

**Environmental Impact Assessment (EIA) Report
for
Korea-Myanmar Industrial Complex Project,
Hlegu Township,
Yangon
(3rd Revised Report)**



Submitted to

KMIC

KMIC Development Co., Ltd

By

MSR

Myanmar Survey Research

November 2021

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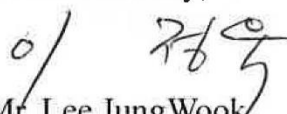
To: Director General

Environment Conservation Department
Ministry of Natural Resources and Environmental Conservation

Subject: Submission of EIA Report for KMIC Development Project

- (1) KMIC Development Co., Ltd is planning to develop Korea-Myanmar Industrial Complex on the land of approximately 555.81 acres in Hlegu township, Yangon Region. This project is being implemented jointly by Ministry of Construction, Government of the Republic of the Union of Myanmar and Korean Consortium.
- (2) In order to conduct Environmental Impact Assessment (the "EIA") for the 555.81 acre land, the project proponent commissioned a third party, Myanmar Survey Research (MSR). MSR visited KMIC site and the surroundings for the preparation of the EIA report in accordance with the existing laws, regulation, guidelines, and standards of the corresponding Ministries of the Republic of the Union of Myanmar.
- (3) KMIC Development Co., Ltd would like to confirm the following aspects related to the EIA report:
 - (a) The accuracy and completeness of the EIA;
 - (b) The EIA has been prepared in strict compliance with applicable laws including EIA procedure; and
 - (c) The project will, at all times, comply fully with the commitments, mitigation measures and plans in the EIA reports.

Yours sincerely,


Mr. Lee JungWook

Managing Director of KMIC Development Co., Ltd.

Submission of Documentation

We, Myanmar Survey Research (MSR) Co., Ltd., hereby submit this Environmental Impact Assessment (EIA) Report for KMIC Project in Hlegu township, Yangon Region. To our best knowledge, the information contained in this report is accurate and truthful, representing all findings related to the project.

Signed at Yangon on 26 March 2020.

Environmental Impact Assessment Team Members

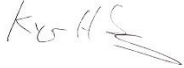


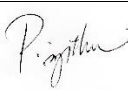
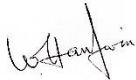
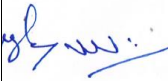
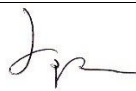
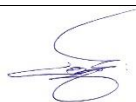

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TERMS AND ACRONYMS

TERMS

| | |
|-----|--|
| U | “U” is an honorific placed before the name of a male adult. It is an equivalent of “Mr.” It does not say whether the person addressed is single or married. |
| Daw | “Daw” is an honorific placed before the name of a female adult. It does not say whether the person addressed is single or married. |
| Ma | “Ma” is used to address a female child or a young lady. Women of same age— young or old—also address each other using this honorific. Especially older persons use this address for younger persons. |
| Ko | “Ko” is used to address a young man. Men of same age—young or old—also address each other using this honorific. Older persons also use this address for younger persons. |

ACRONYMS

| | |
|------------------|--|
| (ACGIH) | American Conference of Governmental Industrial Hygienist |
| MSL | Mean Sea Level |
| BOD ₅ | 5-day Biochemical Oxygen Demand |
| CBD | Central Business District |
| Co., Ltd. | Company Limited |
| CO | Carbon monoxide |
| CO ₂ | Carbon dioxide |
| COD | Chemical Oxygen Demand |
| CSR | Corporate Social Responsibility |
| D | Diameter |
| DUHD | Department of Urban and Housing Development |
| Dy | Deputy |
| ECC | Environmental Compliance Certificate |
| ECD | Environmental Conservation Department |
| ECL | Environmental Conservation Law |
| ECR | Environmental Conservation Rules |
| e. g | For example |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| EPC | Engineering, Procurement and Construction |
| ESIA | Environmental and Social Impact Assessment |
| FAO | Food and Agriculture Organization |
| GEF | Global Environment Facility |
| GIS | Geographic Information System |
| IT | Information Technology |
| JVC | Joint Venture Company |
| KMIC JVC | KMIC Development Co., Ltd. |
| km | Kilometer |
| kV | Kilovolts |
| MDGs | Millennium Development Goals |
| MEPE | Myanmar Electric Power Enterprise |
| MMK | Myanmar kyat |
| MOC | Ministry of Construction |
| MOF | Ministry of Forestry |
| MOECAF | Ministry of Environmental Conservation and Forestry |
| MONREC | Ministry of Natural Resources and Environmental Conservation |
| MoU | Memorandum of Understanding |
| MSR | Myanmar Survey Research |
| M.S.T | Myanmar Standard Time |

| | |
|----------------------|---|
| MW | Megawatt |
| m ² (sqm) | Square meter |
| mm | millimeter |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NCDP | National Comprehensive Development Plan |
| NEQ | National Environmental Quality |
| NLD | National League for Democracy |
| no. | Number |
| NSDS | National Sustainable Development Strategy |
| PAP | Project Affected People |
| PM | Particulate Matter |
| PPE | Personal Protective Equipment |
| ppm | Parts per million |
| R& D | Research and Development |
| SAR | Sodium Absorption Ratio |
| SIA | Socio-economic Impact Assessment |
| SO ₂ | Sulphur dioxide |
| USDA | Union Solidarity and Development Association |
| USDP | Union Solidarity and Development Party |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Economic, Scientific and Cultural Organization |
| VOC | Volatile Organic Compound |
| µg/m ³ | micro gram per cubic meter |
| mg/l | milligram per liter |
| E | East |
| W | West |
| S | South |
| N | North |
| SE | South East |
| SW | South West |
| NE | North East |
| NW | North West |

Basic Education System in Myanmar

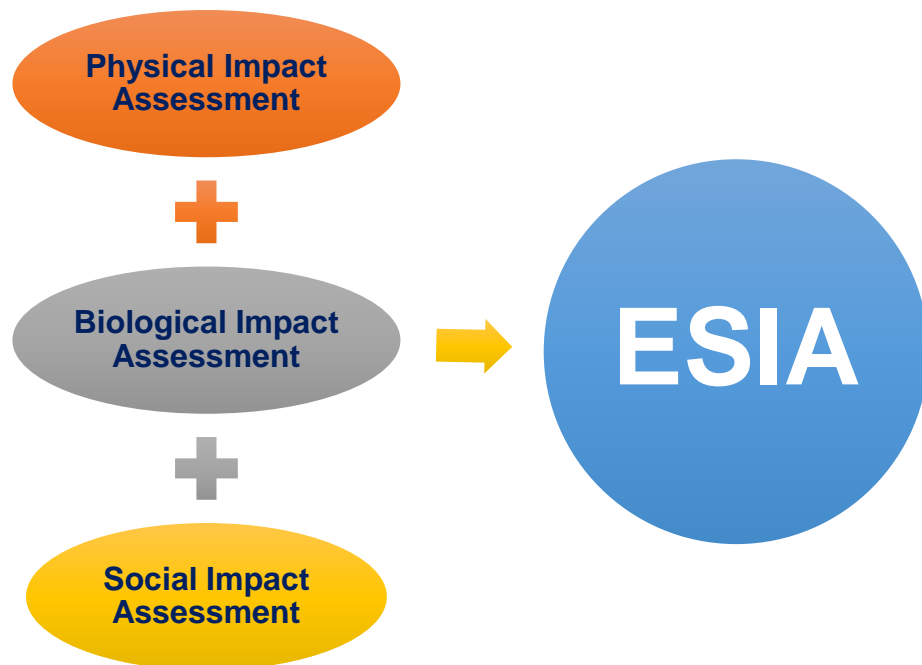
| | | |
|----------------|--------------------------|--|
| Primary School | = Elementary School | 1 st Grade (Kindergarten) |
| | | 2 nd Grade |
| | | 3 rd Grade |
| | | 4 th Grade |
| | | 5 th Grade |
| Middle School | = Lower Secondary School | 6 th Grade |
| | | 7 th Grade |
| | | 8 th Grade |
| | | 9 th Grade |
| High School | = Upper Secondary School | 10 th Grade |
| | | 11 th Grade |
| | | 12 th Grade (Matriculation) |

After completing 12 years of Basic Education, a student can join an institution of higher learning.

| | |
|---------------------|--|
| Post-Primary School | A primary school teaching some more Middle School grades in addition to the Primary School grades. |
|---------------------|--|

ESIA

This assessment comprises three components



SECTION 1

EXECUTIVE SUMMARY



Executive Summary (Myanmar)

ရန်ကုန်တိုင်းဒေသကြီး၊ လှည်းကူးမြို့နယ်ရှိ ညောင်နှစ်ပင်ရေယာတွင် တည်ဆောက်မည့် ကိုရီးယား-မြန်မာ စက်မှုလုပ်ငန်းနယ်မြေစီမံကိန်း ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာအကျဉ်းချုပ် (မြန်မာဘာသာ)

၁။ နိဒါန်း

ဤအစီရင်ခံစာ၏ ရည်ရွယ်ချက်မှာ ကိုရီးယား-မြန်မာ စက်မှုလုပ်ငန်းနယ်မြေစီမံကိန်းကြောင့် ပတ်ဝန်းကျင်အပေါ် အလားအလာရှိသော ထိခိုက်မှုများနှင့် ဆက်စပ်သက်ရောက်မှုများကို စနစ်တကျ အမျိုးအစားခွဲခြားဖော်ထုတ်ပြီး ဆန်းစစ်မှုပြုလုပ်ရန်ဖြစ်ပါသည်။ ထို့ပြင် ဖြစ်နိုင်ခြေရှိသော စီမံကိန်း အခြား ဆောင်ရွက်နိုင်သော နည်းလမ်းများကို စနစ်တကျဆန်းစစ်မှုပြုလုပ်ခြင်းနှင့် အလားအလာရှိသော ထိခိုက်မှု များကို လျော့နည်းစေသည့် ဆီလျော်သော နည်းလမ်းများကို ဆုံးဖြတ်ဖော်ထုတ်ရန်ဖြစ်ပါသည်။ ဤအစီရင် ခံစာတွင် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်ပါရှိပါသည်။

၂။ စီမံကိန်းအကြောင်းအရာနှင့်တည်နေရာ

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ၊ ဆောက်လုပ်ရေးဝန်ကြီးဌာနနှင့် ကိုရီးယားနိုင်ငံမှ ကိုရီးယား-မြန်မာ စက်မှုလုပ်ငန်းနယ်မြေ ဖွံ့ဖြိုးတိုးတက်ရေး ကုမ္ပဏီလီမိတက် (ကိုရီးယား-မြန်မာ စက်မှု လုပ်ငန်းနယ်မြေ ဖက်စပ် ကုမ္ပဏီ) KMIC Development Co., Ltd. (KMIC JVC) တို့သည် ကိုရီးယား-မြန်မာ စက်မှုလုပ်ငန်းနယ်မြေစီမံကိန်းကို အကောင်အထည်ဖော်ရန် ၂၀၁၅ ခုနှစ်၊ စက်တင်ဘာလတွင် စတင်လုပ် ဆောင်ခဲ့ပါသည်။ နှစ်ဖက်သောအဖွဲ့အစည်းတို့သည် အဆိုပါလုပ်ငန်းစီမံချက်ကို ရန်ကုန်မြို့မြောက်ဘက် ၄၀ ကီလိုမီတာ အကွာအဝေးတွင်ရှိသောညောင်နှစ်ပင်ဒေသတွင် အကောင်အထည်ဖော်ရန် သဘောတူညီခဲ့ကြ သည်။ ၎င်းလုပ်ငန်းတည်နေရာသည် ၅၅၅.၈၁ ဧက (၂၄၉၂၈၈ စတုရန်းမီတာ) ကျယ်ဝန်းသော မြေပြန့်ပြစ်ပြီး လှည်းကူးမြို့နယ်ရှိ ညောင်နှစ်ပင်မွေးမြူရေးနှင့် စိုက်ပျိုးရေးဇုန် အမှတ်-၃ အနီးတွင် တည်ရှိပါသည်။ လုပ်ငန်းနယ်မြေ၏ ၁၆၄၀၂၄၅ စတုရန်းမီတာမှာ စက်မှုလုပ်ငန်းများအတွက်ဖြစ်ပြီး ကျန်သော အစိတ်အပိုင်း တွင် လမ်းများအပါအဝင် အခြားအခြေခံအဆောက်အအုံနှင့်ပတ်သက်သည်များ တည်ရှိမည်ဖြစ်သည်။ စက်မှုလုပ်ငန်းများအတွက် သတ်မှတ်ထားသောမြေကို မြေကွက် အကြီး၊ အလတ်၊ အသေးဟူ၍ သုံးမျိုးပိုင်းခြား သတ်မှတ်ထားပြီး ထိုမြေကွက်များပေါ်တွင် အထည်ချုပ်၊ အစားအစာ ထုတ်လုပ်ခြင်း၊ ကျောက်မျက်ရတနာလုပ်ငန်း၊ ယာဉ်အပိုပစ္စည်းနှင့်လျှပ်စစ်ပစ္စည်းများတပ်ဆင်ခြင်း စသည့် လုပ်ငန်းများနှင့် သက်ဆိုင်သည့် စက်ရုံများနှင့်ကုန်လောင်ရုံများကို ဆောက်လုပ်မည်ဖြစ်သည်။ ကျန်သောအစိတ်အပိုင်းတွင် လူနေအဆောက်အအုံများ၊ စီးပွားရေးလုပ်ငန်းအဆောက်အအုံများ၊ အသက်မွေးဝမ်းကျောင်း ပညာသင်တန်း ကျောင်း၊ အဓိကလမ်းမများ၊ လမ်းဖြတ်များနှင့်ရေမြောင်းများ၊ လျှပ်စစ်မီးကြိုးသွယ်တန်းခြင်း၊ စိမ်းလန်း သစ်ပင်စိုက်ပျိုးခင်းများ၊ လျှပ်စစ်ခါတ်အားခွဲရုံ၊ ရေပုပ်ရေဆိုးသန့်စက်ရုံ၊ ရေသန့်စင်စက်နှင့် အများပြည်သူနှင့် သက်ဆိုင်သည့်နေရာများ (ပန်းခြံ၊ ကစားကွင်း၊ အိမ်သာစသည်)တို့ကိုဆောက်လုပ်မည်ဖြစ်သည်။

ဤလုပ်ငန်းစီမံကိန်းဧရိယာကို ညောင်နှစ်ပင်အမျိုးသားညီလာခံဝင်းဟုအများကသိရှိကြပြီး၊ ယခုအခါ ထိုဝင်းကိုအသုံးမပြုတော့သည့်အလျောက် (စီမံကိန်းမြေနှင့် ထိုမြေပေါ်ရှိ အဆောက်အအုံများကို ၂၀၀၈ ဖွဲ့စည်းပုံ အခြေခံဥပဒေရေးဆွဲရန်အတွက် ၁၉၉၄ မှ ၂၀၀၇ အထိ အမျိုးသားညီလာခံကျင်းပရာတွင် အသုံးပြုခဲ့ပြီး နောက်ပိုင်းတွင်အသုံးပြုခြင်းမရှိတော့သည်မှာ ယခုအချိန်အထိဖြစ်ပါသည်။) ယခင်ကရှိခဲ့သော ခန်းမ၊ တည်းခိုဆောင်၊ ကဇာတ်ရုံ၊ ဆေးရုံ၊ လမ်းစသည့် အဆောက်အအုံများမှာ ပျက်စီးယိုယွင်းနေပြီး ထိုနေရာသည် နေရာသီတွင်ခြောက်သွေ့ကာ ဖုံးဆိုးတော့အဖြစ်ရှိပြီး၊ မိုးရာသီတွင် ရွံ့ထူထပ်ပြီး မြက်ပင်ရိုင်းများ၊ သစ်ပင်ရိုင်းများ၊ ခြံပုတ်မျိုးစုံတို့ ဖုံးလွှမ်းနေသည့် နေရာအဖြစ် ရှိနေပါသည်။

၂.၁။ လမ်း

စီမံကိန်းဧရိယာအတွင်းတွင် ၃၈၊ ၄၆၊ ၂၆၊ ၁၈၊ ၁၂ နှင့် ၈ မီတာ အကျယ်ရှိသော လမ်းများကို ဖောက်လုပ်သွားပါမည်။

၂.၂။ ရေအရင်းအမြစ်နှင့်ရေအသုံးချရေး

ညောင်နှစ်ပင်ဒေသရှိ မွေးမြူရေးနှင့်စိုက်ပျိုးရေးဇုန်ကို ရေပေးဝေရန် ၂၀၀၁ ခုနှစ်ကတည်းက ဆောက်လုပ်ခဲ့သော ကလီထော်ရေလှောင်တံမံမှ ရေကိုရယူသုံးစွဲရန်စီစဉ်ထားပါသည်။

၂.၃။ လျှပ်စစ်ဓာတ်အားရယူသုံးစွဲမှု

စီမံကိန်းသည် ၂၃၀ ကေဗီ ကမာနတ်-မြောင်းတကာ မဟာဓာတ်အားလိုင်းမှ လျှပ်စစ်ဓာတ်အားကို ရယူအသုံးပြုမည်ဖြစ်သည်။ အဆိုပြုစီမံကိန်းဝင်း အတွင်းတွင် လျှပ်စစ်ဓာတ်အားခွဲရုံကို တည်ဆောက်မည် ဖြစ်ပြီး လုပ်ငန်းဧရိယာအတွင်းတွင် လျှပ်စစ်ဓာတ်အားကို မြေပေါ်လမ်းဘေးဓာတ်တိုင်များ စိုက်ထူ သွယ်တန်း၍ ဖြန့်ဝေပေးပြီး စီမံကိန်းလည်ပတ်သည့် အဆင့်တွင် ဓာတ်အားမီဂါဝပ် ၅၀ ကို အသုံးပြုမည် ဖြစ်သည်။

၂.၄။ မွေးမြူရေးနှင့်စိုက်ပျိုးရေးဇုန်

ဧက (၁၀၀၀၀) ခန့် ကျယ်ဝန်းသောညောင်နှစ်ပင်ဧရိယာတွင် စိုက်ပျိုးရေး ဇုန် ၃ ဇုန်ကို ထူထောင် ထားပြီးဖြစ်သည်။ စိုက်ပျိုးရေးလုပ်ငန်းကို လုပ်ကိုင်နိုင်ရန်အတွက် သတ်မှတ်ထားသောဈေးနှုန်းကို ပေးဆောင်နိုင်သည့် ပုဂ္ဂိုလ်တစ်ဦးစီအား စီမံကိန်းမြေဧရိယာတစ်ဝိုက်တွင် မြေ ၅ ဧကစီကို အသုံးပြုခွင့်ပေးထားပါသည်။ စီမံကိန်းဧရိယာတစ်ဝိုက်တွင် လူပုဂ္ဂိုလ်အချို့က ၅ ဧကစီကျယ်သော မြေကွက်များတွင် သီးပင် စိုက်ခင်းများစိုက်ပျိုးထားရှိသည်။ အလားတူနှစ်ရှည်သီးနှံပင်များဖြစ်သော သရက်၊ ပိန္နဲ၊ နဂါးမောက်သီး၊ ကြက်မောက်သီးအပင်များကို အဆိုပါမြေကွက်များစိုက်ပျိုးထားသည်ကိုတွေ့ရသည်။ သီးပင်စိုက်ပျိုးခင်းများနှင့် ကပ်လျက် ငါးမွေးမြူရေးကန်များ၊ ကြက်ဘဲမွေးမြူရေးခြံများ ထူထောင်ထားရှိသည်ကိုလည်းတွေ့ရသည်။ လှည်းကူးမြို့နယ်နှင့် မှော်ဘီမြို့နယ်အကြားရှိ ယခင်သဘာဝပေါက်ပင်များရှိခဲ့သောနေရာတွင် ယခုအခါ ရာဘာနှင့်အော်ရေးရှားပင်များအပါအဝင် ဝင်ငွေရရှိစေသောသီးနှံစိုက်ပျိုးခင်းများနှင့် စပါးစိုက်ခင်းများက နေရာယူလျက်ရှိကြသည်။

၂.၅။ စီမံကိန်း အခြားဆောင်ရွက်နိုင်သောနည်းလမ်းများ

ရန်ကုန်တိုင်းဒေသကြီးတွင် ပြန်လည်နေရာချထားရေးပြဿနာ၊ လျှပ်စစ်မီးရရှိရေးနှင့် ရေရရှိရေးတို့ အတွက် စိုးရိမ်ပူပန်မှုမရှိရသောနေရာမှာ ရှားပါးလှသည်။ ဤစီမံကိန်းနေရာသည် အဓိက လမ်းမကြီးများနှင့်

အမြန်လမ်းမကြီးများသို့ အတိုဆုံးခရီးအကွာအဝေးဖြင့် ရောက်ရှိနိုင်ရန် စီစဉ်၍ရနိုင်ပါသည်။ ဤနေရာကို နဂိုမူလအတိုင်း ပေါက်ပင်အရိုင်းများဖြင့်သာ ထားမည်ဆိုပါလျှင် နိုင်ငံ၏ရည်မှန်းချက်ဖြစ်သော "တိုင်းပြည် စီးပွားဖွံ့ဖြိုးတိုးတက်အောင်လုပ်ဆောင်ခြင်း" သဘောတရားကို ဆန့်ကျင်ရာရောက်ပေသည်။

၃။ မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာမူဘောင်

ဤအပိုင်းတွင် စက်မှုလုပ်ငန်းဆိုင်ရာနယ်မြေများကို အကောင်အထည်ဖော်သော စီမံကိန်းများ အတွက် ဥပဒေမူဘောင်မည်သို့ရှိသည်ကိုဖော်ပြပြီး၊ စီမံကိန်းကိုအကောင်အထည်ဖော်ဆောင်ရွက်ရာတွင် မြန်မာနိုင်ငံတွင်ပတ်ဝန်းကျင်နှင့်သဟဇာတဖြစ်ပြီးလူမှုရေးရာပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေဖြစ်အောင် သတ်မှတ်ပြဋ္ဌာန်းထားသည့် ဥပဒေ၊နည်းဥပဒေနှင့် လုပ်ထုံးလုပ်နည်းများနှင့်အညီ မည်သို့ဆောင်ရွက်ရမည် ဆိုသည်ကို ဖော်ပြထားသည်။

ပတ်ဝန်းကျင်နှင့်လူမှုရေး ထိခိုက်မှုဆန်းစစ်ချက်လုပ်ငန်းတွင် အမျိုးသားစီမံကိန်း မူဝါဒဆိုင်ရာ လုပ်ငန်းမူဘောင်ကို လေ့လာသုံးသပ်ခြင်း၊ အစိုးရ၏သက်ဆိုင်ရာ လမ်းညွှန်ချက်များအပေါ် လေ့လာသုံးသပ် ခြင်းနှင့် လုပ်ငန်းကဏ္ဍများနှင့်ပတ်သက်သော ဥပဒေများအပေါ် လေ့လာသုံးသပ်ခြင်းများ ပါဝင်ပါသည်။ မူဝါဒဆိုင်ရာအစီအမံများက အဆိုပြုစီမံကိန်းလုပ်ငန်းအပေါ် မည်သို့သက်ရောက်မှုရှိသည်ကို ဤဆန်းစစ် ခြင်း အစီရင်ခံစာတွင် အသေးစိတ် ဖော်ပြမည်ဖြစ်သည်။

၄။ အခြေခံအချက်အလက်ရယူခြင်း

၄.၁။ လေ့လာမှုနယ်ပယ်

မြန်မာ့ဆေးသုတေသန (MSR) ၏ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဖွဲ့သည် ယခင် စီမံကိန်း အဆိုပြုချက်တွင် ဖော်ပြပါရှိသော ၂၄၆၄၂၅ စတုရန်းမီတာ (၆၀၀ ဧက) အကျယ်အဝန်းပေါ်အခြေခံပြီး မြေကြီး၊ ရေနမူနာကောက်ယူခြင်းများ ပြုလုပ်ခဲ့ပါသည်။ လေအရည်အသွေးတိုင်းတာခြင်းကို စီမံကိန်း ဧရိယာနှင့် စီမံကိန်းသက်ရောက်မှုရှိမည့်ဧရိယာများကို လွှမ်းခြုံနိုင်ရန် တိုင်းတာသည့် နေရာမှ ၅ ကီလိုမီတာ အချင်းဝက်အထိ လွှမ်းခြုံနိုင်သည့်နေရာများတွင် ရွေးချယ်တိုင်းတာခဲ့ပါသည်။

လူမှုပတ်ဝန်းကျင်လေ့လာမှုနယ်ပယ်အဖြစ် စီမံကိန်းဧရိယာမှ ၅ ကီလိုမီတာ အချင်းဝက် အကွာ အဝေး အတွင်း၌ တည်ရှိသော ကြာကန်စု၊ ညောင်နှစ်ပင်၊ တကူတုံး၊ စုန်ကုန်း၊ ကြာအင်း (အနောက်) နှင့် ကြာအင်း (အရှေ့) ကျေးရွာများကို သတ်မှတ်ပါသည်။

ဇီဝပတ်ဝန်းကျင်လေ့လာမှုနယ်ပယ်အဖြစ် စီမံကိန်းဧရိယာမှ ၃ ကီလိုမီတာ အချင်းဝက် အကွာ အဝေး အတွင်းရှိ နေရာဒေသများကို အဓိကထား၍ သတ်မှတ်ပါသည်။ သို့ရာတွင် လူမှုရေး၊ ရုပ်ပိုင်းနှင့် သက်ရှိ များအပေါ် ထိခိုက်မှုဆန်းစစ်ခြင်းသည် စီမံကိန်း ပတ်ဝန်းကျင် ဧရိယာကိုသာ ကန့်သတ်လုပ်ဆောင်ခြင်း မဟုတ်ပါ။ ဒေသတွင်းနှင့် နိုင်ငံတော်အဆင့်အထိ ထိခိုက်မှုမည်မျှရှိနိုင်သည်ကို နားလည်သဘောပေါက်စေရန် လေ့လာဆန်းစစ်ချက်များကို ကျယ်ကျယ်ပြန့်ပြန့် လုပ်ဆောင်ထားပါသည်။

၄.၂။ ရုပ်ပိုင်းဆိုင်ရာပတ်ဝန်းကျင်အချက်အလက်များရယူခြင်း

၄.၂.၁။ လေအရည်အသွေးတိုင်းတာခြင်း

စီမံကိန်းဧရိယာအတွင်း သတ်မှတ်ထားသောနေရာတွင် တပ်ဆင်ထားသော EPAS haz-scanner စက်၏ အလိုအလျောက်အာရုံခံကိရိယာများဖြင့် လေ၏အရည်အသွေးကို တိုင်းတာပါသည်။ ၎င်းတို့က

လက်ရှိအခြေအနေတွင်ရှိသော လေအရည်အသွေးကို မှတ်တမ်းတင်ထားပြီး လေထုညစ်ညမ်းမှုရှိလာနိုင်သောအခါ ရှိလာသည့်အခြေအနေနှင့် နှိုင်းယှဉ်ဖော်ပြပြီးခွဲခြမ်းစိတ်ဖြာနိုင်ရန် ဖြစ်ပါသည်။ လေနမူနာ စုဆောင်းသည့် အချိန်သည် EPAS haz-scanner လေနမူနာ စုဆောင်းသည့် ကရိယာကို အသုံးပြုပြီး PM_{2.5} နှင့် PM₁₀ တို့ကို တိုင်းတာခြင်းနှင့် အခြားသော ဓာတ်ငွေ့များကို EPAS haz-scanner ၏ အလိုအလျောက် အာရုံခံကိရိယာများဖြင့် တိုင်းတာ ခြင်းတို့၏ ၂၄ နာရီတိုင်းတာသည့်အဆင့် အပေါ် အခြေခံသည်။ ၂၀၁၇ ခုနှစ် ဧပြီလတွင် လေတိုင်းတာမှုတစ်ကြိမ်နှင့် ၂၀၁၉ ခုနှစ် ဇူလိုင်လတွင် လေတိုင်းတာမှုတစ်ကြိမ် စုစုပေါင်း နှစ်ကြိမ် ပြုလုပ်ခဲ့ပါသည်။ လေတိုင်းတာမှုများကို ကျန်းမာရေးနှင့်အားကစားဝန်ကြီးဌာန၊ လုပ်ငန်းခွင် နှင့် ပတ်ဝန်းကျင် ကျန်းမာရေးဌာနခွဲ၊ ပတ်ဝန်းကျင် ကျန်းမာရေးဓာတ်ခွဲခန်းတွင် စစ်ဆေးပါသည်။ ဓာတ်ခွဲခန်း တွင် စစ်ဆေးတွေ့ရှိချက်များအရ ပထမအကြိမ် လေတိုင်းတာမှုတွင် PM_{2.5} ၊ PM₁₀ နှင့် ဆလဖာဒိုင် အောက်ဆိုဒ်၊ ဒုတိယအကြိမ် လေတိုင်းတာမှုတွင် ဆလဖာဒိုင် အောက်ဆိုဒ်တို့၏ လေထုထဲတွင်ပါဝင်မှုမှာ အမျိုးသားပတ်ဝန်းကျင်အရည်အသွေးထုတ်လွှတ်မှု လမ်းညွှန်ချက်များပါ ရည်ညွှန်းတန်ဖိုးများထက် ကျော်လွန်နေပြီး နိုက်ထရိုဂျင် ဒိုင်အောက်ဆိုဒ်၊ ကာဗွန်မိုနောက်ဆိုဒ်၊ အိုဇုန်းနှင့် VOCs တို့သည် ရည်ညွှန်း တန်ဖိုးများအောက် လျော့နည်းပါသည်။

၄.၂.၂ ဆူညံသံနှင့်တုန်ခါမှုတိုင်းတာခြင်း

အသံအဆင့်အားစောင့်ကြည့်တိုင်းတာခြင်းကို မြန်မာနိုင်ငံတွင် ခွင့်ပြုချက်ရရှိပြီး လက်ရှိ အသုံးပြု နေသော အမေရိကန်နိုင်ငံရှိ အစိုးရစက်မှုဆိုင်ရာသန့်ရှင်းမှုကွန်ဖရင့် (ACGIH) မှချမှတ်ထားသည့် စံချိန်စံညွှန်း အတိုင်းဆောင်ရွက်ပါသည်။ တိုင်းတာမှုကို ၂၄ နာရီ ဆောင်ရွက်ပါသည်။ တစ်နာရီအတွင်းပျမ်းမျှ ဆူညံသံ အဆင့် (Leq in dBA) နှင့် အမြင့်ဆုံး ဆူညံသံ (Lmax in dBA)ကို တိုင်းတာပါသည်။ ဤတိုင်းတာမှုကို လေအရည်အသွေး တိုင်းတာခြင်းနှင့် အတူလုပ်ဆောင်ခဲ့ပါသည်။ နေ့အချိန်နှင့် ညအချိန်တို့အတွက် တစ်နာရီ အတွင်းပျမ်းမျှ ဆူညံသံနှင့် အမြင့်ဆုံး ဆူညံသံအဆင့်တို့မှာ ရည်ညွှန်းတန်ဖိုးများအောက် လျော့နည်းပါသည်။

၄.၂.၃ မြေဆီလွှာအရည်အသွေးတိုင်းတာခြင်း

မြေဆီလွှာ အာဟာရဓာတ်နှင့် သတ္တုပါဝင်မှုကို တိုင်းတာစစ်ဆေးရန် အပေါ်ယံမြေဆီလွှာ နမူနာ စုစုပေါင်း ၁၀ မျိုးနှင့် အောက်မြေဆီလွှာ နမူနာ စုစုပေါင်း ၈ မျိုးကို ကောက်ယူခဲ့ပါသည်။ ၂၀၁၇ ခုနှစ် ဧပြီလ တွင် အပေါ်ယံမြေဆီလွှာ နမူနာ ၆ မျိုးနှင့် အောက်မြေဆီလွှာ နမူနာ ၄ မျိုး၊ ၂၀၁၉ ခုနှစ် ဇူလိုင်လတွင် အပေါ်ယံမြေဆီလွှာ နမူနာ ၄ မျိုးနှင့် အောက်မြေဆီလွှာ နမူနာ ၄ မျိုးကို ကောက်ယူခဲ့ပါသည်။ မြေဆီလွှာ နမူနာများကို စီမံကိန်းဧရိယာ ပတ်ဝန်းကျင်နှင့် စိုက်ပျိုးရေးဇုန် ၁ အတွင်းမှ ကောက်ယူခဲ့ပါသည်။

မြေဆီလွှာလေ့လာခြင်းကို ရုရှားမြေဆီလွှာသိပ္ပံပညာရှင်၏ စမ်းသပ်ခြင်းနည်းနှင့် FAO၊ UNESCO တို့၏နည်းစနစ်များကို အသုံးပြု၍ဆောင်ရွက်ပါသည်။ မြေဆီလွှာ အရောင်အဆင်း၊ မြေသားအခြေအနေ၊ မြေဆီလွှာဖွဲ့စည်းထားပုံ၊ ရေငွေ့ပါဝင်မှု၊ မာကျောမှု၊ ရေစီးရေလာ၊ ပေါင်းစပ်ပါဝင်မှုနှင့် မြေဆီလွှာသစ်ဖြစ်ထွန်းမှုစသော ရုပ်ပိုင်းဆိုင်ရာဂုဏ်သတ္တိများကို မှတ်တမ်းတင်ပြီး၊ မြေဆီလွှာ အမျိုးအမည် သတ်မှတ်ခြင်းကို ရုရှားနိုင်ငံမြေဆီလွှာအမျိုးအစားခွဲခြားမှုနည်းနှင့် FAO ၏မြေဆီလွှာအမျိုး အစားခွဲခြား နည်းများကို အသုံးပြုပါသည်။

မြေကြီးနမူနာများကို စိုက်ပျိုးရေး၊ မွေးမြူရေးနှင့် ဆည်မြောင်းဝန်ကြီးဌာန၊ စိုက်ပျိုးရေးဦးစီးဌာန၊ ဓာတ်ခွဲခန်းတွင် ဓာတ်ခွဲစမ်းသပ်ပြီး အတည်ပြုချက်ရယူပါသည်။ ဓာတ်ခွဲခန်းအဖြေအရ ရေတွင်ပျော်ဝင်သောဆားကို ခွဲခြမ်းစိတ်ဖြာရာတွင် ပျော်ဝင်ဆားပမာဏ၊ လျှပ်ကူးသတ္တိ၊ ကြွင်းကျန် ဆိုဒီယမ်ကာဗွန်နိတ်နှင့် ဆိုဒီယမ်စုပ်ယူနိုင်သည့်အချိုးတို့သည် ပြဿနာမရှိကြောင်း သိရှိရပါသည်။ မြေဆီလွှာ အာဟာရဓာတ်နှင့် ပတ်သက်ပြီး ကောင်းမွန်သော အနေအထားတွင်ရှိပါသည်။ သတ္တုပါဝင်မှုတွင် နီကယ်၊ ခရိုမီယမ်၊ ကယ်ဒမီယမ်နှင့် ခဲပါဝင်မှုတို့ကို မတွေ့ရှိရဘဲ သံဓာတ်ပါဝင်မှုမှာ အများဆုံးပါဝင်ရန်ခွင့်ပြုထားသော ပမာဏ ၂၄၀ ppm ထက် များစွာကျော်လွန်နေသည်ကို တွေ့ရှိရပါသည်။

၄.၂.၄။ ရေအရည်အသွေးတိုင်းတာခြင်း

ရေအရည်အသွေးတိုင်းတာစစ်ဆေးရန် ရေနမူနာ စုစုပေါင်း ၁၂ မျိုးကို ၂၀၁၇ ခုနှစ် ဧပြီလနှင့် ၂၀၁၉ ခုနှစ် ဇူလိုင်လတို့တွင်ကောက်ယူခဲ့ပါသည်။ မြေပေါ်ရေ/သောက်ရေ အတွက် ရေနမူနာ ၅ မျိုးကို ရေကန်၊ ရန်ကုန်-မန္တလေးအမြန်လမ်းအနီး (၆.၂မိုင်) ရှိ ကြာအင်းချောင်း၊ လက်ပန်ဝဲကျေးရွာအနီး ပုဇွန်တောင်ချောင်း၊ ကလီထော် ရေလှောင်တံခံတို့မှ ကောက်ယူခဲ့ပြီး စွန့်ပစ်ရေ နမူနာ ၅ မျိုးနှင့် မြေအောက်ရေ (ရေတွင်းရေ) နမူနာ ၂ မျိုးကိုလည်းကောက်ယူခဲ့ပါသည်။

ရေနမူနာများကိုစစ်ဆေးတိုင်းတာရန် atomic absorption spectrophotometer (graphite furnace method) ကရိယာနှင့် POTATEST ၏ Spectrophotometer နှင့် Incubation နည်းကို အသုံးပြု၍ စစ်ဆေးလေ့လာပါသည်။ ကောက်ယူထားသော ရေနမူနာများ၏ ပါရာမီတာများဖြစ်သော ရေ၏အရောင် အဆင်း၊ ချဉ်ဓာတ် (pH)၊ BOD၊ COD၊ Total Dissolved Solid၊ နိုက်ထရိတ်၊ အာဆင်နစ်၊ ဘတ်တီးရီးယားပေါက်ပွားနေမှုစသည်တို့ကို တိုင်းတာခြင်းဖြစ်ပြီး ဓာတ်ခွဲခန်းအဖြေအရ ပါရာမီတာအများစု၏ ရေတွင် ပါဝင်မှု/ပြင်းအားမှာ ရည်ညွှန်းတန်ဖိုးအောက် လျော့နည်းနေပြီး စွန့်ပစ်ရေတွင် ဆီ/ချောဆီပါဝင်မှုမှာ ရည်ညွှန်းတန်ဖိုးထက် ကျော်လွန်နေပါသည်။

၄.၃။ သက်ရှိပတ်ဝန်းကျင်ဆိုင်ရာအချက်အလက်များရယူခြင်း

ယခုအဆိုပြုထားသော စက်မှုနယ်မြေစီမံကိန်းမြေသည် သီးပင်စိုက်ခင်းများနှင့် စီးပွားဖြစ် စိုက်ပျိုးထားသော သစ်သီးနှင့်ဟင်းသီးဟင်းရွက်စိုက်ပျိုးခင်းများနှင့် ဆက်စပ်နေသော တောတိရစ္ဆာန်များ ရှင်သန်နေထိုင်ရန် မြက်ရိုင်း၊ သစ်ပင်ရိုင်းများရှိသည့် ပလပ်မြေအဖြစ် ရှိနေသော အသုံးပြုခြင်းမရှိသည့် မြေဖြစ်သည်။ စီမံကိန်း ပြုလုပ်မည့် နေရာသို့သွားရောက်၍ အခြေခံအချက်အလက်များကိုရယူခဲ့ပါသည်။ ၎င်းနေရာ၏ ကုန်းနေ၊ရေနေသတ္တဝါများ၊ သစ်ပင်ပန်းမန်၊ မြေအသုံးချမှုဆိုင်ရာအချက်အလက်များကို ရယူမှတ်တမ်းပြုစုခြင်းတို့ကို ပြုလုပ်ခဲ့ပြီး နေရာဒေသ၏ဖြစ်စဉ်သမိုင်း၊ ယခင်ကဖြစ်တည်ခဲ့သော သစ်ပင်နှင့် တိရစ္ဆာန်များနှင့် ယခုရှိနေသောသစ်ပင်နှင့် တိရစ္ဆာန်များဆိုင်ရာ အချက်အလက်များကို ရရှိနိုင်ရန် ဒေသခံများနှင့် တွေ့ဆုံခြင်းတို့ကိုဆောင်ရွက်ခဲ့ပါသည်။

မြေပြင်နှင့်ရေပြင်ဂေဟဖြစ်စဉ်များကို လေ့လာဆန်းစစ်ခဲ့ပြီး စီမံကိန်းနေရာတွင် ရှိနေကြသော သတ္တဝါများ ရှင်သန်နေထိုင်ရာနေရာများကို ခွဲခြားလေ့လာမည်ဖြစ်သည်။

သက်ရှိများအပေါ်ထိခိုက်မှုကို ဆန်းစစ်လေ့လာသည့်အဖွဲ့သည် မျက်မြင်လေ့လာခြင်းနှင့် စီမံကိန်းမြေဧရိယာကိုအပိုင်းလိုက်ဖြတ်၍လေ့လာခြင်းတို့ကို ပြုလုပ်ခဲ့ပါသည်။ သစ်ပင်ကြီးများ၊ သစ်ပင်ငယ်များ၊

ခြံပုတ်များ၊ သစ်ပင်မျိုးစိတ်များနှင့် ၎င်းတို့ စီမံကိန်းဝန်းကျင်တွင် မည်သို့ပျံ့နှံ့ပေါက်ရောက်နေသည်ကို အမျိုးအစားအလိုက် ခွဲခြားသတ်မှတ်ခဲ့ပါသည်။

အခြေခံအားဖြင့် စီမံကိန်း နေရာသည် အသုံးချမှုမရှိဘဲ စွန့်ပစ်ထားသောနေရာ ဖြစ်ကာ ၁၉၉၀ နောက်ပိုင်းနှစ် များတွင် အမျိုးသားညီလာခံကျင်းပခဲ့သည့် အဆောက်အအုံများနှင့် မြေနေရာကို စောင့်ရှောက်ထိန်းသိမ်းမှု မရှိဘဲ ထားရာမှ ဖုန်းဆိုးမြေနေရာ အဖြစ်ရှိနေပြီး နွေအခါတွင် ခြောက်သွေ့ကာ မိုးရာသီတွင် ရွှံ့ညွန်များဖြင့် ရှိနေပါသည်။

စီမံကိန်းဝင်းအတွင်းရှိ လမ်းများနှင့် အဆောက်အအုံအများစုသည် ယခုအခါ ပျက်စီးနေပြီဖြစ်ပါသည်။ စီမံကိန်းပြုလုပ်မည့် နေရာ၏ အပြင်ဘက်တွင် စိုက်ပျိုးမွေးမြူရေးဇုန် ရှိပါသည်။ အချို့သော ခြံများတွင် နှစ်ရှည်ပင်များဖြစ်သော သရက်၊ပိန္နဲ၊ကြက်မောက်တို့ကို စိုက်ပျိုးထားသည်။ အချို့မှာ စပါး၊ သီဟိုဠ်သရက်၊ မြေပဲ၊ ကြံ၊ သခွား၊ ရုံးပတီ၊ ကင်ပွန်းချည်၊ ဂေါ်ဖီ၊ခရမ်းသီး၊ မုန့်ညင်း၊ ဘူးသီး၊ သပြေပင်နှင့် အခြား ပန်းအမျိုးအစားစုံကို စိုက်ပျိုးထားပါသည်။ စီမံကိန်းဝင်း ပတ်ဝန်းကျင် ဧရိယာ (ရွာများအပါအဝင်) ကို စိုက်ပျိုး၊ မွေးမြူရေးဇုန် များအဖြစ် သတ်မှတ်ထားရှိပါသည်။ စီမံကိန်းဝင်း ပတ်ဝန်းကျင်တွင် ငါးမွေးမြူရေး ကန်များနှင့် ကြက်၊ဘဲ မွေးမြူရေးခြံများ ရှိပါသည်။

ယခင်က အနီးအနားတွင် ကျွန်းသစ်တောများရှိခဲ့ပါသည်။ အခြားသော အပင်ကြီးများ ဖြစ်သည့် အင်၊ ကညင် တို့လည်းပေါက်ရောက်ခဲ့ပါသည်။ ထိုသစ်တောများတွင် ဆင်၊ကျား၊ သမင်၊ဒရယ်၊ ချေ၊ဆတ်၊ တောကြောင်၊ မြွေပိတောက်ရှိခဲ့ပါသည်။ ထိုအပင်နှင့် တိရစ္ဆာန်များမှာ ယခုအခါ မျိုးသုဉ်းပျောက်ကွယ်ခဲ့ပြီဖြစ်ပါသည်။ ယခင်က ရှိခဲ့သော ပေါက်ပင်များနှင့် သဘာဝသစ်တောများကို စပါးစိုက်ခင်းများနှင့် စီးပွားဖြစ်စိုက်ပျိုးပင်များဖြစ်သော ရာဘာ၊ အကေးရှားပင်ကဲ့သို့သော စိုက်ခင်းများက အစားထိုး ဝင်ရောက်နေရာယူခဲ့ပြီဖြစ်ပါသည်။

စီမံကိန်းပြုလုပ်မည့် နေရာသည် ကန်သတ်ဧရိယာဖြစ်ပြီး ဧရိယာတစ်ခုလုံးတွင် အပင်ရိုင်းများ ပေါက်ရောက် ဖုံးအုပ်နေပါသည်။ ထိုအပင်များမှာ သက်ကယ်၊ကိုင်းပင် ကဲ့သို့သော မြက်ရိုင်းပင်များ၊ရေဆလပ်၊ နရမြက်၊ မဟူရာ ပိန်း၊ မိချောင်း ကွမ်းဖတ်၊ ဆင်နာမောင်းပင် ကဲ့သို့သော ဆေးဖတ်ဝင်အပင်များ၊ မလေးရှား ပိတောက်၊ ကအောင်းပင်၊ ဖွန်မသိမ်း ပင် ကဲ့သို့သော အပင်ရိုင်းငယ်များ ပေါက်ရောက်လျက်ရှိပါသည်။

ငှက်မျိုးရင်း (၂၂) မျိုး၊ လိပ်ပြာ မျိုးရင်း (၁၅) မျိုး၊ ပုစဉ်း မျိုးရင်း (၁၁) မျိုး၊ ကုန်းနေ၊ ရေနေ သတ္တဝါ မျိုးရင်း (၁) မျိုး၊ ငါးနှင့် ပုဇွန် မျိုးရင်း (၇) မျိုး ကို တွေ့ရှိ မှတ်တမ်းတင်ခဲ့ပါသည်။ ရွာသားများ၏ ပြောပြချက်အရ မြေမျိုးစိတ်များနှင့် ငှက်မျိုးစိတ်များစွာ ရှိသေးကြောင်း သိရှိခဲ့ရပါသည်။

၄.၄။ လူမှု-စီးပွားဆိုင်ရာအချက်အလက်များရယူခြင်း

စီမံကိန်းဧရိယာမှ အချင်းဝက် ၅ ကီလိုမီတာအတွင်းရှိ ရွာ ၆ ရွာမှ ကျေးရွာခေါင်းဆောင်များ၊ ကျေးရွာ အုပ်ချုပ်ရေးအဖွဲ့များမှ တာဝန်ရှိသူများ၊ ရဟန်းတော်များ၊ အခြားဘာသာရေးခေါင်းဆောင်များ၊ စီးပွားရေး လုပ်ငန်းလုပ်ကိုင်နေသူများ၊ ကျန်းမာရေး ဝန်ထမ်းများ၊ ဈေးဆိုင်ပိုင်ရှင်များ၊ ရွာသူ၊ရွာသားများ (အမျိုးသမီး၊ လူကြီး၊ လူငယ် အပါအဝင်) ကို မေးမြန်းဆွေးနွေးခဲ့ပါသည်။ ထို ကျေးရွာ ၆ ရွာ၏ လူမှုစီးပွားအခြေအနေကို မှတ်တမ်းပြုစုခဲ့ပါသည်။

လူမှုစီးပွားအခြေအနေ ကောက်ယူမှုပြုခဲ့သည့် ရွာ (၆) ရွာမှာ ကြာကန်စု၊ ညောင်နှစ်ပင်၊ တကူတုံး၊ စုန်ကုန်း၊ ကြာအင်း (အရှေ့)နှင့် ကြာအင်း (အနောက်) တို့ဖြစ်ပါသည်။ ကြာကန်စုရွာတွင် အိမ်ထောင်စုပေါင်း

(၃၂၀) ရှိပြီး လူဦးရေ စုစုပေါင်း (၁၆၀၀) ယောက်ရှိပါသည်။ ညောင်နှစ်ပင်ရွာတွင် အိမ်ထောင်စုပေါင်း (၆၅၅) ရှိပြီး လူဦးရေ စုစုပေါင်း (၃၁၂၆) ယောက်ရှိပါသည်။ ထိုရွာတွင် အထက်တန်းကျောင်း (ခွဲ) တစ်ကျောင်းရှိကာ ဆရာ၊ ဆရာမ စုစုပေါင်း (၃၅) ယောက်ရှိ ပြီး ကျောင်းသား၊ ကျောင်းသူ စုစုပေါင်း (၁၃၁၈) ယောက်ရှိပါသည်။ ရွာတွင် ကျေးလက်ဆေးပေးခန်း (၁) ခန်း၊ ဝမ်းဆွဲဆရာမ (၁) ယောက်နှင့် အကူ ဝမ်းဆွဲဆရာမ (၁) ယောက်ရှိ ပါသည်။ ကျေးလက်စာကြည့်တိုက် (၁) ခုလည်းရှိပါသည်။ တကူတုံးရွာတွင် အိမ်ထောင်စုပေါင်း (၁၂၀) ရှိပြီး လူဦးရေ စုစုပေါင်း (၅၇၀) ယောက်ရှိပါသည်။ ထိုရွာတွင် အလယ်တန်းကျောင်း တစ်ကျောင်းရှိပါသည်။ ရွာတွင် ဝမ်းဆွဲဆရာမ (၁) ယောက် ရှိပါသည်။ စုန်ကုန်းရွာတွင် အိမ်ထောင်စုပေါင်း (၁၁၀) ရှိပြီး လူဦးရေ စုစုပေါင်း (၃၉၂) ယောက်ရှိပါသည်။ ထိုရွာတွင် မူလတန်းကျောင်း တစ်ကျောင်းရှိပါသည်။ ကြာအင်း (အရှေ့) ရွာတွင် အိမ်ထောင်စုပေါင်း (၄၈၀) ရှိပြီး လူဦးရေ စုစုပေါင်း (၂၁၃၇) ယောက်ရှိပါသည်။ ထိုရွာတွင် အလယ် တန်းကျောင်း (ခွဲ) တစ်ကျောင်း ရှိပါသည်။ ရွာတွင် ကျေးလက်ဆေးပေးခန်း (၁) ခန်း နှင့် ဝမ်းဆွဲဆရာမ (၁) ယောက် ရှိ ပါသည်။ ကြာအင်း (အနောက်) ရွာတွင် အိမ်ထောင်စုပေါင်း (၃၇၀) ရှိပြီး လူဦးရေ စုစုပေါင်း (၁၈၅၀) ယောက်ရှိပါသည်။ ထိုရွာတွင် အလယ်တန်းကျောင်း (ခွဲ) တစ်ကျောင်းရှိပါသည်။ ရွာတွင် အကူ ဝမ်းဆွဲဆရာမ (၁) ယောက်ရှိ ပါသည်။

ရွာများတွင် စီးပွားရေးလုပ်ငန်းမျိုးစုံ လုပ်ကိုင်ကြသည်။ ထိုစီးပွားရေးလုပ်ငန်းများမှာ ဈေးဆိုင်များ၊ ကားအငှားလိုက်ခြင်း၊ မော်တော်ဆိုင်ကယ် တက္ကစီလုပ်ငန်း၊ ငါးကန်၊ ကြက်၊ဝက်မွေးမြူရေး၊ စိုက်ပျိုးရေး (ဘူးသီး၊ မြေပဲ၊ စပါး၊ သခွားနှင့် ကန်စွန်းရွက် စသည်ဖြင့်) တို့ဖြစ်သည်။ အချို့ရွာများတွင် ဘုရားစေတီများရှိ ပြီးရွာတိုင်းတွင် ဘုန်းကြီးကျောင်းရှိပါသည်။ ရွာသူ၊ရွာသားအများစုမှာ ဗုဒ္ဓဘာသာ၊ ဗမာလူမျိုးများ ဖြစ်ကြ သည်။

အိမ်ထောင်စုအချို့သည် လျှပ်စစ်ဓာတ်အား အသုံးပြုနိုင်ပြီး တယ်လီဖုန်းဆက်သွယ်မှု စနစ်ကို ကျေးရွာတိုင်းတွင် ကျယ်ပြန့်စွာ အသုံးပြုနေကြောင်းတွေ့ရပါသည်။ ရေအသုံးပြုနှင့်ပတ်သက်ပြီး အချို့မှာ အဝီစိတွင်းရေနှင့် အချို့မှာ လက်ယက်တွင်းရေကို အသုံးပြုကြသည်။ သယ်ယူပို့ဆောင်ရေးအဖြစ် အပေါ့စား ထရပ်ကား၊ သုံးဘီးတွဲယာဉ်နှင့် မော်တော်ဆိုင်ကယ်များကို အသုံးပြုကြပါသည်။

ပထမအကြိမ် အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးပွဲကို ၂၀၁၉ ခုနှစ် ဖေဖော်ဝါရီလ ၈ ရက်တွင် စိုက်ပျိုး မွေးမြူရေးဇုန် အမှတ် (၃) အစည်းအဝေးခန်းမတွင် ကျင်းပခဲ့ပြီး ဒုတိယအကြိမ် အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးပွဲကို ၂၀၂၀ ခုနှစ် ဩဂုတ်လ ၂၁ ရက်တွင် ကျောင်းကြီး ဓမ္မာရုံ၊ ကြာအင်း (အရှေ့) ကျေးရွာ တွင် ကိုဗစ် - ၁၉ ရောဂါကာကွယ်ရေး လမ်းညွှန်ချက်များနှင့် အညီ ပြုလုပ်ကျင်းပခဲ့ပါသည်။

၅။ ဖြစ်ပေါ်နိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုများ

စီမံကိန်းလုပ်ငန်းအဆင့်တစ်ခုချင်းစီအလိုက် ဖြစ်ပေါ်နိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုများမှာ လေထု ညစ်ညမ်းခြင်း၊ ရေညစ်ညမ်းခြင်း၊ ဆူညံသံနှင့် တုန်ခါမှုဖြစ်စေခြင်း၊ အစိုင်အခဲ စွန့်ပစ်အညစ်အကြေး ထုတ်လွှတ်ခြင်း၊ မြေတိုက်စားခြင်းနှင့် မြေအရည်အသွေးကျဆင်းခြင်း၊ မြေအောက်ရေနှင့် မြေပေါ်ရေကို ညစ်ညမ်းစေခြင်းနှင့် သဘာဝပေါက်ပင်များ ပျက်စီးပြီး တောတိရစ္ဆာန်များကို အခြားနေရာသို့ ရွှေ့ပြောင်း စေခြင်း၊ အများပြည်သူ၏ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးကို ထိခိုက်စေခြင်းနှင့် အရေးပေါ် အခြေအနေများ ပေါ်ပေါက် လာစေခြင်း စသည်တို့ဖြစ်ပါသည်။

၅.၁။ ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်း နယ်ပယ်

စီမံကိန်း၏ ကောင်းကျိုးနှင့် ထိခိုက်မှု (ဆိုးကျိုး) နှစ်မျိုးလုံးကို ဆန်းစစ်ခဲ့ပါသည်။ ဆန်းစစ်ရာတွင် ရုပ်ပိုင်း၊ ဇီဝပိုင်း နှင့် လူမှုစီးပွားရေးဆိုင်ရာ အရေးပါသော အခြေအနေများကို ဆန်းစစ်အကဲဖြတ်ခြင်းနှင့် ဖြစ်ပေါ်နိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုများ၏ပမာဏနှင့်အရေးပါမှုကို အကဲဖြတ်ခြင်း၊ ပတ်ဝန်းကျင် အပေါ်သက်ရောက်မှုများကို လျော့ပါးစေနိုင်သည့် နည်းလမ်းများနှင့် ကြွင်းကျန် သက်ရောက်မှုများကို ဖော်ထုတ်ခြင်း၊ ဆက်စပ်သက်ရောက်မှုများကို ဖော်ထုတ်ခြင်းနှင့် လျော့ပါးစေနိုင်သည့် နည်းလမ်းများ ပါဝင် ပါသည်။

၅.၂။ ထိခိုက်မှုများနှင့် လျော့ပါးစေရေးနည်းလမ်းများ

စီမံကိန်းလုပ်ငန်းများကြောင့် ရုပ်ပိုင်း၊ ဇီဝပိုင်းနှင့် လူမှုရေးပိုင်းဆိုင်ရာ ပတ်ဝန်းကျင်များအပေါ် ထိခိုက်မှုများကို စီမံကိန်း အဆင့် (အကြိုတည်ဆောက်ခြင်းကာလ၊ တည်ဆောက်ခြင်းကာလ၊ လည်ပတ်သည့် ကာလ၊ ရပ်ဆိုင်းသည့်ကာလ) အလိုက် ဆန်းစစ်ခဲ့ပါသည်။

ထိုသို့ ဆန်းစစ်ရာတွင် စီမံကိန်း အကြိုတည်ဆောက်ခြင်းကာလအတွက် ရုပ်ပိုင်း၊ ဇီဝပိုင်းနှင့် လူမှုရေးပိုင်း ဆိုင်ရာ ပတ်ဝန်းကျင်များအပေါ်တွင် ဆိုးကျိုးသက်ရောက်မှု မရှိကြောင်းတွေ့ရှိရပါသည်။ အများပြည်သူ နှင့် တွေ့ဆုံ ဆွေးနွေးချက်များအရ စီမံကိန်းအပေါ်တွင် ကန့်ကွက်မှုမရှိဘဲ ကြိုဆိုကြကြောင်းကို သိရှိရပါသည်။ ထိုစီမံကိန်းတွင် ၎င်းတို့အလုပ်အကိုင်အခွင့်အလမ်းများ ပေါ်ပေါက်လာရန် မျှော်လင့်ကြပါသည်။ အချို့အနေ ဖြင့် စိုးရိမ် ပူပန် မှုများ ရှိပြီး ၎င်းတို့ မှာ စီမံကိန်းက အစိုင်အခဲ စွန့်ပစ် အမှိုက်များနှင့် စွန့်ပစ်အရည်များကို စွန့် ထုတ်ခြင်းနှင့် ၎င်းတို့၏ စိုက်ခင်းများအတွက် ရေလုံလောက်စွာ မရရှိခြင်းတို့ ဖြစ်ပါသည်။ မြို့ပြနှင့် အိမ်ရာဖွံ့ဖြိုးရေးဦးစီးဌာနနှင့် စီမံကိန်း အကောင်အထည်ဖော်ဆောင်ရွက်သည့် အဖွဲ့အစည်း၏ တာဝန် ရှိသူများက အများပြည်သူ၏ စိုးရိမ်ပူပန်မှုများမဖြစ်ပေါ်စေရန် ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်းနှင့် လိုအပ်ချက်များကို တတ်နိုင်သမျှ ဖြည့်ဆည်းဆောင်ရွက်သွားမည် ဖြစ်ကြောင်း ရှင်းလင်းဖြေကြားခဲ့ပါသည်။

စီမံကိန်း တည်ဆောက်ခြင်းကာလ၊ လည်ပတ်သည့်ကာလ (ပြုပြင်ထိန်းသိမ်းခြင်းလုပ်ငန်းများ အပါအဝင်)၊ ရပ်ဆိုင်းသည့်ကာလတို့ အတွက် အဓိက ဖြစ်ပေါ်နိုင်သည့် ထိခိုက်မှုများနှင့် ဆီလျော်သော လျော့ပါးစေသည့် နည်းလမ်းများကို အောက်တွင် ဇယားဖြင့် အကျဉ်းဖော်ပြထားပါသည်။

| ပတ်ဝန်းကျင် အပေါ်သက်ရောက်မှုများ | လျော့နည်းစေရေး နည်းလမ်းများ |
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| မြေဆီလွှာ ပျက်စီးခြင်း (စီမံကိန်း တည်ဆောက်ခြင်းကာလ) | <ul style="list-style-type: none"> ✓ ရေစီးဆင်းရန် မြောင်းများ စနစ်တကျ ဖောက်လုပ်ထားခြင်း။ ✓ မြေကြီးလုပ်ငန်းများကို စနစ်တကျလုပ်ကိုင်ခြင်း။ ✓ အစိုင်အခဲ စွန့်ပစ် အမှိုက် (ဘေးအန္တရာယ်ရှိသော အမှိုက်များ အပါအဝင်) စီမံခန့်ခွဲမှုကို ကျင့်သုံးခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းမှ ထွက်ရှိလာသည့် စွန့်ပစ် အရည်များကို အနည်စစ် ကန်တွင် အနည်ကျစေပြီးမှ စွန့်ပစ်ခြင်း။ |

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| | <ul style="list-style-type: none"> ✓ ဆောက်လုပ်ရေးလုပ်ငန်းများတွင် အသုံးပြုသည့် ဆီ၊ လောင်စာနှင့် ချောဆီတို့ကို စနစ်တကျ သယ်ယူပို့ဆောင်ခြင်း၊ ကိုင်တွယ် အသုံးပြုခြင်းနှင့် သိမ်းဆည်းခြင်း။ ✓ အမှိုက်စွန့်ပစ်ရန် လိုအပ်သည့် နေရာများတွင် အမှိုက်ပုံးများ ထားပေးခြင်း။ ✓ မိလ္လာကန် အသုံးပြုသော ယာယီသန့်စင်ခန်း များကို အသုံးပြုခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းသုံးယာဉ်များနှင့် ယန္တရားများကို ပုံမှန် စစ်ဆေးခြင်းနှင့် ပြုပြင်ထိန်းသိမ်းခြင်းဖြင့် ဆီ၊လောင်စာဆီ၊ ဓာတုပစ္စည်းနှင့် ချောဆီ လျှံကျခြင်းနှင့် ယိုဖိတ်ခြင်းတို့ကို ရှောင်ကျဉ်ခြင်း။ ✓ ဆီ ဖိတ်လျှံကျခြင်းကို ကန့်သတ်ထိန်းချုပ်ရန် လုပ်ငန်းခွင်နှင့် သင့်လျော်သော ကိရိယာ တန်ဆာပလာများ (ဥပမာ - ဆီသုတ်အဝတ် များ၊ ရာဘာလက်အိတ်များ၊ တခါသုံး ပစ္စည်းစွန့်ပစ်သည့် အိတ်များ) ထားရှိခြင်း။ |
| <p>မြေဆီလွှာ ပျက်စီးခြင်း (စီမံကိန်း လည်ပတ်ခြင်းကာလ)</p> | <ul style="list-style-type: none"> ✓ အစိုင်အခဲ စွန့်ပစ် အမှိုက် (ဘေးအန္တရာယ်ရှိသော အမှိုက်များ အပါအဝင်) စီမံခန့်ခွဲမှုကို ကျင့်သုံးခြင်း။ ✓ စီမံကိန်း (စက်ရုံများ) မှ စွန့်ပစ်အရည်များကို အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာစွန့်ထုတ်မှု အရည်အသွေး စံချိန်စံနှုန်းသတ်မှတ်ချက်နှင့် အညီ သန့်စင်ပြီးမှ စွန့်ပစ်ခြင်း။ ✓ ဆီ၊ လောင်စာ၊ ဓာတုပစ္စည်းများနှင့် ချောဆီတို့ကို စနစ်တကျ သယ်ယူပို့ဆောင်ခြင်း၊ ကိုင်တွယ် အသုံးပြုခြင်းနှင့် သိမ်းဆည်းခြင်း (သင်တန်းပေးခြင်းများ အပါအဝင်)။ |
| <p>မြေလွှာ တိုက်စားခြင်း (စီမံကိန်း တည်ဆောက်ခြင်းကာလ)</p> | <ul style="list-style-type: none"> ✓ မြေရှင်းသည့် လုပ်ငန်းများကို လိုအပ်သလောက်သာ အနည်းဆုံး လုပ်ကိုင်ခြင်းနှင့် ပေါက်ရောက်နေသော အပင်များကို လိုအပ်သလောက်သာ ရှင်းလင်းခြင်း။ ✓ မတ်စောက်သောနေရာများတွင် ကွန်ကရစ် မြောင်းများပြုလုပ်ပေးခြင်းနှင့် ယာယီရေဆင်းမြောင်းများကို သင့်လျော်သော လျှောစောက်ဖြင့် ပြုလုပ်ပေးခြင်း။ ✓ မြေလွှာ တိုက်စားခြင်းဖြစ် ပေါ်နိုင်သည့် နေရာများတွင် ကောက်ရိုးဆွေး၊ သစ်ဆွေးများဖြင့် အကာအကွယ် လုပ်ဆောင်ခြင်း။ |
| <p>လေထုညစ်ညမ်းခြင်း (စီမံကိန်း တည်ဆောက်ခြင်း ကာလ၊ စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ)</p> | <ul style="list-style-type: none"> ✓ စီမံကိန်းဝင်းအတွင်း မြေသယ်ယာဉ်များနှင့် သယ်ယူပို့ဆောင်ရေးယာဉ်များအတွက် မောင်းနှင်မှုအမြန်နှုန်းကို ကန့်သတ်ခြင်း။ ✓ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်အတွင်းလမ်းများ၊ မြေကြီးတူးထား သော နေရာများနှင့် မြေသိပ်ထားသည့်နေရာများကို ခြောက် သွေ့ရာသီများတွင် ဖုန်မထစေရန် ရေဖျန်းထားခြင်း။ |

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| | <ul style="list-style-type: none"> ✓ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်မှအထွက်တွင်ယာဉ်များမှနှံ့များ၊ဖုန်များ ကို ဆေးရန် ယာဉ်ရေဆေးခုံတစ်ခုကို ထားခြင်း။ ✓ ဆောက်လုပ်ရေးသုံးပစ္စည်းများကိုထရပ်ကားများဖြင့် သယ်ယူသည့် အခါ ထိုပစ္စည်းများကို တာပေါ်လင်စဖြင့်ဖြစ်စေ၊ အခြားသော အကာတစ်မျိုးမျိုးဖြင့်ဖြစ်စေ ဖုံးအုပ်ထားခြင်း။ ✓ မလိုအပ်ဘဲ ယာဉ်များနှင့် ဆောက်လုပ်ရေးစက်ယန္တရားများ မောင်းနှင်ခြင်း၊ ရွှေ့ခြင်းနှင့် စက်နှိုး၍အလွတ်အင်ဂျင်လည် ထားခြင်း ကို တားမြစ်ခြင်း။ ✓ ယာဉ်များနှင့် ဆောက်လုပ်ရေးစက်ယန္တရားများကိုပုံမှန် ပြုပြင် ထိန်းသိမ်းခြင်းဖြင့် ကားအင်ဂျင်စသည်မှ ထုတ် လွှတ်သောအခိုးများ၊ အမှုန်အမွှားများထွက်ခြင်းကို ရှောင်ရှားခြင်း။ ✓ စွန့်ပစ်အမှိုက်များနှင့်သစ်ရွက်ခြောက်များကိုမီးမရှိရန်ထားမြစ်ခြင်း။ ✓ လေထုညစ်ညမ်းမှု ရှိသောနေရာများ အနီးတဝိုက်တွင် အလုပ်လုပ်ရသော အလုပ်သမားများကို နှာခေါင်းစည်း၊ မျက်နှာဖုံးများ ဝတ်ဆင်ရန် အားပေးတိုက်တွန်းပြီး လေထုညစ်ညမ်းမှုကို လျော့ချစေမည့် နည်းလမ်းများကို သင်တန်းပေးခြင်း။ ✓ လေအရည်အသွေးကို ပုံမှန် တိုင်းတာခြင်း။ |
| <p>လေထုညစ်ညမ်းခြင်း (စီမံကိန်း လည်ပတ်သည့်ကာလ)</p> | <ul style="list-style-type: none"> ✓ အရည်အသွေးမြင့်မားပြီး ခဲနှင့် ဆာလဖာဓာတ်ပါဝင်မှု နည်းပါးသော လောင်စာဆီများကို အသုံးပြုခြင်း။ ✓ အမျိုးသား ပတ်ဝန်းကျင် ဆိုင်ရာစွန့်ထုတ်မှု အရည်အသွေး စံချိန်စံနှုန်း သတ်မှတ်ချက်နှင့် သက်ဆိုင်ရာ ဝန်ကြီးဌာနများက သတ်မှတ် ထားသော စည်းမျဉ်းစည်းကမ်းများ၊ လမ်းညွှန်ချက်များအတိုင်း စက်ရုံများက လိုက်နာ ဆောင်ရွက်ခြင်း။ ✓ လေအရည်အသွေးကို ပုံမှန် တိုင်းတာခြင်း။ |
| <p>မှန်လုံအိမ် ဓာတ်ငွေ့ထုတ် လွှတ်ခြင်း (စီမံကိန်း တည်ဆောက်ခြင်းကာလ၊ စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ)</p> | <ul style="list-style-type: none"> ✓ ယာဉ်မောင်းများ၊ စက်ယန္တရား မောင်းနှင်သူများနှင့် သက်ဆိုင်ရာ ဝန်ထမ်းများကို မှန်လုံအိမ် ဓာတ်ငွေ့ထုတ် လွှတ်ခြင်းနှင့် လျော့ပါးစေခြင်း ဆောင်ရွက်နိုင်သည့် သင်တန်းများပေးခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းသုံးယာဉ်များနှင့် ယန္တရားများကို မလိုအပ်ဘဲ မောင်းနှင်ခြင်း၊ ရွှေ့ခြင်းနှင့် စက်နှိုးထားခြင်းများကို တားမြစ်ခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းသုံးယာဉ်များနှင့် ယန္တရားများကို ပုံမှန် စစ်ဆေးခြင်းနှင့် ပြုပြင်ထိန်းသိမ်းခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းသုံးယာဉ်များနှင့် ယန္တရားများကို အကျိုးရှိရှိ အသုံးပြုနိုင်ရန် အစီအစဉ်များကို ရေးဆွဲခြင်း။ |

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| | <ul style="list-style-type: none"> ✓ သဘာဝ အလင်းရောင်နှင့် လေဝင်လေထွက် ကို တတ်နိုင်သမျှ အသုံးပြုခြင်း။ |
| <p>မှန်လုံအိမ် ဓာတ်ငွေ့ထုတ် လွှတ်ခြင်း (စီမံကိန်း လည်ပတ်သည့်ကာလ)</p> | <ul style="list-style-type: none"> ✓ သဘာဝ အလင်းရောင်ကို တတ်နိုင်သမျှ အသုံးပြုခြင်း။ ✓ စွမ်းအင်ချွေတာသည့် လျှပ်စစ်အသုံးအဆောင်ပစ္စည်းများ တပ်ဆင် အသုံးပြုခြင်း။ ✓ အပူပေးစနစ်၊ လေအေးပေးစက်များ အသုံးပြုနေစဉ် ပြတင်းပေါက်များ ပိတ်ထားခြင်း။ ဖြစ်နိုင်ပါက သဘာဝ လေဝင်လေထွက်ကို တတ်နိုင်သမျှ အသုံးပြုခြင်း။ ✓ လျှပ်စစ်အသုံးအဆောင်ပစ္စည်းများ အသုံးမပြုသောအခါ လျှပ်စစ်ပလတ်ခေါင်းဖြုတ်ထားခြင်း။ ✓ စွန့်ပစ်မည့် ပစ္စည်းများကို တတ်နိုင်သမျှ ပြန်လည်အသုံးပြုခြင်းနှင့် ပြန်လည် ပြုပြင် သုံးစွဲခြင်း။ ✓ ဖလိုရိုက်ဓာတ်ငွေ့ ထုတ်လွှတ်မှုနည်းသော (သို့မဟုတ်) ထုတ်လွှတ်မှု မရှိသော လေအေးပေးစက်နှင့် ရေခဲစက်များကို အသုံးပြုခြင်း။ |
| <p>မြေပေါ်ရေ အရည်အသွေး ကျဆင်းခြင်း/ မြေအောက်ရေ အရည်အသွေး ကျဆင်းခြင်း (စီမံကိန်း တည်ဆောက်ခြင်း ကာလ၊ စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ)</p> | <ul style="list-style-type: none"> ✓ ဆောက်လုပ်ရေး လုပ်ငန်းမှ ထွက်ရှိလာသည့် စွန့်ပစ် အရည်များကို အနည်အနှစ်စစ်သည့် ကန်တွင် ဦးစွာ သိုလှောင်ထားပြီး အနည်အနှစ်များကို ကျစေပြီးမှ ရေကိုစွန့်ထုတ်ခြင်း။ ✓ အစိုင်အခဲ စွန့်ပစ် အမှိုက် (ဘေးအန္တရာယ်ရှိသော အမှိုက်များ အပါအဝင်) စီမံခန့်ခွဲမှုကို ကျင့်သုံးခြင်း။ ✓ လောင်စာဆီ၊ ဆီ တို့ကို သိုလှောင်တိုင်ကီတွင် ထဲပြီး စနစ်တကျ သိမ်းဆည်း ခြင်း၊ လဲလှယ်ခြင်း၊ ထဲခြင်းနှင့် ယာဉ်များ၊ ဆောက်လုပ်ရေး စက်ယန္တရားများကို ပုံမှန်ပြုပြင်ထိန်းသိမ်းခြင်းနှင့် ထိုသို့ ပုံမှန်ပြုပြင် ထိန်းသိမ်းခြင်းနှင့် ပြင်ဆင်ခြင်းတို့ကို လုပ်ဆောင်ရာတွင် ဆီယိုဖိတ်ပြီး မြေကြီးထဲသို့ မစိမ့်ဝင်နိုင်သည့် အမာခံ မျက်နှာပြင်ပေါ်တွင် လုပ်ဆောင်ခြင်း (ဆီယိုဖိတ်ပါက ချက်ချင်းသန့်ရှင်းရေးပြုလုပ်ခြင်း)။ ✓ အလုပ်သမားများ မစင်စွန့်ရန် မိလ္လာကန်စနစ်ကို တည်ဆောက်ခြင်း။ ✓ မိလ္လာပိုက်နှင့် ပိုက်ဆက်များမှ စိမ့်ထွက်မှုမရှိစေရန် ပုံမှန်စစ်ဆေးခြင်း။ |
| <p>မြေပေါ်ရေ အရည်အသွေး ကျဆင်းခြင်း/ မြေအောက်ရေ အရည်အသွေး ကျဆင်းခြင်း (စီမံကိန်း လည်ပတ်သည့် ကာလ)</p> | <ul style="list-style-type: none"> ✓ စက်ရုံများက စွန့်ထုတ်လိုက်သော စွန့်ပစ်အရည်များကိုအမျိုးသား ပတ်ဝန်းကျင် ဆိုင်ရာစွန့်ထုတ်မှု အရည်အသွေး စံချိန်စံနှုန်း သတ်မှတ်ချက် နှင့် အညီ သန့်စင်ပြီးမှ စွန့်ပစ်ခြင်း။ ✓ အစိုင်အခဲ စွန့်ပစ်အမှိုက် (ဘေးအန္တရာယ်ရှိသော အမှိုက်များ အပါအဝင်) ကို ယာယီသိမ်းဆည်းထားမည့် အဆောက်အအုံတည်ဆောက်ခြင်း။ ထို အဆောက်အအုံတွင် ကွန်ကရစ်ကြမ်းခင်း၊ ရေမြောင်း၊ သန့်ရှင်းရေးပြုလုပ် ရန် လုံလောက်သော ရေတိုပါရှိရမည်။ ✓ ဆီယိုဖိတ်မှုကို လျော့နည်းစေသည့် နည်းလမ်းများဆောင်ရွက်ခြင်း။ |

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| | <ul style="list-style-type: none"> ✓ သန့်စင်ပြီး စွန့်ပစ်အရည်များ၏ အရည်အသွေးကို ပုံမှန် တိုင်းတာစစ်ဆေးခြင်း။ |
| <p>ဆူညံမှုနှင့် တုန်ခါခြင်း (စီမံကိန်း တည်ဆောက်ခြင်း ကာလ၊ စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ)</p> | <ul style="list-style-type: none"> ✓ ဆောက်လုပ်ရေးယာဉ်များနှင့် စက်ယန္တရားများကို မောင်းနှင်သည့် ယာဉ်မောင်းနှင့် စက်မောင်းများကို ၎င်းတို့၏ ယာဉ်များ၊ စက်များမှ ဆူညံသံများ မည်သို့လျှော့ချရမည်ကို သင်တန်းပေးခြင်း။ ✓ ညဖက် ဆောက်လုပ်ရေး လုပ်ငန်းများ လုပ်ကိုင်ခြင်း ကိုကန့်သတ်ထားခြင်း။ ✓ ယာဉ်များနှင့် ဆောက်လုပ်ရေးစက်ယန္တရားများကိုပုံမှန် ပြုပြင် ထိန်းသိမ်းခြင်းဖြင့် ဆူညံသံနှင့် တုန်ခါမှု အလွန်အကျွံ ထွက်ခြင်းကို ရှောင်ရှားခြင်း။ ✓ အသံဆူညံမှု ရှိသောနေရာများ အနီးတဝိုက်တွင် အလုပ်လုပ်ရသော အလုပ်သမားများကို နားကာ များ ဝတ်ဆင်စေခြင်း။ ✓ အသံဆူညံမှုကို ဖြစ်ပေါ်စေသည့် အလုပ်ဝန်းကျင်တွင် အကာအရံ၊ အတားအဆီးများ တပ်ဆင်ထားခြင်းနှင့် ထောင်ထားခြင်း။ |
| <p>ဆူညံမှုနှင့် တုန်ခါခြင်း (စီမံကိန်း လည်ပတ်သည့် ကာလ)</p> | <ul style="list-style-type: none"> ✓ စက်ရုံများတွင် လိုအပ်သော ဆူညံသံအကာအကွယ်ပေးသည့် ပစ္စည်းများ၊ ဆူညံသံစုပ်ယူပေးသည့် ပစ္စည်းများကို လိုအပ်သလို တပ်ဆင်ခြင်း။ ✓ ပုံမှန်အလုပ်ချိန် ပြင်ပအလုပ်လုပ်ခြင်း (ရုံးပိတ်ရက်များ၊ ညဘက်များ) ကို ကန့်သတ်ခြင်း။ ✓ စက်ရုံများမှ ထွက်ရှိသော ဆူညံသံများသည် အမျိုးသား ပတ်ဝန်းကျင် ဆိုင်ရာစွန့်ထုတ်မှု အရည်အသွေး စံချိန်စံနှုန်း သတ်မှတ်ချက် နှင့် အညီ ဖြစ်စေရန် ဆောင်ရွက်ခြင်း။ |
| <p>အပင်များ ဆုံးရှုံးခြင်း၊ တိရစ္ဆာန်များကို အခြားနေရာသို့ ရွှေ့ပြောင်းစေခြင်း (စီမံကိန်း တည်ဆောက်ခြင်း ကာလ)</p> | <ul style="list-style-type: none"> ✓ စီမံကိန်းလုပ်ဆောင်ရန် အမှန်တကယ် လိုအပ်သည့် နေရာကိုသာ (အပင်များကိုသာ) ခုတ်ထွင်ရှင်းလင်းခြင်း။ ✓ မျိုးတူရာ အပင်များကိုသာ ပြန်လည်စိုက်ပျိုးခြင်း။ ✓ ဆောက်လုပ်ရေး ယာဉ်များကြောင့် မလိုအပ်ဘဲ အပင်များကို ထိခိုက် စေခြင်းမှ ရှောင်ရှားခြင်း။ |
| <p>လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (စီမံကိန်း တည်ဆောက်ခြင်း ကာလ၊ စီမံကိန်း လည်ပတ်သည့် ကာလ၊ စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ)</p> | <ul style="list-style-type: none"> ✓ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး လုပ်ထုံးလုပ်နည်းများကို လိုက်နာဆောင်ရွက်ခြင်း (မြေကြီးတူးလုပ်ငန်း လုပ်ကိုင်ခြင်း၊ အမြင့်တွင် အလုပ်လုပ်ခြင်း၊ ငြိမ်းအသုံးပြုခြင်း၊ လှေကား အသုံးပြုခြင်း၊ ချော်ခြင်းကို ကာကွယ်ခြင်း၊ ဘေးအန္တရာယ်ကင်းရှင်းသော လုပ်ငန်းခွင် သယ်ယူ ပို့ဆောင်ရေးလုပ်ငန်းများ၊ လျှပ်စစ်လုပ်ငန်းများ၊ မီးဘေးအန္တရာယ်၊ လူဖြင့် ပစ္စည်းများကို မခြင်း၊ သယ်ယူခြင်းနည်းလမ်းများ၊ လက်ကိုင် ကိရိယာများကို အသုံးပြုခြင်း၊ စက် |

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| | <p>ကိရိယာများကို အသုံးပြုခြင်း၊ ဓာတု ပစ္စည်းများကို အသုံးပြုခြင်း၊ ဘိလပ်မြေ ဖျော်စက်များကို အသုံးပြုခြင်း၊ တကိုယ်ရေ ကာကွယ်ရေး ပစ္စည်းကိရိယာများ ဝတ်ဆင်ခြင်း၊ ဆေးဝါးနှင့် အရေးပေါ်အခြေအနေ ကယ်ဆယ်ရေး လုပ်ငန်းများ တို့နှင့် သက်ဆိုင်သော လုပ်ထုံးလုပ်နည်းများ (ဖြစ်သည်)</p> <ul style="list-style-type: none"> ✓ အလုပ်သမားများကို လုပ်ငန်းခွင်ဆိုင်ရာကျန်းမာရေးနှင့် အန္တရာယ် ကင်းရှင်းရေး သင်တန်းများနှင့် အခြားဆက်စပ်သင်တန်းများပေးခြင်း။ ✓ အလုပ်သမားများ အလုပ်လုပ်ရန် မှန်ကန်သောပစ္စည်းကိရိယာများ ပေးခြင်း၊ ပစ္စည်းအသုံးပြုပုံညွှန်ကြားချက်များ၊ လမ်းညွှန်စာအုပ်များ ပေးခြင်းတို့အပြင်ကိုယ်ခန္ဓာအကာအကွယ်ပေးသည့်အဝတ်များ၊ဦးထုပ် များ၊ လက်အိတ်များ၊ ဖိနပ်များ အစရှိသည်တို့ ဝတ်ဆင်စေခြင်း။ ✓ အရေးပေါ်သူနာပြုစုနည်း ဆေးသေတ္တာများပေးထားပြီး အသုံးပြု နည်းများကိုသင်တန်းပေးခြင်း (အရေးပေါ်တုံ့ပြန်မှုအတွက်) |
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စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလတွင် စက်ရုံနှင့် အခြားသော အဆောက်အအုံများကို ဖြိုဖျက်ရန် မျှော်လင့်ထားခြင်းမရှိပါ။ KMIC Development Co., Ltd. နှင့် မြို့ပြနှင့် အိမ်ရာဖွံ့ဖြိုးရေး ဦးစီးဌာနတို့အကြား ချုပ်ဆိုသော မြေငှားစာချုပ်အရ မြေငှားသက်တမ်းကုန်ဆုံးပြီးနောက် KMIC Development Co., Ltd. အနေဖြင့် စီမံကိန်းမြေနေရာကို ပြုပြင်ခြင်း၊ အဆောက်အအုံများကို ဖြိုချ ဖယ်ရှားခြင်း၊ စီမံကိန်းမြေ မူလအနေအထားအတိုင်း ပြန်လည်ရောက်ရှိ စေရန် ပြုလုပ်ခြင်းတို့ကို ဆောင်ရွက်ရန် တာဝန်မရှိဘဲ မြေငှားသက်တမ်း ကုန်ဆုံးသည့် အချိန်တွင် ရှိနေသည့် ပြောင်းလဲတိုးတက် ဖြစ်ပေါ်နေမှု အတိုင်း ပြန်လည် ပေးအပ်ရန်သာ တာဝန်ရှိသည်ဟု ဖော်ပြထားပါသည်။ အကယ်၍ အဆောက်အအုံများကို ဖြိုချ ဖယ်ရှားခြင်းပြုပါက လေထု ညစ်ညမ်းခြင်း၊ ဆူညံသံနှင့် တုန်ခါမှုဖြစ်စေခြင်း၊ အစိုင်အခဲ စွန့်ပစ်အညစ်အကြေး ထုတ်လွှတ်ခြင်း၊ မြေအရည်အသွေးကျဆင်းခြင်း၊ မြေအောက်ရေနှင့် မြေပေါ်ရေကို ညစ်ညမ်းစေခြင်းနှင့် အများပြည်သူ၏ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးကို ထိခိုက်စေခြင်းနှင့် အရေးပေါ် အခြေအနေများ ပေါ်ပေါက်လာစေခြင်း စသည့် ထိခိုက်မှုများ ဖြစ်ပေါ်လာနိုင်ပါသည်။ ထို ထိခိုက်မှုများ လျော့နည်းစေမည့် နည်းလမ်းများ ကို အထက်ပါဇယားတွင် ဖော်ပြထားပါသည်။

ကြွင်းကျန်သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း

တည်ဆောက်ရေးကာလတွင် ရေအရင်းအမြစ်ပေါ်တွင် သက်ရောက်မှု၊ မြေအောက်ရေ ညစ်ညမ်းခြင်း၊ လေထုညစ်ညမ်းခြင်း၊ ဖုံထခြင်း၊ အများပြည်သူ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး တို့ အပေါ်တွင် ကြွင်းကျန် သက်ရောက်မှုရှိနိုင်ပြီး စီမံကိန်းလည်ပတ်သည့် ကာလတွင် မြေအောက်ရေ ညစ်ညမ်းခြင်း၊ အများပြည်သူ ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ အလုပ်သမား များ မတော်တဆ ထိခိုက်မှုဖြစ်ခြင်းတို့ အပေါ်တွင် ကြွင်းကျန် သက်ရောက်မှုရှိနိုင်ပြီး စီမံကိန်းရပ်ဆိုင်းသည့် ကာလတွင် ရေအရင်းအမြစ်ပေါ်တွင် သက်ရောက်မှု၊ လေထုညစ်ညမ်းခြင်း၊ ဖုံထခြင်း၊ အများပြည်သူ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးတို့ အပေါ်တွင် ကြွင်းကျန်သက်ရောက်မှုရှိနိုင်သည်ဟု

ခန့်မှန်းပါသည်။ သို့ရာ တွင် ထိုကြွင်းကျန်သက်ရောက်မှုများ၏ အရေးပါမှုအဆင့်မှာ အနည်းအကျဉ်းမျှနှင့် သာမန်သာရှိပါသည်။ ထိုကြွင်းကျန်သက်ရောက်မှုများဖြစ်ပေါ်မည့် ပတ်ဝန်းကျင်ဆိုင်ရာ အနေအထား များသည် သက်ရောက်မှု ပြီးဆုံးပါက မူလအနေအထားသို့ ပြန်လည်ရောက်ရှိနိုင်မည် ဖြစ်ပါသည်။ သို့ဖြစ်ပါ၍ ထိုကြွင်းကျန် သက်ရောက်မှုများနှင့် ပတ်သက်ပြီးနောက်ထပ် သုတေသနပြုခြင်း၊ စောင့်ကြပ် ကြည့်ရှုခြင်းများ ဆောင်ရွက် ရန် မလိုအပ်တော့ပါ။

ဆက်စပ်သက်ရောက်မှု ဆန်းစစ်ခြင်း

ဤကိုရီးယား-မြန်မာစက်မှုလုပ်ငန်းနယ်မြေစီမံကိန်းအတွက်ပြင်ပအခြေခံအဆောက်အအုံများ တည်ဆောက် ခြင်း စီမံကိန်းသည် လျာထားသော (သို့မဟုတ်) ကျိုးကြောင်းဆီလျော်စွာဖြင့် ကြိုတင်ခန့်မှန်းတွက်ဆနိုင် သည့် စီမံကိန်းဖြစ်ပါသည်။ ထိုပြင်ပအခြေခံအဆောက်အအုံများ တည်ဆောက်ခြင်း စီမံကိန်းတွင် လျှပ်စစ် ဓာတ်အားလိုင်းသွယ်တန်းခြင်းနှင့် လျှပ်စစ်ဓာတ်အားခွဲရုံအဆောက်အအုံဆောက်လုပ်ခြင်း၊ ရေပိုက် သွယ်တန်းခြင်း၊ ရေယူအဆောက်အအုံဆောက်လုပ်ခြင်းနှင့်ရေသန့်စင်စက်ရုံဆောက်လုပ်ခြင်း၊ လက်ရှိ အသုံးပြုနေသော နှစ်လမ်းသွားလမ်းကို လေးလမ်းသွားလမ်း (စုစုပေါင်း အကျယ် ၂၂ မီတာ) အဖြစ် ချဲ့ ထွင်ပြီး ကွန်ကရစ် ကတ္တရာခင်းလမ်းအဖြစ် အဆင့်မြှင့်တင်သွားခြင်းတို့ ဖြစ်ပါသည်။ ထိုစီမံကိန်းကို ဆောက်လုပ်ရေး ဝန်ကြီးဌာနကအကောင်အထည်ဖော်ဆောင်ရွက်ပါမည်။ ဆက်စပ်သက်ရောက်မှုများကိုဆန်းစစ်ရန် ဤ ကိုရီးယား-မြန်မာ စက်မှုလုပ်ငန်းနယ်မြေစီမံကိန်းကြောင့် ဖြစ်ပေါ်လာမည့် ကြွင်းကျန် သက်ရောက်မှုများနှင့် ဖော်ပြခဲ့ပြီးသော စီမံကိန်းများကြောင့် ဖြစ်ပေါ်လာမည့် အလားအလာ ရှိသော သက်ရောက်မှုများ ပေါင်းစုပြီး ဘုံဖြစ်နေသော အရင်းအမြစ်များကို မည်သို့ သက်ရောက်မည်ကို ဦးစွာ ဆန်း စစ်ပါသည်။ ဖြစ်နိုင်ခြေရှိသော ဆက်စပ်သက်ရောက်မှုများနှင့် ဆီလျော်သော လျော့ပါးစေသည့် နည်းလမ်းများကို ဇယားဖြင့်ဖော်ပြ ထားပါသည်။

| စဉ် | ဆက်စပ်သက်ရောက်မှုများ | အရေးပါမှု | လျော့ပါးစေသည့် နည်းလမ်းများ |
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| ၁ | မြေပေါ်ရေ ပိုမို ညစ်ညမ်းလာခြင်း | မပြောပလောက်သော အဆင့် | <ul style="list-style-type: none"> ✓ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြပ် ကြည့်ရှုခြင်း အစီအစဉ်ကို လိုက်နာဆောင်ရွက်ခြင်း။ ✓ အခြား စီမံကိန်းများကို အကောင်အထည် ဖော်နေသူ များနှင့် အကျိုး သက်ရောက် မှု ရှိစွာ ချိတ်ဆက် ပူးပေါင်း ဆောင်ရွက်ခြင်း။ |
| ၂ | မြေအောက်ရေ ပိုမို ညစ်ညမ်း လာခြင်း | မပြောပလောက်သော အဆင့် | <ul style="list-style-type: none"> ✓ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြပ် |

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| | | | <p>ကြည့်ရှုခြင်း အစီအစဉ်ကို လိုက်နာဆောင်ရွက်ခြင်း။</p> <ul style="list-style-type: none"> ✓ အခြား စီမံကိန်းများကို အကောင်အထည် ဖော်နေသူ များနှင့် အကျိုးသက် ရောက်မှုရှိစွာ ချိတ်ဆက် ပူးပေါင်း ဆောင်ရွက်ခြင်း။ |
| ၃ | လေထု ပိုမိုညစ်ညမ်းလာခြင်း | နိမ့်သောအဆင့် | <ul style="list-style-type: none"> ✓ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြပ် ကြည့်ရှုခြင်း အစီအစဉ်ကို လိုက်နာဆောင်ရွက်ခြင်း။ ✓ အခြား စီမံကိန်းများကို အကောင်အထည် ဖော်နေသူ များနှင့် အကျိုးသက် ရောက်မှုရှိစွာ ချိတ်ဆက် ပူးပေါင်း ဆောင်ရွက်ခြင်း။ ✓ ဒေသတွင်းဆိုင်ရာ အခြားသော ဆက်စပ်သက်ရောက်မှုများကို စီမံခန့်ခွဲမှုပြုလုပ်ခြင်း မဟာဗျူဟာ တွင် ပူးပေါင်းပါဝင်ဆောင်ရွက်ခြင်း။ ✓ ဖြစ်ပေါ်လာမည်ဟု နားလည် လက်ခံထားသော ဆက်စပ် သက်ရောက်မှုများနှင့် စီမံခန့်ခွဲမှုဆိုင်ရာ ဆောင်ရွက်ချက်များ၏ အကျိုးသက်ရောက်မှုကို ဆန်းစစ်ရန် ဒေသတွင်းဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်များ တွင် ပူးပေါင်း ပါဝင်ဆောင်ရွက်ခြင်း။ |
| ၄ | လေထဲတွင် ဖုန်မှုန့် ပိုမိုပါဝင် လာခြင်း | မပြောပလောက်သော အဆင့် | <ul style="list-style-type: none"> ✓ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြပ် ကြည့်ရှုခြင်း အစီအစဉ်ကို |

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| | | | <p>လိုက်နာဆောင်ရွက်ခြင်း။</p> <ul style="list-style-type: none"> ✓ အခြား စီမံကိန်းများကို အကောင်အထည် ဖော်နေသူ များနှင့် အကျိုးသက် ရောက်မှု ရှိစွာ ချိတ်ဆက် ပူးပေါင်း ဆောင်ရွက်ခြင်း။ |
| ၅ | <p>အများပြည်သူ ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး ကို ထိခိုက်စေမည့် အကြောင်းအရာ များလာခြင်း</p> | <p>အလယ်အလတ် အဆင့်</p> | <ul style="list-style-type: none"> ✓ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြပ် ကြည့်ရှုခြင်း အစီအစဉ်ကို လိုက်နာဆောင်ရွက်ခြင်း။ ✓ အခြား စီမံကိန်းများကို အကောင်အထည် ဖော်နေသူ များနှင့် အကျိုးသက် ရောက်မှု ရှိစွာ ချိတ်ဆက် ပူးပေါင်း ဆောင်ရွက်ခြင်း။ ✓ အများပြည်သူနှင့် တိုင်ပင်ဆွေး နွေးကာ ၎င်းတို့၏ ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်း ရေး ကို ထိခိုက်စေမည့် အကြောင်းအရာ များနှင့် သက်ဆိုင်သည့် ပညာပေး အစီအစဉ်များ လုပ်ဆောင် ပေးခြင်း။ ✓ အများပြည်သူနှင့် တိုင်ပင်ဆွေး နွေးချက်များ အပေါ်အခြေခံပြီး ၎င်းတို့၏ ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး အတွက် ထပ်ဆောင်း ဆောင်ရွက်ချက်များ လုပ်ဆောင်ခြင်း။ |

ကိုရီးယား-မြန်မာစက်မှုလုပ်ငန်းနယ်မြေစီမံကိန်းလည်ပတ်သည့် အဆင့်တွင် လာရောက်ရင်းနှီးမြှုပ်နှံ လည်ပတ်မည့် စက်ရုံများ၏ အကြောင်းအရာ အသေးစိတ်ကို သိရှိရခြင်းမရှိသေးသည့် အတွက် ထိုစက်ရုံများ လာရောက်ရင်းနှီး လည်ပတ်သည့်အခါတွင်မှ သက်ဆိုင်ရာ စက်ရုံလုပ်ငန်းများ၏ စီမံကိန်း

အကောင်အထည် ဖော်ဆောင်ရွက်သူများက စီမံကိန်းလည်ပတ်သည့် အဆင့်အတွက် ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ် လေ့လာခြင်းသည် ပို၍ ကျိုးကြောင်းဆီလျော်ပါသည်။

၆။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်မှပေါ်ထွက်လာသောစီမံကိန်း၏အားလုံးသော ဖြစ်စဉ် များတလျှောက် အကောင်အထည်ဖော်ရမည့် ပတ်ဝန်းကျင်နှင့်လူမှုစီးပွားဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် များကို ရှင်းလင်းစွာ သတ်မှတ်ဖော်ပြထားပြီး အကောင်အထည်ဖော်လုပ်ဆောင်နိုင်ရန် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ကိုရေးဆွဲခဲ့ပါသည်။ ၎င်းအစီအစဉ်ကို တည်ဆောက်ခြင်း၊ လုပ်ငန်းလည်ပတ်ဆောင် ရွက်ခြင်း၊ ရပ်ဆိုင်းခြင်းနှင့်ပိတ်သိမ်းခြင်းကာလများအတွင်း ဖော်ဆောင်ရမည်ဖြစ်ပြီး အစီအစဉ် အကျဉ်းချုပ်ကို ဖော်ပြ ထားပါသည်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်

| ပတ်ဝန်းကျင် အပေါ်ထိခိုက်မှု | စီမံကိန်းကာလ | လျော့ပါးစေသောနည်းလမ်းများ | ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် နှင့် စောင့်ကြပ်ကြည့်ရှု ခြင်းအစီအစဉ်ကို ဆောင်ရွက်မည့် တာဝန်ရှိသူ/အဖွဲ့အစည်း | စောင့်ကြပ်ကြည့်ရှု ခြင်း အကြိမ် (အရေ အတွက်) |
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| မြေဆီလွှာ ပျက်စီးခြင်း | တည်ဆောက်ခြင်း ကာလ | <ul style="list-style-type: none"> ✓ ရေစီးဆင်းရန် မြောင်းများ စနစ်တကျ ဖောက်လုပ်ထားခြင်း။ ✓ မြေကြီးလုပ်ငန်းများကို စနစ်တကျလုပ်ကိုင်ခြင်း။ ✓ အစိုင်အခဲ စွန့်ပစ် အမှိုက် (ဘေးအန္တရာယ်ရှိသော အမှိုက်များ အပါအဝင်) စီမံခန့်ခွဲမှုကို ကျင့်သုံးခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းမှ ထွက်ရှိလာသည့် စွန့်ပစ် အရည်များကို အနည်စစ် ကန်တွင် အနည်ကျစေပြီးမှ စွန့်ပစ်ခြင်း။ ✓ ဆောက်လုပ်ရေးလုပ်ငန်းများတွင် အသုံးပြုသည့် ဆီ၊ လောင်စာနှင့် ချောဆီ တို့ကို စနစ်တကျသယ်ယူပို့ဆောင်ခြင်း၊ ကိုင်တွယ်အသုံးပြုခြင်းနှင့် သိမ်းဆည်းခြင်း။ ✓ အမှိုက်စွန့်ပစ်ရန် လိုအပ်သည့် နေရာများတွင် အမှိုက်ပုံးများ ထားပေးခြင်း။ ✓ မိလ္လာကန် အသုံးပြုသော ယာယီသန့်စင်ခန်းများကို အသုံးပြုခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းသုံးယာဉ်များနှင့် ယန္တရားများကို ပုံမှန်စစ်ဆေး ခြင်းနှင့် ပြုပြင်ထိန်းသိမ်းခြင်းဖြင့် ဆီ၊လောင်စာဆီ၊ ဓာတုပစ္စည်းနှင့် ချောဆီ လျှံကျခြင်းနှင့် ယိုဖိတ်ခြင်းတို့ကို ရှောင်ကျဉ်ခြင်း။ | ကန်ထရိုက်တာ | အပတ်စဉ် |

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| | | <ul style="list-style-type: none"> ✓ ဆီဖိတ်လျှံကျခြင်းကို ကန့်သတ်ထိန်းချုပ်ရန် လုပ်ငန်းခွင်နှင့်သင့်လျော်သော ကိရိယာတန်ဆာပလာများ (ဥပမာ - ဆီသုတ်အဝတ်များ၊ ရာဘာလက်အိတ်များ၊ တခါသုံး ပစ္စည်းစွန့်ပစ်သည့်အိတ်များ) ထားရှိခြင်း။ | | |
| မြေဆီလွှာပျက်စီးခြင်း | စီမံကိန်းလည်ပတ်ခြင်းကာလ | <ul style="list-style-type: none"> ✓ အစိုင်အခဲ စွန့်ပစ် အမှိုက် (ဘေးအန္တရာယ်ရှိသော အမှိုက်များ အပါအဝင်) စီမံခန့်ခွဲမှုကို ကျင့်သုံးခြင်း။ ✓ စီမံကိန်း(စက်ရုံများ)မှ စွန့်ပစ်အရည်များကို အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ စွန့်ထုတ်မှု အရည်အသွေး စံချိန်စံနှုန်းသတ်မှတ်ချက်နှင့် အညီ သန့်စင်ပြီးမှ စွန့်ပစ်ခြင်း။ ✓ ဆီ၊ လောင်စာ၊ ဓာတုပစ္စည်းများနှင့် ချောဆီတို့ကို စနစ်တကျ သယ်ယူပို့ဆောင်ခြင်း၊ ကိုင်တွယ် အသုံးပြုခြင်းနှင့် သိမ်းဆည်းခြင်း (သင်တန်းပေးခြင်းများ အပါအဝင်)။ | စီမံကိန်း လုပ်ဆောင်သူ (များ) | အပတ်စဉ် |
| မြေလွှာတိုက်စားခြင်း | တည်ဆောက်ခြင်းကာလ | <ul style="list-style-type: none"> ✓ မြေရှင်းသည့် လုပ်ငန်းများကို လိုအပ်သလောက်သာ အနည်းဆုံး လုပ်ကိုင်ခြင်းနှင့် ပေါက်ရောက်နေသော အပင်များကို လိုအပ်သလောက်သာ ရှင်းလင်းခြင်း။ ✓ မတ်စောက်သောနေရာများတွင် ကွန်ကရစ် မြောင်းများပြုလုပ်ပေးခြင်းနှင့် ယာယီရေဆင်းမြောင်းများကို သင့်လျော်သော လျှောစောက်ဖြင့် ပြုလုပ်ပေးခြင်း။ ✓ မြေလွှာ တိုက်စားခြင်းဖြစ် ပေါ်နိုင်သည့် နေရာများတွင် ကောက်ရိုးဆွေး၊ | ကန်ထရိုက်တာ | နေ့စဉ် |

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| | | သစ်ဆွေးများဖြင့် အကာအကွယ် လုပ်ဆောင်ခြင်း။ | | |
| ဖုန်မှုန့်ထွက်ခြင်း | စီမံကိန်းတည်ဆောက်ခြင်းကာလ၊ စီမံကိန်းရပ်ဆိုင်းသည့်ကာလ | <ul style="list-style-type: none"> ✓ စီမံကိန်းဝင်းအတွင်း မြေသယ်ယာဉ်များနှင့် သယ်ယူပို့ဆောင်ရေးယာဉ်များအတွက် မောင်းနှင်မှုအမြန်နှုန်းကို ကန့်သတ်ခြင်း။ ✓ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်အတွင်းလမ်းများ၊ မြေကြီးတူးထား သော နေရာများနှင့် မြေသိပ်ထားသည့်နေရာများကို ခြောက်သွေ့ရာသီများတွင် ဖုန်မထစေရန် ရေဖျန်းထားခြင်း။ ✓ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်မှအထွက်တွင်ယာဉ်များမှရွံ့များ၊ဖုန်များ ကို ဆေးရန် ယာဉ်ရေဆေးခုံတစ်ခုကို ထားခြင်း။ ✓ ဆောက်လုပ်ရေးသုံးပစ္စည်းများကိုထရပ်ကားများဖြင့် သယ်ယူသည့် အခါ ထိုပစ္စည်းများကို တာပေါလင်စဖြင့်ဖြစ်စေ၊ အခြားသော အကာတစ်မျိုးမျိုး ဖြင့်ဖြစ်စေ ဖုံးအုပ်ထားခြင်း။ ✓ သိုမှီးထားသော ကုန်ပစ္စည်းများကို ဖုံးအုပ်ထားခြင်းနှင့် ၎င်းတို့အနီးတွင် အကာအရံများ ပြုလုပ်ထားခြင်း။ ✓ မလိုအပ်ဘဲ ယာဉ်များနှင့် ဆောက်လုပ်ရေးစက်ယန္တရားများ မောင်းနှင်ခြင်း၊ ရွှေ့ခြင်းနှင့် စက်နှိုး၍အလွတ်အင်ဂျင်လည် ထားခြင်း ကို တားမြစ်ခြင်း။ ✓ ယာဉ်များနှင့် ဆောက်လုပ်ရေးစက်ယန္တရားများကိုပုံမှန် ပြုပြင် ထိန်းသိမ်းခြင်းဖြင့် ကားအင်ဂျင်စသည်မှ ထုတ်လွှတ်သောအခိုးများ၊ အမှုန်အမွှားများ | ကန်ထရိုက်တာ | နေ့စဉ် (စီမံကိန်းတည်ဆောက်ခြင်းကာလ၊ စီမံကိန်းရပ်ဆိုင်းသည့်ကာလ) |

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| | | ထွက်ခြင်းကို ရှောင်ရှားခြင်း။ | | |
| လေထုညစ်ညမ်းခြင်း | စီမံကိန်းတည်ဆောက်ခြင်းကာလ၊ စီမံကိန်းရပ်ဆိုင်းသည့်ကာလ | <ul style="list-style-type: none"> ✓ စီမံကိန်းဝင်းအတွင်း မြေသယ်ယာဉ်များနှင့် သယ်ယူပို့ဆောင်ရေးယာဉ်များ အတွက် မောင်းနှင်မှုအမြန်နှုန်းကို ကန့်သတ်ခြင်း။ ✓ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်အတွင်းလမ်းများ၊ မြေကြီးတူးထား သော နေရာများနှင့် မြေသိပ်ထားသည့်နေရာများကို ခြောက် သွေ့ရာသီများတွင် ဖုန်မထစေရန် ရေဖျန်းထားခြင်း။ ✓ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်မှအထွက်တွင်ယာဉ်များမှနှံ့များ၊ဖုန်များ ကို ဆေးရန် ယာဉ်ရေဆေးခုံတစ်ခုကို ထားခြင်း။ ✓ ဆောက်လုပ်ရေးသုံးပစ္စည်းများကိုထရပ်ကားများဖြင့် သယ်ယူသည့် အခါ ထိုပစ္စည်းများကို တာပေါလင်စဖြင့်ဖြစ်စေ၊ အခြားသော အကာ တစ်မျိုးမျိုး ဖြင့်ဖြစ်စေ ဖုံးအုပ်ထားခြင်း။ ✓ မလိုအပ်ဘဲ ယာဉ်များနှင့် ဆောက်လုပ်ရေးစက်ယန္တရားများ မောင်းနှင်ခြင်း၊ ရွှေ့ခြင်းနှင့် စက်နှိုး၍အလွတ်အင်ဂျင်လည် ထားခြင်း ကို တားမြစ်ခြင်း။ ✓ ယာဉ်များနှင့် ဆောက်လုပ်ရေးစက်ယန္တရားများကိုပုံမှန် ပြုပြင် ထိန်းသိမ်းခြင်းဖြင့် ကားအင်ဂျင်စသည်မှ ထုတ်လွှတ်သောအခိုးများ၊ အမှုန်အမွှားများ ထွက်ခြင်းကို ရှောင်ရှားခြင်း။ | ကန်ထရိုက်တာ | လစဉ် (စီမံကိန်းတည်ဆောက်ခြင်းကာလ၊ စီမံကိန်းရပ်ဆိုင်းသည့်ကာလ) |

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| | | <ul style="list-style-type: none"> ✓ စွန့်ပစ်အမှိုက်များနှင့်သစ်ရွက်ခြောက်များကိုမီးမရှို့ရန်တားမြစ်ခြင်း။ ✓ လေထုညစ်ညမ်းမှု ရှိသောနေရာများ အနီးတဝိုက်တွင် အလုပ်လုပ်ရသော အလုပ်သမားများကို နှာခေါင်းစည်း၊ မျက်နှာဖုံးများ ဝတ်ဆင်ရန် အားပေး တိုက်တွန်းပြီး လေထုညစ်ညမ်းမှုကို လျော့ချစေမည့် နည်းလမ်းများကို သင်တန်းပေးခြင်း။ ✓ လေအရည်အသွေးကို ပုံမှန် တိုင်းတာခြင်း။ | | |
| လေထုညစ်ညမ်းခြင်း | စီမံကိန်းလည်ပတ်သည့်ကာလ | <ul style="list-style-type: none"> ✓ အရည်အသွေးမြင့်မားပြီး ခဲနှင့် ဆာလဖာဓာတ်ပါဝင်မှု နည်းပါးသော လောင်စာဆီများကို အသုံးပြုခြင်း။ ✓ အမျိုးသား ပတ်ဝန်းကျင် ဆိုင်ရာစွန့်ထုတ်မှု အရည်အသွေး စံချိန်စံနှုန်း သတ်မှတ်ချက်နှင့် သက်ဆိုင်ရာ ဝန်ကြီးဌာနများက သတ်မှတ် ထားသော စည်းမျဉ်းစည်းကမ်းများ၊ လမ်းညွှန်ချက်များအတိုင်း စက်ရုံများက လိုက်နာ ဆောင်ရွက်ခြင်း။ ✓ လေအရည်အသွေးကို ပုံမှန် တိုင်းတာခြင်း။ | စီမံကိန်း လုပ်ဆောင်သူ (များ) | လစဉ် နေ့စဉ် (လေအရည်အသွေးကို ပုံမှန် တိုင်းတာခြင်း) |
| မှန်လုံအိမ်ဓာတ်ငွေ့ထုတ်လွှတ်ခြင်း | စီမံကိန်းတည်ဆောက်ခြင်းကာလ၊ စီမံကိန်းရပ်ဆိုင်းသည့်ကာလ | <ul style="list-style-type: none"> ✓ ယာဉ်မောင်းများ၊ စက်ယန္တရား မောင်းနှင်သူများနှင့် သက်ဆိုင်ရာ ဝန်ထမ်းများကို မှန်လုံအိမ် ဓာတ်ငွေ့ထုတ်လွှတ်ခြင်းနှင့် လျော့ပါးစေခြင်း ဆောင်ရွက်နိုင်သည့် သင်တန်းများပေးခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းသုံးယာဉ်များနှင့် ယန္တရားများကို မလိုအပ်ဘဲ မောင်းနှင်ခြင်း၊ ရွှေ့ခြင်းနှင့် စက်နှိုးထားခြင်းများကို တားမြစ်ခြင်း။ | ကန်ထရိုက်တာ | အပတ်စဉ် (စီမံကိန်းတည်ဆောက်ခြင်းကာလ) လစဉ် (စီမံကိန်း |

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| | | <ul style="list-style-type: none"> ✓ ဆောက်လုပ်ရေး လုပ်ငန်းသုံးယာဉ်များနှင့် ယန္တရားများကို ပုံမှန် စစ်ဆေးခြင်းနှင့် ပြုပြင်ထိန်းသိမ်းခြင်း။ ✓ ဆောက်လုပ်ရေး လုပ်ငန်းသုံးယာဉ်များနှင့် ယန္တရားများကို အကျိုးရှိရှိ အသုံးပြုနိုင်ရန် အစီအစဉ်များကို ရေးဆွဲခြင်း။ ✓ သဘာဝအလင်းရောင်နှင့် လေဝင်လေထွက်ကို တတ်နိုင်သမျှ အသုံးပြုခြင်း။ | | ရပ်ဆိုင်းသည့်ကာလ) |
| မှန်လုံအိမ် ဓာတ်ငွေ့ထုတ် လွှတ်ခြင်း | စီမံကိန်း လည်ပတ်သည့် ကာလ | <ul style="list-style-type: none"> ✓ သဘာဝ အလင်းရောင်ကို တတ်နိုင်သမျှ အသုံးပြုခြင်း။ ✓ စွမ်းအင်ချွေတာသည့် လျှပ်စစ်အသုံးအဆောင်ပစ္စည်းများ တပ်ဆင် အသုံးပြုခြင်း။ ✓ အပူပေးစနစ်၊ လေအေးပေးစက်များ အသုံးပြုနေစဉ် ပြတင်းပေါက်များ ပိတ်ထားခြင်း။ ဖြစ်နိုင်ပါက သဘာဝ လေဝင်လေထွက်ကို တတ်နိုင်သမျှ အသုံးပြုခြင်း။ ✓ လျှပ်စစ်အသုံးအဆောင်ပစ္စည်းများ အသုံးမပြုသောအခါ လျှပ်စစ်ပလတ်ခေါင်းဖြုတ်ထားခြင်း။ ✓ စွန့်ပစ်မည့်ပစ္စည်းများကို တတ်နိုင်သမျှ ပြန်လည်အသုံးပြုခြင်းနှင့် ပြန်လည် ပြုပြင် သုံးစွဲခြင်း။ ✓ ဖလိုရိုက်ဓာတ်ငွေ့ ထုတ်လွှတ်မှုနည်းသော (သို့မဟုတ်) ထုတ်လွှတ်မှု မရှိသော လေအေးပေးစက်နှင့် ရေခဲစက်များကို အသုံးပြုခြင်း။ | စီမံကိန်း လုပ်ဆောင်သူ (များ) | လစဉ် |
| မြေပေါ်ရေ | စီမံကိန်း | <ul style="list-style-type: none"> ✓ ဆောက်လုပ်ရေးလုပ်ငန်းမှ ထွက်ရှိလာသည့် စွန့်ပစ် အရည်များကို အနည် | ကန်ထရိုက်တာ | လစဉ် |

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| <p>အရည်အသွေး ကျဆင်းခြင်း/ မြေအောက်ရေ အရည်အသွေး ကျဆင်းခြင်း</p> | <p>တည်ဆောက်ခြင်း ကာလ၊ စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ</p> | <p>အနှစ်စစ်သည့် ကန်တွင် ဦးစွာသိုလှောင်ထားပြီး အနည်အနှစ်များကို ကျစေ ပြီးမှ ရေကိုစွန့်ထုတ်ခြင်း။</p> <ul style="list-style-type: none"> ✓ အစိုင်အခဲ စွန့်ပစ်အမှုိုက် (ဘေးအန္တရာယ်ရှိသော အမှုိုက်များ အပါအဝင်) စီမံခန့်ခွဲမှုကို ကျင့်သုံးခြင်း။ ✓ လောင်စာဆီ၊ ဆီ တို့ကို သိုလှောင်တိုင်ကီတွင် ထဲပြီး စနစ်တကျ သိမ်းဆည်း ခြင်း၊ လဲလှယ်ခြင်း၊ ထဲခြင်းနှင့် ယာဉ်များ၊ ဆောက်လုပ်ရေး စက်ယန္တရား များကို ပုံမှန်ပြုပြင်ထိန်းသိမ်းခြင်းနှင့် ထိုသို့ ပုံမှန်ပြုပြင် ထိန်းသိမ်းခြင်းနှင့် ပြင်ဆင်ခြင်းတို့ကို လုပ်ဆောင်ရာတွင် ဆီယိုဖိတ်ပြီး မြေကြီးထဲသို့ မစိမ့်ဝင် နိုင်သည့် အမာခံ မျက်နှာပြင်ပေါ်တွင် လုပ်ဆောင်ခြင်း (ဆီယိုဖိတ်ပါက ချက်ချင်းသန့်ရှင်းရေးပြုလုပ်ခြင်း)။ ✓ အလုပ်သမားများ မစင်စွန့်ရန် မိလ္လာကန်စနစ်ကို တည်ဆောက်ခြင်း။ ✓ မိလ္လာပိုက်နှင့် ပိုက်ဆက်များမှ စိမ့်ထွက်မှုမရှိစေရန် ပုံမှန်စစ်ဆေးခြင်း။ | | |
| <p>မြေပေါ်ရေ အရည်အသွေး ကျဆင်းခြင်း/ မြေအောက်ရေ အရည်အသွေး ကျဆင်းခြင်း</p> | <p>စီမံကိန်း လည်ပတ်သည့် ကာလ</p> | <ul style="list-style-type: none"> ✓ စက်ရုံများက စွန့်ထုတ်လိုက်သော စွန့်ပစ်အရည်များကို အမျိုးသား ပတ်ဝန်းကျင် ဆိုင်ရာစွန့်ထုတ်မှု အရည်အသွေး စံချိန်စံနှုန်း သတ်မှတ်ချက် နှင့် အညီ သန့်စင်ပြီးမှ စွန့်ပစ်ခြင်း။ ✓ အစိုင်အခဲ စွန့်ပစ်အမှုိုက် (ဘေးအန္တရာယ်ရှိသော အမှုိုက်များ အပါအဝင်) ကို ယာယီသိမ်းဆည်းထားမည့် အဆောက်အအုံတည်ဆောက်ခြင်း။ ထို အဆောက်အအုံတွင် ကွန်ကရစ်ကြမ်းခင်း၊ ရေမြောင်း၊ သန့်ရှင်းရေးပြုလုပ် ရန် လုံလောက်သော ရေတိုက်ပါရှိရမည်။ | <p>စီမံကိန်း လုပ်ဆောင်သူ (များ)</p> | <p>လစဉ်</p> |

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| | | <ul style="list-style-type: none"> ✓ ဆီယိုဖိတ်မှုကို လျော့နည်းစေသည့် နည်းလမ်းများဆောင်ရွက်ခြင်း။ ✓ သန့်စင်ပြီး စွန့်ပစ်အရည်များ၏ အရည်အသွေးကို ပုံမှန် တိုင်းတာစစ်ဆေးခြင်း။ | | |
| ဆူညံမှုနှင့် တုန်ခါခြင်း | စီမံကိန်း တည်ဆောက်ခြင်း ကာလ၊ စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ | <ul style="list-style-type: none"> ✓ ဆောက်လုပ်ရေး ယာဉ်များနှင့် စက်ယန္တရားများကို မောင်းနှင်သည့် ယာဉ်မောင်းနှင့် စက်မောင်းများကို ၎င်းတို့၏ ယာဉ်များ၊ စက်များမှ ဆူညံသံများ မည်သို့လျော့ချရမည်ကို သင်တန်းပေးခြင်း။ ✓ ညဖက် ဆောက်လုပ်ရေး လုပ်ငန်းများ လုပ်ကိုင်ခြင်း ကိုကန့်သတ်ထားခြင်း။ ✓ ယာဉ်များနှင့် ဆောက်လုပ်ရေးစက်ယန္တရားများကိုပုံမှန် ပြုပြင် ထိန်းသိမ်းခြင်းဖြင့် ဆူညံသံနှင့် တုန်ခါမှု အလွန်အကျွံ ထွက်ခြင်းကို ရှောင်ရှားခြင်း။ ✓ အသံဆူညံမှု ရှိသောနေရာများ အနီးတဝိုက်တွင် အလုပ်လုပ်ရသော အလုပ်သမားများကို နားကာ များ ဝတ်ဆင်စေခြင်း။ ✓ အသံဆူညံမှုကို ဖြစ်ပေါ်စေသည့် အလုပ်ဝန်းကျင်တွင် အကာအရံ၊ အတားအဆီးများ တပ်ဆင်ထားခြင်းနှင့် ထောင်ထားခြင်း။ | ကန်ထရိုက်တာ | တစ်လလျှင် တစ်ကြိမ် (၂၄ နာရီ) (စီမံကိန်း တည်ဆောက်ခြင်း ကာလ) လစဉ် (စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ) |
| ဆူညံမှုနှင့် တုန်ခါခြင်း | စီမံကိန်း လည်ပတ်သည့် ကာလ | <ul style="list-style-type: none"> ✓ စက်ရုံများတွင် လိုအပ်သော ဆူညံသံအကာအကွယ်ပေးသည့် ပစ္စည်းများ၊ ဆူညံသံစုပ်ယူပေးသည့် ပစ္စည်းများကို လိုအပ်သလို တပ်ဆင်ခြင်း။ ✓ ပုံမှန်အလုပ်ချိန် ပြင်ပအလုပ်လုပ်ခြင်း (ရုံးပိတ်ရက်များ၊ ညဘက်များ) ကို | စီမံကိန်း လုပ်ဆောင်သူ (များ) | လစဉ် |

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| | | <p>ကန့်သတ်ခြင်း။</p> <ul style="list-style-type: none"> ✓ စက်ရုံများမှ ထွက်ရှိသော ဆူညံသံများသည် အမျိုးသား ပတ်ဝန်းကျင် ဆိုင်ရာ စွန့်ထုတ်မှု အရည်အသွေး စံချိန်စံနှုန်း သတ်မှတ်ချက်နှင့် အညီ ဖြစ်စေရန် ဆောင်ရွက်ခြင်း။ | | |
| <p>အပင်များ ဆုံးရှုံးခြင်း၊ တိရစ္ဆာန်များကို အခြားနေရာသို့ ရွှေ့ပြောင်းစေခြင်း</p> | <p>စီမံကိန်း တည်ဆောက်ခြင်း ကာလ</p> | <ul style="list-style-type: none"> ✓ စီမံကိန်းလုပ်ဆောင်ရန် အမှန်တကယ် လိုအပ်သည့် နေရာကိုသာ (အပင်များကိုသာ) ခုတ်ထွင် ရှင်းလင်းခြင်း။ ✓ မျိုးတူရာ အပင်များကိုသာ ပြန်လည်စိုက်ပျိုးခြင်း။ ✓ ဆောက်လုပ်ရေး ယာဉ်များကြောင့် မလိုအပ်ဘဲ အပင်များကို ထိခိုက်စေခြင်းမှ ရှောင်ရှားခြင်း။ | ကန်ထရိုက်တာ | လစဉ် |
| <p>လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး</p> | <p>စီမံကိန်း တည်ဆောက်ခြင်း ကာလ၊ စီမံကိန်း လည်ပတ်သည့် ကာလ၊ စီမံကိန်း ရပ်ဆိုင်းသည့်</p> | <ul style="list-style-type: none"> ✓ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး လုပ်ထုံးလုပ်နည်းများကို လိုက်နာဆောင်ရွက်ခြင်း (မြေကြီးတူးလုပ်ငန်း လုပ်ကိုင်ခြင်း၊ အမြင့်တွင် အလုပ်လုပ်ခြင်း၊ ငြိမ်းအသုံးပြုခြင်း၊ လှေကား အသုံးပြုခြင်း၊ ချော်ခြင်းကို ကာကွယ်ခြင်း၊ ဘေးအန္တရာယ်ကင်းရှင်းသော လုပ်ငန်းခွင် သယ်ယူ ပို့ဆောင်ရေးလုပ်ငန်းများ၊ လျှပ်စစ်လုပ်ငန်းများ၊ မီးဘေးအန္တရာယ်၊ လူဖြင့် ပစ္စည်းများကို မခြင်း၊ သယ်ယူခြင်းနည်းလမ်းများ၊ လက်ကိုင် ကိရိယာများကို အသုံးပြုခြင်း၊ စက် ကိရိယာများကို အသုံးပြုခြင်း၊ ဓာတု ပစ္စည်းများကို အသုံးပြုခြင်း။ | <p>ကန်ထရိုက်တာ စီမံကိန်း လုပ်ဆောင်သူ (များ)</p> | လစဉ် |

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| | ကာလ | <p>ဘိလပ်မြေ ဖျော်စက်များကို အသုံးပြုခြင်း၊ တကိုယ်ရေ ကာကွယ်ရေး ပစ္စည်းကိရိယာများ ဝတ်ဆင်ခြင်း၊ ဆေးဝါးနှင့် အရေးပေါ် အခြေအနေ ကယ်ဆယ်ရေး လုပ်ငန်းများ တို့နှင့် သက်ဆိုင်သော လုပ်ထုံးလုပ်နည်းများဖြစ်သည်)</p> <ul style="list-style-type: none"> ✓ အလုပ်သမားများကို လုပ်ငန်းခွင်ဆိုင်ရာကျန်းမာရေးနှင့် အန္တရာယ် ကင်းရှင်းရေး သင်တန်းများနှင့် အခြားဆက်စပ်သင်တန်းများပေးခြင်း။ ✓ အလုပ်သမားများ အလုပ်လုပ်ရန် မှန်ကန်သောပစ္စည်းကိရိယာများ ပေးခြင်း၊ ပစ္စည်းအသုံးပြုညွှန်ကြားချက်များ၊ လမ်းညွှန်စာအုပ်များ ပေးခြင်းတို့အပြင်ကိုယ်ခန္ဓာအကာအကွယ်ပေးသည့်အဝတ်များ၊ ဦးထုပ်များ၊ လက်အိတ်များ၊ ဖိနပ်များ အစရှိသည်တို့ ဝတ်ဆင်စေခြင်း။ ✓ အရေးပေါ်သူနာပြုစုနည်း ဆေးသေတ္တာများပေးထားပြီး အသုံးပြု နည်းများကိုသင်တန်းပေးခြင်း (အရေးပေါ်တုံ့ပြန်မှုအတွက်) | | |
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၇။ စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်

| ပတ်ဝန်းကျင်အပေါ်ထိခိုက်မှု | စောင့်ကြပ်ကြည့်ရှုရမည့်အရာများ | စီမံကိန်းကာလ | စောင့်ကြပ်ကြည့်ရှုရမည့်နည်းလမ်းများ | တစ်နှစ်အတွက်လျာထားအသုံးစရိတ် (မြန်မာကျပ်ငွေ) |
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| မြေဆီလွှာ ပျက်စီးခြင်း | ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါးစေသည့် နည်းလမ်းများကို စောင့်ကြပ် | တည်ဆောက်ခြင်းကာလ | စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း | ၅၀၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက် |

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| | ကြည့်ရှုခြင်း။ | | | ထားပါသည်။) |
| | | စီမံကိန်း လည်ပတ်ခြင်းကာလ | စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း | ၂၅၀၀၀၀ (ပြုပြင်ထိန်းသိမ်းရေးလုပ်ငန်းဘတ် ဂျက်တွင်ထည့် သွင်းတွက်ချက် ထားပါသည်။) |
| မြေလွှာ တိုက်စားခြင်း | <ul style="list-style-type: none"> ❖ မြေလွှာ တိုက်စားခြင်း လျော့ပါးစေသည့် နည်းလမ်းများ၏ အသုံးဝင်မှု။ ❖ ရေစီးမြောင်းများ၊ ချောင်းများ။ ❖ အပင်များ။ ❖ ကွန်ကရစ် ရေမြောင်းများ။ ❖ တိုက်စားခံရ၍ ပုံပျက်ယွင်းခြင်းများ။ | တည်ဆောက်ခြင်းကာလ | စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း | ၅၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ် ဂျက်တွင်ထည့် သွင်းတွက်ချက် ထားပါသည်။) |
| ဖုန်မှုန့်ထွက်ခြင်း | <ul style="list-style-type: none"> ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါး စေသည့် နည်းလမ်းများကို စောင့်ကြပ် ကြည့်ရှုခြင်း။ ❖ လမ်းဘေး သစ်ပင်၊ သစ်ရွက်များ ပေါ်တွင် ဖုန်တင်ကျန်ခဲ့သည့် ပမာဏ။ ❖ လေထဲတွင် ဖုန်ပါဝင်နေခြင်းကို အသက်ရှူ၊ ရာမှ သတိထားမိခြင်း။ | တည်ဆောက်ခြင်းကာလ | စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း | ၁၀၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ် ဂျက်တွင်ထည့် သွင်းတွက်ချက် ထားပါသည်။) |

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| | ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါးစေသည့် နည်းလမ်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း။ | စီမံကိန်းလည်ပတ်ခြင်းကာလ | စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း | ၂၀၀၀၀၀၀ (ပြုပြင်ထိန်းသိမ်းရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက်ထားပါသည်။) |
| | ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါးစေသည့် နည်းလမ်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း။ | စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ | စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း | ၁၅၀၀၀၀၀ |
| လေထုညစ်ညမ်းခြင်း | ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါးစေသည့် နည်းလမ်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း။ ❖ လေထုထဲတွင် PM _{2.5} , PM ₁₀ , NO ₂ , SO ₂ , CO ပါဝင်မှု | တည်ဆောက်ခြင်းကာလ | ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ လေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း | ၂၀၀၀၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက်ထားပါသည်။) |
| | | စီမံကိန်း လည်ပတ်ခြင်း ကာလ | ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ လေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း | ၂၀၀၀၀၀၀၀ (ပြုပြင်ထိန်းသိမ်းရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက်ထားပါသည်။) |

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| | | စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ လေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း | ၂၀၀၀၀၀ |
| မှန်လုံအိမ် ဓာတ်ငွေ့ထုတ် လွှတ်ခြင်း | <ul style="list-style-type: none"> ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါးစေသည့် နည်းလမ်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း။ ❖ လေထုထဲတွင် CO₂ ပါဝင်မှု | တည်ဆောက်ခြင်းကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ လေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း | ၂၅၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက်ထားပါသည်။) |
| | | စီမံကိန်း လည်ပတ်ခြင်း ကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ လေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း | ၃၅၀၀၀၀ (ပြုပြင်ထိန်းသိမ်းရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက်ထားပါသည်။) |
| | | စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ လေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း | ၁၅၀၀၀၀ |
| မြေပေါ်ရေ အရည်အသွေး | <ul style="list-style-type: none"> ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါးစေသည့် နည်းလမ်းများကို စောင့်ကြပ် | တည်ဆောက်ခြင်းကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ ရေအရည်အသွေး | ၅၀၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက်ထားပါသည်။) |

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| ကျဆင်းခြင်း/ မြေအောက်ရေ အရည်အသွေး ကျဆင်းခြင်း | <ul style="list-style-type: none"> ❖ ကြည့်ရှုခြင်း။ ရေ၏ အပူချိန်၊ pH, SS, DO, BOD₅, COD, total coliform bacteria, oil and grease ပါဝင်မှု | | တိုင်းတာစစ်ဆေးခြင်း | ဂျက်တွင်ထည့် သွင်းတွက်ချက် ထားပါသည်။) |
| | | စီမံကိန်း လည်ပတ်ခြင်း ကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ ရေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း | ၇၅၀၀၀၀ (ပြုပြင်ထိန်းသိမ်းရေးလုပ်ငန်းဘတ် ဂျက်တွင်ထည့် သွင်းတွက်ချက် ထားပါသည်။) |
| | | စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ ရေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း | ၁၀၀၀၀၀ |
| ဆူညံသံနှင့် တုန်ခါမှု | <ul style="list-style-type: none"> ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါး စေသည့် နည်းလမ်းများကို စောင့်ကြပ် ကြည့်ရှုခြင်း။ | တည်ဆောက်ခြင်းကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ ဆူညံသံ တိုင်းတာ စစ်ဆေးခြင်း | ၂၀၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ် ဂျက်တွင်ထည့် သွင်းတွက်ချက် ထားပါသည်။) |
| | | စီမံကိန်း လည်ပတ်ခြင်း ကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ ဆူညံသံ တိုင်းတာ စစ်ဆေးခြင်း | ၂၀၀၀၀၀ (ပြုပြင်ထိန်းသိမ်းရေးလုပ်ငန်းဘတ် ဂျက်တွင်ထည့် သွင်းတွက်ချက် |

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| | | | | ထားပါသည်။) |
| | | စီမံကိန်း ရပ်ဆိုင်းသည့် ကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ ဆူညံသံ တိုင်းတာ စစ်ဆေးခြင်း | ၁၀၀၀၀၀၀ |
| အပင်များ ဆုံးရှုံးခြင်း၊ တိရစ္ဆာန်များကို အခြားနေရာသို့ ရွှေ့ပြောင်းစေခြင်း | <ul style="list-style-type: none"> ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါး စေသည့် နည်းလမ်းများကို စောင့်ကြပ် ကြည့်ရှုခြင်း။ | တည်ဆောက်ခြင်းကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း | ၁၀၀၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက်ထားပါသည်။) |
| လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး | <ul style="list-style-type: none"> ❖ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ဇယားတွင် ဖော်ပြထားသော လျော့ပါး စေသည့် နည်းလမ်းများကို စောင့်ကြပ် ကြည့်ရှုခြင်း။ ❖ မတော်တဆ ထိခိုက်မှုဖြစ်ပွားသည့် မှတ်တမ်းများ | တည်ဆောက်ခြင်းကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ မှတ်တမ်းပြုစုခြင်း | ၃၅၀၀၀၀၀ (ဆောက်လုပ်ရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက်ထားပါသည်။) |
| | | စီမံကိန်း လည်ပတ်ခြင်း ကာလ | <ul style="list-style-type: none"> ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ မှတ်တမ်းပြုစုခြင်း | ၃၅၀၀၀၀၀ (ပြုပြင်ထိန်းသိမ်းရေးလုပ်ငန်းဘတ်ဂျက်တွင်ထည့် သွင်းတွက်ချက် |

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| | | | | ထားပါသည်။) |
| | | စီမံကိန်း ရုပ်ဆိုင်းသည့် ကာလ | ❖ စစ်ဆေးခြင်းနှင့် လေ့လာကြည့်ရှုခြင်း ❖ မှတ်တမ်းပြုစုခြင်း | ၃၅၀၀၀၀၀ |

၈။ လူမှုစီးပွားဆိုင်ရာသက်ရောက်မှုကိုဆန်းစစ်ခြင်းနှင့်အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်း

ဤလုပ်ငန်းစဉ်တွင် အပိုင်း ၃ပိုင်း ပါဝင်သည်။

(က) အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် စီမံကိန်းအကြောင်းရှင်းလင်းတင်ပြခြင်း

(ခ) လူမှုအခြေခံအခြေအနေကို ပဏာမ လေ့လာခြင်းနှင့် အချက်အလက်ကောက်ယူခြင်း

(ဂ) လူမှုရေးဆိုင်ရာ သက်ရောက်မှုကိုဆန်းစစ်ခြင်း

အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးခြင်းတွင် အောက်ဖော်ပြပါလုပ်ငန်းများကိုဆောင်ရွက်ပါသည်။

(က) စီမံကိန်းဧရိယာကို ဗဟိုပြုလျက်အချင်းဝက် ၅ကီလိုမီတာအတွင်း၌ တည်ရှိသောကျေးရွာ

(၆) ရွာရှိရပ်ရွာခေါင်းဆောင်များ၊ ကျေးရွာအုပ်ချုပ်ရေးတာဝန်ရှိသူများ၊ ဗုဒ္ဓဘာသာ ဘုန်းတော်ကြီးများ၊ စီးပွားရေးလုပ်ငန်းလုပ်ကိုင်သည့် ဒေသခံအသိုင်းအဝိုင်း၊ ကျောင်းဆရာ များ၊ ကျန်းမာရေးဝန်ထမ်းများ၊ ကုန်ပစ္စည်းရောင်းချသူများနှင့် ဆိုင်ပိုင်ရှင်များကို တွေ့ဆုံ မေးမြန်းခဲ့ပါသည်။

(ခ) စီမံကိန်းသက်ရောက်မှုရှိမည့်ကျေးရွာ(၆)ရွာ၏အချက်အလက်များကိုကောက်ယူခဲ့ပါသည်။

(ဂ) စီမံကိန်းကြောင့် တိုက်ရိုက် သို့မဟုတ် သွယ်ဝိုက်ပြီး သက်ရောက်ခြင်းခံရနိုင်သည့် လူမှု အသိုက်အဝန်းများ၊ အိမ်ထောင်စုများ၊ စီမံကိန်းနယ်မြေနှင့်အနီးအနားဒေသတွင် နေထိုင်သူ များ၊ စိုက်ပျိုးရေးနှင့်မွေးမြူရေးဇုန် (၃) ဇုန်မှ တာဝန်ရှိသူများ၊ ညောင်နှစ်ပင်ဧရိယာရှိ ကျေးရွာအုပ်ချုပ်ရေးအဖွဲ့များနှင့် ၂၀၁၉ ခုနှစ် ဖေဖော်ဝါရီလ ၈ ရက်တွင် စိုက်ပျိုးရေးနှင့် မွေးမြူရေးဇုန် (၃) အစည်းအဝေးခန်းမတွင် ပြုလုပ်ခဲ့သော အများပြည်သူနှင့်တွေ့ဆုံပွဲ တွင် တွေ့ဆုံကာ တိုင်ပင်ဆွေးနွေးခြင်းနှင့် စီမံကိန်းအကြောင်းရှင်းလင်းတင်ပြခြင်းကို ပြုလုပ်ခဲ့ ပါသည်။

(ဃ) ဒုတိယအကြိမ် အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးပွဲကို ၂၀၂၀ ခုနှစ် ဩဂုတ်လ ၂၁ ရက်တွင် ကျောင်းကြီး ဓမ္မာရုံ၊ ကြာအင်း (အရှေ့) ကျေးရွာ၊ လှည်းကူးမြို့နယ် တွင် ကိုဗစ် - ၁၉ ရောဂါ ကာကွယ်ရေး လမ်းညွှန်ချက်များနှင့် အညီ ပြုလုပ်ကျင်းပခဲ့ပါသည်။

၈.၁။ အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးပွဲတွင် ဆွေးနွေးအကြံပြုချက်များနှင့် တွေ့ရှိချက်များ

၁။ ညောင်နှစ်ပင်စိုက်ပျိုးမွေးမြူရေးဇုန် (၃) တွင်မူလတန်းကျောင်းသာရှိသဖြင့်အလယ်တန်းကျောင်း လိုအပ်ကြောင်းတွေ့ရှိရသည်။

၂။ အလုပ်သမားများ မှော်ဘီ ၊ လှည်းကူး ၊ ထောက်ကြွံတို့တွင်သွား၍ အလုပ်လုပ်ကြရန် အခက်အခဲ ရှိနေ၍ စက်မှုဇုန်ပေါ်ပေါက်လာပါက ၎င်းတို့ကို အလုပ်ခန့်ထားသင့်ပါသည်။

၃။ ကျန်းမာရေးအတွက် ဆေးကုသရန်ငါးဆူတောင်ရွာသို့ သွားရသဖြင့် အခက်အခဲ ရှိနေသော ကြောင့် ကျေးလက်ဆေးပေးခန်း/ဆေးရုံတစ်ခုလိုအပ်ကြောင်း တွေ့ရှိရသည်။

၄။ ဇုန် (၃) အတွင်းရှိစိုက်ပျိုးရေးလုပ်ကိုင်သူများမှာ ကလီထော်ဆည်မှ ရေကိုမရရှိသဖြင့် ရေလွှတ်ပေးရန်လိုအပ်ကြောင်း တွေ့ရှိရသည်။

၅။ စိုက်ပျိုးမွေးမြူရေးဇုန်တွင် နေထိုင်ကြသည့် မိသားစုများနာရေးဖြစ်ပါက မြေမြှုပ်သဂြိုဟ်ရန် မြေနေရာမရှိသဖြင့်သီချိုင်းမြေတစ်ခုလိုအပ်သည်။

- ၆။ ညောင်နှစ်ပင်ညီလာခံဝင်း၏ ပြင်ပပတ်လည်ရှိလမ်းများမှာပျက်စီးနေသဖြင့် လမ်းများ ကောင်းအောင် ဆောင်ရွက်ပေးရန်လိုအပ်သည်။
- ၇။ စက်မှုဇုန်တွင်ပတ်ဝန်းကျင်ရှိနေထိုင်သူများကို ဒုက္ခပေးနိုင်သော အနံ့အသက်များနံသည့် စက်ရုံများပါဝင်ပါက ကျန်းမာရေးထိခိုက်မှုရှိနိုင်၍ ၎င်းစက်ရုံများတည်ဆောက်ခြင်းကို မလိုလားကြပါ။
- ၈။ စိုက်ပျိုး၊ မွေးမြူရေးဇုန်ဖြစ်သဖြင့် စိုက်ပျိုး၍ ထွက်လာသောအသီးအရွက်များ၊ မွေးမြူရေးထွက်ကုန်များကို နိုင်ငံခြားတင်ပို့ ပေးမည့် စက်ရုံ ၊ အလုပ်ရုံများပါဝင်ရန်လိုလားကြသည်။
- ၉။ ဇုန်အတွင်း နေထိုင်ကြသူအများစုမှာ အဝီစိတွင်းနှင့် လက်တူးရေတွင်းမှရေကို သောက်သုံးကြရသဖြင့် သောက်သုံးရေကောင်း၊ ရေသန့်ရရှိရန် လိုအပ်သည်။
- ၁၀။ စက်မှုဇုန်ပေါ်ပေါက်လာပါက မြေဈေးကောင်းလာမည်ဖြစ်ပြီး မြေပိုင်ရှင်မှ မြေရောင်းလိုက်လျှင်နေစရာ၊ လုပ်စရာမရှိဖြစ်သွားမှာကို စိုက်ပျိုးရေးလုပ်ရန် မြေငှားလုပ်ကိုင်နေသူများသည် စိုးရိမ်ပူပင်လျက်ရှိကြသည်။
- ၁၁။ စက်မှုဇုန်တွင် ဓါတုပစ္စည်းများအသုံးပြုခြင်းနှင့် စက်ရုံထုတ် စွန့်ပစ်ပစ္စည်းများကြောင့် စိုက်ပျိုး မြေများ ပျက်စီးသွားမှာကို စိုးရိမ်မှုရှိနေကြသည်။
- ၁၂။ စက်မှုဇုန်ဆောင်ရွက်ရာတွင် ကျွဲ၊ နွား သားသတ်ရုံများပါဝင်လာမည်ကို ဒေသခံများနှင့် ဘုန်းတော်ကြီးများက စိုးရိမ်မှုရှိကြသည်။
- ၁၃။ စိုက်ပျိုးရေးဇုန်အဖြစ်ထူထောင်ထားသော်လည်း ဆည်ရေအလုံအလောက်မရှိသောကြောင့် စက်ရေတွင်းများကို မှီခိုနေကြရသော နေရာများတွေ့ရှိရသည်။
- ၁၄။ စက်ရုံများမှ စွန့်ထုတ်လိုက်သောအရည်များကို ကောင်းစွာသန့်စင်ပြီးမှ ငမိုးရိပ်ချောင်းအတွင်းသို့ စွန့်ပစ်ရန် လိုလားကြသည်။
- ၁၅။ စက်မှုဇုန်အများစုသည် အမျိုးသမီးများကိုသာ အလုပ်ခန့်ထားလေ့ရှိသဖြင့် ဤစီမံကိန်းအနေဖြင့် အမျိုးသားများကိုလည်း အလုပ်ခန့်ထားစေလိုကြသည်။
- ၁၆။ ဤစီမံကိန်း ပတ်ဝန်းကျင်ရှိ ရွာများနှင့် စိုက်ပျိုး၊ မွေးမြူရေးဇုန်များသည် စီမံကိန်းမှ လျှပ်စစ်ဓာတ်အား ဖြန့်ဝေပေးရန် မျှော်လင့်ကြသည်။

၉။ အစီရင်ခံစာဖွဲ့စည်းပုံ

အစီရင်ခံစာကို သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၏ ကြေညာချက်အမှတ် - ၆၁၆/၂၀၁၅ အရ ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းအတိုင်းရေးသားပြုစုပါသည်။

- အကျဉ်းချုပ်အစီရင်ခံစာ (မြန်မာ၊ အင်္ဂလိပ် နှစ်ဘာသာဖြင့်)
- (က) နိဒါန်း
- (ခ) မူဝါဒ၊ ဥပဒေနှင့်အဖွဲ့အစည်းဆိုင်ရာမူဘောင်
- (ဂ) စီမံကိန်းအကြောင်းအရာဖော်ပြချက်နှင့် အခြားနည်းရွေးချယ်ခြင်းများ
- (ဃ) အနီးပတ်ဝန်းကျင်အကြောင်းအရာများဖော်ပြချက်
- (င) ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှုနှင့်ဘေးအန္တရာယ်ရှိမှုဆန်းစစ်ခြင်းနှင့် လျော့နည်းစေရေးလုပ်ငန်းများ

- (စ) ကျန်းမာရေးဆိုင်ရာ သက်ရောက်မှု ဆန်းစစ်ခြင်း
- (ဆ) ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်း
- (ဇ) ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်
- (ဈ) အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့်သတင်းအချက်အလက်များထုတ်ဖော်တင်ပြခြင်း
- (ည) နိဂုံး

၁၀။ နိဂုံး

စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်၊ လူမှုရေးနှင့် ကျန်းမာရေးဆိုင်ရာ သက်ရောက်မှုများကို ဆန်းစစ်ပြီး ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို ရေးဆွဲခဲ့ပါသည်။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်တွင် အများပြည်သူပူးပေါင်းပါဝင်မှုကို အလေးထားဆောင်ရွက်ခဲ့ပြီး ၎င်းတို့၏ အကြံပြုချက်များနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန၊ သယံဇာတနှင့်သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန၏ သဘောထားမှတ်ချက်များကို ထည့်သွင်းစဉ်းစားပြီး ဤအစီရင်ခံစာကို ရေးသားထားပါသည်။ သို့ဖြစ်ပါ၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဤစီမံကိန်းအတွက် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းကို ဆောင်ရွက်ခဲ့ပြီး စီမံကိန်းဖော်ဆောင်သူမှ လိုက်နာဆောင်ရွက်ရမည့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို ရေးဆွဲခဲ့ပါသည်။



Executive Summary (English)

1. Introduction

The objective of this report is to present the systematic identification and assessment of potential adverse impacts including cumulative impacts of the Industrial Complex project, systematic assessment of feasible project alternatives and determination of appropriate measures to mitigate potential adverse impacts. The report also includes the Environmental Management Plan (EMP).

2. Project Description and Location

The Ministry of Construction, Government of Myanmar and KMIC Development Co., Ltd. (KMIC JVC) have worked together on September 2015 to develop an industrial complex called KMIC Project. Both parties have agreed to develop it at Nyaung Hnitpin area about 40 km away to the north of Yangon. This site is 555.81 acres (2,249,288 square meter) wide flat land, located near Nyaung Hnitpin Livestock and Agricultural Zone No.3 in Hlegu Township. In this site, the industrial park would occupy the land area of 1,640,245 m². The rest will be occupied by other inside infrastructure including roads. The industrial park will be made up of three scale (large, medium and small) industrial plots where factories and warehouses for Garment Products, Food Manufacturing, Jewelry Processing, Vehicle Spare Parts, Electronic Parts installation etc. will be constructed. Besides, it will contain inside infrastructure such as residential, commercial, vocational training school, main roads, intersection roads, drainage, overhead electricity installation, plantation of green spaces, substation, wastewater treatment plant, water purification plant and public facilities.

The project site area also is known as Nyaung Hnitpin National Convention Compound, currently remained as unused land (that project area including buildings on it were used for drafting 2008 Constitution of Myanmar from 1994 to 2007 and then the Government at that time and the succeeding Governments had not used that area until this project was initiated.) where the buildings (Hall, Hostel, Theatre, Hospital, etc...) and roads have been remained in ruin among the Phone-zoe area of a fallow land, dry in summer, swampy in rainy season covered with wild grasses, wild plants and weak herbs and shrubs of many species.

2.1 Road

There are six types of road ways which would be constructed in the internal infrastructure. They are 38 m wide, 46 m wide, 26 m wide, 18m wide, 12 m wide and 8 m wide road ways.

2.2 Water Resource and usage

The developer has already planned to install the water from Kalihtaw Dam which was constructed since 2001 for supplying water for livestock and Agricultural Zone of Nyaung Hnitpin area.

2.3 Electricity

The project will use electricity supplied by government and installed from 230 kV Kamarnat-Myaungtakar national grid. The proper process of transformers will be installed at substation-yard. Internal supply will be installed overhead lines at road sides. Demand of consumption of electricity at the proposed project's operation stage will be 50 MW.

2.4 Livestock and Agricultural Zone

Three agricultural zones have been established at the Nyaung Hnitpin area of about 10,000 acres of land. Around the project site there exists 5-acre unit of land which is offered to any

individual who could pay the designated price to use the land for agriculture. There are orchards of 5-acre land owned by different persons surrounding the project site. Long-term crops, such as mango, jack fruit, dragon fruit, and rambutan are grown in most of the unit of land. Many fish farming ponds and poultry keeping farms have also been already established just next to these orchards. Former vegetation of natural forest of the area have already been replaced by paddy growing fields and cash crop plantation including rubber and acacia plantation across the landscape between Hlegu and Hmawbi townships.

2.5 Project Alternatives

In terms of an alternative project, such area which does not need to solve the resettlement problem, worry on electricity and availability of water is rare in Yangon Region. Transport system could be built with shortest route to reach the main highways and expressways. No actionable option of keeping the area by maintaining the status quo of abandoning in wilderness is negative to the country goal of economic growth.

3. Policy, Legal and Institutional Framework

This session specifies the legislative framework relating to the project like KMIC Project. This session mainly focuses on the enacted laws, regulations and guidelines which are compulsory for the project proponent to comply with in developing the project as environmentally friendly and socially responsible business investment in Myanmar.

The ESIA process will include: a review of the National Policy and Legal Framework, a review of relevant Government Guidelines and legal policies in force, and a review of most of the relevant laws regulating such a kind of project in Myanmar. A full assessment of policy and regulatory context is detailed in this report.

4. Baseline Data Collection

4.1 Study Limit

MSR study team sets the study limit within the premises of 2,464,282 m² (600 Acres) wide land which is previous proposal limit for soil samples, water samples collection. Air quality measurement is done within 5 km radius range which covers the existing proposed land area of project site and area of influence of the project.

For the social environment, the study covers 6 villages, namely, Kyarkansu, Nyaung Hnitpin, Takutone, Sonekone, Kyarinn (Ashe) and Kyarinn (Anauk) villages which are located within 5 km radius from the project site.

Focus area for the biological environment is at project site and area within 3 km range for ecological perspective. However, overall social, physical and biological impact assessments are not limited to the surrounding area of the project site. The study looks at the wider scope for an understanding of regional and national level effect of the project.

4.2 Physical Environmental Data Collection

4.2.1 Air Quality Analysis

Air quality was measured by using Auto Sensors of the EPAS haz-scanner which was installed at the project site to identify the current condition of air quality to analyze and match with the air quality of later time in case of occurrence of air pollution. Sampling period was based on 24-hour measurement level of PM_{2.5} and PM₁₀ using EPAS air sampler and other gases were also measured by auto sensors of the EPAS haz-scanner. Two times of measurements were conducted (one location in each time for air quality measurement): one in April 2017 and the other in July 2019. Results were certified by Environmental Health Laboratory, Occupation and Environmental Health Division, Ministry of Health and Sports.

According to the laboratory test results, for the first time measurement, the concentrations of PM₁₀, PM_{2.5} and SO₂ were higher than the reference value of National Environment Quality - NEQ (Emission) Guidelines and for the second time measurement, the concentrations of SO₂ was higher than the reference value of NEQ Guidelines. The concentrations of NO₂, CO, O₃ and VOCs were much lower than the guideline values.

4.2.2 Noise and Vibration Analysis

The sound level monitoring was performed in accordance with standard procedures adopted by American Conference of Governmental Industrial Hygienist (ACGIH) which is authoritatively and currently used in Myanmar; measuring was conducted 24 hours (1-hour average noise level (Leq in dBA) and (Lmax in dBA). It was done in conjunction with air quality measurement. The sound levels L_{eq} and L_{max} for day time and night time respectively are lower than the reference value.

4.2.3 Soil Analysis

Total 10 samples of top soil and 8 samples of deep/sub soil were collected for testing nutrients and heavy metals content of the soil respectively. In April 2017, top soil from 6 places and deep/sub soil from 4 places were collected from the project site. In July 2019, top soil from 4 places and deep/sub soil from 4 places were collected from different places around the project area including within the agricultural zone 1.

Soil survey was made by using Russian soil scientist soil analysis method and F.A.O/UNESCO method. Physical properties of soil such as soil color, texture, structure, moisture, hardness, drainage, inclusion and new formation were recorded, and soil names were given by using Russian soil classification, F.A.O soil classification method.

Results were certified by laboratory of Department of Agriculture, Ministry of Agriculture, Livestock and Irrigation. The laboratory results showed that there was no distinct problem in total dissolved salt content in water soluble salts analysis, no problem in Electrical conductivity and residual sodium carbonate and SAR sodium Absorption Ratio also did not show as a soil problem. Therefore, there is no nutrients problem and soil soluble salts problem in these soils. Regarding heavy metals analysis, the concentration of Nickel, Chromium, Cadmium and Lead are not detectable, but the concentration of Iron is much higher than the maximum allowable limit of 250 ppm.

4.2.4 Water Analysis

Total 12 water samples were collected to test water quality. 5 water samples for surface water/drinking water (pond, Kyarinn Creek (6.2 miles) near Yangon-Mandalay Expressway and Pazundaung Creek near Let Pyan Wae village, Kalihtaw Dam), 5 water samples for drain water (wastewater), and 2 samples for ground water (tube well water). The water samples were collected in April 2017 and July 2019 respectively.

Standard method of water analysis with atomic absorption spectrophotometer (graphite furnace method), Spectrophotometer and Incubation method by POTATEST were used to measure the values of following parameters of collected water samples. These parameters include Color, pH, BOD, COD, Total Dissolved Solid, Nitrate, Arsenic, Bacterial Growth etc. According to laboratory results, most of the parameters' concentrations are lower than the reference value while some parameters like oil and grease for wastewater has higher concentration than the reference value.

4.3 Biological Environmental Data Collection

Current proposed industrial complex site is a restricted and abandoned place that becomes a wild fallow land, covered with wild grasses and wild plants which provides variety of

habitats for wild animals to survive with some connectivity with surrounding of orchards and commercial fruit and vegetable growing fields.

Site visits were made to conduct baseline data collection. The secondary information of terrestrial and aquatic fauna, flora and land-use were also recorded, and interviews with residents were made for getting information of the history of the area and presence and absence of flora and fauna in the past and present time.

Both terrestrial and aquatic ecosystems were examined. Most habitats on sites were differentiated. The biological impact assessment field team carried out observations, transect line survey in the project area. The tree, plant, and shrub and species composition of plant and their distribution near the project site were studied and identified taxonomically.

Basically, the project site is an abandoned place which has been left in nature without caring the land and buildings that had been used for National Convention meetings in late 1990s and it becomes a Phone-zo area of a fallow land, dry in summer, swampy in rainy season.

Some of the roads and buildings are in a state of ruin now. In and around this area, an agricultural zone has been established. Perennial trees, such as mango, jack fruit, and rambutan are grown in some yards. Some grow paddy, cashew, groundnut, sugarcane, cucumber, lady's finger, Kinponchin (*Concinna*) lettuce, eggplant, mustard, gourd and Eugenia and different types of flowers. Whole lots of surrounding areas including villages have been designated as agricultural and livestock breeding zones. Many fish farming ponds and poultry keeping farms have been already established around the proposed project site area.

There used to be teak forests in the immediate vicinity. In addition, there also were other wood trees—in (*dipterocarpus tuberculatus*) and *kanyin* (*dipterocarpus alatus*). In the past, those nearby forests were inhabited by wild animals such as elephants, tigers, barking deer, muntjac, samburs, wild cats and mongoose. Those flora and fauna have become extinct now. Former vegetation of natural forest has already been replaced by paddy growing and cash crop plantation including rubber and acacia plantation.

As the KMIC project site is a restricted area, the total lot has been thickly covered with wild plants of abundantly growing coarse grasses of Thetke (*Imperata cylindrical*), Kaing (*Saccharum spontaneum*); weak herbs of many species such as Ye-salat (*Pistia stratiotes*) and Naya-myet (*Setaria verticillata*), Mahuya-Pein (*Colocasia esculenta*), Burma linseed (*Hygrophila phlomoides*) and Sin-hna-maung pin (*Heliotropium indicum*) as well. And it is also found proliferately thriving wild small trees of Phon-ma-thein (*Blumea balsamifera*), Malaysia Padauk (*Acacia auriculiformis*) and Ka-aung pin (*Ficus hispida*).

Total twenty-two family types of avifauna, fifteen different types of butterfly, eleven different types of dragonflies, one type of herpetofauna, and seven different types of fish and prawn were recorded. Some villagers said that there are still many species of snakes and birds.

4.4 Socio-Economic Data Collection

Key stakeholder interviews in 6 villages located in 5 km radius from the project site. Village heads, village administrative officials, religious leaders, local business community, school teachers, health workers, local stores and villagers (including women, young and old people) in villages were interviewed. Village profiles of 6 villages have been established.

The six villages for socio-economic survey conducted are Kyarkansu, Nyaung Hnitpin, Takutone, Sonekone, Kyarinn Ashe and Kyarinn Anauk villages. Kyarkansu village has total 320 households and population of 1600. Nyaung Hnitpin village has total 655 households and population of 3126. It has one high school (branch) and 35 school teachers. There are total 1318 students in that high school. The village has a dispensary, one midwife and one

auxiliary midwife. It also has a library. Takutone village has total 120 households and population of 570. It has one middle school. Regarding health sector, the village has one midwife. Sonekone village has total 110 households and population of 392. It has one primary school. Kyarinn Ashe village has total 480 households and population of 2137. It has one middle school (branch). Regarding health sector, the village has a dispensary and one midwife. Kyarinn Anauk village has total 370 households and population of 1850. It has one middle school (branch). Regarding health sector, the village has one auxiliary midwife.

There are different types of businesses, namely, small shop, car rental, motorcycle taxi, fish pond, chicken and pig breeding, agricultural practices (growing gourd, groundnut, paddy, cucumber, water cress etc.) in all villages. Some villages have a pagoda and every village has a monastery. The majority of village community are Buddhist and Myanmar nationalities.

Some households can access the electricity and it is found that the telecommunication is widely used in all villages. For water use, some have tube wells and some rely on hand dug wells. For transportation, the villagers use light truck, three-wheelers and motorcycles.

The first public consultation meeting and second public consultation meeting were held at Zone No. 3. meeting hall on 8 February 2019 and at Kyaungyi Religious House (Damaryone), East Kyarinn Village, Hlegu township on 21 August 2020 in line with the guidelines for COVID – 19 preventions respectively.

5. Potential Impacts

The potential impacts identified for different project phases including but not limited to Air pollution, Water pollution, Noise and vibration, Solid wastes generation, Soil erosion and degradation, Surface and Ground water contamination, Destruction of vegetation and expelling of wildlife to other places, Community Health and safety, and Emergency risk.

5.1 Scope of Impact Assessment

The occurrence of impacts that may be both beneficial and adverse were evaluated.

The impact assessment covered: Evaluation of identified important features of biophysical and socioeconomic situation; Description and evaluation of the magnitude and significance of the potential effects.

Detail specific impact assessment

Mitigation and enhancement measures to address the identified effects and identification of any residual effects following mitigation; a description and evaluation of residual effects of the Proposed Development and cumulative impact assessment.

5.2 Impacts and Mitigation Measures

For the physical, biological and social environmental impacts of the project activities, the project phases: pre-construction, construction, operation and decommissioning phases are considered.

There are no negative impacts on physical, biological and social environment for the pre-construction (planning) phase of the project. According to the assessment made by EIA/SIA team and discussion with the community (public engagement events), it was noted that the community made no objection on the project and they welcomed the project and hoped to get job in the project. Some mentioned their concerns of solid waste and wastewater disposal of the project, water availability for their agricultural fields and other issues. The project developer and responsible officials from Department of Urban and Housing Development committed that the issues and concerns will be addressed with due diligence and solved.

For the construction phase, operation phase (including maintenance work) and decommissioning phase, the summary of following key impacts are identified and relevant mitigation measures will be applied.

| Environmental Impact | Project Phase | Mitigation Measures |
|----------------------|--|--|
| Soil Contamination | Construction Phase | <ul style="list-style-type: none"> ✓ Installation and construction of drainage structure properly ✓ Ensuring supervision of excavation activities ✓ Practicing hazardous and non-hazardous waste management ✓ Construction of sedimentation basin for construction wastewater before disposal ✓ Construction of sand traps to settle the sand at the bottom and store the deposited sand ✓ Applying a proper sanitation system for the construction workers and project staff ✓ Regular check and maintenance of construction machineries and vehicles to avoid oil, fuel, chemicals and lubricant spills or leaks ✓ Readily available of the site – appropriate spill containment kit |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Practicing hazardous and non-hazardous waste management ✓ Treatment of wastewater before discharging to waterways ✓ Following the procedures of using, storing and handling the chemicals, oil, grease and hazardous materials (if any) – including training of safety usage |
| Soil Erosion | Construction Phase | <ul style="list-style-type: none"> ✓ Construction of concrete drains at steep levels and proper gradient at temporary drain ✓ Minimizing clearance of vegetation ✓ Protecting areas susceptible to erosion with mulch or a suitable alternative |
| Dust Emission | Construction Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Control speed and operation of construction vehicles ✓ Proper cover of trucks carrying construction materials ✓ Prohibition of idling of vehicles ✓ Water should be sprayed earth moving work place and main roads ✓ Restriction of speed control of transport buses and traffic within the project site |
| Air pollution | Construction Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Regular maintenance of construction plants and equipment ✓ Provide masks and PPE ✓ Worker to understand about hazardous gas emission ✓ Measuring air quality |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Using quality fuel which contains reduced or no lead and Sulphur content ✓ Following National Environmental Quality Emission Guidelines and the |

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| | | <p>rules, regulations and guidelines set by the respective Ministry by individual project</p> <ul style="list-style-type: none"> ✓ Measuring air quality |
| Greenhouse gas emission | Construction Phase/Decommissioning Phase | <ul style="list-style-type: none"> ✓ Conducting training to raise the awareness of drivers, operators and concerned staff on greenhouse emissions and mitigation measures ✓ Prohibiting unnecessary driving and moving at site and idling of vehicles and construction machineries as well ✓ Regular maintenance of vehicles and machineries ✓ Efficient use of vehicles and machineries ✓ Formulating the construction management procedures including the efficient use of construction vehicles and machineries ✓ Designing and construction of site offices as much as possible to get the natural light and ventilation |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Using natural light as much as possible (and using energy efficient electrical appliances like energy - saving light bulbs) ✓ Keeping windows shut when HVAC is in use, but employing natural ventilation whenever possible ✓ Unplugging TVs, AV equipment, and phone chargers when not in use ✓ Turning off the lights and computer when leaving the office ✓ Recycling and/or reusing as many waste materials as possible ✓ Using the environmentally friendly airconditioners and refrigerators to avoid or reduce the emission of fluorinated gases |
| Surface water/Ground water contamination | Construction Phase/Decommissioning Phase | <ul style="list-style-type: none"> ✓ Building sedimentation basin on a construction site to capture the disturbed soil ✓ Adopting the proper waste management system ✓ Regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills (if found, the immediate repair and cleansing will be conducted) ✓ Systematic storage of fuels and filling station at construction site yard compound, handling and disposal of new oil and used oil waste ✓ Provision of impervious basement at operation area to prevent oil spill when heavy machineries are working ✓ Providing a good pavement at machine workshop and garage ✓ Applying the proper sanitation system for the construction workers and project staff ✓ Checking sewer connections and pipes |

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| | | regularly to avoid any leaks |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Treating wastewater to the acceptable limit according to the National Environmental Quality Emission Guidelines ✓ Storing solid waste in a temporary storage building having a hard, impermeable floor with drainage and designed for cleaning/ disinfection with available water supply ✓ Adopting oil spills mitigation procedures ✓ Measuring treated wastewater discharges quality |
| Noise and Vibration | Construction Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Training drivers and operators of construction vehicles and machineries to reduce the noise from their operations, and the construction activities will be restricted in night times ✓ Regular maintenance of vehicles and machineries and wearing the ear mufflers (hearing protection devices) ✓ Using sound absorb, sound proof engines at construction site and proper maintenance |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Installing sound barrier and sound absorbing materials at the factories as needed ✓ Limiting outside standard working hours (weekend, evening or night-time works) ✓ Ensuring that noise level of operation of all facilities and structures within the acceptable limit stipulated in National Environmental Quality Emission Guidelines |
| Destruction of vegetation and expelling of wildlife | Construction Phase | <ul style="list-style-type: none"> ✓ Making the proper demarcation of project area that would be affected by construction works ✓ Controlling construction vehicles to ensure the avoidance of unnecessary disturbance of vegetation ✓ Replantation with native species, leaving native trees/plants as much as possible |
| Occupational Health and Safety | Construction Phase/ Operation Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Following the guidelines and procedures covering <ul style="list-style-type: none"> • organizing the work, common facilities to be provided, site access, public safety, lighting, site tidiness, storage areas, fire safety • Preventive measures for accidents or injuries from excavations, working at height, moving, lifting and handling loads, site vehicles and mobile plants operation, chemicals use, handling and storage • Protective Equipment (Safety helmet, footwear, goggles and safety spectacles, gloves and protective clothing, other protective equipment) |

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| | | <ul style="list-style-type: none"> • Emergency procedures and preparedness (company's emergency personnel contact information, evacuation plan including exit routes, evacuation signals and sirens, location of eyewash stations and showers, fire extinguishers) • Providing First Aid kits and training on how to use them • Accident/Injury Reporting procedures • Training (Orientation) for all employees and workers |
|--|--|---|

For the decommissioning phase, the demolition work is not expected and in the land lease agreement between KMIC Development Co., Ltd. and Department of Urban and Housing Development, it was mentioned that upon expiry of the Lease Term, the KMIC Development Co., Ltd. (JV Company) shall not in any case have any duty to repair the Site, dismantle or remove any Project Assets from the Site or otherwise return the Site to any previous or other condition but rather is entitled to return the Site and any improvements on an 'as is' basis at that time. However, if the factories and industries and other existing structures are demolished, the environmental impacts such as air pollution (including dust emission), greenhouse gas emissions, surface water contamination, noise and vibration, waste generation (hazardous and non-hazardous solid waste), living and livelihood, risks for infectious diseases like AIDS/HIV, occupational health and safety, community health and safety are expected. For these impacts anticipated, the relevant mitigation measures for similar impacts for construction phase would be applied as mentioned in the table above.

Residual Impacts

Regarding residual impacts, for the construction phase: effects on watercourse, ground water contamination, air pollution, dust emission, community health and safety are predicted. For the operation phase: degradation of groundwater quality, community health and safety, risk of injuries and accidents to workers and light intrusion are expected. For the decommissioning phase: effects on watercourse, air pollution, dust emission, community health and safety are predicted. However, the significance levels of these impacts are minimal and minor. The environmental receptor of these residual impacts can be re-established to the original condition after a change or being impacted. The additional research, monitoring, and/or recovery initiatives are not necessary to consider and these impacts are negligible to the overall baseline status of the resource.

Cumulative Impact Assessment

The planned or reasonably foreseeable projects are the outside infrastructure development for this KMIC project. These outside infrastructure projects include the construction of electrical substation and installation of power line, construction of raw water intake pumping station and water purification plant, installation of water pipe line and upgrading of existing access road way to 4-lane road way with mid-island and sidewalks. These developments will be implemented by Ministry of Construction. In order to assess the cumulative impacts, it was first assessed that how the residual impacts of the project could combine with the potential impacts of the anticipated future projects and impact common resources and receptors. And, the table below shows the expected cumulative impacts and corresponding mitigation measures.

| No. | Cumulative Impacts | Significance of Impacts | Mitigation Measures |
|-----|---|-------------------------|---|
| 1. | Increase in pollutant concentrations in surface water | Negligible | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other |

| | | | |
|----|--|------------|---|
| | | | developments/ projects for effective collaboration or coordination |
| 2. | Increase in pollutant concentrations in ground water | Negligible | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination |
| 3. | Incremental contribution of air pollutants | Low | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination ✓ Collaborative engagement in other regional cumulative impact management strategies ✓ Participation in regional monitoring programs to assess the realized cumulative impacts and efficacy of management efforts <p>(The last two points involve collaborative engagement with other stakeholders, including project proponents, government agencies, affected communities, conservation groups and expert groups.)</p> |
| 4. | Incremental contribution of dust in air | Negligible | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination |
| 5. | Increased community safety and health issues | Medium | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination ✓ Consultation with community and providing education programs related to community health and safety issues ✓ Providing additional community safety and health measures based on discussion with the community |

For the operation phase, the detail information of these factories and industries are not available at the time of writing this report. It is more realistic and rational to do the cumulative impact assessment by the developers of industries and factories based on their business and the existing and future private and public developments and projects.

