential high spill areas (fuel depot, generators).
5.	Impact of waste (solid and liquid)	<p><u>Solid wastes</u></p> <ul style="list-style-type: none"> - Install bag filter, dust collector to systematic collect combustion residuals (fly ash, down ash) from boiler unit and dispose at the landfill; reuse some fly ash, or give away to cement brick manufacturer. - Also install dust collector inside the factory (at stacking, de-stacking unit). - Reuse the rejects, (wet slab) resulting from water jet cutting of wet fiber cement boards (there is a waste materials recycle system). - Collect the reject (destroyed boards) and reuse them. - Systematically collect dust and small bits and pieces of board resulting from smoothing, sanding, edging and chamfering activities.

		<ul style="list-style-type: none"> - Industrial solid waste in the form of packing materials (cement bags, packing materials for imported pulp, and all other packing materials) that are generated from time to time to be reused or given away to locals or discard at land fill. - Avoid open burning of these wastes. - Collect domestic solid waste in at least two kinds of bins (recyclable and non-recyclable); reuse or put up for sale the recyclable one while discard the non-recyclable one at the landfill. - Make organic waste (kitchen waste) into compost for greening. <p><u>Liquid waste</u></p> <ul style="list-style-type: none"> - Construct sound drainage network in the first place. - Educate and train workers for conservation of water; water consumption should be within the stated work frame (60 tons/day). - Treat raw water before use; apply conventional sand and carbon filter, and water softness. - Recycle the used water/processed water for reuse applying circulating water vacuum pump; (the factory have two large clean and recycled water tanks). - Drain ash water into collector pond and later manually discard. - Apply defoaming agent to tackle foam issue. - Set up a flocculants system to tackle the suspended particles issue; - Collect slurry discharge from flow on sheet making machine into hopper and discharge at drainages system. - Remove oil and grease (the factory has cleaning and oiling section to do this). - No special waste water/used water treatment in the Operation Phase. - As regards domestic waste water from kitchen, messing hall and bath will flow into the drain and end up in waste water sink, west of the factory. - Sanitary water from toilet will end up in septic tank and soak pit.
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6.	Potential impact on traffic	<ul style="list-style-type: none"> - The factory has only 5 office vehicles but trucks have to be hired for transportation of raw materials and finished products; educate all drivers not to cause traffic congestion by any means. - Draw up a traffic management plan. - Schedule the logistics; avoid rush hours; if possible avoid road with heavy traffic. - Educate drivers, staffs (motorists and motorcyclists) for defensive driving; drive at reduced speed. - Most of all educate them for observing strict traffic rules. - Set up signage at the intersection of the factory and access road and Bellin-Ye-ywar Road, e.g.- speed limits, warning signs, etc. - Avoid overloading of truck, or any vehicles. - Regular maintenance of cars and motor bikes. - Deploy traffic control staffs at the entrance of the factory and at the parking area; systematically control the parking area. - Provide enough parking spaces for all cars (the company has enough parking lot for many cars). - Local community should be able to file complaints regarding traffic issue.
7.	Occupational health and safety	<ul style="list-style-type: none"> - Plan and manage for a safe and healthy atmosphere inside the factory. - Create a safety work place and try to achieve zero accidents at the work place. - Comply with Factory Acts 1974; Boiler Law, 2015; Myanmar Labour Law, 2016; the Social Security Law, 2012 and Workmen's Compensation Act, 1923. - Comply with NEQEG guideline for emission and noise level, by ECD (Already mentioned in Chapter-3). - Educate train and supervize workers for good working practice, good safety practice, good house-keeping practice and good health and hygiene practice until all these practices are ingrained in their mindsets and become good habits. - Especially educate, train and supervize them for skill, for handling and operation of equipment, handling and application of chemicals. - Educate and train them for environmental awareness and OHS hazards.

		<ul style="list-style-type: none"> - Keep all machinery and equipment well-maintained, well-operated and well-lubricated (regular check necessary). - Provide adequate PPEs eg. outfit, boots, helmet, gloves, face mask, goggles, ear muff etc where necessary. - Beware of all the common accidents that used to happen and implement prevention, protection and mitigation measures. - Carefully plan for emergency procedure including life saving and rescue operations. - Organize first aid training and firefighting training for some workers. - Provide adequate First Aid Kits well-stocked with medicines and drugs. - Provide adequate Fire Extinguisher, firefighting equipment and other associated device; keep water tank always full for firefighting. - Provide relevant PPEs where necessary (boots, helmet, gloves, outfit, face mask, ear muffs etc.) - For emergency response organize mock drill and rehearsal from time to time. - Phone numbers and addresses of Red Cross Society, Ambulance Service, Fire Brigade, Police Station, and Sint-kaing Hospital must be displayed so that everyone can see easily. - Give treatment to sick or injured workers with First Aid Treatment; immediately admit to Sint Kaing Township Hospital or Kyaukse District Hospital for serious sickness or injury. - Take out insurance for the factory; and also take out fire insurance
8.	Potential social issue	<ul style="list-style-type: none"> - Prevent or minimize negative impact on socio-economic life of the local. - Build and maintain good relation with locals. - Appoint an affable staff as a liaison officer of the company to deal with the local in an affable manner. - Hold public consultation from time to time. - Educate the workers for etiquette, and respect the custom and tradition of the locals, - Manage misbehaviors and social illness of workers.

		<ul style="list-style-type: none"> - Keep separate housing for male, female workers and family line - Provide proper training on work place regulation and code of conducts. - Provide welfare programme (The company has a good programme). - Educate and discipline workers for conducts. - Deal with workers on a fair and square basis; not to overwork and underpaid; need to overtime works, if any, and duly pay them. - Take punitive action on wrong doer, eg sacking, dismissal. - Prohibit the drinking of alcohol during working hours; ban the use of narcotics. - Prohibit all kinds of quarrels and brawls taking place among workers or between works and locals. - Prohibit all kinds of unethical sexual practices. - Consider for gender parity; employ women workers as much as possible. - Ensure that there is no issue of child labour as far as the project is concerned. - Heed to the voice of the locals, their view, and concern, if any.
9.	Potential security issue	<ul style="list-style-type: none"> - Manage security of the site. - Effective fencing/walling of the site. - Control all accesses; set up security gates; deploys guards. - Do not let workers mingle freely with locals. - Do not let the workers enter the neighbouring village without pre-authorization. - Put certain materials under lock and key. - Apply punitive measures to wrong doer. - Provide ID cards for all for easy identification. - Provide uniform for all.

Mitigation measures to be taken during the Decommissioning Phase

Sr No.	Impacts	Mitigation measures (if decommissioning has to be undertaken)
1.	Potential occupational health and safety issue	<ul style="list-style-type: none"> - Plan and manage for safe and effective decommissioning. - Hire a decommissioning contractor and party for the demolition of the building, dismantling of equipment and tidying up the site. - Reuse or put up for sale some materials that are still usable and saleable. - Dispose those that are no longer usable. - Send old obsolete machinery and equipment to smelting mill. - Remove all contaminated soil, if any. - Test the condition of the soil for the last time. - Also test the quality of air and water for the last time. - Level the ground, plant trees and commence rehabilitation work and restore the site to its original condition.
2.	Potential residuals impact	<ul style="list-style-type: none"> - Plan and manage for effective removal and clearing of all residuals, if any. - Remove and dispose contaminated soil and water. - Ensure that all contaminated are removed and cleared. - Conduct final chemical testing of soil. - Restore the soil to its natural condition as far as possible - Ensure that the ecology of the site is restored to its quasi-original condition. - Ensure that in the aftermath of the project the site is safe for the local people; that the air, land and ground water are not polluted.

8.4 Overall Budget for Implementation of EMP

Since EMP involves the management of all environmental issues there have to be adequate budget for the implementation of EMP.

This budget will be only for the actual implementation of EMP but it will also cover the procurement of certain devices and equipment for uses in EMP works, e.g. monitoring, works, emergency responses, e.g. PPEs, first aid facility etc. (The cost for all machinery, equipment and vehicles etc. will be covered by the project's main budget.)

In order to effectively execute EMP and (Monitoring Plan) MP Sann Shinn & Brothers Co., Ltd has setup an EMP fund. (In addition to a separate fund for the implementation of CSR programme which is raised from 2% of the net profit). As for EMP budget 5% of the project budget (that is Ks 996,565,500) is set aside for EMP fund which will cover the initial costs and the recurring expenses for the effective and meaningful implementation of EMP and MP.

Allotment of EMP fund

The sub-funds allotted for each programme under EMP and MP are as follows:

The EMP fund is allotted as follows:

- | | |
|--|-----------------------------------|
| - Cost of organizing EMP | 2% of EMP fund (Ks. 19,931,310) |
| - Cost for capacity building and training | 7% of EMP fund (Ks. 69,759,585) |
| - Cost for procurement of specific equipment and materials for EMP | 10% of EMP fund (Ks. 99, 656,550) |
| - Cost for execution and dissemination of EMP in the forms of: | |
| (a) Taking mitigation measure | 30% of EMP fund(Ks. 278,969,650) |
| (b) Monitoring actions | 30% of EMP fund (Ks. 278,969,650) |
| - Cost for emergency/contingency actions | 10% of EMP fund(Ks. 99, 656,550) |
| - Cost for reporting, documentation stationery | 7% of EMP fund (Ks. 69,759,585) |
| - Miscellaneous including casual fees for two villagers who are EMP cell members | 4% of EMP fund (Ks. 39,862,620) |

Labour cast will be kept at a minimum. Only staffs will be trained and organized into EMP cell members and they will be involved in the implementation of EMP throughout the project life, especially during the Long Operation Phase. (There are EMP contractors in developed countries but not in Myanmar yet. Therefore, own staffs will have to be trained for this purpose.)

Additional EMP fund for Decommissioning

Since this phase will come above 30 years from now, only a generalized idea will be provided in this report. Decommissioning task is a really big task and so another one percent of the main project budget (Ks 9,965,655) will be set aside for implementation of Decommissioning.

8.5 Contents for each sub-plan (Management and Monitoring sub-plan, MMSP)

In this section (8.5) the content and description of each sub plan that addresses the above-mentioned issues such as

- noise and vibration
- waste
- hazardous waste
- waste water and storm water
- air quality
- odour
- chemicals
- water quality
- erosion and sedimentation
- biodiversity
- occupational health and safety
- community health and safety
- cultural heritage
- employment and training
- emergency response plan and
- traffic

8.6 Environmental and Social Management Sub-plans (contents of each Sub-plan)

Since the project is already in the Construction Phase the sub plan for Preconstruction Phase is simply omitted. Only sub-plans for construction, operation and decommissioning phases are summarized below.

I. During the Construction Phase

The content for each sub-plan are summarized as follow.

1. Noise and vibration

Objectives

- To reduce/mitigate noise and vibration levels; to create safe working places for workers;
- Not to cause nuisance and disturbances to the local people.

Legal requirement

- Comply with NEQEG (emission) guideline, 2015; code No.1.3

Overview maps, layout maps, images, aerial photos, satellite images

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Plan in the Preconstruction Phase for procurement of equipment, and vehicles that emit lower noise level.
- Procure these eco-friendly machinery, equipment, and vehicle.
- Comply with ECD's NEQEG guidelines for noise level.
- Test/monitor noise and vibration once.
- Avoid construction work at night.
- Provide PPE to workers exposed to prolonged high noise level.
- Manage vibration of machine, equipment and vehicle.
- Limit the speed of vehicles.

Monitoring Plan

Parameter to be monitor : dBA during day and night time.

Monitoring points : Project site: N 21° 40' 25.79", E 96° 8' 21.84"

Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78"

Bellin Village: N 21°40'23.82", E 96° 7'40.34"

Frequency : Semi-annually (have to hire technicians). Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Ks 3,000,000 (once off cost)

Responsibilities – hired technicians and EMP cell members.

2. Waste

Objective

- To mitigation waste especially construction waste during the Construction Phase.
- Not to pollute environment and not to let residual/remain after construction.

Legal requirement

- Comply with Environmental Conservation Law, 2012 (Section 14, 15, 32); Environmental Conservation Rules, 2014 (Rule 69), to discharge wastes in accord with environmentally sound method.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 (will not be repeated here).

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Manage construction wastes, construction tailing as far as possible.
- After completion of construction works tidy up the site.
- Put up for sale construction materials that are useable, those are left over.
- Discard those that are not useable at the approved land fill of the factory.
- As regard domestic waste at camp regularly collect them in bins and dispose at landfill (or dumping site).

Monitoring Plan

- Monitor the generation of construction waste and domestic waste at the site on a regular basis.
- Monitor the mitigation actions for waste on a regular basis.

Monitoring point: – the whole area of the site.

Frequency: – weekly

Budget and responsibilities

Free of charge. (All EMP cell leader and EMP cell members are well-paid employees of the factory; no extra fees for them; no EMP contractor exist in Myanmar yet for hire).

Responsible

EMP cell leader and EMP cell members.

3. Hazardous waste

Note: No real hazardous waste generated during the Construction Phase.

- Used fuel oils are collected in old drums and gave away to local recyclers.
- Old lamps, bulbs and batteries discarded at landfill.

4. Waste water and storm water

Objectives

- To control, manage and mitigate waste water and storm water;

Legal requirement

- Comply with NEQEG guideline (2015), Code No.1.2 (for waste water, storm water runoff, effluent etc.)

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Create systematic drainage at the site to manage waste water; ensure that it does not enter the stream; also to manage storm water.
- Create suitable drainage at site to manage storm water.
- Avoid indiscriminate discharge of waste water/used water onto the open ground or into the stream.

Monitoring Plan

Parameter to be monitored: BOD, ammonia, arsenic, cadmium, COD, chlorine, chromium, copper, cyanide, fluoride, heavy metals, iron, lead, mercury, nickel, oil and grease, pH, phenols, selenium, silver, sulphide, total coliform, bacteria, phosphorous, nitrogen, TSS, zinc.

Monitoring Point

- At the drainage, coordinates: N. Lat. 21° 40' 22.58", E. Long. 96° 8' 23.92".

Frequency – Semi-annually (have to hire technicians for analysis).

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Budget: Ks 300,000 (once off cost)

Responsibilities: hired technicians and EMP cell members.

5. Air quality

Objectives

- To prevent air pollution due to construction activities.
- To mitigate/reduce air emission and control air quality as practical as possible.
- To create a healthy environment for all in the area.

Legal requirement

- Comply with NEQEG guideline 2015; Code No.1.1

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Comply with ECD's NEQEG emission guidelines.
- Plan in the Pre-Construction Phase for the procurement of equipment, vehicles that emit less smoke (to be certified for emission compliance) and procure them.
- Test/monitor air quality regularly.
- Keep equipment and vehicles well-maintained, well-operated and well-lubricated to reduce smoke emission.

- Used machinery and vehicle with low emission rate; use fuel with low sulphur content.
- Avoid open burning of debris.
- Spray water for suppression of dust.
- Restrict vehicular movement; maintain road clear of mud and dirt.
- Limit open stockpile of earth, sand etc.
- Stop loading/unloading of earth, sand for a moment while strong wind is blowing.
- Provide PPE to workers who are exposed to smoke or dust for long period.

Monitoring plan

Parameters to be monitored: NO₂, SO₂, PM₁₀, PM_{2.5}, O₃ for air quality;

Monitoring point – Project site: N 21° 40' 25.79", E 96° 8' 21.84"

Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78"

Bellin Village: N 21°40'23.82", E 96° 7'40.34"

Frequency – Semi-annually (have to hire technicians).

Visual inspection of ambient air condition: weekly,

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Budget: Ks 3,000,000 (once off cost).

Responsibilities: hired technicians and EMP cell members.

6. Odour

Note – No bad odour is generated during Construction Phase.

7. Chemicals

Note – No chemicals are used during the Construction Phase.

8. Water quality

Objectives

- To prevent pollution of ground water.
- To control/manage water quality and quantity.
- Not to cause any negative impact on water resources of the local community.

Legal requirement

- Comply with Myanmar National Drinking Water Standard, OEHD.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase (in retrospect).

Management action

- Avoid water bodies as far as possible when constructing or building roads
- Test/monitor water quality regularly.
- Storage of fuel oil as well as used fuel oil should be done in a designated banded side until removal
- Maintain vehicles and machinery adequately to prevent spillages.
- When handling fuel oil avoid accidental spillages; should spillages occurs implement appropriate clean up immediately.
- Avoid disposing of waste (both liquid and solid) into water bodies if any.
- Top soil should be allowed to naturally vegetate in order to stabilize soil particles and thus preventing erosion and limiting siltation to avoid pollution of water by all means.

Monitoring Plan

Parameter to be monitored: total coliforms, taste, odor, color, turbidity, arsenic, lead, nitrate, manganese, chloride, hardness, iron, pH, sulphate, total dissolved solids.

Monitoring Point – Project site: N 21° 40' 21.51", E 96° 8' 22.06"

Taung Yinn Village: N 21°40'16.43", E 96° 7'59.40"

Bellin Village: N 21°40'23.26", E 96° 7'39.34"

Frequency: Semi-annually (have to hire technicians)

Visual inspection of water condition: weekly

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Budget: Ks 600,000 (once off cost)

Responsibilities: hired technicians and EMP cell members.

9. Erosion and sedimentation

Objectives:

- To avoid, prevent, manage and mitigate potential soil erosion and sedimentation.
- To maintain natural ecology as far as possible.