6. Environmental Management Plan (EMP)

The summaries of EMP tables are described below.

| Environmental Impact | Project Phase | Mitigation Measures | Responsible Person/Organization for implementing EMP and monitoring plan | Recommended frequency of monitoring |
|----------------------|---------------------|--|--|-------------------------------------|
| Soil Contamination | Construction Phase | <ul style="list-style-type: none"> ✓ Practicing hazardous and non-hazardous waste management ✓ Installation and construction of drainage structure properly ✓ Ensuring supervision of excavation activities ✓ Construction of sedimentation basin for construction wastewater before disposal ✓ Construction of sand traps to settle the sand at the bottom and store the deposited sand ✓ Applying a proper sanitation system for the construction workers and project staff ✓ Regular check and maintenance of construction machineries and vehicles to avoid oil, fuel, chemicals and lubricant spills or leaks ✓ Readily available of the site – appropriate spill containment kit | ✓ Contractor | ✓ Weekly |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Practicing hazardous and non-hazardous waste management ✓ Treatment of wastewater before discharging to waterways ✓ Following the procedures of using, storing and handling the chemicals, oil, grease and hazardous materials (if any) – including training of safety usage | ✓ Developer, Tenants | ✓ Weekly |
| Soil Erosion | Construction Phase | <ul style="list-style-type: none"> ✓ Construction of concrete drains at steep levels and proper gradient at temporary drain ✓ Minimizing clearance of vegetation ✓ Protecting areas susceptible to erosion with mulch or a suitable alternative | ✓ Contractor | ✓ Daily |
| Dust Emission | Construction Phase/ | ✓ Control speed and operation of construction | ✓ Contractor | ✓ Daily (Construction |

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|-------------------------|---|--|----------------------|--|
| | Decommissioning Phase | <ul style="list-style-type: none"> vehicles ✓ Proper cover of trucks carrying construction materials ✓ Prohibition of idling of vehicles ✓ Water should be sprayed earth moving work place and main roads ✓ Restriction of speed control of transport buses and traffic within the project site | | <ul style="list-style-type: none"> Phase) ✓ Daily (Decommissioning Phase) |
| Air pollution | Construction Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Regular maintenance of construction plants and equipment ✓ Engage sensitive workers ✓ Provide masks and PPE ✓ Worker to understand about hazardous gas emission ✓ Measuring air quality | ✓ Contractor | <ul style="list-style-type: none"> ✓ Monthly for both phases ✓ Daily for measuring air quality |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Using quality fuel which contains reduced or no lead and Sulphur content ✓ Following National Environmental Quality Emission Guidelines and the rules, regulations and guidelines set by the respective Ministry by individual project ✓ Measuring air quality | ✓ Developer, Tenants | <ul style="list-style-type: none"> ✓ Monthly ✓ Daily for measuring air quality |
| Greenhouse emission gas | Construction Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Conducting training to raise the awareness of drivers, operators and concerned staff on greenhouse emissions and mitigation measures ✓ Prohibiting unnecessary driving and moving at site and idling of vehicles and construction machineries as well ✓ Regular maintenance of vehicles and machineries ✓ Efficient use of vehicles and machineries ✓ Formulating the construction management procedures including the efficient use of construction vehicles and machineries ✓ Designing and construction of site offices as much as possible to get the natural light and ventilation | ✓ Contractor | <ul style="list-style-type: none"> ✓ Weekly for construction phase ✓ Monthly for decommissioning phase |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Using natural light as much as possible (and using energy efficient electrical appliances like energy - | ✓ Developer, Tenants | ✓ Monthly |

| | | | | |
|--|--|---|----------------------|---------------------------|
| | | <ul style="list-style-type: none"> ✓ saving light bulbs) ✓ Keeping windows shut when HVAC is in use, but employing natural ventilation whenever possible ✓ Unplugging TVs, AV equipment, and phone chargers when not in use ✓ Turning off the lights and computer when leaving the office ✓ Recycling and/or reusing as many waste materials as possible ✓ Using the environmentally friendly airconditioners and refrigerators to avoid or reduce the emission of fluorinated gases | | |
| Surface water/Ground water contamination | Construction Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Building sedimentation basin on a construction site to capture the disturbed soil which is washed off during rainfall ✓ Adopting the proper waste management system ✓ Regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills (if found, the immediate repair and cleansing will be conducted) ✓ Systematic storage of fuels and filling station at construction site yard compound, handling and disposal of new oil and used oil waste ✓ Provision of impervious basement at operation area to prevent oil spill when heavy machineries are working ✓ Providing a good pavement at machine workshop and garage ✓ Applying the proper sanitation system for the construction workers and project staff ✓ Checking sewer connections and pipes regularly to avoid any leaks | ✓ Contractor | ✓ Monthly for both phases |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Treating wastewater to the acceptable limit according to the National Environmental Quality Emission Guidelines ✓ Storing solid waste in a temporary storage building having a hard, impermeable floor with drainage and | ✓ Developer, Tenants | ✓ Monthly |

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| | | <p>designed for cleaning/ disinfection with available water supply</p> <ul style="list-style-type: none"> ✓ Adopting oil spills mitigation procedures | | |
| Noise and Vibration | Construction Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Training drivers and operators of construction vehicles and machineries to reduce the noise from their operations, and the construction activities will be restricted in night times ✓ Regular maintenance of vehicles and machineries and wearing the ear mufflers (hearing protection devices) ✓ Using sound absorb, sound proof engines at construction site and proper maintenance | <ul style="list-style-type: none"> ✓ Contractor | <ul style="list-style-type: none"> ✓ Once (24 hours)/month for construction phase ✓ Monthly for decommissioning phase |
| | Operation Phase | <ul style="list-style-type: none"> ✓ Installing sound barrier and sound absorbing materials at the factories as needed ✓ Limiting outside standard working hours (weekend, evening or night-time works) ✓ Ensuring that noise level of operation of all facilities and structures within the acceptable limit stipulated in National Environmental Quality Emission Guidelines | <ul style="list-style-type: none"> ✓ Developer, Tenants | <ul style="list-style-type: none"> ✓ Monthly |
| Destruction of vegetation and expelling of wildlife | Construction Phase | <ul style="list-style-type: none"> ✓ Making the proper demarcation of project area that would be affected by construction works ✓ Controlling construction vehicles to ensure the avoidance of unnecessary disturbance of vegetation ✓ Replantation with native species, leaving native trees/plants as much as possible | <ul style="list-style-type: none"> ✓ Contractor | <ul style="list-style-type: none"> ✓ Monthly |
| Occupational Safety and Health | Construction Phase/ Operation Phase/ Decommissioning Phase | <ul style="list-style-type: none"> ✓ Following the guidelines and procedures covering <ul style="list-style-type: none"> • organizing the work, common facilities to be provided, site access, public safety, lighting, site tidiness, storage areas, fire safety • Preventive measures for accidents or injuries from excavations, working at height, moving, lifting and handling loads, site vehicles and mobile plants operation, chemicals use, handling and storage • Protective Equipment (Safety helmet, footwear, | <ul style="list-style-type: none"> ✓ Contractor ✓ Developer, Tenants | <ul style="list-style-type: none"> ✓ Monthly for all phases |

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|--|--|--|--|--|
| | | <p>goggles and safety spectacles, gloves and protective clothing, other protective equipment)</p> <ul style="list-style-type: none">• Emergency procedures and preparedness (company's emergency personnel contact information, evacuation plan including exit routes, evacuation signals and sirens, location of eyewash stations and showers, fire extinguishers)• Providing First Aid kits and training on how to use them• Accident/Injury Reporting procedures• Training (Orientation) for all employees and workers | | |
|--|--|--|--|--|

7. Environmental Monitoring Plan

A summary of Environmental Monitoring Plans is mentioned below.

| Potential Impact | Monitoring Item | Project Phase | Monitoring Means | Allocated Budget per year (MMK) |
|--------------------|---|-----------------|----------------------------|--|
| Soil Contamination | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Construction | Inspection and Observation | 500,000 (included in construction cost) |
| | | Operation | Inspection and Observation | 2,500,000 (included in maintenance cost) |
| Soil Erosion | <ul style="list-style-type: none"> Efficiency of erosion control measures Drains, waterways Vegetation and plants Concrete Aprons, concrete drains Deformation by erosion | Construction | Inspection and Observation | 500,000 (included in construction cost) |
| Dust Emission | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Amount of dust on road side tree leaves Breathing Air | Construction | Inspection and Observation | 1,000,000 (included in construction cost) |
| | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Operation | Inspection and Observation | 2,000,000 (included in maintenance cost) |
| | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Decommissioning | Inspection and Observation | 1,500,000 |

| | | | | |
|--|--|-----------------|--|--|
| Air Pollution | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Content of PM_{2.5}, PM₁₀, NO₂, SO₂, CO in air | Construction | Inspection, observation measuring air quality | 20,000,000 (included in construction cost) |
| | | Operation | Inspection, observation Measuring air quality | 20,000,000 (included in maintenance cost) |
| | | Decommissioning | Inspection and Observation Measuring air quality | 2,000,000 |
| Greenhouse gas emissions | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Content of CO₂ in air | Construction | Inspection, observation measuring air quality | 2,500,000 (included in construction cost) |
| | | Operation | Inspection, observation Measuring air quality | 3,500,000 (included in maintenance cost) |
| | | Decommissioning | Inspection, observation Measuring air quality | 1,500,000 |
| Surface water/Ground water contamination | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Water quality test for temperature, pH, SS, DO, BOD₅, COD, total coliform bacteria, oil and grease | Construction | Inspection, observation measuring water quality | 5,000,000 (included in construction cost) |
| | | | Operation | |
| | | Decommissioning | Inspection, observation measuring water quality | 1,000,000 |
| Noise and vibration | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects | Construction | Inspection, observation | 2,000,000 (included in construction) |

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|--|--|-----------------|--|--|
| | for monitoring in Environmental Management Plan table | | measuring | cost) |
| | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Operation | Inspection, observation Measuring | 2,000,000 (included in maintenance cost) |
| | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Decommissioning | Inspection, observation Measuring | 1,000,000 |
| Destruction of vegetation and expelling of wildlife | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Construction | Inspection and observation | 1,000,000 (included in construction cost) |
| Occupational safety and health (Risk of injuries and accidents to workers) | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Record of accidents | Construction | Inspection, observation Recording and documentation | 3,500,000 (included in construction cost) |
| | | Operation | Inspection, observation Recording and documentation | 3,500,000 (included in maintenance cost) |
| | | Decommissioning | Inspection, observation Recording and documentation | 3,500,000 |

8. Socio-economic Impact Assessment and Public Consultation

The socio-economic impact assessment process is comprised of three parts:

i. Public Consultation and Disclosure; ii. Preliminary Social Baseline Collection, and iii. Social Impact Assessment

The approach focused on:

- Key stakeholder interviews in 6 villages located in 5 km radius from the project site. Village heads, village administrative officials, Buddhist monks, local business community, school teachers, health workers, commodity-sellers with small venter in villages were interviewed.
- Village profiles of 6-villages with the influence of project were established.
- Directly and indirectly affected PAPs in communities, households, and individuals who live near the proposed project site as well as officials from three agricultural and animal breeding zones and village administrations of the Nyaung Hnitpin area were invited to participate in the Public Consultation meeting which was held at Zone No. 3. meeting hall on 8 February 2019.
- The second public consultation meeting was organized on 21 August 2020 at Kyaungyi Religious House (Damaryone), East Kyarinn Village, Hlegu township in line with the guidelines for COVID – 19 preventions.

8.1 Findings and Suggestions of community during Public Consultation and Interviews

1. As there is only one primary school in Nyaung Hnitpin Agriculture and Livestock Zone (3), it is found that Middle School is needed.
2. It is observed that the workers experience difficulties to work in Hmawbi, Hlegu and Htauk Kyant township. When the industrial zone is developed, they should be hired to employ in the zone.
3. It is found that a dispensary / hospital is needed because it is difficult for the people to go to Ngar Suu Taung village for medical treatment.
4. The cultivators at Zone (3) cannot get the water supply from Kalihtaw dam, it is found that water from this dam should be provided.
5. It is necessary to provide a cemetery land for the people who are living in Nyaung Hnitpin Agriculture and Livestock Zone (3) because they don't have land for burial.
6. It is necessary to upgrade the roads for the people because the roads outside of Nyaung Hnitpin Convention Center are bad.
7. People worry for their health because there will be factories that produce bad odor in the Industrial zone. So that they don't want to build such factories in the zone.
8. People want agricultural and livestock processing export companies in the industrial zone because the zone itself is used for agriculture and livestock breeding.
9. It is necessary for people to access to clean drinking water because they have to use water from the well and tube well.
10. Tenant worry for losing lands when the landlords sell their lands with high price when the industrial zone is developed.
11. People worry for degradation of cultivated land because of chemical and industrial wastes from the Industrial Zone.

12. People and Buddhist monks worry that there will be slaughter houses in the Industrial Zone.
13. Thought the agricultural zone has been established, it is found that there is not enough reservoir water so that people have to rely on the well.
14. There is a concern regarding the wastewater disposal where wastewater generated from industrial complex should be treated well before releasing into Ngamoeyeik creek.
15. Since most of the factories in industrial zones employ female workers, people hope this project will offer job opportunities for male workers.
16. Villages and farming zones surrounding the KMIC project are hoping to receive electricity distributing from the project.

9. Report Structure

The EIA report is structured according to “Environmental Impact Assessment Procedure” by Ministry of Natural Resources and Environmental Conservation (notification no. 616/2015).

Executive Summary (Myanmar and English)

- 1) Introduction
- 2) Policy, Legal and Institutional Framework
- 3) Project Description and Alternatives
- 4) Description of the Surrounding Environment
- 5) Impact and Risk Assessment and Mitigation Measures
- 6) Health Impact Assessment
- 7) Cumulative Impact Assessment
- 8) Environmental Management Plan
- 9) Public Consultation and Disclosure
- 10) Conclusion

10. Conclusion

It is confirmed that the environmental, social and health impacts of the Project were assessed, and the Environmental Management Plan was formulated properly. In the process of EIA, opportunity of public involvement was ensured and comments from the public and MONREC were reflected into the final EIA Report. Thus, the EIA was completed in accordance with the requirements of the EIA Procedure properly for the project proponent to follow the EMP accordingly.



CHAPTER 1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment (EIA) report has been prepared by Myanmar Survey Research (MSR) on behalf of KMIC Development Co., Ltd. (KMIC JVC). The proposed project is the development of an industrial complex to be built on the land of approximately 555.81 acres in Hlegu township. KMIC JVC is currently preparing an outline planning application for the site, including an Environmental and Social Impact Assessment (ESIA).

The intention is to submit an ESIA Report to the Environmental Conservation Department for the Environmental Compliance Certificate for the Industrial Complex in the area of Nyaung Hnitpin public land area of 555.81 acres along with infrastructure development for roads, electricity and water pipeline.

1.2 Project Proponent

Table 1. 1: Project Proponent Information

| | |
|------------------------|---|
| Company Name: | KMIC Development Co., Ltd. (KMIC JVC) |
| Contact person | Mr. Kim Gunwoo, Mr. Noh Hun Seung |
| Company Address | KMIC Development Co., Ltd. Office Suite 2007, Pyay Garden Office Tower, 346-354, Pyay Road, Sanchaung Township, Yangon |
| Country | Myanmar |
| Telephone | +95-99757 99222 |
| Email | gonwoo2@gmail.com |
| Website | http://www.mykmic.com |

1.3 Environmental and Social Impact Assessment Expert Team

It is obligatory for the project proponent, KMIC JVC, to submit an Environmental and Socio-economic Impact Assessment (ESIA) report with regards to the project to Environmental Conservation Department. Hence, it has contracted Myanmar Survey Research – an independent and private research firm in Myanmar – to conduct this assessment to ensure that the project will be environmentally sound and acceptable to local communities and in full compliance with guidelines and regulations of ECD and the Myanmar Environmental Conservation Law.

Myanmar Survey Research is a leading research company in Myanmar with more than 20 years of research experiences in social, marketing, industry and environmental and social impact assessment.

General Information and Address of MSR ESIA Team

Table 1. 2: General Information and Address of MSR ESIA Team

| | |
|--------------------------------------|--|
| Company Name: | Myanmar Survey Research Co. Ltd. |
| Company Address | MSR Head Office Yangon-Central-Railway Station Building, Mingalartaungnyunt Township, Yangon |
| Country | Myanmar |
| Website | http://www.myanmarsurveyresearch.com |
| Telephone | +95-1-370464 |
| Fax | +95-1-254263 |
| Email | msr@myanmarsurveyresearch.com |
| Qualifications and Experience of MSR | Established in 1995, Myanmar Survey Research company has been providing research and consultancy services for more than twenty years to local and international firms including international organizations like UN agencies, World Bank and INGOs in Myanmar. MSR is certified by Department of Environmental Conservation of the Ministry of Natural Resources and Environmental Conservation. Besides ESIA assessment services for different types of projects in Myanmar, MSR also offers market, social and industry research services. |

Assessment team members



Figure 1. 1: MSR EIA Team meeting on project

The MSR's EIA assessment team has been formed for conducting the ESIA study and assessment for this KMIC Project with the following environmental and social experts:

Table 1. 3: MSR EIA Assessment Team Members

| Name and designation | Position in team | Responsibility |
|------------------------------------|------------------|---|
| U Kyaw Hlaing President | Leader | Overseeing the EIA/ESIA assessment process and the project |
| Dr. San Tun Aung Senior Adviser | Dy Leader | Advising on socio-economic impact assessment and editing the report |
| U Tin Than | Member | Assessment of flora, fauna and ecosystem |

| Biologist | | |
|---|--|--|
| Engr. U Myint Swe Consultant Engineer | Member | Specialist gathering data of physical environment and devising the Environmental Management and Monitoring Plan |
| U Aung Lin Social Impact Assessment Specialist | Member | Co-writer of ESIA report and gathering data (Social impacts) |
| U Ko Ko Soe Lwin Thaw (a) Ko Soe GIS & IT Specialist | Member | Cartography, photography and designing |
| U Oo Kyaw Maung Policy Specialist | Member | Policy specialist Specialize on laws, by-laws and regulations of Myanmar related to EIA/ESIA |
| U Kyan Dyne Aung Environmental Engineering Management Specialist | Member | Conducting research and designing the environmental management plan of different project. |
| U Phone Myint Tun Consultant, Physical Environment | Member | Air Quality & Noise Level Assessment Hydrology, Geology & Soil Studies |
| U William Han Lwin Senior Analyst, MSR | Member | Senior Analyst and Report Writer |
| U Nyana Soe, Project Coordinator | Member | Coordinating and project implementation Do in-depth study of secondary research / literature review and, from time to time, liaise between company staff and officials from the developer side, whenever required |
| Daw Tin Tin Htwe Staff | Member | Supporting Staff Assist in typing and desktop publishing |
| Government agencies that provide lab results | | |
| Relevant Agencies | Lab tests performed | |
| Land Use Division of Department of Agriculture | Soil interpretation and soil analysis; soil water extraction interpretation and soil water extraction analysis | |
| Plant Protection Division of Department of Agriculture | Heavy metal analysis of soil sample | |

U Kyaw Hlaing (President-cum-Research Director)



U KYAW HLAING (PRESIDENT-CUM-RESEARCH DIRECTOR) is a founding member of Myanmar Survey Research (MSR), which was officially established in 1995.

He has had experience in conducting more than 300 research projects on various industries, macroeconomics, international relations and socio-economics and health. He is also a co-founder of AV Media Ltd, Yangon, Myanmar Monitor, Yangon and Myanmar Think Tank, which is attached to MSR. He has had experience in conducting five ESIA surveys.

He worked for Daikan Service Co Ltd in Tokyo, Japan, as a managerial assistant from 1992 to 1994. In 1995, he was an Administrative Associate at California Institute of Biological Research, San Diego, USA. In MSR, he was the Vice-President of MSR from 1995 to 1998.

U Kyaw Hlaing obtained a B Sc degree from Yangon University in 1985 and MA degree, specializing in International Management, from the International University of Japan in Niigata, in 1992.

U San Tun Aung, Ph.D. (Sociology, University of Hawaii)

U SAN TUN AUNG has been Technical Advisor to Myanmar Survey Research since 2009. Before joining MSR, he served with IFRC (International Federation of Red Cross and Red Crescent Societies), Myanmar Delegation Yangon, at various positions—Regional Information Officer and Senior Field Officer—from August 2004 to August 2008. From September 2002 to July 2004, he worked for Myanmar Red Cross Society, Yangon, in the position of Head of Communications. He was also Editor of The Myanmar Times, a weekly news journal published in two versions—Myanmar and English. He taught English to undergraduate students as a lecturer at English Language Institute, Thammasat University, Bangkok, for one year from June 1993 to June 1994. The first organization he joined after university graduation was The Working People’s Daily (Now renamed: The New Light of Myanmar), a State-owned English language newspaper. He was an editor there from July 1983 to July 1992. He studied mathematics at University of Rangoon for BS and MS degrees which were conferred on him in 1977 and 1983 respectively. He obtained MA (International Development Program) from International University of Japan in 1998. Now he holds a Ph D, specializing in sociology, conferred by University of Hawaii, USA.



U Aung Lin (Social Impact Assessment Specialist)



U AUNG LIN (Social Impact Assessment Specialist) joined MSR 19 years ago in 1998 as an Assistant Librarian who was responsible for gathering data and information.

He occasionally takes charge of MSR’s data collection teams playing a key role in public consultations and conducting in-depth interviews with key stakeholders. He was promoted to Librarian and Databank Manager in 2003. He monitors political and economic news stories carried by State-owned newspapers

and private weekly news journals, and also carries out radio and television monitoring. He has had experience in conducting five ESIA surveys.

He is knowledgeable in almost all sectors and fields—the environment, deforestation, water and sanitation, mangroves, fishery industry, special economic zones (SEZs) and industrial zones, national infrastructure projects, hydropower and other sources of electricity, rice industry and agri-products, mining, etc.

Before joining MSR, he was a teacher from 1981 to 1998. With pen-names “Ko Lin Nwe (Main Ma Hla Island)” and “Ko Lynn Man Aung,” he has written a total of 200 articles on the natural environment and reduction of natural disasters among other topics.

He was conferred a B Sc with specialization in physics by Yangon University in 1979

U Myint Swe (Engineer)

U MYINT SWE is currently the Civil Engineer of MSS Engineering Co Ltd, which is an affiliate of MSR. He is mainly responsible for analyzing physical impact of the proposed project and developing environmental management plan (EMP) and monitoring plan.

He is experienced in civil engineering field more than 42 years of surveying, construction of buildings, Roads, Bridges, Revetments, Ports and calculating of structure designs.

U Myint Swe is the civil engineer of MSSE engineering Co Ltd which is an affiliate of MSR. He obtained degree of A.G.T.I (Civil) from Government Technical Institute of Myanmar. He has conducted over 52 construction projects at Building department, Yangon City Development Committee (YCDC) from 1975 to 1992. He has also conducted as a senior licensed engineer and consultant, serviced to over 65 construction projects from 1993 to current. He was recognised Registered Senior Engineer (R.S.E) by Myanmar Engineering Council and awarded (Engr.) title.

He has reorganized as a Membership of the Society of Environmental Engineering, MSEE (UK) and also a Member of Myanmar Engineer Society.



U Ko Ko Soe Lwin Thaw (GIS & IT Specialist)

U KO KO SOE LWIN THAW (GIS SPECIALIST), or better known as KoSoe, has officially been appointed a GIS and IT specialist since 2012. His other tasks on the EIA/ESIA team include doing cartography, designing and audio-video production.

He was an Assistant Manager and also a Creative Director for Lao Fo Ye Co Ltd in Singapore from 2008 to 2012. He also worked as a producer/editor for MRTV 3 and MRTV 4, government television channels in English version, from 1996 to 2008. He is also engaged in live show production and post-production. From 1992 to 1995, he worked as a freelance videographer and video editor in Singapore.

Bangkok Bureau of NHK Japan appointed him Assistant Cameraman (TV) from 1991 to 1992. Earlier from 1989 to 1991, he worked for AV Media Co Ltd (Yangon) as a cameraman.

He pursued his academic education, computer applications and advanced English in Singapore.



U Kyan Dyne Aung (Environmental Engineering Management Specialist and Report Writer)

U Kyan Dyne Aung obtained his bachelor's degree in civil engineering from Yangon Technological University in 2002. He worked as a construction site engineer in TACCO construction company from 2002 to 2004. After working a few years in the private construction business, he did his master's in environmental engineering management in Sydney, Australia in the years of 2005 and 2006. He was then appointed as Consultant – Civil Engineer for the project, namely, Community Development for Remote Townships – CDRT in Mon Kayin area from September 2006 to July 2007. Then he joined Asian Institute of Technology (AIT) in May 2008 to work for School of Environment, Resources and Development (SERD) as research associate. He worked on preparation and reviewing of several Environmental reports including but not limited to Environmental Impact Assessment, Healthcare Waste Status for Developing Countries, NGOs Implementing 3R Practice in Developing Countries, Eco-Industrial Cluster, and Integrated Management of Municipal Solid Waste in Asia. Afterwards, he was also a Project Officer in External Relations and Communications Office, AIT for organizing the 50th Anniversary Celebration of AIT until February 2010. In March 2010, he joined one of the leading Myanmar local Environmental NGOs, ECODEV. Being a Program Officer there for almost four years, he was responsible for managing several climate change and Environment related programs, projects and activities. From October 2013 to April 2018, he was a Senior Program Officer at Yangon Heritage Trust, a prominent local NGO, and had a good experience of overseeing and managing different and very challenging heritage and urban planning issues. He is now working for Myanmar Survey Research as Environmental Engineering Management Specialist and Report



Writer for Environmental Impact Assessment on diverse projects and development.

U Oo Kyaw Maung (Policy Specialist)



U Oo Kyaw Maung (Policy Specialist) joined MSR in 2016 as a senior researcher. He is responsible for conducting research on different of social, economic policy issues for MSR. He will be advising on laws, by-laws and regulations related to the proposed project.

U Oo Kyaw Maung has extensive working experiences as independent consultant in different national and international organizations. In addition to such experiences, he also worked for UN agency in Myanmar for over four years.

U Oo Kyaw Maung hold B.A (Economics). Also, he holds Postgraduate Diploma in Public Administration and Master of Public Policy (Economic Policy) from the Australian National University.



CHAPTER 2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Introduction

The Lessor (Department of Urban and Housing Development - DUHD, Under the Ministry of Construction) agrees to lease the Leased Area (555.81 acres of land in Nyaung Hnit Pin, Hlegu Township, Yangon Region) to the lessee, KMIC Development Co., Ltd., and the company agrees to lease the Leased Area from the Lessor, on an exclusive basis, to develop, construct, own, finance, operate and maintain the Project, in accordance with the terms of the Project Agreements, free and clear of any claims, rights and encumbrances or encroachments by third parties (including but not limited to any occupation of the Leased Area by third parties, and claims for compensation by prior occupants of the Leased Area under the Land Acquisition Act 1894 or similar law or regulation in Myanmar).

The KMIC Development Co., Ltd. shall use and have the benefit of the Leased Area for the purpose of developing, constructing, owning, financing, operating and maintaining the Project, subject to the terms and conditions of the Project Agreements. The KMIC Development Co., Ltd. shall be entitled to sublease any portion or portions of the Leased Area to Sub-Lessees under Sublease Agreements, and the Sub-Lessees will be responsible for developing their respective portions of the Leased Area.

The project shall be developed in two phases, Zone A and Zone B. The initial lease period for Zone A is fifty (50) years and if the KMIC Development Co., Ltd. wishes to extend the Initial Lease Period for another ten (10) years, the KMIC Development Co., Ltd. shall inform the Lessor in writing at least three (3) months before the Initial Lease Period expires. The Initial Lease Period shall be extended ("First Extended Lease Period") without the payment of additional fees provided the KMIC Development Co., Ltd. is not in material breach of the Agreement at the time of the notice.

If the KMIC Development Co., Ltd. wishes to extend the First Extended Lease Period for another ten (10) years, the KMIC Development Co., Ltd. shall inform the Lessor in writing at least three (3) months before the First Extended Lease Period expires. The First Extended Lease Period shall be extended ("Second Extended Lease Period") without the payment of additional fees provided the KMIC Development Co., Ltd. is not in material breach of the Agreement at the time of the notice.

The Parties shall sign a new separate land lease agreement in respect of Zone B in accordance with the JVA ("JVA" means the joint venture agreement as of the 7th day of August 2019, executed by the Shareholders of the KMIC Development Co., Ltd.) for the purposes of creating a fresh Lease Term for Zone B, which land lease agreement will (i) commence from the signing thereof, which shall be the date of issue of Second Round Completion Certificate in terms of the JVA and continue for a term equivalent to Clauses mentioned above for Zone A, and (ii) otherwise be in duplicate form to this Agreement, mutatis mutandis. However, this Agreement shall act as a master lease agreement and therefore reference herein to the Lease, Land, Leased Area and Site shall mean the lands including Zone A and Zone B, and both Zone A and Zone B shall be encumbered by this Agreement for the benefit of the JV Company and both Zone A and Zone B shall be subject to registration (The Parties shall mutually arrange and complete the registration of this Agreement with all relevant Government Authorities, including the Office of Registration of Deeds) and the purpose of the separate lease agreement for Zone B shall be to re-commence the Lease Term in respect only of Zone B.

KMIC Development Co., Ltd. is a developer for the establishment of Korea-Myanmar Industrial Complex including the development of infrastructure in the industrial complex and the operation and maintenance of the industrial complex. Therefore, the policies, laws, rules, guidelines, procedures, contractual and other commitments and legal commitments described in this section are the ones which will be followed by KMIC Development Co., Ltd. as a developer.

KMIC is a Joint Venture consisting of Korea Land and Housing Corp, Global Sae-A Co., Ltd. and Ministry of Construction of Myanmar, and will select a construction contractor at the end of this year to ensure that construction is carried out in compliance with EMP.

This section covers the following aspects:

- i. Project relevant Local Laws, Rules, Guidelines and Procedures;
- ii. Project relevant Policies and Strategies of Myanmar Government and relevant Ministries;
- iii. International Conventions, Treaties and Agreements;
- iv. Contractual and Other Commitments;
- v. Legal Commitments; and
- vi. Policies and Programs of Project Proponent (Developer).

2.1 Project relevant Local Laws, Rules, Guidelines and Procedures

2.1.1 Constitution of the Republic of the Union of Myanmar (2008)

The project developer commits to follow sections (350), (390) sub-sections (a), (b), (c) and (d).

Section 350. Women shall be entitled to the same rights and salaries as that received by men in respect of similar work

Section 390. Every citizen has the duty to assist the Union in carrying out the following matters

- a) preservation and safeguarding of cultural heritage;
- b) environmental conservation;
- c) striving for development of human resources; and
- d) protection and preservation of public property.

2.1.2 Environmental Conservation Law (2012)

The project developer commits to comply with the sections (14), (15), (16) sub-sections (a), (b) and (c), (28), (29) and (30).

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 16. A person or organization operating business in the industrial estate or business in the special economic zone or category of business stipulated by the Ministry:

- a) is responsible to carry out by contributing the stipulated cash or kind in the relevant combined scheme for the environmental conservation including the management and treatment of waste;

- b) shall contribute the stipulated users' charges or management fees for the environmental conservation according to the relevant industrial estate, special economic zone and business organization;
- c) shall comply with the directives issued for environmental conservation according to the relevant industrial estate, special economic zone or business.

Section 28. No one shall, without the prior permission, operate business, work-site or factory, workshop which is required to obtain the prior permission under this Law.

Section 29. No one shall violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law.

Section 30. No one shall, without permission of the Ministry, import, export, produce, store, carry or trade any material which causes impact on the environment prohibited by the Ministry.

2.1.3 Environmental Conservation Rules (2014)

The project developer commits to comply with the sections (56) and (69) sub-sections (a) and (b).

Section 56. The person who carries out any project, business, service or activity shall arrange and carry out for conducting the environmental impact assessment for the project, business or activity by a qualified third person or third party accepted by the Ministry.

Section 69. (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 the hazardous waste or hazardous material stipulated by notification under the Law and any of these rules at any place which may affect the public directly or indirectly.

(b) Any person shall not carry out the actions 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.

2.1.4 Environmental Impact Assessment Procedure (2015)

The project developer commits to comply with the articles (13) clauses (a) and (b), (45), (48), (50), (51), (52), (53), (55), (59), (61) clauses (a), (b), (c) and (d), (62) clauses (a), (b) and (c), (63), (64), (65), (68), (69), (87), (88), (89), (93), (94) clauses (a), (b), (c), (d), (e), (f) and (g), (95), (100), (101), (102) clauses (a) and (b), (103), (104), (105), (106), (107), (108), (109) clauses (a), (b), (c), (d), (e) and (f), (110), (112), (113) clauses (a) and (b), (117) and (122).

Article 13. The project proponent shall:

- a) arrange for appropriate public consultation through all phases of the IEE and EIA process as required by Articles 34, 50, and 61; and
- b) disclose to the public in a timely manner all relevant project-related information in accordance with this procedure except that which may relate to National Security concerns as informed by the Ministry.

Article 45. The project proponent must appoint a registered Third Person or Organization to carry out the EIA investigation and reporting. Prior to commencement of the EIA, the project proponent shall inform the Department in writing as to the identity of the duly registered person (s) and/or organization it has selected to undertake the EIA investigation and reporting.

Article 48. The project proponent shall be responsible to ensure that the Scoping and the preparation of the ToR for the EIA Report are undertaken in a professional manner and in accordance with this Procedure and any applicable guidelines issued or adopted by the Ministry.

Article 50. As part of the Scoping, the Project Proponent shall ensure that the following public consultation and participation process is carried out:

- a) disclose information about the proposed Project to the public and civil society through posting on the Project or Project Proponent's website (s) and local media, including by means of the prominent posting of legible sign boards and advertising boards at the Project site which are visible to the public; and
- b) arrange the required complement of consultation meetings as advised by the Ministry, with local communities, potential PAPs, local authorities, community-based organizations, and civil society, and provide appropriate and timely explanations in press conferences and media interviews.

Article 51. The Project Proponent shall prepare a Scoping Report either in the Myanmar language or in the English language with an accompanying, accurate summary in the Myanmar language, with the following content:

- a) Executive Summary
- b) Context of the Project
- c) Overview of the Policy, Legal and Institutional Framework
- d) Project Description and Alternatives
- e) Description of the Environment together with maps in proper scale indicating all relevant features, images, aerial photos and satellite images
- f) Key Potential Environmental Impacts and Mitigation Measures
- g) Public Consultation and Disclosure
- h) Conclusions and Recommendations

Article 52. Based on the Scoping, the Project Proponent shall prepare the ToR for the EIA investigations in accordance with applicable guidelines issued or adopted by the Ministry.

Article 53. The Project Proponent shall submit the completed Scoping Report and ToR to the Department for review and approval.

Article 55. The Project Proponent shall ensure that the EIA investigation properly addresses all adverse impacts and is undertaken in accordance with the ToR as approved by the Department.

Article 59. The Project Proponent is obliged to use, comply with and refer to applicable national and international standards adopted by the Union Government and/or the Ministry, or in the absence of relevant national or adopted international standards, such standards as may be agreed with the Ministry.

Article 61. As part of the EIA investigations, the Project Proponent shall undertake the following consultation process:

- a) Timely disclosure of all relevant information about the proposed project and its likely adverse impacts to the public and civil society through local and national media, the websites (s) of the project or project proponent, at public places such as libraries and community halls, and on sign boards at the project site visible to the public, and provide appropriate and timely explanations in press conferences and media interviews;
- b) Arrange consultation meetings at national, regional, state, Nay Pyi Taw Union Territory and local levels with PAPs, authorities, community-based organizations and civil society;
- c) Consultations with concerned government organizations including the Ministry, the concerned sector ministry, regional government authorities and others; and
- d) Field visits for the Ministry and concerned government organizations.

Article 62. The project proponent shall issue a letter of endorsement in a format prescribed by the Ministry. Such letter shall be submitted to the Department together with the EIA report

prepared either in the Myanmar language or in the English language with an accompanying, accurate summary in the Myanmar language, confirming:

- a) The accuracy and completeness of the EIA;
- b) That the EIA has been prepared in strict compliance with applicable laws including this procedure and with the ToR for the EIA; and
- c) That the project will at all times comply fully with the commitments, mitigation measures, and plans in the EIA report.

Article 63. The project proponent is responsible for the preparation of an EIA report which shall contain the following:

1. Executive Summary
2. Introduction
3. Policy, Legal and Institutional Framework
4. Project Description and Alternative Selection
5. Description of the Surrounding Environment
6. Impact and Risk Assessment and Mitigation Measures
7. Cumulative Impact Assessment
8. Environmental Management Plan
9. Public Consultation and Disclosure

Article 64. After completing all investigations and public consultation and participation processes required for EIA type projects, the project proponent shall submit the EIA report to the Department in both digital form and complete paper copies, together with the required service fee as prescribed by the Department.

Article 65. Not later than fifteen (15) days after submission of the EIA report to the Department, the project proponent shall disclose the EIA report to civil society, PAPs, local communities and other concerned stakeholders: (i) by means of national media (i.e. newspapers); (ii) the website (s) of the project or project proponent; (iii) at public meeting places (e.g. libraries, community halls); and (iv) at the offices of the project proponent.

Article 68. If it is determined by the Ministry that the EIA report does not satisfy requirements, then the project proponent shall be called upon by the Department to undertake the necessary amendments as directed by the Ministry.

Article 69. All costs incurred in completing the EIA report disclosure and review, including the public consultation process, shall be borne by the project proponent.

Article 87. Upon receipt of the written approval from the relevant authority, the project proponent shall commence implementation of the project strictly in accordance with the conditions attached to the ECC and including the EMP, within such time as may be prescribed by the Ministry.

Article 88. The project proponent shall commence substantial implementation of the project within the first two (2) years after the issuance of the ECC and not later than thirty (30) days after such commencement shall notify the Department in writing of the date of commencement and identify the activities constituting substantial implementation of the project.

Article 89. The project proponent shall be required to carry out and submit for the Ministry's approval a new assessment (IEE or EIA, as the case may be) if substantial project commencement has not occurred within two (2) years after obtaining the ECC, unless the project proponent has applied in writing providing reasons why it has not been able to commence substantial implementation of the project, indicating what further period of time is needed before substantial commencement of the project can take place and the Ministry has in its discretion granted an extension.

Article 93. An ECC issued by the Ministry shall be valid for a period of five (5) years from the date of issuance. Six (6) months prior to expiration of an ECC issued by the Ministry, the project proponent may apply to the Ministry for an extension.

Article 94. The Ministry may unilaterally modify conditions in the ECC and/or require the project proponent to revise and resubmit the EMP to the Ministry for review and approval, if at any time the Ministry determines that:

- a) The mitigation measures are insufficient or inadequate to mitigate the actual or likely impacts of the project;
- b) New information becomes known as to how harmful the adverse impacts of the project are, or are likely to be or become;
- c) The project has adverse impacts which could not be foreseen at the time the originally approved IEE report/EIA report and EMP were approved;
- d) The adverse impacts of the project are greater than those anticipated impacts that formed the basis for the preparation, submission, and approvals of the original IEE report/EIA report and EMP and the issuance of the ECC and conditions therein;
- e) New techniques conforming to the definition of BAT are available which would significantly reduce the adverse impacts of the project;
- f) The adverse impacts of the project can be reduced through adherence to Good Practice without commercially significant extra cost to the project; or
- g) The measures/conditions are unnecessary to mitigate the adverse impacts.

Article 95. In case of major changes in size, scope, location, layout, technology, risk associated with foreseeable adverse impacts, production methods or pollution prevention/mitigation measures of the project, or an expansion or second phase development is proposed, the project proponent shall notify the Ministry and provide supporting documentation of such changes within the timeframe as may be prescribed.

Article 100. The project proponent shall incorporate all relevant environmental commitments and requirements set forth in the EIA report, construction phase EMP and/or operation phase EMP as the case may be, and in the ECC, applicable Emission Limit Values and Environmental Quality Standards, into detailed designs, construction contract specifications, and contracts on project operations related to any part of the Project.

Article 101. In case the Department finds that changes to the Project, the project site or adverse impacts of the project warrant revisions to the EMP, Construction Phase EMP, or Operational Phase EMP as the case may be, then the Department may require the project proponent to prepare and submit a revised EMP, Construction Phase EMP, or Operational Phase EMP, as the case may be to the Department for review and approval.

Article 102. 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 for or on behalf of the Project, in carrying out work on the Project; and
- 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.

Article 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 conditions when providing services to the Project.

Article 104. The Project Proponent shall be responsible for, and shall fully and effectively implement, all requirements set forth in the ECC, applicable Laws, the Rules, this Procedure and standards.

Article 105. The Project Proponent shall timely notify and identify in writing to the Ministry, providing detailed information as to the proposed Project's potential Adverse Impacts.

Article 106. The Project Proponent shall, during all phases of the Project (pre-construction, 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.

Article 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 of the Ministry is or may be required, within not later than twenty-four (24) hours, and in all other cases within seven (7) days of the Project Proponent becoming aware of such incident.

Article 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.

Article 109. The monitoring reports shall include:

- 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 the 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.

Article 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 may 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, within ten (10) days of receiving such request, submit a digital copy via email or as may otherwise be agreed upon with the requestor.

Article 112. If, upon inspection, the Ministry identifies any non-compliance with the conditions in the ECC, the Ministry may require the Project Proponent to undertake remedial measures and/or may impose penalties as provided for in this Procedure.

Article 113. For purposes 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.

Article 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 subcontractors.

Article 122. All costs of the Ministry to conduct inspection and monitoring of the Project shall be borne by the Project Proponent. Such costs shall not exceed that which is necessary to ensure the Project's compliance with the Project commitments as set out in the EMP and in the ECC.

2.1.5 National Environmental Quality (Emission) Guidelines (2015)

The project developer commits to follow the following guidelines, namely National Environmental Quality (Emission) Guidelines established by Ministry of Natural Resources and Environmental Conservation on air emissions, wastewater, storm water runoff, effluent and sanitary discharges (general application), site runoff and wastewater discharges (construction phase), and noise levels.

Air Emissions

Table 2. 1: National Environmental Quality (Emission) (NEQ) Guidelines for Air Emissions

| Parameter | Averaging Period | Guideline Value ($\mu\text{g}/\text{m}^3$) |
|---|----------------------|--|
| 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 $\text{PM}_{2.5}$ ^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

Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (general application)

Table 2. 2: NEQ Guidelines for Wastewater, Stormwater Runoff, Effluent and Sanitary Discharges

| 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 suspended solids | mg/l | 50 |
| Zinc | mg/l | 2 |

^a Standard unit

^b At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity; when the zone is not defined, use 100 meters from the point of discharge.

Site Runoff and Wastewater Discharges (construction phase)

| Parameter | Unit | Guideline Value |
|--------------------------|-------------------|-----------------|
| Biological oxygen demand | mg/l | 30 |
| Chemical oxygen demand | mg/l | 125 |
| Oil and grease | mg/l | 10 |
| pH | S.U. ^a | 6-9 |
| Total coliform bacteria | 100 ml | 400 |
| Total nitrogen | mg/l | 10 |
| Total phosphorus | mg/l | 2 |
| Total suspended solids | mg/l | 50 |

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

Noise Levels

Table 2. 3: NEQ Guidelines for Noise Levels

| Receptor | One Hour LAeq (dBA) ^a | |
|---|---|---|
| | Daytime 07:00 - 22:00 (10:00 - 22:00 for Public Holidays) | Nighttime 22:00 - 07:00 (22:00 - 10:00 for Public Holidays) |
| Residential, institutional, educational | 55 | 45 |
| Industrial, commercial | 70 | 70 |

^a Equivalent continuous sound level in decibels

2.1.6 Conservation of Biodiversity and Protected Areas Law (2018)

The project developer commits to comply with the sections (40) sub-sections (a) and (b), and (41) sub-sections (a) and (b). Specifically, the stipulation that there may be charge with fine or imprisonment of both if finds guilty of:

Section 40

- a) Hunting or selling normally protected wild fauna, or possessing, transporting or transferring such wild fauna or any part of them, without permission;
- b) Extracting, collecting or destroying, in any manner, any protected wild flora within a specified area without permission.

Section 41

- a) Killing, hunting, wounding, collecting, selling or transferring a completely protected wild animal or animal regulated for international trade, or possessing or transporting such wild animal or animal or any part or blood derivative or product thereof without permission;
- b) Extracting, collecting or destroying in any way a completely protected wild plant or a plant regulated for international trade without permission or collecting, possessing, selling, transporting or transferring in any way such wildlife plant or plant or any derivative product thereof without permission.

2.1.7 The Conservation of Water Resources and Rivers Law (2006)

The project developer commits to follow the section (8) sub-sections (a) and (b).

Section 8. No person shall:

- a) carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks;
- b) cause the wastage of water resources willfully.

2.1.8 Protection and Preservation of Antique Objects Law (2015)

The project developer commits to comply with the section (12) of the law.

Section 12. The person who finds any object which has no owner or custodian, he shall promptly inform the relevant ward or village tract administrator if he knows or it seems reasonable to assume that the said object is an antique object.

2.1.9 Myanmar Investment Law (2016 amended in 2019)

The project developer commits to comply with the section (36) sub-sections (a), (b), (c), (d) and (e), (37), (38), (50) sub-sections (a), (b), (c) and (d), (51) sub-sections (a), (b), (c), (d), (e) and (f), (56) sub-sections (a), (b), (c), (d), (e), (f) and (g), (57), (59), (60), (61), (62) sub-sections (a), (b), (c), (d), (e), (f) and (g), (63), (64), (65) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p) and (q), (66), (67), (68), (69), (70), (71), (72), (73), (74), (77) sub-sections (a) and (d), (78) sub-sections (a), (b) and (c), (79), (80), (82), (83), (84) sub-sections (a) and (b).

Section 36. The investor shall submit a proposal to the Commission and invest after receiving the Permit for the following businesses stipulated in the rules:

- a) Investment businesses that are essential to the Union Strategy;
- b) Large capital intensive investment projects;
- c) Projects which are likely to cause a large impact on the environment and the local community;
- d) Investment businesses which use state-owned land and building;
- e) Investment businesses which are designated by the government to require the submission of a proposal to the Commission.

Section 37. No investor requires to submit a proposal to the Commission for other investment businesses except investment businesses stipulated under section 36. However, in order to enjoy the rights to use land under Chapter XII, and all or more than or any exemptions and reliefs under sections 75, 77 and 78, an endorsement application must be submitted in the stipulated form to the Commission office.

Section 38. When submitting the endorsement application, all approvals or licenses or permits or similar documents issued by the relevant organizations according to the type business have to be attached.

Section 50 (a) An investor who obtains permit or endorsement under this Law has the right to obtain a long-term lease of land or building from the owner if it is private land or building, or from the relevant government departments or government organization if it is land managed by the government, or land or building owned by the Union in accordance with the stipulations in order to do investment.

(b) Foreign investor may lease land or building either from the government or government organizations or from owners of private land or building from commencing on the date of receipt of the permit or endorsement of the Commission up to an initial period of (50) years in accordance with the stipulation.

(c) After the expiry of the term of the right to use land or building or the period of right to lease of land or building permitted under subsection (b), a consecutive period of (10) years and a further consecutive period of (10) years extension to such period of lease of land or building may be obtained with the approval of the Commission.

(d) The investor shall register the land lease contract at the Office of Registry of Deeds in accordance with the Registration Act.

Section 51. The investor:

- a) may appoint of 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 Laws;
- b) shall appoint them to replace, after providing for capacity building programs in order to be able to appoint citizens to different level positions of management, technical and operational experts, and advisors;
- c) shall appoint only citizens for works which does not require skill;

- d) shall appoint skilled citizen and foreign workers, technicians, and staff by signing an employment contract between employer and employee in accordance with the labor laws and rules;
- e) shall ensure to obtain the entitlements and rights in the labor laws and rules, including minimum wages and salary, leave, holiday, overtime fee, damages, compensation of the workman, social welfare, and other insurance relating to workers in stipulating the rights and duties of employers and employees and occupational terms and conditions in the employment contract;
- f) shall settle disputes arising among employers, among workers, between employers and workers, and technicians or staff in the investment in accordance with the applicable laws.

Section 56. Foreign Investors may transfer abroad the following funds relating to the investments made under this law:

- a) capital designated under the provisions relating to capital account rules stipulated by the Central Bank of Myanmar;
- b) proceeds, profits from the asset, dividends, royalties, patent fees, license fees, technical assistance and management fees, shares and other current income resulting from any investment under this Law;
- c) proceeds from the total or partial sale or liquidation of an investment or property owned by an investment;
- d) payments made under a contract, including a loan agreement;
- e) payments resulting from any settlement of investment disputes;
- f) other compensation or money as compensation under investment or expropriation;
- g) remuneration, salary and earning of foreign expert legally employed in the Union.

Section 57. With respect to transferring a loan or taking a loan, it shall be transferred and taken with the approval of the Central Bank of Myanmar, in accordance with the stipulated regulations.

Section 59. Any transfer of funds shall be allowed only after paying all tax obligations imposed on the amount to be transferred in accordance with the stipulated tax laws.

Section 60. Foreign experts with legal work permits may make remittances abroad without any further deduction from the amount of money paid the tax obligations under the Income Tax Law, through banks authorized foreign exchange dealer license and established in the Union.

Section 61. In respect of transfers of funds made by foreign investors under section 56, such funds, including capital accounts or current accounts under the Foreign Exchange Management Law may be transferred through banks authorized foreign exchange dealer license and legally established in the Union by freely usable currencies.

Section 62. The Government may prevent or delay a transfer of funds relating to any of the following circumstances:

- a) insolvency, or the protection of the rights of creditors;
- b) criminal or penal offences and the recovery of proceeds of crime;
- c) financial reporting or record keeping of transfers when necessary to assist law enforcement or financial regulatory authorities;
- d) ensuring compliance with orders or judgments in judicial or administrative proceedings;
- e) taxation;
- f) social security, public retirement, or compulsory savings schemes;
- g) severance entitlements of employees.

Section 63. The Government shall allow the transfer of capital or expenditures and foreign loans from abroad, which are required to be used for investors and their investments within the Union in accordance with applicable laws.

Section 64. In the event of serious balance-of-payments or external financial difficulties, the Government may adopt or maintain restrictions on payments or transfers related to investments in accordance with the Foreign Exchange Management Law and other international commitments.

Section 65. The Investor:

- a) shall respect and comply with the customs, traditions and traditional culture of the ethnic groups in the Union;
- b) shall establish and register a company or sole proprietorship or legal entities or branches of such entities under the Laws in order to invest;
- c) shall abide by the terms and conditions, stipulations of special licenses, permits, and business operation certificates issued to them, including the rules, notifications, orders, and directives and procedures issued by this Law and the applicable laws, terms and conditions of contract and tax obligations;
- d) shall carry out in accordance with the stipulations of the relevant department if it is, by the nature of business or by other need, required to obtain any license or permit from the relevant Union Ministries, government departments and government organizations, or to carry out registration;
- e) shall immediately inform to the Commission if it is found that natural mineral resources or antique objects and treasure trove are not related to the investment permitted above and under the land on which the investor is entitled to lease or use and not included in the original contracts. If the Commission allows, the investor shall continue to carry out the investment in such land, and if not allowed, the investor shall transfer and carry out, by obtaining the permission, at the substituted place which is selected and submitted by him;
- f) shall not make any significant alteration of topography or elevation of the land on which he is entitled to lease or to use, without the approval of the Commission;
- 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;
- h) shall list and keep proper records of books of account and annual financial statement, and necessary financial matters relating to the investments performed by permit or endorsement in accordance with internationally and locally recognized accounting standards;
- 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;
- 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;
- 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;
- 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;
- m) shall respect and comply with the labor laws;
- n) shall have the right to sue and to be sued in accordance with the laws;
- 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) shall allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment;
- 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.

Section 66. Subject to the assessment under section 65 (q), the Commission may administer the investments to carry out necessary, including to conduct or suspend.

Section 67. The investors shall comply with all responsibilities stipulated under section 65 from the date of this Law comes into effect.

Section 68. If the investor discontinues the investment before the expiry of the permitted period, after paying the tax exemptions or reliefs or both enjoyed during importation in accordance with the approval of the Commission, the investor is to sell, export and dispose all machineries, equipment, motor vehicles and all other articles imported from abroad with the customs duty, other internal taxes and tax exemption or relief or both for his investment.

Section 69. After obtaining a permit or an endorsement from the Commission, the investor shall execute and sign necessary contracts with the relevant government department or a government organization or government organizations and conduct its investments.

Section 70. The permission of the Commission shall be obtained for any extension and amendment of the contracts mentioned in section 69.

Section 71. In conducting their investment businesses, the investor shall carry out health assessment, cultural heritage impact assessment, environmental impact assessment and social impact assessment according to the type of investment business in accordance with the relevant laws, rules, regulations and procedures.

Section 72. Investment obtained a permit or an endorsement, shall submit and notice to the Commission of any sublease, mortgage transfer of shares or transfer of business to any person during the investment period.

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.

Section 74. The Commission shall, for the purpose of supporting the development of the Union by allowing investment in sectors which need to be developed, and for the proportionate development of Regions and States, scrutinize and may grant one or more tax exemptions or reliefs if the investor applies for such exemptions or reliefs.

Section 77. The Commission may scrutinize and grant the following exemptions or reliefs from customs duty and other internal taxes to the investor if applied.

- a) exemptions or reliefs from customs duty or other internal taxes or both on machineries, equipments, instruments, machinery components, spare parts, construction materials unavailable locally, and materials used in the business, which are imported as they are actually required, during the construction period or during the preparatory period of the investment business;
- d) if the volume of investment is increased with the approval of the Commission and the original investment business is expanded during the permitted period of investment,

exemption or relief from the customs duty or other internal taxes or both on machineries, equipment, instruments, machinery components, spare parts, materials used in the business, and construction materials unavailable locally, which are imported as they are actually required for use in the business which is being expanded as such.

Section 78. The Commission may scrutinize and grant the following exemptions and relief, as required, to the investor if applied:

- a) exemption or relief from income tax if the profit obtained from the investment business that has obtained a permit or an endorsement is reinvested in such investment business or in any similar type of investment business within one year;
- b) right to depreciation for the purpose of income tax assessment, after computing such depreciation from the year of commencement of commercial operation based on a depreciation rate which is less than the stipulated lifetime of the machinery, equipment, building or capital assets used in the investment;
- c) right to deduct expenses which are incurred for the research and development relating to the investment businesses carried out within the Union and actually required for the economic development of the Union from the assessable income.

Section 79. The foreign investors have to pay income tax on their income at the rates applicable to the citizens residing within the Union.

Section 80. Except the exemptions and reliefs under section 75, 77 and 78, other taxes shall be carried out in accordance with relevant tax laws.

Section 82. In effective implementation of this Law, the Commission shall establish and manage a grievance mechanism to resolve, prevent the occurrence of disputes, and carry out the relevant inquiries for the investment issues before reaching at the stage of legal disputes.

Section 83. Before any investment dispute between the investor and the Union or between the investors is brought to any court or arbitral tribunal, all disputing parties shall use due attempts to settle the disputes amicably.

Section 84. If investment disputes are not able to be settled amicably:

- a) if the dispute settlement mechanism is not stipulated in the relevant agreement, it shall be settled in the competent court or the arbitral tribunal in accord with the applicable laws;
- b) if the dispute settlement mechanism is stipulated in the relevant agreement, it shall be complied with and carried out in accord with the mechanism.

2.1.10 Industrial Zone Law (2020)

The project developer commits to comply with the sections (23) sub-sections (a), (b), (c), (d), (e), (f), (g), (h) and (i), (37), (38), (45), and (56).

Section 23. A Developer –

- a) shall obtain approval from the Central Committee through the Regional Committee with regard to the proposal to implement development work;
- b) may implement the industrial zone business, sublease to investors and develop infrastructure after concluding a commercial agreement with the Regional Committee in accordance with the prescribed terms and conditions;
- c) may implement maintenance work of the industrial zone under the supervision of the Management Committee;
- d) shall complete construction within the proposed period at the respective industrial zone. If the construction cannot be completed within the proposed period, sufficient reason has to be reported to and a decision has to be requested from the Central

- Committee, together with comments from the Regional Committee. If the reason is found to be insufficient, the permit shall be revoked;
- e) may develop the infrastructure in the industrial zone himself or contract to other parties;
 - f) if the developer provides a service related to infrastructure beyond the border of the industrial zone, he shall comply with the instructions of the relevant government departments;
 - g) shall comply with the laws in force with regard to matters such as environmental conservation, occupational safety, fire safety and health care;
 - h) the fees payable for land use and the business permit according to the commercial contract concluded with the Regional Committee shall be paid to the Regional Committee as a lump-sum or in installments;
 - i) shall implement a bonded warehouse system in the industrial zone in accordance with custom laws and procedures.

Section 37. Environmental conservation arrangements shall be implemented in accordance with the laws in force during the establishment of an Industrial Zone and the implementation of industrial businesses.

Section 38. The Developer shall arrange and include required facilities and technology for the storage, treatment and disposal of waste products from industrial businesses in a newly established Industrial Zone.

Section 45. Developers and Investors are allowed to temporarily import machinery and equipment for use in initial construction according to the procedures prescribed in the Sea Customs Act. The Ministry of Commerce shall coordinate with regard to imports made with the recommendation of the Regional Committee.

Section 56. No investor or developer shall continue to conduct a business or occupy land after the land-use permit or land grant is revoked according to section 34 sub-section (b).

2.1.11 The Electricity Law (2014)

The project developer commits to comply with the sections (44), (45), (46), (47) and (48).

Section 44. No person shall operate the electrical business without permit.

Section 45. No permit holder shall operate any other electrical business except the business contained in the permit.

Section 46. No person shall operate the electrical installation and repair without obtaining the electrical professional certificate.

Section 47. No person shall operate the generation, transmission, connection of electric power without obtaining the electrical safety certificate.

Section 48. No person shall operate the importing, manufacturing in the country, exporting, distributing and selling of the electrical equipment which are not consistent with the prescribed norm and standard.

2.1.12 Public Health Law (1972)

The Chapter 2. Protection of Public Health, section 3, sub-section 1 states the guidelines for environmental health as follows and the project developer commits to follow these guidelines.

1. Residential area has to be trash free and wastage has to be properly disposed.
2. Area of drinking water source has to be cleaned and monitor according to the international standards.

3. Residential area has to be free of odor, smoke, carbon dioxide, dust, noise and radioactive materials.
4. Buildings and places which are used for the development of city/villages, building construction and public uses are advised to be clean.

2.1.13 The Prevention and Control of Communicable Diseases Law (1995, amended in 2011)

The project developer commits to comply with the sections (8) sub-sections (a), (b), (c), (d) and (e), (9) sub-sections (a), (b), (c) and (d), (11) sub-sections (a), (b), (c) and (d), and (14) sub-sections (a), (b), (c), (d) and (e).

Section 8. For prevention of the outbreak of communicable disease and effective control of communicable disease when it occurs, the public shall, under the supervision and guidance of the Health Officer of the relevant area, undertake the responsibility of carrying out the following environmental sanitation measures:

- a) indoor, outdoor sanitation or inside the fence, outside the fence sanitation;
- b) well, ponds and drainage sanitation;
- c) proper disposal of refuse and destruction thereof by fire;
- d) construction and use of sanitary latrines;
- e) other necessary environmental sanitation measures.

Section 9. When the head of the household, any member of the household or any entrepreneur knows the occurrence of any of the following matters, he shall report immediately to the nearest health department or hospital:

- a) en masse death of animals including chicken and birds;
- b) rat fall;
- c) suspicion or occurrence of epidemic disease;
- d) occurrence of notifiable disease.

Section 11. In order to prevent and control the spread of a Principal Epidemic 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 investigation of stool, urine, sputum and blood samples to be carried out;
- d) other necessary investigation.

Section 14. An organization or an officer on whom power is conferred by the Ministry of Health and Sports may issue a prohibitive order or a restrictive order in respect of the following matters:

- a) right of the person suffering from Principal Epidemic Disease to leave and return to his house;
- b) right of people living in the house, ward, village or township infected by Principal Epidemic Disease to leave and return thereto;
- c) right of people from outside to enter the house, ward, village or township infected by Principal Epidemic Disease;
- d) if there is a person suffering from Principal Epidemic Disease among those people arriving by train, motor vehicle, aircraft, vessel or any other vehicle, right of such person put under quarantine up to a period necessary for medical examination to leave and return thereto;

- e) when an outbreak of Principal Epidemic Disease occurs during the time of fair and festival, right of the public to visit the site and right to continue the festival.

2.1.14 Prevention of Hazard from Chemical and Related Substances Law (2013)

The project developer commits to comply with the sections (13), (15) sub-sections (a) and (b), (16) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j) and (k), (17), (18), (20), (22), (23) sub-sections (a) and (b), (24), (25), (26), (27) sub-sections (a), (b), (c), (d) and (e), (28) sub-sections (a), (b) and (c), (29) sub-sections (a) and (b), (33), (34), (35), (36), and (45).

Section 13. A person who wants to operate the chemical and related substances business shall apply to obtain a licence together with the management working plan relation to the environmental conservation to the Central Supervisory Board in accordance with the stipulations

Section 15. 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 equipment 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 trainings 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. A person who has obtained a licence:

- a) shall abide the licence regulations;
- 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 Boards 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 check up 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 check up records shall be kept systematically;
- 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;
- 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;
- 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;
- 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 licence;

- k) shall abide and perform in accordance with the related environmental laws not to impact and damage to the environment in operating the chemical and related substances business.

Section 17. A person who has obtained a licence, shall put the insurance in accordance with the prescriptive stipulations to be able to pay the compensation, if the impact and damage is occurred on the Human Being and Animals or the environment in respect of the chemical and related substances businesses.

Section 18. A person who has obtained a licence, shall apply to extend the duration of licence, (30) days in advance before the date of expiry to the Central Supervisory Board in accordance with the stipulations.

Section 20. A person who has obtained a licence shall apply the related chemical and related substances that will be used in his chemical and related substances business in accordance with the stipulations to the Central Supervisory Board.

Section 22. A person who has obtained the registration certificate shall abide the regulations consisted in the registration certificate furthermore shall also abide the order and instructions issued occasionally by the Central Supervisory Board.

Section 23. A person who has obtained the registration certificate:

- a) shall apply to register again, to the Central Supervisory Board if the chemical and related substances, which are not contained in the registered list, are used;
- b) shall inform and submit the unused chemical and related substances list to the Central Supervisory Board, although which are contained in the registered list.

Section 24. A person who has obtained the registration certificate shall apply to extend the duration of the registration certificate (30) days in advance before the date of expiry to the Central Supervisory Board in accordance with the stipulations.

Section 25. The Central Supervisory Board may permit or refuse the application according to section 24 after scrutinizing in accordance with the stipulations.

Section 26. The Central Supervisory Board shall prohibit the performance of the chemical and related substances business, if the chemical and related substances which have granted by the registration are known to be hazardous to Human Being, Animal and environment according to the information that is obtained again from local and abroad. The registration certificate may be withdrawn, if necessary.

Section 27. A person who has obtained the licence to be complied the following matters to control and decrease the hazard of the chemical and related substances:

- 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 equipments, the personal protection equipments to protect and decrease the accident and attending to the training to be used systematically;
- d) performing in accordance with the stipulations in respect of transporting, possessing, storing, using, discharging the chemical and related substances;
- e) not being imported or exported the chemical and related substances banned by the Central Supervisory Board and the machinery and equipments which are used them.

Section 28. The licence shall be deemed to be annulled, when one of the following matter is appeared:

- a) re-entrusting the licence;
- b) no applying to renew the licence until the licence duration is due;
- c) annulling the licence according to this Law.

Section 29. A person who has obtained the licence:

- a) has an opportunity to reapply the licence in the case of licence annul due to any matter contained in sub-section (a) and (b) of the section 28 in accordance with the stipulations;
- b) has no opportunity to reapply the licence due to the matter of licence annulled according to sub-section (c) of the section 28.

Section 33. No one shall produce, treat and formulate, use, possess, store, distribute, sell, transport, import or export the chemical or related substances prohibited by the Central Leading Board.

Section 34. No one shall operate the chemical and related substances business without licence.

Section 35. No one shall use the chemical or the related substances which are unregistered or annulled from the registered list or not met to the quality and norm in the chemical and related substance business.

Section 36. No one shall restrict or disturb the inspecting of the Central Supervisory Board, the Supervisory Board and the Boards of Inspection in respect of the chemical and related substances business.

Section 45. A person who has obtained licence acquire the recommendation of the Central Supervisory Board and shall apply to the respective Department and Organization if he wants to import or export the chemical and related substances.

2.1.15 Occupational Safety and Health Law (2019)

The developer commits to comply with sections (18) sub-sections (a), (b), (c) and (d), (19) sub-sections (a) and (b), (21) sub-sections (a), (b) and (c), (23), (26) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p), (q), and (r), (27) sub-sections (a), (b), (c), and (d), (28), (29) sub-sections (a), (b) and (c), (34) sub-sections (a) and (b), (48) sub-sections (a) and (b), (49) sub-sections (a), (b), (c), (d) and (e).

Section 18. 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:

- 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 19. Inspection Officers shall:

- a) approve the reopening of the whole or part of the workplace if they find out that the submission made by the employer for his/her compliance subject to the order to close the workplace temporarily made under section 18 is complete and correct; and
- b) inform the relevant Departments and Employer of the approval to resume the workplace under sub-section (a).

Section 21. Inspection Officers:

- a) may instruct the Employer in writing to repair and reform the condition within the specified timeline if they have a reason to believe that workers are likely to be bodily injured or their health is likely to be at risk or any materials are likely to be damaged;
- b) shall cause the Employer to submit the compliance and completion of the instruction made under sub-section (a) within the specified timeline by showing complete records and evidence; and
- c) may prohibit the Employer not to continue operating the Industry/Business if he/she does not follow the instruction under sub-section (a).

Section 23. The Inspection Officer shall direct the Employer to train his/her workers to learn and observe first aid care, extinguishing fire, arrangements and systems to be applied in case of emergency, precautionary plans and likelihood of occurrence of hazards in the workplaces that are listed pursuant to section 22.

Section 26. The employer shall be responsible to:

- 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;
- 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;
- m) Arrange to be complied with precautions when entering restricted hazardous workplaces;
- 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;
- o) Lay down the fire safety plan, perform fire drilling and train workers to use fire extinguishers systematically;
- p) Allow the Chief Inspection Officer and Inspection Officers to enter workplaces, inquire, request documents and information or seize exhibits;
- q) Cause workers to work only for the specified working hours if they have to work in hazardous industry/business and workplace; and
- r) Incur the expenses for occupational safety and health matters.

Section 27. No employer shall dismiss or demote a worker:

- 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;
- b) Because the said worker has addressed a complaint for hazardous or health detrimental conditions;
- c) Because the said worker has conducted the responsibilities of occupational safety and health committee; or
- d) Because the said worker has refused to work in any condition where an occupational accident or occupational disease is about to occur.

Section 28: If any worker who has been injured due to occupational accident or contacted with occupational disease is not covered under the Social Security Law 2012, the employer must pay for medical expenses to check the extent of capacity reduction and class of disability of such worker.

Section 29. The employer:

- a) Can prohibit or restrict any worker to work if he/she does not meet the health standards due to medical check-up results done by the registered doctor in accordance with the needs and nature of the industry/business;
- b) Must, without delay, employ any worker who has been prohibited or restricted to work subject to sub section (a) in his/her original position or at the relevant workplace upon his/her submission of health improvement evidence; and
- c) Must make necessary arrangements in the workplace in order not to damage health of female workers who are pregnant or breast-feed.

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 48. (a) Any person who is currently operating or wants to operate any Industry/Business to which this Law applies shall not fail to lodge the registration with the Department.

(b) No one shall fail to notify the Department in accordance with the stipulations that he/she will build, extend or restructure a building, place, install, extend or change the use of machines in respective processes for the Industry/Business to which this Law applies in accordance with Occupational Safety and Health stipulations.

Section 49. No Employer:

- a) shall fail to comply with an order to close the workplace temporarily in accordance with section 18;
- b) shall fail to comply with the conditions prescribed under section 20, sub-section (b);
- c) shall fail to comply with the instructions issued by the Inspection Officer in accordance with section 21 sub-section (a);
- d) shall ask workers to work for more than the specified hours in accordance with section 26 sub-section (q); or
- e) shall fail to pay for occupational safety and health expenses subject to section 26, sub-section (r).

2.1.16 The Control of Smoking and Consumption of Tobacco Product Law (2006)

The project developer commits to follow section (9) sub-sections (a), (b), (c) and (d).

Section 9. The person-in-charge shall:

- a) keep the caption and mark referring that it is a non-smoking area at the place mentioned in section 6 in accordance with the stipulations;
- b) arrange the specific place where smoking is allowed 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 stipulations;
- c) supervise and carry out measures so that no one shall smoke at the non-smoking area;
- d) accept the inspection when the supervisory body comes to the place for which he is responsible.

2.1.17 The Workmen's Compensation Act (1923, amended in 1955, 1957 and 2005)

The project developer commits to follow section (3) sub-sections (1), (2) and (3), section (4) sub-section (1) clauses (A), (B), (C), (D) and (E), sub-section (2), sub-section (3), section (8) sub-sections (1), (2), (3), (4), (5), (6), (7), (8) and (9).

Section 3. (1) If personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation with the provisions of this Chapter:

Provided that the employer shall not be so liable in respect of any injury, not resulting in death, caused by an accident which is directly attributable to –

- I. the workman having been at the time thereof under the influence of drink or drugs, or
- II. the wilful disobedience of the workman to an order expressly given, or to a rule expressly framed, for the purpose of securing the safety of workmen, or

- III. the wilful removal or disregard by the workman of any safety guard or other device which he knew to have been provided for the purpose of securing the safety of workmen.

(2) * * * * If a workman, whilst in the service of an employer in whose service he has been employed for a continuous period of not less than six months in any employment specified in [List A of] Schedule III, contracts any disease specified therein as an occupational disease peculiar to that employment, the contracting of the disease shall be deemed to be an injury by accident within the meaning of this section and, unless the employer proves the contrary, the accident shall be deemed to have arisen out of and in the course of the employment.

Explanation - For the purposes of this sub-section a period of service shall be deemed to be continuous which has not included a period of service under any other employer.

(3) If a workman contracts any disease specified in List B of Schedule III, and it is certified by a qualified medical practitioner that the disease is directly due to the nature of any employment in which the workman was employed at any time within the twelve months previous to the date of disablement, the contracting of the disease shall be deemed to be an injury by accident within the meaning of this section, and unless the employer proves the contrary the accident shall be deemed to have arisen out of and in the course of the employment aforesaid:

Provided that the compensation shall be recoverable from the employer who last employed the workman during the said twelve months in the employment to the nature of which the disease was due.

Section 4 (1) Subject to the provisions of this Act, the amount of compensation shall be as follows, namely:

A. Where death results from the injury –

- I. in the case of an adult, a sum equal to 36 times the workman's monthly wages calculated in accordance with this Act:

Provided that the minimum and the maximum payment in such a case shall be the amount of compensation prescribed by notification made by the Ministry of Labour with the approval of the Government respectively, and

- II. in the case of a minor- the amount of compensation prescribed by notification made by the Ministry of Labour, Immigration and Population with the approval of the Government;

B. Where permanent total disablement results from the injury –

- I. in the case of an adult, a sum equal to 36 times 140 per cent of the workman's monthly wages calculated in accordance with this Act:

Provided that the minimum and the maximum payment in such a case shall be the amount of compensation prescribed by notification made by the Ministry of Labour, Immigration and Population with the approval of the Government respectively, and

- II. in the case of a minor- the amount of compensation prescribed by notification made by the Ministry of Labour, Immigration and Population with the approval of the Government;

C. Where permanent partial disablement results from the injury –

- I. in the case of an injury specified in Schedule I, such percentage of the compensation which would have been payable in the case of permanent total disablement as is specified therein as being the percentage of the loss of earning capacity caused by that injury, and
- II. in the case of an injury not specified in Schedule I, such percentage of the compensation payable in the case of permanent total disablement as is proportionate to the loss of earning capacity permanently caused by the injury;

Explanation - Where more injuries than one are caused by the same accident, the amount of compensation payable under this head shall be aggregated but not so in any case as to exceed the amount which would have been payable if permanent total disablement had resulted from the injuries;

D. Where temporary disablement, whether total or partial, results from the injury, a half-monthly payment payable on the sixteenth day * * * * from the date of the disablement, and thereafter half-monthly during the disablement or during a period of five years, whichever period is shorter –

- I. in the case of an adult-of a sum equivalent to one-third of the workman's monthly wages calculated in accordance with this Act, and
- II. in the case of a minor-of one-half of his monthly wages:

Provided that –

- a) there shall be deducted from any lump sum or half-monthly payments to which the workman is entitled the amount of any payment or allowance which the workman has received from the employer by way of compensation during the period of disablement prior to the receipt of such lump sum or of the first half-monthly payment, as the case may be; and
- b) no half-monthly payment shall in any case exceed the amount, if any, by which half the amount of the monthly wages of the workman before the accident exceeds half the amount of such wages which he is earning after the accident; and
- c) no compensation shall be payable in respect of the first four days of the disablement if the period of the workman's disablement is ten days or less.

E. In cases where the injury results in incapacity of such a nature that the injured workman must have the constant help of another person, additional compensation equivalent to twenty-five percent of the compensation payable in respect of the injury shall be paid to the injured workman.

(2) On the ceasing of the disablement before the date on which any half-monthly payment falls due, there shall be payable in respect of that half-month a sum proportionates to the duration of the disablement in that half-month.

(3) Where the injury sustained is of such a nature as would entitle the injured workman to the supply and renewal by the employer of such artificial limbs and surgical appliances as are recognised to be necessary, the injured workman shall be paid a lump sum compensation representing the probable cost of the supply and renewal of such appliances. This sum, which shall not exceed ten percent of the compensation payable in respect of the injury, shall be decided at the time when the amount of compensation payable in respect of the injury is settled or revised.

Section 8 (1) No payment of compensation in respect of a workman whose injury has resulted in death, and no payment of a lump sum as compensation to a woman or a person under a legal disability, shall be made otherwise than by deposit with the Commissioner, and

no such payment made directly by an employer shall be deemed to be a payment of compensation:

Provided that, in the case of a deceased workman, an employer may make to any dependent advances on account of compensation not exceeding an aggregate of the amount of compensation prescribed by notification made by the Ministry of Labour, Immigration and Population with the approval of the Government, and so much of such aggregate as does not exceed the compensation payable to that dependent shall be deducted by the Commissioner from such compensation and repaid to the employer.

(2) Any other sum amounting to not less than the amount of money prescribed by notification made by the Ministry of Labour, Immigration and Population with the approval of the Government which is payable as compensation may be deposited with the Commissioner on behalf of the person entitled thereto.

(3) The receipt of the Commissioner shall be a sufficient discharge in respect of any compensation deposited with him.

(4) On the deposit of any money under sub-section (1) as compensation in respect of a deceased workman the Commissioner shall deduct therefrom the actual cost of the workman's funeral expenses, to an amount not exceeding the amount of money prescribed by notification made by the Ministry of Labour, Immigration and Population with the approval of the Government, and pay the same to person by whom such expenses were incurred, and shall, if he thinks necessary, cause notice to be published or to be served on each dependent in such manner as he thinks fit, calling upon the dependents to appear before him on such date as he may fix for determining the distribution of the compensation. If the Commissioner is satisfied after any inquiry which he may deem necessary, that no dependent exists, he shall repay the balance of the money to the employer by whom it was paid. The Commissioner shall, on application by the employer, furnish a statement showing in detail all disbursements made.

(5) Compensation deposited in respect of a deceased workman shall, subject to any deduction made under sub-section (4), be apportioned among the dependents of the deceased workman or any of them in such proportion as the Commissioner thinks fit, or may, in the discretion of the Commissioner, be allotted to any one dependent.

(6) Where any compensation deposited with the Commissioner is payable to any person, the Commissioner shall, if the person to whom compensation is payable is not a woman or a person under a legal disability, and may in other cases, pay the money to the person entitled thereto.

(7) Where any lump sum deposited with the Commissioner is payable to a woman or a person under a legal disability, such sum may be invested, applied or otherwise dealt with for the benefit of the woman, or of such person during his disability, in such manner as the Commissioner may direct; and where a half-monthly payment is payable to any person under a legal disability, the Commissioner may, of his own motion or on an application made to him in this behalf, order that the payment be made during the disability to any dependent of the workman or to any other person whom the Commissioner thinks best fitted to provide for the welfare of the workman.

(8) Where, on application made to him in this behalf or otherwise, the Commissioner is satisfied that, on account of neglect of children on the part of a parent or on account of the variation of the circumstances of any dependent or for any other sufficient cause, an order of the Commissioner as to the distribution of any sum paid as compensation, or as to the manner in which any sum payable to any such dependent is to be invested, applied or

otherwise dealt with, ought to be varied, the Commissioner may make such orders for the variation of the former order as he thinks just in the circumstances of the case:

Provided that no such order prejudicial to any person shall be made unless such person has been given an opportunity of showing cause why the order should not be made, or shall be made in any case in which it would involve the repayment by a dependent of any sum already paid to him.

(9) Where the Commissioner varies any order under sub-section (8) by reason of the fact that payment of compensation to any person has been obtained by fraud, impersonation or other improper means, any amount so paid to or on behalf of such person may be recovered in the manner hereinafter provided in section 31.

2.1.18 The Payment of Wages Law (2016)

The project developer commits to comply with the sections (3) sub-sections (a) and (b), (4) sub-sections (a), (b), (c), (d), (e), (f) and (g), (5), (6), (7) sub-sections (a), (b), (c) and (d), (8), (9), (10) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i) and (j), and (11) sub-sections (a) and (b).

Section 3. The employer:

- a) shall pay wages to the workers employing in his business in local currency or foreign currencies stipulated by the Central Bank of Myanmar. Such payment may be paid in cash or cheque or deposit into the bank account of the worker with the agreement between the employer and the worker.
- b) In paying such wages:
 - i. if it is necessary to pay particular benefit, profits and opportunities for workers working in commerce, production and service businesses, it may be paid in cash or some in cash and some in things set up by local price on own volition of workers in accordance with the stipulations;

Section 4. The employer:

- a) shall pay wages at the end of the work or at the time agreed to pay to the worker for hourly, daily, weekly or other part time work, or temporary or piece work;
- b) shall not exceed one month than the period agreed with the worker under sub-section (a) to pay wages;
- c) shall pay the wages for the permanent work monthly. In making such payment:
 - i. if workers are not more than 100, wages shall be paid at the end of the period for payment of wage;
 - ii. if workers are more than 100, it shall be paid no later than five days after the end of the period for payment of wage;
- d) shall pay the due wages within two working days from the date of termination, if a worker is terminated;
- e) shall pay the wages at the end of the period for payment of wages, if a worker resigns on his own volition by sending prior written notice of resignation;
- f) shall pay the due wages to a legal heir within two working days after the decease, if a worker is deceased;
- g) shall pay all wages on a working day.

Section 5. If an employer encounters difficulties to make payment under sub-section (c) of the Section 4 due to any unexpected condition, including natural disaster, the employer shall submit that which date has been altered for the payment of wages with the consent of the workers to the Department on reasonable ground.

Section 6. The Department may, with the approval of the Ministry, allow the employers to postpone payment within the appropriate time under stipulated conditions, if it is scrutinized that the submission under Section 5 should be allowed.

Section 7. The employer:

- a) may deduct from wages, except leaves which are entitled wages under the relevant law and public holidays, for the absent period from work;
- b) may deduct expenses which are allowance for accommodation and ferry service arranged by the employer, meal allowance, electricity charges, water service charges and income taxes liable to be paid by worker and cash paid in excess under a mistake, which are not included in the expression of wages under this Law;
- c) may deduct advance payment or reimburse or savings for the worker or any contribution under any law demanded by a worker from wages;
- d) may deduct from the wages of the worker under a decision of a Court or Arbitration Council or Arbitration Body.

Section 8. The employer shall not deduct from the wages of the worker except deduction from wages in accordance with provisions of Section 7 and Section 11.

Section 9. In deducting from wages under Section 7, all deductions made by the employer shall not exceed 50 percent of the wages of a worker except deduction from wages for the failure of a worker to perform his duty.

Section 10. The employer:

- a) shall obtain prior approval of the Department for what deduction can be made from wage and how much can be deducted before deducting anything stipulated as a fine under section 11;
- b) shall post the approval contained in sub-section (a) in conspicuous places at relevant factory and work;
- c) shall not exceed fine deducted for compensation than the value of damage or loss by action or omission of a worker;
- d) in deducting from wages under Section 11:
 - i. shall not deduct from wages without giving right to defence of the worker;
 - ii. shall not deduct more than 5 percent of the monthly wages of the worker;
- e) shall not absolutely deduct as the fine from a worker under 16 years of age;
- f) may carry out the date of payment of passing fine in accordance with the agreement between the employer and the worker;
- g) shall deduct from wages for compensation due to loss of property within a limited period by an agreement of the relevant Township Conciliation Body;
- h) shall enter the deducting cash from wages into the register and systematically maintain it;
- i) shall submit a report of the deduction from wages to the Department;
- j) shall use fines of deduction from wages under sub-section (b) of Section 11 for the worker benefit in coordination with legally registered Labour Organization in the factory.

Section 11. The employer may designate as fine to compensate for the following acts and omissions of a worker and deduct from his wages:

- a) any loss of property and cash expressly entrusted to the worker by the employer due to intentional negligence and carelessness or dishonest acts or omissions of the worker, which is caused directly by the carelessness and mistake of such worker;
- b) violation of any terms or conditions stipulated as fines in the employment agreement.

2.1.19 The Leave and Holiday Act (1951 and amended in 2014)

The project developer commits to comply with the sections (3) sub-sections (1), (2), (3), and (4), (4) sub-sections (1), (2), (3), (4), and (5), (5) sub-sections (1), (2), and (3), (6) sub-sections (1), (2), (4), and (5), (7) sub-section (A), (8), (9), (10) sub-sections (1), and (2), and (11).

Section 3. (1) Every employee shall be granted by his employer the following public holidays with full wages or pay:

“Public holidays published and declared annually by notification by the Union Government”.

(2) If any public holiday falls on any weekly day of rest or on any other holiday, an alternative holiday shall not be allowed, but that weekly day of rest or holiday (as the case may be) on which the public holiday incidentally falls shall be regarded as a public holiday. If, however, an employee is required to work on a public holiday, he shall be paid basic wages or pay (as the case may be) at double the usual rate, as well as the cost of living allowance, if admissible, at the ordinary single rate.

(3) A holiday without wages or pay may be granted on the occasion of religious festivals to non-Buddhist employees by mutual agreement between employers and employees.

(4) The employer shall determine and allow at least a day in a week as the holiday on full wage or pay.

Section 4. (1) Every employee who has completed a period of twelve months continuous service shall be granted earned leave with average wages or average pay for a period of ten consecutive days by his employer during the subsequent period of twelve months.

(2) Earned leave shall be granted after completion of a period of 12 months' continuous service during which and employee has worked at least twenty four days in every month. Provided that an employee shall forfeit one day from his earned leave for every month in which he has not worked twenty days.

Explanation: An employee shall be deemed to have completed a period of 12 months' continuous service notwithstanding any interruptions in service during those 12 months brought about by sickness or accident or absence duly authorized under this Act, which counted together, do not exceed 90 days, or by a lockout or a strike which is not an illegal strike or by intermittent periods of involuntary unemployment which, counted together, do not exceed 30 days.

(3) An employer shall fix the time at which earned leave may be taken by his employee within three months from the last date of the period of 12 months in respect of which the earned leave is to be granted. Accumulated earned leave admissible may, however, by mutual agreement between the employer and the employee concerned be granted to the employee at any time during any period not exceeding three years.

(4) An employee who has been granted earned leave shall, before his earned leave begins, be paid the wages or pay (as the case may be) due for the period of earned leave allowed. Such payment shall be made to the employee or his authorized representative at the place where wages or pay are or is usually paid.

(5) If an employee who is entitled to earned leave resigns, or is discharged by his employer, or dies before he has taken his earned or accumulated leave, the employer shall pay him or his legal representative wages or pay (as the case may be) in lieu of earned leave at a rate equivalent to the daily average of the wages or pay (as the case may be) for the days on which he had worked during the 30 days immediately preceding his resignation, discharge or death. Such payment shall, in the case of resignation or discharge, be made within two days and, in case of death, as soon as possible after a claim is made for such payment.

Section 5. (1) An employee shall be admissible to casual leave with wages or pay (as the case may be) aggregating six days in a year:

Provided that he shall only be admissible to a maximum casual leave of three days at any one time for either traveling long journey by water and land transport or any special occasions related to religious affairs.

(2) Casual leave shall not be combined with any other kind of leave.

(3) If the employee does not take the casual leave which he is entitled to within the year, it shall lapse.

Section 6. (1) An employee shall be admissible to leave on medical certificate with wages or pay (as the case may be) not exceeding 30 days in a year:

Provided that leave on medical certificate shall not be admissible to an employee until he has been in service for at least six months, and that the grant of such leave shall be subject to a waiting period of three days for which he shall be paid half his usual pay or wages (as the case may be).

If however, an employee has not been in service for at least six months, he shall be admissible to leave on medical certificate without pay.

(2) Leave on medical certificate shall be granted on production of a certificate (in order of priority) from the registered doctor of the trade, industry or establishment concerned, or a registered doctor approved by the trade, industry or establishment, or from a government registered doctor in the case of government employees, or from the railway registered doctor in the case of railway employees, or from any other registered doctor.

(4) An employee, who has been granted leave on medical certificate shall, if so requested by him, be paid the wages or pay (as the case may be) due to him weekly during the period of leave on medical certificate. Such payment shall be made to the employee or his authorized representative at the place where wages or pay are or is usually paid.

(5) If the employee does not take the medical leave which he is entitled to within the year, it shall lapse.

Section 7. Subject to the provisions of sub-section (5) of section 6, leave on medical certificate may be granted in continuation of earned leave.

7 (A) The pregnant woman workers shall be allowed six weeks before and eight weeks after the delivery as maternity leave with the relevant wage or pay. The maternity leave may be allowed joining with medical leave.

Section 8. Notwithstanding the provisions contained in sections 4,5 and 6, an employee who works in any trade, industry or establishment where work is not carried on continuously for 12 months shall be granted by his employer earned leave, casual leave or leave on medical certificate proportionate to his period of service.

Section 9. Any agreement or contract of service whereby an employee agrees to take leave or holidays on terms less favourable than those provided in this Act shall be null and void in so far as it purports to reduce the liability of an employer.

Section 10. (1) Any change in ownership of any trade, industry or establishment shall not affect the employee's rights under this Act.

(2) Nothing in this Act shall operate to the prejudice of any rights to which an employee may be entitled under any other law or under the terms of any award, agreement or contract of service or under any custom or practice, which provides better rights in respect of leave and holidays with wages or pay (as the case may be) than those provided in this Act.

Section 11. Every employer shall keep and maintain such registers and records as may be prescribed.

2.1.20 The Leave and Holiday Rules (2018)

The project developer commits to comply with the sections (15), (20), (21), (29), (33), (41), (50) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i) and (j), (51) and (52).

Section 15. As an employer, one must document the wages for the weekly day off and send a monthly report with Form (4) to the Department.

Section 20. Even if the employer instructs a worker to work only part-time on a gazette holiday, the employer must still pay double of the respective basic wages or basic salary, according to the law.

Section 21. When the employer instructs a piece-work worker to work full working hours on a gazette holiday, the employer has to pay double of the regular respective wages, calculated based on the number of products or counted based on the extent of the worker's performance.

Section 50. The employer –

- a) must provide the worker casual leave, medical leave and maternity leave with respective wages or salary. Moreover, must allow the worker earned leave with respective average wages or average salary. If the employer normally pays the cost of living then the cost of living must also be included;
- b) must provide the worker with earned leave starting from the day of entitlement within 12 months, with respective average wages or with average salary, and also must advance the entitled wage prior to the worker taking leave;
- c) must announce the number of entitled earned leave calculations within three months starting from the last day of the 12-month period or entitled earned leave. In this way, workers can take leave by turns (alternatively). Moreover, to fix the eligibility period within which workers can take earned leave;
- d) if the worker resigns or is terminated or in case of death, has to pay the respective wages/salary within two business/working days starting from the date of incidence;
- e) has to pay the eligible wage/salary for earned leave to his/her official representative (if the worker is deceased);
- f) has to pay for the respective earned leave period if there is a temporary or permanent shutdown and to allow eligible earned leave if the nature of work is less than twelve months;
- g) is not allowed to suspend, to reduce the salary, to relocate or to terminate a worker due to the worker taking maternity leave or medical leave;
- h) has to fill up Form (1), (2), (3), (4), (5) and (6) according to the law. These forms shall be easily accessible from the Inspector. The employer must maintain these documents for up to twelve months' period;
- i) has to record the leave taken in Form (7) and submit to the Inspector not later than every seventh day of each month;
- j) wants the worker to work on a gazette holiday, the employer must receive consent from the worker. The employer must submit Form (8) to the Inspector for approval.

Section 29. Workers can take a maximum of three days' consecutive casual leave. If the worker needs to take additional casual leave, and has a concrete reason, the worker must present to the employer or manager or to an authorized person the concrete reason. If so, the employer can allow casual leave of more than three days.

Section 33. The employer or manager or authorized person must maintain the casual leave record. And, this also must be reported to the Department in the designated format.

Section 41. The employer has to pay wages for entitled earned leave to the terminated worker for the earned leave period according to the employment contract or workplace rules established based upon the nature of work.

Section 51. If the employer rents the business to another person or organization, that other person or organization (the one renting the premises) is responsible for the legal entitlements included within these Rules.

Section 52. One must follow the provisions within the Rules when settling disputes on matters related to leave and holidays.

2.1.21 The Labour Organization Law (2011)

The project developer commits to comply with the sections (29), (30), (31), (37), (43), (44) sub-sections (a), (b), (c) and (d), and (49).

Section 29. The employer shall recognize the labour organizations of his trade as the organizations representing the workers.

Section 30. The employer shall allow the worker who is assigned any duty on the recommendation of the relevant executive committee to perform such duty not exceeding two days per month unless they have agreed otherwise. Such period shall be deemed as if he is performing the original duty of his work.

Section 31. The employer shall assist as much as possible if the labour organizations request for help for the interest of his workers. However, the employer shall not exercise any acts designed to promote the establishment or functioning of labour organizations under his domination or control by financial or other means.

Section 37. The employer desirous of locking-out the public utility service or service which is not included in the public utility service shall inform the starting day and period of lock-out of the work in accord with the stipulation, at least 14 days in advance before the lock-out to the relevant township labour organization and relevant conciliation body and lock-out the work only after receiving the permission of the relevant conciliation body.

Section 43. No employer shall, without permission of the relevant conciliation body, lock-out a public utility service or service which is not included in public utility service.

Section 44. No employer shall:

- a) lock-out a work due to such dispute during the pendency of a trade dispute settlement;
- b) carry out an illegal lock-out which is involved with any provision contained in sub-sections (a) and (c) of section 41;
- c) dismiss a worker who opposes an illegal lock-out which is involved with any provision contained in sub-sections (a) and (c) of section 41;
- d) dismiss a worker for his membership in a labour organization for the exercise of organizational activities or participating in a strike in accord with this Law.

Section 49. No person shall coerce, threaten, use undue influence or seduce by illegal means any worker to participate or not to participate in a labour organization.

2.1.22 The Social Security Law (2012)

The project developer commits to comply with the sections (48) sub-sections (a) and (b), (49) sub-section (a), (50), (51) sub-sections (a) and (b), (53) sub-sections (a) and (b), (54) sub-section (a), (65) sub-sections (a) and (b), (66) sub-sections (a) and (b), (67) sub-section (a), (69) sub-section (b), (70) sub-section (a), clause (iv), sub-section (b) clause (ii), sub-section (c) clause (ii), (74), (75) sub-section (a) clauses (i), (ii), (iii) and (iv), sub-section (b) clauses (i), (ii) and (iii), sub-section (c), (77), sub-sections (a), (b), (c) and (d).

Section 48. (a) The employer shall effect insurance by registering at the relevant township social security office in order to get employment injury benefit by the workers applied to provisions of compulsory registration for employment injury benefit insurance system contained in section 45 and by paying contribution to employment injury benefit fund in accord with the stipulations.

(b) The employers may effect insurance by registering voluntarily for the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system and by paying stipulated contribution to employment injury benefit insurance fund.

Section 49. (a) The employers and insured of establishments where the employer had registered compulsorily under sub-section (a) of section 48 or where the employer had registered voluntarily under sub-section (b) of section 48 who have paid contribution to employment injury benefit fund shall not apply to the provisions contained in the Workmen's Compensation Act in respect of the employment injury benefit.

Section 50. In respect of employer's contribution to be paid to employment injury benefit fund for the worker to enjoy the employment injury benefit under section 47, the Ministry of Labour, Immigration and Population shall determine rates of contribution depending on the worker's wage and degree of possibility of employment hazard, by notification, in co-ordination with the Social Security Board with the approval of the Union Government.

Section 51. The employer:

- a) shall pay contribution monthly to Employment Injury Benefit Fund at the rates stipulated under section 50. Moreover, he shall also incur the expenses for paying as such;
- b) shall pay defaulting fees stipulated under section 88, in addition to the contribution if fails to contribute after effecting insurance for employment injury benefit.

Section 53. (a) The employers and workers shall co-ordinate with Social Security Board or insurance agency in respect of keeping plans for safety and health in order to prevent employment injury, contracting disease and decease owing to occupation and in addition to safety and educational work of the workers and accident at the establishment.

(b) The employer shall incur the costs of medical treatment for employment injury occurring from criminal action or omission of the employer, or occurring from employer's failure to keep occupational safety plans and protections, and other benefits entitled to enjoy under this Law in accord with the stipulations without fail.

Section 54. (a) The employer shall report immediately to the relevant township social security office if a serious occupational accident has been occurred to his insured worker. There shall not be any delay without sufficient cause to report as such.

Section 65. The employer:

- a) has the right of reimbursement out of benefits granted under this Law, for expenses incurred according to social obligation for an insured in cases of health care, medical treatment and other matters entitled to benefit;
- b) if the total amount of wages and cash benefit paid to the insured during the period of enjoying any of sickness or maternity, or employment injury benefits under this Law exceeds the normal wages of that insured, may deduct the amount in excess out of benefits granted under this Law. Such payment of excess amount shall be informed to the relevant township social security office.

Section 66. (a) The employer, subject to health care and medical treatment in accord with sections 67 and 68:

- i. shall not dismiss or terminate the insured from work or demote to lower level during the period which an insured is enjoying any of the sickness or maternity or temporary disability benefits owing to employment injury under this Law;

- ii. shall not reduce or deduct wages and fees of his worker due to liability for contribution payable under this Law.

(b) The insured, as regards his injury due to employer's violation of prohibitions under subsection (a), may submit the matter to the relevant township social security office for settlement in accord with the stipulations.

Section 67. (a) The employer may, in order to provide medical treatment to his insured workers, after obtaining permission and terms and conditions of the Social Security Board, establish private hospital and clinic in accord with the existing law and provide health care and medical treatment in accord with the stipulations with doctors and nurses appointed by him.

69. (b) The employer who defaults to pay contribution shall pay contribution liable under section 17 and 50 and also defaulting fees stipulated under section 88, and incur the benefits and cost payable to the insured and all expenses.

Section 70. (a) When the insured voluntarily resigns from work or transfers to any other establishment not applied by this Law before the completion of age stipulated for superannuation benefit under section 34:

(iv) the employer has the right to draw 25 per cent of contribution paid by him for the insured to the fund for invalidity benefit, superannuation benefit, and survivors' benefit for 36 months and above together with interest from that fund in accord with the stipulations.

(b) In case of permanent total disability or decease of an insured owing to employment injury:

(ii) the employer has the right to draw 25 per cent of contribution paid for 36 months and above to the fund contained in clause (i) for an insured together with interest in accord with the stipulations.

(c) In case of voluntary resignation or transfer to any other establishment which is not applied by this Law of taking superannuation or becoming invalidity or permanent total disability owing to employment injury, or decease resulting from any cause of an insured:

(ii) the employer has the right to draw contribution paid for that insured to the fund for unemployment benefit for 36 months and above together with interest in accord with the stipulations.

Section 74. The employer of each establishment applied by this Law shall keep record of contributions paid to the Social Security Fund and Employment Injury Benefit Fund for himself and his insured workers, keep the record of benefits received for each insured and open account for each insured. Those records and accounts shall be submitted to the relevant township social security office in accord with the stipulations.

Section 75. The employers of establishments applied by this Law:

- a) shall prepare and keep the following records and lists correctly and submit to the relevant township social security office in accord with the stipulations:
 - i. records and lists of workers' daily attendance;
 - ii. records on appointment of new workers, employing worker by changing of work, termination, dismissal and resignation;
 - iii. records on promotion and paying remuneration;
 - iv. records and lists of employer, manager, and administrator and records on change of them;
- b) shall inform the relevant township social security office if the following matters arise:
 - i. changes in number of workers and address of establishment;

- ii. change of employer, change of business, suspension of work, and close-down of work;
 - iii. employment injury, decease and contracting diseases.
- c) shall submit records of work and lists if requested by inspectorate or official assigned by the Social Security Head Office and various levels of Regional Social Security Office under this Law.

Section 77. Any employer of establishment concerning with the social security and employment injury benefit:

- a) shall not prepare incorrectly, modify or delete records contained in section 74 and sub-section (a) of section 75;
- b) shall not report incorrectly to the relevant township social security office relating to the number of workers and contribution;
- c) shall not refuse when the inspectorate or the official requests to produce those records, reports and other necessary documents under this Law or assigned by the Social Security Board;
- d) shall not fail when he is summoned by the inspectorate or the official under this Law or assigned by the Social Security Board or various levels of Regional Social Security Office.

2.1.23 The Labor Dispute Settlement Law (2012, amended in 2014 and 2019)

The project developer commits to comply with the sections (23), (28) sub-sections (a) and (b), (34), (35), (36), (37) sub-sections (a), (b) and (c), (38) sub-section (a), (39), (40), (41), (42), (43), (44), (45) sub-section (a), and (51).

Section 23. An employer or worker may file in person or through a legally authorized representative, an application to the relevant department or competent court with regard to a dispute concerning a right.

Section 28. The parties in dispute may do the following if they do not agree with the decision of the arbitration body, except a decision with regard to an essential services business –

- a) filing an application to the arbitration council by a party within 7 days from the receipt of the decision of the arbitration body;
- b) carrying out a lock-out or strike in accordance with the relevant law.

Section 34. If both parties agree with or no party files an application to the arbitration council within the specified period concerning a decision of the arbitration body, the decision shall be valid from the date of it having been passed.

Section 35. The decision of the Tribunal shall be deemed as the decision of the Arbitration Council. Such decision shall come into force on the day of its decision.

Section 36. The relevant parties may agree to amend the decision of the Arbitration Body or Arbitration Council after ninety days from the day of coming into force. In such circumstances, the new agreement shall supersede the relevant part of the Arbitration decision.

Section 37. The following persons shall be complied with the decision which had been come into force:

- a) all of the persons relevant to the dispute;
- b) legal successors of the employer involved in the dispute;
- c) all of the workers working in the trade at the time of the dispute or thereafter.

Section 38. No employer or worker shall fail to be present in person or through a representative without proper reason on the date and time set by the conciliation body for the negotiation of a dispute.

(a) No employer or worker shall fail to form a coordination committee according to the provisions of section 3. Furthermore, there shall be no failure to do so within 60 days after being sentenced by the relevant court for the failure.

Section 39. No employer shall, with the intention of harming the interest of the workers, suddenly amend the employment terms specified before the dispute or carry out a lock-out without proper reason during the process of the dispute being heard by the arbitration body or tribunal.

Section 40. No person shall lock-out or strike without accepting negotiation, conciliation and arbitration by Arbitration Body in accord with this law in respect of a dispute.

Section 41. No person shall lock-out or strike to amend such decision or agreement to amend within the effective period of any decision or collective agreement of the Arbitration Body or the Arbitration Council.

Section 42. No person shall prohibit the right to work independently of the workers who are not desirous to participate in the strike nor impede the right of a worker to strike.

Section 43. No employer or worker shall fail to comply with or enforce an item in the agreement concluded in front of the conciliation body with regard to a dispute.

Section 44. No person, after having informed in advance by the Arbitration Body or Tribunal for settling the dispute, shall fail to arrange to enable to examine the trade under dispute or to produce the documents which is considered by the Arbitration Body or Tribunal that it concerns with the dispute or to appear as a witness when he is so summoned.

Section 45. No person, if he is sent notice for examination before the Arbitration Body or Tribunal, shall fail without sufficient cause to appear in person or to send legal representative within the stipulated period.

(a) No one shall violate any provision of the rules, notifications, orders and directives issued according to this law.

Section 51. An employer having done or omitted, without proper reason, an act with the intention of harming the interest of a worker during the settlement of a dispute shall fully pay the amount specified by the arbitration body, arbitration council or tribunal. An officer of the Department assigned by the Ministry shall collect the amount like arrears of land tax.

2.1.24 The Minimum Wage Law (2013)

The project developer commits to comply with the sections (12) sub-sections (a), (b), (c), (d) and (e), (13) sub-sections (a), (b), (c), (d), (e), (f) and (g), (16), (22) sub-sections (a), (b), (c), (d) and (e), (24) sub-sections (a) and (b).

Section 12. The employer:

- a) shall not pay wage to the worker less than the minimum wage stipulated under this Law;
- b) may pay more than the minimum wage stipulated under this Law;
- 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;
- d) shall pay the minimum wage to the workers working in the commerce, production business and service in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash in accord with the stipulations or

jointly in some cash and in some produce prescribed in local price according to the desire of the worker;

- e) may pay jointly in some cash and some produce prescribed in local price according to the local custom or desire of the majority of workers or collective agreement in paying the minimum wage to the workers and working in the agriculture and livestock breeding business. Such payment shall be for any personal use and benefit of the worker and his family and the value shall also be considerable and fair.

Section 13. The employer:

- 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;
- b) shall record the lists, schedules, documents and wages of the workers correctly in accord with the stipulation;
- c) shall report the lists, schedules and documents recorded under sub-section (b) to the relevant department in accord with the stipulations;
- d) shall accept the inspection when summoned by the inspection. Moreover, he shall produce the said lists and documents when so required;
- e) shall allow the entry and inspection of the inspector workplaces of commerce, production and service, agriculture and livestock breeding and give necessary assistances;
- f) shall give them holiday for medical treatment in accord with the stipulations if the workers cannot work due to sickness;
- g) shall give holiday without deducting from the minimum wage, in accord with the stipulations if the funeral matter of the family of worker or his parent occurs.

Section 16. If an employer is convicted by a court for his failure to pay the minimum wages and other benefits stipulated under this Law or for the payment to worker less than such minimum wage and ordered to pay defaulted wages and other benefits to the relevant worker as fine, and if such worker does not obtain fully the wages and other benefits which is entitled under section 14, it shall not affect the right to institute civil proceeding for such wages and benefits.

Section 22. Any employer:

- a) shall not fail to pay the workers the minimum wage stipulated under this Law;
- b) shall not pay to the workers less than the minimum wages and other benefits which is entitled to enjoy by the worker under section 14;
- c) in respect of the accounts, schedules, documents and lists of wage of the workers:
 - i. shall not make false entry, deceitful recording or false and deceitful reporting;
 - ii. shall not fail to report to the relevant department in accord with the stipulations;
 - iii. shall not fail to submit when required by the inspection officer.
- d) shall not fail to go and accept without sufficient case when summoned by the inspection officer;
- e) shall not disturb or interfere with the inspection officer who comes and inspects on duty.

Section 24. Any employer:

- a) shall not violate term and condition contained in the minimum wage notification;
- b) shall not fail to inform the workers in respect of the rates of minimum wage concerning to his workers among the rates of minimum wage stipulated under this Law and advertise at the place where the workers are able to see it in the work department and workplace.

2.1.25 The Minimum Wages Rules (2013)

The project developer commits to comply with the section (43) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k) and (l).

Section 43. The employer:

- a) shall increase the remuneration depending on the skill, to promote the productivity and the employment skill of the employees;
- b) shall perform in accord with the factory act 1951, leave and holiday act 1951 under section 13 (b) at the law for the list, schedule and document, remunerations;
- c) when the employees are not able to work due to ill health, injury at work site:
 - i. if they are under premium paid insurance to the health and social care fund, the insurance under health and social security care 2012, or
 - ii. if they are not entitled to enjoy social security law 2012, they must be arranged to enjoy the leave and holiday act 1951.
- d) in the event of family or parents' funeral affairs, his entitled remuneration should not be deducted and shall be arranged to enjoy according to leave and holiday act 1951;
- e) before fixing of the minimum wage by the National Committee under this rule, if his remuneration is less than the prescribed amount, he should be paid up to the full amount;
- f) part time, hourly job employees shall be paid the prescribed minimum wage for the working hours;
- g) for the salary employees one-day day – off shall be allowed in a week. If he has to work on the off day, overtime wage shall be paid in accord with the existing law;
- h) if the employee has to work less than the prescribed working hour and if it is not due to his will or he has to stop the work due to the shortage of work from the employer, he shall be entitled to enjoy the remuneration as if he has to work full time;
- i) the prescribed minimum wage shall be paid without discrimination of the male or female;
- j) although he has the obligation to pay the minimum wage in cash, separate entitlement, benefit in accord with the stipulation shall be given due to the employee's will, majority of the employees' will, collective consent, in cash or partial in cash or prevailing regional rate or regional tradition;
- k) overtime work shall be allowed according to the law after negotiation with the employees;
- l) the employee who is not capable to fulfill the standard norm or production norm prescribed in accord with the factory, workshop, department, shall be trained to be skillful in the probation period. If necessary, the relevant factory, workshop, departments under this law shall be paid for not less than 50% of the remuneration within three months. In the probation period 75% of the remuneration shall be paid.

2.1.26 Myanmar Fire Brigade Law (2015)

The project developer commits to comply with the sections (16) sub-sections (a) and (b), (17) sub – section (a), (24), (25) sub-sections (a) and (b), (30), and (32).

Section 16. The person-in-charge of the Township Fire Services Department shall:

- a) issue, from time to time, the directives on fire safety to be abided by the residents in the city, ward or village – tract;
- b) inspect or cause to inspect in accord with the stipulations whether the residents in the city, ward or village – tract abide by the directives issued under sub-section (a) and arrange to enable warning or taking action, as may be necessary, against those who do not abide by.

Section 17. The relevant Government department or organization shall, for the purpose of fire safety, obtain the recommendation of the inspection on fire safety of the Department of Fire Services before granting permission for the following matters:

- a) constructing three-storied and above buildings, condominium, market and complex buildings;

Section 24. No person shall fail to abide by the directives of fire safety issued under section 16 by the head of the relevant Township Department of Fire Services.

Section 25. The owner or manager of the factory, workshop, bus terminal, airport, port, hotel, motel, lodgings, condominium, market, department, organization or business exposed to fire hazard shall, in accord with the directive of the Department of Fire Services:

- a) not fail to form the Reserve Fire Brigade;
- b) not fail to provide fire safety equipment.

Section 30. No person shall remove, clear or transfer the evidence from the specified area of the place razed by fire before the place of starting fire on and cause of fire are inspected confirmed by whom it concerns.

Section 32. No person shall form or dissolve the Reserve Fire Brigade without the direction or permission of the Department of Fire Services.

2.1.27 Vehicle Safety and Motor Vehicle Management Law (2020)

The project developer commits to comply with the sections (17), (18) sub-sections (a), (19) sub – sections (a) and (b), (24), (26), (28), (29) sub – sections (a) and (b), (75) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l) and (m), (80), (81) sub-sections (a), (b), (c), (d), (e), (f), (g), (h) and (i), (82), (83) and (84) sub-sections (a), (b), (c) and (d).

Section 17. The owner of a motor vehicle shall register a motor vehicle to a registrar.

Section 18. The owner of a motor vehicle shall

- a) maintain a motor vehicle to drive safely in accord with standards stipulated by the Department;
- b) the registration of a vehicle shall not be allowed if the vehicle implies one of the following:
 - i. has any defect;
 - ii. if it is not in conformity with the requirements contained in sub - section a)
 - iii. if it is not in conformity with stipulations contained in the rules made under this Law;
 - iv. if the applicant fails to mention the previous registration of this vehicle.

Section 19. a) The owner of a motor vehicle may apply to the registrar to register a motor vehicle temporarily according to the prescribed manner;

b) According to sub-section (a), the registrar may review the application and issue the temporary registration certificate by prescribing the period and place.

Section 24. The owner of motor vehicle shall register commercial motor vehicle as a hired motor vehicle.

Section 26. The registrant of a motor vehicle shall inform the registrar to record the new address whenever changing the address.

Section 28. The registrant has to apply to the registrar for the renewal of the vehicle registration before the registration is expired within the prescribed time period and if the registrant applied the renewal after the expiration of the registration, the fines will be applied.

Section 29. The registrant of a motor vehicle shall:

- a) if he desires to alter in a motor vehicle, apply to the registrar in advance.
- b) Pay fines prescribed by the Ministry with the approval of Union Government if changes are made to the motor vehicle without the prior permission of the registrant except the stipulations in section 31, sub – section (b).

Section 75. No person shall:

- a) drive a motor vehicle in a public place without bringing his/her valid driving license with him/her;
- b) operate as a spare man without bringing his/her valid spare man license with him/her;
- c) drive a motor vehicle with the expired driving license;
- d) operate as a spare man with the expired spare man license;
- e) drive a motor vehicle if he/she is mentally or physically not good enough to drive;
- f) drive a motor vehicle with the overload;
- g) drive a motor vehicle installing the extra lights and beams;
- h) drive a motor vehicle against the rules and regulations of pedestrians crossing;
- i) use other's spare man license to operate as a spare man;
- j) fail to present the vehicle registration certificate while driving the valid and registered vehicle;
- k) use the mobile phone while driving the vehicle;
- l) let the children under the age of 10 safety sitting in the car seats of baby while driving the vehicle;
- m) drive the vehicle without wearing seat belt and let other riders not to wear seat belts.

Section 80. No person shall drive/ let drive or stop the motor vehicle at the public place if the vehicle has temporarily suspended or expelled vehicle registration certificate, or the expired vehicle.

Section 81. No person shall in a public place:

- a) drive a motor vehicle if he has no driving licence;
- b) drive a motor vehicle if it is not allowed to drive and prescribed in the driving licence;
- c) drive a motor vehicle by using other's driving licence;
- d) drive a motor vehicle more or less the speed limit;
- e) drive carelessly or dangerously a motor vehicle;
- f) drive a motor vehicle which may be dangerous;
- g) drive or transport a motor vehicle with dangerous goods without following the regulations;
- h) drive a motor vehicle by using narcotic drugs or psychotropic substances or intoxicated liquor;
- i) use the vehicle registered as hired vehicle for business purposes;

Section 82. No person shall use or allow to use a motor vehicle in a public place without paying third party liability insurance .This prohibition shall not be applicable to passengers.

Section 83. No owner or responsible person of a motor vehicle shall permit to drive or allow to drive such motor vehicle to any person who has no driving licence.

Section 84. No person shall make any of the followings on the registered motor vehicle:

- a) making a motor vehicle number plate not to be obvious;
- b) using other number plate rather than the motor vehicle number plate issued by the department;
- c) driving or stopping a motor vehicle in a public place without installing the motor vehicle number plate;
- d) use the documents and motor vehicle number plate for other vehicle issued by the department.

2.1.28 Vacant, Fallow and Virgin Land Management Law (2012)

The project developer commits to comply with the section (16), sub-sections (a), (b), (c), (d), (e), (f), and (g).

Section 16. The person who has the right to carry out or use vacant, fallow and virgins shall:

- a) carry out only the carry out only the permitted category of business and the business relating to it;
- b) reclaim and carry out the permitted land until the completion of business according to the stipulation within 4 years starting from the day of permission. The prescribed period for the passed time due to the natural disaster or unstable situation may be amended and stipulated by the Central Committee;
- c) not mortgage, gift sell, lease, transfer by other means or divide the permitted vacant, fallow and virgin lands without permission of the Union Government;
- d) pay up the land revenue for vacant, fallow and virgin lands which he has the right to carry out;
- e) comply with the terms and conditions stipulated by the Central Committee relating to the right to carry out or use vacant, fallow and virgin lands;
- f) not extract other natural resources above and below the ground except the permitted business;
- g) when confiscating the required land area from the permitted land area, in finding the natural resources within the permitted land and the Government is desirous to produce commercially, shall return as directed by the Union Government.

2.1.29 Farm Land Law (2012)

The project developer commits to comply with the sections (12), sub-section (f), and (29).

Section 12. The person who has the right to use the farmland:

(f) right to use common interest the farmland in accord with the Foreign Investment Law of the Republic of the Union of Myanmar by cooperating with the foreigner or the organization in which the foreigner is included.

Section 29. In order to use the farmland by other means for the purpose of long-term national interests of the State, the relevant Ministry that will implement the huge projects may carry out with the approval of the Union Government after obtaining remark of the Central Administrative Body of the Farmland.

2.1.30 Protection and Preservation of Cultural Heritage Regions Law (2019)

The project developer commits to comply with the section (21), sub-sections (a), (b), and (c).

Section 21. A person desirous of carrying out one of the following shall abide by the provisions of other existing laws and also apply to the Region or State Preservation Committee or Regional Preservation Committee in accordance with stipulations to obtain prior permission for not impacting the cultural heritage regions:

- a) Within the urban and villages of cultural heritage zone
 - 1) constructing or extending a building;

- 2) renovating other building or fencing, renovating or extending the boundary of its enclosure except heritage building;
 - 3) renovating and constructing the religious buildings, education and health infrastructures without impacting the cultural heritage;
 - 4) expansion of road and road repairing and renovation of jetty;
 - 5) digging well, pond, swimming pool, reservoir, fish-breeding pond, livestock farm, perennial trees plantation, or extending or renovation;
 - 6) constructing, extending or repairing craftwork factories;
 - 7) constructing, extending or repairing restaurants, souvenir shops, activities related to touring;
 - 8) constructing, extending or repairing exhibition buildings;
 - 9) Repairing the existing hotel, motel, inn, guest house or small and medium industrial buildings;
 - 10) Flying helicopter, gas – ballons, drones.
- b) In buffer zone
- 1) Road construction, constructing or extending jetty, railroad, railway station, stadium and field, building and bridges;
 - 2) Constructing and erecting transmission towers, underground works, underground cables, power grid, electrical sub-station, posts, and gas pipelines;
 - 3) Flying helicopter, gas – ballons, drones;
 - 4) Constructing entertainment building, guest house, rest camp, horse riding field and infrastructure.
- c) Within the cultural heritage zone
- 1) Growing perennial trees which can impact the environment and surrounding views on farm land;
 - 2) Carrying out the following which can destroy the original topography of the land:
 - i. Gold panning, sand extraction, rock extraction, brick making, garbage disposal and wastewater disposal;
 - ii. Land clearing, earthwork excavation, bulldozing natural high lands and blocking water flow;
 - iii. Covering pond, stream, irrigation channel with soil.
 - 3) Destroying and cutting the existing local species of natural plants and growing the exotic species and perennial trees;
 - 4) Blocking or fencing the heritage buildings or places which are located in a compound.

2.1.31 Yangon City Development Committee (YCDC) Law (2018)

The project developer commits to comply with the section (70), sub-sections (a), (b), (c) (1),(2), (3), (4), section (72), section (77), section (123), section (150), section (151), section (152), section (310), sub-sections (a), (b), (c), (d), section (312), sub-sections (a), (b), (c) (i), (ii), (d), (e), (f), (g), (k), (l), (m), (n), section (315), sub-sections (a), (b), (c), (d), (i), (k), (l), (m), (n), section (316), sub-sections (a), (b), (c) (1), (2), (3), (4), (d), (e) (1), (2), (3), (4), (5), (6), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), section 317, sub-sections (a), (b), (c), (d), section 318, sub-sections (a), (b), (c), (d), section 322, sub-sections (a), (b), (c), (d), (f), (g), (h), (i), (l), (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (z), (aa).

Section 70. (a) Every person shall apply to the Committee for permission of constructing building in accordance with the prescribed rules and regulations. The committee may review the application within 60 days starting from the date of application received and make approval or refusal.

(b) The application was made according to sub-section (a) and unless the committee made any reply on this within the prescribed period, the applicant shall continue with building construction assuming that the permission was granted from thee committee. Having said

that, the building construction will be in compliance with building construction rules and regulations.

(c) (1) The committee shall define the completion period of the building construction based on the applicant's application, building floor and size.

(2) A person who was granted permission for building construction shall complete the work within the prescribed period.

(3) Unless the building construction cannot be completed within the prescribed period, the applicant shall apply to the committee for the renewal of permission with concrete reasons.

(4) The committee shall review the reasons and approve the renewal.

Section 72. If the construction, repairing and demolition of building occurs in the public place, a person who is doing these implementations shall carry out the necessary precautions and protection measures to avoid any impacts on the commuters and community lives and disturbances.

Section 77. Any person who is constructing a building within the city boundary shall submit the report of completion of building construction to the committee within 30 days after completion. All the requirements shall be ready for the inspection of building.

Section 123. If a new private street is made within the city boundary for the purpose of public use or private use, the approval of the committee is required to do so.

Section 150. The rainwater runoff from buildings and compounds within the city boundary shall be properly disposed into the committee drains.

Section 151. If a building owner or a land owner needs to connect his drain with the committee drain then the committee shall be reported accordingly.

Section 152. If a cluster of buildings will be constructed within the city boundary, then the committee shall direct the corresponding owner of the building or building users to do the digging of drains according to the prescribed regulations and standards.

Section 310. Prohibitions concerning Urban Planning and Land Management

a) No one shall construct buildings for residing, establish industries, implement agriculture and livestock or other businesses within the city boundary without getting the land lease agreement, license, permit, grant in line with the regulations of the committee;

b) No one shall continue with the businesses mentioned in sub-section a) after the expiration of land lease agreement, license, permit, grant and renewal was not made yet;

c) No one shall let other party or person except the land measurement unit or staff designated by the committee to measure his own land for the purposes of building construction, selling to others or land division;

d) No one shall obstruct or prevent the land measurement unit or officer designated and permitted by the committee to enter and measure the committee land lease agreement, license, permit issued land and land under the management of committee within the city boundary;

Section 312. Prohibitions concerning Building

a) No one shall construct building or assist to construct building within the city boundary without the approval of the committee;

- b) No one shall construct or repair a building which was prohibited by the committee for building construction and doing business related to building construction;
- c) (i) No one shall construct or repair a building which was suspended by the committee for building construction for a period of time;
(ii) No one shall construct or repair a building which was completely dismissed by the committee;
- d) No one shall construct a building or do a business related to building construction which is different from the building approval and building blueprint approved by the committee;
- e) No one shall reside or use the completed building or part of the completed building without the permission of the committee;
- f) No one shall reside in a building which was constructed to use as a store;
- g) No one shall work as a building contractor within the city boundary without having a business license issued by the committee;
- k) No one shall place the exceed amount of the construction materials on the public street which is temporarily permitted by the committee;
- l) No one shall place the advertisement signboards without the permission of the committee;
- m) No one shall make changes of the existing topography or fill the pond with earth without the permission of the committee;
- n) No one shall construct building without following the regulations for digging drains and connecting with public drains for disposal of water coming from construction;

Section 315. Prohibitions concerning Road, Bridge, Pavement and Drains

- a) No one shall construct a public street or private street within the city boundary without the permission of the committee;
- b) No one shall construct a street or bridge underground or on ground without the permission of the committee;
- c) No one shall dig or destroy the public street, bridge or pavement without the permission of the committee;
- d) No one shall dig or fill or clear the land to change the road surface without the permission of the committee;
- i) No one shall dispose or spill the construction materials, unclean substances, wastes and other materials on streets and pavements within the city boundary;
- k) No one shall cleanse and repair a kind of motor vehicle in street and on pavement within the city boundary. No one shall do night parking of a vehicle without the permission;
- l) No one shall drive either a type of vehicle which was not permitted by the committee to be driven in the street designated by the committee or overloaded vehicle than permissible load;
- m) No one shall park, repair and leave a vehicle long in the public street without reasoning within the city boundary;
- n) No one shall obstruct the movement or parking of vehicles in the public street within the city boundary;

Section 316. Prohibitions concerning Water Supply and Distribution

- a) No one shall violate any of the stipulation of the act regarding the daily drinking water supply and distribution of the committee for the people who are living in the city boundary;
- b) No one shall do the water connection work within the city boundary without the permission of the committee;
- c) No one shall do any of the following water connection work within the city boundary without the permission of the committee;
 - 1. Direct connection to the main pipe to get water to the house;
 - 2. Connection to the permissible water pipe with auxiliary water pipe;
 - 3. Using electricity or any kind of energy or hand pump to get more water from the permissible water pipe;
 - 4. New installation or additional installation of the permitted and original installation of materials, sizes and quantities related to water and sanitation;
- d) No one shall illegally fix, destroy, remove or make changes and install the water meter installed by the committee and connect water without using the water meter;
- e) No one shall do any of the following related to the committee water supply and distribution within the city boundary:
 - 1. Impurification of drinking water by some means;
 - 2. Wasting, redistributing and selling water;
 - 3. Piling materials, excavation, filling and burying on the soil which is related to water supply and distribution work;
 - 4. Letting animals enter into the water storage pond or reservoir, bathing and cleansing with water in the designated boundary;
 - 5. Disposing any materials which can pollute water and degrade water quality into the water reservoir;
 - 6. Violation of any regulations which protect the trees and forests within the reservoir designated area.
- f) No one shall illegally stay and do any business within protected pond and reservoir embankment, fencing boundary, pipe line boundary for the committee water supply and distribution work;
- g) No one shall construct a building or fill earth on and within the designated distance of the collection ponds, the filtration ponds and water reservoirs related to water supply and distribution work;
- h) No one shall move, fix, change and destroy the pond embankment and fencing, water pipe and associated materials;
- i) No one shall open, close, adjust, install (a new sluice gate), remove and move the sluice gate installed at the reservoir and water pipes without the permission.
- j) No one shall without the permission of the committee construct, repair, and extend the street, railway, bridge, building on the main water supply pipe connected from the outside of the city boundary and main water supply pipe within the city boundary;

- k) No one shall row or ride the boat, swim, do fishing, wash clothes and take bath within the water reservoir;
- l) No one shall take bath, wash clothes, excavate and fill soil, and cleanse motor vehicles within the designated boundary of the water reservoir;
- m) No one shall dispose, spill and emit the wastes and bad smell which are harmful to the public and the environment from sanitary pipes and wastewater pipes of the compound, land, building, factory and industry and high rise buildings;
- n) No one shall without the permission of the committee connect to the sanitary pipe system managed by the committee to dispose the wastewater from buildings and compound;
- o) No one shall obstruct and deter the work related to finding the water source (in cooperation with foreign private companies) for supplying enough drinking water for the public within the city boundary.

Section 317. Prohibitions related to drains

- a) No one shall block without the permission of the committee the natural streams, creeks and estuary or any parts of these, the drains, underground drains, natural water flows in some ways or change the water flow direction, obstruct the water flow, fill the earth and divert the water flow;
- b) No one shall dispose the wastes, wastewater, and block the public roadside drains, big drains, river and river mouths, streams and creeks within the city boundary;
- c) No one shall without the permission of the committee dispose and flow the wastewater from the building compound within city boundary into the public drains and rivers and creeks;
- d) No one shall without the permission of the committee build, repair and destroy the drains, sluice pipe, sluice gate, wall and bank of creek, pond and bank of earth within the city boundary.

Section 318. Prohibitions related to sewage and wastewater collection, treatment and disposal

- a) No one shall build factory, industry and buildings without incorporating the flush toilet, squat toilet, sewer pipe, wastewater pipe, septic tank, sewage and wastewater treating system;
- b) No one shall build a building or pile materials which can obstruct or impact the septic tank, wastewater treatment tank, sewage and wastewater treatment tank, septic tank, sewer pipe, and wastewater pipe;
- c) No one shall dispose the sewage and wastewater which are not in compliance with the wastewater quality standards set by the committee into the drains, rivers and creeks;
- d) No one shall destroy the wastewater treatment system.

Section 322. Prohibitions related to Environmental Protection and Cleansing Work

- a) No one shall carry out any businesses which can cause soil pollution, air pollution, water pollution and noise pollution within the city boundary;
- b) No one shall dispose the chemical related substances, hazardous substances, substances which can cause radiation, electronics wastes which can cause the environmental pollution at any places except the designated area with the prescription of the committee within the city boundary;

- c) The owner or the operator of the business, factory, industry and hospital within the city boundary shall not flow, pile, dispose, spread the hazardous solid waste and liquid waste, healthcare wastes at the public places;
- d) The owner or the operator of the construction business, economic activities, factory and industry within the city boundary shall take responsibility of establishing the necessary plans to avoid the environmental pollution which can be caused by his/her work implementation;
- f) The owner or the operator shall not fail to carry out the duties and responsibilities to avoid the pollution of the surrounding well, pond, tube well, drain and creeks and streams due to the flow and disposal of solid waste and waste water from economic activities, factories and industries or percolation of these wastes into the ground;
- g) A person who is desirous of establishing economic business, factory and industry within the city boundary has to follow the guidelines and stipulations of environmental conservation for the establishment of economic business, factory and industry;
- h) No one shall dispose garbage at any place except the designated garbage bin, garbage tank and places by the committee within the city boundary;
- i) No one shall pile the objects on the land owned by the committee;
- l) No one shall move or destroy the designated garbage bin, garbage tank and places by the committee within the city boundary;
- m) No one shall without the permission of the committee take the garbage at the designated garbage disposal place to use as mulch or peat or other purposes;
- n) No one shall dispose wastewater from factories, industries and economic businesses into the drains, rivers and creeks without treating in compliance with the standards;
- o) No one shall emit air polluting gases and emissions from factories, industries and economic businesses into the ambient air without treating in compliance with the standards;
- p) No one shall dispose or burn any type of waste at any place except the designated place by the committee;
- q) No one shall do the waste collection and disposal business without the permission of the committee;
- r) If a new building is constructed within the city boundary, then the owner or the constructor has to build, incorporate and implement the waste disposal system, and the plans related to maintenance, repair and change of the system;
- s) The committee guidelines on solid waste storage and disposal in the public buildings and compound shall be followed and the necessary plans have to be implemented;
- t) No one shall dispose or leave dust, dirt, card board, scrap paper, plastic container and cup, plastic bag, bad smell emitters such as dead animals, garbage bin, garbage bag or any objects and feed animals in public places;
- u) No one shall spit betel nut spitting, dispose wastes and wastes from pet animals in public places and streets;
- v) No one shall dispose or leave the garbage or hazardous chemicals, wastewater and electronics wastes generated from factories, industries and hospitals in the drains, ponds, reservoirs, rivers, creeks and sea or parts of them;
- z) No one shall dispose the waste generated from factories and industries, construction activities, economic businesses, clinics and hospitals, hazardous wastes, electronics wastes

at the designated garbage bin, tank and places for general wastes or other places except disposal according to the special instructions;

aa) No one shall dispose the garden waste and domestic wastes at the designated garbage bin, tank and places for general wastes or other places except disposal according to the special instructions;

2.2 Project relevant Plans, Policies and Strategies of Myanmar Government and relevant Ministries

2.2.1 National Environmental Policy of Myanmar (2019)

The project developer commits to comply with the following National Environmental Policy principles:

- 1) Every person and citizen living in Myanmar has the right to access a clean and healthy environment, and the duty to protect the environment.
- 2) The complete value of Myanmar's environment is recognized and considered – both tangible and intangible values, including its significant spiritual values, ecological assets and cultural heritage, in addition to its direct benefits for humanity.
- 3) Environment and natural resource management will recognise the critical roles that Myanmar's natural capital and ecosystem services play in the country's society and economy.
- 4) Myanmar's ecosystems are to be protected and managed in a sustainable way in order to maintain their natural functions and resilience, and rich biodiversity.
- 5) Myanmar's natural resources are to be protected and managed in integrated and sustainable ways without diminishing their availability and quality for future generations.
- 6) The rights of indigenous people and ethnic nationalities to their lands, territories, resources and cultural heritage, and their roles in environmental conservation and natural resources management, are recognised and protected.
- 7) Environmental service provisioning (including waste management, wastewater treatment, drinking water purification, ambient air and water quality monitoring and management) will be included as necessary parts of infrastructure planning and development for urban and human settlement areas, with resource efficient and zero waste approaches used.
- 8) Environmental sustainability will always be a central objective in determining Myanmar's economic and social development strategies, which will prioritise low-carbon and green economy pathways, through responsible investment and partnerships with the private sector and civil society.
- 9) Recognising the inextricable link between environment and poverty, environmental considerations must be central to effective people-centred development and serve to guide development strategies so that sustainable and equitable approaches to improved prosperity and living standards are pursued.
- 10) Sustainable and renewable energy for the needs of people and for economic development in Myanmar will be secured, and utilized efficiently, through the use of existing technology and innovations in the generation, storage, supply and use of energy.
- 11) Climate smart approaches to development, including resilience, climate change adaptation and mitigation, and disaster reduction strategies, will be aligned to environmental protection and good natural resource management approaches in the pursuit of low- carbon, sustainable development.
- 12) Economic values of environmental services will be recognised and incorporated in development policies so that these values are optimised and maintained to the extent possible.

- 13) Pollution and waste is to be avoided and minimised at the source as more cost effective than remediation, enterprises will be encouraged to adopt clean production principles and best practices.

2.2.2 Myanmar Climate Change Policy (2019)

The project developer commits that the project will be in line with the following guiding principles:

- a) Sustainable development – Develop sustainably to meet the needs of the present without compromising the ability of future generations to meet their own needs by ensuring the promotion of an economically, socially and environmentally sustainable future and a fair and equitable society;
- b) Precaution – Take cost-effective measures to avoid, minimize and protect from environmentally harmful consequences where there are threats of serious or irreversible damage even if there is a lack of full scientific certainty;
- c) Prevention – Take anticipatory action to prevent or minimize environmental damage before it occurs by avoiding, prohibiting or controlling threatening activities;
- d) Environmental integrity – Promote, protect and conserve the natural environment and recognize its complete and intrinsic value, whether tangible or non-tangible, economic or non-economic, to the natural, cultural and spiritual heritage of Myanmar;
- e) Shared responsibility and cooperation – Encourage, support and embrace the common and shared responsibility of all people for the protection, conservation, and equitable sharing of benefits and resources of the environment, and encourage wide cooperation across sectors and stakeholders at all levels, including the private sector.
- f) Inclusiveness – Engage all people at all levels in decision – making and action, by supporting and embracing their diverse social, economic and cultural perspectives, participation and contributions without discrimination, particularly with respect to gender, ethnicity and age, in order to equitably share the benefits and opportunities of climate change adaptation, mitigation and low-carbon, climate-resilient development.
- g) Good governance – Adopt transparent, participatory and responsive processes to ensure that decision-making at all levels is inclusive, equitable and accountable to all people in Myanmar, in accordance with the rule of law.
- h) Climate justice and equity – Promote and protect the rights of the people of Myanmar, in particular the poorest, most vulnerable and marginalized segments of society, including indigenous peoples, all ethnic groups, local communities, women, children, the elderly, and persons with disabilities to live in a healthy environment and a fair, equitable and sustainable society.
- i) Gender equity and women’s empowerment – Promote and protect gender equality and women’s equal rights through strengthening gender-responsive climate change policy concerning adaptation, mitigation, finance, technology development and transfer and capacity-building and ensuring full and equal participation of women in decision-making.

2.2.3 Industrial Policy (2016)

The project developer commits to comply with the vision of Industrial Policy.

Vision

10. If consideration the economic development events of the world, it is found that the development of industrial sector is the core of economic development. The industries may produce and supply various kinds of accessory related to food, clothes and living which are the basic needs of citizens, necessary parts of machine, spare parts for factories and

improving the industries of export, import-substitute products and the new employment opportunities may also be created. Therefore, the establishment of modern industrial country is laid down in the four economic policies of the State.

11. Thus, the State will be established as the modern industrial country for establishing a new modern developed nation and improving the socio-economic of the public in accordance with the vision of the State “to establish a new peaceful and modern developed democratic nation”. The vision of industrial policy is “to establish a new modern industrial nation”.

In order to stand on as a green industry, the project developer commits to follow the following aspects:

78. The following processes shall be taken into consideration not effecting the environment in carrying out sustainable development as the green industries:

- (a) disposal of waste water after treating;
- (b) managing to use the suitable methods for solid waste, liquid and vapour to minimize the environmental impact;
- (c) control of emission of toxic gas, vapour and dust;
- (d) obtaining prior permission to operate business or preliminary surveying the environment or assessing the environmental impact and designing the procedure of environmental conservation;
- (e) designing the supporting procedure assessing the social impact, the effect of health and natural disaster impact;
- (f) establishing service companies to be carried out environmental management.

79. The delay will be avoided in obtaining environmental permission designing the suitable framework in coordination with the Ministry of Natural Resources and Environmental Conservation.

80. The management for environmental conservation shall be carried out by getting information from the relevant local and foreign organizations which are monitoring and recording the following environmental situations:

- (a) measuring cleanliness of air;
- (b) testing water resource;
- (c) monitoring the ecosystem of aquatic animals;
- (d) surveying the socio-economic development;
- (e) surveying the public health.

2.2.4 Myanmar Sustainable Development Plan (2018 - 2030)

This MSDP is structured around 3 pillars, 5 Goals, 28 Strategies and 251 Action Plans. The project developer commits to comply with the following aspects.

Pillar 3: People & Planet is about empowering our people and protecting our planet and it is necessary for sustainable development to be achieved. It is also pointed out that protecting our natural capital and strengthening our human capital will be essential in meeting our national development objectives and ensuring the sustainability of economic growth.

Goal 5: Natural Resources & the Environment for Posterity of the Nation

Protecting Myanmar’s natural environment is essential to ensuring Myanmar’s development gains may be enjoyed by both our present and future generations.

Strategy 5.1: Ensure a clean environment together with healthy and functioning ecosystems

Strategy 5.2: Increase climate change resilience, reduce exposure to disasters and shocks while protecting livelihoods, and facilitate a shift to a low-carbon growth pathway.

Strategy 5.3: Enable safe and equitable access to water and sanitation in ways that ensure environmental sustainability.

Strategy 5.4: Provide affordable and reliable energy to populations and industries via an appropriate energy generation mix.

2.2.5 National Sustainable Development Strategy (2009)

The project developer commits that the project will not negatively impact on the following goal and relevant areas and corresponding activities.

Goal 1. Sustainable Management of Natural Resources

Area (2) Biodiversity conservation

Area (3) Sustainable freshwater resources management

Area (4) Environmental quality management and enhancement

Area (10) Sustainable energy production and consumption

Area (11) Sustainable industrial, transport and communication development

2.3 International Conventions, Treaties and Agreements

The Government of the Republic of the Union of Myanmar has also ratified international agreements and treaties which are related to environmental and social issues. It is also essential for the project proponent to take into consideration these treaties and agreements in commencing the project. The major international agreements and treaties relevant to the project are described in the table below.

| No. | Conventions | Year (Ratified/Acceded/ Accepted) |
|-------------|---|---|
| Environment | | |
| 1 | Plant Protection Agreement for the Southeast Asia and Pacific Region, Rome 1956 | 1959 (Ratified) |
| 2 | Vienna Convention for the Protection of the Ozone Layer, Vienna 1985 | 1993 (Ratification) |
| 3 | Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal 1987 | 1993 (Ratification) |
| 4 | London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London 1990 | 1993 (Ratification) |
| 5 | Convention on Biological Diversity, Rio De Janeiro, 1992 | 1994 (Ratification) |
| 6 | United Nations Framework Convention on Climate Change (UNFCCC), New York 1992 | 1994 (Ratification) |
| 7 | Stockholm Convention on Persistent Organic Pollutants (POPs), 2001 | 2004 (Accession) |
| 8 | ASEAN Agreement on the Conservation of Nature and Natural Resources, Kuala Lumpur 1985 | 1997 (Signatory) |
| 9 | Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto 1997 | 2003 (Accession) |

| Social | | |
|--------|---|----------------|
| 10 | Universal Declaration of Human Rights (UNDHR) | Signed |
| 11 | Convention on the Rights of the Child | 1991 (Acceded) |
| 12 | Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) | 1997 (Acceded) |
| 13 | Workmen's Compensation (Accidents) Convention 1925 | 1956 |
| 14 | Workmen's Compensation (Occupational Diseases) Convention 1925 and its Revision 1934 | 2016 |
| 15 | Relevant ILO Conventions in force in Myanmar concerning <ul style="list-style-type: none"> - Hours of Work (Industry) - Night Work of Young Persons (Industry) Convention, 1919 - Weekly Rest (Industry) Convention, 1921 - Workmen's Compensation (Accidents) - Workmen's Compensation (Occupational Diseases) Convention, 1925 - Equality of Treatment (Accident Compensation) - Minimum Wage-Fixing Machinery Convention - Forced Labour Convention - Workmen's Compensation (Occupational Diseases) Revised, 1934 - Holidays with Pay - Convention concerning Statistics of Wages and Hours of Work, 1938 - Freedom of Association and Protection of the Right to Organize - Worst Forms of Child Labour | |

2.4 Contractual and other Commitments

- 1) The Lessor (Department of Urban and Housing Development - DUHD, Under the Ministry of Construction) agrees to lease the Leased Area (555.81 acres of land in Nyaung Hnit Pin, Hlegu Township, Yangon Region) to the lessee, KMIC Development Co., Ltd., and the company agrees to lease the Leased Area from the Lessor, on an exclusive basis, to develop, construct, own, finance, operate and maintain the Project, in accordance with the terms of the Project Agreements, free and clear of any claims, rights and encumbrances or encroachments by third parties (including but not limited to any occupation of the Leased Area by third parties, and claims for compensation by prior occupants of the Leased Area under the Land Acquisition Act 1894 or similar law or regulation in Myanmar).
- 2) The KMIC Development Co., Ltd. shall use and have the benefit of the Leased Area for the purpose of developing, constructing, owning, financing, operating and

maintaining the Project, subject to the terms and conditions of the Project Agreements. The KMIC Development Co., Ltd. shall be entitled to sublease any portion or portions of the Leased Area to Sub-Lessees under Sublease Agreements, and the Sub-Lessees will be responsible for developing their respective portions of the Leased Area.

- 3) The project shall be developed in two phases, Zone A and Zone B. The development of Zone B shall not commence until 75% of the Sublease Payments in respect of Zone A have been duly and unconditionally received by the KMIC Development Co., Ltd. (“Zone A” means the first phase of development of the Project, in the approximate area (314.69 acres) of the total site area and “Zone B” means the second phase of development of the project, in the approximate area (241.12 acres) of the total site area for which development shall not commence until 75% of the Sublease Payments have been duly and unconditionally received by the KMIC Development Co., Ltd. in respect of Zone A.)
- 4) The initial lease period for Zone A is fifty (50) years and it is agreed by the Parties (the Lessor (Department of Urban and Housing Development – DUHD) and KMIC Development Co., Ltd. that KMIC Development Co., Ltd. has the right to implement the project through third parties by entering into sub-development agreement and in such cases, where KMIC Development Co., Ltd. has entered into sub-development agreements with any third party for implementation/development of the Project.
- 5) If the KMIC Development Co., Ltd. wishes to extend the Initial Lease Period for another ten (10) years, the KMIC Development Co., Ltd. shall inform the Lessor in writing at least three (3) months before the Initial Lease Period expires. The Initial Lease Period shall be extended (“First Extended Lease Period”) without the payment of additional fees provided the KMIC Development Co., Ltd. is not in material breach of the Agreement at the time of the notice.
- 6) If the KMIC Development Co., Ltd. wishes to extend the First Extended Lease Period for another ten (10) years, the KMIC Development Co., Ltd. shall inform the Lessor in writing at least three (3) months before the First Extended Lease Period expires. The First Extended Lease Period shall be extended (“Second Extended Lease Period”) without the payment of additional fees provided the KMIC Development Co., Ltd. is not in material breach of the Agreement at the time of the notice.
- 7) The Parties shall sign a new separate land lease agreement in respect of Zone B in accordance with the JVA (“JVA” means the joint venture agreement as of the 7th day of August 2019, executed by the Shareholders of the KMIC Development Co., Ltd.) for the purposes of creating a fresh Lease Term for Zone B, which land lease agreement will (i) commence from the signing thereof, which shall be the date of issue of Second Round Completion Certificate in terms of the JVA and continue for a term equivalent to Clauses mentioned above for Zone A, and (ii) otherwise be in duplicate form to this Agreement, mutatis mutandis. However, this Agreement shall act as a master lease agreement and therefore reference herein to the Lease, Land, Leased Area and Site shall mean the lands including Zone A and Zone B, and both Zone A and Zone B shall be encumbered by this Agreement for the benefit of the JV Company and both Zone A and Zone B shall be subject to registration (The Parties shall mutually arrange and complete the registration of this Agreement with all relevant Government Authorities, including the Office of Registration of Deeds) and the purpose of the separate lease agreement for Zone B shall be to re-commence the Lease Term in respect only of Zone B.
- 8) The Lessee shall, during and in the consideration for the Lease Term, pay to the Lessor a rent (the “Rent”), calculated on a basis of US\$127,351.4 per annum for Zone A (“Zone A Annual Rent”) and US\$97,577.4 per annum for Zone B (“Zone B Annual Rent”). In addition, the Parties agree that the Rent of the Leased Area for the Lease Term shall be contributed to the business of the Lessee (as the KMIC Development Co., Ltd.) as a capital-in kind, or otherwise as the Parties may decide and such contribution shall account for 40% shareholding ratio of the business of the KMIC Development Co., Ltd.”.

- 9) The KMIC Development Co., Ltd. shall carry out the construction of the Project without cost to the Lessor in accordance with the plans approved by the Lessor and as amended. The Lessor shall approve the KMIC Development Co., Ltd.'s plans insofar as these are in compliance with the Laws of Myanmar.
- 10) If the KMIC Development Co., Ltd. wishes to make any material alterations to the Land, the KMIC Development Co., Ltd. shall have the right to do so with the consent of the Lessor. The Lessor shall approve the KMIC Development Co., Ltd.'s alterations to the Land insofar as such alterations are in compliance with the Laws of Myanmar.
- 11) The KMIC Development Co., Ltd. shall have the right to peacefully and exclusively use the Leased Area during the Lease Term without interference by the Lessor, any parties affiliated with the Lessor, or any third parties.
- 12) The KMIC Development Co., Ltd., in accordance with the provisions of Myanmar Insurance Law, shall pay all types of necessary insurance, and for the purpose of raising financing for the Project, has the right to: (a) assign its rights and interests to any insurance claims and/or proceeds to third parties, and (b) grant rights of subrogation to third parties, including for the purpose of creating Secured Interests.
- 13) The KMIC Development Co., Ltd. shall use the Leased Area for the purposes set out in this Agreement.
- 14) The KMIC Development Co., Ltd. shall have the right, without any further consent of the Lessor, to transfer or assign this Agreement to any person, including for the purpose of creating any Secured Interests in the Site and Leased Area, all buildings, fixtures, fittings, properties and moveable properties on this Site and Leased Area under this Agreement and the other Project Agreements. However, any such transfer or assignment or creation of Secured Interests shall be notified to MIC.
- 15) The KMIC Development Co., Ltd. shall have the right to create one or more sub-leases for parts of the Land to the Sub-Lessees under Sub-Lease Agreements, and the Lessor shall have no right, title, interest or claim over the Sub-Lease Payments.
- 16) The KMIC Development Co., Ltd. shall have the right to grant access, use and possession of the Land comprised in the Leased Area or specified parts of it to its contractors and sub-contractors for the purposes of the Project, and to entrust rights and duties relating to the construction and handover of the Project, and to generally delegate its rights and obligations, to third-party contractors as the KMIC Development Co., Ltd. deems fit.
- 17) The KMIC Development Co., Ltd. shall have the right to log trees and clear away and remove soil, stone, gravel, lumber, overburden, other obstructions and other materials on the land comprising the Leased Area as is necessary or convenient for the purposes of the Project.
- 18) The KMIC Development Co., Ltd. shall manage and protect the Leased Area by taking appropriate measures to maintain the conditions of the Leased Area.
- 19) Upon expiry of the Lease Term, the KMIC Development Co., Ltd. shall not in any case have any duty to repair the Site, dismantle or remove any Project Assets from the Site or otherwise return the Site to any previous or other condition but rather is entitled to return the Site and any improvements on an 'as is' basis at that time.
- 20) In order to facilitate the implementation of the Project by the KMIC Development Co., Ltd. in cooperation with other persons, whether citizens of the Republic of the Union of Myanmar or foreign investors, the KMIC Development Co., Ltd. under the Project Agreements is allowed to create one or more sub-lease for parts of the Land. The KMIC Development Co., Ltd. shall notify the Lessor of a sub-lease Agreement within thirty (30) days of execution of the same.
- 21) If any mineral resources, treasures, gems and other natural resources are discovered unexpectedly from, in or under the Leased Area or the Land during the Lease Term, the Lessor shall be promptly notified and such mineral resources, treasures, gems and other natural resources shall be the property of Government of the Republic of the Union of Myanmar, which shall be at liberty to excavate the aforesaid at any time, provided that the KMIC Development Co., Ltd.'s rights and interests under this Agreement and the development of the Project are not in any way adversely affected.

- 22) The KMIC Development Co., Ltd. must follow the rules to ensure that the implementation of the activities under the Agreement is in accordance with the existing laws and regulations of Myanmar being then in force (the Laws of Myanmar”).

2.5 Legal Commitments

The project developer makes the following legal commitments:

- The project developer will ensure women shall be entitled to the same rights and salaries as that received by men in respect of similar work.
- The project developer will ensure the project will be in line with preservation and safeguarding of cultural heritage, environmental conservation, striving for development of human resources and protection and preservation of public property.
- The project developer will pay the compensation set forth by the MONREC for the environmental impacts caused by his project activities.
- The project developer will carry out the Environmental Impact Assessment for the project as stipulated in the Environmental Impact Assessment procedure.
- The proposed project will implement mitigation measures and management plans stated in the EIA report.
- The project developer is responsible for its actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the company acting for or on behalf of the Project.
- The project developer is responsible for, and shall fully and effectively implement, all requirements set forth in the Environmental Compliance Certificate, applicable laws, rules, procedures and standards.
- The project developer will timely notify and identify in writing to the MONREC, providing detailed information as to the proposed project's potential Adverse Impacts.
- The project developer will follow the National Environmental Quality (Emission) guidelines established by MONREC.
- The project developer will inform the relevant ward or village tract administrator if he or his workers/employees find any object which has no owner or custodian and if he knows or it seems reasonable to assume that the said object is an antique object.
- The project developer will abide by the terms and conditions, stipulations of special licenses, permits, and business operation certificates issued to them, including the rules, notifications, orders, and directives and procedures issued by the applicable laws, terms and conditions of contract and tax obligations.
- The project developer will carry out in accordance with the stipulations of the relevant department if it is, by the nature of business or by other need, required to obtain any license or permit from the relevant Union Ministries, government departments and governmental organizations, or to carry out registration.
- The project developer will immediately inform the Commission if it is found that natural mineral resources or antique objects and treasure trove not related to the investment permitted above and under the land on which the investor is entitled to lease or use and not included in the original contracts.
- The project developer will abide by the applicable laws, rules, procedures and best standards practiced internationally for this project so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage.

- The project developer will close and discontinue the project 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.
- The project developer will pay wages and salaries to employees in accordance with applicable laws, rules, procedures directives and so forth during the period of suspension of project for a credible reason.
- The project developer will 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.
- The project developer will supervise foreign experts, supervisors and their families, who are employed in its investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar.
- The project developer will respect and comply with the labor laws.
- The project developer will have the right to sue and to be sued in accordance with law.
- The project developer will ensure equal rights for local workers and avoid salary bias, i.e. ensure that local and foreign workers have the same salary at the same level.
- The project developer will ensure that all foreign employees apply for the proper work permit and visa through the relevant Ministry.
- The project developer will obtain approval from the Central Committee through the Regional Committee with regard to the proposal to implement development work.
- The project developer will implement the industrial zone business, sublease to investors and develop infrastructure after concluding a commercial agreement with the Regional Committee in accordance with the prescribed terms and conditions.
- The project developer will implement maintenance work of the industrial zone under the supervision of the Management Committee.
- The project developer will complete construction within the proposed period at the respective industrial zone. If the construction cannot be completed within the proposed period, sufficient reason has to be reported to and a decision has to be requested from the Central Committee, together with comments from the Regional Committee. If the reason is found to be insufficient, the permit shall be revoked.
- The project developer will develop the infrastructure in the industrial zone himself or contract to other parties.
- If the project developer provides a service related to infrastructure beyond the border of the industrial zone, he shall comply with the instructions of the relevant government departments.
- The project developer will comply with the laws in force with regard to matters such as environmental conservation, occupational safety, fire safety and health care.
- The project developer will pay the fees payable for land use and the business permit according to the commercial contract concluded with the Regional Committee to the Regional Committee as a lump-sum or in installments.
- The project developer will implement a bonded warehouse system in the industrial zone in accordance with custom laws and procedures.
- The project developer will arrange as required to assess the risks of workplace, process and machines and materials used thereat.
- The project developer will arrange as required to assess the likelihood of occurrence of hazards at the workplace and to the environment.

- The project developer will arrange to have workers' medical checked-up by the recognized doctor in accordance with stipulations whether they suffer from any occupational disease.
- The project developer will arrange to improve the workplace until it is safe and good for health.
- The project developer will 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.
- The project developer will prescribe precautionary plans and plans for emergency.
- The project developer will 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.
- The project developer will 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.
- The project developer will 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.
- The project developer will 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.
- The project developer will 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.
- The project developer will display occupational safety and health instructions, danger signs, notices, posters and signage for directions in accordance with stipulations.
- The project developer will arrange to be complied with precautions when entering restricted hazardous workplaces.
- The project developer will 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.
- The project developer will lay down the fire safety plan, perform fire drilling and train workers to use fire extinguishers systematically.
- The project developer will allow the Chief Inspection Officer and Inspection Officers to enter workplaces, inquire, request documents and information or seize exhibits.
- The project developer will cause workers to work only for the specified working hours if they have to work in hazardous industry/business and workplace.
- The project developer will incur the expenses for occupational safety and health matters.
- The project developer will not dismiss or demote a worker: 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; because the said worker has addressed a complaint for hazardous or health detrimental conditions; because the said worker has conducted the responsibilities of occupational safety and health committee; or because the said worker has refused to work in any condition where an occupational accident or occupational disease is about to occur.

- The project developer will recognize the labour organizations of his trade as the organizations representing the workers.
- The project developer will allow the worker who is assigned any duty on the recommendation of the relevant executive committee to perform such duty not exceeding two days per month unless they have agreed otherwise. Such period shall be deemed as if he is performing the original duty of his work.
- The project developer will assist as much as possible if the labour organizations request for help for the interest of his workers. However, the employer shall not exercise any acts designed to promote the establishment or functioning of labour organizations under his domination or control by financial or other means.
- The project developer will provide rights and benefits including but not limited to, leave, holidays, overtime pay, compensation and social security.
- The project developer will settle disputes, within the law, between workers, employers, consulting experts or any other personnel involved in the business operation.

2.6 Policies of Project Proponent (Developer)

2.6.1 Environmental Policy of the Project Proponent

The KMIC JVC is committed to providing a quality services in a manner that ensures a safe and healthy workplace for the employees and minimizes the potential impact on the environment. The Corporation sets out the policies to make sure that the environment is protected by conserving energy and natural resources and proper management of the wastes generated. The Policy addresses the following aspects:

- 1) Taking significant environmental aspects and impacts into account throughout the project construction and operations;
- 2) Ensuring that the environmental issues are properly assessed and considered when key decisions are taken for the project activities;
- 3) Establishing and measuring the significant environmental impacts of construction and operations, setting targets for performance improvements and monitoring progress against those targets in areas including but not limited to energy, greenhouse gas emissions, water usage/quality and waste;
- 4) Using energy and natural resources wisely and efficiently, reusing and recycling whenever possible and practical;
- 5) Developing and improving operations and technologies to minimize waste, and other pollution, minimize health and safety risks, and dispose of waste safely and responsibly;
- 6) Ensuring that employees have a level of knowledge and understanding appropriate to their environmental responsibilities and are aware of actions they can take to reduce their impacts; and
- 7) Updating the policy as needed according to the new laws, rules and regulations.

A unit with members will be established with specific responsibilities for the Project's environmental policy and performance. The findings and results of the Project's environmental performance would be available at the Project website.

2.6.2 Social Policy of the Project Proponent

The KMIC JVC sets the social policy covering the following factors:

- 1) Employment opportunities;
- 2) On – job skills training;
- 3) Workplace safety and health;
- 4) Mandatory social security schemes for certain workers and voluntary insurance under the social security schemes for all workers entitling them to benefits according to law; and

- 5) Provision of health care and monetary benefits that are provided for in the Social Security Law in an accurate and speedy manner, supporting insured workers and their families in times of need and suffering.

The healthcare and monetary benefits include:

- (i) medical treatment and cash benefit for sickness;
- (ii) medical treatment and cash benefits for maternity;
- (iii) temporary and permanent disability (regarding employment injury) benefit;
- (iv) funeral benefit for decease due to occupation; and
- (v) survivors' benefit for occupational decease.

The policy will also cover:

Fair Employment System: The talented individuals who can work together would be hired to achieve the mission and vision in a transparent manner. The diversity and human rights of the employees are respected and there will be no discrimination based on their gender, ethnicity, age, religion, educational background and physical disability while ensuring full compliance with Myanmar Labor Law and International Labor Organization (ILO) on the prohibition of force labor.

Ethical Management System: Based on the high level of ethical standards, a transparent and fair company culture is created to build an ethical management system so that all employees can conduct themselves and make decisions rightly. We fully comply with all applicable laws and regulations and treat every individual fairly with respect according to our ethical practice guidelines.

Improving Employees: It is important to have an accurate understanding of the mindset and values that each and every employee has toward the company and their work, and to improve employee satisfaction as well as reflecting these findings into the management of the company, in order to bring out the full potential of each and every employee and to create a lively workplace environment.

Creating Healthy and Enjoyable Workplace: The healthy and enjoyable workplace will be created by developing public places such as recreation place, day care center and playground for children, canteen and lounge for workers.

Creating Safe Work Environment: The safe work environment will be created by establishing health and safety procedures and guidelines. These will be guiding and directing all employees to work safely and prevent injury, to themselves and others. All employees are encouraged to participate in implementing and enforcing occupational health and safety procedures and guidelines. All employees must take all reasonable steps to prevent accidents.

Authority

The Ministry of Natural Resources and Environmental Conservation (MONREC) has the power and exclusive authority to: define project screening criteria, approve technical guidelines for IEE and EIA, provide guidelines for and approve the ToR of EIA, review and approve IEE and EIA reports, review and approve construction phase and operational phase EMP, determine and impose Environmental impact related conditions which will be applicable to any approval of an IEE, EIA or EMP, monitor and enforce compliance with the conditions set forth in an Environmental Compliance Certificate (ECC) and monitor and enforce the implementation of EMP, require any project to update its EMP and to submit such updated EMP to the Ministry for review and approval according to a schedule defined by the Ministry, identify and notify the registration conditions and/or procedures for a third person or organization who wishes to undertake IEE or EIA, and perform other duties and functions relating to IEE and EIA as stipulated by the Union Government.



CHAPTER 3. PROJECT DESCRIPTION AND ALTERNATIVES

3.1 Project Background



Figure 3. 1: Overview Image of Project

This Environmental Impact Assessment (EIA) report has been prepared by Myanmar Survey Research (MSR) on behalf of KMIC JVC.

The proposed project is the development of an industrial complex to be built on the land of approximately 555.81 acres in a public open space, access and landscaping. KMIC JVC is currently preparing an outline planning application for the site, including an Environmental and Social Impact Assessment (ESIA).

At this stage, the intention is to submit an ESIA Report to the Environmental Conservation Department to obtain the Environmental Compliance Certificate for construction of the KMIC project of land area of 555.81 acres along with infrastructure development for roads, electricity and water pipeline.

3.2 Project Description

The project is designed for large scale, middle scale and small scale industrial compounds including internal infrastructure such as 8 high rise residentials, 30 villa blocks, 2 management centers, 1 public support facility, 4 commercial buildings, Industrial area, gas station, recreation park, main roads, intersection roads, drainage, overhead electricity installation, plantation of green spaces, electricity sub-station, wastewater treatment plant, and water purification plant. There will be approximately 203 buildings, including large scale, middle scale and small-scale industrial plots be situated and constructed. These buildings include factories and warehouses for Garment Products, Food Manufacturing, Jewelry Processing, Vehicle Spare Parts and Electronic Parts installation. Residential areas will be used for dormitory and apartments for managers and owners. Total 100,000 job opportunities will be created. According to the documents of MIC Permit, in 2020, 1,400 workers/year, in 2021, 24,000 workers/year, in 2022, 19,200 workers/year and in 2023, 4,800 workers/year would be employed.

The existing two-lanes access road way to the project site is 9.45 km in length and 6 m in width and connecting from Yangon - Mandalay main road junction to the proposed site. Ministry of Construction will improve the existing road way as 4 lanes carriage ways mid island and sidewalks. The requirement of water will be supplied from Kalihtaw Dam which is

situated in the north. The direct buried supply pipes will be used, and the water will be purified at site. The 230 KV transmission line will be installed from Kamarnat- Myaungtakar national grid.



Figure 3. 2: Artist Impression

3.3 Project Location

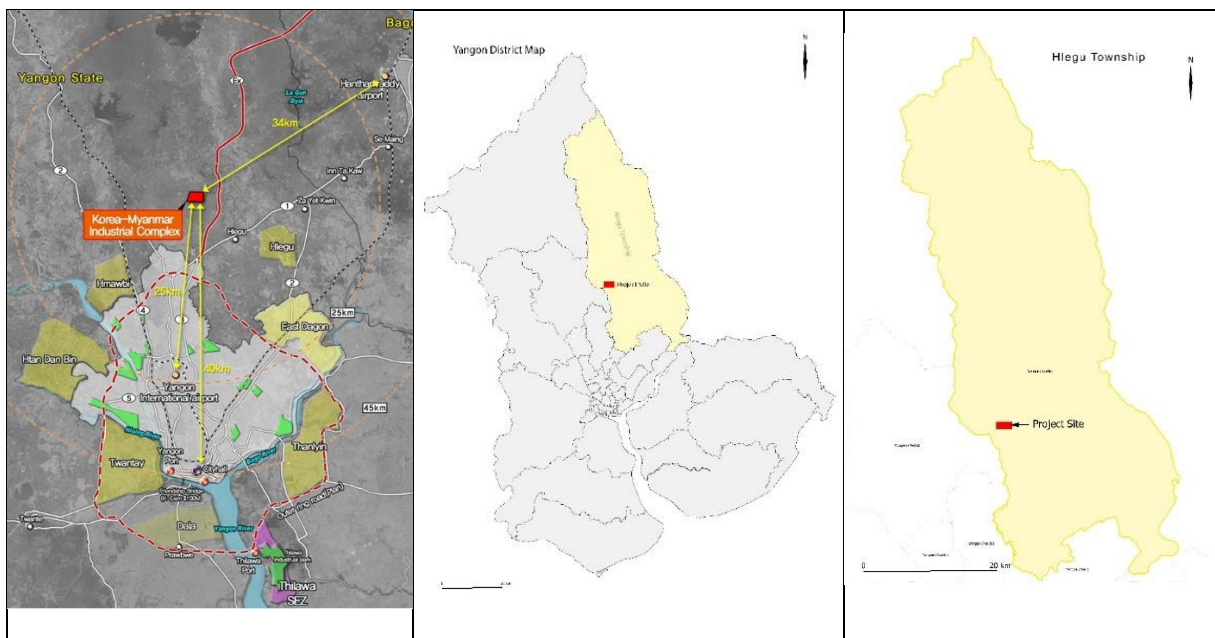


Figure 3. 3: Project Location Overview Map

Ministry of Construction, Government of Republic of Union of Myanmar, and KMIC JVC agreed to develop an Industrial complex around Yangon Region. KMIC JVC is formed, and it initiates KMIC Project which is located in Nyaung Hnitpin Livestock and Agricultural Zone No.3, Hlegu Township, and which is 40 km north from Yangon Port, 25 km from Yangon International Airport and 35 km from Hantharwaddy Airport (Bago), 9 km from Yangon –

Mandalay Expressway. The land is 555.81 acre (2,249,288 square meter) in area and is flat and swampy area previously known as Nyaung Hnitpin Research and Training Institute of Union Solidarity and Development Association (USDA), later became Union Solidarity and Development Party (USDP). According to the Government of Union of Myanmar, it was a training institution until 1992. Then it was called a National Convention Center until 2008 when it was closed. However, it was told that the ownership of the project site had never belonged to USDP, rather it belonged to Yangon Region Government prior to transferring it to Ministry of Construction.

The location is between:

Table 3. 1: Location Points for Project Boundary

| | Latitude | Longitude |
|---------|------------|------------|
| Point A | 17.136131° | 96.155709° |
| Point B | 17.141934° | 96.157951° |
| Point C | 17.142103° | 96.162789° |
| Point D | 17.144476° | 96.162692° |
| Point E | 17.144329° | 96.158867° |
| Point F | 17.145730° | 96.159415° |
| Point G | 17.146511° | 96.179249° |
| Point H | 17.137174° | 96.178757° |

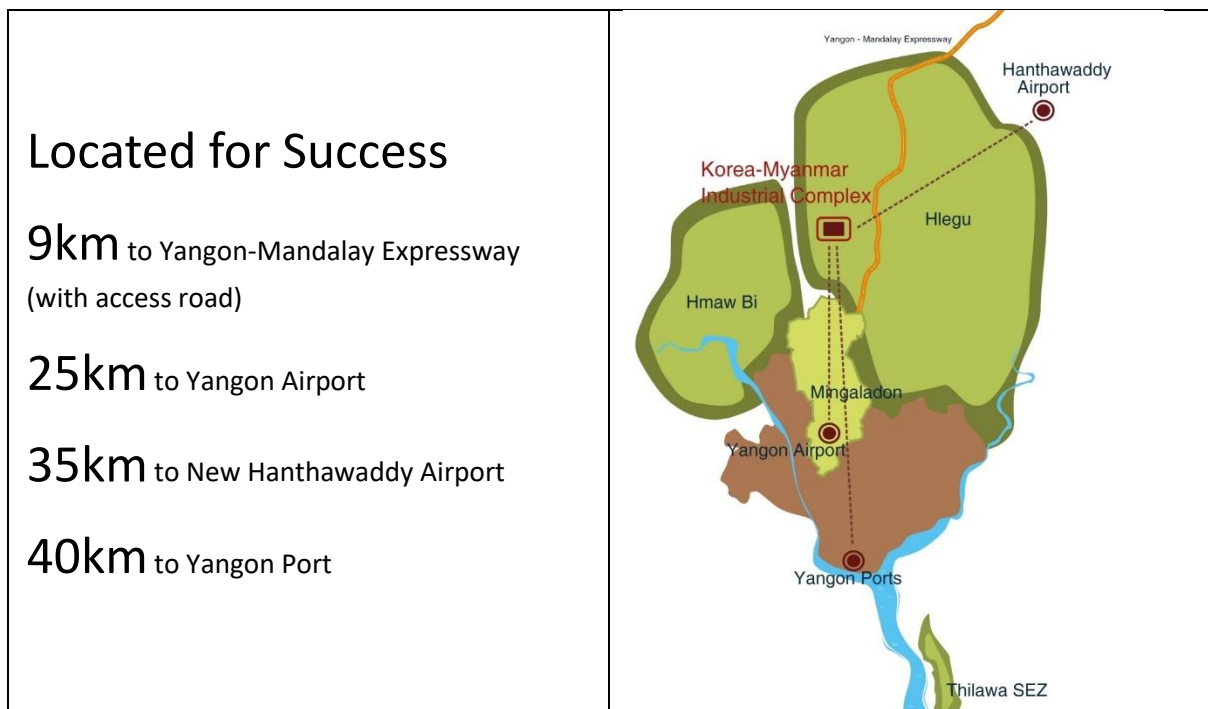


Figure 3. 4: Project Location Map



Figure 3. 5: Aerial Photo of Existing Project Site (Taken by MSR Drone Team)

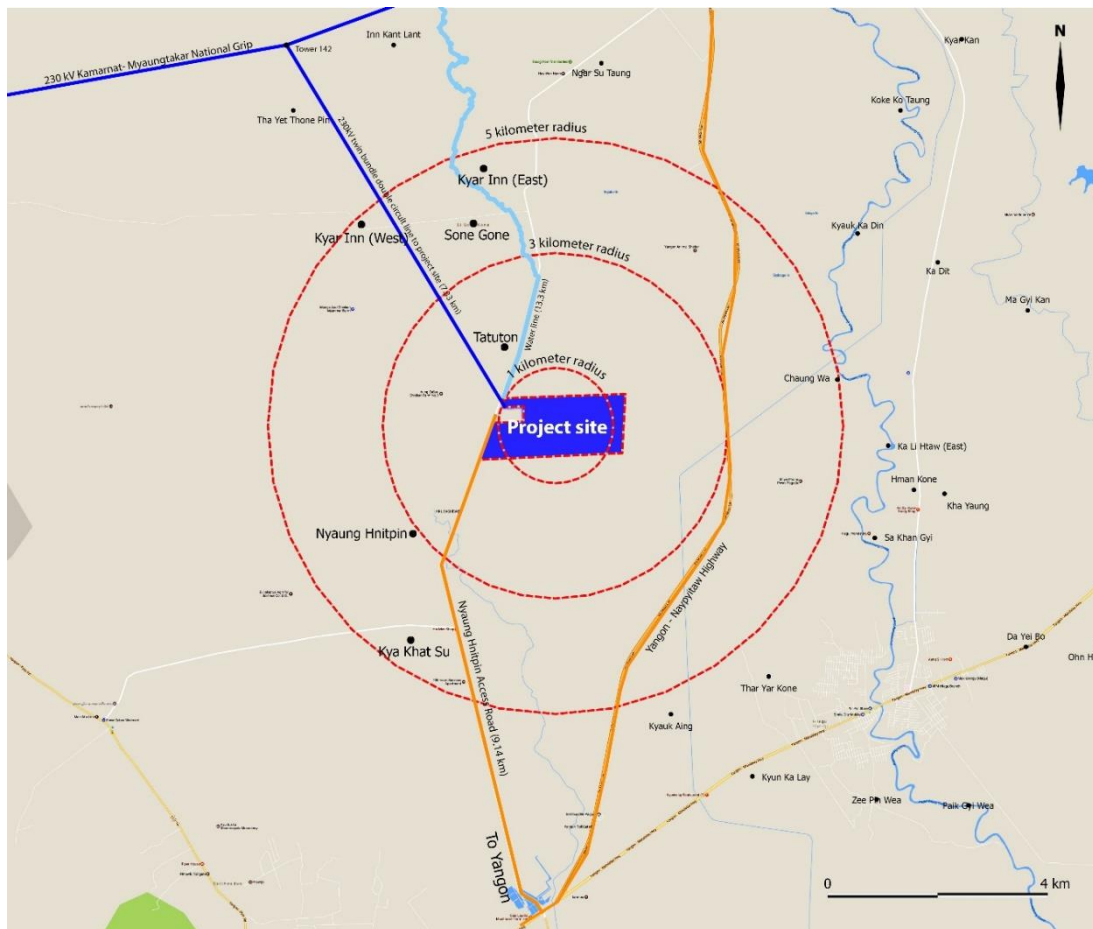


Figure 3. 6: Map of Project Site and surrounding villages

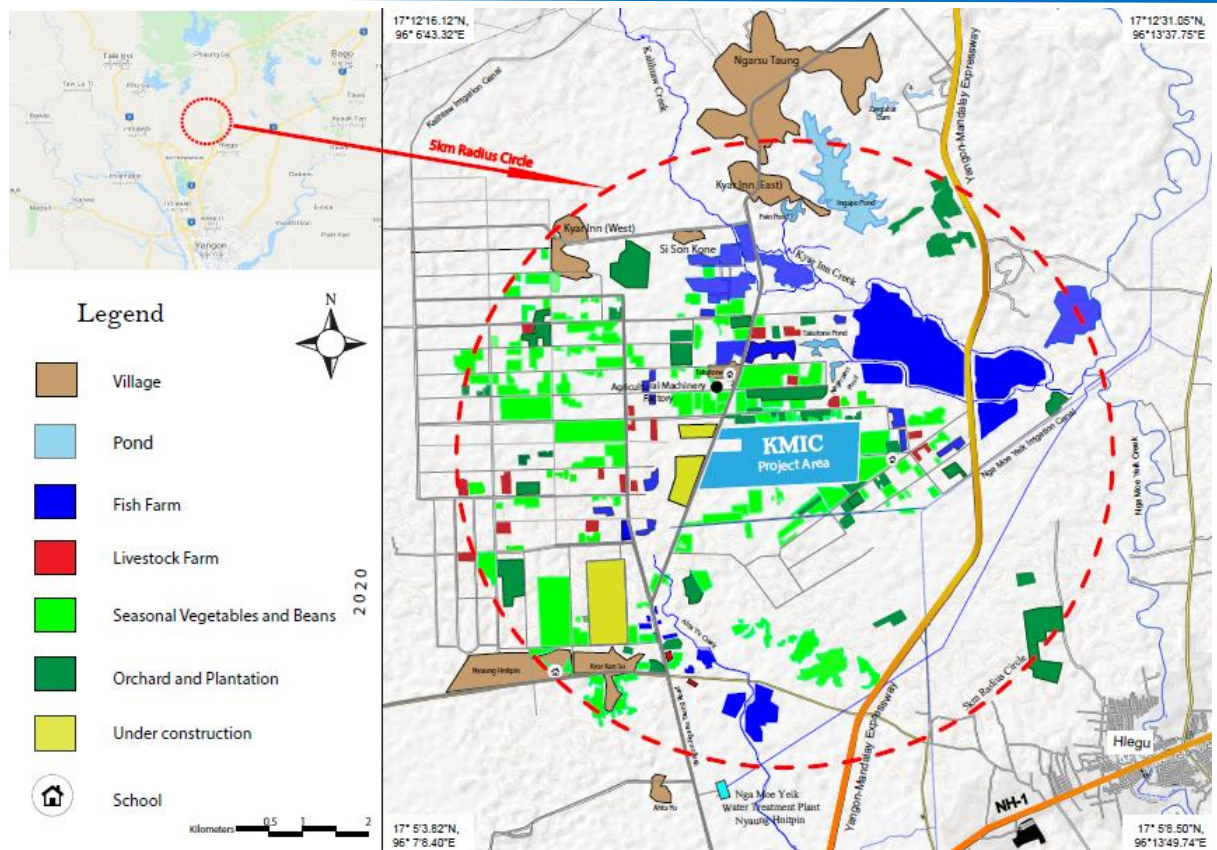


Figure 3. 7: Land Use Map of surrounding areas of Project Site (see appendix for clearer image)

3.3.1 Land Holding Certificate

The documents related to land ownership (land holding) of the proposed KMIC project are mentioned below.



Figure 3. 8: Land Holding Record (Clear Image in Appendix)



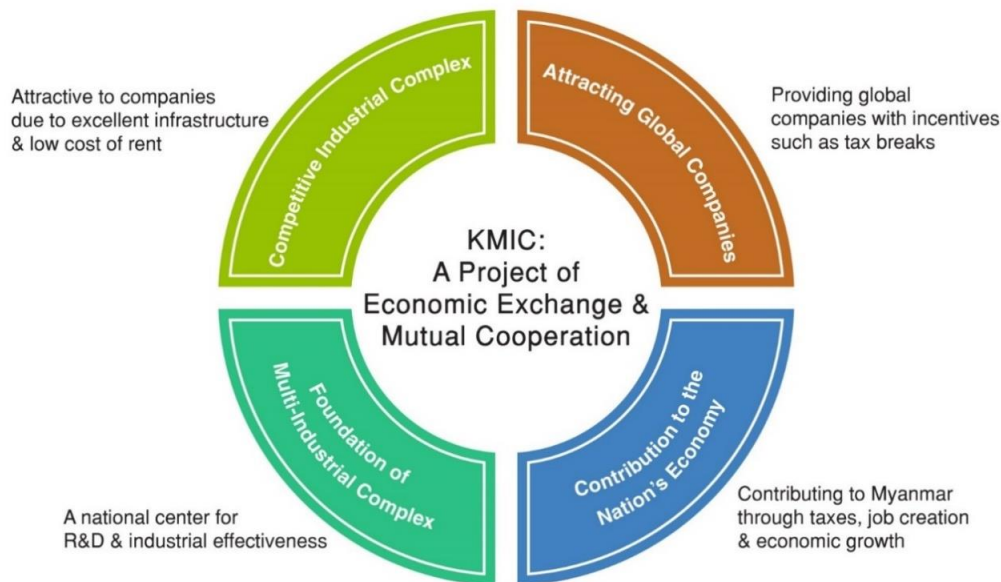
Figure 3. 9: Land Holding Map (Clear Image in Appendix)

3.4 Project Development and Implementation Time Schedules

3.4.1 Development Concept

KMIC Development Co., Ltd. (hereinafter referred to as KMIC JVC, Project Proponent or the Developer) plans to implement an Industrial Complex in Nyaung Hnitpin, Hlegu township, Yangon Region, Myanmar. The main objectives of the development are mentioned below:

- 1) To become a competitive industrial complex by attracting international companies providing with excellent infrastructure, incentives such as tax breaks, and low cost of rent;
- 2) To become a national center for R& D and industrial effectiveness as a foundation of multi-industrial complex;
- 3) To contribute the national economic growth through job creation and revenue generation; and
- 4) To become a project of economic exchange and mutual cooperation between two countries.



This KMIC project not only benefits the region but also the whole country.

3.4.2 Implementation Time Schedule

Table 3. 2: Implementation Time Schedule (quarterly)

| CATEGORY | 2019 | | 2020 | | | | 2021 | | | | 2022 | | | | 2023 | | | | 2024 | ... | 2075 | | | | |
|------------------|---|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|------------------------|------|-----|-----|-----|-----|
| | 3Q | 4Q | 1/4 | 2/4 | 3/4 | 4/4 | 1/4 | 2/4 | 3/4 | 4/4 | 1/4 | 2/4 | 3/4 | 4/4 | 1/4 | 2/4 | 3/4 | 4/4 | | | | | | | |
| | Aug | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov |
| Site Development | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>Site Investigation (Q1 2020)</p> <p>Bidding (Q2 2020)</p> <p>Detailed Design (Zone A) (Q2-Q3 2020)</p> </div> <div style="width: 20%; border-left: 1px solid black;"> <p>Detailed Design (Zone B) (Q4 2020 - Q1 2021)</p> </div> <div style="width: 20%; border-left: 1px solid black;"> <p>Bidding (Q2 2021)</p> <p>Beginning of construction (Zone A) (Q2 2021 - Q4 2021)</p> <p>construction of waste water treatment plant (Q3 2021 - Q4 2021)</p> </div> <div style="width: 20%; border-left: 1px solid black;"> <p>Beginning of construction (Zone B) (Q1 2022 - Q4 2022)</p> </div> </div> | | | | | | | | | | | | | | | | | | | | | | | | |
| operation | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | Beginning of operation | | | | | |

(NOTE: The above table is annexed in appendix as a clearer table)

Table 3. 3: Implementation Time Schedule

| Implementation Year | Activity | Remark |
|---------------------|--------------------------------|---|
| 2020 or 2021 | Phase 1 construction started | Industrial, Commercial, Water Purification Plant, Power Transformer (Substation) and Wastewater Treatment Plant |
| 2022 | Phase 1 construction completed | |
| 2023 | Phase 2 construction started | Industrial, Residential, Villas, Park, Management office |
| 2024 | Phase 2 construction completed | |

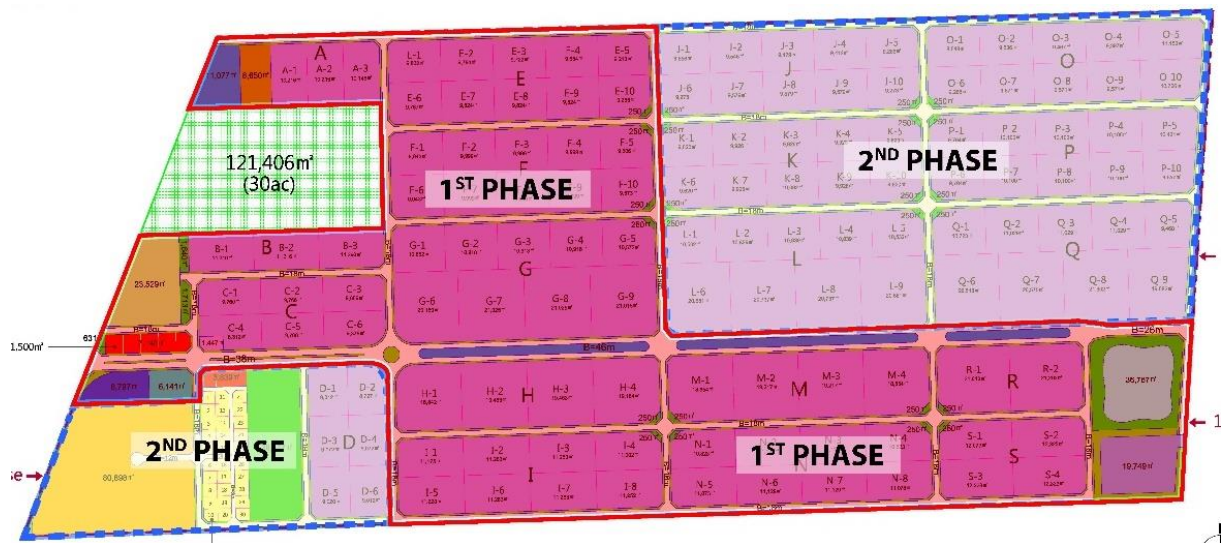


Figure 3. 10: Project Phases for Implementation

3.5 Project Summary

| Land Use Type | Area(㎡) | Percentage(%) | Note |
|----------------------------|-----------|---------------|--------------------------------|
| Total | 2,249,288 | 100.0 | |
| Industrial Area | 1,593,119 | 70.8 | |
| Residential Area | 60,898 | 3.6 | |
| Villa | 23,810 | 1.1 | |
| Technopark (IT Park) | 10,887 | 0.5 | |
| Technopark (IT Park) | 23,929 | 1.0 | |
| Gas Station | 1,447 | 0.1 | |
| Public Facility Site | 915,498 | 22.9 | |
| Road | 258,589 | 11.4 | |
| Retention Canal | 26,062 | 1.1 | |
| Park | 92,628 | 3.7 | Included Undercurrent Facility |
| Buffer Green Belt | 84,506 | 4.2 | |
| Management Center | 8,797 | 0.4 | |
| Public Support Facility | 6,141 | 0.3 | |
| Substation | 8,650 | 0.4 | |
| Wastewater Treatment Plant | 19,749 | 0.9 | |
| Water Purification Plant | 11,077 | 0.5 | |

| Land Use Type | Total Area(㎡) | Total Percentage(%) | 1st Phase | | 2nd Phase | |
|--------------------------|---------------|---------------------|-----------|---------------|-----------|---------------|
| | | | Area(㎡) | Percentage(%) | Area(㎡) | Percentage(%) |
| Total | 2,249,288 | 100.0 | 1,273,514 | 56.6 | 975,774 | 43.4 |
| Industrial Area | 1,593,119 | 70.8 | 876,708 | 38.0 | 716,411 | 31.8 |
| Residential Area & Villa | 104,708 | 4.7 | - | - | 104,708 | 4.7 |
| Commande Area | 10,887 | 0.5 | 7,148 | 0.3 | 3,839 | 0.2 |
| Other Facility Site | 540,474 | 24.0 | 389,658 | 17.3 | 150,816 | 6.7 |

Master Plan
S = 1 : 8,000



Figure 3. 11: Project Master Plan showing project phases (See large Image in A3 size in Appendix)

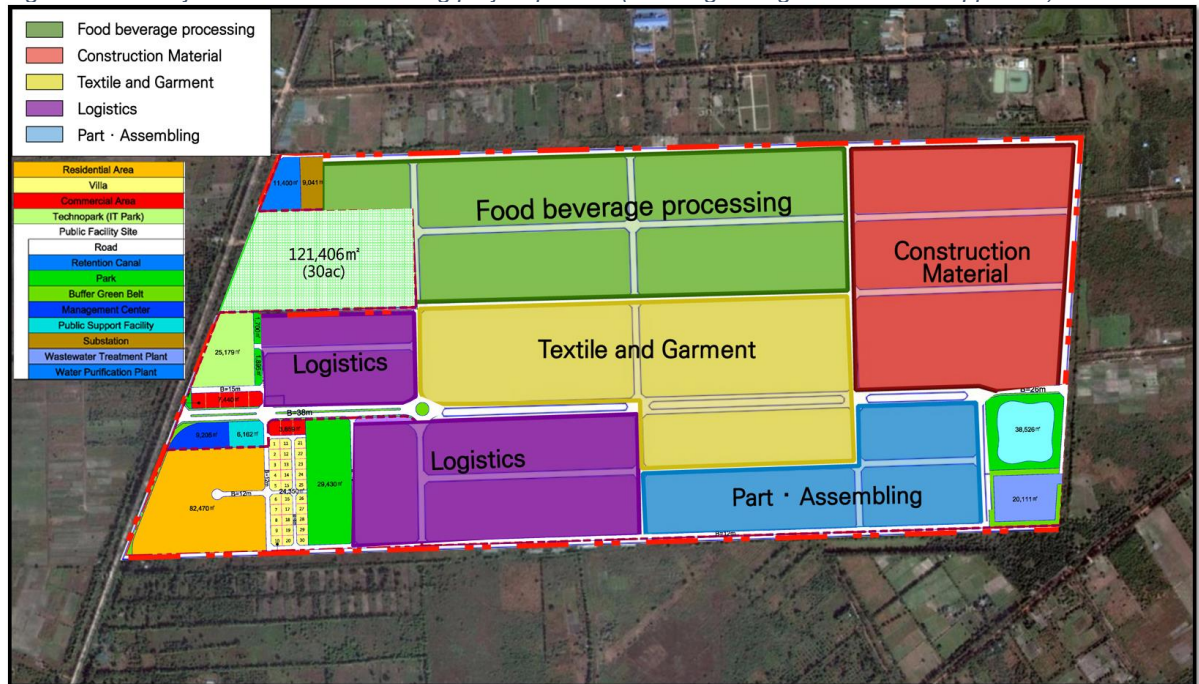


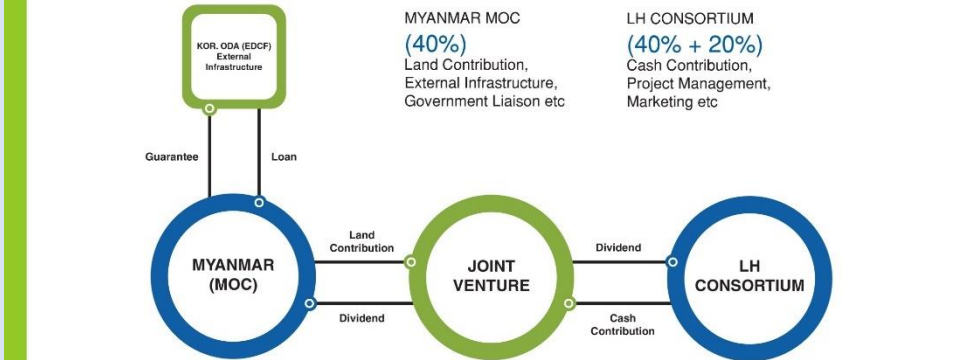
Figure 3. 12: Site Layout Map with different Factories and Facilities of Complex (See large image A3 size in Appendix)

Table 3. 4: Project Summary

PROJECT SUMMARY

| | |
|--------------|--------------|
| Project Name | KMIC Project |
|--------------|--------------|

| | | | |
|---|--|----------------------------|-----------------------------|
| Location: | Nyaung Hnitpin Livestock and Agricultural Zone No.3, Hlegu Township, Yangon Region. | | |
| | Coordinates: | | |
| | Point A | Latitude 17.136131° | Longitude 96.155709° |
| | Point B | Latitude 17.141934° | Longitude 96.157951° |
| | Point C | Latitude 17.142103° | Longitude 96.162789° |
| | Point D | Latitude 17.144476° | Longitude 96.162692° |
| | Point E | Latitude 17.144329° | Longitude 96.158867° |
| | Point F | Latitude 17.145730° | Longitude 96.159415° |
| | Point G | Latitude 17.146511° | Longitude 96.179249° |
| Point H | Latitude 17.137174° | Longitude 96.178757° | |
| | 40 km north from Yangon CBD, 25 km from Yangon International Airport and 34 km from Hantharwaddy Airport (Bago) | | |
| Site area: | 555.81 acre (2,249,288 square meter) | | |
| Land Use | Classification | Area (sqm) | Composition Rate (%) |
| | Industrial | 1,640,245 | 72.9 |
| | Residential | 83,010 | 3.6 |
| | Villa | 23,810 | 1.1 |
| | Commercial | 9,852 | 0.5 |
| | Gas Station | 1,447 | 0.1 |
| | Public Facilities Site (including greening area) | 490,924 | 21.8 |
| | Total | 2,249,288 | 100.0 |
| | Public Facilities Site | | |
| | • Road | 233,745 | 10.4 |
| | • Retention Canal (Water way) | 25,062 | 1.1 |
| | • Park | 82,928 | 3.7 |
| | • Buffer Green Belt | 94,775 | 4.2 |
| | • Management Center | 8,797 | 0.4 |
| • Public Support Facility | 6,141 | 0.3 | |
| • Substation | 8,650 | 0.4 | |
| • Wastewater Treatment Plant | 19,749 | 0.9 | |
| • Water Purification Plant | 11,077 | 0.5 | |
| Total | 490,924 | 21.8 | |
| Building | 203 buildings | | |
| Land Owner | Myanmar Government Land, Ministry of Construction (MOC) | | |
| Land Lease | 50 years + 10 years + 10 years (Land is contributed by DUHD as a shareholder of JV) | | |
| Construction /Preparation Period | 1. a period of three (3) years from the date of commencement of Zone A 2. a period of three (3) years from the date of commencement of Zone B | | |
| Project Period | Phase 1: 2019 – 2069 Phase 2: 2022 – 2072 (Expected) | | |
| Investment Capital | 75 million USD | | |

| | |
|----------------------------------|---|
| <p>Business Structure</p> | <p>Joint Venture between Myanmar Government, Ministry of Construction (40%) and LH Consortium (60%)</p> <p>Myanmar (DUHD, under MOC)</p> <ul style="list-style-type: none"> • Land Contribution, • Construction of External Infrastructure, • Government Liaison etc... <p>Land contribution for 50 years Terms of investment which is equivalent to 40% of share, construction of external infrastructure facilities (power, driveway, water) and regulatory support.</p> <p>LH Consortium (Korea Land & Housing Corporation and Global Sae-A Co., Ltd)</p> <ul style="list-style-type: none"> • Cash Contribution, • Project Management, • Marketing etc... <p>LH Consortium is responsible for 3 main aspects, namely, making a capital contribution to fund the joint venture by holding 60% of the shares, Marketing and planning, design, construction and quantity management as the main developer.</p>  |
| <p>Developer</p> | <p>KMIC Development Co., Ltd.</p> <p>Address: Office Suite 2007, Pyay Garden Office Tower, 346-354, Pyay Road, Sanchaung Township, Yangon</p> <p>Contact person:</p> <p>For Social issue: Mr. Kim Gunwoo Email: gonwoo2@gmail.com Phone: 09 9757 99222</p> <p>For Environmental issue : Mr. Noh Hun Seung Email : no1211@lh.or.kr Phone: 0959791554414</p> |
| <p>Electricity Source</p> | <p>230kV twin bundle double circuit Line from Tower No.142 Myaungtagar – Kamarnat National Grid. Total estimated consumption 50 MW</p> |
| <p>Water usage</p> | <p>10,000 cubic meters (2.6 million gallons) per day (Kalihtaw Dam)</p> |
| <p>Access Road</p> | <p>9.45 km length, expanding 4 lanes from Highway Road No.1 and No.2 Junction to Nyaung Hnitpin Research and Training Institute</p> |

The project is designed for large scale, middle scale and small scale industrial compounds including inside infrastructure such as residential, commercial, vocational training school, main roads, intersection roads, drainage, overhead electricity installation, plantation of green spaces, public support, electricity sub-station, wastewater treatment plant, water purification plant and public facilities.

The large scale, middle scale and small scale industrial plots will be situated and construction will include factories and warehouses for Garment Products, Food Manufacturing, Jewelry Processing, Vehicle Spare Parts and Electronic Parts installation. Residential areas will use for dormitory purpose and apartments for managers and owners.

3.6 Proposed Land Use Pattern

From the total demarcated land area of 2,249,288 square meters, KMIC project will occupy 100 percent of the land area. The Industrial area will occupy 72.9% (1,640,245 square meter), Residential area is 3.6% (80,898 square meter), Villa is 1.1% (23,810 square meter), Commercial, IT park and Gas station will take 1.6% (35,963 square meter), and Public Facility Site such as road, retention canal, park, buffer green belt, management center, public support facility, substation, wastewater treatment plant and water purification plant would occupy 22.9% (515,498 square meter).

The developer planned to complete the proposed project within two phases. The detail arrangement is as follow:

Table 3. 5: Proposed Landuse Pattern

| Land Use Type | Total | | 1 st Phase | | 2 nd Phase | |
|-------------------------------------|------------------------|------|------------------------|------|------------------------|------|
| | Area (m ²) | % | Area (m ²) | % | Area (m ²) | % |
| Total | 2,249,288 | 100 | 1,273,514 | 56.6 | 975,774 | 43.4 |
| Industrial Area | 1,640,245 | 72.9 | 905,011 | 40.2 | 735,234 | 32.7 |
| Residential & Villa Area | 106,820 | 4.7 | - | - | 106,820 | 4.7 |
| Commercial Area | 11,299 | 0.6 | 7,440 | 0.3 | 3,859 | 0.2 |
| Other | 490,924 | 21.8 | 361,063 | 16.1 | 129,861 | 5.8 |

The proposed project will be completed after phase1 and phase 2 construction work.

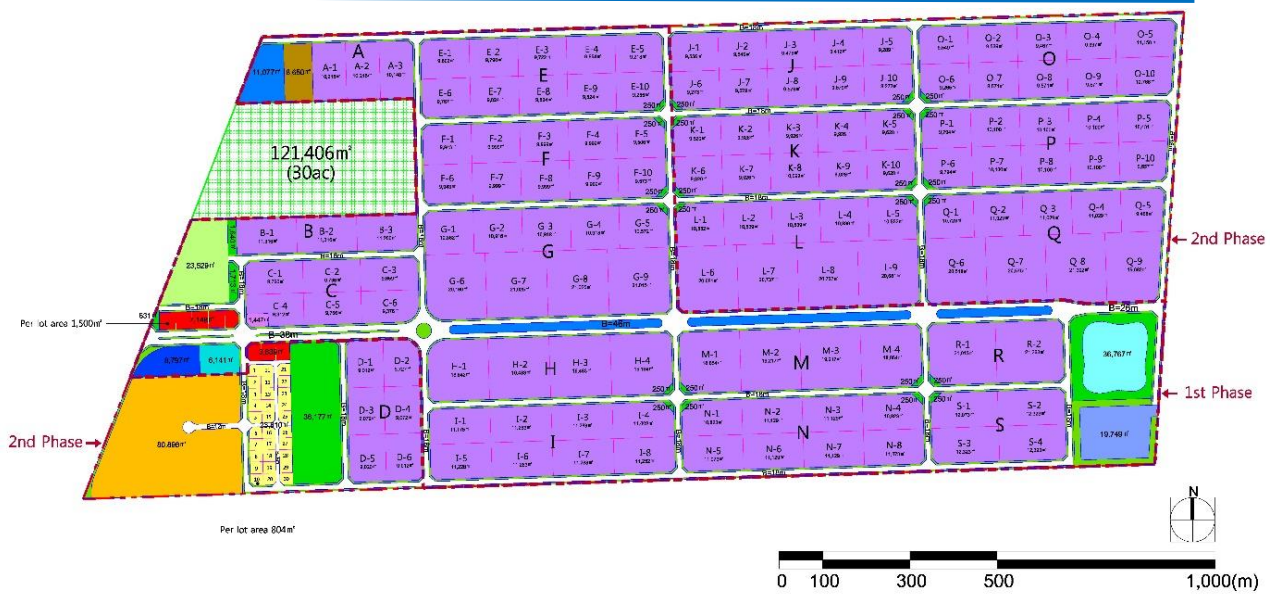


Figure 3. 13: Lot Layout and Land Use Plan Drawing (See large image A3 size in Appendix)

3.7 Proposed Internal Infrastructure

The two-meter high reinforced brick wall fencing will be constructed around parameter of proposed land and entrance gates will be constructed at main road. Main entry roads and intersection roads will be paved by concrete and road side drainage will be constructed by concrete which will collect storm water to detention ponds. Over flows from detention pond will be disposed at front and back drains. Sewage from every habitant area will be collected to waste water treatment plant and treated water will be disposed along the back drainage which will lead to Kyar Inn creek. Residential, commercial and public buildings will be constructed at beside entrance gates. The power substation facilities will be dropped from 230 KV high tension line which will be looped from Kamarnat - Myaungtakar national grid. Purification plant and buildings will be constructed beside access road near the entrance. The plant will purify the water supplied from Kalihtaw Dam.

3.7.1 Road Ways in KMIC Project Compound

There are six types of road ways which would be consturctued in the internal infrastructure. They are 38 m wide, 46 m wide, 26 m wide, 18m wide, 12 m wide and 8 m wide road ways. Details of cross section of roads are as follow:

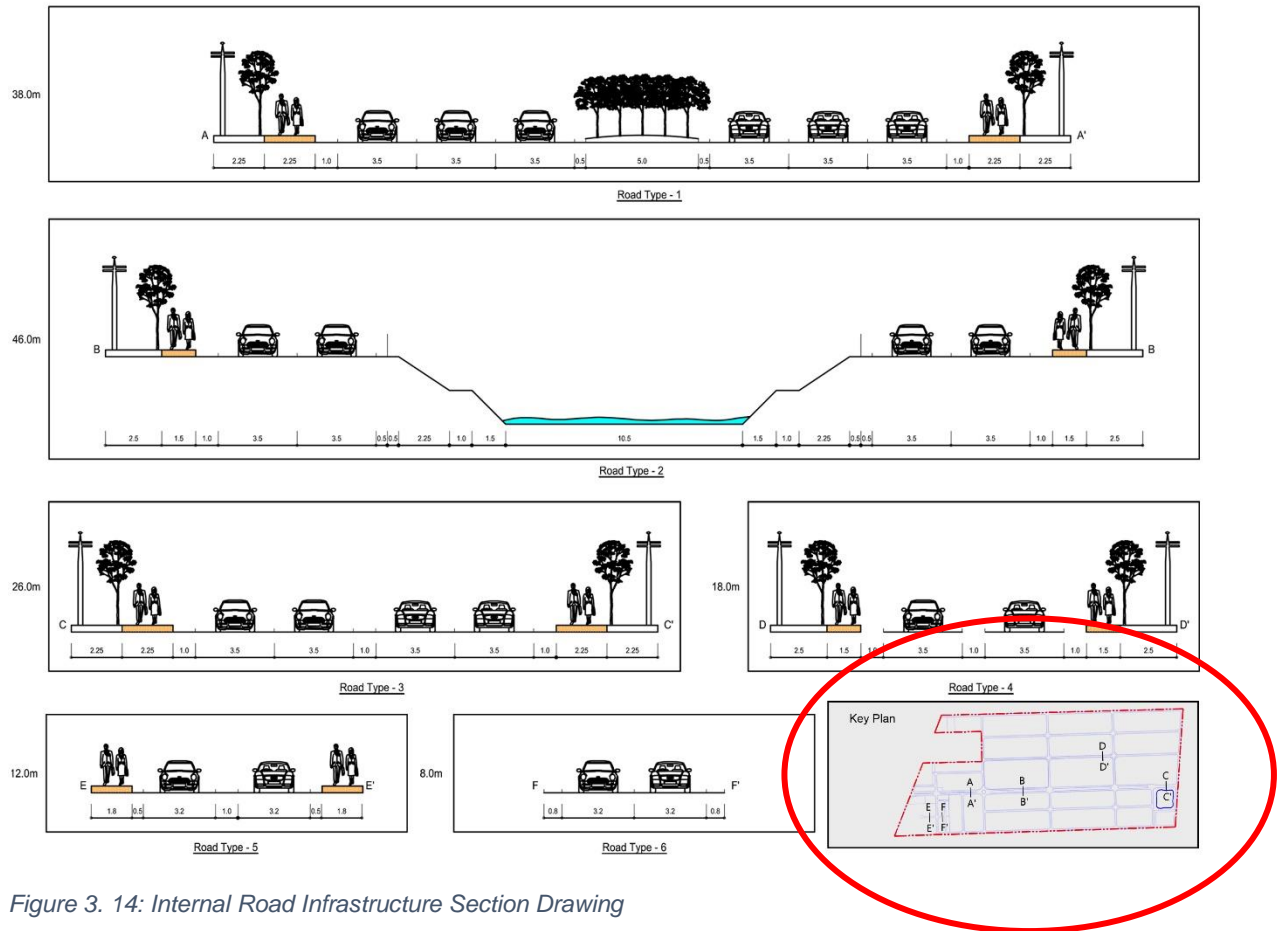


Figure 3. 14: Internal Road Infrastructure Section Drawing

3.7.2 Water Use and Supply System

During construction, the Engineering, Procurement and Construction (EPC) contractors usually dig several ponds to collect rainwater and make use of it for construction. Penta-Ocean construction Co., Ltd, which was the EPC contractor for Thilawa Phase A, confirmed this practice. KMIC JVC planned to expose several temporary ponds for on-site measures (prevention of flooding in wet weather). It is sufficient to use fresh water for construction. Water from water purification plant will be supplied to the KMIC project and the schematic diagram of water supply system is shown in Fig 3.13.

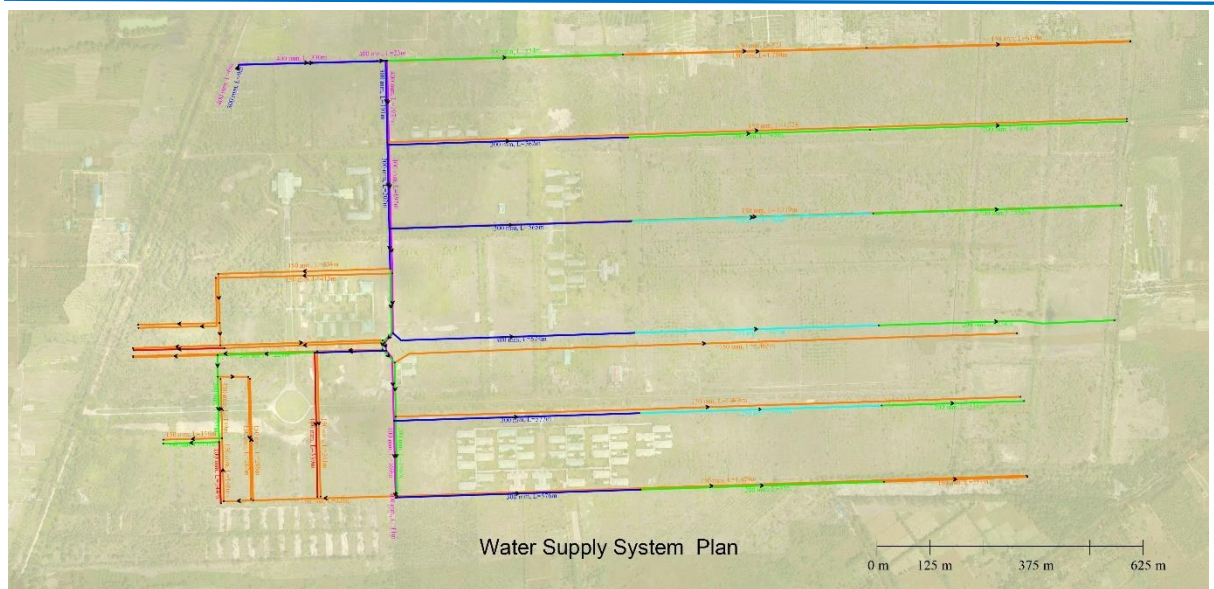


Figure 3. 15: Diagram of water supply system

A - LINE

| Particulars | Standard | Unit | Quantity | Explanatory |
|-------------|----------|------|----------|-------------|
| PIPE | D100 | M | - | |
| | D150 | M | 13,016 | |
| | D200 | M | 566 | |
| | D250 | M | - | |
| | D300 | M | 843 | |
| | D400 | M | - | |

B - LINE

| Particulars | Standard | Unit | Quantity | Explanatory |
|-------------|----------|------|----------|-------------|
| PIPE | D100 | M | 697 | |
| | D150 | M | 3,174 | |
| | D200 | M | 3,761 | |
| | D250 | M | 2,284 | |
| | D300 | M | 3,022 | |
| | D400 | M | 1,396 | |

3.7.3 Water Purification Plant



Figure 3. 16: Location map of Water Purification Plant

The location of water purification plant for KMIC project will be constructed at the corner of north west area as shown in the figure above. The appropriate land occupancy will be 11,770 square meters. The following facilities will be included in the water treatment plant

installation. The following figures show the water purification plant layout plan, the process of water purification plant and size of each facility of the plant.

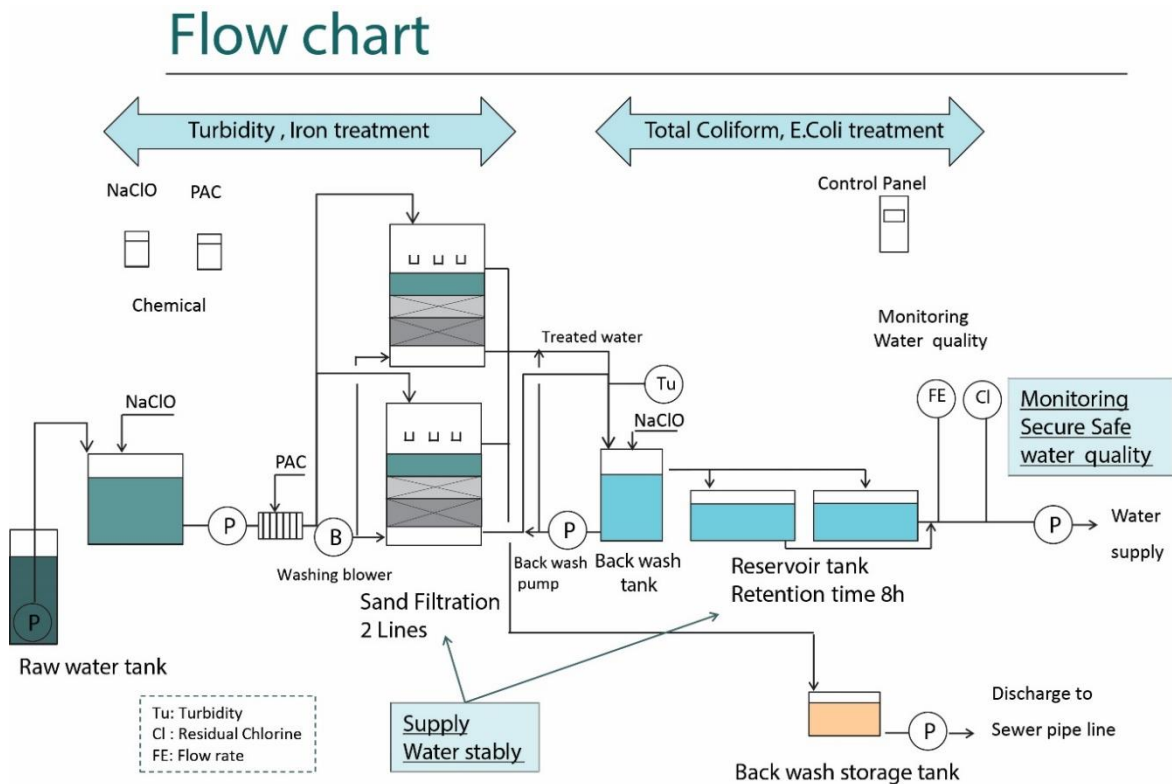


Figure 3. 17: Process Flow Chart of Water Purification Plant

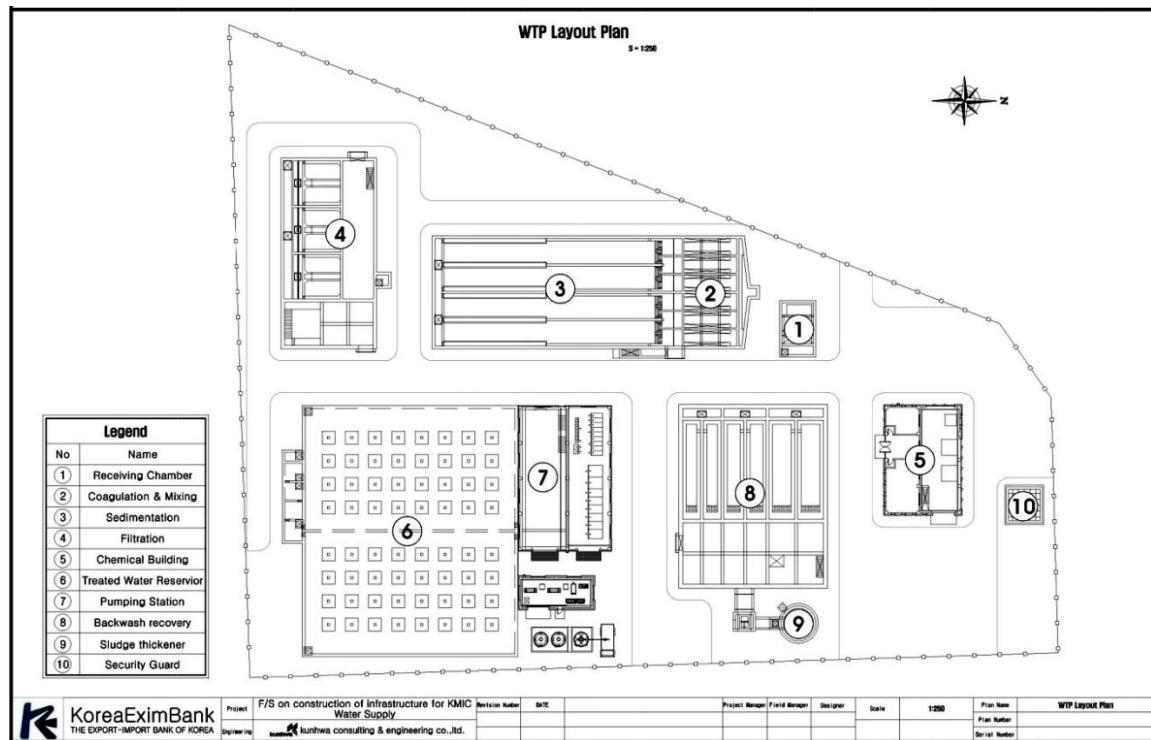


Figure 3. 18: Water Purification Plant Layout Plan

Table 3. 6: Details of Water Purification Plant

| No. | Facility | Dimension |
|-----|-------------------------|-------------------------------|
| 1 | Receiving Chamber | W2.5m×L2.4m×H3.0m (2module) |
| 2 | Mixing Flocculation | W8.4m×L8.4m×H2.6m (2module) |
| 3 | Sedimentation | W8.4m×L39.5m×H3.6m (2module) |
| 4 | Rapid Filter | B3.1m×L6.1m×2cell (3module) |
| 5 | Chemical Building | 10,000m ³ /day |
| 6 | Treater Water Reservoir | W20.8m×L36.0m×H4.5m (2module) |
| 7 | Pumping Station | 10,000m ³ /day |
| 8 | Backwash | W3.4m×L17.0m×H3.0m (2module) |
| | Sludge | W3.0m×L17.0m×H3.0m (2module) |
| | Recovery | W4.4m×L17.0m×H3.0m (2module) |
| 9 | Sludge Thickener | D7.0m(1module) |
| 10 | Security Guard | - |

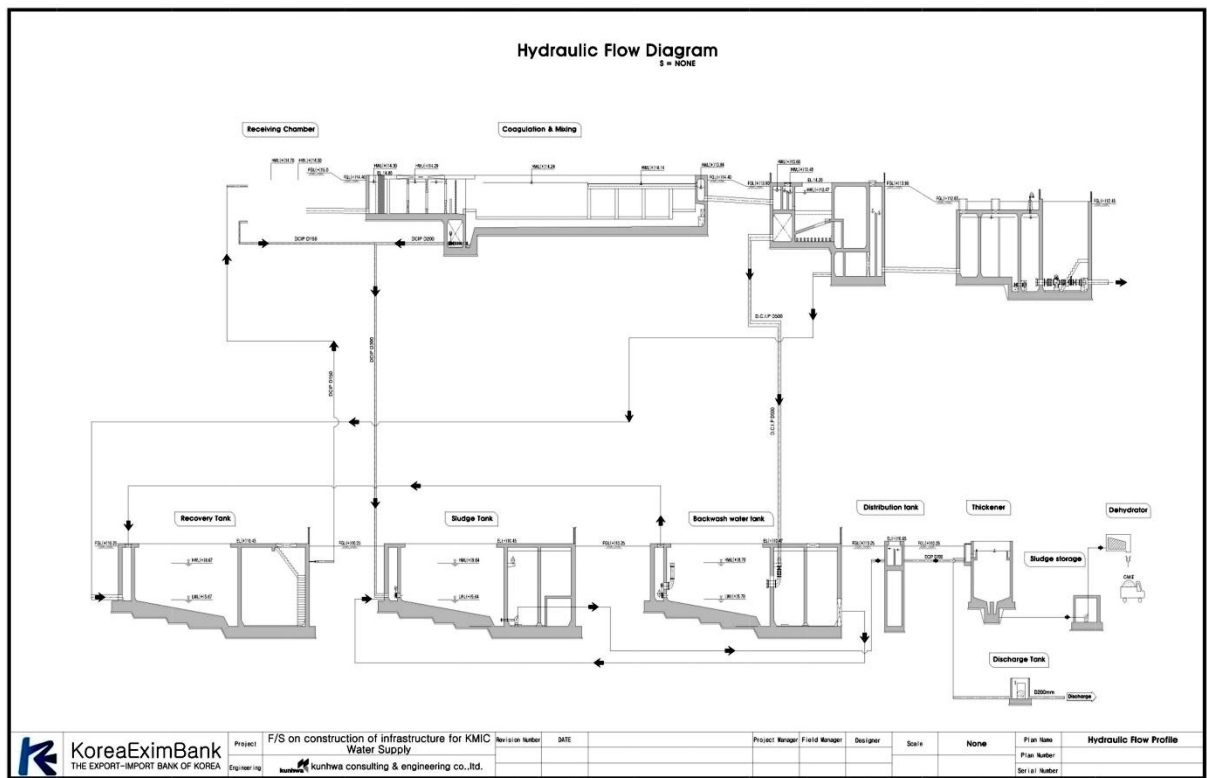


Figure 3. 19: Hydraulic Flow Diagram

3.7.4 Electricity Supply

230kV substation 1 EA, 100 MVA Transformer 2EA

1st 230 kV Gas Circuit Breaker (GCB), 2nd Circuit Breaker 33kV, Gas Insulated Switch (GIS)

The raw water pumping station is scheduled to be provided from the three phase lines. The water treatment plant is planned to be supplied the necessary power according to the entire power plan of the complex.

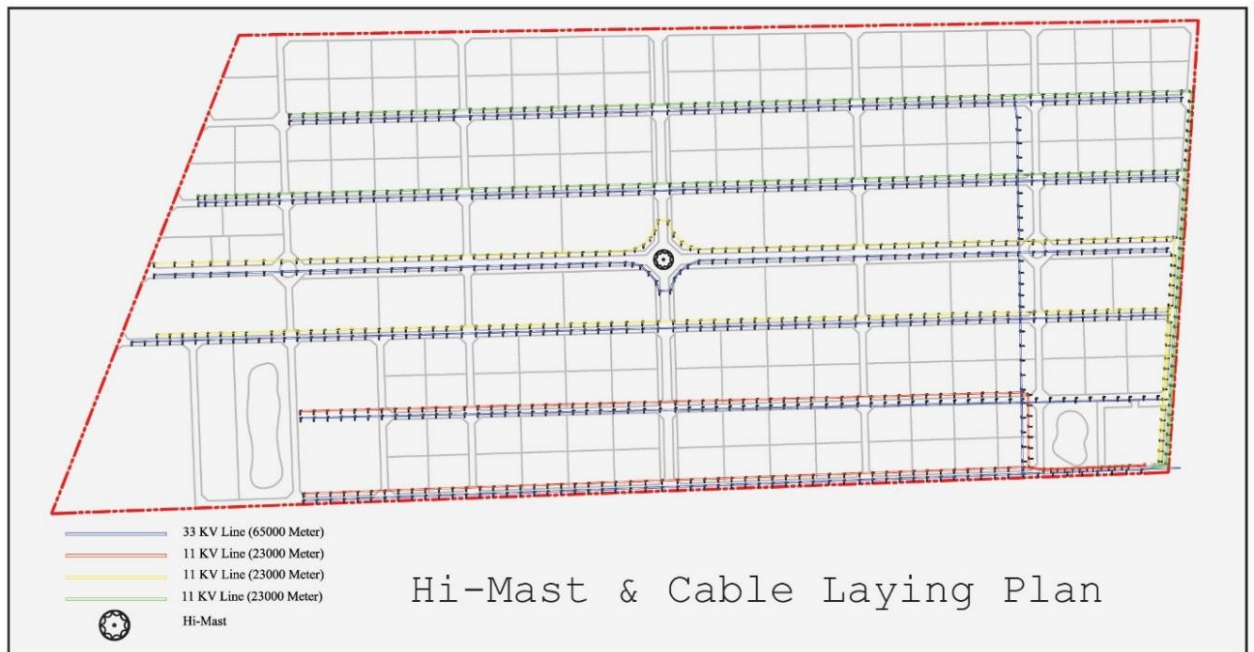


Figure 3. 20: Transmission line construction 230kV cable spec. 605 MCM 2-line 7.5 km

The substation is located in the site next to the water purification plant in the upper left corner of the KMIC complex. The substation and the water purification plant will be built by Ministry of Construction and will be maintained by the respective Myanmar government ministries. The residents will be provided with electricity via an electric pole installed on the ground. (Planning to install 11KV, 33KV power lines)

3.7.5 Wastewater and Sewage Collection and Disposal

3.7.5.1 Construction Phase

During construction phase, the approximate number of workers and employees will be 120, 150, 150 and 120 in 2021, 2022, 2023 and 2024 respectively. Temporary toilets with 3 – compartments septic tanks will be constructed for temporary sanitary system. The size of septic tank is 7 m (7,000 mm) in length, 1.6 m (1,600 mm) in breadth and 2 m (2,000 mm) in depth. The capacity (total volume) of the septic tank is 22 m³. One 3-compartments septic tanks will be built for five toilets and there will be total 15 toilets with three 3 compartments septic tanks. The cross-sections of the septic tank are described below.

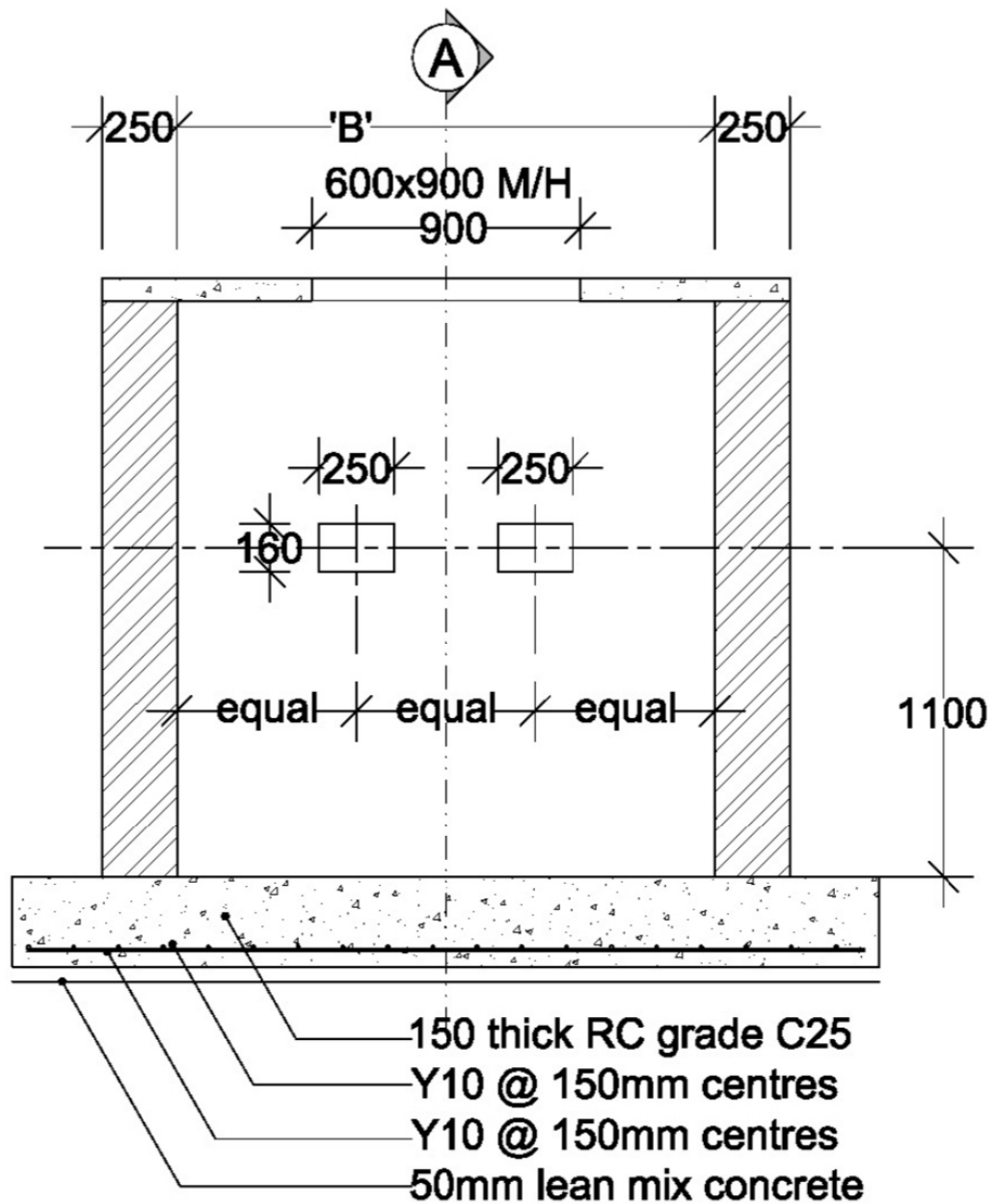


Figure 3. 21: Cross-section A-A of the septic tank

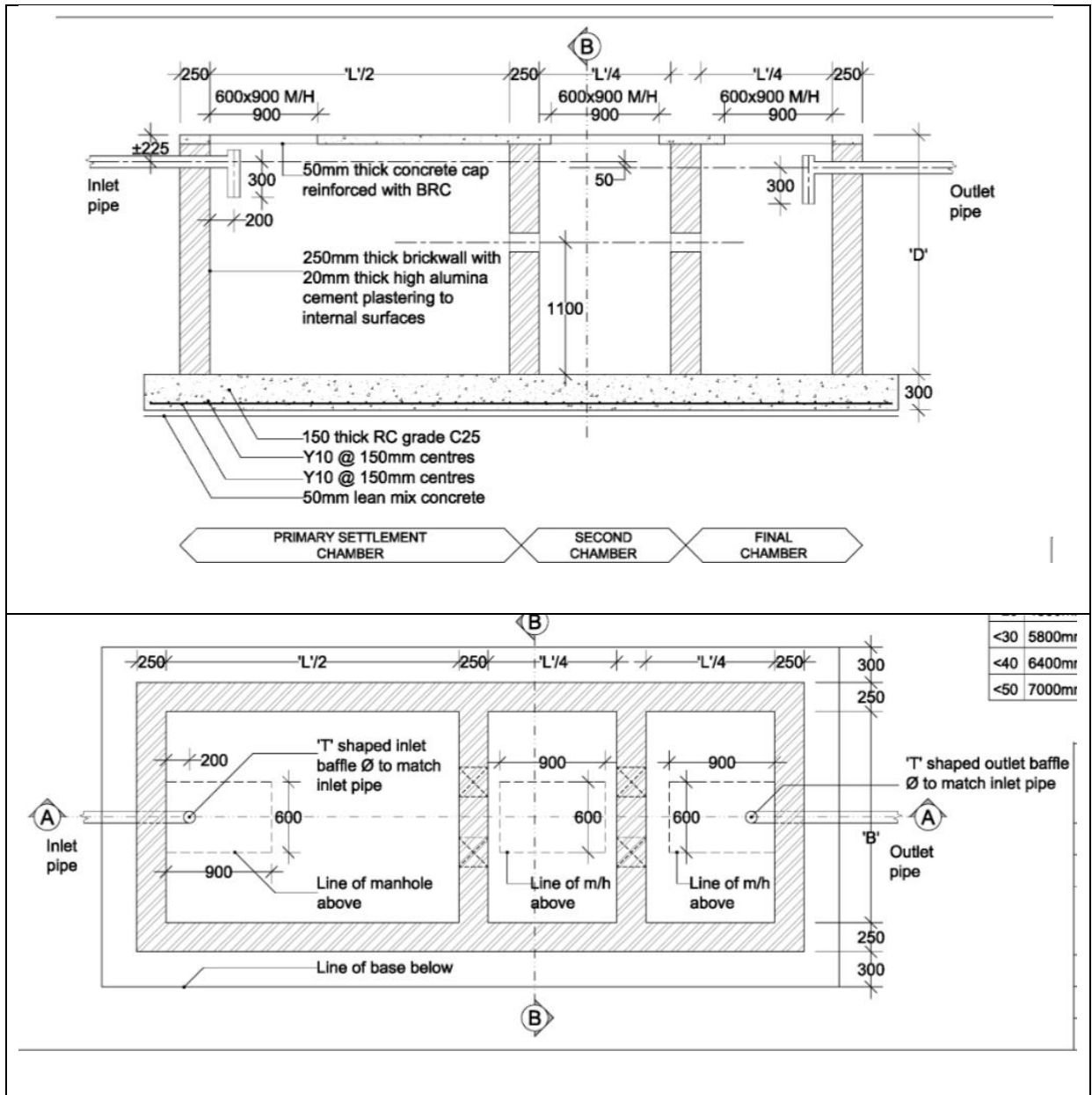


Figure 3.22: Cross-section B-B of septic tank

3.7.5.2 Operation Phase

Domestic wastewater, industrial wastewater and other disposed water will be collected via road side pipe network and gathered into wastewater treatment plant. The estimated capacity of wastewater will be 8,000 cubic meters per day. Wastewater from Industrial plots, residential plots and other infrastructure buildings will be collected through buried pipe lines at the road side. The developer will use ejectors, pumps and compressors along pipeline. The plant will treat wastewater and which will be constructed at south east corner of proposed project land. Treated water will be disposed off at the back drainage which leads to Kyar Inn creek.

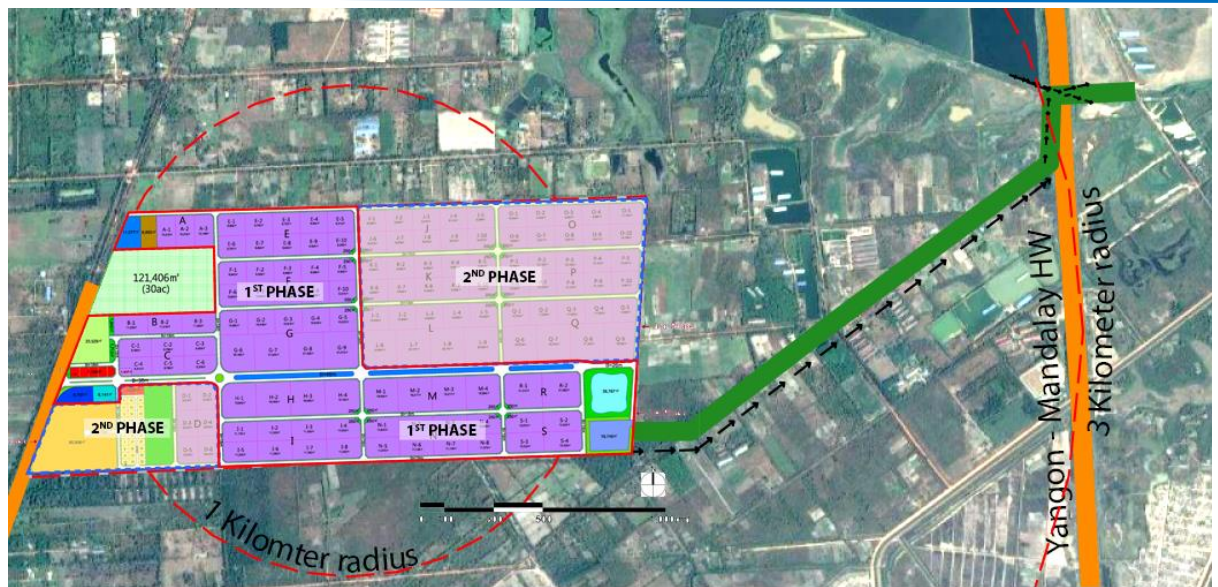


Figure 3. 23: Proposed Drainage



Figure 3. 24: Wastewater Treatment Plant Location Map

The treatment process of wastewater and sewage can be seen in the flow diagram below.

Flow Chart

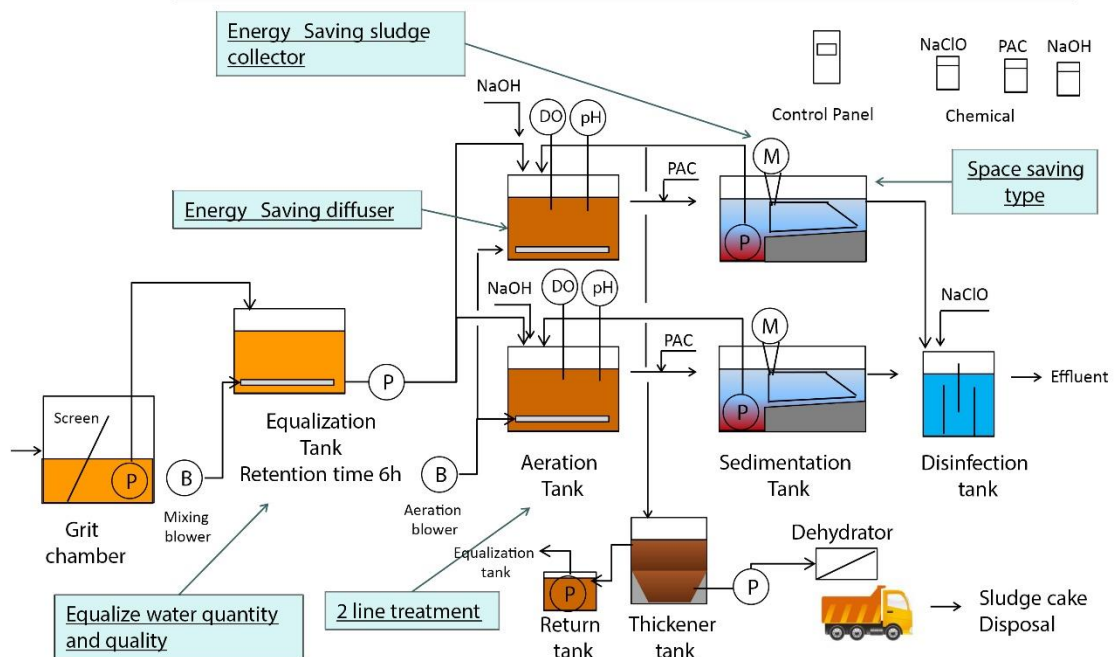


Figure 3. 25: Wastewater treatment plant flow diagram

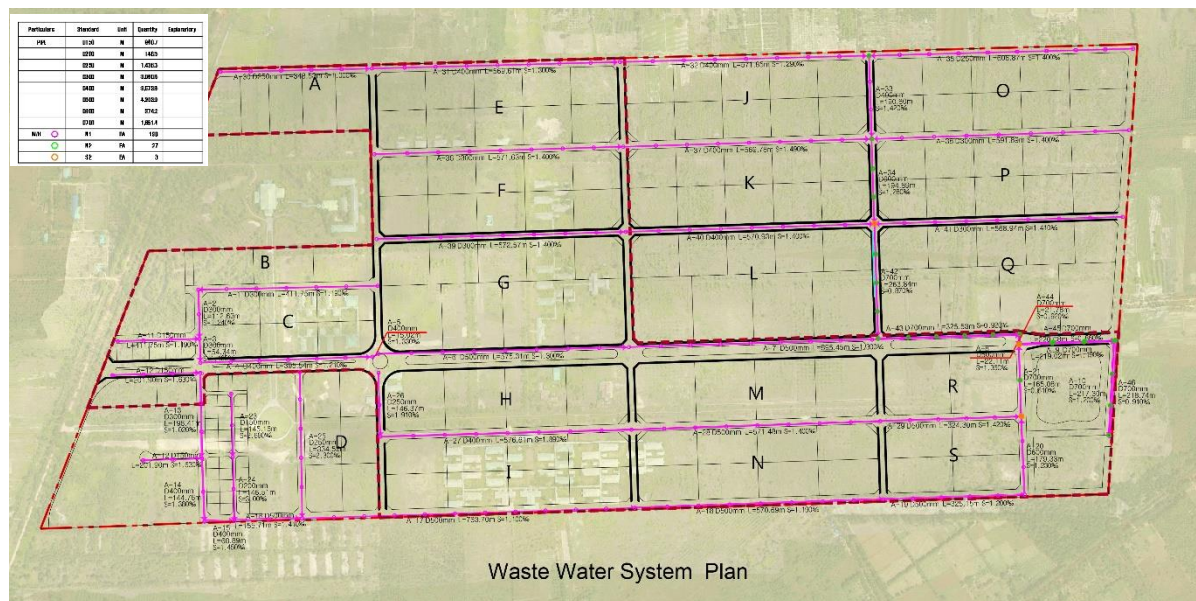


Figure 3. 26: Wastewater System Plan (See clear figure in Appendix)

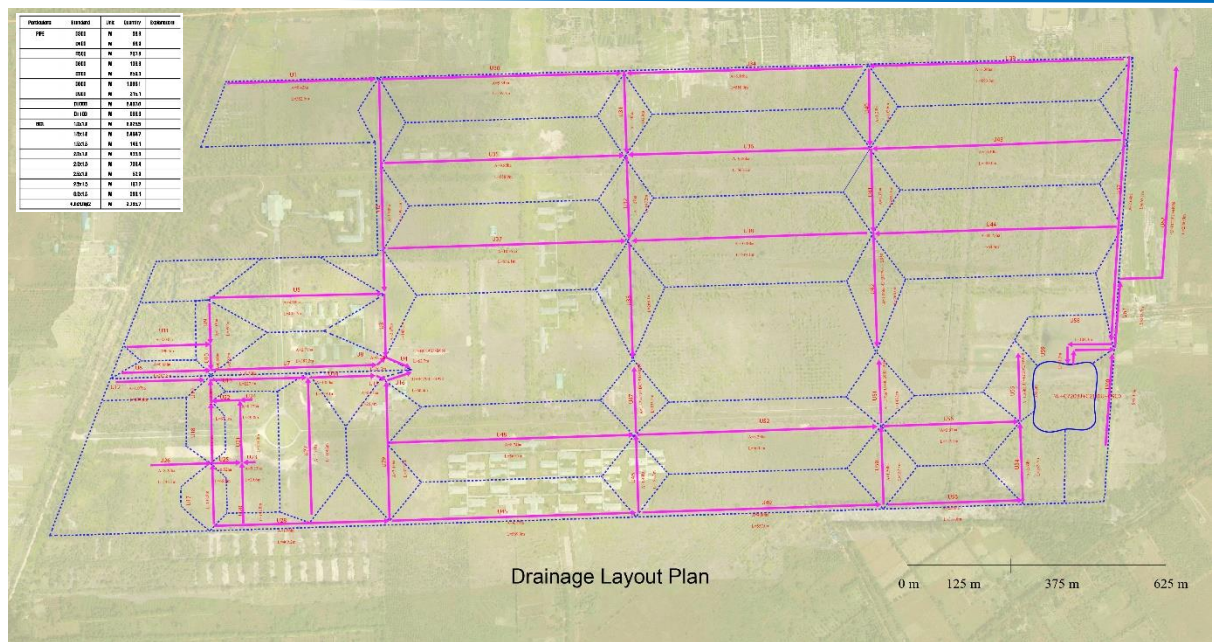


Figure 3. 27: Drainage Layout Plan (See clear figure in Appendix)

3.7.5.2.1 Wastewater Collection Design

Overview

Below indices were used for the wastewater collection.

- ✓ Planned completion year: 2024
- ✓ Target population: 8,974 residents, 14,023 workers, and floating population 5,277

Quantifying Wastewater

| Subject | Description | Application | | | | | | | | | | | | |
|---|--|--|-----|-------|----|----|------|-----|-----|----|-----|-----|-----|---|
| Planned completion year | Either 2020 or what is stated in the Urban Master Plan. ⁽¹⁾ | 2024, as stated the project plan. | | | | | | | | | | | | |
| Sewage drainage | Separate system and gravity flow ⁽²⁾ | Separate system and gravity flow | | | | | | | | | | | | |
| Domestic wastewater flow | Design water demand (DWD) x conversion factor (CF) x return factor (RF) ⁽¹⁾ Examples of revenue water ratio (RWR) and RF: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Subject</th> <th>SEZ</th> <th>KOICA</th> <th>LH</th> </tr> </thead> <tbody> <tr> <td>CF</td> <td>0.82</td> <td>n/a</td> <td>0.8</td> </tr> <tr> <td>RF</td> <td>1.0</td> <td>0.9</td> <td>0.9</td> </tr> </tbody> </table> | Subject | SEZ | KOICA | LH | CF | 0.82 | n/a | 0.8 | RF | 1.0 | 0.9 | 0.9 | The CF and the RF are applied to the DWD. CF and RF of 0.9 each are applied to support stable wastewater treatment. |
| Subject | SEZ | KOICA | LH | | | | | | | | | | | |
| CF | 0.82 | n/a | 0.8 | | | | | | | | | | | |
| RF | 1.0 | 0.9 | 0.9 | | | | | | | | | | | |
| Industrial wastewater flow | Wastewater unit flow by industrial type: ⁽²⁾ Maximum day flow (m ³ /day) = Area (m ²) x daily unit flow by industry (m ³ /1,000 m ² ·day) ⁽³⁾ | Daily unit flow by industrial type is applied to estimate industrial wastewater flow per area. | | | | | | | | | | | | |
| Hourly peak factor (HPF) of Domestic wastewater | The hourly peak factor is to be 1.3 to 1.8 times the maximum daily | A HPF of 1.5 applied. | | | | | | | | | | | | |

| | | | | | | | | | | |
|-----------------------------------|---|--|------------|-------|----|------------------|--------------------------|-----|------------|--|
| flow | flow. (1) Examples of HPFs: <table border="1"> <tr> <td>Subject</td> <td>SEZ</td> <td>KOICA</td> <td>LH</td> </tr> <tr> <td>HPF</td> <td>1.5</td> <td>1.5</td> <td>1.3 to 1.8</td> </tr> </table> | Subject | SEZ | KOICA | LH | HPF | 1.5 | 1.5 | 1.3 to 1.8 | |
| Subject | SEZ | KOICA | LH | | | | | | | |
| HPF | 1.5 | 1.5 | 1.3 to 1.8 | | | | | | | |
| HPF of Industrial wastewater flow | The peak hourly flow is to be 1.3 to 2.0 times the maximum daily flow. ⁽²⁾ | HPF of 2.0 is applied to support reliable treatment of wastewater. | | | | | | | | |
| Groundwater influx | 10 to 20 percent of maximum daily wastewater flow ⁽²⁾ Examples of groundwater flow: <table border="1"> <tr> <td>Subject</td> <td>SEZ</td> <td>KOICA</td> <td>LH</td> </tr> <tr> <td>Groundwater flow</td> <td>10m³ /ha,day</td> <td>15%</td> <td>around 10%</td> </tr> </table> | Subject | SEZ | KOICA | LH | Groundwater flow | 10m ³ /ha,day | 15% | around 10% | Ten percent of the maximum daily wastewater flow is applied as groundwater flow. |
| Subject | SEZ | KOICA | LH | | | | | | | |
| Groundwater flow | 10m ³ /ha,day | 15% | around 10% | | | | | | | |

| | Subject | Description |
|-----------------------------|--|--|
| Design conditions for sewer | Flow | Estimated using the rational method and Manning formula. ⁽¹⁾ |
| | Conveyance | 100% of round shaped pipe cross section ⁽¹⁾ |
| | Allowance | 100% (small conduit with D200 to 600 mm) ⁽¹⁾ |
| | Velocity range | 0.6 to 3.0 m/sec ⁽¹⁾ |
| | Coefficient of roughness | 0.010 (PVC pipe) |
| | Burial depth | Minimum 1.0 m (pipe protection works applied where necessary) |
| | Burial location | Pedestrian road next to each roadway |
| | Pipe diameters | Main pipes: D300 to 500 mm, branched pipes: D150 mm |
| | Connection type | Pipe top connection |
| | Pipe bases | Excavated earth: Sand (stone dust) base (180°) Soft ground: Concrete base (90°) |
| | Manhole interval | 75m (for D600 mm or less) ⁽¹⁾ |
| | Conduit testing | Watertight testing and CCTV inspection |
| | Conduit indication | Tape (dark brown color) |
| Branched pipe | At least one per lot | |
| Branched pipe connection | To drain wastewater into manholes in principle | |

REFERENCES:

(1) Ministry of Environment (ME, 2011), Sewerage Network Facility Standard

(2) ME (2017), Public Wastewater Treatment Facility Design Guide

(3) LH (2015), "Sewage Unit Flow by Industry," Estimation of Units for Industrial Sites

KOICA (2017), Master Plan for Local Development Near the Hanthawaddy International Airport and

in Southwest Yanggon, Myanmar

JICA (2017), Preparatory Survey for Greater Yangon Water Supply Improvement Project - Phase II

LH (2019), LH Design Guide

3.7.5.2.2 Wastewater Collection Plan

Collection Plan

The wastewater service sheds are divided into two parts considering topographic conditions and the final height of the project site.

Wastewater Service Area Plan

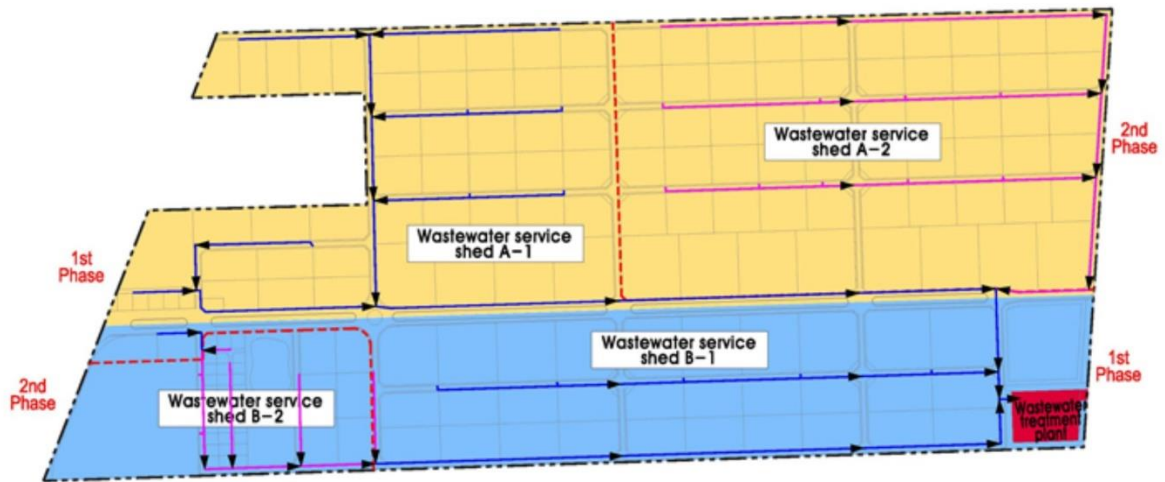


Figure 3. 28: Wastewater Service Area Plan

Wastewater Treatment Plant

| Subject | Flow (m ³ /day) | Inlet Elevation (m) | Design Capacity (m ³ /day) | Lot Area (m ²) |
|-----------------|----------------------------|---------------------|---------------------------------------|----------------------------|
| Treatment Plant | 4,624 | 9.32 | 5,100 | 19,474 |

Estimating Design Flows

Design Wastewater Flows

Summary (m³/day)

| Subject | Daily Maximum Flow | Groundwater Flow | DDMF | DHPF |
|------------|--------------------|------------------|---------|---------|
| Domestic | 2,712 | 271.4 | 2,983.4 | 4,339.4 |
| Industrial | 1,913 | 191 | 2,105 | 4,019 |
| Total | 4,625 | 462.4 | 5,088.4 | 8,358.4 |

Domestic Wastewater

- ✓ An CF of 90%, RF of 90% and ground water ratio (GR) of 10% are applied.
- ✓ Design daily maximum flow (DDMF) (m³/day) = daily maximum flow + groundwater flow

- ✓ Design hourly peak flow (DHPF) (m³/day) = daily maximum flow x peak factor (1.5) + groundwater flow

Domestic Wastewater Flows (m³/day)

| Subject | Daily maximum water demand | CF | RF | Daily maximum wastewater flow | Groundwater flow | DDMF | DHPF |
|--|----------------------------|-----|-----|-------------------------------|------------------|---------|---------|
| Total | 3,348.3 | | | 2,712.0 | 271.4 | 2,983.4 | 4,339.4 |
| Industrial | 1,083.1 | | | 877.3 | 87.8 | 965.1 | 1,403.8 |
| Food and beverage | 206.2 | 0.9 | 0.9 | 167.0 | 16.7 | 183.7 | 267.2 |
| Textile and garment | 474.9 | 0.9 | 0.9 | 384.7 | 38.5 | 423.2 | 615.6 |
| Electronics and computer assembly | 157.7 | 0.9 | 0.9 | 127.7 | 12.8 | 140.5 | 204.4 |
| Logistics | 173.3 | 0.9 | 0.9 | 140.4 | 14.0 | 154.4 | 224.6 |
| Construction materials | 71.0 | 0.9 | 0.9 | 57.5 | 5.8 | 63.3 | 92.1 |
| Technopark | 203.5 | 0.9 | 0.9 | 164.8 | 16.5 | 181.3 | 263.7 |
| Public facilities | 166.3 | 0.9 | 0.9 | 134.7 | 13.5 | 148.2 | 215.6 |
| Commercial | 253.1 | 0.9 | 0.9 | 205.0 | 20.5 | 225.5 | 328.0 |
| Apartment housing | 1,569.8 | 0.9 | 0.9 | 1,271.5 | 127.2 | 1,398.7 | 2,034.5 |
| Detached housing | 72.5 | 0.9 | 0.9 | 58.7 | 5.9 | 64.6 | 94.0 |

Industrial Wastewater

- ✓ Daily maximum flow (m³/day) = lot area (m²) × unit flow (m³/1,000 m²·day)
- ✓ DDMF (m³/day) = maximum daily flow + groundwater flow
- ✓ DHPF (m³/day) = maximum daily flow × peak factor (2.0) + groundwater flow

Industrial Wastewater Flows (m³/day)

| Subject | Area (m ²) | Unit flow (m ³ /1,000 m ² ·day) | Daily maximum flow | Ground water flow | DDMF | DHPF |
|--|------------------------|---|--------------------|-------------------|-------|-------|
| Industrial | 1,592,525 | | 1,914 | 191 | 2,105 | 4,019 |
| Food and beverage (C10) | 418,815 | 2.47 | 1,034.5 | 103 | 1,138 | 2,172 |
| Textile and garment (C14) | 351,657 | 0.82 | 288.4 | 29 | 317 | 606 |
| Electronics and computer assembly (C26) | 179,935 | 0.82 | 147.5 | 15 | 163 | 310 |
| Logistics (C33) | 308,116 | 0.55 | 169.5 | 17 | 187 | 356 |

| | | | | | | |
|-------------------------------------|---------|------|-------|----|-----|-----|
| Construction materials (C23) | 334,002 | 0.82 | 273.9 | 27 | 301 | 575 |
|-------------------------------------|---------|------|-------|----|-----|-----|

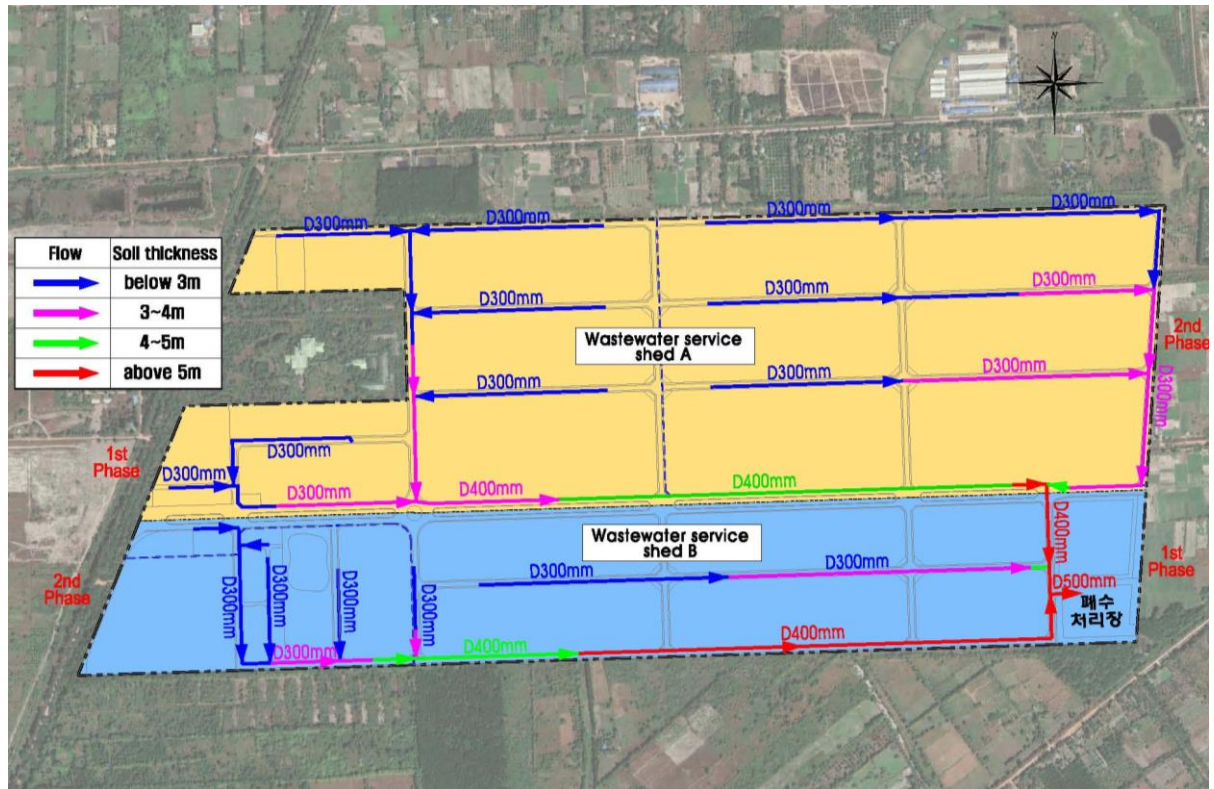


Figure 3.29: Wastewater Collection Plan

According to the data mentioned above, the wastewater treatment plant has enough capacity to treat the wastewater generated from industries during the operation phase of the industrial complex.

Note: For the operation phase, the developer of each industry and business will arrange the relevant and reliable sanitary system based on the number of their employees and staff.

The industry-specific guidelines for effluent levels stipulated in the National Environmental Quality (Emission) Guidelines will be followed by each and every industry and manufacturing invested in the complex and the final effluent (drainage discharge water) level from the central wastewater treatment plant will also be in line with the National Environmental Quality (Emission) Guidelines. The quality of treated wastewater will be monitored by the real-time monitoring indicator. The sludge generated from the central wastewater treatment plant will be disposed systematically in connection with the Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee.

3.7.6 Solid Waste Management System

3.7.6.1 Construction Phase

During construction phase, demolition of some old buildings and site cleaning will be resulted in large quantities of solid waste that come out of the excavation and grading earth level at the site. In the construction phase, solid waste will consist of rejected parts of pre-casted concrete, solid components, surplus materials, rejected materials, papers, containers, broken bricks, solvent containers, empty paint drums, surplus oil and waste from workers.

Some wastes are hazardous substances such as paints, solvent, cement, adhesives, and chemicals. Non-hazardous waste will be reused and recycled as much as possible.

The non-hazardous and hazardous solid waste management plan for construction phase will be set by the developer. The amount of construction waste generated will be estimated and calculated for the submission to Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee.

Non-hazardous solid waste management plan

Waste Transfer Plots

The waste transfer plots are used to collect the refuse and to reload their waste into a garbage truck of Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee. The transfer plots will have collection bins for wastes and recyclables, transfer containers and trailers. It is designed with drainage of paved areas and adequate water hydrants for maintenance of cleanliness and fire control and other concerns like traffic, odor, dust, litter. The routes for garbage collection trucks to get easy access to the waste transfer plot will be constructed.

Final collection of waste

The construction waste will be collected by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) with the on-call system.

Note: The 3Rs (Reduce, reuse and recycle) practice would be applied in the project and trainings related to the non-hazardous solid waste management will be conducted for the workers.

Hazardous solid waste management plan

Waste minimization (Reduction at source)

The required amount of construction materials will be carefully calculated and ordered to minimize the generation of waste at source.

Substitution – Substitution of a non-hazardous or less hazardous materials in place of a hazardous material whenever possible.

Storing and Disposal of Hazardous Waste

The hazardous waste will be kept in a separate bin in the waste transfer station and collected by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) with the on-call system.

3.7.6.2 Operation Phase

The non-hazardous and hazardous solid waste management plan for operation phase will be set by the developer. The amount of daily waste generated from residential/apartment and industries will be estimated and calculated for the submission to Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee.

Non-Hazardous Solid Waste Management Plan

Waste minimization (Reduction at source)

Source reduction includes technological efficiency, material substitute and good management practice.

Waste segregation

The kitchen waste from residential/apartment will be segregated as wet and dry. The wet waste will be put in green bags and dry waste will be in blue bags. The recyclable wastes would be segregated and disposed in the relevant dust bins by the tenants with their own arrangement in their project compound. The tenants' storage of solid waste shall be allowed with KMIC JVC's prior approval only when it is stored in solid waste receptacles or trash containers which must be large enough to facilitate storage and collection and which must be installed within their plots.

Waste collection

The waste generated by tenants would be collected on a daily basis by the cleaners. The system requires use of a container, truck container pick-up equipment, and replacement of the container.

Waste storage

The waste collected from residential/apartment will be temporarily stored in a bin center. The bin center will cover the following aspects:

- 1) The size of the bin center will be big enough for storing the amount of waste generated for two days.
- 2) The routes for garbage collection trucks to get easy access to the bin center will be considered and made.
- 3) The lighting will be installed at the bin center for day and night work.
- 4) The air purification systems will be installed at the bin center for clean ventilation.
- 5) The liquid produced from waste and wastewater generated from cleansing bin center will be treated at the central wastewater treatment plant before disposal.
- 6) Locating the separate collection dust bins at the bin center for separately disposing the wastes and recycle products.
- 7) The adequate amount of water will be available for cleansing the bin center.
- 8) The bad smell from walls and leakage of contaminated water will be avoided.

The waste generated from industries will be categorized as hazardous waste, non-hazardous waste, toxic waste, and chemical waste and temporarily stored in the bin center separately based on the type of waste.

Final disposal of waste

Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) will collect the waste from the bin center on a specified day regularly based on the type of waste.

Note: The 3Rs (Reduce, reuse and recycle) practice would be applied especially in offices, industries, and commercial areas where office stationeries and different reusable and recyclable materials are being used. Trainings related to the non-hazardous solid waste management will be conducted for all concerned persons.

Hazardous Solid Waste Management Plan

The hazardous waste management plan contains the following procedures and processes.

Waste minimization (Reduction at source)

The technological efficiency, material substitute and good management practice will be applied for waste source reduction. The employees and staff of all factories, industries and offices will be encouraged to reduce the volume of waste generated.

Recycling – Many materials treated as chemical waste are actually surplus chemicals that are reusable. The unopened or unwanted chemicals would be transferred to related industries where they may be used.

Substitution – Substitution of a non-hazardous or less hazardous chemical in place of a hazardous chemical is a commonly used method of reducing waste. For e.g. Changing a

cleaning agent from a toxic, flammable solvent to an appropriate soap or detergent solution, and the use of water-based paints and cements over solvent based.

Waste Segregation and Storage

All waste stored together must be compatible. Guidelines for segregation of chemicals as found in the Laboratory Safety Manual must be adhered to. Generally, classes, i.e. ignitable, corrosives, toxics, and reactive, would be segregated. This information will be listed on the label of each chemical or on the MSDS.

The hazardous waste and chemical waste will be temporarily stored in the bin center separately. Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee will collect the waste.

Transportation and Disposal of Hazardous Waste

The transportation of hazardous waste to the bin center will be carefully conducted and if needed personal protective equipment will be provided for the workers to wear for the transportation of hazardous waste. The necessary trainings will also be provided to the workers.

The type of hazardous waste which will be disposed by the industries will be informed to Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee. The department will decide what kind of treatment will be done based on the waste category.

3.8 Proposed External Infrastructure

The external infrastructure development will be implemented by Ministry of Construction, counterpart of KMIC Development Co., Ltd. (KMIC JVC) and not related to this Environmental Impact Assessment of KMIC project. Therefore, the information mentioned under this section 3.8 is just for information.

The existing access road way to the project site is 9.45 km length and 6-meter-wide: two lanes lies from Yangon - Mandalay main road T junction to the proposed site. Ministry of Construction (MOC) will improve the existing road way to 4 lanes carriage ways mid island and sidewalks. Requirement of consumption of water will be supplied from Kalihtaw Dam which is situated in the north. Direct buried supply pipes (D=600mm) will be used and the water will be purified at KMIC site. 230 KV electricity will be installed from Myaungtakar - Kamarnat national grid.



Figure 3. 30: Map showing External Structures and Project Site

3.8.1 Access Road



Figure 3. 31: Access Road to Project Site

The Ministry of Construction (MOC), counterpart of the developer, has planned to upgrade existing road which has access to Yangon –Mandalay express way to the proposed project site. The existing tar road was constructed since 2002 and 9.45 km length but already damaged by heavy loaded transportation. The 6-meter-wide the existing road way will be improved to 21-meter crest width road way. Two lane -7-meter carriageway will be constructed at both side of 3-meter mid island. Both 2-meter-wide sidewalk will be situated at edges. Necessary drainage at road side will be constructed. Along the traffic way, culverts and bridges will be constructed. Regulatory signs such as control, command and prohibitions, Guidance signs such as direction and guide signs, Caution and Warning signs such as advanced warning signs and hazard marker signs, safety barriers will be installed for road safety. The expanded and improved road shall also accommodate heavy trucks.

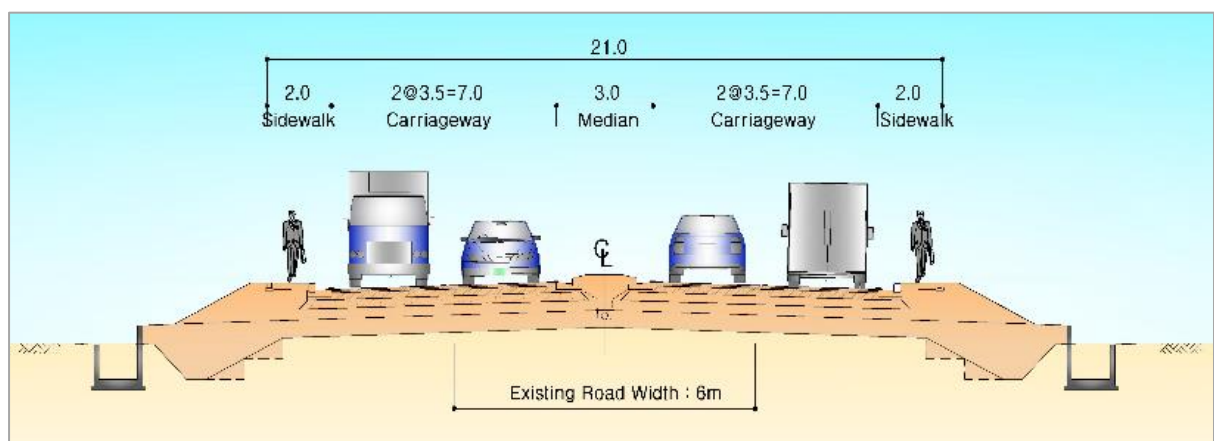


Figure 3. 32: Proposed design to upgrade existing road

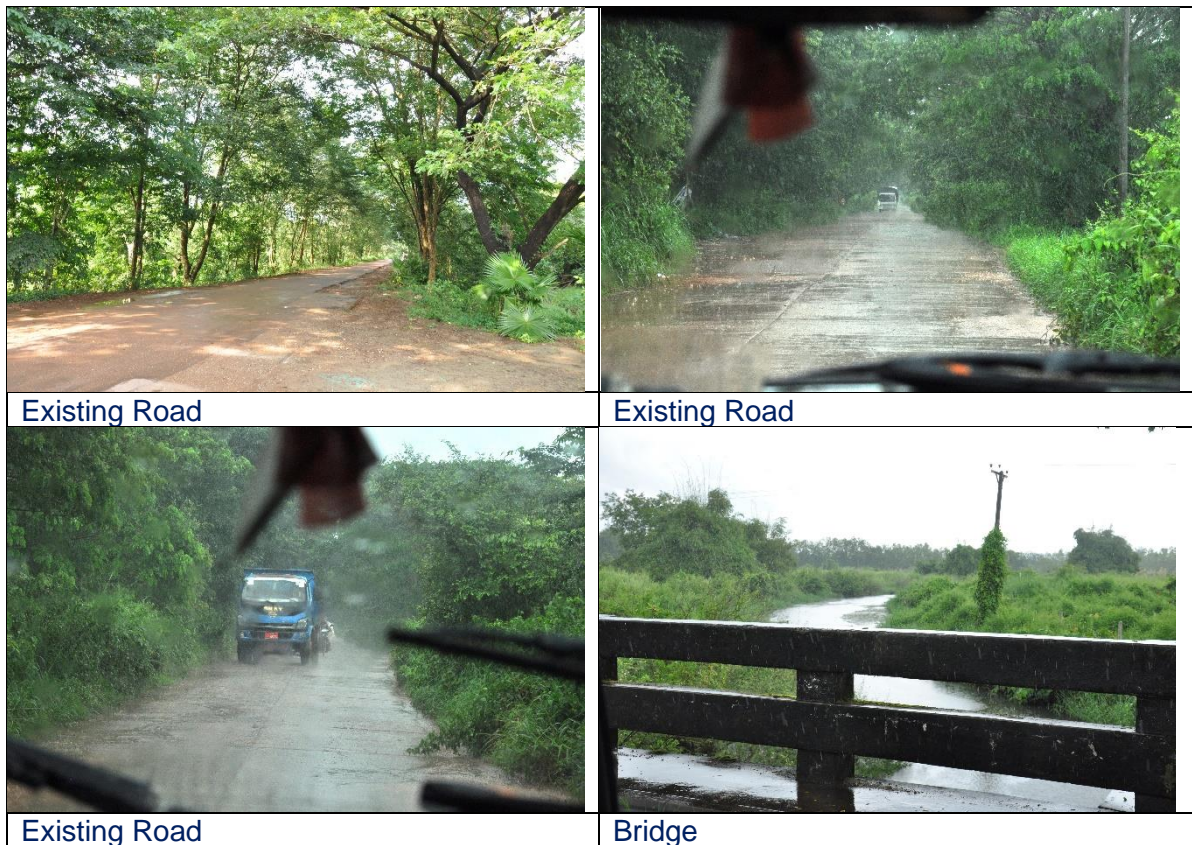


Figure 3. 33: Existing Road Condition Photos

3.8.2 Water Resource and Usage

The developer has already planned to access water from Kalihtaw Dam which was constructed in 2001 for the purpose of supplying water for livestock and Agricultural Zone in Nyaung Hnitpin (Due to the policy of KMIC Development Co., Ltd., the underground water will not be extracted to protect the environment). It now supplies water also to residents and farms in the area. The developer has planned 600 mm diameter pipe line (buried) to be installed from Kalihtaw Dam to KMIC project, along the 17.95 km kilometer-stretch bank crest road belonging to irrigation department and 5 kilometer long Town road. Total pipe line distance is 20 kilometers. The dam is 65 feet height and 3500 feet in length.

The dam is supplying water to 9,000 acres of agricultural land. Maximum storage of high flood level of the dam is 26,000 acre-feet and dead storage level of dam is 760 acre-feet (at a minimum). The developer will install supply pipe line along the old creek to avoid public area and cultivated lands. In the operation phase, daily requirement of purified water will be 10,000 cubic meters (2.6 million gallons). The purification plant will be constructed at the north-west corner of the proposed project site and water supply pipes will be buried at main and intersection road sides. Raw water from Kalihtaw dam will reach in front of proposed project land via collection drain. The water will be collected in raw water tank. Chemical treatment and mechanical treatment will be done at the plant and secure safe water will be supplied.

3.8.2.1 Estimated Water Demand During Construction

(unit: m³/day)

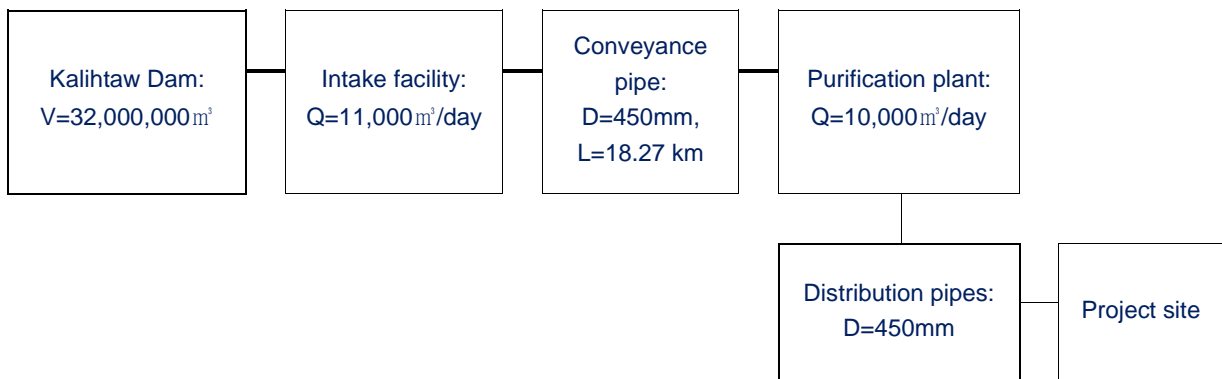
| | 2021 | 2022 | 2023 | 2024 |
|--------------|-------|-------|-------|-------|
| construction | 1,500 | 1,000 | 1,000 | 1,000 |
| domestic | 500 | 500 | 500 | 500 |
| sum | 1,500 | 1,500 | 1,500 | 1,500 |

3.8.2.2 Water Supply for Operation Phase

Water Supply Plan

General

- ✓ Water is to be taken from the Kalihtaw Dam ($V = 32,000,000 \text{ m}^3$);
- ✓ Water is to be supplied from the planned water purification plant ($Q = 10,000 \text{ m}^3/\text{day}$) on the project site and the raw water is to be conveyed via the intake facility ($Q = 11,000 \text{ m}^3/\text{day}$, pump capacity: $3.90 \text{ m}^3/\text{min.} \times 31 \text{ mH} \times 3(1) \text{ units}$) and the water conveyance pipeline ($D = 450 \text{ mm}$, $L = 18.27 \text{ km}$);
- ✓ From the planned water purification plant, water is to be distributed via the distribution pipe network ($D = 450 \text{ mm}$) across the project site.



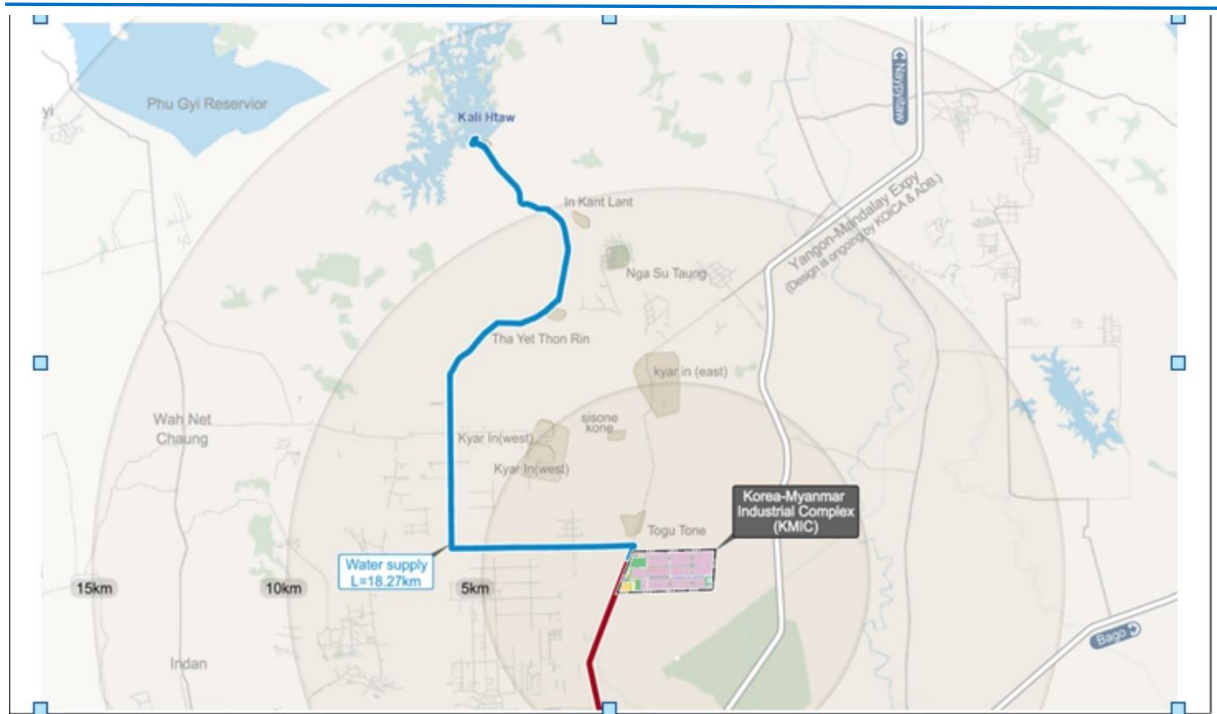


Figure 3. 34: Water Supply Network

3.8.2.3 Planned Water Purification Plant

In order to ensure uninterrupted supply of water throughout the project site, the pump facility would meet the following requirements:

- ✓ Pump head = 45 m or greater
- ✓ Design water demand = 12,137 m³/day (design daily maximum demand)

3.8.2.4 Determining Water Demand (LPCD)

Industrial Water Demand

| Subject | LH Institute (m ³ /1,000m ² .day) | Myanmar (m ³ /1,000m ² .day) | Applied |
|--|--|---|---------|
| Industrial | | | |
| Food and beverage (C10) | 9.5 | - | 9.5 |
| Textile and garment (C14) | 4.2 | - | 4.2 |
| Electronics and computer assembly (C26) | 9.2 | - | 4.0 |
| Logistics (C33) | 3.7 | - | 3.7 |
| Construction materials (C23) | 1.6 | - | 1.6 |

• ※ Source: LH Institute (2015), "Determining Water Demand for Industrial Locations,"

Domestic Water Demand

Water Demand for the Resident Population

- The design daily maximum water demand for the resident population has been set at 183 liters per capita per day (LPCD) according to the YCDC document.
- Domestic demand: 150, non-domestic demand: 100, and total 250 in 2025.
- A leakage ratio of 10% was applied for year 2040, given the fact that this is a new urban development project.
- A peak factor of 110% was applied.

Source: JICA (2017), Preparatory Survey for Greater Yangon Water Supply Improvement Project – Phase II

Water Demand for the Working and Visiting Population

Based on a review of similar industrial complex projects in Korea, the design daily maximum water demand for these two types of populations were set at 100 lpcd and 30 lpcd respectively.

3.8.2.5 Determining Water Demand (LPD)

Industrial Water Demand

| Subject | Area (1,000 m ²) | Demand per area (m ³ /1,000 m ² .day) | Design Daily Maximum Water Demand (DMWD) (m ³ /day) |
|---|------------------------------|---|--|
| Industrial | 1,593 | | 8,788.9 |
| Food and beverage (C10) | 419 | 9.5 | 3,980.5 |
| Textile and garment (C14) | 352 | 4.2 | 1,478.4 |
| Electronics and computer assembly (C26) | 180 | 9.2 | 1,656.0 |
| Logistics (C33) | 308 | 3.7 | 1,139.6 |
| Construction materials (C23) | 334 | 1.6 | 534.4 |

Comparison to other similar Projects nearby

| Project | KMIC | Mingaladon | Thilawa |
|----------------------|-----------------------------------|-----------------------------------|-------------------------------------|
| Area | 159 ha | 89 ha | 2,400 ha |
| Completion year | 2024 (planned) | 1998 | 2015 |
| Water demand | 8,789m ³ /day (design) | 5,000m ³ /day (design) | 117,000m ³ /day (design) |
| Unit demand per area | 55.17m ³ /ha·day | 56.18m ³ /ha·day | 48.75m ³ /ha·day |

| | |
|------------|--|
| Comparison | <ul style="list-style-type: none"> - The Thilawa project has not been in operation for long (since 2015), and only Zone A (405 ha) of its planned 2,400 ha is under operation at present. This complicates comparing the KMIC project to it. - The Mingaladon project, on the other hand, offers more reliable data as it has been in full operation for over 20 years. - KMIC's design water demand, which is about 98 percent of Mingaladon's, therefore appears to be appropriate. |
|------------|--|

Domestic Water Demand

| Subject | No. of households | Population | | | Lpcd | | | DMWD (m ³ /day) |
|-----------------------------------|-------------------|------------|---------|----------|----------|---------|----------|----------------------------|
| | | Resident | Working | Visiting | Resident | Working | Visiting | |
| Total | 2,039 | 8,974 | 14,023 | 5,277 | n/a | n/a | n/a | 3,348.3 |
| Industrial | n/a | n/a | 10,490 | 1,140 | n/a | n/a | n/a | 1,083.1 |
| Food and beverage | n/a | n/a | 1,968 | 314 | n/a | 100 | 30 | 206.2 |
| Textile and garment | n/a | n/a | 4,712 | 123 | n/a | 100 | 30 | 474.9 |
| Electronics and computer assembly | n/a | n/a | 1,511 | 221 | n/a | 100 | 30 | 157.7 |
| Logistics | n/a | n/a | 1,664 | 231 | n/a | 100 | 30 | 173.3 |
| Construction materials | n/a | n/a | 635 | 251 | n/a | 100 | 30 | 71.0 |
| Technopark | n/a | n/a | 1,555 | 46 | n/a | 130 | 30 | 203.5 |
| Public facilities | n/a | n/a | 847 | 1,309 | n/a | 150 | 30 | 166.3 |
| Commercial | n/a | n/a | 1,131 | 2,782 | n/a | 150 | 30 | 253.1 |
| Residential | 2,039 | 8,974 | n/a | n/a | 183 | n/a | n/a | 1,642.3 |

Design Water Demand

| Type | DMWD (m ³ /day) | Design Hourly Peak Supply (DHPS) (m ³ /day) | Remark |
|------------|----------------------------|--|------------------|
| Industrial | 8,788.9 | 8,788.9 | Peak factor: 1.0 |
| Domestic | 3,348.3 | 5,022.8 | Peak factor: 1.5 |
| Total | 12,137.2 | 13,811.7 | |

Fire Hydrants

- ✓ The standard applied in the “Myanmar Fire Safety Code of Procedures 2020 Draft” by the Fire Services Department of the Ministry of Home Affairs.
- ✓ The distance between a public fire hydrant and the entrance to each lot is to be kept 50 meters or less.
- ✓ Fire hydrants are to be installed on both sides of the road (except for those with only a single or two lanes).

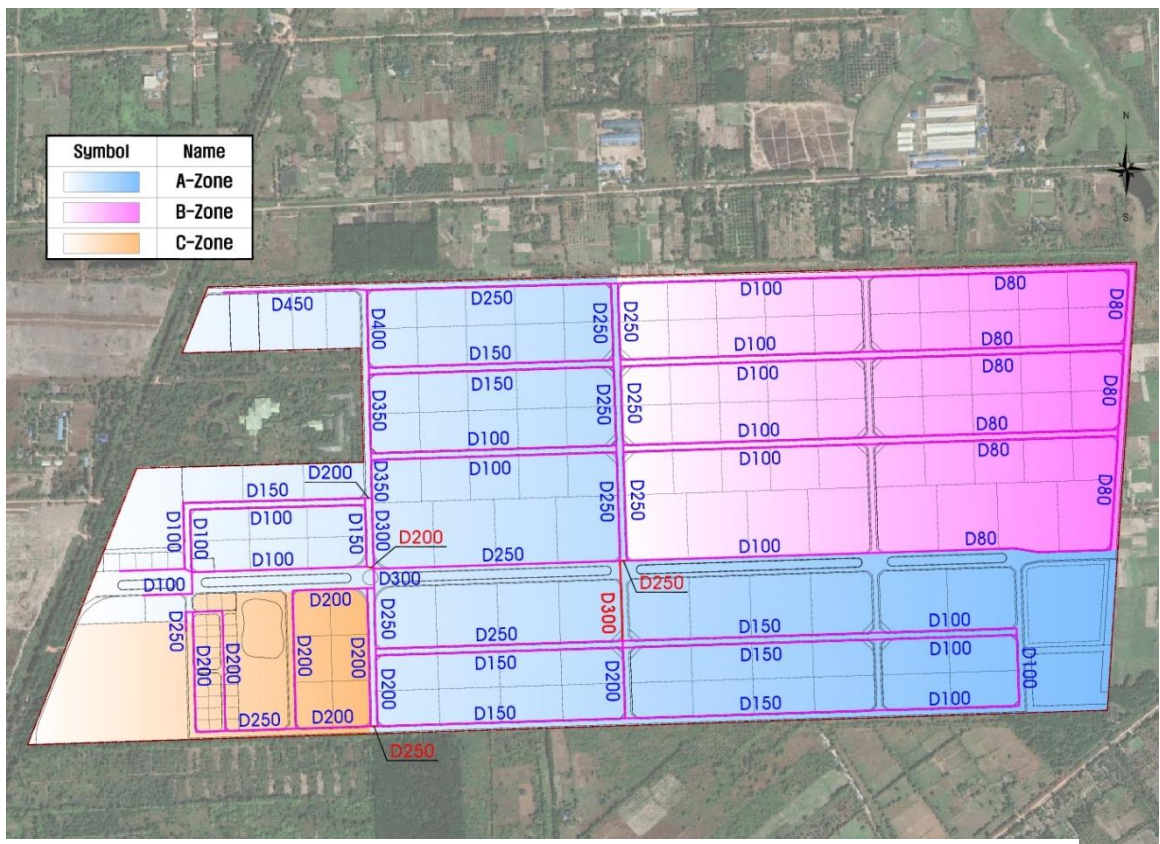


Figure 3. 35: Water Supply Plan

3.8.2.6 Meeting Minutes related to Water Supply from Kalihtaw Dam

The meeting between Irrigation and Water Utilization Department (Yangon Region) and Kun hwa Engineering and Consulting Co., Ltd. for KMIC Project was held for water supply to the project. This meeting was organized on 20 June 2017 and the meeting minutes was included below.

**Feasibility Study on Construction of Infrastructure for KMIC
(Korea Myanmar industrial Complex) Minutes of Meeting**

Date and Time : 20.06.2017 at 10.00 am

Venue : At Irrigation Department

Participant Organization :

01. Irrigation Department


02. Kunhwa Engineering and Consulting Co., Ltd.

Contents:

Irrigation Department (MOALI, Ministry of Agriculture, Livestock and Irrigation) agreed to supply Q=12,300 m³/day of total water demand (Industrial : Q=7,800 m³/day, Domestic : Q=4,500 m³/day) to KMIC project as follows.

1. Total supply quantity of raw water from the Kalitow Dam is Q= 13,530 m³/day (including 10% of allowance rate)
2. Raw water should be continuously supplied with 365 days, 7days, 24 hours always.
3. Raw water should be monitored and managed in accordance with the water treatment standard of KMIC to meet both industrial and domestic purposes.
4. Raw water used for the drinking purpose should be managed based on the potable water standard.
5. Raw water (Kalitow Dam and water pipe line) should be observed and managed not to be polluted by toxic materials. (Designate as water resource protection area or prevention of toxic materials, etc.)

Irrigation Department


kan chum
A/D YGN.

Kunhwa Engineering and Consulting Co., Ltd.



Page 1 of 2

Attendance List:

| No. | Name | Position | Organization | E-mail/Phone | Signature |
|-----|--------------------------|---------------|-----------------------|------------------------|---|
| 1 | Mr Kanchun | A/D | Irrigation Department | kanchun62.kc@gmail.com |  |
| 2 | Mr. Kyaw Zwa X.Li Win | Staff Officer | " | - |  |
| 3 | Ms Ni Mar Tun | Staff Man.1 | " | - |  |
| 4 | U win Zwa | S.A.E | - | - |  |
| 5 | Ku Kyaw Yaw | Director | Kantwana | kyawyaw@cantwana.com |  |
| 6 | Kim Hyungbae | Manager | - | hyungbae@gmail.com |  |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
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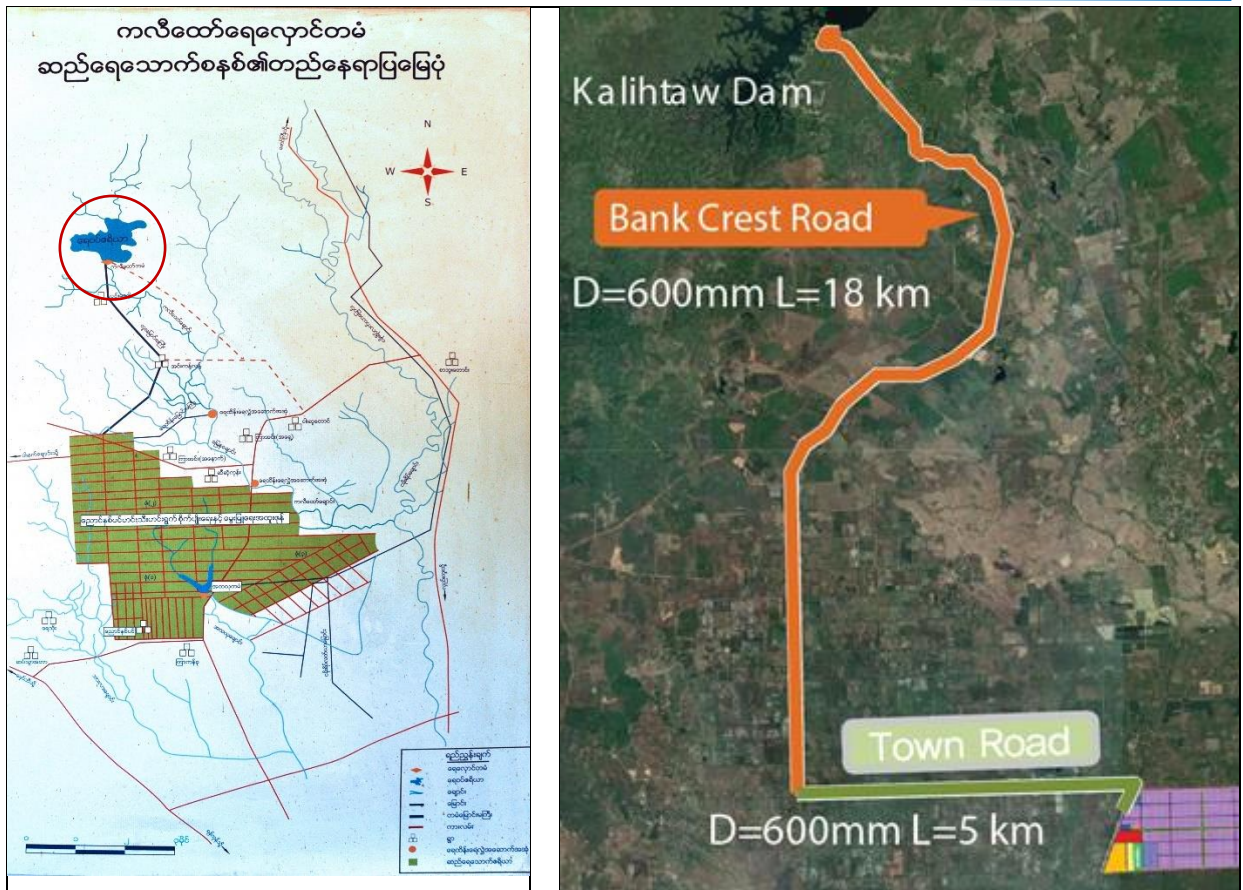


Figure 3.36: Kalihtaw Dam location and water supply pipes line ROW



Kalihtaw Dam



Kalihtaw Dam



Water Channel to Agricultural Zone



Water Channel to Agricultural Zone

Figure 3.37: Kalihtaw Dam Photos

3.8.3 Power Supply

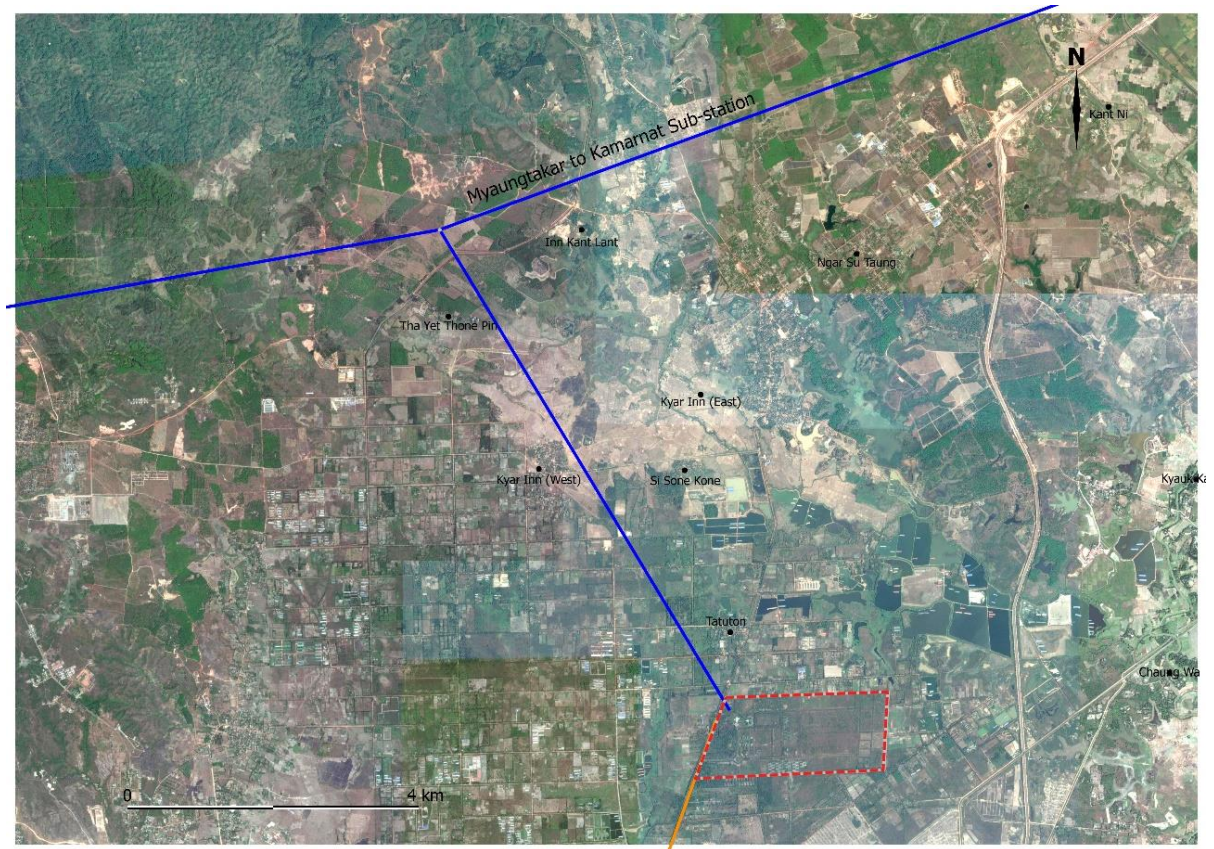


Figure 3. 38: Proposed power supply ROW

The electricity will be supplied by Ministry of Electricity and Energy (MoEE) and installed 230kV Twin Bundle Double Circuit Line from existing 230kV high-tension line Myaungdakar-Kamarnat national grid. The looping point is 48 km from Kamarnat and 16 km from Myaungtakar. From looping point to proposed project site will have a 9 km stretch. 230 KV high tension line is already constructed as national grid. Demand of consumption of electricity at the proposed project's operation stage will be 50 MW.

230 KV high tension voltage will be dropped off to the stage of industrial use, the developer will construct a substation-yard at the northern site of proposed land. The proper process of transformers will be installed at substation yard. Internal supply will be installed overhead lines at road sides.

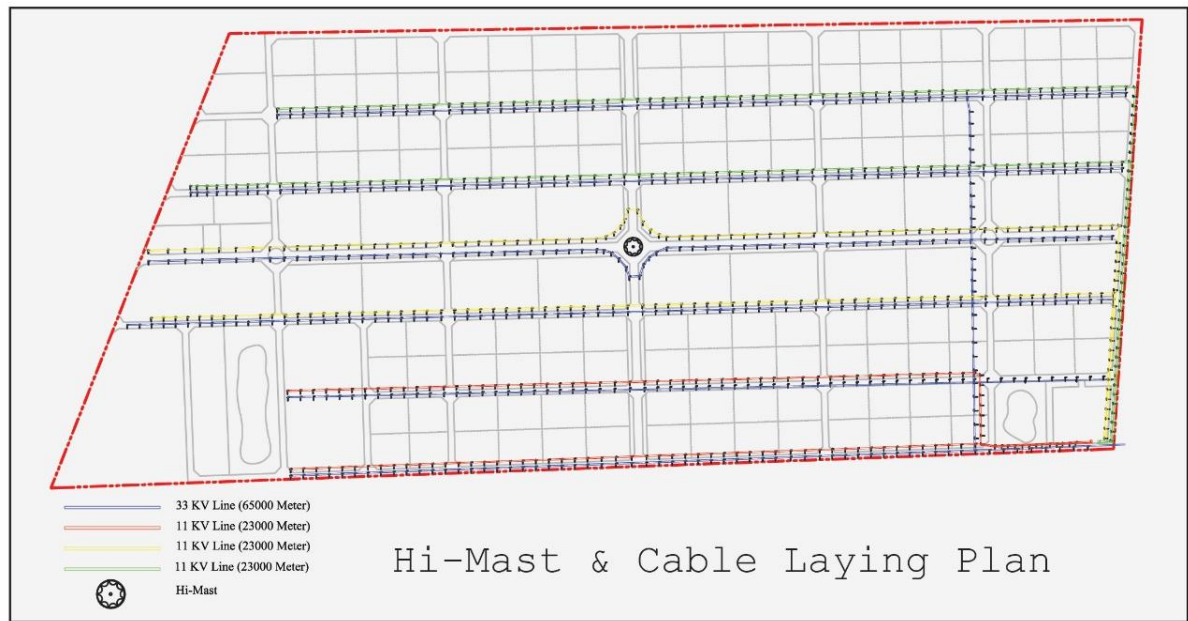


Figure 3. 39: Hi-Mast & Cable Laying Plan

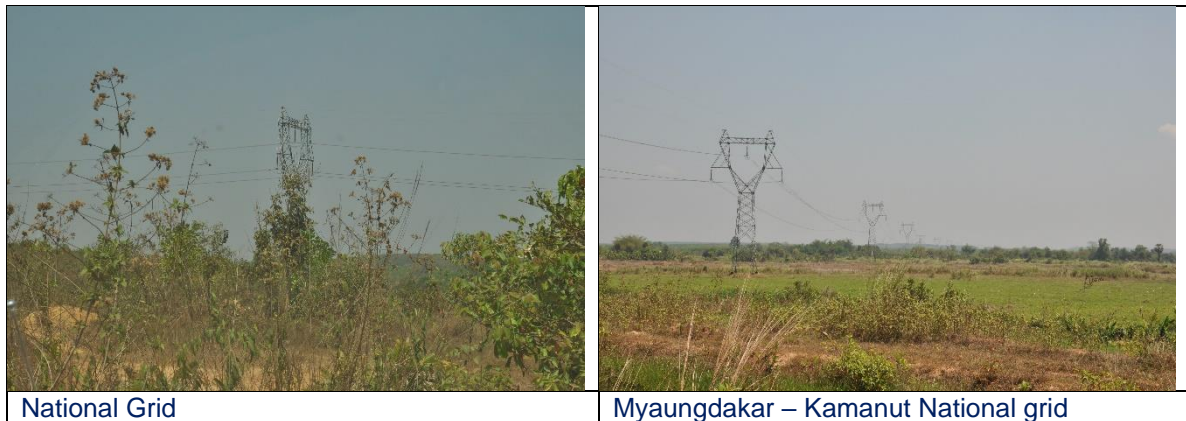


Figure 3. 40: Existing National Grid - Myaungdakar - Kamanut Station

3.8.3.1 Official Letters between Department of Urban and Housing Development and Department of Power Transmission and Control for Power Supply

For the power supply, Department of Urban and Housing Development under the Ministry of Construction, the counterpart of KMIC Development Co., Ltd. is responsible and the communication between Department of Urban and Housing Development and Department of Power Transmission and Control is herewith mentioned.



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
ဆောက်လုပ်ရေးဝန်ကြီးဌာန
မြို့ပြနှင့်အိမ်ရာဖွံ့ဖြိုးရေးဦးစီးဌာန
နေပြည်တော်

စာအမှတ် ၊ နပတ/မြို့၊ ရာ/မခဖ/ ၂၀၁၆(၁၀၃) ၊
ရက်စွဲ ၊ ၂၀၁၆ခုနှစ်၊ စက်တင်ဘာလ (၁၅) ရက်

သို့

အမြဲတမ်းအတွင်းဝန်
လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန

အကြောင်းအရာ ၊ လျှပ်စွန့်ပစ်ရန် ညောင်နှစ်ပင်တွင် အကောင်အထည်ဖော်မည့် (KMIC)
စက်မှုလုပ်ငန်းတွင် အသုံးပြုမည့် လျှပ်စစ်ဓါတ်အားရရှိရေးကိစ္စ၊

၁။ အထက်အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ ဆောက်လုပ်ရေးဝန်ကြီးဌာန၊ မြို့ပြနှင့် အိမ်ရာဖွံ့ဖြိုးရေးဦးစီးဌာနနှင့် တိုရီးယားနိုင်ငံ Korea Research Institute for Human Settlement (KRIHS) တို့သည် နှစ်နိုင်ငံအစိုးရအဖွဲ့အနေဖြင့် ပူးပေါင်း၍ 'ကိုရီးယား-မြန်မာ Industrial Complex စီမံကိန်း' ဖြစ်နိုင်ရေးလေ့လာခြင်းနှင့် စက်မှုလုပ်ငန်းမြို့တိုးတက်ရေး မူဝါဒပိုင်းဆိုင်ရာ အကြံပြုဆွေးနွေးခြင်းတို့အတွက် အသိပညာမျှဝေလှယ်ခြင်း အစီအစဉ်ကို ၁/၂၀၁၅ မှ ၇/၂၀၁၅ ထိ အကောင်အထည်ဖော်ဆောင်ရွက်ခဲ့ပါသည်။

၂။ Korea - Myanmar Economic Cooperative Industrial Complex (KMECIC) စီမံကိန်းအပြီးသတ်အစီရင်ခံစာကို မြန်မာနိုင်ငံဘက်မှ သက်ဆိုင်ရာဝန်ကြီးဌာနများနှင့် တိုရီးယား အစိုးရအဖွဲ့အစည်းများ ပူးပေါင်း၍ (၃-၇-၂၀၁၅)ရက်နေ့တွင် ဆွေးနွေးခဲ့ပြီး KMECIC စမ်းသပ် အကောင်အထည်ဖော်ဆောင်ရွက်ရန် ညောင်နှစ်ပင်သင်တန်းကျောင်း မြေဧရိယာ(၆၀၀)ဧကကို ရွေးချယ်ခဲ့ပါသည်။ ယင်းစီမံကိန်းကို ကိုရီးယားအစိုးရဌာနဖြစ်သော Land and Housing Corporation (LH) နှင့် မြို့ပြနှင့်အိမ်ရာဖွံ့ဖြိုးရေးဦးစီးဌာနတို့ ပက်စပ်ပူးပေါင်း၍ Korea-Myanmar Industrial Complex (KMIC) ဆောင်ရွက်မည့် ဖြစ်ကြောင်းကို ထင်မြင်ချက် မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်က (၁၈-၈-၂၀၀၅)ရက်စွဲပါ မြန်ကြားချက်၊ စီးပွားရေး ကော်မတီ၏ (၁၆-၀၂-၂၀၀၅)ရက်စွဲပါ ခွင့်ပြုချက်နှင့် အစိုးရအဖွဲ့ရုံး၏ (၃၀-၀၂-၂၀၀၅)ရက်စွဲပါ ခွင့်ပြုချက်တို့ကို ရရှိခဲ့ပါသည်။ ထို့နောက် အစိုးရအဖွဲ့ရုံး၏ခွင့်ပြုချက်ဖြင့် KMIC စက်မှုလုပ် ဖွဲ့အကောင်အထည်ဖော်ရန် ဆွေးနွေးသဘောတူချက် (Record of Discussion)အား (၂၄-၃-၂၀၀၆) ရက်နေ့တွင် လက်မှတ်ရေးထိုးဆောင်ရွက်ထားပါသည်။

၃။ KMIC စက်မှုဇုန်စီမံကိန်းတွင် စက်မှုဇုန်၊ ဘိမ်းချား သယ်ယူပို့ဆောင်ရေးစရိယာစသည်တို့ ပါဝင်ပြီး ရန်ကုန်မြို့ဝန်းကျင်ဖွံ့ဖြိုးတိုးတက်ရေး၊ စက်မှုကဏ္ဍဖွံ့ဖြိုးတိုးတက်ရေး နိုင်ငံခြားရင်းနှီးမြှုပ်နှံမှုများ၊ မိတ်ဆော်နိုင်ရေးတို့အတွက် ရည်ရွယ်၍ အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်း ဖြစ်ပါသည်။

၄။ စက်မှုဇုန်ထည်ဆောက်ရေး လုပ်ငန်းများကို ၂၀၁၇တွင် စတင်ပြီး၊ ၂၀၁၉တွင် ငြိမ်းစိတ်ပတ်နိုင်ရန် စီစဉ်ထားပါသည်။ KMIC စက်မှုဇုန်တွင် လုပ်သားအင်အား (၅၀၀၀၀)ခန့် အလုပ်အကိုင်များ ရရှိနိုင်မည်ဖြစ်ပြီး ဒေသ၏စီးပွားဖွံ့ဖြိုးရေးအတွက် များစွာအထောက်အပံ့ ဖြစ်စေပါသည်။ ပထမအဆင့်အနေဖြင့် စက်မှုဇုန်အား ဖက်ဝပ်စနစ်ထူထောင်ရန် နှစ်ဦးနှစ်မက် ရင်းနှီးမြှုပ်နှံမှုအပိုင်းအား ဆွေးနွေးညှိနှိုင်းခြင်းနှင့်အတူ စက်မှုဇုန်တွင်အသုံးပြုမည့် အခြေခံ အဆောက်အအုံများ (ရေ၊ လျှပ်စစ်ဓါတ်အား၊ လမ်းပိုင်း)စသည်တို့ ရရှိနိုင်ရေးအတွက် ညှိနှိုင်း ဆောင်ရွက်လျှက်ရှိပါသည်။

၅။ KMIC စက်မှုဇုန်သည် နှစ်နိုင်ငံစီးပွားဖွံ့ဖြိုးတိုးတက်ရေးအား အကျိုးတူပူးပေါင်း ဆောင်ရွက်သည့်လုပ်ငန်းဖြစ်ပါသဖြင့် စက်မှုဇုန်တွင် လျှပ်စစ်ဓါတ်အားပြည့်ဝစွာရရှိရေးအတွက် မြန်မာနိုင်ငံဘဏ်မှ အာမခံချက်များပေးရန်လိုအပ်နေပါသည်။ စက်မှုဇုန်ထည်ဆောက်ရေးနှင့် စက်ရုံလုပ်ငန်းများလည်ပတ်ရေးအတွက် နှစ်အလိုက် လျှပ်စစ်ဓါတ်အား ခန့်မှန်းလိုအပ်ချက် ပမာဏမှာ ၂၀၁၉ခုနှစ်အတွက် ၁၅ မဂ္ဂါဝပ်၊ ၂၀၂၀ခုနှစ်တွင် ၂၅ မဂ္ဂါဝပ်နှင့် ၂၀၂၁ခုနှစ်တွင် ၃၀ မဂ္ဂါဝပ်ဖြင့် စုစုပေါင်း ၅၀ မဂ္ဂါဝပ် လိုအပ်မည်ဖြစ်ပါသည်။

၆။ သို့ဖြစ်ပါ၍ KMIC စက်မှုဇုန်စတင်လည်ပတ်ချိန်တွင် စက်မှုဇုန်သို့ လျှပ်စစ်ဓါတ်အား လိုင်းသွယ်တန်းချောက်ရှိနိုင်ရေးအတွက် ရရှိနိုင်မည့်နည်းလမ်းနှင့် လျှပ်စစ်ဝန်ကြီးဌာန အနေဖြင့် ပင်မဓာတ်အားလိုင်းမှ လျှပ်စစ်ဓာတ်အားပြန့်ဖြူးချောင်းဆွဲပေးရေး အစီအစဉ်များအား ကြိုတင် လျာထားဆောင်ရွက်ပေးပါရန်နှင့် အကြောင်းပြန်ကြားပေးပါရန်အတွက် ညှိနှိုင်းမေတ္တာရပ်ခံ အပ်သည်။


မင်းထိန်
ညွှန်ကြားရေးမှူးချုပ်

မိတ္တူတို

- ညွှန်ကြားရေးမှူးချုပ်၊ လျှပ်စစ်နှင့်စွမ်းအားစီမံရေးဦးစီးဌာန၊ လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန
- ရုံးလက်ခံ။

၂၀၁၆/၂၃၇၆
 ၃.၁၀.၁၆

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်
 လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန
 လျှပ်စစ်ဓာတ်အားရရှိရေးနှင့်ကွပ်ကဲရေးဦးစီးဌာန

စာအမှတ်: ၈၇၀ / ညွှန်ချုပ်(အဆင့်-၅) / ၂၀၁၆
 ရက်စွဲ : ၂၀၁၆ ခုနှစ်၊ ဇူလိုင်လ ၁၅ ရက်

၂၀၁၆
 ၂.၁၀.၁၆

၂၇၀၆၆/၆၅၅
 PRS- ၁၅/၁၆

ညွှန်ကြားရေးမှူးချုပ်
 မြို့ပြနှင့်အိမ်ရာဖွံ့ဖြိုးရေးဦးစီးဌာန
 ဆောက်လုပ်ရေးဝန်ကြီးဌာန

အကြောင်းအရာ။ လှည်းကူးမြို့နယ်၊ ညောင်နှစ်ပင်တွင် အကောင်အထည်ဖော်မည့် KMIC ဝက်မှုရန်တွင် အသုံးပြုမည့် လျှပ်စစ်ဓာတ်အားရရှိရေးကိစ္စ

ရည်ညွှန်းချက်။ ဆောက်လုပ်ရေးဝန်ကြီးဌာန၊ မြို့ပြနှင့်အိမ်ရာဖွံ့ဖြိုးရေးဦးစီးဌာန၏ (၁၅-၉-၂၀၁၆) ရက်စွဲပါ စာအမှတ်-နပတ/မြို့ပြရာ/မဝပ/၂၀၁၆ (၁၀၄၃) ရန်ကုန်မြောက်ပိုင်းစရိုင်၊ မှော်ဘီမြို့နယ်၊ ယခင်ညောင်နှစ်ပင် သင်တန်းကျောင်း မြေဧရိယာ (၆၀၀) ဧက အကျယ်အဝန်းရှိ မြေဧရာတွင် မြန်မာ-ကိုရီးယားစီးပွားရေး ပူးပေါင်း ဆောင်ရွက်မှုအခြေပြင် Korea Land and Housing Cooperation မှ ဝက်မှုရန်အိမ်ကိန်း အကောင်အထည်ဖော် ဆောင်ရွက်မည်ဖြစ်ပါသဖြင့် ဝက်မှုရန်အတွက် လိုအပ်သော လျှပ်စစ် ဓာတ်အားရရှိရေးအတွက် ရရှိနိုင်မည့်နည်းလမ်းနှင့် လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာနအနေဖြင့် ပင်မဓာတ်အားလိုင်းမှ လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးရောင်းချပေးရေး အစီအစဉ်များကို ဖြန့်ကြား ပေးပါရန် ရည်ညွှန်းပါစေဖြင့် အကြောင်းကြားလာခြင်းအား ဆောက်ပါအတိုင်း စိစစ်ဖြန့်ကြား အပ်ပါသည်။

(က) ဝက်မှုရန်အတွက် လိုအပ်သော စုစုပေါင်း (၅၀) မဂ္ဂါဝပ် ရယူအသုံးပြုနိုင်ရေး အတွက် ညောင်နှစ်ပင်ဝက်မှုရန်တွင် ၂၃၀ ဧကခွံ၊ (၂၃၅၀) အင်စီအေ ပင်မ ဓာတ်အားစွဲခွံ(၁)ရုံ တည်ဆောက်ရမည်ဖြစ်ပါသည်။

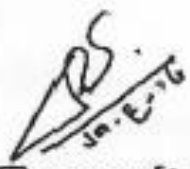
(ခ) ၎င်း ၂၃၀ ဧကခွံ ပင်မဓာတ်အားစွဲခွံ လျှပ်စစ်ဓာတ်အားရရှိရေးအတွက် စခန်းဆုံး ဓာတ်အားရယူနိုင်မည့် မဟာဓာတ်အားလိုင်းမှာ ၂၃၀ ဧကခွံ

ကမကုမ္ပဏီ-မြောင်းတကာ ဓာတ်အား နှင်းမြစ်ရာ အဆိုပါ ဓာတ်အားလှိုင်းမှ

In/Out ပြုလုပ်၍ ဓာတ်အားရယူရမည်ဖြစ်ပါသည်။

(ဂ) စက်မှုစနစ် တည်ဆောက်ရာနှင့် ဓာတ်အားခွဲခွဲတည်ဆောက်ရန် စေ့့ချယ်ထားသည့် တည်ဆောက်ရာပုံ ဝါဝင်ခြင်း မရှိသည့်အတွက် ၂၃၀ ဧကရှိ မဟာဓာတ်အားလှိုင်းမှ In/Out ပြုလုပ်တည်ဆောက်ရမည့် ဓာတ်အားလှိုင်းမိုင်ကို ကြိုတင်စနစ်မှန်း တွက်ချက်နိုင်ခြင်းမရှိပါ။

(ဃ) ဓာတ်အား ရောင်းဝယ်မှုဆိုင်ရာကိစ္စရပ်များနှင့် ဓာတ်အားလှိုင်း/ဓာတ်အားခွဲခွဲ တည်ဆောက်ခြင်းဆိုင်ရာ ကိစ္စရပ်များနှင့် ပတ်သက်၍ ဌာနမှသတ်မှတ် ထားသော စံချိန်စံညွှန်းများနှင့်ကိုက်ညီမှုရှိစေရေးအတွက် လုပ်ငန်းများ မဆောင်ရွက်မီ သက်ဆိုင်ရာဌာနများအနေဖြင့် လျှပ်စစ်နှင့်ငွမ်းအင်ဝန်ကြီး ဌာနနှင့် ကြိုတင်ညှိနှိုင်း အတည်ပြုချက်များ ရယူရန်လိုအပ်ပါသည်။


 ညွှန်ကြားရေးမှူးချုပ် (ကဏ္ဍစား)
 (သိမ်းသုရ ဒုတိယညွှန်ကြားရေးမှူးချုပ်)

မိတ္တူ - လျှပ်စစ်နှင့်ငွမ်းအင်ဝန်ကြီးဌာန
 ညွှန်ကြားရေးမှူးချုပ်မှူး၊ လျှပ်စစ်ဓာတ်အားဗိုလ်ချုပ်မှူးကြီးကွပ်ကဲရေးဦးစီးဌာန
 ညွှန်ကြားရေးမှူး(ဖွဲ့စည်း) ဓာတ်အားစနစ်ဌာန

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19/05 2014 23 04

3.9 Estimated Number of Workers for Construction Phase

| | 2021 | 2022 | 2023 | 2024 |
|------------------------|------|------|------|------|
| Contractor employee | 20 | 20 | 20 | 20 |
| Subcontractor employee | 30 | 30 | 30 | 30 |
| Worker | 70 | 100 | 100 | 70 |
| Sum | 120 | 150 | 150 | 120 |

Note: The plans and processes related to workers including hiring, accommodation, welfare, management ect. will be undertaken by the contractors and sub-contractors for construction. KMIC Development Co., Ltd. is not a solely responsible organization for that but the company set the guidelines and procedures for matters related to workers which will be followed by the contractors and sub-contractors (See sections 3.10 – 3.13).

3.10 Plan for coordination between contractors for the safety of workers on worksite

In order to establish the safety of workers on worksite, a plan to coordinate between contractors and sub-contractors will be adopted and the plan included the following steps.

- 1) Any safety – related specifications and pre-qualifications will be included in contracts and bid documents and it will be ensured that contractors and sub-contractors selected for the work meet those requirements.
- 2) The developer will communicate with contractors and sub-contractors to determine which among them will implement and maintain the various parts of the safety and health procedures to ensure protection of all on-site workers before work begins.
- 3) Contractors, sub-contractors will ensure that work is planned and scheduled to minimize impacts on safety.
- 4) Regular meetings among contractors and sub-contractors will be held in order to share the work plan and schedule and occupational health and safety measures for each work.
- 5) Each contractor and sub-contractor will assign occupational health and safety personnel for their work sites and these persons will coordinate.
- 6) The contractors and sub-contractors will exchange information among others about hazards present on the job site and the measures that have been implemented to prevent or control such hazards. The information is communicated before on-site work starts and, as needed, if conditions change.
- 7) Contractors and sub-contractors will ensure that their site manager or construction engineer during a tool-box meeting every day before work starts to remind their workers about the previous work done and the types of hazards that may already be present at the job site and the procedures or measures they need to use to avoid or control their exposure to these hazards.
- 8) Contractors will cooperate to identify and select methods for eliminating, preventing or controlling workplace hazards.
- 9) Contractors, sub-contractors will ensure that joint-employed workers are adequately trained and equipped before arriving on the worksite.
- 10) Contractors and sub-contractors will make sure that the first-aid kits and emergency health care procedures are available in case of emergencies.

3. 11 Welfare Plan for Workers

A welfare plan for workers including the following aspects will be adopted.

Employment Conditions

- 1) Workers shall have equal opportunities regardless of age, nationality, ethnic, gender, race, religion or belief or marital status;
- 2) The use of violence, bullying, harassment, victimization, threats in any form against workers shall be strictly prohibited;
- 3) The contractor will strictly prohibit the exploitation of the vulnerability of workers;
- 4) The contractor shall ensure that all workers have personal possession of their identification cards and other personal documents;
- 5) Contractors shall ensure that workers are granted their entitlements to leave, holidays and all other minimum requirements of labor laws and corresponding laws;
- 6) Workers shall be free to travel to their native towns or places during leave without any penalty or threat of termination;

Occupational related injury or disease

- 1) If a worker is suffered from any work related injury or occupational disease, the contractor shall promptly pay for the cost of any treatment as stipulated in the Occupational Safety and Health Law (2019);
- 2) Where an injury of a worker prevents the worker from undertaking their work, the contractor shall continue to pay that workers' wages, subject to the provisions of the Workmen's Compensation Act (1924 and amended in 1955, 1957 and 2005);
- 3) The medical practitioner shall disclose and discuss the results of their examination with the worker including any matters which in the medical practitioner's opinion, might hinder or prevent the worker from returning to work or for any period of time properly, performing their duties;
- 4) A worker who has been ill, injured or suffered from any other form of incapacity shall not be required to return to work for the duration of any doctors/ medical certificate excusing the worker from duty. The contractor is entitled to receive a copy of any such certificate.

Accommodation

In general, the developer considers and will urge the contractors/sub-contractors to hire the local workers living nearby the project site and/or within a reasonable distance from the work site as many as possible in order to avoid any accommodation arrangements which may cause environmental and social issues. However, if the accommodation is necessary to be arranged for the workers then the following principles will be adopted.

General Living Facilities

The location of the facilities is designed to avoid flooding or other natural hazards, and living facilities are located within a reasonable distance from the worksite.

Drainage

For drainage, it is adequately drained.

Ventilation and light

Depending on climate, living facilities will be constructed to cope with hot and cold weathers and the natural light and ventilation will be used as much as possible. The light system will be installed.

Water

Workers will have easy access to a supply of clean/potable water in adequate quantities of Myanmar Drinking Water Standards/WHO quality standards. Tanks used for the storage of drinking water are constructed and covered to prevent water stored therein from becoming polluted or contaminated.

Wastewater and solid waste

Wastewater, sewage and any other waste materials are adequately discharged in compliance with Myanmar National Environmental Quality (Emission) Guidelines and without causing any significant impacts on camp residents, the environment or surrounding communities. Specific containers for rubbish collection are provided and emptied on a regular basis by the residents.

Rooms facilities

The rooms will be kept in good condition and aired and cleaned at regular intervals by the residents. Residents will be provided with enough space and the ceiling height will be high enough. The number of workers sharing the same room will be minimised. The doors and windows are lockable and provided with mosquito screens when necessary. The separate sleeping areas are provided for men and women.

Sanitary and toilet facilities

Sanitary and toilet facilities will be constructed from materials that are easily cleanable and cleaned frequently and kept in working condition by the residents. Toilets and bathrooms will be designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors. Separate sanitary and toilet facilities are provided for men and women.

Toilet facilities

There will be an adequate number of toilets which are conveniently located and easily accessible.

Miscellaneous

- 1) Holding a regular monthly meeting with contractors and workers' representatives to discuss the welfare arrangements, issues arise and find out the solutions to solve the issues;
- 2) Organizing and supporting religious ceremonies and donations for the workers and their families at the monastery nearby;
- 3) Creation of recreation activities (like tournaments and some games) for workers and their families on some public holidays;
- 4) Providing subsidized transport facilities if needed;
- 5) Organizing year end party for the workers and including luck draw programs for the workers;
- 6) Providing in-kind assistance to the relatives of the workers who are being ill (like sending the ill persons to the hospital or clinics by company's vehicles);
- 7) Providing in-kind and in-cash assistance to the dead ones who are the relatives of workers
- 8) In the case of death of a worker, all wages shall be promptly settled and transferred to the worker's family wherever they reside; and
- 9) Establishing workers' grievances redress mechanism.

Workers' Grievance Redress Mechanism

A mechanism is to be established to resolve complaints of workers during construction and the operation of the Project. The complaints may relate to the following and others:

- Working and accommodation conditions;
- Occupational safety and occupational hazards; and
- Salaries, wages and leave entitlements.

The workers will be informed of the grievance mechanism at the time of hiring and make it easily accessible to them. The mechanism includes an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned, without any retribution. The mechanism also allows for confidential complaints to be raised and addressed. The mechanism would not impede access to other judicial or administrative remedies that might be available under law or through existing arbitration or mediation procedures or would not substitute for dispute

resolution system governed by the Settlement of Labour Dispute Law enacted by Pyidaungsu Hluttaw on 28 March 2012.

The Worker Grievance Mechanism consists of

- 1) Grievance Reporting Channels;
- 2) Roles and Responsibilities;
- 3) Grievance Mechanism Process; and
- 4) Appeal.

1) Grievance Reporting Channels

The contractor/sub-contractor will communicate this procedure to its workers to raise awareness and offer transparency of how workers can voice their grievances. The channels for workers to formally vocalise their grievances include:

- ✓ Telephone: Workers can call and speak to the site manager or contractor/sub-contractor.
- ✓ Face to face: Workers can directly go and see the site manager or contractor/sub-contractor to voice their grievance.

2) Roles and Responsibilities

| Role/Position Title | Responsibilities |
|---|---|
| Site Manager | <ul style="list-style-type: none"> • Receiving grievances and assign a grievance owner • Ensuring the grievance mechanism procedure is being adhered to and followed correctly • Maintaining grievance register and monitoring any correspondence • Monitoring grievances/trends over time and reporting findings to the Management (Contractor/Sub-contractor/Director of the company etc.) • Raising internal awareness of the grievance mechanism among workers |
| Assistant to Site Manager (Grievance Owner) | <ul style="list-style-type: none"> • Investigating the grievance and liaising with the worker/s • Developing resolutions and actions to rectify any issues • Following up and tracking progress of grievance • Documenting any interactions with worker/s |

3) Grievance Mechanism Process

The process includes Receive Grievance, Record, Screen, Acknowledge, Investigate, and Act (or Hearing).

Receive Grievance in person/over the phone – If the site manager received a grievance face to face or over the phone, the site manager would complete a Grievance Lodgement Form.

Record - All formal grievances will be logged in the External Grievance Register and these Grievance Lodgement Forms will be saved in company's intranet for record of correspondence.

Screen - The site manager is responsible for assigning a grievance owner (Assistant to Site Manager) to liaise with worker/s and work on a resolution. Grievances will be screened depending on the level of severity in order to determine how the grievance is approached. The following table shows different levels of categories.

| Category | Description |
|----------|--|
| Level 1 | When an answer can be provided immediately, and/or the company is already working on a resolution. |
| Level 2 | One off grievance that will not affect the reputation of the company. |
| Level 3 | Repeated, extensive and high-profile grievances that may damage the reputation of the company |

For level 3 grievances, the management of the company will also be fully working with site manager to get the resolution.

Acknowledge – A grievance will be acknowledged by the Assistant to Site Manager within two working days of a grievance being submitted. Communication will be made either verbally or in written form. (Workers will outline their preferred method of contact on the Grievance Lodgement Form). The acknowledgement of a grievance will include a summary of grievance, method that will be taken to resolve the grievance and an estimated timeframe in which the grievance will be resolved. If needed, the acknowledgement provides an opportunity to ask for any additional information or to clarify any issues.

Investigate – The grievance owner (Assistant to Site Manager) is responsible for investigating the grievance and the investigation will include site visits, consultation with workers, contacting external stakeholders and completing other necessary activities. Records of meetings, discussions and activities will be recorded during the investigation. Information gathered during the investigation will be analysed and will assist in determining how the grievance is handled and what steps need to be taken in order to resolve the grievance. Based on the level of grievance, site manager will get involved in all or some of the investigation processes.

Act (or Hearing) – Following the investigation, the site manager and assistant (if needed other management staff included), will call the worker to a meeting to resolve his/her grievance. The worker has the right to be accompanied a colleague at this meeting on request. After the meeting the site manager will give the worker minutes of the meeting signed by both parties and a decision in writing, within a predetermined period of time. The meeting minutes will be stored in company's intranet.

4) Appeal

If the worker is not satisfied with the decision about a grievance and wants to appeal, the company will seek advice from other independent parties or a grievance committee, representing Ministry of Labour, Immigration and Population, township or ward administration department, different functional areas of the company, one or more worker representatives or as specified by the Settlement of Labour Dispute Law in order to help ensure an objective and transparent appeal process.

However, all staff, workers and employees are encouraged to use informal methods of resolving disagreements or disputes. If workers have a reasonable grievance or complaint regarding their work or the people, they work with they should, wherever possible, start by

talking it over with their manager/in charge. It may be possible to agree a solution informally between workers and their manager/in charge. This makes it more likely that disputes can be resolved faster and closer to the source of the problem and less likely that they will escalate into intractable problems. If discussions with site manager fail to resolve the issue, it is still possible to pursue an informal approach without triggering a formal procedure. For instance, the contractor/sub-contractor could host an informal meeting or discussion.

3.12 Employment of staff and workers

In general, the developer considers and will urge the contractors to hire the local workers living nearby the project site and/or within a reasonable distance from the work site in order to avoid any accommodation arrangements which may cause environmental and social issues. The hiring of workers will be done by contractors/sub-contractors and nevertheless the developer will give the following guidelines for hiring workers:

- 1) Prioritizing local community for employment;
- 2) Appointing of any local person who is a qualified person as manager, technician, in the project;
- 3) Appointing any local persons for works which do not need require skill;
- 4) Appointing skilled local workers, technicians and staff by signing an employment contract between employer and employee in accordance with the labor laws and rules;
- 5) Advertising or announcing the employment opportunities at the villages;
- 6) Hiring workers will be regardless of nationality, ethnic, gender, race, religion or belief or marital status;
- 7) Child labour is not allowed;
- 8) Following all relevant labor laws and rules to ensure to obtain the entitlements and rights including minimum wages and salaries, leave, holidays, overtime fees, damages, compensation of the workman, social welfare, and other insurance related to workers in stipulating the rights and duties of employers and employees and occupational terms and conditions in the employment contract; and
- 9) Providing necessary work trainings.

3.13 Management and staff

The main contractor will appoint a workers' welfare officer at the construction site. The roles and responsibilities of welfare officer are mentioned below:

- ✓ Overall responsibility for coordinating all employee relations and functions relating workers' issues, especially interactions between the workers, the contractors, sub-contractors, and the community;
- ✓ Specific responsibility for overseeing site welfare requirements and acting as the interface between workers, the contractors and sub-contractors;
- ✓ Receiving and addressing workers' issues at the accommodation site and project site;
- ✓ Be present at construction site inductions to introduce themselves and give an overview of the workers' legal rights and responsibility on the construction site;

The contractors will appoint a person in-charge for occupational safety and health to closely supervise safety and health of workers in line with the type of business as mentioned in the Occupational Safety and Health Law (2019).

The key responsibilities of a person in-charge for occupational safety and health are described below:

- ✓ Monitoring and assessing hazardous and unsafe situations;
- ✓ Developing measures to assure personnel safety;
- ✓ Preventing or stopping unsafe acts when immediate action is required;

- ✓ Participating in planning meetings to identify any health and safety concerns inherent in the operations daily work-plan;
- ✓ Ensuring preparation and implementation of site safety and health plan;
- ✓ Inspection the site to ensure it is a hazard – free environment;
- ✓ Conducting toolbox meetings;
- ✓ Reviewing and approving all sub-contractors' safety plans;
- ✓ Verifying that all tools and equipment are adequate and safe for us;
- ✓ Promoting safe practices at the job site;
- ✓ Training and carrying out drills and exercises on how to manage emergency situations;
- ✓ Establishing safety standards and policies as needed;
- ✓ Inspecting premises and the work of personnel to identify issues or non-conformity (e.g. not using PPE)
- ✓ Preparing reports on occurrences and providing statistical information to the contractors.

3.13.1 Responsible Person of KMIC Development Co., Ltd. for Social Issues

Note: For the time being, the contractor was not selected yet, and it is not possible to give a name of the person who will be taking responsibility for the workers' safety, health and rights. However, for social issues including worker's affairs, safety, health and rights the following person from KMIC Development Co., Ltd. can be contacted.

Mr. Kim Gunwoo

Email: gonwoo2@gmail.com

Phone: 09975799222

Address: Office Suite 2007, Pyay Garden Office Tower, 346-354, Pyay Road, Sanchaung Township, Yangon.

3.14 Raw materials, equipment and machineries for construction

List of raw materials, equipment and machineries for project (Locally available)

| No. | Work Type | List of Item | Description | Unit | Quantity |
|-----|---------------|--|---------------------------|------|----------|
| 1 | Drainage | Construction pumps (self – priming) | Various standard and size | Nos | 3 |
| 2 | Drainage | Side ditch water pipe | Various Standard and Size | m | 728 |
| 3 | Drainage | Concrete pipe | Various Standard and Size | m | 4735 |
| 4 | Electricity | Concrete pole 14 m round type (200ft/span) | Various Standard and Size | Nos | 700 |
| 5 | Electricity | 4 Pole structure | Various Standard and Size | lot | 28 |
| 6 | Electricity | Pole footing | Various Standard and Size | lot | 700 |
| 7 | Electricity | Concrete Pole 12 m round type (100 ft/span) | Various Standard and Size | Nos | 1338 |
| 8 | Electricity | Pole footing | Various Standard and Size | lot | 1410 |
| 9 | Fire fighting | Firefighting (Engine+ Motor +Jockey) including | Various Standard and Size | set | 1 |
| 10 | Fire fighting | firefighting piping & accessories | Various Standard and Size | set | 1 |
| 11 | Fire fighting | fire pump | Various Standard and Size | Nos | 25 |
| 12 | Road | Concrete batch plant | Various Standard and Size | set | 1 |
| 13 | Road | cement | Various Standard and Size | ton | 15970 |
| 14 | Road | Automatic cover | Various Standard and Size | Nos | 6 |
| 15 | Road | Junction (20 M Ø) | Various Standard and Size | set | 1 |
| 16 | Wastewater | Polyethylene Pipe | Various Standard and Size | m | 100 |

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| | | | | | |
|----|----------------------|-------------------------|---------------------------|----------------|-------|
| 17 | Wastewater Treatment | Form | Various Standard and Size | m ² | 72800 |
| 18 | Wastewater Treatment | steel pipe scaffold | Various Standard and Size | m | 8400 |
| 19 | Wastewater Treatment | Hoist (2 ton) | Various Standard and Size | Nos | 1 |
| 20 | Water Supply | PVC pipe | Various Standard and Size | m | 55245 |
| 21 | Water Supply | P.E film | Various Standard and Size | Ton | 13636 |
| 22 | Water Supply | Concrete PC Pile | Various Standard and Size | M | 1680 |
| 23 | Water Supply | Europium | Various Standard and Size | m ² | 8400 |
| 24 | Water Supply | Water proof (external) | Various Standard and Size | m ² | 6720 |
| 25 | Water Supply | Water proof (Inside) | Various Standard and Size | m ² | 5600 |
| 26 | Water Supply | Balancing tank agitator | Various Standard and Size | Nos | 1 |
| 27 | Water Supply | Inflow pump | Various Standard and Size | Nos | 1 |
| 28 | Road | Concrete Vibrator | Various Standard and Size | Nos | 2 |
| 29 | Road | Vibrator | Various Standard and Size | Nos | 2 |
| 30 | Road | Ramer | Various Standard and Size | Nos | 4 |
| 31 | Road | Compactor | Various Standard and Size | Nos | 3 |

Note: The raw materials, equipment and machineries for project will be sourced locally.

List of raw materials, equipment and machineries for project (Imported)

| No. | Work Type | List of Item | Description | Unit | Quantity | Quantity | |
|-----|-------------|---|-------------------------|------|----------|----------|--------|
| | | | | | | 2020 | 2021 |
| 1 | Electricity | 33kV Tension fitting for 300 mm ² SAC | Various Standard & Size | Set | 150 | 50 | 100 |
| 2 | Electricity | 33kV Suspension fitting for 300 mm ² SAC | Various Standard & Size | Set | 590 | 93 | 497 |
| 3 | Electricity | 33kV Suspension Spacer | Various Standard & Size | Set | 2,860 | 860 | 2,000 |
| 4 | Electricity | 33kV , 1C x 300 mm ² AL/XLPE/XLPE SAC | Various Standard & Size | m | 132,130 | 52,100 | 80,030 |
| 5 | Electricity | 33kV Recloser with controller | Various Standard & Size | set | 62 | 32 | 30 |
| 6 | Electricity | Messenger Wire 7/12 | Various Standard & Size | kg | 13,608 | 13,608 | |
| 7 | Electricity | NLD-1 for Messenger Wire Tension | Various Standard & Size | Set | 140 | 140 | |
| 8 | Electricity | Suspension Set for Messenger Wire | Various Standard & Size | Set | 550 | 550 | |
| 9 | Electricity | Back Stay c/w Stay Accessories | Various Standard & Size | Set | 114 | 114 | |
| 10 | Electricity | 11kV Tension fitting for 185 mm ² SAC | Various Standard & Size | Set | 286 | 100 | 186 |
| 11 | Electricity | 11kV Suspension fitting for 185 mm ² SAC | Various Standard & Size | Set | 1,150 | 450 | 700 |
| 12 | Electricity | 11kV , 1C x 185 mm ² AL/XLPE/XLPE SAC | Various Standard & Size | m | 133,000 | 53,000 | 80,000 |
| 13 | Electricity | Messenger Wire 7/12 | Various Standard & Size | kg | 13,000 | 13,000 | |

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| | | | | | | | |
|----|-----------------------|-----------------------------------|-------------------------|-----|--------|-------|--------|
| 14 | Electricity | NL D-1 for Messenger Wire Tension | Various Standard & Size | Set | 272 | 272 | |
| 15 | Electricity | Suspension Set for Messenger Wire | Various Standard & Size | Set | 1,183 | 1,183 | |
| 16 | Electricity | Back Stay c/w Stay Accessories | Various Standard & Size | Set | 142 | 142 | |
| 17 | Electricity | 11kV Recloser & controller | Various Standard & Size | set | 62 | 29 | 33 |
| 18 | Road | generator | Various Standard & Size | Nos | 3 | 3 | |
| 19 | Waste Water | PRC pipe | Various Standard & Size | m | 10,449 | | 10,449 |
| 20 | Waste Water | Manhole Pump | Various Standard & Size | set | 2 | 2 | |
| 21 | Waste Water Treatment | Emergency shut-off gate | Various Standard & Size | Set | 1 | | 1 |
| 22 | Waste Water Treatment | Inlet valve | Various Standard & Size | Set | 2 | | 2 |
| 23 | Waste Water Treatment | General grit screen | Various Standard & Size | Set | 2 | | 2 |
| 24 | Waste Water Treatment | Grit Conveyor A | Various Standard & Size | Set | 1 | | 1 |
| 25 | Waste Water Treatment | Grit Conveyor B | Various Standard & Size | Set | 1 | | 1 |
| 26 | Waste Water Treatment | Grit Storage Hopper | Various Standard & Size | Set | 1 | | 1 |
| 27 | Waste Water Treatment | Hoist A for maintenance | Various Standard & Size | Set | 1 | | 1 |
| 28 | Waste Water Treatment | pH adjustment mixer | Various Standard & Size | Set | 1 | | 1 |
| 29 | Waste Water Treatment | Equalization tank Mixer | Various Standard & Size | Set | 4 | | 4 |
| 30 | Waste Water Treatment | Maintenance Gate A | Various Standard & Size | Set | 2 | | 2 |
| 31 | Waste Water Treatment | Maintenance Gate B | Various Standard & Size | Set | 2 | | 2 |
| 32 | Waste Water Treatment | Inlet Pump A | Various Standard & Size | Set | 2 | | 2 |
| 33 | Waste Water Treatment | Inlet Pump B | Various Standard & Size | Set | 2 | | 2 |
| 34 | Waste Water Treatment | Discharge valve for Inlet Pump A | Various Standard & Size | Set | 2 | | 2 |
| 35 | Waste Water Treatment | Discharge valve for Inlet Pump B | Various Standard & Size | Set | 2 | | 2 |
| 36 | Waste Water Treatment | Ultra fine screen | Various Standard & Size | Set | 2 | | 2 |
| 37 | Waste Water Treatment | Ultra fine Conveyor A | Various Standard & Size | Set | 1 | | 1 |
| 38 | Waste Water Treatment | Ultra fine grit Conveyor B | Various Standard & Size | Set | 1 | | 1 |
| 39 | Waste Water Treatment | Hoist B for maintenance | Various Standard & Size | Set | 1 | | 1 |
| 40 | Waste Water Treatment | Waste water connection inlet pump | Various Standard & Size | Set | 1 | | 1 |
| 41 | Waste Water Treatment | Un-Aeration pond mixer | Various Standard & Size | Set | 2 | | 2 |

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| | | | | | | | |
|----|-----------------------|---|-------------------------|-----|---|--|---|
| 42 | Waste Water Treatment | Switching water gate for rotational reaction pond | Various Standard & Size | Set | 2 | | 2 |
| 43 | Waste Water Treatment | Rotational reaction pond mixer | Various Standard & Size | Set | 2 | | 2 |
| 44 | Waste Water Treatment | Air supply valve for rotational reaction pond | Various Standard & Size | Set | 2 | | 2 |
| 45 | Waste Water Treatment | Air supply system for rotational reaction pond | Various Standard & Size | Set | 1 | | 1 |
| 46 | Waste Water Treatment | Air supply valve for aeration pond | Various Standard & Size | Set | 1 | | 1 |
| 47 | Waste Water Treatment | Aeration system for aeration pond | Various Standard & Size | Set | 1 | | 1 |
| 48 | Waste Water Treatment | Air supply valve for aeration pond | Various Standard & Size | Set | 1 | | 1 |
| 49 | Waste Water Treatment | Submerged Membrane | Various Standard & Size | Set | 1 | | 1 |
| 50 | Waste Water Treatment | Dissolved oxygen deduction mixer | Various Standard & Size | Set | 1 | | 1 |
| 51 | Waste Water Treatment | Sludge return pump | Various Standard & Size | Set | 2 | | 2 |
| 52 | Waste Water Treatment | Sludge shut-off valve | Various Standard & Size | Set | 1 | | 1 |
| 53 | Waste Water Treatment | Excessive sludge pump | Various Standard & Size | Set | 2 | | 2 |
| 54 | Waste Water Treatment | Treated water suction pump | Various Standard & Size | Set | 2 | | 2 |
| 55 | Waste Water Treatment | Suction valve for treated water | Various Standard & Size | Set | 2 | | 2 |
| 56 | Waste Water Treatment | Membrane backwash pump | Various Standard & Size | Set | 2 | | 2 |
| 57 | Waste Water Treatment | Back wash auto valve for Membrane | Various Standard & Size | Set | 1 | | 1 |
| 58 | Waste Water Treatment | line mixer (back wash) | Various Standard & Size | Set | 1 | | 1 |
| 59 | Waste Water Treatment | Vacuum generator | Various Standard & Size | Set | 1 | | 1 |
| 60 | Waste Water Treatment | Air compressor | Various Standard & Size | Set | 1 | | 1 |
| 61 | Waste Water Treatment | Scum remover | Various Standard & Size | Set | 1 | | 1 |
| 62 | Waste Water Treatment | Hoist for Membrane | Various Standard & Size | Set | 1 | | 1 |
| 63 | Waste Water Treatment | Compressor for valve and Conveyor | Various Standard & Size | Set | 1 | | 1 |
| 64 | Waste Water Treatment | Drain pump for pond | Various Standard & Size | Set | 2 | | 2 |
| 65 | Waste Water Treatment | drain pump for washing pond | Various Standard & Size | Set | 1 | | 1 |
| 66 | Waste Water Treatment | Auto valve for washing | Various Standard & Size | Set | 1 | | 1 |
| 67 | Waste Water Treatment | Rapid coagulation mixer | Various Standard & Size | Set | 1 | | 1 |
| 68 | Waste Water Treatment | Nozzle for antifoaming | Various Standard & Size | Set | 1 | | 1 |
| 69 | Waste Water Treatment | Switching valve for antifoaming | Various Standard & Size | Set | 1 | | 1 |
| 70 | Waste Water Treatment | Air filter | Various Standard & Size | Set | 1 | | 1 |

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| | | | | | | | |
|----|-----------------------|---|-------------------------|-----|---|--|---|
| 71 | Waste Water Treatment | Blower for rotational aeration pond | Various Standard & Size | Set | 2 | | 2 |
| 72 | Waste Water Treatment | Blower for aeration pond | Various Standard & Size | Set | 2 | | 2 |
| 73 | Waste Water Treatment | Blower for membrane | Various Standard & Size | Set | 2 | | 2 |
| 74 | Waste Water Treatment | Hoist for maintenance C | Various Standard & Size | Set | 1 | | 1 |
| 75 | Waste Water Treatment | NaOCl Storage tank | Various Standard & Size | Set | 1 | | 1 |
| 76 | Waste Water Treatment | NaOCl injection pump | Various Standard & Size | Set | 2 | | 2 |
| 77 | Waste Water Treatment | Oxalic acid Storage tank | Various Standard & Size | Set | 1 | | 1 |
| 78 | Waste Water Treatment | Oxalic acid injection pump | Various Standard & Size | Set | 2 | | 2 |
| 79 | Waste Water Treatment | Methanol storage tank | Various Standard & Size | Set | 1 | | 1 |
| 80 | Waste Water Treatment | Methanol injection pump | Various Standard & Size | Set | 2 | | 2 |
| 81 | Waste Water Treatment | NaOH Storage tank | Various Standard & Size | Set | 1 | | 1 |
| 82 | Waste Water Treatment | NaOH injection pump A | Various Standard & Size | Set | 2 | | 2 |
| 83 | Waste Water Treatment | NaOH injection pump B | Various Standard & Size | Set | 2 | | 2 |
| 84 | Waste Water Treatment | Alum Storage tank | Various Standard & Size | Set | 1 | | 1 |
| 85 | Waste Water Treatment | Alum injection pump | Various Standard & Size | Set | 2 | | 2 |
| 86 | Waste Water Treatment | H ₂ SO ₄ Storage Tank | Various Standard & Size | Set | 1 | | 1 |
| 87 | Waste Water Treatment | H ₂ SO ₄ injection pump | Various Standard & Size | Set | 2 | | 2 |
| 88 | Waste Water Treatment | Eye washer | Various Standard & Size | Set | 2 | | 2 |
| 89 | Waste Water Treatment | Auto supply system for reuse water | Various Standard & Size | Set | 1 | | 1 |
| 90 | Waste Water Treatment | Hoist for equipment supply | Various Standard & Size | Set | 1 | | 1 |
| 91 | Waste Water Treatment | Aeration system for Sludge storage tank | Various Standard & Size | Set | 1 | | 1 |
| 92 | Waste Water Treatment | Blower for sludge return | Various Standard & Size | Set | 1 | | 1 |
| 93 | Waste Water Treatment | Blower for sludge injection | Various Standard & Size | Set | 2 | | 2 |
| 94 | Waste Water Treatment | Dehydrator | Various Standard & Size | Set | 1 | | 1 |
| 95 | Waste Water Treatment | Auto supply system for polymer | Various Standard & Size | Set | 1 | | 1 |
| 96 | Waste Water Treatment | Polymer injection pump | Various Standard & Size | Set | 2 | | 2 |
| 97 | Waste Water Treatment | Cake conveyor (A) | Various Standard & Size | Set | 1 | | 1 |

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| | | | | | | | |
|-----|-----------------------|--|-------------------------|-----|--------|-------|--------|
| 98 | Waste Water Treatment | By-pass valve for cake | Various Standard & Size | Set | 1 | | 1 |
| 99 | Waste Water Treatment | Cake storage hopper | Various Standard & Size | Set | 1 | | 1 |
| 100 | Waste Water Treatment | Hoist for dehydrator maintenance | Various Standard & Size | Set | 1 | | 1 |
| 101 | Waste Water Treatment | Sludge effluent transfer pump | Various Standard & Size | Set | 2 | | 2 |
| 102 | Waste Water Treatment | Deodorization equipment for high concentration | Various Standard & Size | Set | 1 | | 1 |
| 103 | Waste Water Treatment | Deodorization equipment for middle concentration | Various Standard & Size | Set | 1 | | 1 |
| 104 | Waste Water Treatment | Deodorization equipment for retreatment | Various Standard & Size | Set | 1 | | 1 |
| 105 | Waste Water Treatment | Deodorization equipment for emergency | Various Standard & Size | Set | 1 | | 1 |
| 106 | Waste Water Treatment | Deodorization equipment for cake hopper room | Various Standard & Size | Set | 1 | | 1 |
| 107 | Waste Water Treatment | Odor monitoring system | Various Standard & Size | Set | 1 | | 1 |
| 108 | Waste Water Treatment | Piping | Various Standard & Size | Set | 1 | | 1 |
| 109 | Waste Water Treatment | Electrical system | Various Standard & Size | Set | 1 | | 1 |
| 110 | Waste Water Treatment | I&C system | Various Standard & Size | Set | 1 | | 1 |
| 111 | Waste Water Treatment | Structural Steel | Various Standard & Size | Ton | 2,046 | 2,046 | |
| 112 | Water Supply | Ductile Iron Pipe | Various Standard & Size | m | 18,652 | 6,652 | 12,000 |
| 113 | Water Supply | Gate Valve | Various Standard & Size | Nos | 35 | | 35 |
| 114 | Water Supply | Check Valve | Various Standard & Size | Nos | 1 | | 1 |
| 115 | Water Supply | Air Valve | Various Standard & Size | Nos | 16 | | 16 |
| 116 | Water Supply | Inflow gate | Various Standard & Size | Nos | 1 | 1 | |
| 117 | Water Supply | Inflow gate valve | Various Standard & Size | Nos | 1 | 1 | |
| 118 | Water Supply | CCTV | Various Standard & Size | Set | 1 | | 1 |
| 119 | Drainage | fork lift | Various Standard & Size | Nos | 2 | 2 | |
| 120 | Drainage | Air compressor | Various Standard & Size | Nos | 2 | 2 | |
| 121 | Road | Concrete Vibrator | Various Standard & Size | Nos | 6 | 6 | |
| 122 | Road | Vibrator | Various Standard & Size | Nos | 6 | 6 | |
| 123 | Road | Ramer | Various Standard & Size | Nos | 9 | 9 | |
| 124 | Road | Compactor | Various Standard & Size | Nos | 9 | 9 | |

| | | | | | | | |
|-----|------|---------------------------|-------------------------|-----|---|---|---|
| 125 | Road | Water tank(sprinkler car) | Various Standard & Size | Nos | 1 | | 1 |
| 126 | Road | Boring machine | Various Standard & Size | Nos | 2 | 2 | |
| 127 | Road | Core Drill | Various Standard & Size | Nos | 3 | 3 | |
| 128 | Road | Automatic wheel wash | Various Standard & Size | Nos | 1 | 1 | |

Note: The equipment and machineries for project will be imported either from Korea or China or Vietnam.