Legal requirement

- Comply with Environmental Conservation Law (2012) and Environmental Conservation Rules (2014); not to cause destruction of soil structures and profile, and conservation of soil ecology.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Implement erosion control/management when the natural slope is more than 20°.
- Minimize the area of bare soil exposed as practical as possible (do not clear the vegetation more than necessary leaving large area of bare land).
- Run-off from areas adjacent to the site will be diverted around disturbed areas (construction of small diversion canal/drainage).
- Control sediment (build sediment trap or dam where necessary).
- Prevent sliding and erosion of stockpiles of sand and earth as far as possible.
- Ensure that the slope of a stockpile is not more than 37°.

Monitoring plan

- Regular visual inspection of ground and soil condition only.

Monitoring points: inside the factory premise.

Frequency: Weekly during rainy season and monthly during dry season.

Also monitor the effectiveness of mitigation measures taken.

Budget and responsibilities

Budget: Free of charge (All EMP cell leader and EMP cell members are well-paid employees of the factory; no extra fees for them; no EMP contractor exist in Myanmar yet for hire).

Responsible

EMP cell leader and EMP cell members.

10. Biodiversity

Objectives

- To protect and conserve the biodiversity of the area as far as possible.

Legal requirement

- Comply with Conservation of Biodiversity and Protected Areas Law, 2018; not to impact or destroy natural habitat and biological ecosystem.

Overview maps, layout maps, images, aerial photos, satellite images

- **There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.**

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Do not clear vegetation more than necessary for the construction of access road and site.
- Prevent the spillages of hydrocarbons which has negative impact on plants especially on the root system
- Avoid open burning of debris.
- Educate workers for fire awareness and protection.
- Promote environment awareness to workers.
- Implement rehabilitation to promote natural vegetation establishment after completion of construction works and also around the site.
- Prevent the potential injury or death of wildlife due to vehicular movements especially during night time.
- Avoid the use of excessive bright light for long hours at night to prevent the aggregation and eventual death of large number of insects (offensive bright light in the forest at night will also scare away wild animals from their natural foraging or breeding ground).

Monitoring plan

- Monitor the situation of flora and fauna in the surrounding area (both natural and artificial flora and fauna).

Monitoring point

The whole surrounding area where flora and fauna exist.

Frequency: quarterly (during dry, wet, cool season).

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Budget: Free of charge (All EMP cell leader and EMP cell members are well-paid employees of the factory; no extra fees for them; no EMP contractor exist in Myanmar yet for hire).

Responsible

EMP cell leader and EMP cell members.

11. Occupational Health and Safety (OHS)

Objectives

- To prevent workers from any occupational health risks and accidents;
- To create a safety working atmosphere for workers.
- To provide free Medicare for all workers.

Legal requirement

- comply with Occupational Health and Safety Law, 2019; Prevention and Control of Communicable Diseases Law, 1995;
- To ensure for a healthy and productive workforce for successful implementation of the project.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Creation of a safe working place and working condition.
- Facilities will have adequate space for all kinds of activities, e.g. excavation, transportation, crushing, site for stockpiles, etc.
- Provision of adequate lavatory facility, bath and washing area; provision of adequate potable drinking; provision of health living spaces and clear eating areas, provision of first aid at all times for workers.
- For practical purpose provide adequate first aid facility including first aid kits, medicines and drugs.

- Provide training for Occupational Health and Safety; training for good safety practice, for personal safety (preventing accidents, injuries), basic hazards awareness, and site specific hazards, (especially at mining sites).
- Provide training on safety handling and operation of machinery equipment, safety storage and handling of fuel oils.
- Will provide adequate PPEs to workers where and when necessary to ensure the basic health protection and safety of workers.
- Provide safe work procedure for all electrical works.
- Educate and train drivers, particularly heavy truck drivers for safety driving and defensive driving; ensure that the access road is not bumpy and safe for driving.
- Try to achieve zero accidents in excavation, hauling and transportation activities including traffic.
- Ensure that workers are not subject to excessive repetitive motions, over exertion and excessive manual handling; if possible will use mechanical labour rather than manual labour as practical as possible to reduce fatigue, strain and injury on workers.

Monitoring plan

- Regular monitoring and inspection of all work places and working condition during the Construction Phase.
- Monitor/inspect medicines and drugs kept at the store, First Aid Kits and other; replenishment of medicines and drugs.

Parameter to be monitored: working condition, especially at factory construction site.

Monitoring point : Factory construction site,

Coordinates: N. Lat. 21° 40' 25.03", E. Long. 96° 8' 24.58".

Frequency : daily and weekly.

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Budget: Ks 99,656,550 cost of provision of medicines and drugs and First Aid facility for the Construction Phase.

Responsibilities

Two employees that have First Aid training and EMP cell member.

12. Community Health and Safety

Objectives

- To ensure that the construction activities do not have any adverse effect on the health and safety as well as social well-being of the local people.

Legal requirement

- Comply with Myanmar Public Health Law, 1972; and Prevention and Control of Communicable Diseases Law, 1995, the Environmental Conservation Law, 2012, and the Environmental Conservation Rules, 2014.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Control smoke and dust as practical as possible;
- Avoid open burning of debris and trash so that smoke will not reach the village; educate the driver to lower speed when passing through the village (the reduction of speed from 40 km to 35 km can reduce dust to 50%, it is learnt).
- Ensure that noise from construction activities do not cause any undesirable impact on the social and health of the local people.
- Local should be able to file complaints regarding dust, noise and vibration.
- Also ensure that domestic solid wastes, liquid waste water and drainage do not become breeding ground for flies, mosquitoes and insect for prevention of vector borne diseases and water borne or water related disease.
- Prevent the occurrence and spread of infectious and communicable diseases by all means; undertake health awareness and educations initiative (health education campaign) in local community as far as possible.
- Avoid/minimize by all means, vector borne, water borne (water based, water related) disease and communicable diseases that would result from project activities. Liaise with Township Health Authority regularly.
- Avoid/minimize by all mean spread of diseases from workers. Educate long distance truck driver regarding sex education; example for use of prophylactic condom; prevent spread of STD, HIV/AIDS.
- Educate workers regarding code of conducts, social conducts, etiquette and local culture and tradition.

- Educate drivers for safe driving and defensive driving and to comply with rules and regulation regarding traffic; also conduct road safety education campaign for the local community, if possible; local should be able to file complaint regarding traffic.
- Comply with law and regulation relevant to transportation of hazardous materials such as fuel oils; also plan for measures for preventing and/or mitigation the consequence of accidental release/spill of hazardous materials (fuel oil); avoid/minimize community exposure to hazardous materials.
- Develop emergency preparedness and emergency response plan and contingency plan (action plan) for effective implementation when necessary. Cooperation with local community and authority in preparation of emergency plan.

Monitoring plan

- Monitor the overall health condition of the local people of the 2 nearby village during the Construction Phase.
- Occasional inquiry of the health issue at two nearby villages, namely, Bellin and Taung Yinn; providing health education, giving health education lectures.

Parameter to be monitored: overall health situation of the locals.

Frequency: at least once during the Construction Phase.

Budget and responsibilities

Budget: Ks 1,000,000 – cost for fees or courtesy gifts to the Township Health Department personnel, who will be required to give health education speeches and lectures (the expense will be from the allotted EMP fund).

Responsibilities

EMP cell members and personnel from Township Health Department who will be requested to provide assistance in execution of Community Health and Safety programme.

13. Cultural heritage

Objectives

- Not to have any adverse impact on the cultural/religious heritage (monasteries, pagodas and churches) in the area due to construction activities.

Legal requirement

- Comply with "The Protection and Preservation of Cultural Heritage Law", 2019; "the Protection and Preservation of Ancient Monument Law 2015"; protect the religious components of the surrounding area.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Ensure that the construction activities have no negative impact on the nearby village monasteries.
- Pay obeisance visit occasionally to the abbot monks, offer cash and kind.

Monitoring plan

Monitoring site : the said Buddhist monasteries.

Frequency : occasionally, especially during religious festival days.

Budget and responsibilities

Budget: Ks 2,500,000 (appropriate Ks 2,500,000 per year for donations and charities for the above monasteries). The money is from CSR programme fund, not EMP fund.

Responsibilities – The factory manager and EMP cell members.

14. Employment and Training

Objectives

- To prioritize employment of the locals as practical as possible; to organize induction training and long term professional training.

Legal requirement

- Comply with Employment and Skill Development Law, 2013.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Plan for human resource development.
- Prioritize employing locals as far as possible.
- Organize new task employees for job training.
- Also provide systematic induction training for new workers to enable them to do their jobs efficiently.

- Induction training will cover: general training; skill training for efficiency and mandatory training relating to health and safety (e.g. safety operation of machinery and handling of hazardous materials).
- Educate and train them for good working practice, good safety practice, good health and hygiene practice and good environmental awareness practice until all these practices are ingrained in their mind sets and become good habits.
- Educate and train them for familiarization with negative impacts and subsequent taking of mitigation measures.
- Educate and train them for basic eco-friendly behaviours e.g. good house-keeping practice, do not litter, do not dirty your place, minimize the use of water, fuel.

Monitoring plan

Monitoring sites: all work places (inspect/monitor training programme; training in process; training course; work efficiency of workers).

Also monitor effectiveness of training programme.

Frequency: from time to time; or monthly, or every training session.

Budget and responsibilities

- Free of charge (the company's senior staff members, senior technician and experienced staff will educate train and supervise new workers).
- However, appropriate Ks 2,000,000 as fees and courtesy gifts for trainers and educators from relevant governmental departments.

Responsibilities

- The factory managers, seniors staffs and EMP cell members.

15. Emergency response

Objectives

- To maintain emergency preparedness and response to any emergency in a systematic and effective way.
- To execute emergency response plan, emergency procedure plan, rescue operation plan, contingency plan and aftermath plan, all in a systematic manner.

Legal requirement

- Comply with Fire Brigade Law, 2015; Factories Act 1951, and Occupational Health and Safety Law, 2019.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase (in retrospect).

Management action

- Prepare Emergency Response Plan (ERP) and team to prevent fatalities and injuries, to reduce damage and to protect environment and community.
- Prepare emergency preparedness plan and execute the plan.
- (Emergency Response Plan will cover emergency resources, emergency preparedness and training, emergency response procedures, administration of the plan, communication and procedures, and debriefing and post-traumatic stress procedures.)
- Provide facilities (e.g. fire fighting equipment, suit, first aid kits, and emergency vehicle.
- Display phone numbers of Firefighting Department, Ambulance Services, Red Cross Society, Hospital and Police Station.

Monitoring plan

- Monitor First Aid kits, drugs and medicines.
- Inspect the construction site for emergency preparedness.

Frequency : monitor activities during all training sessions.

: monitor construction activities at least once a week.

Budget and responsibilities

Ks 5,000,000 set aside for execution of emergency response plan. In case of major accident like major fire budget for emergency will be used mainly for compensation for injured, sicked and dead employees; and will use for rehabilitation of injured and disabled employees.

No other fees or charges as this emergency response plan will be executed by EMP cell members who are all well-paid employees.

Responsibilities

EMP cell leader, EMP cell members and staff trained for emergency response.

16. Traffic safety

Objectives

- To ensure for traffic safety in the area, particularly along the access road.
- To avoid/prevent traffic congestion along the access road and particularly at the intersection of the access road and the high way.
- To aim for zero road/traffic accident.

Legal requirement

- Comply with "Vehicle Safety and Motor Vehicle Management Law," 2020; the High Way Law, 2000; and all regulation regarding road traffic.

Overview maps, layout maps, images, aerial photos, satellite images

- There are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub plan will be implemented during the Construction Phase.

Management action

- Traffic is light but safety plan is necessary.
- Set up warning signage and speed limits at appropriate spots.
- Educate and train company's drivers for compliance with road and traffic regulation.
- Educate heavy trucks drivers for slow driving and defensive driving.
- Do not over load the trucks.
- Cover truck haulages (building materials) with tarpaulin.
- Try to achieve zero road accidents.
- Keep a log book for each vehicle.
- Ensure that driver is not over-worked, set up rotating system for drivers.

Monitoring plan

- Inspect the condition of the vehicles fortnightly
- Monitor traffic on the access road on a fortnightly basis.
- Monitor the daily arrival and departure of vehicles at the construction site.
- Monitor the log book for each vehicle on a weekly basis.

Monitoring point : at one point on the access road outside the site.

Frequency : daily, weekly, fortnightly as mentioned above.

Budget and responsibilities

Free of charge. The EMP cell members who are well-paid employees will do the work free of charge.

The costs for vehicles repairs or maintenance will be borne by the main budget, not from the EMP fund.

Responsibilities : EMP cell leader and cell members.

II. During the Operation Phase

These are summarized as follow:

1. Noise and vibration

Objectives:

- To mitigate/reduce noise and vibration levels; to create a safety work place; not to cause nuisance to the local.

Legal requirement:

- Comply with NEQEG (emission) guideline, 2015; Code No.1.3.

Overview maps, layout map, images, aerial photo, satellite image

These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

The sub-plans will be implemented during the Operation Phase.

Management action

- Procure eco-friendly machinery that emits low noise level in the first place.
- Restrict vehicular movement to reduce noise and vibration.
- Keep machinery and vehicles well-maintained and well-lubricated to reduce noise level.
- Develop green belt as noise pollution sink (abate noise).
- Ensure that foundations for machinery are stable to reduce vibration.
- Create smooth road surface to mitigation vibration by trucks movements.
- Provide PPE, ear muffs, where necessary.
- Conduct daily inspection of noise condition.
- Implement GRM, so that locals can file complaints regarding noise and vibration.
- Regularly monitor effectiveness of mitigation measures taken.

Monitoring plan

Parameter to be monitor : dBA during day and night time

Monitoring point

Project site: N 21° 40' 25.79", E 96° 8' 21.84"

Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78"

Bellin Village: N 21°40'23.82", E 96° 7'40.34"

Frequency – Semi-annually (have to hire technicians)

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Ks 3,000,000 (once off cost)

Responsibilities – hired technicians and EMP cell members.

2. Waste

Objectives:

- To mitigate/reduce industrial and domestic wastes; not to pollute the environment; to create a healthy environment.

Legal requirement

- Comply with Environmental Conservation Law, 2012 (Section 14, 15, 31) and Environmental Conservation Rules, 2014 (Rule 69) (to discharge wastes in accord with environmentally sound method).

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Educate and train workers for the proper handling of wastes; educate them for good housekeeping and minimization of waste as practical as possible.
- Separate wastes into recyclable and non-recyclable ones; dispose only those that are non-recyclable.
- Landfill wastes that cannot be recycled or reused.
- Avoid open burning of solid wastes.
- Monitor waste management monthly.
- Monitor effectiveness of mitigation measures taken.
- Implement GRM (locals can file complaint regarding solid wastes).

Monitoring plan

- Monitor (visual inspection) of waste regularly
- Monitor record book or log book of solid wastes (industrial and domestic) generated weekly or monthly; quantity and mode of collection; tackle issue, if any promptly.

Monitoring point

- Monitor log book and at the company's landfill; N 21°40'22.40", E 96° 8'18.87"

Frequency – weekly, monthly.

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Free of charge (all EMP cell leader and members are well-paid employees of the factory no extra fees for them; no EMP contractor exist in Myanmar yet, for hire).

Responsibilities – EMP cell leader and EMP cell members.

3. Hazardous waste

Objectives

- To control, and manage hazardous wastes, if any, to operate an ecofriendly business.

Legal requirement

- Comply with Environmental Conservation Law, 2012 and Environmental Conservation Rules, 2014.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

Used fuel oils, engine oil, used filter bags, old lamps and batteries are considered hazardous.

- Collect used oil and engine oil in old drums and give away to recyclers.
- Discard used filters, old lamps; old batteries at the approved land fill of the company.

Monitoring plan

- Monitor the storage, handling and uses of fuel oils, inspect fuel depot regularly.
- Monitor the collection of used fuel oil engine oil in old drums and give away to recyclers.
- Monitor the collection of used filter bags, old lamps, batteries and their disposal at landfill.

Monitoring point

- At fuel depot, coordinate: N. Lat. 21°40'31.17"; E. Long. 96°8'25.6"
- Waste bins and landfill

Frequency – weekly, monthly.

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Free of charge (all EMP cell leader and members are well-paid employees of the factory no extra fees for them; no EMP contractor exist in Myanmar yet, for hire).

Responsibilities – EMP cell leader and EMP cell members.

4. Waste water and storm water

Objectives

- To control, manage and mitigation waste water and storm water; to create a healthy environment.

Legal requirement

- Comply with NEQEG guideline (2015); Code No.1.2.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Educate and train workers in the handling, treatment and recirculation of waste water.
- Industrial/used water will be recirculated.
- Set up drainage system for domestic waste water and storm water.

- Domestic waste water (used water) from office, dormitory, kitchen, baths etc. will end up in waste water pond and dry up (no special treatment requirement).
- Domestic waste water (black water) from toilets will end up in septic tanks and soak pits.
- Avoid disposing of liquid waste into open ground by all means.
- Monitor waste water every six months (hire technicians).
- Conduct weekly visual inspection of waste water condition.
- Monitor effectiveness of mitigation measures taken, monthly.

Monitoring plan

Parameters to be monitored: pH, COD, BOD, PO₄, NO₃, oil and grease, total coliform bacteria, total suspended solids (compare with guideline values)

Monitoring points : at the drainage, coordinates: N. Lat. 21° 40' 22.58", E. Long. 96° 8' 23.92".