3.15 Alternatives

In order to establish a new industrial complex/zone, the following criteria were considered and the proposed project site was selected as an appropriate location with the consent of the Government.

- a) Location designated for regional development;
- b) Sufficient land and infrastructure for the implementation of industrial businesses and investments to enable the implementation of the industrial complex/zone implementation master plan;
- c) Existence of international gateways such as ports and airports or suitability for easy transport to international borders or the domestic markets;
- d) Existence of sufficient industrial raw materials, resources and basic goods;
- e) Availability of skilled workers, semi-skilled workers and workers to be trained.

This KMIC project is one of Yangon Project Bank projects to attract private sector participation and investments for regional development. The land area for the proposed project is 555.81 acre and it has the required infrastructure sources (electricity, water and roads) available and therefore, this is a sufficient land area and infrastructure for the implementation of industrial businesses and investments to enable the implementation of the industrial complex implementation master plan. (Note: The electricity supply, water supply and upgrading and expansion of the access road to the proposed KMIC project site from the Yangon-Mandalay Express Way will be carried out by Ministry of Construction.) The proposed project site is 9 km away from Yangon Mandalay Express Way, 25 km away from Yangon International Airport, 35 km away from proposed Hanthawaddy International Airport and 40 km away from Yangon Sea Port. This is a reasonable distance for the KMIC project from the international gateways such as ports and airports and suitable for easy transport. The industrial resources and basic goods are also available in that region. The skilled workers, semi-skilled workers and workers to be trained can be available from the neighbouring areas for the establishment and operation of the industrial complex. Therefore, the location chosen for the project is the preferred alternative.

In terms of alternative, such area which does not need to take into account the resettlement issue, and no concerns about electricity and availability of water. Transport system could be built with shortest route to reach the main highways and expressways.

The project location is located in the Nyaung Hnitpin Livestock and Agricultural Zone No.3, Hlegu Township, and specifically situated at former research and training institute by Union Solidarity and Development Association. Currently, the land is not in use and the buildings on which are in poor condition. There are Zone No. 1 and 2 around the project area and no villages are situated near the project site. The nearest village is Takutone village and it is around 1.54 km away from the project site. Therefore, generally the impact on public will be not much significant.

The buildings (residential, industrial and commercial) in the complex would adopt the features of the green buildings (sustainable buildings) mentioned below as much as possible in order to be environmentally responsible and resource efficient.

- a) Energy efficient through the natural lighting, ventilation and solar passive designs;
- b) Efficient use of water through recycling and water harvesting;
- c) Use of renewable energy through photo voltaic systems and solar systems etc.;
- d) Non-toxic material in-door environment;
- e) Using green cooling commodities (Ozone – depleting substances, CFCs, HCFCs and HFCs, free air conditioners and refrigerators)
- f) Use of recycle/recyclable materials; and
- g) Efficient waste utilization and disposal.

The project will also include wastewater treatment system, hazardous and non-hazardous waste management plan and emergency response plan.

The public consultation meetings were carried out in February 2019 and August 2020 and the concerns, opinions and suggestions of the public were taken into consideration for CSR programs, and developing the Environmental Management Plan and mitigation measures.

Therefore, the project would be environmentally as well as socially accountable and this area is the best option for the proposed project.

No Project Option

If the proposed project is not implemented, economic benefits generated by the project would not be gained. Benefits loss would include:

- Employment generation and project expenditures during the development and operation of the project;
- Potential loss/slowdown of trade and cooperation between two countries;
- Loss of revenue for the Union and region governments;
- Potential loss of infrastructure upgrading in Hlegu region;
- Potential slowdown in the economic development of Hlegu region;



CHAPTER 4. DESCRIPTION OF THE SURROUNDING ENVIRONMENT

4.1 Description the Surrounding Environment

Basically, the project site is an abandoned place which has been left in nature without caring the land and buildings that had been used for convening meetings in late 1990s, an effort of accomplishment for developing the current constitution of the country. Now it becomes a Phone-zo area of a fallow land, dry in summer, swampy in rainy season. As the KMIC project site is a restricted area, the total lot has been thickly covered with wild plants of abundantly growing coarse grasses of Thetke (*Imperata cylindrical*), Kaing (*Saccharum spontaneum*); weak herbs of many species such as Ye-salat (*Pistia stratiotes*) and Naya-myet (*Setaria verticillata*), Mahuya-Pein (*Colocasia esculenta*), Burma linseed (*Hygrophila phlomoides*) and Sin-hna-maung pin (*Heliotropium indicum*) as well. And it is also found proliferately thriving wild small trees of Phon-ma-thein (*Blumea balsamifera*), Malaysia Padauk (*Acacia auriculiformis*) and Ka-aung pin (*Ficus hispida*).

Some of the roads and buildings are in a state of ruin now. In and around this area, an agricultural zone has been established. Each individual owner was offered 5 acres of land per unit so as to grow vegetables and seasonal plants. Perennial trees, such as mango, jack fruit, and rambutan are grown in some yards. Whole lots of surrounding areas including villages have been designated as agricultural and livestock breeding zones. Many fish farming ponds and poultry keeping farms have been already established just next to the project site area. Former vegetation of natural forest has already been replaced by paddy growing and cash crop plantation including rubber and acacia plantation.

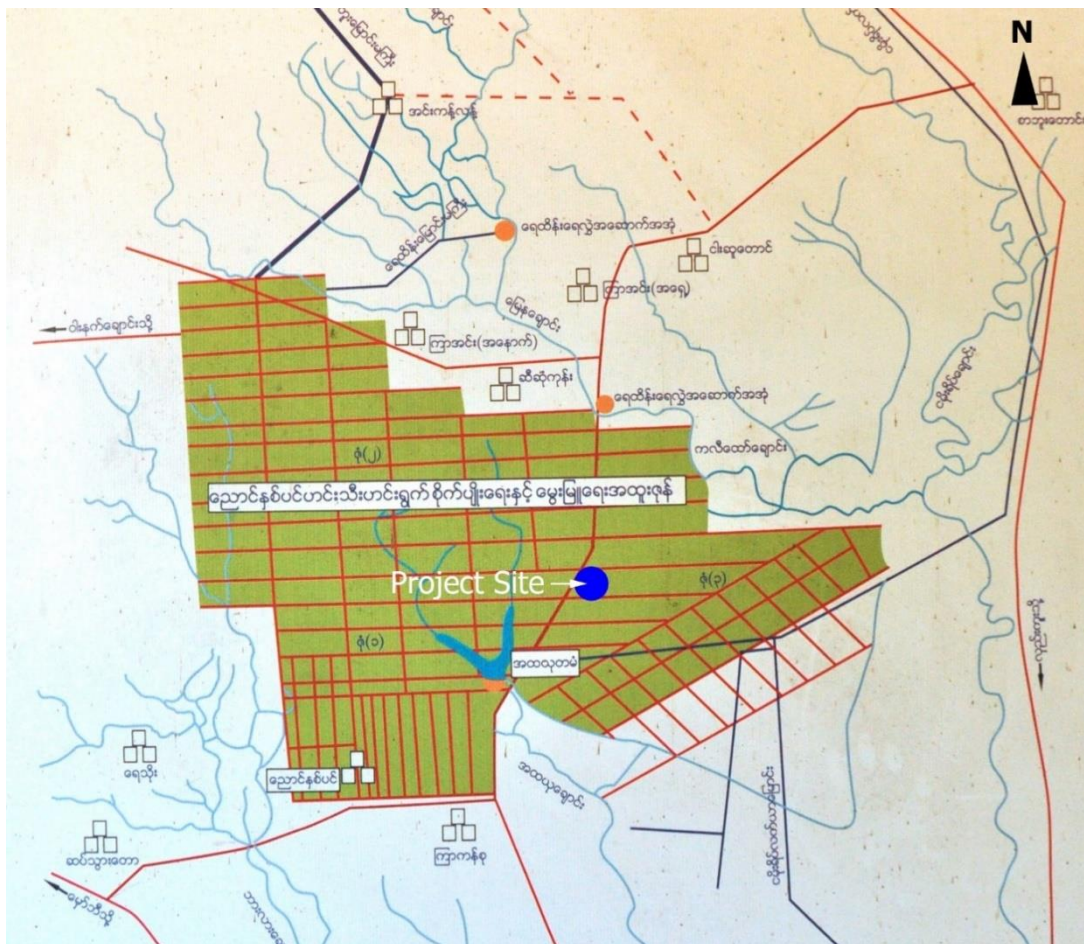


Figure 4. 1: Location Map of Nyaung Hnitpin Livestock and Agricultural Zone and Surrounding Environment

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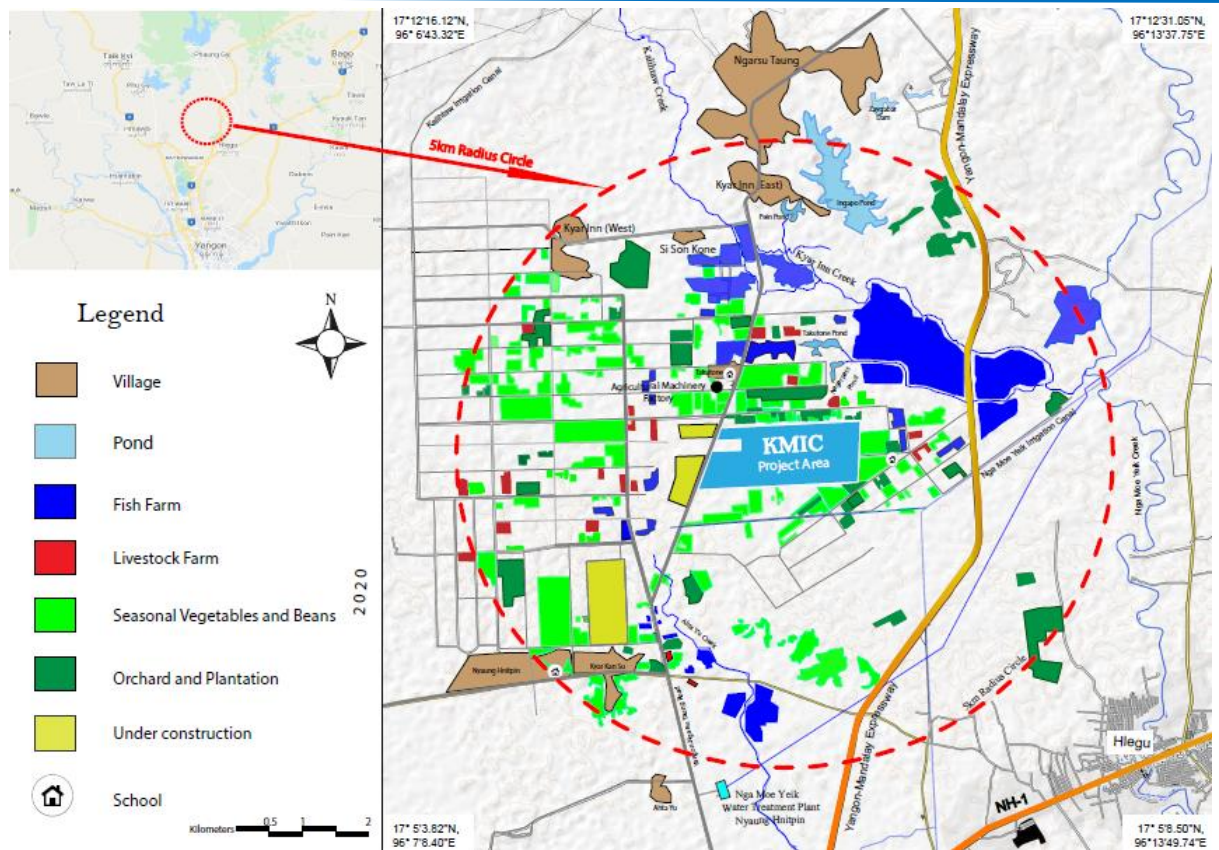


Figure 4. 2: Map of surrounding areas of project site (within 5 km radius) (Same as figure 3.7)

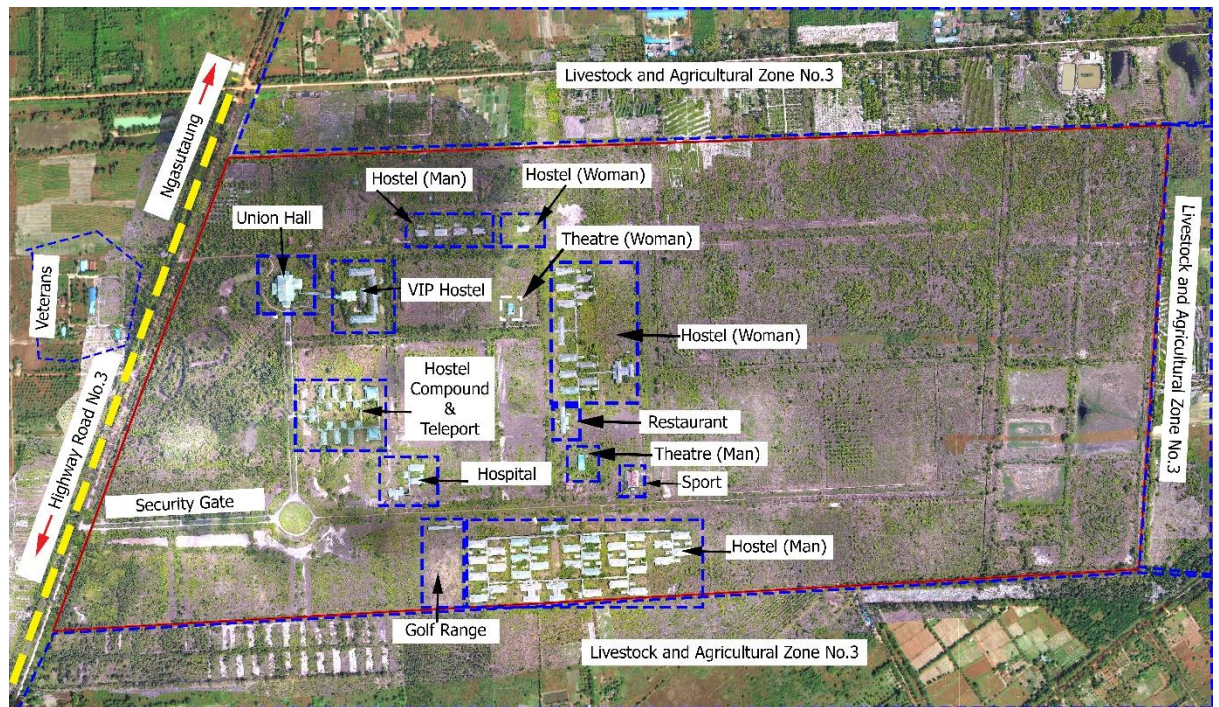


Figure 4. 3: Aerial Photo of Existing Buildings' location



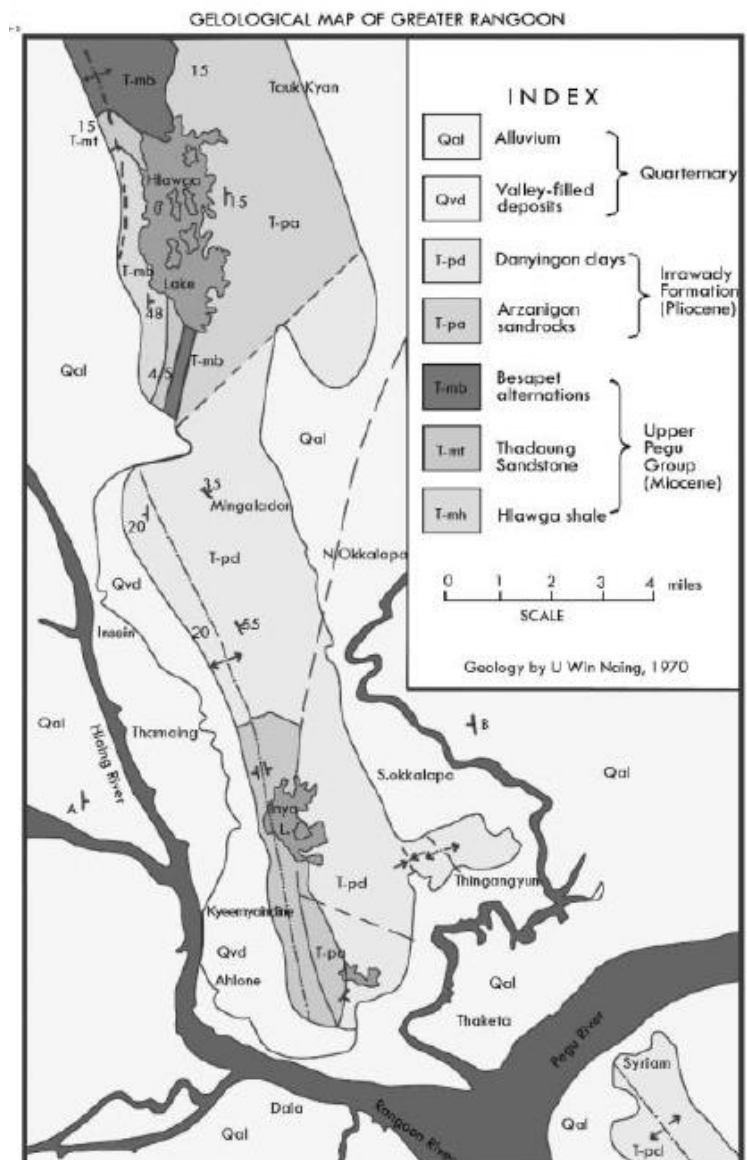


Figure 4. 4: Existing Buildings

4.2 Geology

The proposed project area is located in the northern part of Yangon Region. This region is distributed by the Pegu Group comprising the Besapet Alternation, Thadugan Sandstone and Hlawga Shale. Therefore, the geological condition of the project site is also the Pegu Group. This formation is mainly composed of sand and shale inter-beds. Outcropping areas are found along the anticlinal ridges of the Danyingone and Than Hlyn areas. Most of them are composed of reddish brown oxidized lateritic soil.

Figure 4. 5: Geological Map of Yangon (encompassing the northern part of Yangon in which the project site is located)



4.3 Tectonics

(Hlegu) Yangon is situated in the southern part of the Central lowland which is one of the three major tectonic provinces of Myanmar. The Taungnio Range of the Gyophyu catchment area of Taikkyi District, north of Yangon, through the Thanlyin Ridge, south of Yangon forming a series of isolated hills probably resulted from the progressive deformation of the Upper

Miocene rocks as the eastern continuation of the subduction or stretching and compression along the southern part of the Central basin and regional uplifting of the Pegu Yoma (Aung Lwin 2012).

4.4 Hydrogeology

The aquifer of the project area is alluvial aquifer (Holocene - Younger alluvium) and the major units are sand, gravels and muds. Groundwater availability is generally based on the distribution of permeable and relatively impermeable rocks. The nature of openings in the rocks determines permeability of rocks. Based on local geological considerations, potential groundwater source of Yangon can be roughly divided into two sub regions, namely the low potential area and high potential area. Low potential areas are areas with those rock units of Hlawga Shale, Thadugan Sandstones and Basepet Alternation of upper Pegu Group (Miocene epoch) and Danyingon Clays of Irrawaddy rocks. These rocks and formations are a dense, massive and consolidated nature and have impervious characteristic. High potential areas are underlain by Pliocene Series and recent Formations.

4.5 Soil

The soil type of the project area is Meadow and Meadow Alluvial soil. The meadow soils which occur near the river plains with occasional tidal floods are non-carbonate. They usually contain large amount of salts. Meadow Alluvial soils (fluvic Gleysols) can be found in the flood plains. They have the texture of silty clay loam and they have the neutral soil reaction and are rich in available plant nutrients.

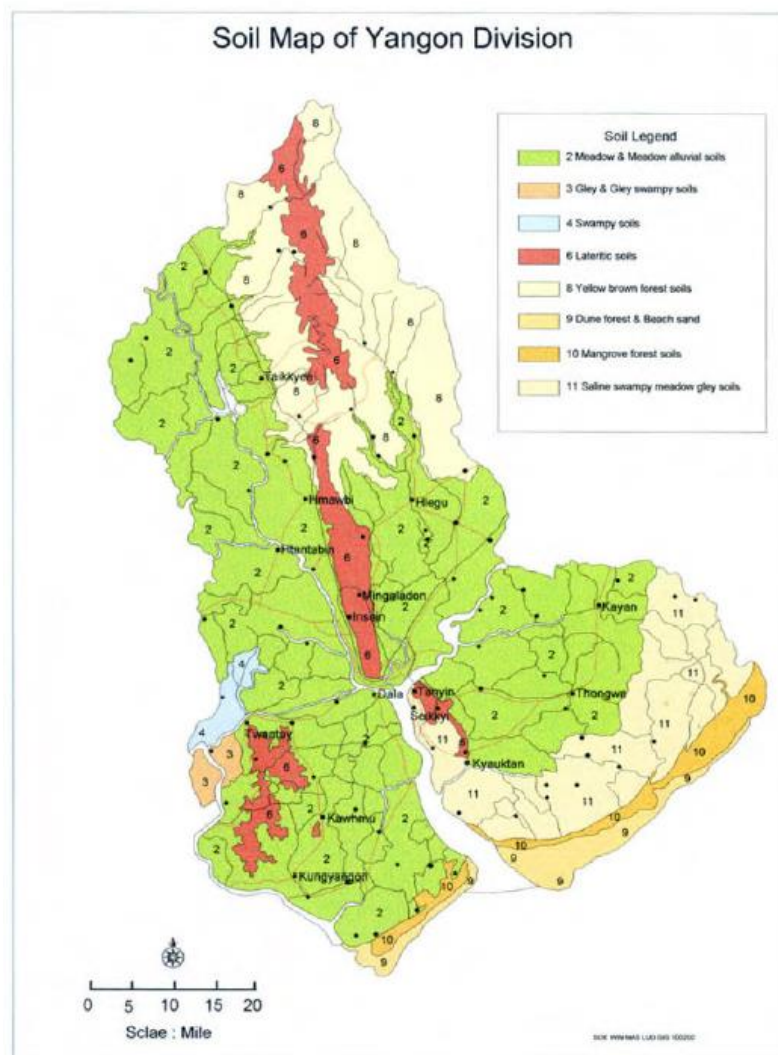


Figure 4. 6: Soil map of Yangon area (copyright of Land use division, Myanmar Agriculture Service (Feb 11, 2002)

4.6 Climate

Yangon Region is located in the tropical monsoon climate region, and it has three seasons, summer (March to May), rainy season (June to October), and cold season (November to February). In Yangon Region, there are three meteorological stations, namely, Kaba Aye, Mingalardon, Hmawbi, which are managed by Department of Meteorology and Hydrology, Ministry of Transport and Communication. Long-term monthly averages for the climatic parameters, which can be representative of the climate of project area are obtained from Hmawbi station which is closest to the project site.

Rainfall

The monthly rainfall data for 2014 – 2018 are mentioned in the table below.

Table 4. 1: Monthly Rainfall (mm) 2014 - 2018

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|-------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 0 | 0 | 0 | 0 | 182 | 390 | 760 | 547 | 249 | 82 | 180 | 0 |
| 2015 | 0 | 0 | Trace | 29 | 256 | 358 | 828 | 315 | 264 | 197 | 25 | 0 |
| 2016 | 38 | 1 | 23 | 0 | 387 | 310 | 581 | 509 | 332 | 208 | 6 | 0 |
| 2017 | Trace | 0 | 0 | 98 | 319 | 427 | 643 | 491 | 326 | 328 | 10 | 0 |
| 2018 | 2 | 0 | 0 | 35 | 26 | 434 | 666 | 562 | 303 | 280 | 42 | 1 |

“Trace” The amount of rainfall which cannot be measured.

“1 mm=0.04 inch”

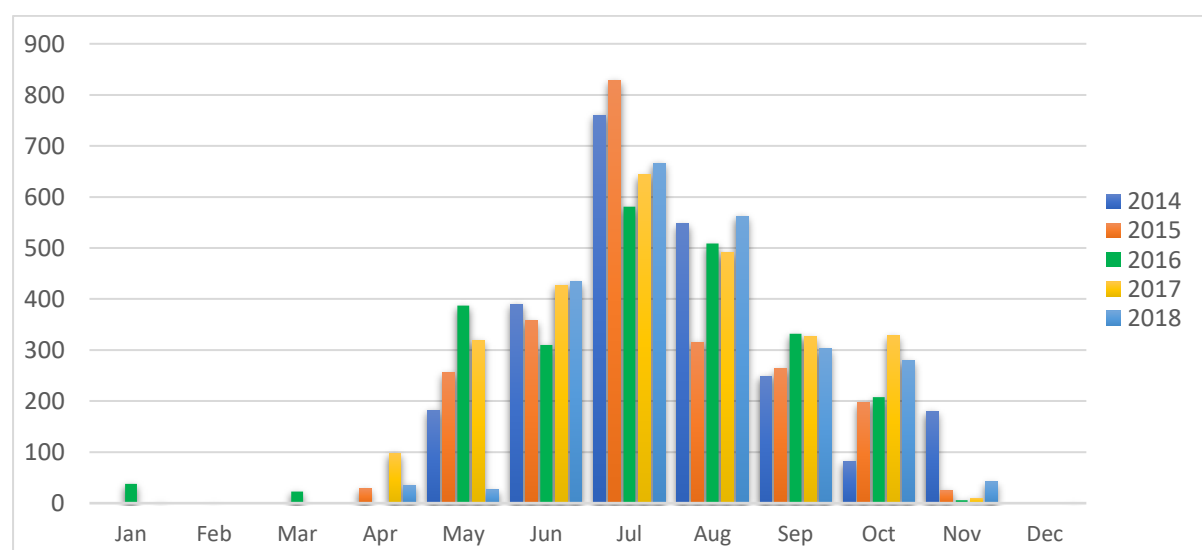


Figure 4. 7: Monthly Rainfall (mm) 2014 - 2018

For the months of rainy season (June – October), July 2015 has the highest rainfall of 828 mm while October 2014 has the lowest rainfall of 82 mm.

Highest and Lowest Temperatures

The monthly mean maximum temperature (°C) for 2014 – 2018 are mentioned in the table below.

Table 4. 2: Monthly Mean Maximum Temperature (°C) 2014-2018

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2014 | 31.9 | 34.3 | 37.5 | 37.8 | 34.8 | 30.8 | 29.8 | 30.0 | 31.2 | 33.1 | 30.0 | 32.9 |
| 2015 | 31.9 | 34.5 | 37.6 | 38.0 | 36.0 | 31.8 | 30.9 | 30.8 | 31.8 | 32.4 | 34.5 | 33.5 |

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| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2016 | 31.8 | 34.7 | 37.1 | 38.8 | 37.2 | 30.8 | 30.6 | 30.4 | 31.9 | 31.9 | 33.7 | 33.1 |
| 2017 | 32.7 | 34.9 | 36.9 | 36.1 | 35.0 | 31.8 | 29.8 | 30.2 | 32.6 | 32.6 | 34.7 | 32.7 |
| 2018 | 33.0 | 34.9 | 37.1 | 38.1 | 35.8 | 30.9 | 29.9 | 30.2 | 32.1 | 32.8 | 33.2 | 32.9 |

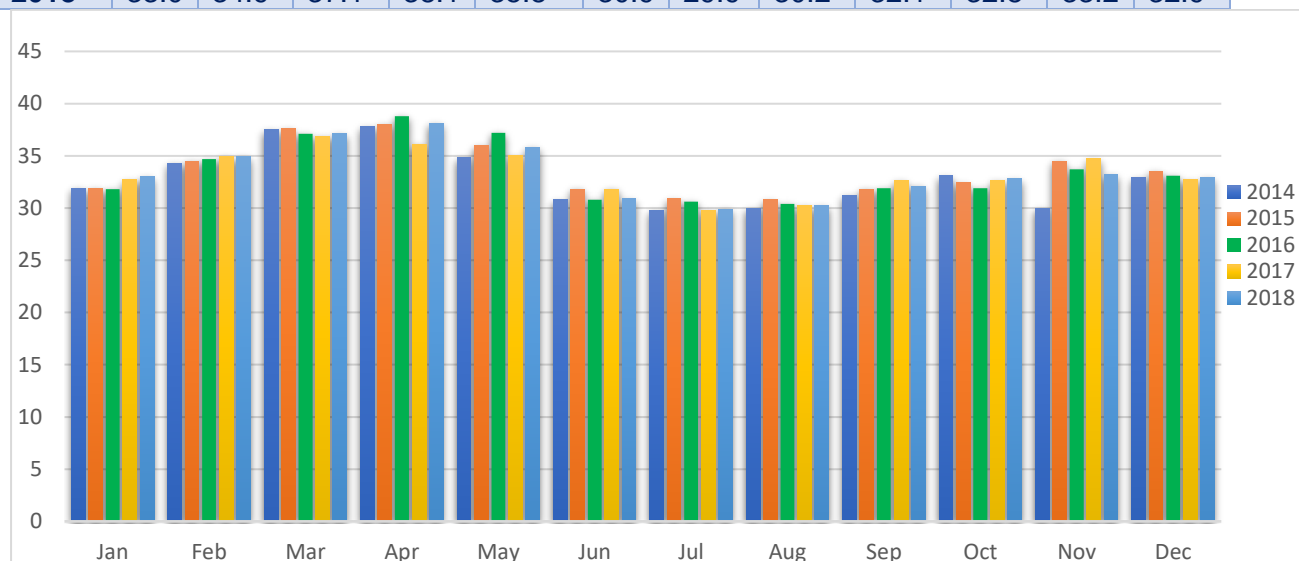


Figure 4. 8: Monthly Mean Maximum Temperature (C) 2014 - 2018

For mean maximum temperature of the months of summer (March to May), April 2016 has 38.8°C (highest) and May 2014 has 34.8°C (lowest).

Table 4. 3: Monthly mean Minimum Temperature (°C) 2014 – 2018

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2014 | 14.4 | 16.5 | 18.7 | 24.1 | 24.8 | 24.4 | 23.7 | 23.8 | 23.9 | 23.2 | 21.3 | 19.2 |
| 2015 | 17.1 | 16.3 | 19.9 | 23.6 | 25.0 | 24.6 | 24.6 | 24.7 | 24.7 | 24.0 | 21.8 | 18.1 |
| 2016 | 14.6 | 18.1 | 22.1 | 24.0 | 24.6 | 24.9 | 24.9 | 24.8 | 23.8 | 24.2 | 21.9 | 20.3 |
| 2017 | 18.4 | 18.2 | 20.2 | 23.4 | 25.2 | 24.9 | 24.5 | 24.7 | 24.7 | 24.0 | 22.6 | 18.8 |
| 2018 | 17.9 | 17.4 | 21.0 | 23.5 | 24.1 | 24.9 | 24.6 | 23.4 | 23.2 | 22.4 | 19.9 | 19.3 |

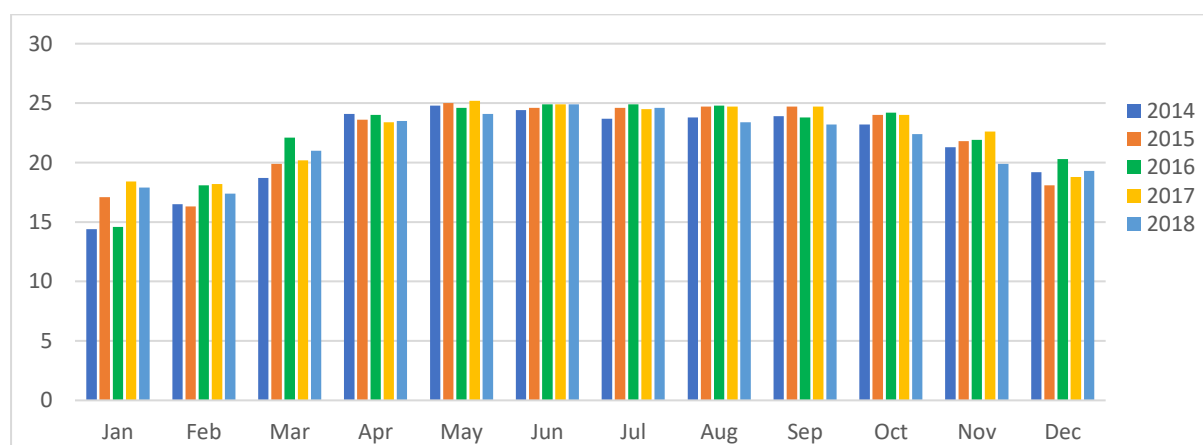


Figure 4. 9: Monthly Mean Minimum Temperature (C) 2014 - 2018

For mean minimum temperature of the months of summer (March to May), May 2017 has 25.2°C (highest) and March 2014 has 18.7°C (lowest).

Wind Direction and Wind Speed

Wind Direction

Monthly mean wind direction measured at 6:30 hrs M.S.T, 9:30 hrs M.S.T, 12:30 hrs M.S.T, 18:30 hrs M.S.T for 2014 - 2018 is mentioned in the tables below.

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Table 4. 4: Monthly Mean Wind Direction At (6:30)hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| 2014 | NE | NE | NE | E | SE | SE | SE | SE | SW | E | SE | Clam |
| 2015 | NE | NE | SE | SE | SW | SE | SE | SW | SE | E | NW | NW |
| 2016 | E | E | E | E | SE | SE | SE | SE | SE | SE | NW | NW |
| 2017 | NE | E | W | W | SW | SE | SW | SE | SE | SE | Clam | NW |
| 2018 | E | E | SW | SW | SE | SE | SW | S | SE | SE | Clam | Clam |

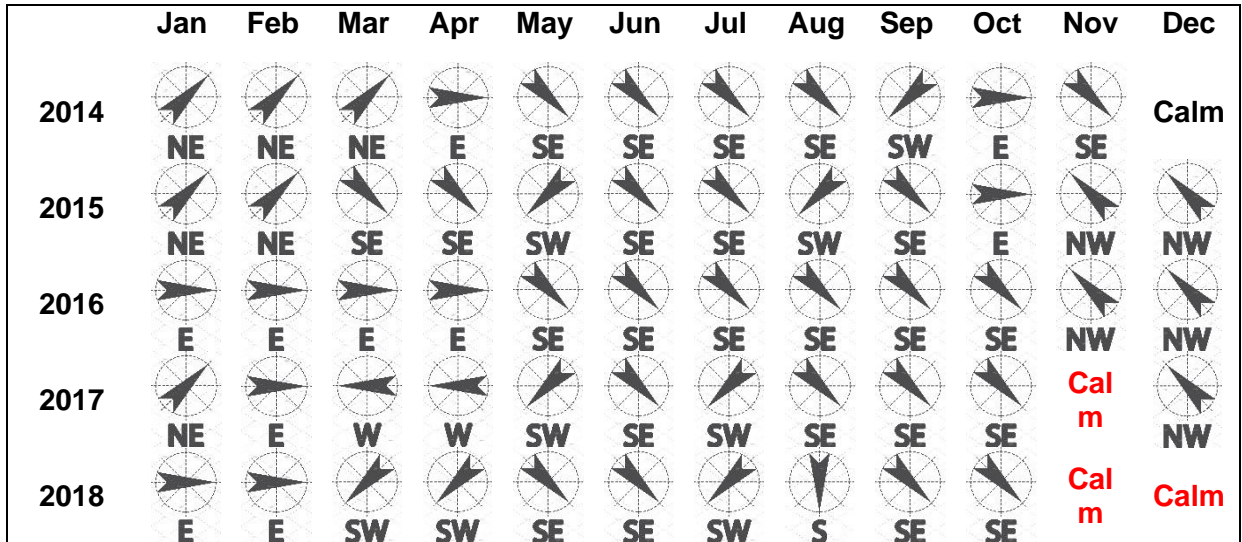


Figure 4. 10: Monthly Mean Wind Direction at (6:30) hrs. M.S.T 2014 - 2018

Table 4. 5: Monthly Mean Wind Direction At (9:30)hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | NE | SW | SW | SW | S | SW | SE | SW | SW | SE | NE | SE |
| 2015 | NE | SW | SW | SW | SW | SW | SW | SW | SW | SE | NW | NW |
| 2016 | NW | SW | SW | SW | SW | SE | SE | SE | SE | E | NE | NE |
| 2017 | N | SE | SE | SW | SE | SE | SW | SW | SW | SE | E | E |
| 2018 | E | SE | SE | SW | SE | S | SW | SW | SW | E | E | NW |

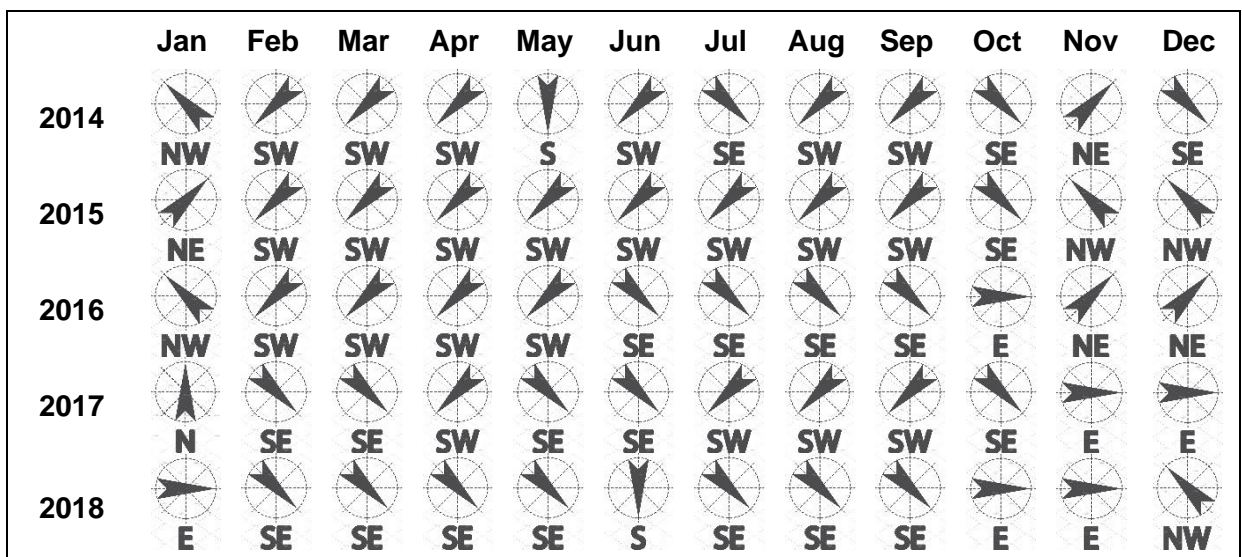


Figure 4. 11: Monthly Mean Wind Direction at (9:30) hrs. M.S.T 2014 - 2018

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Table 4. 6: Monthly Mean Wind Direction At (12:30)hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | NE | NE | SW | SW | SW | SW | SW | SW | SW | SE | SE | NE |
| 2015 | NE | SE | SE | SW | SW | SE | SE | SW | SW | SE | NW | N |
| 2016 | NW | E | SE | SE | SW | SE | SE | SW | SW | E | NW | NE |
| 2017 | NE | SE | SW | SW | SE | SW | SW | SW | SW | SE | E | E |
| 2018 | NW | SE | SW | SW | SE | SW | SW | SW | SW | E | NE | E |

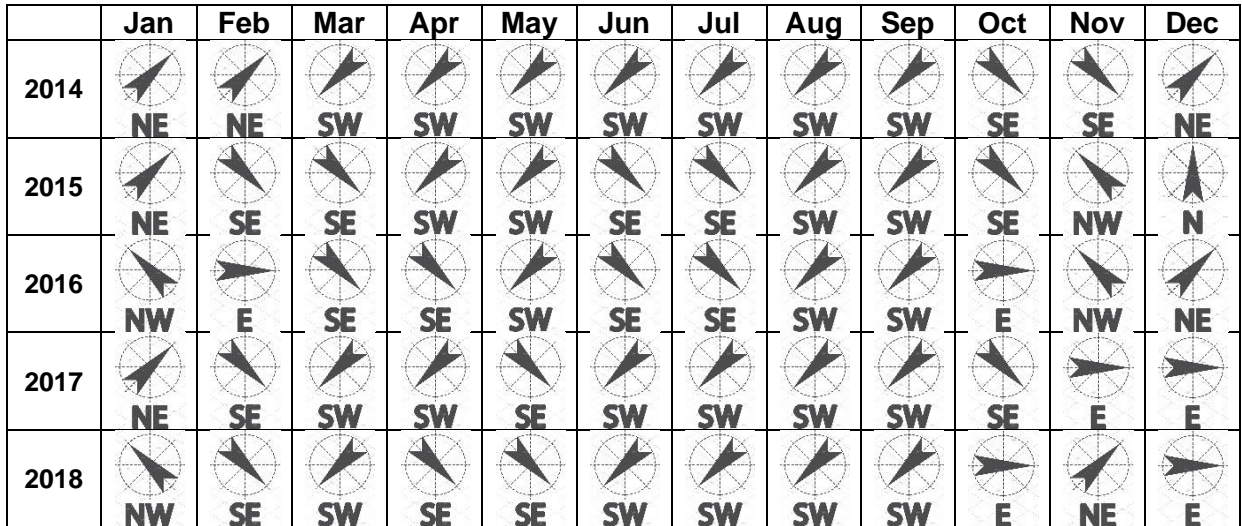


Figure 4. 12: Monthly Mean Wind Direction at (12:30) hrs. M.S.T 2014 - 2018

Table 4. 7: Monthly Mean Wind Direction At (18:30)hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|
| 2014 | NE | SW | SW | SW | S | SW | SE | SW | SW | SE | NE | SE |
| 2015 | NE | SW | SW | SW | SW | SW | SW | SW | SW | SE | NW | NW |
| 2016 | NW | SW | SW | SW | SW | SE | SW | SW | SW | SW | SE | NE |
| 2017 | NW | SW | SW | SW | SW | SW | SW | SW | SW | SE | SE | E |
| 2018 | NW | SW | SW | SW | SE | SW | SW | SW | SW | SW | Clam | SW |

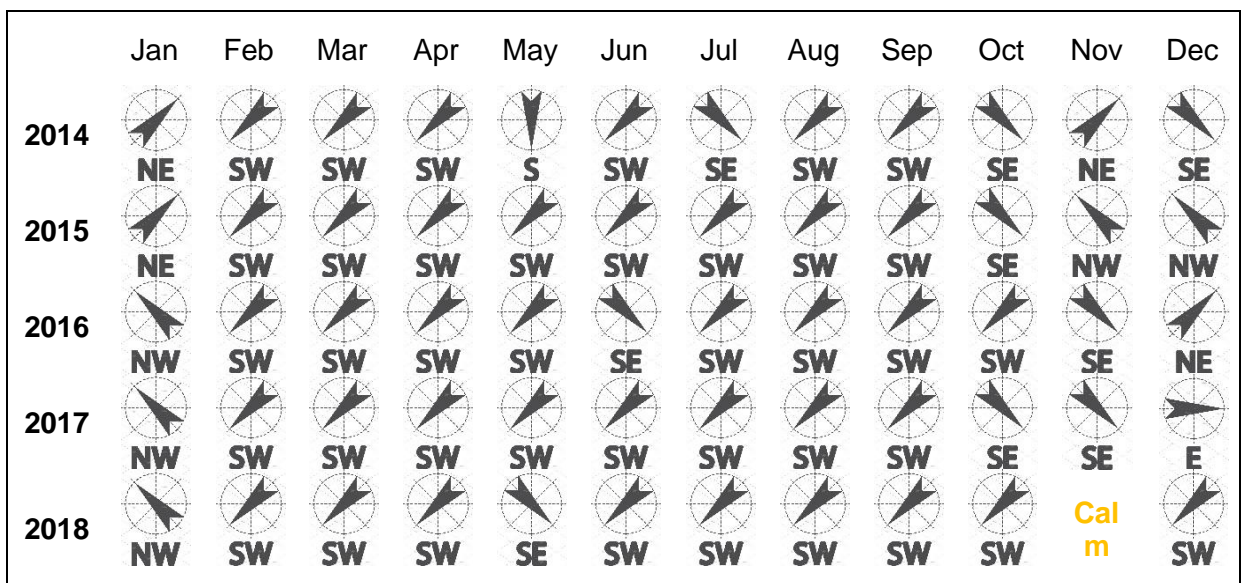


Figure 4. 13: Monthly Mean Wind Direction at (18:30) hrs. M.S.T 2014 - 2018

Wind Speed

Monthly mean wind speed measured at 6:30 hrs M.S.T, 9:30 hrs M.S.T, 12:30 hrs M.S.T, 18:30 hrs M.S.T for 2014 - 2018 is mentioned in the tables below.

Table 4. 8: Monthly Mean Wind Speed (mph) At (6:30) hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 0.5 | 0.7 | 0.9 | 0.9 | 0.8 | 0.8 | 1.4 | 0.5 | 0.4 | 0.5 | 0.5 | 0.0 |
| 2015 | 0.2 | 0.7 | 0.6 | 0.4 | 0.4 | 0.8 | 1.4 | 0.2 | 0.2 | 1.0 | 0.4 | 0.3 |
| 2016 | 0.5 | 0.4 | 0.5 | 0.2 | 0.6 | 1.0 | 0.6 | 1.4 | 0.4 | 0.1 | 0.2 | 0.5 |
| 2017 | 0.2 | 0.5 | 0.3 | 0.9 | 1.5 | 0.7 | 1.2 | 0.6 | 0.3 | 0.5 | 0.0 | 0.2 |
| 2018 | 0.1 | 0.1 | 0.2 | 0.6 | 0.6 | 1.3 | 0.9 | 0.5 | 0.8 | 0.5 | 0.0 | 0.0 |

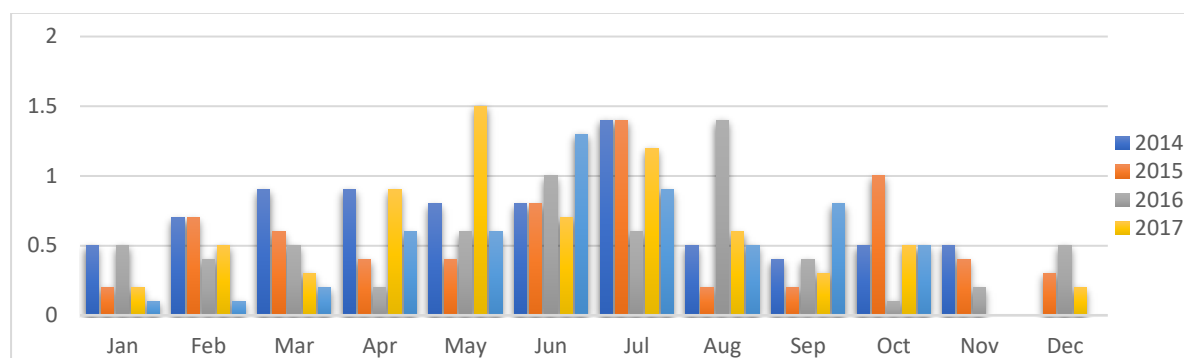


Figure 4. 14: Monthly Mean Wind Speed (mph) at (6:30) hrs. M.S.T 2014 - 2018

Table 4. 9: Monthly Mean Wind Speed (mph) At (9:30) hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 2.7 | 1.8 | 2.3 | 3.6 | 3.1 | 3.2 | 3.3 | 2.6 | 2.7 | 2.0 | 1.4 | 1.4 |
| 2015 | 1.8 | 2.5 | 2.3 | 2.4 | 2.4 | 2.4 | 3.3 | 3.1 | 3.3 | 2.7 | 1.9 | 1.7 |
| 2016 | 2.0 | 0.3 | 2.2 | 3.8 | 2.7 | 3.2 | 2.9 | 3.2 | 1.8 | 2.1 | 2.2 | 1.9 |
| 2017 | 2.1 | 2.6 | 2.6 | 2.7 | 2.9 | 2.9 | 2.4 | 2.4 | 2.1 | 1.9 | 1.9 | 1.9 |
| 2018 | 1.3 | 2.8 | 2.3 | 2.5 | 2.8 | 3.3 | 3.6 | 3.5 | 2.9 | 2.1 | 1.9 | 2.0 |

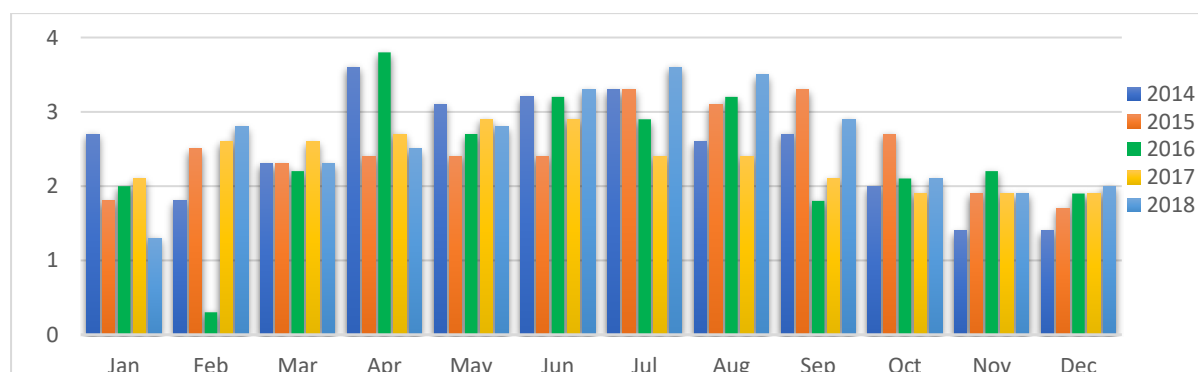


Figure 4. 15: Monthly Mean Wind Speed (mph) at (9:30) hrs. M.S.T 2014 – 2018

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Table 4. 10: Monthly Mean Wind Speed (mph) At (12:30) hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 3.1 | 3.1 | 3.8 | 4.7 | 3.8 | 3.4 | 3.1 | 3.5 | 2.9 | 2.2 | 1.7 | 1.9 |
| 2015 | 2.9 | 3.0 | 3.1 | 3.5 | 3.2 | 3.4 | 4.7 | 3.6 | 4.5 | 3.3 | 2.0 | 2.2 |
| 2016 | 2.6 | 3.2 | 3.2 | 4.5 | 4.3 | 4.3 | 3.9 | 4.7 | 3.1 | 3.0 | 3.2 | 3.0 |
| 2017 | 3.3 | 4.2 | 4.2 | 4.0 | 3.9 | 4.3 | 3.2 | 3.2 | 2.6 | 2.7 | 2.4 | 2.8 |
| 2018 | 2.7 | 3.5 | 3.6 | 3.5 | 3.6 | 4.9 | 0.5 | 0.5 | 4.2 | 2.9 | 2.2 | 2.6 |

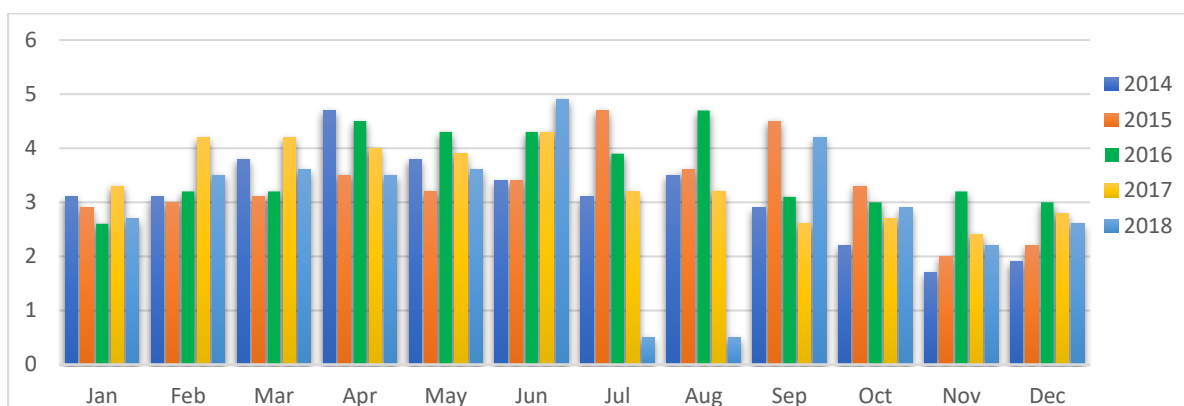


Figure 4. 16: Monthly Mean Wind Speed (mph) at (12:30) hrs. M.S.T 2014 – 2018

Table 4. 11: Monthly Mean Wind Speed (mph) At (18:30) hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 0.7 | 1.8 | 2.1 | 3.5 | 3.3 | 2.1 | 2.9 | 2.3 | 2.2 | 0.6 | 0.1 | 0.0 |
| 2015 | 0.3 | 0.7 | 2.6 | 3.6 | 3.5 | 1.9 | 2.8 | 1.7 | 2.7 | 0.5 | 0.4 | 0.6 |
| 2016 | 0.9 | 1.0 | 2.8 | 4.8 | 3.9 | 2.4 | 1.9 | 2.4 | 2.4 | 1.2 | 0.7 | 0.3 |
| 2017 | 0.7 | 1.6 | 3.5 | 2.8 | 3.6 | 2.9 | 2.1 | 2.4 | 2.2 | 0.5 | 0.3 | 0.1 |
| 2018 | 0.6 | 0.9 | 2.4 | 2.5 | 3.4 | 3.1 | 2.4 | 3.2 | 1.4 | 0.2 | 0.0 | 0.2 |

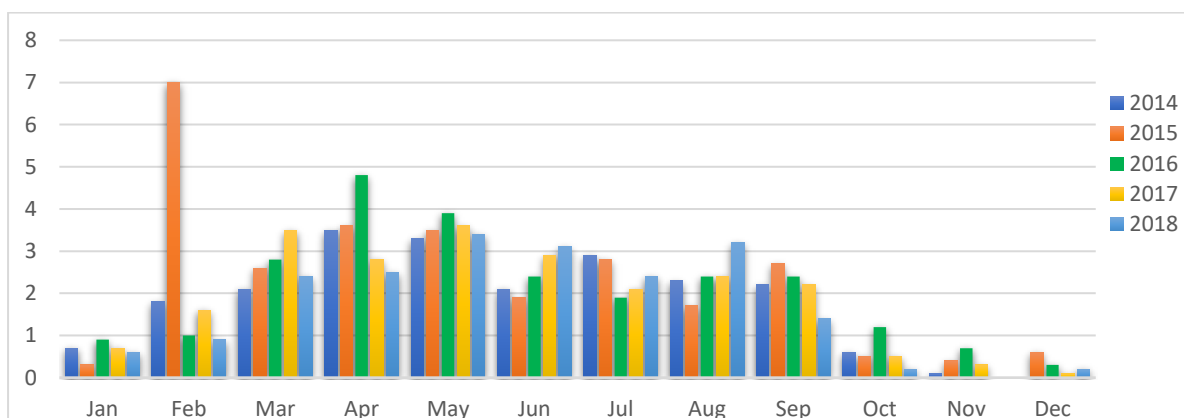


Figure 4. 17: Monthly Mean Wind Speed (mph) at (18:30) hrs. M.S.T 2014 - 2018

Table 4. 12: Monthly Mean Relative Humidity (%) At (6:30) hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 95 | 95 | 97 | 95 | 96 | 98 | 99 | 99 | 95 | 96 | 95 | 95 |
| 2015 | 93 | 93 | 94 | 96 | 96 | 98 | 97 | 97 | 98 | 95 | 95 | 94 |
| 2016 | 94 | 94 | 95 | 94 | 95 | 96 | 98 | 99 | 99 | 95 | 95 | 94 |

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| | | | | | | | | | | | | |
|-------------|----|----|----|----|----|----|----|----|----|----|----|----|
| 2017 | 89 | 93 | 95 | 94 | 95 | 98 | 98 | 98 | 98 | 93 | 93 | 91 |
| 2018 | 93 | 94 | 94 | 94 | 96 | 99 | 99 | 99 | 99 | 99 | 99 | 96 |

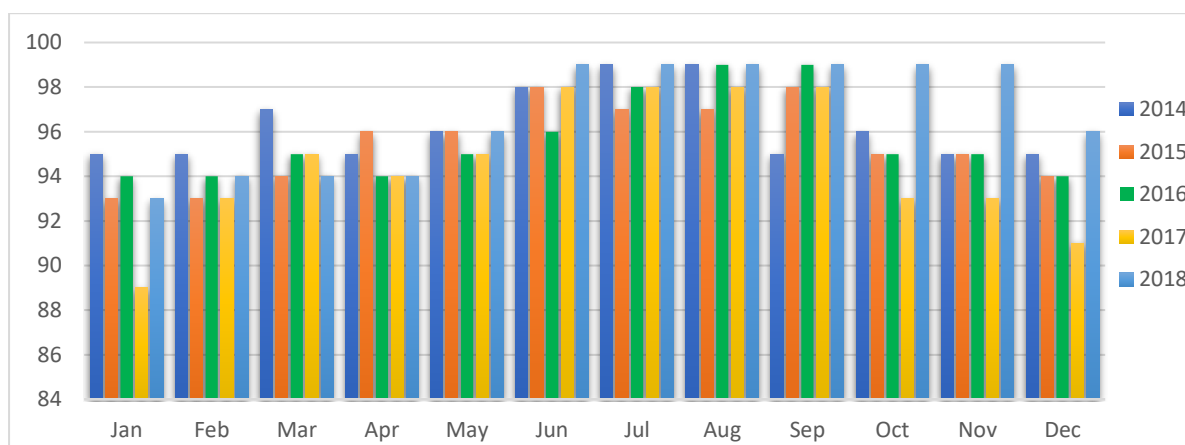


Figure 4. 18: Monthly Mean Relative Humidity (%) at (6:30) hrs. M.S.T 2014 - 2018

Table 4. 13: Monthly Mean Relative Humidity (%) At (9:30) hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 68 | 73 | 74 | 72 | 77 | 89 | 94 | 93 | 89 | 80 | 78 | 70 |
| 2015 | 71 | 71 | 73 | 69 | 75 | 87 | 90 | 90 | 86 | 84 | 77 | 72 |
| 2016 | 70 | 73 | 79 | 94 | 76 | 88 | 91 | 91 | 92 | 88 | 80 | 75 |
| 2017 | 71 | 70 | 72 | 73 | 81 | 87 | 93 | 92 | 89 | 89 | 80 | 71 |
| 2018 | 69 | 71 | 75 | 72 | 78 | 92 | 95 | 95 | 89 | 86 | 79 | 81 |

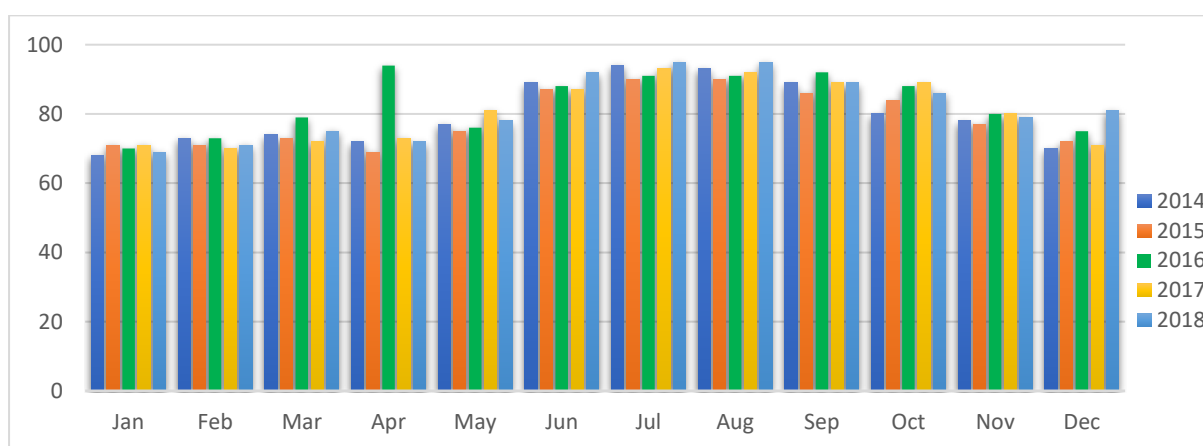


Figure 4. 19: Monthly Mean Relative Humidity (%) at (9:30) hrs. M.S.T 2014 - 2018

Table 4. 14: Monthly Mean Relative Humidity (%) At (12:30) hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 40 | 39 | 35 | 48 | 63 | 82 | 88 | 86 | 78 | 68 | 65 | 50 |
| 2015 | 45 | 37 | 48 | 47 | 57 | 77 | 84 | 84 | 76 | 74 | 60 | 50 |
| 2016 | 43 | 42 | 46 | 45 | 56 | 81 | 85 | 84 | 79 | 75 | 64 | 54 |
| 2017 | 46 | 37 | 36 | 50 | 66 | 80 | 87 | 85 | 76 | 80 | 64 | 51 |
| 2018 | 47 | 41 | 43 | 43 | 62 | 85 | 89 | 87 | 79 | 73 | 64 | 59 |

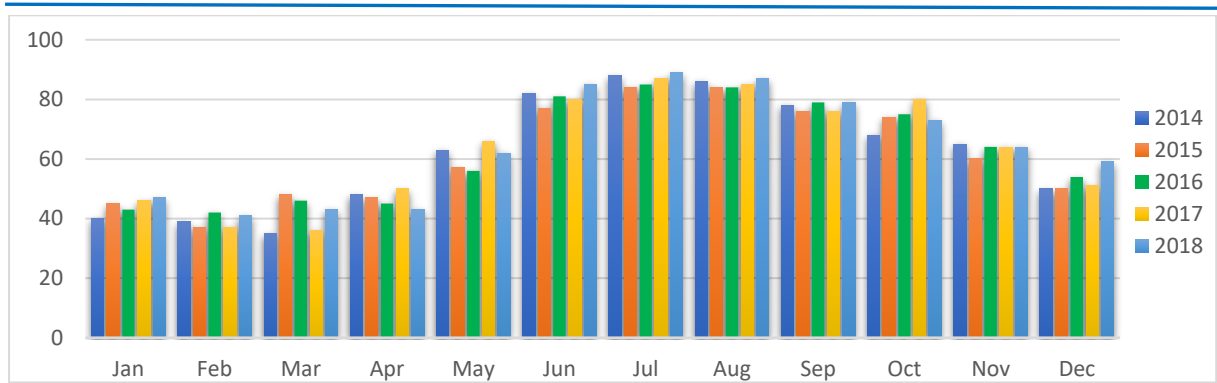


Figure 4. 20: Monthly Mean Relative Humidity (%) at (12:30) hrs. M.S.T 2014 - 2018

Table 4. 15: Monthly Mean Relative Humidity (%) At (18:30) hrs M.S.T 2014-2018

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 56 | 47 | 44 | 50 | 73 | 92 | 95 | 93 | 89 | 87 | 82 | 73 |
| 2015 | 61 | 46 | 55 | 51 | 69 | 90 | 91 | 93 | 91 | 89 | 82 | 71 |
| 2016 | 61 | 52 | 51 | 46 | 65 | 87 | 90 | 89 | 90 | 89 | 81 | 71 |
| 2017 | 60 | 45 | 40 | 54 | 70 | 89 | 91 | 89 | 89 | 92 | 86 | 73 |
| 2018 | 57 | 48 | 46 | 46 | 72 | 91 | 97 | 96 | 90 | 88 | 89 | 80 |

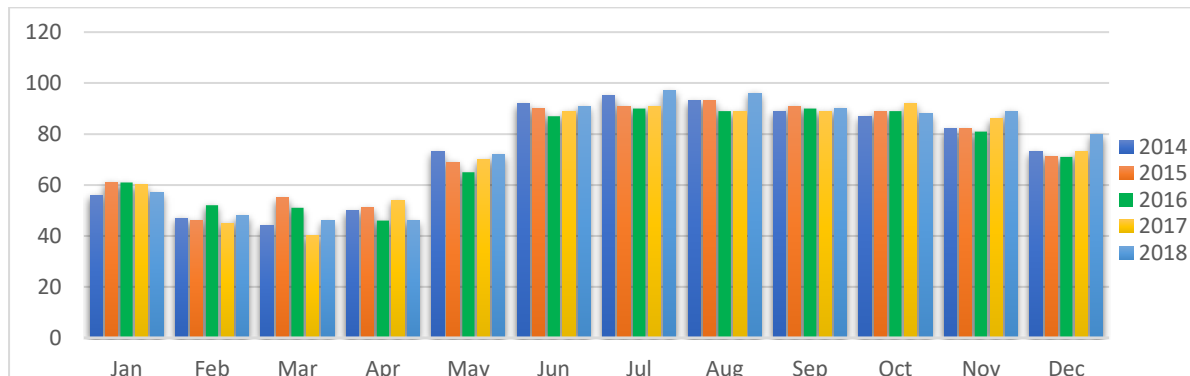


Figure 4. 21: Monthly Mean Relative Humidity (%) at (18:30) hrs. M.S.T 2014 - 2018

4.7 Earthquake

It could be seen in the above Figure that Myanmar falls in the Alpide Belt.

The Alpide Belt or Alpine-Himalayan orogenic belt is a seismic belt and orogenic belt that includes an array of mountain ranges extending along the southern margin of Eurasia, stretching from Java to Sumatra through the Himalayas, the Mediterranean, and out into the Atlantic. It includes the Alps, the Carpathians, the Pyrenees, the mountains of Anatolia and Iran, the Hindu Kush, and the mountains of Southeast Asia. It is the second most seismically active region in the world, after the circum-Pacific Belt (The Ring of Fire), with 17% of the world's largest earthquakes.

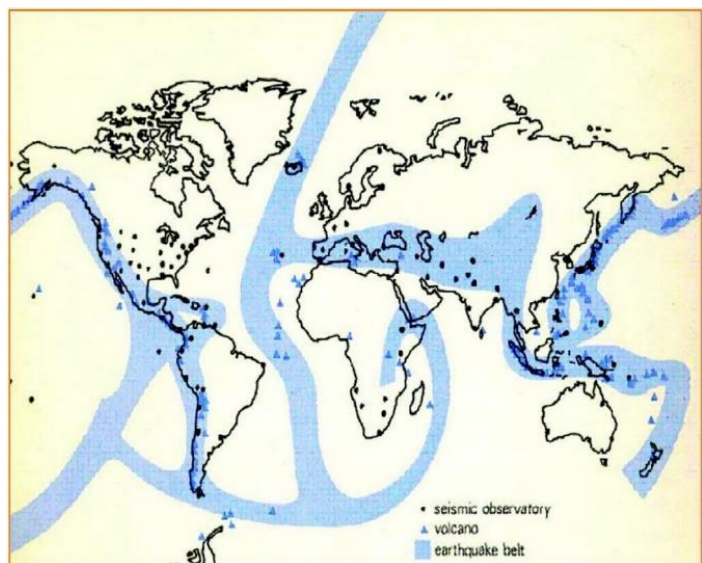


Figure 4. 22: Myanmar in Alpide Earthquake Belt Source: Manual on Earthquake, UN-Habitat

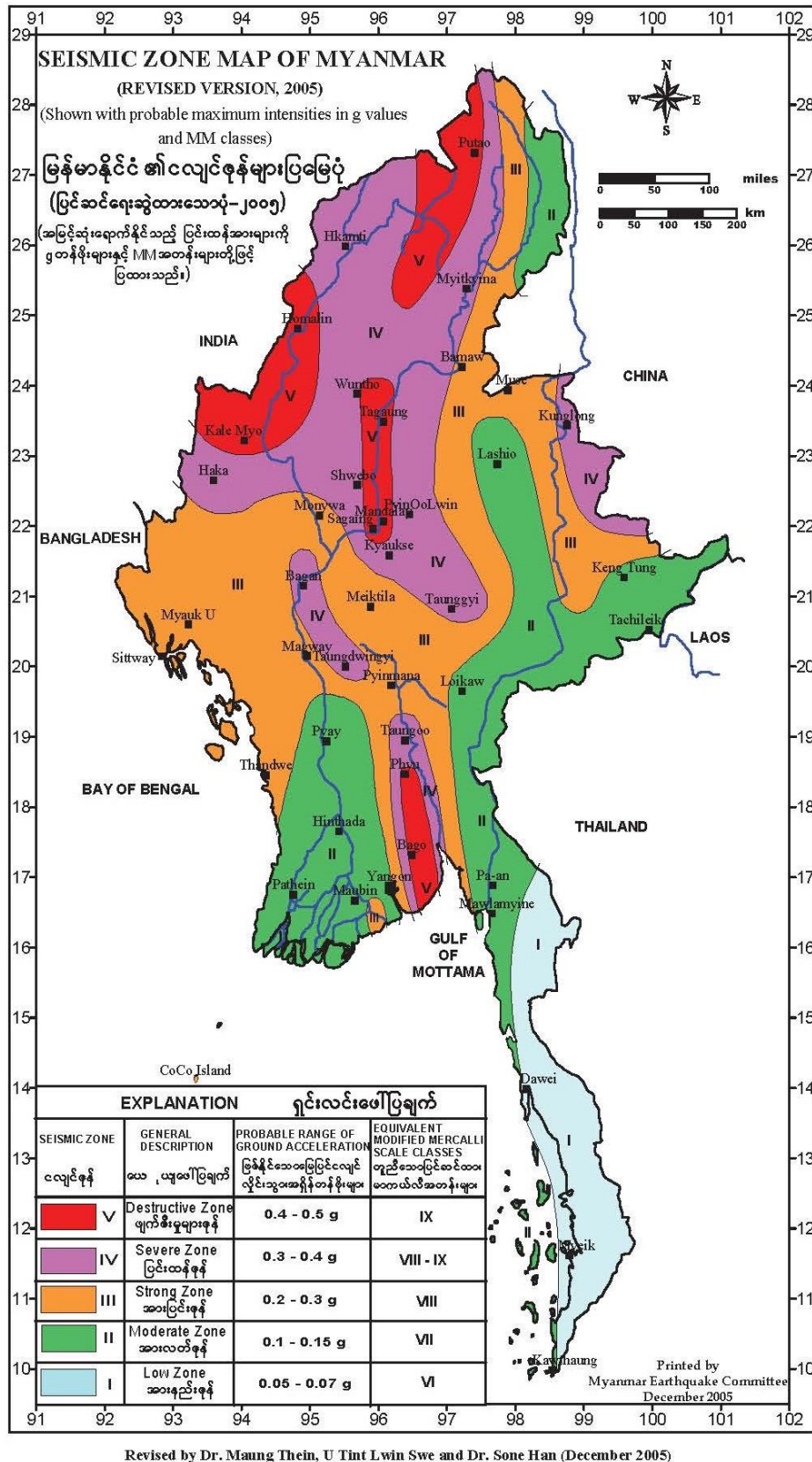


Figure 4. 22: Seismic Map of Myanmar

According to the above Seismic Map of Myanmar, Yangon/Hlegu Township is located in the zones where only strong and moderate earthquakes will likely strike, avoiding the zones where destructive and severe earthquakes could strike.

Myanmar's Earthquake Zone and the Sagaing Fault

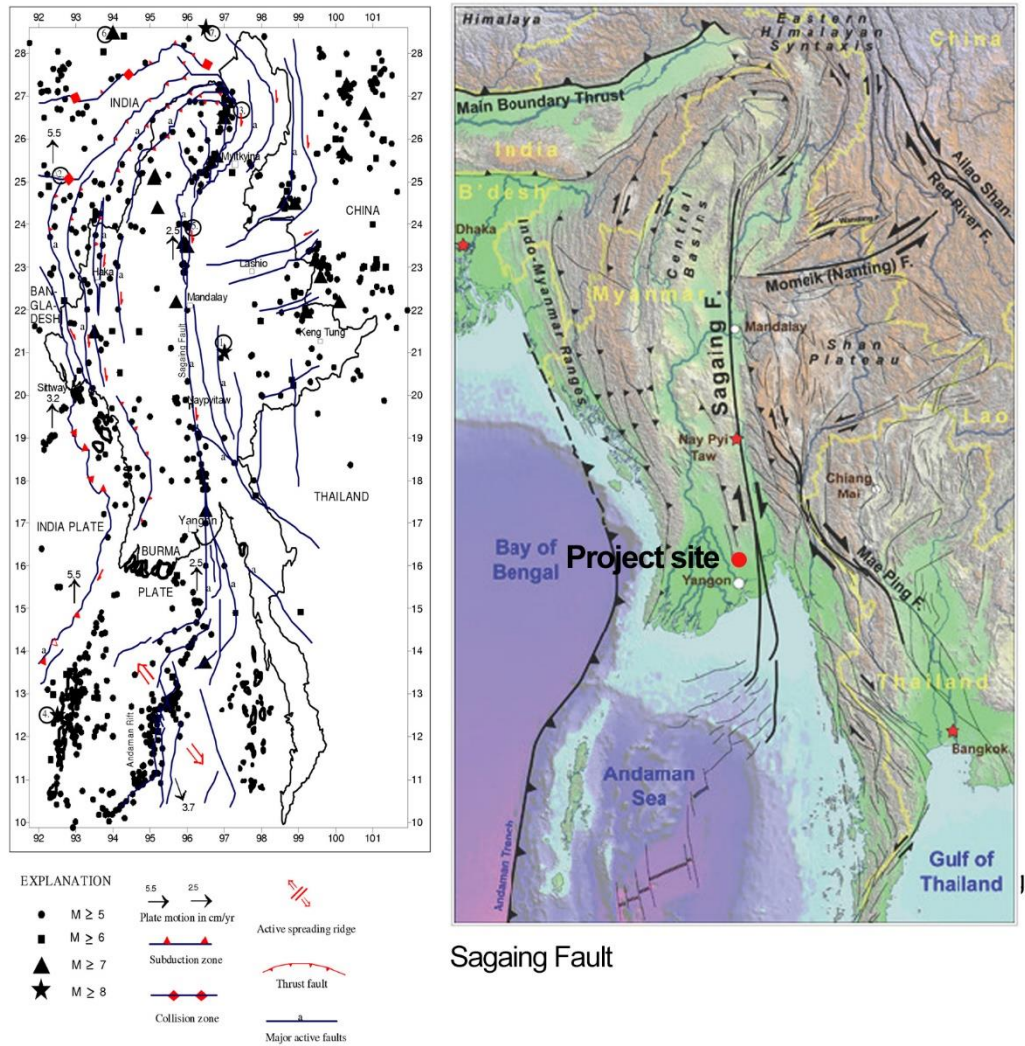


Figure 4. 23: Myanmar's Earthquake Zone and the Sagaing Fault
 Source: Department of Geological Engineering, Gadjah Mada University and www.sagaingfault.info/index.html#info

The proposed project site is located at approximately 37 kilometers to the west of the 1,200-kilometre long Sagaing Fault which stretches from the northernmost part of the country to the Gulf of Mottama.

Summary record of earthquakes which struck Myanmar is listed in Table below.

Table 4. 16: List of earthquakes which struck Myanmar

| Date | Location | Magnitude and/or brief description |
|--------------|----------|---|
| 868 | Bago | Shwemawdaw Pagoda a fell |
| 875 | Bago | Shwemawdaw Pagoda a fell |
| 1429 | Innwa | Fire-stopping enclosure walls fell |
| 1467 | Innwa | Pagodas, solid and hollow, and brick monasteries destroy-ed |
| 24 July 1485 | Sagaing | 3 well-known pagodas fell |
| 1501 | Innwa | Pagodas, etc. fell |
| 13 Sep 1534 | Bago | Pagodas including Shwemawdaw and Mahazedi fell |
| 1567 | Bago | Kyaikko Pagoda fell |
| 1582 | Bago | Umbrella of Mahazedi Pagoda fell |
| 9 Feb 1588 | Bago | Pagodas, and other structures fell |
| 30 Mar 1591 | Bago | The Great Incumbent Buddha destroyed |
| 23 June 1620 | Innwa | Ground surface broken, river fishes were killed after quake |

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| | | |
|---------------|------------------|--|
| 18 Aug 1637 | Innwa | River water flush |
| 10 Sep 1616 | Innwa | - |
| 11 June 1648 | Innwa | - |
| 1 Sep 1660 | Innwa | - |
| 3 April 1690 | Innwa | - |
| 15 Sep 1696 | Innwa | 4 well-known pagodas destroyed |
| 8 Aug 1714 | Innwa | Pagodas etc. fell; the water from the river gushed into the city |
| 4 June 1757 | Bago | Shwemawdaw Pagoda damaged |
| 2 April 1762 | Sittwe | M=7 RS: very destructive violent earthquake felt over Bengal, Rakhine up to Calcutta |
| 27 Dec 1768 | Bago | Ponnya Yadana Pagoda fell |
| 9 June 1776 | Innwa | A well-known pagoda fell |
| 26 April 1850 | Innwa | - |
| 21 Mar 1839 | Innwa | Oil place and many buildings demolished; |
| 23 Mar 1839 | Innwa | Pagodas and city walls fell; ground surface broken; the river's flow reversed for sometime; Mingun Pagoda shattered; about 300 to 400 persons killed |
| 6 Feb 1843 | Kyaukphyu | Eruption of mud volcanoes at the Ram bye (Ramree) Island |
| 3 Jan 1848 | Kyaukphyu | The civil line and other buildings were damaged |
| 24 Aug 1858 | Pyay | Collapsed houses and tops of pagodas at Pyay, Henzada, and Thayet Myo and felt with some damages in Innwa, Sittwe, Kyaukphyu and Yangon |
| 8 Oct 1888 | Bago | Mahazedi Pagoda collapsed |
| 6 Mar 1913 | Bago | Shwemawdaw Pagoda lost its final |
| 5 July 1917 | Bago | Shwemawdaw Pagoda fell |
| 10 Sep 1927 | Yangon | - |
| 17 Dec 1927 | Yangon | M-7 RS: extended to Dedaye |
| 8 Aug 1929 | Near Taungoo | Bent railroad tracks, bridges and culver is collapsed , and loaded trucks overturned (Swa Earthquake) |
| 5 May 1930 | Near Khayan | M-7.3 RS. 1 mix-IX; in a zone tending north-south for 37km south of Bago (on the Sagaing Fault line) about 500 persons in Bago and about 50 persons in Yangon killed |
| 3 Dec 1930 | Nyaunglebin | M-7.3 RS: railroad tracks twisted (Pyu Earthquake): about 30 persons killed |
| 27 Jan 1931 | East of Indawgyi | M-7.6 RS: 1 mix-IX: numerous fissures and cracks (Myitkyina Earthquake) |
| 10 Aug 1931 | Pyinmana | - |
| 27 Mar 1931 | Yangon | - |
| 16 May 1931 | Yangon | - |
| 21 May 1931 | Yangon | - |
| 12 Sep 1946 | Tagaung | M-7.5 RS |
| 12 Sep 1946 | Tagaung | M-7.75 RS |
| 16 July 1956 | Sagaing | M-7.0 RS: Several pagodas severely damaged (40to50 persons killed) |
| 8 July 1976 | Bagan | M-6.8 RS: Several pagodas in Bagan Ancient City were severely damaged (only 1 person killed) |
| 22 Sep 2003 | Taundwingyi | M-6.8 RS: Severe damaged to rural houses and religious buildings (7 persons killed) |
| 24 Mar 2011 | Tarlay | Mw 6.8, Myanmar, Thailand, Laos, China and Vietnam border areas were affected and about 150 person were killed when 130 houses collapsed. |
| 24 Aug 2016 | Chauk | Mw 6.8, several temples in the nearby ancient city of Bagan were damaged and four people were reported dead |

Source: Myanmar Geosciences Society

4.8 Topography

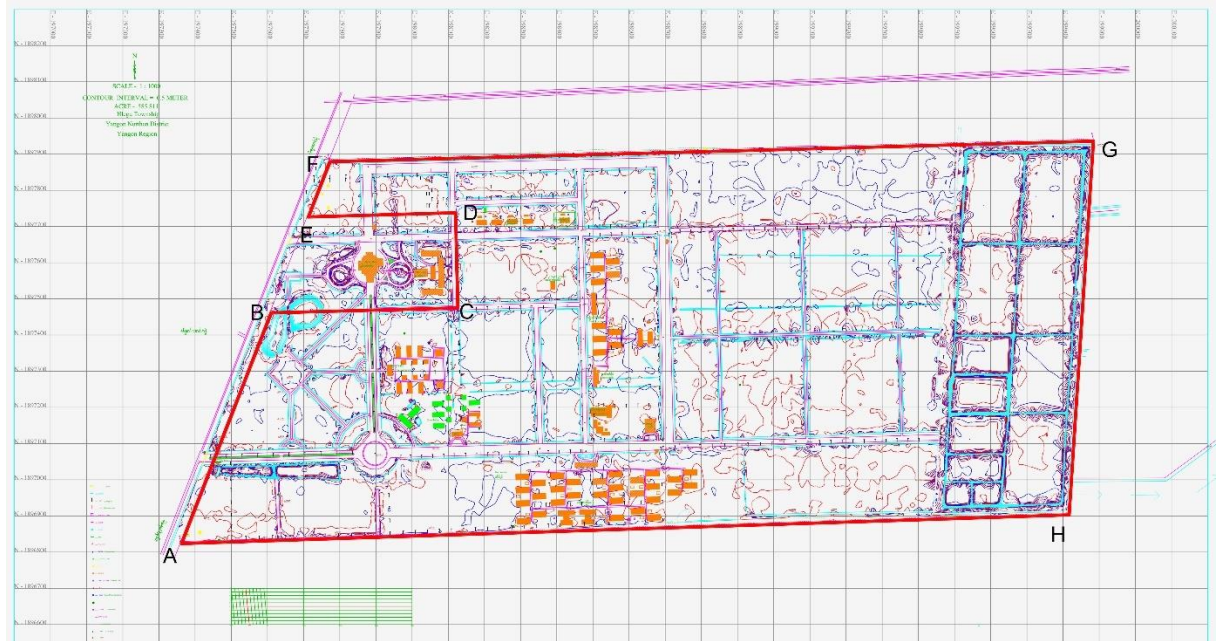


Figure 4. 24: Topography Map of Project Site

The proposed project land is situated between latitude N-1896800 and N-1898000 and between longitude E-197300 and E-199900. Approach road way to project site is 9.14 km length from junction of Yangon - Mandalay Highway No.3.

The project location is between:

| | Latitude | Longitude |
|---------|------------|------------|
| Point A | 17.136131° | 96.155709° |
| Point B | 17.141934° | 96.157951° |
| Point C | 17.142103° | 96.162789° |
| Point D | 17.144476° | 96.162692° |
| Point E | 17.144329° | 96.158867° |
| Point F | 17.145730° | 96.159415° |
| Point G | 17.146511° | 96.179249° |
| Point H | 17.137174° | 96.178757° |

The highest point is 15.5 meters above sea level (ASL) in the north east and the lowest point is 11.5 meters above sea level (ASL) in the south-west of the project site. The land was previously used as research and training institute by Union Solidarity and Development Party (USDP). Currently, it remains as an unused land where the buildings (Hall, Hostel, Theatre, Hospital, etc.) have been ruined.

4.9 Study Limit

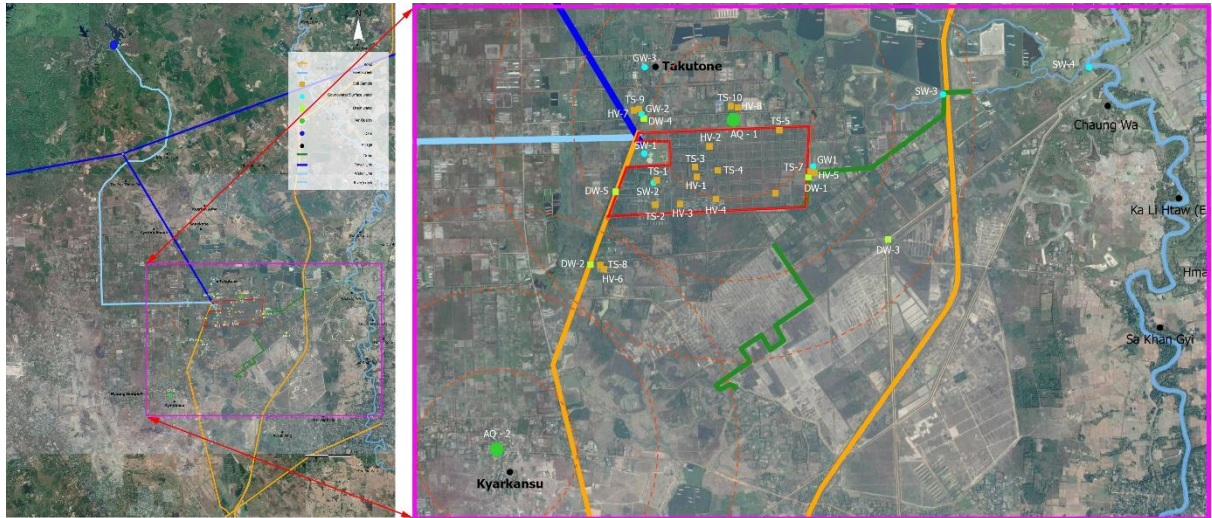


Figure 4. 25: Map of setting the study limit

MSR study team set the study limit within the proposed premises such as 2,249,288 square meter (555.81 acres) wide land and the study area is 3 to 5 kilometers radius of the project area (surrounding environment) for physical data collection and impact assessment. The study area would cover not only the project site but also included the spatial and temporal limits of individual environmental components outside the Project Area boundaries where an effect can be reasonably expected. The geographic boundaries for the assessment included the area that will be directly affected by the project operations.

For the social environment, the study covers 6 villages, namely, Kyarkansu, Nyaung Hnitpin, Takutone, Sonekone, Kyarinn (Ashe) and Kyarinn (Anauk) villages which are located within 5 km from the project site or more. These 6 villages are the areas which will likely be directly affected by the project. According to the experts' observation, the impact of the project and its influence area are expected within 3 – kilometer radius of the project. The detailed information of socioeconomic conditions of households in these villages is described in 4.11.3.5 Village Profile Overview.

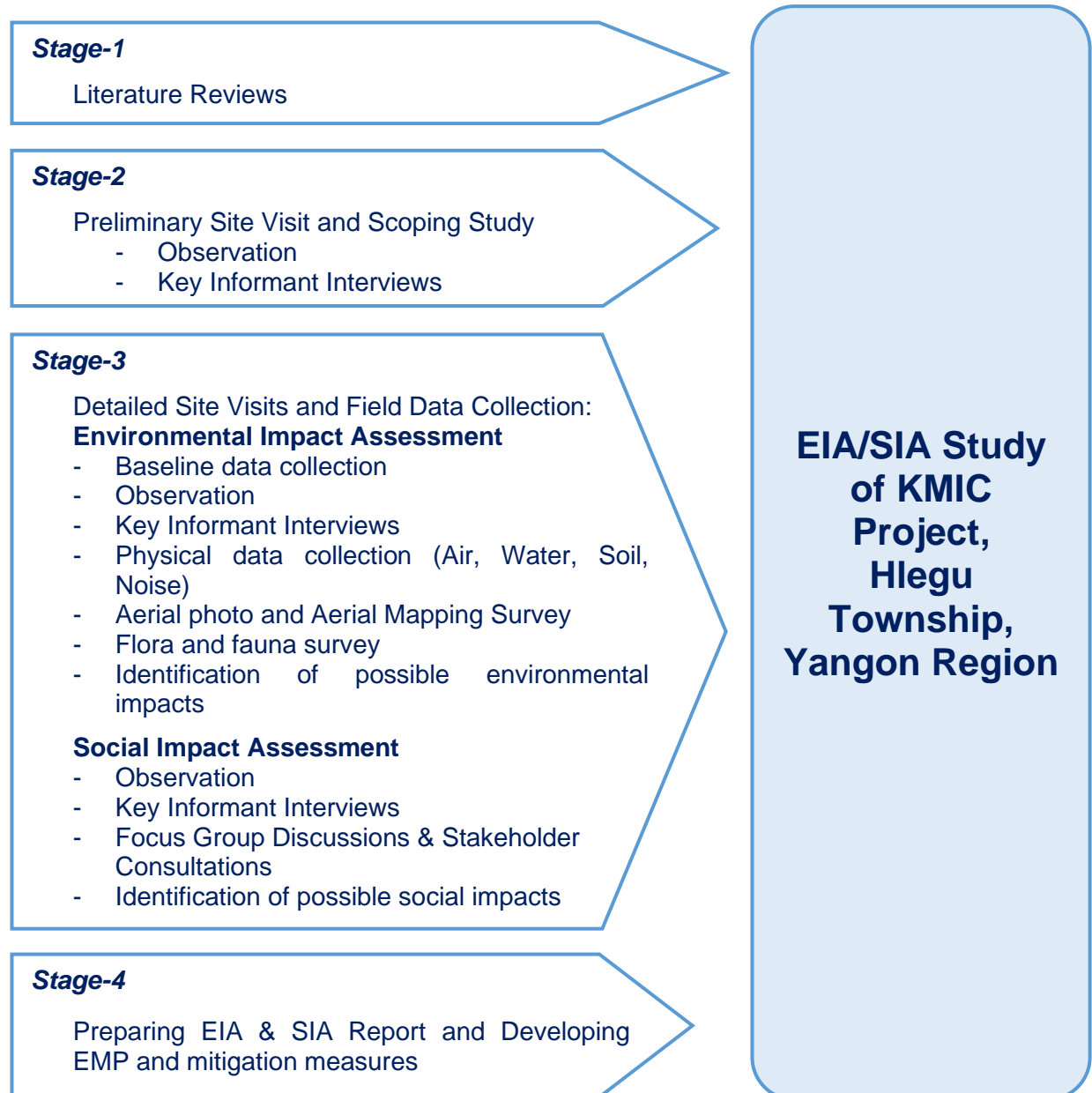
The main focus area for the biological impact assessment is the project site and ecological aspect is observed inside and outside of range and is within 3 km from the project site.

However, the overall social and biological impacts are not limited to the surrounding areas of the project site. Therefore, the study looked at wider scope and contribution to regional level.

In addition, the study would cover topography of landscape and presence of large natural lakes and fish-farming ponds surrounding the project site in such distance. Thus, drainage system of the areas (freshwater aquatic environment) especially in rainy season expands within the area of 3 km radius from the center of the project site where aquatic organisms will have the effect of the industrial zone development.

4.10 Research Methodology

Research methodology involved literature reviews, preliminary site visits for scoping study, and detailed field data collection at sites. By reviewing and analyzing the data collected, EIA and SIA reports were prepared, and Environmental Management Plan and mitigation measures were developed.



4.11 Baseline Data Collection

4.11.1 Physical Environmental Baseline Data Collection

Physical environmental study team of MSR studied topographic map, site layout plan, water drains and associated structures. The team visited the site and observable locations of the proposed project and decided to collect samples as baseline data for this environmental impact assessment report.

1. Air may be polluted by dust emission, operating of machineries which use diesel fuel at construction, operation and decommission phases and 24 hour - ambient air quality test was done near the proposed project area. 2 locations were selected to measure the air quality and sound level. The analytical reports are baseline data of air.
2. Wastewater and groundwater may be impacted by oil spills, dumping of materials, dumping of solid waste, factory waste and sewage. Total 12 water samples were collected to test water quality. 5 water samples for surface water/drinking water (pond, Kyarinn Creek (6.2 miles) near Yangon-Mandalay Expressway and

Pazundaung Creek near Let Pyan Wae village, Kalihtaw Dam), 5 water samples for drain water (wastewater), and 2 samples for ground water (tube well water). The analytical reports are baseline data of wastewater and ground water.

3. Soil may be impacted negatively at site by preparation, construction, operation and decommissioning phases. MSR study team collected total 10 samples of soil in which 6 samples of soil to analyze soil nutrients and 4 samples of soil to analyze heavy metal contents. The analytical reports are baseline data of soil.

The following map shows the locations of soil and water sample collection and air quality measurement.

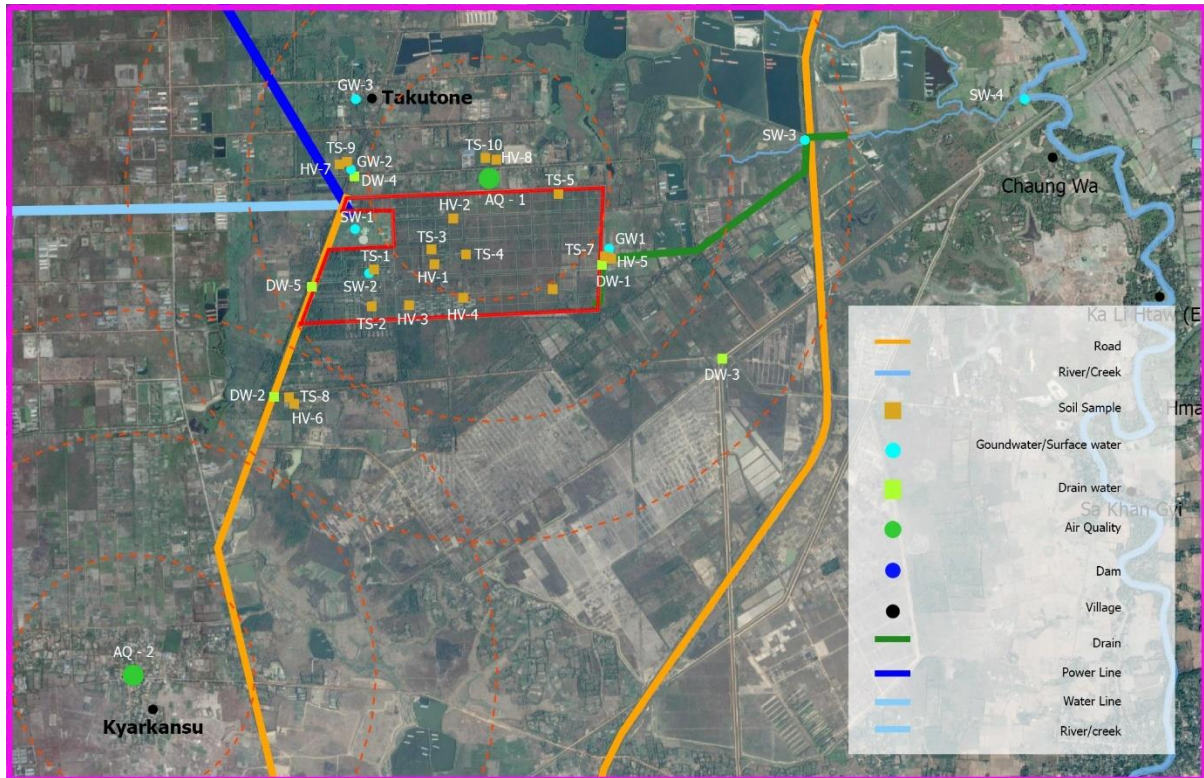


Figure 4. 26: Locations of Soil, Water Sample Collection and Air Quality Measurement

- TS - Top soil sample collection point (nutrients test)
- HV - Sub soil/Deep soil sample collection point (Heavy metal contents test)
- AQ - Air Quality Measurement point
- GW - Ground Water sample collection point
- DW (WW) – Drain Water sample collection point (Wastewater)
- SW - Surface Water sample collection point (Pond, Creek, Dam water)

4.11.1.1 Air Quality and Sound Level

4.11.1.1.1 Air Quality and Sound Level Measuring Location

Ambient air quality and sound level were measured at two locations mentioned in the following table. This measurement was done by Occupational and Environmental Health Laboratory, Ministry of Health and Sports in two different seasons. AQ 1 was located at fram land (downwind direction of project site) near the project area and the measurement was made on 25 April 2017. AQ 2 was located in the monastery compound of Kyarkansu village (upwind direction of project site) and the measurement was conducted on 17 July 2019.

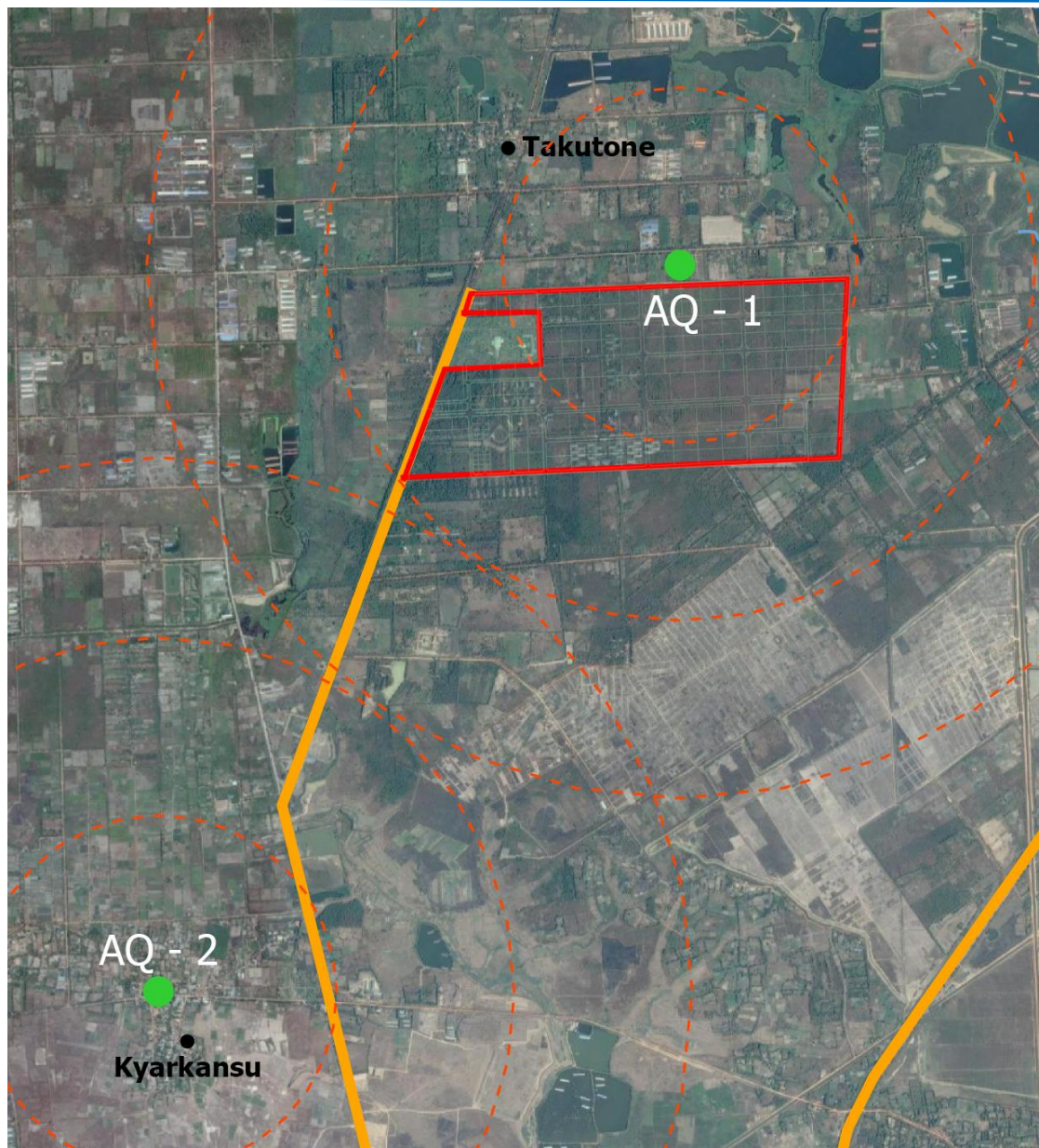


Figure 4. 27: Locations of Air Quality Measurement

AQ - Air Quality Measurement point

Table 4. 17: Air Quality Measuring Locations

| Sample point | Latitude | Longitude |
|--------------|-----------------|------------------|
| AQ -1 | N 17° 8' 48.93" | E 96° 10' 12.93" |
| AQ-2 | N 17° 6' 37" | E 96° 8' 34" |

4.11.1.1.2 Air quality survey method

Measuring period was based on 24-hour measurement level of PM_{2.5} and PM₁₀ using EPAS air sampler and other gases were also measured by auto sensors of the EPAS haze-scanner. Particulate Matter (PM₁₀), Particulate Matter (PM_{2.5}), Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), Carbon monoxide (CO), Total Volatile Organic Compound (TVOCs), Hydrocarbon (HC), and Methane (CH₄) are measured 1-hour average and Ozone (O₃) is measured 8 hours average. The report covered the observations for the baseline data obtained in one cross-sectional survey.



Figure 4. 28: Air Quality Measurement Device



Figure 4. 29: Air Quality Measurement in Monastery Compound, Kyarkansu Village

4.11.1.1.3 Sound level survey method

Maximum Sound Pressure Level (L_{max}) and the Equivalent Continuous Sound Level (L_{eq}) were measured. Acoustic environment monitoring was performed in accordance with standard procedures adopted by American Conference of Governmental Industrial Hygienist (ACGIH) which is authoritatively and currently used in Myanmar.



Figure 4. 30: Sound Level Measuring Device

4.11.1.1.4 Ambient Air Standards and Noise Levels

The maximum concentrations of air pollutants considered to be protective of the environment and sound levels are defined in the *National Environmental Quality (Emission) Guidelines, 2015* (See tables below).

Table 4. 18: NEQ Guidelines for ambient air standards

| Parameter | Averaging Period | Guideline Value $\mu\text{g}/\text{m}^3$ |
|---|----------------------|--|
| 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

Table 4. 19: NEQ Guidelines for noise levels

| Receptor | One Hour LAeq (dBA) ^a | |
|---|---|---|
| | Day Time 07:00 - 22:00 (10:00 - 22:00 for Public holidays) | Night Time 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

4.11.1.1.5 Air Quality Results

The air quality test results are presented below.

Table 4. 20: Air quality results at AQ1 (Measured date 25 – 26 April 2017)

| Name | AQ-1 | Reference Unit | Unit |
|---------------------------|-------|----------------|--------------------------|
| PM ₁₀ (24 hr) | 70.6 | 50 | $\mu\text{g}/\text{m}^3$ |
| PM _{2.5} (24 hr) | 32.1 | 25 | $\mu\text{g}/\text{m}^3$ |
| SO ₂ (24 hr) | 50.7 | 20 | $\mu\text{g}/\text{m}^3$ |
| NO ₂ (1 hr) | 78.3 | 200 | $\mu\text{g}/\text{m}^3$ |
| CO (1 hr) | 301 | 30000 | $\mu\text{g}/\text{m}^3$ |
| O ₃ (8 hr) | 17.8 | 100 | $\mu\text{g}/\text{m}^3$ |
| VOCs (1 hr) | 17.9 | 400 | $\mu\text{g}/\text{m}^3$ |
| HC | 401.1 | - | ppm |
| CH ₄ | 6362 | - | ppm |

The content of Hydrocarbon (HC) is (401.1) ppm and that of Methane (CH₄) is (6362) ppm respectively.

NO₂ (1 hr) is (78.3) micro gram per cubic meter, CO (1 hr) is (301) micro gram per cubic meter, O₃ (8 hr) is (17.8) micro gram per cubic meter, VOCs (1 hr) is (17.9) micro gram per cubic meter. The emissions of these parameters are lower than reference value.

PM₁₀ (24 hr) is (70.6) micro grams per cubic meter, PM_{2.5} (24 hr) is (32.1) micro grams per cubic meter and SO₂ (24 hr) is (50.7) micro grams per cubic meter. The emissions of these parameters are higher than reference value.

Particulate matter (PM₁₀), Particulate matter (PM_{2.5}) and Sulphur dioxide (SO₂)

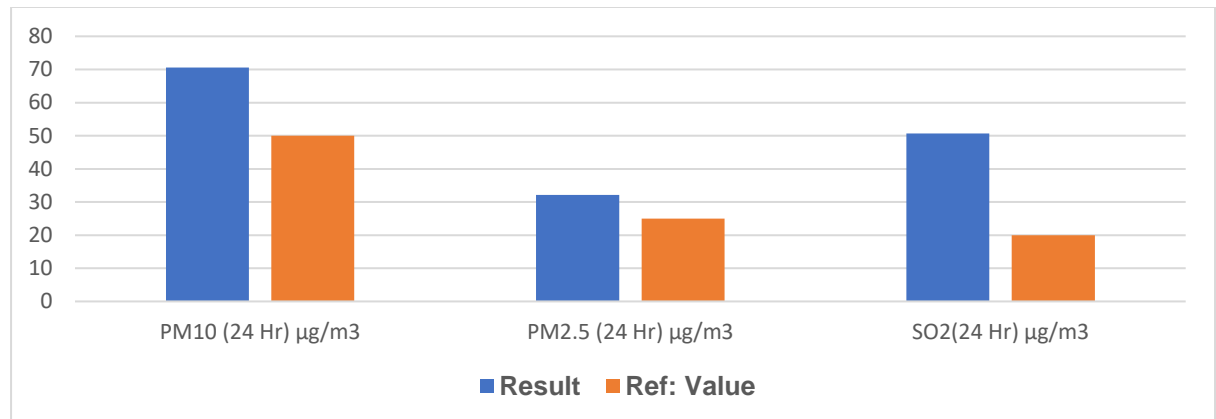


Figure 4. 31: Comparison between Reference and Result Values of PM and Sulphur Dioxide

Nitrogen dioxide (NO₂) and Volatile Organic Compounds (VOCs)

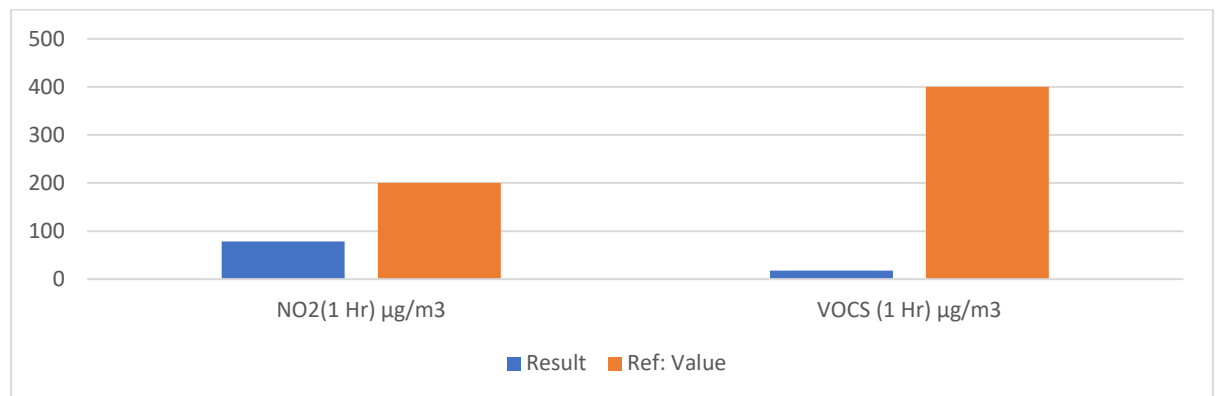


Figure 4. 32: Comparison between Reference and Result Values of Nitrogen dioxide and Volatile Organic Compounds

Carbon Monoxide (CO)

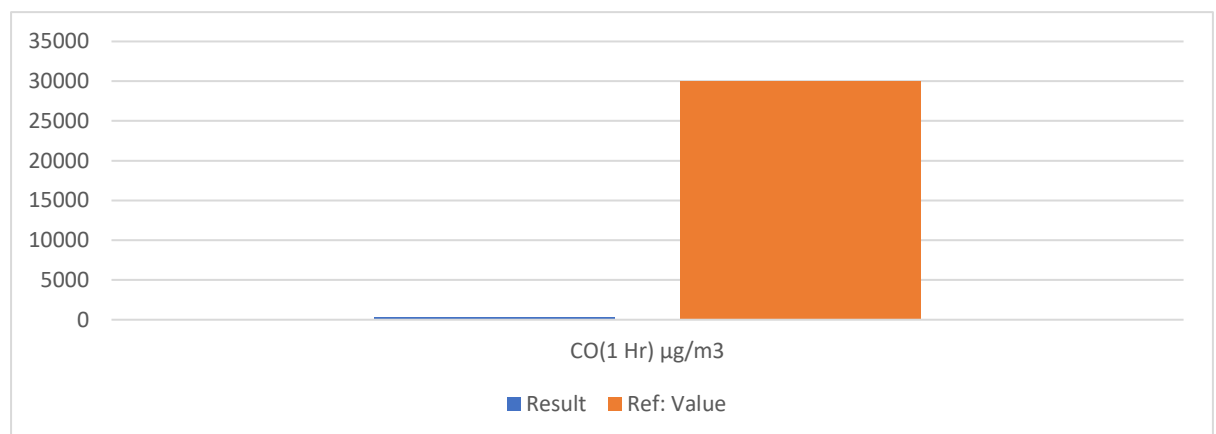


Figure 4. 33: Comparison between Reference and Result Values of Carbon monoxide

Ozone (O₃)

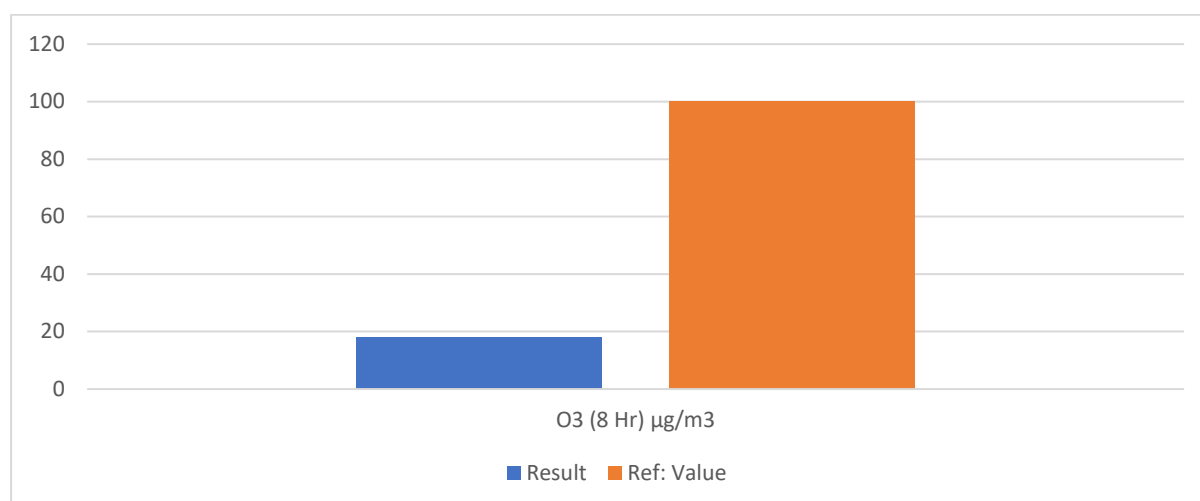


Figure 4. 34: Comparison between Reference and Result Values of Ozone

Hydro carbon (HC) and Methane (CH₄)

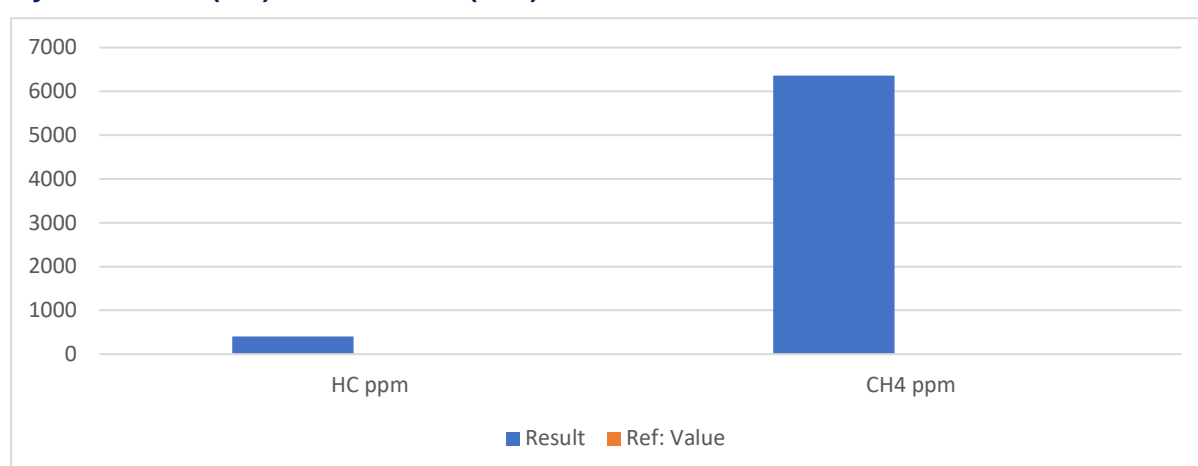


Figure 4. 35: Comparison between Reference and Result Values of Hydro Carbon and Methane

Table 4. 21: Air quality results at AQ2 (Measured date 17 July 2019)

| Parameter | Result | Reference Unit | Unit |
|---------------------------|--------|----------------|-------------------|
| PM ₁₀ (24 hr) | 41.7 | 50 | µg/m ³ |
| PM _{2.5} (24 hr) | 20.4 | 25 | µg/m ³ |
| SO ₂ (24 hr) | 26.6 | 20 | µg/m ³ |
| NO ₂ (1 hr) | 66.5 | 200 | µg/m ³ |
| CO (1 hr) | 196.3 | 30000 | µg/m ³ |
| O ₃ (8 hr) | 10.9 | 100 | µg/m ³ |
| VOCs (1 hr) | 41 | 400 | µg/m ³ |
| HC | 504 | - | |
| CH ₄ ppm | 4569 | - | |

The content of Hydrocarbon (HC) is (504) ppm and that of Methane (CH₄) is (4569) ppm respectively.

NO₂ (1 hr) is (66.5) micro gram per cubic meter, CO (1 hr) is (196.3) micro gram per cubic meter, O₃ (8 hr) is (10.9) micro gram per cubic meter, VOCs (1 hr) is (41) micro gram per cubic meter. PM₁₀ (24 hr) is (41.7) micro grams per cubic meter and PM_{2.5} (24 hr) is (20.4) micro grams per cubic meter. The emissions of these parameters are lower than reference value.

SO₂ is (26.6) micro grams per cubic meter is higher than reference value.

Particulate matter (PM₁₀), Particulate matter (PM_{2.5}) and Sulphur dioxide (SO₂)

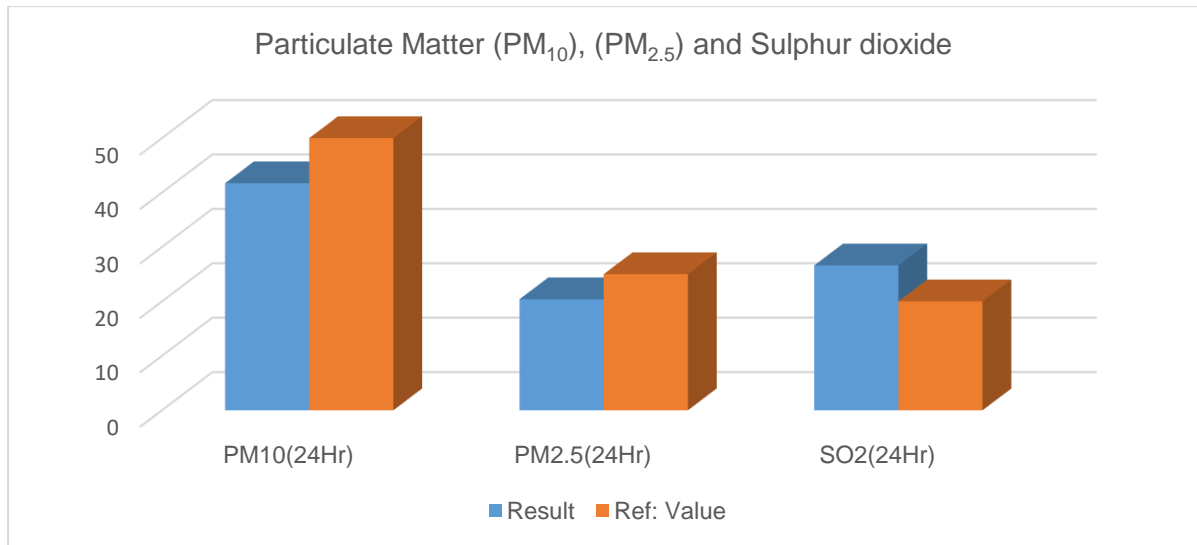


Figure 4. 36: Comparison between Reference and Result Values of PM and Sulphur Dioxide

Nitrogen Dioxide (NO₂), Carbon Monoxide and Volatile Organic Compounds (VOCs)

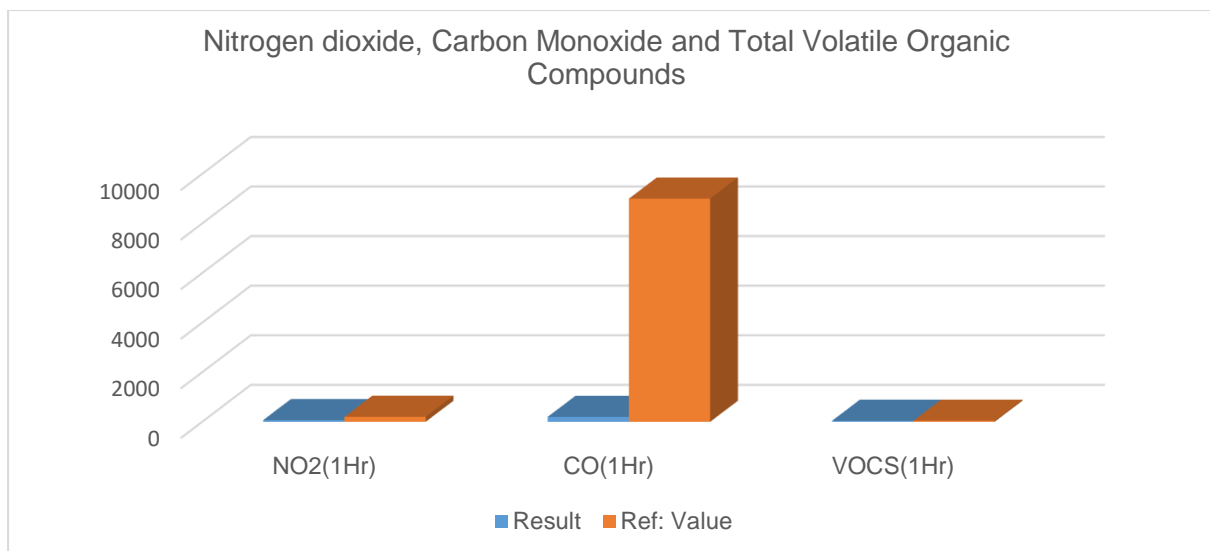


Figure 4. 37: Comparison between Reference and Result Values of Nitrogen dioxide, Carbon Monoxide and Volatile Organic Compounds

Ozone (O₃)

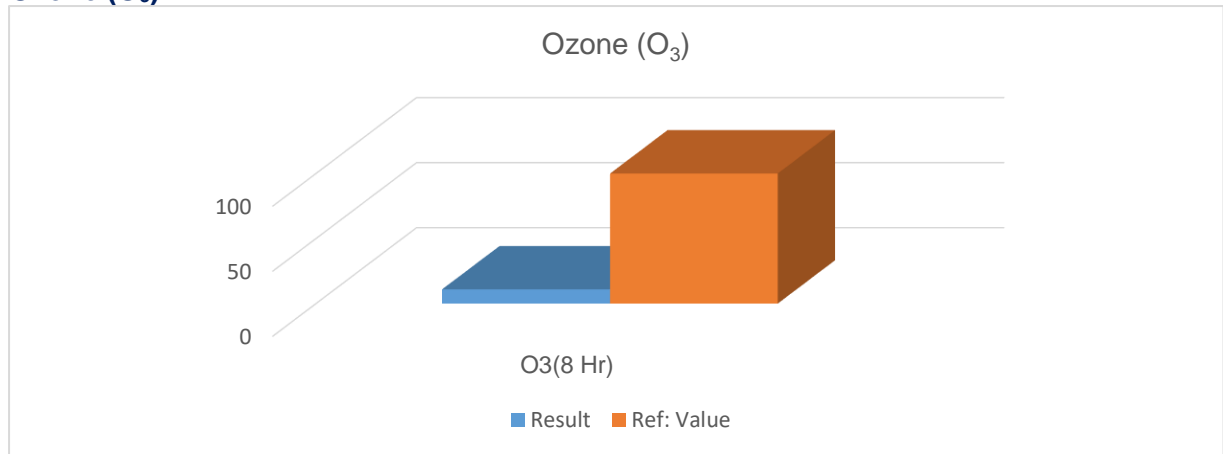


Figure 4. 38: Comparison between Reference and Result Values of Ozone

Hydro carbon (HC) and Methane (CH₄)

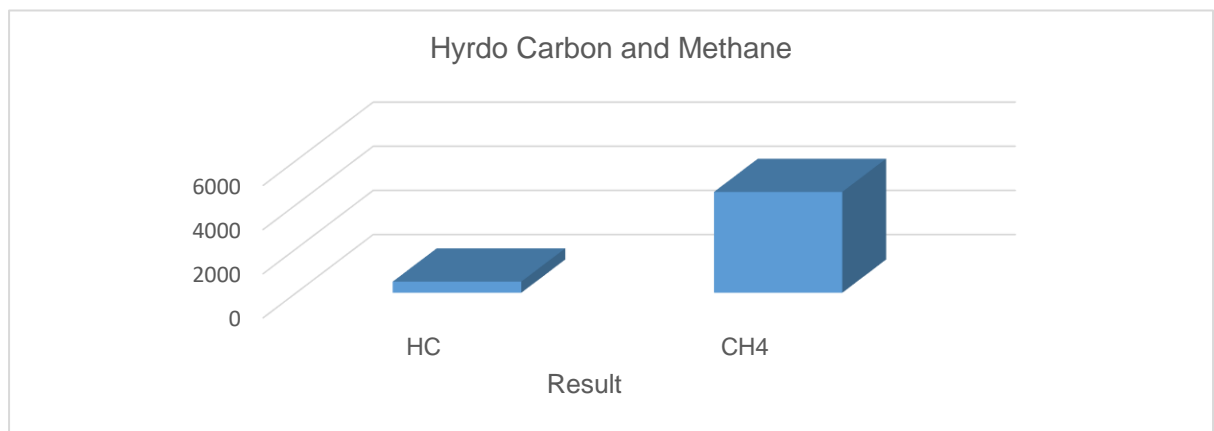


Figure 4. 39: Comparison between Reference and Result Values of Hydro Carbon and Methane

4.11.1.1.6 Sound level Results

The sound level test results are presented below.

Table 4. 22: Sound level results at AQ 1 (Measured date 25-26 April 2017)

| Sample Site | L _{eq} in dBA | | | L _{max} in dBA | | |
|-----------------------------|------------------------|-------|-------|-------------------------|-------|-------|
| | Day | Night | Total | Day | Night | Total |
| Farm land near Project site | 38 | 45 | 42 | 25 | 30 | 27 |

Equivalent continuous sound level (L_{eq}) in sample site

Equivalent continuous sound level (L_{eq}), the constant noise level that would result in the same total sound intensity being produced over a given period, in day is 38 dBA and that in night is 45 dBA. All values are not increased that the position of observation should be taken into account.

Maximum sound pressure level (L_{max}) in sample site

Maximum sound pressure level (L_{max}), square root of mean of the square of the measurement values (RMS) in day is 25 dBA and at night is 30 dBA. All values are not increased at the position of observation should be taken into account.

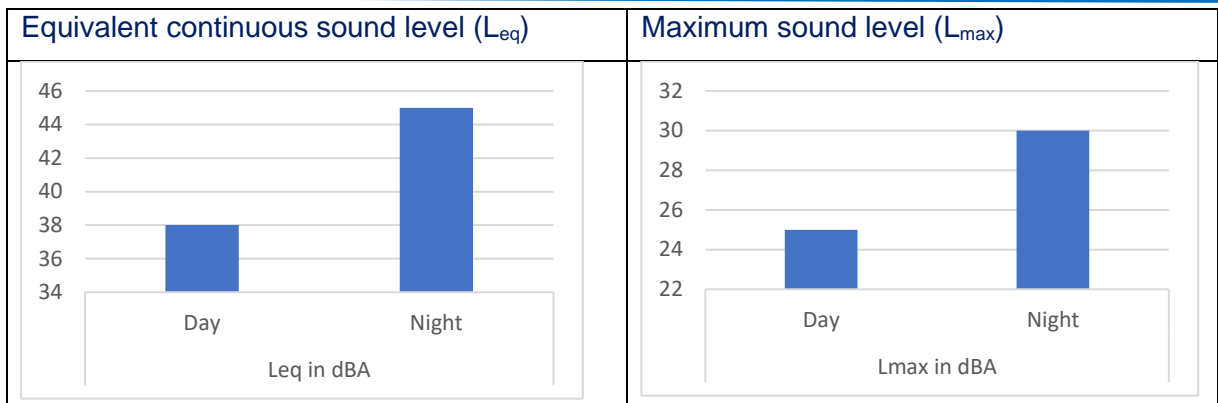


Figure 4. 40: 24 hours (1 hour average noise L_{eq} in dBA and L_{max} in dBA) AQ 1

Table 4. 23: Sound level results at AQ 2 (Measured date 17 July 2019)

| Sample Site | L_{eq} in dBA | | | L_{max} in dBA | | |
|---------------------------------------|-----------------|-------|-------|------------------|-------|-------|
| | Day | Night | Total | Day | Night | Total |
| Monastery Compound, Kyarkansu village | 42 | 33 | 40.8 | 27 | 22.6 | 26 |

Equivalent continuous sound level (L_{eq}) in sample site

Equivalent continuous sound level (L_{eq}), the constant noise level that would result in the same total sound intensity being produced over a given period, in day is 42 dBA and that in night is 33 dBA. All values are not increased that the position of observation should be taken into account.

Maximum sound pressure level (L_{max}) in sample site

Maximum sound pressure level (L_{max}), square root of mean of the square of the measurement values (RMS) in day is 27 dBA and at night is 22.6 dBA. All values are not increased at the position of observation should be taken into account.

The sound level at receptor (monastery – like residential area) is lower than the reference level.

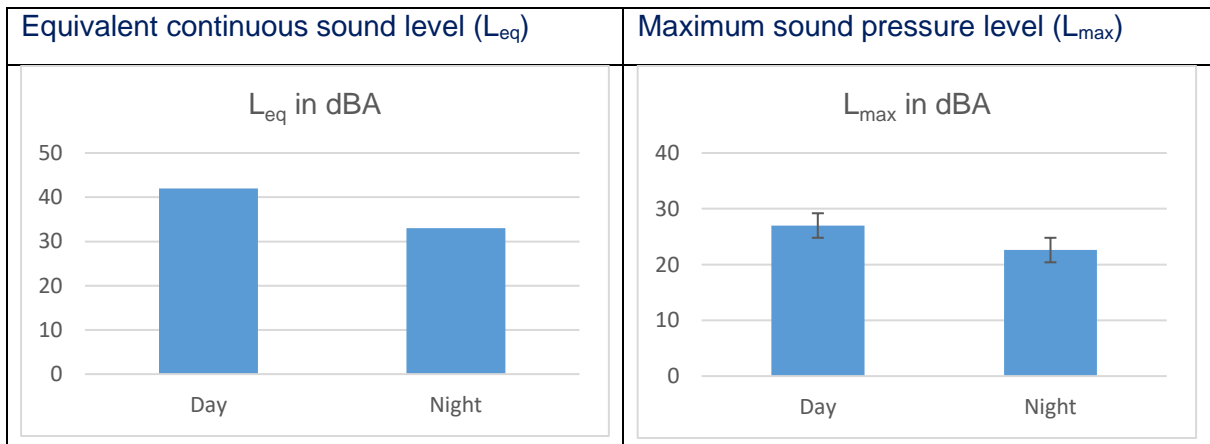


Figure 4. 41: 24 hours (1 hour average noise L_{eq} in dBA and L_{max} in dBA) AQ 2

4.11.1.2 Wind direction and wind speed

The wind direction and speed were measured with the instrument mentioned in the figure below. It was also done at the same two locations for air quality measurement on the same dates.



Figure 4.42: Wind Direction and Speed Measurement Device

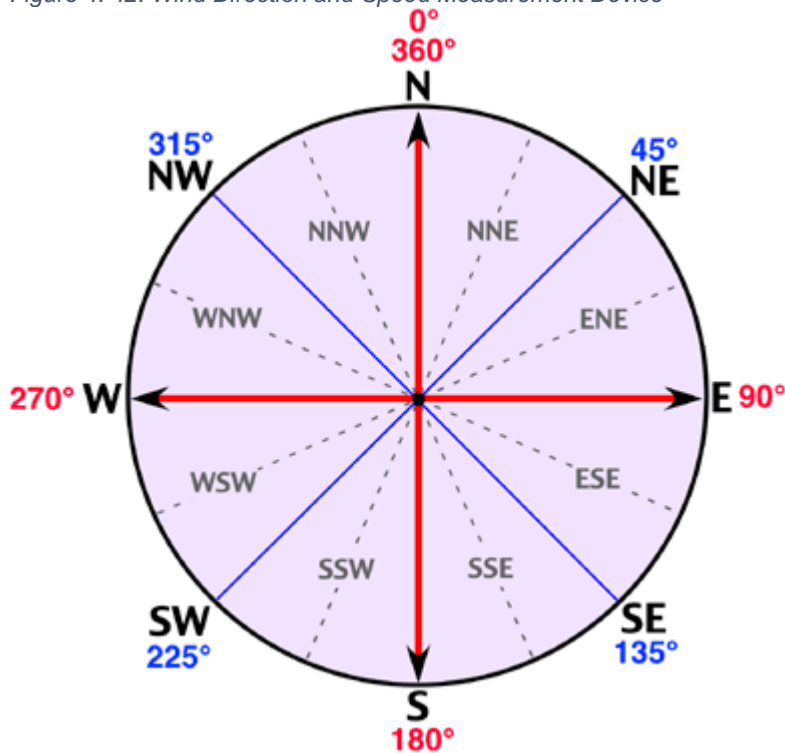


Figure 4.43: Wind Direction Chart

Table 4.24: Wind direction and wind speed Results at AQ1 (Measured date 25-26 April 2017)

| Starting Date and Time | WDir Deg. | WSpM kph |
|---|-----------|----------|
| 25.4.2017 (9:00 am) to 26.4.2017 (8:00am) | 288 | 0.3 |

The wind speed is 0.3 km per hour and wind is blowing from north west (approximately) direction.

Table 4.25: Wind direction and wind speed Results at AQ 2 (Measured date 17 July 2019)

| Starting Date and Time | WDir Deg. | WSpM kph |
|--|-----------|----------|
| 17.7.2019 (8:55 am) to 18.7.2019 (8:55 am) | 166 | 0.33 |

The wind speed is 0.33 km per hour and wind is blowing from south east (approximately) direction.

Table 4. 26: Comparison between Air Quality measured in two seasons and sources of air emissions surrounding the site

| Name | AQ-1 | AQ-2 | Reference Unit | Unit |
|---------------------------|-------|-------|----------------|-------------------|
| PM ₁₀ (24 hr) | 70.6 | 41.7 | 50 | µg/m ³ |
| PM _{2.5} (24 hr) | 32.1 | 20.4 | 25 | µg/m ³ |
| SO ₂ (24 hr) | 50.7 | 26.6 | 20 | µg/m ³ |
| NO ₂ (1 hr) | 78.3 | 66.5 | 200 | µg/m ³ |
| CO (1 hr) | 301 | 196.3 | 30000 | µg/m ³ |
| O ₃ (8 hr) | 17.8 | 10.9 | 100 | µg/m ³ |
| VOCs (1 hr) | 17.9 | 41 | 400 | µg/m ³ |
| HC | 401.1 | 504 | - | ppm |
| CH ₄ | 6362 | 4569 | - | ppm |

Measurement at AQ 1 was done in dry season and at AQ 2 was done in rainy season. As shown in the above table, the emissions of parameters PM₁₀ and PM_{2.5} measured in the dry season was higher than the reference value while that of the same parameters measured in rainy season was lower than the reference value. This is mainly because of the unpaved access road (Nyaung Hnitpin - Ngarsuutaung main road) next to the project site. Earthmoving vehicles from other project and other heavy duty vehicles are heavily using the road for different purposes. Dust plumes behind vehicles moving along unpaved roads represent a typical occurrence and fugitive dust from unpaved roads can be considered for air pollution. The humidity, temperature, wind speed and direction of the season/month and man-made fires in the surrounding area are also factors for the higher emission values of parameters.

For SO₂, the major source of emission is expected from the combustion of diesel generators used by industries and local residents. Mainly from the exhaust emissions of vehicles and also from incomplete combustion of various other fuels (including wood, charcoal, and trash).

The dusty road in summer can be seen in the figures below.





Figure 4. 44: Road situation in summer at Nyaung Hnitpin Agricultural and Livestock Zone and windblown dust on the leaves which grown beside Ngar Suu Taung Road

4.11.1.3 Water Quality

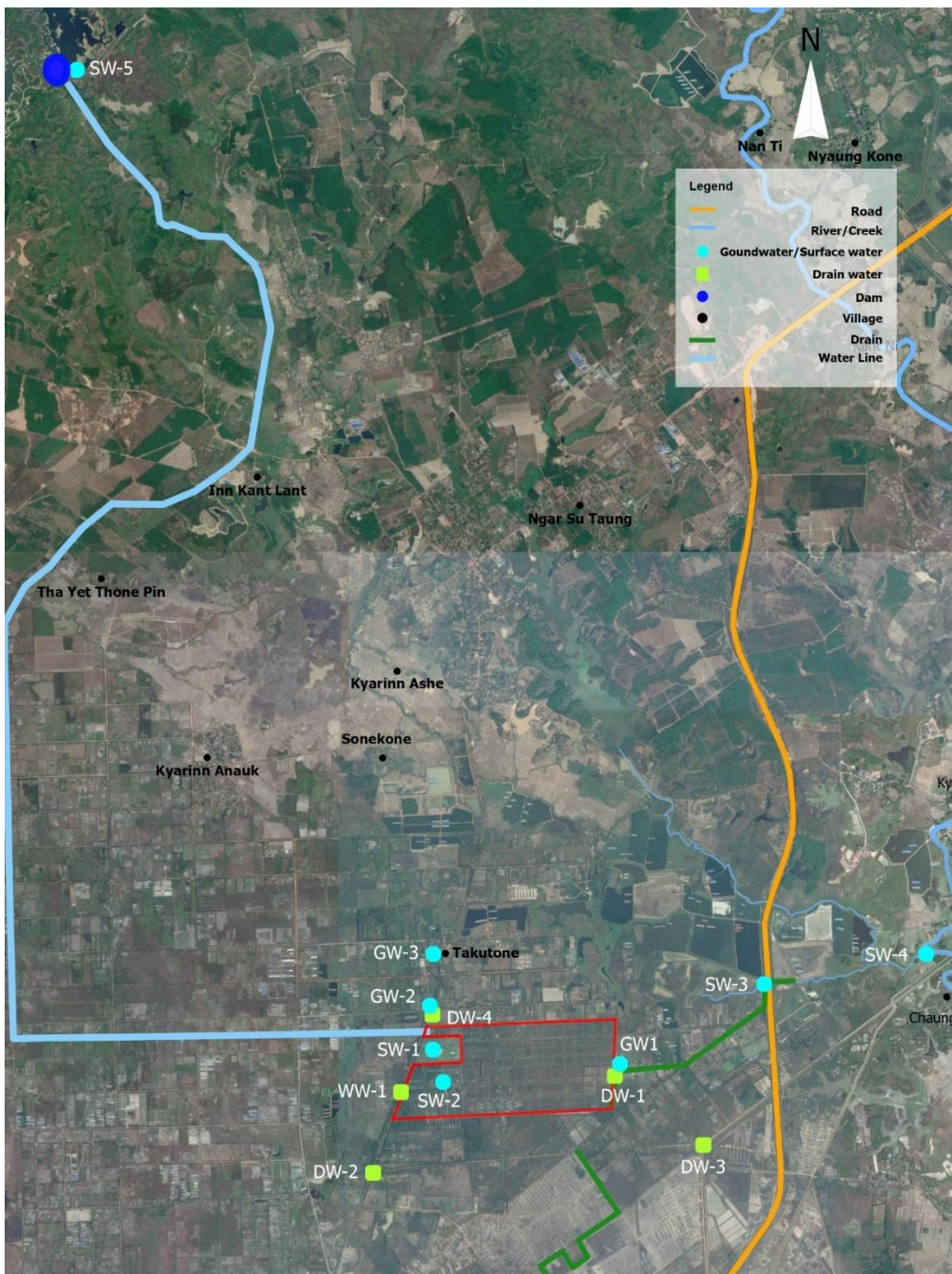


Figure 4. 45: Water Samples Collection Location

4.11.1.3.1 Water Samples Collection Locations

Total 12 water samples were collected to test water quality. 5 water samples for surface water/drinking water (pond, Kyarinn Creek (6.2 miles) near Yangon-Mandalay Expressway and Pazundaung Creek near Let Pyan Wae village, Kalihtaw Dam), 5 water samples for drain water (wastewater), and 2 samples for ground water (tube well water). The analytical reports are baseline data of wastewater and ground water.

Table 4. 27: Water Sample Collection Locations (26 April 2017)

| Sample point (ID) | Location | | Remark |
|-------------------|-----------------|-----------------|--------------------------------------|
| SW 1 | N 17° 8' 36.27" | E 96° 9' 36.46" | Pond inside Nyaung Hnitpin Compound |
| SW 2 | N 17° 8'22.00" | E 96° 9'39.28" | Pond inside Nyaung Hnitpin Compound |
| WW 1 | N 17° 8'19.28" | E 96° 9'23.36" | Front drain of proposed project site |

Table 4. 28: Water Sample Collection Locations (20 July 2019)

| Sample point (ID) | Location | | Remark |
|---------------------------------------|---------------|---------------|--|
| Ground water (Tube Well) | | | |
| GW-1 | 17° 8'29.45"N | 96°10'45.81"E | From agriculture land, near the proposed Wastewater Treatment Plant area (downstream area) |
| GW-2 | 17° 8'51.67"N | 96° 9'34.26"E | State Middle School, Takutone village |
| Surface water (Drinking water) | | | |
| SW-3 | 17° 9'0.07"N | 96°11'41.49"E | Drinking water (Kyarinn Creek) |
| SW-4 | 17° 9'10.77"N | 96°12'41.92"E | Drinking water (Pazung Taung Creek) |
| SW-5 | 17°14'28.60"N | 96° 7'15.46"E | Kalihtaw Dam |
| Drain water (Wastewater) | | | |
| DW-1 | 17° 8'27.61"N | 96°10'44.31"E | Existing drain, near proposed Wastewater Treatment Plant area |
| DW-2 | 17° 7'51.29"N | 96° 9'12.92"E | Drain water at the corner of Zone 3 street and Ngar Suu Taung – Nyaung Hnitpin Road |
| DW-3 | 17° 8'1.29"N | 96°11'17.83"E | Drain water near project area (road side of Ngarsuutaung – Nyaung Hnitpin Road) |
| DW-4 | 17° 8'49.91"N | 96° 9'35.22"E | Drain water, outlet of drainage to Ngamoeyeik Dam canal |

SW – Surface Water

GW – Ground Water (Water from Tube Well)

DW (WW) – Drain water (Wastewater)

Water samples collecting

| | |
|---|--|
|  |  |
| <p>Water sample collected from drain at the front of Nyaung Hnitpin Compound.</p> | <p>Water sample collected from drain at the front of Nyaung Hnitpin Compound.</p> |
|  |  |
| <p>Water sample collected from pond at project site</p> | <p>Water sample collected from pond at project site</p> |
|  |  |
| <p>Water sample collected from pond at project site</p> | <p>Water sample collected from pond at project site</p> |

Figure 4. 46: Water Samples Collection Location (April 2017)



Ground water sampling at farmhouse which lies near proposed wastewater treatment plant



Ground water sampling at State Middle School Takutone village

Figure 4. 47: Ground water sample collection points (July 2019)



Figure 4. 48: Surface water sampling at Kalihtaw Dam (July 2019)





Figure 4. 49: Drain Water/Wastewater sample collection points (July 2019)

4.11.1.3.2 Water Quality Survey Method

The water samples were collected with specially treated bottles by sampling officer of Occupational and Environmental Health Department. Water samples were analyzed at the Occupational and Environment Health Department Laboratory and by using spectrophotometer, atomic absorption spectrophotometer (Graphite furnace method), pH meter with wastewater analysis standard method and POTATEST incubation method.

Ground water samples were collected from tube wells within (2) km of the proposed project site. In each location, two (2) replicates sampling were done at approximately the same time to identify the variability in all sampling and analysis system.

4.11.1.3.3 Water Quality Results

The water quality results are shown in the following tables.

Table 4. 29: Summary of Drain Water (Wastewater) & Surface Water/drinking water Laboratory Results (April 2017)

| Parameter | Ref: Value | Unit | Results | | |
|-----------------------|------------|--------------------------|-----------------|--------------------|--------------------|
| | | | WW-1 Wastewater | SW-1 Surface Water | SW-2 Surface Water |
| Turbidity | 5-15 | NTU | 1 | 1 | 0.1 |
| Nitrate | 10 | ppm | 0 | 0 | 0 |
| Chloride | 1000 | ppm | 1.5 | 1.6 | 1.1 |
| pH | 5.5 – 9 | | 7.1 | 7.3 | 6.5 |
| Sulphate | 1000 | ppm | 12 | 12 | 7 |
| Total Dissolved Solid | 2000 | ppm | 20 | 10 | 20 |
| Chlorine | 1.5 | ppm | 0.08 | 0.12 | 0.05 |
| Electro conductivity | 1500 | µmhos/cm | 70 | 10 | 10 |
| Fluoride | 1.5 | ppm | 0 | 0 | 0 |
| Hardness | 500 | ppm as CaCO ₃ | 20 | 25 | 22 |

| | | | | | |
|----------------|----------------|----------------------|-------|-------|-------|
| Color | 15 | TCU | 10 | 10 | 5 |
| COD | 200 | ppm | 30 | 42 | 18.0 |
| BOD | 20 – 60 | mg O ₂ /L | 40.5 | 40.0 | 22.4 |
| Oil and Grease | 10 | ppm | 13.20 | 3.20 | 5.2 |
| Arsenic | 50 | ppb | 0.000 | 0.000 | 0.000 |
| Beryllium | 0.012 | ppm | 0.018 | 0.088 | 0.018 |
| Calcium | 200 | ppm | 3.406 | 2.003 | 2.901 |
| Cadmium | 0.003 | ppm | 0.003 | 0.005 | 0.008 |
| Cobalt | 0.001 – 0.002 | ppm | 0.000 | 0.000 | 0.000 |
| Chromium | 0.05 | ppm | 0.000 | 0.000 | 0.000 |
| Copper | 2 | ppm | 0.000 | 0.000 | 0.000 |
| Iron | 1 | ppm | 0.000 | 0.000 | 0.000 |
| Lithium | 0 | ppm | 0.005 | 0.005 | 0.004 |
| Magnesium | 150 | ppm | 1.840 | 1.857 | 2.436 |
| Manganese | 0.4 | ppm | 0.000 | 0.000 | 0.000 |
| Molybdenum | 0.07 | ppm | 0.000 | 0.000 | 0.000 |
| Nickel | 3 | ppm | 0.000 | 0.000 | 0.000 |
| Lead | 10 | ppb | 0.000 | 0.000 | 0.000 |
| Antimony | 0.02 | ppm | 0.000 | 0.014 | 0.022 |
| Selenium | 0.04 | ppm | 0.084 | 0.084 | 0.029 |
| Strontium | 0.5 – 1.5 | ppm | 1.640 | 1.453 | 0.55 |
| Titanium | 0 | ppm | 0.024 | 0.044 | 0.025 |
| Vanadium | 0.0012 – 0.001 | ppm | 0.000 | 0.000 | 0.000 |
| Thallium | 0.001 | ppm | 0.000 | 0.000 | 0.000 |
| Zinc | 3 | ppm | 0.000 | 0.000 | 0.000 |
| Mercury | 0.001 | ppm | 0.00 | 0.00 | 0.00 |

Findings: Oil and Grease content of wastewater sample 1 is higher than reference value. Heavy metal parameters of Beryllium, Lithium and Titanium for wastewater 1 and surface waters 1 and 2 are higher than reference value. Cadmium for surface waters 1 and 2 are higher than reference value. Antimony parameter of surface water 2 is higher than reference value. Selenium of wastewater 1 and surface water 1 is higher than reference value. Strontium of wastewater sample 1 is also higher than reference value.

Rationale for having higher concentrations of some parameters

Oil and Grease: It can be due to people intentionally drain oil products to the drainage system without considering their effects on the environment. This happens when mechanics spill oil after changing oil from vehicle or motorcycle engines of the villagers or people living nearby.

Natural occurrences such as hurricanes, earthquakes, sea storms, and other climatic disturbances cause natural oil spills.

Beryllium: The primary source of beryllium compounds in water appears to be release from coal burning and other industries using beryllium. Other sources of beryllium in surface water include deposition of atmospheric beryllium and weathering of rocks and soils containing beryllium.

Cadmium: It is widely distributed in the earth's crust at an average concentration of about 0.1 mg/kg. The highest level of cadmium compounds in the environment is accumulated in sedimentary rocks.

Lithium: Lithium is in the alkali-metal group that includes sodium and potassium. High concentration of Lithium in wastewater is expected due to the waste from batteries and grease. Lithium is a soft, silver-white alkali metal, found in some foods and, in some places, the drinking water. Lithium can be found throughout the world, but freshwater typically less than 0.001 to 0.003 ppm.

Antimony: Man-made releases of Antimony occur to water from waste incineration. Antimony is also released naturally from the earth's crust and so is found (usually at relatively low concentrations) in soils, natural water bodies and sediments.

Selenium: The most significant releases of Selenium are likely to occur from industry manufacturing or using it. Selenium may also be released when oil containing it is burned. Small amounts of Selenium compounds may also be released naturally from rocks, soils and water bodies containing them.

Strontium: Strontium is present in nearly all fresh water but generally only in trace amount. The concentration of strontium in wastewater is higher than reference value because this is probably due to localized geologic conditions that supply considerable amounts of strontium to ground and waters of the area.

Titanium: Titanium is a component of various types of rock, such as rutile, anatase, ilmenite, titanite and brookite, and is therefore abundant in soils. Titanium oxide and other titanium compounds are among the most stable soil components. Consequently, only small amounts of titanium end up in water from rock weathering.

Table 4. 30: Summary of Ground water quality measurement and water quality criteria (July 2019)

| Parameter | Ref: Value | Unit | Results | | Remarks |
|-----------------------------------|------------|---------------------------|---------|-------|-----------------------|
| | | | GW-1 | GW-2 | |
| Nutrient condition | | | | | |
| Nitrate | - | mg/L | 0 | 0 | Maintain the Standard |
| Salinity | | | | | |
| Chloride | 250 | mg/L | 1.4 | 2.2 | Maintain the Standard |
| Sulphate | 250 | mg/L | 0 | 0 | Maintain the Standard |
| Acidification status | | | | | |
| pH | 6.5-8.5 | | 6.4 | 6.6 | Normal Range |
| Trace Metals | | | | | |
| Arsenic | 0.05 | mg/L | 0.006 | 0.013 | Maintain the Standard |
| Lead | 0.01 | mg/L | 0.0012 | 0.002 | Maintain the Standard |
| Mercury | 0.001 | mg/L | 0.161 | 0.00 | GW-1, Out of Range |
| Copper | 2 | mg/L | 0.000 | 0.003 | Maintain the Standard |
| Zinc | 3 | mg/L | 0 | 0 | Maintain the Standard |
| Magnesium | 150 | mg/L | 9.674 | 31.48 | Maintain the Standard |
| Manganese | 0.4 | mg/L | 0.103 | 1.864 | GW-2, Out of Range |
| Iron | 1 | mg/L | 1.688 | 3.154 | Out of Range |
| Fluoride | 1.5 | mg/L | 0 | 0 | Maintain the Standard |
| Other parameters | | | | | |
| Turbidity | 5 | NTU | 0.1 | 0.1 | Maintain the Standard |
| Total Dissolved Solid | 1000 | mg/l | 126 | 175 | Maintain the Standard |
| Color | 15 | TCU | 1 | 1 | Maintain the Standard |
| Total Hardness | 500 | mg/L as CaCO ₃ | 228 | 241 | Maintain the Standard |
| Electro conductivity | - | µmhos/cm | 180 | 250 | Maintain the Standard |
| Phenols | - | mg/L | 0 | 0 | Normal |
| Chlorine (residual) | 4 | mg/L | 0 | 0 | Normal |
| Bacteriological parameters | | | | | |
| Total coliforms | 3 | CFU/100ml | 7 | 5 | Out of Range |
| Faecal coliforms | 0 | CFU/100ml | 2 | 1 | Out of Range |

Findings: The samples were analyzed for physicochemical parameters and results compared with National Drinking Water Quality Standard. After comparing with National Drinking Water Quality Standard both tube wells, it can be seen that most of the water

results of the tube well I, agriculture land, near project site and tube well II, residential area are within the standards. However, the results (mercury concentration, iron contents, total coliforms and faecal coliforms) of the tube well I, farmland area are out of standard's range and while others maintain the standards and also the results (manganese concentration, iron content, total coliforms and faecal coliforms) of the tube well II, residential area are out of standard's range and while others maintain the standards.

Rationale for having higher concentrations of some parameters

Mercury: The main source of mercury in the project area is waste disposal (municipal and hazardous waste). Atmospheric mercury is deposited and accumulated in soils which are in the connection to water. Mercury in groundwater is from dissolution of minerals and ores, industrial effluents, mercury in the air eventually settles into water or onto land where it can be washed into water.

Manganese and Iron: Iron (Fe) and Manganese (Mn) are metals that occur naturally in soils, rocks and minerals. In the aquifer, groundwater comes in contact with these solid materials dissolving them, releasing their constituents, including Fe and Mn, to the water. The extent to which Fe and Mn dissolve in groundwater depends on the amount of oxygen in the water and, to a lesser extent, upon its degree of acidity, i.e., its pH. Industrial effluent, sewage and landfill leachate may also contribute iron and manganese to local groundwater.

Total Coliforms and Faecal Coliforms: Sources of Total and Faecal Coliform in groundwater can include agricultural runoff, effluent from septic systems or sewage discharges, infiltration of domestic or wild animal fecal matter, poor well maintenance and construction (particularly shallow dug wells) can also increase the risk of bacteria and other harmful organisms getting into a well water supply.

Table 4. 31: Summary of Surface water (Drinking Water) quality measurement and water quality criteria (July 2019)

| Parameter | Ref: Value | Unit | SW -3 Drinking water (Kyar Inn Creek) | SW-4 Drinking water (Pazung Taung Creek) | SW-5 Drinking water (Kalihtaw Dam) |
|------------------------------|------------|-----------------------|---|--|--|
| Oxygenation condition | | | | | |
| BOD | | mg O ₂ / L | 20.5 | 58.1 | - |
| COD | | mg/L | 8.3 | 18.8 | - |
| Nutrient condition | | | | | |
| Nitrate | 50 | mg/L | 0 | 0 | 0 |
| Salinity | | | | | |
| Chloride | 250 | mg/L | 4.9 | 1.0 | 0.5 |
| Sulphate | 250 | mg/L | 8 | 3 | 1.0 |
| Phosphate | - | mg/L | 3 | 2 | |
| Acidification status | | | | | |
| pH | 6.5-8.5 | | 7.2 | 7.9 | 6.6 |
| Trace Metals | | | | | |
| Arsenic | 0.05 | mg/L | 0 | 0 | 0.011 |
| Lead | 0.01 | mg/L | 0.000 | 0.000 | 0.0009 |
| Mercury | 0.001 | mg/L | 0.000 | 0.000 | 0.000 |
| Copper | 2 | mg/L | 0.008 | 0.005 | 0.000 |
| Zinc | 3 | mg/L | 2 | 1 | 0.000 |
| Magnesium | 150 | mg/L | 14.32 | 16.8 | 10.57 |
| Manganese | 0.4 | ppm | - | - | 0.56 |
| Iron | 1 | mg/L | 0.19 | 0.09 | 5.804 |
| Fluoride | 1.5 | mg/L | 0 | 0.0 | 0 |
| Other parameters | | | | | |
| Turbidity | 5 | NTU | 0.1 | 1 | 0.1 |
| TDS | 1000 | mg/L | 196 | 140 | 77 |
| Color | 15 | TCU | 10 | 5 | 1 |
| EC | - | μS/cm | 280 | 200 | 110 |
| Total | 500 | mg/L as | 57 | 68 | 189 |

| | | | | | |
|-----------------------------------|---|-------------------|------|------|------|
| Hardness | | CaCO ₃ | | | |
| Chlorine (Residual) | 4 | mg/L | 0.07 | 0.14 | 0.01 |
| Oil and grease | | mg/L | 1.06 | 2.62 | |
| Phenol | - | mg/L | | | 0.04 |
| Bacteriological parameters | | | | | |
| Total coliforms | 3 | CFU/100ml | - | - | 5 |
| Faecal coliforms | 0 | CFU/100ml | - | - | 1 |

Note: BOD = Biological Oxygen Demand, COD = Chemical Oxygen Demand, DO = Dissolved Oxygen, TDS = Total Dissolved Solid, 1 mg/l= 1ppm, TCU = True Color Unit, NTU – Nephelometric Turbidity Unit

Findings: The samples were analyzed for physiochemical parameters and results compared with National Drinking Water Quality Standard to identify and interpret any deviation in the statutory limits set for parameters in the standard. After comparing with National Drinking Water Quality Standard for surface water (drinking water), it can be seen that all of the results of the parameters are within the reference value except the contents of iron, total coliforms and faecal coliforms of Kalihtaw Dam water is higher than the reference values. The water quality is fair in all other locations and mainly because they are flowing water bodies.

Rationale for having higher concentrations of some parameters

Iron: This is expected because of naturally occurring (erosion and weathering of rocks and minerals) and water from natural geological sources.

Total Coliforms and Faecal Coliforms: Total coliforms include bacteria that are found in the soil, in water that has been influenced by surface water, and in human or animal waste. Human and animal wastes are a primary source of bacteria in water. These sources of bacterial contamination include runoff from feedlots, pastures, dog runs, and other land areas where animal wastes are deposited. Additional sources include seepage or discharge from septic tanks, and natural soil/plant bacteria.

Fecal-coliform bacteria sources, such as combined sewer overflows and wildlife, contribute bacteria mainly through run off during rainfall, whereas other sources, such as sanitary sewer overflows and failing septic systems, contribute bacteria during low- and high-flow conditions. Bacteria also can originate from point sources such as leaking sewers or in leachate from failing septic systems.

Table 4. 32: Summary of Wastewater/Drain Water quality measurement and water quality criteria (July 2019)

| Parameter | Ref: Value | Unit | Results | | | |
|------------------------------|------------|-----------------------|---------|--------|--------|--------|
| | | | DW-1 | DW-2 | DW-3 | DW-4 |
| Oxygenation condition | | | | | | |
| BOD | 30 | mg O ₂ / L | 10.5 | 8.2 | 2.2 | 24.4 |
| COD | 125 | mg / L | 26 | 12 | 6 | 14 |
| Nutrient condition | | | | | | |
| Nitrate | - | mg / L | 0 | 0 | 0 | 0 |
| Salinity | | | | | | |
| Chloride | - | mg / L | 0.9 | 1.2 | 1.4 | 0.7 |
| Sulphate | - | mg / L | 0 | 3.0 | 5.0 | 0 |
| Acidification status | | | | | | |
| pH | 6-9.0 | | 6.3 | 6.4 | 7.0 | 6.4 |
| Trace Metals | | | | | | |
| Arsenic | 0.1 | mg / L | 0.015 | 0.016 | 0.015 | 0.012 |
| Lead | 0.1 | mg / L | 0.0003 | 0.0005 | 0.0001 | 0.0017 |
| Mercury | 0.01 | mg / L | 0.000 | 0.000 | 0.000 | 0.000 |

| | | | | | | |
|-----------------------------------|-----|-----------------------------|-------|-------|-------|-------|
| Copper | 0.5 | mg / L | 0.000 | 0.008 | 0.000 | 0.001 |
| Magnesium | - | mg / L | 1.669 | 7.992 | 8.008 | 4.65 |
| Manganese | - | mg / L | 0.712 | 0.184 | 1.334 | 0.546 |
| Iron | 3.5 | mg / L | 3.276 | 6.259 | 10.96 | 4.463 |
| Fluoride | 20 | mg / L | 0 | 0 | 0 | 0 |
| Cadmium | 0.1 | mg / L | 0.00 | 0.00 | 0.00 | 0.00 |
| Chromium | 0.5 | mg / L | 0.00 | 0.058 | 0.013 | 0.00 |
| Other parameters | | | | | | |
| Turbidity | - | NTU | 0.1 | 0.1 | 1 | 1 |
| TDS | - | mg / L | 35 | 7 | 14 | 14 |
| Color | - | TCU | 1 | 1 | 5 | 5 |
| EC | - | µmhos/cm | 50 | 10 | 20 | 20 |
| Total Hardness | - | mg / L as CaCO ₃ | 0 | 6 | 11 | 0 |
| Total Chlorine | 0.2 | mg / L | 0.09 | 0.16 | 0.11 | 0.08 |
| Oil and grease | 10 | mg / L | 5.07 | 2.76 | 1.23 | 0.59 |
| Phenol | 0.5 | mg / L | 0 | 0.21 | 0.38 | 0.03 |
| Bacteriological parameters | | | | | | |
| Total coliform | 400 | CFU/100ml | 0 | 0 | 10 | 15 |
| Faecal coliform | - | CFU/100ml | 0 | 0 | 2 | 3 |

Note: BOD = Biological Oxygen Demand, COD = Chemical Oxygen Demand, DO = Dissolved Oxygen, TDS = Total Dissolved Solid, 1 mg/l= 1ppm, TCU = True Color Unit, NTU – Nephelometric Turbidity Unit, CFU = Coliform Forming Unit

Findings: The samples were analyzed for physicochemical parameters and results compared with National Environmental Quality (Emission) Guidelines to identify and interpret any deviation in the statutory limits set for parameters in the standard. After comparing with Guidelines, it can be seen that all of the results of the wastewater except iron contents (DW 2, 3, and 4) are within the reference values.

Rationale for having higher concentrations of some parameters

Iron: Iron exists naturally in rivers, lakes, and underground water. It may also be released to water from natural deposits, industrial wastes, refining of iron ores, and corrosion of iron containing metals. The combination of naturally occurring organic material and iron can be found in shallow wells and surface water. This water is usually yellow or brown but may be colorless.

4.11.1.4 Soil Quality

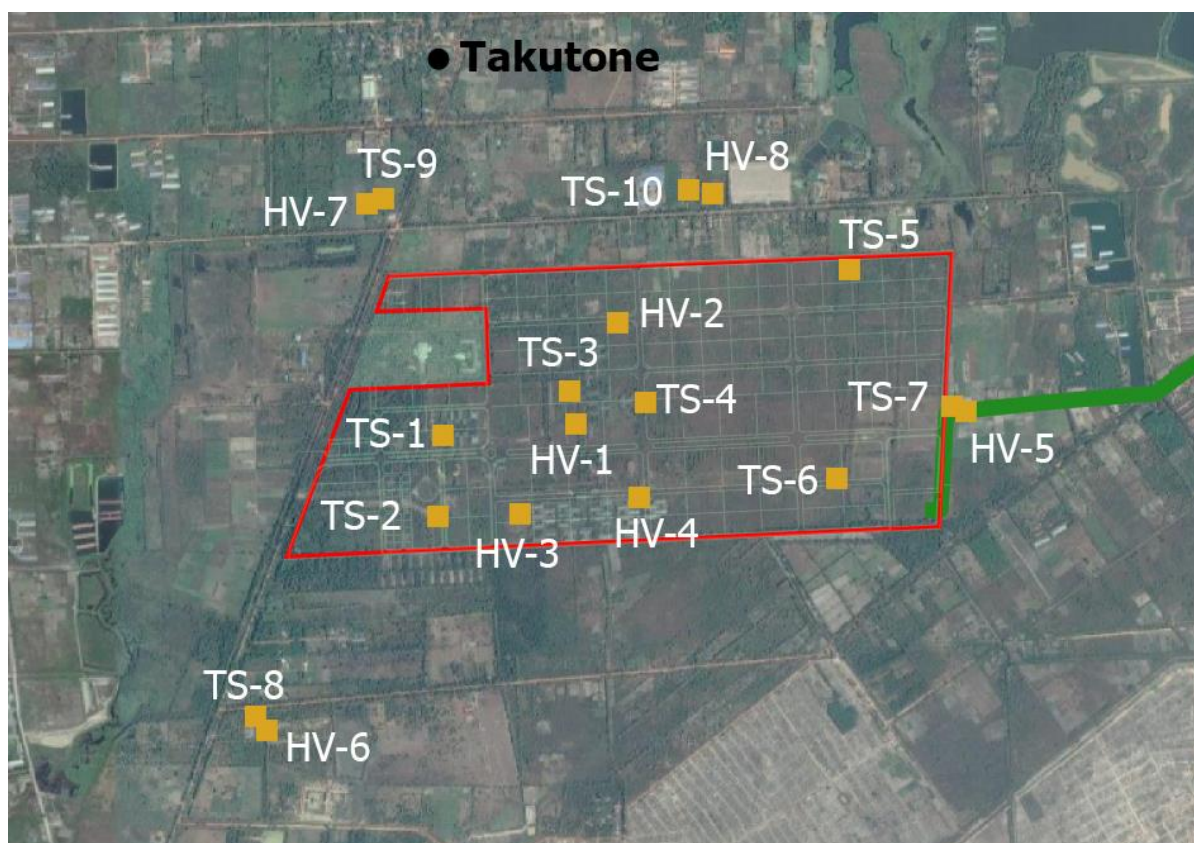


Figure 4. 50: Soil Samples Collection Location

4.11.1.4.1 Soil Samples Collection Location

Total 10 samples of top soil and 8 samples of deep/sub soil were collected for testing nutrients and heavy metals content of the soil respectively. In April 2017, top soil from 6 places and deep/sub soil from 4 places were collected from the project site. In July 2019, top soil from 4 places and deep/sub soil from 4 places were collected from different places around the project area including within the agricultural zone 1.

Table 4. 33: Top soil sample locations (Nutrients Test) (April 2017)

| Sample point | Soil Depth | Layer | Location | |
|--------------|------------|-------|---------------|---------------|
| | | | Latitude | Longitude |
| TS -1 | 0 "-8" | A/P | 17° 8'25.70"N | 96° 9'40.70"E |
| | 8" -20" | A/B | | |
| TS -2 | 0 "-8" | A/P | 17° 8'14.90"N | 96° 9'39.80"E |
| | 8" -22" | A/B | | |
| TS -3 | 0 "-10" | A/P | 17° 8'31.10"N | 96° 9'56.90"E |
| | 10" -18" | A/B | | |
| TS-4 | 0 "-10" | A/P | 17° 8'30.20"N | 96°10'5.50"E |
| | 10" -25" | A/B | | |
| TS-5 | 0 "-10" | A/P | 17° 8'45.60"N | 96°10'32.70"E |
| | 10" -20" | A/B | | |
| TS-6 | 0 "-10" | A/P | 17° 8'19.60"N | 96°10'30.20"E |
| | 10" -20" | A/B | | |

Table 4. 34: Deep/Sub soil sample locations (Heavy Metals Test) (April 2017)

| Sample point | Soil Depth | Layer | Location | |
|--------------|------------|-------|---------------|---------------|
| | | | Latitude | Longitude |
| HV -1 | 0 " - 10" | A/P | 17° 8'25.97"N | 96° 9'57.38"E |
| | 10" -22" | A/B | | |

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| | | | | |
|--------------|---------------------------------|-----------------|---------------|---------------|
| HV -2 | 0" -10" 10" -23" | A/P A/B | 17° 8'38.10"N | 96°10'4.20"E |
| HV -3 | 0" -10" 18" -20" 30" -35" | A/P A/B B | 17° 8'17.60"N | 96° 9'50.70"E |
| HV-4 | 0" -10" 10" -25" | A/P A/B | 17° 8'18.87"N | 96°10'7.73"E |

Table 4. 35: Top soil sample locations (Nutrients Test) (July 2019)

| Sample Point | Soil depth | Layer | Latitude and Longitude | Location |
|--------------|-----------------------|-----------------|--------------------------------|------------------------------|
| TS-7 | 0" - 12" 12" - 25" | A/P A/B B | N 17° 08' 29" E 96° 10' 45" | Eastern Area of Project Site |
| TS-8 | 0" - 12" 12" - 25" | A/P A/B B | N 17° 07' 50" E 96° 09' 17" | Near Project Area |
| TS-9 | 0" - 12" 12" - 25" | A/P A/B B | N 17° 08' 52" E 96° 09' 34" | Near Farmer Harvest |
| TS-10 | 0" - 12" 12" - 25" | A/P A/B B | N 17° 08' 54" E 96° 10' 12" | Near Project Area |

Table 4. 36: Sub soil/Deep soil sample locations (Heavy Metals Test) (July 2019)

| Sample Point | Soil depth | Layer | Latitude and Longitude | Location |
|--------------|-----------------------|-----------------|--------------------------------|------------------------------|
| HV-5 | 0" - 12" 12" - 25" | A/P A/B B | N 17° 08' 29" E 96° 10' 45" | Eastern Area of Project Site |
| HV-6 | 0" - 12" 12" - 25" | A/P A/B B | N 17° 07' 50" E 96° 09' 17" | Near Project Area |
| HV-7 | 0" - 12" 12" - 25" | A/P A/B B | N 17° 08' 52" E 96° 09' 34" | Near Farmer Harvest |
| HV-8 | 0" - 12" 12" - 25" | A/P A/B B | N 17° 08' 54" E 96° 10' 12" | Near Project Area |

TS – Top Soil

HV – Deep/Sub Soil

Soil samples collecting



Collecting soil samples



Collecting soil samples



Collecting soil samples



Testing soil Electrical conductivity (Ec)



Testing soil pH level



Comparing soil color

Figure 4. 51: Soil Sample Collection (April 2017)





Figure 4. 52: Soil Sample Collection (July 2019)

4.11.1.4.2 Soil Survey Method

The soil survey was conducted by using the Russian soil scientist soil analysis method and FAO/UNESCO method.

When soil survey was conducted physical properties of soil such as soil colour, texture, structure, moisture, hardness, drainage, inclusion and new formation were recorded and the soil name was given by using Russian soil classification, FAO soil classification method.

When classified the soil types, soil horizontal characteristics were based and identified the soil type. Soil properties are formed according to the soil forming process and it is not possible to give nomenclature on the base of site seeing different norms of the soil characteristics. It needs thousands of million years to form one inch cubic of soil but soil can be easily deteriorated in a few years due to improper use of the land and soil.

4.11.1.4.3 Soil Samples Results for April 2017 Collection

In April 2017, top soil from 6 places and deep/sub soil from 4 places were collected from the project site and according to the soil sample laboratory results, the surveyed soils are light yellow Brown Forest Lateritic at base soils and called as Xanthic Ferralsols according to F.A.O soil classification. The top soils are sandy loam texture. The sub soils about 15 inches depth are 1:1 Kaolinite clay. The third layer soils, about 25" inches depth are clayey and soft lateritic soils and some are red in colour. These soils have rapid water infiltration rate and rain water will be disappeared as soon as after raining. It contains well drainage infiltration

rate. It has low soil pH and low cation exchangeable capacity and low in Ca^{+2} , Mg^{+2} and K^{+} . It has low humus content and reduces in micro nutrient content.

The soils are suitable for orchard and vegetable cultivation and it needs to use compost, organic manure and chemical fertilizers as a balanced fertilization. Split application and foliar fertilizer application are suitable. Broken building and other waste materials should be removed when these soils are used for agriculture because it is a Nyaung Hnitpin Zone (3) departmental compound.

The soil survey results are expressed as Profile Description, External Features, chemical analysis and water-soluble salts.

Table 4. 37: Soil Analysis Results

| | |
|--|--|
| Soil texture | Silt Loam, Silty Clay Loam |
| Soil Structure | Crumbly & sub angular blocky |
| Soil pH | Moderately acid, Near Neutral, Extremely acid, Strongly acid |
| Nitrogen content (N_2) | Low, Very Low |
| Phosphorus content (P) | Low |
| Potassium content (K_2O) | Low |
| Humus | Medium |
| Organic carbon | Medium |
| Calcium (Ca^{++}) | Low |
| Magnesium (Mg^{++}) | Low |
| Potassium (K^{+}) | Low |
| Aluminum (Al^{+3}) | Not detected |
| Hydrogen (H^{+}) | Low |
| Sodium (Na^{+}) | Low |
| Cation Exchange capacity (C.E.C) | Low |
| Electrical conductivity (EC) | Very Low |

Table 4. 38: Soil Soluble Salts Analysis Results

| | |
|-------------------------------|--|
| Total dissolved solids TDS | Low |
| Electrical conductivity (Ec) | Very Low |
| Sodium Adsorption Ratio SAR | Low (Not detected) |
| Residual Sodium Carbonate RSC | Not detected |
| pH | Moderately acid, Near Neutral, Extremely acid |
| Dorminate salts | CaCl_2 , $\text{Ca}(\text{SO}_3)_2$, NaCl , CaSO_4 |

Table 4. 39: Heavy Metal Analysis Results

| No | Heavy Metal Contaminants | Profile No.1 HV A/P Layer 0-10" | | Profile No.2 HV A/P Layer 0-10" | | Profile No.3 Layer (B) Layer 30-35" | | Profile No.4 HV Layer 0-10" | |
|----|--------------------------|---------------------------------|---------------------|---------------------------------|---------------------|-------------------------------------|---------------------|-----------------------------|---------------------|
| | | Result (ppm) | Maximum Level (ppm) | Result (ppm) | Maximum Level (ppm) | Result (ppm) | Maximum Level (ppm) | Result (ppm) | Maximum Level (ppm) |
| | | | | | | | | | |

| | | | | | | | | | |
|---|---------------|-------|-----|-------|-----|-----|-----|-----|-----|
| 1 | Nickel (Ni) | ND | 35 | ND | 35 | ND | 35 | ND | 35 |
| 2 | Chromium (Cr) | ND | 100 | ND | 100 | ND | 100 | ND | 100 |
| 3 | Cadmium (Cd) | ND | 0.8 | ND | 0.8 | ND | 0.8 | ND | 0.8 |
| 4 | Lead (Pb) | ND | 85 | ND | 85 | ND | 85 | ND | 85 |
| 5 | Iron (Fe) | 894.5 | 250 | 950.5 | 250 | 939 | 250 | 801 | 250 |

ND – Not Detected

Soil analytical data of heavy metal analyzed at Pesticide Analytical Laboratory, Plant Protection Division, Department on Agriculture, Ministry of Agriculture, Livestock and Irrigation resulted. The concentration of heavy metals: Nickel, Chromium, Cadmium and lead are (Not Detected) lower than reference value.

Iron (Fe) is 894.5 ppm at Profile No.1 HV A/P Layer 0-10", 950.5 ppm at Profile No.2 HV A/P Layer 0-10", 939 ppm at Profile No.3 HV A/P Layer 30-35" and 801 ppm at Profile No.4 HV A/P Layer 0-10" are higher than maximum permitted level of 250 ppm.

Rationale for having higher concentration of Iron

The soil type is soft lateritic soil and the amount of iron is different in soils of various origins and used differently. Its natural, average content in soil is 0.6% and may undergo significant changes due to the high vertical mobility of iron in soil profiles.

Analytical data evaluation and recommendation

There is no plant nutrient problem in soil analysis of Nyaung Hnitpin Zone (3) compound in Hlegu Township, Yangon Region. Also soil problems such as saline soil, sodic soil, sodium toxicity, high in calcium and aluminum content etc.

There is no distinct problem in total dissolved salt content in water soluble salts analysis. SAR sodium Absorption Ratio also did not show as a soil problem.

There is no problem in Electrical conductivity and residual sodium carbonate.

Therefore, there is no nutrients problem and soil soluble salts problem in these soils.

4.11.1.4.4 Soil Samples Results for July 2019 Collection

In July 2019, top soil from 4 places and deep/sub soil from 4 places were collected from different places around the project area including within the agricultural zone 1 for testing nutrients and heavy metals contents. The survey results show that the surveyed soils are light yellow Brown Forest Lateritic at base soils and called as Xanthic Ferralsols according to F.A.O soil classification. The top soils are sandy loam texture. The sub soils about 15 inches depth are 1:1 Kaolinite clay. The third layer soils, about 25" inches depth are clayey and soft lateritic soils and some are red in colour. These soils have rapid water infiltration rate and rain water will be disappeared as soon as after raining. It contains well drainage infiltration rate. It has low soil pH and low cation exchangeable capacity and low in Ca²⁺, Mg²⁺ and K⁺. It has low humus content and reduces in micro nutrient content.

The soils are suitable for orchard and vegetable cultivation and it needs to use compost, organic manure and chemical fertilizers as a balanced fertilization. Split application and foliar fertilizer application are suitable.

The soil survey results are expressed as Profile Description, External Features, chemical analysis and water-soluble salts.

Table 4. 40: Soil Analysis Results

| | |
|--------------------------------------|-------------------------------|
| Soil texture | Silt Loam, Silty Clay Loam |
| Soil Structure | Crumbly & sub angular blocky |
| Soil pH | Extremely acid, Strongly acid |
| Nitrogen content (N ₂) | Low, Very Low |
| Phosphorus content (P) | Low |
| Potassium content (K ₂ O) | Low |
| Humus | Medium |
| Organic carbon | Medium |
| Calcium (Ca ⁺⁺) | Low |
| Magnesium (Mg ⁺⁺) | Low |
| Potassium (K ⁺) | Low |
| Aluminum (Al ⁺³) | Not detected |
| Hydrogen (H ⁺) | Low |
| Sodium (Na ⁺) | Low |
| Cation Exchange capacity (C.E.C) | Low |
| Electrical conductivity (EC) | Very Low |

Table 4. 41: Soil Soluble Salts Analysis Results

| | |
|-------------------------------|--|
| Total dissolved solids TDS | Low |
| Electrical conductivity (Ec) | Very Low |
| Sodium Adsorption Ratio SAR | Low (Not detected) |
| Residual Sodium Carbonate RSC | Not detected |
| pH | Strongly acid |
| Dorminate salts | CaCl ₂ , Ca (SO ₃) ₂ , NaCl, CaSO ₄ |

Table 4. 42: Heavy Metal Analysis Results

| No | Heavy Metal Contaminants | Profile No.5 HV A/P Layer 0-12" A/B Layer 12" – 25" B | | Profile No.6 HV A/P Layer 0-12" A/B Layer 12" – 25" B | | Profile No.7 Layer A/P Layer 0-12" A/B Layer 12" – 25" B | | Profile No.8 HV A/P Layer 0-12" A/B Layer 12" – 25" B | |
|----|--------------------------|--|---------------------|--|---------------------|---|---------------------|--|---------------------|
| | | Result (ppm) | Maximum Level (ppm) | Result (ppm) | Maximum Level (ppm) | Result (ppm) | Maximum Level (ppm) | Result (ppm) | Maximum Level (ppm) |
| 1 | Nickel (Ni) | ND | 35 | ND | 35 | ND | 35 | ND | 35 |
| 2 | Chromium (Cr) | ND | 100 | ND | 100 | ND | 100 | ND | 100 |
| 3 | Cadmium (Cd) | ND | 0.8 | ND | 0.8 | ND | 0.8 | ND | 0.8 |

| | | | | | | | | | |
|---|-----------|-------|-----|-------|-----|-------|-----|-------|-----|
| 4 | Lead (Pb) | ND | 85 | ND | 85 | ND | 85 | ND | 85 |
| 5 | Iron (Fe) | 809.8 | 250 | 950.8 | 250 | 900.2 | 250 | 850.4 | 250 |

ND – Not Detected

Soil analytical data of heavy metal analyzed at Pesticide Analytical Laboratory, Plant Protection Division, Department on Agriculture, Ministry of Agriculture, Livestock and Irrigation resulted. The concentration of heavy metals: Nickel, Chromium, Cadmium and lead are (Not Detected) lower than reference value.

Iron (Fe) is 809.8 ppm at Profile No.5 HV A/P Layer 0-12”, 950.8 ppm at Profile No.6 HV A/P Layer 0-12”, 900.2 ppm at Profile No.7 HV A/P Layer 0-12” and 850.4 ppm at Profile No.8 HV A/P Layer 0-12” are higher than maximum permitted level of 250 ppm.

Rationale for having higher concentration of Iron

The soil type is soft lateritic soil and the amount of iron is different in soils of various origins and used differently. Its natural, average content in soil is 0.6% and may undergo significant changes due to the high vertical mobility of iron in soil profiles.

Analytical data evaluation and recommendation

There is no plant nutrient problem in soil analysis of Nyaung Hnitpin Industrial Complex Project compound in Hlegu Township, Yangon Region. Also soil problems such as saline soil, sodic soil, sodium toxicity, high in calcium and aluminum content etc.

There is no distinct problem in total dissolved salt content in water soluble salts analysis. SAR sodium Absorption Ratio also did not show as a soil problem.

There is no problem in Electrical conductivity and residual sodium carbonate.

Therefore, there is no nutrients problem and soil soluble salts problem in these soils.

4.11.2 Biological Environmental Baseline Data Collection

The biological assessment portion considers the likely ecological issues relating to the proposed Development. It can be expected that significant effects on habitats and species can arise directly during construction (including demolition) and following the completion of the proposed development.

The project site itself has been the used land for some years in since 1995. However, after 2008, the area was abandoned and buildings were left with natural ecological succession of plants and animals in a wilderness terrestrial ecosystem of 600-acre compound, though some connectivity exist with surrounding environment which is basically striving with agricultural activities of flowers and commercial fruit and vegetable growing practice for almost a decade.

The secondary information of terrestrial and aquatic fauna, flora and land use was also recorded, and interviews with local residents were made for getting information of the history of the area and presence and absence of flora and fauna in the past and present time.



Figure 4. 53: Area of the project where tall trees are scattering, and grasses take place the larger area



Figure 4. 54: Northwestern part of the project is covered by to some extent thick tall trees



Figure 4. 55: Tree-lacking area of project site and somewhat larger water bodies existing in the vicinity

Both terrestrial and aquatic ecosystems were examined. Recorded terrestrial flora, fauna and natural habitats were based on secondary information and direct observation and through examination. The tree, plant, and shrub and species composition of plant and their distribution near the project site were studied and identified.

Bird watching was undertaken in the habitats of the study area to build up a true picture of species-habitat relationship. Collection of butterflies was made along the transect lines set up at various habitats in the proposed project area. The specimens were photographed.

For the floral assessment, walk-through and visual identification methods were used. Total thirty-seven different family of flowers were recorded. Among them, most are abundant and frequent for species abundance assessment. Total twenty-two family types of avifauna, fifteen different types of butterfly, eleven different types of dragonflies, seven different types of fish and prawn were recorded.

The impact assessment covered:

- Evaluation of identified important features: flora and fauna species, habitats and vegetation;
- Description and evaluation of the magnitude and significance of potential impacts of the proposed project on species, habitats and vegetation;
- Detail species-specific assessment;
- Mitigation measures to address the identified potential impacts;
- Cumulative impact assessment; and
- Description and evaluation of residual impacts of the proposed project.

4.11.2.1 Methodology for flora and fauna Survey

4.11.2.1.1 Flora (Vegetation)



Figure 4. 56: Depression of the land at the nearby area of project site keeps water until summer

For the purpose of conducting this EIA, boundaries of the study area were to determine the site maps and development plans provided. The species in both direct impact zone and indirect impact zone nearby villages, lakes, farming and plantation fields were studied, identified and recorded.

The methods of identification are walk-through and visual identification by the floral expert. The survey method was conducted into analysis of the presence or absence of ecologically or commercially important species diversity of flora on the site.



Figure 4. 57: Recorded Terrestrial Plants of Flora collected from secondary forest type in KMIC Project Area

Table 4. 43: Valuable and abundance assessment of collected species identified from KMIC Project Site

| No | Type | Family | Science Name | Common Name | Economic/ Ecological Value | Habit | Abundance Assessment | | | |
|----|-------------------------|----------------|--|--------------|----------------------------|---------------|----------------------|---|---|---|
| | | | | | | | D | A | F | R |
| 1 | Mono-cotyle dons | Araceae | <i>Caladium esculentum Vent</i> | Pain | Animal feed | Herb | * | * | | |
| 2 | | | <i>Caladium numboldtti</i> | Pain kyar | Animal feed | Herb | * | * | | |
| 3 | | Gramineae | <i>Echinochloa colona</i> | Ba-sa-myet | Animal feed | Grass | | * | | |
| 4 | | Musaceae | <i>Musa sapientum L.</i> | Nget pyaw | Food | Herb | | * | | |
| 5 | | Poaceae | <i>Chrysopogon acicularis</i> | Nauk-po-myet | Wild | Grass | | * | | |
| 6 | | | <i>Eleusine indica Gaertn.</i> | Sin-ngo-myet | Wild/ Medicine | Grass | | * | | |
| 7 | | | <i>Cyndon dactylon (L.)</i> | Mye-sa-myet | Wild | Grass | | * | | |
| 8 | | | <i>Panicum spp.</i> | Myet-hka | Wild | Grass | * | * | | |
| 9 | | | <i>Bambusa spp.</i> | Wa | Shade | Bambo o | | | * | |
| 10 | | Pontederiaceae | <i>Eichornia crassipes Mart</i> | Beda | Wild/ Compose | Aquatic plant | | * | | |
| 11 | | | <i>Monochoria Vaginalis Kunth</i> | Kadauk set | Wild/ Compose | Aquatic plant | | | * | |
| 12 | Di-cotyle dons | Asteraceae | <i>Chromolaena odorata (L.)R.M.King & Robinson</i> | Bi-zet | Wild/ Medicine | Shrub | * | * | | |

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| | | | | | | | | | | |
|----|--|----------------|---------------------------------------|--------------------|-----------------------|-------------|---|---|---|---|
| 13 | | | <i>Wedelia calendulacea</i> Nees. | Nay-kya-ka-lay | Wild | Herb | * | * | | |
| 14 | | | <i>Lactuca sativa</i> L. | Salad | Wild | Shrub | | | | * |
| 15 | | | <i>Mikaniamicrantha</i> H.B.K | Bi-zet-nwee | Wild | Climber | | * | | |
| 16 | | Anacardiaceae | <i>Anacardium occidentale</i> L. | Thi-ho | Food | Tree | | | | * |
| 17 | | | <i>Mangifera</i> spp. | Thet-yat | Food | Tree | | | * | |
| 18 | | Amaryllidaceae | <i>Crinum amoenum</i> Roxb. | Khat-ta | Ornamental | Herb | | | | * |
| 19 | | Apocynaceae | <i>Allamanda cathartica</i> L. | Shwe-wa-pan | Ornamental | Shrub | | | * | |
| 20 | | Arecaceae | <i>Livistona</i> spp. | Taung-htan | Ornamental | Tree | | | * | |
| 21 | | Amaryllidaceae | <i>Zephyranthes</i> spp.. | Hnin-pan | Ornamental | Herb | | | * | |
| 22 | | Asphodelaceae | <i>Alove vera</i> | Sha-shaung-letpat | Food/Medicine | Herb | | | * | |
| 23 | | Bignoniaceae | <i>Oroxylum indicum</i> (L.)Kurz. | Kyaung-sha | Food/Medicine | Small tree | | | * | |
| 24 | | Bombacaceae | <i>Bombox ceiba</i> L. | Let-pan | Wild | Tree | | | | * |
| 25 | | Costaceae | <i>Costus speciosus</i> Sm. | Pha-lan-taung-hmwe | Wild | Herb | | | | * |
| 26 | | Connaraceae | <i>Cnestis palapa</i> Merr. | Khwee-dauk | Wild/Food | Climber | | | * | |
| 27 | | Cariceae | <i>Carica papaya</i> L. | Thin-baw | Food/Medicine | Woody plant | | | * | |
| 28 | | Cucurbitaceae | <i>Cucumis sativa</i> L. | Tha-khaw-thi | Food | Climber | | * | * | |
| 29 | | Euphorbiaceae | <i>Cassava</i> spp. | Ka-law | Wild/Food | Woody plant | | | | * |
| 30 | | | <i>Sauropus albicans</i> Blume | Kyet-tha-hin | Wild | Climber | | * | | |
| 31 | | | <i>Antidesma bunius</i> (L.)Spreng. | Kin-ba-lin | Wild/Food | Small/Shrub | | | * | |
| 32 | | | <i>Hevea brasiliensis</i> | Rubber | Industrial plantation | Tree | | | * | |
| 33 | | | <i>Ricinus</i> spp. | Kyet-su | Wild | Small tree | | | * | |
| 34 | | Fabaceae | <i>Ptreocarpus macrocarpus</i> Kurz. | Pa-dauk | Wild | Tree | | | | * |
| 35 | | Leeaceae | <i>Leea rubra</i> Blume | Na-ga-mauk-ni | Food/Medicine | Herb | | | * | |
| 36 | | Lythraceae | <i>Lagerstroemia speciosa</i> (L)Pers | Pyin ma | Wild | Tree | | * | * | |
| 37 | | Melastomaceae | <i>Melastoma malabathricum</i> L. | Say-o-pok | Wild/medicine | Tree | | * | * | |
| 38 | | Moraceae | <i>Atrocarpus heterophyllus</i> Lam. | Pein-ne | Food | Tree | | | * | |
| 39 | | Meliaceae | <i>Azadirachta indica</i> A.juss | Tama | Wild | Tree | | | * | |
| 40 | | Mimosoideae | <i>Acacia auriculiformis</i> A.Cunn. | Ma-lay-sia-padauk | Recover plant | Tree | | * | * | |
| 41 | | Mimosaceae | <i>Albizia lebbek</i> Benth | Kokko | Wild | Tree | | | | * |
| 42 | | | <i>Ficus cinerascens</i> | Tha-phan | Wild | Tree | | | * | |

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| | | | | | | | | | | |
|----|--|---------------|---|-----------------|------------------|------------|--|---|---|---|
| 43 | | | <i>Ficus spp.</i> | Naung | Wild | Tree | | | * | |
| 44 | | | <i>Leucaena gluca Benth</i> | Baw-za-gaing | Wild | Small tree | | | * | |
| 45 | | | <i>Neptunia javanica Miq</i> | Hti-ga-yon | Wild | Shrub | | * | * | |
| 46 | | Myrtaceae | <i>Psidium guajava L.</i> | Ma-la ka | Food | Small tree | | | * | |
| 47 | | | <i>Eucalyptus camaldulensis Dehh</i> | Yu-ka-lit | Recover plant | Tree | | | * | |
| 48 | | | <i>Syzygium fruticosum DC.</i> | Tha-bye | Plantation plant | Small tree | | | * | |
| 49 | | Oleaceae | <i>Jasminum arboresens Roxb</i> | Sabe | Ornamental | Shrub | | | * | |
| 50 | | Rutaceae | <i>Citrus aurantifolia (Christm.)Sw</i> | Than-pa-ya | Food | Shrub | | | * | |
| 51 | | Rhamnaceae | <i>Zizyphus jujube Lam.</i> | Zi | Food | Tree | | | * | |
| 52 | | Sapindaceae | <i>Nephelium lappaceum</i> | Kyawt-mauk-thi | Food | Small tree | | | * | |
| 53 | | Smilacaceae | <i>Smilax macrophylla Roxb</i> | Sein-na-baw-gyi | Wild | Climber | | | * | |
| 54 | | Sapotaceae | <i>Mimusops elengi L.</i> | Kha-yae | Shade | Tree | | | | * |
| 55 | | Tiliaceae | <i>Triumfetta bartramia L.</i> | Kat-se-thay | Wild | Shrub | | | * | |
| 56 | | | <i>Microcos tomentosa J.E.Smith</i> | Mya-ya | Wild | Tree | | | * | |
| 57 | | Vitaceae | <i>Cissus hastate Miq</i> | Sa-byit-yaing | Wild | Climber | | | * | |
| 58 | | Zingiberaceae | <i>Curcuma attenuate Wall.</i> | Ma-la | Food | Herb | | | * | |

D = Dominant, A = Abundant, F = Frequent, R = Rare





Figure 4. 58: Recorded terrestrial plants of Flora collected from KMIC Project Area





| | |
|---|--|
| <i>Acacia auriculiformis</i> A.Cunn. | <i>Livistona</i> spp |
|  |  |
| <i>Croton roxburghianus</i> Bal. | <i>Dalbergia</i> spp. |

Figure 4. 59: Recorded woody plants species of Flora from KMIC Project Area

| | |
|---|--|
|  |  |
| <i>Carex</i> spp. | <i>Aglaia odorata</i> |
|  |  |
| <i>Carex</i> spp. and <i>Wedelia calendulacea</i> | <i>Delonix regia</i> |
|  |  |
| <i>Musa</i> spp. | <i>Sauropus albican</i> |

Figure 4. 60: Recorded herb and shrub plants species of Flora from KMIC Project Area



Figure 4. 61: Recorded aquatic plants species of Flora from KMIC Project Area



Figure 4. 62: Recorded recover plantation species of Flora from KMIC Project Area

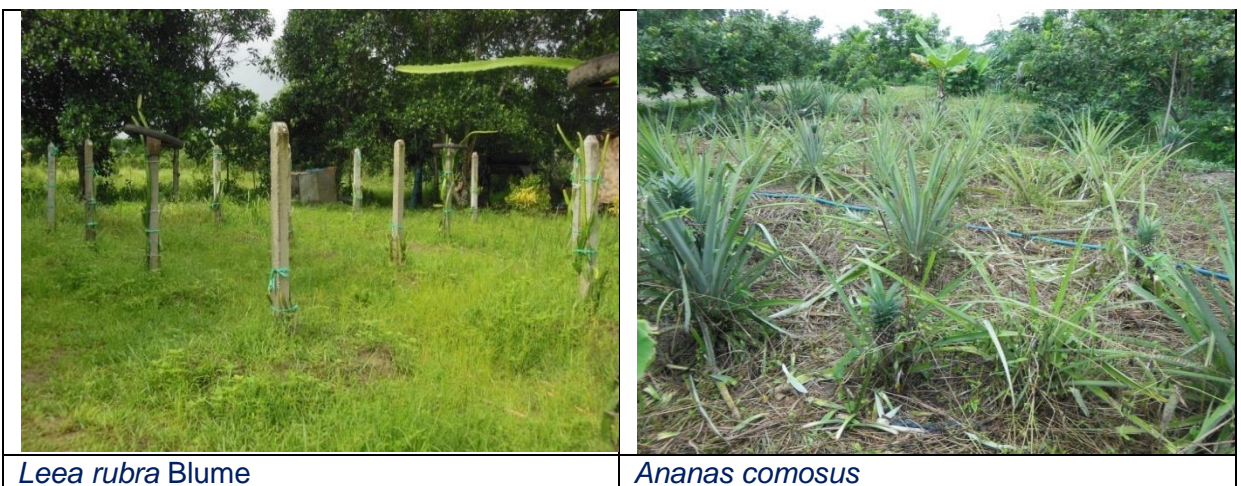
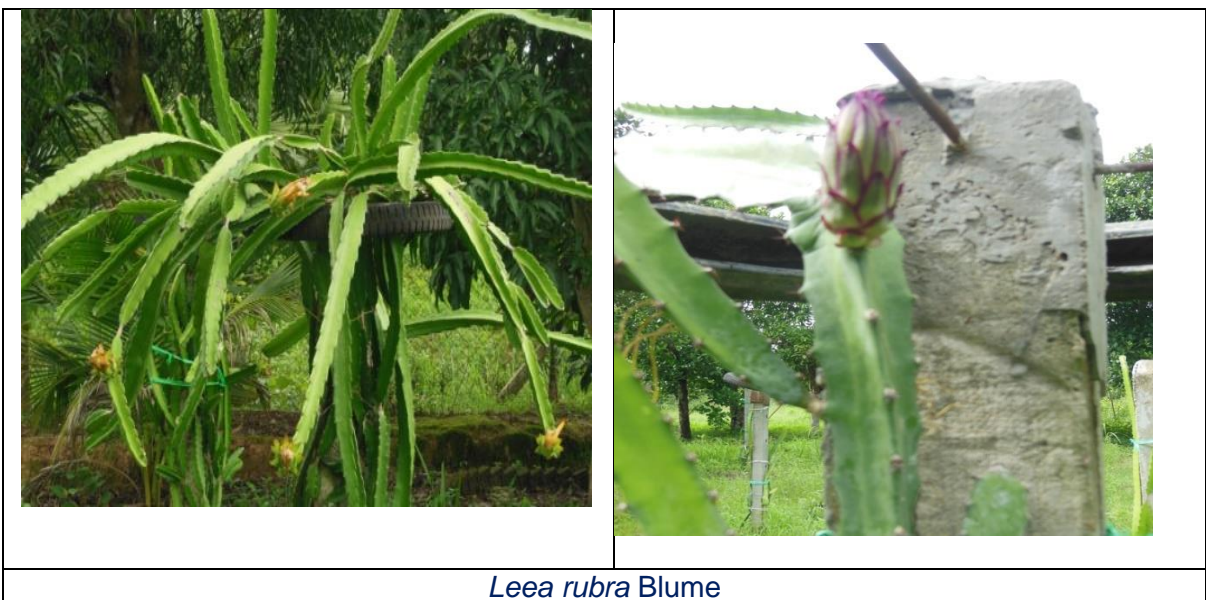




Figure 4. 63: Recorded plantation plants species of Flora from KMIC Project Area





Cucumis sativa



Nephelium lappaceum

Figure 4. 64: Recorded harvest plants species of Flora from surround orchard of KMIC Project Area



Cyperus spp.

Figure 4. 65: Recorded grass plants species of Flora from KMIC Project Area





| | |
|---|--|
|  |  |
| <p><i>Ixora coccinea</i></p> | <p><i>Dendrobium jenkinsii</i></p> |
|  |  |
| <p><i>Wedelia calendulacea Nees.</i></p> | <p><i>Bougainvillea glabra</i></p> |
|  |  |
| <p><i>Melastoma malabathricum L.</i></p> | <p><i>Bambusa vulgaris</i></p> |

Figure 4. 66: Recorded flowering plants species of Flora from KMIC Project Area

4.11.2.1.2 Avifauna


The findings of an avifaunal survey conducted in 11th, June 2017 were mentioned in the following tables. Birds were identified and enumerated according to the Fixed Radius Point Count Method which is based on the principle of counting individuals from a defined location and estimating the distance to the individual contact. Avifaunal species observed between

point counts were also recorded. A total of 7 (seven) points done over a one-day period along other paths within the area. Notation of species observed between surveys points formed the basis of transects counts for the area.

Table 4. 44: Systematic Position of Avifauna collected from KMIC Project Site











| Sr. No. | Order | Family | Scientific name | Common name | Local name |
|---------|---------------|---------------|-------------------------------|---------------------------------|----------------|
| 1. | Galliformes | Turnicidae | <i>Turnix suscitator</i> | Barred button quail | Ngone |
| 2. | Coraciiformes | Halcyonidae | <i>Halcyon smymensis</i> | White throated kingfisher | Bein nyin |
| 3. | Coraciiformes | Meropidae | <i>Merops orientalis</i> | Green Bee Eater | Puzin htoe |
| 4. | Cuculiformes | Centropodidae | <i>Centropus sinensis</i> | Greater coucal | Boke |
| 5. | Cuculiformes | Centropodidae | <i>Centropus bengalensis</i> | Lesser coucal | Boke hinie |
| 6. | Apodiformes | Apodidae | <i>Cypsiurus balasiensis</i> | Asian palm swift | Moesar |
| 7. | Columbiformes | Columbidae | <i>Columba livia</i> | Rock pigeon | Khao |
| 8. | Columbiformes | Columbidae | <i>Streptopelia chinensis</i> | Spotted dove | Gyoe Lae Pyauk |
| 9. | Suliformes | Anhingidae | <i>Phalacrocorax niger</i> | Little cormorant | Tinkyee |
| 10. | Passeriformes | Corvidae | <i>Corvus macrorhynchos</i> | Large billed crow | Jungle crow |
| 11. | Passeriformes | Corvidae | <i>Dicrurus macrocerus</i> | Black drongo | Nget taw |
| 12. | Passeriformes | Corvidae | <i>Artamus fuscus</i> | Ashy wood swallow | Nil |
| 13. | Passeriformes | Sylviidae | <i>Pteruthius aenobarbus</i> | Chestnut fronted shrike babbler | Nil |
| 14. | Passeriformes | Sylviidae | <i>Turdoides gularis</i> | White throated babbler | Swae |
| 15. | Passeriformes | Sturnidae | <i>Acridotheres tristis</i> | Common myna | Setyet |
| 16. | Passeriformes | Sturnidae | <i>Acridotheres grandis</i> | White vented myna | Nil |
| 17. | Passeriformes | Pycnonotidae | <i>Pycnonotus cafer</i> | Red vented bul bul | Voak phin ni |
| 18. | Passeriformes | Pycnonotidae | <i>Pycnonotus blanfordi</i> | Streak eared bul bul | Voak chawe |
| 19. | Passeriformes | Muscicapidae | <i>Copsychus saularis</i> | Oriental magpie robin | Thabaikelwe |
| 20. | Passeriformes | Cisticolidae | <i>Prinia hodgsonii</i> | Grey breasted prinia | Nil |
| 21. | Passeriformes | Passeridae | <i>Passer montanus</i> | Eurasian tree sparrow | Sargalay |
| 22. | Passeriformes | Passeridae | <i>Passer domesticus</i> | House sparrow | Sargalay |

Table 4. 45: Recorded species of Avifauna from KMIC Project Area

| Sr. No. | Order | Family | Scientific name | Common name | Local name | Image |
|---------|-------------|------------|--------------------------|---------------------|------------|---|
| 1. | Galliformes | Turnicidae | <i>Turnix suscitator</i> | Barred button quail | Ngone |  |

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| | | | | | | |
|-----|---------------|---------------|-------------------------------|---------------------------|----------------|---|
| 2. | Coraciiformes | Halcyonidae | <i>Halcyon smymensis</i> | White throated kingfisher | Bein nyin |  |
| 3. | Coraciiformes | Meropidae | <i>Merops orientalis</i> | Green Bee Eater | Puzin htoe |  |
| 4. | Cuculiformes | Centropodidae | <i>Centropus sinensis</i> | Greater coucal | Boke |  |
| 5. | Cuculiformes | Centropodidae | <i>Centropus bengalensis</i> | Lesser coucal | Boke hinie |  |
| 6. | Apodiformes | Apodidae | <i>Cypsiurus balasiensis</i> | Asian palm swift | Moesar |  |
| 7. | Columbiformes | Columbidae | <i>Columba livia</i> | Rock pigeon | Khao |  |
| 8. | Columbiformes | Columbidae | <i>Streptopelia chinensis</i> | Spotted dove | Gyoe Lae Pyauk |  |
| 9. | Suliformes | Anhingidae | <i>Phalacrocorax niger</i> | Little cormorant | Tinkyee |  |
| 10. | Passeriformes | Corvidae | <i>Corvus macrorhynchos</i> | Large billed crow | Jungle crow |  |
| 11. | Passeriformes | Corvidae | <i>Dicurus macrocercus</i> | Black drongo | Nget taw |  |
| 12. | Passeriformes | Corvidae | <i>Artamus fuscus</i> | Ashy wood swallow | Nil |  |

| | | | | | | |
|-----|---------------|--------------|------------------------------|---------------------------------|--------------|---|
| 13. | Passeriformes | Sylviidae | <i>Pteruthius aenobarbus</i> | Chestnut fronted shrike babbler | Nil |  |
| 14. | Passeriformes | Sylviidae | <i>Turdoides gularis</i> | White throated babbler | Swae |  |
| 15. | Passeriformes | Sturnidae | <i>Acridotheres tristis</i> | Common myna | Setyet |  |
| 16. | Passeriformes | Sturnidae | <i>Acridotheres grandis</i> | White vented myna | Nil |  |
| 17. | Passeriformes | Pycnonotidae | <i>Pycnonotus cafer</i> | Red vented bul bul | Voak phin ni |  |
| 18. | Passeriformes | Pycnonotidae | <i>Pycnonotus blanfordi</i> | Streak eared bul bul | Voak chawe |  |
| 19. | Passeriformes | Muscicapidae | <i>Copsychus saularis</i> | Oriental magpie robin | Thabaikwe |  |
| 20. | Passeriformes | Cisticolidae | <i>Prinia hodgsonii</i> | Grey breasted prinia | Nil |  |
| 21. | Passeriformes | Passeridae | <i>Passer montanus</i> | Eurasian tree sparrow | Sargalay |  |
| 22. | Passeriformes | Passeridae | <i>Passer domesticus</i> | House sparrow | Sargalay |  |

4.11.2.1.3 Insects and Amphibians Fauna

Insects and amphibians being the most obvious groups observed on the project area. Surveys to identify the presence of these groups of animals were conducted through the use of stationary observation sites and walking transects on the property for general identification and utilizing the point count method.







Table 4. 46: Butterfly species (order Lepidoptera) recorded from KMIC Project Area

| Sr. No. | Order | Family | Scientific name | Common name |
|---------|-------|--------|-----------------|-------------|
|---------|-------|--------|-----------------|-------------|

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| | | | | |
|-----|-------------|--------------|---------------------------------|--|
| 1. | Lepidoptera | Nymphalidae | <i>Acraea terpsicore</i> | Tawny coster |
| 2. | | Nymphalidae | <i>Danaus genutia</i> | Striped tiger |
| 3. | | Papilionidae | <i>Papilio demoleus</i> | Lime butterfly |
| 4. | | Papilionidae | <i>Papilio demoleus</i> | Swallowtail butterfly |
| 5. | | Nymphalidae | <i>Euploea crameri</i> | Euploea crameri bremeri(Spotted black crow) |
| 6. | | Hesperiidae | <i>Lambrix salsala</i> | Chestnut bo |
| 7. | | Nymphalidae | <i>Tirumala limniace</i> | Oriental blue tiger |
| 8. | | Pieridae | <i>Eurema hecabe</i> | Grass yellow |
| 9. | | Nymphalidae | <i>Athyma ranga</i> | Black veined sergeant |
| 10. | | Pieridae | <i>Appias libythea</i> | Striped albatross |
| 11. | | Nymphalidae | <i>Junonia almana</i> | Peacock pansy |
| 12. | | Hesperiidae | <i>Taractrocera ceramas</i> | Grass dart |
| 13. | | Nymphalidae | <i>Celaenorrhinus ambareesa</i> | Spotted flat |
| 14. | | Pieridae | <i>Catopsilia pomona</i> | Emigrant |
| 15. | | Nymphalidae | <i>Eulaceura osteria</i> | Purple duke |

Table 4. 47: Recorded species of Butterflies from KMIC Project Area

| Sr. No | Order | Family | Scientific name | Common name | Image |
|--------|-------------|--------------|--------------------------|--|---|
| 1. | Lepidoptera | Nymphalidae | <i>Acraea terpsicore</i> | Tawny coster |  |
| 2. | | Nymphalidae | <i>Danaus genutia</i> | Striped tiger |  |
| 3. | | Papilionidae | <i>Papilio demoleus</i> | Lime butterfly |  |
| 4. | | Papilionidae | <i>Papilio demoleus</i> | Swallowtail butterfly |  |
| 5. | | Nymphalidae | <i>Euploea crameri</i> | Euploea crameri bremeri(Spotted black crow) |  |
| 6. | | Hesperiidae | <i>Lambrix salsala</i> | Chestnut bo |  |



| | | | | | |
|----|--|-------------|---------------------------------|-----------------------|---|
| 7. | | Nymphalidae | <i>Tirumala limniace</i> | Oriental blue tiger |  |
| 8. | | Pieridae | <i>Eurema hecabe</i> | Grass yellow |  |
| 9. | | Nymphalidae | <i>Athyma ranga</i> | Black veined sergeant |  |
| 10 | | Pieridae | <i>Appias libythea</i> | Striped albatross |  |
| 11 | | Nymphalidae | <i>Junonia almana</i> | Peacock pansy |  |
| 12 | | Hesperiidae | <i>Taractrocer a ceramas</i> | Grass dart |  |
| 13 | | Nymphalidae | <i>Celaenorrhinus ambareesa</i> | Spotted flat |  |
| 14 | | Pieridae | <i>Catopsilia pomona</i> | Emigrant |  |
| 15 | | Nymphalidae | <i>Eulaceura osteria</i> | Purple duke |  |

Table 4. 48: Dragonflies (order Odonata) recorded from KMIC Project Area

| Sr.no | Order | Family | Scientific name | Common name |
|-------|---------|--------------|---------------------------------|---------------------------|
| 1. | Odonata | Libellulidae | <i>Trithemis pallidinervis</i> | Dancing dropping |
| 2. | | | <i>Brachythemis contaminata</i> | Asian groundling |
| 3. | | | <i>Rhyothemis variegata</i> | Common picture wing |
| 4. | | | <i>Orthetrum prunosum</i> | Crimson tailed marsh hawk |

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| | | | | |
|-----|--|--|------------------------------------|--------------------|
| 5. | | | <i>Trithemis festiva</i> | Indigo dropwing |
| 6. | | | <i>Neurothemis tullia</i> (Male) | Pied paddy skimmer |
| 7. | | | <i>Neurothemis tullia</i> (female) | Pied paddy skimmer |
| 8. | | | <i>Rhodothemis rufa</i> | Common redbolt |
| 9. | | | <i>Potamarcha congener</i> | Common chaser |
| 10. | | | <i>Pantala hymenaea</i> | Spot winged glider |
| 11. | | | <i>Orthetrum sobina</i> | Green skimmer |

Table 4. 49: Recorded species of Dragonflies from KMIC Project Area

| Sr. No. | Order | Family | Scientific name | Common name | Photographs |
|---------|---------|--------------|------------------------------------|---------------------------|---|
| 1. | Odonata | Libellulidae | <i>Trithemis pallidinervis</i> | Dancing droping |  |
| 2. | | | <i>Brachythemis contaminata</i> | Asian groundling |  |
| 3. | | | <i>Rhyothemis variegata</i> | Common picture wing |  |
| 4. | | | <i>Orthetrum pruinosum</i> | Crimson tailed marsh hawk |  |
| 5. | | | <i>Trithemis festiva</i> | Indigo dropwing |  |
| 6. | | | <i>Neurothemis tullia</i> (Male) | Pied paddy skimmer |  |
| 7. | | | <i>Neurothemis tullia</i> (female) | Pied paddy skimmer |  |
| 8. | | | <i>Rhodothemis rufa</i> | Common redbolt |  |
| 9. | | | <i>Potamarcha congener</i> | Common chaser |  |




| | | | | | |
|-----|--|--|-------------------------|--------------------|---|
| 10. | | | <i>Pantala hymenaea</i> | Spot winged glider |  |
| 11. | | | <i>Orthetrum sobina</i> | Green skimmer |  |

Table 4. 50: Systematic position of Herptofauna recorded from KMIC Project Area

| Sr.no | Order | Family | Scientific name | Common name |
|-------|----------|-----------|-----------------------------|--------------------------|
| 1. | Squamata | Scincidae | <i>Mabuya multifasciata</i> | East Indian brown mabuya |

Table 4. 51: Recorded species of Herptofauna from KMIC Project Area

| Sr.no | Order | Family | Scientific name | Common name | Photograph |
|-------|----------|-----------|-----------------------------|--------------------------|---|
| 1. | Squamata | Scincidae | <i>Mabuya multifasciata</i> | East Indian brown mabuya |  |


4.11.2.1.4 Fish and Prawn Fauna







Recorded fish species have been studied with the help of fishermen at the wetland (flooded plain/flooded rice field) and fish ponds nearby the project area.

Table 4. 52: Systematic position of Fish and prawn fauna recorded from KMIC Project Area

| Sr. No. | Order | Family | Scientific name | Common name |
|---------|-------------------|--------------|--------------------------------|--------------------|
| 1. | Cypriniformes | Cyprinidae | <i>Danio spp:</i> | Striped danio |
| 2. | Perciformes | Anabantidae | <i>Anabas testudineus</i> | Climbing perch |
| 3. | Osteoglossiformes | Notopteridae | <i>Notopterus notopterus</i> | Featherback |
| 4. | Perciformes | Channidae | <i>Channa punctata</i> | Spotted snakehead |
| 5. | Siluriformes | Clariidae | <i>Clarias batrachus</i> | Walking catfish |
| 6. | Perciformes | Cichlidae | <i>Oreochromis mossambicus</i> | Mozambique Tilapia |
| 7. | Decapoda | Palaemonidae | <i>Macrobrachium marible</i> | Fresh water prawn |

Table 4. 53: Recorded species of Fish and prawn fauna from KMIC Project Area

| Sr. No. | Order | Family | Scientific name | Common name | Photographs |
|---------|---------------|------------|-------------------|---------------|---|
| 1. | Cypriniformes | Cyprinidae | <i>Danio spp:</i> | Striped danio |  |

| | | | | | |
|----|-------------------|--------------|--------------------------------|--------------------|---|
| 2. | Perciformes | Anabantidae | <i>Anabas testudineus</i> | Climbing perch |  |
| 3. | Osteoglossiformes | Notopteridae | <i>Notopterus notopterus</i> | Featherback |  |
| 4. | Perciformes | Channidae | <i>Channa punctata</i> | Spotted snakehead |  |
| 5. | Siluriformes | Clariidae | <i>Clarias batrachus</i> | Walking catfish |  |
| 6. | Perciformes | Cichlidae | <i>Oreochromis mossambicus</i> | Mozambique Tilapia |  |
| 7. | Decapoda | Palaemonidae | <i>Macrobrachium maribale</i> | Fresh water prawn |  |

4.11.2.2 Ecological Impact of the Project

Development of industrial complex projects as integrated scheme on single expanse of land such as the project area property brings within a series of environmental impacts. The

following section identifies anticipated environmental impacts resulting from the proposed project based on the information provided and, on the surveys, conducted in the area.

4.11.2.3 Loss of Vegetation Cover

Primary forests are forests of native tree species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed. Secondary forests regenerate on native forests, which have been cleared by natural or manmade causes, such as agriculture or ranching.

The clearing of the site in preparation for the construction phase represents an immediate and negative environmental impact to the area. The removal of trees, shrubs, herbs and other aquatic plants would reduce the existing vegetative cover, resulting in irreversible loss of natural habitat for floral and associated fauna in this area.

4.11.2.4 Loss of Terrestrial Fauna

The industrial construction activities and the presence of the development will impact negatively (disruptive) effects on the composition of the bird community and lead to loss of species from the area. There will obviously be loss of species from the area, however based on the low numbers of species observed, any loss would be negligible. IT is expected that most species would relocate to more suitable habitat.

Suggested mitigation especially with respect to the birds and insects are able to tolerate the replanting of the development. For sustain and safety of fish fauna care should be needed to avoid releasing anthropogenic wastes into it that is connected with wetland, Inns and Kalitaw creek near the project area.

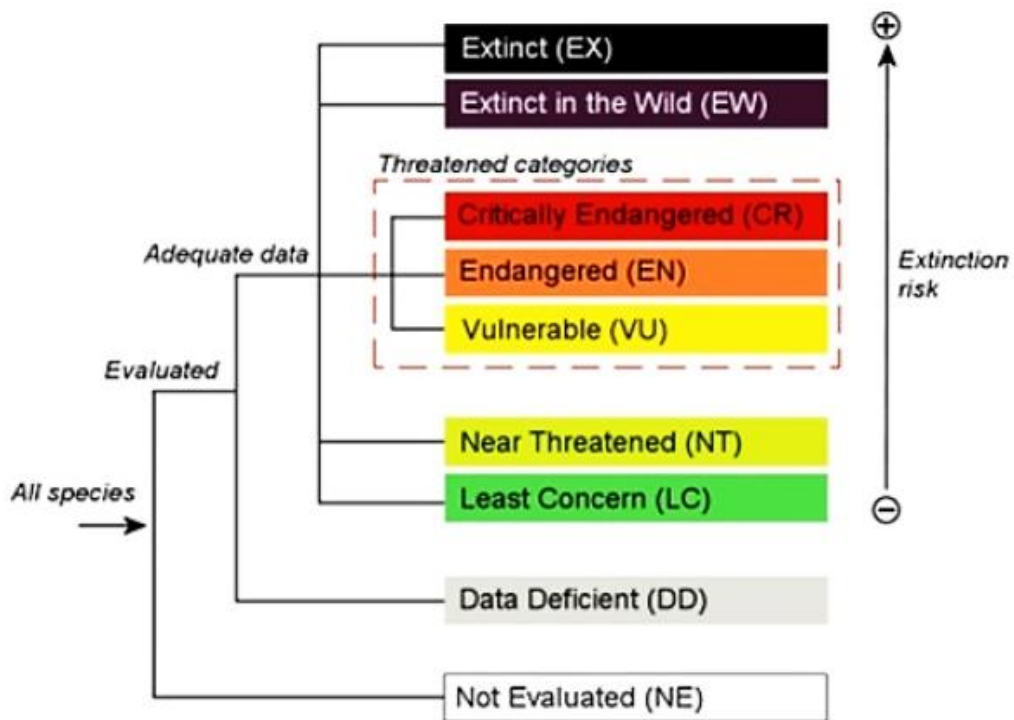
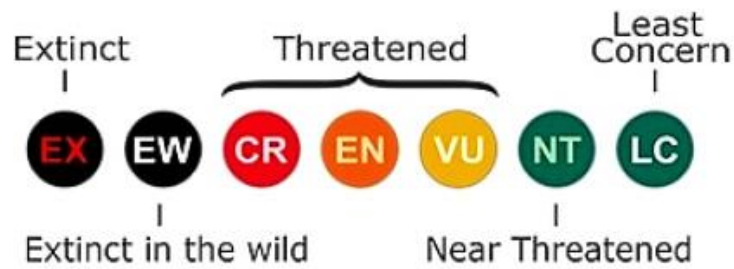
Table 4. 54: Recorded terrestrial plants species from KMIC Project Area

| Sr. No. | Forest type | Habit | Type | Family | Species |
|---------|-------------------------|---------------------|--------------------------------|--------|---------|
| 1. | Secondary growth forest | Trees | Wilde type and Vegetation type | 38 | 58 |
| | | Small trees | Wilde type and Vegetation type | | |
| | | Shrubs | Wilde type | | |
| | | herbs | Wilde type | | |
| | | Climbers/Creepers | Wilde type | | |
| | | Aquatic plants | Wild type | | |
| | | Horticulture plants | Vegetation type | | |
| | | Ornamental plants | Vegetation type | | |

Table 4. 55: Recorded species of Fish fauna from KMIC Project Area

| Sr. No. | Name | Order | Family | Species |
|---------|--------------------------|-------|--------|---------|
| 1. | Avifauna | 7 | 14 | 22 |
| 2. | Insects fauna(Butterfly) | 1 | 4 | 15 |
| 3. | Insects fauna(Dragonfly) | 1 | 1 | 11 |
| 4. | Herpetofauna | 2 | 2 | 2 |
| 5. | Fish and prawn fauna | 5 | 7 | 7 |

4.11.2.5 Protection Measures of Animal and Plant Species



According to the Plant Species of IUCN Red List in Myanmar, among the surveyed plant species, if *Wedelia calendulacea* Nees (LC) and *Mangifera spp.* are in Burmese (တောသရက် နှင့် ဆင်နင်း သရက်), these plants can be declared as prohibited trees. *Ptreocarpus macrocarpus* Kurz and *Lagerstroemia Speciosa* (L) Pers among the surveyed plant species are prohibited trees. By leaving the hard wood trees as they were and/or moving these trees to a place for landscaping purpose will be done for protection of hard wood trees. By conserving the trees, biodiversity can also be conserved and protected.

If there is a need to plant trees, the following plants/trees will be selected: plants/trees which absorb more pollutants and carbon dioxide and release oxygen, fruits of plants are likened by animals (birds and squirrels etc.) and plants good for landscaping. The plant experts will be discussed for conservation of biodiversity.

For protection of aquatic plants and animals, the warning signs like “No fishing, No cutting grass, Fines will apply” will be erected.

4.11.2.5.1 Ecological Impact of the Project

Development of industrial complex projects as integrated scheme on single expanse of land such as the project area property brings within a series of environmental impacts. The following section identifies anticipated environmental impacts resulting from the proposed project based on the information provided and, on the surveys, conducted in the area.

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Primary forests are forests of native tree species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed. Secondary forests regenerate on native forests, which have been cleared by natural or manmade causes, such as agriculture or ranching.

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Suggested mitigation especially with respect to the birds and insects are able to tolerate the replanting of the development. For sustain and safety of fish fauna care should be needed to avoid releasing anthropogenic wastes into it that is connected with wetland, Inns and Kalihtaw creek near the project area.

4.11.2.5.4 Biological Environment (Construction Phase)

Protected areas

There is no protected area in the proposed project area and surroundings.

Loss of wildlife

There is no IUCN Red listed threatened species in the proposed project area and surroundings.

Destruction of vegetation and expelling of wildlife to other places

Conversion of vegetation-covered land into industrial compound of the KMIC project will involve land leveling and removal of trees and plants over the whole project site. This action will cause negative impact on wildlife and ecosystem of the current landscape and the area's vegetation which is largely composed of scrub, herbs, and grasses. No timber tree is present.

This means a negative impact on the current function of the fragile ecosystem of shrub-herb and semi-aquatic environment where terrestrial and aquatic organisms depend on the formed food chain, as vegetation provides habitat and cover for organisms, as well as providing the stability of soil. The situation will force other wildlife migrate to other habitable places. The animals currently living in the project area will disappear. Animals such as long distance flying birds, some rodents, butterflies, bat and some mammals are able to overcome the impact of habitat destruction, but some animal such as earth-dwelling arthropods, small insects and unmovable plants will face termination of life. The

significance level of impact is low.

Disturbance to aquatic organisms and aquatic habitats

Aquatic ecosystem of Hpayo Stream and project-site's surrounding waterways will be changed both in terms of drainage capacity and pollution level by faster run off from the project site and its waste water discharge.

Potential toxic effects to plants and animals as a result of air or water pollutant discharges or waste-disposal activities of industries will also have negative impact on surrounding ecological function. Therefore, number and species of current level existence of fishes and invertebrates including aquatic insects will decline along with the reduction of microorganisms. The significance level of impact is medium.

4.11.2.5.5 Biological Environment (Operation Phase)

Changes to terrestrial flora and fauna

Due to operation works terrestrial flora and fauna will be impacted. The significance level of impact is negligible.

Changes to aquatic flora and fauna

Due to operation works aquatic flora and fauna will be impacted. The significance level of impact is medium.

4.11.2.5.6 Mitigation Measures for Biological Environmental Impacts (Construction Phase)

Destruction of vegetation and expelling of wildlife

The plants in this site and surrounding and the potential impact on animals may not be necessarily significant either as the animals around the site would have run away with fear by the activities of construction and move further away into nearby forests. Therefore, the developer will make the proper demarcation of the project area that would be affected by construction works. This is aimed at ensuring that any disturbance to flora and fauna is restricted to the actual project area and avoids spillover effects on the neighboring areas. There will also be strict control of construction vehicles to ensure the avoidance of unnecessary disturbance of vegetation. The mitigation measures (for e.g. replantation with native species, leaving native trees/plants and supporting Environmental Education and Public Participation and Environmental Protection activities through CSR programs) would be adopted.

Disturbance to aquatic organisms and aquatic habitats

The decline of biodiversity (loss of species in aquatic environment) will be mitigated by banning fishing in fish spawning season and electric shock catching.

The following mitigation measures to minimize the negative impact to the biological environment will also be adopted by the developer:

- All the marginal and common lands available in the nearby area would be brought into a plantation program giving priority to native species for good green cover.
- Biological mitigation measures which were suggested for impacts to vegetation is providing the implementation of revalidation programs elsewhere outside of the project site which store top soil for reapplication. Replacing or restoring the vegetation is the most critical of all mitigation activities if the environmental impacts to the

biological environment are to be minimized.

- Community Forestry (people's committee at village level) would be placed in the center of redevelopment efforts so as to provide protection of common property resources, local employment, and local people's participation (including women).
- Raising public awareness upon presence of healthy ecosystems where trees and wildlife including micro-organisms and invertebrates should be present to maintain food-chains, food-webs, and biogeochemical cycles balanced would be strengthened assisting with an environmental education program.

4.11.2.5.7 Mitigation Measures for Biological Environmental Impacts (Operation Phase)

Changes to terrestrial flora and fauna

Replantation of native species and leaving native trees/plants as much as possible will be adopted to reduce the negative changes to terrestrial flora and fauna. The restored natural habitat will be conserved and protected from any activities of operation phase. The project will continue this activity through the operation phase as much as possible.

Changes to aquatic flora and fauna

The decline of biodiversity (loss of species in aquatic environment) will be mitigated by banning fishing in fish spawning season and electric shock catching. The wastewater disposed to the waterways will be treated to the acceptable limit.

4.11.2.6 Discussion and Conclusion for Biodiversity

The studies area from the diversity of avifauna that is recorded species in the proposed area, habitats vegetation for richness of other fauna has been fragmented by human exploitation and modification in the project area. Selecting appropriate plant species for replanting is essential in determined the types of birds, butterflies and other fauna that will re-inhabit the site upon completion if the project.

Industrial clearing of tropical forests for non-timber plantations has been a key driver of biodiversity loss in tropical zone.

A large proportion of plantations are monocultures of fast growing, low-density wood species, such as *Pinus spp.* or *Eucalyptus spp.*, used for fuel, or the pulp and paper industry, notably *Acacia spp.* These plantations also often consist of exotic species, and consider them as a separate category, because they are typically harvested on a much shorter time cycle than timber plantations.

Agro forestry maintains a structural diversity that imitates the native forest better than conventional pastures, row crops, and monoculture plantations. In agro forestry systems, perennial tree crops such as coconut, rubber, and other woody plants replace the original forest understory but some canopy trees are left for shade.

The variable impacts of forestry management types on local species richness of different taxa, we conduct a global categorical meta-analysis, using log response ratio as a measure of effect size. Existing meta-analyses on the subject are either restricted to a region of the taxon e.g. plants, management type e.g. selective logging, or consider forestry as one generic land use type without accounting for differences in management types.

The recent trend to destroy forests and to replace them with alien tree plantations, euphemized by timber industry supporters as "planted forests". The expose this dishonesty, it is necessary to enlist the expert views of indigenous peoples and others who are prepared to stand up in defense of the truth: Plantations are not forests!

The estimates for three vegetation layers (canopy, sub canopy, and tall shrub) on primary and secondary sites. The midpoint of the field estimated cover class at each point as our cover estimate importance values by multiplying the percent contribution of each species by the midpoint of the cover class for the primary and secondary forest.

The suggestion of the maintaining and replacing green areas on the development site with trees, shrubs, herbs and other aquatic plants that would continue to attract avifauna and insect species to this area. Plant large trees on perimeter of compound to create a natural windbreak, which will also serve the purpose of being a sight screen.

The materials produced from industrial process released into the atmosphere or discharged into streams or rivers cause pollution. Pollution in the environment affects both animals and plants, either by causing a loss in productivity (slower growth and loss yield) or by damage to tissue, thus causing illness or disease. Pollution can occur in the atmosphere, in the soil, in the sea or in fresh water causes pollution. The progressive accumulation of wastes causes pollution.

Pollution entering the atmosphere produces their effects in many ways; Noise pollution of construction site and vehicles may stress to different fauna of this area and it should be minimized as possible as. This was related to the development plans and the potential impacts identified.

Recommendations are made which are aimed at ensuring compliance with relevant environmental status and ensuring the preservation or restoration of the ecological balance through the mitigation of anticipated impacts.

According to ecological impact, indicator that reveals negatively impact to habitat, biodiversity, change in drainage pattern and soil erosion and noise pollution but positive impact on recover plantation in the project area of industrial construction which having little negative of impact weight.

4.11.3 Social Environmental Baseline Data Collection

4.11.3.1 Setting the Study Limit

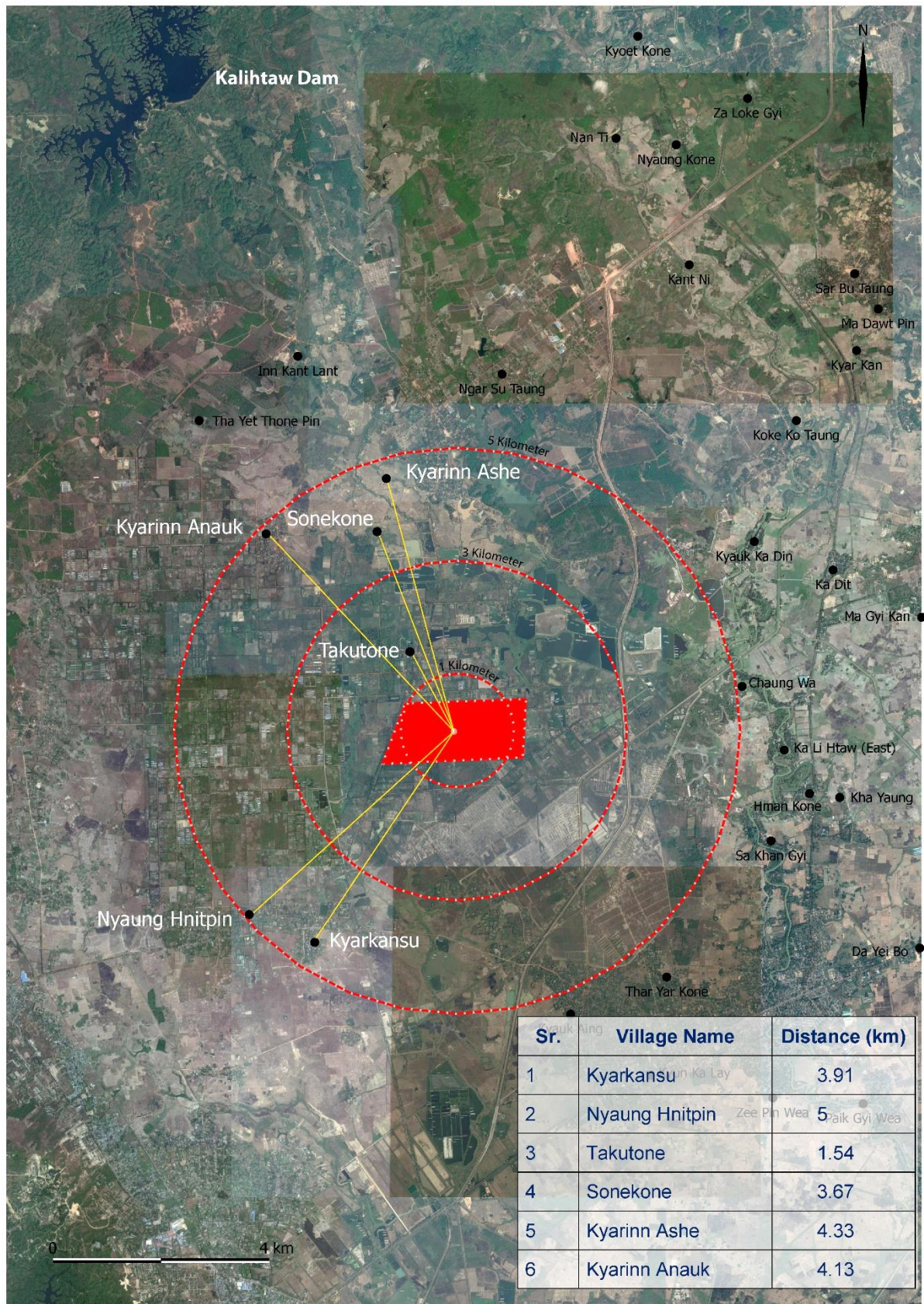


Figure 4. 67: Map of Study Limit

The Social Impact Assessment (SIA) process comprised three parts:

1. Public consultation and disclosure;
2. Social baseline; and
3. Social Impact Assessment.

Early consultation with all interested parties is an essential part of study.

The approach was to focus on:

- Key stakeholder interviews in 6 villages located in 5 km radius from the project site. Village heads, village administrative officials, religious leaders, local business community, school teachers, health workers, local stores and villagers (including women, young and old people) in villages were interviewed.
- Village profiles of 6 villages have been established.
- Directly and indirectly affected PAPs in communities, households, and individuals who live in close proximity to the proposed project site as well as officials from three agricultural and animal breeding zones and village administrations of the Nyaung Hnitpin area were invited to participate in the Public Consultation meeting which was held at Zone no. 2.

4.11.3.2 Summary of Takutone Village Profile (Nearest Village to Project Site)

| 1 | Village Name | Takutone |
|----|----------------------|---|
| 2 | Number of Households | 120 |
| 3 | Population | 570 |
| 4 | Education | Middle school - 1 |
| 5 | Health | Midwife - 1 |
| 6 | Economy/Business | Small shop - 8 Light Truck - 2 Motorcycle (motorcycle taxi) - 20 Agriculture: - Livestock: Fish, Chicken, Pig |
| 7 | Transport | Light Truck - 2 Three wheeler - 1 Motorcycle - 40 |
| 8 | Communication | Mobile Phone MPT, MEC, Ooredoo – 250 TV - 60 Radio - 5 |
| 9 | Social | Monastery - 1 |
| 10 | Other | Electricity <ul style="list-style-type: none"> • 84 households with electricity from EPC • 36 households without electricity from EPC Water <ul style="list-style-type: none"> • Tube well -10 • Hand-dug well - 70 |
| 11 | Religion | Buddhist |

4.11.3.3 Key Points raised by local communities living around the project site

1. An agricultural zone has been established around the project site. Each individual owner was offered 5 acres of land per unit so as to grow vegetables and seasonal plants.
2. Perennial trees are, however, grown in some yards. The farm-yard owners are worried that the forest fire may spread to their farm-yards if it breaks out in the Nyaung Hnitpin project complex area.
3. Some of the fields cultivated with crops have the water supply through irrigational channels while most of the cultivators rely on artesian/tube wells.
4. People from 6 villages in the immediate vicinity of the project area warmly welcome current investors. They hope there will be more employment opportunities and road transport and socio-economic conditions will be significantly improved only if the factories emerge.
5. Health, economic and educational situations have a lot of difficulties due to the extremely ruined roads that link the area with the nearby villages.
6. As there is a rural dispensary in only one village, the locals are facing with difficulties in seeking health services. As the roads are getting worse in monsoon, the nurses find it difficult to go from one place to another.
7. The Agricultural and Livestock Breeding Zone No 2 is the flood-prone area because it is close to the Takutone Inn (fishery) and lies on the low-land. In this area, business people buy land, dig fish-breeding ponds and breed fish. Digging ponds causes diversion of the natural flow of water and slowdown of water flow, leading to flooding.
8. Another flood-prone area is Takutone Village, adjacent to Nyaung Hnitpin and the Agricultural and Livestock Breeding Zone No 2 and it is also located in the low-lying part of the land. Takutone Inn (fishery) is next to Takutone Village. If the Agricultural and Livestock Breeding Zone 2 is flooded, so is Takutone Village. The floods never reached this village in the past. Flooding began to occur in this village after formation of zones in 2000.

4.11.3.3.1 Causes of Flood

More than 30 years back, the villages existed as small villages and in front of these villages there was natural lakes (loches - in Myanmar language "Inn"). In rainy season, the rain water drained from villages flew into these natural lakes naturally and the villages did not experience any flood issues. However, due to the establishment of three (3) agricultural and livestock zones and earthen roads were made and lack of sound drainage system blocked the water flow and consequently the villages were flooded in rainy season especially on heavy rains. In addition, the naturally flowing water could not flow easily into the natural lakes and more floods occurred in villages. The other cause was blocking the naturally water flowing to the natural lakes and fish and poultry farms were established in these lakes. Due to the absence of village drainage system and drains, the villages in the west of Ngar Suu Taung road have floods in heavy raining days. Yet, the agricultural and livestock zone (3) does not have any flood problems. By constructing the proper drains and drainage system, the flooded villages can avoid any flood problems.

4.11.3.4 Interviews with Villagers

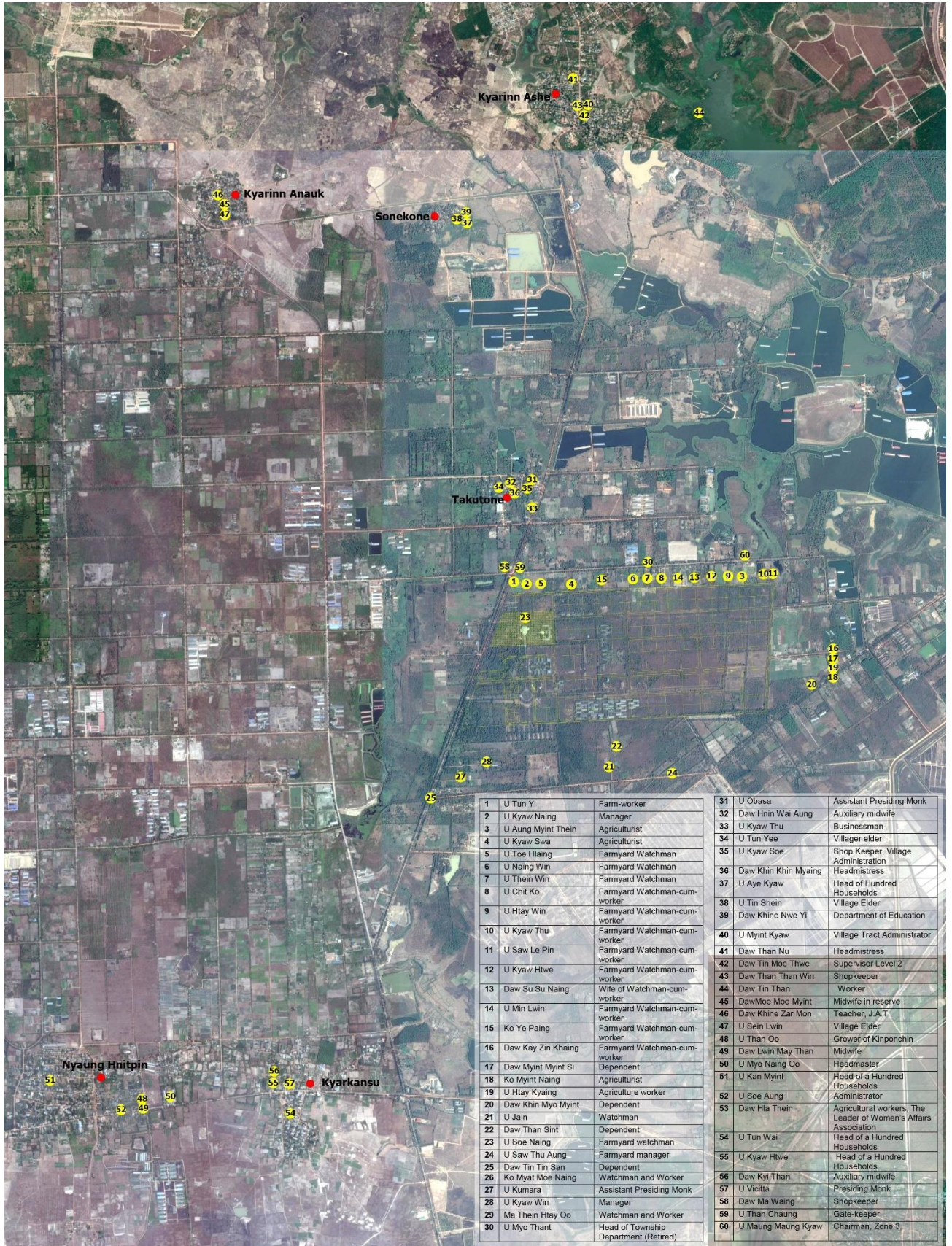
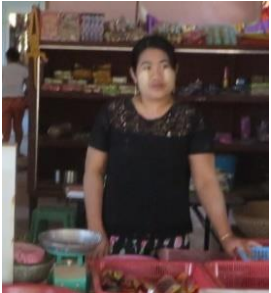





Figure 4. 68: Location of some villagers interviewed by SIA Team


| | | | |
|---|---|---|---|
| 1 | Name: | Daw Ma Waing |  |
| | Age: | 35 | |
| | Address: | Agriculture and Livestock Breeding Zone 2, Nyaung Hnitpin, Hlegu Township | |
| | Occupation: | Grocer | |
| | Rank: | Shopkeeper | |
| | Tel: | 09 976 308000 | |
| | <p>I haven't known that an industrial zone is to be established in the immediate vicinity. This is Nyaung Hnitpin Agriculture and Livestock Breeding Zone 2. People from here have to go to work at Hmawbi Industrial Zone (Sanchaungpau). I have been living here for over 10 years. There is a tractor repair workshop (agricultural machinery factory) in the neighbourhood. Some of the people have to go to work at Shwepyitha Industrial Zone. We have only a primary school. The middle school students from here have to attend the middle school in Nyaung Hnitpin Village. We have to go to the Rural Healthcare Centre in Ngar Suu Taung Village. Our village products are vegetables and fruits. We are happy if an industrial zone emerges near our village. We agree with it. We also hope that we will have better roads and bridges with the emergence of the industrial zone. It will also be a job creation for the people in this area. The nearest villages to the Nyaung Hnitpin Zone are Takutone, Photanagone, Kyarinn, Sonekone, Thayekyun, and Nyaung Hnitpin Villages. I feel joyous because my grocery will sell better if the industrial zone comes into existence.</p> | | |

| | | | |
|---|--|---|---|
| 2 | Name: | U Than Chaung |  |
| | Age: | 65 | |
| | Address: | Agriculture and Livestock Breeding Zone 3, Nyaung Hnitpin, Hlegu Township | |
| | Occupation: | Security for the zone | |
| | Rank: | Gate-keeper | |
| | Tel: | 09 9729 70250 | |
| | <p>I haven't known that an industrial zone will be built in Nyaung Hnitpin. The zonal chairman U Maung Maung Kyaw has once told me about that project. He is the chairman of the Agriculture and Livestock Breeding Zone 3. He is doing agricultural business. I have to collect tax from the cars passing the gate and check them for security. This road is built by the entrepreneurs living on this road after raising funds. Some of my children are in Hlegu. Some are in the armed forces. There is one teacher. Both my wife and myself—only two of us—are here. I hope the locals will have job opportunities if an industrial zone is built here. We are hoping that certain roads will be improved then. For these reasons, I agree with the construction of the industrial zone.</p> | | |


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|---|-------------|--|---|
| 3 | Name: | U Maung Maung Kyaw |  |
| | Age: | 53 | |
| | Address: | No 3 Industrial Zone Road, Agriculture and Livestock Breeding Zone 3, Nyaung Hnitpin, Hlegu Township | |
| | Occupation: | Agriculture and Livestock Breeding | |
| | Rank: | Chairman, Zone 3, Agriculture and Livestock Breeding Zone | |


| | |
|---|---------------|
| Tel: | 09 4500 29805 |
| <p>I have already known that an industrial zone is to be established in Nyaung Hnitpin . I have been informed that a team from Korea will come and meet me. They will come and discuss the construction of an industrial zone. If MSR Team conducts EIA/SIA assessment, it is very suitable to do that. We are ready to give you necessary help regarding the EIA/SIA assessment. What I specifically desire is the development of this area. It is not for individual purpose but for the purpose of supporting the socio-economic development of our region and our people. If you want to hold a public consultation meeting, I will invite people, provide a venue and help your discussion to be successful.</p> | |

| | | | |
|--|-------------|---|---|
| 4 | Name: | U Tun Yi |  |
| | Age: | 56 | |
| | Address: | Farm No. 1, 2, Agriculture and Livestock Land (3), Nyaung Hnitpin, Hlegu Township | |
| | Occupation: | Rubber Seedlings and Fruit Plants Agricultural Farm | |
| | Rank: | Farm-worker | |
| | Tel: | 09 7674 33487 | |
| <p>I have lived on this farm as a farm-worker for 4 years. There are one manager and 4 farm-workers working on this farm. My birth-place is Labutta. I stay here alone. There are two other men living with their families. The children from here go to the Primary School in Takutone by bicycle. The children of the manager go to attend school in Hlegu in their car. My salary is 120,000 kyats. The proceeds from the sales of farm-crops and rubber seedlings have to be given to the owner through the manager. Drinking water, water for domestic use and agriculture are obtained from the hand scooped well by pumping up. If the family members are not well, they have to go to the clinic in Ngar Suu Taung Village by hired motorcycle. The motorcycle fee is 3,000 kyats for round trip. We find it difficult to travel during the monsoon because of the ruined roads. If this new industrial zone emerges, it is good to have job-opportunities. I think the socio-economic status will be higher as the locals and their children will get jobs. I don't think the establishment of industrial zone will not have bad impacts on us. If there are favourable job creations, locals will come and join it. As the wells dry up in summer, the water is pumped up from the drains to be used during the months between April and June, the hot months. The water fetched from the wells is used for drinking and for domestic use.</p> | | | |


| | | | |
|---|-------------|--|---|
| 5 | Name: | U Kyaw Naing |  |
| | Age: | 39 | |
| | Address: | Farm No. 1, 2, Agriculture and Livestock Zone (3), Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Rubber Seedlings and Fruits & Crops Agricultural Farm | |
| | Rank: | Manager | |
| | Tel: | 09 7746 00086, 09 4546 00086 | |
| <p>I have worked on this farm for 5 years. I'm a staff-member of the Inter-Myanmar Pacific Co., Ltd. (IMP). The farm block numbers 1, 2, 6, and 8 belong to this company. The owner of this farmyard is Retired Major General Khin Maung Than. My salary is Ks. 300,000. I was once a staff member of the Agriculture Department.</p> | | | |


Water is available from tube wells that can be dug here. If a 4-inch-diameter well is dug, the water is found at a depth of 100 feet. But the water at this depth can be used only for agriculture. We cannot drink it because it contains too much iron. The water fit for drinking is found at a depth of 300 feet. The hand-dug well we are now using is dug up to 8 to 10 feet deep. It is dug at a location 50 feet deep from the ditch of the Irrigation Department. When the irrigational canal has no water, the water in the wells dries up. U Maung Maung Kyaw, No. 3 Zone Chairman and Yangon Region Chief Minister U Phyo Min Thein have once said an industrial zone will be constructed in the compound of the past Nyaung Hnitpin National Convention venue. If an industrial zone comes into existence, we will have employment opportunities and road links. I don't anticipate any negative impact. As the roads are bad, students and those who have to go to the health care centre are faced with difficulties. The roads become worse during monsoon. If the CSO (corporate social responsibilities) is to be provided, we expect that certain portion is spent on improving roads. We also need a clinic. It will be appropriate if the company making investment does it. I tried to enroll my children at the Nyaung Hnitpin High School. But as there are not enough rooms for incoming students there, I sent my children to a Hlegu private High School. There is Ngar Suu Taung High School, but it is very far and the roads have been ruined. We have to go to the Tagukone monastery for religious activities. We have no graveyard for the funeral rites such as cremation and burial. We go to the Takutone village for such affairs. There are 120 households, with a population of 600, in No. 3 of Agriculture and Livestock Zone. On our farm, a male worker earns Ks. 3,500 and a female worker Ks. 3,000 as daily wages. The general prevailing daily wage for a worker Ks. 6,000.

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| 6 | Name: | U Aung Myint Thein |  |
| | Age: | 52 | |
| | Address: | Farmyard No 16, Land No 3 of Agriculture and Livestock, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Agriculturist | |
| | Tel: | 09 7672 93779 | |
| <p>Vegetables are grown on this farm. I have worked on a leased land for about 2 years. My birthplace is Letpadan Township. I have four family members including a son and a daughter. If there emerges an industrial zone, the locals including my children will have jobs. I've already heard of building an industrial zone that will bring benefits for us. Currently, people find it difficult to go to school or clinic. If one goes to Main Road No 3 or Highway Road by motorcycle, we have to pay a round-trip fee of Ks. 3,000. The road is good there. It is not convenient to use the road to Tagukone, Ngasutaung and Nyaung Hnitpin villages because it is not in good condition. I have to pay Ks. 50,000 per acre per year to lease this 5-acre farm. If I hire a worker from outside, a worker (male) is to be paid Ks. 5,000 a day and a worker (female) is paid Ks. 4,000 a day respectively. I have no idea whether what would be the impact of the industrial zone.</p> | | | |



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|-------------|----------|--|---|
| 7 | Name: | U Kyaw Swa |  |
| | Age: | 36 | |
| | Address: | Farmyard No. 5, Land No. 3 of Agriculture and Livestock, Nyaung Hnitpin Area, Hlegu Township | |
| Occupation: | | Agriculture | |

| | | | |
|--|--|-------------------------|--|
| | Rank: | Agriculturist (Private) | |
| | Tel: | 09 4202 01041 | |
| | <p>I came to this farmyard before 2008. I've known that it is owned by Major General San Sint (Retd.). I haven't known that an industrial zone will be constructed in the complex of Nyaung Hnitpin National Convention. I grow mint and other varieties of flower plants which are sold at Htaukkyant Market. Regarding education, people from this area go to attend the Nyaung Hnitpin High School. We go to the government clinics and private health care centres for medical treatment. It is inconvenient for us to use those ruined roads leading to those places. The situation becomes worse in monsoon. They can be used in summer, though. We hope we will have employment opportunities if there emerges an industrial zone in the vicinity. It will be better if the factories and companies that can export the products from Agriculture and Livestock zone will be included in that zone. The agriculture and livestock zone has no cemetery. We have to use the Takutone graveyard for our funeral rites. We have many difficulties because we have to wade through the water about 2 feet deep during monsoon. The locals here need good roads that can be used in all seasons. Good roads will give us convenient access to deal with the affairs of education, health, society and religion. There are no longer wild animals such as barking deer, samburs, boars, etc. which used to be there. But there are still many species of snakes and birds. The construction of an industrial may have either good or bad impacts on us. We are worried to evacuate from our land as a bad impact.</p> | | |


| | | | |
|---|---|---|--|
| 8 | Name: | U Toe Hlaing |  |
| | Age: | 39 | |
| | Address: | Farmyard No. 3 and 4, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Farmyard Watchman | |
| | Tel: | | |
| | <p>I have 5 family members, including 3 children. I have been working in this farmyard for about 6 years. I grow vegetables and seasonal fruit trees and earn my living by selling them. I use a hand scooped well for the water required for agriculture. That well was 8 feet in depth. It provides us with enough water for agriculture as well as for domestic use. I haven't known that an industrial zone will be built in the complex of Nyaung Hnitpin National Convention. I believe it will bring benefits to our locals and our own children—getting jobs at the industrial zone. My children go to attend the primary school in Takutone village. The high school students have to go to Nyaung Hnitpin High school. If we are sick, we go to a traditional medical practitioner in Takutone Village. There are government clinics in Nyaung Hnitpin and Kyarinn Villages. We need a school and a clinic for our agriculture and livestock zone. The plants grown in this farmyard are known as 'Aurisha' which are now about 5 years old each and the circumference of each is about 12 inches. The stem of the plant can be used as posts in building houses. I have no idea whether there will be good or bad impacts. But I hope there will not be bad impacts. We have no serious diseases here such as malaria, cholera, etc. We only have minor illnesses.</p> | | |

| | | | |
|--|-------------|---|---|
| 9 | Name: | U Naing Win |  |
| | Age: | 45 | |
| | Address: | Farmyard No. 9, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Farmyard Watchman | |
| | Tel: | 09 3131 0234, 09 7999 21540 | |
| <p>I'm a watchman and grow flower plants and trees. I have been doing agriculture for 7 years. I have 6 family members. My children go to Takutone primary school and Ngar Suu Taung High School. When we are ill, we go to Ngar Suu Taung public health care centre and private clinics. I haven't known that an industrial zone is to be established in the complex of past Nyaung Hnitpin National Convention. Now it has been confirmed as you have just told me about it. The factories that exude odour in the environment should not be included in this new industrial zone. I will not object to this project if there is no factories that release bad smell. We hope we will have good roads if an industrial zone is established. We have to dig tube wells to get water for domestic use and for drinking purposes. Formerly Irrigation Department supplied water and we had to use that water in the drains near our farmyard. Now we get no water from the Irrigation Department and we can only grow Eugenia. We have dug three tube wells in our farmyard. When we went to the Irrigation Department and requested it to supply water, they complied with our request. I haven't got water from there for about 3 years. The most crucial requirement for this locality is water for agriculture and good roads for better transport.</p> | | | |


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|--|-------------|--|---|
| 10 | Name: | U Thein Win |  |
| | Age: | 57 | |
| | Address: | Farmyard No. 10, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Farmyard Watchman | |
| | Tel: | 09 4578 32794 | |
| <p>I have worked in this farmyard for 6 years. My birthplace is Kyaiklat. I have five family members including three children. I grow perennial fruit trees such as mango, jackfruit and Eugenia. The owner of this farmyard is Lt. Col San Matu. He gives me Ks 50,000 per month as a watchman. I also grow seasonal plants in some parts here. I have ever heard of establishing a new industrial zone in the complex of Nyaung Hnitpin National Convention. I feel happy to hear that an industrial zone will be constructed because the locals will have jobs. I think the construction of factories will not have bad impacts on us. We find it difficult to deal with health and educational matters because the roads in this area are in bad condition. I want the companies constructing factories to help improve road transport. Currently we get water for drinking as well as for domestic use from the tube well. As the water for agriculture is not available from the irrigated water, it is fetched from the tube well. For this reason, water for agriculture should be provided in all seasons. For the time being, the irrigated water cannot reach the nearby drains starting from January until the end of May and June every year. This has been going on for about 2 or 3 years. I hope the lives of the locals will be much better than the current situation if there emerges an industrial zone.</p> | | | |

| | | | |
|----|---|--|---|
| 11 | Name: | U Chit Ko |  |
| | Age: | 36 | |
| | Address: | Farmyard No. 11, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Farmyard Watchman-cum-worker | |
| | Tel: | 09 7984 34654 | |
| | <p>I have been working in this farmyard for 4 years. I have 8 family members including 6 children. The owner of the farmyard is U Soe Myint living in Yangon. We grow ram button plants in this farmyard. They have been grown for about 4 years and they are bearing fruits. If they are in 5 year-term, they will bear more fruits. The money earned from selling rambutan fruits is paid to the owner.</p> <p>The owner himself also comes and picks fruits. The farmyard owner gives me Ks 20,000 per month as a watchman's salary. When I work in the farmyard, I get daily wage. A daily-wage earner (male) is given Ks 3,000 a day and a female worker Ks 2,500 a day. My family members work as daily-wage earners. If workers from outside areas are to be hired, a male worker is given Ks 5,000 a day and a female worker, Ks 3000 a day. My children go to attend the post-primary school in Zone 5. If we are sick, we have to go to the midwife in Takutone Village for medical treatment. If we suffer from serious diseases, we have to go to the Ngar Suu Taung health care centre. Sometimes we also need to go to the Hlegu hospital. We find it very difficult to go to Takutone, Ngar Suu Taung and Nyaung Hnitpin villages for health matters in monsoon because the roads to those villages are bad. For those reasons, the roads leading to those villages should be improved to be able to use conveniently in all seasons. As the irrigated water does not reach our farmyard, we dug a hand scooped well to get water for agriculture, for drinking and for domestic use. The well is about 15 feet deep. If the irrigated water is available all the year round, it will be more convenient. We want the irrigated water to be supplied to reach our farmyard. I am happy to hear that an industrial zone will be built in the complex of Nyaung Hnitpin National Convention. I feel happier because people from nearby places will get jobs at the factories. I don't think that construction of factories will have bad impacts on the locality. I hope it will be a good impact on us.</p> | | |
| 12 | Name: | U Htay Win |  |
| | Age: | 43 | |
| | Address: | Farmyard No. 15, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Farmyard Watchman-cum-worker | |
| | Tel: | 09 7736 87948 | |
| | <p>I have worked in this farmyard for 5 years. The owner is Daw Hteik Hteik living in Yangon. The main plants grown in the farmyard are Eugenia trees. They are ordinary. We did not grow ASEAN Eugenia. As the plenty of water is not available, we grow only ordinary Eugenia. We use water the tube well we dug. The irrigated water is available only in monsoon. It hasn't reached here in summer for 3 years. My wife and I myself live here. So there are 2 family members. If we are ill. We go to the Ngar Suu Taung Health Care Centre for medical treatment. I think it is better if an industrial zone emerges in the vicinity. I feel happy because I hope that the locals</p> | | |

will get jobs in that zone. I want to object to building factories that exude stink smells. We feel very inconvenient in the Agriculture and Livestock Zone 3 as the smells from the poultry farm and the cowsheds are awful. It is worse in monsoon. We are worried about those awful smells that will cause ill-health. We are worried about those bad smells that will cause ill-health. For those reasons, only the factories that do not pour out bad smell should be built.


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| 13 | Name: | U Kyaw Thu |  |
| | Age: | 33 | |
| | Address: | Farmyard No. 18, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Farmyard Watchman-cum-worker | |
| | Tel: | 09 7882 41569 | |


I have worked in this farmyard for 2 years. Formerly I lived in my father's farmyard. There are 6 family members including children. My children are in 6th grade, attending the post-primary school in Agriculture and Livestock Zone 3. Next year, they will be in the 7th grade and will have to attend the Nyaung Hnitpin High School. When we are ill, we go to Ngar Suu Taung for medical treatment. In the rainy season, the muddy tracks make it difficult to go there. In summer, the ground tracks are so dusty that we are worried about the dust that may cause harm to our health. We need good roads to Ngar Suu Taung and Nyaung Hnitpin villages and they must be useful in all seasons. We grow perennial trees in our farmyard such as eaglewood, mango and jackfruit. The owner himself comes and picks the fruits. The owner is Police Colonel U Aung Naing (Retired). We grow vegetables in monsoon and in winter. We do it in accordance with the permission of the owner. We grow vegetables and sell them without the need to pay the owner. If there emerges a new industrial zone in the complex of Nyaung Hnitpin National Convention, the locals and the people from the nearby area will get jobs. So I am happy about it. I am worried about the roads that may become worse if there is the traffic of heavy trucks in and out of the construction sites. I have no idea whether there will be other bad impacts. I have heard that an industrial zone will be constructed in the complex of Nyaung Hnitpin National Convention since last year. I haven't got any information this year.

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| 14 | Name: | U Saw Le Pin |  |
| | Age: | 46 | |
| | Address: | Farmyard No. 18, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Farmyard Watchman-cum-worker | |
| | Tel: | 09 4517 42451 | |

I have been working in this farmyard for 4 years. My birthplace is Labutta. There are 5 family members including 3 children. Two of them, still single are working in this farmyard. The youngest child is attending the post-primary school in the Agriculture and Livestock Zone. I am given Ks 100,000 per month as a salary for a watchman. My two sons earn Ks 70,000 per month each. We grow jackfruit and mango. We fetch water from the pond which is in our farmyard. Water is available from there until the monsoon. The pond is one acre wide. We haven't got irrigated water for a long time. If we are ill, we go to the private clinic and the State Health Care Centre in Ngasutaung Village for medical treatment. We have no serious diseases in this area


such as malaria, cholera, TB, etc. We only suffer from minor ailments. Our area will be more developed if an industrial zone is established. The area has forests and farms overgrown with bushes in close proximity to our farmyard. I am worried that the fire may break out. If the industrial zone is constructed, the bushes will be cleared and the area will be safe from fire.


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| 15 | Name: | U Kyaw Htwe |  |
| | Age: | 53 | |
| | Address: | Farmyard No. 14, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Farmyard Watchman-cum-worker | |
| | Tel: | 09 7829 91739 | |
| <p>I have lived in this farmyard for over 1 year. We grow perennial trees in this farmyard such as mango, jackfruit and Eugenia. We have a hand-dug well so as to get water for agriculture, for domestic use and for drinking. It has been dug to a depth of 20 feet. I have 4 family members including myself. If we are ill, we have to go far for medical treatment. A motorcycle that takes us to No 3 Highway Road asks Ks 3000 for a round trip. I hope there will be a good impact on the locals as they will get jobs if an industrial zone emerges in the complex of Nyaung Hnitpin National Convention. I don't think there will be bad impacts. If the water and electric power are available, the living standards of the locals will surely be improved.</p> | | | |

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| 16 | Name: | Daw Su Su Naing |  |
| | Age: | 37 | |
| | Address: | Farmyard No. 13, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Wife of Watchman-cum-worker | |
| | Tel: | 09 3169 5568 | |
| <p>I have lived in this farmyard for over 2 years. There are 3 members in my family including a parent-in-law. We grow jackfruit, Ngamauk, pine-apple and mango. We use both a hand-dug well and a tube well for water. The hand-dug well gets dry in summer. The owner gives me a salary for watching his farmyard. The money obtained from selling crops and fruits has to pay to the owner. If we are ill, we go to Tagukone Village for medical treatment. We go there by bicycle. It is inconvenient to go there in monsoon because of the damaged roads. I feel happy to hear that an industrial zone is to be constructed in the complex where the National Convention was held and people may get jobs. This place and its environs will be developed as a whole I have no idea whether there will be bad impacts.</p> | | | |


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| 17 | Name: | U Min Lwin |  |
| | Age: | 44 | |
| | Address: | Farmyard No. 12, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |


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| | Rank: | Watchman-cum-worker | |
| | Tel: | 09 9655 33752 | |
| | <p>I have been working in this farmyard for about 7 years. My birthplace is Yangon. The owner of this farmyard is U Tin Maung Win. We have dug a tube well to get water for agriculture. As the irrigated water is not available, we had to dig it. If we are not well, we go to Ngar Suu Ttaung Health Care Centre for medical treatment. We are faced with difficulties to use the damaged roads to go there especially at night and in monsoon. If the roads are good, we will be convenient. If an industrial zone springs up in the complex of Nyaung Hnitpin Conference, the locals here and people in the vicinity of this place will be sure to get jobs. It can be said that there will be a good impact. I have no idea about any bad impacts.</p> | | |

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| 18 | Name: | Ko Ye Paing |  |
| | Age: | 20 | |
| | Address: | Farmyard No. 7, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Watchman-cum-worker | |
| | Tel: | 09 7916 20343 | |
| | <p>I have been working in this farmyard for about 7 years. I live with my parents. There are other members in my family. I grow perennial trees and seasonal vegetables. Perennial trees we grow are mango and jackfruit and seasonal vegetables are aubergine and some flower beds. The crops and flowers are sent to Htaukkyant and Danyingone market. We get water for agriculture from a tube well. The irrigated water is not available. I haven't known that an industrial zone is to be established in the complex of Nyaung Hnitpin National Convention. I know it now. We hope to get jobs thanks to the emergence of factories. if we are given jobs, we want to work there. I have no idea that the construction of factories may have bad impacts. Our area will be sure to get developed compared to the present situation.</p> | | |

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| 19 | Name: | Daw Kay Zin Khaing |  |
| | Age: | 25 | |
| | Address: | Farmyard No. 171, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agricultural farm | |
| | Rank: | Wife of watchman | |
| | Tel: | 09 7954 71598 | |
| | <p>I have lived in this place for 17 years. Formerly we grew lychee for Ve Ve factory. We no longer grow it. We grow Eugenia, flower plants and aubergine like kitchen garden plants, as irrigated water is not available for the plantations, we have dug tube wells to get water. Once the plantations failed due to the lack of water. Now the tube well we dug is 60 feet in depth. The cost of drilling is over Ks 100,000. It will be more convenient if the irrigated water is available all year round. I have heard that an industrial zone will be established in the complex of Nyaung Hnitpin Conference. I feel happy as I hope the unemployed will get jobs. We need a health care centre in this place. It costs us a lot as we have to go to Hlegu and Yangon for medical treatment. As the agricultural business is not doing well, we need to pay off our debts. To pay off the debts, we have to cut trees into pieces of firewood. I do not</p> | | |


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| | anticipate the construction of an industrial zone will have bad impacts on the locals. I have no idea of what sort of bad impacts will have on us. |
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| 20 | Name: | Daw Myint Myint Si |  |
| | Age: | 50 | |
| | Address: | Farmyard No. 171, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agricultural farm | |
| | Rank: | Dependent | |
| | Tel: | 09 7829 51288 | |
| | <p>There are 6 members in our family. We have leased 5 acres of land for agriculture from the owner of the farmyard. We grow flowers, gourd, Eugenia, jackfruit and guava. For leasing the land, we have to pay Ks 100,000 annually. Our children at the school going age attend the post-primary school on Zone 3. If we feel ill, we have to go to Yangon for medical treatment. We dug a tube well that gives us the chance of growing plants. We get water for drinking and for domestic use. If there emerge factories in the complex of Nyaung Hnitpin National Convention, we are happy as we will get jobs, although we are relatively old, we need jobs. We do not object to the construction of an industrial zone as it will bring us benefits, we welcome it. But if the owners and workers are from abroad, we do not welcome it. I have no idea how it will have bad impacts on us. We hope our lives will improve compared to the current situation.</p> | | |

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| 21 | Name: | Ko Myint Naing |  |
| | Age: | 31 | |
| | Address: | Farmyard No. 171, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agricultural farm | |
| | Rank: | Agriculturist | |
| | Tel: | 09 7964 37830 | |
| | <p>I have already leased 10 acres of land for agriculture. I grow sugarcane, cucumber, gourd and flowers. Land lease costs me Ks 200,000 per year. I have 5 family members. My children attend Agriculture and Livestock Zone 3 School. We go to Hlegu for medical treatment. We need a health care centre in this locality. My birthplace is Kyonepyaw Township, Ayeyarwady Region. Some children who have no birth certificates cannot attend school. We feel happy to hear that an industrial zone will be established in the complex of Nyaung Hnitpin National Convention. We want to get jobs at factories when they are established. So I do not object to it. I hope the locals and their whole environment will be changed and developed. It will be better than the current situation. I hope there will not be bad impacts on men and their environment.</p> | | |


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| 22 | Name: | U Htay Kyaing |  |
| | Age: | 45 | |
| | Address: | Farmyard No. 171, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agricultural farm | |


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| | Rank: | Agriculture worker | |
| | Tel: | 09 2545 85780 | |
| | <p>I have lived here for 2 years. There are six members in my family. One of my children attends Agricultural and Livestock School and another goes to Tagukone School. If we are ill, we go to the Hlegu hospital for medical treatment. I leased 3 acres of land and have been growing Eugenia and other varieties of flowers. We dug a tube well to get water for drinking, agriculture and domestic use. We are happy to hear the emergence of an industrial zone. We want the factories that export our products to be included. It will bring us another chance of getting jobs. So we can have benefits. We hope there will not be bad impacts. We don't want the factories that exude bad smell. We are worried about that.</p> | | |


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| 23 | Name: | Daw Khin Myo Myint |  |
| | Age: | 47 | |
| | Address: | Farmyard No. 174, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agricultural farm | |
| | Rank: | Dependent | |
| | Tel: | 09 7906 87819 | |
| | <p>We have been doing agricultural business for 5 years. There are 7 family members in our family. We have leased 5 acres of land. We have to pay Ks 25,000 per acre for leasing land every year. We grew flowers, gourd, lettuce and cucumber. We sell them at Danyingone market. Sometimes people who resell them come and buy them here. Our children attend the post-primary school in Agriculture and Livestock Zone 3. If we are ill, we go to the Hlegu hospital for medical treatment. We find it very difficult to use the road to Hlegu as it is not usable in monsoon. I am happy to know that an industrial zone will spring up in the complex of Nyaung Hnitpin National Convention. I hope this area will develop more than before and our lives will improve. We are worried that the factories that pour out awful smell will be included. We are also worried about losing our shelter if the owners sell their land that we have leased currently. We want the employers who will give us jobs at the factories in the industrial zone and provide shelters for us.</p> | | |


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| 24 | Name: | U Jain |  |
| | Age: | 47 | |
| | Address: | Agriculture and Livestock Zone 3 to the south of the complex of National Conference, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Watchman | |
| | Tel: | 09 9761 47765 | |
| | <p>I have lived in this farmyard for 4 years. The owner of the farmyard is Daw Hlaing Myo Htet, whom I am familiar with. So I became a watchman. She gives me Ks 70,000 per month for watching the farmyard. We grow cashew, mango, cucumber, lady's fingers, etc. I have the right to sell those fruits and earn the money. There are 4 members in my family. One of my children is attending the Agriculture and Livestock Zone 3 School. If we are ill, we go to Hlegu for medical treatment. I have previously known that an industrial zone is to be established in the complex of Nyaung Hnitpin National Convention. As for me, I'm happy. I think people may get</p> | | |


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| | jobs at the factories. The socio-economic lives of the locals may also be improved. We may have a lot to gain from the emergence of an industrial zone. I have no idea of what bad impacts there will be. We have dug 3 tube wells to get water for drinking, domestic use and agriculture. Each of them is 75 feet in depth. |
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| 25 | Name: | Daw Than Sint |  |
| | Age: | 62 | |
| | Address: | Agriculture and Livestock Zone 3 to the south of the complex of National Conference, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Dependent | |
| | Tel: | — | |
| | <p>My birthplace is Hinthada. I have lived in this farmyard for about 14 years. I am a watchman and grow trees and plants to earn my living. There are 3 members in my family. I grow gourd, cucumber, beans and flowers. I cut trees into firewood and sell them. The owner of this farmyard is Colonel Khin Myint. The money earned from growing vegetables is not enough for us to make a living. We have to be frugal. We sometimes suffer from a total loss due to low prices of our agricultural products. Traders from Htaukkyant market come and buy vegetables here. We dug a tube well to get water for drinking, domestic and agricultural use. If there arises an industrial zone, the land prices may go up and the owner may sell his land. The locals are sure to get jobs because of the emergence of an industrial zone. We are deeply worried that we may lose our shelter and our livelihood. As an old person, I have a rare chance to be given a job.</p> | | |


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| 26 | Name: | U Soe Naing |  |
| | Age: | 44 | |
| | Address: | Agriculture and Livestock Zone 3 to the south of the complex of National Conference, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Watchman | |
| | Tel: | 09 4581 15518 | |
| | <p>I have worked and lived in this farmyard for over 10 years. My birthplace is Hinthada Township. There are 4 members in my family. We grow such vegetables as cucumber, marrow, gourd and lettuce and flowers. We sell them at Htaukkyant market. If we are ill, we go to the Hlegu hospital for medical treatment. I have already heard that an industrial zone is to be established in the complex of Nyaung Hnitpin National Convention. I welcome it because people will get jobs if there arises an industrial zone. My life has not changed although I have been growing vegetables and flowers. I am worried that we will lose our livelihood and shelter once the industrial complex is established. The prices of the land may go up due to the emergence of an industrial zone. As a consequence, the owner may feel like selling out his land. By then, we are likely to lose our place to live and work to earn a living.</p> | | |

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| 27 | Name: | U Saw Thu Aung |  |
| | Age: | 54 | |
| | Address: | Farmyard to the south of the complex of Conference, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture, Tetlan Sein Lae Oo Company | |
| | Rank: | Farmyard manager | |
| | Tel: | 09 4202 13197 | |
| | <p>I have worked in this farmyard for over 10 years. We grow fruit trees such as honey orange, pomelo and Nagamauk in the farmyard. The farmyard is 30 acres in total. I feel happy to know that an industrial zone is to be established in the complex of Nyaung Hnitpin Conference. On the other hand, the area forested and overgrown with weeds in this complex will be cleared and we don't have to be worried about fire anymore. There are 3 members in my family. My child attends the No 3 Agriculture and Livestock Zone School. When we are ill, we go to Ngar Suu Taung Village health care center and Hlegu hospital for medical treatment. I'm sure many locals will get jobs if there arises an industrial zone that will have a good impact on them. Their lives will be improved. We are afraid of the bad smell spread in the air that may have bad impacts on the health of the locals. I am also concerned about polluted water from the industrial zone that may have disastrous impacts on the environment. We also need a good system of discarding the rubbish in dustbins and of sewage disposal. But as this industrial zone project is to be implemented through the G to G agreement, I hope everything will be put in order. There are 2 permanent staff members and 18 daily wage-earners in this farmyard. A man earning a daily wage of Ks 3,000 and a woman Ks 2,500.</p> | | |


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| 28 | Name: | Daw Tin Tin San |  |
| | Age: | 52 | |
| | Address: | The Western part of the complex of Conference, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Rank: | Dependent | |
| | Tel: | 09 4202 13197 | |
| | <p>I have lived here for 18 years. My husband was a staff member of Telecommunication Department in the complex of Conference. He got retired in 2017. The owner of our farmyard is Colonel Aung San. We live here watching farmyard. There are 6 members in our family. One of our children is now working at Hmawbi Industrial Zone. He goes there by commuter bus. Two students attend Nyaung Hnitpin High School. People face difficulties in going to school or work as the roads are damaged in monsoon. I now come to know that an industrial zone is to be established in the complex of Nyaung Hnitpin National Convention. We are sure the locals will get jobs thanks to the emergence of an industrial zone. I'm hoping that our children will be able to shift their jobs from Hmawbi to this area. I think educational and health sector will be much more improved. We welcome the emergence of an industrial zone. I have no idea of whether the emergence of an industrial zone has the bad impact on us or not.</p> | | |


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| 29 | Name: | Ko Myat Moe Naing |  |
| | Age: | 27 | |
| | Address: | Farmyard No. 979, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Video Production Yard | |
| | Rank: | Watchman and Worker | |
| | Tel: | 09 2520 78027 | |
| <p>I have been a watchman in this farmyard for 5 years. There are 3 members in my family. One of my children will attend the Nyaung Hnitpin High School this year starting from the kindergarten. I worked as a watchman and my wife opens a shop at the corner of the road selling goods. I myself have a motorcycle repair shop. The roads here are so muddy and damaged in the rainy season that we find it very difficult to use them. I hope roads will become much better if there emerges an industrial zone. People in the vicinity will also get jobs. There will be a better road link; health and educational sectors will consequently be improved a lot. I fear that the factories that exude bad smell will harm the health of the locals. The current crucial issues are bad roads and having difficult of access to health facilities. I want the roads to be become all-weather ones. Another requirement is a clinic. I have no objection to the construction of an industrial zone.</p> | | | |

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| 30 | Name: | U Kumara |  |
| | Age: | 31 | |
| | Address: | Promotion of Sasana (The Teaching of the Buddha) Ayemyayeithar Pakokku Monastery | |
| | Occupation: | Religion | |
| | Rank: | Assistant Presiding Monk | |
| | Tel: | 09 4025 44652 | |
| <p>This monastery has been built for 10 years. I have been presiding at this monastery for 4 years. My objective is to launch a school of Buddhist scriptures. But I haven't achieved my objective because Buddhism is not flourishing in this area at the moment. If an industrial zone is established in the complex of Nyaung Hnitpin Conference, the area will be developed and the population will increase. And then the number of monks and novices will increase. There are only 2 novices at the monastery. I'm also worried that the factories which are unbearably noisy and those which exude awful smell may be included in the establishment of the industrial zone. In monsoon, the roads are so damaged that we find it difficult to go on an alms-round. I want those roads to be repaired when the industrial zone is constructed. We also need a health care centre. A tube well has been dug to get water for drinking and domestic use at the monastery. The monastic complex is 20 acres in its area. We applied for changing the land type of 5 acres to a religious land and have been given permission. For these reasons I do not object to the establishment of an industrial zone. I welcome it as it will have good impacts on us. Systematic implementation shall not have had impacts.</p> | | | |


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| 31 | Name: | U Kyaw Win |  |
| | Age: | 59 | |
| | Address: | The Western part of the complex of Conference, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Cow-Breeding Yard | |
| | Rank: | Manager | |

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| | Tel: | 09 2502 29043 |
| | <p>I have worked in this cow breeding farm for about 7 years. It is 25 acres in its area. There are 20 workers on this farm. We have about 100 dairy and beef cattle. I have already known about the forthcoming construction of an industrial zone in the complex of Nyaung Hnitpin National Convention. The roads will be better if there emerges an industrial zone. People in close proximity will get jobs. The agricultural farmers in this locality are not doing well. They sometimes suffer from financial losses. Their living conditions haven't been changed for the better. But there should be a systematic management of getting rid of awful smell, disposal of polluted water, rubbish and sewage. I am worried about the environment impacts.</p> | |


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| 32 | Name: | Ma Thein Htay Oo |  |
| | Age: | 32 | |
| | Address: | Universe Farmyard, The western part of the complex of Conference, Agriculture and Livestock Zone 3, Nyaung-Hnitpin Area, Hlegu Township | |
| | Occupation: | Agricultural Farmyard | |
| | Rank: | Watchman and Worker | |
| | Tel: | 09 9709 94148 | |
| | <p>I have lived in this farmyard for about 4 years. I work here as a watchman and worker. I get a monthly salary of Ks 120,000 as a watchman and worker. We cultivate a nursery of Malaysian padauk. Other trees such as mango, cashew, and guava are grown in the farmyard in Takutone Village where the manager lives. Our farmyard is 50 acres in total. The owner of the farmyard is Daw Than Than Htay. If we are ill, we go to Ngar Suu Taung rural clinic or Hlegu hospital. I haven't known that factories will be established in the complex of Nyaung Hnitpin Conference. Now I come to know about that and I'm happy. I'm also happy that people will get jobs if the factories are constructed. I also want to work there. There are 4 members in our family. My children are too young to attend schools. I welcome the construction of factories because my family will have more income then the present time of we get jobs at the industrial zone. I have no idea of what bad impacts there will be.</p> | | |

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| 33 | Name: | U Myo Thant |  |
| | Age: | 69 | |
| | Address: | Farmyard No. 131, Agriculture and Livestock Zone 3, Nyaung Hnitpin Area, Hlegu Township | |
| | Occupation: | Survey and Land Records Department | |
| | Rank: | Head of Township Department (Retired) | |
| | Tel: | 09 9739 93031 | |
| | <p>I have lived in this farmyard since 2008. I bought 2.5 acres of land and have been growing seasonal fruit trees. There are 5 members in my family. My children are now government employees. I was formerly the township head of the Land Records Department and I have retired from it. I haven't known that an industrial zone will be established in the complex of Nyaung Hnitpin Conference. I welcome this construction because many people will get jobs if the industrial zone springs up. But the factories to be established should be the ones which do not have negative impacts on the environment. Currently, a chicken farm of Agriculture and Livestock Zone 3 close to our yard has dumped dead chicken and rotten eggs. We are very displeased about it and we don't want factories that will have bad impacts on the environment and that emit bad smell. If there will no negative environmental impact, we don't object to the project. Water supply, electric power and improved roads are required for the present situation to be significantly improved. We only grow seasonal plants and vegetables as much as we can. In the past, we hired many</p> | | |

workers but we suffered losses. Since then we haven't hired any worker. We cannot walk along the roads around this area in monsoon as they all are damaged due to the traffic of heavy trucks loaded with tons of goods. In constructing the industrial zone, we are worried that roads will be more damaged if they don't follow relevant rules and regulations. The builders of the industrial zone should systematically implement the project. And once the industrial complex is established, it should properly be maintained.

| | | | |
|----|-------------|----------------------------------|---|
| 34 | Name: | U Kyaw Soe |  |
| | Age: | 40 | |
| | Address: | Takutone Village, Hlegu Township | |
| | Occupation: | Head of Hundred Households | |
| | Tel: | 09 2500 41552 | |


I was born in this village. We had some first-hand experience of flooded fields in our childhood. The water flowed from Takutone Inn (lake) into the Ngamoeyeik Creek. Even though it was flooded, water did not flow into the village. The fields were full of flood waters but it subsided after 2 or 3 days. But later in the present period, when it is flooded, the water reaches the village. It has happened like that for about 4 years. There are floods on village roads and inside the house compounds, rising up to over one feet. Hand-dug wells are deluged. Only after about one week, it subsides. There have been floods due to the entrepreneurs of agricultural and livestock breeding zones who divert the flow of water, blocking or unblocking the drains as they like. The drains they dug are also too narrow.


| | | | |
|----|-------------|----------------------------------|---|
| 35 | Name: | U Aye Kyaw |  |
| | Age: | 40 | |
| | Address: | Sonekone Village, Hlegu Township | |
| | Occupation: | Head of Hundred Households | |
| | Tel: | 09 7954 53349 | |


There were floods when we were young. The fields were full of flood waters and it flowed into the village. I had some experiences of witnessing the water rising right up to about one foot. It subsided after about one week. And then the water ran down into the Zone No. 2 and Zone No.3.

For the time being, there are floods every year. But the water does not flow into the villages as it happened in my childhood. The water does not flow into the village after making embankments on the main roads at the entrance of the village. There have been floods only in the fields. The water normally subsides after about one week.

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| | | | |
|--|-------------|---------------------------------------|---|
| 36 | Name: | Daw Sandar Oo |  |
| | Age: | 38 | |
| | Address: | Kyarinn Anauk Village, Hlegu Township | |
| | Occupation: | Head of Hundred Households | |
| | Tel: | 09 7836 19636 | |
| <p>I was born in this village. We experienced flooding in monsoon when we were young, studying in the primary school level. There were floods in the fields and the water reached only up to the fringe of the village. The flood waters in the field subsided after about one week. These days, the flooding becomes normal, damaging the plantations. After the water subsides, plants are grown again. There have been flooding more or less and it happens every year.</p> | | | |

| | | | |
|---|-------------|--------------------------------------|---|
| 37 | Name: | Daw Than Nu |  |
| | Age: | 52 | |
| | Address: | Kyarinn Ashe Village, Hlegu Township | |
| | Occupation: | Headmistress, Middle School | |
| | Tel: | 09 4201 59596 | |
| <p>I was born in this village. I have never seen floods and inflow of water into the village as far as I remember. But there have been floods since 2015. The water does not flow into the village. I have seen the flood waters running high above the lower parts of the main causeway. It subsided after 7 days. The flood waters flow into the Innkapaw Inn (Fishery) that is situated to the east of Kyarinn Ashe Village. We experience floods about once a year.</p> | | | |

| | | | |
|--|-------------|--|---|
| 38 | Name: | U Soe Aung |  |
| | Age: | 55 | |
| | Address: | Nyaung Hnitpin Village, Hlegu Township | |
| | Occupation: | Village-tract Administrator | |
| | Tel: | 09 4304 0242 | |
| <p>I was born in this village. There have never been floods so far since we were very young. Even today there are absolutely no floods. Sometimes some water flows into the field outside our village when it rains heavily. But it rarely happens. Although it is flooded, it subsides immediately. There have been no harm to the economy and no buildings damaged of due to flooding.</p> | | | |

| | | | |
|--|----------|--|------------------------|
| 39 | Name: | U Hla Tun | Photo Not Taken |
| | Age: | 60 | |
| | Address: | Agricultural and Livestock Breeding Zone No 3. Nyaung Hnitpin Village, Hlegu Township | |
| <p>I have been living at No 45-46 in the Agricultural and Livestock Breeding Zone No 3</p> | | | |

for 23 years. Now, I live in another place. I have been here before the holding of Nyaung Hnitpin Convention and since 1990s. By then there was no agricultural and breeding zone. The Zone emerged later in 2000. There has been no flooding. Even though it is flooded because of heavy rains, it flows out within a few hours. Zone No 3 does not suffer flooding. Zone No 2 usually experience floods. Zone No. 2 is located to the west of the main motor road, at the back of the Convention Complex. I think flooding takes place due to the ponds dug up by businessmen, reinforcing embankments, and blocking the drains.

4.11.3.5 Village Profile Overview

Total 6 villages were covered for social baseline data collection and these villages are **Kyarkansu village**, Nyayung Hnitpin Village tract, Hmawbi township (which is 3.91 km away from the project area), **Nyaung Hnitpin Village**, Nyaung Hnitpin Village tract, Hmawbi Township (which is 5 km away from the project area), **Takutone Village**, Kyarinn Village tract, Hlegu Township (which is 1.54 km away from the project area), **Sonekone Village**, Kyarinn Village tract, Hlegu Township (which is 3.67 km away from the project area), **Kyarinn Ashe Village**, Kyarinn Village tract, Hlegu Township (which is 4.33 km away from the project area), and **Kyarinn Anauk Village**, Kyarinn Village tract, Hlegu Township (which is 4.13 km away from the project area). The distance between each village and project site is shown in figure 4.70.

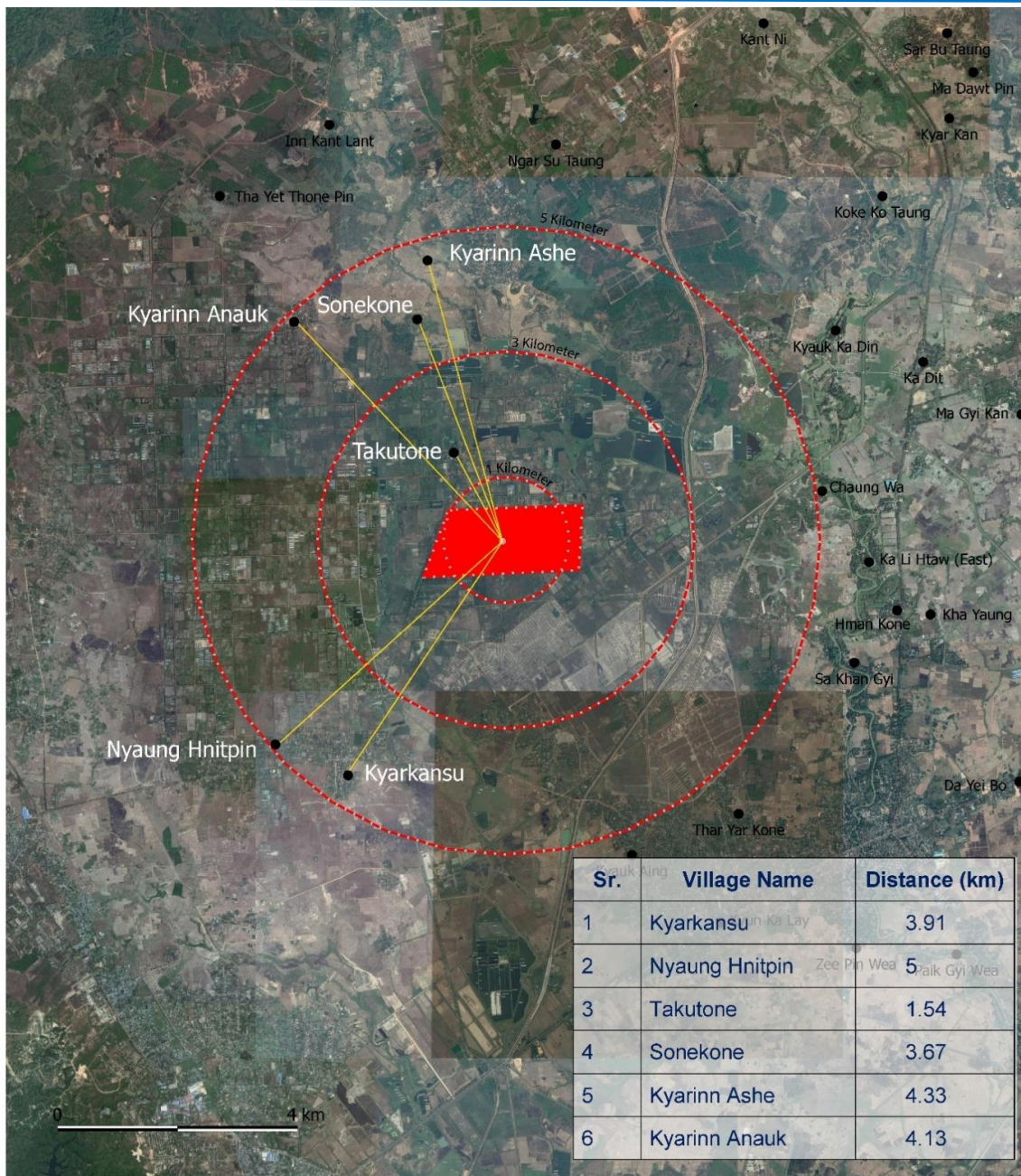


Figure 4. 69: Map showing distance between Project Area and villages for conducting Social Impact Assessment

4.11.3.5.1 Profile of Kyarkansu Village, Nyaung Hnitpin Village tract, Hmawbi Township


| | | |
|-----------------------|-------------------------|----------------|
| Population: | | 1600 |
| Number of households: | | 320 households |
| Number of houses: | | 300 houses |
| Nationality: | | Myanmar |
| Religion: | | Buddhism |
| Education | | |
| 1 | High School (Branch): | Nil |
| 2 | Number of teachers: | Nil |
| 3 | Number of students: | Nil |
| | a 5 th grade | Nil |
| | b 4 th grade | Nil |
| | c 3 rd grade | Nil |


| | | | |
|--------------------------|---------------------------------------|-----------------------|--|
| | d | 2 nd grade | Nil |
| | e | 1 st grade | Nil |
| | f | Kindergarten | Nil |
| Health | | | |
| 1 | 25-bed hospital: | | Nil |
| 2 | Village dispensary: | | Nil |
| 3 | Doctor: | | Nil |
| 4 | Nurse: | | Nil |
| 5 | Midwife: | | Nil |
| 6 | Auxiliary midwife: | | Nil |
| 7 | Midwife (not scientifically trained): | | 2 |
| Business | | | |
| 1 | Grocery: | | 7 |
| 2 | Car rental service: | | 4 |
| 3 | Trishaw: | | Nil |
| 4 | Agriculture: | | Gourd, groundnut, paddy, cucumber, acacia, water cress |
| 5 | Fishery (motorboat/schooner): | | Nil |
| 6 | Livestock breeding: | | Pig, chicken |
| 7 | Hotel: | | Nil |
| 8 | Lodge: | | Nil |
| Social activities | | | |
| 1 | Fire-fighting station: | | Nil |
| 2 | Bank: | | Nil |
| 3 | Library: | | 1 |
| 4 | Recreation centre: | | Nil |
| 5 | Village market: | | Nil |
| 6 | Football ground: | | Nil |
| 7 | Monastery: | | 3 |
| 8 | Pagoda: | | 3 |
| 9 | Spirit shrine: | | 1 |
| 10 | Preschool: | | 1 |
| Security | | | |
| 1 | Police station: | | Nil |
| 2 | Military unit/post: | | Nil |
| Transportation | | | |
| 1 | Car (private-owned) | | Nil |
| 2 | Bus | | Nil |
| 3 | Rental car | | 3 |
| 4 | Motorcycle (Passenger transport) | | 15 |
| 5 | Motorcycle (private-owned) | | 150 |
| 6 | 3-wheel motorcycle | | Nil |
| 7 | Trailer Jeep | | 5 |
| 8 | Trishaw | | Nil |
| Telecommunication | | | |
| 1 | Landline phone | | Nil |
| 2 | Mobile phone | | 300 |
| 3 | Television set | | 150 |
| 4 | Radio | | Nil |
| General | | | |
| 1 | Households using electricity | | 180 |
| 2 | Households not using electricity | | 120 |
| 3 | Availability (hand-scooped well) | | Nil |
| 4 | Tubewell | | 250 |


Overview



Figure 4. 70: Kyarkansu Village Buildings

| | | | |
|--|---|-------------|---|
| 1 |  | Name: | U Vicitta |
| | | Age: | 56 |
| | | Address: | Kyarkansu Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region |
| | | Occupation: | Buddhist Monk |
| | | Rank: | Presiding Monk |
| | | Hand phone: | 09 4203 07708 |
| <p>I have been presiding at this village monastery and disseminating the Sasana (the Teachings of the Buddha) for a long time. I have not formerly known about the establishment of an industrial zone in the complex of Nyaung Hnitpin Convention. Although the locals will get jobs due to the emergence of the industrial zone, I am worried that the polluted water and pungent smell the factories produce will have a damaging impact on the natural environment and the men's health. Currently there is an animal feed factory near this village. The pungent smell that this factory produces is giving trouble to the locals. It will cause damage to people later. The workers at the factories should be provided with compensation payment if they are injured. Slaughter-houses should not be included in the plan of factories. The government and those setting up factories must be accountable for the bad impacts on social and natural environment and for the compensation to the workers. If the above-mentioned requirements can be fulfilled, I will not object to the establishment of the industrial zone.</p> | | | |

| | | | |
|--|---|-------------|---|
| 2 |  | Name: | U Tun Wai |
| | | Age: | 47 |
| | | Address: | Kyarkansu Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region |
| | | Occupation: | Agricultural Business, member of village administration |
| | | Rank: | Head of Hundred Households |
| | | Hand phone: | 09 4500 56073 |
| <p>I was born in this village. There are 6 family members. I run my own agricultural business. I grow paddy, cucumbers, and gourds. I have not known about the establishment of Nyaung Hnitpin industrial zone. I feel happy to know it now. If an industrial zone appears, people in the vicinity will get jobs. The village will be developed and the roads will be greatly improved. I am worried about the pungent smell and the polluted water from the industrial zone. They will do harm to people in nearby areas. I do not have to object to it if it does not do any harm to the people in the environment. It needs to be managed and implemented without any harm to men. I request the project developers and those who will establish the industrial zone to offer us a rural dispensary and a primary school. They should also help improve roads in the village.</p> | | | |

| | | | |
|---|---|-------------|---|
| 3 |  | Name: | U Kyaw Htwe |
| | | Age: | 30 |
| | | Address: | Kyarkansu Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region |
| | | Occupation: | Agricultural Business |
| | | Rank: | Head of Ten Households |

| | | |
|--|--|---------------|
| | Hand phone: | 09 4202 72004 |
| | <p>I was born in this village. There are 4 family members. I run my own agricultural business. I grow paddy and Kinponchin (species: Concinna). I have not known about the establishment of an industrial zone in the complex of Nyaung Hnitpin Convention. When the industrial zone is completed, people from our village will get jobs. The roads and the living conditions of the people will be greatly improved. But I am anxious that the polluted water and the pungent smell produced by the factories will do harm to the health of the people in the nearby areas. I do not have to object to it if the industrial zone is set up without causing such harm. I welcome it. Those who are establishing the industrial zone should contribute to the development of our village.</p> | |

| | | | |
|---|---|---|---|
| 4 |  | Name: | Daw Kyi Than |
| | | Age: | 50 |
| | | Address: | Kyarkansu Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region |
| | | Occupation: | Agricultural Business, Department of Health |
| | | Rank: | Auxiliary midwife |
| | | Hand phone: | 09 4202 52420 |
| | | <p>I was born in this village. There are 6 family members. My main business is agriculture. I am an auxiliary midwife. I heard about the establishment of an industrial zone in the complex of Nyaung Hnitpin Convention last year. I am not sure which country will come and set it up. If the industrial zone is really established, the locals will get jobs and their social status will be improved. I am anxious that the waste dumped by the factory will have bad impacts on the water and air in our environment. It may also harm the health of people in the nearby area. For these reasons, those who are constructing factories should follow set guidelines to cause minimum negative impacts on the environment and the people. There has been no serious disease in this village. They suffer from normal illnesses. I don't have a record of a child that dies at birth.</p> | |

4.11.3.5.2 Profile of Nyaung Hnitpin Village, Nyaung Hnitpin Village tract, Hmawbi Township

| | | | |
|-----------------------|-----------------------|------------------------|-----|
| Population: | | 3126 | |
| Number of households: | | 655 households | |
| Number of houses: | | 640 houses | |
| Nationality: | | Myanmar | |
| Religion: | | Buddhism | |
| Education | | | |
| 1 | High school (Branch): | 1 | |
| 2 | Number of teachers: | 35 | |
| 3 | Number of students: | 1318 | |
| | a | 10 th grade | 49 |
| | b | 9 th grade | 91 |
| | c | 8 th grade | 137 |
| | d | 7 th grade | 124 |
| | e | 6 th grade | 119 |
| | f | 5 th grade | 171 |
| | g | 4 th grade | 114 |
| | h | 3 rd grade | 130 |
| | i | 2 nd grade | 116 |
| | j | 1 st grade | 130 |

| | | | |
|--------------------------|---|----------------------------------|--|
| | k | Kindergarten | 137 |
| Health | | | |
| 1 | | 25-bed hospital: | Nil |
| 2 | | Village dispensary: | 1 |
| 3 | | Doctor: | Nil |
| 4 | | Nurse: | Nil |
| 5 | | Midwife: | 1 |
| 6 | | Auxiliary midwife: | 1 |
| Business | | | |
| 1 | | Grocery: | 15 |
| 2 | | Car rental service: | 33 |
| 3 | | Trishaw: | Nil |
| 4 | | Agriculture: | Acacia, gway-tauk (bitter leaves), cucumber, gourd, eggplant, mustard, paddy |
| 5 | | Fishery (motorboat/schooner): | Nil |
| 6 | | Livestock breeding: | Pig, chicken, quail |
| 7 | | Hotel: | Nil |
| 8 | | Lodge: | Nil |
| Social activities | | | |
| 1 | | Fire-fighting station: | Nil |
| 2 | | Bank: | Nil |
| 3 | | Library: | 1 |
| 4 | | Recreation centre: | Nil |
| 5 | | Village market: | Nil |
| 6 | | Football ground: | 1 |
| 7 | | Monastery: | 1 |
| 8 | | Pagoda: | 2 |
| 9 | | Spirit shrine: | 1 |
| Security | | | |
| 1 | | Police station: | Nil |
| 2 | | Military unit/post: | Nil |
| Transportation | | | |
| 1 | | Car (private-owned) | 1 |
| 2 | | Bus | Nil |
| 3 | | Rental car(Light Truck) | 16 |
| 4 | | Motorcycle (Passenger transport) | 50 |
| 5 | | Motorcycle (private-owned) | 250 |
| 6 | | 3-wheel motorcycle | 7 |
| 7 | | Trailer Jeep | 10 |
| 8 | | Trishaw | Nil |
| Telecommunication | | | |
| 1 | | Landline phone | Nil |
| 2 | | Mobile phone | 1200 |
| 3 | | Television set | 300 |
| 4 | | Radio | 5 |
| General | | | |
| 1 | | Households using electricity | 400 |
| 2 | | Households not using electricity | 60 |
| 3 | | Availability (hand-scooped well) | Nil |
| 4 | | Tubewell | 200 |

Overview



Pagoda



Monastery



Buddhist Ordination Hall




Community Hall





Shrines for guardian spirits




Figure 4. 71: Nyaung Hnitpin Village Buildings


| | | | |
|--|-------------|--|---|
| 1 | Name: | U Than Oo |  |
| | Age: | 57 | |
| | Address: | Nyaung Hnitpin Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region | |
| | Occupation: | Agriculture | |
| | Rank: | Grower of Kinponchin (Concinna), sour leaf vegetable | |
| | Hand phone: | 09 4250 18226 | |
| <p>I have lived in this village since I was young. There are 4 family members. I grow Kinponchin (Concinna) on this farm. I sell the sprigs of Kinponchin at the Htaukkyant and Danyingone Railway Station markets. I have heard about an industrial zone to be built. I do not know where it would be built. I feel happy now to hear the exact information of the industrial zone to be set up in the complex of Nyaung Hnitpin National Convention. When the industrial zone emerges, people from nearby villages will get jobs. I am sure the road transport as well as the living conditions of the people will be greatly improved. When the factories actually run, there may be harmful products from them. The polluted air and water may have bad impacts on the environment. For these reasons, the wastes must be systematically treated so as not to harm the environment. They have to be in conformity with prescribed rules and regulations. I do not object to the establishment of the industrial zone if it is done in conformity with set rules and regulations. I want to suggest that the company that is to set up the industrial zone should help meet the needs of the development of this village.</p> | | | |

| | | | |
|--|---|-------------|--|
| 2 |  | Name: | U Myo Naing Oo |
| | | Age: | 58 |
| | | Address: | Nyaung Hnitpin Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region |
| | | Occupation: | Department of Education |
| | | Rank: | Headmaster |
| | | Hand phone: | 09 7788 53745 |
| <p>I was born in Pyinmana. I have taken this responsibility for over 2 months. There are 4 family members. I am living with my nephews now. I have not known about the establishment of an industrial zone in the complex of Nyaung Hnitpin Convention. The locals will get jobs thanks to its establishment. The roads as well as the social status of the people will be greatly improved. As for bad impacts, the polluted water, pungent smell and industrial wastes are systematically managed I do not have to object to the setting up of the industrial zone. I have no objection to it. What I want to ask the companies establishing the industrial zone is to provide our school with enough school benches as we don't have enough of them. As the subsidy of the government is not enough, the company that is to set up the industrial zone is requested to help us in this respect.</p> | | | |


| | | | |
|---|-------------|--|---|
| 3 | Name: | Daw Lwin May Than |  |
| | Age: | 38 | |
| | Address: | Nyaung Hnitpin Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region | |
| | Occupation: | Department of Health | |
| | Rank: | Midwife | |
| | Hand phone: | 09 4480 22106 | |

| | |
|--|--|
| | <p>I am from Minhla Township, Bago Region. There are 9 family members. I have been serving as a health staff for 19 years. I feel happy to know that an industrial zone is to be set up in the complex of Nyaung Hnitpin National Convention. The locals will get jobs. As many people will be employed, their social conditions will be improved. The road transport will be much better. The polluted air and contaminated water will have bad impacts on the environment if harmful industrial wastes are disposed of from the industrial zone. Providing health care services will be a challenging task as there will more and more people working and living in the area. I want to suggest that the establishment of the industrial zone should be systematically managed so as not to pollute the water and the air. Moreover, the dumping of polluted water should also be properly managed not to harm the natural environment. Wastes should also be disposed in accordance with set rules and regulations.</p> |
|--|--|

| | | | |
|--|---|-------------|--|
| 4 |  | Name: | U Kan Myint |
| | | Age: | 58 |
| | | Address: | Nyaung Hnitpin Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region |
| | | Occupation: | Agricultural Business, member of Village Administration |
| | | Rank: | Head of Hundred Households |
| | | Hand phone: | 09 7968 04634 |
| <p>I was born in this village. There are 6 family members. I run my own agricultural business. I grow eggplants, cucumbers, mustards and gourds. I have heard about the establishment of an industrial zone in the immediate vicinity. But I do not exactly know its exact location. I feel happy to hear that an industrial zone is to be set up in the present complex of Nyaung Hnitpin National Convention. People here barely meet their basic needs. I hope that both skilled and non-skilled workers will be given jobs. I am concerned that the zone may cause air pollution and dump polluted water having bad impacts on the health of the locals. I am also concerned that foreigners from the zone may fall in love with local women. What I am worried is that they may leave the women behind without marrying them legally. Another thing I have concerns are that there may clashes between people who profess different faiths. In addition, I want to suggest the company to build a station hospital as the factory workers may need medical treatment. The company should also help us repair our roads that they will become much better than the present situation. I do not object to the setting up of an industrial zone.</p> | | | |

| | | | |
|--|-------------|--|---|
| 5 | Name: | Daw Hla Thein |  |
| | Age: | 55 | |
| | Address: | Nyaung Hnitpin Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region | |
| | Occupation: | Agriculture | |
| | Rank: | Agricultural worker, Leader of Women's Affairs Association | |
| | Hand phone: | 09 7814 31788 | |
| <p>I was born in this village. There are 4 family members. I have not heard of establishing an industrial zone in the complex of Nyaung Hnitpin Convention. There are high school and university graduates and casual labourers in this village. They have still been unemployed. I hope they will get jobs if the industrial zone emerges. I am happy because they will have to work under shelter as those manual labourers had to work under the sun in the past. The educated will have the kind of jobs that suit their status.</p> | | | |

| | |
|--|---|
| | That is why I am happy to have an industrial zone. I am not sure what bad impacts there will be. I do not want the factories that produce pungent smell to be included. I do not object to it if it does no harm to the people and natural environment. The task of paving the village main road with concrete has not been finished yet. We request the company establishing the industrial zone to help complete it. The jobless, landless and homeless should be provided with jobs as well as shelter for them. |
|--|---|

| | | | |
|---|---|--|--|
| 6 |  | Name: | U Soe Aung |
| | | Age: | 55 |
| | | Address: | Nyaung Hnitpin Village, Nyaung Hnitpin Village Tract, Hmawbi Township, Yangon Region |
| | | Occupation: | Agriculture, Administration |
| | | Rank: | Village Administrator |
| | | Hand phone: | 09 4304 0243 |
| | | <p>I was born in this village. There are 10 members in my family. I grow paddy. I have heard about creating an industrial zone in the complex of Nyaung Hnitpin National Convention. One of the companies said to me that a factory is to be built in this complex. So I showed them around the area. The unemployed will be sure to have jobs if there arises an industrial zone. The roads will be sure to be improved if an industrial zone arises. We won't be experiencing power cutoffs. Men will be of high social status. For these reasons, I welcome the establishment of the industrial zone. Building factories should also have least impacts on the natural and social environment. The factory that produces polluted water and pungent smell should not be included. There are landless and homeless people in our village and they should be offered jobs when the factories are completed. Shelter should also be provided for them. I have no objection to it if the wastes dumped by the factories will not do serious harm to the environment. If so, I support it.</p> | |

4.11.3.5.3 Profile of Takutone Village, Kyarinn Village tract, Hlegu Township

| | | | |
|-----------------------|-------------------------|--------------------------------------|----|
| Population: | | 570 | |
| Number of households: | | 120 households | |
| Number of houses: | | 120 houses | |
| Nationality: | | Myanmar | |
| Education | | | |
| 1 | Middle School (Branch): | 1 | |
| 2 | Number of teachers: | 11 | |
| 3 | Number of students: | 255 | |
| | a | 8 th grade | 23 |
| | b | 7 th grade | 26 |
| | c | 6 th grade | 33 |
| | d | 5 th grade | 27 |
| | e | 4 th grade | 25 |
| | f | 3 rd grade | 33 |
| | g | 2 nd grade | 50 |
| | h | 1 st grade (Kindergarten) | 38 |
| Health | | | |
| 1 | 25-bed hospital: | Nil | |
| 2 | Village dispensary: | Nil | |
| 3 | Doctor: | Nil | |
| 4 | Nurse: | Nil | |
| 5 | Midwife: | Nil | |

| | | |
|--------------------------|----------------------------------|---|
| 6 | Auxiliary midwife: | 1 |
| Business | | |
| 1 | Grocery, food shop, cafeteria: | 8 |
| 2 | Rental car | 1 |
| 3 | Trishaw: | Nil |
| 4 | Agriculture: | Gourd, eggplant, cucumber, peas, roselle, flowers, eugenia sprigs |
| 5 | Fishery (motorboat/schooner): | Nil |
| 6 | Livestock breeding: | Pig, chicken, fish |
| 7 | Hotel: | Nil |
| 8 | Lodge: | Nil |
| Social activities | | |
| 1 | Fire-fighting station: | Nil |
| 2 | Bank: | Nil |
| 3 | Library: | Nil |
| 4 | Recreation centre: | Nil |
| 5 | Village market: | Nil |
| 6 | Football ground: | Nil |
| 7 | Monastery: | 1 |
| 8 | Pagoda: | 1 |
| Security | | |
| 1 | Police station: | Nil |
| 2 | Military unit/post: | Nil |
| Transportation | | |
| 1 | Car (private-owned) | Nil |
| 2 | Bus | Nil |
| 3 | Rental car | 1 |
| 4 | Motorcycle (Passenger transport) | 20 |
| 5 | Motorcycle (private-owned) | 40 |
| 6 | Trishaw | Nil |
| Telecommunication | | |
| 1 | Landline phone | Nil |
| 2 | Moblile phone | 250 |
| 3 | Television set | 60 |
| 4 | Radio | 5 |
| General | | |
| 1 | Households using electricity | 84 |
| 2 | Households not using electricity | 36 |
| 3 | Availability (hand-scooped well) | 70 |
| 4 | Tubewell (pedal-driven) | 10 |

Overview




Monastery and pagoda

Basic Education Middle School (Branch)


Basic Education Middle School (Branch)


Grocery

Figure 4. 72: Takutone Village Buildings

| | | | |
|---|---|--------------|--|
| 1 |  | Name: | U Obasa |
| | | Age: | 26 |
| | | Address: | Takutone Village Monastery, Hlegu Township |
| | | Occupation: | — |
| | | Designation: | Assistant Presiding Monk |
| | | Hand phone: | 09 2649 23980 |
| <p>My birthplace is Kyaiklat Township, Ayeyarwaddy Region. I have been residing at this monastery for about a year. I have already heard about the construction of an industrial zone in the Nyaung Hnitpin National Convention complex. The religious lands or buildings are not involved in the area in which the industrial zone is to be built. There are one monastery, 2 stupas and a rest house in this village. All the villagers are Buddhists. There is no one who professes other religions. We have hand-dug wells as well as tube wells. We have electricity from the national grid. I am happy that people from this village will get jobs when there arises an industrial zone. As a consequence, the economy of the villagers will improve a lot. If the socio-economic condition of the villagers has become much better, people will also engage in more meritorious deeds. Most of the villagers earn their living through agriculture. They grow seasonal vegetables, flower plants and Eugenia trees. There are some others working for factories and workshops. What we need in our village are a rest house at the cemetery,</p> | | | |

| | |
|--|---|
| | and good roads. We have to wade through the water during the rainy season. I want to request the project developers to help us repair the existing roads. |
|--|---|

| | | | |
|---|--|---|---|
| 2 | Name: | U Kyaw Thu |  |
| | Age: | 42 | |
| | Address: | Agriculture & Livestock Breeding Zone 2, Takutone Village, Hlegu | |
| | Occupation: | Agriculture and Livestock Breeding | |
| | Designation: | Businessman (who owns his business), Vice Chairman of Village Funeral Rites Association | |
| | Hand phone: | 09 9763 08000 | |
| | <p>I have lived in this village for over 17 years. My birthplace is Khayan Township, Ayeyarwady Region. The place where there are agricultural and livestock breeding zones and that are close to the Nyaung Hnitpin National Convention complex are vacant lands. In 2003, the lands were confiscated by the Union Solidarity and Development Association and the buildings for the national convention were constructed within two years—2004 and 2005. In 2006 and 2007, national conventions were held in these USDP-owned buildings. The Constitution was approved in 2008. This village is the closet to the Nyaung Hnitpin Convention complex. It is about 3,600 feet away from the complex. The village has over 100 houses. Formerly, there was no primary school. We had a primary school in 2008. Now, it has become an affiliated middle school. There are classes up to eighth grade. If there is an industrial zone in Nyaung Hnitpin, the locals will get jobs. So I welcome it. Most of the people from this village earn their living through agriculture. There are a few livestock breeders. They breed chickens. I have fifty acres of Eugenia trees. There are high school as well as university graduates in this village. Some people have to work in the industrial zones in Hmawbi, Hlegu, etc. When the industrial zone is completed, the standard of living of people from this village will change. I wish the developers of the industrial zone would contribute to the development of our village and to the increase of knowledge and technology.</p> | | |

| | | | |
|---|---|--------------|---|
| 3 |  | Name: | Daw Hnin Wai Aung |
| | | Age: | 49 |
| | | Address: | Takutone Village, Hlegu Township, Kyarinn Village Tract |
| | | Occupation: | Health Department (and a shop-keeper) |
| | | Designation: | Auxiliary midwife |
| | | Hand phone: | 09 7671 48201 |
| | <p>This village is my birthplace. There is no Rural Health Centre (RHC) in this village. There is an RHC in Kyarinn Village. I am a midwife under the Kyarinn Health Department. Kalihtaw Village also has an RHC. There has been no serious disease breakout in this village. People suffer from minor ailments due to changes in weather. The mortality rate of newly born babies was fairly high in 2015. It has declined since 2016 and it is only about 10% in 2017. The rate of malnutrition in children was about 30% in 2015. It dropped to about 10% in 2017. The Health Department is helping to nourish the children with the support of the World Health Organization (WHO). Malnourished children are being offered financial assistance, medications, milk powder and clothes. But what they have received is still not enough for them. Vaccination against infections is enough. As we have no rural dispensary in our village, we find it very difficult, when someone is ill at night and in monsoon, to look for a place where there is a dispensary. We need a dispensary in this village. In this village, every house</p> | | |

uses a fly-proof flush toilet. If an industrial zone is established in the complex of Nyaung Hnitpin National Convention, I feel happy because the locals will get more jobs. Some have to go far from this village to earn their living. If the industrial complex is constructed, they will be able to work in this area. I hope our health, education and economy will be significantly improved. I will not object to the establishment of this industrial zone. We welcome and recommend it.


| | | | |
|---|--------------|----------------------------------|---|
| 4 | Name: | U Tun Yee |  |
| | Age: | 60 | |
| | Address: | Takutone Village, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Designation: | Villager elder | |
| | Hand phone: | 09 3131 7675 | |

I have lived in this village since my childhood. This village had existed since before we regained independence. This village was destroyed due to the conflict between Kayin and Myanmar after the independence was regained. When U Ne Win government assumed power in 1962, the village was reestablished with about 10 houses. There are now over a hundred houses, I'm happy to hear that an industrial zone is going to be established in the complex of Nyaung Hnitpin National Convention. As this village is close to the complex, I hope that people from the village will get jobs at the factories. The villagers had their own pieces of farmland in the past and worked on their farms for their livelihoods. Nowadays, most of them become employees working for others. There are only a few people who own farmlands. Only one or two villagers own their farmland. Most of them work as daily-wage earners doing casual work in agriculture and livestock breeding zones 1, 2 and 3. They earn about Ks 5,000 or 6,000 a day. Masons and construction workers earn more. On completion of the factories, we expect that our villagers will be offered jobs. If there arises an industrial zone, the zone will have good impact on the whole area and I am not sure whether if there will be bad impacts.

| | | | |
|---|--------------|---|---|
| 5 | Name: | U Kyaw Soe |  |
| | Age: | 40 | |
| | Address: | Takutone Village, Kyarinn Village Tract, Hlegu Township | |
| | Occupation: | Shop Keeper, Village Administration | |
| | Designation: | Head of a Hundred Households | |
| | Hand phone: | 09 2500 41552 | |

I was born in this village. I have lived in this village since my childhood. There are five members in my family. There are about 150 houses in this village. I am working towards the development of our village in cooperation with village elders and villagers. Having an affiliated middle school in our village, there are high school and university graduates. We have no rural dispensary but a auxiliary midwife. Villagers have lost their land and farm which were confiscated at the beginning of the agriculture and livestock breeding zone. Now those who confiscated the lands are leasing them to the agriculture and livestock breeders at Ks 30,000 per acre per year. Most of the people in this village rely on agriculture for their livelihoods as they are now working as hired labourers in the agriculture and livestock breeding zone. There are those who go and work at the factories and workshops in other places by commuter bus. They mostly believe in Buddhism. So there are religious buildings, monasteries, zedis and pagodas. There is no other religion. It will be more convenient for the villagers to get jobs if there

arises an industrial zone in the complex of Nyaung Hnitpin National Convention. As a result, they no longer need to go for and work in other places for these reasons; we welcome the construction of the industrial zone. We feel happy on behalf of the villagers as there have been requirements to improve the education and health sectors in this village, we wish the companies building factories would help fulfill those requirements.

| | | | |
|--|--------------|--|---|
| 6 | Name: | Daw Khin Khin Myaing |  |
| | Age: | 49 | |
| | Address: | Takutone Village, Hlegu Township | |
| | Occupation: | Department of Education | |
| | Designation: | Headmistress of the Middle School (Branch), Takutone Village | |
| | Hand phone: | 09 7954 77330 | |
| <p>My birthplace is South Okkalapa, Yangon. I am now taking responsibility as the headmistress of the Middle School (Branch) in Takutone Village. There are 4 family members. My husband belongs to the Hmawbi telecommunication military unit. When the school closes, I go to live in that military quarter. I have not previously known about the industrial zone to be established in the complex of the Nyaung Hnitpin Convention. People from this village will get jobs if the industrial zone is constructed. So I am happy. I am sure the whole area including this village will be totally changed. I hope that the main changes will be good roads and the social life will simultaneously be improved. I think the bad impacts may be due to the dumping of polluted water from the factories and air pollution. Confiscating land will not happen, I think. So it needs to avoid any harm. The constructions of two school rooms remain unfinished in any school. As Ninth Grade classes are going to be first opened in this academic year, we need some more school rooms and school benches. The company that will invest in the industrial zone and the government should help meet the needs of our village in cooperation with village elders and authorities concerned. I will not object to the construction of this industrial one if there is no harm to the locals and their socio-economic life. I welcome it if it has good impacts.</p> | | | |

4.11.3.5.4 Profile of Sonekone Village, Kyarinn Village tract, Hlegu Township

| | | | |
|-----------------------|---------------------|--------------------------------------|----|
| Population: | | 392 | |
| Number of households: | | 110 households | |
| Number of houses: | | 116 houses | |
| Nationality: | | Myanmar | |
| Education | | | |
| 1 | Primary school: | 1 | |
| 2 | Number of teachers: | 5 | |
| 3 | Number of students: | 39 | |
| | a | 5 th grade | 8 |
| | b | 4 th grade | 6 |
| | c | 3 rd grade | 9 |
| | d | 2 nd grade | 6 |
| | e | 1 st grade (Kindergarten) | 10 |
| Health | | | |
| 1 | 25-bed hospital: | Nil | |
| 2 | Village dispensary: | Nil | |
| 3 | Doctor: | Nil | |
| 4 | Nurse: | Nil | |
| 5 | Midwife: | Nil | |
| 6 | Auxiliary midwife: | Nil | |


| | | |
|--------------------------|----------------------------------|-------------------------|
| Business | | |
| 1 | Grocery: | Nil |
| 2 | Car rental service: | Nil |
| 3 | Trishaw: | Nil |
| 4 | Agriculture: | Gourd, groundnut, paddy |
| 5 | Fishery (motorboat/schooner): | Nil |
| 6 | Livestock breeding: | Pig, chicken |
| 7 | Hotel: | Nil |
| 8 | Lodge: | Nil |
| Social activities | | |
| 1 | Fire-fighting station: | Nil |
| 2 | Bank: | Nil |
| 3 | Library: | Nil |
| 4 | Recreation centre: | Nil |
| 5 | Village market: | Nil |
| 6 | Football ground: | Nil |
| 7 | Monastery: | 1 |
| 8 | Pagoda: | 1 |
| 9 | Spirit shrine: | 1 |
| Security | | |
| 1 | Police station: | Nil |
| 2 | Military unit/post: | Nil |
| Transportation | | |
| 1 | Car (private-owned) | Nil |
| 2 | Bus | Nil |
| 3 | Rental car | Nil |
| 4 | Motorcycle (Passenger transport) | 14 |
| 5 | Motorcycle (private-owned) | 30 |
| 6 | 3-wheel motorcycle | 3 |
| 7 | Trailer Jeep | 1 |
| 8 | Trishaw | Nil |
| 9 | Bullock-cart | 5 |
| Telecommunication | | |
| 1 | Landline phone | Nil |
| 2 | Mobile phone | 150 |
| 3 | Television set | 70 |
| 4 | Radio | Nil |
| 5 | Sky Net | 3 |
| General | | |
| 1 | Households using electricity | 110 |
| 2 | Households not using electricity | 6 |
| 3 | Availability (hand-scooped well) | 1 |
| 4 | Tubewell | 50 |




Figure 4. 73: Sonekone Village Buildings

| | | | |
|--|---|--------------|--|
| 1 |  | Name: | U Aye Kyaw |
| | | Age: | 40 |
| | | Address: | Sonekone Village, Kyarinn Village Tract, Hlegu Township |
| | | Occupation: | Agriculture and Livestock Breeding, Village administration |
| | | Designation: | Head of Hundred Households |
| | | Hand phone: | 09 7954 53349 |
| <p>This village is my birthplace, and I have lived here since my childhood. There are 5 members in my family. I run an agriculture and livestock breeding business. I grow seasonal vegetables and breed chickens and swines. We have a primary school but no rural dispensary and female nurse. I have a leading role to play in festive occasions,</p> | | | |

funerals, electricity supply and road communication of my village in cooperation with village elders and villagers, I have not formerly heard of establishing an industrial zone in the complex of Nyaung Hnitpin Convention. I have come to know it now, I hope most of the villagers will get jobs if it is an industrial zone, the villagers will no longer be casual labourers outside the area of the village as there are a number of people taking manual jobs. For them, I feel happy to have an industrial zone. It is to be positively said that the establishment of an industrial zone will have good impact on our community. I have no idea of what seems to be negative about it.

| | | | |
|---|--------------|---|---|
| 2 | Name: | U Tin Shein |  |
| | Age: | 65 | |
| | Address: | Sonekone Village, Kyarinn Village Tract, Hlegu Township | |
| | Occupation: | Agriculture | |
| | Designation: | Village Elder | |
| | Hand phone: | 09 2505 23125 | |

I have lived in this village since my childhood. It is my birthplace. There used to be teak forests in the immediate vicinity. In addition, there also were other wood trees—in (dipterocarpus tuberculosis) and *kanyin* (dipterocarpus alatus). In the past, those nearby forests were inhabited by wild animals such as elephants, tigers, muntjac, samburs, wild cats and mongoose. Those flora and fauna have become extinct now. I have 5 family members. I work on a paddy farm land and also grow groundnut. I haven't known that an industrial zone is to be built in the complex of Nyaung Hnitpin National Convention. I am sure our villagers will get jobs if the industrial zone appears. Many of our villagers have limited formal education and they work as manual labourers. There are a few high school and university graduates. The project developer and factories in the industrial complex should offer jobs to them. We have a primary school. But we do not have a rural dispensary. If possible, the companies establishing the industrial zone should provide a dispensary and better roads for our village. I do not object to the construction of an industrial zone as it will have good impacts on our village and its environment. We welcome it. I do not know if there will be any bad impact. I have no idea as to what bad impacts will come out.

| | | | |
|---|--------------|---|---|
| 3 | Name: | Daw Khine Nwe Yi |  |
| | Age: | 46 | |
| | Address: | Sonekone Village, Kyarinn Village Tract, Hlegu Township | |
| | Occupation: | Department of Education | |
| | Designation: | Headmistress of Primary School | |
| | Hand phone: | 09 7954 53354 | |

My birthplace is in Maubin Township. I have been taking responsibility as the headmistress of the primary school for 10 years. I live in this village. There are 4 teachers including myself and one worker in this school. There are altogether 39 students at our school. The government had this school constructed in fiscal 2004-2005 as we can now see. The Partner Myanmar NGO offered the water storage tank in front of the school to collect rain water. I have not previously known that a new industrial zone will be established in the complex of Nyaung Hnitpin National Convention. The construction of a new industrial zone is sure to have good and bad impacts. The good impacts are that many of the locals will get jobs and the roads will be greatly improved. Now, people from the village have to go far and work in Hlegu and Hmawbi townships and Yangon, Htaukkyant and Mingaladon industrial zones. They will no longer need to go far to work if an industrial zone exists. I hope that skilled persons as well as the

manual labourers will be offered jobs in their appropriate positions; it is rather difficult to say that it will have only bad impacts. What I really want to say is that the management needs to do no harm to men and their environment.

4.11.3.5.5 Profile of Kyarinn Ashe Village, Kyarinn Village tract, Hlegu Township

| | | | |
|--------------------------|-------------------------------|---------------------------------------|----|
| Population: | | 2137 | |
| Number of households: | | 480 households | |
| Number of houses: | | 470 houses | |
| Nationality: | | Myanmar | |
| Religion: | | Buddhism | |
| Education | | | |
| 1 | Middle School (Branch): | 1 | |
| 2 | Number of teachers: | 12 | |
| 3 | Number of students: | 408 | |
| | a | 7 th grade | 36 |
| | b | 6 th grade | 54 |
| | c | 5 th grade | 46 |
| | d | 4 th grade | 39 |
| | e | 3 rd grade | 48 |
| | f | 2 nd grade | 54 |
| | g | 1 st grade | 56 |
| | h | KG | 75 |
| Health | | | |
| 1 | 25-bed hospital: | Nil | |
| 2 | Village dispensary: | 1 | |
| 3 | Doctor: | Nil | |
| 4 | Nurse: | Nil | |
| 5 | Midwife: | 1 | |
| 6 | Auxiliary midwife: | Nil | |
| Business | | | |
| 1 | Grocery: | 12 | |
| 2 | Car rental service: | Nil | |
| 3 | Trishaw: | Nil | |
| 4 | Agriculture: | Paddy, cucumber, nut, mustard, rubber | |
| 5 | Fishery (motorboat/schooner): | Nil | |
| 6 | Livestock breeding: | Swine, chicken and fish | |
| 7 | Hotel: | Nil | |
| 8 | Lodge: | Nil | |
| Social activities | | | |
| 1 | Fire-fighting station: | Nil | |
| 2 | Bank: | Nil | |
| 3 | Library: | 1 | |
| 4 | Recreation centre: | Nil | |
| 5 | Village market: | Nil | |
| 6 | Football ground: | Nil | |
| 7 | Monastery: | 2 | |
| 8 | Pagoda: | 2 | |
| Security | | | |
| 1 | Police station: | Nil | |
| 2 | Military unit/post: | Nil | |
| Transportation | | | |
| 1 | Car (private-owned) | Nil | |
| 2 | Bus | Nil | |
| 3 | Rental car | Nil | |

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| | | |
|--------------------------|----------------------------------|------|
| 4 | Motorcycle (Passenger transport) | 25 |
| 5 | Motorcycle (private-owned) | 480 |
| 6 | 3-wheel motorcycle | 2 |
| 7 | Trailer Jeep | Nil |
| 8 | Trishaw | Nil |
| Telecommunication | | |
| 1 | Landline phone | Nil |
| 2 | Mobile phone | 1200 |
| 3 | Television set | 280 |
| 4 | Radio | 40 |
| General | | |
| 1 | Households using electricity | 400 |
| 2 | Households not using electricity | 70 |
| 3 | Availability (hand-scooped well) | 70 |
| 4 | Tubewell | 400 |

Overview



Two monasteries and pagodas



Basic Education Middle School (Branch)




Renovation of the Primary School in Kyarinn Ashe Village was carried out by the development funds of the Pyidaungsu Hluttaw.


The value of funds: MMK 5 million
Renovation started: January 24, 2014
Renovation completed: February 25, 2014




Figure 4. 74: Kyarinn Ashe Village Buildings

| | | | |
|--|--------------|---|---|
| 1 | Name: | U Myint Kyaw |  |
| | Age: | 49 | |
| | Address: | Kyarinn Ashe Village, Kyarinn Village Tract, Hlegu Township | |
| | Occupation: | Administration | |
| | Designation: | Village Tract Administrator | |
| | Hand phone: | 09 540 0908 | |
| <p>My birthplace is Kyarinn Ashe Village. There are 5 members in my family. I run my own grocery store to earn my living. Currently I am taking responsibility as the Village Tract Administrator. I have heard that an industrial zone is to be established in the complex of Nyaung Hnitpin Convention. I do not know which country is implementing it. If the industrial zone emerges, the whole area will be changed and the roads will be improved compared to the present situation. If the roads become much better, it will consequently improve our social status. I feel happy as the locals will get jobs. If the</p> | | | |

businesses flourish, the rule of law will improve. The establishment of the industrial zone may have good impacts as well as bad impacts. The construction of the industrial zone should be systematically implemented under the supervision of the developers in order that bad impacts will not cause any harm to the natural environment as well as the social life. If there is no harm to natural and social environment, we welcome the industrial zone construction. I feel joy as I hope many locals will get jobs.


| | | | |
|---|--------------|---|---|
| 2 | Name: | Daw Than Nu |  |
| | Age: | 52 | |
| | Address: | Kyarinn Ashe Village, Kyarinn Village Tract, Hlegu Township | |
| | Occupation: | Department of Education | |
| | Designation: | Headmistress of the Middle School (Branch) | |
| | Hand phone: | 09 4201 59596 | |

I was born in this village. There are 5 members in my family. Currently, I am taking responsibility as the headmistress of the Middle School (Branch) in Kyarinn Ashe Village. I have heard about building an industrial zone in the complex of Nyaung Hnitpin Convention. I feel happy because I hope the high school and university graduates as well as unskilled labourers will get jobs if an industrial zone is established. There are jobless people although they have passed 11th Grade (matriculation) examination. Some of them are now working with the village monastic school. As there is no nursery school, the company implementing the project should provide a daycare centre for the village. If there is a nursery, people in this village will be more convenient to work outside their houses. When the industrial zone is finished, some young people will get jobs and will be able to spend more money. I'm concerned that they will be using narcotic drugs if they have no jobs. The construction of the industrial zone will have good impacts on our village. It is difficult to say if there will be bad impacts. I want to suggest that the project developers need to manage it in order not to harm natural and social environments.


| | | | |
|---|--------------|---|---|
| 3 | Name: | Daw Tin Moe Thwe |  |
| | Age: | 27 | |
| | Address: | Kyarinn Ashe Health Department (Branch), Kyarinn Ashe Village, Hlegu Township | |
| | Occupation: | Health Department | |
| | Designation: | Supervisor Level 2 | |
| | Hand phone: | 09 7983 23928 | |

My birthplace is Darbein, Hlegu Township. Our family is an extended one. There are seven members including father, mother, brothers and sisters in my family. I have been taking responsibility (as a health staff member) in this village for over 4 months. I am now living in the rural health department (Branch) quarter with my younger brother. There has been no serious disease in this village. In the past, some of them suffered from malaria. However, they no longer have it. I haven't known before that an industrial zone is to be set up in the complex of Nyaung Hnitpin Convention. I feel happy that the locals, young and old alike, will get jobs if an industrial zone is established. The social status of the locals will be improved and the roads will become much better. The industrial zone may probably cause harm to the natural environment. The builders of the factories need to be responsible for not harming the earth, air and water in the natural environment. There is no doctor to take care of health in this village. We have only a midwife. If someone suffers from a disease, we have to go to the hospitals and health care centres in Yangon or Hlegu. Patients in an emergency

| | |
|--|---|
| | situation find it difficult to go to town because the roads are bad. The builders of the factories should help improve roads. |
|--|---|

| | | | |
|---|--------------|---|---|
| 4 | Name: | Daw Than Than Win |  |
| | Age: | 48 | |
| | Address: | Kyarinn Ashe Village, Kyarinn Village Tract, Hlegu Township | |
| | Occupation: | Own shop | |
| | Designation: | Shopkeeper | |
| | Hand phone: | 09 2634 67583 | |

I was born in this village. There are only 2 members in my family. I haven't heard about the establishment of an industrial zone in the complex of Nyaung Hnitpin National Convention. I feel happy because people from our village and nearby villages will get jobs if an industrial zone is set up. I am not sure if the industrial zone will have bad impacts. I think our shop will also sell much better than the present. It is needed to improve roads for the local development. The present roads are so damaged that they cannot be properly used. Those are worse in monsoon. When the industrial zone is completed, this place will be more populated. We will be able to enjoy a growing business as we sell better. We do not have to be worried about emissions from the industrial zone as it is rather far from our village. But I am worried that the harmful by-products may cause harm to the natural and social environments of the villages close to the zone. Those who set up factories should take proper measures so that there will be no bad impacts.

| | | | |
|---|-------------|--|---|
| 5 | Name: | Daw Tin Than |  |
| | Age: | 60 | |
| | Address: | Kyarinn Ashe Village, Kyarinn Village Tract, Hlegu Township, Yangon Region | |
| | Occupation: | Fishery | |
| | Rank: | Worker | |
| | Hand phone: | 09 7737 11814 | |

We have lived in this village for a long time. There are 4 members in my family. I haven't known that an industrial zone is to be set up in the complex of Nyaung Hnitpin National Convention. When the industrial zone is completed, the social status of the people, young and old alike, from the villages in the vicinity will be improved. I have a daughter working in the business of packaging plum jam. Now, she earns Ks 3,000 a day. If the industrial zone emerges, I want her to work at the zone. I think it will be more convenient for her to work at a factory than to take any job that comes by. So I support the establishment of the industrial zone. My son has already passed the matriculation exam. He aims to work at the industrial zone. I have no idea of whether the establishment of the industrial zone will have bad impacts on the environment. It will depend on what kind of factories are to be built and how they will be built.