Frequency : Semi-annually (have to hire technicians).

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities: Ks 300,000 (once off cost).

Responsibilities : Hired technicians and EMP cell members.

5. Air quality

Objectives

- To prevent pollution of air environment
- To mitigate/reduce air emission and air pollution and control air quality as practical as possible; to create a healthy environment for all in the area.

Legal requirement

- Comply with NEQEG (emission) guideline (2015); Code No.1.1 prescribed by ECD.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Set up wet scrubber system.
- Install bag filters.
- Ensure complete combustion of coal.
- Avoid open burning of any trash, debris.
- Keep equipment, vehicles well-operated, well-maintained and well-lubricated to reduce smoke.
- Spray water for suppression of dust.
- Provide PPE, face mask where necessary.
- Plant fast growing trees to sequesterate CO₂ and trap dust.
- Conduct regular monitoring; hire technicians.
- Daily overall inspection of smoke and dust.
- Implement GRM so that locals can file complaint about smoke and dust.

Monitoring plan

- Parameters to be monitored: for air quality, NO₂, SO₂, PM₁₀, PM_{2.5}, O₃ (compare with NEQEG guideline).

Monitoring point

Project site: N 21° 40' 25.79", E 96° 8' 21.84"

Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78"

Bellin Village: N 21°40'23.82", E 96° 7'40.34"

Frequency – Semi-annually (have to hire technicians)

Visual inspection of condition: weekly

Also monitor effectiveness of mitigation measures taken.

Budget and responsibilities

Budget: Ks 3,000,000 (once off cost).

Responsibilities – hired technicians and EMP cell members.

6. Odour

Note: Odour is not an issue; no bad odour is generated. Odour, if any, cannot be measured yet. Theoretically odorant unit should be within 10.

7. Chemicals

Objectives

- To manage the storage, handling and uses of chemicals in an eco-friendly way, to avoid or prevent any chemical hazards.

Legal requirement

- Comply with Prevention of Hazards from Chemical Substances Law, 2013; abide strictly to safety transportation, storage, handling and uses of chemicals, safety equipment and PPE, uses of MSDS and Pictogram.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Manage for safety transportation and storage of chemical.
- Kept all bottles, containers, vases on shelves in laboratory room.
- Manage for safety handling and uses of chemical.
- Deploy experienced lab technicians.
- Ensure the quality testing laboratory is of standards.
- Used chemical bottles and containers to be regularly disposed at the landfill.

Monitoring plan

- Monitor the factory laboratory and activities taking place inside the laboratory; ensure that lab technicians are performing a good working practice and good safety practice.

Frequency – weekly/monthly.

Also monitor effectiveness of mitigation/corrective measures taken.

Budget and responsibilities

No separate budget for procuring chemicals for EMP purpose; all are borne by the main budget; no technicians have to be hired; all lab technicians are well-paid staff of the factory.

Responsibilities – EMP cell members and lab technicians.

8. Water quality

Objectives

- To prevent pollution of ground water.
- To control/manage water quality and quantity; not to pollute the water environment.

Legal requirement

- Comply with Myanmar National Drinking Water Standard Guideline, OEHD.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Ensure no wastes (solid, liquid) are indiscriminately disposed/discharged
- Apply recirculation water (cooling ponds) system.
- Create systematic drainage system in the first place.
- Wash equipment and vehicle in designated areas.
- Avoid spills on ground; should spill occur do not wash down with water but use absorbents.
- Set up fuel drip trays and bund fuel depot to protect soil, and hence water.
- Maintain machinery and vehicles to prevent spills or leaks.
- Manage water conservation; reduce water consumption, educated workers for this.
- Test water quality semi-annually (hire technicians).
- Conduct weekly visual inspection of water condition.

Monitoring plan

Parameter to be monitored: total coliforms, taste, odor, color, turbidity, arsenic, lead, nitrate, manganese, chloride, hardness, iron, pH, sulphate, total dissolved solids.

Monitoring Point – Project site: N 21° 40' 21.51", E 96° 8' 22.06"

Taung Yinn Village: N 21°40'16.43", E 96° 7'59.40"

Bellin Village: N 21°40'23.26", E 96° 7'39.34"

Frequency – Semi-annually (have to hire technicians)

Visual inspection of water condition: weekly.

Also monitor effectiveness of mitigation measures taken.

Budget and Responsibilities

Budget: Ks 600,000 (once off cost)

Responsibilities: hired technicians and EMP cell members.

9. Erosion and sedimentation

Objective:

- To avoid, prevent, manage and mitigate potential erosion and sedimentation;
- To maintain natural ecology as far as possible.

Legal requirement

- Comply with the Environmental Conservation Law, (2012) and Environmental Conservation Rules, (2014); not to cause destruction of soil structure and profile, and conservation of soil ecology.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Ensure that activities do not impact soil structure.
- Minimize the area of bare soil exposed as practical as possible (do not clear the vegetation more than necessary leaving large area of bare land).
- Create sound drainage system; the factory compound has a network of drainage.
- Run-off from areas adjacent to the site will be diverted (construction of small diversion canal/drainage).
- Control sediment if necessary, inside the compound.
- Ensure that the soil profile of the site is stable and not easily eroded.
- Regularly monitor erosion (rainy season).

Monitoring plan

- Regular visual inspection of ground and soil condition only.

Monitoring point:

- Inside the factory premise
- Frequency – weekly during raining season (wet months); monthly during dry months.

Also monitored effectiveness of mitigation measures taken.

Budget and responsibilities

Free of charge (all EMP cell leader and members are well-paid employees of the factory no extra fees for them; no EMP contractor exist in Myanmar yet, for hire).

Responsibilities – EMP cell leader and EMP cell members.

10. Biodiversity

Objectives

- To protect and conserve the biodiversity of the area as far as possible.

Legal requirement

- Comply with the Conservation of Diversity and Protected Areas Law, 2018; not to impact or destroy natural habitats and biological ecosystem.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Plan for minimum disturbance to the flora and fauna if any.
- Do not clear any vegetation more than necessary.
- Avoid open burning of debris.
- Educate workers for fire awareness and protection; get rid of all debris that can cause fire.
- Implement rehabilitation to promote natural vegetation establishment after Construction Phase.
- Prevent the potential injury or death of small wildlife due to vehicular movements especially during night time.
- Avoid the use of excessive bright light for long hours at night to prevent the aggregation and eventual death of large number of insects.
- Plant trees, create green belt and green landscaping.

Monitoring plan

- Monitor the situation of flora and fauna in the surrounding area (both natural and artificial flora and fauna).

Monitoring point – the whole surrounding area where flora, fauna exist.

Frequency – quarterly (during dry season, wet season, cool season).

Also monitor effectiveness of mitigation taken for biodiversity.

Budget and responsibilities

Free of charge (all EMP cell leader and members are well-paid employees of the factory no extra fees for them; no EMP contractor exist in Myanmar yet, for hire).

Responsibilities – EMP cell leader and EMP cell members.

11. Occupational Health and Safety

Objectives

- To prevent workers from any occupational health risks and accidents; to create a safety working atmosphere for workers,
- To provide free health cares for workers.

Legal requirement

- Comply with Occupational Health and Safety Law, 2019; Prevention and Control of Community Disease Law, 1995; to ensure for a healthy and productive workforce for successful implementation of the project.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Plan and manage for creation of a safe working environment, (safe working place and working condition for all staff.
- Provide adequate portable drinking water, lavatory facilities
- Provide healthy living space (housing) and clean eating areas.
- Provide sufficient natural light or artificial illumination and good ventilation system.

- Create emergency exist.
- Workers are providing with PPE, where necessary.
- Conduct annual medical check-up for all.
- Emergency and logistics plan for sick and injured staffs; treatment at clinic; admission to nearest hospital.

Training

- Induction training (new task employee training) for workers covering: knowledge of materials, equipment, tools; known hazards in the operation and control; potential to risk and precaution; hygiene requirement; wearing of PPEs; appropriate/emergency response to accident, to natural disaster.
- Education and training for safety handling and operation of machinery, equipment; safety storage, handling and uses of chemical, fuels etc.
- Provide OHS training for all staff; educate and train them for good working practice, good safety practice, good housekeeping practice, good health and hygiene practice.
- Provide firefighting training and First Aid training.

Physical hazards

- Design all machine to eliminate trap hazards; extremities (hands, fingers) are kept out of harm way during operation; avoid machinery accidents by all mean.
- Ensure that no worker is exposed to noise level greater than 85-90 dBA. (Provide ear muffs, ear plugs).
- Avoid, prevent whole body vibration, and hand-arm vibration. Reduce working hours for high level noise and vibration works.

Electrical

- Use new electric cords, cables, device and equipment; regularly check them for faults.
- Mark all electrical devices and lines with warning signs.

Hot work

- Provide PPE, e.g. protective suits including insulation gloves and boots to workers working near hot spots.

Industrial vehicle driving and site traffic and outward traffic

- Train operators in the safe operations of forklifts, etc.

Ergonomics, repetitive motions and manual handling

- Ensure that workers are not subjected to excessive repetitive movement, over exertion and excessive manual handling to prevent strain, sprain, and injuries.
- Use mechanical labour rather than manual labour; apply automation system as far as possible.

Potential chemical hazards

- Small quantity of hazards chemical (acids) have to be used in laboratory.
- Educate train and supervise staff for safety storage, handling and application.
- Label chemical (pictogram).

Fire and explosion

- Fuel and flammable storage in secured spots (safety fuel depot).
- Store flammable away from ignition sources and oxidizing materials.
- Keep adequate fire extinguishers, equipment, (firefighting pond to be always full of water).
- Define and label warning signs for all fire hazards and explosion hazards area.

Monitoring plan

- Regular inspection of work places and working condition.
- Monitor log book on accident, injuries, sickness; number of patients treatment at clinic and admitted to hospital.
- Inspection medicines and drugs; refill where necessary
- Monitor First Aid training.

Parameter to be monitored: working conditions.

Monitoring point

- Inside the factory, coordinates: N. Lat. 21° 40' 25.03", E. Long. 96° 8' 24.58".

Frequency: daily and weekly.

Also monitor effectiveness of mitigation/corrective measures taken.

Budget and responsibilities

Budgets: Ks. 9,965,650 costs for provision of medicines and drugs and First Aid facility. (This will be from the allotted EMP fund, where 10% of the fund under emergency programme.)

Responsibilities – Trained first aid workers and EMP cell members.

12. Community Health and Safety

Objectives

- To ensure that the activities of the project do not have any adverse effect on the health and safety as well as social well-being of the local community.

Legal requirement

- Comply with Myanmar Public Health Law, 1972; the Prevention and Control of Communicable Diseases Law, 1995; the Environmental Conservation Law, 2012 and the Environmental Conservation Rules, 2014.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Control smoke and dust as practical as possible; avoid open burning of debris and trash so that smoke will not reach the villages; educate the driver to lower speed when passing near or through the villages (the reduction of speed from 40 km to 35 km can reduce dust to 50%, it is learnt).
- Locals should be able to file complaints regarding dust, noise and vibration (through GRM system).
- Also ensure that domestic solid wastes, liquid waste water and drainage do not become breeding ground for flies, mosquitoes and insect for prevention of vector borne diseases and water borne or water related disease.
- Prevent the occurrence and spread of infectious and communicable diseases by all means; undertake health awareness and educations initiative (health education campaign) in local community as far as possible. The clinic at the site also provide health care for locals as practical as possible.
- Avoid/minimize by all means, vector borne, water borne (water based, water related) disease and communicable diseases that would result from project activities. Liaise with Township Health Authority regularly.
- Avoid/minimize by all mean spread of diseases from workers. Educate long distance truck driver regarding sex education example for use of prophylactic condom; prevent spread of STD, HIV/AIDS.
- Educate workers regarding code of conducts, social conducts, etiquette and local culture and tradition.

- Educate drivers for safe driving and defensive driving and to comply with rules and regulation regarding traffic; also conduct road safety education campaign for the local community, if possible; locals should be able to file complaint regarding traffic (through GRM system).
- Comply with law and regulation relevant to transportation of hazardous materials such as fuel oils; also plan for measures for preventing and/or mitigation the consequence of accidental release/spill of (fuel oil); avoid/minimize community exposure to hazardous materials.
- Develop emergency preparedness and emergency response plan and contingency plan (action plan) for effective implementation when necessary. Conduct rehearsals or drills for such plan. Cooperation with local community and authority in preparation of emergency plan.

Monitoring plan

- Monitor the overall health situation of the 2 nearby villages; occasional inquiry of the health issues of the villagers at two villages nearby, providing Health Education; giving health education lectures.

Parameters to be monitored: overall health situation of locals.

Frequency: annually (with the help of personnel from Sint Kaing Township Health Department).

Budget and responsibilities

Budgets: Ks 6,975,900 costs for fees or courtesy gifts to Township Health Department personals who will give health educative speeches and lectures. (The expenses will be from the allotted EMP fund, where 7% of the fund under capacity building and training.)

Responsibilities

EMP cell members and personals from Township Health Department (who will be requested to help execution of Community Health and Safety programme).

13. Cultural heritage

Objective

- Not to have any adverse impact on the cultural/religious heritage (monasteries and pagodas and churches) in the area due to activities of the project.

Legal requirement

- Comply with "the Protection and Preservation of Cultural Heritage Region Law, 2019", "Protection and Preservation of Ancient Monument Law, 2015"; protect the religious component of the surrounding area.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase. Most are already implemented and on-going.

Management action

- Ensure that the factory has no negative impact on the nearby villages monasteries.
- Monitor the situation bi-monthly; conduct visual inspection of the said monasteries.
- Pay courtesy visit (obeisance visit) occasionally the abbot monks of the monasteries and offer cash and kinds.
- Try to build good and cordial relation with the Buddhist communities.
- Get involve in religious festivals; provide donations.

Monitoring plan

- the villages Buddhist monasteries of the two villages.

Frequency – occasionally, especially during religious festivals days.

Budget and responsibilities

Budget: appropriate Ks 2,500,000 per year for donation and charities for the above mentioned monasteries. The money will be from CSR programme fund, not EMP fund.

Responsibilities – the factory manager and EMP cell members.

14. Employment and training

Objectives

- To prioritize employment of the locals as practical as possible; to organize induction training and long term professional training.

Legal requirement

- Comply with Employment and Skill Development Law, 2013.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Plan for human resource development.
- Prioritize employing locals as far as possible.
- Organize new task employees for job training.
- Also provide systematic induction training for new workers to enable them to do their jobs efficiently.
- Induction training will cover: general training; skill training for efficiency and mandatory training relating to health and safety (e.g. safety operation of machinery and handling of hazardous materials such as fuel.
- Educate and train them for good working practice, good safety practice, good health and hygiene practice and good environmental awareness practice until all these practices are ingrained in their mind sets and become good habits.
- Educate and train them for familiarization with negative impacts and subsequent taking of mitigation measures.
- Educate and train them for basic eco-friendly behaviours e.g. good house-keeping practice, do not litter, do not dirty your place, minimize the use of water, fuel.
- More specific training for operation of heavy machinery and specific machinery and equipment and heavy trucks will be organized.
- Review on the effectiveness of training will be done for improvement.
- Overall regular monitoring of activities at the site will be conducted.

Monitoring plan

Monitoring sites – all main work places inside the factory compound (inspect/monitor training programme, training course, training in process; work efficiency of workers).

Also monitor effectiveness of training programme: monthly or every training session.

Budget and responsibilities

Budgets

- Free of charges (the company's senior staff member, technicians and experienced staff with educate, train and supervise new workers.
- However, appropriate Ks 2,000,000 (fees and courtesy gifts for trainers and educators from relevant governmental department).

Responsibilities

The factory managers, senior staffs and EMP cell members.

15. Emergency response

Objectives

- To maintain emergency preparedness, and response to any emergency in a systematic and effective way.
- To execute emergency response plan, emergency procedure plan, rescue operation plan, contingency plan and aftermath plan, all in a systematic manner.

Legal requirement

- Comply with Fire Brigade Law, 2015; Factories Act, 1951; Occupational Health and Safety Law, 2019.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Prepare Emergency Response Plan (ERP) and team to prevent fatalities and injuries, to reduce damage and to protect environment and community.
- Prepare emergency preparedness plan execute the plan.
- (Emergency Response Plan will cover emergency resources, emergency preparedness and training, emergency response procedures, administration of the plan, first aid work, rescue operation works, communication and procedures, and debriefing and post-traumatic stress procedures.)
- For practical purpose provide training for firefighting, training for First Aid and Rescue.
- Provide facilities (e.g. fire extinguishers, equipment, suit, first aid kits, emergency vehicle).
- Display phone members of Firefighting Department, Ambulance Services, Red Cross Society, Hospital and Police Station.
- Review on the effectiveness of training will be done for improvement.
- Regular monitoring of all activities at the project site will be conducted.
- Mock drill for ERP will be conducted, on a regular basic; bi-annually.

Monitoring plan

- Monitor fire fighting training activities during training session,
- Monitor First Aid training activities during training session.
- Also monitor rehearsal or mock drill session for emergency response.
- Monitor activities at main work places on a daily or weekly basis.
- Inspect facilities for emergency preparedness.

Frequency

- Daily or at least weekly at all main work sites; monitory training only during training session; monitor mock drill only during drill session.

Budget and responsibilities

Budget – Ks 9,000,000, set aside for execution of emergency response plan. In case of major accident like major fire budget for emergency will be used mainly for compensation for injured, sick or dead employees; and also for rehabilitation of injured and disable employees.

No other fees or charges as emergency response plan will be executed by EMP cell members who are well-paid employees.

Responsibilities

EMP cell leaders, EMP cell members and some staff trained for emergency response.

16. Traffic safety

Objectives

- To ensure for the safety of traffic in the area.
- To avoid traffic congestion along the access road and particularly at the intersection where the access road meets the High way.
- To aim for zero road/traffic accidents.

Legal requirement

- Comply with Vehicle Safety and Motor Vehicle Management Las, 2020; the High Way Law, 2000 and regulation regarding road traffic.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule:

- The sub-plans will be implemented during the Operation Phase.

Management action

- Plan for traffic safety; try to achieve zero traffic accident.
- Draw up a traffic management plan.
- Set up more signage's for speed limits, if necessary, e.g. near schools, public places.
- Schedule the logistic, especially for trucks.
- Avoid over loading trucks; comply with regulation.
- Cover haulage (cement bags, coal, sand etc.) with tarpaulin to prevent spills.
- Educate driver (heavy truck drivers) for driving at reduced speed and adhere to the principle of defensive driving.
- Educate drivers for complying with traffic and road regulations.
- Provide traffic education, not only for drivers, but also for motorcyclists.
- Keep a log book for each vehicle.
- Check the arrival and departure of all vehicles at the site.
- If possible, conduct education campaign for traffic to the local communities.

Monitoring plan

- Inspect the condition of the vehicles fortnightly;
- Monitor traffic on the access road on a weekly basis.
- Monitor the daily arrival and departure of vehicle at the factory premise.
- Monitor the log book for each vehicle on a weekly basis.

Monitoring point: at a point on the access road outside the factory.

Frequency: daily, weekly and fortnightly as mentioned above.

Budget and responsibilities

Free of charge. The EMP cell members who are well-paid employees will do this work free of charge.

The costs for vehicular repairs or maintenance will be borne by the main budget, not by the EMP fund.

Responsibilities

EMP cell leader and EMP cell members.

III. During Decommissioning Phase

The issues or component to be managed and monitored during the Decommissioning Phase are much lesser in numbers and smaller in magnitudes. After Operation Phase virtually all activities to an end.

Management and monitoring sub-plans during Decommissioning/Rehabilitation Phase

1. Air quality

Objectives

- To prevent pollution of air.
- To ensure that air quality is not deteriorated after the end of the operation of the project.
- To ensure that ecology of the area is not degraded at the end of the project.
- Ensure that the site remain an environmentally healthy site for the local people.

Legal requirement

- Comply with NEQEG (emission) guideline (2015); Code No.1.1, Environmental Conservation Law, 2012.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub-plan will be implemented during the Decommissioning/Rehabilitation Phase.

Management action

- Try to manage and control all Decommissioning works
- Test the air quality once at the early stage of Decommissioning Phase and test another one for the last time at the end of Decommissioning Phase.
- Ensure that the air quality remain in good condition after the end of the project.

Monitoring plan

- Monitor Decommissioning activities daily or weekly
- Monitor air quality testing during early phase and monitor for the last time at the end of Decommissioning Phase.

Parameter to be monitored: NO₂, SO₂, PM₁₀, PM_{2.5} and O₃.

Monitoring point : Project site: N 21° 40' 25.79", E 96° 8' 21.84"

Taung Yinn Village: N 21°40'16.65", E 96° 7'58.78"

Bellin Village: N 21°40'23.82", E 96° 7'40.34"

Budget and responsibilities

Budget: Ks 3,000,000 (once off cost)

Responsibilities: hired technicians and EMP cell members.

2. Water quality

Objectives

- To prevent pollution of water.
- To ensure that water quality do not deteriorate after the end of the Operation Phase.

Legal requirement

- Comply with Myanmar National Drinking Water Standard Guideline, OEHD.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub-plan will be implemented during the Decommissioning Phase.

Management action

- Test water quality at the beginning of Decommissioning Phase.
- Test water quality for the last time near the end of Decommissioning Phase.
- Maintain good housekeeping habit; avoid discarding solid or liquid wastes into the ground by all means.
- Avoid accidental spills of fuel oil.
- Maintain machinery and vehicles to prevent leaks.

Monitoring plan

- Monitor all Decommissioning activities.
- Monitor water quality of the stream.

Parameters to be monitored: pH, chlorine, total hardness, total iron, sulphate, turbidity, manganese, TDS, copper, arsenic, cyanide and zinc.

Monitoring point: Tube well

Coordinate: N. Lat. 21°40'21.51" and E. Long. 96° 8'22.06"

Frequency: once during early Decommissioning Phase.

once during the end of Decommissioning Phase.

Budget and responsibilities

Budget: Ks. 1,000,000 (once off cost)

Responsibilities: hired technicians and EMP cell members.

3. Soil quality

Objectives

- To prevent contamination of soil.
- To ensure that soil quality is not degraded after Operation Phase of the project.

Legal requirement

- Comply with Environmental Conservation Law, (2012) and Environmental Conservation Rules, (2014); protect and conserve land environment.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub-plan will be implemented during the Decommissioning Phase.

Management action

- Conduct regular visual inspection of ground and soil.
- Prevent destruction of soil structure during this phase.
- Also prevent contamination of soil such as oil spills or leak; remove spill immediately, if any.
- Level the ground, refill and rake the soil to maintain soil profile and soil condition.
- Ensure that the soil ecology remain intact after the end of the project.
- Test soil quality for the last time; ensure that the site is ecologically restored.

Monitoring plan

- Monitor the Decommission activities daily or regularly.
- Monitor soil restoration activities weekly or regularly.

Parameter to be monitored: soil quality (with the aid of hired technicians).

Monitoring points: Project site, Bellin and Taung Yinn.

Frequency:

- Monitor decommissioning activities : daily
- Monitor soil restoration, reclamation - weekly test soil quality for the last time.

Budget and responsibilities

Budget: Ks 4,000,000 (once off cost)

- Soil quality to be analysed by hired technicians.

Responsibilities – hired technicians and EMP cell members.

4. Erosion and sedimentation

Objectives

- To avoid, prevent, manage and mitigate potential soil erosion and sedimentation.
- To maintain natural ecology as practical as possible.

Legal requirement

- Comply with Environmental Conservation Law, (2012) and Environmental Conservation Rules, (2014) not to cause destruction of soil profile, and conservation of soil ecology.

Overview maps, layout map, images, aerial photo, satellite image

- These are already shown earlier in Chapter 4 and Chapter 5 will not be repeated here.

Implementation schedule

This sub-plan will be implemented during the Decommissioning Phase.

Management action

- Continue erosion control management applied during the Operation Phase.
- Keep drainage system inside the factory intact also keep natural drainage system in the vicinity intact.

- Ensure that Decommissioning activities do not impact soil structure and soil profile.
- Ensure that the soil profile is stable and not easily eroded.
- Conduct visual inspection of the land and soil especially during the rainy season, to tackle any issue of erosion.

Monitoring plan

- Monitor decommissioning activities daily or weekly.
- Monitor the drainage system on a regular basic – weekly or monthly especially during rainy season.
- Conduct regular visual inspection of the site and environ.

Parameter to be monitored: soil structure, soil profile; any potential erosion phenomenon.

Monitoring point: inside the factory compound.

Frequency: from time to time; weekly or monthly during wet months.

Budget and responsibilities

Budget: free of charge (EMP cell members who are well-paid staff will manage this issue).

Responsibilities: EMP cell leaders and EMP cell members.

Commitment

The project proponent, Sann Shinn & Brothers Co., Ltd is committed to implement the environmental management plan in a meaningful and effective way so that there will be no serious adverse impacts on the environment of the surrounding area. Adequate fund will be provided for the implementation of EMP and priority will be given to mitigation and monitoring works.

U Kyaw Myint Oo

Director

Sann Shinn & Brothers Co., Ltd.

9. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Public consultation is an integral part of EIA/IEE and EMP. Involving the public and stakeholder participation in the EIA/IEE/EMP work is fundamental to increasing the understanding and acceptance of the project.

Public consultation and participation should be started as early as possible in the preparation of EMP. And it has to be a continuous process, especially during the Operation Phase, carry out from time to time.

Purposes of the consultation during the preparation of the EIA/IEE/EMP report

- To enlighten the locals/stakeholders about the project.
- To increase the understanding and acceptance of the project.
- To give the locals/stakeholders the opportunity to present their views, opinions, perception of the project, express their concerns, complaints, grievances etc.
- To identify impacts and issues that are not immediately obvious to project proponent and the EIA/EMP team.
- To access social assistant and community development needs for the locals/stakeholders.
- To gain community consent and to interact with the people to further strengthen existing cordial relationship.
- To tap local knowledge and to negotiate for mutually beneficial future that is sustainable and locally relevant.

Requirements for public consultations:

- Public consultation should be conducted in the early phase of project
- Must ensure the direct involvement of the locals/stakeholders
- Must ensure that all locals/stakeholders who are interested will have the chance to fully participate, especially the vulnerable and marginalized group,
- It should be a continuous process --- throughout the entire phase of the project, especially during the long Operation Phase, and
- There must be an action plan or response programme such as complaints and grievances mechanism (CGM) to tackle any issue.

9.1 Methodology and approach

Standard methodology applied here includes:

- (i) **Consensus building:** First of all a pre-sensitizing visits to the local authority (Village Administrator and party, elders) and briefing on the proposed project was carried out, and ask for their approval and assistant for holding the public consultation.
- (ii) **Transect walk:** site visit (visit to the village) and conduct observation and visual inspection and photography.
- (iii) **Actual public consultation meeting:** mainly involves disclosure of the proposed project and giving complete and accurate information; consultation mainly in the form of two-way conversation --- listening and talking; waiting for their response; further discussion.
- (iv) **Interviews and discussions:**
 - In the form of KII/SS, (Key Informant Interview/Secondary Source) for the gathering of secondary baseline socio-economical data and community profile with the aid of questionnaires (structured questionnaires or pre-designed questionnaires).
 - In the form of FGD (Focal Group Discussion); interview with few selected people (authority, knowledgeable persons) especially for ranking the pressing need of the locals for prioritizing the needs for community assistance and implementation of CSR.
 - In the form of House Hold Interview (HHI) for gathering baseline/primary information/data on the social and economic profile structure of the community. (HHI not conducted as the report will not be a social science research paper report.)

In conducting public consultation meeting attention will be made on stakeholders and Project Affected People (PAP), and first priority will be listening to their comments, views and opinions and grievance, if any. In this project context the stakeholder and PAP are local people of Bellin Village and Taung Yin Village. The staffs and employees from the two adjacent factories, the Incense/Joss stack factory and Myanmar Linn Kyan Shoe Factory are also the stakeholders. In addition staff and employees from the Prison Department (in the north), from Housing Complex of MEPE (in the south) and from MEC Co., Ltd (in the east) are all stakeholders and potentially effected people.

9.2 Summary of consultation and activities undertaken

I. Preliminary public consultation meeting during the scoping study

A preliminary public consultation was held on 20-2-2020 between the responsible officers of the company and the locals. The village administrator and members, village elders and interested person and stakeholders have attended the consultation meeting. It was actually a sensitizing visit and briefing, explaining the proposed project to the locals and stakeholders and listen to their views and opinions.

Date : 20-2-2020
Time : 09:30 – 10:35 hrs
Venue : At the factory compound underneath trees
Attendees : 40 persons

(All heads of households are invited.)

Minutes of meeting

First of all U San Nyunt Oo, the factory manager, gave an address.

U San Nyunt Oo (factory manager): Mingalabar to all. My name is San Nyunt Oo. When building a factory we can guess who will get the benefits. How the factory will benefit the nation. Our factory is no doubt a benefactor.

Our factory will produce fiber cement boards. During our grandfathers/grandmothers day they had to use the wood and the forests are already gone now. But after this factory materialized there will be change. The building materials will be not from timber but from the finished products of the factory. Formerly building materials such as cement had to be imported. Now not only cement but fiber cement board will be manufactured. The factory will provide jobs for the locals and we will be proud of our products. The project will contribute to the minimized use of timber and consequently to the conservation of forest.

We will procure raw materials such as sand (48.6%) from the area; cement (32.2%) from crown cement factory. There are two types of fibers, soluble and insoluble. We will use the insoluble one (about 9.7%). Quality fiber will have to be imported from US and Canada. Quick lime powder will be procured locally. The raw materials to be imported are 9% of the total. We will need workers for the proposed factory and well will prioritize the hiring of the local people. Thank you.

U Myint Kyaw Thura (team leader, MESC): Mingalarbar to all the village elders, the locals and stakeholders. Thank you for giving your time to attend this meeting. My name is Myint Kyaw Thura and my organization is Myanmar Environment Sustainable Conservation (MESC) Co., Ltd. Our organization is a neutral one, neither on the government side nor on the company side.

We have experiences with well over 50 projects. Our work involves the environmental affairs of a project. We have botanists and zoologists to study plants and animals. This is just a preliminary study trip. During the subsequent EIA study we will measure the quality of air for 24 hours period. The air quality will be tested whether it is up to guideline values or not.

Water samples will be collected and quality will be also tested. In the same way soil samples will be collected and tested.

We will also make visual inspections and conducts studies on the socio-economic aspects of the area. The findings will be incorporated into the report. All the impacts, both negative and positive, will be studied, documented and incorporated into the report which will has to be submitted to the authority.

After scrutinizing our report the authority will make decision for the proceeding of the proposed project. We have held this public consultation meeting which is a must in this era of environmental awareness. All aspects have to be transparent. You are given the chance to ask questions, make comments and express your views, opinions and concerns. The pro and con of a project is best understood by the locals who can see and feel the impacts, if any, every day. I invite you to express your views and opinion in a candid manner so that we can know the real situation.

U Myint Aye, a local elder: As factories are emerging in our area we appreciate the situation. Our locals are mostly poor and so they have to do hard manual jobs for living. As factories are sprouting in our area our off springs are employed and the living conditions have improved. I appreciate the increase in factories in our area. There is only one thing I want to make a point. Whichever companies come and established factories they should prioritize hiring our local youths. Thank you.

U San Nyunt Oo (factory manager): Our company's authorities are considerate people who always consider for their staff and workers. I have witness this personally. When employing workers for the factoring the locals with be given the first priority. But we would like to run the factory with only honest and hardworking employees. We will train our employees in a systematic way to work and live according to the rule of conduct for an employee. We need hardworking and honest employees. The technology is high but we can employ the local youths and train them for skill. Thank you.

U Wai Moe, a local: I want to know whether there will be odour (bad odour) due to the activities of the proposed fiber cement board factory.

U San Nyunt Oo (factory manager): Unlike some other factories our factory does not emit malodorous odour; this is not a food factory or animal feed factory. I guarantee this. We mix the raw materials with water and heat the mixture. During heating the water evaporates slowly and we cut the boards with cutter. There can be no impact. We use high technology and therefore impacts, if any, are minimized and there will be no bad odour as from some factories. We do not let the particles (dust) generated to disperse but are trapped in filter bags and reuse the particles. You can come and study our factory when it is in operation.

U Than Win Aung, a local elder: I want to know if the testing of air, water and soil benefit the project or the villages nearby.

U Myint Kyaw Thura (team leader, MESC): Thank you for asking this question. The machines that measure the air quality are quite effective. The testing of air quality is done not for any beneficiary. It is simply done for knowing the baseline data value of air quality. If no such testing is done prior to the operation of the factory we will have nothing to compare the air qualities of before and after the operation of the factory. We have done this and compare the pre and present situation to know if there is any impact. Air will be measured not for once but every 6 months according to instruction. In this way whether the situation has worsen or improved can be known. If worsening appropriate mitigation measures will be taken. So what I want to say is that the test of air quality is done not for any one benefit but only for knowing the value of air quality.

U San Nyunt Oo (factory manager): Our company does not discriminate any employees but regarding them all as our comrades. We will provide housing and food for all our employees. But we also hope for the honest of and royalty from our employees. Any employee can enjoy all the rights and benefits accordingly prescribed by the Ministry of Labour, Immigration and Population.

U Than Htike, a local: No other factories in the neighborhood have held such a public consultation meeting. On the other hand I want to tell our local people not the take advantage of the good intention of the company. Employees will have to live and work according to the regulations of the company. The company has to invest a lot of money for the project and also more time and money for training new employees. Our local youths on the part should be considerate and show understanding for this matter. Or behalf of our local people are thank the authority of the company for holding such public consultation meeting.

The meeting was over at 10:35 hours.



Figure-98: FGD



Figure-99: KII



Figure-100: Preliminary public consultation meeting

9.3 Result of consultation (preliminary meeting)

During the meeting four local elders, U Myint Aung, U Wai Moe, U Than Win Aung and U Than Htaik asked question and/or gave comment. U Myint Aung and U Than Htaik have spoken in support of the project. U Wai Moe wanted to know if there would be any bad odour emitted during operation of the factory.

U San Nyunt Oo, the factory manager, replied that there will be none as the factory is not a food factory or animal feed factory involving organic food compounds. And that all of you can come and study the factory when in operation.