4.11.3.5.6 Profile of Kyarinn Anauk Village, Kyarinn Village tract, Hlegu Township

| | | | |
|--------------------------|-----------------------------------|--|----|
| Population: | | 1850 | |
| Number of households: | | 370 households | |
| Number of houses: | | 350 houses | |
| Nationality: | | Myanmar | |
| Religion: | | Buddhism | |
| Education | | | |
| 1 | Middle School (Branch): | 1 | |
| 2 | Number of teachers: | 12 | |
| 3 | Number of students: | 204 | |
| | a | 7 th grade | 23 |
| | b | 6 th grade | 23 |
| | c | 5 th grade | 37 |
| | d | 4 th grade | 28 |
| | e | 3 rd grade | 19 |
| | f | 2 nd grade | 24 |
| | g | 1 st grade | 25 |
| | h | KG | 25 |
| Health | | | |
| 1 | 25-bed hospital: | Nil | |
| 2 | Village dispensary: | Nil | |
| 3 | Doctor: | Nil | |
| 4 | Nurse: | Nil | |
| 5 | Midwife: | Nil | |
| 6 | Auxiliary midwife: | 1 | |
| Business | | | |
| 1 | Grocery: | 20 | |
| 2 | Car rental service: | 5 | |
| 3 | Trishaw: | Nil | |
| 4 | Agriculture: | Paddy, eggplant, cucumber ,nut, mustard, roselle, chilly | |
| 5 | Fishery (motorboat/schooner): | Nil | |
| 6 | Livestock breeding (small scale): | 30 | |
| 7 | Hotel: | Nil | |
| 8 | Lodge: | Nil | |
| Social activities | | | |
| 1 | Fire-fighting station: | Nil | |
| 2 | Bank: | Nil | |
| 3 | Library: | Nil | |
| 4 | Recreation centre: | Nil | |
| 5 | Village market: | Nil | |
| 6 | Football ground: | 1 | |
| 7 | Monastery: | 1 | |
| 8 | Pagoda: | 4 | |
| 9 | Spirit shrine: | 1 | |
| Security | | | |
| 1 | Police station: | Nil | |
| 2 | Military unit/post: | Nil | |
| Transportation | | | |
| 1 | Car (private-owned) | Nil | |
| 2 | Bus | Nil | |
| 3 | Rental car | 2 | |
| 4 | Motorcycle (Passenger transport) | 100 | |
| 5 | Motorcycle (private-owned) | 300 | |

| | | |
|--------------------------|----------------------------------|-----|
| 6 | 3-wheel motorcycle | Nil |
| 7 | Trailer Jeep | 3 |
| 8 | Trishaw | Nil |
| Telecommunication | | |
| 1 | Landline phone | Nil |
| 2 | Mobile phone | 700 |
| 3 | Television set | 300 |
| 4 | Radio | 50 |
| General | | |
| 1 | Households using electricity | 200 |
| 2 | Households not using electricity | 150 |
| 3 | Availability (hand-scooped well) | 200 |
| 4 | Tubewell | 2 |

Overview





Basic Education Middle School (Branch)

A tube well and a Lake


A Grocery and store

A street inside the village

Figure 4. 75: Kyarinn Anauk Village Buildings

| | | | |
|--|-------------|---|---|
| 1 | Name: | Daw Moe Moe Myint |  |
| | Age: | 31 | |
| | Address: | Kyarinn Anauk Village, Kyarinn Village Tract, Hlegu Township, Yangon Region | |
| | Occupation: | Health Department | |
| | Rank: | Auxiliary midwife | |
| | Hand phone: | 09 4202 01191 | |
| <p>This village is my birthplace. There are 3 family members. I am involved in the health care of this village. When the Health Assistant sends for me for help, I have to go to Kalihtaw Health Department. If an industrial zone is to be set up in the complex of Nyaung Hnitpin National Convention, people from the nearby villages will get jobs. I do not object to the establishment of the industrial zone as it will benefit this area and the country. If there are factories that will harm the natural as well as the social environments, I would like to suggest that the developers of the factories need to implement it in such a way that it will have minimum impacts on the natural and social environment.</p> | | | |
| 2 | Name: | Daw Khine Zar Mon |  |
| | Age: | 30 | |
| | Address: | Kyarinn Anauk Village, Kyarinn Village Tract, Hlegu Township, Yangon Region | |
| | Occupation: | Department of Education | |
| | Rank: | Teacher, middle school teacher | |
| | Hand phone: | 09 7818 20731 | |
| <p>This village is my birthplace. There are 3 family members. I have been working as a teacher for 12 years. I have never heard about the establishment of the industrial zone in the complex of Nyaung Hnitpin National Convention. If the industrial zone is set up,</p> | | | |

the roads in this area will be greatly improved and the communication links will be much better. People will get jobs. As there will be more job opportunities, students will learn more to have better jobs. However, I am a bit worried that that they will become less interested in their education and become eager to work in a factory. As more and more people will be moving into the area, I am worried about the clashes that would occur between people of different religious faiths. The factories that produce dangerous industrial waste should not be built as they will have bad impacts on men and their environment. I do not accept the idea of having an industrial zone in which such bad factories are to be built.

| | | | |
|--|---|-------------|---|
| 3 |  | Name: | U Sein Lwin |
| | | Age: | 53 |
| | | Address: | Kyarinn Anauk Village, Kyarinn Village Tract, Hlegu Township, Yangon Region |
| | | Occupation: | Agricultural and Livestock Breeding |
| | | Rank: | Village Elder, Chairman of Parent-Teacher Association |
| | | Hand phone: | 09 7820 02082 |
| <p>My birthplace is Phoyingale village, Hlegu Township. I have lived in this village for 33 years. I ge married here. There are 4 family members. I haven't heard before that an industrial zone is to be created in the complex of Nyaung Hnitpin Convention. I feel happy and unhappy at the same time. I am happy because locals, young and old alike, will get jobs. My worries are that it will have bad impacts on the health of people in our vicinity due to the polluted air and water that might be disposed of from the factories. It is required to manage and implement the establishment of the industrial zone so that there will not be any harm to the men and natural environment due to the harmful wastes from the factories to be built. We need a day nursery and a rural dispensary in our village. I want to request the company that is to set up the industrial zone to help provide a tube well for drinking water and a reservoir. I welcome it and do not object to the establishment of the industrial zone if it causes no harm to man and his environment.</p> | | | |

4.11.3.5.7 Profile of Agriculture and Livestock Zone No. (1)

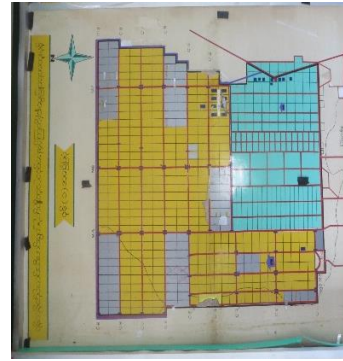
| | | |
|----------------------------|------------------------------------|--|
| Population: | | 2295 |
| Number of farm units/plots | | 459 |
| Number of houses: | | 570 |
| Ethnicity: | | Bamar, Rakhine, Kayin, Shan, Chinese, Indian |
| Religion: | | Buddhism, Christianity |
| Education | | |
| 1 | Primary School (Branch): | Nil |
| 2 | Number of teachers: | Nil |
| 3 | Number of students: | Nil |
| Health | | |
| 1 | 25-bed hospital: | Nil |
| 2 | Village dispensary: | Nil |
| 3 | Doctor: | Nil |
| 4 | Nurse: | Nil |
| 5 | Midwife: | Nil |
| 6 | Auxiliary midwife: | Nil |
| Business | | |
| 1 | Grocery: | 9 shops |
| 2 | Car rental service: | Nil |
| 3 | Trishaw: | Nil |
| 4 | Agriculture (vegetables, flowers): | 346 plantations |
| 5 | Fish Farming | 10 ponds |

| | | |
|--------------------------|--|-------------|
| 6 | Livestock breeding (pig, chicken) | 103 farms |
| 7 | Hotel: | Nil |
| 8 | Lodge: | Nil |
| Social activities | | |
| 1 | Fire-fighting (auxillary) | 20 persons |
| 2 | Fire fighting station | 1 |
| 3 | Library: | Nil |
| 4 | Recreation centre: | Nil |
| 5 | Village market: | Nil |
| 6 | Football ground: | Nil |
| 7 | Monastery: | Nil |
| 8 | Pagoda: | Nil |
| 9 | Spirit shrine: | Nil |
| 10 | Preschool: | Nil |
| 11 | Damayone | Nil |
| 12 | Zone Administrative Committee Office | 1 |
| Security | | |
| 1 | Police station: | Nil |
| 2 | Police guard station: | Nil |
| Transportation | | |
| 1 | Car (private-owned) | 50 |
| 2 | Bus | Nil |
| 3 | Rental car | Nil |
| 4 | Motorcycle (Passenger transport) | Nil |
| 5 | Motorcycle (private-owned) | Every house |
| 6 | 3-wheel motorcycle | Nil |
| 7 | Trailer Jeep | 5 |
| 8 | Bicycle | 70 |
| Telecommunication | | |
| 1 | Landline phone | Nil |
| 2 | Mobile phone | 1150 |
| 3 | Television set | 400 |
| 4 | Satellite | 30 |
| Electricity | | |
| 1 | Households using electricity | Every house |
| Water sources | | |
| 1 | Dug well | Every plot |
| 2 | Tube well | Every plot |
| 3 | Purified water | A few |
| Sanitation | | |
| 1 | Fly proof toilet | Every house |
| Garbage Disposal | | |
| 1 | Burning | Every house |
| 2 | Digging hole | Every house |
| House condition | | |
| 1 | Sole ownership of land and house | 120 |
| 2 | Built house and stay on not owned land | 450 |
| 3 | First class house | 100 |
| 4 | Second class house | 200 |
| 5 | Third class house | 270 |

Photographs of Agriculture and Livestock Zone No. (1)



Agriculture and Livestock Zone 1
Administrative Office



Map of Agriculture and Livestock Zone 1



Poultry Farm on M 7 Road



Plantation on C3 Road



Poultry Farm on C 8 Road



Grocery Store on M 7 Road



Project Site for Factory



Plantation on M7 Road



War Veteran Training School opposite the KMIC Project Site



Aung Zebu Poultry Farm on C8 Road

4.11.3.5.8 Profile of Livestock and Agricultural Zone No. (2)

| | | |
|----------------------------|--|---|
| Population: | | 1161 |
| Number of farm units/plots | | 940 |
| Number of houses: | | 481 |
| Ethnicity: | | Bamar, Rakhine, Kayin, Shan, Chinese, Indian, Mon |
| Religion: | | Buddhism, Christianity |
| Education | | |
| 1 | Middle School (Branch): | 1 |
| 2 | Number of teachers: | 8 |
| 3 | Number of students: | 217 |
| Health | | |
| 1 | 25-bed hospital: | Nil |
| 2 | Village dispensary: | Nil |
| 3 | Doctor: | Nil |
| 4 | Nurse: | Nil |
| 5 | Midwife: | Nil |
| 6 | Auxiliary midwife: | Nil |
| Business | | |
| 1 | Grocery: | 30 shops |
| 2 | Car rental service: | Nil |
| 3 | Trishaw: | Nil |
| 4 | Agriculture (vegetables, flowers): | 505 plantations |
| 5 | Fish Farming | 8 ponds |
| 6 | Livestock breeding (pig, chicken) | 225 farms |
| 7 | Fruit plantation (mango, jack fruit, rambutan) | 150 |
| 8 | Company/Factory Plot | 42 |
| Social activities | | |
| 1 | Fire-fighting (auxillary) | Nil |
| 2 | Fire fighting station | Nil |
| 3 | Library: | Nil |
| 4 | Recreation centre: | Nil |
| 5 | Village market: | Nil |
| 6 | Football ground: | Nil |
| 7 | Monastery: | 2 |
| 8 | Pagoda: | 4 |
| 9 | Spirit shrine: | Nil |
| 10 | Preschool: | Nil |
| 11 | Damayone | 1 |
| 12 | Ordination Hall | 1 |
| 13 | Zone Administrative Committee Office | 1 |

| | | |
|--------------------------|--|-------------|
| Security | | |
| 1 | Police station: | Nil |
| 2 | Police guard station: | 1 |
| Transportation | | |
| 1 | Car (private-owned) | 50 |
| 2 | Bus | Nil |
| 3 | Rental car | Nil |
| 4 | Motorcycle (Passenger transport) | Nil |
| 5 | Motorcycle (private-owned) | Every house |
| 6 | 3-wheel motorcycle | Nil |
| 7 | Trailer Jeep | 5 |
| 8 | Bicycle | 100 |
| Telecommunication | | |
| 1 | Landline phone | Nil |
| 2 | Mobile phone | 962 |
| 3 | Television set | 7 |
| 4 | Satellite | 80 |
| 5 | Radio | 10 |
| Electricity | | |
| 1 | Households using electricity | Every house |
| Water sources | | |
| 1 | Dug well | 1600 wells |
| 2 | Tube well | 30 wells |
| 3 | Purified water | 110 houses |
| Sanitation | | |
| 1 | Fly proof toilet | Every house |
| Garbage Disposal | | |
| 1 | Burning | Nil |
| 2 | Digging hole | Every house |
| House condition | | |
| 1 | Sole ownership of land and house | 331 |
| 2 | Built house and stay on not owned land | 150 |
| 3 | First class house | 100 |
| 4 | Second class house | 100 |
| 5 | Third class house | 281 |

Photographs of Agriculture and Livestock Zone No. (2)



Pagoda



Ordination Hall

| | |
|---|---|
| | |
| Dhamma Hall (Dhamma Yone) | Monastery |
| | |
| Agriculture and Livestock Zone 2 Administrative Office | Map of Agriculture and Livestock Zone 2 |
| | |
| Middle School (Branch) | Grocery Store |

4.11.3.5.9 Profile of Livestock and Agricultural Zone No. (3)

| | |
|----------------------------|---|
| Population: | 1750 |
| Number of households: | 360 households |
| Number of houses: | 350 houses |
| Number of farm unit: | 347 plots |
| Zone Area: | 1734 acre (347 plots x 5 acre) |
| Ethnicity: | Bamar, Rakhine, Kayin, Mon, Shan, Chinese, Indian |
| Religion: | Buddhism, Christian, Hindu, |
| Education | |
| 1 Primary School (Branch): | 1 |
| 2 Number of teachers: | 9 |
| 3 Number of students: | 235 |
| Health | |
| 1 25-bed hospital: | Nil |
| 2 Village dispensary: | Nil |
| 3 Doctor: | Nil |

| | | |
|--------------------------|---|-----------------|
| 4 | Nurse: | Nil |
| 5 | Midwife: | Nil |
| 6 | Auxiliary midwife: | Nil |
| Business | | |
| 1 | Grocery: | 2 |
| 2 | Car rental service: | Nil |
| 3 | Trishaw: | Nil |
| 4 | Agriculture: | 289 |
| 5 | Fish Farming | 40 |
| 6 | Livestock breeding (pig, chicken, cows) | 18 |
| 7 | Hotel: | Nil |
| 8 | Lodge: | Nil |
| Social activities | | |
| 1 | Fire-fighting station: | Nil |
| 2 | Bank: | Nil |
| 3 | Library: | Nil |
| 4 | Recreation centre: | Nil |
| 5 | Village market: | Nil |
| 6 | Football ground: | Nil |
| 7 | Monastery: | 3 |
| 8 | Pagoda: | 1 |
| 9 | Spirit shrine: | Nil |
| 10 | Preschool: | Nil |
| 11 | Damayone | 1 |
| 12 | Zone Administrative Committee Office | 1 |
| Security | | |
| 1 | Police station: | 1 |
| 2 | Police guard station: | 1 |
| Transportation | | |
| 1 | Car (private-owned) | 10 |
| 2 | Bus | Nil |
| 3 | Rental car | Nil |
| 4 | Motorcycle (Passenger transport) | Nil |
| 5 | Motorcycle (private-owned) | 100 |
| 6 | 3-wheel motorcycle | Nil |
| 7 | Trailer Jeep | Nil |
| 8 | Trishaw | Nil |
| Telecommunication | | |
| 1 | Landline phone | Nil |
| 2 | Mobile phone | 1000 |
| 3 | Television set | Every house |
| 4 | Satellite | 10 |
| General | | |
| 1 | Households using electricity | Every house |
| Water sources | | |
| 1 | Dug well | Every household |
| 2 | Tube well | 150 |
| 3 | Purified water | 100 |
| House condition | | |
| 1 | Sole ownership of land and house | 35 |
| 2 | Built house and stay on not owned land | 315 |
| 3 | First class house | 30 |
| 4 | Second class house | 20 |
| 5 | Third class house | 300 |

KMIC project is located in Livestock and Agriculture Zone 3 which area is about 1734 acre primarily a farm land. The zone comprises of 347 farm units that are 5-acre minimum area each.

Population

The zone is sparsely populated with 1750 people residing in total of 350 houses. Bamar is the most dominant ethnicity with several ethnic minority Rakhine, Kayin, Mon, Shan, Chinese, and Indian settling in zone 3.

Economy and livelihood

As it is the agriculture and livestock zone, the main sources of earnings in Zone 3 are agriculture, livestock breeding, fish farming and casual labours. Majority of people of zone 3 are agriculture workers, casual labours and tenants. Most of the casual labours are employed in the agricultural sector.

Agriculture

In the total of 289 agriculture units the farmers do not grow one particular crops but they grow vegetables together with perennial fruits trees. The dominant perennial trees are mango, pomelo, Lisbon lemon, Rambutan, drumstick (*Moringa oleifera*), cashew nut and oil palm. Farmers also grow vegetables such as Eggplants, tomato, Lady's finger, and Pole bean. Marketed flowers especially Eugenia, Aster (*Anisopappus novae anglica*), Chrysanthemum, and Gladiolus are also planted, and cultivated in the farmlands.

Livestock farming

Five units in zone 3 is running poultry farming which are owned by two persons. Another two land owners are planning to start the poultry farming business in 6 units. There are total of 50 pond of fish farming. Integrated chicken-fish farming is seen in 15 units. Integrated fish farming with pigs and chicken is widespread in 15 units which is the business of one owner. Pig rising and breeding business is running in 3 units. Currently seven units of poultry farming owned by three persons are barred to continue the business.

Others

There are two grocery stores selling household essentials in zone 3.

Water source

Every farm unit has dug well and tube well which are sufficient for farming and household use. Some households use purified water for drinking and cooking.

Electricity

Every household receive electricity.

Social infrastructure

As social infrastructure there are zone committee office, police station, monastery, pagoda, damayone and one primary school.



Health

There are no health care facilities available in zone 3. Residents of zone 3 go to Htauk Kyant or Hlegu for medical care if they have medical problem. However, residents reported that they have good health as farming jobs involve a great deal of walking one of the simplest and most effective ways to get fit and stay fit.

Generally, a farm unit 5 acre afford as a buffer zone between neighbours to spread odour from chicken farm. However, it is reported that during rainy season flies are and chicken poop odour from a poultry farm bothering the neighbours.

Photos of Agriculture and Livestock Zone 3

| | |
|---|--|
|  |  |
| <p>Management Committee Office of Agriculture and Livestock Zone 3</p> | <p>A map of Agriculture and Livestock Zone 3</p> |
|  |  |
| <p>Monastery</p> | <p>Pagoda</p> |
|  |  |
| <p>Primary Branch School</p> | <p>Eugenia farm</p> |
|  |  |

| Integrated chicken-fish farming | Integrated chicken-fish farming |
|---|--|
|  |  |
| Pig farm | Lisbon lemon plants |

Opinions and Suggestions of the Community living in Agriculture and Livestock Zones (1), (2) and (3)

1. KMIC project will be implemented by a Korean company and it was not expected that there would be many negative impacts on agriculture and livestock zones. Positive effects like job opportunities and improved living are more expected than adverse impacts.
2. In the public consultation meeting, the responsible person from Korean company said that the project will be implemented in line with international standards and least negative impacts on the environment. Therefore, it was hoped that there would be positive effects.
3. Regarding the adverse impacts, the community will monitor what will happen when industries and factories are in operation. If the wastewater, noise, and solid waste cannot be managed well, the community nearby will be affected.
4. The owners of agriculture plantations and livestock farms are worried about bad smells generated from operation of factories and industries would reach to the plantations and livestock farms and improper management and disposal of solid waste and wastewater would degrade the soil and plantations, vegetables and fruit trees.
5. The noise from factories' operation can cause the decrease of egg production (egg laying) rate and milk production rate and the owners of farms worried about noise.



CHAPTER 5. IMPACT AND RISK ASSESSMENT AND MITIGATION MEASURES

5.1 Overview

This chapter presents assessments of potential environmental impacts of proposed KMIC Project in Hlegu Township, Yangon Region during pre-construction, construction, operation and decommissioning phases. These environmental impacts are related to physical, biological, and social aspects and including but not limited to pollution (air quality, surface and ground water quality, waste, soil contamination, sedimentation, hydrology, soil erosion, noise and vibration) social environment (living and livelihood, local conflict, misdistribution benefit and damage, existing infrastructures and services, water usage), natural environment (flora, fauna and biodiversity, ecosystem), health and safety (risks for infectious diseases such as AIDS/HIV, occupational health and safety, community health and safety), emergency (flood risk, risk of fire, earth quake, storms) and climate change and greenhouse gases effects. The risk assessment and mitigation measures for the potential environmental impacts are also described.

5.2 Impact Assessment

Assessment refers to the interpretation of the significance of anticipated changes relating to the proposed project. Impact interpretation is based upon the systematic application of definition of “significance”: E.g., waste-discharge standards (effluent limitation) from particular facilities. The application of professional judgment in the context of assessing impacts is a pivotal role in our work.

Another basis for impact assessment is public input; this input could be received through the conduct of public meetings and interviews with residents in surrounding area of the project site. As the general public can often delineate important environmental resources and values for the particular areas, and these are also considered essential in impact assessment. The assessment of short- and long-term potential impacts is made on the basis of information collected from existing sources supplemented by the field data. Impacts are also differentiated as direct or indirect – those that arise directly from the proposed project, and those that arise because of secondary activities induced by the project. Impacts are also categorized in relations with different implementation phases: Pre-construction phase, Construction phase, Operation phase and Decommissioning phases.

5.3 Impact Assessment Methodology

5.3.1 Identification of the Potential Impacts

There are several methods applied to assist in the identification. These include checklists, map overlays, public consultation and professional judgement based on information collected from existing sources supplemented by the field data.

The interaction-matrix method developed by Leopold et al (1971) is used as an example. The Leopold Matrix contains the list of actions and environmental items. Each action and its potential for creating an impact on each environmental item are considered.

The project activities and related potential negative environmental impacts are generally mentioned in the sample matrix table below. The specific details of project activities and the potential impacts caused by these activities for different project phases are described in the following respective sections.

Table 5. 1: Matrix for project activities and the related negative environmental impacts

| Project Activities | Environmental Parameters | | | | | | | | | | | | | | |
|--|--------------------------|-------------|---------------------|-----------------------|----------------------|------------------------------|--------------|---------------------------|---------------|----------------------------|-----------------------|-----------------------|--------------------------------|----------------|-----------------------------|
| | Topography | Air Quality | Noise and vibration | Surface Water Quality | Ground Water Quality | Soil Quality / Contamination | Soil Erosion | Generation of solid waste | GHG emissions | Flora, fauna and ecosystem | Living and livelihood | Landscape and scenery | Occupational health and safety | Emergency Risk | Community Health and Safety |
| Site clearing and levelling | X | X | X | X | | X | X | X | X | X | X | X | X | X | X |
| Transportation and storage of construction materials/equipment | | X | X | X | | X | | X | X | X | X | | X | X | X |
| Construction Activities (including equipment and machine use) | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Influx of labor and construction of temporary houses | | | | X | | | | X | | | X | | X | X | X |
| Transportation and disposal of construction waste and debris | | X | X | X | X | X | | X | X | | | | X | | X |
| Operation of project activities | | X | X | X | X | X | | X | X | | X | | X | X | X |
| Wastewater disposed from different industries and project facilities | | | | X | X | X | | | | | | | X | | X |
| Solid waste generation from operation of project activities | | | | X | X | X | | X | | | | | X | | X |
| Emissions from | | X | | | | | | | X | | | | X | X | X |

| | | | | | | | | | | | | | | |
|-----------------------------|--|---|---|---|--|---|--|---|---|--|---|--|---|---|
| different industries | | | | | | | | | | | | | | |
| Demolition work | | x | x | x | | x | | x | x | | x | | x | x |

Comprehensive literature reviews and published information helps for impact identification as well. Impact prediction is also accomplished by the use of look-alike (analogous) information on actual impacts from similar types of projects and based on professional judgment.

5.3.2 Nature and Characteristics Impacts

There can be different nature of impacts with different characteristics which include:

- Positive and negative: Negative impacts harm, degrade or impair the ecosystem health and the health and quality of life of people who live and work in the affected ecosystems. Some impacts can be perceived to be neutral, whilst others are positive.
- Direct and Indirect: Direct impacts are created directly by a project action. Indirect impacts result from subsequent impacts caused by the direct impacts. Direct impacts are more easily identifiable and quantifiable than indirect impacts.
- Long term and short term: Some impacts occur only during the construction phase of the project (short term), others persist to the operational phase (medium term) and others linger on long after the project has been decommissioned (long term).
- Recurring and Non-Recurring: Some impacts occur repeatedly in space and time, while others occur only once.
- Regional and Local: Some impacts cover large areas whilst others are restricted to a small area.
- Cumulative and Non-cumulative: Cumulative impacts result when impacts from one activity combine with those from another activity to produce a greater impact or a different impact. Non-cumulative impacts do not accumulate in space and in time.
- Reversible and Irreversible: This refers to the permanence of an impact. Impacts maybe reversible by natural means at natural rates (e.g. sand deposition) or through human intervention (e.g. reforestation). However, some impacts are irreversible such as the elimination of particular wildlife habitats through urban development.

5.3.3 Assessment of Impact Significance

This section describes the impact assessment process undertaken to evaluate the level of risk to environmental, socio-economic and health receptors from activities associated with the proposed project. This description provides an account of the identification of potential impacts and benefits and the evaluation of their significance.

The assessment of the level of impact significance requires consideration of the impact level in relation to the receptor sensitivity. The impact assessment is based on four categories of impact significance level as described in the following table. These address the level of mitigation that is considered appropriate to be applied for a given impact.

The degree of significance depends upon the level (i.e. magnitude, extent and duration) of impacts and the sensitivity of the resource value that they may impact. The criteria used to define the significance ranking of impacts on a qualitative basis are mentioned in the table below.

Table 5. 2: Criteria used to determine Impact Significance

| Criteria | Score | Detail |
|----------------------|-------|---|
| Extent | 3 | High – Area of impact is beyond 5 km and impact extends to regional and national level |
| | 2 | Medium – Area of impact is beyond the project area but is in a limited area of 1-5 km |
| | 1 | Low – Area of impacts is in the project area within a radius of 1 km |
| Duration | 3 | Long Term – Permanent impact and impact will remain after decommissioning of the project. Impact occurs in long term duration (> 5 years) |
| | 2 | Medium Term – Impact can be reversible over time (1-5 years), period of impact occurrence is within the project period, impact occurs over mid-term duration (1-5 years) |
| | 1 | Short Term – Impact can be quickly reversible (< 1 year), period of impact occurrence is less than the project period, impact occurs in short-term duration (< 1 year) |
| Magnitude | 3 | High – Exceeds regulatory standards, changes the original structure of the environmental or social system or ecosystem |
| | 2 | Medium – Within regulatory standards, but changes some factors in the environmental or social system or ecosystem but does not change the structure |
| | 1 | Low – within regulatory standards, with small changes in some factors for the environmental or social system or ecosystem but does not change the structure |
| | | Negligible – no detectable impact on the environment or socio-economic conditions |
| Receptor Sensitivity | 3 | High – High value/sensitivity receptor or resource, rare or endangered species or habitat impacted on a national or international level, exceeding standards, large permanent change in human use and quality of life values at a regional level, long-term or no reversible. |
| | 2 | Medium - Medium value/sensitivity receptor or resource, impact disturbs an area that has a value for conservation or causes change in species diversity. Impact important on a local or regional level, within standards, moderate change in human use and quality of life values at moderate level over a long-term duration, reversible over medium-term. |
| | 1 | Low - Low value/sensitivity receptor or resource, impact disturbs degraded area or slightly disturbs area with value for conservation, causes small changes in species and diversity, within standards, small local change in human use and quality of life values over a short- term duration, reversible over short-term. |
| | | Negligible – no detectable sensitivity |

Source: Adapted from Nigel Rossouw (2003); Sippe (1999); and United Nations University (2007)

Impact Level = Magnitude + Extent + Duration

Table 5. 3: Impact Level Score

| Total Score for Impact Level | Impact Level | Score |
|------------------------------|--------------|-------|
| 7-9 | High | 3 |
| 4-6 | Medium | 2 |
| 1-3 | Low | 1 |

The above matrix method is used to consider the Impact Level and Receptor Sensitivity as follows:

SIGNIFICANCE = IMPACT LEVEL SCORE X RECEPTOR SENSITIVITY

Table 5. 4: Impact Significance Evaluation

| Significance Level of Environmental Impact | | | Impact Level Score | | |
|--|--------|---|--------------------|------------|------------|
| | | | Low | Medium | High |
| | | | 1 | 2 | 3 |
| Receptor Sensitivity | Low | 1 | Negligible (1) | Low (2) | Low (3) |
| | Medium | 2 | Low (2) | Medium (4) | Medium (6) |
| | High | 3 | Low (3) | Medium (6) | High (9) |

Table 5. 5: Categories of Impact Significance

| Significance Level | Definition |
|-----------------------|--|
| High (7-9) | Impact is classified as high and can cause numerous effects. Major impacts affect an entire population or species in sufficient magnitude to cause a decline in abundance and/or change in distribution. Large permanent change in human use and quality of life values at a regional and national level. Fatality from an accident or occupational illness. Impacts cannot be managed or resolved by any mitigation measures. |
| Medium (4-6) | Impact may result in changes that affect the value of resources and environment. Moderate impacts affect a portion of a population and may bring about a change in abundance and/or distribution but does not threaten integrity of population. Impact may affect moderate change in human use and quality of life values at a local and regional level over a long-term duration. Major injury or health effects (including Permanent Partial Disability). Mitigation measures are required to manage or reduce the potential impacts and monitoring measures are required to determine effectiveness of mitigation measures. |
| Low (2-3) | Impact may result in changes in resources and environment, but this change does not decrease value of these resources and environment. Minor impacts affect individuals within a population over a short period of time. Local change in human use and quality of life values over a short-term duration. Minor injury or health effects (Lost Time Injury). Impact can be managed and resolved by implementation of general mitigation |
| Negligible (1) | Impact has no effect. |

5.3.4 Identification and Assessment of Potential Environmental Impacts

The KMIC project will consist of industrial area (including food and beverages processing, textile and garment, logistics, and assembly plant), residential area, villa, commercial, IT park, Gas station, public facility (road, park, buffer green belt, management center, public support facility), substation, wastewater treatment plant and water purification plant.

Currently, the detailed information of the buildings and facilities proposed to be included in the project is not yet available and hence the potential environmental impacts for each and

every project activity cannot be identified in this stage. However, based on the past experience of the EIA consultancy team, base line data collection, discussion with public and professional judgement, the potential environmental impacts of the proposed project were identified and these would cover the significant and larger extent of the possible impacts. Each project in the industrial complex will also carry out individual EIA or IEE according to the decision made by ECD.

Generally, the identification and assessment of potential environmental impacts will encompass the pre-construction, construction, operation and decommissioning phases of proposed projects.

5.3.4.1 Potential Environmental Impacts during Pre-Construction Phase

There are no negative impacts on physical, biological and social environment for the pre-construction (planning) phase of the project. According to the assessment made by EIA/SIA team and discussion with the community (public engagement events) in that area, the following social issues but not limited to: land acquisition, involuntary resettlement, conflict of interest, loss of income, and degrading of living and livelihood were not raised by the public. The community made no objection on the project and they welcomed the project and hoped to get job in the project.

5.3.4.2 Potential Environmental Impacts during Construction Phase

| Type of impact, impacted Environment and Environmental parameters | Score | | | | Significance level of Impact = Impact Level Score x Receptor Sensitivity |
|--|--------|----------|-----------|----------------------|--|
| | Extent | Duration | Magnitude | Receptor Sensitivity | |
| Negative Impacts on Physical Environment | | | | | |
| Soil Degradation | 1 | 1 | 1 | 2 | 2 (Low) |
| Soil Contamination | 1 | 1 | 1 | 2 | 2 (Low) |
| Soil Erosion | 1 | 1 | 1 | 1 | 1 (Negligible) |
| Topography | 1 | 1 | 1 | 1 | 1 (Negligible) |
| Air Pollution (including dust emission) | 2 | 2 | 2 | 2 | 4 (Medium) |
| Greenhouse gas emissions | 1 | 1 | 1 | 2 | 2 (Low) |
| Surface water/ Ground water contamination | 2 | 2 | 2 | 2 | 4 (Medium) |
| Noise and vibration | 2 | 2 | 2 | 1 | 2 (Low) |
| Solid waste generation | 2 | 2 | 2 | 2 | 4 (Medium) |
| Changes to Natural Resources | 2 | 3 | 2 | 2 | 6 (Medium) |
| Traffic flow | 2 | 2 | 2 | 2 | 4 (Medium) |
| Negative Impacts on Biological Environment | | | | | |
| Protected Area | - | - | - | - | N/A |
| Loss of wildlife (Endangered species – IUCN Red List) | - | - | - | - | N/A |
| Destruction of vegetation and expelling of wildlife to other places | 1 | 2 | 1 | 1 | 2 (Low) |
| Disturbance to aquatic organisms and aquatic habitats | 1 | 2 | 2 | 2 | 4 (Medium) |
| Negative Impacts on Social Environment | | | | | |
| Existing social infrastructures and services | 2 | 2 | 2 | 2 | 4 (Medium) |
| Landscape and scenery | 1 | 1 | 1 | 1 | 1 (Negligible) |
| Risks for infectious diseases such as AIDS/HIV | 2 | 3 | 2 | 2 | 6 (Medium) |
| Occupational health and safety (Risk of injuries and accidents to workers) | 2 | 2 | 2 | 2 | 4 (Medium) |
| Emergency risk (earthquake, risk of fire, flood) | 1 | 1 | 1 | 1 | 1 (Negligible) |
| Community Health and Safety | 2 | 2 | 2 | 2 | 4 (Medium) |

Note: Impact Level Score is the combination of the ratings credited to magnitude, extent and duration.

Negative Impacts

Physical Environment

Soil Degradation

The proposed development project is to be constructed on 555.81 acre of flat and swampy area which is located in Nyaung Hnitpin Livestock and Agricultural Zone 3. The project civil engineering works need to excavate, fill and cut a large quantity of volume of soil to get a correct slope and gradient at borrowed area and levelling at filling areas as per design. The top soil nutrient layers will be cut and removed and in some places soil from different places will be mixed. This will lead to the degradation of soil. The stacking of solid wastes, piling of construction materials, improper handling and stacking of soil, oil and lubricant spills from changing, repairing and removing parts of motor-powered construction machines, vehicles and instruments can cause contamination and degradation of soil. The significance level of impact is low.

Soil Contamination

During the construction phase, improper management of solid waste and wastewater, improper storing, handling and disposal of oil, lubricants, and used oil, oil and lubricant spills from changing repairing and removing parts of motor-powered construction machines, vehicles and instruments, improper management of human wastes from construction workers can cause soil contamination. The significance level of impact is low.

Soil Erosion

The rainfall and the surface runoff can cause the soil erosion and especially it can happen when the excavated or borrowed soil are stacked on bare land. The significance level of impact is negligible.

Topography

The topography of some parts of project area may be changed because of the project buildings and structures. The significance level of impact is negligible.

Air Pollution (including dust emission)

The construction of proposed KMIC project will generate substantial quantities of dust at the construction site and its surroundings. The sources of dust emission will include site preparation, leveling, earthwork in excavation, landscaping, concrete mixing and vehicles which transport building materials and workers. Transportation of building materials from various sites to proposed work site will be used dusty branch road which turned to right from main road way of situated zone area. Emission of dust may lead to impact on workers and surrounding area during construction phase. The dust emission will be accentuated during winter and summer times.

Diesel combustion of construction machineries such as loaders, excavators, trucks, dumpers, bulldozers, backhoes, compactors, road rollers, graders, management vehicles, diesel generators and heavy-duty machineries will emit air pollutants such as carbon monoxide (CO), sulfur oxide (SO_x), particulate matter (PM₁₀, PM_{2.5}), and nitrogen oxide (NO_x). Such emissions and air pollution will affect human health such as respiratory problems. The significance level of impact is medium.

MSR survey team observed and collected samples at proposed site on (25 April 2017). Air quality Haz-scanner machine is installed at the proposed site (Coordinate 17° 8' 48.93"N, 96° 10' 12.93"E). Analytical data of air quality is analyzed and operated by Occupational and Environmental Health Laboratory experts, Ministry of Health.

Greenhouse gas emissions

The greenhouse gases such as carbon dioxide (CO₂), and nitrous oxide would be generated from the construction machineries and vehicles traffic during the construction phase. It can lead to the global warming and contribute to climate change. The significance level of impact is low.

Surface water/Ground water contamination

The construction process of concrete foundations at the proposed project and other infrastructures will need to excavate surface earth. The deeply excavated foundation will pass through water layers and underground waterbody. The building process of these foundation needs to use cement and hardener chemicals and these materials will reach to ground water. Consequently, temporary contamination of ground water will occur during concrete construction. The negative impacts during construction phase, especially in rainy season are surface water and ground water contamination by stacking of solid waste, oil spill, improper storage of fuel oil, chemical and hazardous materials, piling of construction materials, transporting of materials and improper sewage disposal. The designated earthwork will change and contaminate the water layers and water ways.

The motor- powered construction machines on site will need to be regularly serviced. This requires continuous oiling to minimize the usual corrosion or wear and tear. Changing spare parts, repairing and removing parts need to be cleaned and washed by oil and lubricants. The oil and lubricant spills during these works can contaminate the surface water.

Existing groundwater range is about 1-meter depth at a surface water collected lake which is at the west north of the proposed land near main road. The significance level of impact is medium.

Noise and vibration

Delivering of building materials by trucks, and operating earth moving machines, excavators, loaders, bulldozers, backhoes, metal cutters, compressors and concrete mixers will contribute a certain level of noise and vibration within the construction site and surrounding area. Higher noise level within the site can impose adverse impact on health of workers, and those are in vicinity of the project site. As crawling type earth moving machineries vibrate earth surface heavily, it can impose negative impact on natural habitat and native animals. The significance level of impact is low.

Solid waste generation

During construction phase, large quantities of solid waste from site clearing, tree leaves, roots, cut logs, and other disposed materials will be generated as a result of the excavation and grading earth level at the site. Construction phase solid waste will consist of rejected parts of pre-casted concrete, solid components, surplus materials, rejected materials, papers, containers, broken bricks, solvent containers, empty paint drums, surplus oil and waste from workers. Such solid waste will be detrimental to the environment through blockage of drainage system, choking of water bodies, and also have negative impact on human and animal health. This may be accentuated by the fact that some of the waste materials contain hazardous substances such as paints, solvent, cement, adhesives, and chemicals. Some of waste materials including plastic containers and plastic bags are not biodegradable and can have long term effects on the environment. The significance level of impact is medium.

Changes to Natural Resources

During construction phase, a large volume of water will be required for different construction activities of different buildings and sanitary and washing purposes as well. The excessive and unsystematic utilization of water will impose negative impacts on the water resources and their sustainability.

A large amount of fuel will be used for the project to transport construction materials, run the construction vehicles and machineries and other associated activities. These fuels are fossil fuels and generally considered as non-renewable resources and the excessive use of these fossil fuels may have serious environmental implications.

At the same time, the project will use high consumption of electricity. The electricity will be supplied by government and installed from 230kV twin bundle double circuit Line from Tower No.142 Myaungtagar – Kamarnat National Grid. Total estimated consumption is 50 MW in operation phase. Hydropower and natural gas are natural resources of the country. In this regard, high consumption of electricity is negatively impacted to natural resources and their sustainability.

Some of the building materials such as hardcore, ballast, aggregates, rough stones, and sand will be obtained from quarries, sand yards, and mines and also the raw materials for making building materials such as mild steel, roofing sheet, brick, cement, glazed tile and shuttering wood will also be extracted from natural resource banks, namely, sea shore, rivers, hills, land and forest. Since substantial quantities of these materials will be required for construction work, the availability and sustainability of such resources will be affected in several ways. The significance level of impact on changes to natural resources is medium.

Traffic Flow

During construction phase heavy machineries will be working at proposed site and only vehicles of office staffs and visitors will use access road way which is 9.14-kilometer distance from Yangon-Mandalay express high-way. During construction phase of proposed project, a few traffic congestions may occur by vehicles of construction site and vehicles of entry and exit to industrial zone. The significance level of impact is medium.

Biological Environment

Protected areas

There is no protected area in the proposed project area and surroundings.

Loss of wildlife

There is no IUCN Red listed threatened species in the proposed project area and surroundings.

Destruction of vegetation and expelling of wildlife to other places

Conversion of vegetation-covered land into industrial compound of the KMIC project will involve land leveling and removal of trees and plants over the whole project site. This action will cause negative impact on wildlife and ecosystem of the current landscape and the area's vegetation which is largely composed of scrub, herbs, and grasses. No timber tree is present.

This means a negative impact on the current function of the fragile ecosystem of shrub-herb and semi-aquatic environment where terrestrial and aquatic organisms depend on the formed food chain, as vegetation provides habitat and cover for organisms, as well as providing the stability of soil. The situation will force other wildlife migrate to other habitable places. The animals currently living in the project area will disappear. Animals such as long distance flying birds, some rodents, butterflies, bat and some mammals are able to overcome the impact of habitat destruction, but some animal such as earth-dwelling arthropods, small insects and unmovable plants will face termination of life. The significance level of impact is low.

Disturbance to aquatic organisms and aquatic habitats

Aquatic ecosystem of Hpayo Stream and project-site's surrounding waterways will be changed both in terms of drainage capacity and pollution level by faster run off from the project site and its waste water discharge.

Potential toxic effects to plants and animals as a result of air or water pollutant discharges or waste-disposal activities of industries will also have negative impact on surrounding ecological function. Therefore, number and species of current level existence of fishes and invertebrates including aquatic insects will decline along with the reduction of microorganisms. The significance level of impact is medium.

Social Environment

Existing social infrastructures and services

The existing social infrastructures and services such as health care center, clinic, school, market, shop, and emergency services for public safety will be accessed by additional construction workers during the construction phase and the availability of the services provided by these infrastructures and facilities for additional people is considerable and it can be a negative impact. The significance level of impact is medium.

Landscape and scenery

The existing landscape and scenery (general appearance of the nature) will be totally changed. This significance level of impact is negligible.

Risks for infectious diseases

The influx of construction workers from different areas of the country could bring different infectious diseases like Hepatitis, Malaria, Tuberculosis, and HIV/AIDS. These infectious diseases could spread between the workers and the local community and there is a possibility to increase the risks. The significance level of impact is medium.

Occupational Health and Safety (Risks of accidents and injuries to workers)

During construction of the proposed project, it is expected that construction workers are likely to have accidental injuries and hazards due to human and workplace interactions. Because of the intensive engineering and construction activities, metal grinding and cutting, concrete work, scaffolding, steel erection and fastening, piling and welding and electricity using, traffic accidents, handling of heavy-duty machines and other works, construction workers will be exposed to risks of accidents and injuries. Such injuries can result from accidental falls from high elevations, injuries from using hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others. The significance level of impact is low. It's recommended an appropriate approach to ergonomics be sought Personal Protective Equipment (PPE) should be issued to all workers on site. Trainings on Fire Management, First Aid, occupational Health and Safety also be conducted occasionally. The significance level of impact is medium.

Emergency Risk

During construction phase the improper storage and handling of fuels (loading, unloading), vehicle transporting petroleum products involving in accidents (collision, overturning), defective oil tightness integrity or incomplete closing of valves and connections, and not following no-naked flames warning signs will pose a risk of fire and explosion. There is also a possibility that if earthquake occurs the construction work structures would be collapsed. There is also a possibility that flood can occur due to construction activities in the rainy season. The significance level of impact is negligible.

Community Health and Safety

It is anticipated that there will be an impact on community health and safety because of influx of construction workers (who might bring the infectious diseases) and increase of vehicle traffic (vehicular exhaust emissions can cause the pollution – related diseases including respiratory problems, heart diseases, stroke, lung cancer, and chronic obstructive pulmonary disease). The increase of traffic and operation of construction machineries can also cause accidents to the local community and the injuries and even death is possible and hence the safety of the community is threatened. The significance level of impact is medium.

Positive Impact

There are several potential positive impacts in social environment. These are mentioned below.

Creation of employment opportunities

Several employment opportunities will be created by different construction activities of the project. This will be a significant positive impact to the community nearby.

Provision of market for supply of building materials

The project will require supply of large quantities of building materials which will be sourced locally. This provides a market for building materials suppliers such as sand, gravel, stones, woods and hardware stores and individual with such materials.

Increased business opportunities

Requirement of a large number of project staff members and workers will create a market for various goods and services, leading to several business opportunities for small-scale traders such as food stalls near the construction site.

Living and livelihood

The increase of job opportunities as construction workers, technicians or increased business opportunities or provision of market for supply of building materials can positively change the living standards and livelihood of the community to some extent.

Existing social infrastructures and services

The social infrastructures will be improved due to the project (for instance. a new school will be built for the project as part of CSR program).

Corporate Social Responsibility Programs of Project Proponent

The KMIC JVC will accept Corporate Social Responsibility (CSR) for the communities living near to the project. The CSR programs will cover:

Education Sector: Construction and upgrading school building and facilities, providing necessities for students (for instance, school uniforms, books, pencils).

Healthcare Sector: Building dispensary/healthcare center at the appropriate village where villagers from surrounding villages can access.

Infrastructure Development: Upgrading of the roads which connect the project site and the village nearby.

Note: Details of CSR programs are mentioned in Corporate Social Responsibility Programme (CSR) under Environmental Management Sub-plans.

Improved security in the neighboring area

During construction phase, security persons will check and go around the perimeter of the project. They will serve 24 hours' duty at site, and this will lead to improvement of security at surrounding area.

Impacts on Agricultural and Livestock Zones

There are three agricultural and livestock zones around the proposed KMIC project site. The KMIC project will be located in agricultural and livestock zone (3) and the impacts on the fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations nearby the proposed KMIC project in the zone (3) are mostly expected for the construction phase of the KMIC project (the establishment of KMIC). The impacts on some fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in zones (1) and (2) adjacent to the KMIC project are also expected for the construction phase.

The possible impacts on the fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in the zones (1), (2) and (3) nearby the proposed KMIC project are anticipated as death of livestock, fishes, and dying of plantations and vegetables due to the soil degradation, soil contamination, soil erosion, air pollution, greenhouse gases emission, surface water and ground water contamination, solid waste generation, emergency risk of the construction activities of the KMIC project.

Consequently, the community who are the owners and workers of these fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in the zones (1), (2) and (3) nearby the proposed KMIC project will also be impacted in their economy, livelihood, social and health conditions.

However, the area of impact will be in a limited area of 1-5 km, short-term duration (< 1 year), the impact has low magnitude and the receptor sensitivity is also low. Therefore, the significance level of impact on these fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in the zones (1), (2) and (3) nearby the proposed KMIC project will be low. And hence, the significance level of impacts on economy, livelihood, social and health of the community of these businesses is also low.

5.3.4.3 Potential Environmental Impacts during Operation Phase

| Type of impact, impacted Environment and Environmental parameters | Score | | | | Significance level of Impact = Impact Level Score x Receptor Sensitivity |
|---|--------|----------|-----------|----------------------|--|
| | Extent | Duration | Magnitude | Receptor Sensitivity | |
| Negative Impacts on Physical Environment | | | | | |
| Soil Degradation | 2 | 2 | 2 | 2 | 4 (Medium) |
| Soil Contamination | 2 | 2 | 2 | 2 | 4 (Medium) |
| Air Pollution (including dust emission) | 2 | 1 | 2 | 2 | 4 (Medium) |
| Greenhouse gas emissions | 2 | 2 | 2 | 2 | 4 (Medium) |
| Surface water/Ground water contamination | 2 | 2 | 2 | 2 | 4 (Medium) |
| Increased water demand | 2 | 3 | 2 | 2 | 6 (Medium) |
| Noise and vibration | 2 | 2 | 2 | 2 | 4 (Medium) |
| Increased Solid waste generation | 2 | 2 | 2 | 2 | 4 (Medium) |
| Increased wastewater generation | 2 | 2 | 2 | 2 | 4 (Medium) |
| Hazardous waste generation | 1 | 2 | 2 | 2 | 4 (Medium) |
| Changes to Natural Resources | 2 | 2 | 2 | 2 | 4 (Medium) |
| Increased Traffic flow | 2 | 2 | 2 | 2 | 4 (Medium) |
| Foul Odor and Vectors | 1 | 2 | 2 | 2 | 4 (Medium) |
| Negative Impacts on Biological Environment | | | | | |
| Changes to terrestrial flora and fauna | 1 | 1 | 1 | 1 | 1 (Negligible) |
| Changes to aquatic flora and fauna | 2 | 2 | 2 | 2 | 4 (Medium) |
| Negative Impacts on Social Environment | | | | | |
| Inconveniency with socio-economic change | 1 | 1 | 1 | 2 | 2 (Low) |
| Community Health and Safety | 2 | 2 | 2 | 2 | 4 (Medium) |
| Risk of injuries and accidents to workers | 2 | 2 | 2 | 2 | 4 (Medium) |
| Light intrusion | 1 | 2 | 2 | 2 | 4 (Medium) |
| Increased Emergency risk (risk of fire) | 2 | 2 | 2 | 2 | 4 (Medium) |

Negative Impact

Physical Environment

Soil Degradation

During operation phase, top soil layer can be degraded by domestic wastewater, oil leaks and spills from generators, transformer failure of electricity sub-station, process of usage, producing, storing, disposing and handling of oil, chemical, hazardous materials of different industries and factories (garment and textile, food and beverages processing, and assembling factories), pollution from stormwater runoff, leachate from improper dumping of solid waste, improper maintenance of water supply and wastewater system, drainage system, vehicles and equipment. The car parking, offices, wastewater treatment plant and other proposed project developments can also degrade the soil condition because of oil leaks and spills from the generators and other machinery and some activities of the developments. The significance level of impact is medium.

Soil Contamination

During operation phase, soil can be contaminated by oil leaks and spills from generators, transformer failure of electricity sub-station, process of usage, producing, storing, disposing and handling of oil, chemical, hazardous materials of different industries and factories (garment and textile, food and beverages processing, and assembling factories), leachate from improper dumping of solid waste, improper maintenance of water supply and wastewater system, drainage system, vehicles and equipment. The car parking, offices, wastewater treatment plant and other proposed project developments can also make the soil contaminated because of oil leaks and spills from the generators and other machinery and some activities of the developments. The significance level of impact is medium.

Air Pollution (including Dust Emission)

The fugitive dust emission can occur mainly because of the vehicular movement within the project area. The air quality can be chiefly impacted by the emissions of the factories and industries. The significance level of impact is medium.

Greenhouse gas emissions

The activities and sectors associated with the project: transportation, industry, commercial and residential will emit the greenhouse gases to the atmosphere and these gases are carbon dioxide, nitrous oxide, and fluorinated gases respectively. The significance level of impact is medium.

Surface water/Ground water contamination

During monsoon season, ground water level is higher than winter and summer times. Ground water and surface water will be contaminated because of handling of oil and solid waste. Without proper care, dumping solid waste may cause ground water and surface water sources contaminated and also form breeding area of mosquitoes and flies that will impose adverse effect on the health of people in these areas.

The water quality can be degraded by domestic wastewater, oil leaks and spills from generators, transformer failure of electricity sub-station, process of usage, producing, storing, disposing and handling of oil, chemical, hazardous materials of different industries and factories, pollution from stormwater runoff, leachate from dumping of solid waste, improper maintenance of water supply and wastewater system, drainage system, vehicles and equipment. The car parking, offices, water purification plant, wastewater treatment plant and other proposed project developments can also degrade the water quality because of oil leaks and spills from the generators and other machinery and some activities of the developments. The significance level of impact is medium.

Increased water demand

The amount of water consumption will be increased for the operation phase of the project due to different project structures and facilities.

The developer estimated total water usage demand is 10,000m³ (2,641,721 gallons) per day, in which industrial plots will be using 8,000 m³ (2,113,376 gallons) per day and living plots will be using 2,000 m³ (528,344 gallons) per day. The developer planned to get water from Kalihtaw dam which is 20 kilometers away from KMIC project.

Excessive use of water and unnecessary use of water may negatively impact the water resource. Kalihtaw Dam is currently supplying to Nyaung Hnitpin Livestock and Agricultural Zone. The significance level of impact is medium.

Noise and vibration

The impacts of noise and vibration by residents, traveling vehicles and industrial processes are expected during the operation stage. Delivering raw materials and products by cargo trucks and such as factories operating machinery, will contribute high level of noise and vibration within the site and surrounding area. Elevated noise level within the site can affect the workers. The significance level of impact is medium.

Increased Solid waste generation

The project is expected to generate enormous volume of solid waste during its operation phase. The bulk of solid waste generated during the operation of the project will consist of papers, plastic bags, glass, metal, textiles, used containers, organic waste and disposed by workers, kitchen, room services, landscaping, cutting grass, trimming trees, annual painting, decoration and maintenance works. Such waste can be detrimental to the environment through blockage of drainage system, pipes, choking of water body and negative impacts on animal health. Some of these waste materials especially the plastic/ polythene are not biodegradable, can cause long- term injurious effects to the environment. The significance level of impact is medium.

Increased wastewater generation

The wastewater disposed from different project buildings, facilities and developments will be increasing during the operation phase. Among them, the industrial wastewater will have more negative impact on the surrounding environment. The significance level of impact is medium.

Hazardous waste generation

The hazardous waste can be largely generated from different processes of industries. The significance level of impact is medium.

Changes to Natural Resources

During operation phase, more energy, and water will be utilized for different project activities and it will have impacts on natural resources to a certain extent. The developer is planned to use government electrical supply which will be installed from 230kV twin bundle double circuit line from Tower No.142 Myaungtagar – Kamarnat National Grid. For back-up source, the developer will use diesel generators. Since electricity generation involves utilization of natural resources such as hydropower, natural gas and diesel fuels, excessive electricity consumption will strain the resources and have negative impact on their sustainability. The significance level of impact is medium.

Increased Traffic Flow

During operation phase of the proposed project, many raw materials will be distributed to the respective ware house of the compound. Cargo trucks will enter and exit along the road way carrying raw materials and delivering finished products. Office vehicles and buses also will be using the access road. Existing road is not wide enough for industrial zone. The

developer planned to upgrade 2 lane road to 4 lane road. The significance level of impact is medium.

Foul Odor and Vectors

Especially, the sludge and bio-solid handling in the wastewater treatment plant and waste dumping ground are the sources of foul odor and they can attract the vectors. The significance level of impact is medium.

Biological Environment

Changes to terrestrial flora and fauna

Due to operation works terrestrial flora and fauna will be impacted. The significance level of impact is negligible.

Changes to aquatic flora and fauna

Due to operation works aquatic flora and fauna will be impacted. The significance level of impact is medium.

Social Environment

Inconveniency with socio-economic change

This impact will be resulted from increased activities with growing economy spilled from the development of the industrial zone. Residents may need to give up their current means of livelihood and adapt themselves to new ways of making a living that come along with the development. They will also have to interact with migrant population, who will be visiting or residing in their areas. The significance level of impact is low.

Community Health and Safety

There will be food and beverages processing, textile and garment factories and vehicle spare parts and electronic parts installation factories, operating in the industrial complex. The emissions and waste disposed from these factories may have impact on the health of communities. The increased traffic flow due to the project operation will possibly threaten the safety of surrounding communities on account of traffic accidents. The significance level of impact is medium.

Risk of injuries and accidents to workers

During operation of the proposed project, it is expected that operation workers are likely to have accidental injuries and hazards due to human and workplace interactions. The workers will be exposed to risks of accidents and injuries at maintenance and operation. Such injuries can result from accidental falls from high elevations, injuries from hand tools and operation equipment cuts from sharp edges of metal sheets and collapse of building sections among others. It's recommended an appropriate approach to ergonomics be sought. Personal Protective Equipment (PPE) should be issued to all workers on site. Trainings on fire management, first aid, occupational health and safety also be conducted occasionally. The significance level of impact is medium.

Light Intrusion

The light pollution resulting from the substation's security lighting at night is also considered as impact on the neighboring properties. The significance level of impact is medium.

Increased Emergency Risk

The fire risk can be most expected from operation of different project activities. The fire occurrences are associated with the activities of gas station such as fuels receipt, fuels storage and vehicles supply. For the electricity sub-station, a failure of one or more transformers could cause fire and spillage of the purified mineral oil used for insulation and

coolant. In the case of a fire, the products of combustion would be released to the surrounding environment and these products are mainly carbon soot, carbon monoxide and carbon dioxide. The significance level of impact is medium.

Positive Impact

There will be some positive impacts in the social environment and these impacts can be seen below.

Optimal Land Use

The land will be used as the industrial complex to full potential for the benefit of the local and regional people. It will also be beneficial for the nation.

Creation of employment opportunities

Total 100,000 job opportunities will be created. Local workers, local graduates will have a chance to get employment at operational phase of this project. This will help reduce the unemployment problem of people including graduates residing nearby. The skills development training programs will be provided to those who need them and improved living conditions with the development of local economy.

Increased business opportunities

The requirement of a large number of project staff members and workers for the project operation will create a market for various goods and services, leading to several business opportunities for small-scale traders such as food stalls near the project area.

Increase in Revenue to Region and Union governments

Through payment of relevant taxes such as properties tax, income tax and other fees to local authorities, revenue department and other related offices, the Region and Union government will earn revenue. Implementation of the KMIC project will contribute to national industrial growth and GDP will also be increased.

Improvement of social infrastructure and services

After completion of construction phase and starting operation phase, the company will contribute surrounding area by developing and providing assistance to schools, clinics, roads, bridges and other infrastructure works and services as CSR program. This will lead to improvement of surrounding villages by developing the proposed project.

Provision of quality fuel (gas) at a reasonable price

The quality fuel (gas) could be purchased in the local area at a reasonable price and consequently the transportation costs for goods and persons will be lowered.

Improving aesthetic by planting flowers and landscaping

The project will include green areas (parks and gardens) for the public and the aesthetical value of the area would be increased.

Impacts on Agricultural and Livestock Zones

For the operation phase, due to the operation activities of different industries and factories, the impacts on the fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in zones (1), (2) and (3) are expected.

The possible impacts on the fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in the zones (1), (2) and (3) nearby the proposed KMIC project will be death of livestock, fishes, and dying of plantations and vegetables due to the soil degradation, soil contamination, air pollution, greenhouse gases emission, surface water and ground water contamination, water shortages, increased solid waste generation and wastewater generation, hazardous waste generation, foul odors and vectors, emergency risk of the operation activities of the KMIC project.

Consequently, the community who are the owners and workers of these fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in the zones (1), (2)

and (3) nearby the proposed KMIC project will also be impacted in their economy, livelihood, social and health conditions.

It is expected that the area of impact will be in a limited area of 1-5 km, medium-term duration (1-5 years), the impact has medium magnitude and the receptor sensitivity is also medium. Therefore, the significance level of impact on these fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in the zones (1), (2) and (3) nearby the proposed KMIC project will be medium. And hence, the significance level of impacts on economy, livelihood, social and health of the community of these businesses is also medium.

However, the developer of each and every single industry and factory will have to assess this issue in their IEE, EIA or EMP according to their business types.

5.3.4.4 Potential Environmental Impacts during Decommissioning/Closure Phase

| Type of impact, impacted Environment and Environmental parameters | Score | | | | Significance level of Impact = Impact Level Score x Receptor Sensitivity |
|---|--------|----------|-----------|----------------------|--|
| | Extent | Duration | Magnitude | Receptor Sensitivity | |
| Negative Impacts on Physical Environment | | | | | |
| Air Pollution (including Dust Emission) | 2 | 2 | 2 | 2 | 4 (Medium) |
| Greenhouse gas emissions | 1 | 1 | 1 | 2 | 2 (Low) |
| Surface water/Ground water contamination | 2 | 2 | 2 | 2 | 4 (Medium) |
| Noise and vibration | 2 | 2 | 2 | 1 | 2 (Low) |
| Waste generation (Solid, Wastewater, Hazardous) | 2 | 2 | 2 | 2 | 4 (Medium) |
| Negative Impacts on Social Environment | | | | | |
| Living and Livelihood | 2 | 3 | 2 | 2 | 6 (Medium) |
| Risks for Infectious disease such as AIDS/HIV | 2 | 3 | 2 | 2 | 6 (Medium) |
| Occupational Health and Safety | 2 | 2 | 2 | 2 | 4 (Medium) |
| Community Health and Safety | 2 | 2 | 2 | 2 | 4 (Medium) |

Negative Impacts

Physical Environment

Air Pollution (including Dust Emission)

The demolishing of buildings and structures will cause dust emission and the emission gases from construction vehicles travelling around the area during the decommissioning and closing phase will cause air pollution. The significance level of impact is medium.

Greenhouse gas emissions

The exhaust emission of construction vehicles (including trucks for collecting demolition waste) can emit greenhouse gases and it will lead to the global warming. The significance level of impact is low.

Surface water/ground water contamination

The surface water and ground water can be contaminated due to wastewater quality caused by demolition work. The significance level of impact is medium.

Noise and vibration

The noise and vibration can occur from manual work or machinery and vehicles during the demolition work. The significance level of impact is low.

Waste generation (Solid, wastewater and Hazardous)

The hazardous and non-hazardous solid waste will be generated from demolition work. The significance level of impact is medium.

Social Environment

Living and Livelihood

Due to the termination of the operation of the project, some people would lose their job and income as well. Therefore, their living and livelihood will be impacted and changed. The significance level of impact is medium.

Risks for Infectious disease such as AIDS/HIV

There will be a flux of workers from local or other regions for the demolition work and the risk for communicable and vector-borne diseases are expected among the workers and the surrounding local people. The significance level of impact is medium.

Occupational Health and Safety

The occupational health and safety are expected because of the demolished work. The significance level of impact is medium.

Community Health and Safety

The community health and safety can be impacted due to the influx of labors for demolishing buildings and structures. The significance level of impact is medium.

Positive Impacts

As the positive impact, the natural habitat, land cover or vegetation could be regenerated. After the demolition and closure of the project, the damaged land could be reclaimed and revegetated, and it will regenerate the natural habitat, land cover and vegetation. Consequently, the decline of aquatic and terrestrial fauna and flora can be reversed.

Impacts on Agricultural and Livestock Zones

For the decommissioning phase, the industries and factories are not expected to be demolished. If these industries and factories are demolished, then due to the demolition and associated work, air pollution, greenhouse gases emission, surface water and ground water

contamination, solid waste generation and wastewater generation, hazardous waste generation can happen and these can also impact on the fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in zones (1), (2) and (3). As a consequence, the fishes and livestock can die and plantations and vegetables can be destroyed.

As a result, the community who are the owners and workers of these fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in the zones (1), (2) and (3) nearby the proposed KMIC project will also be impacted in their economy, livelihood, social and health conditions.

It is expected that the area of impact will be in a limited area of 1-5 km, short-term duration (< 1 year), the impact has medium magnitude and the receptor sensitivity is also medium. Therefore, the significance level of impact on these fish farms, livestock farms, seasonal vegetables and beans fields, orchards and plantations in the zones (1), (2) and (3) nearby the proposed KMIC project will be medium. And hence, the significance level of impacts on economy, livelihood, social and health of the community of these businesses is also medium.

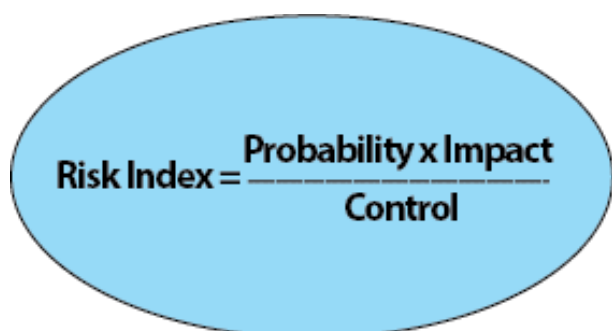
However, the developer of each and every single industry and factory will have to assess this issue in their IEE, EIA or EMP according to their business types.

5.3.5 Risk Assessment

Risk is analyzed by estimating the likelihood of the event occurring and the consequences or impact of the event if it does occur as well as the amount of control one has over the event. The probability of occurrence means the probability of an adverse event occurred, seriousness of impact is also the severity of degradation caused by the impact and degree of control is to what extent the degradation which could result from loss of control can be managed or detectable.

Table 5. 6: Risk Assessment Criteria

| Probability of occurrence | | Seriousness of Impact | | Degree of Control | |
|---------------------------|---|-----------------------|---|-------------------|-----|
| Almost certain | 8 | Major | 8 | High | 2.5 |
| Likely | 6 | High | 6 | Moderate | 2 |
| Moderate | 4 | Moderate | 4 | Low | 1.5 |
| Unlikely | 2 | Low | 2 | None | 1 |



| Risk Index | |
|------------------|-------|
| Low Risk | 2-12 |
| Moderate Risk | 13-18 |
| Significant Risk | 19-36 |
| High Risk | 37-64 |

| Risk Index | Definition |
|-------------|--|
| Low | A risk at this level – if it occurs – will have a minor impact on achieving desired results, to the extent that one or more stated outcome objectives will fall below goals but well above minimum acceptable levels. |
| Moderate | A risk at this level – if it occurs – will have a moderate impact on achieving desired results, to the extent that one or more stated outcome objectives will fall well below goals but above minimum acceptable levels. |
| Significant | A risk at this level – if it occurs – will have a significant impact on achieving desired results, to the extent that one or more stated outcome objectives will fall below acceptable levels. |
| High | A risk at this level – if it occurs – will have a severe impact on achieving desired results, to the extent that one or more of its critical outcome objectives will not be achieved. |

5.3.5.1 Construction Phase

| Impact | Probability of occurrence | Seriousness of Impact | Degree of Control | Risk Index | RISK LEVEL |
|--|---------------------------|-----------------------|-------------------|------------|------------------|
| Physical Environment | | | | | |
| Soil Degradation | 8 | 4 | 2 | 16 | Moderate Risk |
| Soil Contamination | 8 | 4 | 2 | 16 | Moderate Risk |
| Soil Erosion | 6 | 4 | 2 | 12 | Low Risk |
| Topography | 4 | 2 | 2.5 | 3.2 | Low Risk |
| Air Pollution (including Dust Emission) | 8 | 6 | 2 | 24 | Significant Risk |
| Greenhouse gas emissions | 6 | 6 | 2 | 18 | Moderate Risk |
| Surface water/Ground water contamination | 8 | 6 | 2.5 | 19.2 | Significant Risk |
| Noise & Vibration | 8 | 6 | 2 | 24 | Significant Risk |
| Solid waste generation | 8 | 6 | 2 | 24 | Significant Risk |
| Changes to Natural Resources | 6 | 4 | 2 | 12 | Low Risk |
| Traffic Flow | 8 | 4 | 2 | 16 | Moderate Risk |
| Biological Environment | | | | | |
| Destruction of vegetation and expelling of | 6 | 4 | 2 | 12 | Low Risk |

| | | | | | |
|---|---|---|---|----|---------------|
| wildlife to other places | | | | | |
| Disturbance to aquatic organisms and aquatic habitats | 6 | 4 | 2 | 12 | Low Risk |
| Social Environment | | | | | |
| Existing social infrastructures and services | 6 | 4 | 2 | 12 | Low Risk |
| Landscape and scenery | 6 | 4 | 2 | 12 | Low Risk |
| Risks for infectious diseases such as AIDS/HIV | 8 | 4 | 2 | 16 | Moderate Risk |
| Occupational health and safety | 8 | 4 | 2 | 16 | Moderate Risk |
| Emergency risk (earthquake, risk of fire) | 6 | 4 | 2 | 12 | Low Risk |
| Community Health and Safety | 6 | 4 | 2 | 12 | Low Risk |
| Impacts on Agricultural and Livestock Zones (fish farms, livestock, vegetables field and plantation nearby the project site and community associated with these businesses) | 6 | 2 | 2 | 6 | Low Risk |

5.3.5.2 Operation Phase

| Impact | Probability of occurrence | Seriousness of Impact | Degree of Control | Risk Index | RISK LEVEL |
|--|---------------------------|-----------------------|-------------------|------------|---------------|
| Soil Degradation | 6 | 4 | 2 | 12 | Low Risk |
| Soil Contamination | 6 | 4 | 2 | 12 | Low Risk |
| Air Pollution (including dust emission) | 8 | 4 | 2 | 16 | Moderate Risk |
| Greenhouse gas emissions | 6 | 4 | 2.5 | 9.6 | Low Risk |
| Surface water/Ground water contamination | 6 | 4 | 2 | 12 | Low Risk |

| | | | | | |
|---|---|---|-----|------|---------------|
| Increased water demand | 8 | 4 | 2 | 16 | Moderate Risk |
| Noise and vibration | 8 | 4 | 2 | 16 | Moderate Risk |
| Increased Solid waste generation | 8 | 4 | 2 | 16 | Moderate Risk |
| Increased wastewater generation | 8 | 4 | 2 | 16 | Moderate Risk |
| Hazardous waste generation | 8 | 4 | 2 | 16 | Moderate Risk |
| Changes to Natural Resources | 8 | 4 | 2 | 16 | Moderate Risk |
| Increased Traffic flow | 8 | 6 | 2.5 | 19.2 | Moderate Risk |
| Foul Odor and Vectors | 6 | 4 | 2 | 12 | Low Risk |
| Biological Environment | | | | | |
| Changes to terrestrial flora and fauna | 6 | 4 | 2 | 12 | Low Risk |
| Changes to aquatic flora and fauna | 4 | 4 | 2 | 8 | Low Risk |
| Social Environment | | | | | |
| Inconveniency with socio-economic change | 6 | 4 | 1.5 | 16 | Moderate Risk |
| Community Health and Safety | 6 | 4 | 2.5 | 9.6 | Low Risk |
| Risk of injuries and accidents to workers | 6 | 4 | 2.5 | 9.6 | Low Risk |
| Light intrusion | 6 | 4 | 2 | 12 | Low Risk |
| Increased Emergency risk (risk of fire) | 6 | 4 | 2 | 12 | Low Risk |
| Impacts on Agricultural and Livestock Zones (fish farms, livestock, vegetables field and plantation nearby the project site and community associated with these businesses) | 6 | 4 | 2 | 12 | Low Risk |

5.3.5.3 Decommissioning Phase

| Impact | Probability of occurrence | Seriousness of Impact | Degree of Control | Risk Index | RISK LEVEL |
|--|---------------------------|-----------------------|-------------------|------------|------------------|
| Physical Environment | | | | | |
| Air Pollution (including Dust Emission) | 8 | 6 | 2 | 24 | Significant Risk |
| Greenhouse gas emissions | 6 | 4 | 2 | 12 | Low Risk |
| Surface water/Ground water contamination | 6 | 4 | 2 | 12 | Low Risk |
| Noise and vibration | 8 | 4 | 2 | 16 | Moderate Risk |
| Waste generation (Solid, Wastewater, Hazardous) | 8 | 6 | 2 | 24 | Significant Risk |
| Social Environment | | | | | |
| Living and Livelihood | 8 | 4 | 2 | 16 | Moderate Risk |
| Risks for Infectious disease such as AIDS/HIV | 6 | 4 | 2 | 12 | Low Risk |
| Occupational Health and Safety | 6 | 4 | 2 | 12 | Low Risk |
| Community Health and Safety | 6 | 4 | 2 | 12 | Low Risk |
| Impacts on Agricultural and Livestock Zones (fish farms, livestocks, vegetables field and plantation nearby the project site and community associated with these businesses) | 6 | 4 | 2 | 12 | Low Risk |

5.4 Mitigation Measures

This section outlines the necessary mitigation measures that will be adopted to prevent or minimize significant negative environmental impacts associated with the activities of the project during Construction Phase, Operation Phase and Decommissioning Phase.

5.4.1 Mitigation Measures for Construction Phase

5.4.1.1 Mitigation Measures for Physical Environmental Impacts

Soil Degradation

The soil degradation during construction phase will be mitigated by the following measures: avoidance of unnecessary cutting and removing of trees and vegetation, controlling earthwork and compacting loose soil, installation and construction of drainage structure properly, landscaping, ensuring supervision of excavation activities (especially during rainy season), providing soil erosion control and conservation structure where necessary, restriction of access only to construction site yard and monitoring and maintenance of drainage system.

Topsoil would only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and runoff. It would be ensured that the stockpiles generated on site must be used as natural material for landscaping of the work site and to develop in-situ stormwater attenuation or abutments, rather than stockpile for disposal as a waste material. The stripped top soil prior to any construction activities will be reused to rehabilitate disturbed areas. Topsoil will be kept separate from overburden and will not be used for building purposes or maintenance or road maintenance/works.

Soil Contamination

The hazardous and non-hazardous waste management will be adopted. The construction wastewater will be disposed after sedimentation in the sedimentation basin. The sand traps will also be constructed to settle the sand at the bottom and store the deposited sand. The proper sanitation system for the construction workers and project staff will also be applied. Regular check and maintenance of construction machineries and vehicles will be done to avoid oil, fuel, chemicals and lubricant spills or leaks. The site-appropriate spill containment kit (for e.g. oil pads, disposable material containment bags, latex gloves and bag container) will be readily available.

Soil Erosion

In the rainy season of during construction phase, soil erosion will be occurred due to the construction activities, surface and stormwater runoff. During rainy season, to control soil erosion and land slide at site, it is needed to control the velocity of rain water and it will be made to ensure that levelling the drains can be minimized at construction phase. Construction of concrete drains at steep levels and proper gradient at temporary drain can control the velocity of rain water and unnecessary erosion. The clearance of vegetation will be minimized to avoid exposure of soil, only alien vegetation which constitutes the majority of vegetation on site, must be removed – where there is work/construction. The areas susceptible to erosion will be protected with mulch or a suitable alternative.

Topography

The shape and features of land surfaces will be maintained as much as possible by designing and constructing buildings and structures of the project.

Air Pollution (including Dust Emission)

Dust emission during construction phase will be minimized through restricted speed control of earth moving machines, transport buses and traffic within the project site. Pouring water on road ways at site and excavated area, cutting area, filling area and compacting area will reduce rising of dust in dry season. The contractor will install a wash deck at the exit way of

the site to remove mud from vehicles which may become dust around the site and along the main road. Trucks need to be installed with proper covers when carrying sand, river shingles and cement to avoid falling down along the main road and emission of particulates. Notice and caution signs of “Dusty Area” will be erected around the project areas for the awareness of the people. The workers will be provided with facial masks to wear in the project site.

The air pollution mitigation measures which will be adopted by the project are regular maintenance of construction plants and equipment, prohibiting unnecessary driving and moving at site and idling of vehicles, strictly prohibition of open fire burning of materials or wastes, permanent monitoring to minimize emissions of pollutant, ensuring using no materials and substances emitting toxic and carcinogenic substances, and proper storage of chemical and emitted construction materials. There will be a notice to the workers and surrounding environment that it is the “Expected Air Pollution Area”. Caution signs to wear masks will be posted and the workers will be provided with masks to wear. The visitors to the site have also to wear the masks.

Greenhouse gas emissions

The mitigation measures for reducing greenhouse gas emissions are conducting training to raise the awareness of drivers, operators and concerned staff on greenhouse emissions and mitigation measures, prohibiting unnecessary driving and moving at site and idling of vehicles and construction machineries as well, the regular maintenance of vehicles and machineries will be done, the efficient use of vehicles and machineries will be applied. The construction engineers and project managers will formulate the construction management procedures including the efficient use of construction vehicles and machineries and it will ensure the reduction of greenhouse gas emissions during the construction phase.

The site offices will be designed and constructed as much as possible to get the natural light and ventilation.

Surface water/Ground water contamination

In order to reduce or avoid the surface and ground water contamination, the sedimentation basin will be built on a construction site to capture the disturbed soil which is washed off during rainfall and lead to protection of the water quality of surface and ground water. The sand traps will also be constructed to settle the sand at the bottom and store the deposited sand. The systematic stacking and piling of materials on site, avoidance of hazardous wastes disposal in drinking-water sources, adopting the proper waste management system, regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills (if found, the immediate repair and cleansing will be conducted), systematic storage of fuels and filling station at construction site yard compound, handling and disposal of new oil and used oil waste, provision of impervious basement at operation area to prevent oil spill when heavy machineries are working, daily checking to earth moving machines by motor transport officer before start engines, and providing a good pavement at machine workshop and garage are the mitigation measures for the project to avoid the surface/ground water contamination.

It is estimated that total workers (including contractor’s employees, sub-contractor’s employees and workers) will be 120 in 2021, 150 in 2022, 150 in 2023, 120 in 2024 respectively.

The proper sanitation system for the construction workers and project staff will also be applied. Temporary toilets with 3 –compartments septic tanks will be constructed for temporary sanitary system. The size of septic tank is 7 m (7,000 mm) in length, 1.6 m (1,600 mm) in breadth and 2 m (2,000 mm) in depth. The capacity (total volume) of the septic tank is 22 m³. One 3-compartments septic tanks will be built for five toilets and there will be total 15 toilets with three 3 compartments septic tanks.

Noise and vibration

The drivers and operators of construction vehicles and machineries will be trained how to reduce the noise from their operations, and the construction activities will be restricted in night times. The regular maintenance of vehicles and machineries and wearing the ear mufflers (hearing protection devices) can also protect the noise and vibration. The noise will be strictly maintained within the noise level (National Environmental Quality Emission Guidelines) set by Ministry of Natural Resources and Environmental Conservation.

The following measures will also be adopted: using sound absorb, sound proof engines at construction site and proper maintenance, enclosing noisy outdoor engines and generators in sound proof wall or buildings, regular checking and maintenance to silencers of engines and conserving trees around the site as some buffers against noise.

Solid waste generation

The following practices will be exercised as mitigation measures: avoidance of unnecessary cutting and removing of vegetation plants, developing drawing and land survey map to follow as drawing of landscaping procedure, producing a precise construction drawing to avoid unnecessary cutting and filling of earth work and excavation work, ensuring calculation and estimation of materials requirement to avoid excessive purchase, ensuring purchase of materials and stacking at collection yard and ware houses, providing dust bins at appropriate places for hazardous substances and non-hazardous substances, providing facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure. The construction waste will be collected by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) with the on-call system. Whenever possible, reusing and recycling of solid waste will be done to reduce the amount and volume of construction debris.

Non-Hazardous Solid Waste Management Plan

Waste Transfer Plots

The waste transfer plots are used to collect the refuse and to reload their waste into a garbage truck of Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee. The transfer plots will have collection bins for wastes and recyclables, transfer containers and trailers. It is designed with drainage of paved areas and adequate water hydrants for maintenance of cleanliness and fire control and other concerns like traffic, odor, dust, litter. The routes for garbage collection trucks to get easy access to the waste transfer plot will be constructed.

Final collection of Waste

The construction waste will be collected by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) with the on-call system.

Note: The 3Rs (Reduce, reuse and recycle) practice would be applied in the project and trainings related to the non-hazardous solid waste management will be conducted for the workers.

Hazardous waste generation

During construction, the following construction hazardous wastes may be generated.

1. Wastes from Use of Coatings (Paints, Varnishes and vitreous enamels), Adhesives and Sealants and removal of paint and varnish;
2. Wastes from Use of adhesives and sealants (including waterproofing products);
3. Oil Wastes and wastes of liquid fuels (Waste hydraulic oils, Waste engine, gear and lubricating oils, Waste insulating and heat transmission oils, Oil/water separator (grease trap) contents, fuel oil and diesel, petrol, other fuels (including mixture));
4. Waste Organic Solvents, Refrigerants and Propellants;
5. Waste Packaging, absorbents, wiping cloths, filter materials and protective clothing;

6. Wastes from vehicle maintenance (Oil filters, components containing mercury, components containing PCBs, explosive components (for e.g. air bags), brake pads containing asbestos, brake fluids, antifreeze fluids containing hazardous substances);
7. Wastes from electrical and electronic equipment (transformers and capacitors containing PCBs, discarded equipment containing chlorofluorocarbons, HCFC, HFC, discarded equipment containing free asbestos, hazardous components removed from discarded equipment) - Hazardous components from electrical and electronic equipment may include accumulators and batteries, mercury switches, glass from cathode ray tubes and other activated glass, etc.;
8. Gases in pressure containers and discarded chemicals;
9. Batteries and accumulators (lead batteries, Ni-Cd batteries, mercury-containing batteries, separately collected electrolyte from batteries and accumulators);
10. Wastes from transport tank, storage tank and barrel cleaning (wastes containing oil and wastes containing other hazardous substances);
11. Aqueous liquid wastes destined for off-site treatment (aqueous liquid wastes containing hazardous substances and aqueous concentrates containing hazardous substances);
12. Construction and Demolition wastes (mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing hazardous substances, glass, plastic and wood containing or contaminated with hazardous substances, bituminous mixtures containing coal tar, coal tar and tarred products, metal waste contaminated with hazardous substances and cables containing oil, coal tar and other hazardous substances);
13. Soil, stones and dredging spoil;
14. Insulation materials and asbestos-containing construction materials;
15. Gypsum-based construction materials contaminated with hazardous substances; and
16. Municipal Wastes (Household waste and similar commercial, industrial and institutional wastes) including separately collected fractions: solvents, acids, alkalines, pesticides, fluorescent tubes and other mercury-containing waste, discarded equipment containing chlorofluorocarbons, oil and fat (excluding edible oil and fat), paint, inks, adhesives and resins containing hazardous substances, detergents containing hazardous substances and wood containing hazardous substances.

The hazardous waste generated will be managed by the Hazardous Solid Waste Management plan as mentioned below.

Hazardous Solid Waste Management Plan

Waste minimization (Reduction at source)

The required amount of construction materials will be carefully calculated and ordered to minimize the generation of waste at source.

Substitution – Substitution of a non-hazardous or less hazardous materials in place of a hazardous material whenever possible.

Storing and Disposal of Hazardous Waste

The hazardous waste will be kept in a separate bin in the waste transfer station and collected by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) with the on-call system.

Changes to Natural Resources

In order to reduce the natural resources depletion, calculation and estimation of material requirement will be ensured to avoid excessive purchase, and the accurate quantities of materials will be ordered and collected. The efficient use of fuel, electricity, water and office

stationery will be applied. During rainy season of construction phase, rain water will be collected and used for concrete curing works, pouring water on roadways and washing purpose. The reusable materials will be reused by the project. The recyclables will be sent to the local recyclers.

Traffic flow

The mitigation measures such as proper planning of transportation of construction materials (will reduce unnecessary traffic congestion), provision of traffic management staff at site and junctions, installation of road signs and traffic signals at along the way of work site, main road, cross roads, approach roads, to notify stakeholders of the development, enforcing speed limit to all vehicles which are transporting materials and accessing the site. The project will also follow the following practices.

- Emphasizing safety aspects among drivers;
- Improving driving skills and requiring licensing of drivers;
- Adopting limits for trip duration and arranging driver rosters to avoid overtiredness; and
- Avoiding dangerous routes and times of day to reduce the risk of accidents.

Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

5.4.1.2 Mitigation Measures for Biological Environmental Impacts

Destruction of vegetation and expelling of wildlife

The plants in this site and surrounding and the potential impact on animals may not be necessarily significant either as the animals around the site would have run away with fear by the activities of construction and move further away into nearby forests. Therefore, the developer will make the proper demarcation of the project area that would be affected by construction works. This is aimed at ensuring that any disturbance to flora and fauna is restricted to the actual project area and avoid spillover effects on the neighboring areas. There will also be strict control of construction vehicles to ensure the avoidance of unnecessary disturbance of vegetation. The mitigation measures (for e.g. replantation with native species, leaving native trees/plants and supporting Environmental Education and Public Participation and Environmental Protection activities through CSR programs) would be adopted.

Disturbance to aquatic organisms and aquatic habitats

The decline of biodiversity (loss of species in aquatic environment) will be mitigated by banning fishing in fish spawning season and electric shock catching.

The following mitigation measures to minimize the negative impact to the biological environment will also be adopted by the developer:

- All the marginal and common lands available in the nearby area would be brought into a plantation program giving priority to native species for good green cover.
- Biological mitigation measures which were suggested for impacts to vegetation is providing the implementation of revalidation programs elsewhere outside of the project site which store top soil for reapplication. Replacing or restoring the vegetation is the most critical of all mitigation activities if the environmental impacts to the biological environment are to be minimized.
- Community Forestry (people's committee at village level) would be placed in the center of redevelopment efforts so as to provide protection of common property resources, local employment, and local people's participation (including women).
- Raising public awareness upon presence of healthy ecosystems where trees and wildlife including micro-organisms and invertebrates should be present to maintain food-

chains, food-webs, and biogeochemical cycles balanced would be strengthened assisting with an environmental education program.

5.4.1.3 Mitigation Measures for Social Environmental Impacts

Existing social infrastructures and services

The existing social infrastructures and services will be upgraded and expanded as CSR program of the project to meet the needs of the local people and the additional construction workers.

Landscape and scenery

The architectural design, height and color of the buildings and structures will be developed by taking the visual impacts of these structures into account. The factors related to the design of the building structures, distance between the viewer and these buildings, setting of the tower including the space between these buildings and the viewer, the degree to which these buildings are visible, and the disposition and visual preferences of those who observe these buildings and structures will also be assessed before designing and construction stages.

The visual impacts of the electricity substation will be mitigated by the control measures:

- ✓ Placing the structures in such a manner as to maximize the buffer zone between the structures and the roads
- ✓ The retention of as much existing vegetation as possible, specifically the existing mature trees in the area
- ✓ The establishment of climbing plants on sections of the perimeter fencing for safety and security considerations. Such planting will be done with specific viewpoints in mind and be used to break the monolithic nature or soften the visual impact of the development from those specific viewpoints.
- ✓ All lighting, especially perimeter security lighting will be shielded to minimize light spillage and pollution. No direct light sources will be seen from outside the site.
- ✓ Signage will be simple and unobtrusive

Risks for infectious diseases such as AIDS/HIV

The project will follow the general EHS guidelines set by International Finance Corporation, World Bank Group. The interventions for communicable diseases will be as follows: providing surveillance and active screening and treatment of workers, preventing illness among workers in local communities (undertaking health awareness and education initiatives, training health workers in disease treatment, conducting immunization programs for workers in local community to improve health and guard against infection, providing health services), providing treatment through standard case management in on-site or community health care facilities, promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization. For the vector-borne diseases, the mitigation measures are prevention of larval and adult propagation through sanitary improvements and elimination of breeding grounds close to human settlements, elimination of unusable impounded water, increase in water velocity in natural and artificial channels, implementation of integrated vector control programs, promoting use of repellents, clothing, netting and other barriers to prevent insect bites, use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs, monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread, collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects, educating project personnel and local residents on risks, prevention and available treatment, monitoring communities during high-risk seasons to detect and treat cases, distributing appropriate education materials and following safety guidelines for the storage,

transport and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure.

Occupational health and safety (Risk of injuries and accidents to workers)

The company has guidelines and procedures for occupational health and safety.

The KMIC JVC as an employer considers its employees to be its most valuable assets and undertakes to safeguard them through providing and maintaining, as far as reasonably practical, a working environment that is safe and without risk to the health of its employees.

The consortium also believes that health and safety orientation is a vital component of the health and safety management system. It is the process of introducing new, inexperienced, transferred and returning employees to a safe and healthy workplace.

Orientation provides employees with necessary safety information about their job and tasks, informs them of specific details about workplace hazards and provides an opportunity to learn about the company and their colleagues, ask questions and to clarify new or confusing information.

The orientation will be conducted for all employees, and workers for the construction phase and the length of time required for orientation will depend on the workplace, and the specific job and tasks. Orientation will not consist of a whirlwind of checklists and safety manuals handed to the new employee, but rather needs to be practical and hands-on, and will focus on the skills the employee must develop to be successful at their job.

Orientation Topics

The following topics are the minimum requirement for the company to review with new employees before they begin work:

1. Contact Information:

Names, phone numbers of employee's supervisor and company personnel, including emergency contact information.

2. Rights and Responsibilities:

Explain both the employee and employer responsibilities as outlined in Occupational Safety and Health Law (Draft) by Pyidaungsu Hluttaw.

3. Procedures and Codes of Practice:

Explain the company's procedures and codes of practice as it pertains to the employee's job and department. Outline the expectations for the employee and the employee's supervisor to adhere to all standards.

4. First Aid:

Introduce first aid providers, indicate areas for first aid kits or room, explain to employees how to summon first aid for themselves or for a co-worker.

5. Accident/Injury Reporting Procedures:

Explain the established company procedure and contact people for reporting any injuries sustained by the employee.

6. Emergency Procedures and Preparedness:

Review the company's emergency personnel contact info; evacuation plan, including exit routes; evacuation signals and sirens; location of eyewash stations and showers, fire extinguishers, and alarm pull boxes; identify fire marshal(s); and identify exposures. Other procedures may include:

- ✓ Bomb threats/suspicious packages
- ✓ Threatening, violent or disruptive behaviours
- ✓ Chemical spills, gas leaks
- ✓ Debriefing assistance for critical incidents

7. Personal Protective Equipment (PPE):

Review the required PPE (legal) standards for specific jobs or job tasks, including the appropriate use, fitting, storage, and maintenance for assigned jobs.

8. Code of Practice for Working Alone:

Outline the process for any employee who works alone so they can remain safe on the job or to be able to summon emergency assistance, if required.

9. Workplace Hazardous Material Information System (WHMIS):

Explain where hazardous material and substances are located and review the labeling system, hazardous symbols and location and contents of the Material Safety Data Sheets (MSDS). Train employees on site-specific products and accompanying MSDS material.

Guidelines, standards and activities for occupational health and safety

1. Organising the Site

1.1 Planning the work

A good planning will be made by gathering as much information about the project and the project site before works begin to ensure safety during construction phase. Information that could be sought would be:

- a) Underground services;
- b) Presence of live bare electrical conductors, underground/overhead insulated cables. Advice from the authority concerned would also be sought prior to start of work;
- c) Ground conditions;
- d) Contract documents;
- e) Nearby schools, footpaths and roads; and
- f) Other activities going on the site.

1.2 Organising the work

Responsibilities regarding safety and health between different stakeholders would be clearly allocated:

- a) Between client/main contractor/subcontractor;
- b) By appointment of competent supervisors/safety and health officers; and
- c) By proper coordination on site between parties.

1.3 Common facilities to be provided

The provision of basic facilities to ensure safety, health and welfare of employees would be ascertained.

1.3.1 Site access

Adequate, safe and separate pedestrian and vehicular traffic routes would be provided on and around the site.

1.3.2 Site boundaries

The construction site will be fenced to prevent the entry of unauthorised persons on construction sites, which are located in built-up areas and alongside vehicular and pedestrian traffic routes.

1.3.3 Public safety

The public safety would be ensured through appropriate fencing of site or by other means.

1.3.4 Lighting

The adequate lighting of all worksite would be ensured through natural and/or artificial lighting.

1.3.5 Site tidiness

- a. The site would be kept tidy.
- b. Walkways and stairs would be kept free of slipping and tripping hazards.
- c. There will be no protruding nails on loose or fixed materials.

1.3.6 Storage areas

- a) The storage areas would be set up for plants, materials, flammable substances (e.g. flammable liquids and gases) and hazardous substances (e.g. chemicals).
- b) The flammable materials would be stored away from other materials and protected from accidental ignition.
- c) The obstruction of access routes/emergency escapes by proper storage of materials would be prevented.
- d) Materials to be properly stacked to prevent falls.

1.3.7 Fire Safety

Details can be reviewed in Fire Safety Management and Fire Emergency Plan.

2.0 Excavations

- a) All utility services, such as electrical, water and sewer in the area would be located and identified before beginning to excavate.
- b) The pointed tools will not be used to probe for underground electrical cables.
- c) Trees, utility poles, rocks or similar objects near the edge of an excavation would be removed or secured to prevent workers from being injured.
- d) The sides of excavations would be supported by sheet piling, shoring and bracing to guard against danger to workers from fall or dislodgement of earth, rock or other material.
- e) The excavation slopes and/or supporting systems would be inspected daily for erosion or deterioration.
- f) The excavated materials will be kept back at least 600 mm (2 ft.) from the edge of any trench excavation and 1.2 m (4 ft.) from any other excavation.
- g) The substantial guardrails or barriers would be erected around excavations to prevent workers or other persons from falling into them.
- h) A ladder will be provided when workers are required to enter excavations over 1.5 m (5 ft) in depth.
- i) The load, plant or equipment would not be placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endanger any person unless precautions such as the provision of shoring or piling are taken to prevent the sides from collapsing.
- j) The anchored stop blocks, and barriers would be provided to prevent vehicles being driven into the excavation.
- k) The heavy vehicles will not be allowed near the excavation unless the support work has been specially designed to permit it.

- l) If an excavation is likely to affect the security of a structure on which persons are working, precautions would be taken to protect the structure from collapse by providing shoring.

3.0 Working at Height

3.1 General provisions

- a. Ensure that working platform is secure and check that it:
 - i. will support the weight of workers using it and any materials and equipment they are likely to use or store on it.
 - ii. is stable and will not overturn.
 - iii. is footed on stable ground or on a stable support or structure.
- b. Provide guard rails, barriers, etc. at open edges, including edges of floors, floor openings, edges of roofs and edges of working platforms.

3.2 Guard rails

Guard rails would:

- a) be made from any material, provided they are strong and rigid enough to prevent people from falling and be able to withstand other loads likely to be placed on them.
- b) be fixed to a structure, or part of a structure capable of supporting them.
- c) Include:
 - i. a main guard rail at least 900 mm above any edge from which people are liable to fall.
 - ii. a toe board at least 150 mm high.
 - iii. a sufficient number of intermediate guard rails or suitable alternatives.
- d) Risks of falls through openings or fragile material (e.g. rooflights), to be reduced by providing appropriate and adequate guard rails or barriers to cover the opening or material.

3.3 Safe working platforms

All working platforms would be:

- a) Fully boarded and securely fixed to prevent displacement.
- b) Strong enough to support the load usually placed on it (workers and materials).
- c) Provided with toe-boards so as to prevent materials and tools from falling over the edges.

3.4 General access scaffolds

All scaffolds would be:

- a) Properly designed, constructed, erected and maintained so as to prevent collapse or accidental displacement.
- b) Based on a firm and level foundation.
- c) Erected on a firm ground capable of supporting the weight of the scaffold and any load likely to be placed on it.
- d) Braced and tied into a permanent structure or otherwise stabilized.
- e) Provided with platforms that are fully boarded and wide enough for the work and for access.
- f) Provided with scaffold boards that are properly supported and rest on at least three supports.
- g) Have a safe ladder or other access onto the work platforms.

3.5 Safe use of access ladders

- a) Any ladder would be properly fixed to prevent slipping.
- b) A good handhold would be provided to the ladder.
- c) The ladder would be leaned at the proper angle to minimize the risk of slipping outwards, that is, about 1 m out at the base for every 4 m in height.
- d) The top of the ladder would rest against a solid surface and not on fragile or other insecure materials such as cement or plastic guttering.
- e) Both feet of the ladder would rest on a firm footing and cannot slip.
- f) If the ladder is more than 3 m long or used as a way to and from a workplace, it would be secured from falling by fixing it at the top or sometimes at base.
- g) If the ladder cannot be fixed a second person would secure the ladder at the base while it is being used.
- h) The ladder would extend a sufficient height (about 1 m) above any landing place where workers will get on and off it unless some other adequate handhold is available.

3.6 Stepladders

- a) Stepladders would be fully opened, and both spreader bars would be locked.
- b) Stepladders would not be used on top of scaffolds, platforms, or other surfaces above the ground.
- c) Unattended tools, such as hammers, would not be left on top of stepladder.
- d) Stepladder would be dismounted before being moved.
- e) Top most rung of a stepladder would not be used.

3.7 Care of ladders

- a) Ladders would be inspected regularly by a competent person and damaged ladders should be removed from service.
- b) Ladders would be properly stored on racks under cover and above ground.
- c) Ladders would not be hung from its rungs.

3.8 Roof works

- a) All roof-work operations would be pre-planned and properly supervised.
- b) Roof work would only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.
- c) Work on roofs should not be carried on in weather conditions that threaten the safety of workers.

3.8.1 Flat roofs

- a) All the edges and openings on a roof from or through which there is a risk of fall would be protected with suitable guardrails and toe boards.
- b) All covers for openings in roofs would be of substantial construction and be secured in position.

3.8.2 Sloping roofs

- a) When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders would be provided and firmly secured in position as soon as practicable.
- b) During extensive work on sloping roofs, edge protection in the form of barriers or guardrails high enough and strong enough would be provided to stop worker from falling off the roof.

3.8.3 Fragile Roofs

Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they would be provided with sufficient suitable roof ladders or crawling boards strong enough, when spanning across the supports for the roof covering, to support those workers.

4.0 Moving, Lifting and Handling Loads

4.1 Manual handling

- a) Work site and storage of materials would be planned so that manual handling is reduced to a minimum.
- b) Manual handling would be done by the kinetic lifting technique and the person involved should be properly trained.

4.2 Hoists

- a) Selection of a hoist, which is suitable for the site and capable of lifting the loads required will be made.
- b) To prevent people being struck by the platform or other moving parts:
 - i. Enclose the hoistway at places where people might be struck, e.g., working platforms or window/door openings;
 - ii. Provide gates at all landings and at ground level;
- c) Prevent falling down the hoistway by making sure:
 - i. the hoistway is fenced where people could fall down it;
 - ii. the gates at landings are kept closed except during loading and unloading;
 - iii. the edge of the hoist platform is close to the edge of the landing so that there is no gap to fall through;
- d) Prevent being hit by falling materials by:
 - i. stopping loads falling from the platform, e.g., make sure wheelbarrows are not overfilled;
 - ii. not carrying loose loads. Put loose loads in proper container or use a hoist with an enclosed platform;
 - iii. not overloading the platform;
 - iv. enclosing the hoistway;
 - v. hoist should be used to carry materials only.

4.3 Lifts

Lifts for the carriage of persons need to be especially constructed and installed for the purpose, with such features as mechanical and electrical interlocking devices on the cage and landing gates.

4.4 Mobile cranes

- a) The crane would be able to lift the load on a site.
- b) It should be of such a size so that it can be used safely on a site.
- c) Crane's inspection certificates would be up-to-date.
- d) The crane would be fitted with an automatic Safe Load Indicator, which should be in good working order.
- e) The employer would ensure that the driver is trained and experienced in the operation of the type of crane being used.
- f) The crane should be sited in a safe place, so that;
 - The driver has a clear view of the site.
 - It is well away from excavations and overhead powerlines.

- It is on level ground which can take its full weight and together with its maximum load.

5.0 Site Vehicles and Mobile Plant

- Provide safe site entry and exit points with adequate turning room and good visibility for vehicle drivers;
- Keep pedestrians separate from vehicles, e.g., by providing separate site entry and exit points;
- Consider a one - way system and avoid needs for vehicles to reverse wherever possible;
- Consider fitting reversing alarms to vehicles;
- Make use of signalers to control high-risk situations, e.g., where visibility is restricted;
- Prepare the running surface of temporary roads. Where the site is muddy, use hardcore or other fill to overcome the problem of skidding and repair potholes;
- Protect any temporary structures, such as scaffolds or falseworks, which might be damaged and made unsafe if struck by a vehicle;
- Protect any excavations and alongside any areas of water if vehicles must pass close by;
- Take precautions, such as stop blocks, where vehicles tip materials into excavations;
- Make sure that vehicles are not overloaded as they may become unstable, difficult to steer or have their braking efficiency impaired;
- Make sure loads are securely attached to vehicles and that loose materials cannot fall from lorries or site dumpers and strike workers; and
- Take special precautions with blind corners.

6.0 Chemicals

- Follow the instructions provided on the labels when working with glues, paints, and solvents;
- Work with glue, paint, or solvents in well-ventilated areas so as to prevent build-up of hazardous environment to chemical vapours; and
- Use appropriate personal protective equipment and clothing to employees working with chemicals based on labels and Material Safety Data Sheet (MSDS).

7.0 Protective Equipment

Employees on construction sites need specific Personal Protective Equipment (PPE) to ensure their safety and health. e.g.:

7.1 Safety helmet

- Employees would be provided with safety helmets to protect the head from injury due to falling or flying objects or due to striking against objects or structures.
- Employers would ensure that the safety helmets are worn.
- When working at height, a strap would additionally be used to prevent the safety helmets from falling.

7.2 Footwear

- Protective footwear would be provided to workers who are exposed to the risk of injury of materials being dropped on their feet or nail or other sharp objects penetrating their sole.
- Where it is likely that employees will be working in water or wet concrete, appropriate boots would be provided.

7.3 Goggles and safety spectacles

The employer would provide goggles or other suitable protective device when likely to be exposed to eye or face injury from airborne dust or flying particles, dangerous substances,

harmful heat, light or other radiation, and in particular during welding, flame cutting, rock drilling, concrete mixing or other hazardous work;

7.4 Gloves and protective clothing

Protective gloves and suitable protective clothing to protect hands or the whole body as required when exposed to heat radiation or while handling hot, hazardous or other substances which might cause injury to the skin would be provided by the employer.

7.5 Other protective equipments

Where necessary, workers would be provided with and required to wear the following personal protective equipment:

- a) Ear protection when exposed to noise.
- b) Dust masks when exposed to excessive dust.
- c) Waterproof clothing and head coverings when working in adverse weather conditions.
- d) Safety harnesses with independently secured lifelines where protection against falls cannot be provided by other appropriate means.
- e) Life vests and life preservers where there is a danger of falling into water.
- f) Distinguishing clothing or reflective devices or otherwise conspicuously visible material when there is regular exposure to danger from moving vehicles.

Note: All protective equipments would be properly maintained and stored after use.

8.0 Emergency Procedures

8.1 Transport

- a) Where an employee has suffered injury or illness at work necessitating his removal to his home or to a hospital or other similar institution, the employer shall promptly and at his own expense provide an appropriate means of conveyance for the employee.
- b) The appointed person or first-aider shall accompany the injured or ill employee to a hospital or other similar institution whenever the circumstances so justify.

Emergency risk (risk of fire, earthquake, flood)

The company has guidelines and procedures for emergency risk such as risk of fire and earthquake. (Please see in the Annex section).

For the flood risk, KMIC Development Co., Ltd. planned to expose several temporary ponds for on-site measures (prevention of flooding in wet weather) and to use water for construction and other purposes. The proper gradient at temporary drain in the construction site can control the velocity of rain water and also mitigate the flood occurrence in and around the project area. The other measures such as avoidance of unnecessary cutting and removing of trees and vegetation, controlling earthwork, installation and construction of drainage structure properly, providing soil erosion control and conservation structure where necessary will also be carried out to avoid any flood events.

Community Health and Safety

The project will follow the general EHS guidelines set by International Finance Corporation (IFC), World Bank Group.

| Parameter | Control Measures |
|---------------|---|
| Water Quality | Drinking water sources – at all times be protected. |
| | Delivery of water to the community or to users of facility infrastructure – water quality needs to comply with National Acceptability Standards (or in their absence the current edition of with WHO Drinking Water Guidelines) |

| | |
|---|--|
| Water Availability | Potential effect of groundwater or surface water abstraction for project activities would be properly assessed accounting for seasonal variability and projected changes in demand in the project area. |
| Structural Safety of Project Infrastructure | <p>Buffer strips or other methods of physical separation around project sites will be included to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odor or other emissions.</p> <p>The siting and safety engineering criteria will be incorporated to prevent failures due to natural disasters.</p> <p>Myanmar National Building Code (2016) will be applied to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response.</p> <p>Hazardous materials storage, handling and use will be managed to reduce or eliminate consequences of the potential off-site release.</p> |
| Life and Fire Safety | The new buildings and facilities which can be assessed by the public will be designed, constructed and operated in full compliance with Myanmar National Building Code (2016), Myanmar Fire Services Department regulations and other local legal/insurance requirements. |
| Traffic Safety | <p>Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public.</p> <ul style="list-style-type: none"> • Emphasizing safety aspects among drivers • Improving driving skills and requiring licensing of drivers • Adopting limits for trip duration and arranging driver rosters to avoid overtiredness • Avoiding dangerous routes and times of day to reduce the risk of accidents <p>Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.</p> <p>Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, the following measures will be applied:</p> <ul style="list-style-type: none"> • Minimizing pedestrian interaction with construction vehicles • Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations (hospital). Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaign) • Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate first aid is provided in the event of accidents • Using locally sourced materials, whenever possible, to minimize transport distances. Locating worker camps close to project sites and arranging worker transport system to minimizing external traffic |

| | |
|-------------------------------------|--|
| | <ul style="list-style-type: none"> Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions |
| Transport of Hazardous Materials | <p>Project will have procedures ensuring the compliance with local laws and requirements applicable to the transport of hazardous materials. The procedures will be:</p> <ul style="list-style-type: none"> Proper labeling of containers, including the identity and quantity of the contents, hazards, and shipper contact information Providing a shipping document (e.g. shipping manifest) describing the contents of the load and its associated hazards in addition to the labeling of the containers. Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved Ensuring adequate transport vehicle specifications Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures Using labeling and placarding (external signs on transport vehicles) as required Providing the necessary means for emergency response |
| Disease Prevention | <p>Communicable Diseases and Vector-Borne Diseases – Please see in the “Risks for infectious diseases such as AIDS/HIV” section above.</p> |
| Emergency Preparedness and Response | <p>If there is a risk to the local community from a potential emergency arising at the project site, the company will inform the community through the communication measures, namely, informing the local authorities, communicating details of the nature of emergency, communicating protection options (evacuation, quarantine), providing advices on selecting an appropriate option and vehicle mounted speakers.</p> |

Impacts on Agricultural and Livestock Zones

The mitigation measures for soil degradation, soil contamination, soil erosion, air pollution, greenhouse gases emission, surface water and ground water contamination, solid waste generation, emergency risk mentioned in the respective sections above can reduce or avoid any impacts on fish farms, livestock, vegetables field and plantation nearby the project site and community associated with these businesses.

5.4.2 Mitigation Measures for Operation Phase

5.4.2.1 Mitigation Measures for Physical Environmental Impacts

Soil Degradation

To mitigate soil degradation due to the oil (purified mineral oil used for insulation and coolant) leaks of the transformer, the industrial complex will have banded detention ponds to contain an oil spill. To avoid soil degradation by wastewater, the wastewater treatment plant will be constructed in the project area and that plant will treat the domestic and industrial wastewater before discharging to the back drainage which leads to Kyar Inn creek.

The waste collected from residential/apartment will be temporarily stored in a bin center and collected by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee.

- 1) The size of the bin center will be big enough for storing the amount of waste generated for two days.
- 2) The routes for garbage collection trucks to get easy access to the bin center will be considered and made.
- 3) The lighting will be installed at the bin center for day and night work.
- 4) The air purification systems will be installed at the bin center for clean ventilation.
- 5) The liquid produced from waste and wastewater generated from cleansing bin center will be treated at the central wastewater treatment plant before disposal.
- 6) Locating the separate collection dust bins at the bin center for separately disposing the wastes and recycle products.
- 7) The adequate amount of water will be available for cleansing the bin center.
- 8) The bad smell from walls and leakage of contaminated water will be avoided.

The waste generated from industries will be categorized as hazardous waste, non-hazardous waste, toxic waste, and chemical waste and temporarily stored in the bin center separately based on the type of waste.

Each development will have the following procedures adopted for oil spills mitigation.

- All development/activity - related machinery will be thoroughly checked not to leak oils on the ground and regular maintenance of the machinery will be done.
- All maintenance works will be carried out in a designated area and where oil spills are totally restrained from reaching the ground. Such areas will be cemented and enclosed to avoid storm water from carrying away oil into the soil.
- Car wash areas and other places handling oil activities within the site will be well managed and the drains from these areas controlled.

Soil Contamination

To mitigate soil contamination due to the oil leaks and spills from generators and transformers and process of usage, producing, storing, disposing and handling of oil, chemical, hazardous materials of different industries and factories, the industrial complex will have bunded detention ponds to contain an oil spill. To avoid soil contamination by wastewater, the wastewater treatment plant will be constructed in the project area and that plant will treat the domestic and industrial wastewater before discharging to the waterway nearby.

The waste collected from residential/apartment will be temporarily stored in a bin center and collected by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee. The waste generated from industries will be categorized as hazardous waste, non-hazardous waste, toxic waste, and chemical waste and temporarily stored in the bin center separately based on the type of waste.

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- All development/activity - related machinery will be thoroughly checked not to leak oils on the ground and regular maintenance of the machinery will be done.
- All maintenance works will be carried out in a designated area and where oil spills are totally restrained from reaching the ground. Such areas will be cemented and enclosed to avoid storm water from carrying away oil into the soil.
- Car wash areas and other places handling oil activities within the site will be well managed and the drains from these areas controlled.

Air Pollution (including Dust Emission)

Dust emission during operation phase will be minimized through restricted speed control of transport buses and traffic within the project site.

The emissions of the factories and industries will be controlled by different technologies and technical measures not to exceed General Guidelines for Air Emissions described in National Environmental Quality Emission Guidelines. For the parameters not included in the National Environmental Quality Emission Guidelines, "Air Quality Guidelines for Europe, 1997. WHO Regional Publications, European Series No. 23. World Health Organization" will be followed.

All fuel will be sourced from trusted sources that have employed the necessary steps to eliminate lead and reduce Sulphur content.

The businesses to be invested in KMIC are food and beverages processing, textile/garment, electronics/parts assembling, logistics/warehousing and construction materials. For the time being, detail information of these businesses are not available yet. However, these businesses have to follow the industry-specific guidelines set by Ministry of Natural Resources and Environmental Conservation.

Food and Beverage Processing

This guideline covers the processing of meat, vegetable, fruit, and other raw materials in value-added food and non-fermented beverage products for human consumption.

Air Emission Levels

Emissions from food processing activities are principally associated with matter and odor. Particulate matter PM₁₀ emissions should typically not exceed 50 mg/Nm³.

Garments/Textile

Textiles Manufacturing

This guideline applies to textile manufacturing using natural fibers, synthetic fibers (made entirely from chemicals), and regenerated fibers (made from natural materials by processing these materials to form a fiber structure). It does not include polymer synthesis and natural raw material production.

Air Emission Levels

| Parameter | Unit | Guideline Value |
|----------------------------|---------------------|-----------------------------------|
| Ammonia | mg/Nm ^{3a} | 30 |
| Carbon disulfide | mg/Nm ³ | 150 |
| Chlorine | mg/Nm ³ | 5 |
| Formaldehyde | mg/Nm ³ | 20 |
| Hydrogen sulfide | mg/Nm ³ | 5 |
| Particulates | mg/Nm ³ | 50 ^b |
| Volatile organic compounds | mg/Nm ³ | 2/20/50/75/100/150 ^{c,d} |

^a Milligrams per normal cubic meter at specified temperature and pressure

^b As the 30-minute mean for stack emissions

^c Calculated as Total carbon

^d As the 30-minute mean for stack emissions: 2 mg/Nm³ for volatile organic compounds classified as carcinogenic or mutagenic with mass flow greater than or equal to 10 g/hour; 20 mg/Nm³ for discharges of halogenated volatile organic compounds with a mass flow equal or greater than 100

g/hour; 50 mg/Nm³ for waste gases from drying of large installations (solvent consumption > 15 tons/year); 75 mg/Nm³ for coating application processes for large installations (solvent consumption > 15 tons/year); 100 mg/Nm³ for small installations (solvent consumption < 15 tons/year); if solvent is recovered from emissions and reused, the guideline value is 150 mg/Nm³

For electronics/parts assembling, logistics/warehousing and construction materials, the specific guidelines for air emission will be followed.

Greenhouse gas emissions

The greenhouse gas emissions can be controlled by energy use efficiency, process modification, selection of fuels or other materials, the processing of which may result in less emission, application of emission control techniques, if possible. For the time being, the exact information of type of industries to be allocated in the project is not available and hence the specific control measures for every single factory and manufacturing cannot be mentioned at this point. There will be an EIA process for individual industrial development and project activities. Residents and staff/employee of residential areas and offices and other development/facilities will do the following practice:

- Using natural light as much as possible (and using energy efficient electrical appliances like energy - saving light bulbs)
- Keeping windows shut when HVAC is in use, but employing natural ventilation whenever possible
- Unplugging TVs, AV equipment, and phone chargers when not in use
- Turning off the lights and computer when leaving the office
- Recycling and/or reusing as many waste materials as possible
- Biking or walking to work if possible (OR) arranging bus for the workers
- Using the environmentally friendly airconditioners and refrigerators to avoid or reduce the emission of fluorinated gases

Surface water/Ground water contamination

The wastewater treatment plant will be constructed in the project area and that plant will treat the domestic and industrial wastewater before discharging at the back drainage which leads to Kyar Inn creek.

The waste collected from residential/apartment will be temporarily stored in a bin center and collected by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee. The waste generated from industries will be categorized as hazardous waste, non-hazardous waste, toxic waste, and chemical waste and temporarily stored in the bin center separately based on the type of waste.

The bin center will have a hard, impermeable floor with drainage, and designed for cleaning with available water supply. The storage area will be secured by locks with restricted access and designed for access and regular cleaning by authorized cleaning staff. It will also be protected from sun, and inaccessible to animals/rodents.

Each development will have the following procedures adopted for oil spills mitigation.

- All development/activity - related machinery will be thoroughly checked not to leak oils on the ground and regular maintenance of the machinery will be done.
- All maintenance works will be carried out in a designated area and where oil spills are totally restrained from reaching the ground. Such areas will be cemented and enclosed to avoid storm water from carrying away oil into the soil.
- Car wash areas and other places handling oil activities within the site will be well managed and the drains from these areas controlled.

Increased water demand

Residents and responsible persons of each development/facility will be encouraged to use rainwater harvesting tanks to collect rainwater if possible. The water connections, pipes and taps will be checked regularly to avoid any leaks and wastages.

Noise and vibration

In the operation stage, the potential main sources of noise and vibration are processing factories and assembling factories, wastewater treatment plant, and residential area and commercial area. If necessary, the sound barrier, and sound absorbing materials will be prepared and installed at the facilities. The vibration control devices for equipment and design of the structure to disconnect between the sources and ground will be considered and applied as needed. The outside standard working hours such as weekend, evening or night-time works will be controlled and limited. If there is no negative impact on the community, these works will be allowed. However, the noise level of operation of all facilities and structures will be within the acceptable limit stipulated in National Environmental Quality Emission Guidelines.

Increased Solid waste generation

During operation phase, a large quantity of solid wastes will be generated, and solid waste will be collected separately for industrial waste and kitchen waste (domestic waste). Some types of industrial solid waste and kitchen solid waste will be sorted for recycling. The project will accept and implement the basic concept of 3Rs (Reduce, Reuse and Recycle) for reducing solid waste generation.

The non-hazardous and hazardous solid waste management plan for operation phase will be set by the developer. The amount of daily waste generated from residential/apartment and industries will be estimated and calculated for the submission to Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee.

Non-Hazardous Solid Waste Management Plan

Waste minimization (Reduction at source)

Source reduction includes technological efficiency, material substitute and good management practice.

Waste segregation

The kitchen waste from residential/apartment will be segregated as wet and dry. The wet waste will be put in green bags and dry waste will be in blue bags. The recyclable wastes would be segregated and disposed in the relevant dust bins by the tenants with their own arrangement in their project compound. The tenants' storage of solid waste shall be allowed with KMIC JVC's prior approval only when it is stored in solid waste receptacles or trash containers which must be large enough to facilitate storage and collection and which must be installed within their plots.

Waste collection

The waste generated by tenants would be collected on a daily basis by the cleaners. The system requires use of a container, truck container pick-up equipment, and replacement of the container.

Waste storage

The waste collected from residential/apartment will be temporarily stored in a bin center. The bin center will cover the following aspects:

- 1) The size of the bin center will be big enough for storing the amount of waste generated for two days.
- 2) The routes for garbage collection trucks to get easy access to the bin center will be considered and made.
- 3) The lighting will be installed at the bin center for day and night work.
- 4) The air purification systems will be installed at the bin center for clean ventilation.
- 5) The liquid produced from waste and wastewater generated from cleansing bin center will be treated at the central wastewater treatment plant before disposal.
- 6) Locating the separate collection dust bins at the bin center for separately disposing the wastes and recycle products.
- 7) The adequate amount of water will be available for cleansing the bin center.
- 8) The bad smell from walls and leakage of contaminated water will be avoided.

The waste generated from industries will be categorized as hazardous waste, non-hazardous waste, toxic waste, and chemical waste and temporarily stored in the bin center separately based on the type of waste.

Final disposal of waste

Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) will collect the waste from the bin center on a specified day regularly based on the type of waste.

Note: The 3Rs (Reduce, reuse and recycle) practice would be applied especially in offices, industries, and commercial areas where office stationeries and different reusable and recyclable materials are being used. Trainings related to the non-hazardous solid waste management will be conducted for all concerned persons.

Hazardous Solid Waste Management Plan

The hazardous waste management plan contains the following procedures and processes.

Waste minimization (Reduction at source)

The technological efficiency, material substitute and good management practice will be applied for waste source reduction. The employees and staff of all factories, industries and offices will be encouraged to reduce the volume of waste generated.

Recycling – Many materials treated as chemical waste are actually surplus chemicals that are reusable. The unopened or unwanted chemicals would be transferred to related industries where they may be used.

Substitution – Substitution of a non-hazardous or less hazardous chemical in place of a hazardous chemical is a commonly used method of reducing waste. For e.g. Changing a cleaning agent from a toxic, flammable solvent to an appropriate soap or detergent solution, and the use of water-based paints and cements over solvent based.

Waste Segregation and Storage

All waste stored together must be compatible. Guidelines for segregation of chemicals as found in the Laboratory Safety Manual must be adhered to. Generally, classes, i.e. ignitable, corrosives, toxics, and reactive, would be segregated. This information will be listed on the label of each chemical or on the MSDS.

The hazardous waste and chemical waste will be temporarily stored in the bin center separately. The hazardous waste and chemical waste will be temporarily stored in the bin center separately. Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee will collect the waste.

Increased wastewater generation

The design of sewage collection and treatment for the proposed project is a central control system and all sewage and wastewater will be collected at the treatment plant. The effluent levels of final treated water to be disposed to waterway will be following the National Environmental Quality Emission Guidelines. The quality of treated wastewater will be monitored by the real-time monitoring indicator.

The observation and checking to sewage treatment plant and its disposal will be done regularly. The backup generator or alternate source of power will be used in case of power failure.

Maintenance and Operation planning of Wastewater treatment

The plan of wastewater treatment will cover the following: outline of maintenance and operation planning, purpose and a range of application, basic features, operation and management of facilities, operation and management of wastewater treatment facility and emergency plans.

Outline of maintenance and operation planning

| Division | Maintenance and operation planning |
|--------------------|---|
| Main points | <ul style="list-style-type: none"> ✓ Economic operation that can consider stability and efficiency ✓ Safety and cleanliness ✓ Maintaining and improving of facility performance ✓ Economic management of facility operation ✓ Establishing duty system ✓ Energy-saving management |
| Maintenance points | <ul style="list-style-type: none"> ✓ Daily Maintenance (Short-term maintenance and long-term maintenance) ✓ Preventing overload operating ✓ Establishing emergency plan ✓ Managing and securing fair return reserve stocks ✓ Writing and analyzing operation log ✓ Writing and analyzing record of machinery performance ✓ Establishing plan of fair operation through regular wastewater analysis |

Purpose and a range of application

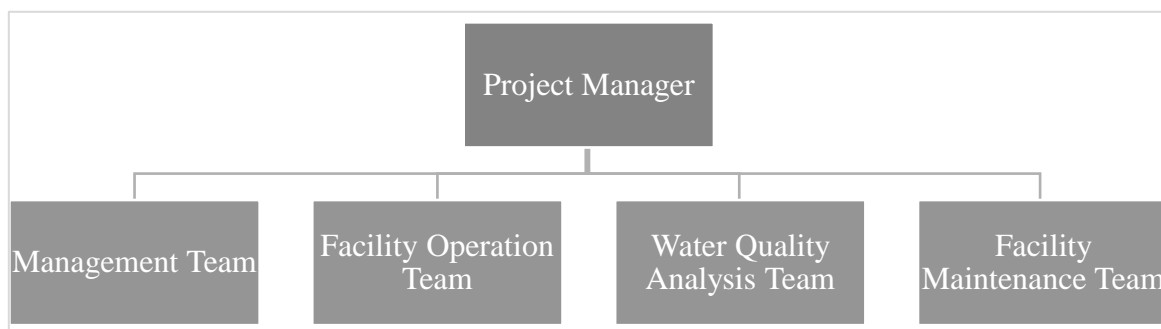
The purpose of operation and planning of maintenance is prompt work process and effective maintenance work. A range of application of planning is wastewater pipes, mediation pumping station and wastewater treatment.

Basic features

The basic features are:

- ✓ Organizing integrated management system to monitor and control wastewater treatment facility.
- ✓ Setting emergency plan for emergency situation.

Organization chart of maintenance and operation management



Operation and management of facilities

Writing maintenance guideline within a month from construction date. The guideline includes maintenance features and problem that occurred during the trial operation.

1. Primary treatment facility (Mechanical biological treatment included)

Facility that removes grit in inflow wastewater in order to prevent pipe closing.

Operation and management of primary treatment facility

| | |
|------------------------------|---|
| Grit Chamber Facility | <ul style="list-style-type: none"> ➤ Plan for preventing sedimentation Inflow sewage flow ➤ Operation of screen facility ➤ Operation of sand removal machine ➤ Coating regularly as a precaution of corrosive gas exposure or inundation |
| Inflow pump station Facility | <ul style="list-style-type: none"> ➤ Water level surveillance of pump sump ➤ Maintenance of pump structure ➤ Change of Operation by changing inflow time and season ➤ Operation control of pump ➤ Standard inspection of inflow pump operation (starting duty should be within the range of 6 times per hour) ➤ Frequent inspection of abnormal noise and vibration |
| Primary sedimentation Tank | <ul style="list-style-type: none"> ➤ Scheme to maintain optimum C/N, C/P of biological reactor ➤ Inspection of noise and vibration of sludge collector |

2. Secondary treatment facility

Treatment facility that processes nutritive salts and organic in sewage, by biological way with microorganism.

Operation and management of secondary treatment facility

| | |
|-----------------------------|--|
| Biological Reactor Facility | <ul style="list-style-type: none"> ➤ Measure for bulking of activated sludge ➤ Measure for floatation of activated sludge ➤ Regular calibration inspection of DO, MLSS measuring instrument ➤ Inspection of start-up time of reduced-voltage starter |
|-----------------------------|--|

3. Tertiary treatment facility

Operation and management of tertiary treatment facility

| | |
|--|---|
| Filter Facility and Recycling Facility | <ul style="list-style-type: none"> ➤ Inspection of backwashing period of filter facility ➤ Inspection of speed and filter resistance of backwashing ➤ Inspection of delivery pressure and functioning condition of water supply facility |
|--|---|

4. Odor treatment facility

Management of deodorization facility

| | |
|------------------------|---|
| Deodorization Facility | <ul style="list-style-type: none"> ➤ Inspection standard of normal operability of deodorization fan ➤ Problem of operation, measure, inspection method and replacement period of filler |
|------------------------|---|

5. Sludge conditioning process

Operation and management of sludge conditioning process

| | |
|------------------------------|---|
| Dewatering Facility | <ul style="list-style-type: none"> ➤ Operating condition inspection of mechanical filtration ➤ Inspection of VVVF automated operation |
| Chemical Dissolving Facility | <ul style="list-style-type: none"> ➤ Storage, inspection and handling key point of chemical ➤ Setting dissolving and dosing period by automatic control of chemical dissolving facility |

6. Other management and operation facilities

Operation and management of other facilities

| | |
|--|---|
| Automatic operation and maintenance facilities | <ul style="list-style-type: none"> • Instrumentation facility precision reliability • Securing measuring instrument and spares to replace in case of situation of failure and deterioration |
| Water quality management | <ul style="list-style-type: none"> • Outline and purpose of water quality, equipment specification of laboratory and handling key points • Standard and items for water quality (Test list, number of times, management index) • Sampling (way to sample, location, quantity and precaution) and water quality management method |

7. Electricity and instrumentation facility

Operation and management of electricity and instrumentation facility

| | |
|-------------------|--|
| Electric facility | <ul style="list-style-type: none"> ▪ Outline: Design outline and system explanation of electrical facility, power distribution facility and power plant facility ▪ General handling: ordinary requirements, safety regulation and provisions for service interruption ▪ Receiving power facility and service interruption: corrective mea |
|-------------------|--|

| | |
|--------------------------|---|
| | <p>sure for situations (before starting receiving power facility, in operation, service interruption)</p> <ul style="list-style-type: none"> ▪ Receiving power facility and power distribution facility: operation requirements, working characteristic of circuit breaker, transformer, receiving power facility and power distribution facility ▪ Load Facility: system explanation of electric heat, lighting, telephone program, fire alarm apparatus and load facility ▪ Maintenance and inspection standard: requirements for daily inspection, regular inspection and special inspection |
| Instrumentation Facility | <ul style="list-style-type: none"> ▪ Outline: outline explanation of instrumentation facility detect converter, monitoring and control equipment, centralized control system and Automation system equipment ▪ General handling: ordinary requirements, safety regulations and provisions for service interruption ▪ Maintenance and inspection standard: inspection standard of each instrumentation facilities ▪ Maintenance and inspection of facilities ▪ Instrumentation measuring instrument: maintenance and inspection method of detection converter, flowmeter, densitometer and water gauge ▪ Control equipment: maintenance and inspection method of computer control section (control section and transmission section) |

8. Sewage pipes

Operation and management of sewage pipe and pump station facilities

| | |
|-----------------------------|---|
| Sewage Pipes | <ul style="list-style-type: none"> ✓ Establishing plan for effective leakage management ✓ Preventing sedimentation of soil in pipes |
| Relay pump station Facility | <ul style="list-style-type: none"> ✓ Water level surveillance of pump sump ✓ Maintenance of pump structure ✓ Change of operation by changing inflow time and season ✓ Operation control of pump ✓ Standard inspection of inflow pump operation (starting duty should be within the range of 6 times per hour) ✓ Frequent inspection of abnormal noise and vibration |

Operation and Management of Wastewater treatment facility

1. Management method of wastewater treatment facility

- Regular inspection for maintenance of facility.
- Management by designating staffs for each facility.
- Setting management plan for flexible response by inflow sewage change.
- Planning facility safety management plan annually

2. Water quality analysis of wastewater treatment facility

- ✓ Discharge water and inlet raw water sampling (Sampling should consider time of sewage inflow)
- ✓ Water quality analysis of discharge water
- ✓ Water quality analysis of inlet raw water
- ✓ Water quality inspection (If autonomous water quality inspection is not available, consigned inspection can be conducted.)
- ✓ Corrective measure of water quality inspection result (If result exceeds inlet raw water quality standard, because analysis is needed for improvement measure).

Analysis would be repeated until it meets inlet raw water quality standard.

3. Management of linked treatment water (outflow, sewage and landfill leachate)

Water quality control plan of individual discharger (National Environmental Quality Emission Guidelines will apply)

Water quality control plan of linked treatment water (sewage and landfill leachate)

If sewage and landfill leachate are treated as linked, flowmeter that can measure inflow water automatically would be installed.

4. Treatment of wastewater sludge

National Environmental Quality Emission Guidelines will apply

The sludge generated from the central wastewater treatment plant will be disposed systematically in connection with the Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee.

5. Details of stopping operation of wastewater treatment facility

Individual wastewater discharger that is informed to stop operation of wastewater treatment facility should control wastewater by stopping operation of facility until normal operation of facility.

Emergency Plans

Emergency plans for wastewater treatment facility

| Emergency Plans | Contents |
|--|---|
| Emergency plans for normal operation | <p>Proper control (alarm system, facility changeover) is automatically initiated when minor error occurs in major section of facility.</p> <p>After initiating proper action, facility should be controlled by operator primarily when emergency shutdown is needed caused by critical malfunction of facility.</p> <p>In preparation of decreased response capabilities of operator, automatic emergency shutdown control method is needed after a period of time.</p> |
| Emergency plans for service interruption of receiving power line | Common-emergency two-circuit receiving power system will be used. By automatic load transfer switches (ALTS), it is able to operate normally with instantaneous changeover. |
| Emergency plans for service interruption by transformer accident | In the case of service interruption by transformer accident, system automatically switches into emergency transformer to operate overall facilities normally. |

Changes to Natural Resources

Each activity of the project operation will efficiently use the energy, fuel, water, raw materials for production, and office stationeries etc. The mitigation and control measures mentioned in this whole chapter for every implementation which can potentially impact the Environment will also help reduce the depletion of natural resources.

Increased Traffic flow

The mitigation measures such as provision of traffic management staff at project area and surroundings, installation of road signs and traffic signals at along main road, cross roads, approach roads, enforcing speed limit to all vehicles which are transporting materials and accessing the site will be applied. The transportation for the factory workers will be considered and they will also be encouraged to use bicycles.

Foul Odor and Vectors

The main source to release foul odor and attract vectors is the wastewater treatment plant. The sludge and bio-solid handling is usually the most significant source of odor release and good sludge management is required. All raw sludge and bio solids will release odor largely dependent upon age.

One of the options is to thermal dry the primary sludge with the use of the biogas generated in the anaerobic digestion process. If this is done, then this impact is negated entirely. The process of dewatering also reduces odor.

At the preliminary treatment (Degritting), flies will be attracted and as mitigation measures, skips would be covered to minimize vector attraction. Contents of skips to be stabilized with lime.

5.4.2.2 Mitigation Measures for Biological Environmental Impacts

Changes to terrestrial flora and fauna

Replantation of native species and leaving native trees/plants as much as possible will be adopted to reduce the negative changes to terrestrial flora and fauna. The restored natural habitat will be conserved and protected from any activities of operation phase. The project will continue this activity through the operation phase as much as possible.

Changes to aquatic flora and fauna

The decline of biodiversity (loss of species in aquatic environment) will be mitigated by banning fishing in fish spawning season and electric shock catching. The wastewater disposed to the waterways will be treated to the acceptable limit.

5.4.2.3 Mitigation Measures for Social Environmental Impacts

Inconveniency with socio-economic change

Some people will meet with difficulty, especially at the initial stage and vocational trainings would be provided to the local people to be fit with skills requirement with project activities and needs.

Community Health and Safety

The project will follow the general EHS guidelines set by International Finance Corporation (IFC), World Bank Group.

| Parameter | Control Measures |
|--------------------------------|--|
| Water Quality | Drinking water sources – at all times be protected. |
| | Delivery of water to the community or to users of facility infrastructure – water quality needs to comply with National Acceptability Standards (or in their absence the current edition of with WHO Drinking Water Guidelines) |
| Water Availability | Potential effect of groundwater or surface water abstraction for project activities would be properly assessed accounting for seasonal variability and projected changes in demand in the project area. |
| Hazardous materials Management | Buffer strips or other methods of physical separation around project sites will be included to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odor or other emissions. Hazardous materials storage, handling and use will be managed to reduce or eliminate consequences of the potential off-site release. |
| Traffic Safety | Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. <ul style="list-style-type: none"> • Emphasizing safety aspects among drivers • Improving driving skills and requiring licensing of drivers |

| | |
|---|--|
| | <ul style="list-style-type: none"> • Adopting limits for trip duration and arranging driver rosters to avoid overtiredness • Avoiding dangerous routes and times of day to reduce the risk of accidents <p>Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.</p> <p>Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, the following measures will be applied:</p> <ul style="list-style-type: none"> • Minimizing pedestrian interaction with vehicles • Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations (hospital). Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaign) • Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate first aid is provided in the event of accidents • Using locally sourced materials, whenever possible, to minimize transport distances. Locating worker camps close to project sites and arranging worker transport system to minimizing external traffic • Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions |
| <p>Transport of Hazardous Materials</p> | <p>Project will have procedures ensuring the compliance with local laws and requirements applicable to the transport of hazardous materials. The procedures will be:</p> <ul style="list-style-type: none"> • Proper labeling of containers, including the identity and quantity of the contents, hazards, and shipper contact information • Providing a shipping document (e.g. shipping manifest) describing the contents of the load and its associated hazards in addition to the labeling of the containers. • Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved • Ensuring adequate transport vehicle specifications • Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures • Using labeling and placarding (external signs on transport vehicles) as required • Providing the necessary means for emergency response |
| <p>Disease Prevention</p> | <p>Communicable Diseases and Vector-Borne Diseases – Please see in the “Risks for infectious diseases such as AIDS/HIV” section above.</p> |
| <p>Emergency Preparedness and</p> | <p>If there is a risk to the local community from a potential emergency arising at the project site, the company will inform the community</p> |

| | |
|----------|--|
| Response | through the communication measures, namely, informing the local authorities, communicating details of the nature of emergency, communicating protection options (evacuation, quarantine), providing advices on selecting an appropriate option and vehicle mounted speakers. |
|----------|--|

Risk of injuries and accidents to workers

The project will follow its general procedures and guidelines for Occupational Safety and Health mentioned in above section.

A clinic with qualified staff members will be located on the administration office during operation.

Light intrusion

The fence of the electricity substation will be high enough to mitigate the light intrusion to the neighboring areas and community. There will also be a buffer area between the substation and the residential area and other sensitive areas.

Increased Emergency risk

The emergency response plans will be strictly applied to all stakeholders of the project.

Impacts on Agricultural and Livestock Zones

The mitigation measures for soil degradation, soil contamination, air pollution, greenhouse gases emission, surface water and ground water contamination, water shortages, increased solid waste generation and wastewater generation, hazardous waste generation, foul odors and vectors, emergency risk mentioned in the respective sections above can reduce or avoid any impacts on fish farms, livestock, vegetables field and plantation nearby the project site and community associated with these businesses.

However, the developer of each and every single industry and factory will have to assess this issue in their IEE, EIA or EMP according to their business types and adopt the relevant mitigation measures.

5.4.3 Mitigation Measures for Decommissioning and Closure Phase

5.4.3.1 Mitigation Measures for Physical Environmental Impacts

Air Pollution (including Dust Emission)

The control techniques the project will implement for the reduction and control of air pollution and dust emission from decommissioning site include: minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone), minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content, applying water or non-toxic chemicals to minimize dust from vehicle movements, selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition, speed reduction for traffic, and avoiding open burning of solid waste.

Greenhouse gas emissions

The mitigation measures for reducing greenhouse gas emissions are conducting training to raise the awareness of drivers, operators and concerned staff on greenhouse emissions and mitigation measures, prohibiting unnecessary driving and moving at site and idling of vehicles and construction machineries as well, the regular maintenance of vehicles and machineries will be done, the efficient use of vehicles (car-pooling) and machineries will be applied. The construction engineers and project managers will formulate the construction

management procedures including the efficient use of construction vehicles and machineries and it will ensure the reduction of greenhouse gas emissions during the demolition phase.

Surface water contamination

The wastewater from demolition site will be treated by the treatment plant before discharging to the creek nearby.

Noise and vibration

The control measures for noise and vibration are: planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance, using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines, and avoiding or minimizing project transportation through community areas.

Waste generation (Hazardous and Non-Hazardous Solid Waste)

The procedures and practices described in Hazardous and Non-Hazardous Solid Waste Management Plans by the Project will be followed for the waste generated from demolition work.

5.4.3.2 Mitigation Measures for Social Environmental Impacts

Living and Livelihood

The Employment Contract between workers and the concerned company (employer) will be prepared according to the existing Myanmar Labor Law. In this way, the worker's labor right will be protected by confirming termination service. In case the termination service will be preceded unfairly, workers can request authorities from labor office to settle and resolve the situation.

Risks for Infectious disease such as AIDS/HIV

The project will follow the general EHS guidelines set by International Finance Corporation, World Bank Group. The interventions for communicable diseases will be as follows: providing surveillance and active screening and treatment of workers, preventing illness among workers in local communities (undertaking health awareness and education initiatives, training health workers in disease treatment, conducting immunization programs for workers in local community to improve health and guard against infection, providing health services), providing treatment through standard case management in on-site or community health care facilities, promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization. For the vector-borne diseases, the mitigation measures are prevention of larval and adult propagation through sanitary improvements and elimination of breeding grounds close to human settlements, elimination of unusable impounded water, increase in water velocity in natural and artificial channels, implementation of integrated vector control programs, promoting use of repellents, clothing, netting and other barriers to prevent insect bites, use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs, monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread, collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects, educating project personnel and local residents on risks, prevention and available treatment, monitoring communities during high-risk seasons to detect and treat cases, distributing appropriate education materials and following safety guidelines for the storage, transport and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure.

Occupational Health and Safety

The company will follow its Occupational Health and Safety Plan and Procedures mentioned in above section.

Community Health and Safety

The project will follow the general EHS guidelines for Community Health and Safety set by International Finance Corporation, World Bank Group.

| Parameter | Control Measures |
|--------------------|--|
| Water Quality | Drinking water sources – at all times be protected. |
| | Delivery of water to the community or to users of facility infrastructure – water quality needs to comply with National Acceptability Standards (or in their absence the current edition of with WHO Drinking Water Guidelines) |
| Water Availability | Potential effect of groundwater or surface water abstraction for project activities would be properly assessed accounting for seasonal variability and projected changes in demand in the project area. |
| Traffic Safety | <p>Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public.</p> <ul style="list-style-type: none"> • Emphasizing safety aspects among drivers • Improving driving skills and requiring licensing of drivers • Adopting limits for trip duration and arranging driver rosters to avoid overtiredness • Avoiding dangerous routes and times of day to reduce the risk of accidents <p>Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.</p> <p>Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, the following measures will be applied:</p> <ul style="list-style-type: none"> • Minimizing pedestrian interaction with construction vehicles • Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations (hospital). Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaign) • Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate first aid is provided in the event of accidents • Using locally sourced materials, whenever possible, to minimize transport distances. Locating worker camps close to project sites and arranging worker transport system to minimizing external traffic |

| | |
|-------------------------------------|--|
| | <ul style="list-style-type: none"> Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions |
| Transport of Hazardous Materials | <p>Project will have procedures ensuring the compliance with local laws and requirements applicable to the transport of hazardous materials. The procedures will be:</p> <ul style="list-style-type: none"> Proper labeling of containers, including the identity and quantity of the contents, hazards, and shipper contact information Providing a shipping document (e.g. shipping manifest) describing the contents of the load and its associated hazards in addition to the labeling of the containers. Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved Ensuring adequate transport vehicle specifications Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures Using labeling and placarding (external signs on transport vehicles) as required Providing the necessary means for emergency response |
| Disease Prevention | <p>Communicable Diseases and Vector-Borne Diseases – Please see in the “Risks for infectious diseases such as AIDS/HIV” section above.</p> |
| Emergency Preparedness and Response | <p>If there is a risk to the local community from a potential emergency arising at the project site, the company will inform the community through the communication measures, namely, informing the local authorities, communicating details of the nature of emergency, communicating protection options (evacuation, quarantine), providing advices on selecting an appropriate option and vehicle mounted speakers.</p> |

Impacts on Agricultural and Livestock Zones

The mitigation measures for air pollution, greenhouse gases emission, surface water and ground water contamination, solid waste generation and wastewater generation, hazardous waste generation mentioned in the respective sections above can reduce or avoid any impacts on fish farms, livestock, vegetables field and plantation nearby the project site and community associated with these businesses.

However, the developer of each and every single industry and factory will have to assess this issue in their IEE, EIA or EMP according to their business types and adopt the relevant mitigation measures.

5.5 Characterization and Assessment of Residual Impacts

The project will apply careful design and planning in combination with the mitigation measures and hence there are no significant adverse impacts to the physical, biological and socio-economic environments. For several valued Environmental and Social Components,

no adverse environmental effects were identified that could result from routine activities during any of the project phases. However, there will be some residual impacts predicted.

The residual impacts are the impacts which remain after the implementation of the mitigation measures described. The predicted residual adverse impacts are considered for each project phase (Construction, Operation and Decommissioning/Closure). The residual impacts and their significance are determined by the professional judgement and expertise based on the nature of impacts, namely, magnitude, duration, and reversibility.

| Level of Magnitude | Description |
|--------------------|---|
| High | Impact is high enough to cause numerous effects. |
| Medium | Impact may result in changes that affect the value of resources, social-cultural, economic and environment. |
| Low | Impact may result in changes in resources and environment, but this change does not decrease value of these resources, social-cultural, economic and environment. |
| Nil | Impact has no effect. |

| Duration | Description |
|--------------------|---|
| Long term | Beyond the construction phase for years or the operational life of project or permanent |
| Medium term | 1-2 years |
| Short term | (0-12 months) and intermittent |

| Reversibility | Description |
|---------------------|--|
| Reversible | Capable of re-establishing the original condition after a change or being impacted |
| Irreversible | Incapable of re-establishing the original condition after a change or being impacted |

| Level of Significance | Description |
|-----------------------|---|
| Major | Potential impact could threaten the long-term sustainability of the resource. Additional research, monitoring, and/or recovery initiatives should be considered. |
| Medium | Potential impact could result in a decline of a resource in terms of quality/quantity, such that the impact is considered moderate in its combination of magnitude, aerial extent, duration, and frequency, but does not affect the long-term sustainability. Additional research, monitoring, and/or recovery initiatives may be considered. |
| Minor | Potential impact may result in a localized or short-term decline in a resource during the life of the Project. Typically, no additional research, monitoring, and/or recovery initiatives are considered. |
| Minimal | Potential impact may result in a small, localized decline in a resource during the construction phase of the Project and should be negligible to the overall baseline status of the resource. |

5.5.1 Residual Impact Assessment for Construction Phase

| No. | Impact | Magnitude | Duration | Reversibility | Level of Significance |
|-----------------------------|--|-----------|-----------------------------|---------------|-----------------------|
| Physical Environment | | | | | |
| 1 | Effects on watercourses (erosion, sediment loading, stormwater discharges, oil and fuel spills and leaks) | Low | Intermittent and Short term | Reversible | Minor |
| 2 | Groundwater Contamination (due to uncontrolled site and road runoff, accidental release of fuel chemicals and hazardous materials) | Low | Intermittent and Short term | Reversible | Minimal |
| 3 | Air Pollution (Emissions of gaseous pollutants from diesel powered construction equipment, vehicles and machineries) | Low | Intermittent and Short term | Reversible | Minimal |
| 4 | Dust Emission (from excavating and moving earth, construction equipment and machinery, vehicles) | Low | Intermittent and Short term | Reversible | Minimal |
| Social Environment | | | | | |
| 1 | Community Health and Safety | Low | Long term | Reversible | Minimal |

5.5.2 Residual Impact Assessment for Operation Phase

| No. | Impact | Magnitude | Duration | Reversibility | Level of Significance |
|-----------------------------|---|-----------|-----------------------------|---------------|-----------------------|
| Physical Environment | | | | | |
| 1 | Degradation of groundwater quality due to accidental and chronic spills and release of chemical and hazardous materials | Low | Intermittent and Short term | Reversible | Minimal |
| Social Environment | | | | | |
| 1 | Community Health and Safety | Low | Intermittent and Short term | Reversible | Minimal |
| 2 | Risk of injuries and accidents to workers | Low | Intermittent and Short term | Reversible | Minimal |
| 3 | Light intrusion | Low | Intermittent and Short term | Reversible | Minor |

5.5.3 Residual Impact Assessment for Decommissioning/Closure Phase

| No. | Impact | Magnitude | Duration | Reversibility | Level of Significance |
|-----------------------------|--|-----------|-----------------------------|---------------|-----------------------|
| Physical Environment | | | | | |
| 1 | Effects on watercourses (erosion, sediment loading, storm water discharges, oil and fuel spills and leaks) | Low | Intermittent and Short term | Reversible | Minimal |
| 2 | Air Pollution (Emissions of gaseous pollutants from diesel powered construction equipment, vehicles and machineries) | Low | Intermittent and Short term | Reversible | Minimal |
| 3 | Dust Emission (from excavating and moving earth, construction equipment and machinery, vehicles) | Low | Intermittent and Short term | Reversible | Minimal |
| Social Environment | | | | | |
| 1 | Community Health and Safety | Low | Intermittent and Short term | Reversible | Minimal |

Although the residual impacts are expected for construction, operation and decommissioning/closure phases as described in the tables above. The level of significance of these residual impacts are minor and minimal. Therefore, no additional research, monitoring, and/or recovery initiatives are considered and these impacts are negligible to the overall baseline status of the resource.



CHAPTER 6. HEALTH IMPACT ASSESSMENT

6.1 Overview

Health Impact Assessment (HIA) was carried out in order to identify how the Project might influence the health of the population. Potential health impacts of the Project are identified based on the profile of the population in the surrounding area, a review of the literature, review of the publicly available information at township level and local area and key informant interviews. Subsequently, systematically assessed potential impacts and recommend strategies to mitigate harmful effects and enhance benefits are presented.

KMIC Project is located in Nyaung Hnitpin Livestock and Agricultural Zone No.3, Hlegu Township. Three kilometres radius from the project site is set as study area to assess the health impact. Within this 3 km from the project site the area covers 6 villages, namely, Kyarkansu, Nyaung Hnitpin, Takutone, Sonekone, Kyarinn (Ashe) and Kyarinn (Anauk) villages which are considered to be affected areas. Among these villages Kyarkansu and Nyaung Hnitpin villages are located in Hmawbi Township and Takutone, Sonekone, Kyarinn (Ashe) and Kyarinn (Anauk) villages are in Hlegu Township.

Hlegu Township is made up of 5 wards, 52 village tracts and 168 villages whereas Hmawbi Township comprises of 4 wards, 39 village tracts and 195 villages.

6.2 Public Health in Hlegu Township and Hmawbi Township

Population profile

In 2019, there are about 239,458 people in Hlegu Township and 202,904 in Hmawbi Township. Female population is more dominant in both township and sex ratio males/100 females is 98 in both Hlegu and Hmawbi. More than 80% of the population are resided in the rural areas in both townships. Only about 16.2% and 12.9% of people living in urban of Hlegu and Hmawbi respectively. The population density is higher in Hmawbi Township than in Hlegu.

Table 6. 1: Population in two townships

| Township | Male N (%) | Female N (%) | Total population | Sex ratio Male/100 female | Urban population N (%) | Rural population N (%) | Population density (per Sq meter) |
|----------|----------------|----------------|------------------|---------------------------|------------------------|------------------------|-----------------------------------|
| Hlegu | 117,731 (49.2) | 121,727 (50.8) | 239,458 | 98 | 38,757 (16.2) | 200,701 (83.2) | 181.9 persons |
| Hmawbi | 97,213 (47.9) | 105,691 (52.1) | 202,904 | 98 | 26,352 (12.9) | 176,552 (87.1) | 513.9 persons |

Source: Yangon Region, northern district administrative department

Health care facilities/services

Number of health care facilities and services available in Hlegu and Mhawbi townships are described in the following table.

Hlegu Township has one 50 bedded township hospital located in Aung Mingalar Ward. There are 16 bedded hospitals in Ma Yan Chaung Village, East Phaung Kyi Village, and Dah Pein Taung Village. Hundred bedded hospital is in Min Lwin Kone Village. As in Hmawbi Township there is only 50 bedded township hospital in the Hmawbi city, and two 16 bedded hospitals in Phuu Kyi village and War Net Chaung Village.

Table 6. 2: Number of health care facilities in Hlegu Township and Hmawbi Township

| Township | Hospital | | | Village dispensary | Private clinic | Rural health centre | Sub-rural health centre |
|----------|------------|-----------|-----------|--------------------|----------------|---------------------|-------------------------|
| | 100 bedded | 50 bedded | 16 bedded | | | | |
| Hlegu | 1 | 1 | 3 | - | 22 | 12 | 37 |
| Hmawbi | - | 1 | 2 | 5 | 6 | 5 | 30 |

Source: Yangon Region, northern district administrative department

Medical personnel and auxiliary appointed by government and the ratio of medical personnel and population are listed as follows.

Table 6. 3: Medical personnel and auxiliary appointed by government and population ratio

| Township | Health care by doctors | | Health care by nurses | | Health care by medical assistant | |
|----------|------------------------|-----------------------------|-----------------------|-----------------------------|----------------------------------|--|
| | Number of doctors | Doctor and population ratio | Number of nurses | Nurses and population ratio | Number of medical assistant | Medical assistant and population ratio |
| Hlegu | 12 | 1:19954 | 38 | 1:6301 | 12 | 1:19954 |
| Hmawbi | 12 | 1:16908 | 27 | 1:7514 | 6 | 1:33817 |

Based on the data above, Hlegu Township has more facilities than in Hmawbi Township. There are 20 private general practice clinics and 2 dental clinics in Hlegu city.

Disease morbidity and mortality rate

According to the township data of administrative department of Hlegu and Hmawbi townships the most common disease in Hmawbi Township is epidemic prone diarrhoea whereas in Hlegu Township is dysentery. It is understandable that diarrhoea and dysentery are ranked 4th commonest diseases in the country. In both townships there was no mortality due to diarrhoea and dysentery. It was found that relatively small number of people among the population has suffered from communicable diseases such as Tuberculosis, Malaria (Table 6.4).

Table 6. 4: Morbidity and mortality of diseases in two townships in 2019

| Township | Morbidity and mortality of diseases | | | | | | | | | |
|----------|-------------------------------------|-------|------------|-------|--------------|-------|------------|-------|------------|-------|
| | Malaria | | Diarrhoea | | Tuberculosis | | Dysentery | | Hepatitis | |
| | Occurrence | Death | Occurrence | Death | Occurrence | Death | Occurrence | Death | Occurrence | Death |
| Hlegu | 5 | - | 683 | - | 520 | 10 | 884 | - | 11 | - |
| Hmawbi | 4 | - | 1111 | - | 361 | - | 100 | - | - | - |

Known cases of HIV/AIDS are shown in table 6.5. Number of people living HIV/AIDS is relatively lower than regional level except in Chin State and Kayah State.

Table 6. 5: Number of cases of HIV/AIDS

| Township | 2016-2017 | | 2017 - 2018 | | 2018 - 2019 | |
|----------|------------|-------|-------------|-------|-------------|-------|
| | Occurrence | Death | Occurrence | Death | Occurrence | Death |
| Hlegu | 64 | - | 36 | 2 | 43 | 4 |
| Hmawbi | 10 | - | 13 | - | 128 | 3 |

Concerning the impact due to the Project the influx of workers may bring communicable diseases to the project area, including sexually transmitted diseases (STDs), or the incoming workers may be exposed to diseases to which they have low resistance. This can result in an additional burden on local health resources.

Health indicators

Health indicators of both townships are shown by population growth rate, birth rate, maternal mortality rate, infant mortality rate and abortion rate.

Table 6. 6: Health indicator

| Health indicator | Hlegu | | Hmawbi | |
|--|-----------|-----------|-----------|-----------|
| | 2016-2017 | 2018-2019 | 2016-2017 | 2018-2019 |
| Population Growth Rate (%) | 4.95 | 3.28 | 2.59 | 4.96 |
| Birth Rate | 20.17 | 19.1 | 30.99 | 17.0 |
| Infant Mortality Rate (IMR)/1,000 Live Birth | 4.32 | 4.6 | 11.46 | 4.0 |
| Maternal Mortality Rate (MMR)/1,000 Live Birth | 0.64 | 1.1 | 0.22 | 1.0 |
| Abortion rate in /1000 | 2.74 | 3.1 | 6.45 | 5.2 |

Source: Township Health Profile 2018, 2019 of Hlegu Township and Hmawbi Township

6.3 Public Health in Project Area

Settlements nearest to the Project area are Nyaung Hnitpin Livestock and Agricultural Zone No.3, Kyarkansu, Nyaung Hnitpin, Takutone, Sonekone, Kyarinn (Ashe) and Kyarinn (Anauk) villages. Socio-economic data of these villages are described in chapter 5. In this section, health related information of population residing nearby the project area are presented. The data were collected from Village Tract Administration Office and Rural Health Centre of Kyar Inn (East) Village.

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Table 6. 7: Summary of population profile of villages nearby project area

| Village | 2020 | | Using water [(%) of household] | | | | | Method of waste disposal [(%) of household] | | | Flush Toilet use |
|----------------|----------------|---------------|----------------------------------|--------------|--------------------|--------------------------------|--------------|---|------------------|--------------|------------------|
| | Population (N) | Household (N) | Source of water use for drinking | | | Source of water for other uses | | Burning (%) | Open dumping (%) | Dig hole (%) | |
| | | | Dug well water (%) | Borehole (%) | Purified water (%) | Dug well water (%) | Borehole (%) | | | | |
| Nyaung Hnitpin | 3126 | 655 | - | 39 | 61 | - | 100 | 100 | - | - | Every household |
| Kyar Kan Su | 1473 | 400 | - | 75 | 25 | - | 100 | 100 | - | - | |
| Takutone | 570 | 170 | 6 | 6 | 88 | 52 | 48 | 12 | 88 | - | |
| Kyarinn Ashe | 2197 | 492 | 4 | 45 | 51 | 4 | 96 | 98 | 2 | - | |
| Kyarinn Anauk | 1840 | 362 | 14 | 36 | 50 | 350 | 12 | 100 | - | - | |
| Sonekone | 392 | 110 | 100 | - | - | - | 100 | 100 | - | - | |
| Zone3 | 1750 | 360 | - | 41.6 | 28 | Every household | 41.6 | 13 | - | 83.3 | |

Source: Village tract administrative office

Safe water, sanitation, waste management influence hygienic condition which is essential for protecting human health. Most of the households in the villages near the project use ground water for both drinking and other uses except in Tagudone where most of the people drink purified water. As for waste disposal open burning is the dominant practice in these villages. During the field study it was found that every house has toilet in their compound.

Table 6. 8: Most prevalent diseases occurred in the villages nearby project area

| Sr. No. | Most prevalent diseases | Age group | Cases in % |
|---------|-------------------------------|--------------|--|
| 1 | Hypertension | 40 and above | 30 % |
| 2 | Diabetes | 40 and above | 15 % |
| 3 | Heart disease | 40 and above | 5 % |
| 4 | Liver diseases due to alcohol | 20 and above | 50 % |
| 5 | Diarrhoea | 5 and above | 5% |
| 6 | Tuberculosis | 20 and above | 2 % |
| 7 | Seasonal illness | Any age | 50% in rainy season. 5% in cold season and in summer |

Source: Rural Health Centre, Kyar Inn East Village Tract Hlegu Township

Infant birth and dead record is obtained as follow.

Table 6. 9: Infant birth and dead record

| Year | Number of childbirth alive | Number of child dead |
|------|----------------------------|----------------------|
| 2014 | 178 | - |
| 2015 | 186 | - |
| 2016 | 197 | - |

Source: Rural Health Centre, Kyar Inn East Village Tract Hlegu Township

Health care facilities

Not every village tract of both Hlegu Township and Hmawbi Township have rural health centre or sub-rural health centre only in Kyarinn Ashe (East) Village and Nyaung Hnitpin Village have rural health centre with midwife in service. As for other villages in study area, one mid-wife in Tagudone and Kyarinn Anauk village, two training midwife in Kyar Kan Su Village, are taking care for pregnant woman. No health care service is available in Sone Kone Village and Zone 3. Residents of villages nearby the project area rely on Kyarinn Rural Health Centre for getting over-the-counter medicines, checking blood pressure and for health advice. As for the treatment most of the time they go to Htauk Kyant for medical care which is nearer than to the towns Hlegu and Hmawbi.

The most common disease among the residents is hypertension.

6.4 Occupational Health and Safety (OHS) [Accidents and Diseases]

Occupational health and safety (OHS) refers to health, safety and welfare issues of the workers who involved in this Project. OHS includes the laws, standards guidelines and policy that are aimed at making the workplace better for workers along with co-workers and other

stakeholders. Contractors, management staff and workers are obliged to comply the occupational safety and health policy based on the Occupational Safety and Health Law (Pyidaungsu Hluttaw Law No 8 of 2019) and Factory Act.

Since the contents of the occupational safety and health policy and the goals set for occupational health and safety work are based on the assessment of potential impacts and risks, this section identifies the potential occupational hazards related to the construction, operation and closing phase of the proposed project. Subsequently appropriate mitigation measures that should be taken in order to prevent and/or minimize the impact of such hazards are suggested.

Environmental, Health, and Safety (EHS) Guidelines are the guideline that provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. Although the focus is placed on the operational phase of projects, much of the guidance also applies to construction and decommissioning activities.

The project proponent would hire contractors that have the technical capability to manage the occupational health and safety issues of their employees, extending the application of the hazard management activities through formal procurement agreements. The construction contractor will be required to submit a "Safety Management Plan" which will document the systems and processes that will be implemented during this construction phase to ensure the safety of all construction workers.

The working condition during the construction and closure should be managed by construction contractor based on the international guidelines such as EHS Guidelines by IFC.

Contractors have legal responsibilities toward themselves, their employees, sub- contractors and the general public to ensure harm does not occur.

6.5 Potential Impacts

The prediction and analysis of the health impacts of the proposed project is based on compliance with World Bank Safeguards as well as World Bank's Environment, Health and Safety guidelines and professional judgment. The followings are envisaged as potential impacts.

- Impacts on occupational health and safety which might cause **by construction work** of the Project **and closing work** of the Project
- Impacts on occupational health and safety which might cause during **operation work** of the Project

6.5.1 Impacts on occupational health and safety which might cause by construction work and closing work of the Project

Construction workers are one exposed to physical, chemical, biological and ergonomic risk factors than workers in other industries. During construction and decommissioning activities of the Project there can be health consequences from exposures to environmental threats including air quality, elevated noise, and water quality within the site can affect the workers. Because of intensive engineering and construction activities construction workers are likely to have accidental injuries and hazards as a result of handling hazardous waste.

Assessment of impact significance is described in Chapter 5 section 5.3.3. Anticipated health impacts on workers during construction and decommissioning are described in table 7.10.

6.5.2 Expected Mitigation Measures for Occupational Health and Safety (OHS)

According to Factories Act (1951) if there are more than 150 workers first aid supplies should be available and have someone who has a valid certificate in first-aid training available at the worksite. Additionally, factories with more than 250 workers shall have a

dispensary run by a certified nurse. The essential mitigation measures prerequisite to prevent potential impacts and to promote general health of the workers are explained.

According to The Factories Act, 1951, section 47. sub – section (3), in every factory wherein more than one hundred and fifty workers are employed there shall be provided and maintained a clinic of the prescribed dimension, containing the prescribed equipment, and shall be kept under the supervision of such medical officer (medical doctor) and nursing staff (nurses) as may be prescribed.

On-site medical services

Concerning location of the project site, rural health centres, clinic, hospital or physician are not accessible in terms of time and distance hence it is required to provide medical services at the worksite which should be equipped with basic health care facilities. First aid should be present within workplace.

It is required to available medical personnel for advice and consultation on matters of occupational health and for prompt medical attention in case of serious injury. There must means to transport an injured person to a physician or hospital.

Management of medical waste from worksite medical service

Health care waste such as pharmaceutical waste includes expired, unused, spilt and contaminated pharmaceutical products, wastes contaminated with human tissue, blood, pathogens, disposable needle and syringe, gloves, are harmful to environment. These waste from healthcare activities service have to dispose according to the “Health Care Waste Management Guideline, 2019” published by Ministry of Health (MOH).

Periodic Medical Examination

The periodic medical examination is to monitor the health status of employee to determine its departure from normal health, so as to identify potential problem area and effectiveness of existing preventive strategies and provide preventive counselling. Pre-employment examinations are used to identify individuals believed to be at increased risk of developing occupational disease.

Regular medical examination of workers can detect abnormalities or occupational diseases at the early stage so that timely treatment can be given. Moreover, it is important to detect workers with infectious diseases and to prevent spread of disease to others. Generally, it is recommended to check every 12 months or 4 months. The purposes are;

- To detect early abnormalities and prevent workers from developing occupational diseases
- To verify the effectiveness of existing preventive strategies
- To provide occupational health education and advice to workers

Reporting of infectious disease

In detection of infectious disease and infectious disease related condition during examination responsible medical personnel must report to worker’s supervisor and Township Health Department without delay. Subsequently arrange for further treatment.

Health and safety for migrant workers

Project contractors might hire migrant workers from outside the township. Because migrant workers are employed outside their home town the company may need to provide the labour camp (accommodation) for them. The labour camp should be safe, hygienic and comfortable. Sanitation facilities should be located conveniently, meeting minimum standards of health and hygiene. For health and safety, measures should be taken to prevent the spread of diseases, fire safety measures and security to protect workers and their belongings. Inspection of premises should be frequent. For the workers who bring their family along, the lodging arrangement should be considered for the families.

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Table 6. 10: Impact on occupational health and safety during construction phase and closing phase

| Category | Source | Health impact | Significance level of Impact |
|--|---|---|------------------------------|
| Physical Environment | | | |
| Air pollution including dust emission | Dust arising from the construction sites and labour camps while <ul style="list-style-type: none"> - demolition of existing buildings - drilling earthworks - vehicle movement on unpaved surfaces - release of engine emissions from construction equipment and vehicles | Lengthy exposure of workers to air pollutants raises the respiratory diseases risks including asthma, chronic obstructive pulmonary ailments, pneumoconiosis, allergies and lung cancer | 4 (Medium) |
| Noise and vibrations | Noise and vibrations will mainly result from use of heavy equipment including bulldozers, graders, piling, and dump trucks during site preparation and construction activities. | Elevated noise level can lead to temporary or permanent hearing damage and can impair workers' efficiency. It can also lead to accidents due to limited speech communication, misunderstanding oral instructions and masking the sounds of approaching danger or warnings. | 4 (Medium) |
| | Operating heavy machinery and vehicles can cause whole-body vibration. | Hand-arm vibration diseases normally result from the use of powered hand-tools, which could damage the nerves and blood vessels in the hand and arm. | |
| Workers accidents and hazards during construction | | | |
| Risk of injuries and accidents | Intensive engineering and construction activities including steel erection and fastening, metal grinding and cutting, scaffolding, concrete work, piling, erection and welding, electricity using, traffic accidents, handling of heavy-duty machines etc. Accidents and injuries occur due to a <ul style="list-style-type: none"> - lack of knowledge and experience (unskilled workers) - lack of safety training and continuous training | Types of injuries <ul style="list-style-type: none"> - contusion or bruising, - amputation, - sunstroke, - burns, - fainting or coma, - wounds, - bleeding, - suffocation, - fractures | 4 (Medium) |

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| Category | Source | Health impact | Significance level of Impact |
|---------------------------|--|---|------------------------------|
| | <ul style="list-style-type: none"> - human errors, - machines defect or errors, - lack of proper supervision, - carelessness, - apathy and downright recklessness - poor and ineffective management at the sites lack of personal protective equipment, - unsafe work environment, <p>Types of accidents</p> <ul style="list-style-type: none"> - Falling from a height, - Getting hit with stationary equipment, hit with moving equipment, - Electric shock, - Exposure to chemicals, material handling incidents, - Car accidents | | |
| Solid waste generation | Large quantity of various kind of solid waste will attract germ-carrying pests like flies and cockroaches insect and rodent vectors | Cholera Dengue fever | 2 (Low) |
| Communicable disease | The influx of construction workers from different areas of the country could bring different infectious diseases | Sexually Transmitted Diseases (STDs) and HIV/AIDS. | 4 (Medium) |
| | Contaminated water and poor sanitation Absent, inadequate, or inappropriately managed water and sanitation services expose individuals to preventable health risks. | Transmission of diseases such as cholera, diarrhoea, dysentery, hepatitis A, typhoid Water-borne, water-based, water-related and vector-borne diseases can be spread between the workers | |
| Non-communicable diseases | Over-exertion High physical work particularly manual handling e.g., lifting, lowering, pushing and carrying), repetitive tasks. | The highest rates of musculoskeletal disorders (MSD) especially back and in lower extremities. | 4 (Medium) |

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| Category | Source | Health impact | Significance level of Impact |
|---------------------|---|---|------------------------------|
| | <p>Prolonged occupational exposure to vapours and fumes</p> <p>Tobacco use by workers (smokers) Second hand smoke Betel quid consists of tobacco</p> <p>Handling or touching toxic chemical, dangerous substances and rough materials during working hours</p> | <p>Respiratory diseases such as asthma, silicosis, asbestosis and cancer.</p> <p>Increase the risk of lung disease. Chronic obstructive pulmonary disease (COPD): Chronic bronchitis, emphysema, lung cancer, oral conditions</p> <p>Skin Diseases can cause as occupational skin problems such as dryness, redness and itching of the skin. The skin may become swollen, cracked, scaly and thickened, and blisters and occupational dermatitis may develop.</p> | |
| Psychosocial health | <p>Tight planning in budget and time of construction projects</p> <p>Work-related stress at the worksite</p> <p>Low social support from the supervisor</p> <p>Low job autonomy and skill discretion</p> <p>Workers with family members inconvenience using infrastructure e.g. health, schooling for children</p> | <p>Work-related stress and lower work ability cause stress, fatigue and burnout, depression</p> <p>Job strain-related anxiety disorders</p> <p>Stress, tension</p> | |

6.5.3 Expected Mitigation Measures against negative impact on Occupational Health and Safety in **Construction and Closure Stages**

The health related mitigation measures to prevent potential impacts and promote health in general and the expected specific mitigation measures and described in table 6.11.

Table 6. 11: Expected Specific Mitigation Measures against Negative Impact on Occupational Health and Safety in Construction and Closure Stages

| Health Impact | Mitigation Measures |
|-----------------------------|--|
| For general health | <ul style="list-style-type: none"> - To provide health care facilities and first aid within construction sites - To post emergency numbers for physicians, hospitals, and ambulances - To provide OHS training program and information of basic hazard awareness, site specific hazards, safe work practices and emergency procedure - To provide OHS orientation training to all new employees such as the basic site rules of work at on the site and of personal protection and preventing injury - To provide adequate lavatory facilities for the number of people expected to work in the facility - To provide adequate supplies and easy access of drinking water with a sanitary means - To provide temporary shelters to protect against heat stroke during working activities or for use as rest areas as needed - To promote the use of repellents, clothing, netting, and other barriers to prevent insect bites and snake bite |
| Hearing impairment | <p>No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85dB(A)</p> |
| Hand-arm vibration diseases | <p>Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure.</p> <p>Limits for vibration and action values, (i.e. the level of exposure at which remediation should be initiated) are provided by the American Conference of Governmental Industrial Hygienists (ACGIH), 2006.</p> <p>Exposure levels should be checked on the basis of daily exposure time and data provided by equipment manufacturers</p> |
| Slips and falls | <p>Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths</p> <ul style="list-style-type: none"> - Cleaning up excessive waste debris and liquid spills regularly - Locating electrical cords and ropes in common areas and marked corridors - Use of slip retardant footwear |
| Work in Heights | <p>Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labelling covers for openings in floors, roofs, or walking surfaces</p> |
| Struck by objects | <p>Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels</p> <p>Conducting sawing, cutting, grinding, sanding, chipping or chiselling with proper guards and anchoring as applicable</p> <p>Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap</p> <p>Use of temporary fall protection measures in scaffolds and out edges of</p> |

| Health Impact | Mitigation Measures |
|---|---|
| | <p>elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged</p> <p>Evacuating work areas during blasting operations, and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures</p> <p>Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes</p> |
| Rotating and Moving Equipment | <p>Designing machines to eliminate trap hazards and ensuring that extremities are kept out of harm's way under normal operating conditions.</p> <p>Plan and segregate the location of vehicle traffic, machine operation, and walking areas, and control vehicle traffic through the use of one-way traffic routes, establish speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic.</p> <p>Ensure the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and train workers to verify eye contact with equipment operators before approaching the operating vehicle.</p> <p>Ensure moving equipment is outfitted with audible back-up alarms</p> <p>Use inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and secure loads when lifting them to higher job-site elevation</p> |
| Communicable disease Hepatitis HIV/AIDS Malaria Dengue Influenza | <p>Be aware of their own communicable disease vaccination and immunity status. Conduct immunization programme for workers</p> <p>Report communicable disease exposures to their employer</p> <p>Report to Township Health Department</p> <p>All employees must receive instruction in prevention strategies and behaviour appropriate to the level of risk in their work.</p> <p>All employee communicable disease exposure incidents are to be reported to his supervisor</p> <p>Educating employees and area residents on risks, prevention and available treatment</p> <p>Promoting use of repellents, clothing, netting and other barriers to prevent insects bite</p> |
| Risk of musculoskeletal disorders | <p>Training of workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary.</p> <p>Planning work site layout to minimize the need for manual transfer of heavy loads.</p> <p>Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations.</p> <p>Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks.</p> |
| Respiratory diseases Asthma, silicosis, asbestosis and cancer. | <p>Use PPE, such as dusk masks, where dust levels are excessive</p> <p>Pouring water on road ways at site and excavated area, cutting area, filling area and compacting area will reduce rising of dust in dry season</p> <p>Workers who are required to handle hazardous materials insulation or structural elements containing asbestos and polychlorinated biphenyls (PCBs), electrical components containing mercury, corrosive, oxidizing, or reactive chemicals should be provided with specialized training and provided with, and wear, appropriate PPE (gloves, apron, splash suits, face shield or goggles, etc.).</p> |

| Health Impact | Mitigation Measures |
|---|--|
| Tobacco related lung diseases Oral diseases and condition | According to Control of Smoking and Consumption of Tobacco Product Law, (2006), arrange at the specific area where smoking is allowed. Caption and marks referring to make known the non-smoking area and specific smoking area Caption and marks referring to make known to avoid spitting betel quid sputum |
| Risk of transmission of diseases linked to contaminated water and poor sanitation | To provide adequate supplies and easy access of safe drinking water with a sanitary means To provide adequate lavatory facilities for the number of people expected to work in the facility |
| Expose to contaminated dust, soil and injurious corrosive materials | Provide adequate gloves to prevent contact To be available suitable facilities for quick drenching or flushing of the eyes and body in the work area for immediate emergency use |
| Skin Lesions | Provide skin protection creams to apply on skin Following contamination or during work breaks, hands should be washed with an appropriate hand cleanser or soap to remove all dirt and harmful contaminants from the skin, and then followed with the application of the correct protection or restore cream, specific to skin type. After work, restorative products should be applied to moisturise, nourish and condition the skin, to improve its strength and prevent it from becoming dry or damaged |
| Psychosocial health | Psychosocial risk management is among employers' obligations to assess and manage all types of risk to workers' health (Counselling). Regular reviews and incentives for supervisors to ensure workers are treated fairly Arrange for welfare of families of migrant workers, flexible work week |

6.5.4 Impacts on occupational health and safety which might cause during operation work of the Project

In the time of the tenant industrial companies start their operation, risk of occurring accidents is expected during the operation phase. Similar to construction phase the project proponents undertake the security and maintain safety preventive measures for the use of each plot for operation. Furthermore, the international regulations are installed to prevent accidents. Based on the rules and regulations the respective newly setup industrial companies have to prepare and implement appropriate mitigation measures under the specific impact assessment on their projects according to the international guidelines such as EHS Guidelines by IFC.

For the health and safety of the workers especially during the extreme weather such as heavy rainy months, each project proponent will give notification to the contractors to prevent electricity hazard at construction sites when everything is wet as well as dangerous and difficult to work. Likewise, in extreme hot season prevention of heat stroke is to consider. Additionally, the accommodation for workers should be arranged according to the project proponent of logistic, residential and commercial area in order to provide dwelling place for the workers.

Since the type of businesses or projects are varying, potential impacts of particular project would be assessed by ESIA process, and the mitigation measures would be prepared for the respective occupational risk based on their nature of operation plans and working conditions of each company.

6.5.5 *Expected Mitigation Measures against Negative Impact on Occupational Health and Safety in **Operation** Stage*

The health-related mitigation measures to prevent potential impacts and promote health in general and specific mitigation measures are listed in table 6.12.

Table 6. 12: *Expected Specific Mitigation Measures to prevent Negative Impact on Occupational Health and Safety in Operation Stage*

| Conditions | Mitigation Measures |
|------------------------------|---|
| General health | <ul style="list-style-type: none"> - To provide adequate health care facilities and first aid within work place - To provide OHS training program and information of basic hazard awareness, site specific hazards, safe work practices, and emergency procedure - To provide OHS orientation training such as to all new employees the basic site rules of work at on the site and of personal protection and preventing injury - To provide adequate lavatory facilities for the number of people expected to work in the facility - To provide adequate supplies and easy access of drinking water with a sanitary means - To provide a spacious spot to protect against heat stroke during working activities or for use as rest areas as needed - To arrange for provision of clean eating areas where workers are not exposed to the hazardous or noxious substances where there is potential for exposure to substances poisonous by ingestion of food as necessary - To promote the use of repellents, clothing, netting, and other barriers to prevent insect bites and snake bite |
| Fire Precautions | To install adequate number of equipping facilities with fire detectors, alarm systems and fire-fighting equipment and to maintain in good working order and be readily accessible. |
| Lighting | To arrange workplaces which receive natural light and are supplemented with sufficient artificial illumination to promote workers' safety and health and enable safe equipment operation to the degree feasible. To install emergency lighting of adequate intensity |
| Safe Access | To install passageways for pedestrians and vehicles within and outside buildings for easy, safe, and appropriate access To install unobstructed, unrestricted, and ready access for equipment and installations requiring servicing, inspection, and or cleaning To be in place measures to prevent unauthorized access to dangerous areas |
| Work environment temperature | To maintain the temperature at a level appropriate for the purpose of the facility in work, rest room and other welfare facilities during service hours |
| Area Signage | To mark hazardous areas and installations and materials, safety measures appropriately in accordance |
| Labelling of equipment | To label all vessels that may contain substances that are hazardous as a result of chemical or toxicological properties, or temperature or pressure as to the contents and hazard, or appropriately colour coded |
| Communicate hazard codes | To post copies of the hazard coding system appropriate place such as outside the facility at emergency entrance doors and fire |

| | |
|---|--|
| | <p>emergency connection systems</p> <p>To share information regarding the types of hazardous materials stored, handled or used at the facility proactively with emergency services and security personnel</p> |
| Electrical | <p>To mark all energized electrical devices and lines with warning signs</p> <p>To lock out and tag out devices during service or maintenance</p> |
| Industrial vehicle driving and site traffic | <p>To train and license industrial vehicle operators in the safe operation of specialized vehicles such as forklifts, including safe loading /unloading, load limits</p> <p>To establish rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures, and control of traffic patterns or direction</p> |
| Personal protective equipment (PPE) | <p>To identify and provide appropriate PPE, slip-resistant shoes that offers adequate protection to the worker, co-workers, and occasional visitors</p> <p>Proper maintenance of PPE and the instruction of proper use</p> |

6.6 Community Health and Safety

During the implementation of construction, operation, and closing activities, community health and safety issues will need to be taken into consideration. Community health and safety is to protecting local communities from hazards caused and or exacerbated by Project activities equipment and infrastructure. This section presents the predicted potential impacts for community health and safety by assessing the community health and safety during **construction / operation / and closing phase** with the consideration of work plan of those three phases.

During the construction / closing phases Project sites can be dangerous places often since there are functioning of large machinery, heavy objects and moving vehicles. Public can get injuries by tools and materials falling outside the site boundary, falling into trenches and being struck by moving vehicles. A secure fence can help to prevent people and children from entering the site and prevent particular objects from escaping.

Community health can be affected by air pollution, noise and vibration accidents, and solid waste generation including hazardous materials from Project site.

Air quality results from physical environment baseline data collection showed the emission of parameters PM₁₀ and PM_{2.5} were higher than reference value in dry season while the same parameters measured in rainy season was lower than the reference value (section 4.11.1.1.4). Likewise, SO₂ concentration in the air was higher than the reference value. However, health effects in the community with lung problems and irritation to the skin and mucous membranes of the eyes, nose, and throat due to SO₂ exposure and air pollution is unknown.

Sound level was measured as physical environment baseline data in terms of Maximum Sound Pressure Level (Lmax) and the Equivalent Continuous Sound Level (Leq). The results show the sound level at receptor like monastery and residential area is lower than the reference level (section 4.11.1.1.4). It can be assumed that the residents of study area have acoustical comfort. Hence, mitigation measures should be carried out to protect people from harmful effects of noise generated by Project activities.

Improper waste disposal and management causes air soil and water pollution. Indiscriminate dumping of wastes contaminates surface and ground water supplies. However, the proposed project will be implementing a Solid Waste Management System which enables the protection of human health and reducing environmental pollution.

Road traffic safety is unlikely to be affected because during construction and closing phases a few traffic congestions may be occurred by vehicles of construction site only at the entry and exit of industrial zone.

Labour influx can have positive effects in local community such as increased opportunities for local businesses. At the same time there can be increased risk of communicable diseases on local community. Influx of people might an introduction of vector related diseases, such as malaria and dengue, the spread of infectious diseases, such as HIV, AIDS; syphilis, tuberculosis; epidemic diseases such as the H1N1 influenza and unwanted pregnancies.

Conflicts and tension may arise between the local community and the construction workers which may be related to religious, cultural or ethnic differences. The living environment of local community is expected to be disturbed and lose their comfort by migrated workers in case they stay in and around the local community. Without paying attention to local community alcohol, drug abuse, waste disposal practice can cause worker-community conflict.

For the purpose of minimizing risks and disturbance in the local community mitigation measures should be planned and implemented based on the international guidelines such as the EHS Guidelines by IFC by the construction contractors during the construction and closing phase and by each tenant companies (projects) during their operation phase. Potential health impacts, health risks and mitigation measures are shown in table 6.13 and expected mitigation measures are in table 6.14.

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Table 6. 13: Impact on Community Health and Safety during construction / operation / and closing phase

| Category | Source | Health impact/ health risk | Significance level of Impact |
|---------------------------------------|--|--|------------------------------|
| Air pollution including dust emission | Dust arising from the construction activities - demolition of existing buildings - drilling earthworks - vehicle movement on unpaved surfaces - release of engine emissions from construction equipment and vehicles | Lengthy exposure to air pollutants raises the respiratory diseases risks including asthma, chronic obstructive pulmonary ailments, pneumoconiosis, allergies and lung cancer | 2 (Low) |
| Noise and vibrations | Noise and vibrations will mainly result from use of heavy equipment including bulldozers, graders, piling, and dump trucks during site preparation and construction activities. | Cardiovascular disease (CVD), Cognitive impairment, sleep disturbance and annoyance | 2 (Low) |
| Risk of injuries and accidents | At the active construction sites in project area due to increased traffic and movement of heavy machinery communities posing safety risks to residents. Tools and materials falling outside the site boundary. Falling into trenches. Being struck by moving vehicles. | Types of injuries - contusion or bruising, - amputation, - fractures | 2 (Low) |
| Solid waste generation | Large quantity of various kind of solid waste will attract insect and rodent vectors | Cholera, dengue fever | 2 (Low) |
| Hazardous substances | Use or disposal | Cause ill- health effects when hazardous substances are inhaled, swallowed or come into contact with skin or eyes. | 2 (Low) |
| Communicable disease | The influx of construction workers from different areas of the country- Overcrowded or camp-based living conditions could bring different infectious diseases | Sexually Transmitted Diseases (STDs) and HIV/AIDS, tuberculosis. Water-borne, water-based, water-related and vector-borne diseases can be increased | 2 (Low) |
| Psychosocial health | The influx of construction workers can result higher rates of violence, injury, alcohol and drug consumption. | Mental health disorders and psychosocial problems can be arising from conflict. Irritability and anger can cause mental stress | 2 (Low) |

Table 6. 14: Expected Mitigation Measures against Negative Impact on Community Health and Safety during construction / operation / and closing phase

| Health risk | Mitigation Measures |
|--|--|
| Respiratory diseases risks | <p>Use of specially trained personnel to identify and selectively remove potentially hazardous materials in building elements prior to dismantling or demolition including, for example, insulation or structural elements containing asbestos and polychlorinated biphenyls (PCBs), electrical components containing mercury.</p> <p>Pouring water on roadways at site and excavated area, cutting area, filling area and compacting area will reduce rising of dust in dry season</p> |
| Cardiovascular disease (CVD), Cognitive impairment, sleep disturbance and annoyance due to noise | <p>The construction activities will be restricted in night times.</p> <p>Use quieter equipment, modifying existing old equipment, install barrier protection</p> |
| Injuries and accidents [General site hazards] | <p>Restricting access to Project site through administrative control.</p> <p>Define site boundaries clearly and physically with suitable fencing, signage, and communication of risks to the local community</p> <p>To ensure objects from the site cannot fall outside the boundary e.g. install netting</p> <p>Removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials</p> |
| Ill- health effects due to hazardous substances contact with skin or eyes | <p>Use less hazardous materials if possible, e.g. water rather than solvent-based paints</p> <p>Limit the amount of flammable or hazardous substances handled or used on site at any one time</p> <p>Decant hazardous materials into suitable and properly marked containers</p> <p>Collect and dispose of empty containers and store all hazardous substances in suitable container or in secure compounds when not in use</p> |
| Traffic safety | <p>Incorporate transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public.</p> |
| Psychosocial health | <p>Establish a worker code of conduct that requires respect for local communities, appropriate behaviour during and outside working hours, prohibitions on carrying knives, or other weapons, prohibitions on the possession or consumption of alcohol and drugs, and especially in remote areas, on hunting, collecting animals or plants, and enforcement of penalties in the event of worker-community conflicts, petty crime, etc.</p> <p>Put in place zero-drug and alcohol tolerance policies</p> |

Despite the location of the Project being in livestock and agriculture Zone 3 settlements are not in the vicinity. According to survey, it is noted that total of 350 houses are scattered in Zone 1734 acre. Hence, potential community health impacts arising from the Project during three phases are considered to be low. With the recommended mitigation measures provided in HIA the Project will not have substantial effect on community health.

6.7 Cumulative Impact and Residual Impact

KMIC industrial complex project is designed for large scale, middle scale and small scale industrial compounds including inside infrastructure such as residential, commercial buildings, industrial area, gas station, recreation park, main roads, intersection roads, drainage, overhead electricity installation, plantation of green spaces, electricity sub-station, wastewater treatment plant, and water purification plant. The industrial complex is expected to accommodate up to 200 business in CMP garment productions, food and beverage processing, logistics, construction materials, and assembly to operate.

The Cumulative Impact Assessment is the process of assessing potential effects on community of neighbouring area of the proposed project caused by the combination of known planned projects in the industrial complex. Currently, there is lack of information on definite implementation plans, type and size of the projects and technical issues of future developments. Therefore, cumulative health impact is unable to assess.

However, assumption can be made that creation of job opportunities will cause population influx in the surrounding area. There will be a positive effect on local business as a result of the presence of construction workers using local facilities during the construction phase. Increase job opportunities for the local people will promote wellbeing.

Residual impacts of proposed project upon Community Health and Safety would be very limited.

6.8 Emergency Response Plan and Training

An emergency response plan is designed to help construction, operation, demolishing of project address various emergency situations and develop systems for preventing accidents, provide appropriate mechanisms for minimizing risk, loss and damage resulting from such accidents.

Nature of emergency may be natural or manmade. The emergencies to plan for may include fire, explosion, medical emergency, accidents, incidents with hazardous chemicals, and natural disasters. Anticipation of what kind of emergencies could happen can properly be planned and had the equipment, the people, the training that need to deal with whatever particular emergencies are.

Emergency response training is essential to offer workers a chance to learn how to behave and response to emergency situations. This type of training is indeed very crucial as it can be the difference between the life and death of an individual in the workplace. The professional trainers should be commissioned to teach employees the procedures they should follow in the event of an emergency. General training for employees must cover

- Individual roles and responsibilities;
- Threats, hazards, and protective actions including flammable materials, toxic chemicals, radioactive sources, or water-reactive substances
- Notification, warning, and communications procedures;
- Means for locating family members in an emergency;
- Emergency response procedures;
- Evacuation, shelter, and accountability procedures;
- Location and use of common emergency equipment; and
- Emergency shutdown procedures
- First-aid procedures, including protection against bloodborne pathogens;
- Respiratory protection, including use of an escape-only respirator; and
- Methods for preventing unauthorized access to the site

Exercises and drills may be conducted to practice all or critical portions (such as evacuation) of the emergency plan. A thorough and immediate review after each exercise, drill, or after

an actual emergency will point out areas that require improvement. Knowledge of individual responsibilities can be evaluated through paper tests or interviews.

Medical assistance

First aid must be available within 3 to 4 minutes of an emergency. Worksites more than 3 to 4 minutes from an infirmary, clinic, or hospital should have at least one person on-site trained in first aid (available all shifts), have medical personnel readily available for advice and consultation, and develop written emergency medical procedures. It may help to coordinate an emergency action plan with the outsider responders such as the fire department and hospital emergency room.

Communication system should be established which include contact information to communicate with managers, employees, families, outside agencies, and police department, township administrative department. Specific duties, responsibilities, authority, and resources must be clearly defined and contact numbers of the police, fire department, ambulance service, rescue squad, company fire brigade, and the first aid team must be available on-site.

6.9 Public Health and Safety Monitoring and Management Plan

The following table outlines the key monitoring requirements identified through EIA process to monitor the health and safety performance of the project.

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Table 6. 15: Health and Safety Monitoring and Management Plan

| Health Impact/ Health Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|---|---|--|-------------------|-------------------------------------|
| | | Construction phase | Operation phase | |
| General Health | To provide health care facilities and first aid To post emergency numbers for physicians, hospitals, and ambulances | Contractor | Project developer | Monthly |
| | To provide adequate lavatory facilities for the number of people expected to work in the facility | Contractor | Project developer | Weekly |
| | To provide OHS training program and information of basic hazard awareness, site specific hazards, safe work practices and emergency procedure To provide OHS orientation training to all new employees such as the basic site rules of work at on the site and of personal protection and preventing injury To provide temporary shelters to protect against heat stroke during working activities or for use as rest areas as needed | Contractor | Project developer | Monthly |
| | To provide adequate supplies and easy access of drinking water with a sanitary means | Contractor | Project developer | Daily |
| Respiratory diseases risks Asthma, Chronic obstructive pulmonary ailments, Pneumoconiosis, Allergies, Lung cancer | Pouring water on road ways at site and excavated area, cutting area, filling area and compacting area will reduce rising of dust in dry season Provide appropriate PPE (gloves, apron, splash suits, face shield or goggles, dusk masks etc.) to wear. | Contractor | - | Daily |
| | Provide specialized training for workers who are required to handle hazardous materials insulation or structural elements containing asbestos and polychlorinated biphenyls (PCBs), electrical components containing mercury, corrosive, oxidizing, or reactive chemicals. | Contractor | Project developer | Monthly |
| Temporary or permanent hearing damage | Provide hearing protective devices at sound level 85 dB (A) and more. | Contractor | Project developer | Daily |
| Hand-arm vibration diseases | Control through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure. Limits for vibration and action values | Contractor | Project developer | Daily |

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| Health Impact/ Health Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|---|---|--|-------------------|-------------------------------------|
| | | Construction phase | Operation phase | |
| | Exposure levels should be checked on the basis of daily exposure time and data provided by equipment manufacturers. | | | |
| Injuries / accidents / exposure to chemicals | [Ref: Detail in HIA Chapter Table 6.11] Adequate preventive measures from negative factors such as fire precautions, lighting, safe access, work environment temperature, area signage, labelling of equipment, communicate Hazard codes, electrical. To establish rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures, and control of traffic patterns or direction. To identify and provide appropriate PPE, use of slip retardant footwear that offers adequate protection to the worker, co-workers, and occasional visitors. Proper maintenance of PPE and the instruction of proper use. Provide adequate gloves to prevent direct contact Provide restorative creams for skin contact To be available suitable facilities for quick drenching or flushing of the eyes and body in the work area for immediate emergency use | Contractor | Project developer | Daily |
| Prevention infectious of diseases Sexually Transmitted Diseases (STDs) HIV/AIDS Influenza Hepatitis, Malaria, Dengue, Cholera, Diarrhoea Dysentery | To provide surveillance for worker's health Prevention of illness among workers by undertaking health awareness and education initiatives Conduct immunization programme (Hepatitis B, influenza and tetanus) | Contractor | Project developer | 6 monthly |
| | Getting rid of stagnant water/ impounded water to prevent larva growth Check for mosquito breeding places (unused containers and building wastes in the worksite etc.) and apply insecticides or anti-mosquito oil every week to all stagnant water and water-bearing containers at ground level and on upper floors. | Contractor | Project developer | Daily |

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| Health Impact/ Health Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|---|---|--|-------------------|---|
| | | Construction phase | Operation phase | |
| Typhoid | Practice proper waste disposal To provide adequate supplies and easy access of safe drinking water with a sanitary means | | | |
| | To promote the use of repellents, clothing, netting, and other barriers to prevent insect bites and snake bite To provide adequate lavatory facilities for the number of people expected to work in the facility | Contractor | Project developer | Monthly |
| Heat stroke | To provide temporary shelters to protect against heat stroke during working activities or for use as rest areas as needed | Contractor | Project developer | Monthly |
| Risk of musculoskeletal disorders | Training of workers in lifting and materials handling techniques in construction, operation and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary. Planning work site layout to minimize the need for manual transfer of heavy loads. Selecting tools and designing workstations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations. | Contractor | Project developer | 6 monthly |
| | Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks. | Contractor | Project developer | Weekly |
| Tobacco related lung diseases Prevent second-hand smoke Oral diseases and condition | Arrange at the specific area where smoking is allowed. Caption and marks referring to make known the non-smoking area and specific smoking area Caption and marks referring to make known to avoid spitting betel quid sputum | Contractor | Project developer | Monthly |
| Stress in the Workplace | To set realistic expectations of how long a project will take and not overpromise owners. | Contractor | Project developer | Once (Design Stage) |
| | Appoint well-trained supervisors in planning as well as how to identify, reduce stress on the job and be able to cope with stress and communicate well when listening | Contractor | Project developer | Once at the construction / operation starts |

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| Health Impact/ Health Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|---|---|--|-------------------|-------------------------------------|
| | | Construction phase | Operation phase | |
| | to a worker's concerns Arrange for welfare of families of migrant workers, flexible work week | | | |
| | Use toolbox talks or lunch meetings to discuss stress and encourage workers to open up about the challenges they are facing and pressure them. | Contractor | Project developer | Monthly |
| Psychosocial problems arising from conflicts between workers and with community | Establish a worker code of conduct that requires respect for local communities, appropriate behaviour during and outside working hours Put in place zero-drug and alcohol tolerance policies | Contractor | Project developer | weekly |
| | | | | |

| Impact on Occupational Safety/ Safety Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|--|--|--|-----------------|-------------------------------------|
| | | Construction phase | Operation phase | |
| Injuries and accidents [General site hazards] | Restricting access to Project site through administrative control. Define site boundaries clearly and physically with suitable fencing, signage, and communication of risks to the local community To ensure objects from the site cannot fall outside the boundary e.g., install netting Removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small | Contractor | - | Daily/ Weekly |

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| Impact on Occupational Safety/ Safety Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|--|---|--|-------------------|-------------------------------------|
| | | Construction phase | Operation phase | |
| | confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials | | | |
| Slips and Falls | <p>Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths</p> <ul style="list-style-type: none"> - Cleaning up excessive waste debris and liquid spills regularly - Locating electrical cords and ropes in common areas and marked corridors - Use of slip retardant footwear | Contractor | - | Daily |
| Work in Heights | Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labelling covers for openings in floors, roofs, or walking surfaces | Contractor | Project developer | Daily |
| Struck by objects | <p>Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels</p> <p>Conducting sawing, cutting, grinding, sanding, chipping or chiselling with proper guards and anchoring as applicable</p> <p>Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap</p> <p>Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as handrails and toe boards to prevent materials from being dislodged</p> <p>Evacuating work areas during blasting operations, and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures</p> | Contractor | - | Daily |

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| Impact on Occupational Safety/ Safety Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|--|---|--|-------------------|-------------------------------------|
| | | Construction phase | Operation phase | |
| | Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes | | | |
| Rotating and Moving Equipment | <p>Designing machines to eliminate trap hazards and ensuring that extremities are kept out of harm's way under normal operating conditions.</p> <p>Plan and segregate the location of vehicle traffic, machine operation, and walking areas, and control vehicle traffic through the use of one-way traffic routes, establish speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic.</p> <p>Ensure the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and train workers to verify eye contact with equipment operators before approaching the operating vehicle.</p> <p>Ensure moving equipment is outfitted with audible back-up alarms</p> <p>Use inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and secure loads when lifting them to higher job-site elevation</p> | Contractor | Project developer | Daily |
| Personal protective equipment (PPE) | <p>To identify and provide appropriate PPE, slip-resistant shoes that offers adequate protection to the worker, co-workers, and occasional visitors</p> <p>Proper maintenance of PPE and the instruction of proper use</p> | Contractor | Project developer | Daily |
| Traffic safety | Incorporate transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. | Contractor | Project developer | Weekly |
| Fire Precautions | To install adequate number of equipping facilities with fire detectors, alarm systems and fire-fighting equipment and to maintain in good working order and be readily | Contractor | Project developer | Monthly |

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| Impact on Occupational Safety/ Safety Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|--|--|--|-------------------|-------------------------------------|
| | | Construction phase | Operation phase | |
| | accessible. | | | |
| Lighting | To arrange workplaces which receive natural light and are supplemented with sufficient artificial illumination to promote workers' safety and health and enable safe equipment operation to the degree feasible. To install emergency lighting of adequate intensity | Contractor | Project developer | Monthly |
| Safe Access | To install passageways for pedestrians and vehicles within and outside buildings for easy, safe, and appropriate access To install unobstructed, unrestricted, and ready access for equipment and installations requiring servicing, inspection, and or cleaning To be in place measures to prevent unauthorized access to dangerous areas | Contractor | Project developer | Monthly |
| Work environment temperature | To maintain the temperature at a level appropriate for the purpose of the facility in work, rest room and other welfare facilities during service hours | Contractor | Project developer | Monthly |
| Area Signage | To mark hazardous areas and installations and materials, safety measures appropriately in accordance | Contractor | Project developer | Monthly |
| Labelling of equipment | To label all vessels that may contain substances that are hazardous as a result of chemical or toxicological properties, or temperature or pressure as to the contents and hazard, or appropriately colour coded | Contractor | Project developer | Monthly |
| Communicate hazard codes | To post copies of the hazard coding system appropriate place such as outside the facility at emergency entrance doors and fire emergency connection systems To share information regarding the types of hazardous materials stored, handled or used at the facility proactively with emergency services and security personnel | Contractor | Project developer | Monthly |
| Electrical | To mark all energized electrical devices and lines with warning signs To lock out and tag out devices during service or | Contractor | Project developer | Monthly |

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| Impact on Occupational Safety/ Safety Risk | Mitigation measures and management plan | Responsibility for mitigation monitoring and maintenance | | Recommended frequency of monitoring |
|---|---|--|-------------------|-------------------------------------|
| | | Construction phase | Operation phase | |
| | maintenance | | | |
| Industrial vehicle driving and site traffic | To train and license industrial vehicle operators in the safe operation of specialized vehicles such as forklifts, including safe loading /unloading, load limits To establish rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures, and control of traffic patterns or direction | Contractor | Project developer | Monthly |
| | | | | |

6.10 Noise Control Measures for Night Work

The noise control for night works which can annoy the community living the surrounding of the project area includes elimination or substitution of noise sources, collective control measures through engineering and work organisation, and communication with the community living nearby.

Elimination

Elimination is a process that eradicates the noise source and it is the most effective way to prevent risks to the community living nearby and workers as well. Examples of noise elimination will include avoiding the use of noisy processes or machinery, elimination of impacts between hard objects or surfaces, outsourcing the noisy work processes and moving the noisy operations away from other work activities.

Advance planning and introducing a suitable purchasing or hire policy are essential to reducing the level of noise at work. Before acquiring new machinery, its noise levels would be considered and this can be achieved by liaising with and obtaining information from the manufacturer or supplier of the plant or machinery. This may include installation instructions, maintenance arrangements and likely noise levels under the specific conditions in which the machinery will be operated.

Substitution

Substitution is a process of replacing noisy machinery or equipment with quieter alternatives. When elimination is not possible, substitution of the noisy machinery or equipment for quieter ones may be the next-best alternative to protect community from exposure to noise.

The following table provides some exemplar substitution methods that will be adopted as many as possible to reduce the level of noise in a workplace.

| Noise source / process | Alternative source / process |
|-----------------------------|---|
| Pneumatic tools | Electrical tools |
| Throwing | Positioning gently |
| Solid wheels | Rubber tyres |
| Metal gears | Plastic gears |
| Metal bearings | Fibre bearings |
| Metal chutes and containers | Rubber or plastic chutes and containers |
| Forging | Pressing |
| Hammering | Gluing |
| Stapling | Clipping |
| Rollers | Conveyor belts |
| Chipping | Grinding |

Engineering controls

Engineering controls are all about making changes to processes, machinery or equipment so that the community and workers are exposed to less noise. For example, using screens, barriers, enclosures and absorbent materials help to reduce community's noise exposure.

Some engineering measures that would be adopted include:

- Separating the noisy area from other workspaces by a sound-reducing partition;
- Enclosure of noisy machinery with sound-absorbing material;

- Avoiding metal-to-metal contact by using plastic bumpers;
- Using absorbent lining on surfaces to cushion the fall or impact of objects fitting sound-absorbing materials to hard reflective surfaces;
- Using conveyor belts rather than rollers;
- Using acoustical silencers in intake and exhaust systems;
- Using rubber mounts to isolate vibrating noise source to separate it from the surface it's mounted to maintaining optimum speed of machinery or its particular components;
- Repairing and replacing loose rotating parts, worn bearings and gears;
- Using sound-absorbing material on walls, ceiling and floors to reduce the noise level due to reverberation;
- Undertaking regular maintenance on equipment.

Administrative controls

Administrative controls are the way work is organized to reduce either the number of community (including workers of the project) who are exposed or the length of time they are exposed to noise. These would be used when it is not possible to reduce noise exposure through elimination, substitution or engineering noise control measures.

Some administrative measures include:

- Identifying hearing protection zones and clearly sign-posting noisy areas;
- Increasing the distance between noise sources and community;
- Organising schedules so that noisy tasks are performed when as few people as possible are present;
- Limiting the noisy work in night time and avoiding night shift as much as possible;
- Providing sufficient information, instructions and training to the workers for the proper use of work equipment.

Community notification

- Contact potentially noise affected neighbours at the earliest possible time before any work begins.
- Inform potentially noise affected neighbours about the nature of the work and the duration of noisier activities.
- Describe any noise controls, such as walls to be built first that will reduce noise, temporary noise walls, or use of silenced equipment.
- Keep potentially noise affected neighbours up to date on progress.
- Provide contact details on a board at the front of the project and maintain complaints register suited to the scale of works.
- Ask about any concerns that potentially noise affected neighbours may have and discuss possible solutions.

6.11 Control Measures for Electrical Hazards

The guidelines for controlling and avoiding electrical hazards are developed. The purpose of these guidelines is to require precautions to be taken against the risk of death or personnel injury from electricity in work activities. These guidelines also protect the community living nearby from the electrical hazards caused by the project.

Systems, work activities and protective equipment

- Systems must, at all times, be of such construction as to prevent danger. Construction covers the physical condition, arrangement of components and design of the system and equipment.
- All systems must be maintained so as to prevent danger.
- Every work activity, including operation, use and maintenance or work near a system, shall be carried out in a way which prevents danger.
- Protective equipment shall be suitable, suitably maintained and used properly.
- No electrical equipment will be put into use where its strength and capability may be exceeded in such a way as may give rise to danger, in normal transient or fault conditions

Electrical equipment which may be exposed to:

- ✓ Mechanical damage;
- ✓ The effects of weather, natural hazards, temperature or pressure;
- ✓ The effects of wet, dirty, dusty or corrosive conditions;
- ✓ Any inflammable or explosive substances including dusts, vapours or gases

shall be so constructed and protected that it prevents danger.

Depending on the type of work and the risks involved, the following PPE would be considered.

Face Protection – Use of a suitably arc rated full face shield will be appropriate when working where there is potential for high current and arcing.

Eye Protection – Metal spectacle frames would not be worn.

Gloves – Use gloves insulated to the highest potential voltage expected for the work being undertaken. Leather work gloves will be used for de-energised electrical work.

Clothing – Use non-synthetic, flame-resistant clothing of non-fusible material. Clothing made from conductive material or containing metal threads would not be worn.

Footwear – Use non-conductive footwear (e.g. steel toe cap boots or shoes manufactured to a suitable standard).

Safety belt/harness – Safety belts and harnesses would be checked and inspected each time before use with particular attention being paid to buckles, rings, hooks, clips and webbing.

Insulation, protection and placing of conductors

All conductors in a system which may give rise to danger shall either be suitably covered with insulating material and further protected as necessary, for example, against mechanical damage, using trunking or sheathing, or have precautions taken that will prevent danger, for example being suitably placed like overhead electric power cables, or by having strictly controlled working practices.

Earthing, integrity and other suitable precautions

Precautions shall be taken, either by earthing or by other suitable means, for example double insulation, use of safe voltages and earth-free non-conducting environments.

Connection

Every joint and connection in a system shall be mechanically and electrically suitable for its use. This includes terminals, plugs and sockets.

Excess current protection

Every part of a system shall be protected from excess current, for example short circuit or overload, by a suitably located efficient means such as a fuse or circuit breaker.

Cutting off supply and isolation

There would be suitably located and identified means of cutting off (switch) the supply of electricity to any electrical equipment and also isolating any electrical equipment. The isolator would be capable of being locked off to allow maintenance to be done safely. Sources of electrical energy (accumulators, capacitors and generators) are exempt from this requirement, but precautions must be taken to prevent danger.

Work on equipment made dead

Adequate precautions would be taken to prevent electrical equipment that has been made dead from becoming live while work is carried out on or near the equipment. This will include means of locking off isolators, tagging equipment, permits to work and removing fuses.

Work on or near live conductors

No persons shall work near a live conductor, except if it is insulated, unless:

- ✓ It is unreasonable in all the circumstances for it to be dead;
- ✓ It is reasonable in all the circumstances for them to be at work on or near it while it is live;
- ✓ Suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

Working space access and lighting

Adequate working space means of access and lighting shall be provided for all electrical equipment at which or near which work is being done in circumstances which may give rise to danger. This covers work of any kind. However, when the work is on live conductors, the access space must be sufficient for a person to fall back out of danger and if needed for persons to pass one another with ease and without hazard.

Protection against contact with live overhead or buried power lines

Where possible all work likely to lead to contact with overhead power lines would be done in an area well clear of the line itself. As a general rule, vehicles, plant or equipment would be brought no closer than:

- ✓ 15 m of overhead lines suspended from steel towers
- ✓ 9 m of overhead lines supported on wooden poles

Where a closer approach is likely either the lines would be made dead or barriers erected to prevent an approach.

The following precautions will be taken when there is uncertainty about the location of underground services in an area to be excavated:

- ✓ Check for any obvious signs of underground services, for e.g. valve covers or patching of the road surface
- ✓ Ensure that the excavation supervisor has the necessary service plans and is competent to use them to locate underground services

- ✓ Ensure that all excavation workers are trained in safe digging practices and emergency procedures
- ✓ Use locators to trace any services and mark the ground accordingly. A series of trial holes would be dug by hand to confirm the position of the pipes or cables
- ✓ In areas where underground services may be present, only hand digging would be used with insulated tools. Spades and shovels would be used rather than picks and forks, which are more likely to pierce cables
- ✓ Assume that all cables are “live” unless it is known otherwise
- ✓ Hand-held power tools would not be used within 0.5 m of the marked position of an electricity cable. Collars would be fitted to the tools so that initial penetration of the surface is restricted
- ✓ Any suspected damage to cables must be reported to the persons concerned
- ✓ All exposed cables would be backfilled with fine materials such as dry sand or small gravels

Emergency procedures following an electrical incident

The emergency procedures would ensure that for a serious electrical accident, the emergency services and key personnel in the organization are notified and the emergency plan is activated. Such a plan would include the following points:

- ✓ The isolation of the electrical device that has caused the emergency by switching off and disconnecting the supply
- ✓ If electric shock is the main emergency, the victim must not be touched until there is no longer a possibility of contact with the electrical current
- ✓ If there is a fire as a result of electrical equipment malfunction, the fire procedures would also be activated
- ✓ If the emergency could affect hazardous equipment or processes, essential actions, such as emergency plant shutdown, isolation or making processes safe, would be put into action. It is important that important items such as shut-off valves and electrical isolators are easily identifiable
- ✓ Work must not resume after an emergency until a competent person has checked and declared that all electrical equipment affected by the emergency is safe and the electrical supply has been switched back on. If there are any doubts, then advice would be sought from the emergency services
- ✓ Following the incident, an investigation would take place, a report produced and submitted to the responsible persons.

Labels

1. Electrical equipment such as switchboards, panelboards, industrial control panels, motor control centers shall be field marked with the label containing the following information:
 - a. Restricted approach boundaries
 - b. Voltage
 - c. Arc flash boundaries
 - d. PPE categories
2. High-Voltage Labels and Warning Signs
Entrances to all buildings, rooms, or enclosures containing exposed live parts or exposed conductors operating at over 600 volts shall:
 - i. Be kept locked unless they are under the observation of a qualified person.
 - ii. Have a permanent and conspicuous warning sign that reads: “DANGER – HIGH VOLTAGE – KEEP OUT.”
3. Warning labels or signs are required on the following electrical equipment:

- i. Medium-voltage motor controls centers, stand-alone medium-voltage starters.
- ii. Low-voltage motor controls centers, stand-alone low-voltage starters, grouped low-voltage starters.
- iii. Medium and low – voltage switchgear.
- iv. Transformers.
- v. Panelboards above 250 V.
- vi. Stand-alone switches and circuit breakers above 250 V.

Work in substation

Work in substations shall conform to the following work practices:

- i. Follow all the guidelines and safety procedures outlined above.
- ii. Enough space shall be provided around electric equipment to allow ready and safe access to, operation and maintenance of the equipment.
- iii. Conductive fences around substation shall be grounded.
- iv. Specifically identified areas in a substation are subject to the following rules:
 - a. They shall be enclosed to minimize entry of unqualified persons.
 - b. Warning signs shall be displayed.
 - c. Entrances not under the observation of an attendant have to be locked.
 - d. Unqualified persons are not allowed to enter these areas while equipment is energized.
 - e. When any work is being done in the fenced area, all gates shall be fully opened prior to any work commencing to facilitate immediate exit if warranted.
- v. Live parts operating at more than 150 V nominal shall be guarded (by physical guards or by location) or insulated.

Competence

Where technical knowledge or experience is necessary to prevent danger, all persons must possess such knowledge or experience or be under appropriate supervision.

Training

Training is required at all levels of the organization ranging from simple on-the-job instruction to apprenticeship for electrical technicians and supervisory courses for experienced electrical engineers. First-aid training related to the need for cardiovascular resuscitation and treatment of electric burns would be available to all people working on electrical equipment and their supervisors. The community would also be invited and encouraged to join the relevant trainings related to electrical hazards.

The objectives of electrical safety knowledge trainings are for employees who have exposure to electrical hazards, i.e. shock, arc flash and arc blast, to:

- a) Be familiar with and use the company's safety-related work practices and procedural requirements intended to provide protection from the electrical hazards.
- b) Know the actual or potential hazards involved with the tasks to be performed.
- c) Identify and understand the relationship between electrical hazards and possible injury.
- d) Know how to eliminate any exposure to the hazard or how to mitigate the effects of any hazard that remains while the task is being executed.
- e) Know and realistically accept the limits of the employee's authority, knowledge and skill.
- f) Be able to identify situations that may involve unacceptable risk.

6.12 Actions for Violation of Policies, Guidelines and Control Measures

The developer (project proponent) will take full responsibility for the respective investors and contractors in complying with the established guidelines, control measures and policies. The following administrative actions are also developed for the violations of any guidelines, control measures and policies. The developer shall:

- a) send a notice to the investor and/or contractor that his/her right to operate the business is suspended if he/she breaches any conditions of the guidelines, control measures and policies.
- b) the investor and/or contractor shall be provided with the right to give explanation in relation to the notice of suspension of the right to operate the business within seven working days from the date of receiving the notice.
- c) the developer in consultation with the relevant government departments will review the explanation made by the investor and/or contractor within seven working days from the date of receiving the explanation.
- d) the review team consisting of the developer and the relevant government departmental officials after finding out that the explanation of the investor and/or contractor subject to the explanation is not reliable or relevant, cause him/her to pay for the fine or be punishable with imprisonment for a term of months or both according to the relevant Myanmar Government laws.
- e) If the investor and/or contractor breaches the policy or guideline for the second time, his/her business will be suspended, and the explanation will be asked. If the explanation made by the investor and/or contractor is not reliable or relevant, cause him/her to pay for the fine or be punishable with imprisonment for a term of months or both according to the relevant Myanmar Government laws.
- f) If the investor and/or contractor breaches the policy or guideline for the third time, his/her business will be suspended for a certain period (maximum 3 years) or closed permanently.

CHAPTER 7. CUMULATIVE IMPACT ASSESSMENT

Cumulative impacts from different projects (in combination with the project being assessed) whereby the impact may arise from the combined action of a number of different projects, in combination with the project being assessed, on a single environmental parameter (receptor/resource). This can include multiple impacts of the same or similar type from a number of projects upon the same environmental receptor/resources.

7.1 Methodology and Approach

In order to carry out the Cumulative Impact Assessment (CIA), as a methodology, the IFC's Rapid Cumulative Impact Assessment (RCIA) was adopted and the following steps were followed:

1. Identification of other existing and future private and public projects and developments;
2. Determining spatial and temporal boundaries;
3. Identification of Valued Environmental and Social Components (VECs) for which CIA will be assessed;
4. Determination of present conditions of VECs;
5. Assessing cumulative impacts and their significance on VECs; and
6. Developing mitigation measures for cumulative impacts.

The approach included following a six-step RCIA process, engaging stakeholders to get their views and making professional judgement. This assessment considered the residual impacts of the project and evaluated these alongside potential impacts from other projects/activities that may impact common resources and receptors.

7.2 Identification of other existing and future private and public projects and developments

The planned or reasonably foreseeable projects are the outside infrastructure development for this KMIC project. These outside infrastructure projects include the construction of electrical substation and installation of power line, construction of raw water intake pumping station and water purification plant, installation of water pipe line and upgrading of existing access road way to 4-lane road way with mid-island and sidewalks. These developments will be implemented by Ministry of Construction and the information about these developments are explained below.

Construction of electrical sub-station and installation of power line

A 230 kV (conductor size of 605 MCM) transmission line of approximately 7.84 km will be installed to KMIC project area from the connection point of Towers 133 and 134 of Kamarnat – Myaungtagar line. Throughout the route of electricity transmission line, some areas of Acacia mangium plantation, some squatter houses living on either side of the access road to KMIC project, some fish farms, pomelo orchard, road will be passed by the overhead transmission line. A 230kV substation with two 100 MVA transformers will be built in the KMIC. The substation will be equipped with 230kV Gas Circuit Breaker (GCB) (1st), circuit Breaker 33kV (2nd), and Gas Insulated Switch(GIS).

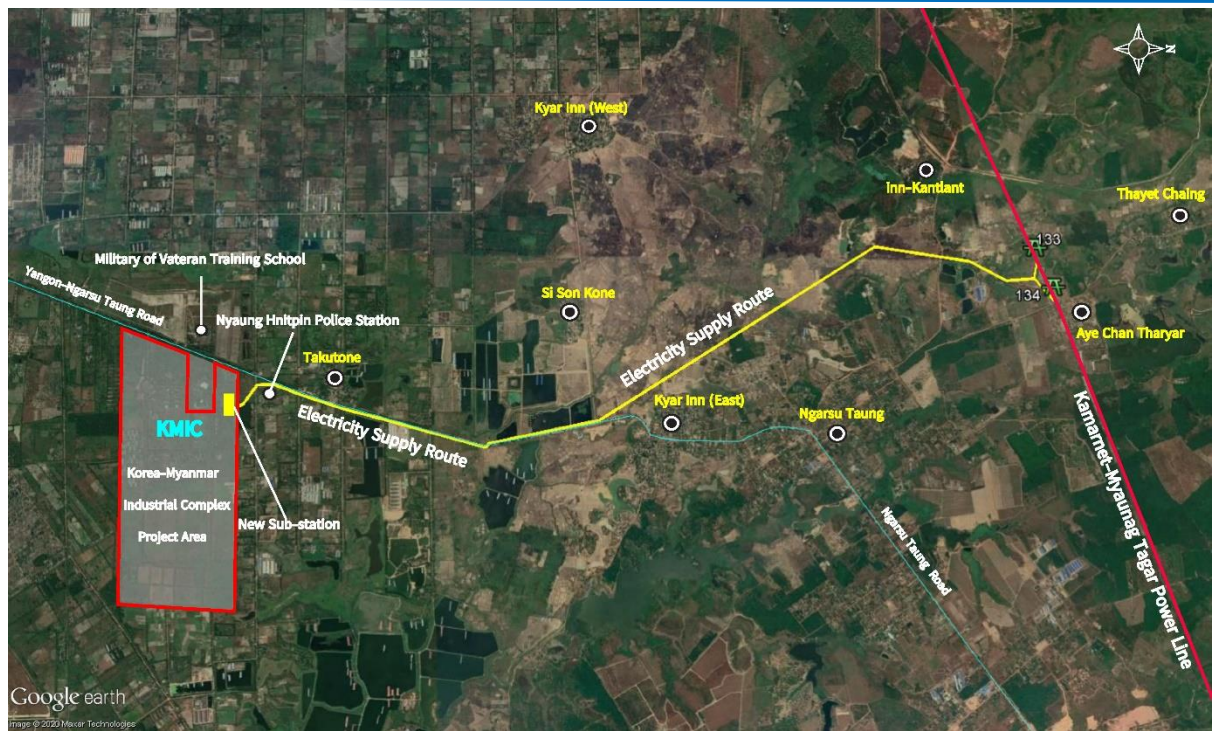


Figure 7. 1: Electrical Sub-station Location and Power Line Route

Construction of raw water intake pumping station and water purification plant, installation of water pipe line

The water supply system will include the raw water intake pumping station, raw water transmission pipeline, and water treatment plant. The raw water will be supplied from Kalihtaw dam to KMIC project and the dam is under the management of Irrigation and Water Utilization Department (Yangon Region) of the Ministry of Agriculture, Livestock and Irrigation (MOALI). The Irrigation and Water Utilization Department (Yangon Region) has entered into an agreement with Ministry of Construction to supply water for this project.

The capacity ($Q=11,000 \text{ m}^3/\text{d}$) and pump size $3.90 \text{ m}^3/\text{min} \times 31 \text{ mH} \times 3 (1) \text{ EA}$ of raw water intake pumping station will be built near Kalihtaw dam.

The raw water transmission pipeline of diameter 450 mm and length 18.27 km from pumping station to water treatment plant will be installed. Therefore, the location of water transmission pipeline will be along the irrigation channel (which passes through Inn Ka Lant and Tha Yat Thone Pin villages in Hlegu township), along M – 1 road and C – 8 road in Agriculture and Livelihood zone (2) and passes through Takutone village near the proposed KMIC project site. The water pipe will be laid along the maintenance road and public road next to new agricultural waterway.

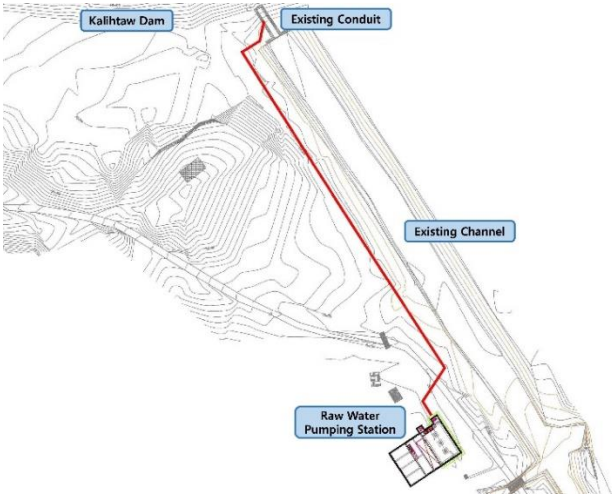
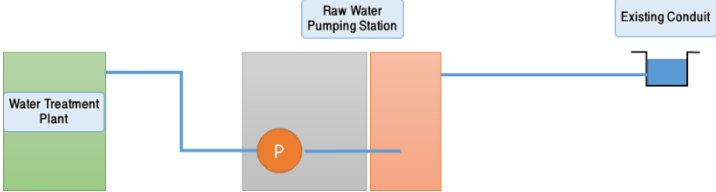
The water treatment (purification) plant having capacity of $Q = 10,000 \text{ m}^3/\text{d}$ (Industrial water $Q = 8,000 \text{ m}^3/\text{day}$ and domestic water (non-potable water for toilet, washing and car washing) $Q = 2,000 \text{ m}^3/\text{d}$) will be treated by using treatment process of combining Coagulation and flocculation, sedimentation, rapid sand filtration and disinfection. The water treatment plant will be located on the left and above the KMIC site. The area for the treatment plant is approximately 1.14 ha.

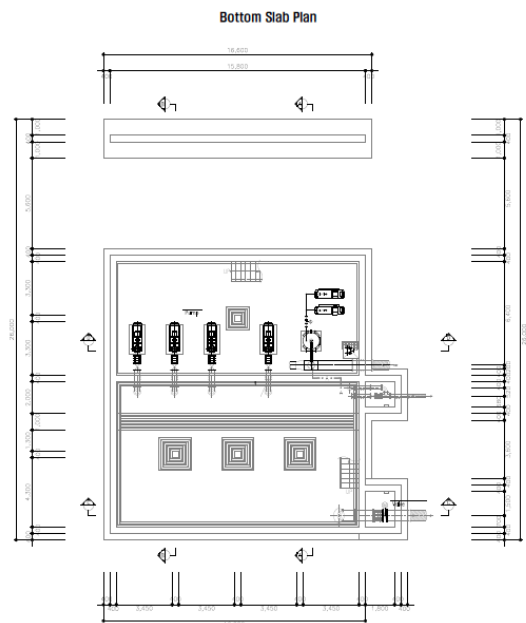
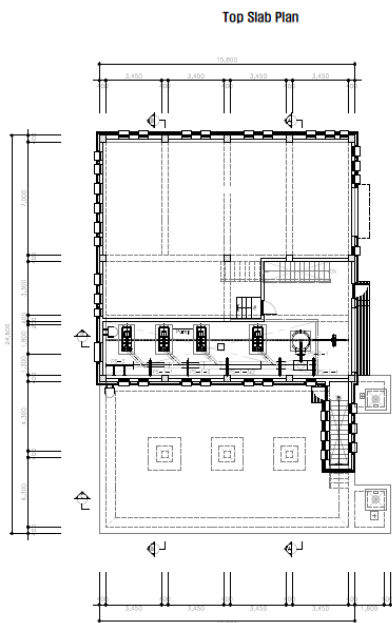


Figure 7. 2: Water purification plant location and installation of water pipe line route

Details of Raw Water Intake Pumping Station

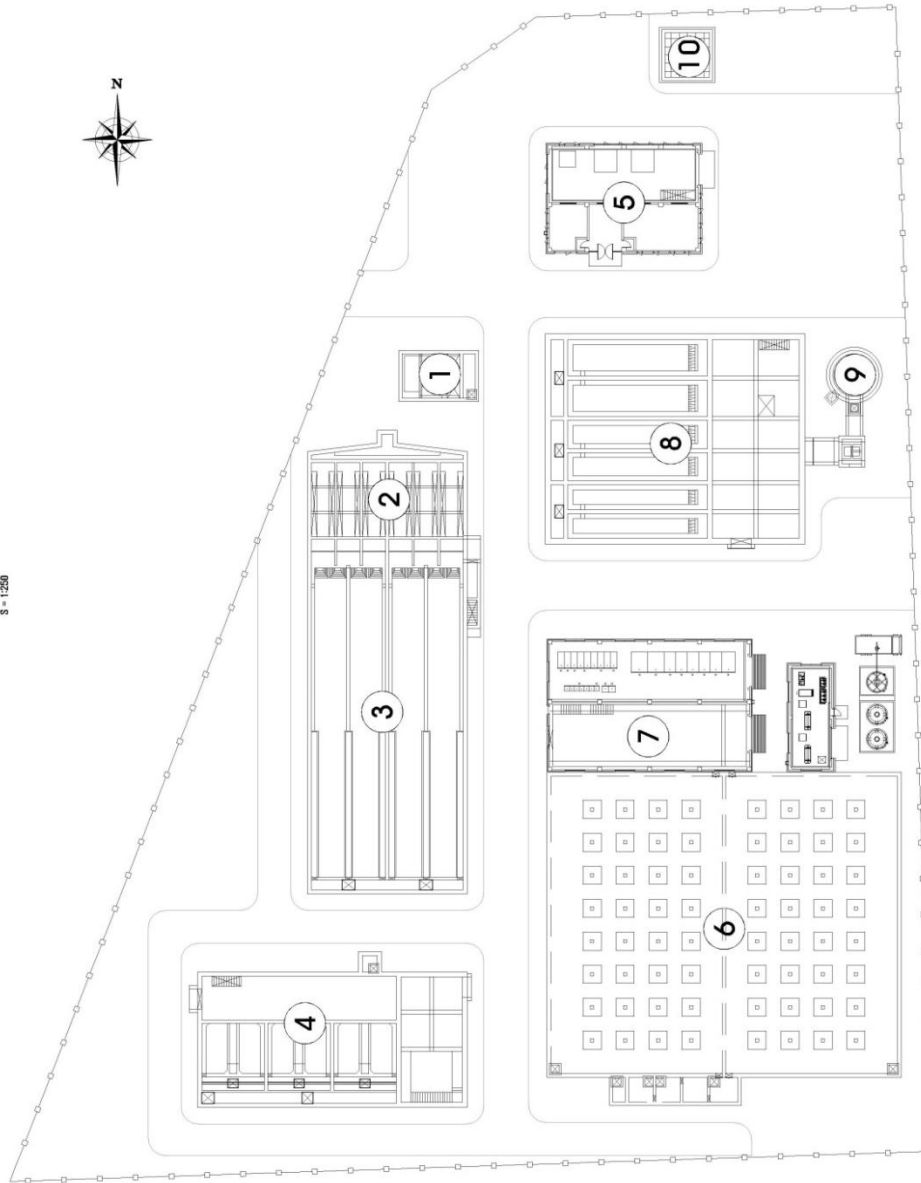
| Classification | Description |
|----------------|--|
| Location | <ul style="list-style-type: none"> • Flat land on the right side of channel |
| Site View |  |

| Classification | Description |
|--------------------|--|
| Plan View |  |
| Specification | <ul style="list-style-type: none"> • Sump station: B15m×L9m×H3m • Pump: 3.90m³/min×31mH×3(1) • Pipe diameter: D450mm • Foundation Type : RC Pile Type |
| Conceptual Drawing |  |



Top Slab and Bottom Slab Plan of Raw Water Intake Pumping Station

Water Treatment Plant Layout Plan
S-11250



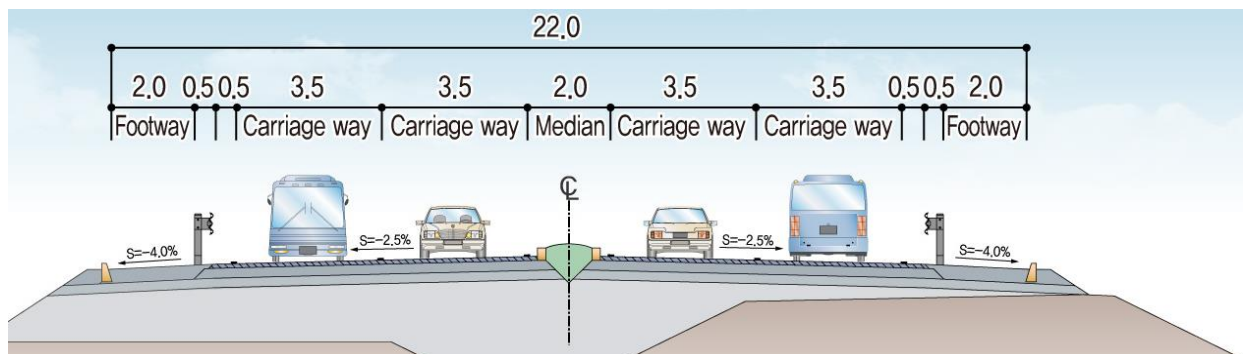
| Legend | |
|--------|----------------------------|
| No | Name |
| 1 | Receiving Chamber |
| 2 | Mixing & Coagulation Basin |
| 3 | Sedimentation Basin |
| 4 | Filtration Basin |
| 5 | Chemical Tank |
| 6 | Treated Water Reservoir |
| 7 | Pumping Station |
| 8 | Backwash Water Basin |
| 9 | Thickening Basin |
| 10 | Security Guard |

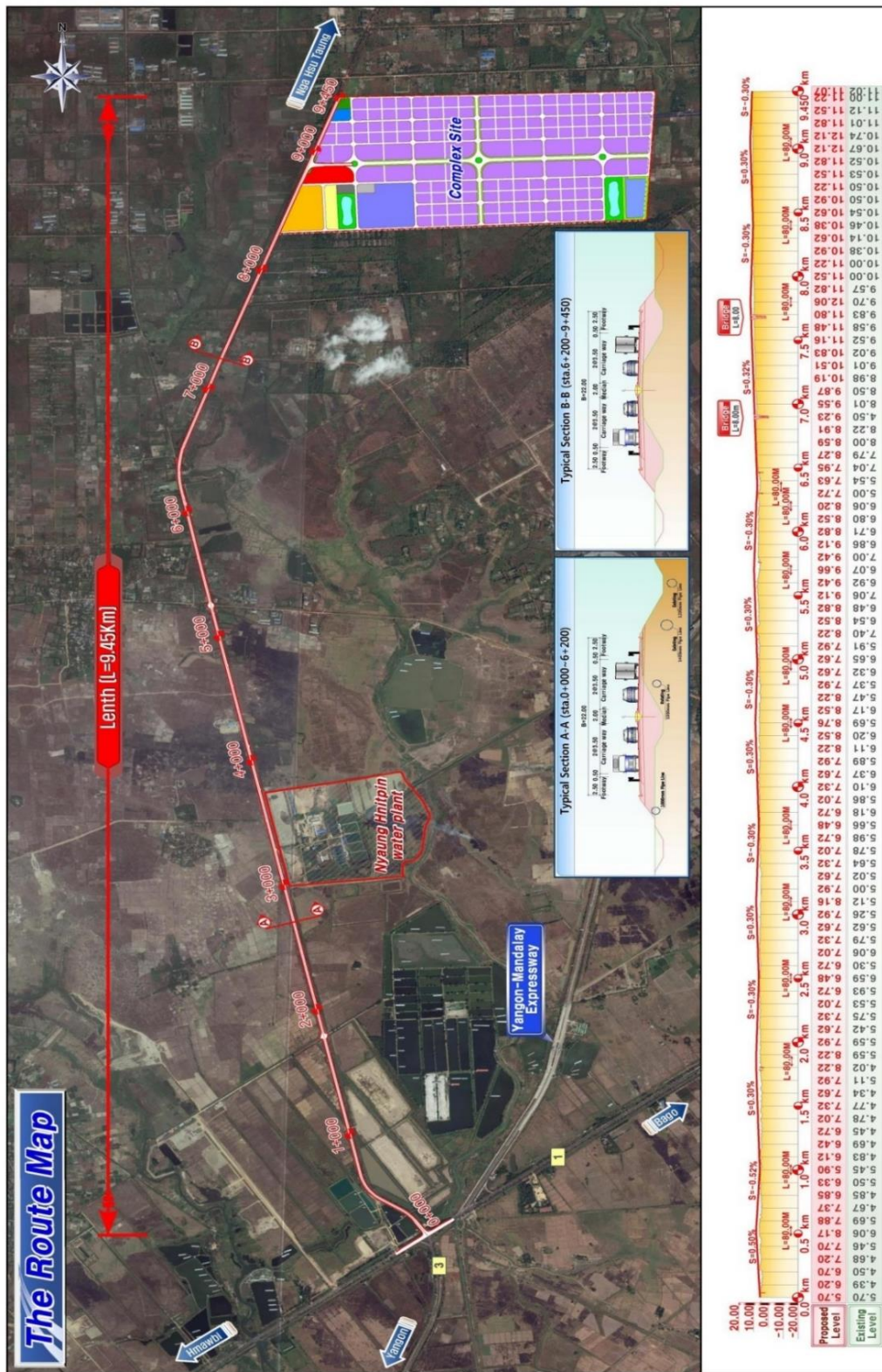


Upgrading of existing access road way to 4-lane road way

The existing two-lane road will be expanded to bi-directional four-lane road of 22 m in width. The total length of road to be expanded is 9.45 km and its type is sub arterial road.

The lane width is designed as 3.5m. Appropriate wide road shoulder is needed for the safety of pedestrians. It shall be 2.5m at least according to the road category, but given the pedestrian walk separated by guardrail, 0.5m was applied. As the road is classified as rural sub-arterial road, 2.0m median was adopted and median with green zone is expected to provide the comfortable and safe environment. The right of way for sub arterial road is 45.75 m (source: Ministry of Construction).





There are total 6 intersections at project site and the plan was developed considering the following to maximize the function as sub-arterial road that links KMIC at the intersection NH.1 and NH.3.

Asphalt concrete pavement, which is favorable to traffic control during construction and is able to deal with a long-term settlement, was adopted for this project and thickness of 60cm was applied.

The road in this project is linked to National Highway NH 1 and NH 3 and Yangon – Mandalay Expressway. The location of road expansion will fall under the area of 3 townships of Yangon Region, namely Hlegu, Hmawbi and Mingaladon, and also in Agriculture and Livestock Zone (3).

The starting point of the road project is from a place where National Highway No.3 and No. 1 meet. And, this is within the administrative area of Akayit Ward, Mingaladon Township. The mid-section of the road is within the area of Ahtayu Village, Kyarkansu Village and Nyaung Hnitpin Village in Hmawbi Township. The last portion of the road will be located in Agriculture and Livestock Zone (3).



Figure 7. 3: Road Expansion and Upgrading Route

The proposed industries, factories, residential and commercial activities in the project complex for construction, operation and decommissioning phases will have cumulative impacts on the VECs but these are not considered in this report because of the following aspects:

- 1) Although the developer of KMIC project is mainly responsible for the whole complex according to EIA procedure, each developer of industries, factories, and other developments in the complex will need to prepare EIA or IEE based on their business type and the cumulative impact assessment will be included in their report.
- 2) The information of the proposed industries, factories, residential and commercial activities in the project complex is not available at this time.

7.3 Setting up spatial and temporal boundaries for Cumulative Impact Assessment

In order to define the boundaries for the assessment, it is necessary to encompass the spatial and temporal extent of impacts that influence VEC condition throughout the time period during which project impacts will occur.

The spatial boundary for VECs for which cumulative impacts were assessed was 1 km both sides from the center of/and along the existing access road to the KMIC project site (covering the road upgrading and expansion project) and within 5 km radius of the KMIC project site. The area directly affected by the project and where cumulative impacts may

arise for the water pipeline installation and water treatment plant construction project and electrical sub-station construction and electrical power line installation are covered by 5 km radius of the KMIC project site. This spatial boundary also covers Akayit Ward of Mingaladon Township, Ahtayu Village, Kyarkansu Village and Nyaung Hnitpin Village in Hmawbi Township, Inn Ka Lant, Tha Yat Thone Pin, Takutone, Sonekone, Kyarinn Ashe, Kyarinn Anauk villages in Hlegu township, and some parts of Agriculture and Livelihood zone (2) and (3). The geographic boundary defined also covered the distance an effect can travel and other impacts the VEC may be exposed to within its range.

The temporal boundary is the lifetime of the proposed KMIC project, including the construction, operation and decommissioning phases. The potential effects of the proposed project cannot extend beyond the lifetime of project because of the good industrial practices, implementation of Environmental Management Plan and monitoring plans. Hence this temporal boundary is the most conservative timeframe.

7.4 Identification of VECs

The VECs that are likely to be at the greatest risk from the residual impacts of the KMIC project and the potential impacts of the anticipated future developments to cumulative impacts were identified.

VECs are the environmental and social attributes that are considered to be important in assessing risks and ambient air and surface water and ground water are the VECs for environmental perspective. From socio-economic perspective, cumulative impacts would include: the safety and health of the community and hence social conditions (community health and safety) are VECs.

7.5 Baseline Information of VECs

The baseline information of VECs are the existing information for ESIA because such information provided a sufficient basis for a complete assessment of cumulative impacts.

7.6 Assessment of Cumulative Impacts and their significance on VECs

In order to assess the cumulative impacts, it was first assessed that how the residual impacts of the project could combine with the potential impacts of the anticipated future projects and impact common resources and receptors.

Residual Impacts and their significance

The surface water contamination (effects on watercourses), ground water contamination, air pollution and dust emission, community health and safety are predicted as residual impacts for construction phase.

The magnitude of residual impact, surface water contamination (effects on watercourses), is low and this impact may result in changes in resources and environment, but this change does not decrease value of these resources, social – cultural, economic and environment. Its duration is intermittent and short term in the construction phase only. It is also capable of re-establishing the original condition after a change or being impact. Its level of significance is minor (i.e. potential impact may result in a localized or short-term decline in a resource during the construction period). Typically, no additional research, monitoring and/or recovery initiatives are considered.

The magnitude of residual impact, ground water contamination, is low and this impact may result in changes in resources and environment, but this change does not decrease value of these resources, social – cultural, economic and environment. Its duration is intermittent and short term in the construction phase only. It is also capable of re-establishing the original condition after a change or being impact. Its level of significance is minimal (i.e. potential

impact may result in a small, localized decline in a resource during the construction phase of the project and should be negligible to the overall baseline status of the resource.

The magnitude of residual impact, air pollution, is low and this impact may result in changes in resources and environment, but this change does not decrease value of these resources, social – cultural, economic and environment. Its duration is intermittent and short term in the construction phase only. It is also capable of re-establishing the original condition after a change or being impact. Its level of significance is minimal (i.e. potential impact may result in a small, localized decline in a resource during the construction phase of the project and should be negligible to the overall baseline status of the resource.

The magnitude of residual impact, dust emission, is low and this impact may result in changes in resources and environment, but this change does not decrease value of these resources, social – cultural, economic and environment. Its duration is intermittent and short term in the construction phase only. It is also capable of re-establishing the original condition after a change or being impact. Its level of significance is minimal (i.e. potential impact may result in a small, localized decline in a resource during the construction phase of the project and should be negligible to the overall baseline status of the resource.

The magnitude of residual impact, community health and safety, is low and this impact may result in changes in resources and environment, but this change does not decrease value of these resources, social – cultural, economic and environment. Its duration can be long term. It is also capable of re-establishing the original condition after a change or being impact. Its level of significance is minimal.

Cumulative Impacts and their significance

The residual impacts above mentioned in combined with the potential impacts of the existing businesses and future projects may contribute to the cumulative impacts, namely, increase in pollutant concentrations in surface water, increase in pollutant concentrations in ground water, incremental contribution of air pollutants and dust, and increased community safety and health issues.

The impact significance was determined based on the level of impacts (magnitude + extent + duration) and the sensitivity (also the sustainability) of the VECs that they may impact. The thresholds of acceptable VEC condition were established according to the National Environmental Quality (Emission) Guidelines (2015) set by the Ministry of Natural Resources and Environmental Conservation. These guidelines are mentioned in the following tables.

Air Emission Guidelines

| Parameter | Averaging Period | Guideline Value (µg/m ³) |
|---|----------------------|--------------------------------------|
| Nitrogen dioxide | 1-year | 40 |
| | 1-hour | 200 |
| Ozone | 8-hour daily maximum | 100 |
| Particulate matter 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

Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges Guidelines (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 suspended solids | mg/l | 50 |
| Zinc | mg/l | 2 |

^a Standard unit

^b At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity; when the zone is not defined, use 100 meters from the point of discharge.

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

The following guideline applies to construction, operation and maintenance of large, sealed road projects including associated bridges and overpasses. While roads do not typically give rise to significant point source effluents or air emissions, discrete point source sanitary wastewater and storm water should achieve the following source effluent levels and general air emissions guidelines shall apply.

Site Runoff and Wastewater Discharges (construction phase)

| Parameter | Unit | Guideline Value |
|--------------------------|-------------------|-----------------|
| Biological oxygen demand | mg/l | 30 |
| Chemical oxygen demand | mg/l | 125 |
| Oil and grease | mg/l | 10 |
| pH | S.U. ^a | 6-9 |
| Total coliform bacteria | 100 ml | 400 |
| Total nitrogen | mg/l | 10 |
| Total phosphorus | mg/l | 2 |
| Total suspended solids | mg/l | 50 |

Significance of cumulative impact (Increase in pollutant concentrations in surface water)

The increase in pollutant concentrations in surface water can occur due to soil erosion, sediment loading, storm water discharges, oil and fuel spills and leaks and improper management of waste from construction workers. The road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant are identified as potential projects for cumulative impacts. However, it is not predicted that the residual impact and impact from the road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant will happen within too small an area and in too brief a period of time. These projects will also have the EMP and monitoring plans to mitigate the potential impacts.

The other projects/developments are not identified as potential projects for cumulative impacts because of the following factors: nature of the project, distance between KMIC project and existing businesses and future projects, distance for which pollutants can travel, uncommon receptors, and not overlapping in spatial and temporal boundaries.

The extent of cumulative impact is determined low because the area of impact will be in the project area within a radius of 1 km. Duration of impact will be short term because impact can be quickly reversible (less than 1 year). The magnitude of impact is low because it is

within regulatory standards, with small changes in some factors for the environmental or social system or ecosystem but does not change the structure. The sensitivity of the VEC (receptor) is low because impact slightly disturbs area with value for conservation, causes small changes in species and diversity, within standards, small local change in human use and quality of life values over a short-term duration, reversible over short-term. Therefore, the significance level of cumulative impact is negligible.

Significance of cumulative impact (Increase in pollutant concentrations in ground water)

The increase in pollutant concentrations in ground water can occur due to uncontrolled site and road runoff, accidental release of fuel and hazardous materials. The road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant are identified as potential projects for cumulative impacts. However, it is not predicted that the residual impact and impact from the road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant will happen within too small an area and in too brief a period of time. These projects will also have the EMP and monitoring plans to mitigate the potential impacts.

The other projects/developments are not identified as potential projects for cumulative impacts because of the following factors: nature of the project, distance between KMIC project and existing businesses and future projects, distance for which pollutants can travel, uncommon receptors, and not overlapping in spatial and temporal boundaries.

The extent of cumulative impact is determined low because the area of impact will be in the project area within a radius of 1 km. Duration of impact will be short term because impact can be quickly reversible (less than 1 year). The magnitude of impact is low because it is within regulatory standards, with small changes in some factors for the environmental or social system or ecosystem but does not change the structure. The sensitivity of the VEC (receptor) is low because impact slightly disturbs area with value for conservation, causes small changes in species and diversity, within standards, small local change in human use and quality of life values over a short-term duration, reversible over short-term. Therefore, the significance level of cumulative impact is negligible.

Significance of cumulative impact (Incremental contribution of air pollutants)

The incremental contribution of air pollutants can occur due to emissions of gaseous pollutants from diesel powered construction equipment, vehicles and machineries. The road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant are identified as potential projects for cumulative impacts. However, it is not predicted that the residual impact and impact from the road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant will happen within too small an area and in too brief a period of time. These projects will also have the EMP and monitoring plans to mitigate the potential impacts.

The other projects/developments are not identified as potential projects for cumulative impacts because of the following factors: nature of the project, distance between KMIC project and existing businesses and future projects, distance for which pollutants can travel, uncommon receptors, and not overlapping in spatial and temporal boundaries.

The extent of cumulative impact is determined medium because the area of impact is beyond the project area but is a limited area of radius between 1 and 5 km. Duration of impact will be short term because impact can be quickly reversible (less than 1 year). The magnitude of impact is low because it is within regulatory standards, with small changes in some factors for the environmental or social system or ecosystem but does not change the structure. The sensitivity of the VEC (receptor) is low because impact slightly disturbs area with value for conservation, causes small changes in species and diversity, within standards,

small local change in human use and quality of life values over a short-term duration, reversible over short-term. Therefore, the significance level of cumulative impact is low.

Significance of cumulative impact (Incremental contribution of dust)

The incremental contribution of dust can occur from excavating and moving earth, construction equipment and machinery and vehicles. The road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant are identified as potential projects for cumulative impacts. However, it is not predicted that the residual impact and impact from the road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant will happen within too small an area and in too brief a period of time. These projects will also have the EMP and monitoring plans to mitigate the potential impacts.

The other projects/developments are not identified as potential projects for cumulative impacts because of the following factors: nature of the project, distance between KMIC project and existing businesses and future projects, distance for which pollutants can travel, uncommon receptors, and not overlapping in spatial and temporal boundaries.

The extent of cumulative impact is determined low because the area of impact will be in the project area within a radius of 1 km. Duration of impact will be short term because impact can be quickly reversible (less than 1 year). The magnitude of impact is low because it is within regulatory standards, with small changes in some factors for the environmental or social system or ecosystem but does not change the structure. The sensitivity of the VEC (receptor) is low because impact slightly disturbs area with value for conservation, causes small changes in species and diversity, within standards, small local change in human use and quality of life values over a short-term duration, reversible over short-term. Therefore, the significance level of cumulative impact is negligible.

Significance of cumulative impact (Increased community safety and health issues)

The increased community safety and health issues can occur due to emissions of gaseous pollutants from diesel powered construction equipment, vehicles and machineries, dust from excavating and moving earth, construction equipment and machinery and vehicles, surface water and ground water contamination, accidents caused by construction machineries and also increased traffic due to construction activities. The road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant are identified as potential projects for cumulative impacts. However, it is not predicted that the residual impact and impact from the road expansion and upgrading, electrical sub-station construction, water treatment (purification) plant will happen within too small an area and in too brief a period of time. These projects will also have the EMP and monitoring plans to mitigate the potential impacts.

The other projects/developments are not identified as potential projects for cumulative impacts because of the following factors: nature of the project, distance between KMIC project and existing businesses and future projects, distance for which pollutants can travel, uncommon receptors, and not overlapping in spatial and temporal boundaries.

The extent of cumulative impact is determined low because the area of impact will be in the project area within a radius of 1 km. Duration of impact might be long term because the health problems (like disability caused by traffic accident) will be the permanent impact and it will remain after decommissioning of the project and it was judged that the significance level of cumulative impact is medium.

7.7 Relevant Mitigation Measures for Cumulative Impacts

| No. | Cumulative Impacts | Significance of Impacts | Mitigation Measures |
|-----|---|-------------------------|---|
| 1. | Increase in pollutant concentrations in surface water | Negligible | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination |
| 2. | Increase in pollutant concentrations in ground water | Negligible | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination |
| 3. | Incremental contribution of air pollutants | Low | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination ✓ Collaborative engagement in other regional cumulative impact management strategies ✓ Participation in regional monitoring programs to assess the realized cumulative impacts and efficacy of management efforts <p>(The last two points involve collaborative engagement with other stakeholders, including project proponents, government agencies, affected communities, conservation groups and expert groups.)</p> |
| 4. | Incremental contribution of dust in air | Negligible | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination |
| 5. | Increased community safety and health issues | Medium | <ul style="list-style-type: none"> ✓ Following EMP and monitoring plan ✓ Engaging developers of other developments/ projects for effective collaboration or coordination ✓ Consultation with community and providing education programs related to community health and safety issues ✓ Providing additional community safety and health measures based on discussion with the community |

For the operation phase it is more realistic and rational to do the cumulative impact assessment by the developers of industries and factories based on their business and the existing and future private and public developments and projects. The residual impacts for operation phase in combined with the potential impacts of the anticipated future

developments to produce cumulative impacts and this will be conducted by respective developer of each development.



CHAPTER 8. ENVIRONMENTAL MANAGEMENT PLAN

8.1 Environmental Management and Monitoring Plan (Construction and Operation Phases)

| Environmental impact | Mitigation measures and aspects for monitoring | Responsibility for | | Mitigation and Monitoring Phase | Recommended frequency of monitoring |
|---------------------------|---|---|--|---------------------------------|-------------------------------------|
| | | Mitigation monitoring and maintenance during construction | Mitigation monitoring and maintenance during operation | Construction / Operation | |
| Soil Degradation | <ul style="list-style-type: none"> ✓ Avoidance of unnecessary cutting and removing of trees and vegetation ✓ Controlling earthwork and compacting loose soil ✓ Installation and construction of drainage structure properly ✓ Ensuring supervision of excavation activities ✓ Keeping the removed topsoil and reusing to rehabilitate disturbed areas | Contractor | - | Construction | Daily |
| | <ul style="list-style-type: none"> ✓ Installation of bunded detention ponds to contain oil spills ✓ Treatment of wastewater before discharging to waterways ✓ Following the procedures of using, storing and handling the chemicals, oil, grease and hazardous materials (if any) – including training of safety usage | - | Developer, Tenants | Operation | Monthly |
| Soil Contamination | <ul style="list-style-type: none"> ✓ Practicing hazardous and non-hazardous waste management ✓ Construction of sedimentation basin for construction wastewater before disposal ✓ Construction of sand traps to settle the sand at the bottom and store the deposited sand ✓ Applying a proper sanitation system for the construction workers and project staff ✓ Regular check and maintenance of construction machineries and vehicles to avoid oil, fuel, chemicals and lubricant spills or leaks ✓ Readily available of the site – appropriate spill containment kit | Contractor | | Construction | Weekly |
| | <ul style="list-style-type: none"> ✓ Installation of bunded detention ponds to contain oil spills ✓ Practicing hazardous and non-hazardous waste management ✓ Treatment of wastewater before discharging to waterways ✓ Constructing a bin center to receive the solid waste generated from different activities and facilities | | Developer, Tenants | Operation | Weekly |

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| | <ul style="list-style-type: none"> ✓ The building will have a hard, impermeable floor with drainage, and designed for cleaning/disinfection with available water supply ✓ Securing the storage area by locks with restricted access and designed for access and regular cleaning by authorized cleaning staff ✓ Protecting the storage area from sun, and inaccessible to animals/rodents ✓ Adopting procedures for oil spills mitigation by each development | | | | |
| Soil Erosion | <ul style="list-style-type: none"> ✓ Construction of concrete drains at steep levels and proper gradient at temporary drain ✓ Minimizing clearance of vegetation ✓ Protecting areas susceptible to erosion with mulch or a suitable alternative | Contractor | - | Construction | Daily |
| Topography | <ul style="list-style-type: none"> ✓ Designing and constructing buildings and structures as much as possible to maintain shape and features of land surfaces | Architect, Civil Engineer, Contractor | - | Construction | Once (Design Stage) |
| Dust Emission | <ul style="list-style-type: none"> ✓ Control speed and operation of construction vehicles ✓ Proper cover of trucks carrying construction materials ✓ Prohibition of idling of vehicles ✓ Water should be sprayed earth moving work place and main roads | Contractor | - | Construction | Daily |
| | <ul style="list-style-type: none"> ✓ Restriction of speed control of transport buses and traffic within the project site | - | Developer, Tenants | Operation | Daily |
| Air pollution | <ul style="list-style-type: none"> ✓ Regular maintenance of construction plants and equipment | Contractor | - | Construction | Monthly |
| | | | Developer, Tenants | Operation | Monthly |
| | <ul style="list-style-type: none"> ✓ Engage sensitive workers ✓ Provide masks and PPE ✓ Worker to understand about hazardous gas emission ✓ Inspection and observation of air quality | Contractor | - | Construction | Monthly |
| | <ul style="list-style-type: none"> ✓ Measuring air quality | Contractor | - | Construction | Every six months (Daily according to PCCD – YCDC) |

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|--------------------------------|--|------------|--------------------|--------------|---|
| | <ul style="list-style-type: none"> ✓ Using quality fuel which contains reduced or no lead and Sulphur content ✓ Following National Environmental Quality Emission Guidelines (For the parameters not included in the guidelines, “Air Quality Guidelines for Europe, 1997. WHO Regional Publications, European Series No. 23. World Health Organization” will be followed) and the rules, regulations and guidelines set by the respective Ministry by individual project | - | Developer, Tenants | Operation | Monthly |
| | <ul style="list-style-type: none"> ✓ Measuring air quality | - | Developer, Tenants | Operation | Every six months (Daily according to PCCD – YCDC) |
| Greenhouse gas emission | <ul style="list-style-type: none"> ✓ Conducting training to raise the awareness of drivers, operators and concerned staff on greenhouse emissions and mitigation measures ✓ Prohibiting unnecessary driving and moving at site and idling of vehicles and construction machineries as well ✓ Regular maintenance of vehicles and machineries ✓ Efficient use of vehicles (car-pooling and if possible a truck will be used for two purposes at the same time – unloading of building materials and loading of construction wastes) and machineries ✓ Formulating the construction management procedures including the efficient use of construction vehicles and machineries ✓ Designing and construction of site offices as much as possible to get the natural light and ventilation | Contractor | - | Construction | Weekly |
| | <ul style="list-style-type: none"> ✓ Using natural light as much as possible (and using energy efficient electrical appliances like energy - saving light bulbs) ✓ Keeping windows shut when HVAC is in use, but employing natural ventilation whenever possible ✓ Unplugging TVs, AV equipment, and phone chargers when not in use ✓ Turning off the lights and computer when leaving the office ✓ Recycling and/or reusing as many waste materials as possible ✓ Biking or walking to work if possible (OR) arranging bus for the workers ✓ Using the environmentally friendly airconditioners and refrigerators to avoid or reduce the emission of fluorinated gases | - | Developer, Tenants | Operation | Monthly |

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| Surface water/Ground water contamination | <ul style="list-style-type: none"> ✓ Building sedimentation basin on a construction site to capture the disturbed soil which is washed off during rainfall ✓ Construction of sand traps to settle the sand at the bottom and store the deposited sand ✓ Systematic stacking and piling of materials on site, the regular solid waste disposal at the dumping site designated by the local municipality ✓ Avoidance of hazardous wastes disposal in drinking-water sources ✓ Adopting the proper waste management system ✓ Regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills (if found, the immediate repair and cleansing will be conducted) ✓ Systematic storage of fuels and filling station at construction site yard compound, handling and disposal of new oil and used oil waste ✓ Provision of impervious basement at operation area to prevent oil spill when heavy machineries are working ✓ Daily checking to earth moving machines by motor transport officer before start engines ✓ Providing a good pavement at machine workshop and garage ✓ Applying the proper sanitation system for the construction workers and project staff ✓ Checking sewer connections and pipes regularly to avoid any leaks | Contractor | - | Construction | Monthly |
| | <ul style="list-style-type: none"> ✓ Measuring water quality | Contractor | - | Construction | Every six months |
| | <ul style="list-style-type: none"> ✓ Treating wastewater to the acceptable limit according to the National Environmental Quality Emission Guidelines ✓ Storing solid waste in a bin center having a hard, impermeable floor with drainage and designed for cleaning/ disinfection with available water supply ✓ Adopting oil spills mitigation procedures | - | Developer, Tenants | Operation | Monthly |
| | <ul style="list-style-type: none"> ✓ Measuring water quality | - | Developer, Tenants | Operation | Every six months |
| | <ul style="list-style-type: none"> ✓ Monitoring treated wastewater quality by the real-time monitoring indicator | - | Developer, Tenants | Operation | Daily (According to PCCD – YCDC) |
| Increased water demand | <ul style="list-style-type: none"> ✓ Checking water connections, pipes and taps regularly to avoid any leaks and wastages | - | Developer, Tenants | Operation | Monthly |
| Noise and vibration | <ul style="list-style-type: none"> ✓ Training drivers and operators of construction vehicles and machineries to reduce the noise from their operations, and the | Contractor | - | Construction | Once (24 hours)/mo |

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| | <ul style="list-style-type: none"> ✓ construction activities will be restricted in night times ✓ Regular maintenance of vehicles and machineries and wearing the ear mufflers (hearing protection devices) ✓ The construction noise will be strictly maintained within the noise level (National Environmental Quality Emission Guidelines) set by Ministry of Natural Resources and Environmental Conservation ✓ Using sound absorb, sound proof engines at construction site and proper maintenance, enclosing noisy outdoor engines and generators in sound proof wall or buildings, regular checking and maintenance to silencers of engines and conserving trees around the site as some buffers against noise. | | | | nth |
| | <ul style="list-style-type: none"> ✓ Installing sound barrier and sound absorbing materials at the factories as needed ✓ Applying vibration control devices for equipment and design of the structure as needed ✓ Limiting outside standard working hours (weekend, evening or night-time works) ✓ Ensuring that noise level of operation of all facilities and structures within the acceptable limit stipulated in National Environmental Quality Emission Guidelines | - | Developer, Tenants | Operation | Monthly |
| | <ul style="list-style-type: none"> ✓ Measuring sound level | - | Developer, Tenants | Operation | Every six months |
| Solid waste generation | <ul style="list-style-type: none"> ✓ Avoidance of unnecessary cutting and removing of vegetation plants ✓ Developing drawing and land survey map to follow as drawing of landscaping procedure, producing a precise construction drawing to avoid unnecessary cutting and filling of earth work and excavation work ✓ Ensuring calculation and estimation of materials requirement to avoid excessive purchase ✓ Ensuring purchase of materials and stacking at collection yard and ware houses ✓ Providing dust bins at appropriate places for hazardous substances and non-hazardous substances ✓ Providing facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure ✓ Collection of solid waste by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) with the on-call system. ✓ Whenever possible, reusing and recycling of solid waste will be done to reduce the amount and volume of construction debris. | Contractor | - | Construction | Monthly |

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| | <ul style="list-style-type: none"> ✓ Practicing Non-hazardous and Hazardous Solid Waste Management Plan | | | | |
| Increased solid waste generation | <ul style="list-style-type: none"> ✓ Adopting 3R (Reduce, Reuse and Recycle) practice ✓ Practicing Non-Hazardous and Hazardous Solid Waste Management Plan | - | Developer, Tenants | Operation | Monthly |
| Increased wastewater generation | <ul style="list-style-type: none"> ✓ Installation of wastewater treatment facility to treat wastewater before disposal ✓ All other development, industries and activities would have to follow the guidelines and standards set by Ministry of Natural Resources and Environmental Conservation and other respective Ministries. | - | Developer, Tenants | Operation | Monthly |
| Hazardous waste generation | <ul style="list-style-type: none"> ✓ Practicing Hazardous Solid Waste Management Plan | Contractor | - | Construction | Monthly |
| | <ul style="list-style-type: none"> ✓ Practicing Hazardous Solid Waste Management Plan | - | Developer, Tenants | Operation | Monthly |
| Changes to Natural Resources | <ul style="list-style-type: none"> ✓ Ensuring calculation and estimation of material requirement to avoid excessive purchase ✓ Ordering and collection of the accurate quantities of materials ✓ Efficient use of fuel, electricity, water and office stationery ✓ The reusable materials will be reused by the project. The recyclables will be sent to the local recyclers. (Adopting 3 R Practice) | Contractor | - | Construction | Monthly |
| | <ul style="list-style-type: none"> ✓ Efficient use of energy, fuel, water, raw materials and office stationeries etc. | - | Developer, Tenants | Operation | Monthly |
| Traffic Flow | <ul style="list-style-type: none"> ✓ Proper planning of transportation of construction materials ✓ Provision of traffic management staff at site and junctions ✓ Installation of road signs and traffic signals at along the way of work site, main road, cross roads, approach roads, to notify stakeholders of the development ✓ Enforcing speed limit to all vehicles which are transporting materials and accessing the site ✓ Discussion with the traffic police unit there to make necessary arrangements not to worsen the existing traffic condition in the town Traffic Safety: ✓ Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. ✓ Emphasizing safety aspects among drivers ✓ Improving driving skills and requiring licensing of drivers ✓ Adopting limits for trip duration and arranging driver rosters to avoid | Contractor | - | Construction | Daily |

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| | <p>overtiredness</p> <ul style="list-style-type: none"> ✓ Avoiding dangerous routes and times of day to reduce the risk of accidents ✓ Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. | | | | |
| Increased Traffic Flow | <ul style="list-style-type: none"> • Provision of traffic management staff at project area and surroundings • Installation of road signs and traffic signals at along main road, cross roads, approach roads • Enforcing speed limit to all vehicles which are transporting materials and accessing the site • Designation of different loading and unloading time for some factories and industries if needed • Managing queuing vehicles with enough space so queues do not impact on other traffic • Providing separate entries and exits for pedestrians and vehicles • Using speed humps to slow vehicles down <p>Note: Ministry of Construction will be implementing the expansion and upgrading of the existing access road to the proposed KMIC project site. The design speed will be limited at 60 km/h to regulate the speed for safety of residents and protection of their living environment. Shoulders with pedestrian walk will be included and safety and auxiliary facilities (traffic sign, road mark, guard rails, road safety protection facilities) will be installed as needed.</p> <p>These initiatives will reduce and/or avoid any traffic related issues and also mitigate the concerns of the community related to traffic issues.</p> | - | Developer, Tenants | Operation | Monthly |
| Foul Odor and Vectors | <ul style="list-style-type: none"> • Thermal drying the primary sludge with the use of biogas generated in the anaerobic digestion process • Process of dewatering • Covering the skips • Stabilizing the contents of skips with lime | - | Developer, Tenants | Operation | Monthly |
| Destruction of vegetation and expelling of wildlife | <ul style="list-style-type: none"> ✓ Making the proper demarcation of project area that would be affected by construction works ✓ Controlling construction vehicles to ensure the avoidance of unnecessary disturbance of vegetation | Contractor | - | Construction | Monthly |

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| | <ul style="list-style-type: none"> ✓ Replantation with native species, leaving native trees/plants ✓ Supporting Environmental Education and Public Participation and Environmental Protection activities through CSR programs | | | | |
| Changes to terrestrial flora and fauna | <ul style="list-style-type: none"> ✓ Replantation of native species and leaving native trees/plants ✓ Conservation of the restored natural habitat | Contractor | - | Construction | Monthly |
| Disturbance to aquatic organisms and aquatic habitats | <ul style="list-style-type: none"> ✓ Banning fishing in fish spawning season and electric shock catching | Contractor | - | Construction | Monthly |
| Changes to aquatic flora and fauna | <ul style="list-style-type: none"> ✓ Banning fishing in fish spawning season and electric shock catching ✓ Treating wastewater before disposing to waterways | - | Developer, Tenants | Operation | Monthly |
| Existing social infrastructure and services | <ul style="list-style-type: none"> ✓ Upgrading the existing social infrastructures, services and facilities and/or building new social infrastructures and services | Contractor (under CSR program of developer) | - | Construction | Monthly |
| Inconveniency with socio-economic change | <ul style="list-style-type: none"> ✓ Providing vocational trainings to the local people to be fit with skills requirement with project activities and needs | - | Developer, Tenants | Operation | Monthly |
| Landscape and scenery | <ul style="list-style-type: none"> ✓ Developing the architectural design, height and color of the buildings and structures by taking the visual impacts of these structures into account <p>For visual impacts of electricity substation</p> <ul style="list-style-type: none"> ✓ Placing the structures in such a manner as to maximize the buffer zone between the structures and the roads ✓ The retention of as much existing vegetation as possible, specifically the existing mature trees in the area ✓ The re-establishment of some agricultural activity around the substation depending on the proposed land use ✓ The establishment of climbing plants on sections of the perimeter fencing for safety and security considerations. Such planting will be done with specific viewpoints in mind and be used to break the monolithic nature or soften the visual impact of the development from those specific viewpoints. ✓ All lighting, especially perimeter security lighting will be shielded to | Contractor/Architect/Designer/Engineer | - | Construction | Once |

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| | <p>minimize light spillage and pollution. No direct light sources will be seen from outside the site.</p> <ul style="list-style-type: none"> ✓ Signage will be simple and unobtrusive | | | | |
| <p>Risks for infectious diseases such as AIDS/HIV</p> | <p>Following the general EHS guidelines set by IFC, World Bank Group.</p> <p>Interventions for communicable diseases</p> <ul style="list-style-type: none"> ✓ Providing surveillance and active screening and treatment of workers ✓ Preventing illness among workers in local communities (undertaking health awareness and education initiatives, training health workers in disease treatment, conducting immunization programs for workers in local community to improve health and guard against infection, providing health services) ✓ Providing treatment through standard case management in on-site or community health care facilities ✓ Promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization <p>Interventions for vector-borne diseases</p> <ul style="list-style-type: none"> ✓ Prevention of larval and adult propagation through sanitary improvements and elimination of breeding grounds close to human settlements ✓ Elimination of unusable impounded water, increase in water velocity in natural and artificial channels ✓ Implementation of integrated vector control programs ✓ Promoting use of repellents, clothing, netting and other barriers to prevent insect bites ✓ Use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs ✓ Monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread ✓ Collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects | Contractor | - | Construction | Monthly |

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| | <ul style="list-style-type: none"> ✓ Educating project personnel and local residents on risks ✓ Prevention and available treatment, monitoring communities during high-risk seasons to detect and treat cases ✓ Distributing appropriate education materials and following safety guidelines for the storage, transport and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure | | | | |
| Occupational safety and health | <ul style="list-style-type: none"> ✓ Company has guidelines and procedures and generally the following aspects are covered: ✓ Guidelines and procedures for organizing the site (planning the work, organizing the work, common facilities to be provided, site access, public safety, lighting, site tidiness, storage areas, fire safety) ✓ Preventive measures for accidents or injuries from excavations, working at height, moving, lifting and handling loads, site vehicles and mobile plants operation, chemicals use, handling and storage ✓ Protective Equipment (Safety helmet, footwear, goggles and safety spectacles, gloves and protective clothing, other protective equipment) ✓ Emergency procedures and preparedness (company's emergency personnel contact information, evacuation plan including exit routes, evacuation signals and sirens, location of eyewash stations and showers, fire extinguishers) ✓ Providing First Aid kits and training on how to use them ✓ Accident/Injury Reporting procedures ✓ Training (Orientation) for all employees and workers | Contractor | Developer, Tenants | Construction Operation | Monthly |
| Emergency risk | <p>Company has guidelines and procedures (Please see in the Annex section) and generally the following aspects are covered:</p> <p>Fire Safety Management</p> <ul style="list-style-type: none"> ✓ Practical Fire Safety Arrangements, Planning, Organization and Control, Monitoring and Review <p>Fire Emergency Plan</p> <ul style="list-style-type: none"> ✓ Training and Training Provision, Information Distribution, Procedures to follow when discovering a fire and hearing the fire alarm, Contacting Emergency Services, Identify processes, machines or power which must be shut down, Emergency Services Liaison Procedures, Specific Information for the Emergency | Contractor | - | Construction | Every three months |

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| | <p>Services, Escape Routes, Assembly Points, Identify Persons especially at risk, , Evacuation Arrangements for disabled people, staff with specific responsibilities, firefighting, fire control panel, contingency plans and Re-entering the building. (also including Fire Safety Maintenance Checklist, Fire Safety Training Program)</p> <p>Emergency Response Plan for</p> <ul style="list-style-type: none"> ✓ Utility Failures (electrical outages, plumbing failure, gas leaks, steam line breaks, ventilation problems, elevator failures) ✓ Earthquakes ✓ Floods ✓ Storms and Tornadoes ✓ Medical Emergency ✓ Shelter in place/Safe shelter | | | | |
| Increased Emergency Risk | <ul style="list-style-type: none"> • Applying emergency response plans to all stakeholders of project | - | Developer, Tenants | Operation | Monthly |
| Community Health and Safety | <p>Following the general EHS guidelines set by IFC, World Bank Group.</p> <p>Water Quality</p> <ul style="list-style-type: none"> ✓ Drinking water sources – at all times be protected. ✓ Delivery of water to the community or to users of facility infrastructure – water quality needs to comply with National Acceptability Standards (or in their absence the current edition of with WHO Drinking Water Guidelines) <p>Water Availability</p> <ul style="list-style-type: none"> ✓ Potential effect of groundwater or surface water abstraction for project activities would be properly assessed accounting for seasonal variability and projected changes in demand in the project area. The higher demand of water use by health care facilities will be taken into account. <p>Structural Safety of Project Infrastructure</p> <ul style="list-style-type: none"> ✓ Buffer strips or other methods of physical separation around project sites will be included to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odor or other emissions. ✓ The siting and safety engineering criteria will be incorporated to prevent failures due to natural disasters. ✓ Myanmar National Building Code (2016) will be applied to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response. | Contractor | Developer, Tenants | Construction Operation | Monthly |

| | | | | | |
|--|---|--|--|--|--|
| | <ul style="list-style-type: none"> ✓ Hazardous materials storage, handling and use will be managed to reduce or eliminate consequences of the potential off-site release. <p>Life and Fire Safety</p> <ul style="list-style-type: none"> ✓ The new buildings and facilities which can be assessed by the public will be designed, constructed and operated in full compliance with Myanmar National Building Code (2016), Myanmar Fire Services Department regulations and other local legal/insurance requirements. <p>Traffic Safety</p> <ul style="list-style-type: none"> ✓ Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. ✓ Emphasizing safety aspects among drivers ✓ Improving driving skills and requiring licensing of drivers ✓ Adopting limits for trip duration and arranging driver rosters to avoid overtiredness ✓ Avoiding dangerous routes and times of day to reduce the risk of accidents ✓ Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. <p>Transport of Hazardous Materials</p> <p>Project will have procedures ensuring the compliance with local laws and requirements applicable to the transport of hazardous materials. The procedures will be:</p> <ul style="list-style-type: none"> - Proper labeling of containers, including the identity and quantity of the contents, hazards, and shipper contact information - Providing a shipping document (e.g. shipping manifest) describing the contents of the load and its associated hazards in addition to the labeling of the containers. - Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved - Ensuring adequate transport vehicle specifications | | | | |
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| | <ul style="list-style-type: none"> - Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures - Using labeling and placarding (external signs on transport vehicles) as required - Providing the necessary means for emergency response <p>Disease Prevention Communicable Diseases and Vector-Borne Diseases – Please see in the “Risks for infectious diseases such as AIDS/HIV” section above.</p> <p>Emergency Preparedness and Response If there is a risk to the local community from a potential emergency arising at the project site, the company will inform the community through the communication measures, namely, informing the local authorities, communicating details of the nature of emergency, communicating protection options (evacuation, quarantine), providing advices on selecting an appropriate option and vehicle mounted speakers.</p> | | | | |
| Light Intrusion | <ul style="list-style-type: none"> • Fencing electricity substation high enough • Having buffer area between substation and residential area and other sensitive areas | - | Developer, Tenants | Operation | Monthly |

8.2 Environmental Management and Monitoring Plan (Decommissioning/Closure Phase)

| Environmental impact | Proposed mitigation and aspects for monitoring | Responsibility for | Mitigation and Monitoring Phase | Recommended frequency of monitoring |
|--|--|--|---------------------------------|-------------------------------------|
| | | Mitigation monitoring and maintenance during decommissioning | Decommissioning | |
| Air Pollution (including Dust Emission) | <ul style="list-style-type: none"> ✓ Minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone) ✓ Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content ✓ Applying water or non-toxic chemicals to minimize dust from vehicle movements, selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition, speed reduction for traffic ✓ Avoiding open burning of solid waste | Contractor | Decommissioning | Monthly |
| Greenhouse gas emissions | <ul style="list-style-type: none"> ✓ Conducting training to raise the awareness of drivers, operators and concerned staff on greenhouse emissions and mitigation measures ✓ Prohibiting unnecessary driving and moving at site and idling of vehicles and construction machineries as well ✓ Regular maintenance of vehicles and machineries ✓ Formulating the construction management procedures including the efficient use of construction vehicles and machineries | Contractor | Decommissioning | Monthly |
| Surface water contamination | <ul style="list-style-type: none"> ✓ Treating the wastewater from demolition site before discharging to the waterway | Contractor | Decommissioning | Monthly |
| Noise and vibration | <ul style="list-style-type: none"> ✓ Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance ✓ Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines ✓ Avoiding or minimizing project transportation through community areas | Contractor | Decommissioning | Monthly |
| Waste generation | <ul style="list-style-type: none"> ✓ Adopting the mitigation measures used for the construction phase | Contractor | Decommissioning | Monthly |

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| (Hazardous and Non-hazardous Solid waste) | | | | |
| Living and livelihood | <ul style="list-style-type: none"> ✓ Preparing the employment contract between workers and the concerned company according to the Myanmar Labor Law (workers' labor right will be protected by confirming termination service) ✓ Workers request government authorities (labor office) to settle and resolve the situation provided that the termination service is not fair | Contractor | Decommissioning | As needed |
| Risks for infectious diseases | <p>Following the general EHS guidelines set by IFC, World Bank Group.</p> <p>Interventions for communicable diseases</p> <ul style="list-style-type: none"> ✓ Providing surveillance and active screening and treatment of workers ✓ Preventing illness among workers in local communities (undertaking health awareness and education initiatives, training health workers in disease treatment, conducting immunization programs for workers in local community to improve health and guard against infection, providing health services) ✓ Providing treatment through standard case management in on-site or community health care facilities ✓ Promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization <p>Interventions for vector-borne diseases</p> <ul style="list-style-type: none"> ✓ Prevention of larval and adult propagation through sanitary improvements and elimination of breeding grounds close to human settlements ✓ Elimination of unusable impounded water, increase in water velocity in natural and artificial channels ✓ Implementation of integrated vector control programs ✓ Promoting use of repellents, clothing, netting and other barriers to prevent insect bites ✓ Use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs ✓ Monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread ✓ Collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects ✓ Educating project personnel and local residents on risks ✓ Prevention and available treatment, monitoring communities during high-risk seasons to detect and treat cases ✓ Distributing appropriate education materials and following safety guidelines for the storage, transport and distribution of pesticides to | Contractor | Decommissioning | Monthly |

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| | minimize the potential for misuse, spills, and accidental human exposure | | | |
| Occupational Health and Safety | <p>Company has guidelines and procedures (Please see in the Annex section) and generally the following aspects are covered:</p> <ul style="list-style-type: none"> ✓ Guidelines and procedures for organizing the site (planning the work, organizing the work, common facilities to be provided, site access, public safety, lighting, site tidiness, storage areas, fire safety) ✓ Preventive measures for accidents or injuries from excavations, working at height, moving, lifting and handling loads, site vehicles and mobile plants operation, chemicals use, handling and storage ✓ Protective Equipment (Safety helmet, footwear, goggles and safety spectacles, gloves and protective clothing, other protective equipment) ✓ Emergency procedures and preparedness (company's emergency personnel contact information, evacuation plan including exit routes, evacuation signals and sirens, location of eyewash stations and showers, fire extinguishers) ✓ Providing First Aid kits and training on how to use them ✓ Accident/Injury Reporting procedures ✓ Training (Orientation) for all employees and workers | Contractor | Decommissioning | Monthly |
| Community Health and Safety | <p>Following the general EHS guidelines set by IFC, World Bank Group.</p> <p>Water Quality</p> <ul style="list-style-type: none"> ✓ Drinking water sources – at all times be protected. ✓ Delivery of water to the community or to users of facility infrastructure – water quality needs to comply with National Acceptability Standards (or in their absence the current edition of with WHO Drinking Water Guidelines) <p>Water Availability</p> <ul style="list-style-type: none"> ✓ Potential effect of groundwater or surface water abstraction for project activities would be properly assessed accounting for seasonal variability and projected changes in demand in the project area. The higher demand of water use by health care facilities will be considered. <p>Hazardous materials Management</p> <ul style="list-style-type: none"> ✓ Buffer strips or other methods of physical separation around project sites will be included to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odor or other emissions. ✓ Hazardous materials storage, handling and use will be managed to reduce or eliminate consequences of the potential off-site release. <p>Traffic Safety</p> <ul style="list-style-type: none"> ✓ Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. ✓ Emphasizing safety aspects among drivers | Contractor | Decommissioning | Monthly |

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| | <ul style="list-style-type: none"> ✓ Improving driving skills and requiring licensing of drivers ✓ Adopting limits for trip duration and arranging driver rosters to avoid overtiredness ✓ Avoiding dangerous routes and times of day to reduce the risk of accidents ✓ Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. <p>Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, the following measures will be applied:</p> <ul style="list-style-type: none"> ✓ Minimizing pedestrian interaction with vehicles ✓ Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations (hospital). Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaign) ✓ Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate first aid is provided in the event of accidents ✓ Using locally sourced materials, whenever possible, to minimize transport distances. Locating worker camps close to project sites and arranging worker transport system to minimizing external traffic ✓ Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions <p>Transport of Hazardous Materials</p> <p>Project will have procedures ensuring the compliance with local laws and requirements applicable to the transport of hazardous materials. The procedures will be:</p> <ul style="list-style-type: none"> ✓ Proper labeling of containers, including the identity and quantity of the contents, hazards, and shipper contact information ✓ Providing a shipping document (e.g. shipping manifest) describing the contents of the load and its associated hazards in addition to the labeling of the containers. ✓ Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved ✓ Ensuring adequate transport vehicle specifications ✓ Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures ✓ Using labeling and placarding (external signs on transport vehicles) as required | | | |
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| | <ul style="list-style-type: none"> ✓ Providing the necessary means for emergency response Disease Prevention <ul style="list-style-type: none"> Interventions for communicable diseases ✓ Providing surveillance and active screening and treatment of workers ✓ Preventing illness among workers in local communities (undertaking health awareness and education initiatives, training health workers in disease treatment, conducting immunization programs for workers in local community to improve health and guard against infection, providing health services) ✓ Providing treatment through standard case management in on-site or community health care facilities ✓ Promoting collaboration with local authorities to enhance access of workers' families and the community to public health services and promote immunization Interventions for vector-borne diseases ✓ Prevention of larval and adult propagation through sanitary improvements and elimination of breeding grounds close to human settlements ✓ Elimination of unusable impounded water, increase in water velocity in natural and artificial channels ✓ Implementation of integrated vector control programs ✓ Promoting use of repellents, clothing, netting and other barriers to prevent insect bites ✓ Use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs ✓ Monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread ✓ Collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects ✓ Educating project personnel and local residents on risks ✓ Prevention and available treatment, monitoring communities during high-risk seasons to detect and treat cases ✓ Distributing appropriate education materials and following safety guidelines for the storage, transport and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure Emergency Preparedness and Response <ul style="list-style-type: none"> ✓ If there is a risk to the local community from a potential emergency arising at the project site, the company will inform the community through the communication measures, namely, informing the local authorities, communicating details of the nature of emergency, communicating protection options (evacuation, quarantine), providing advices on selecting an appropriate option and vehicle mounted speakers. | | | |
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8.3 Environmental Monitoring Plan with estimated budget (Construction Phase)

| Potential Impact | Monitoring Item | Monitoring Means | Allocated Budget per year (MMK) |
|--|--|--|--|
| Physical Environment | | | |
| Soil Degradation | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and Observation | 500,000 (included in construction cost) |
| Soil Contamination | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and Observation | 500,000 (included in construction cost) |
| Soil Erosion | <ul style="list-style-type: none"> Efficiency of erosion control measures Drains, waterways Vegetation and plants Concrete Aprons, concrete drains Deformation by erosion | Inspection and Observation | 500,000 (included in construction cost) |
| Topography | <ul style="list-style-type: none"> Monitoring of design of buildings and structures | Inspection and Observation | This is included in design cost. |
| Dust Emission | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Amount of dust on road side tree leaves Breathing Air | Inspection and Observation | 1,000,000 (included in construction cost) |
| Air Pollution | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Content of PM_{2.5}, PM₁₀, NO₂, SO₂, CO in air | Inspection, observation measuring air quality | 20,000,000 (included in construction cost) |
| Greenhouse gas emissions | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Content of CO₂ in air | Inspection, observation measuring air quality | 2,500,000 (included in construction cost) |
| Surface water/Ground water contamination | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Water quality test for temperature, pH, SS, DO, BOD₅, COD, total coliform bacteria, oil and grease | Inspection, observation measuring water quality | 5,000,000 (included in construction cost) |

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| Noise and vibration | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Noise and vibration level Traffic (on-site vehicles) count | Inspection, observation measuring and counting | 2,000,000 (included in construction cost) |
| Solid waste generation | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Amount and kind of solid waste | Inspection and observation | 2,000,000 (included in construction cost) |
| Changes to natural resources | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 2,000,000 (included in construction cost) |
| Traffic flow | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 1,500,000 (included in construction cost) |
| Biological Environment | | | |
| Destruction of vegetation and expelling of wildlife | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 1,000,000 (included in construction cost) |
| Disturbance to aquatic organisms and aquatic habitats | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 1,000,000 (included in construction cost) |
| Social Environment | | | |
| Existing social infrastructures and services | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and inspection | Part of CSR program and cost will be covered by the program |
| Landscape and scenery | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and interviewing the affected people | Some cost will be covered by design cost. 1,000,000 (included in construction cost) |
| Risks for infectious diseases such as AIDS/HIV due to influx of workers | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Workers' awareness on infectious diseases | Inspection, observation and interviewing | 9,500,000 (included in construction cost) |

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| Occupational safety and health (Risk of injuries and accidents to workers) | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Record of accidents | Inspection, observation Recording and documentation | |
| Emergency risk (risk of fire, earthquake) | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | |
| Community Health and Safety because of construction activities and increased traffic | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Record of accidents and infectious diseases | Inspection, observation and interviewing | |

8.4 Environmental Monitoring Plan with estimated budget (Operation Phase)

| Potential Impact | Monitoring Item | Monitoring Means | Allocated Budget per year (MMK) |
|--|--|----------------------------|---|
| Physical Environment | | | |
| Soil Degradation | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and Observation | 2,500,000 (included in maintenance cost) |
| Soil Contamination | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and Observation | 2,500,000 (included in maintenance cost) |
| Dust Emission | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection, observation | 2,000,000 (included in maintenance cost) |
| Air Pollution | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Content of NO₂, SO₂, CO, PM_{2.5}, PM₁₀ in air | Inspection, observation | 20,000,000 (included in maintenance cost) |
| | | measuring | |
| Greenhouse gas emissions | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Content of greenhouse gases in air (CO₂, hydrofluorocarbons etc.) | Inspection, observation | 3,500,000 (included in maintenance cost) |
| | | measuring | |
| Surface water/Ground water contamination | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Water temperature, pH, SS, DO, BOD5, COD, colour and | Inspection, observation | 7,500,000 (included in maintenance cost) |

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| | <p>odour, Total Nitrogen, Total Phosphorus, Sulphide, oil and grease, total coliform bacteria, formaldehyde, phenols, free chlorine, heavy metals such as zinc, chromium, arsenic, copper, mercury, cadmium, barium, lead and nickel</p> <ul style="list-style-type: none"> Discharge water from each source to the waterways | measuring | |
| Increased water demand | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 1,500,000 (included in maintenance cost) |
| Noise and vibration | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation measuring | 2,000,000 (included in maintenance cost) |
| Increased solid waste generation | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 3,000,000 (included in maintenance cost) |
| Increased wastewater generation | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 2,500,000 (included in maintenance cost) |
| Hazardous waste generation | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 3,000,000 (included in maintenance cost) |
| Changes to Natural Resources | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 1,000,000 (included in maintenance cost) |
| Increased traffic flow | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table Traffic count | Inspection, observation and counting | 1,500,000 (included in maintenance cost) |
| Foul Odor and Vectors | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 2,000,000 (included in maintenance cost) |
| Biological Environment | | | |
| Changes to terrestrial flora and fauna | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 1,000,000 (included in maintenance cost) |
| Changes to aquatic flora and fauna | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 1,000,000 (included in maintenance cost) |
| Social Environment | | | |

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|---|---|----------------------------|---|
| Inconveniency with socio-economic change | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 2,000,000 (included in maintenance cost) |
| Risk of injuries and accidents to workers | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 13,500,000 (included in maintenance cost) |
| Increased Emergency risk (risk of fire) | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | |
| Community Health and Safety because of project operation activities and increased traffic | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | |
| Light Intrusion | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Inspection and observation | 2,000,000 (included in maintenance cost) |

8.5 Environmental Monitoring Plan with estimated budget (Decommissioning Phase)

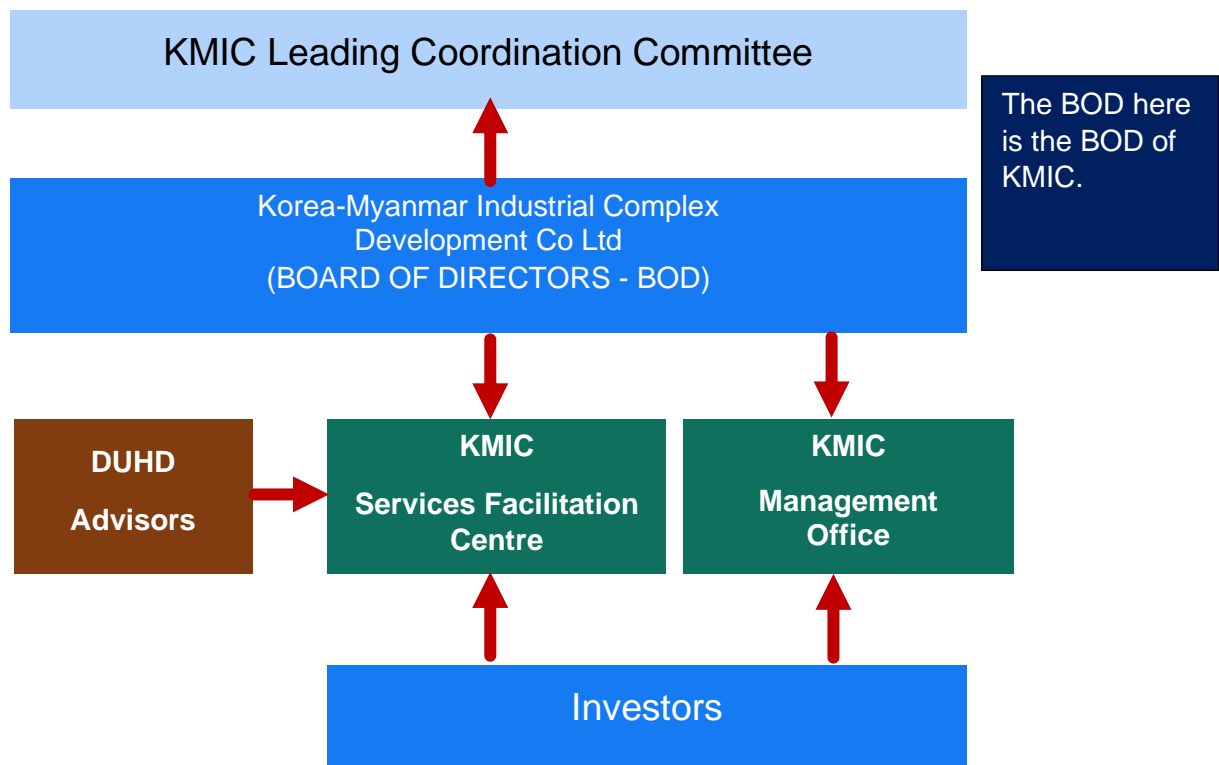
| Potential Impact | Monitoring Item | Monitoring Means | Allocated Budget per year (MMK) |
|---------------------------------|---|----------------------------|---------------------------------|
| Physical Environment | | | |
| Dust Emission and Air Pollution | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and inspection | 5,000,000 |
| Greenhouse gas emissions | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and inspection | |
| Surface water contamination | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and inspection | 1,000,000 |
| Noise and vibration | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in | Observation | 1,000,000 |

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| | Environmental Management Plan table | and inspection | |
| Solid waste generation (Hazardous and Non-Hazardous) | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and inspection | 1,500,000 |
| Social Environment | | | |
| Living and livelihood | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation | 2,000,000 |
| Risks for infectious diseases such as AIDS/HIV due to influx of workers | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and inspection | 9,500,000 |
| Occupational safety and health (Risk of injuries and accidents to workers) | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and inspection | |
| Community Health and Safety because of demolition activities and increased traffic | <ul style="list-style-type: none"> Monitoring of mitigation measures and aspects for monitoring in Environmental Management Plan table | Observation and inspection | |

8.5.1 Organization Structure for Environmental Management Plan Implementation Team

For the construction phase, the contractors will be responsible for implementing Environmental Management Plan and Monitoring Plan. For the operation phase, the developer of each industry and factory and tenants in the industrial complex will be responsible for implementing Environmental Management Plan and Monitoring Plan. For the time being, contractors have not been selected and developers of industries and factories and tenants are unknown yet. However, KMIC Management System will be developed as below.



The Board of Directors of Korea-Myanmar Industrial Complex Development Co Ltd will mainly oversee all the activities in the pre-construction, construction and operation periods, and manage affairs in accordance with the KMIC Internal Management Regulations.

In some matters, the KMIC BOD will seek guidance and advice from KMIC Leading Coordination Committee.

KMIC Services Facilitation Centre (KSFC) will provide services and advice to the investors, in accordance with these SOPs, in their obtaining of the necessary permits, approvals and certificates issued by the government entities concerned.

KMIC Management Office will manage all the affairs in the zone mainly during the operation period.

The KMIC Leading Coordination Committee will be established including responsible officials from Department of Urban and Housing Development and personnel from KMIC Development Co., Ltd. The responsibilities of the committee are to manage, supervise and

assist the contractors and developers and tenants of the KMIC in implementing EMP and monitoring plan. The committee members are mentioned in the following table.

Table 8. 1: Organization Structure for KMIC Leading Coordination Committee

| No. | Name | Position | Role in the committee |
|-----|-----------------------------|--|-----------------------|
| 1. | Daw Aye Aye Myint | Deputy Director General (Urban and Regional Development) Department of Urban and Housing Department (DUHD), Ministry of Construction | Leader |
| 2. | Mr. Kim Gunwoo | General Manager KMIC Development Co., Ltd. | Member |
| 3. | Daw Khin Thi Thi | Chief Engineer Department of Urban and Housing Department (DUHD), Ministry of Construction | Member |
| 4. | Daw Moe Moe Hlaing Myint | Deputy Director Department of Urban and Housing Department (DUHD), Ministry of Construction | Member |
| 5. | Mr. Noh Hun Seung | KMIC Development Co., Ltd. | Member |

8.5.2 Submission of Monitoring Report

The project proponent (project developer) will submit the monitoring reports to the Ministry of Natural Resources and Environmental Conservation every six months.

8.6 Development Effectiveness Indicators (Construction and operation Phase)

| Indicator | Monitoring Item | Monitoring Means | Recommended frequency of monitoring | Responsible Person During construction | Responsible Person During Operation |
|-----------------------------------|--|---------------------------------------|-------------------------------------|--|-------------------------------------|
| Direct Employment | <ul style="list-style-type: none"> Total number of employees working directly for the Project Enterprise | Reviewing | Every six months | Contractor/ Developer | Developer/ Tenants |
| Female Employment (%) | <ul style="list-style-type: none"> Total female employment as a percentage of total employees in the Project Enterprise. | Reviewing | Every six months | Contractor/ Developer | Developer/ Tenants |
| Taxes and Fees | <ul style="list-style-type: none"> Tax receipts and documents related to taxes and fees paid to the Government | Reviewing and Inspection | Every six months | Contractor/ Developer | Developer/ Tenants |
| E&S Management Systems | <ul style="list-style-type: none"> Tracking whether the Project Enterprise is compliant with E&S Management System active and in place. | Inspection, Observation and Measuring | Every six months | Contractor/ Developer | Developer/ Tenants |
| Purchases from domestic suppliers | <ul style="list-style-type: none"> The annual purchase of goods and services of the Project Enterprise | Inspection | Every six months | Contractor/ Developer | Developer/ Tenants |

8.7 Environmental Management Sub-Plans

The details of the following Environmental Management Plans are mentioned.

- 1) Waste Management Plan (including hazardous & non-hazardous waste)
- 2) Wastewater Management Plan
- 3) Air Pollution Control Management Plan
- 4) Noise Pollution Control Management Plan
- 5) Water Quality Management and Monitoring Plan
- 6) Energy and Water Efficiency Plan
- 7) Traffic Management Plan
- 8) Corporate Social Responsibility Programme (CSR)

8.7.1 Waste Management Plan (Hazardous and non-hazardous waste)

Objectives

The objective of the plan is to manage the waste generated from project activities to avoid any environmental damages and to monitor the effectiveness of the management plan and actions.

Legal Requirements

The plan will be in line with Environmental Conservation Law (2012), Environmental Conservation Rules (2014), National Environmental Policy of Myanmar (2019), EIA Procedure (2015), National Environmental Quality (Emission) Guideline, Public Health Law (1972), and Yangon City Development Law (2018).

Implementation Schedule

The plan will be implemented during the construction and operation phases of project.

Management Actions

The following management actions for hazardous and non-hazardous wastes will be carried out. The waste management will be sustainable and based on the principle of 3 Rs (Reduce, Reuse, Recycle) practice.

Non-hazardous solid waste management plan

For non-hazardous solid wastes, the following practices will be exercised as management actions:

- ✓ Avoidance of unnecessary cutting and removing of vegetation plants;
- ✓ Producing a precise construction drawing to avoid unnecessary cutting and filling of earth work and excavation work;
- ✓ Ensuring calculation and estimation of materials requirement to avoid excessive purchase;
- ✓ Ensuring purchase of materials and stacking at collection yard and ware houses;
- ✓ Educating workers to manage waste properly;
- ✓ Providing facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure;
- ✓ Reusing of construction materials and office materials to reduce the amount and volume of construction debris (for e.g. using formwork for several times, reusing the excavated earth for backfilling, and reusing scrap papers for office use and printing both sides whenever possible);
- ✓ Recycling of solid waste to reduce the amount and volume of construction debris (for e.g. sending recyclable solid waste to local recyclers);
- ✓ Providing dust bins at appropriate places for recyclables and non-recyclable wastes;
- ✓ Transporting waste to the waste transfer plot which has transfer container and trailer;
- ✓ Designing and constructing the waste transfer plot with drainage of paved areas and adequate water hydrants for maintenance of cleanliness and fire control and routes for garbage collection trucks for easy access;
- ✓ Collection of solid waste by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee on a regular basis (on-call system for construction waste).

The kitchen waste from residential/apartment will be segregated as wet and dry. The wet waste will be put in green bags and dry waste will be in blue bags. The recyclable wastes would be segregated and disposed in the relevant dust bins by the tenants with their own arrangement in their project compound. The tenants' storage of solid waste shall be allowed with KMIC JVC's prior approval only when it is stored in solid waste receptacles or trash containers which must be large enough to facilitate storage and collection and which must be installed within their plots.

The waste generated by tenants would be collected on a daily basis by the cleaners. The system requires use of a container, truck container pick-up equipment, and replacement of the container.

The waste collected from residential/apartment will be temporarily stored in a bin center. The bin center will cover the following aspects:

- 1) The size of the bin center will be big enough for storing the amount of waste generated for two days.
- 2) The routes for garbage collection trucks to get easy access to the bin center will be considered and made.
- 3) The lighting will be installed at the bin center for day and night work.
- 4) The air purification systems will be installed at the bin center for clean ventilation.
- 5) The liquid produced from waste and wastewater generated from cleansing bin center will be treated at the central wastewater treatment plant before disposal.
- 6) Locating the separate collection dust bins at the bin center for separately disposing the wastes and recycle products.
- 7) The adequate amount of water will be available for cleansing the bin center.
- 8) The bad smell from walls and leakage of contaminated water will be avoided.

The waste generated from industries will be categorized as hazardous waste, non-hazardous waste, toxic waste, and chemical waste and temporarily stored in the bin center separately based on the type of waste.

Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing) will collect the waste from the bin center on a specified day regularly based on the type of waste.

The developers of industries and factories of KMIC will prepare IEE or EIA report based on their business type and they will have their EMP and Monitoring Plan for non-hazardous solid waste to follow for different project phases.

Hazardous solid waste management plan

For hazardous solid wastes, in addition to the above-mentioned measures for non-hazardous solid waste, the following practices will be exercised as management actions:

- ✓ Educating workers and staff about hazardous wastes and waste management;
- ✓ Identifying and characterizing the waste as hazardous waste;
- ✓ Providing safety shoes, masks, face shields and tools with the workers/cleaners (who have been trained to manage hazardous wastes) to handle the waste;
- ✓ Segregation and collection will be made on the day of generation of the waste and sending for the transit storage for facilitating the storage at the place of "earmarked" storage point;
- ✓ Storing hazardous waste in the specific containers used for storage (the date of storage is stated specifically, and each container contains the label and tag of the waste stored);
- ✓ Clear mention of the content and composition of the chemicals for hazardous chemicals;
- ✓ The waste storage area will be away from the place of generation and specifically marked for the purpose of storage;
- ✓ The waste storage area will have a hard, impermeable floor with drainage, and designed for cleaning/disinfection with available water supply;

- ✓ The waste storage area will be secured by locks with restricted access and designed for access and it will also be protected from sun, and inaccessible to animals/rodents.
- ✓ Cleaning the waste storage area by authorized cleaning staff at fixed intervals;
- ✓ Avoiding the use of containers with leakage;
- ✓ Keeping hazardous waste containers closed at all times except to add waste;
- ✓ Storing hazardous wastes with secondary containment;
- ✓ Making space available in between the containers of different characteristics;
- ✓ Having all the equipment for controlling the pollution, water – spray systems, and alarm systems to caution others at the storage area;
- ✓ Carrying out regular inspections to find the deficiencies of the storage systems;
- ✓ Availability of an extra number of containers at the place of storage to meet the exigencies of the demand or excess generation of the wastes;
- ✓ Maximum quantity permissibility depends upon the type and characteristics of the waste intended to be stored;
- ✓ The maximum quantity will not be more than a truckload;
- ✓ Taking care of loading waste container to the transportation truck (Transportation and disposal will be carried out by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing))
- ✓ Availability of first-aid kit and cleaning materials for emergency spills.

Hazardous Waste Management for Tenants

The hazardous waste will be separately kept in bin center until Pollution Control and Cleansing Department – PCCD collects waste. Respective tenants will be responsible for handling and disposing of hazardous waste.

Hazardous Waste Management for Factories and Industries

The developers of industries and factories of KMIC will prepare IEE or EIA report based on their business type and they will have their EMP and Monitoring Plan for hazardous solid waste to follow for different project phases. In general, the developers have to consider the following aspects in preparation of their EMP for hazardous waste for operation phase.

Waste minimization (Reduction at source)

Source reduction includes technological efficiency, material substitute and good management practice. The construction workers, employees and staff of factories, and offices will be encouraged to reduce the volume wastes generated.

Minimizing quantities of ordering chemicals – This can also reduce potential chemical exposure to personnel, thus minimizing the risks and severity of accidents.

Substitution – Substitution of a non-hazardous or less hazardous chemical in place of a hazardous chemical is a commonly used method of reducing waste. For e.g. Changing a cleaning agent from a toxic, flammable solvent to an appropriate soap or detergent solution, and the use of water-based paints and cements over solvent based.

Recycling – Many materials treated as chemical waste are actually surplus chemicals that are reusable. The unopened or unwanted chemicals would be transferred to related industries where they may be used.

Waste Segregation and Storage

All waste stored together must be compatible. Guidelines for segregation of chemicals as found in the Laboratory Safety Manual must be adhered to. Generally, classes, i.e. ignitable, corrosives, toxics, and reactive, would be segregated. This information will be listed on the label of each chemical or on the MSDS.

The hazardous waste and chemical waste will be temporarily stored in the bin center separately. Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee will collect the waste.

Monitoring Plan

Monitoring will be carried out for construction and operation phases.

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Table 8. 2: Solid Waste (Hazardous and Non-hazardous) Management Plan

| Mitigation Measures | Project Phase | Monitoring Item/ Place | Monitoring Mean | Responsible Person/Organization | Frequency of Monitoring |
|---|---------------|-----------------------------------|------------------------|--|---|
| Non-hazardous Solid Waste | | | | | |
| Avoidance of unnecessary cutting and removing of vegetation plants | Construction | Construction Site | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Daily during site clearing |
| Producing a precise construction drawing to avoid unnecessary cutting and filling of earth work and excavation work | Construction | Drawings | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Once before site clearing and earthwork |
| Ensuring calculation and estimation of materials requirement to avoid excessive purchase | Construction | Calculation and Office Documents | Observation Inspection | Environment, Health and Safety Officer, Procurement Staff and Site Engineer (Contractor) | whenever purchase is needed |
| Ensuring purchase of materials and stacking at collection yard and warehouses | Construction | Collection Yard Warehouse | Observation Inspection | Environment, Health and Safety Officer, Store Keeper and Site Engineer (Contractor) | Monthly |
| Providing dust bins at appropriate places for different waste (recyclables, non-recyclables and kitchen waste) | Construction | Construction Site | Observation Inspection | Environment, Health and Safety Officer, Site Engineer and Cleaner (Contractor) | Daily |
| Providing facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure | Construction | Construction Site | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Daily |
| If possible, the recycling and reusing of solid waste will be done to reduce the amount and volume of solid waste | Construction | Construction Site and Site Office | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Monthly |

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| | Operation | Factories, Industries and Facilities of KMIC | Observation Inspection | Environment, Health and Safety Officer (Developer) | Monthly |
| Designing and constructing the transfer plot with drainage of paved areas and adequate water hydrants | Construction | Design of Transfer plot Construction site of Transfer plot | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Two or three times each during design stage and construction stage |
| Designing and constructing the bin center including necessary requirements | Operation | Design of bin center Construction site of bin center | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Developer) | Two or three times each during design stage and construction stage |
| Transporting waste to the waste transfer plot/bin center | Construction | Waste Transfer Plot | Observation Inspection | Environment, Health and Safety Officer and Cleansing Officer (Contractor) | Every two or three days |
| | Operation | Bin Center | Observation Inspection | Environment, Health and Safety Officer and Cleansing Officer (Developer) | Every two or three days |
| Waste Collection by Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee | Construction | Waste Transfer Plot | Observation Inspection | Environment, Health and Safety Officer, Site Engineer and Cleansing Officer (Contractor) | whenever the garbage truck of YCDC to collect the garbage |
| | Operation | Bin Center | Observation Inspection | Environment, Health and Safety Officer and Cleansing Officer (Developer) | whenever the garbage truck of YCDC comes to collect the garbage from the site. |
| Hazardous Solid Waste | | | | | |
| Educating workers and staff about | Construction | Number of | Recording | Environment, Health | Weekly |

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|--|--------------|---|--|---|---|
| hazardous wastes and waste management | | Trainings conducted and training contents Workers' and staff's performance | and Documenting Observation Inspection | and Safety Officer (Contractor) | |
| | Operation | Number of Trainings conducted and training contents Workers' and staff's performance | Recording and Documenting Observation Inspection | Environment, Health and Safety Officer (Developer) | Weekly |
| Identifying and characterizing the waste as hazardous waste | Construction | Type of Hazardous Waste | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Whenever the waste is needed to identify and characterize |
| | Operation | Type of Hazardous Waste | Observation Inspection | Environment, Health and Safety Officer and Supervisor (Developer) | Whenever the waste is needed to identify and characterize |
| Providing safety shoes, masks, face shields and tools with the workers/cleaners (who have been trained to manage hazardous wastes) to handle the waste | Construction | Workers/cleaners equipped with Personal Protective Gear | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Whenever Personal Protective Equipment is needed to wear |
| | Operation | Workers/cleaners equipped with Personal Protective Gear | Observation Inspection | Environment, Health and Safety Officer and Supervisor (Developer) | Whenever Personal Protective Equipment is needed to wear |
| Segregation and collection on the day of generation of the waste and sending for | Construction | Segregated Waste | Observation Inspection | Environment, Health and Safety Officer | Whenever segregation and |

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| the transit storage for facilitating the storage at the place of “earmarked” storage point | | Construction Site Storage Site | | (Contractor) | collection are made |
| | Operation | Segregated Waste Factory and Industries Storage Site | Observation Inspection | Environment, Health and Safety Officer (Developer) | Whenever segregation and collection are made |
| Storing hazardous waste in the specific containers used for storage (the date of storage is stated specifically, and each container contains the label and tag of the waste stored) | Construction | Storage Site | Observation Inspection | Environment, Health and Safety Officer (Contractor) | Weekly |
| | Operation | Storage Site | Observation Inspection | Environment, Health and Safety Officer (Developer) | Weekly |
| Clear mention of the content and composition of the chemicals for hazardous chemicals | Construction | Hazardous Chemicals and Tag | Observation Inspection | Environment, Health and Safety Officer (Contractor) | Whenever chemical waste is found |
| | Operation | Hazardous Chemicals and Tag | Observation Inspection | Environment, Health and Safety Officer (Developer) | Whenever chemical waste is found |
| The waste storage area will be away from the place of generation and specifically marked for the purpose of storage | Construction | Waste Storage Area | Observation Inspection | Environment, Health and Safety Officer (Contractor) | Once |
| | Operation | Waste Storage Area | Observation Inspection | Environment, Health and Safety Officer (Developer) | Once |
| The waste storage area will have a hard, impermeable floor with drainage, and designed for cleaning/disinfection with available water supply | Construction | Waste Storage Area | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Once |
| | Operation | Waste Storage Area (Bin Center) | Observation Inspection | Environment, Health and Safety Officer (Developer) | Monthly |
| The waste storage area will be secured by locks with restricted access and designed for access and it will also be protected from sun, and inaccessible to | Construction | Waste Storage Area | Observation Inspection | Environment, Health and Safety Officer, Security Officer (Contractor) | Weekly |

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|---|--------------|---|------------------------|---|--------|
| animals/rodents | Operation | Waste Storage Area (Bin Center) | Observation Inspection | Environment, Health and Safety Officer, Security Officer (Developer) | Weekly |
| Cleaning the waste storage area by authorized cleaning staff at fixed intervals | Construction | Waste Storage Area | Observation Inspection | Cleansing Supervisor (Contractor) | Daily |
| | Operation | Waste Storage Area (Bin Center) | Observation Inspection | Cleansing Supervisor (Developer) | Daily |
| Avoiding the use of containers with leakage | Construction | Waste Container | Observation Inspection | Cleansing Supervisor (Contractor) | Daily |
| | Operation | Waste Container | Observation Inspection | Cleansing Supervisor (Developer) | Daily |
| Keeping hazardous waste containers closed at all times except to add waste | Construction | Waste Container | Observation Inspection | Environment, Health and Safety Officer, and Cleansing Supervisor (Contractor) | Daily |
| | Operation | Waste Container | Observation Inspection | Environment, Health and Safety Officer, and Cleansing Supervisor (Developer) | Daily |
| Storing hazardous wastes with secondary containment | Construction | Secondary Containment for Hazardous Waste | Observation Inspection | Environment, Health and Safety Officer and Cleansing Supervisor (Contractor) | Daily |
| | Construction | Secondary Containment for Hazardous Waste | Observation Inspection | Environment, Health and Safety Officer and Cleansing Supervisor (Developer) | Daily |
| Making space available in between the containers of different characteristics | Construction | Space Availability between the containers | Observation Inspection | Environment, Health and Safety Officer and Cleansing Supervisor (Contractor) | Weekly |
| | Operation | Space Availability between the containers | Observation Inspection | Environment, Health and Safety Officer and Cleansing Supervisor (Developer) | Weekly |
| Having all the equipment for controlling | Construction | Availability and | Observation | Environment, Health | Weekly |

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| the pollution, water – spray systems, and alarm systems to caution others at the storage area | | functionality of Equipment | Inspection | and Safety Officer and Cleansing Supervisor (Contractor) | |
| | Operation | Availability and functionality of Equipment | Observation Inspection | Environment, Health and Safety Officer and Cleansing Supervisor (Developer) | Weekly |
| Carrying out regular inspections to find the deficiencies of the storage systems | Construction | Facilities and functions of storage system | Observation Inspection | Environment, Health and Safety Officer and Cleansing Supervisor (Contractor) | Monthly |
| | Operation | Facilities and functions of storage system | Observation Inspection | Environment, Health and Safety Officer and Cleansing Supervisor (Developer) | Monthly |
| Availability of an extra number of containers at the place of storage to meet the exigencies of the demand or excess generation of the wastes | Construction | Availability of Extra Number of Containers | Checking | Environment, Health and Safety Officer, Cleansing Supervisor (Contractor) | Weekly |
| | Operation | Availability of Extra Number of Containers | Checking | Environment, Health and Safety Officer, Cleansing Supervisor (Developer) | Weekly |
| Maximum quantity permissibility depends upon the type and characteristics of the waste intended to be stored | Construction | Maximum quantity of waste permitted Type and characteristics of waste | Inspection Observation | Environment, Health and Safety Officer and Cleansing Supervisor (Contractor) | Daily |
| | Operation | Maximum quantity of waste permitted Type and characteristics of waste | Inspection Observation | Environment, Health and Safety Officer and Cleansing Supervisor (Developer) | Daily |

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|---|--------------|-------------------------------------|------------------------|--|------------------------------------|
| The maximum quantity will not be more than a truckload | Construction | Maximum quantity of waste | Inspection Observation | Environment, Health and Safety Officer and Cleansing Supervisor (Contractor) | Daily |
| | Operation | Maximum quantity of waste | Inspection Observation | Environment, Health and Safety Officer and Cleansing Supervisor (Developer) | Daily |
| Taking care of loading waste container to the transportation truck | Construction | Cleaners' Performance | Inspection Observation | Environment, Health and Safety Officer and Cleansing Supervisor (Contractor) | Whenever waste container is loaded |
| | Operation | Cleaners' Performance | Inspection Observation | Environment, Health and Safety Officer and Cleansing Supervisor (Developer) | Whenever waste container is loaded |
| Availability of first-aid kit and cleaning materials for emergency spills | Construction | First aid kit Cleaning Materials | Inspection Observation | Environment, Health and Safety Officer and Cleansing Supervisor (Contractor) | Weekly |
| | Operation | First aid kit Cleaning Materials | Inspection Observation | Environment, Health and Safety Officer and Cleansing Supervisor (Developer) | Weekly |

Budget and Responsibilities

Budget

For the construction phase, total 2,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

For the operation phase, total 6,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

Note: Developers of different industries and factories will allocate budgets for different project phases of their projects.

Responsibilities

For the construction phase, the contractors will be responsible for implementing Environmental Management Plan and Monitoring Plan. For the operation phase, the developer of each industry and factory and tenants in the industrial complex will be responsible for implementing Environmental Management Plan and Monitoring Plan. For the time being, contractors have not been selected and developers of industries and factories and tenants are unknown yet. However, KMIC Leading Coordination Committee will be established including responsible officials from Department of Urban and Housing Development and personnel from KMIC Development Co., Ltd. The responsibilities of the committee are to manage, supervise and assist the contractors and developers and tenants of the KMIC in implementing EMP and monitoring plan. The monitoring report will be submitted to the Ministry of Natural Resources and Environmental Conservation (MONREC) every six months or directed by the MONREC. The committee members are mentioned in the following table.

| No. | Name | Position | Role in the committee |
|-----|-----------------------------|--|-----------------------|
| 1. | Daw Aye Aye Myint | Deputy Director General (Urban and Regional Development) Department of Urban and Housing Department (DUHD), Ministry of Construction | Leader |
| 2. | Mr. Kim Gunwoo | General Manager KMIC Development Co., Ltd. | Member |
| 3. | Daw Khin Thi Thi | Chief Engineer Department of Urban and Housing Department (DUHD), Ministry of Construction | Member |
| 4. | Daw Moe Moe Hlaing Myint | Deputy Director Department of Urban and Housing Department (DUHD), Ministry of Construction | Member |
| 5. | Mr. Noh Hun Seung | KMIC Development Co., Ltd. | Member |

8.7.2 Wastewater Management Plan

Objectives

The objective of the plan is to manage the wastewater generated from project activities to avoid or reduce the impacts on soil, surface water, ground water and public health and any other impacts and nuisance.

Legal Requirements

The plan will be in line with Environmental Conservation Law (2012), Environmental Conservation Rules (2014), National Environmental Policy of Myanmar (2019), EIA Procedure (2015), National Environmental Quality (Emission) Guideline – Site Runoff and Effluent Levels, Public Health Law (1972), and Yangon City Development Law (2018).

Implementation Schedule

The plan will be implemented for the construction and operation phases of project.

Management Actions

The following practices will be exercised as management actions:

- ✓ Controlling earthwork and ensuring supervision of excavation activities;
- ✓ Installation and construction of drainage structure properly;
- ✓ Providing soil erosion control where necessary;
- ✓ Building the sedimentation basin on a construction site to capture the disturbed soil which is washed off during rainfall and lead to protection of the water quality of surface and ground water;
- ✓ Constructing sand traps to settle the sand at the bottom and store the deposited sand;
- ✓ Systematic stacking and piling of materials on site;
- ✓ Adopting the proper waste management system (including hazardous and non-hazardous wastes);
- ✓ Regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills (if found, the immediate repair and cleansing will be conducted);
- ✓ Systematic storage of fuels and filling station at construction site yard compound, handling and disposal of new oil and used oil waste;
- ✓ Provision of impervious basement at operation area to prevent oil spill when heavy machineries are working;
- ✓ Daily checking to earth moving machines by motor transport officer before start engines;
- ✓ Providing a good pavement at machine workshop and garage;
- ✓ Providing the proper sanitation system for the construction workers and project staff;
- ✓ Maintaining on-site sanitation facilities in good condition and encouraging to use;
- ✓ Preventing sewer leakage and implementation of adequate final disposal of sludge as permitted by the local municipality;
- ✓ Checking all development/activity - related machinery thoroughly not to leak oils on the ground and regular maintenance of the machinery;
- ✓ Carrying out all maintenance works in a designated area and such areas will be cemented and enclosed to avoid storm water from carrying away oil and form wastewater;
- ✓ Managing car wash areas and other places handling oil activities within the site and controlling the drains from these areas;
- ✓ Treating domestic and industrial wastewater to reach the standards stipulated in National Environmental Quality (Emission) Guidelines before disposal;
- ✓ Disposing sludge generated from the central wastewater treatment plant systematically in connection with the Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing);

- ✓ Adopting wastewater treatment system by each industry and factory according to their business type;
- ✓ Monitoring the quality of treated wastewater by the real-time monitoring indicator; and
- ✓ Measuring the quality of treated wastewater every six months.

Note: Developers of industries and factories have their own EMP and monitoring plans for wastewater generation according to their business type.

Monitoring Plan

Monitoring will be carried out for construction and operation phases.

Table 8. 3: Wastewater Management Plan

| Mitigation Measures | Project Phase | Monitoring Item/ Place | Monitoring Mean | Responsible Person/Organization | Frequency of Monitoring |
|---|---------------|------------------------------------|------------------------|---|---|
| Controlling earthwork and ensuring supervision of excavation activities | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Daily during excavation works |
| Installation and construction of drainage structure properly | Construction | Drainage at Construction Site | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Weekly during construction |
| | Operation | Drainage at KMIC | Observation Inspection | Environment, Health and Safety Officer (Developer) | Monthly |
| Providing soil erosion control where necessary | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Three times a week (especially in rainy season) |
| Building the sedimentation basin on a construction site | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Once |
| | | Quality of Construction Wastewater | Measuring | Environment, Health and Safety Officer (Contractor) | Every six months |
| Constructing sand traps to settle the sand at the bottom and store the deposited sand | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Once |
| Systematic stacking and piling of materials on site | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Daily |

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|---|--------------|--|------------------------|---|--|
| Adopting the proper waste management system (including hazardous and non-hazardous wastes) | Construction | Practices and processes of waste management system | Observation Inspection | Environment, Health and Safety Officer (Contractor) | Weekly |
| | Operation | Practices and processes of waste management system | Observation Inspection | Environment, Health and Safety Officer (Developer) | Weekly |
| Regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills | Construction | Machineries, vehicles and sources Record of maintenance | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Weekly |
| | Operation | Machineries, vehicles and sources Record of maintenance | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Weekly |
| Systematic storage of fuels and filling station at construction site yard compound, handling and disposal of new oil and used oil waste | Construction | Store at Construction Site | Observation Inspection | Store Manager (Contractor) | Weekly |
| | Operation | Store at KMIC | Observation Inspection | Store Manager (Developer) | Weekly |
| Provision of impervious basement at operation area to prevent oil spill when heavy machineries are working | Construction | Operation Area for heavy machineries | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Whenever heavy machineries are working |
| | Operation | Operation Area for heavy machineries | Observation Inspection | Environment, Health and Safety Officer and Supervisor (Developer) | Whenever heavy machineries are working |

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|---|--------------|---|------------------------|---|----------------|
| | | | | | (or) as needed |
| Daily checking to earth moving machines before start engines | Construction | Earth moving machines | Observation Inspection | Motor transport officer (Contractor) | Daily |
| Providing a good pavement at machine workshop and garage | Construction | Pavement at machine workshop and garage | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Once |
| | Operation | Pavement at machine workshop and garage | Observation Inspection | Environment, Health and Safety Officer (Developer) | Once |
| Providing the proper sanitation system for the construction workers and staff | Construction | Sanitation System (toilet, septic tank, water supply, collection and disposal system) | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Monthly |
| | Operation | Sanitation System (toilet, septic tank, water supply, collection and disposal system) | Observation Inspection | Environment, Health and Safety Officer (Developer) | Monthly |
| Maintaining on-site sanitation facilities in good condition and encouraging to use | Construction | Sanitation facilities | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Monthly |
| | Operation | Sanitation facilities | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Monthly |
| Preventing sewer leakage and implementation of adequate final disposal of sludge as permitted by the local municipality | Construction | Sewer Disposal of sludge | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Monthly |

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|--|--------------|--|------------------------|--|---------|
| | Operation | Sewer Disposal of sludge | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Monthly |
| Checking all development/activity - related machinery thoroughly not to leak oils on the ground and regular maintenance of the machinery | Construction | Machineries Record of machinery maintenance | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Weekly |
| | Operation | Machineries Record of machinery maintenance | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Weekly |
| Carrying out all maintenance works in a designated area and such areas will be cemented and enclosed to avoid storm water from carrying away oil and form wastewater | Construction | Maintenance Works Designated area for maintenance works | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Weekly |
| | Operation | Maintenance Works Designated area for maintenance works | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Weekly |
| Managing car wash areas and other places handling oil activities within the site and controlling the drains from these areas | Construction | Car Wash Areas and other places handling oil activities and drains connected | Observation Inspection | Environment, Health and Safety Officer, and Site Engineer (Contractor) | Weekly |
| | Operation | Car Wash Areas and other places handling oil activities and drains connected | Observation Inspection | Environment, Health and Safety Officer, and Cleansing Supervisor (Developer) | Weekly |

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|---|-----------|-------------------------------|---|--|------------------|
| Treating domestic and industrial wastewater to reach the standards stipulated in National Environmental Quality (Emission) Guidelines before disposal | Operation | Quality of treated wastewater | Measuring at laboratory | Environment, Health and Safety Officer (Developer) | Every six months |
| Monitoring quality of treated wastewater by the real-time monitoring indicator | Operation | Quality of treated wastewater | Reading of real – time monitoring indicator | Environment, Health and Safety Officer (Developer) | Daily |
| Adopting wastewater treatment system by each industry and factory according to their business type | Operation | Quality of treated wastewater | Measuring at laboratory | Environment, Health and Safety Officer (Developer) | Every six months |

Budget and Responsibilities

Budget

For the construction phase, total 3,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

For the operation phase, total 2,500,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

Note: Developers of different industries and factories will allocate budgets for different project phases of their projects.

Responsibilities

Regarding the responsibilities, details are mentioned in the above section: Waste Management Plan (Hazardous and non-hazardous waste).

8.7.3 Air Pollution Control Management Plan

Objectives

The objective of the plan is to reduce and mitigate the emission of air pollutants and dust from the project activities following National Environmental Quality Emission guidelines (and in their absence current World Health Organization (WHO) air quality guidelines for the most common pollutants).

Legal Requirements

The plan will be in line with Environmental Conservation Law (2012), Environmental Conservation Rules (2014), EIA Procedure (2015), Motor Vehicle Law (2015), National Environmental Quality (Emission) Guideline – relevant standards for air emissions (2015) and World Health Organization (WHO) air quality guidelines.

Implementation Schedule

The plan will be implemented for the construction and operation phases of project.

Management Actions

The following mitigation measures will be implemented for reducing the air and dust emissions generated from the construction, operation (including maintenance work), and decommissioning phases of the project.

- ✓ Restricting speed control of earth moving machines, transport buses and traffic within the project site;
- ✓ Pouring water on road ways at site and excavated area, cutting area, filling area and compacting area;
- ✓ Installing a wash deck at the exit way of the site to remove mud from vehicles which may become dust around the site and along the main road;
- ✓ Installing trucks with proper covers when carrying sand, river shingles and cement to avoid falling down along the main road and emission of particulates;
- ✓ Erecting notice and caution signs of “Dusty Area” around the project areas for the awareness of the people;
- ✓ Providing the workers with facial masks to wear in the project site;
- ✓ Regular maintenance of construction plants, vehicles, machineries and equipment;
- ✓ Prohibiting unnecessary driving and moving at site and idling of vehicles;

- ✓ Prohibition of open fire burning of materials or wastes;
- ✓ Proper storage of chemical and emitted construction materials;
- ✓ Conducting training to raise the awareness of drivers, operators and staff on greenhouse emissions and mitigation measures;
- ✓ Formulating the construction management procedures including the efficient use of construction vehicles and machineries to reduce greenhouse gas emissions during the construction phase;
- ✓ Designing and constructing the site offices as much as possible to get the natural light and ventilation.
- ✓ The air quality will be monitored by installing an air quality monitoring station and the air quality results will be sent to Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee on a monthly basis.

For the operation phase, the developers of industries and factories will be encouraged to adopt the following mitigation measures.

- ✓ Controlling the emissions of the factories and industries by different technologies and technical measures to follow Guidelines for Air Emissions described in National Environmental Quality Emission Guidelines (For the parameters not included in the National Environmental Quality Emission Guidelines, “Air Quality Guidelines for Europe, 1997. WHO Regional Publications, European Series No. 23. World Health Organization” will be followed);
- ✓ All fuel will be sourced from trusted sources that have employed the necessary steps to eliminate lead and reduce sulphur content;
- ✓ Controlling greenhouse gas emissions by energy use efficiency, process modification, selection of fuels or other materials, the processing of which may result in less emission, application of emission control techniques, if possible;
- ✓ The air quality will be monitored by installing an air quality monitoring station and the air quality results will be sent to Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee on a monthly basis.

Residents and staff/employee of residential areas and offices and other development/facilities will be encouraged to do the following practice:

- Using natural light as much as possible (and using energy efficient electrical appliances like energy - saving light bulbs);
- Keeping windows shut when HVAC is in use, but employing natural ventilation whenever possible;
- Unplugging TVs, AV equipment, and phone chargers when not in use;
- Turning off the lights and computer when leaving the office;
- Recycling and/or reusing as many waste materials as possible;
- Biking or walking to work if possible (OR) arranging bus for the workers;
- Using the environmentally friendly air conditioners and refrigerators to avoid or reduce the emission of fluorinated gases.

Note: Developers of different industries and factories will have their EMP and monitoring plans for air pollution based on the business type.

Monitoring Plan

Monitoring will be carried out for construction and operation phases.

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Table 8. 4: Air Pollution Control Management Plan

| Mitigation Measures | Project Phase | Monitoring Item/ Place | Monitoring Mean | Responsible Person/Organization | Frequency of Monitoring |
|---|---------------|--|---|--|--|
| Restricting speed control of earth moving machines, transport buses and traffic within the project site | Construction | Vehicles moving in construction site | Measuring vehicular speed by using portable speedometer | Construction Supervisor (Contractor) Site | Three times a week in dry season Once a week in wet season |
| Pouring water on road ways at site and excavated area, cutting area, filling area and compacting area | Construction | Areas mentioned in construction site | Observation Inspection | Construction Supervisor (Contractor) Site | Daily in dry season Once a week in wet season |
| Installing a wash deck at the exit way of the site to remove mud from vehicles | Construction | Wash Deck | Observation Inspection | Construction Supervisor (Contractor) Site | Two times a week |
| Installing trucks with proper covers when carrying sand, river shingles, cement, excavated earth, construction debris | Construction | Trucks carrying sand, river shingles, cement, excavated earth, construction debris | Observation Inspection | Construction Supervisor (Contractor) Site | whenever these trucks come to the site and leave from the site |
| Erecting notice and caution signs of "Dusty Area" around the project areas for the awareness of the people | Construction | Around Construction Site | Observation Inspection | Construction Supervisor (Contractor) Site | Once |
| Providing the workers with facial masks to wear in the project site | Construction | Workers wearing facial masks | Observation Inspection | Construction Supervisor (Contractor) Site | Whenever workers need to wear masks |
| Regular maintenance of construction plants, vehicles, machineries and equipment | Construction | Construction plants, vehicles, | Observation Inspection | M&E Officer and Construction Supervisor Site | Weekly |

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|--|--------------|--|------------------------|---|---|
| | | machineries and equipment Maintenance records | | (Contractor) | |
| Prohibiting unnecessary driving and moving at site and idling of vehicles | Construction | Vehicles at site | Observation Inspection | Construction Site Supervisor (Contractor) | Daily |
| Prohibition of open fire burning of materials or wastes | Construction | Incident of open fire burning | Observation Inspection | Security Officer and Construction Site Supervisor (Contractor) | Daily |
| Proper storage of chemical and emitted construction materials | Construction | Storage area | Observation Inspection | Store Supervisor (Contractor) | Daily |
| Conducting training to raise the awareness of drivers, operators and staff on greenhouse emissions and mitigation measures | Construction | Number of trainings conducted Training Manuals | Recording | Environment, Health and Safety Officer (Contractor) | Every four months |
| Formulating the construction management procedures including the efficient use of construction vehicles and machineries to reduce greenhouse gas emissions during the construction phase | Construction | Construction Management Procedures and Guidelines | Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Once at least (if needed two or three times for revision) |
| Using natural light as much as possible (and using energy efficient electrical appliances like energy - saving light bulbs) | Construction | Construction Site Office Construction Site | Observation Inspection | Administrative Officer and Construction Site Supervisor (Contractor) | Monthly |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer (Developer) | Weekly |
| Keeping windows shut when | Construction | Construction | Observation | Administrative | Daily |

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| HVAC is in use, but employing natural ventilation whenever possible | | Site Office | Inspection | Officer(Contractor) | |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer(Developer) | Daily |
| Turning off the lights and computer and office appliances when leaving the office | Construction | Construction Site Office | Observation Inspection | Administrative Officer(Contractor) | Daily |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer(Developer) | Daily |
| Recycling and/or reusing as many waste materials as possible | Construction | Wastes generated from Construction Site Office and Construction Site | Observation Inspection | Environmental, Health and Safety Officer and Administrative Officer(Contractor) | Weekly |
| | Operation | Wastes generated from Offices, Industries and factories in KMIC compound | Observation Inspection | Environmental, Health and Safety Officer and Administrative Officer(Developer) | Weekly |
| Biking or walking to work if possible (OR) arranging bus for the workers | Construction | Transportation arrangement for workers | Observation Inspection | Administrative Officer(Contractor) | Weekly |
| | Operation | Transportation arrangement for workers | Observation Inspection | Administrative Officer (Developer) | Weekly |
| Using the environmentally | Construction | Construction | Observation | Administrative | when air conditioners |

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| friendly air conditioners and refrigerators to avoid or reduce the emission of fluorinated gases | | Site Office | Inspection | Officer(Contractor) | and refrigerators are necessary to be used |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer(Developer) | when air conditioners and refrigerators are necessary to be used |
| Air quality will be monitored by installing an air quality monitoring station and the air quality results will be sent to Pollution Control and Cleansing Department – PCCD (Urban Environmental Conservation and Cleansing), Yangon City Development Committee on a monthly basis. | Construction | Strategic location of construction site which covers the whole area of project site | Measuring | Environment, Health and Safety Officer and Site Engineer (Contractor) | Daily |
| | Operation | Strategic location of project compound which covers the whole area of project | Measuring | Environment, Health and Safety Officer (Developer) | Daily |

Air Quality Monitoring Locations and Parameters to be measured

Table 8. 5: Air Quality Monitoring Locations and Parameters to be measured

| Sample point | Parameters to be measured | Latitude and Longitude | Location |
|--------------|--|------------------------|---------------------------------------|
| AQ -1 | PM ₁₀ (24 hr), PM _{2.5} (24 hr), SO ₂ (24 hr), NO ₂ (1 hr), CO (1 hr), O ₃ (8 hr), VOCs (1 hr), HC, CH ₄ | N 17° 8' 48.93" | Farm land near project site |
| | | E 96° 10' 12.93" | |
| AQ-2 | | N 17° 6' 37" | Monastery compound, Kyarkansu village |
| | | E 96° 8' 34" | |

Budget and Responsibilities

Budget

For the construction phase, total 6,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

For the operation phase, total 9,500,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

Note: Developers of industries and different factories will allocate budget for implementing EMP and monitoring plans for air pollution for different project phases.

Responsibilities

Regarding the responsibilities, details are mentioned in the above section: Waste Management Plan (Hazardous and non-hazardous waste).

8.7.4 Noise Pollution Control Management Plan

Objectives

The objective of the plan is to reduce and mitigate the noise level which can be generated from the project activities.

Legal Requirements

The plan will be in line with Environmental Conservation Law (2012), Environmental Conservation Rules (2014), EIA Procedure (2015), Motor Vehicle Law (2015), National Environmental Quality (Emission) Guideline – relevant standards for noise emissions (2015).

Implementation Schedule

The plan will be implemented for the construction and operation phases of project.

Management Actions

The following mitigation measures will be implemented for reducing the noise emissions generated from the construction, operation (including maintenance work), and decommissioning phases of the project.

- ✓ Providing training to the drivers and operators of construction vehicles and machineries how to reduce the noise from their operations;
- ✓ Restriction of the construction activities in night times;
- ✓ Regular maintenance of vehicles and machineries;
- ✓ Wearing the ear muffers (hearing protection devices) to protect the noise and vibration;

- ✓ Maintaining the noise within the noise level (National Environmental Quality Emission Guidelines) set by Ministry of Natural Resources and Environmental Conservation;
- ✓ Using sound absorb, sound proof engines at construction site and proper maintenance;
- ✓ Regular checking and maintenance to silencers of engines;
- ✓ Conserving trees around the site as some buffers against noise;
- ✓ Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance;
- ✓ The outside standard working hours such as weekend, evening or night-time works will be controlled and limited;
- ✓ Avoiding or minimizing project transportation through community areas.

The developers of industries and factories in KMIC will be urged to follow the practices mentioned below for their operations.

- ✓ Using noise control devices, such as temporary noise barriers and deflectors for impact and exhaust muffling devices for combustion engines;
- ✓ Enclosing noisy outdoor engines and generators in sound proof wall or buildings (OR) using sound proof engines and generators;
- ✓ If necessary, the sound barrier, and sound absorbing materials will be prepared and installed at the facilities;
- ✓ The vibration control devices for equipment and design of the structure to disconnect between the sources and ground will be considered and applied as needed;
- ✓ The outside standard working hours such as weekend, evening or night-time works will be controlled and limited;
- ✓ The noise level of operation of all facilities and structures will be within the acceptable limit stipulated in National Environmental Quality Emission Guidelines.

Note: The developers of factories and industries will have their own EMP and monitoring plans for noise pollution.

Monitoring Plan

Monitoring will be carried out for construction and operation phases.

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Table 8. 6: Noise Pollution Control Management Plan

| Mitigation Measures | Project Phase | Monitoring Item/ Place | Monitoring Mean | Responsible Person/Organization | Frequency of Monitoring |
|--|---------------|---|------------------------|--|--|
| Providing training to the drivers and operators of construction vehicles and machineries how to reduce the noise from their operations | Construction | Trainings conducted Training manuals Drivers' and operators' work after having training | Observation Inspection | Construction Site Supervisor (Contractor) | Weekly |
| Restriction of the construction activities in night times | Construction | construction site | Observation Inspection | Construction Site Supervisor (Contractor) | Weekly |
| Regular maintenance of vehicles and machineries | Construction | Vehicles and machineries Record of maintenance | Observation Inspection | Construction Site Supervisor (Contractor) | Weekly |
| | Operation | Vehicles and machineries Record of maintenance | Observation Inspection | Administrative Officer and M&E Officer (Developer) | Weekly |
| Wearing the ear muffers (hearing protection devices) to protect the noise and vibration | Construction | Workers wearing ear protection on site | Observation Inspection | Construction Site Supervisor (Contractor) | Whenever workers need to wear ear protection |
| | Operation | Workers wearing ear protection on site | Observation Inspection | Supervisor (Developer) | Whenever workers need to wear ear protection |
| Maintaining the noise within the noise level (National Environmental Quality Emission | Construction | Sound level at the sensitive receptors | Measuring | Environment, Health and Safety Officer and Site Engineer | Every six months |

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| Guidelines) set by Ministry of Natural Resources and Environmental Conservation | | | | (Contractor) | |
| | Operation | Sound level at the sensitive receptors | Measuring | Environment, Health and Safety Officer and Site Engineer (Developer) | Every six months |
| Using sound absorb, sound proof engines at construction site and proper maintenance | Construction | Construction site Record of maintenance | Observation Inspection Hearing | Construction Site Supervisor and M&E Officer (Contractor) | Weekly |
| Using sound absorb, sound proof engines and proper maintenance | Operation | Construction site Record of maintenance | Observation Inspection Hearing | Supervisor and M&E Officer (Developer) | Weekly |
| Regular checking and maintenance to silencers of engines | Construction | Sound generated from engines Record of maintenance of Silencers of engines | Hearing Observation Inspection | Construction Site Supervisor (Contractor) | Weekly |
| | Operation | Sound generated from engines Record of maintenance of Silencers of engines | Hearing Observation Inspection | Supervisor (Developer) | Weekly |
| Conserving trees around the site as some buffers against noise | Construction | Trees around the site | Observation Inspection | Environment, Health and Safety Officer (Contractor) in cooperation with local community and authority | Monthly |

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| | Operation | Trees around the site | Observation Inspection | Environment, Health and Safety Officer (Developer) in cooperation with local community and authority | Monthly |
| Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance | Construction | Consultation with local communities | Documenting Recording | Environment, Health and Safety Officer, Administrative Officer and Site Engineer (Contractor) | Whenever local community is needed to be informed. |
| | Operation | Consultation with local communities | Documenting Recording | Environment, Health and Safety Officer and Administrative Officer (Developer) | Whenever local community is needed to be informed. |
| Controlling and limiting the outside standard working hours such as weekend, evening or night-time works | Construction | Work Schedule and Roster | Inspection | HR Officer (Contractor) | Weekly |
| | Operation | Work Schedule and Roster | Inspection | HR Officer (Developer) | Weekly |
| Avoiding or minimizing project transportation through community areas. | Construction | Transportation Route | Observation Inspection | Administrative Officer and Construction Site Supervisor (Contractor) | Monthly |
| | Operation | Transportation Route | Observation Inspection | Administrative Officer(Developer) | Monthly |

Noise Monitoring Locations and Parameters to be measured

Table 8. 7: Noise Monitoring Locations and Parameters to be measured

| Sample point | Parameters to be measured | Latitude and Longitude | Location |
|--------------|---|-------------------------------------|---------------------------------------|
| AQ -1 | Equivalent continuous sound level (L_{eq}) in day and night times | N 17° 8' 48.93" E 96° 10' 12.93" | Farm land near project site |
| AQ-2 | Maximum sound level (L_{max}) in day and night times | N 17° 6' 37" E 96° 8' 34" | Monastery compound, Kyarkansu village |

Budget and Responsibilities

Budget

For the construction phase, total 2,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

For the operation phase, total 2,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

The developers of factories and industries will allocate budget based on their EMP and monitoring plans for noise pollution accordingly.

Responsibilities

Regarding the responsibilities, details are mentioned in the above section: Waste Management Plan (Hazardous and non-hazardous waste).

8.7.5 Water Quality Management and Monitoring Plan

Objectives

The objective of the plan is to protect the surface and ground water quality from polluting due to solid waste and wastewater disposal and other project activities.

For the water to be supplied and distributed to KMIC, it will be treated by water treatment plant (water purification plant). Water will be treated by the standard treatment process, coagulative precipitation and rapid filtration process for distribution to KMIC. This is a part of the project "Provision of Infrastructure Development for KMIC" and will not be discussed in this report.

Legal Requirements

The plan will be in line with Environmental Conservation Law (2012), Environmental Conservation Rules (2014), EIA Procedure (2015), and National Environmental Quality (Emission) Guideline.

Implementation Schedule

The plan will be implemented for the construction and operation phases of project.

Management Actions

The following actions will be taken to manage and monitor the water quality. These actions are also the management actions for solid waste management and wastewater management plans mentioned above.

- ✓ Building the sedimentation basin on a construction site to capture the disturbed soil which is washed off during rainfall and lead to protection of the water quality of surface and ground water;
- ✓ Constructing the sand traps to settle the sand at the bottom and store the deposited sand;
- ✓ Systematic stacking and piling of materials on site;
- ✓ Regular solid waste collection and disposal by PCCD-YCDC;
- ✓ Avoidance of hazardous wastes disposal in drinking-water sources;
- ✓ Regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills (if found, the immediate repair and cleansing will be conducted);
- ✓ Systematic storage of fuels at construction site yard compound, handling and disposal of new oil and used oil waste;
- ✓ Provision of impervious basement at operation area to prevent oil spill when heavy machineries are working;
- ✓ Daily checking to earth moving machines by motor transport officer before start engines;
- ✓ Providing a good pavement at machine workshop and garage;
- ✓ Providing a proper sanitation system for the construction workers and project staff;
- ✓ Maintaining on-site sanitation facilities in good condition and encouraging to use;
- ✓ Preventing sewer leakage and implementation of adequate final disposal of sludge as permitted by the local municipality;
- ✓ Checking all development/activity - related machinery thoroughly not to leak oils on the ground and regular maintenance of the machinery;
- ✓ Carrying out all maintenance works in a designated area and such areas will be cemented and enclosed to avoid storm water from carrying away oil and form wastewater;
- ✓ Managing car wash areas and other places handling oil activities within the site and controlling the drains from these areas;
- ✓ Treating domestic and industrial wastewater to reach the standards stipulated in National Environmental Quality (Emission) Guidelines before disposal;
- ✓ Monitoring the treated wastewater quality by installing a real-time monitoring indicator; and
- ✓ Measuring the quality of surface water which will receive the treated wastewater from KMIC.

Monitoring Plan

Monitoring will be carried out for construction and operation phases.