U Than Win Aung wanted to know why air quality is tested. Is that for the sake of the factory or the sake of the local community? The scoping leader, U Myint Kyaw Thura replied that air quality is measures just to record the baseline data. Only then can we compare the quality of air before the operation of the factory and during the operation of the factory and take necessary action. This was done for the good of all local community and factory's employees.

The meeting has ended in a cordial and friendly manner. There are many factories operating in Kyaukse District providing good employment opportunities for the locals. The locals on their parts have realized the benefit of factories existing in their area. Kyaukse District is traditionally an agricultural region since the time of the great king, Anawrahta. However, many of the farms today are not so productive and traditionally the locals are mostly poor. When one factory is set up on a former farm land the use of that land becomes more beneficial for all. These factories provide more permanent jobs with steady income. The living standards have also improved to a great extent for many locals. The only drawback is the lack of regards for the environment by certain companies doing business in this area. Sann Shinn and Brothers Co., Ltd will take lesson from such irresponsible companies and do its best for protection of the environment.

II. Public consultation meeting during the EIA study

During EIA study trip a public consultation meeting was held at the office of the fiber cement board factory on 2-11-2022.

Venue	: at the factory
Date	: 2-11-2022
Time	: 10:00 to 11:00 am
Attendees	: 74 persons

The meeting was attended by the village Administrators of Bellin and Taung Yinn villages, Chairman of the local welfare association, the factory manager and responsible officers and MESCS, EIA leader and members and interested persons.

The factory manager, U Aung Myo Htun

Mingalarbar to all. I am the manager of this factory and we will produce cellulose fiber cement boards using the raw materials, cement, sand and pulp.

The factory has smoke stack but the water sprinkler system is installed and this greatly reduce emission from the stack. When the water is sprinkler the ash and PM in the smoke mix and react with water and the ash settle down. It is then removed into the ash pond and then to a series of sedimentation tank. The supernatant water is recirculating thus minimizing waste water. The sediment is removed from time to time and used in refilling work.

The construction work is now 95% completed and it expected that the factory can be test run in the mid 2023. At the moment we have procured raw materials and experts are installing machinery/equipment.

When the factory is in operation we will employ 80-100 employees. At the moment some 45 staffs/employees are already employed. We prioritize employing the local people.

U Myint Kyaw Thura (MESC)

Mingalarbar to all. My name is Myint Kyaw Thura. Thank you all for attending this meeting. The name of our consultant firm is Myanmar Environment Sustainable Conservation (MESC). We usually have such meetings attended by local authority, officers from various governmental departments and stakeholder in large number. Owing to the pandemic situation and local condition this meeting is a limited meeting.

Our team has been to this site in 2020, this is the second time. Our firm is a neutral third party and the duty is doing only environmental studies. The firm is officially registered by the government.

Our firm has already conducted more than 70 EIAs. We conduct studies on air, water and soil qualities as well on plants and animals both terrestrial and aquatic. Studies are made before the operation of the factory and again when it is in full operation. All the findings/results have to be to the relevant authority.

One of the important aspects of the report includes the perception of the locals on the project. We therefore, invite all of you to participate in this meeting, ask questions and express your opinions, views and concerns, frankly.

Thank you.

U Tin Nyunt, Administrator of Bellin village:

I have nothing to talk about the environmental condition. I want to ask the authority of the factory to check all the complete bio-data of all villagers who are applying for job at this factory. For those applying for job they must have complete testimonials from the local authority. We will give letter of recommendation to only those who can provide original national identity card.

I am satisfied with the explanation given by the factory manager. As our villagers will be employed at this factory I will do my best to help the factory officers if there is any help they need. Thank You.

U Htun Myint, Administrator of Taung Yinn village:

I have nothing not to say against this project. But I would like you to give priority to our villagers when employing workers, if they are qualified. There are many migrant workers coming from elsewhere living in Taung Yinn village. Therefore, I ask you to give first priority to the real locals for employment at your factory.

U Than Htike Soe, Chairman of the local social welfare association

There are over 50 factories in our region but so far public consultation meeting is held only at this fiber cement factory. All the other factories have little or no regards for the environment.

I would like to ask the factory authority to take effort for environmental conservation. The waste generated from the factory will have negative impact only on our local people. Therefore, I would like to request the factory authority to seriously consider and undertake environmental protection effort.

It is very good to have such a factory which carries out environmental protection in a transparent manner. Actually I am glad to see the establishment of factories in the area; our local people will have more job opportunities.

U Myint Kyaw Thuar (MESC)

Thank you for your discussion and comments. This factory is one of the factories owned by the parent company, the Ngwe Yi Pale' group. As far as I know, Ngwe Yi Pale' has applied many new environmental protection technologies that are not yet applied by other companies.

I have seen many big and small trees planted in the factory's premise. These trees are effective dust traps and dust absorbers.

When the EIA report is approved our firm will still have to conduct semi-annual environmental quality testing on air, water and soil and submit the report to the authority.

The factory manager

Our factory will use two chemicals, only from time to time; there can be only negligible impact, if any. The water used for chemical is not discharged but recycled. We have no separate chemical store.

U Myint Kyaw Thura (MESC)

Unlike certain factories that have to use a variety of chemicals in large quantity, there will be only negligible negative impact from this factory. When a factory is in operation there can be more or less negative impact on the environment. There are a lot of mitigation measures prescribed nowadays. If mitigation measures are duly taken all the impacts can be effectively mitigated or eradicated.

I would like to urge the company to carry on community assistance and development (CSR programme) when the factory is in full operation.

The factory manager

As there are no other comments, I hereby declare the meeting is over.

Thank you all.

The meeting was over at 11:00 am.

Result of consultation meeting

U Aung Myo Htun, the factory manager explained to the participant about the project and how mitigation measure will be taken to minimize the impact on the environment.

U Mying Kyaw Thura (MESC) explained how EIA will be conducted.

U Tin Nyunt, Administrator, Bellin village said that he has nothing to say against the project; and that any villagers applying for the job at the factory must have full testimonials/credential from the authority. Since many villagers will be employed here he will do his best to provide help if the company has asked for.

U Htun Myint, Administrator, Taung Yinn village also said that he has nothing to say against the project; and that company should give first priority the villagers of the village for employment at the factory.

U Than Htike, Chairman of the local welfare association said that there are over 50 factories in this region but none of them have held any public consultation meeting yet. He thanks this factory for doing so.

The emergency of more factories will provide jobs for our locals.

U Myint Kyaw Thura (MESC) said that the trees planted in the factory compound will become effective dust trapper and sequestrator of CO₂ and produce O₂.

The factory manager and MESC leader explained to the participants about the occasional uses of only two chemicals in little quantity and negligible impacts, if any, and the mitigation measures to be put in place.

The MESC, EIA leader also urges the company to continue and carry on CSR programme when the factory is in full operation.

The meeting has ended in a cordial and friendly manner. Only three locals, (the two village administrators and chairman of social welfare association) stood up and expressed their opinions and views.

There were no people who had spoken against the project. They very well realized that the project will provide permanent jobs for them. The soil in this area is not so fertile and many locals are working in various factories in Kyaukse district rather than doing this traditional job, farming.

9.4 Information disclosure

Copies of minutes of meeting are made available at the office of the project proponent and that of MESC.

The overall information for this project as well as the public consultation meeting were made public and launched at the facebook website of MESC: [myanmarensustainableconservation.com](https://www.facebook.com/myanmarensustainableconservation) on 6-11-2022.

When this EIA report is approved, the information will be again launched at the website of the project proponent: www.ngweyipale.com and the facebook website of MESC: myanmarensustainableconservation.com. Copies of the approved EIA report will be kept at the officers of the company and MESC firm for perusal for any interested person. Part of the approved EIA report, for instance, the Executive Summary will be launched at those two said website.

9.5 Further ongoing consultation meeting

Public consultation will be a continuous process throughout the entire project life. During the long operation phase of 30 years regular meetings will be held annually or bi-annually (or depending on the situation whenever there is a need for one such meeting).

The company will heed to the voice of the locals and try its best so that the consultation meetings are meaningful and effective (not a mere formality). All meetings will be a two-ways dialogue (talking and listening).

Grievance Redress Mechanism (GRM)

A grievance redress mechanism (GRM) programme will be implemented throughout the project life period. The GRM will be meaningful and effective, not a mere formality.

When the proposed project is in operation address and the phone numbers of the office at the project site will be made available at the village administration office and also at all Yar-ein-hmoos (members of village administrator committee) offices. The telephone number will act as a hot line for complaint. Any villager can also file any complaint by verbal means or by written statement directly or through the village administrator office.

The liaison officer of the company will give special attention to any GRM.

A log book to document all GRM will be kept and the complaints/grievance handling, response and redress will be effective. The date and time of a complaint, details of complaint, action taken (and if not required the reason why will be explained) and all will be systematically recorded and documented. Post complaint contact, if any, or if required, will be also documented.


The main aim is to tackle all the issues arisen from the local community and solve the problems in a friendly manner for the long term benefits of both the community and the company.

Priority will be given to this GRM programme and prompt action will be taken and it is expected that the issue can be tackled in less than one week.

This GRM programme will be for community grievance of only, not for staffs/employees who can talk directly to the officers of the company at any time of the day, if they have any grievances or complaints.

Commitment

The project proponent, Sann Shinn & Brothers Co., Ltd commits to build good relation with the local community and heeds to their opinions, views and concerns as far as possible. Further public consultation meeting will be held regularly or from time to time as required.



U Kyaw Myint Oo
Director
Sann Shinn & Brothers Co., Ltd.

10. CONCLUSION

This EIA report has been organized, prepared and written in accordance with the rules, regulations guidelines and most of all, the format for EIA prescribed by the Environmental Conservation Department (ECD) of the Ministry of Natural Resources and Environmental Conservation (MONREC).

The report has been prepared with utmost effort with all reasonable knowledge, skill, care and diligence within the term of contract with the client. Recommendations are based on our experience, using professional judgement and based on available information.

Purely from environmentalists point of view there is no reason not to undertake the implementation of this project due to the following facts:

- There are no cases of land disputes or cases of land grabbings, forced eviction and forced relocation or resettlement.
- There are no cultural, historical and archeological sites nearby to be effected.
- There are no protected area, national park or wildlife part, wildlife sanctuary and important bird area, etc to be effected.
- The area is not an ecologically fragile habitat or wilderness containing well-known endangered species of plants or animals.
- There is no wet land or lake where large number of aquatic birds aggregate or no natural reservoir nearby which is the drinking water source for large population centre.
- There is no attractive scenic spot or site of aesthetic beauty for potential recreational centre for tourism.
- The area is not prone to natural hazards, eg floods, draughts, violent storms and landslides.

One can never expect a developmental project devoid of negative impacts. Wherever and whenever a developmental project is implemented there can surely be a more or less impacts on the physical, biological and socio-economic components of the surrounding environment. This is inevitable.

For a Least Developed Country (LDC) like Myanmar with infrastructure lagging behind the development and production of new sound building materials like cellulose fiber cement boards is a real development for the nation Construction Sector.

In this era of environment awareness there are now many well-established guidelines for the prevention or mitigation measures which can more or less eliminate or minimize all or most of the undesirable impacts resulting from the execution of a project. There are also appropriate measures (mitigation, corrective, remedial) that can limit or minimize the impacts as well as measures for maintaining the long term well-being of the environment.

After taken into consideration of all the pros and cons of this project it can be concluded that the advantages outweigh the disadvantages in many aspects. There is no point to stop the implementation of this project but instead proceed with the implementation of this project. The project will contribute to the increase in the GDP of the country and also increase in earning for the nation in the form of tax, duty and revenue. It will bring employment opportunities for many locals and, most of all, contribute greatly to national infrastructure development. There is no doubt that it will be economically viable and environmentally sustainable if all the rules, regulation and statutory requirements are complied with and all mitigation measures prescribed are duly taken.

To sum up, Sann Shinn & Brothers Co., Ltd will:

- comply with all the rules, regulation and statutory requirements
- study and heed to all the impacts/potential impacts addressed in the report and duly carry out all the mitigation/corrective measures prescribed in the report
- implement the EMP, especially all the management and monitoring sub-plans prescribed in the report
- duly undertake the rehabilitation task after the completion of the project

Sann Shinn & Brothers Co., Ltd will do its best and try to become an outstanding and exemplary company among other companies in doing environmentally sound business.

List of commitments

No.	Particulars	Chapter and page
1.	Commitment to comply with laws, rules, regulation, procedure, guideline etc.	Chapter-3, Page – 94, 102
2.	Commitment to implement the project in an ecologically sound, economically viable and socially sustainable way	Chapter-4, Page – 151
3.	Commitment not to cause serious negative impacts on physical, biological, socio-economic, cultural and visual components of the environment	Chapter-5, Page – 195
4.	Commitment to duly take all required mitigation measures effectively	Chapter-6, Page – 246
5.	Commitment not to execute the project resulting in cumulative impacts on the environment as far as possible	Chapter-7, Page – 256
6.	Commitment to implement EMP in a meaningful and effective way and to provide adequate fund for EMP	Chapter-8, Page – 261, 320
7.	Commitment to build good relation with the local community, to heed to all their views, opinions, comments and concerns and tackle all the issues in a friendly way	Chapter-9, Page - 332

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ANNEX




ပုံစံ (၃)

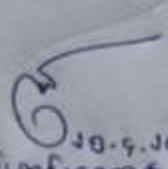
ဘွိုင်လာယာယီအသုံးပြုခွင့်လက်မှတ်
(လုပ်ထုံးလုပ်နည်း အပိုဒ် ၆ အပိုဒ်ခွဲ(ဃ) (ဆ))

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..... ကုမ္ပဏီ..... နိုင်ငံမှ
ထုတ်လုပ်သည့် ဘွိုင်လာအမှတ် ပါသော
သို့မဟုတ် ဘွိုင်လာမှတ်ပုံတင်အမှတ် မ.စ ၉.၇.၇.၆..... ဖြစ်သော..... ဧရိယာ..... ဘွိုင်လာ
ကို နှင့်ပြုမိအား... 1. ၂. ၃. ၄. ၅. ၆..... ဖြင့် လက်မှတ်ထုတ်ပေးသည့်နေ့မှ (၆) လ အသုံးပြုခွင့်
ရှိသည်။ ယင်းကာလအပိုင်းအခြား ကျော်လွန်သည့်အခါ ထုတ်ပေးထားသည့် ဤယာယီ
အသုံးပြုခွင့်လက်မှတ် ပျက်ပြယ်စေရမည်။


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မှတ်ချက်: ဘွိုင်လာဥပဒေပုဒ်မ ၁၅ ပါ ပြဋ္ဌာန်းထားသည့် သက်ဆိုင်ရာအစိုးရဌာန
အဖွဲ့အစည်းက လိုအပ်၍ တောင်းဆိုသည့်အခါ ဤလက်မှတ်ကို တင်ပြရ
မည်။

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Electric Control Panel & Generator

No	Items	Model & Specification	H.S Code	Unit	Qty
	Pulp Section				
1	MCC control cabinet for auxiliary machine		85.04		1
2	Hydraulic pulper soft-start cabinet		85.04		1
3	Pulp refiner soft start cabinet		85.04		2
4	Repair power box		85.04		1
5	Laser level meter		85.04		3
6	Operation box on the site		85.04		3
7	Button box on the site		85.04		1
	Quartz sand slurry preparation section				
8	10 KV incoming cabinet		85.04		1
9	10KV motor protection and control cabinet		85.04		1
10	UPS power (1KVA)		85.04		1
11	Liquid resistance starter cabinet of ball mill		85.04		1
12	Phase advancer cabinet of ball mill		85.04		1
13	MCC control cabinet for auxiliary machine		85.04		1
14	PLC module for quartz sand slurry		25.05		1
15	Repair power box		83.01		1
16	Operation box on the site		83.04		1
17	Button box on the site		83.04		3
18	Crane distribution box		83.04		1
	Slurry preparation section				
19	MCC control cabinet for auxiliary machine		83.04		2
20	PLC control system for slurry preparation		83.04		1
21	Weighting control cabinet		83.04		1
22	Sensor junction box		83.04		5
23	Repair power box		83.04		2
24	Operation box on the site		83.04		4
25	Button box on the site		83.04		3

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Electric Control Panel & Generator

No	Items	Model & Specification	H.S Code	Unit	Qty
Sheet forming, receiving and stacking section					
26	Sheet machine control cabinet		83.04		7
27	PLC control system for sheet forming		46.01		1
28	Stacker servo control cabinet		83.04		2
29	Stacker brake resistor cabinet		83.04		1
30	PLC control system for stacker		83.04		1
31	Touch screen operation box		83.04		2
32	Weighing control box		83.04		1
33	Sensor junction box		83.04		1
34	Operation box on the site		83.04		3
35	Socket box		83.04		5
36	Crane distribution box		83.04		1
37	Repair power box		83.04		2
38	Button box on the site		83.04		6
39	Junction box on the site		83.04		10
Pre curing and restacking section					
40	Pre curing control cabinet		83.04		1
41	PLC control system for Pre curing		85.43		1
42	Touch screen operation box		85.43		2
43	Restacker servo control cabinet		85.43		2
44	Restacker brake resistor cabinet		85.43		1
45	PLC control system for restacker		85.43		1
46	Touch screen operation box		85.43		1
47	Oil brushing control cabinet		85.43		2
48	Stacking servo control cabinet		85.43		1
49	PLC control system for oil brushing				1
50	Junction box on the site		83.04		12
51	Repair power box		83.04		3

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Electric Control Panel & Generator

No	Items	Model & Specification	H.S Code	Unit	Qty
52	Button box on the site		83.04		22
	Autoclaving and curing section				
53	MCC control cabinet for auxiliary machine		83.04		1
54	Detection cabinet of autoclave		83.04		4
55	Control box of cross moving car		83.04		2
56	Tractor control cabinet		83.04		1
57	Button box on the site		83.04		6
58	Repair power box		83.04		3
59	Spacer restacker servo control cabinet		83.04		1
60	MCC control cabinet for auxiliary machine		83.04		1
61	PLC control system		83.04		1
62	Touch screen operation box		83.04		1
63	Control cabinet of palletizing system		83.04		1
64	Control box on the site		83.04		2
65	Junction box on the site		83.04		6
66	Repair power box		83.04		2
67	Button box on the site		83.04		3
	Sanding and edging section				
68	MCC control cabinet for auxiliary machine		83.04		1
69	Repair power box		83.04		1
70	Button box on the site		83.04		3
71	Sanding control cabinet		83.04		3
72	Edging machine control cabinet		83.04		1
	Air compressor room				
73	Distribution cabinet		83.04		1
	Boiler room				
74	MCC control cabinet for auxiliary machine		83.04		2
75	Control cabinet of boiler		83.04		2

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Electric Control Panel & Generator

No	Items	Model & Specification	H.S Code	Unit	Qty
	Water supply and drainage system				
76	MCC control cabinet for auxiliary machine		83.04		3
	Central control room				
77	Operation station		83.04		1
78	Main PLC control station		83.04		5
	Diesel backup generator				
79	Capacity: 2200 KVA	CAT3516B	85.11	Set	1
80	Capacity: 1000 KVA	CAT C32	85.11	Set	2
81	Capacity: 200 KVA	CAT DE220E0	85.11	Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Quartz Sand Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Quartz sand feeder hopper	Outlet diameter : 500x800mm	84.2	Set	1
2	Manual gate valve	Size : 500x800mm	84.7	Set	1
3	Hopper wall vibrator	ZFB-5, Voltage : 380V Power : 0.25 KW Vibration force : 300 kg Vibration frequency : 3000 rpm	84.2	Set	2
4	Belt weightscale	feed capacity : 2-20 t/h Belt width : 650mm Power : 1.1 KW	84.5	Set	1
5	Conveyor	Material : Quartz sand Belt width : 500mm Capacity : 40t/h Speed : 0.8m/s Power : 7.5 KW	84.2	Set	1
6	Electric flow meter	DN80		Set	1
7	Electric flow regulating valve	DN80, 0.06 KW	84.7	Set	1
8	Ball Mill	Φ2.2×9m, Capacity : > 7t/h, Voltage : 10KV Main motor Power: 420KW Auxiliary motor power: 11KW Lubricant station(2)	95.06	Set	1
9	Grinding steel ball		73.25	Ton	50
10	Slurry agitator	Power : 7.5 KW, 9m ³	87.05	Set	1
11	Submersible slurry pump	DYS80-80A-2.5m ,Flow: 60m ³ /h, Motor : 18.5 KW	84.1	Set	1
12(i)	Slurry mixing tank	Tank capacity : 40m ³ , 50m ³ Tank diameter : Φ4000mm	84.8	Set	1
(ii)	Agitator	Power: 22KW	87.05	Set	1
13	DZG80-20-110 Slurry pump	Flow : 60m ³ /h, Head : 24m , Motor : 22KW	84.1	Set	1
14(i)	20m ³ Slurry mixing tank	Tank capacity : 18m ³ , Tank diameter : Φ2600mm	84.8	Set	1
(ii)	Agitator	Power: 7.5KW	87.05	Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Pulp Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Water Weighting Scale	Max weight : 10000kg, 10m ³ With weight scale sensor DN200 Pneumatic butterfly valve	84.23	Set	1
2	Water Pulper	Tank capacity : 9m ³ Diameter : Φ2900 mm Impeller diameter : Φ750mm Impeller speed : 390 rpm Pulp concentration : 5-8% Production capacity : 0.54t / batch Power : 132KW	84.38	Set	1
3	Pulp Pump	Flow : 80-170m ³ /h Head : 37.5-25m Material concentration : 3-5% Power: 18.5KW	84.1	Set	1
4	Slurry Tank	50m ³	84.8	Set	5
5	Screw Propeller	Pulp concentration : <6% Impeller diameter : Φ850mm Impeller speed : 280 rpm Power : 18.5KW	84.87	Set	5
6	Pulp Pump	Flow : 53.5-134m ³ /h Head : 18-14m Material concentration : 3-5% Power : 11KW	84.1	Set	2
7	Pulp Pump	Flow : 80-170m ³ /h Head : 37.5-25m Material concentration : 3-5% Power: 18.5KW	84.1	Set	3
8	Double Disc Pulper	Disc diameter : 500mm Disc speed : 980 rpm Capacity : 24t/d Inlet pulp concentration : 3-5% Power : 185KW	84.38	Set	3
9	Pulp Agitating Tank	Capacity : 18m ³ , 20m ³ Tank diameter : Φ2600mm Agitating device Impeller speed : 17 r/min Power	84.8	Set	1
10	Single Beam Crane	LD5-22.5, Capacity: 2T	84.3	Set	1
11	Pulp Paper *		47.06	Ton	3000

မှတ်ချက်။ * ဖြည့်ပမုတင်သွင်းမည့် ကုန်ကြမ်း (Pulp Paper)

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Slurry Preparation Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Silo	Capacity : 80m ³ , Diameter: Φ3500mm	73.11	Set	2
2	Dust collector	HMC-48B, Capacity : 2100~3200 m ³ /h, Filter area:36 m ² , Filter bag : 48, Power : 3KW	85.4	Set	2
3	Type Hopper	Φ300, Power:0.25KW, Speed:2900r/min, One way screw gate vavle	84.23	Set	2
4	Screw Conveyor	LSY250 , Conveying length:4120mm, Conveying angle:5.79°, Capacity: 50m ³ /h, Power : 7.5KW	84.2	Set	2
5	Powder Weight Scale	Max weighting capacity: 1500kg, Outlet diameter : Φ300mm, DN300 pneumatic butterfly valve, 1.2m ³	84.23	Set	1
6	Screw Conveyor	LSY250, Conveying length : 2200mm, Conveying angle : 0°, Capacity : 50m ³ /h, Power : 4KW	84.23	Set	1
7	Water Weight Scale	6m ³ , Max weighting capacity : 6000kg, Tank diameter : Φ1800mm, Outlet diameter : Φ200mm, DN200 pneumatic butterfly valve	84.23	Set	1
8	Quartz Powder Weight Scale	Max weighting capacity : 3000kg, Tank diameter : Φ1500mm, Outlet diameter : Φ200mm, DN150 pneumatic butterfly valve, 2m ³	84.23	Set	1
9	Pulp Weight Scale	Max weighting capacity : 6000kg, Tank diameter : Φ1800mm, Outlet diameter : Φ200mm, DN200 Pneumatic butterfly valve, 6m ³	84.23	Set	1
10	Vertical Agitator	Capacity : 12m ³ , Power: 45KW, Disk agitator : Φ600, 12m ³	87.05	Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Slurry Preparation Section

No	Items	Model & Specification	H.S Code	Unit	Qty
11	Slurry Pump	Flow : 80m ³ /h, Head : 14m , Power : 11KW	84.1	Set	1
12	Clean Return Water Tank	Tank capacity : 2x80m ³ /↑, Diameter : 4000mm, 2x80t	84.8	Set	1
13	Clean Return Water Agitator	Power : 1.5KW	87.05	Set	1
14	Waste Water Agitator	Tank diameter : 3200mm, Speed : 17r/min, Power : 7.5KW	84.1	Set	2
15	Submersible Slurry Pump	Flow : 80m ³ /h, Head : 32m, Power : 22KW, DYS100-120	85.4	Set	1
16	Dust Collector	Capacity:2900~4300 m ³ /h, Filter area:48 m ² , Filter bag number:64, Power : 0.75KW,HMC-64A	84.1	Set	1
17	Submersible Slurry Pump	Flow : 80m ³ /h, Head : 32m, Power : 22KW, DYS100-120	84.8	Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Sheet Forming Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Slurry Agitating Tank	20m ³ ,Capacity : 18m ³ , Tank diameter : Φ2600mm	84.8	Set	2
2	Agitating Device	Impeller speed : 17 r/min, Power: 7.5KW	87.05	Set	2
3	Slurry Pump	Flow : 80m ³ /h, Head : 14m, Power : 11KW, DZG80-20-40	84.1	Set	2
4	Submersible Slurry Pump	Flow : 90m ³ /h, Head : 29m, Power : 22KW, DYS100-120A	84.1	Set	2
5	Submersible Slurry Pump	Flow : 200m ³ /h, Head : 18m, Power : 30KW,DYS100-160	84.1	Set	1
6	Pre-agitating Tank	Shaft speed : 213r/min, Power : 3KW , 1.5m ³	84.8	Set	1
7	Slag Separator	1: Reducer with motor, Power : 18.5KW, Speed : 277r/min 2: Impeller, Diameter : 565mm 3: Pneumatic butterfly valve	68.06	Set	1 1
8	Flow-on Sheet Machine	Sheet forming drum : Φ1650×1750 Felt cloth : 28750±250x1550mm Felt speed : 90-40m/min Main Motor, Power : 75KW Cloth wiper, Power : 3KW Layer separator : Power : 1.1KW Water sprayer : Power : 0.55KW Slurry tank Brush roll Power : 1.1KW Mixer : Power : 1.5KW Squeeze water roller cylinder : Φ80×80mm	84.24	Set	1
9	High Pressure Centrifugal Pump	Head : 50m, Flow : 100m ³ /h, Power : 22KW	84.1	Set	1
10	Air Water Separator	diameter : Φ500mm,	84.21	Set	1
11	Centrifugal Fan	flow : 2817 m ³ /h, pressure:3962 Pa, power : 5.5KW	84.21	Set	1
12	Air Water Separator	diameter : Φ800	84.21	Set	4

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Sheet Forming Section

No	Items	Model & Specification	H.S Code	Unit	Qty
13	Roots Vacuum Pump	15A ,Max suction : 10m ³ /min, Vacuum degree : 0.053 Mpa, Speed : 450r/min, Motor model : Y160L-4, Speed : 1460r/min, Power : 15KW	84.1	Set	4
14	Laser Thickness Gauge		90.17	Set	1
15	Receiving Conveyor	Receiving height : 1300mm, Conveyor travel speed : 110- 25m/min, Power : 4KW, Positioning device, Power : 2.2KW, Cross cutter, Power : 3KW	84.2	Set	1
16	High Pressure Water Cutter	Pressure : 250MPa, Water flow : 3.7 L/min, Power : 22KW	86.86	Set	1
17	Belt Conveyor	Material: waste , Max weight : 300Kg, Belt width : 1180mm, Conveyor speed : 35 m/min, Power: 2.2KW	84.2	Set	1
18	Twin Shaft Mixer	speed : 33 rpm, Impeller diameter : 250mm, Reducer with motor, power : 18.5KW	87.05	Set	1
19	Impeller Agitator	Tank capacity : 2m ³ , Power : 7.5KW, weight scale	87.05	Set	1
20	Submersible Slurry Pump	Flow : 120m ³ /h, Head : 24m, Power : 22KW	84.13	Set	1
21	Stacking Machine	For stacking fiber cement board Suction lift range : 1350mm Suction travel range : 2200mm or 4400mm Suction servo reducer motor Power: 7.5KW Suction servo reducer motor Power: 5.5KW Suction servo reducer motor Power: 15KW Suction lift servo reducer motor Power: 11KW High pressure centrifugal fan	84.3	Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Sheet Forming Section

No	Items	Model & Specification	H.S Code	Unit	Qty
		Fan pressure : 4447 Pa Flow : 2053 m ³ /h Power : 4 KW Air consumption : ≥30m ³ /h Air compressor pressure : ≥0.5--0.7MPa			
22	Stacking Transfer Machine	Travel speed : 0-20 m/min Power : 3.0KW Positioning device Power : 0.75 KW Roller conveyor Conveying speed : 0-11 m/min Power : 3.0KW	84.3	Set	1
23	Cross Cutter	Servo motor Power : 0.4KW	82.08	Set	1
24	Sheeting Machine Slurry Discharge Hopper		84.23	Set	1

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Precuring, Mould Destacking Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Precuring front and rear transfer machine	Travel speed : 0-20 m/min Power : 3.0KW Positioning device Power : 0.75 KW Roller conveyer Conveying speed : 0-11 m/min Power : 3KW	84.3	Set	2
2	Roller	DYII3m Heavy type roller conveyer Conveying speed : 0-11 m/min Power : 3.0KW DY3.5m Heavy type roller conveyer Conveying speed : 0-11 m/min Power : 3KW	84.28	Set	1
3	Roller	DYII3m Heavy type roller DY3.5m Heavy type roller Heavy type roller conveyer	84.28	Set	1
4	Mould destacker	For use after precuring Suction lift range : 1350mm Suction travel range : 2200mm Servo reducer motor power: 5.5KW Servo reducer motor power:4KW Travel reducer motor power: 4KW Suction lift servo reducer motor Power: 15KW Suction lift servo reducer motor Power: 11KW Suction lift servo reducer motor Power: 5.5KW High pressure centrifugal fan Model : 9-19 №4.5A-5 Pressure : 4447 Pa Flow : 2053 m ³ /h Power : 4 KW Air consumption : ≥35m ³ /h Air compressor pressure : ≥0.5--0.7MPa	84.3	Set	1
5	Positioning device		84.3	Set	2
6	Roller transfer machine	Speed : 0-20 m/min Power : 3KW Positioning device	84.28	Set	1

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Precuring, Mould Destacking Section

No	Items	Model & Specification	H.S Code	Unit	Qty
		Power : 0.75 KW Roller conveyer Speed : 0-11 m/min Power : 3KW			
7	Steel mould oil brushing unit	Steel mould : 2X1280X2550 mm Incoming, conveying, outgoing plate height : 1300 mm Incoming plate conveying speed : 15-50m/min Outgoing plate conveying speed : 15-50m/min Ash brushing roller speed : 4.38m/s Squeeze oil roller speed : 15-30m/min Incoming roller Power : 1.5KW Outgoing roller Power: 1.5KW Ash brushing unit Power:1.5KW Squeeze oil unit Power: 0.75KW	34.03	Set	1
8	Stacker	For : Stacking steel mould Suction lift range : 1350mm Suction travel range : 2200mm Suction travel servo reducer motor power: 4KW Suction lift servo reducer motor power: 11KW Air consumption : $\geq 28\text{m}^3/\text{h}$ Air compressor pressure : $\geq 0.5\text{--}0.7\text{MPa}$	84.3	Set	1
9	Traction Machine	Traction : 1t Speed : 15m/min Rail gauge : 280mm Reducer motor Power : 3KW	87.01	Set	2
10	Hanging plate	Size : 2600x1440x40mm	73.08	Set	40

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Precuring, Mould Destacking Section

No	Items	Model & Specification	H.S Code	Unit	Qty
11	Steel mould plate (Cold roll steel sheet Q235)	Size : 2550×1280×2mm	72.22	Set	4800
12	Autoclave spacer transfer machine	Rail gauge : 750mm power : 3KW Mechanical positioning device Power : 0.55KW	84.28	Set	1
13	Single Girder Crane	LD10-28.5, Lift capacity : 10t Span : 28.5m Lift motor power: 13KW Height: 10m	84.28	Set	1

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Autoclaving Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Cross move machine	Max weight : 10t Rail gauge : 750mm Power: 3KW Mechanical positioning device Power: 0.55KW Push drive Power: 5.5KW	Set	84.28	1
2	Autoclave	Φ2x24.5m, Inner diameter : Φ2m Length : 24.5m Pressure : 1.4MPa Temperature : 198°C Material: Saturated steam and condensate water Autoclave rail gauge : 750mm	Set	73.21	4
3	Transfer machine	Rail gauge : 750mm	Set	84.28	2
4	Cross move machine with winch	Capacity : 10t Rail gauge : 750mm Power: 3KW Positioning device Power: 0.55KW Winch Power: 7.5KW	Set	84.28	1
5	Traction Machine	Traction : 1t Speed : 15m/min Rail gauge : 280mm Power : 3KW	Set	87.01	3
6	Autoclave machine	Capacity : 10t Rail gauge : 750mm	Set	73.21	60
7	Autoclave steel plate	Size : 2475×1330×25mm	Set	72.22	360

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Destacking Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Traction Machine	Traction : 1t Speed : 15m/min Power : 3KW	87.01	Set	2
2	Mould destacker	Suction lifting range : 1350mm Suction horizontal moving range : 2000mm/4000mm Servo reducer motor Servo reducer motor Air consumption : 30m ³ /h Air compressor pressure : 0.7MPa	84.30	Set	1
3	Pneumatic positioning device		84.67	Set	2
4	Destacker transfer machine	Rail gauge : 750mm Moving speed : 0-20m/min Power : 3KW Mechanical positioning device Power : 0.55KW	84.30	Set	1
5	Roller conveyor	Conveying speed : 15~22m/min Power : 0.75KW	84.28	Set	3
6	Directional turning conveyor	Conveying speed : 15~22m/min Lift speed : 10 times/ min Power : 0.75KW	84.28	Set	2
7	Conveying platform	Conveying speed : 15~22m/min Power : 0.75KW	84.28	Set	2
8	Auto stacking device	Stacking number : 130 pcs	84.30	Set	2
9	Pallet lift platform	Lift range : 1000mm Capacity : 5t Power : 7.5KW	84.28	Set	2
10	Transfer frame for standard board	Speed : 15~22m/min Power : 0.75KW	84.28	Set	1
11	Rolling table for sub quality board	Speed : 15~22m/min Power : 0.75KW	84.28	Set	1
12	Injet marking device		84.30		1
13	Wooden pallet	Size : 2500x1300x180 mm	72.22	Set	400

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Hydraulic Press Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Roller transfer machine	Travel speed : 0-20 m/min Power : 3.0KW, Positioning device, Power : 0.75 KW Roller conveying speed : 0-11 m/min, Power : 3KW	84.28	Set	1
2	DYII3m Heavy type roller conveyor	Conveying speed : 0-11 m/min Power : 3KW	84.28	Set	2
3	DY3.5m Heavy type roller conveyor		84.28	Set	2
4	5000T Hydraulic press machine	Max working force : 50MN Height : 1200mm Table size : 2600×1300mm Press speed : 0.05-0.12mm/s Power : 11KW	84.62	Set	1

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Sanding and Edging Section

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Stacking machine	Suction lift range : 1000mm Suction travel range : 2000mm Travel servo reducer motor power : 4.6KW Suction lift servo reducer motor power : 9.7KW Air consumption : 30m ³ /h Air compressor pressure: 0.5--0.8MPa	84.3	Set	1
2	Conveying platform	Working height : 350mm Conveying speed : 15~50m/min Power : 1.5KW	84.28	Set	1
3	Conveying platform	Working height : 1150mm Conveying speed : 15~50m/min Power : 0.75KW	84.28	Set	1
4	Sanding machine inlet roller	Conveying speed : 15~22m/min Power : 0.75KW	84.28	Set	1
5	Heavy sanding machine	Working width: 1300mm, Working thickness: 6-25mm, Working length: 860mm, Accuracy: ±0.08mm, Sanding machine Power: 90KW, Sanding machine Power: 75KW, Lifting power: 2.2KW, Auto feed speed:6~35m/min, Auto feed system power: 22KW, Air pressure: 0.5~0.8MPa, Air compressor consumption: 1.1m ³ /min	84.65	Set	1
6	Sanding machine outlet roller	Conveying speed : 15~22m/min Power : 0.75KW	84.28	Set	1
7	Sanding machine	Working width : 1300mm Working thickness : 3~50mm Speed : 5~47m/min Sanding machine power : 45KW Incoming plate power : 11KW Lifting power : 3KW Cleaning power : 1.1KW	84.65	Set	1

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Sanding and Edging Section

No	Items	Model & Specification	H.S Code	Unit	Qty
8	Directional turning conveyor	Conveying speed : 15~22m/min Lift speed : 10times/ min Conveying power: 0.75KW	84.28	Set	1
9	Transition frame	Conveying speed : 15~22m/min Conveying power : 0.75KW	84.28	Set	1
10	Edging machine	Working height : 1150mm Size : 1220×4~16mm Incoming plate speed : 10~22m/min Conveying power : 4KW Edging motor power : 4KW Edge wheel motor power : 3KW Brush wheel motor power : 2.2KW Brush wheel motor power : 1.1KW Cleaning motor power : 1.1KW	84.31	Set	1
11	Transition frame	Conveying speed : 15~22m/min Power : 0.75KW	84.28	Set	1
12	Directional turning conveyor	Conveying speed : 15~22m/min Lift speed : 10times/ min Power : 0.75KW	84.28	Set	1
13	Transition frame	Conveying speed : 15~22m/min Power : 0.75KW	84.28	Set	1
14	Cross edge chamfering machine	Edging size : 2440×4~16mm Incoming speed : 15~22m/min Conveying power : 4KW Edging power : 3KW Brush wheel motor power : 2.2KW Brush wheel motor power : 1.1KW Cleaning motor power : 1.1KW	85.01	Set	1
15	Transition frame	Dimension : 2800×1450×1150mm Conveying speed : 15~22m/min Power : 0.75KW	84.28	Set	1
16	Directional turning conveyor	Conveying speed : 15~22m/min Lift speed : 10times/ min Power: 0.75KW	84.28	Set	2
17	Roller conveyor	Conveying speed : 15~50m/min Power : 1.5KW	84.28	Set	2

Sann Shinn & Brothers Co., Ltd.
List of Machinery and Equipment to be Imported

Sanding and Edging Section

No	Items	Model & Specification	H.S Code	Unit	Qty
18	Conveying platform	Conveying speed : 15~22m/min Power : 0.75KW	84.28	Set	2
19	Stacking device	Conveying speed : 7~10m/min Stack number : 130pc/6mm plate	84.3	Set	2
20	Lift platform	Lift range : 1000mm,Capacity : 5t, Power : 7.5KW	84.28	Set	2
21	Injet marking device		84.43	Set	1
22	Punching machine	Nominal force : 200T, Mould height: 260mm,Column spacing : 1305mm, Width : 1300mm, Stroke : 45-53 time/min, Power : 22.5KW, Machine dimension : 3000x2400x 1950mm	82.07	Set	1
23	Bag filter	JLPM5C-460 ,Capacity:33400m ³ /h, Filter speed:1.2~2m/min Filter area : 465m ² , Filter bag:480 pcs, Compressed air consumption : 1.5m ³ /min, Discharge device : YJD-26, Hopper : 400×400mm, Power: 2.2KW	97.05	Set	2
24	Centrifugal fan	Pressure : 2373 Pa Flow : 34863m ³ /h, Power : 37KW, 4-72No.10C	84.21	Set	2

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Air Compressor Room

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Screw type air compressor	Capacity:10m ³ /min Pressure : 0.85MPa Motor : 55KW	84.14	Set	2
2	Air dryer	Capacity:10 m ³ /min Motor : 1.46 KW Voltage: 380V	84.21	Set	2
3	Air compressor filter	Flow:10Nm ³ /min	84.21	Set	2
4	Air tank	Capacity : 3.0m ³ Pressure : 1.0MPa	84.81	Set	1
5	Air tank	Capacity : 1.0m ³ Pressure : 1.0MPa	84.81	Set	3

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Laboratory Equipment

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Reciprocating Panelsaw	main saw blade dia:355mm scoring saw blade dia: 160mm max cutting length: 3200mm max cutting thickness: 75mm voltage:380V total power: 11.2KW	82.02	Set	1
2	Electric Universal Testers	Test force range: 100N~50KN Test machine accuracy level: 0.5 / 1 Load resolution (N): 0.1N Test speed (mm/min): 0.001-500 Voltage: 380V Power: 3.0KW Computer Printer Flexural strength fixture Nail holding force fixture Internal bonding strength fixture Saturated rubber layer shear strength fixture	84.19	Set	1
				Set	1
				Set	1
				Pair	6
				Piece	1
3	Pendulum impact tester	Impact speed: 2.9m/s Energy display resolution: 0.01J Pendulum energy: 1J, 2.5J, 5J Strike center distance: 230mm Pendulum angle: 150° Blade radius radii R=2±0.5mm Clamp corner radius R=1±0.1mm Jaw support spacing (mm): 40, 60, 62, 70	84.19	Set	1
4	Electric blast drying oven	Temperature range: 0°C~200°C Temperature fluctuation: ±1 °C Voltage: 380V Power: 3KW Shelf load: 15Kg Size(deep × width × height): 500 × 600 × 700mm	84.19	Set	1
5	Circulating water vacuum pump	Model: SHB-III A type Voltage: 220V Power: 0.18KW Ultimate pressure: 0.01MPa	84.13	Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Laboratory Equipment

No	Items	Model & Specification	H.S Code	Unit	Qty
6	Electronic balance	Range: 0~2000g Graduation value: 0.01g	82.02	Set	1
7	Microwave oven	Microwave frequency: 2450±50MHz Microwave output power: 3KW (adjustable) Microwave leakage: ≤5mw/cm ²	84.19	Set	1
8	Beating meter	Schopper- Riegler beating meter Measuring range: (0~100) SR Measurement accuracy: 1SR Spill discharge time: 149±1s Overflow remaining volume: (7.5~8.0) ml	90.25	Set	1
9	Electronic still water balance	Weighing range: 0.1~2000g Weighing accuracy: 0.1g	84.81	Set	1
10	Stainless steel electric distilled water	Specification: 5L Power: 4.5KW	84.81	Set	1
11	Electric thermostatic water tank	Model: HH-W600 Power: 1.5KW Temperature control range: RT+5~100°C Volume: 45L Liner size: 600mmx300mmx190mm	84.81	Set	1
12	Automatic antifreeze testing machine	Temperature range: -40 ° C ~ 50 ° C Measurement accuracy: ±0.5 °C Liner size: 400mmx500mmx400mm Power: 2.6KW Heating power: 2.0KW, cooling power: 1HP	82.02	Set	1
13	Hand-held electric drill	No-load rate: 0~2800r/min Impact rate: 0~41800 times/min Power: 0.55KW	82.05	Set	1
14	Electric furnace	Dimensions: φ180mm Rated temperature: 600 ° C Power: 2KW	84.19	Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Laboratory Equipment

No	Items	Model & Specification	H.S Code	Unit	Qty
15	pH meter	Measuring range: 0~14pH Measurement accuracy: 0.01pH	84.19	Set	1
16	Water hardness analyzer	Measuring range: 0~10mmol/L or 0~1000mg/L (CaCO ₃) Temperature compensation: (5~50 °C) Resolution: 0.1 water hardness unit	84.19		1
17	Enamel tray	200mmx200mm	84.19	Piece	2
18	Square hole screen	180 mesh, 30cm 200 mesh, 30cm Sieve bottom	84.19	Piece Piece Piece	2 2 1
19	Plastic beaker	500ml 1000ml	84.19	Piece Piece	10 5
20	Glass beaker	500ml	84.19	Piece	5
21	Glass dryer	Inner diameter 300mm	84.19	Piece	1
22	Silica gel	500g	84.19	Bottle	2
23	Vaseline	500g	84.19	Bottle	1
24	Filter bottle	500ml	84.19	Piece	2
25	Cloth type hopper	Inner diameter 120mm	84.19	Piece	2
26	Filter paper	Diameter 120mm	84.19	Box	10
27	Ceramic evaporating dish	110mm/200ml	84.19	Piece	5
28	Vernier caliper	Indexing 0.02mm	84.19	Piece	2
29	Steel tape	Dividing 1mm, 5m	84.19	Piece	2
30	Steel ruler	Dividing 1mm, 30cm	84.19	Piece	2
31	Wall thickness micrometer	Dividing 0.02mm	84.19	Piece	1
32	Wide seat square	1000mmx630mm	84.19	Piece	1
33	Wide seat square	160mmx160mm	84.19	Piece	1
34	Specimen rack	Test piece side spacing 20mm Height: 150~200mm	84.19	Piece	2
35	Thermometer	0~105°C	84.19	Piece	10
36	AB glue		84.19	Piece	10

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Laboratory Equipment

No	Items	Model & Specification	H.S Code	Unit	Qty
37	Self-tapping screw	GB 845-ST 4.2X38-C-H	84.19	Piece	200
38	Glass rod		84.19	Piece	10
39	Tweezers		84.19	Piece	5
40	Wool brush	100mm	84.19	Piece	5

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Boiler

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Boiler	Capacity: 8T/hr Pressure: 1.25 Mpa Steam temperature: 193.3 C	84.02	Set	1
2	Water treatment		84.02	Set	1
3	Water ring vacuum pump	Flow : 10m ³ /min Rated vacuum : 300 mmHg Power : 18.5KW	84.13	Set	1
4	Steam header	Pressure : 0-1.2MPa, D325X10 L=3640mm	84.02	Set	1
5	Steam header	Pressure : 0-1.2MPa, D325X10 L=3340mm	84.02	Set	1
6	Exhaust air silencer	Design capacity : 5.5t/h, RYB(D)-Dg50	87.08	Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Water Supply & Drainage

No	Items	Model & Specification	H.S Code	Unit	Qty
1	Water pump	Flow=6.3m ³ /h ,Head=50m Inlet diameter : Φ40mm Outlet diameter : Φ40mm Power: 4KW	84.13	Set	2
2	Centrifugal hot water pump	Flow=12.5m ³ /h, Head=20m Inlet diameter : Φ50mm Outlet diameter : Φ50mm Power:1.5KW	84.13	Set	2
3	Centrifugal hot water pump	Flow=12.5m ³ /h ,Head=42m Inlet diameter : Φ65mm Outlet diameter : Φ65mm Power: 4KW	84.13	Set	2
4	Counter current cooling tower	Fan diameter:800mm Flow=20m ³ /h Fan power: 0.8KW In out water temperature: 80~40°C Inlet Outlet pipe diameter : Φ50mm	84.19	Set	1
5	Counter current cooling tower	Fan diameter :580mm,JLT-8 Flow=8m ³ /h Fan power: 0.8KW Inlet outlet water temperature: 35~30°C Inlet outlet pipe diameter : Φ40mm	84.19	Set	1
6	Submersible sewage pump	Flow=18m ³ /h, Head=15m Power:1.5KW	84.13	Set	4
7	Oil Filter	TY-50	84.21	Set	1
8	Chemical Dozing Device	YJy0.3/1.44A-1, Solution vessel Volume n=0.3m ³ , Dissolving vessel Volume n=1.44m ³ , equipped with metering Pump		Set	1
9	Impulse automatic high efficiency water purifier	HEJ-350, Q=350m ³ /hr		Set	1

Sann Shinn & Brothers Co., Ltd.

List of Machinery and Equipment to be Imported

Water Supply & Drainage

No	Items	Model & Specification	H.S Code	Unit	Qty
10	Complete equipment for fire water supply	Q=120L/s,P=1.2MPa,Fire fighting electric pump.Fire diesel pump, jockey pump,Air Pressure tank and common-base, etc.		Set	1
11	Sump pump	Q=20m ³ /h,H=10m	84.13	Set	2
12	Sand Filter		84.14	Set	2
13	Carbon Filter		84.14	Set	2
14	Softener			Set	2
15	RO High Pressure Pump	Model-B96548592 ,P11420, Power-37KW, Speed, 2957rpm, Capacity-64m ³ /hr, Head-139.4m	84.13	Set	2
16	Water pollution online analyzer			Set	1

W1122 144

WATER QUALITY TEST RESULTS FORM

Client _____ MESC
 Nature of Water _____ Tube Well Water
 Location _____ စည်တန်းရွာ (Project Site)
 Date and Time of collection _____ 2.11.2022
 Date and Time of arrival at Laboratory _____ 4.11.2022
 Date and Time of commencing examination _____ 5.11.2022
 Date and Time of completing _____ 7.11.2022

Results of Water Analysis

**WHO Drinking Water Guideline
 (Geneva - 1993)**

pH	8.6		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	3	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	56	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	0.26	mg/l	0.3 mg/l
Chloride (as CL)	40	mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO ₄)	108	mg/l	500 mg/l
Total Solids	863	mg/l	1500 mg/l
Total Suspended Solids		mg/l	
Total Dissolved Solids	856	mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
 Signature: _____
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist

Approved by
 Signature: _____
 Name: Soe Thit
B.E (Civil) 1980
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.) ISO Tech Laboratory

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
 Ph: 01-640955, 09-880100172, 09-880100173, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

W1122 144

WATER QUALITY TEST RESULTS FORM

Client	MESC
Nature of Water	Tube Well Water
Location	စင်္ကြံတံတိုင်း (Project Site)
Date and Time of collection	2.11.2022
Date and Time of arrival at Laboratory	4.11.2022
Date and Time of commencing examination	5.11.2022
Date and Time of completing	7.11.2022


Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

Parameter	Unit	Result	Guideline
Temperature (°C)	°C		
Fluoride (F)	mg/l		1.5 mg/l
Lead (as Pb)	mg/l		0.01 mg/l
Arsenic (As)	mg/l		0.01 mg/l
Nitrate (N.NO ₃)	mg/l	Nil	50 mg/l
Chlorine (Residual)	mg/l		
Ammonia Nitrogen (NH ₃)	mg/l		
Ammonium Nitrogen (NH ₄)	mg/l		
Dissolved Oxygen (DO)	mg/l		
Chemical Oxygen Demand (COD)	mg/l		
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	mg/l		
Cyanide (CN)	mg/l		0.07 mg/l
Zinc (Zn)	mg/l	Nil	3 mg/l
Copper (Cu)	mg/l	Nil	2 mg/l
Silica (SiO ₂)	mg/l		

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
 Signature: 
 Name: Zaw Hein Oo
 B.Sc (Chemistry)
 Sr.Chemist
 ISO TECH Laboratory

Approved by
 Signature: 
 Name: Soe Thit
 B.E (Civil) 1980
 Technical Officer
 ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
 Ph: 01-640955, 09-880100172, 09-880100173, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

WATER QUALITY TEST RESULTS FORM

Client _____ MESC
 Nature of Water _____ Tube Well Water
 Location _____ စင်္ကြံမြို့နယ် (ဘယ်လင်း)
 Date and Time of collection _____ 2.11.2022
 Date and Time of arrival at Laboratory _____ 4.11.2022
 Date and Time of commencing examination _____ 5.11.2022
 Date and Time of completing _____ 7.11.2022

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

pH	7.3		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	48	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	288	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	1.41	mg/l	0.3 mg/l
Chloride (as CL)	60	mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO ₄)	52	mg/l	500 mg/l
Total Solids	513	mg/l	1500 mg/l
Total Suspended Solids		mg/l	
Total Dissolved Solids	463	mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
 Signature: _____
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist

Approved by
 Signature: _____
 Name: Soc Thit
B.E (Civil) 1980
Technical Officer
ISOTECH Laboratory

(a division of WEG Co.,Ltd.) ISO Tech Laboratory

No. 18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
 Ph: 01-640955, 09-880100172, 09-880100173, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

W1122 145

WATER QUALITY TEST RESULTS FORM

Client	MESC
Nature of Water	Tube Well Water
Location	စင်္ကြံမြို့နယ် (ဘယ်လင်း)
Date and Time of collection	2.11.2022
Date and Time of arrival at Laboratory	4.11.2022
Date and Time of commencing examination	5.11.2022
Date and Time of completing	7.11.2022

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

Temperature (°C)	°C	
Fluoride (F)	mg/l	1.5 mg/l
Lead (as Pb)	mg/l	0.01 mg/l
Arsenic (As)	mg/l	0.01 mg/l
Nitrate (N.NO ₃)	0.5 mg/l	50 mg/l
Chlorine (Residual)	mg/l	
Ammonia Nitrogen (NH ₃)	mg/l	
Ammonium Nitrogen (NH ₄)	mg/l	
Dissolved Oxygen (DO)	mg/l	
Chemical Oxygen Demand (COD)	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	mg/l	
Cyanide (CN)	mg/l	0.07 mg/l
Zinc (Zn)	Nil mg/l	3 mg/l
Copper (Cu)	Nil mg/l	2 mg/l
Silica (SiO ₂)	mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature: 
 Name: Zaw Hein Oo
 B.Sc (Chemistry)
 Sr.Chemist
 ISO Tech Laboratory

Approved by

Signature: 
 Name: Sue Thit
 B.E (CIVIL) 1989
 Technical Officer
 ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

No.18, Lanthil Road, Nantharagon Quarter, Insein Township, Yangon, Myanmar.
 Ph: 01-640955, 09-880100172, 09-880100173, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

W1122 146

WATER QUALITY TEST RESULTS FORM

Client _____ MESC
 Nature of Water _____ Tube Well Water
 Location _____ စည်တိုင်မြို့နယ် (တောင်ရင်း)
 Date and Time of collection _____ 2.11.2022
 Date and Time of arrival at Laboratory _____ 4.11.2022
 Date and Time of commencing examination _____ 5.11.2022
 Date and Time of completing _____ 7.11.2022

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

pH	8.3		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	3	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	92	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	0.25	mg/l	0.3 mg/l
Chloride (as CL)	60	mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO ₄)	97	mg/l	500 mg/l
Total Solids	850	mg/l	1500 mg/l
Total Suspended Solids		mg/l	
Total Dissolved Solids	645	mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
 Signature: _____
 Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist

Approved by
 Signature: _____
 Name: Sue Thit
B.E (Civil) 1980
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.) 

W1122 146

WATER QUALITY TEST RESULTS FORM

Client MESC
 Nature of Water Tube Well Water
 Location စင်္ကြံမြို့နယ် (တောင်ရင်း)
 Date and Time of collection 2.11.2022
 Date and Time of arrival at Laboratory 4.11.2022
 Date and Time of commencing examination 5.11.2022
 Date and Time of completing 7.11.2022

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

Temperature (°C)	°C	
Fluoride (F)	mg/l	1.5 mg/l
Lead (as Pb)	mg/l	0.01 mg/l
Arsenic (As)	mg/l	0.01 mg/l
Nitrate (N.NO ₃)	0.1 mg/l	50 mg/l
Chlorine (Residual)	mg/l	
Ammonia Nitrogen (NH ₃)	mg/l	
Ammonium Nitrogen (NH ₄)	mg/l	
Dissolved Oxygen (DO)	mg/l	
Chemical Oxygen Demand (COD)	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	mg/l	
Cyanide (CN)	mg/l	0.07 mg/l
Zinc (Zn)	Nil mg/l	3 mg/l
Copper (Cu)	Nil mg/l	2 mg/l
Silica (SiO ₂)	mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature: Hein

Name: Zaw Hein Oo

B.Sc (Chemistry)
Sr. Chemist
ISO Tech Laboratory

Approved by

Signature: Sue Thit

Name: Sue Thit

B.E (Civil) 1980
Technical Officer
ISO TECH Laboratory

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No.18, Lanthit Road, Nanthar-gone Quarter, Insein Township, Yangon, Myanmar.
 Ph: 01-840955, 09-880100172, 09-880100173, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

DEPARTMENT OF AGRICULTURE (LAND USE)

SOIL ANALYTICAL DATA SHEET

MESC (4.11.2022)

Division - မန္တလေးတိုင်းဒေသကြီး ။

Sheet No. 1

Township - စဉ့်ကိုင်မြို့နယ်၊ Project Site။

Sr No. S 1-3 /2022

Sr No.	Sample	Moisture %	pH Soil:Water 1:2.5	Texture				Total N %	Available Nutrients
				Sand %	Silt %	Clay %	Total %		P (ppm) (O)
1	စဉ့်ကိုင်မြို့နယ်၊ Project Site	1.705	9.02	72.34	12	15.66	100	0.195	5.289
2	တောင်ရင်းကျေးရွာ	5.673	8.72	55.34	18	26.66	100	0.185	20.36
3	ဘဲလင်းကျေးရွာ	3.08	9.68	42.34	31.00	26.66	100	0.198	11.97

O= Olsen Method

(ဒေါက်တာသန္တာညီ)
ဒုတိယညွှန်ကြားရေးမှူး
ဓာတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာနခွဲ
ဌ



DEPARTMENT OF AGRICULTURE (LAND USE)

SOIL INTERPRETATION OF RESULTS

MESC (4.11.2022)

Division - မန္တလေးတိုင်းဒေသကြီး။

Sheet No. 1

Township - စဥ့်ကိုင်မြို့နယ်၊ Project Site။

Sr No. S 1-3 / 2022

Sr No.	Sample	pH Soil:Water 1:2.5	Texturure	Total N	Available Nutrients
					P
1	စဥ့်ကိုင်မြို့နယ်၊ Project Site	Extremely Alkaline	Sandy Laom	Low	Low
2	တောင်ရင်းကျေးရွာ	Strongly Alkaline	Sandy Clay Loam	Low	Very High
3	ဘဲလင်းကျေးရွာ	Extremely Alkaline	Loam	Low	Medium

(ဒေါက်တာသန္တာညီ)
 ဒုတိယညွှန်ကြားရေးမှူး
 ဓာတ်ခွဲခန်းတာဝန်ခံ
 မြေအသုံးချရေးဌာနခွဲ
 ၆

မန္တလေးတိုင်းဒေသကြီး
 ကျောက်ဆည်ခရိုင်၊ ခရိုင်မြို့နယ်
 တောင်ရင်းအုပ်စု
 တောင်ရင်းကျေးရွာ
ပုလဲမြို့မှတ်တမ်းလွှာ

အလှူရှင်အမည် ။ SANN SHINN & Brothers
 Company Limited

နေရပ် ။ ဗိုလ်ထာစင်ရုံ စီမံကိန်း

လှူဒါန်းဖွဲ့ ။ တန်ဖိုး (၇၅) ထိန်းခန့်

အောင်ရင်းအုပ်စု၊ အောင်ရင်းရွာ၊ အောင်လုံးရွာအနယ်

အစိုးအထူးပြုလုပ်ရန်

ထွက်လှူချီး - တစ်ကြိမ်ချီးထ ထောင်းထူးအထူးပျံ ဖွားတတ်စေ၏

ရက်စွဲ ။ ၂၁ - ၅ - ၂၀၂၀ (တနင်္ဂနွေနေ့)

my
 ဦးထွန်းထွန်း
 အုပ်စု အုပ်ချုပ်ရေးမှူး
 တောင်ရင်းအထူးအုပ်စု

SANN SHINN & BROTHERS COMPANY LIMITED မှ
 Fiber Cement Board လုပ်ငန်းအတွက် နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း (Scoping) လေ့လာရန်
 အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးဇူးအမည် -----

နေ့စွဲ -----

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
၁	ဦးသုန္ဒရီ		အုပ်ချုပ်ရေးမှူး
၂	တီထွေကျော်		
၃	ကိုစုဝင်းစော		
၄	ဦးကျော်		
၅	စိုးဝင်း		
၆	အောင်ကျော်စိုး		
၇	ဆက်ထွန်း		
၈	နန္ဒာတင်		
၉	မျိုးတီတ		
၁၀	ကျော်စွာမြင့်		
၁၁	ဦးမြင့်ကျော်		
၁၂	ဦးကြည်ထွန်း		

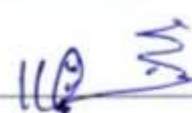


SANN SHINN & BROTHERS COMPANY LIMITED မှ

Fiber Cement Board လုပ်ငန်းအတွက် နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း (Scoping) လေ့လာရန်

အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးဇူးအမည် ဘယ်လင်း

နေ့စွဲ ၃၀.၉.၂၀၂၀









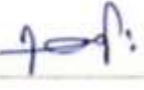
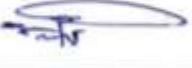


စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
၁၃	ဘို.ဝေ.အေ		
၁၄	ဒေါ်.ဦး.စ.		
၁၅	ဦး.ဦး.ခေမာ	ခေမာ	
၁၆	ဒေါ်.အေးအေး		

SANN SHINN & BROTHERS COMPANY LIMITED မှ

Fiber Cement Board လုပ်ငန်းအတွက် နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း (Scoping) လေ့လာချက် အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးရွာအမည် - ~~အောင်စမ်း~~

နေ့စွဲ - ၂၀-၂-၂၀၂၀

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
၁	ဦးဇော်ကျော်		ဗဟိုဌာနမှူး
၂	ဒေါ်အေးအေးခိုင်		တောင်သူ
၃	ဦးစောစော		လူငယ်
၄	သန်းဝင်းအောင်		ရိယာဦးစီးဌာန
၅	ဦးစောစော		လူငယ်
၆	ဦးစောစော		ယာဇာနည်
၇	" ဝေဖိုး		တောင်သူ
၈	" ဦးစောစော		"
၉	" ဒေါ်ခင်စု		"
၁၀	" သန်းကျော်		ကျေးရွာအုပ်စု
၁၁	" ဦးစောစော		လူငယ်
၁၂	" ဦးစောစော		လူငယ်

SANN SHINN & BROTHERS COMPANY LIMITED မှ
Fiber Cement Board လုပ်ငန်းအတွက် နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း (Scoping) ဓလေ့လာချက်
အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးဇူးအမည် ကောင်စုဦး

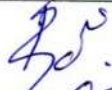










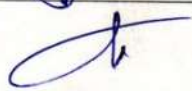
နေ့စွဲ ၂၀၂၂.၀၅.၂၀

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
၁၄.	ဦးခွင်		၁၂
၁၄.	ဦးတင်မေဇာအောင်		ရေတက်စာ
၁၅	။ ကျော် ယိုးဦး		။ ။
၁၆	။ တင်အောင်		
၁၇	။ မိုးဝင်း		
၁၈	။ အောင်ကျော်ဦး		
၁၉	။ ဝင်းမင်းပေ		
၂၀	ဝင်းဝင်း	ဝင်း	
၂၁	အောင်		
၂၂	ထွန်း		
၂၃	နိုးနိုး		
၂၄	ဒေါ်ခင်မာမာ		

Sann Shinn & Brothers Co., Ltd ၏ Fiber Cement Board Factory အတွက်
 ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA)
 အစီရင်ခံစာဆောင်ရွက်ရန် အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးရွာအမည် သာယာသီးနှံစတင်ခြင်း

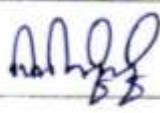





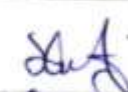

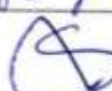



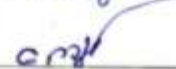
နေ့စွဲ 2.11.2022

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
၁.	ဦးဘိုဘို		
၂.	ဦးချစ်ကို		
၃.	ဦးကျော်မင်းပွင့်		
၄.	ဦးအောင်ဝေလင်း		
၅.	ဦးရဲရင့်စောင့်		
၆.	ဦးကျော်စောယုန်ထွန်း		
၇.	ဦးသက်ကျော်ထွန်း		
၈.	ဦးမိုးမိုးဝင်း		
၉.	ဦးသက်လွင်ဦး		
၁၀.	ဦးဖြိုးစောင်စော		
၁၁.	ဦးစောစော		
၁၂.	ဦးစောစော		

Sann Shinn & Brothers Co., Ltd ၏ Fiber Cement Board Factory အတွက်
 ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA)
 အစီရင်ခံစာဆောင်ရွက်ရန် အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးရွာအမည် - အုန်းပင်...တောင် ၇၉၊

နေ့စွဲ ၂.၁၁.၂၀၂၂

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
၁၃	ဦးမြတ်ကျော်		
၁၄	ကျော်မြင့်		
၁၅	ဒီဇင်		
၁၆	ဦးကောင်းထက်မော်		
၁၇	ထွန်းထွန်းမေ		
၁၈	ခဲဖြူမိုး		
၁၉	ထက်စွန်းအောင်		
၂၀	စိုးလင်းနီ		
၂၁	မြတ်မြတ်အောင်		
၂၂	ကျော်စင်စွန်း		
၂၃	အောင်		
၂၄	ကျော်စင်		
၂၅	ကျော်စင်		

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ကျေးရွာအမည် ၁၁၂၂-၂၀၆-၁၆၀၀-၂၆










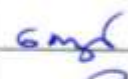



နေ့စွဲ ၂.၁၁.၂၀၂၂

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
၂၆	ကျော်ဇွန်	ကျော်	
၂၇	ယဉ်ယဉ်ဇွန်	ဇွန်	
၂၈	ဦးမြတ်သူ	Myo	
၂၉	အိမ်ကျ	အိမ်	
၃၀	ဘို.စင်ထွန်း	Shinee	
၃၁	မျိုးပဒိတ	Mye Padi	
၃၂	သက်ဦးဦး	Mye	
၃၃	အမှတ်	အမှတ်	
၃၄	ကျော်ထင်လင်း	ကျော်	
၃၅	ထွန်းထွန်းလင်း	ထွန်း	
၃၆	ဦးသန်းထွန်း	ဦးသန်း	အုတ်တိုင် ဂူပူလူအိမ်ထောင် အသင်း-ဥက္ကဋ္ဌ

Sann Shinn & Brothers Co., Ltd ၏ Fiber Cement Board Factory အတွက်
 ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA)
 အစီရင်ခံစာဆောင်ရွက်ရန် အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးရွာအမည် သာယာယောင်ကျေးရွာ

နေ့စွဲ 2.11.2022

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
37	အောင်ကျော်စွာ		
38	မောင်အောင်		
39	နိုဏ်းကျော်စွာ		
40	ခင်ကျော်စွာ		
41	၇၀၆၁		
42	ကျော်စွာ		
43	ကျော်စွာ		
44	ကျော်စွာ		
45	ကျော်စွာ		
46	ကျော်စွာ		
47	ကျော်စွာ		
48	ကျော်စွာ		
49	ကျော်စွာ		

Sann Shinn & Brothers Co., Ltd ၏ Fiber Cement Board Factory အတွက်
 ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA)
 အစီရင်ခံစာဆောင်ရွက်ရန် အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးရွာအမည် ဘယ့်ပင်လယ်ကန်ရွာ

နေ့စွဲ 2.11.2022

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
50	ဦး နှစ်ပန်း		
51	ဦး အောင်ဦး		
52	ဦးစိုးဝင်း		
53	သန်းခွင်		
54	ဦးစိုးမင်းထွန်း		
55	ဦးမျိုးဝင်း		
56	ဦးမင်းဦး		
57	ဦးအောင်		
58	ဦးဝင်းခိုင်ဦး		
59	ဦးခိုင်အောင်လင်း		
60	ဦးစိုးသူ		
61	ဦးဝင်းမင်းဦး		

Sann Shinn & Brothers Co., Ltd ၏ Fiber Cement Board Factory အတွက်
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA)

အစီရင်ခံစာဆောင်ရွက်ရန် အစည်းအဝေးတက်ရောက်သူများစာရင်း

ကျေးရွာအမည် - သစ်လင်း+ကောက်လှိုင်

နေ့စွဲ 2.11.2022

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
62	ဦးတင်ညွန့်		အုပ်ချုပ်ရေးမှူး
63	ဦးဝင်းမောင်		စိုက်ပျိုးရေးဦးစီးဌာန
64	ဦးဝင်းထွန်း		ကျေးဇူး
65	ဦးမြင့်ထွန်း		ကျေးဇူး
66	ဦးထွန်းမင်း		အထွေထွေ (အခြား)
67	ဦးကျော်စိုင်း		
68	ဦးစံစိန်		
69	ဦးစိန်မောင်		
70	ဦးတင်အောင်		
71	ဦးသန်းစိန်		
72	ဦးသိန်းစိန်		
73	ဦးစိန်မောင်		
74	ဦးကျော်စိုင်း		



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