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Table 8. 8: Water Quality Management and Monitoring Plan

| Mitigation Measures | Project Phase | Monitoring Item/ Place | Monitoring Mean | Responsible Person/Organization | Frequency of Monitoring |
|---|---------------|---|------------------------|---|---|
| Building the sedimentation basin on a construction site | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Once |
| | | Quality of Construction Wastewater | Measuring | Environment, Health and Safety Officer (Contractor) | Every six months |
| Constructing sand traps to settle the sand at the bottom and store the deposited sand | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Once |
| Systematic stacking and piling of materials on site | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Daily |
| | Operation | Respective factories and industries in compound | Observation Inspection | Supervisor (Developer) | Daily |
| Regular solid waste collection and disposal by PCCD – YCDC | Construction | Waste Transfer Plot | Observation Inspection | Environment, Health and Safety Officer and Cleansing Officer (Contractor) | On-call system |
| | Operation | Waste Bin Center | Observation Inspection | Environment, Health and Safety Officer and Cleansing Officer (Developer) | Every day (or) Every two days (or) specified day by PCCD-YCDC |
| Avoidance of hazardous wastes disposal in drinking-water sources | Construction | drinking-water sources nearby | Observation Inspection | Environment, Health and Safety Officer and Cleansing Officer (Contractor) | Weekly |
| | Operation | drinking-water sources nearby | Observation Inspection | Environment, Health and Safety Officer and Cleansing Officer (Developer) | Weekly |
| Adopting the proper waste | Construction | Practices and | Observation | Environment, Health and | Weekly |

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| management system (including hazardous and non-hazardous wastes) | | processes of waste management system | Inspection | Safety Officer (Contractor) | |
| | Operation | Practices and processes of waste management system | Observation Inspection | Environment, Health and Safety Officer (Developer) | Weekly |
| Regular maintenance and check of the machineries, vehicles and sources which can cause oil spill and hazardous chemical spills | Construction | Machineries, vehicles and sources Record of maintenance | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Weekly |
| | Operation | Machineries, vehicles and sources Record of maintenance | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Weekly |
| Systematic storage of fuels and filling station at construction site yard compound, handling and disposal of new oil and used oil waste | Construction | Store at Construction Site | Observation Inspection | Store Manager (Contractor) | Weekly |
| | Operation | Store at KMIC | Observation Inspection | Store Manager (Developer) | Weekly |
| Provision of impervious basement at operation area to prevent oil spill when heavy machineries are working | Construction | Operation Area for heavy machineries | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Whenever heavy machineries are working |
| | Operation | Operation Area for heavy machineries | Observation Inspection | Environment, Health and Safety Officer and Supervisor (Developer) | Whenever heavy machineries are working (or) as needed |
| Daily checking to earth moving | Construction | Earth moving | Observation | Motor transport officer | Daily |

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| machines before start engines | | machines | Inspection | (Contractor) | |
| Providing a good pavement at machine workshop and garage | Construction | Pavement at machine workshop and garage | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Once |
| | Operation | Pavement at machine workshop and garage | Observation Inspection | Environment, Health and Safety Officer (Developer) | Once |
| Providing the proper sanitation system for the construction workers and staff | Construction | Sanitation System (toilet, septic tank, water supply, collection and disposal system) | Observation Inspection | Environment, Health and Safety Officer and Site Engineer (Contractor) | Monthly |
| | Operation | Sanitation System (toilet, septic tank, water supply, collection and disposal system) | Observation Inspection | Environment, Health and Safety Officer (Developer) | Monthly |
| Maintaining on-site sanitation facilities in good condition and encouraging to use | Construction | Sanitation facilities | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Monthly |
| | Operation | Sanitation facilities | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Monthly |
| Preventing sewer leakage and implementation of adequate final disposal of sludge as permitted by the local municipality | Construction | Sewer Disposal of sludge | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Monthly |
| | Operation | Sewer Disposal of sludge | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Monthly |
| Checking all development/activity - related machinery thoroughly not to leak oils on the ground and regular maintenance of the machinery | Construction | Machineries Record of machinery maintenance | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Weekly |
| | Operation | Machineries Record of | Observation Inspection | Environment, Health and Safety Officer and M&E | Weekly |

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| | | machinery maintenance | | Officer (Developer) | |
| Carrying out all maintenance works in a designated area and such areas will be cemented and enclosed to avoid storm water from carrying away oil and form wastewater | Construction | Maintenance Works Designated area for maintenance works | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Contractor) | Weekly |
| | Operation | Maintenance Works Designated area for maintenance works | Observation Inspection | Environment, Health and Safety Officer and M&E Officer (Developer) | Weekly |
| Managing car wash areas and other places handling oil activities within the site and controlling the drains from these areas | Construction | Car Wash Areas and other places handling oil activities and drains connected | Observation Inspection | Environment, Health and Safety Officer, and Site Engineer (Contractor) | Weekly |
| | Operation | Car Wash Areas and other places handling oil activities and drains connected | Observation Inspection | Environment, Health and Safety Officer, and Cleansing Supervisor (Developer) | Weekly |
| Treating domestic and industrial wastewater to reach the standards stipulated in National Environmental Quality (Emission) Guidelines before disposal | Operation | Quality of treated wastewater | Measuring at laboratory | Environment, Health and Safety Officer (Developer) | Every six months |

Water Quality Monitoring Locations and Parameters to be measured

Table 8. 9: Water Quality Monitoring Locations

| Sample point (ID) | Latitude and Longitude | | Location |
|---------------------------------------|------------------------|-----------------|--|
| Ground water (Tube Well) | | | |
| GW-1 | 17° 8'29.45"N | 96°10'45.81"E | From agriculture land, near the proposed Wastewater Treatment Plant area (downstream area) |
| GW-2 | 17° 8'51.67"N | 96° 9'34.26"E | State Middle School, Takutone village |
| Surface water (Drinking water) | | | |
| SW 1 | N 17° 8' 36.27" | E 96° 9' 36.46" | Pond inside Nyaung Hnitpin Compound |
| SW 2 | N 17° 8'22.00" | E 96° 9'39.28" | Pond inside Nyaung Hnitpin Compound |
| SW-3 | 17° 9'0.07"N | 96°11'41.49"E | Drinking water (Kyarinn Creek) |
| SW-4 | 17° 9'10.77"N | 96°12'41.92"E | Drinking water (Pazung Taung Creek) |
| SW-5 | 17°14'28.60"N | 96° 7'15.46"E | Kalihtaw Dam |
| Drain water (Wastewater) | | | |
| DW-1 | 17° 8'27.61"N | 96°10'44.31"E | Existing drain, near proposed Wastewater Treatment Plant area |
| DW-2 | 17° 7'51.29"N | 96° 9'12.92"E | Drain water at the corner of Zone 3 street and Ngar Suu Taung – Nyaung Hnitpin Road |
| DW-3 | 17° 8'1.29"N | 96°11'17.83"E | Drain water near project area (roadside of Ngarsuutaung – Nyaung Hnitpin Road) |
| DW-4 | 17° 8'49.91"N | 96° 9'35.22"E | Drain water, outlet of drainage to Ngamoeyeik Dam canal |
| WW 1 | N 17° 8'19.28" | E 96° 9'23.36" | Front drain of proposed project site |

SW – Surface Water

GW – Ground Water (Water from Tube Well)

DW (WW) – Drain water (Wastewater)

Table 8. 10: Parameters of Water Quality to be measured

| Parameters for Ground Water | Parameters for Drinking Water | Parameters for Drain water (wastewater) |
|-----------------------------------|-------------------------------|---|
| <i>Nutrient condition</i> | BOD | <i>Oxygenation condition</i> |
| Nitrate | COD | BOD |
| <i>Salinity</i> | <i>Nutrient condition</i> | COD |
| Chloride | Nitrate | <i>Nutrient condition</i> |
| Sulphate | <i>Salinity</i> | Nitrate |
| <i>Acidification status</i> | Chloride | <i>Salinity</i> |
| pH | Sulphate | Chloride |
| <i>Trace Metals</i> | Phosphate | Sulphate |
| Arsenic | pH | <i>Acidification status</i> |
| Lead | Arsenic | pH |
| Mercury | Lead | <i>Trace Metals</i> |
| Copper | Mercury | Arsenic |
| Zinc | Copper | Lead |
| Magnesium | Zinc | Mercury |
| Manganese | Magnesium | Copper |
| Iron | Manganese | Magnesium |
| Fluoride | Iron | Manganese |
| <i>Other parameters</i> | Fluoride | Iron |
| Turbidity | Turbidity | Fluoride |
| Total Dissolved Solid | TDS | Cadmium |
| Color | Color | Chromium |
| Total Hardness | EC | <i>Other parameters</i> |
| Electro conductivity | Total Hardness | Turbidity |
| Phenols | Chlorine (Residual) | TDS |
| Chlorine (residual) | Oil and grease | Color |
| <i>Bacteriological parameters</i> | Phenol | EC |
| Total coliforms | Total coliforms | Total Hardness |
| Faecal coliforms | Faecal coliforms | Total Chlorine |
| | | Oil and grease |
| | | Phenol |
| | | <i>Bacteriological parameters</i> |
| | | Total coliform |
| | | Faecal coliform |

Budget and Responsibilities

Budget

The budgets allocated for solid waste management and wastewater management plans will be covering the water quality management and monitoring.

Note: Developers of industries and factories will allocate budget for water quality management and monitoring plan for their projects.

Responsibilities

Regarding the responsibilities, details are mentioned in the above section: Waste Management Plan (Hazardous and non-hazardous waste).

8.7.6 Energy and Water Efficiency Plan

Objectives

The objective of the plan is to efficiently use energy and water and not to deplete the energy and water resources.

Legal Requirements

The plan will be in line with Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Myanmar Climate Change Master Plan (2018 – 2030), National Environmental Policy of Myanmar (2019), Myanmar National Water Policy (2015) and Myanmar National Energy Policy (2014).

Implementation Schedule

The plan will be implemented for the construction and operation phases of project.

Management Actions

The following actions will be taken to efficiently use the water.

- ✓ Rainwater harvesting in ponds and tanks for construction work and toilet flushing or car washing or the watering of plants and lawns;
- ✓ Encouraging staff and workers to efficiently use water and providing necessary trainings on saving water related to their work and living;
- ✓ Identification of inefficiencies, leaks and losses that may be impacting on consumption and fixing these problems at once when found;
- ✓ Installing “push” or “percussion” type taps with flow reducers that can be adjusted to deliver a set volume of water, sufficient for hygiene purpose; and
- ✓ Using toilets designed with dual flush cisterns.

The following actions will be taken to efficiently use the energy.

- ✓ Using natural light as much as possible (and using energy efficient electrical appliances like energy - saving light bulbs);
- ✓ Keeping windows shut when HVAC (Heating, Ventilation and Air Conditioning System) is in use, but employing natural ventilation whenever possible;
- ✓ Following the practices for HVAC system: periodic maintenance of the installation, keeping the air conditioning at a relevant temperature in summer and winter, and ensuring that furniture does not obstruct the air inlets;
- ✓ Unplugging TVs, AV equipment, and phone chargers when not in use;
- ✓ Using the energy star office appliances and equipment, machineries;
- ✓ Turning off the lights and computer when leaving the office;
- ✓ Recycling and/or reusing as many waste materials (including office stationery) as possible; and
- ✓ Biking or walking to work if possible (OR) arranging bus for the workers.

For the operation phase, the developers of industries and factories would be encouraged to adopt the relevant measures of the above and the measures mentioned below.

- ✓ Consideration of renewable energy sources (solar power) for industries and factories for operation;
- ✓ Provision of modern process technologies and energy saving industrial technologies;
- ✓ Installation of highly efficient mechanical and electrical equipment; and
- ✓ Recycling of wastewater and reusing by industries and factories during operation phase.

Note: The developers of industries and factories of KMIC will prepare IEE or EIA report based on their business type and they will have their EMP and Monitoring Plan for water and energy efficiency management plan to follow for different project phases.

Monitoring Plan

Monitoring will be carried out for construction and operation phases.

Table 8. 11: Energy and Water Efficiency Plan

| Mitigation Measures | Project Phase | Monitoring Item/ Place | Monitoring Mean | Responsible Person/Organization | Frequency of Monitoring |
|--|---------------|--|--|--|-------------------------|
| Rainwater harvesting in ponds and tanks for construction work and toilet flushing or car washing or the watering of plants and lawns | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Weekly |
| Providing necessary trainings to staff and workers on saving water related to their work and living and encouraging them to efficiently use water | Construction | Number of training conducted Training manual Monthly Water Usage | Observation Inspection Recording | Environment, Health and Safety Officer (Contractor) | Monthly |
| | Operation | Number of training conducted Training manual Monthly Water Usage | Observation Inspection Recording | Environment, Health and Safety Officer (Developer) | Monthly |
| Identification of inefficiencies, leaks and losses that may be impacting on consumption and fixing these problems at once when found | Construction | Construction Site | Observation Inspection | Site Engineer (Contractor) | Daily |
| | Operation | Respective factories and industries in compound | Observation Inspection | Supervisor (Developer) | Daily |
| Installing “push” or “percussion” type taps with flow reducers that can be adjusted to deliver a set volume of water, sufficient for hygiene purpose | Construction | Taps used | Observation Inspection | Site Engineer (Contractor) | Once |
| | Operation | Taps used | Observation Inspection | Supervisor (Developer) | Once |

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| Using toilets designed with dual flush cisterns | Construction | Toilets used | Observation Inspection | Site Engineer (Contractor) | Once |
| | Operation | Toilets used | Observation Inspection | Supervisor (Developer) | Once |
| Using natural light as much as possible (and using energy efficient electrical appliances like energy - saving light bulbs) | Construction | Construction Site Office Construction Site | Observation Inspection | Administrative Officer and Construction Site Supervisor (Contractor) | Monthly |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer (Developer) | Weekly |
| Keeping windows shut when HVAC (Heating, Ventilation and Air Conditioning System) is in use, but employing natural ventilation whenever possible | Construction | Construction Site Office | Observation Inspection | Administrative Officer (Contractor) | Daily |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer (Developer) | Daily |
| Using highly efficient mechanical and electrical equipment | Construction | Construction Site Office | Observation Inspection | Administrative Officer (Contractor) | Whenever mechanical and electrical equipment are needed |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer (Developer) | Whenever mechanical and electrical equipment are needed |
| Following the practices for HVAC system: periodic maintenance of the installation, keeping the air conditioning at a | Construction | Construction Site Office | Observation Inspection | Administrative Officer (Contractor) | Weekly |
| | Operation | Offices, | Observation | Administrative Officer | Weekly |

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|---|--------------|--|------------------------|---|--|
| relevant temperature in summer and winter, and ensuring that furniture does not obstruct the air inlets | | Industries and factories in KMIC compound | Inspection | (Developer) | |
| Unplugging AV equipment, and phone chargers when not in use | Construction | Construction Site Office | Observation Inspection | Administrative Officer (Contractor) | Weekly |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer (Developer) | Weekly |
| Using the energy star office appliances and equipment, machineries | Construction | Construction Site Office | Observation Inspection | Administrative Officer (Contractor) | Whenever office appliances, equipment and machineries are needed |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer (Developer) | Whenever office appliances, equipment and machineries are needed |
| Turning off the lights and computer when leaving the office | Construction | Construction Site Office | Observation Inspection | Administrative Officer (Contractor) | Daily |
| | Operation | Offices, Industries and factories in KMIC compound | Observation Inspection | Administrative Officer(Developer) | Daily |
| Recycling and/or reusing as many waste materials (including office stationery) as possible | Construction | Wastes generated from Construction Site Office and | Observation Inspection | Environmental, Health and Safety Officer and Administrative Officer(Contractor) | Weekly |

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|--|--------------|--|------------------------|---|--------|
| | | Construction Site | | | |
| | Operation | Wastes generated from Offices, Industries and factories in KMIC compound | Observation Inspection | Environmental, Health and Safety Officer and Administrative Officer (Developer) | Weekly |
| Biking or walking to work if possible (OR) arranging bus for the workers | Construction | Transportation arrangement for workers | Observation Inspection | Administrative Officer (Contractor) | Weekly |
| | Operation | Transportation arrangement for workers | Observation Inspection | Administrative Officer (Developer) | Weekly |

Budget and Responsibilities

Budget

For the construction phase, total 5,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

For the operation phase, total 3,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

Note: Developers of industries and factories will allocate budget for water and energy management and monitoring plan for their projects.

Responsibilities

Regarding the responsibilities, details are mentioned in the above section: Waste Management Plan (Hazardous and non-hazardous waste).

8.7.7 Traffic Management Plan

Objectives

The objective of the plan is to avoid or reduce any traffic problems and related issues and incidents by managing the traffic during project phases.

Legal Requirements

The plan will be in line with Motor Vehicle Law (2015), International Finance Corporation (IFC) Performance Standard 1. Assessment and Management of Environmental and Social Risks and Impacts and Performance Standard 4. Community Health, Safety and Security.

Implementation Schedule

The plan will be implemented for the construction and operation phases of project.

Management Actions

The following actions will be taken to manage traffic and avoid any traffic related incidents including traffic congestion.

- ✓ Proper planning of transportation of construction materials;
- ✓ Provision of traffic management staff/flag persons at site and junctions;
- ✓ Installation of road signs and traffic signals at along the way of work site, main road, cross roads, approach roads, to notify stakeholders of the development;
- ✓ Enforcing speed limit to all vehicles which are transporting materials and accessing the site;
- ✓ Emphasizing safety aspects among drivers;
- ✓ Improving driving skills and requiring licensing of drivers;
- ✓ Adopting limits for trip duration and arranging driver rosters to avoid overtiredness;
- ✓ Avoiding dangerous routes and times of day to reduce the risk of accidents;
- ✓ Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure;
- ✓ First aid kit is available on site and a clinic with qualified staff members will be located in the administration office during operation.

Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, the following measures will be applied:

- Minimizing pedestrian interaction (including bicycle and motor cycles users) with construction vehicles;
- Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations (hospital). Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaign) if needed;
- Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate assistance and treatment is provided in the event of accidents;
- Using locally sourced materials, whenever possible, to minimize transport distances;
- Arranging worker transport system to minimizing external traffic.

Note: Developers of industries and factories will have their own EMP and monitoring plans for traffic management for their individual projects.

Monitoring Plan

Monitoring will be carried out for construction and operation phases.

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Table 8. 12: Traffic Management Plan

| Mitigation Measures | Project Phase | Monitoring Item/ Place | Monitoring Mean | Responsible Person/Organization | Frequency of Monitoring |
|---|---------------|---|--|--|-------------------------|
| Proper planning of transportation of construction materials | Construction | Transportation vehicles accessing construction Site | Observation Inspection of traffic record | Site Engineer (Contractor) | Weekly |
| Provision of traffic management staff/flag persons at site and junctions | Construction | Assigning traffic management staff | Observation Inspection | Administrative Officer (Contractor) | Weekly |
| Installation of road signs and traffic signals at along the way of work site, main road, cross roads, approach roads, to notify stakeholders of the development | Construction | Along the road to the construction site, cross roads and approaches | Observation Inspection | Site Engineer (Contractor) | Monthly |
| | Operation | Along the road to the KMIC | Observation Inspection | Supervisor (Developer) | Monthly |
| Enforcing speed limit to all vehicles which are transporting materials and accessing the site | Construction | Vehicular Speed | Measuring by portable speedometer | Site Supervisor (Contractor) | Weekly |
| | Operation | Vehicular Speed | Measuring by portable speedometer | Supervisor (Developer) | Weekly |
| Emphasizing safety aspects among drivers | Construction | Safety measures for drivers | Observation Inspection | Administrative Officer and HR Officer (Contractor) | Monthly |
| | Operation | Safety measures for drivers | Observation Inspection | Administrative Officer and HR Officer (Developer) | Monthly |
| Improving driving skills and requiring licensing of drivers | Construction | Driving License | Inspection | Administrative Officer and HR Officer (Contractor) | Monthly |
| | Operation | Driving License | Inspection | Administrative Officer and HR Officer (Developer) | Monthly |
| Adopting limits for trip duration | Construction | Work Schedule for | Inspection | Administrative Officer | Monthly |

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|---|--------------|---|--|---|---------------------|
| and arranging driver rosters to avoid overtiredness | | drivers | | and HR Officer (Contractor) | |
| | Operation | Work Schedule for drivers | Inspection | Administrative Officer and HR Officer (Developer) | Monthly |
| Avoiding dangerous routes and times of day to reduce the risk of accidents | Construction | Work Schedule for drivers | Inspection | Administrative Officer and HR Officer (Contractor) | Monthly |
| | Operation | Work Schedule for drivers | Inspection | Administrative Officer and HR Officer (Developer) | Monthly |
| Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure | Construction | Record of maintenance | Inspection | Administrative Officer and M&E Officer (Contractor) | Monthly |
| | Operation | Record of maintenance | Inspection | Administrative Officer and M&E Officer (Developer) | Monthly |
| Availability of first aid kit on site | Construction | First aid kit at construction site office | Observation Inspection | Administrative Officer (Contractor) | Weekly |
| Availability of a clinic with qualified staff members located in the administration office during operation | Operation | Clinic equipped with qualified staff | Observation Inspection | Administrative Officer (Developer) | Weekly |
| Minimizing pedestrian (including bicycle and motor cycles users) interaction with construction vehicles | Construction | Incident of interaction Transportation plan for construction materials Transportation routes and times of day | Observation Inspection Recording | Administrative Officer and Site Engineer (Contractor) | Weekly |
| Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads | Construction | Traffic signage and materials for road safety | Observation Inspection | Administrative Officer (Contractor) | Monthly |
| | Operation | Traffic signage and materials for road safety | Observation Inspection | Administrative Officer (Developer) | Monthly |
| Collaborating with local communities on education | Construction | Education Program for traffic and pedestrian | Recording Documenting | Environmental, Health and Safety Officer | When the program is |

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|--|--------------|---|-------------------------------------|--|--------------------------|
| about traffic and pedestrian safety (e.g. school education campaign) if needed | | safety | | (Contractor) with the help of Traffic Police | done |
| | Operation | Education Program for traffic and pedestrian safety | Recording Documenting | Environmental, Health and Safety Officer (Developer) with the help of Traffic Police | When the program is done |
| Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate assistance and treatment is provided in the event of accidents | Construction | Coordination to handle accidents | Observation | Administrative Officer(Contractor) | As needed |
| | Operation | Coordination to handle accidents | Observation | Administrative Officer (Developer) | As needed |
| Using locally sourced materials, whenever possible, to minimize transport distances | Construction | Materials purchased | Inspection of receipts and invoices | Administrative Officer (Contractor) | Weekly |
| | Operation | Materials purchased | Inspection of receipts and invoices | Administrative Officer (Developer) | Weekly |
| Arranging worker transport system to minimizing external traffic | Construction | Transportation arrangement for workers | Observation Inspection | Administrative Officer (Contractor) | Monthly |
| | Operation | Transportation arrangement for workers | Observation Inspection | Administrative Officer (Developer) | Monthly |

Budget and Responsibilities

Budget

For the construction phase, total 3,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

For the operation phase, total 2,000,000 Ks per year is budgeted for implementing Environmental Management Plan and Monitoring Plan.

Note: Developers of industries and factories will allocate budget for traffic management plan for their individual projects.

Responsibilities

Regarding the responsibilities, details are mentioned in the above section: Waste Management Plan (Hazardous and non-hazardous waste).

8.7.8 Corporate Social Responsibility (CSR) Program

Objectives

The objective of the program is to fulfill the commitment related to CSR program made by the developer in his/her business proposal to Myanmar Investment Commission (MIC). It is also intended to meet the needs of the community and project directly affected people by providing assistance in health, education and infrastructure development to be a sustainable development.

Legal Requirements

There is no legal requirement but the developer has to fulfill the commitment related to CSR program made in his/her business proposal to Myanmar Investment Commission (MIC).

Implementation Schedule

The plan will be implemented for the construction and operation phases of project.

Corporate Social Responsibility Programs of Project Proponent

The KMIC JVC will accept Corporate Social Responsibility (CSR) for the communities living near to the project. The CSR programs will cover:

Education Sector: Construction and upgrading school building and facilities, providing necessities for students (for instance, school uniforms, books, pencils).

Healthcare Sector: Building dispensary/healthcare centre at the appropriate village where villagers from surrounding villages can access.

Infrastructure Development: Upgrading of the roads which connect the project site and the village nearby.

Management Actions

The following actions will be taken to implement CSR activities.

Conduct a CSR assessment

- ✓ Establish a CSR team;
- ✓ Review corporate documents, processes and activities and internal capacity;

- ✓ Engage key stakeholders (community, project affected persons, local authorities, MPs, village elders, etc.).

Develop a CSR strategy and CSR commitments

- ✓ Build support with senior management and employees;
- ✓ Prepare a matrix of proposed CSR actions (suggestions and requirements made by the community during public consultation meeting and interviews to be taken into account);
- ✓ Decide on direction, approach, boundaries and focus areas;
- ✓ Do a scan of CSR commitments;
- ✓ Conduct CSR training;
- ✓ Hold discussions with stakeholders;
- ✓ Create a working group to develop the commitments.

Implement CSR commitments

- ✓ Prepare and implement CSR program;
- ✓ Set measurable targets;
- ✓ Make commitments public.

Assure and report on progress

- ✓ Measure and assure performance;
- ✓ Engage stakeholders;
- ✓ Report on performance and results, internally and externally.

Monitoring and Evaluation Plan

Monitoring will be carried out during the implementation of the CSR programs whether these programs implemented are in line with the commitments made by the developer and the requirements of the local community and also the quality and the timeline for implementation are met. The monitoring process will be done by the responsible persons of the development company and the representatives of the local community and authority. The monitoring team will be later established in consultation with the local community and authority.

The CSR strategy and initiatives will be evaluated at periodic intervals to find out the results of the program, barriers for implementing the programs and how to handle these obstacles. If necessary, the original objectives, direction, approach, boundaries and focus areas will be revisited and new ones will be made.

The developer would consider the following aspects for CSR evaluation:

- 1) What worked well? In what areas did the company (developer) meet or exceed its targets?
- 2) Why did it work well? Were these factors within or outside the company that helped it to meet its targets?
- 3) What did not work well? In what areas did the company not meet its targets?
- 4) Why were these areas problematic? Were there factors within or outside the company that made the process more difficult or that created obstacles?
- 5) What is the lesson learned from this experience? What should continue and what should be done differently?
- 6) Drawing on this knowledge and information concerning new trends, what are the CSR priorities for a company in the coming year? Are there new CSR objectives?

The evaluation will involve seeking inputs from management, CSR team, employees and external stakeholders.

Budget and Responsibilities

The budget for CSR programs is allocated 2% of the total profit made by each year.

Note: Developers of industries and factories will allocate budget for CSR program for their individual projects.

The CSR programs will be implemented by the developer of KMIC under the management of KMIC Leading Coordination Committee.

CHAPTER 9. PUBLIC CONSULTATION AND DISCLOSURE

9.1 1st Public Consultation for establishing KMIC Project

The first public consultation meeting for KMIC Project was conducted on 8 February 2019 at Zone (3) Meeting Hall, Agricultural and Livestock Breeding Zone (3), Nyaung Hnitpin Agricultural and Livestock Breeding Zonal Area, Hlegu Township, Yangon Region. The meeting started at 1 pm.

U Aung Lin (MSR) acted as M.C at the ceremony. He introduced MSR Company experts with the attendees and read out the agenda. The agenda and the list of attendees are mentioned below.

Discussions

1. **U Maung Maung Kyaw**, Chairman

Agricultural and Livestock Breeding Zone (3)
Nyaung Hnitpin Agricultural and Livestock Zonal Area
Hlegu Township

Regarding the discussion held today, you might have known about why public consultation was held. MSR Company is carrying out Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) in order that an Industrial Complex will be able to be established in the nearby Nyaung Hnitpin National Convention Complex through the cooperation between KMIC Development Co., Ltd. (KMIC JVC) and Myanmar Government. The project will be explained to the people in the neighbourhood and the people's suggestions and feedbacks will be included in the report. So, this discussion is held for this purpose. The experts from MSR will explain in every detail. As for me, I invited those living in the zone. We have to pay attention to the experts and ask them to clarify what they explain. I express my thanks to all of you.

2. **U Aung Lin**, SIA in – Charge
ESIA Department, MSR
Yangon

We're from MSR – Myanmar Survey Research Company in Myanmar, it's a research company. Our company is a third party. It's not a governmental organization. We do marketing research and economic research, Environmental Impact Assessment. For the purpose of setting up an industrial complex in this Nyaung Hnitpin National Convention Complex over one year ago, 3 Sub-troupes, including 10 members in each from ESIA Department of MSR Company have been here for 6 times and finished doing assessments. One of these 3 sub- troupes is a sub- troupe that conducts assessments by taking measurements of water, wind and earth. They have carried out a study. Another team is the one that makes an assessment of whether or not there is an impact on trees and wild life in the neighbourhood and in the complex. They finished studies on what sort of trees and creatures.

Another team is the one led by me that makes Social and Economic Impact Assessment. Our team went to the people's residences in the neighbourhood and has carried out studies into their livelihoods, foods, economic, social, and educational and health situation. Now, today our team leaders will give explanation to the people attending here. As the industrial complex is internationally standardized project, we' ve carried out studies over one year and there have also been queries put by the people against fastest implementation. First of all, may I express my thanks to you for coming to listen to our explanation. I also make a request to share our explanation to those who cannot attend this

discussion. This time, the limited population has been invited according to the situation of the hall. When the discussion takes place next time, the discussion will be widely held. Next time, authorities concerned of Township level and Regional level will also be invited.

The project that has international status has been made known to people. The suggestions of the people have been obtained. The company carrying out the project needs to understand the people's requirements. The company needs to know what people's requirements the company needs to know, what people's requirements are and what difficulties they are facing. If so, the construction company must know what are to be carried out and what responsibilities to be taken. I request you all to make further suggestions about our findings and discussions about emergence of this industrial zone through concerted effort. May I conclude here and thank all of you.

3. **U Ko Ko Soe Lwin Thaw**, Secretary
GIS & IT Specialist
ESIA Department, MSR

I'll give a brief presentation about this project. This project will be implemented through the cooperation between Ministry of Construction, Myanmar Government and KMIC JVC and the project will be implemented on 500 acres of land. Ministry of Construction will provide plot of land, transportation, electricity and water. For these matters, Myanmar Government will get loan with less interest from Korean Government. Myanmar Government will lease them the land. Korean Government will provide fund and implement the project from the start to the end. The implementation of the project will be of benefit to the Region Government, people and local residents.

Phase 1 of this project will include a garment factory and food production factory. Another sector is logistics that will include spare parts and accessories producing factory, construction material producing factory. In phase 2, there will be buildings for inhabitants, IT Training Schools, and other training schools. Phase 1 has been planned to start in later 2020. As there has been some negotiations with Myanmar Government, it is to be started in later 2020. Our EIA, and SIA Report will be submitted to the Government in April this year. I conclude my portion of presentation here. Thank you all.

4. **U Phone Myint Tun**, Engineer
ESIA Department, MSR
Yangon

Mingalaba (Be auspicious!) My name is U Phone Myint Tun. I'm a retired engineer from the armed forces. MSR Company assesses the impact of the project on socio-economic life of the people in the project area and its neighborhood and on physical environment. The Project is to shape the design to be emerged as shown with picture. There will be buildings for inhabitants. The remaining portion will be an industrial zone including factories. People earn their living through agriculture and livestock breeding in this area. If there emerges an industrial zone, there will be in need of human labour. The locals in the neighborhood will get jobs. The emergence of factories may bring in benefits as well as bad impact. What our MSR does is to assess the guidelines to be followed by the developer to create improved and changed situation by implementing the project without any deterioration of the formal socio- economic and physical situation. We also make carrying out a study of do's and don'ts for impact assessment that is to be included and mentioned in the report. The assessments of wind, water and land were recorded a year ago. The assessment is necessarily carried out in order that air pollution, water pollution and land slide may not occur when the situation is changed due to the implementation of this project. We have records of water and land. We have recorded the situation of the air pollution after taking measurements.

Once the project starts, water will be fetched from the nearby dam as allowed by the concerned department. Electricity will be provided by the Government. Arrangements will be

made so as not to reduce the power of electricity being consumed by the locals as the factory takes it. Water is to be used after being purified by the built-in water purifier. The wastewater will be discarded after being systematically treated by wastewater treatment plant. We make an assessment in order that the project to be implemented has no bad impact on socio- economic life of the locals in the vicinity and physical situation. We want to get the project completed. That is why we have made assessments.

This is our first presentation. When the public consultation is held for the next time, the detailed facts of the factories will be presented.

There will be better transportation and in people will be in good health will have good education and good socio- economic life if this area will be changed into on industrial zone from the status of agriculture and livestock breeding. We'll make presentation on how arrangements will be made to have less or no bad impact. What I explain now is study on physical situation and how to have good impact. You may suggest and discuss something that you do not understand or if there is anything necessary.

5. **U Kyan Dyne Aung**, Environmental Engineering Management Specialist
ESIA Department, MSR

I'll give an explanation about legal section. If is something about the regulation to be followed by the company that is implementing the project when it is doing so. There are laws and by laws that which facts are to be assessed in carrying out Environmental Impact Assessment and Social Impact Assessment. We have to assess how the project can have bad or good impact on water, soil, air and land. If the project has bad impacts, the arrangement to get it deteriorated or to get it eradicated must be followed. Although this project is a joint venture between KMIC JVC and Myanmar Government, the project company has, as it is an overseas company, to comply with the investment law. If to follow the provision that waste and wastewater of the factory must be discarded only if they have been purified by the wastewater treatment plant to the limited extent. It is also to follow the agreements and law signed by Myanmar Government in cooperation with international organization and other nations.

There are mainly four sections in writing a report to carry out a project. The first section is about pre-construction. The second section will cover the process of construction including the ground is being levelled and the foundation is being dug. After the construction, there is a third part covering the findings of the studies on how men can be harmed or how those injuries or harms can be prevented when the project is put into operation. The last one, when the term of the project is over and there is no more operation of the factory, is the management plan of how to remove factories and buildings must be included in the report. When the factory emerges, the management plan of how to eradicate possible bad impact will be included and written in the report. The one who implement the project has to take responsibilities to carry out the written presentation in the report. Fund must be allocated for each phase management plan and an organization/team needs to be formed to carry out each sector. Not only project developer but also factories involved and companies in this industrial complex have to follow the report. Factories wise and company wise teams must be formed in carrying out the EMP. People's opinions, views, concerns and suggestions are crucial and these will be taken into account for the development of EMP. We've to accept communities' suggestions. What I want to explain is enough. Thank you.

6. **U Aung Lin**, SIA in- Charge
ESIA Department, MSR.

I'm the leader of the team that makes the assessment of the impact on the socio-economic life. We've to carry out the studies of the lives of villagers in the vicinity of the project area. There are things that the villagers themselves have no idea. But we've to obtain the knowledge of them to be included and mentioned in the report. This report is presented to the Ministry of Natural Resources and Environmental Conservation and the owner of

project to read by themselves. After reading this report, the ministry makes a remark about whether or not this project should be implemented. There are totally a population of about 10,000 including people living close to proposed KMIC project and those living in both village tracks. We've interviewed village elders, those that belong to administration and the Venerable Sayadaws presiding in monasteries out of them and recorded what they have answered. There are 57 informants. This survey provides us with a lot of findings. Most of them go to Hmawbi, Hlegu and Yangon and work there as they are unemployed. If there emerges an industrial zone, they said they want to get jobs. As there is no health-care service center, they have to go to Ngar Suu Taung clinic and Hlegu hospital for receiving medical treatments. But during the rainy season, the roads are so bad that they have difficulties. If the factories run, population will increase and there will be so densely populated. So, they presented that they need a hospital.

Another difficulty is that those living in the zone have no graveyard if there arises a funeral. As the circular roads around the zone are too bad in the rainy season, the school going children are in trouble. As the water is not enough for agriculture, the water from tube-wells is being used. For drinking water, they need clean and fresh drinking water. They have presented that they need jobs and needs to be given training since construction of the Industrial Complex started. They said they feel worried about the inclusion of chemical factories and the inclusion of chemicals in discarded wastewater. They suggested not including such factories. There will be over 200 factories in the industrial zone- including garment factories, car spare parts and accessories factory and transportation service.

What I view is that they need jobs. There are villages where there is no hospital and clinic for health, no primary school for education, road-communication needs to be much improved. The project implementing company will fulfil the requirements of villages by using Corporate Social Responsibility (CSR) fund. For that matter we've suggestion to be given the purpose of holding this meeting and giving explanation is to make people know what they should know, and people side may make suggestion at this meeting. So, you may query your requirements and make suggestion. Thank you all.

7. **U Phone Myint Htun**, Engineer
ESIA Department, MSR.

We'd like to encourage the people attending here to discuss your opinion and give suggestions. Your opinion may be different from ours. We're never concerned with the company implementing project nor the government. We're said to be bystanders. We're a third-party organization. We hold a meeting and give explanation for the benefits of the people. So, you may feel free to query what you want to know and give suggestions.

8. **U Maung Maung Kyaw**, Chairman
Nyaung Hnitpin Agriculture and Livestock Breeding Zone (3)
Hlegu Township

There is one thing to be worried about. It's the matter of electricity. After the emergence of the industrial complex, the factories will use a lot of power and we're worried about being lack of electricity for agriculture and livestock breeding.

9. **Mr. Shin Hyo Sub**
Chief Representative
LH Yangon Representative Office, Yangon

All Mingalaba! (Be auspicious to all!). I'm a staff member of L.H. Company owned by Korean Government. I am a Chief Representative of LH Yangon Representation Office. Thank you very much.

10. **U Than Myint**
Agricultural and Livestock Breeding Zone (3)
Nyaung Hnitpin Area, Hlegu Township

Nyaung Hnitpin Agricultural and Livestock Breeding Zone No.1, 2 and 3 were started implementation in 2000. Zone 3 started business in 2004. The entrepreneurs have collectively paid the road tax and electricity bill since the zone started running. We have to get our area electrified at our own expense. We perfectly had 230 volts from 2004 to 2008. Now, we have not had enough voltage for a long time. Electricity often goes out. Sometimes comes and sometimes goes out. As the light goes out, water cannot be put up to the plantation. Water cannot be poured on to the plantation. As the plants are not poured with water, they die. Water does not flow through drains. Water is not available. When people die there is no graveyard where dead person can be buried or cremated. If there is a plan, we'd like to request the company implementing the industrial complex to fulfil those requirements. The main requirement of our zone is to have good internal zone roads. School boys and school girls find it very difficult to go to school in mud during the monsoon. I present it to let the company, construction zone with the government know it. Thank you.

11. **U Aung Lin**, SIA in- Charge
ESIA Department, MSR.

The presentation of U Than Myint will be added and presented in the report. We'll present it because the other sectors will run smoothly if the road communication is good.

12. **U Phone Myint Htun**, Engineer
ESIA Department, MSR.
Yangon

May I give you a little more explanation about better road- communication that U Than Myint presented. There is a plan to build a 4- lane- road from No.3 crossroad to Nyaung Hnitpin along the main road situated in front of the project complex. It is nearly 10 miles long. The separate electric current will be used for industrial zone. So, the electric current the locals are now using will not be taken. So, the electric power will not be reduced.

13. **U Aung Lin**, SIA in – Charge
ESIA Department, MSR
Yangon

I want to present road affairs. Road has 2 sectors. The entrance road to the industrial complex and internal roads in the zone. The Ministry of Construction has to promote the status of the main entrance road and the company to build industrial complex has to take responsibilities for internal roads. Regarding electricity, the electric power will be taken from the government's national grid. It will start with 66 KW increasing step by step until the whole industrial complex can be powered.

14. **Daw Thazin Nwe**, Interpreter
LH Yangon Representative Office
Yangon.

You needn't be worried about the reduction in electricity. But an industrial zone cannot be built only with the electric power in the current given to the quarters and agricultural and live-stock Breeding. For industrial zone-specific electric power must be provided. But there is no connection with the electric current, now in use. The Ministry of Construction will take responsibilities for road, water and electricity outside the complex. KMIC JVC will carry out building roads, providing water and electricity inside the complex of industrial complex. The internal and external plan will be simultaneously carried out.

15. **U Maung Maung Kyaw**, Chairman
Nyaung Hnitpin Agriculture and Livestock Breeding Zone (3)
Hlegu Township

We're worried about the difference between the faint light in the zone in the neighbourhood and villages and the bright light in the complex of industrial complex. I've ever seen in some areas before. It is unfair. What I want to say is that people and village in

our neighbourhood want to share the electric current taken for industrial complex. If industrial complex develops, the villages and the local residents in its vicinity have to be in higher status. That is why I present it.

16. **U Aung Lin**, SIA in- Charge
ESIA Department, MSR

Enough electricity and better road- communication – the development sector of village and local residents in the neighbourhood of the complex by constructing an industrial complex. People are asking for them. People living in the neighbourhood of the complex have electrified themselves at their own expense. Lamp posts and cables have been bought through self-reliance. Water must be provided through water pipes until it reaches home. To provide them all must be written and mentioned in the report.

17. **U Sai Zeyar Min**
Nyaung Hnitpin Village, Hlegu Township

I want to present road- communication. I've heard that the status the main road will be raised in building this industrial complex. I want to know whether or not the status of this road is raised until it reaches Ngar Suu Taung. The workers will have to use this road when they go to factories in the industrial complex. Many of the workers will be from our village tract.

There is another thing I'd like to suggest. When I study the plan of the industrial complex project plan, there is one thing lacking. There should be a workers' recreation center either inside or outside the industrial complex. That is why I want to give a suggestion that a sports ground, or a park or a swimming pool in this plan for the workers to overcome stress and strain in this plan.

18. **U Myint Kyaw**, Administrator
Kyarinn Village Tract
Hlegu Township

My name is U Myint Kyaw and I am an Administrator for Kyarinn Village Tract. The management section is out of question in constructing an industrial complex through the cooperation between Korea and Myanmar. What I want to make a request is to think of road communication, health, social affairs and employment of local residents. I'd like to request again to employ local young people as an accountant, a computer user, or a basic worker according to their respective status. There are 7 villages in my village tract. I have to take responsibilities for agricultural and livestock breeding zone 2 and zone 3. There are total 1,300 houses. There are totally a population of about 6,000 including the population in the village legally recognized by the Ministry of Home Affairs and those in the other villages that are not legally recognized by the Ministry of Home Affairs. There are many workers available from my village tract. What I mainly want to say is that the main road from No.3, crossroad to Ngar Suu Taung needs to be built until it reaches Ngar Suu Taung village. As the road is narrow, accidents often occur during the rainy season. That is why I suggest extending this road. Thank you.

19. **U Than Myint**
Nyaung Hnitpin Agriculture and Livestock Breeding Zone (3)
Hlegu Township

The heads of the State invited foreign investment even by going abroad. In some places, they might need to communicate humbly. Even when the foreign investment comes, it is inconvenient for them because the workers here protest against them. What we need is to change the mind – set of Myanmar people. The company that comes here to do business has to actually play its role. And the people here should be provided with employment opportunities and other responsibility.

20. **U Kan Myint**
Nyaung Hnitpin Village
Nyaung Hnitpin Village Tract
Hlegu Township

I'm U Kan Myint from Nyaung Hnitpin Village. There is a village known as Phayarthonsu in Nyaung Hnitpin village Tract. There is no primary school in that village. And it has many houses. They need a primary school for children's education. I'd like to suggest that the company to construct the industrial zone is requested to carry out it if the company can help them.

21. **Daw Hnin Yi Win**, Mid- wife
Rural – Health Department
Kyarinn Village Tract
Hlegu Township

I'm from Kyarinn Village Tract Rural – Health Department. I'm taking responsibilities of the health affairs of a population about of 800, including those from Agricultural and livestock Breeding zone (2) and zone (3). I've to travel for health affairs in the zonal area during the monsoon. The roads in the zonal area are of red ochre. In monsoon, they become muddy and people find it difficult to go on it. Students going on them have difficulties. Zone No. (3) has a population over of 1,350. Most muddy roads are inside the zone. So repairing these roads should be put into consideration.

22. **Daw Thazin Nwe**, Interpreter
LH Yangon Representative Office
Yangon.

I want to inform you of the training school. Giving training is included in our programme. Those have been drawn as plans in the programme. I cannot say for sure it will be carried out. Another thing is employment matter. I've heard that people in the neighbouring villages and in this agricultural and livestock breeding zone want to be employed. Don't be worried about that. We're the ones to be worried about that. We're worried about getting workers as our industrial complex needs to employ about 100,000 workers.

23. **U Phone Myint Htun**, Engineer
ESIA Department, MSR
Yangon

Local people might have heard what Daw Thazin Nwe has just said. People here are worried about not getting job. The KMIC JVC gets worried about not getting enough workers because they need about 100,000 workers. People here no need to be worried about. Even though everyone joins the job, there still in need of more workers. The basic level factory workers only need to be literate or have primary level education. It has been said that there are programmes to give training regarding factories. After the training, the high or low positions will be determined by their respective skills. There will be some positions that need expertise. I want to say don't be worried about getting jobs.

24. **Mr. Shin Hyo Sub**
Chief Representative
LH Yangon Representative Office, Yangon

I work with LH Company, and Korea LH Company has been carrying out industrial zones for about 20 years. What is to be first put into consideration when an industrial zone is to be implemented in Korea is that the industrial project must not have bad and dangerous impact on the people in the neighborhood and people must be developed the same as the industrial zone.

Now, people from Korea ask me whether or not there are enough population and enough workers in the neighborhood of the industrial complex. When an industrial complex emerges, environmental development also follows immediately. It will bring many things that help the neighbouring region. So, I'd like to say to local people to help together to the emergence of an industrial complex. Korean government gives us much help from behind to make this industrial complex come into being. I want to say I'll keep on trying to fast implement the industrial zone. Thank you.

25. **U Maung Maung Kyaw**, Chairman
Nyaung Hnitpin Agriculture and Livestock Breeding Zone (3)
Hlegu Township

I've heard that the industrial complex will include garment factories. I want to know if the investment will come from only Korea or from other places and if the workers from Myanmar or those from other countries can come. For example, is it possible for Thai to come and work here? Because people from Thailand come and see this zone. They returned as nothing is carried out here. So, I ask you. Another thing I want to ask has been only garment factory can be included and not any other else. Why I ask this question is that one of my friends wants to lease land and build a factory to produce spare parts of the tractors.

26. **Daw Thazin Nwe**, Interpreter
LH Yangon Representative Office
Yangon.

Any citizen can come and invest here. There is no restriction. To build the factory in the place specified is what we temporary have drawn as a plan. But this cannot be restricted. If a factory is to be built, someone can lease the land for 50 years. Our KMIC JVC side will provide infrastructure. As we are carrying out G to G project, nobody can come and do something as they wish.

27. **U Maung Maung Kyaw**, Chairman
Nyaung Hnitpin Agriculture and Livestock Breeding Zone (3)
Hlegu Township

Factories will be built on 550 acres of land for establishing an industrial complex through Korea – Myanmar Cooperation. According to the programme of the Chief Minister of Yangon Region, Agricultural and livestock Breeding Training School will be built on the remaining 30 acres of land, taking place in the former Convention buildings. The Training School together with the industrial complex in this area will be simultaneously developed. The other zones are trying to provide themselves with water. Water is being carried along the drains that link to Kalihtaw Dam. The drains are crossing zone (2). Through the reliance on this project, the other people will have the right to use more water. In trying to get water for this project as well as for these zones, the drains may cross your compounds and fences. So all have to contribute to it and not to refuse the drainage system crossing your areas. Even though drains have been dug since 2000, the trees in some places beside the drains have even rather grown up. These trees should be felled when it is necessary to extend the drains. Be mindful of which should be gain priority to- tree or water. I do request to share this message to other people and may I conclude my presentation here.

The public consultation was over at 3:00 pm.

Public Consultation Meeting Agenda

- 1) Reading out the agenda and announcement is made that the ceremony has opened.
- 2) Nyaung Hnitpin Agricultural and Livestock Breeding Zone (3), Chairman U Maung Maung Kyaw delivers an opening speech.
- 3) U Aung Lin from MSR provides an explanation for carrying out EIA and SIA.

- 4) U Ko Ko Soe Lwin Thaw from MSR offers an explanation of project affairs.
- 5) U Phone Myint Htun (Engineer) from MSR offers an explanation of physical affairs.
- 6) U Kyan Dyne Aung from MSR offers an explanation of policy and environmental management.
- 7) U Aung Lin from MSR offers explanation of Social Impact Assessment (SIA) and Environmental Impact Assessment (EIA).
- 8) Attendees query what they want to know and give suggestions.
- 9) Those concerned answer the queries.
- 10) Local people attending there are served with food and drinks.
- 11) Concluding remark is delivered and announcement is made that the public consultation is over.

The list of attendees at the public consultation on establishing KMIC Project is mentioned in the table below.

Table 8. 13: List of attendees at the public consultation on KMIC Project

| No. | Name | Designation | Address | Phone No. | Signature |
|-----|--------------------|---------------------------------|------------------------|-----------|-----------|
| 1. | U Than Myint | Road Administrator | | | |
| 2. | U Win Myint | Administrator of Ten Households | Kyarinn Ahshe Village | | |
| 3. | U Maung Htay | Road Administrator | Zone (3) | | |
| 4. | U Myint Swe | | | | |
| 5. | U Tin Moe | | | | |
| 6. | U Kyaw Thu Win | | Zone (3) | | |
| 7. | U Win Aye | | Takutone Village | | |
| 8. | U Khin Maung Phyu | | Zone (3) | | |
| 9. | U Tun Wai | | | | |
| 10. | U Mon Gyi | | | | |
| 11. | Ko Kyaw Soe Naing | | Zone (3) | | |
| 12. | Ko Zaw Aung | | | | |
| 13. | U Win | | Kyarinn Anauk Village | | |
| 14. | U Kyaw Hsan Min | Road Administrator | Takutone Village | | |
| 15. | U Win Oo | | Zone (3) | | |
| 16. | U Thuya Zaw | | Zone (3) | | |
| 17. | Daw Tin Moe Khaing | | | | |
| 18. | Ko Pyae | | Zone (3) | | |
| 19. | U Maung Myint | | Zone (3) | | |
| 20. | U Maung Maung Kyaw | Chairman | Zone (3) | | |
| 21. | U Khin Myint | Administrator of 100 Households | Ngar Suu Taung Village | | |
| 22. | U Sai Zeyar Min | | | | |
| 23. | U Than Htike Oo | Administrator of 10 Households | Sonekone Village | | |
| 24. | U Tin Win | Village Elder | | | |
| 25. | U Chit Shwe | Village Elder | | | |

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|-----|-----------------------|---------------------------------|------------------------|--------------|--|
| 26. | U Aung Than Htoo | Administrator of 10 Households | | | |
| 27. | U Aye Kyaw | Administrator of 100 Households | Sonekone Village | | |
| 28. | U Aung Myint Thein | | Zone(3) | | |
| 29. | Daw E' Htun | | Zone (3) | | |
| 30. | Khin Maung Win | | Zone (3) | | |
| 31. | Myo Thant Htun | | Zone (3) | | |
| 32. | U Thein Shwe | | Zone (3) | | |
| 33. | U Aung Htin | | Zone (3) | | |
| 34. | U Than Naing | | Zone (3) | | |
| 35. | U Aung Naing OO | Administrator of 100 Households | Kyarkansu Village | | |
| 36. | U Win Than | Administrator of 100 Households | Kyarkansu Village | | |
| 37. | U La Win | Village Elder | Kyarkansu Village | | |
| 38. | U Myint Kyaw | Administrator | Kyarinn Ahshe Village | | |
| 39. | U Kan Myint | Administrator of 100 Households | Nyaung Hnitpin Village | | |
| 40. | U Soe Aung | Administrator | Nyaung Hnitpin Village | | |
| 41. | U Pyone Cho | Village Elder | | | |
| 42. | U Win Maw Htun | Administrator of 100 Households | Kyarkansu Village | | |
| 43. | U Myint Aung | Administrator of 100 Households | Kyarkansu Village | | |
| 44. | U Tin Ngwe | Administrator of 100 Households | Kyarkansu Village | | |
| 45. | U Aung Lin | SIA in- Charge | MSR, Yangon | 09 400977121 | |
| 46. | U Phone Myint Htun | Engineer | MSR, Yangon | | |
| 48. | U Ko Ko Soe Lwin Thaw | Secretary, EIA Dept. | MSR, Yangon | | |
| 49. | U Kyan Dyne Aung | Environmental Specialist | MSR, Yangon | | |
| 50. | U Ohn Kyaing | SIA Team, Member | MSR, Yangon | 09 799139844 | |
| 51. | U Ye Min Aung | Logistics | MSR, Yangon | | |
| 52. | U Ko Sai | Logistics | MSR, Yangon | | |

9.2 Findings and Recommendations

9.2.1 Findings

1. As there is only one primary school in Nyaung Hnitpin Agriculture and Livestock Zone (3), it is found that Middle School is needed.
2. It is observed that the workers experience difficulties to work in Hmawbi, Hlegu and Htauk Kyant townships. When the industrial complex is developed, they should be

- hired to employ in the complex.
3. It is found that a dispensary/hospital is needed because it is difficult for the people to go to Ngar Suu Taung village for medical treatment.
 4. The cultivators at Zone (3) cannot get the water supply from Kalihtaw dam, it is found that water from this dam should be provided.
 5. It is necessary to provide a cemetery land for the people who are living in Nyaung Hnitpin Agriculture and Livestock Zone (3) because they don't have land for burial.
 6. It is necessary to upgrade the roads for the people because the roads outside of Nyaung Hnitpin Convention Center are bad.
 7. People worry for their health because there will be factories that produce bad odor in the Industrial complex. So that they don't want to build such factories in the zone.
 8. People want agricultural and livestock processing export companies in the industrial complex because the complex itself is used for agriculture and livestock breeding.
 9. It is necessary for people to access to clean drinking water because they have to use water from the well and tube well.
 10. Tenant worry for losing lands when the landlords sell their lands with high price when the industrial complex is developed.
 11. People worry for degradation of cultivated land because of chemical and industrial wastes from the Industrial complex.
 12. People and Buddhist monks worry that there will be slaughter houses in the Industrial complex.
 13. Thought the agricultural zone has been established, it is found that there is not enough reservoir water so that people have to rely on the well.

9.2.2 Recommendations

1. Although the households can access to the electricity, they experience power outage. Therefore, it is recommended that electricity supply grid should be upgraded.
2. Roads near the industrial complex are very poor in condition so that they can't be used in the raining season. The road network among villages should be developed as CSR Plan.
3. There are no ambulance and good dispensary / hospital for emergency health issues, therefore the ambulance and good dispensary / hospital are needed.
4. Although it is a cultivated zone, some places in the zone don't access to the water supply for cultivation. So, they can't be useful for cultivation. Therefore, it will be more convenient for local people if they are provided water for cultivation.
5. Trainings should be provided the local people so that local workers can be easily recruited when the industrial complex is developed.
6. As there is lack of job opportunity in the region, the local people migrated to work. When the industrial complex is developed, they might come back for working at the area. Therefore, advanced preparations should be carried out.
7. There can be heavy floods in the raining season in the region, therefore advanced preparation should be carried for better drainage system for the Industrial complex.
8. Industrial complex should include factories for production of value-added agricultural and livestock products. Agricultural and livestock breeding should be expended by providing modern technical skills.
9. Local people want the developer to start the industrial complex as soon as possible. The developer needs to engage with the local people.
10. When the industrial complex is developed, it is suggested that a recreation center or a playground should be included for the wellbeing of the workers.

KMIC JVC will set up a website for KMIC and release all the relevant information including but not limited to the ESIA report and other monitoring reports.



Figure 9. 1: U Aung Lin (MSR) making an announcement that the ceremony opens



Figure 9. 2: U Maung Maung Kyaw, Chairman of Zone (3), Nyaung Hnitpin Agricultural and Livestock Breeding Zone, Hlegu Township, delivering an opening speech



Figure 9. 3: U Aung Lin (SIA in-Charge, MSR), explaining ESIA needs to be carried out



Figure 9. 4: U Ko Ko Soe Lwin Thaw, Secretary, ESIA Department, explaining project



Figure 9. 5: U Phone Myint Tun, Engineer, explaining physical affairs



Figure 9. 6: U Kyan Dye Aung, Environmental Engineering Management Specialist, explaining EMP



Figure 9. 7: U Aung Lin, SIA in-Charge, explaining SIA implementation



Figure 9. 8: Discussion of U Than Myint, Zone (3), Nyaung Hnitpin Agricultural and Livestock Breeding Zone, Hlegu Township



Figure 9. 9: U Sai Zeyar Min, Ngar Suu Taung Village, giving suggestions



Figure 9. 10: U Myint Kyaw, Administrator, Kyarinn Village Tract giving suggestions



Figure 9. 11: U Kan Myint, Nyaung Hnitpin Village, giving suggestions



Figure 9. 12: Daw Hnin Yi Win, Mid-wife, Rural Health Department, Kyarinn Village Tract, giving suggestion



Figure 9. 13: Daw Thazin Nwe, LH Yangon Representative Office, explaining about Project



Figure 9. 14: Mr Shin Hyo Sub, Chief Representative, LH Yangon Representative Office, answering communities' questions



Figure 9. 15: Local people, Departmental Heads, Administrators of village tracts, attending public consultation

9.3 2nd Public Consultation for establishing KMIC Project

The 2nd public consultation meeting was organized on 21 August 2020 at Kyaunggyi Damaryone, East Kyar Inn Village, Hlegu township in line with the guidelines and instructions of Ministry of Health and Sports for COVID – 19 preventions. The Deputy Director-General of Department of Urban and Housing Development, Ministry of Construction briefed about KMIC project and Mr. Hong Sung Soo from KMIC Development Co., Ltd. made a presentation on KMIC project overview. Then consultants from Myanmar Survey Research explained about the ESIA report conducted for the project. Altogether 93 persons including Government officials participated in the meeting.

9.4 Findings of 2nd Public Consultation Meeting

The following concerns were found out in the 2nd public consultation meeting.

- 1) There is a concern regarding the waste water disposal where waste water generate from industrial complex should be purified well before released into Ngamoeyeik creek.
- 2) Since most of the factories in industrial zones employ female workers, people hope this project will offer job opportunities for male workers.
- 3) Villages and farming zones surrounding the KMIC project are hoping to receive electricity distributing from the project.

Questions and Answers

| No. | Issues /comments/ questions | Participant | Consultant/ Representatives and given Clarifications |
|-----|--|--|---|
| 1 | Waste disposal What would be the arrangement to dispose of the rubbish from the industrial zone when it is complete? | U Khin Myint Chairman, Hlegu Township Development Committee | Mr. Hong Sung Soo LH& KMIC Company Kamayut, Yangon The rubbish will be cleaned with the help of YCDC, or hiring a |

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| | | | private company that cleans rubbish. |
| 2 | <p>Waste water disposal</p> <p>I have heard waste water from the industrial zone will be treated and disposed of into the Ngamoeyeik River. There, attention should be paid to the natural flow of water. I have studied the situation in the industrial zone, and I found drains blocked with discarded rubbish. I am worried that there must be such kind of situation when the industrial zone has been built. So I would like the person concerned to explain it to the public. Furthermore, the water from the Ngamoeyeik River is taken and purified, and it is distributed into Yangon City, a point to consider.</p> | <p>U Maung Maung Kyaw</p> <p>Chairman, Farming Zone (3) Nyaunghnapin</p> | <p>Daw Aye Aye Myint Deputy Director General Urban and Housing Development Department Nay Pyi Taw</p> <p>Issues of rubbish disposal and treatment and disposal of industrial waste and waste water are really questionable. They are a matter of concern. An industrial zone will have waste water and industrial waste. If all factories in the industrial zone have waste water, it should be disposed of only often it has been purified to the prescribed standard. There will be a waste water treatment factory in the southeast of the industrial zone, and waste water will be purified before it is disposed of into the public drain. Then it will go into the Pazuntaung River.</p> <p>Before the completion of the industrial zone construction, there is already waste water from the farming business. It is known it contains chemicals. We assure you that the waste water from the industrial zone will be disposed of only after it has been purified to the prescribed standards.</p> <p>Unlike other local industrial zones, this zone will be up to the international standards; a foreign country won't accept it if a factory does wrong with its waste; the work will be done following the rules and regulations adopted by the two countries.</p> <p>All waste water and industrial waste from the whole industrial zone will be collected in one place and it will be handled by Hlegu Township Development Committee, or YCDC, or another company. The industrial zone is under a 50-year term and additional 20 years may be extended, so it will be working for 70 years. ESIA of MSR Co. is being carefully and thoroughly done taking the data in detail. The basic data will be compared with those when the factory is operating and everything will be monitored so that, changes can be made in time if need be. It is working for assurance that there will be no bad impacts on the</p> |

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| | | | environment. |
| 3 | <p>Electricity</p> <p>I have heard there will be a power cable sent into the zone. Then, the industrial zone will have as much as electricity as it wants and the surrounding villages and farming zones won't have less. So I would like to ask what KMIC would do to help them get the power of the same level.</p> | <p>U Maung Maung Kyaw</p> <p>Chairman, Farming Zone (3) Nyaunghnapin</p> | <p>Daw Aye Aye Myint</p> <p>Deputy Director General Urban and Housing Development Department Nay Pyi Taw</p> <p>Regarding power supply, the industrial zone will have transformers. So that it can get sufficient electricity; it will not take power from the power line for public use. The industrial zone will distribute power to the neighboring wards and villages if it has more electricity that it needs.</p> |
| 4 | <p>Opportunity for male employment</p> <p>I have heard projects building factories and those factories employ only women workers, but not men. I would like to know whether men would be employed when KMIC Industrial Zone has been completed.</p> | <p>U Aung Aung</p> <p>University student, Distance Education Kyarinn (East) Village</p> | <p>Daw Aye Aye Myint</p> <p>Deputy Director General Urban and Housing Development Department Nay Pyi Taw</p> <p>It is true that more women are being employed in industrial zone, than are men. But, KMIC Industrial Zone will have factories that will employ men workers. The zone project site includes the convention hall and other buildings built on 30 acres. Yangon Region government has arranged to open training courses on business and technology using those buildings.</p> <p>U Aung Lin SIA Team Leader MSR</p> <p>The report of MSR will include the concern of employment for people from 6 villages close to the industrial zone taking precedence over that of people from elsewhere, and suggestions that men and women should be given the same chance in employment. As far as we know, the zone will have about 6 kinds of factories including those that need men workers, for instance factories to produce car parts.</p> |



9.5 Website Address for uploading EIA Report

This EIA report will be uploaded on the following company's website:

<http://www.mykmic.com>

9.6 Community grievances redress mechanism

Throughout the project phases, the community grievances can be arisen due to different project activities and the community can voice their grievances. The project developer formulated a community grievances redress mechanism as mentioned below.

A mechanism is to be put in place to ensure that the followings are available for community complaints for the life of the project:

- a 24-hour telephone number on which complaints about construction and operational activities at the site may be registered;
- a postal address to which written complaints may be sent;
- an email address to which electronic complaints may be transmitted; and
- a focal person to whom the community may directly lodge their complaints or communicate with.

The telephone number, postal address, e-mail address and the focal person will be displayed on a signage near the entrance to the project site, in a position that is clearly visible to the public.

The procedure of Community Grievances Mechanism (CGM) consists of 7 basic steps: Receive, Acknowledge, Assess and assign, Investigate, Respond, Recourse or appeal, and Follow up and close out.

Receive: Complainants will be provided with a variety of access points (by phone, by email, by letter, face-to-face with company staff) so that they can lodge a grievance in a manner convenient to them. When the complaint is received, the complainant will be explained to understand the timelines for the remaining steps in the procedure, how the complaint will be handled and the types of remedy the company can, or cannot, provide. The complainant confidentiality will be maintained, and grievance details would be provided only to those directly involved in the investigation.

Acknowledge: Once a complaint has been registered, a timely acknowledgement will be made to the complainant that their case is in the system. The acknowledgement will be in a culturally appropriate manner, such as a letter, a telephone call, a visit or an email.

Assess and assign: A grievance officer (HR or Administration staff) will quickly assess the nature of grievance once it is logged. And, if needed, some other relevant staff will be assigned to do the assessment. In practice, the grievance officer will be mandated to directly address relatively minor, easily resolvable grievances (for e.g. paying compensation for a small matter) to minimize bureaucracy.

Investigate: Many complaints can be addressed quickly by a grievance officer or other company staff. Nevertheless, severe, or technically complex complaints will require more thorough investigation to provide evidence for analysis and to support the resolution. This process will begin by seeking to understand the complainant's perception of the issue and what should be done about it. The process then typically calls for examination of the circumstances of the case, which can be done by speaking with involved parties and conferring with relevant stakeholders.

Respond: As soon as the investigation is complete, a provisional response will be developed that is reasonable and proportional to the grievance and takes account of any cultural norms. The final agreement will be made both verbally and in writing and it will be specific, time bound and agreed by both parties.

Recourse or appeal: The CGM will consider a recourse or appeals mechanism for complaints where the complainant and the operation cannot reach agreement. If access to judicial process is complex, very expensive or unavailable, a recourse mechanism gives both company and community the opportunity to explore all resolution options or to demonstrate good intent.

Follow up and close out: Once a resolution has been agreed or a decision made, the final stage is to implement the decision, monitor outcomes and close out the grievance. Follow-up also may be needed to address problems that develop during implementation of the response.

A Complaints Register shall record, but not necessarily be limited to:

- i. the date and time of the complaint;
- ii. the means by which the complaint was made (telephone, mail, email or in person);
- iii. any personal details of the complainant that were provided, or if no details were provided, a note to that effect;
- iv. the nature of the complaint; and
- v. any action(s) taken by the Proponent in relation to the complaint, including timeframes for implementing the action.

The Complaints Register shall be made available for inspection by the Ministry (MONREC) or any other concerned authority upon request.

9.7 List of Commitments

| Commitment Source | Commitment |
|--|---|
| Chapter 2. Policy, Legal and Institutional Framework | |
| Project relevant Local Laws, Rules, Guidelines and Procedures | |
| Constitution of the Republic of the Union of Myanmar (2008) | The project developer commits to follow sections (350), (390) sub-sections (a), (b), (c) and (d). |
| Environmental Conservation Law (2012) | The project developer commits to comply with the sections (14), (15), (16) sub-sections (a), (b) and (c), (28), (29) and (30). |
| Environmental Conservation Rules (2014) | The project developer commits to comply with the sections (56) and (69) sub-sections (a) and (b). |
| Environmental Impact Assessment Procedure (2015) | The project developer commits to comply with the articles (13) clauses (a) and (b), (45), (48), (50), (51), (52), (53), (55), (59), (61) clauses (a), (b), (c) and (d), (62) clauses (a), (b) and (c), (63), (64), (65), (68), (69), (87), (88), (89), (93), (94) clauses (a), (b), (c), (d), (e), (f) and (g), (95), (100), (101), (102) clauses (a) and (b), (103), (104), (105), (106), (107), (108), (109) clauses (a), (b), (c), (d), (e) and (f), (110), (112), (113) clauses (a) and (b), (117) and (122). |
| National Environmental Quality (Emission) Guidelines (2015) | The project developer commits to follow the following guidelines, namely National Environmental Quality (Emission) Guidelines established by Ministry of |

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| | Natural Resources and Environmental Conservation on air emissions, wastewater, storm water runoff, effluent and sanitary discharges (general application), site runoff and wastewater discharges (construction phase), and noise levels. |
| Conservation of Biodiversity and Protected Areas Law (2018) | The project developer commits to comply with the sections (40) sub-sections (a) and (b), and (41) sub-sections (a) and (b). |
| The Conservation of Water Resources and Rivers Law (2006) | The project developer commits to follow the section (8) sub-sections (a) and (b). |
| Protection and Preservation of Antique Objects Law (2015) | The project developer commits to comply with the section (12) of the law. |
| Myanmar Investment Law (2016 amended in 2019) | The project developer commits to comply with the section (36) sub-sections (a), (b), (c), (d) and (e), (37), (38), (50) sub-sections (a), (b), (c) and (d), (51) sub-sections (a), (b), (c), (d), (e) and (f), (56) sub-sections (a), (b), (c), (d), (e), (f) and (g), (57), (59), (60), (61), (62) sub-sections (a), (b), (c), (d), (e), (f) and (g), (63), (64), (65) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p) and (q), (66), (67), (68), (69), (70), (71), (72), (73), (74), (77) sub-sections (a) and (d), (78) sub-sections (a), (b) and (c), (79), (80), (82), (83), (84) sub-sections (a) and (b). |
| Industrial Zone Law (2020) | The project developer commits to comply with the sections (23) sub-sections (a), (b), (c), (d), (e), (f), (g), (h) and (i), (37), (38), (45), and (56). |
| The Electricity Law (2014) | The project developer commits to comply with the sections (44), (45), (46), (47) and (48). |
| Public Health Law (1972) | The project developer commits to follow the guidelines for environmental health stipulated in Chapter 2. Protection of Public Health, section 3, sub-section 1. |
| The Prevention and Control of Communicable Diseases Law (1995, amended in 2011) | The project developer commits to comply with the sections (8) sub-sections (a), (b), (c), (d) and (e), (9) sub-sections (a), (b), (c) and (d), (11) sub-sections (a), (b), (c) and (d), and (14) sub-sections (a), (b), (c), (d) and (e). |
| Prevention of Hazard from Chemical and Related Substances Law (2013) | The project developer commits to comply with the sections (13), (15) sub-sections (a) and (b), (16) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j) and (k), (17), (18), (20), (22), (23) sub-sections (a) and (b), |

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| | (24), (25), (26), (27) sub-sections (a), (b), (c), (d) and (e), (28) sub-sections (a), (b) and (c), (29) sub-sections (a) and (b), (33), (34), (35), (36), and (45). |
| Occupational Safety and Health Law (2019) | The developer commits to comply with sections (18) sub-sections (a), (b), (c) and (d), (19) sub-sections (a) and (b), (21) sub-sections (a), (b) and (c), (23), (26) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p), (q), and (r), (27) sub-sections (a), (b), (c), and (d), (28), (29) sub-sections (a), (b) and (c), (34) sub-sections (a) and (b), (48) sub-sections (a) and (b), (49) sub-sections (a), (b), (c), (d) and (e). |
| The Control of Smoking and Consumption of Tobacco Product Law (2006) | The project developer commits to follow section (9) sub-sections (a), (b), (c) and (d). |
| The Workmen's Compensation Act (1923, amended in 1955, 1957 and 2005) | The project developer commits to follow section (3) sub-sections (1), (2) and (3), section (4) sub-section (1) clauses (A), (B), (C), (D) and (E), sub-section (2), sub-section (3), section (8) sub-sections (1), (2), (3), (4), (5), (6), (7), (8) and (9). |
| The Payment of Wages Law (2016) | The project developer commits to comply with the sections (3) sub-sections (a) and (b), (4) sub-sections (a), (b), (c), (d), (e), (f) and (g), (5), (6), (7) sub-sections (a), (b), (c) and (d), (8), (9), (10) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i) and (j), and (11) sub-sections (a) and (b). |
| The Leave and Holiday Act (1951 and amended in 2014) | The project developer commits to comply with the sections (3) sub-sections (1), (2), (3), and (4), (4) sub-sections (1), (2), (3), (4), and (5), (5) sub-sections (1), (2), and (3), (6) sub-sections (1), (2), (4), and (5), (7) sub-section (A), (8), (9), (10) sub-sections (1), and (2), and (11). |
| The Leave and Holiday Rules (2018) | The project developer commits to comply with the sections (15), (20), (21), (29), (33), (41), (50) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i) and (j), (51) and (52). |
| The Labour Organization Law (2011) | The project developer commits to comply with the sections (29), (30), (31), (37), (43), (44) sub-sections (a), (b), (c) and (d), and (49). |
| The Social Security Law (2012) | The project developer commits to comply with the sections (48) sub-sections (a) and (b), (49) sub-section (a), (50), (51) sub-sections (a) and (b), (53) sub-sections (a) and (b), (54) sub-section (a), (65) sub-sections (a) and (b), (66) sub-sections (a) |

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| | and (b), (67) sub-section (a), (69) sub-section (b), (70) sub-section (a), clause (iv), sub-section (b) clause (ii), sub-section (c) clause (ii), (74), (75) sub-section (a) clauses (i), (ii), (iii) and (iv), sub-section (b) clauses (i), (ii) and (iii), sub-section (c), (77), sub-sections (a), (b), (c) and (d). |
| The Labor Dispute Settlement Law (2012, amended in 2014 and 2019) | The project developer commits to comply with the sections (23), (28) sub-sections (a) and (b), (34), (35), (36), (37) sub-sections (a), (b) and (c), (38) sub-section (a), (39), (40), (41), (42), (43), (44), (45) sub-section (a), and (51). |
| The Minimum Wage Law (2013) | The project developer commits to comply with the sections (12) sub-sections (a), (b), (c), (d) and (e), (13) sub-sections (a), (b), (c), (d), (e), (f) and (g), (16), (22) sub-sections (a), (b), (c), (d) and (e), (24) sub-sections (a) and (b). |
| The Minimum Wages Rules (2013) | The project developer commits to comply with the section (43) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k) and (l). |
| Myanmar Fire Brigade Law (2015) | The project developer commits to comply with the sections (16) sub-sections (a) and (b), (17) sub – section (a), (24), (25) sub-sections (a) and (b), (30), and (32). |
| Vehicle Safety and Motor Vehicle Management Law (2020) | The project developer commits to comply with the sections (17), (18) sub-sections (a), (19) sub – sections (a) and (b), (24), (26), (28), (29) sub – sections (a) and (b), (75) sub-sections (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l) and (m), (80), (81) sub-sections (a), (b), (c), (d), (e), (f), (g), (h) and (i), (82), (83) and (84) sub-sections (a), (b), (c) and (d). |
| Vacant, Fallow and Virgin Land Management Law (2012) | The project developer commits to comply with the section (16), sub-sections (a), (b), (c), (d), (e), (f), and (g). |
| Farm Land Law (2012) | The project developer commits to comply with the sections (12), sub-section (f), and (29). |
| Protection and Preservation of Cultural Heritage Regions Law (2019) | The project developer commits to comply with the section (21), sub-sections (a), (b), and (c). |
| Yangon City Development Committee (YCDC) Law (2018) | The project developer commits to comply with the section (70), sub-sections (a), (b), (c) (1),(2), (3), (4), section (72), section (77), section (123), section (150), section (151), section (152), section (310), sub-sections (a), (b), (c), (d), section (312), sub-sections (a), (b), (c) (i), (ii), (d), (e), (f), (g), |

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| | (k), (l), (m), (n), section (315), sub-sections (a), (b), (c), (d), (i), (k), (l), (m), (n), section (316), sub-sections (a), (b), (c) (1), (2), (3), (4), (d), (e) (1), (2), (3), (4), (5), (6), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), section 317, sub-sections (a), (b), (c), (d), section 318, sub-sections (a), (b), (c), (d), section 322, sub-sections (a), (b), (c), (d), (f), (g), (h), (i), (l), (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (z), (aa). |
| Project relevant Plans, Policies and Strategies of Myanmar Government and relevant Ministries | |
| National Environmental Policy of Myanmar (2019) | The project developer commits to comply with National Environmental Policy principles. |
| Myanmar Climate Change Policy (2019) | The project developer commits that the project will be in line with the guiding principles. |
| Industrial Policy (2016) | The project developer commits to comply with the vision of Industrial Policy and establish a green industry. |
| Myanmar Sustainable Development Plan - MSDP (2018 – 2030) | The project developer commits to comply with the Pillar 3, Goal 5, Strategy 5.1, 5.2, 5.3 and 5.4. |
| National Sustainable Development Strategy (2009) | The project developer commits to comply with the Goal 1, Area 2, 3, 4, 10 and 11. |
| International Conventions, Treaties and Agreements | |
| The project developer will take into consideration the relevant clauses of the following international conventions, treaties and agreements. | |
| Plant Protection Agreement for the Southeast Asia and Pacific Region, Rome 1956 | |
| Vienna Convention for the Protection of the Ozone Layer, Vienna 1985 | |
| Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal 1987 | |
| London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London 1990 | |
| Convention on Biological Diversity, Rio De Janeiro, 1992 | |
| United Nations Framework Convention on Climate Change (UNFCCC), New York 1992 | |
| Stockholm Convention on Persistent Organic Pollutants (POPs), 2001 | |
| ASEAN Agreement on the Conservation of Nature and Natural Resources, Kuala Lumpur 1985 | |
| Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto 1997 | |

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| Universal Declaration of Human Rights (UNDHR) |
| Convention on the Rights of the Child |
| Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) |
| Workmen's Compensation (Accidents) Convention 1925 |
| Workmen's Compensation (Occupational Diseases) Convention 1925 and its Revision 1934 |
| <p>Relevant ILO Conventions in force in Myanmar concerning</p> <ul style="list-style-type: none"> - Hours of Work (Industry) - Night Work of Young Persons (Industry) Convention, 1919 - Weekly Rest (Industry) Convention, 1921 - Workmen's Compensation (Accidents) - Workmen's Compensation (Occupational Diseases) Convention, 1925 - Equality of Treatment (Accident Compensation) - Minimum Wage-Fixing Machinery Convention - Forced Labour Convention - Workmen's Compensation (Occupational Diseases) Revised, 1934 - Holidays with Pay - Convention concerning Statistics of Wages and Hours of Work, 1938 - Freedom of Association and Protection of the Right to Organize - Worst Forms of Child Labour |
| <p>Contractual and other Commitments</p> <p>The developer commits to follow the following contractual and other commitments.</p> |
| <p>The Lessor (Department of Urban and Housing Development - DUHD, Under the Ministry of Construction) agrees to lease the Leased Area (555.81 acres of land in Nyaung Hnit Pin, Hlegu Township, Yangon Region) to the lessee, KMIC Development Co., Ltd., and the company agrees to lease the Leased Area from the Lessor, on an exclusive basis, to develop, construct, own, finance, operate and maintain the Project, in accordance with the terms of the Project Agreements, free and clear of any claims, rights and encumbrances or encroachments by third parties (including but not limited to any occupation of the Leased Area by third parties, and claims for compensation by prior occupants of the Leased Area under the Land Acquisition Act 1894 or similar law or regulation in Myanmar).</p> |
| <p>The KMIC Development Co., Ltd. shall use and have the benefit of the Leased Area for the purpose of developing, constructing, owning, financing, operating and maintaining the Project, subject to the terms and conditions of the Project Agreements. The KMIC Development Co., Ltd. shall be entitled to sublease any portion or portions of the Leased Area to Sub-Lessees under Sublease Agreements, and the Sub-Lessees will be responsible for developing their respective portions of the Leased Area.</p> |
| <p>The project shall be developed in two phases, Zone A and Zone B. The development of Zone B shall not commence until 75% of the Sublease Payments in respect of Zone A have been duly and unconditionally received by the KMIC Development Co., Ltd. ("Zone A" means the first phase of development of the Project, in the approximate area (314.69</p> |

acres) of the total site area and “Zone B” means the second phase of development of the project, in the approximate area (241.12 acres) of the total site area for which development shall not commence until 75% of the Sublease Payments have been duly and unconditionally received by the KMIC Development Co., Ltd. in respect of Zone A.)

The initial lease period for Zone A is fifty (50) years and it is agreed by the Parties (the Lessor (Department of Urban and Housing Development – DUHD) and KMIC Development Co., Ltd. that KMIC Development Co., Ltd. has the right to implement the project through third parties by entering into sub-development agreement and in such cases, where KMIC Development Co., Ltd. has entered into sub-development agreements with any third party for implementation/development of the Project.

If the KMIC Development Co., Ltd. wishes to extend the Initial Lease Period for another ten (10) years, the KMIC Development Co., Ltd. shall inform the Lessor in writing at least three (3) months before the Initial Lease Period expires. The Initial Lease Period shall be extended (“First Extended Lease Period”) without the payment of additional fees provided the KMIC Development Co., Ltd. is not in material breach of the Agreement at the time of the notice.

If the KMIC Development Co., Ltd. wishes to extend the First Extended Lease Period for another ten (10) years, the KMIC Development Co., Ltd. shall inform the Lessor in writing at least three (3) months before the First Extended Lease Period expires. The First Extended Lease Period shall be extended (“Second Extended Lease Period”) without the payment of additional fees provided the KMIC Development Co., Ltd. is not in material breach of the Agreement at the time of the notice.

The Parties shall sign a new separate land lease agreement in respect of Zone B in accordance with the JVA (“JVA” means the joint venture agreement as of the 7th day of August 2019, executed by the Shareholders of the KMIC Development Co., Ltd.) for the purposes of creating a fresh Lease Term for Zone B, which land lease agreement will (i) commence from the signing thereof, which shall be the date of issue of Second Round Completion Certificate in terms of the JVA and continue for a term equivalent to Clauses mentioned above for Zone A, and (ii) otherwise be in duplicate form to this Agreement, mutatis mutandis. However, this Agreement shall act as a master lease agreement and therefore reference herein to the Lease, Land, Leased Area and Site shall mean the lands including Zone A and Zone B, and both Zone A and Zone B shall be encumbered by this Agreement for the benefit of the JV Company and both Zone A and Zone B shall be subject to registration (The Parties shall mutually arrange and complete the registration of this Agreement with all relevant Government Authorities, including the Office of Registration of Deeds) and the purpose of the separate lease agreement for Zone B shall be to re-commence the Lease Term in respect only of Zone B.

The Lessee shall, during and in the consideration for the Lease Term, pay to the Lessor a rent (the “Rent”), calculated on a basis of US\$127,351.4 per annum for Zone A (“Zone A Annual Rent”) and US\$97,577.4 per annum for Zone B (“Zone B Annual Rent”). In addition, the Parties agree that the Rent of the Leased Area for the Lease Term shall be contributed to the business of the Lessee (as the KMIC Development Co., Ltd.) as a capital-in kind, or otherwise as the Parties may decide and such contribution shall account for 40% shareholding ratio of the business of the KMIC Development Co., Ltd.”.

The KMIC Development Co., Ltd. shall carry out the construction of the Project without cost to the Lessor in accordance with the plans approved by the Lessor and as amended. The Lessor shall approve the KMIC Development Co., Ltd.’s plans insofar as these are in compliance with the Laws of Myanmar.

If the KMIC Development Co., Ltd. wishes to make any material alterations to the Land, the KMIC Development Co., Ltd. shall have the right to do so with the consent of the Lessor. The Lessor shall approve the KMIC Development Co., Ltd.’s alterations to the

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| Land insofar as such alterations are in compliance with the Laws of Myanmar. |
| The KMIC Development Co., Ltd. shall have the right to peacefully and exclusively use the Leased Area during the Lease Term without interference by the Lessor, any parties affiliated with the Lessor, or any third parties. |
| The KMIC Development Co., Ltd., in accordance with the provisions of Myanmar Insurance Law, shall pay all types of necessary insurance, and for the purpose of raising financing for the Project, has the right to: (a) assign its rights and interests to any insurance claims and/or proceeds to third parties, and (b) grant rights of subrogation to third parties, including for the purpose of creating Secured Interests. |
| The KMIC Development Co., Ltd. shall use the Leased Area for the purposes set out in this Agreement. |
| The KMIC Development Co., Ltd. shall have the right, without any further consent of the Lessor, to transfer or assign this Agreement to any person, including for the purpose of creating any Secured Interests in the Site and Leased Area, all buildings, fixtures, fittings, properties and moveable properties on this Site and Leased Area under this Agreement and the other Project Agreements. However, any such transfer or assignment or creation of Secured Interests shall be notified to MIC. |
| The KMIC Development Co., Ltd. shall have the right to create one or more sub-leases for parts of the Land to the Sub-Lessees under Sub-Lease Agreements, and the Lessor shall have no right, title, interest or claim over the Sub-Lease Payments. |
| The KMIC Development Co., Ltd. shall manage and protect the Leased Area by taking appropriate measures to maintain the conditions of the Leased Area. |
| Upon expiry of the Lease Term, the KMIC Development Co., Ltd. shall not in any case have any duty to repair the Site, dismantle or remove any Project Assets from the Site or otherwise return the Site to any previous or other condition but rather is entitled to return the Site and any improvements on an 'as is' basis at that time. |
| In order to facilitate the implementation of the Project by the KMIC Development Co., Ltd. in cooperation with other persons, whether citizens of the Republic of the Union of Myanmar or foreign investors, the KMIC Development Co., Ltd. under the Project Agreements is allowed to create one or more sub-lease for parts of the Land. The KMIC Development Co., Ltd. shall notify the Lessor of a sub-lease Agreement within thirty (30) days of execution of the same. |
| If any mineral resources, treasures, gems and other natural resources are discovered unexpectedly from, in or under the Leased Area or the Land during the Lease Term, the Lessor shall be promptly notified and such mineral resources, treasures, gems and other natural resources shall be the property of Government of the Republic of the Union of Myanmar, which shall be at liberty to excavate the aforesaid at any time, provided that the KMIC Development Co., Ltd.'s rights and interests under this Agreement and the development of the Project are not in any way adversely affected. |
| The KMIC Development Co., Ltd. must follow the rules to ensure that the implementation of the activities under the Agreement is in accordance with the existing laws and regulations of Myanmar being then in force (the Laws of Myanmar”). |
| Legal Commitments |
| The project developer makes the following legal commitments. |
| The project developer will ensure women shall be entitled to the same rights and salaries |

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| as that received by men in respect of similar work. |
| The project developer will ensure the project will be in line with preservation and safeguarding of cultural heritage, environmental conservation, striving for development of human resources and protection and preservation of public property. |
| The project developer will pay the compensation set forth by the MONREC for the environmental impacts caused by his project activities. |
| The project developer will carry out the Environmental Impact Assessment for the project as stipulated in the Environmental Impact Assessment procedure. |
| The proposed project will implement mitigation measures and management plans stated in the EIA report. |
| The project developer is responsible for its actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the company acting for or on behalf of the Project. |
| The project developer is responsible for, and shall fully and effectively implement, all requirements set forth in the Environmental Compliance Certificate, applicable laws, rules, procedures and standards. |
| The project developer will timely notify and identify in writing to the MONREC, providing detailed information as to the proposed project's potential Adverse Impacts. |
| The project developer will follow the National Environmental Quality (Emission) guidelines established by MONREC. |
| The project developer will inform the relevant ward or village tract administrator if he or his workers/employees find any object which has no owner or custodian and if he knows or it seems reasonable to assume that the said object is an antique object. |
| The project developer will abide by the terms and conditions, stipulations of special licenses, permits, and business operation certificates issued to them, including the rules, notifications, orders, and directives and procedures issued by the applicable laws, terms and conditions of contract and tax obligations. |
| The project developer will carry out in accordance with the stipulations of the relevant department if it is, by the nature of business or by other need, required to obtain any license or permit from the relevant Union Ministries, government departments and governmental organizations, or to carry out registration. |
| The project developer will immediately inform the Commission if it is found that natural mineral resources or antique objects and treasure trove not related to the investment permitted above and under the land on which the investor is entitled to lease or use and not included in the original contracts. |
| The project developer will abide by the applicable laws, rules, procedures and best standards practiced internationally for this project so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage. |
| The project developer will close and discontinue the project 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. |

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| <p>The project developer will pay wages and salaries to employees in accordance with applicable laws, rules, procedures directives and so forth during the period of suspension of project for a credible reason.</p> |
| <p>The project developer will 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>The project developer will supervise foreign experts, supervisors and their families, who are employed in its investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar.</p> |
| <p>The project developer will respect and comply with the labor laws.</p> |
| <p>The project developer will have the right to sue and to be sued in accordance with law.</p> |
| <p>The project developer will ensure equal rights for local workers and avoid salary bias, i.e. ensure that local and foreign workers have the same salary at the same level.</p> |
| <p>The project developer will ensure that all foreign employees apply for the proper work permit and visa through the relevant Ministry.</p> |
| <p>The project developer will obtain approval from the Central Committee through the Regional Committee with regard to the proposal to implement development work.</p> |
| <p>The project developer will implement the industrial zone business, sublease to investors and develop infrastructure after concluding a commercial agreement with the Regional Committee in accordance with the prescribed terms and conditions.</p> |
| <p>The project developer will implement maintenance work of the industrial zone under the supervision of the Management Committee.</p> |
| <p>The project developer will complete construction within the proposed period at the respective industrial zone. If the construction cannot be completed within the proposed period, sufficient reason has to be reported to and a decision has to be requested from the Central Committee, together with comments from the Regional Committee. If the reason is found to be insufficient, the permit shall be revoked.</p> |
| <p>The project developer will develop the infrastructure in the industrial zone himself or contract to other parties.</p> |
| <p>If the project developer provides a service related to infrastructure beyond the border of the industrial zone, he shall comply with the instructions of the relevant government departments.</p> |
| <p>The project developer will comply with the laws in force with regard to matters such as environmental conservation, occupational safety, fire safety and health care.</p> |
| <p>The project developer will pay the fees payable for land use and the business permit according to the commercial contract concluded with the Regional Committee to the Regional Committee as a lump-sum or in installments.</p> |
| <p>The project developer will implement a bonded warehouse system in the industrial zone in accordance with custom laws and procedures.</p> |
| <p>The project developer will arrange as required to assess the risks of workplace, process and machines and materials used thereat.</p> |

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| The project developer will arrange as required to assess the likelihood of occurrence of hazards at the workplace and to the environment. |
| The project developer will arrange to have workers' medical checked-up by the recognized doctor in accordance with stipulations whether they suffer from any occupational disease. |
| The project developer will arrange to improve the workplace until it is safe and good for health. |
| The project developer will 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. |
| The project developer will prescribe precautionary plans and plans for emergency. |
| The project developer will 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. |
| The project developer will 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. |
| The project developer will 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. |
| The project developer will 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. |
| The project developer will 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. |
| The project developer will display occupational safety and health instructions, danger signs, notices, posters and signage for directions in accordance with stipulations. |
| The project developer will arrange to be complied with precautions when entering restricted hazardous workplaces. |
| The project developer will 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. |
| The project developer will lay down the fire safety plan, perform fire drilling and train workers to use fire extinguishers systematically. |
| The project developer will allow the Chief Inspection Officer and Inspection Officers to enter workplaces, inquire, request documents and information or seize exhibits. |
| The project developer will cause workers to work only for the specified working hours if they have to work in hazardous industry/business and workplace. |
| The project developer will incur the expenses for occupational safety and health matters. |

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| <p>The project developer will not dismiss or demote a worker: 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; because the said worker has addressed a complaint for hazardous or health detrimental conditions; because the said worker has conducted the responsibilities of occupational safety and health committee; or because the said worker has refused to work in any condition where an occupational accident or occupational disease is about to occur.</p> | |
| <p>The project developer will recognize the labour organizations of his trade as the organizations representing the workers.</p> | |
| <p>The project developer will allow the worker who is assigned any duty on the recommendation of the relevant executive committee to perform such duty not exceeding two days per month unless they have agreed otherwise. Such period shall be deemed as if he is performing the original duty of his work.</p> | |
| <p>The project developer will assist as much as possible if the labour organizations request for help for the interest of his workers. However, the employer shall not exercise any acts designed to promote the establishment or functioning of labour organizations under his domination or control by financial or other means.</p> | |
| <p>The project developer will provide rights and benefits including but not limited to, leave, holidays, overtime pay, compensation and social security.</p> | |
| <p>The project developer will settle disputes, within the law, between workers, employers, consulting experts or any other personnel involved in the business operation.</p> | |
| <p>Policies of Developer</p> | |
| <p>The project developer has Environmental and Social Policies and these policies will be implemented for project development.</p> | |
| <p>Chapter 3. Project Description and Alternatives</p> | |
| <p>3.2 Project Description</p> | <p>The project will be designed for large scale, middle scale and small scale industrial compounds including internal infrastructure drainage, road, overhead electricity installation, wastewater treatment plant. Industries will be related to food and beverages, textile and garment, electronics and computer assembly, logistics and construction materials.</p> |
| <p>3.7 Proposed Internal Infrastructure</p> | <p>Main entry roads and intersection roads will be paved by concrete and road side drainage will be constructed by concrete which will collect storm water to detention ponds. Over flows from detention pond will be disposed at front and back drains. Sewage from every habitant area will be collected to waste water treatment plant and treated water will be disposed along the back drainage which will lead to Kyar Inn creek.</p> |
| <p>3.7.1 Road Ways in KMIC Project</p> | <p>There will be six types of road ways which</p> |

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| Compound | would be constructed in the internal infrastructure. They are 38 m wide, 46 m wide, 26 m wide, 18m wide, 12 m wide and 8 m wide road ways. |
| 3.7.2 Water Use and Supply System | KMIC JVC planned to expose several temporary ponds for on-site measures (prevention of flooding in wet weather). It is sufficient to use fresh water for construction. |
| 3.7.5 Wastewater and Sewage Collection and Disposal | Domestic wastewater, industrial wastewater and other disposed water will be collected via road side pipe network and gathered into wastewater treatment plant. The estimated capacity of wastewater will be 8,000 cubic meters per day. Treated water will be disposed off at the back drainage which leads to Kyar Inn creek. |
| 3.7.6 Solid Waste Management System 3.7.6.1 Construction Phase 3.7.6.2 Operation Phase | The developer will practice Non-Hazardous Solid Waste Management Plan and Hazardous Solid Waste Management Plan. |
| 3.10 Plan for coordination between contractors for the safety of workers on worksite | The developer sets a plan to coordinate between contractors and sub-contractors for the safety of workers on worksite. |
| 3. 11 Welfare Plan for Workers | The developer sets a welfare plan for workers to be followed by himself, contractors and sub-contractors. The welfare plan consists of employment conditions, occupational related injury or disease, accommodation, workers' grievance redress mechanism and miscellaneous. |
| 3.12 Employment of staff and workers | the developer sets the guidelines for hiring workers which will be followed by contractors and sub-contractors. |
| 3.13 Management and staff | For social issues including worker's affairs, safety, health and rights the following person from KMIC Development Co., Ltd. can be contacted. Mr. Kim Gunwoo Email: gonwoo2@gmail.com Phone: 09975799222 Address: Office Suite 2007, Pyay Garden Office Tower, 346-354, Pyay Road, Sanchaung Township, Yangon. |
| Chapter 5. Impact and Risk Assessment and Mitigation Measures | |
| 5.4.1 Mitigation Measures for Construction Phase | |
| 5.4.1.1 Mitigation Measures for Physical Environmental Impacts | The developer will implement the mitigation measures for the impacts, namely, soil degradation, soil contamination, soil erosion, topography, air pollution (including |
| 5.4.1.2 Mitigation Measures for Biological | |

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| <p>Environmental Impacts</p> <p>5.4.1.3 Mitigation Measures for Social Environmental Impacts</p> | <p>dust emission), greenhouse gas emissions, surface water/ground water contamination, noise and vibration, solid waste generation, changes to natural resources, traffic flow, destruction of vegetation and expelling of wildlife, disturbance to aquatic organisms and aquatic habitats, existing social infrastructures and services, landscape and scenery, risks for infectious diseases such as AIDS/HIV, occupational health and safety (Risk of injuries and accidents to workers), emergency risk (risk of fire, earthquake), community health and safety, impacts on agricultural and livestock zones.</p> |
| <p>5.4.2 Mitigation Measures for Operation Phase</p> | |
| <p>5.4.2.1 Mitigation Measures for Physical Environmental Impacts</p> <p>5.4.2.2 Mitigation Measures for Biological Environmental Impacts</p> <p>5.4.2.3 Mitigation Measures for Social Environmental Impacts</p> | <p>The developer will implement the mitigation measures for the impacts, namely, soil degradation, soil contamination, air pollution (including dust emission), greenhouse gas emissions, surface water/ground water contamination, Increased water demand, noise and vibration, increased solid waste generation, increased waste water generation, changes to natural resources, increased traffic flow, foul odor and vectors, changes to terrestrial flora and fauna, changes to aquatic flora and fauna, inconveniency with socio-economic change, Community Health and Safety, Risk of injuries and accidents to workers, light intrusion, Increased Emergency risk, Impacts on Agricultural and Livestock Zones.</p> |
| <p>5.4.3 Mitigation Measures for Decommissioning and Closure Phase</p> | |
| <p>5.4.3.1 Mitigation Measures for Physical Environmental Impacts</p> <p>5.4.3.2 Mitigation Measures for Biological Environmental Impacts</p> <p>5.4.3.3 Mitigation Measures for Social Environmental Impacts</p> | <p>The developer will implement the mitigation measures for the impacts, namely, air pollution (including dust emission), greenhouse gas emissions, surface water contamination, noise and vibration, solid waste generation, living and livelihood, risks for Infectious disease such as AIDS/HIV, Occupational Health and Safety, Community Health and Safety, Impacts on Agricultural and Livestock Zones.</p> |
| <p>Chapter 6. Health Impact Assessment</p> | |
| <p>6.5.2 Expected Mitigation Measures for Occupational Health and Safety (OHS)</p> | |
| <p>On-site medical services</p> | <p>The developer will provide medical services at the worksite which should be equipped with basic health care facilities. First aid should be present within workplace.</p> |

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| | The medical personnel will be available for advice and consultation on matters of occupational health and for prompt medical attention in case of serious injury. There must means to transport an injured person to a physician or hospital. |
| Management of medical waste from worksite medical service | Health care waste such as pharmaceutical waste includes expired, unused, spilt and contaminated pharmaceutical products, wastes contaminated with human tissue, blood, pathogens, disposable needle and syringe, gloves, are harmful to environment. These waste from healthcare activities service have to dispose according to the guidelines of “Environmental Management Plan” published by Ministry of Health and Sports. |
| Periodic Medical Examination | Generally, it is recommended to check every 12 months or 4 months. |
| Reporting of infectious disease | In detection of infectious disease and infectious disease related condition during examination responsible medical personnel must report to worker’s supervisor and Township Health Department without delay. Subsequently arrange for further treatment. |
| 6.5.3 Expected Mitigation Measures against negative impact on Occupational Health and Safety in Construction and Closure Stages | The developer will implement the mitigation measures for the health impacts: general health problems, hearing impairment, hand-arm vibration diseases, slips and falls, work in heights, struck by objects, rotating and moving equipment, communicable diseases, risk of musculoskeletal disorders, respiratory diseases and cancer, tobacco related lung diseases, oral diseases and condition, risk of transmission of diseases linked to contaminated water and poor sanitation, expose to contaminated dust, soil and injurious corrosive materials, skin lesions, psychosocial health. |
| 6.5.4 Impacts on occupational health and safety which might cause during operation work of the Project | The developer will implement the mitigation measures for the health impacts: general health problems, Fire Precautions, Lighting, Safe Access, Work environment temperature, Area Signage, labelling of equipment, communicate hazard codes, Electrical, Industrial vehicle driving and site traffic, Personal protective equipment (PPE). |
| Table 6. 14:Expected Mitigation Measures against Negative Impact on Community Health and Safety during construction / operation / and closing phase | The developer will implement the mitigation measures for health risk: respiratory diseases risks, cardiovascular disease (CVD), Cognitive impairment, sleep disturbance and annoyance due to noise, Injuries and accidents [General site |

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| | hazards], ill- health effects due to hazardous substances contact with skin or eyes, traffic safety, psychosocial health. |
| 6.9 Public Health and Safety Monitoring and Management Plan | The developer will manage, oversee and cooperate with contractors and developers of industries and factories to implement the mitigation measures and frequency of monitoring described in Table 6. 15: Health and safety Monitoring and Management Plan. |
| 6.10 Noise Control Measures for Night Work | The developer will adopt the noise control measures for night work to avoid the impacts on the community living nearby. The control measures include elimination of noise source, substitution of noisy machinery with quieter alternatives, engineering controls, administrative controls and community notification. |
| 6.11 Control Measures for Electrical Hazards | The developer will develop guidelines for controlling and avoiding electrical hazards comprising systems, work activities and protective equipment, insulation, protection and placing of conductors, earthing, integrity and other suitable precautions, connection, excess current protection, cutting off supply and isolation, work on equipment made dead, work on or near live conductors, working space access and lighting, protection against contact with live overhead or buried power lines, emergency procedures following an electrical incident, labels, work in substation, competence, training. |
| 6.12 Actions for Violation of Policies, Guidelines and Control Measures | The developer (project proponent) will take full responsibility for the respective investors and contractors in complying with the established guidelines, control measures and policies. The administrative actions are also developed for the violations of any guidelines, control measures and policies. |
| CHAPTER 7. CUMULATIVE IMPACT ASSESSMENT | |
| 7.7 Relevant Mitigation Measures for Cumulative Impacts | The developer will follow the mitigation measures for cumulative impacts: Increase in pollutant concentrations in surface water, Increase in pollutant concentrations in ground water, Incremental contribution of air pollutants, Incremental contribution of dust in air, Increased community safety and health issues. |

CHAPTER 8. ENVIRONMENTAL MANAGEMENT PLAN

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| <p>8.1 Environmental Management and Monitoring Plan (Construction and Operation Phases)</p> | <p>The developer will manage, oversee and cooperate with contractors for implementation of mitigation measures and monitoring for the impacts during construction phase: soil degradation, soil contamination, soil erosion, topography, dust emission, air pollution, greenhouse gas emission, surface water/ground water contamination, noise and vibration, solid waste generation, hazardous waste generation, changes to natural resources, traffic flow, destruction of vegetation and expelling of wildlife, changes to terrestrial flora and fauna, disturbance to aquatic organisms and aquatic habitats, existing social infrastructure and services, landscape and scenery, risks for infectious diseases such as AIDS/HIV, occupational safety and health, emergency risk, community health and safety.</p> <p>The developer will manage, oversee and cooperate with developers of industries and factories (tenants) for implementation of mitigation measures and monitoring for the impacts during operation phase: soil degradation, soil contamination, dust emission, air pollution, greenhouse gas emission, surface water/ground water contamination, increased water demand, noise and vibration, increased solid waste generation, increased wastewater generation, hazardous waste generation, changes to natural resources, increased traffic flow, foul odor and vectors, changes to aquatic flora and fauna, inconveniency with socio- economic change, occupational safety and health, increased emergency risk, community health and safety.</p> |
| <p>8.2 Environmental Management and Monitoring Plan (Decommissioning/Closure Phase)</p> | <p>The developer will manage, oversee and cooperate with contractors for implementation of mitigation measures and monitoring for the impacts during decommissioning/closure phase: dust emission, air pollution, greenhouse gas emission, surface water contamination, noise and vibration, waste generation (hazardous and non-hazardous waste generation), living and livelihood, risks for infectious diseases such as AIDS/HIV, occupational safety and health, community health and safety.</p> |
| <p>8.3 Environmental Monitoring Plan with</p> | <p>The developer will manage, oversee and cooperate with contractors for</p> |

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| <p>estimated budget (Construction Phase)</p> | <p>implementation of monitoring and monitoring means for the impacts for construction phase.</p> <p>The developer will allocate budget for implementation of EMP and monitoring plan as described in the monitoring plan.</p> |
| <p>8.4 Environmental Monitoring Plan with estimated budget (Operation Phase)</p> | <p>The developer will manage, oversee and cooperate with developers of industries and factories (tenants) for implementation of monitoring and monitoring means for the impacts for operation phase.</p> <p>The developer will allocate budget for implementation of EMP and monitoring plan as described in the monitoring plan.</p> |
| <p>8.5 Environmental Monitoring Plan with estimated budget (Decommissioning Phase)</p> | <p>The developer will manage, oversee and cooperate with contractors for implementation of monitoring and monitoring means for the impacts for decommissioning phase.</p> <p>The developer will allocate budget for implementation of EMP and monitoring plan as described in the monitoring plan.</p> |
| <p>8.5.1 Organization Structure for Environmental Management Plan Implementation Team</p> | <p>The developer will establish a committee to manage, supervise and assist the contractors and developers and tenants of the KMIC in implementing EMP and monitoring plan.</p> |
| <p>8.5.2 Submission of Monitoring Report</p> | <p>The project developer will submit the monitoring reports to the Ministry of Natural Resources and Environmental Conservation every six months.</p> |
| <p>8.7 Environmental Management Sub-Plans</p> | <p>The developer will follow/ manage, oversee and cooperate with contractors, developers and tenants for implementation of the following Environmental Management Sub-Plans:</p> <ol style="list-style-type: none"> 1) Waste Management Plan (including hazardous & non-hazardous waste) 2) Wastewater Management Plan 3) Air Pollution Control Management Plan 4) Noise Pollution Control Management Plan 5) Water Quality Management and Monitoring Plan 6) Energy and Water Efficiency Plan 7) Traffic Management Plan 8) Corporate Social Responsibility Programme (CSR) |

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| <p>Corporate Social Responsibility (CSR) Programs</p> | <p>The developer will implement the following CSR programs:</p> <p>Education Sector: Construction and upgrading school building and facilities, providing necessities for students (for instance, school uniforms, books, pencils).</p> <p>Healthcare Sector: Building dispensary/healthcare centre at the appropriate village where villagers from surrounding villages can access.</p> <p>Infrastructure Development: Upgrading of the roads which connect the project site and the village nearby.</p> |
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CHAPTER 9. PUBLIC CONSULTATION AND DISCLOSURE

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| <p>9.2.2 Recommendations</p> | <p>The developer will implement the following suggestions and requests made by the community:</p> <ol style="list-style-type: none"> 1. Although the households can access to the electricity, they experience power outage. Therefore, it is recommended that electricity supply grid should be upgraded. 2. Roads near the industrial complex are very poor in condition so that they can't be used in the raining season. The road network among villages should be developed as CSR Plan. 3. There are no ambulance and good dispensary/hospital for emergency health issues, therefore the ambulance and good dispensary/hospital are needed. 4. Although it is a cultivated zone, some places in the zone don't access to the water supply for cultivation. So, they can't be useful for cultivation. Therefore, it will be more convenient for local people if they are provided water for cultivation. 5. Trainings should be provided the local people so that local workers can be easily recruited when the industrial complex is developed. 6. As there is lack of job opportunity in the region, the local people migrated to work. When the industrial complex is developed, they might come back for working at the area. Therefore, advanced preparations should be carried out. 7. There can be heavy floods in the raining season in the region, therefore advanced preparation should |
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| | <p>be carried for better drainage system for the Industrial complex.</p> <p>8. Industrial complex should include factories for production of value-added agricultural and livestock products. Agricultural and livestock breeding should be expended by providing modern technical skills.</p> <p>9. Local people want the developer to start the industrial complex as soon as possible. The developer needs to engage with the local people.</p> <p>10. When the industrial complex is developed, it is suggested that a recreation center or a playground should be included for the wellbeing of the workers.</p> |
| 9.5 Website Address for uploading EIA Report | <p>This EIA report will be uploaded on the following company's website:</p> <p>http://www.mykmic.com</p> |
| 9.6 Community grievances redress mechanism | <p>The developer will set up a "Community Grievances Redress Mechanism" to solve any complaints and grievances of the community which can be arisen due to different project activities.</p> |



CHAPTER 10. CONCLUSION

The Industrial Complex project proposed by the KMIC JVC has strategic value on many fronts. As Myanmar believes that the establishment of industrial complexes/zones throughout the country will contribute to the development of the national economy, it could also be said that the Project is strategic in the economic sense. The Project will contribute to the economic development of the commercial city, Yangon of Myanmar and, thence, to the economic development of the country. The economic cooperation between the two countries will also be strengthened.

The Project will seek to develop the socio-economic conditions of the people living in the region. There is no denying that, once the Project is implemented, it will substantially enhance mutually beneficial Myanmar-Korea trade. It also has the huge potential of attracting investors from inside and outside the country by establishing a favourable investment environment. At the micro-economic level, the Project will promote entrepreneurship and create job opportunities.

In terms of the living environment, most of the impacts could be controlled and limited in and around the project area. Major negative impacts such as but not limited to air pollution, surface water/ground water contamination, wastewater generation, solid waste generation, traffic flow are expected for construction, operation and decommissioning phases but their significance levels are medium as highest. However, implementation of appropriate mitigation and management plan will minimize these impacts.

In terms of the natural environment, the major negative impact is the clearance of existing vegetation during construction phase, though no sensitive ecological protection area is involved. However, implementation of appropriate mitigation measures, such as creating green areas and sodding of public spaces as soon as possible and keeping the existing environmental conditions as much as possible will minimize the impact on the ecosystem.

In terms of the social environment, the existing social infrastructures and services, risks for infectious diseases, occupational health and safety and community health and safety are expected. However, implementation of appropriate mitigation and management plan, such as to manage working conditions during the construction work and to provide security and maintain safety prevention measures during construction/operation phase will minimize these impacts.

On the other hand, some positive impacts of the Project such as increase in job opportunities and improvement of social infrastructure are also expected. There are no land issues for the project and the community living nearby villages are pleased to see the project implementation as early as possible. They would like to get employment in the project.

The residual impacts, effects on watercourses, groundwater contamination, air pollution, dust emission, community health and safety, are expected but their level of significance is minimal and minor. Therefore, no additional research, monitoring, and/or recovery initiatives are considered and these impacts are negligible to the overall baseline status of the resource.

The cumulative impacts could be expected due to different activities of livestock farms, fish farms, and agricultural production businesses in the surrounding area of the proposed project. Yet, the cumulative impact assessment has not identified any cumulative impacts that are considered to be significant (i.e. high significance) and in need of mitigation measures, monitoring or management. The impacts are within the ability of the resource to absorb such changes. The cumulative impacts typically result from the actions of multiple stakeholders, it is necessary to engage with these stakeholders for effective collaboration and coordination. Therefore, the project developer plans to initiate collaborative engagement in impact management with others including project proponents, government agencies, affected communities, Environmental NGOs, conservation groups, and expert groups for the programs such as collaborative protection and enhancement of regional areas to preserve biodiversity, collaborative engagement in other regional cumulative impact management

strategies, and participation in regional monitoring programs to assess the realized cumulative impacts and efficacy of management efforts, wherever applicable.

In consideration of the result of the EIA study for the Project, the Environmental Management Plans (EMPs) including adequate mitigation measures to reduce the negative impacts and Environmental Monitoring Plan including budget allocation are proposed for each phase of the Project: construction, operation and decommissioning phases. For the pre-construction phase, no negative impacts are judged for physical, biological and social environment.

It is confirmed that the environmental, social and health impacts of the Project were assessed, and the Environmental Management Plan formulated properly. In the process of EIA, opportunity of public involvement was ensured and comments from the public and MONREC were reflected into the EIA Report. Thus, the EIA was completed in accordance with the requirements of the EIA Procedure properly for the project proponent to follow the EMP accordingly.



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APPENDICES

Appendix 1: Fire Safety Management and Fire Emergency Plan

FIRE SAFETY MANAGEMENT AND FIRE EMERGENCY PLAN

FIRE SAFETY MANAGEMENT

1 INTRODUCTION AND SCOPE

- 1.1 Fire is a hazard in any part of the premises. Its consequences include the threat to the lives or health and safety of relevant persons, damage to or loss of property and severe interruption to normal business activities or opportunities.
- 1.2 Managing the risk of fire demands and fire safety precautions based on a combination of appropriate prevention and protection measures depending upon building use and occupancy.
- 1.3 This fire safety management and fire emergency plan applies to all premises which are to any extent under the control of the **The KMIC Development Co., Ltd. (KMIC JVC)** as the employer and owner. Its requirements extend to all persons at those premises including staff, guests and contractors whether permanently or temporarily engaged.
- 1.4 **KMIC JVC** will, so far as is reasonably practicable, and in accordance with legal obligations and standards, in respect of every premises to:
 - provide and maintain passive and active fire prevention, protection and measures according to the purpose or use of the building, the numbers of occupants and the activities or processes undertaken therein;
 - provide comprehensible and relevant information to staff and others, through the provision and availability of emergency instructions or fire safety plans and the risks identified by relevant risk assessments;
 - provide a programme of fire safety training;
 - carry out and keep under review a fire risk assessment to analyse building and process fire risks, the existing preventive and protective measures and to identify areas for improvement;
 - have in place a programme of works to improve or maintain the existing fire safety specifications;
 - identify a sufficient number of persons, whether staff, security or others, to be present at all times the building is occupied with responsibility for initiating the fire evacuation procedure and provide information and assistance to the fire service;
 - where appropriate, to prepare and keep under review risk assessments in relation to the use, storage, handling, disposal and transportation of dangerous substances and ensure that, so far as is reasonably practicable, the risks associated with dangerous substances are reduced or controlled.

2 PRACTICAL FIRE SAFETY ARRANGEMENTS

- 2.1 As part of a holistic fire safety management system, in addition to the management action outlined below, considerations of passive and active fire precautions are essential.
- 2.2 Passive fire precautions are concerned with the physical conditions in premises which are designed to facilitate containment of fire by design, construction and layout, effective communication and safe evacuation. In particular,

- materials specification, design, construction and inspection of buildings, fire doors and escape routes taking into account the needs of service users, people with disabilities, contractors, the public, etc;
 - appropriate safe and secure location of building services e.g. gas and electricity;
 - provision of clear fire safety signage for escape routes and final exits in conformity with the Myanmar Fire Brigade rules and Myanmar National Building Code (2016).
 - provision of prominently located fire action notices (e.g. by fire alarm manual break glass points) to inform people of the action to be taken in the event of fire; and
 - education and training of staff in fire safety arrangements, in particular evacuation procedures and drills.
- 2.3 Active fire precautions are those features of the fire safety management system that detect and operate in the event of a fire, including fire alarm systems, emergency lighting systems and firefighting equipment. In particular,
- the installation, maintenance, inspection and weekly testing of fire alarms;
 - the appropriate design, location, operation, monthly inspection and annual testing of adequate (emergency) lighting systems for fire escape routes;
 - the provision, use, appropriate type and location, and annual maintenance of portable fire extinguishers.
 - A quarterly / six monthly / annual premises fire safety inspection will be carried out.
- 2.4 The fire safety arrangements will be based on the followings:
- Effective planning, organisation, control, monitoring and review of protective and preventative measures
 - Fire safety risk assessments and building audits
 - Fire safety systems and maintenance
 - Fire warden and staff training
 - Fire evacuation drills
 - Building design, alterations and commissioning

3 PLANNING

- 3.1 Fire risk assessments are a requirement and a structured approach to determining the risk of fire occurring in a premise or from a work activity, and identifying the precautions necessary to eliminate, reduce or manage the risk. The outcome of the risk assessment must be incorporated in the fire emergency plan.
- 3.2 Fire Risk Assessments must be carried out and reviewed regularly (recommended to be annually) or when there is any building alteration or change of occupation and use of the premises, or following a fire incident/emergency, etc.
- 3.3 The risk evaluation and appropriate control measures to be taken into account will include those practical fire safety arrangements outlined above.
- 3.4 Risk assessments must take into account those who could be affected, e.g. numbers involved, their location, physical and mental capabilities and employees of organizations with whom a workplace is shared. The significant findings of the fire safety risk assessment will be made known to all other responsible persons as appropriate.

- 3.5 Where appropriate, an individual Personal Emergency Evacuation Plan (PEEP) must be developed for staff or service users who have known disabilities that will impact on their ability to evacuate the particular premises.
- 3.6 Maintenance of fire safety systems include:
- Fire detection and warning system
 - Emergency lighting
 - Firefighting facilities
 - Emergency routes and exits
 - Fire safety signs and notices
 - Portable electrical appliances (PAT) and premises installation testing (5 yearly)
- 3.7 Fire Warden and staff training will be provided through a competent trainer. It is the responsibility of all Fire Wardens to attend one refresher training annually on one of the dates available. A sample fire safety training programme can be found in Appendix 3.
- 3.8 Fire evacuation exercises will be carried out each term / 3 monthly, 6 monthly / annually within individual premises. The purpose of these exercises is to educate premises occupants in the correct manner of evacuating a building in the event of an emergency situation and to meet legal obligations. All evacuations will be conducted by the Fire Wardens. Pre and post de-briefing sessions will accompany each evacuation drill.
- 3.9 Provisions will be made for the safe evacuation of disabled people.
- 3.10 Fire evacuation of a building will be in accordance with established procedures in the fire emergency plan. In the event of a fire alarm outside of normal business hours, building occupants are to evacuate the building. All staff, guests and contractors will be made aware of the fire procedures.
- 3.11 All building design work shall comply with relevant codes and standards. New building works and refurbishment projects that include fire safety equipment and systems will be sanctioned by the concerned government departments.
- 3.12 Testing of building passive and active fire evacuation systems are to be conducted by the responsible Fire Department officer at agreed appropriate times during normal hours and in line with current standards. All building fire wardens will be trained in the use of the evacuation system and operate from pro-forma instructions.
- 3.13 Fire wardens will report any faults or problems to the Manager.
- 3.14 A fire safety log book will be kept to record the details of all tests on passive and active preventative and protective measures, as well as training and fire drills.

4 ORGANIZATION AND CONTROL

- 4.1 Specific named individual responsibility for overall responsibility for Fire Safety, maintenance, Emergency Plans and Staff Training can be found in this plan.
- 4.2 Managers / Section Heads / Department Managers with responsibility for premises or parts of premises will:
- ensure that this Policy and/or any departmental fire safety policies/codes of practice that complement this Policy are in place, properly implemented and reviewed.
 - ensure that a Responsible Person is appointed for all of their premises to oversee and implement fire safety arrangements, and ensure that they are competent and appropriately trained to undertake their duties;
 - ensure that arrangements are in place for the completion of fire risk assessments, including, where appropriate, technical surveys in respect of fire protection;
 - ensure that fire, security, and health and safety arrangements at each premise are complementary;

- ensure that fire risk assessments are carried out for all their workplaces, and for specific activities such as hot working involving welding, cutting, work with bitumen, etc;
- ensure, in conjunction with the outcome of the fire risk assessment that the optimum number and type of fire extinguishers are installed in appropriate locations;
- ensure that fire alarm and detection systems, emergency lighting and fire extinguishers are appropriately located and properly maintained;
- ensure that a robust and effective emergency plan is in place at each location to safely evacuate all persons, whether employees, visitors or service users and this emergency plan must take into account people with mobility, some sensory and some learning impairments, including those with temporary impairments, which will affect their ability to use stairs or otherwise evacuate premises promptly. the plan must be internally deliverable and not reliant on the Fire and Rescue Service to complete the evacuation;
- arrange for the emergency plan to be issued to their employees, guests, etc. to inform them what to do in the event of fire, particularly safe evacuation;
- arrange for a competent responsible person to be nominated to oversee and implement fire safety arrangements at their workplace(s) on their behalf;
- ensure that if there is any doubt about the provision of new or replacement fire extinguishers;
- ensure that staff are appropriately trained in fire safety procedures to reflect the requirements of the fire risk assessment;
- ensure that a copy of the current fire risk assessment for their premises is readily accessible, its provisions complied with;
- ensure that fire risk assessments are reviewed at least annually or whenever there is any building alteration, change of occupation or use of the premises or following an incident involving fire;
- ensure that effective arrangements are in place for contacting the emergency services;
- ensure that the Fire and Rescue Service are aware of any significant hazards associated with the premises e.g. oxygen cylinders, storage of petrol, etc; and
- confirm that their quarterly premises fire safety inspections address fire safety arrangements.

4.3 The Competent Persons (who must be competent to carry out this role) must:

- assist and support with the preparation and review (at least annually) of fire safety risk assessments;
- ensure compliance with the outcomes of the Fire Risk Assessment and that the necessary control measures are implemented;
- prepare and review the emergency plan issued to all staff;
- ensure information on fire safety arrangements is available to service users and guests;
- ensure all staff and, where appropriate, contractors are instructed in the emergency plan;
- arrange and review fire drills at a frequency of not less than six months;
- specify and rehearse the arrangements for assisting guests, disabled people or those with temporary physical impairments to safely evacuate the premises. Where appropriate, a PEEP must be developed;
- ensure Fire Alarms are regularly tested at the recommended frequency e.g. weekly;
- monitor that fire alarm systems, detection devices, emergency lighting and fire extinguishers are appropriately and regularly maintained;
- keep the fire log book or equivalent up to date;
- ensure that fire action notices (displayed as a minimum at fire alarm call points) and fire signage are appropriate and kept up to date;
- ensure all escape routes are kept clear of obstructions and that access to fire extinguishers and fire alarms is not impeded;
- ensure that the annual testing of portable electrical equipment and periodic testing (5 yearly) of the fixed electrical installations has been carried out, and

- ensure that quarterly fire safety inspections of the premises are carried out and that these address fire safety arrangements.
- 4.4 Employees must:
- ensure they are familiar with the emergency plan for their workplace and co-operate by participating in fire evacuation/drill procedures and by observing practical fire safety arrangements;
 - know, and co-operate with, the responsible person for their workplace;
 - report to their manager or supervisor any concerns about fire safety;
 - be familiar with all escape routes;
 - not wedge fire doors open, nor block or obstruct them;
 - be aware of the action to be taken on discovering a fire, hearing a fire alarm, for raising the alarm (including the location of fire alarm call points) and calling the fire and rescue service;
 - promptly evacuate the premises, in accordance with the emergency plan, to a place of safety without putting themselves and others at risk, and NOT attempt to extinguish a fire unless they have been specifically trained; and
 - comply with the No Smoking legislation.

5 MONITORING

- 5.1 The following Key Performance Indicators will be used to monitor the effectiveness of the Fire Safety Management Plan: -
- i. Number of fires recorded annually / number of fire related incidents.
 - ii. Achieving set schedules and time frames (evacuation drills and building audits).
 - iii. Measuring the number of Fire Service call outs against cause.
 - iv. Number and nature of enforcement, alterations or prohibition notices from statutory authorities.
 - v. Quarterly / six monthly/ annual premises inspection and meetings to ensure actions and progress are made.
 - vi. Annual audit of all fire systems by the manager.

6 REVIEW

- 6.1 Annual audit of all fire systems by the manager to ascertain compliance with not only statutory provisions but with this Fire Safety Management Plan.
- 6.2 Active reviews will take place quarterly prior to any likely accident or event.
- 6.3 Reactive reviews will take place following a fire safety event occurring.
- 6.4 A review will also be undertaken following a fire, changes to the premises construction and facilities, new procedures, new equipment, new materials and changes in staff numbers and roles.

7 Fire Emergency Plan

All aspects of the plan will consider out of hours occupation and identify where there would be differences e.g. personnel; locked doors; different escape routes etc.

7.1 Training and Training Provision

Identify any training needed and how it will be provided. This will include the following:

- Staff identified as trained in the use of fire equipment.
- Staff identified as trained in the use of the fire panel.
- Staff identified to register guests at the assembly point(s).
- Staff identified as having duties specific to the type of evacuation.
- Method of ensuring everyone understands how to operate the fire alarm.
- Method of ensuring everyone has sufficient instruction and training for fire evacuation.
- Method of ensuring guests / contractors have sufficient information on procedures in the event of an emergency evacuation.

7.2 Information Distribution

Detail the method(s) of informing personnel (incl. guests / contractors) of escape routes. This will include the following:

- Instruction
- Training
- Emergency exit / route signage
- Fire action Notices
- Include method of informing personnel of an alternative escape route should the main one be blocked or inaccessible. (Consideration should also be given to a route that leads past a potential arson attack areas, such as near rubbish skips.)
- The Emergency Plan

7.3 What People / Staff Should Do If They Discover a Fire

- Raise the alarm by operating the nearest fire alarm call point
- Evacuate to a safe place
- DO NOT USE THE LIFT (unless it has been designated as a refuge or part of the emergency escape route)
- Trained personnel to tackle the fire only where appropriate
- Where appropriate check toilets and close windows and doors on the way out
- If have responsibilities for assisting persons with Personal Evacuation Plans respond as required following the actions as identified in the Plan
- Leave the building by the nearest exit
- Do not stop or return to collect personal belongings
- Ensure visitors are escorted from the building to the assembly point
- Close any doors en-route without delaying your escape
- You must remain at the assembly place
- Return to the building only when authorised to do so

7.4 What People / Staff Should Do If They Hear the Fire Alarm

If a person also has responsibilities for assisting persons with Personal Evacuation Plans respond as identified in the Plan. If not then:

- Leave the building by the nearest exit
- Close any doors en-route without delaying your escape
- Do not stop or return to collect personal belongings
- Do not use any fire fighting equipment unless you have been trained
- Do pass any information to the building responsible person at the assembly point
- Remain at the assembly place
- Return to the building only when authorised to do so

7.5 Contacting the Emergency Services

Detail:

- Who will contact the emergency services?
- What are the means of calling the emergency services? For example, by mobile telephone or landline
- Include a method in the event of a power failure

7.6 Identify Processes, Machines or Power That Must Be Shut Down

This would include the following where appropriate:

- Staff responsible for ensuring any hot work equipment is turned off
- Technology departments
- Welding
- Cookery
- Kitchen

7.7 Specific Arrangements for Any High-Risk Areas

For Example:

- Boiler room
- Chemical storage areas
- Gas storage
- Generators
- Work processes

7.8 Emergency Services Liaison Procedures

- Who will liaise with the emergency services on arrival?
- What information will they have and how will they get it?
- How will the person, identified above, direct the emergency services to the emergency? i.e. will they meet them at the gate or at a pre-determined place?
- How will the emergency services be able to identify this person? e.g. hi-viz vest, armband etc
- If anyone is missing and where they were last seen

7.8.1 Specific Information for the Emergency Services

How will the emergency services be given specific information such as:

- Type of emergency
- Location of the fire / incident
- Missing persons
- Flammable material stores
- Location of high risk areas
- Any unusual activities such as building works or temporary structures
- Hazardous work process

7.8.2 Location of information

Detail:

- Where will the information be kept on risks

E.g. Maps / sketches / alarm identification?

- For example - held near the fire panel.

7.8.3 Accounting for Personnel

- How will all people be accounted for?
- How will the manager be informed?
- Who will ensure that all personnel are accounted for?
- How will this be managed if there is more than one assembly area?
- What is the procedure if someone is missing?
- How are the emergency services informed? (Note: Only the Fire Service personnel with appropriate breathing apparatus can enter the building if there is a person identified as missing)

7.9 Escape Routes

A map or diagram will be included for ease of reference. Include other relevant information such as details of fire fighting equipment provided, location of designated 'Safe Refuges', types and location of emergency exit signs, locations of manual break glass points and emergency lighting.

7.10 Assembly Points

Give the locations of assembly points, including:

- the point where guests/ contractors must assemble
- Identify how each assembly area is recognised
- Identify who should be in each assembly area e.g. groups or departments or sections

- Identify the locations of any designated safe refuges
- Where possible provide plans or schematic diagrams

7.11 Identify Persons Especially at Risk

- Identify lone workers, contractors and the areas where they may be at risk
- Include methods of escape and identify how they will be located
- If there is sleeping accommodation on site, identify the method of ensuring that they are safely out of the building and accounted for

7.12 Evacuation Arrangements for Disabled People

The safe and effective evacuation of disabled people needs careful thought. Management procedures need to be in place which takes account of the various scenarios that may arise. For example, the procedures adopted for people with a disability are employed in the building will be different to those for person with a disability visiting the building that will be unfamiliar with its layout.

Systems of evacuation that may be implemented include:

- **Progressive Horizontal Evacuation.** This system can be used in buildings with a phased alarm system. It involves a person passing from one 'fire compartment' into another that is not part of the initial evacuation zone. A 'fire compartment' is a part of a building separated from other parts of the same building by fire-resisting walls, ceilings, floors and doors of 60 minutes fire resisting construction.

- **Evacuation by Stairs.** This method involves the use of equipment such as special evacuation chairs but is usually only possible if people are being evacuated downwards or horizontally.

Use of Refuges. Relatively safe waiting areas for short periods. They are not areas where disabled people should be left alone indefinitely until rescued by the fire brigade or until the fire is extinguished. (*This should not be confused with the use of refuges in progressive horizontal evacuation*)

A refuge is an area that is separated from the fire by a fire-resisting construction and has access via a safe route to a final fire exit and be clearly marked up with appropriate signage. It provides a temporary space for people to wait for others who will then help them evacuate.

Identify the method of ensuring that persons with any disability (permanent or temporary) are evacuated or taken to a designated 'Safe Refuge' (if one is in place), until they can be evacuated in safety. Identify what communication channels will be used to ensure that persons in the 'Safe Refuge' are kept informed about what is happening.

Designate responsibilities for persons at special risk and:

- Who is responsible for ensuring that personnel at special risk are conducted to a place of safety or refuge until they can be evacuated in safety?
- Have they had any specific training e.g. using the 'evacuation chair'?

7.13 Staff with Specific Responsibilities

Give the name (post) and duties of identified personnel in the event of a fire or other emergency. E.g. the fire marshals / fire wardens, ushers

This would include backup personnel in the event that identified personnel are not available.

7.14 Overall Control

- Who is in overall control of the emergency situation and what are their responsibilities?
- Who records the emergency situation and actions taken?

A senior person would be nominated to:

- Take overall control of the evacuation
- Ensure that other people with specific duties have taken relevant action
- Account for all persons in the premises
- Liaise with the Fire Department
- Initiate any additional response in relation to the care of people with special needs

7.15 Fire Marshals and Fire Wardens

Fire marshals / fire wardens are valuable in any premises and vital in large ones. Fire Marshals / Fire Wardens will always be given responsibility for a specific area, i.e. a floor or a section, and will have general duties in an evacuation such as:

- Who are the Fire Wardens and what are their responsibilities?
- Do they 'sweep' the building on their way out?
- Do they carry out 'first aid' fire fighting if trained and safe to do so?
- How do they ensure they do not work alone and put themselves at risk?
- Proceed to the assembly point close doors on route
- Helping the person in overall control of the evacuation by confirming their area has been checked

7.16 Fire Fighting

- Who is trained to use the fire fighting equipment?
- What are their responsibilities?
- Where is fire fighting equipment located?

7.17 Fire Control Panel

- Who will check the fire panel?
- What is their next step?
- What do they do with the information?
- Who is responsible for silencing and resetting the panel and on what occasions?

7.18 Contingency Plans

Have contingency plans for when life safety systems such as evacuation lifts, fire-detection and warning systems, sprinklers or smoke control systems, emergency lighting or building power system are out of order.

As part of the emergency plan it is good practice to prepare post-incident plans for dealing with situations that might arise such as those involving:

- unaccompanied children;
- people with personal belongings (especially valuables) still in the building;
- people wishing to rejoin friends;
- getting people away from the building (e.g. to transport);
- inclement weather; or
- the building cannot be re-entered / reoccupied.

7.19 Re-Entering the Building

- How people be prevented from re-entering the building?
- How will people know when they can re-enter the building?
- Note: If the emergency services have been called then the Fire Department Officer is responsible for giving permission for re-entry to the building

EXAMPLE FIRE SAFETY MAINTENANCE CHECKLIST

| | YES | NO | N/A | COMMENTS |
|--|--------------------------|--------------------------|--------------------------|----------|
| Daily Checks | | | | |
| Escape Routes | | | | |
| Can all fire exits be opened immediately and easily? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Are fire doors clear of obstruction? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Are escape route clear? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Fire Warning Systems | | | | |
| Is the main indicator panel showing "normal"? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Are whistles, gongs or air horns in their correct place? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Escape Lighting | | | | |
| Are luminaries and exit signs in good condition? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Is the emergency lighting and signs working normally? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Fire fighting Equipment | | | | |
| Are all fire extinguishers in place? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Are all fire extinguishers clearly visible? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Are all fire hydrants accessible for the fire service? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Weekly Checks | | | | |
| Escape Routes | | | | |
| Do all emergency fastening devices work correctly? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Are fire doors clear of obstruction? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Are all external escape routes clear? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Fire Warning Systems | | | | |
| Did the fire alarm work correctly when tested? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Did staff and all others hear the alarm working? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Did any linked fire protection system operate correctly? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Did visual alarms, pagers or vibrating pads work? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Do voice alarms work and was the message understood? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Escape Lighting | | | | |
| Are charging indicators visible and illuminated? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Fire fighting Equipment | | | | |
| Are all fire fighting equipment in working order? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Are all fire extinguishers mounted 1 - 1½ metres? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

Monthly Checks

Escape Routes

| | | | |
|--|--------------------------|--------------------------|--------------------------|
| Do all electronic release mechanisms work correctly? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Do all automatic doors “failsafe” in the open position? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Are all self-closing devices working correctly? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Are all door seals and intumescent strips in good condition? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Are all external stairs in good condition and non-slip? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Do all roller shutters for compartmentation working correctly? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Do all internal fire doors close against their rebate / stop? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Escape Lighting

| | | | |
|---|--------------------------|--------------------------|--------------------------|
| Do all luminaries and exit signs working when tested? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Are emergency generators working correctly? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Fire fighting Equipment

| | | | |
|---|--------------------------|--------------------------|--------------------------|
| Is the “pressure” in stored pressure extinguishers correct? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|

YES | NO | N/A | COMMENTS

Three Monthly Checks

General

| | | | |
|--|--------------------------|--------------------------|--------------------------|
| Are emergency tanks / ponds at their normal / correct level? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Are vehicles blocking fire hydrants or access to them? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Additional items from manufacturers requirements? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Six Monthly Checks

General

| | | | |
|---|--------------------------|--------------------------|--------------------------|
| Have sprinkler systems been tested by a competent person? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Have release and closing mechanisms on fire resisting compartment doors and shutters been tested? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Fire Warning Systems

| | | | |
|--|--------------------------|--------------------------|--------------------------|
| Has the system been checked by a competent person? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|

Escape Lighting

| | | | |
|--|--------------------------|--------------------------|--------------------------|
| Do all luminaries work for a third of their rated value? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|

Annual Checks

Escape Routes

| | | | |
|---|--------------------------|--------------------------|--------------------------|
| Do all fire doors work correctly? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Is escape route compartmentation in good condition? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | |
|--|--------------------------|-------------------------------------|--------------------------|
| Fire Warning Systems | | | |
| Has the system been checked by a competent person? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Escape Lighting | | | |
| Do all luminaries operate on test for their full duration? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Has the system been checked by a competent person? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Fire fighting Equipment | | | |
| Has all equipment been checked by a competent person? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

| | | | |
|---|--------------------------|-------------------------------------|--------------------------|
| Miscellaneous | | | |
| Have dry / wet risers been tested by a competent person? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Has smoke control systems been tested by a competent person? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Has external access for the fire and rescue service been checked for availability at all times? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Have any fire fighters switches been tested? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Are fire assembly points clearly indicated by signs? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

EXAMPLE FIRE SAFETY TRAINING PROGRAMME

All employees will receive adequate fire safety training and all fire safety training sessions will be delivered by a competent person. There will be one / two fire drills per year to test the fire safety training.

Fire Safety Training Sessions

| | |
|---------------------------|--|
| New Employees: | Induction Programme |
| Current Employees: | One / Two training session per year |
| Fire Wardens: | One / Two training session per year specific to their duties |
| Managers: | One / Two training session per year specific to their duties and including fire safety risk assessment, responding to fire hazards, fault reporting procedures, liaising with the fire service, record keeping, induction of new staff, fire safety policies and procedures. |

Fire Safety Training Topics

- The significant findings from the fire risk assessment and fire safety policies;
- What to do on discovering a fire;
- How to raise the alarm, including the locations of fire alarm call points (break glass points);
- The action to take upon hearing the fire alarm;
- The evacuation procedure for alerting guests, residents and visitors including, where appropriate, directing them to exits and assembly points at a place of total safety;
- The arrangements for calling the fire and rescue service;
- The location and, where appropriate, the correct use of portable fire extinguishers and fire-fighting equipment;
- Knowledge of escape routes including stairways and especially those not in regular use;
- How to open all emergency exit doors;
- The appreciation of the importance of fire doors, keeping them closed and not wedged open to prevent the spread of smoke and heat, keeping escape routes unobstructed;
- Where appropriate, isolating electrical power and gas supplies and stopping machines and processes;
- The safe use of and risks from storing and working with highly flammable and explosive substances;
- General fire precautions, fire awareness and good housekeeping practices;
- The no smoking policy (where applicable);
- Special provisions for assisting disabled people and any training needed;
- Identifying fire hazards and fire incidents reporting procedures; and
- Equipment fault reporting procedures.

Appendix 2: Emergency Response Plan

Emergency Response Plan

The **KMIC JVC** is committed to the safety and well-being of its staff, employees and visitors. With this commitment, the Consortium established an emergency response plan and the emergency response team to manage and respond the emergency conditions.

The summary of the plan including procedures and practices to be followed in responding to emergency situations, namely, utility failure and fire and natural disaster like earthquake, storm, and floods is as follows:

Utility Failures

These include electrical outages, plumbing failure, gas leaks, steam line breaks, ventilation problems, elevator failures, etc. and when the utility failures occur, the people who are using these utilities or facing with these incidents have to follow the following procedures.

- Remain calm
- Immediately notify Security in the compound at given phone number
- If the building must be evacuated, follow the instructions on Building Evacuation
- Unplug all electrical equipment (including computers) and turn off light switches
- Use a flashlight: Do not light candles or use other kinds of flames for lighting
- Laboratory personnel:
 - Secure all experiments, unplug electrical equipment, and shut off research gases prior to evacuating
 - Close all fume hoods and chemical containers
- Elevators:
 - Remain calm
 - Use the Call Button of Phone to call for help
 - Do not try to climb out or exit the elevator without assistance

Fire

The detailed procedures are described in Fire Safety Management and Fire Emergency Plan.

Earthquakes

In the event of an earthquake:

- Stay away from large windows, shelving systems, or tall room partitions
- Get under a desk, table, door arch, or stairwell
- If none of these is available: move against an interior wall and cover your head with your arms
- Remain under cover until the movement subsides
- After the shaking stops, survey your immediate area for trapped or injured persons and ruptured utilities (water, gas, etc.)
- If damage has occurred in your area, inform Safety and Security immediately
- If it is safe to do so, remain at your location and await further instructions from responsible personnel
- Do not evacuate until instructed by emergency personnel
- After an earthquake:
 - Put on enclosed shoes to protect against broken glass
 - If the power is out use a flashlight. Do not light a match or candle
 - Be alert for safety hazards such as fire, electrical wires, gas leaks, etc.
 - Check on others. If there are injuries or other urgent problems, report them to Security
- Give or seek first aid. Assist any disabled persons in finding a safe place for them

- Evacuate if the building seems unsafe or if instructed to do so:
- Use stairs, not elevators
- Unplug small electrical appliances
- Bring keys, purses, wallets, warm clothing
- Be prepared for aftershocks
- Cooperate with emergency personnel, keep informed, and remain calm

Floods

Minor or area flooding in the compound could occur as a result of a water main break, loss of power to sump pumps, or major multiple rainstorms.

- Secure vital equipment, records, and other important papers
- Move to higher, safer place
- Shut off all electrical equipment
- If in a lab, secure all laboratory experiments
- Do not attempt to drive or walk through flooded areas
- Wait for further instructions on immediate action from responsible staff and Security
- If the building must be evacuated, follow the instructions on Building Evacuation
- Do not return to your building if you have been evacuated by flooding until you have been instructed to do so by responsible personnel
- If you are assisting with flood cleanup, report immediately to Environmental Health and Safety unit any oil, chemical, or radioactive materials suspected of mixing with flood waters

Storms and Tornadoes

If storms and tornadoes happen

- Go to a basement, or lower floor of interior hallway or corridor (preferably a steel-framed or reinforced concrete building)
- Seek shelter under a sturdy workbench or heavy furniture if no basement is available
- Avoid:
 - Top floors of buildings
 - Areas with glass windows or doors
 - Auditoriums, gymnasiums, cafeterias, or other areas with large, free-span roofs
- If out in the open:
 - Cars -do not wait out the storm in a car; cars are not safe in tornadoes
 - Move away from the path of the tornado at a right-angle direction
 - Lie flat in the nearest depression, ditch, or ravine if there is no time to escape

Medical Emergency

If someone is injured or becomes ill:

- Stay Calm
- Dial **the nearest hospital or ambulance department number** and explain the type of emergency, the location, condition, and number of victims
- Let the dispatcher know of any safety hazards - chemical spill, fire, fumes, etc.
- Do not hang up unless told to do so by the dispatcher
- Do not move the victim unless there is danger of further injury if she/he is not moved
- Render first-aid or Cardiopulmonary Resuscitation (CPR) only if you have been trained

- Do not leave the injured person except to summon help
- Comfort the victim until emergency medical services arrive
- Have someone stand outside the building to flag down the ambulance and/or Safety and Security when they reach the vicinity

Shelter in Place/Safe Shelter

Shelter in place is useful when evacuation is not an option. Refuge is sought in an interior room with few or no windows. It is helpful to identify these locations within the department ahead of time and to ensure employees are familiar.

- Stop operations in the building.
- If there are visitors in the building, provide for their safety by asking them to stay—not leave. When public safety officials provide directions to shelter in place, they want everyone to take those steps immediately, where they are.
- Close and lock all doors, windows, and other openings to the outside.
- If necessary/possible, turn off heating or cooling system.
- Select interior room(s) above the ground floor with the fewest windows and vents. The room(s) should be large enough for everyone to sit comfortably and quietly. Use multiple rooms if necessary.
- Stay away from windows and doors.
- Remain calm and await further instructions.

DO NOT leave the room until directed to do so by a public safety official.

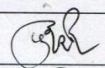
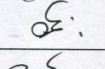
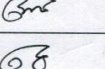
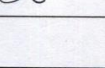
Note: There will be an orientation or training (including refresher course) related to the emergency response plan and procedures for all staff and employees every six months. Also, the practical exercise will be conducted on a regular basis. The emergency plan would be updated as needed.

Appendix 3: Attendance List for First Public Consultation Meeting on 8 February 2019

ညောင်နှစ်ပင် Industrial Complex တည်ဆောက်ရေးအတွက် ပြည်သူလူထုနှင့် တွေ့ဆုံဆွေးနွေးပွဲသို့ တက်ရောက်သူများစာရင်း

| စဉ် | အမည် | ရာထူး | နေရပ် | ဖုန်းနံပါတ် | လက်မှတ် |
|-----|---------------------|-----------------------|--------------------|---------------|---------|
| ၁ | ဦးစောစောလင်း | SIA စုစည်းရေးမှူး | MSR - ရန်ကင်းမြို့ | ၀၉ ၉၅၂၃၀၈၀ | |
| ၂ | ဦး မင်းမြင့်စွန်း | ကနဦးဥပဒေ | " " | | |
| ၃ | ဦး ကိုကိုစိုး | ကမ်းခြေအဖွဲ့၊ EIAမှူး | " " | | |
| ၄ | ဦး ကြံတိုင်း စင်္ကာ | | " " | | |
| ၅ | ဦး ရှင်းမြင့် | SIA စုစည်းရေးမှူး | " " | ၀၉ ၇၇၇၂၃၇၈ ၄၄ | |
| ၆ | ဦး ခင်မင်းစန်း | Logistic | " " | | |
| ၇ | ဦး ကိုစိုး | " | " " | | |
| ၈ | ဦး သန်းမြင့် | လမ်းဖွဲ့ | ရန် (၁) | | |
| ၉ | ဦး ဝင်းမြင့် | (ကမ်းခြေ) | (ကမ်းခြေ) | | |
| ၁၀ | ဦး မောင်ဌေး | လမ်းဖွဲ့ | ရန် (၁) | | |
| ၁၁ | ဦး မြင့်စွန်း | | | | |
| ၁၂ | ဦး တင်မိုး | | ရန် (၁) | | |
| ၁၃ | ဦးကျော်လှဝင်း | | ကမ်းခြေ | | |
| ၁၄ | ဦး ဝင်းဒေါ် | | ရန် (၁) | | |
| ၁၅ | ဦး ဆင်မောင်မြင့် | | | | |
| ၁၆ | ဦး ထွန်းမေ | | " | | |
| ၁၇ | ဦး စွန်းမြ | | ရန် (၁) | | |
| ၁၈ | ဦးကျော်စိုး | | | | |
| ၁၉ | ဦးကျော်စော | | | | |
| ၂၀ | ဦးဝင်း | | ကြမ်းခြေ | | |
| ၂၁ | ဦးကျော်စန်း | လမ်းဖွဲ့ | ကမ်းခြေ | | |
| ၂၂ | ဦးဝင်းစိန် | | ရန် (၁) | | |
| ၂၃ | ဦးကျော်စော | | ရန် (၁) | | |
| ၂၄ | ဦးကျော်စန်း | | ရန် (၁) | | |
| ၂၅ | ဦးကျော်စန်း | | ရန် (၁) | | |

| စဉ် | အမည် | ရာထူး | နေရပ် | ဖုန်းနံပါတ် | လက်မှတ် |
|-----|-----------------------|----------------|------------|-------------|---------|
| ၅၅ | ကျွတ်စွာ | | အုန်း (၅) | | |
| ၅၆ | အောင်စိန် | | အုန်း (၂) | | |
| ၅၇ | ဒေါ်အောင်ကျော် | ဦးစီး | ။ | | |
| ၅၈ | ဒေါ်အေးအေး | ရာ / ဒါရိုက်တာ | ငါးလှေကမ်း | | |
| ၅၉ | ဒေါ်စိုင်းအေးယုဂျာနယ် | | # | | |
| ၆၀ | ဒေါ်သန်းထိုက် | ဝေအိတ်ဗဟို | စင်္ကြံ | | |
| ၆၁ | ဒေါ်တင်ဝင်း | ရပ်ကွက် | ။ | | |
| ၆၂ | ဒေါ်ချစ်စွာ | ရပ်ကွက် | ။ | | |
| ၆၃ | ဒေါ်အောင်စိန် | ဝေအိတ်ဗဟို | ။ | | |
| ၆၄ | ဒေါ်အေးအေး | ရပ်ကွက်ဗဟို | စင်္ကြံ | | |
| ၆၅ | ဒေါ်အေးအေး | | အုန်း (၅) | | |
| ၆၆ | ဒေါ်အေးအေး | | အုန်း (၅) | | |
| ၆၇ | ဒေါ်အေးအေး | | အုန်း (၅) | | |
| ၆၈ | ဒေါ်အေးအေး | | အုန်း (၅) | | |
| ၆၉ | ဒေါ်အေးအေး | | အုန်း (၅) | | |
| ၇၀ | ဒေါ်အေးအေး | | အုန်း (၅) | | |
| ၇၁ | ဒေါ်အေးအေး | ရပ်ကွက်ဗဟို | အုန်း (၅) | | |
| ၇၂ | ဒေါ်အေးအေး | ရပ်ကွက်ဗဟို | ။ | | |
| ၇၃ | ဒေါ်အေးအေး | ရပ်ကွက် | ။ | | |
| ၇၄ | ဒေါ်အေးအေး | ရပ်ကွက်ဗဟို | အုန်း (၅) | ၀၉ ၅၄၀၀၉၀၈ | |
| ၇၅ | ဒေါ်အေးအေး | ရပ်ကွက်ဗဟို | အုန်း (၅) | ၀၉ ၅၆၀၀၉၀၉ | |
| ၇၆ | ဒေါ်အေးအေး | ။ | ။ | ၀၉ ၅၆၀၀၉၀၉ | |
| ၇၇ | ဒေါ်အေးအေး | ရပ်ကွက်ဗဟို | ။ | ၀၉ ၅၇၀၀၉၀၉ | |

| စဉ် | အမည် | ရာထူး | နေရပ် | ဖုန်းနံပါတ် | လက်မှတ် |
|-----|------------------|------------|----------------|-------------|---|
| ၄၉ | ဒိုးဖူးညို | ရဟင်္ဂါရပ် | ဆွေးနွေးပင်ရွာ | |  |
| ၅၀ | ဒိုးဖူးမော်ထွန်း | ရဟင်္ဂါရပ် | ဇာကန်ရွာ | ၀၉၇၃၁၀၁၆၄၃ |  |
| ၅၁ | ဒိုးဖူးမောင် | | ဇာကန်ရွာ | |  |
| ၅၂ | ဒိုးဖူးစွန်း | | ဇာကန်ရွာ | |  |
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| ၆၉ | | | | | |
| ၇၀ | | | | | |

Appendix 4: Monthly Rainfall (mm) and Monthly Mean Maximum and Minimum Temperature (C) (2014 - 2018)



DEPARTMENT OF METEOROLOGY AND HYDROLOGY

MONTHLY RAINFALL (mm)

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 0 | 0 | 0 | 0 | 182 | 390 | 760 | 547 | 249 | 82 | 180 | 0 |
| 2015 | 0 | 0 | Trace | 29 | 256 | 358 | 828 | 315 | 264 | 197 | 25 | 0 |
| 2016 | 38 | 1 | 23 | 0 | 387 | 310 | 581 | 509 | 332 | 208 | 6 | 0 |
| 2017 | Trace | 0 | 0 | 98 | 319 | 427 | 643 | 491 | 326 | 328 | 10 | 0 |
| 2018 | 2 | 0 | 0 | 35 | 26 | 434 | 666 | 562 | 303 | 280 | 42 | 1 |

" Trace " The amount of rainfall which cannot be measured.

"1mm=0.04 inch"

MONTHLY MEAN MAXIMUM TEMPERATURE (°C)

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2014 | 31.9 | 34.3 | 37.5 | 37.8 | 34.8 | 30.8 | 29.8 | 30.0 | 31.2 | 33.1 | 30.0 | 32.9 |
| 2015 | 31.9 | 34.5 | 37.6 | 38.0 | 36.0 | 31.8 | 30.9 | 30.8 | 31.8 | 32.4 | 34.5 | 33.5 |
| 2016 | 31.8 | 34.7 | 37.1 | 38.8 | 37.2 | 30.8 | 30.6 | 30.4 | 31.9 | 31.9 | 33.7 | 33.1 |
| 2017 | 32.7 | 34.9 | 36.9 | 36.1 | 35.0 | 31.8 | 29.8 | 30.2 | 32.6 | 32.6 | 34.7 | 32.7 |
| 2018 | 33.0 | 34.9 | 37.1 | 38.1 | 35.8 | 30.9 | 29.9 | 30.2 | 32.1 | 32.8 | 33.2 | 32.9 |

MONTHLY MEAN MINIMUM TEMPERATURE (°C)

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2014 | 14.4 | 16.5 | 18.7 | 24.1 | 24.8 | 24.4 | 23.7 | 23.8 | 23.9 | 23.2 | 21.3 | 19.2 |
| 2015 | 17.1 | 16.3 | 19.9 | 23.6 | 25.0 | 24.6 | 24.6 | 24.7 | 24.7 | 24.0 | 21.8 | 18.1 |
| 2016 | 14.6 | 18.1 | 22.1 | 24.0 | 24.6 | 24.9 | 24.9 | 24.8 | 23.8 | 24.2 | 21.9 | 20.3 |
| 2017 | 18.4 | 18.2 | 20.2 | 23.4 | 25.2 | 24.9 | 24.5 | 24.7 | 24.7 | 24.0 | 22.6 | 18.8 |
| 2018 | 17.9 | 17.4 | 21.0 | 23.5 | 24.1 | 23.9 | 23.6 | 23.4 | 23.2 | 22.4 | 19.9 | 19.3 |

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မိုးလေဝသနှင့်ဇလဗေဒညွှန်ကြားမှုဦးစီးဌာန

Appendix 5: Monthly Mean Wind Speed and Wind Direction at (06:30) and (12:30) hrs M.S.T (2014 – 2018)



DEPARTMENT OF METEOROLOGY AND HYDROLOGY

STATION : HMAWBI

MONTHLY MEAN WIND SPEED(mph) AT (06:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 0.5 | 0.7 | 0.9 | 0.9 | 0.8 | 0.8 | 1.4 | 0.5 | 0.4 | 0.5 | 0.5 | 0.0 |
| 2015 | 0.2 | 0.7 | 0.6 | 0.4 | 0.4 | 0.8 | 1.4 | 0.2 | 0.2 | 1.0 | 0.4 | 0.3 |
| 2016 | 0.5 | 0.4 | 0.5 | 0.2 | 0.6 | 1.0 | 0.6 | 1.4 | 0.4 | 0.1 | 0.2 | 0.5 |
| 2017 | 0.2 | 0.5 | 0.3 | 0.9 | 1.5 | 0.7 | 1.2 | 0.6 | 0.3 | 0.5 | 0.0 | 0.2 |
| 2018 | 0.1 | 0.1 | 0.2 | 0.6 | 0.6 | 1.3 | 0.9 | 0.5 | 0.8 | 0.5 | 0.0 | 0.0 |

MONTHLY MEAN WIND DIRECTION AT (06:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| 2014 | NE | NE | NE | E | SE | SE | SE | SE | SW | E | SE | Calm |
| 2015 | NE | NE | SE | SE | SW | SE | SE | SW | SE | E | NW | NW |
| 2016 | E | E | E | SE | SE | SE | SE | SE | SE | SE | NW | NW |
| 2017 | NE | E | W | SW | SW | SE | SW | SE | SE | SE | Calm | NW |
| 2018 | E | E | SW | SW | SE | SE | SW | S | SE | SE | Calm | Calm |

MONTHLY MEAN WIND SPEED(mph) AT (12:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 3.1 | 3.1 | 3.8 | 4.7 | 3.8 | 3.4 | 3.1 | 3.5 | 2.9 | 2.2 | 1.7 | 1.9 |
| 2015 | 2.9 | 3.0 | 3.1 | 3.5 | 3.2 | 3.4 | 4.7 | 3.6 | 4.5 | 3.3 | 2.0 | 2.2 |
| 2016 | 2.6 | 3.2 | 3.2 | 4.5 | 4.3 | 4.3 | 3.9 | 4.7 | 3.1 | 3.0 | 3.2 | 3.0 |
| 2017 | 3.3 | 4.2 | 4.2 | 4.0 | 3.9 | 4.3 | 3.2 | 3.2 | 2.6 | 2.7 | 2.4 | 2.8 |
| 2018 | 2.7 | 3.5 | 3.6 | 3.5 | 3.6 | 4.9 | 0.5 | 0.5 | 4.2 | 2.9 | 2.2 | 2.6 |

MONTHLY MEAN WIND DIRECTION AT (12:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | NE | NE | SW | SW | SW | SW | SW | SW | SW | SE | SE | NE |
| 2015 | NE | SE | SE | SW | SW | SE | SW | SW | SW | SE | NW | N |
| 2016 | NW | E | SE | SE | SW | SE | SW | SW | SW | E | NW | NE |
| 2017 | NE | SE | SW | SW | SE | SW | SW | SW | SW | SE | E | E |
| 2018 | NW | SE | SW | SW | SE | SW | SW | SW | SW | E | NE | E |

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မိုးလေဝသနှင့်လေထုဒညွှန်ကြားမှုဦးစီးဌာန

Appendix 6: Monthly Mean Wind Speed and Wind Direction at (09:30) hrs and (18:30) hrs M.S.T (2014 – 2018)



DEPARTMENT OF METEOROLOGY AND HYDROLOGY

STATION : HMAWBI

MONTHLY MEAN WIND SPEED(mph) AT (09:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 2.7 | 1.8 | 2.3 | 3.6 | 3.1 | 3.2 | 3.3 | 2.6 | 2.7 | 2.0 | 1.4 | 1.4 |
| 2015 | 1.8 | 2.5 | 2.3 | 2.4 | 2.4 | 2.4 | 3.3 | 3.1 | 3.3 | 2.7 | 1.9 | 1.7 |
| 2016 | 2.0 | 0.3 | 2.2 | 3.8 | 2.7 | 3.2 | 2.9 | 3.2 | 1.8 | 2.1 | 2.2 | 1.9 |
| 2017 | 2.1 | 2.6 | 2.6 | 2.7 | 2.9 | 2.9 | 2.4 | 2.4 | 2.1 | 1.9 | 1.9 | 1.9 |
| 2018 | 1.3 | 2.8 | 2.3 | 2.5 | 2.8 | 3.3 | 3.6 | 3.5 | 2.9 | 2.1 | 1.9 | 2.0 |

MONTHLY MEAN WIND SPEED(mph) AT (18:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 0.7 | 1.8 | 2.1 | 3.5 | 3.3 | 2.1 | 2.9 | 2.3 | 2.2 | 0.6 | 0.1 | 0.0 |
| 2015 | 0.3 | 0.7 | 2.6 | 3.6 | 3.5 | 1.9 | 2.8 | 1.7 | 2.7 | 0.5 | 0.4 | 0.6 |
| 2016 | 0.9 | 1.0 | 2.8 | 4.8 | 3.9 | 2.4 | 1.9 | 2.4 | 2.4 | 1.2 | 0.7 | 0.3 |
| 2017 | 0.7 | 1.6 | 3.5 | 2.8 | 3.6 | 2.9 | 2.1 | 2.4 | 2.2 | 0.5 | 0.3 | 0.1 |
| 2018 | 0.6 | 0.9 | 2.4 | 2.5 | 3.4 | 3.1 | 2.4 | 3.2 | 1.4 | 0.2 | 0.0 | 0.2 |

MONTHLY MEAN WIND DIRECTION AT (09:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | NE | SW | SW | SW | S | SW | SE | SW | SW | SE | NE | SE |
| 2015 | NE | SW | SW | SW | SW | SW | SW | SW | SW | SE | NW | NW |
| 2016 | NW | SW | SW | SW | SW | SE | SE | SE | SE | E | NE | NE |
| 2017 | N | SE | SE | SW | SE | SE | SW | SW | SW | SE | E | E |
| 2018 | E | SE | SE | SW | SE | S | SW | SW | SW | E | E | NW |

MONTHLY MEAN WIND DIRECTION AT (18:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|
| 2014 | NE | SW | SW | SW | S | SW | SE | SW | SW | SE | NE | SE |
| 2015 | NE | SW | SW | SW | SW | SW | SW | SW | SW | SE | NW | NW |
| 2016 | NW | SW | SW | SW | SW | SE | SW | SW | SW | SW | SE | NW |
| 2017 | NW | SW | SW | SW | SW | SW | SW | SW | SW | SE | SE | E |
| 2018 | NW | SW | SW | SW | SE | SW | SW | SW | SW | SW | Calm | SW |

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မိုးလေဝသနှင့်လေပေညွှန်ကြားမှုဦးစီးဌာန

Appendix 7: Monthly Mean Relative Humidity at (06:30) hrs, (09:30) hrs, (12:30) hrs and (18:30) hrs M.S.T (2014 – 2018)



DEPARTMENT OF METEOROLOGY AND HYDROLOGY

STATION : HMAWBI

MONTHLY MEAN RELATIVE HUMIDITY (%) AT (09:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 68 | 73 | 74 | 72 | 77 | 89 | 94 | 93 | 89 | 80 | 78 | 70 |
| 2015 | 71 | 71 | 73 | 69 | 75 | 87 | 90 | 90 | 86 | 84 | 77 | 72 |
| 2016 | 70 | 73 | 79 | 94 | 76 | 88 | 91 | 91 | 92 | 88 | 80 | 75 |
| 2017 | 71 | 70 | 72 | 73 | 81 | 87 | 93 | 92 | 89 | 89 | 80 | 71 |
| 2018 | 67 | 71 | 75 | 72 | 78 | 92 | 95 | 95 | 89 | 86 | 79 | 81 |

MONTHLY RELATIVE HUMIDITY(%) at (18:30)hrs M.S.T

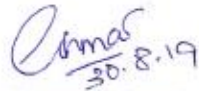
| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 56 | 47 | 44 | 50 | 73 | 92 | 95 | 93 | 89 | 87 | 82 | 73 |
| 2015 | 61 | 46 | 55 | 51 | 69 | 90 | 91 | 93 | 91 | 89 | 82 | 71 |
| 2016 | 61 | 52 | 51 | 46 | 65 | 87 | 90 | 89 | 90 | 89 | 81 | 71 |
| 2017 | 60 | 45 | 40 | 54 | 70 | 89 | 91 | 89 | 89 | 92 | 86 | 73 |
| 2018 | 57 | 48 | 46 | 46 | 72 | 91 | 97 | 96 | 90 | 88 | 89 | 80 |

MONTHLY RELATIVE HUMIDITY(%) at (06:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 95 | 95 | 97 | 95 | 96 | 98 | 99 | 99 | 95 | 96 | 95 | 95 |
| 2015 | 93 | 93 | 94 | 96 | 96 | 98 | 97 | 97 | 98 | 97 | 95 | 94 |
| 2016 | 94 | 94 | 95 | 94 | 95 | 96 | 98 | 99 | 99 | 98 | 95 | 94 |
| 2017 | 89 | 93 | 95 | 94 | 95 | 98 | 98 | 98 | 98 | 99 | 93 | 91 |
| 2018 | 93 | 94 | 94 | 94 | 96 | 99 | 99 | 99 | 99 | 99 | 99 | 96 |

MONTHLY RELATIVE HUMIDITY(%) at (12:30)hrs M.S.T

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2014 | 40 | 39 | 35 | 48 | 63 | 82 | 88 | 86 | 78 | 68 | 65 | 50 |
| 2015 | 45 | 37 | 48 | 47 | 57 | 77 | 84 | 84 | 76 | 74 | 60 | 50 |
| 2016 | 43 | 42 | 46 | 45 | 56 | 81 | 85 | 84 | 79 | 75 | 64 | 54 |
| 2017 | 46 | 37 | 36 | 50 | 66 | 80 | 87 | 85 | 76 | 80 | 64 | 51 |
| 2018 | 47 | 41 | 43 | 43 | 62 | 85 | 89 | 87 | 79 | 73 | 64 | 59 |


 30.8.19
 ဒေါက်တာအောင်မင်းမောင်
 လက်ထောက်ညွှန်ကြားရေးမှူး
 မိုးလေဝသနှင့်ဇလဗေဒညွှန်ကြားမှုဦးစီးဌာန

Appendix 8: Soil Test Result (July 2019)

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL INTERPRETATION OF RESULTS
Myanmar Survey Research Co., Ltd (12.7.2019)

Division - ရန်ကုန်
Township - လှည်းကူး၊ ဧရာဝတီတိုင်း

Sheet No. 1
Sr No. S-1-4/18-19

| Sr No. | Sample plot | Depth in inches | pH Soil : Water 1 : 2.5 | EC Soil : Water 1 : 2.6 | Texture | Organic Carbon | Total N | CEC | Available Nutrients | |
|--------|--|-----------------|-------------------------------|-------------------------------|-----------------|----------------|----------|-----|---------------------|------------------|
| | | | | | | | | | P | K ₂ O |
| | Nyaung Hnit Pin Industrial Complex Project | | | | | | | | | |
| 1 | TS - 7 (နံ့အရှေ့ပိုင်း) | 0 - 12 | Strongly acid | Very low | Silt Loam | Medium | Low | Low | Low | Low |
| 2 | TS - 8 (နံ့အနီး) | 0 - 12 | Strongly acid | Very low | Silty Clay Loam | Medium | Very Low | Low | Low | Low |
| 3 | TS - 9 (ပိုက်ပျိုးရေစုံ - ဘ) | 0 - 12 | Strongly acid | Very low | Silty Clay Loam | Medium | Very Low | Low | Low | Low |
| 4 | TS - 10 (နံ့အတွင်း) | 0 - 12 | Extremely acid | Very low | Silt Loam | Medium | Low | Low | Low | Low |


(ခင်ဝင်းမာ)
ဒု-ဥက္ကဋ္ဌကြားရေးမှူး
ဓါတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာနခွဲ

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL ANALYTICAL DATA SHEET

Sheet No. 1
Sr No. S-1-4/18-19

Myanmar Survey Research Co., Ltd (12.7.2019)

Division - ရန်ကင်း
Township - လှိုင်ကော်၊ ရွှေဘိုခရိုင်

| Sr No. | Sample plot | Depth in inches | Moisture % | pH Soil: Water 1: 2.5 | EC Soil: Water 1: 2.6 | Texture | | | | Organic Carbon % | Humus % | Total N % | CEC meq/100g | Exchangeable Cations meq/100g | | | | | Available Nutrients mg/100gm | | |
|--------|---|-----------------|------------|-----------------------------|-----------------------------|---------|--------|--------|---------|------------------|---------|-----------|--------------|-------------------------------|------------------|-----------------|----------------|----------------|------------------------------|----------|------------------|
| | | | | | | Sand % | Silt % | Clay % | Total % | | | | | Ca ⁺⁺ | Mg ⁺⁺ | Na ⁺ | K ⁺ | H ⁺ | Al ⁺⁺⁺ | P ppm | K ₂ O |
| 1 | Nyaung Hnit Pin Industrial Complex Project (နယောင့်ဟိတ်ပိန် အင်္ဂလိပ်စက်မှုဇုန်) | 0 - 12 | 1.75 | 4.52 | 0.03 | 12.04 | 63.90 | 22.69 | 98.63 | 2.92 | 4.92 | 0.14 | 6.86 | 5.52 | 0.68 | 0.38 | 0.23 | 0.05 | Not Detected | 2.05 (O) | 9.21 |
| 2 | | 0 - 12 | 1.90 | 4.50 | 0.02 | 10.21 | 65.96 | 22.47 | 98.64 | 2.81 | 4.25 | 0.18 | 9.86 | 4.12 | 0.69 | 0.30 | 0.15 | 0.08 | 4.57 | 3.10 (B) | 6.89 |
| 3 | | 0 - 12 | 1.84 | 5.00 | 0.10 | 11.93 | 62.19 | 24.88 | 99.00 | 2.40 | 2.40 | 0.19 | 8.96 | 3.26 | 0.69 | 0.52 | 0.12 | 0.07 | 4.20 | 3.54 (B) | 9.16 |
| 4 | | 0 - 12 | 2.05 | 4.98 | 0.04 | 13.30 | 63.05 | 22.62 | 98.97 | 2.93 | 2.93 | 0.11 | 6.73 | 2.90 | 0.69 | 0.33 | 0.23 | 0.08 | 2.50 | 4.20 (B) | 10.29 |

B = Bray & Kurtz Method
O = Olsen Method

(ခရိုင်အဖွဲ့)
အထောက်အကူပြု
အဖွဲ့ဝင်များ

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL INTERPRETATION OF RESULTS
Myanmar Survey Research Co., Ltd (12.7.2019)

Sheet No. 1
 Sr No. S-1-4/18

Division - ရန်ကင်း
 Township - လှည်းကူး၊ ဧရာဝတီတိုင်း

| Sr No. | Sample plot | Depth in inches | pH | EC | TDS | SAR | RSC | Dorminant Salts |
|--------|--|-----------------|---------------|----------|-----|--------------|--------------|---------------------------------------|
| 1 | Nyaung Hnit Pin Industrial Complex Project TS - 7 (နံအရှေ့ပိုင်း) TS - 8 (နံအနီး) TS - 9 (ပိုက်ပျိုးရေခဲ - ဝ) TS - 10 (နံအတွင်း) | 0 - 12 | Strongly acid | Very low | Low | Not Detected | Not Detected | CaCl ₂ |
| 2 | | 0 - 12 | Strongly acid | Very low | Low | Not Detected | Low | Ca(HCO ₃) ₂ |
| 3 | | 0 - 12 | Strongly acid | Very low | Low | Low | Not Detected | NaCl, CaCl ₂ |
| 4 | | 0 - 12 | Strongly acid | Very low | Low | Not Detected | Not Detected | CaSO ₄ , CaCl ₂ |


 (ခင်ဝင်းမာ)
 ဒု-ညွှန်ကြားရေးမှူး
 မြေပိုင်းရေးရာဌာန
 မြေအသုံးချရေးဌာန

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL WATER EXTRACTION ANALYTICAL DATA SHEET
Myanmar Survey Research Co., Ltd (12.7.2019)

Sheet No. 1
Sr No. S-1-4/18-19

Division - ရန်ကင်း
Township - လှည်းကူးမြို့နယ်

| Sr No. | Sample plot | Depth in inches | ANIONS meq/100gm | | | CATIONS meq/100gm | | | | pH Soil : Water 1 : 2.5 | EC ms/cm | SAR | RSC meq/100gm | TDS % |
|--------|--|-----------------|------------------|------------------|-----------------|-------------------|------------------|------------------|-----------------|-------------------------------|--------------|--------------|------------------|----------|
| | | | CO ₃ | HCO ₃ | Cl ⁻ | SO ₄ | Ca ⁺⁺ | Mg ⁺⁺ | Na ⁺ | | | | | |
| 1 | Nyaung Hnit Pin Industrial Complex Project TS - 7 (ရန်ကင်းမြို့နယ်) TS - 8 (ရန်ကင်းမြို့နယ်) TS - 9 (ရန်ကင်းမြို့နယ် - ငါ) TS - 10 (ရန်ကင်းမြို့နယ်) | 0 - 12 | Not Detected | 0.12 | 0.24 | 0.08 | 0.20 | Not Detected | 0.008 | 4.92 | Not Detected | Not Detected | 0.01 | |
| 2 | | 0 - 12 | Not Detected | 0.24 | 0.20 | 0.16 | 0.16 | Not Detected | 0.003 | 4.50 | Not Detected | Not Detected | 0.02 | |
| 3 | | 0 - 12 | Not Detected | 0.12 | 0.48 | 0.12 | 0.24 | Not Detected | 0.006 | 5.00 | 0.68 | Not Detected | 0.03 | |
| 4 | | 0 - 12 | Not Detected | 0.12 | 0.16 | 0.16 | 0.24 | Not Detected | 0.003 | 4.98 | Not Detected | Not Detected | 0.01 | |

(ခရိုင်အဖွဲ့)
မြန်မာ့စုံစမ်းစစ်ချက်ရေးအဖွဲ့
ဦးစီးဌာန

**Department of Agriculture
Land Use Division
Soil analytical Laboratory
Heavy Metal analysis
Soil Interpretation of Results**

Name of Owner and Address Myanmar Survey Research Company Limited

Project name Naung Hnitpin Industrial Complex Project,
Hlegu Township, Yangon Region.

Place of Sampling Naung Hnitpin Industrial Complex Project,
Hlegu Township, Yangon Region.

Designation of Sample HV - 5 Eastern of Project Site
17° 08' 29" N 96° 10' 45" E

Soil Depth within 1 Meter

| Heavy Metal Contaminants | Laboratory Finding (ppm) | Maxium Permitted Level (ppm) |
|--------------------------|--------------------------|------------------------------|
| Nickel (Ni) | Not detected | 35 |
| Chromium (Cr) | Not detected | 100 |
| Cadmium (Cd) | Not detected | 0.8 |
| Lead (Pb) | Not detected | 85 |
| Iron (Fe) | 809.8 | 250 |

ppm - parts per million

- Source of reference standard: F.A.O Soil Bulletin 65 & guidelines used in Netherland.

**Department of Agriculture
Land Use Division
Soil analytical Laboratory
Heavy Metal analysis
Soil Interpretation of Results**

Name of Owner and Address Myanmar Survey Research Company Limited

Project name Naung Hnitpin Industrial Complex Project,
Hlegu Township, Yangon Region.

Place of Sampling Naung Hnitpin Industrial Complex Project,
Hlegu Township, Yangon Region.

Designation of Sample HV - 6 Near Project Area
17° 07' 50" N 96° 09' 17" E

Soil Depth within 1 Meter

| Heavy Metal Contaminants | Laboratory Finding (ppm) | Maxium Permitted Level (ppm) |
|---------------------------------|---------------------------------|-------------------------------------|
| Nickel (Ni) | Not detected | 35 |
| Chromium (Cr) | Not detected | 100 |
| Cadmium (Cd) | Not detected | 0.8 |
| Lead (Pb) | Not detected | 85 |
| Iron (Fe) | 950.8 | 250 |

ppm - parts per million

- Source of reference standard: F.A.O Soil Bulletin 65 & guidelines used in Netherland.

Appendix 9: Air Quality Test Report (July 2019)



Department of Agriculture

**Department of Agriculture
Land Use Division
Soil analytical Laboratory
Heavy Metal analysis
Soil Interpretation of Results**

Name of Owner and Address Myanmar Survey Research Company Limited

Project name Naung Hnitpin Industrial Complex Project,
Hlegu Township, Yangon Region.

Place of Sampling Naung Hnitpin Industrial Complex Project,
Hlegu Township, Yangon Region.

Designation of Sample HV - 7 Farmer Harvest Zone - 1
17° 08' 52" N 96° 09' 34" E

Soil Depth within 1 Meter

| Heavy Metal Contaminants | Laboratory Finding (ppm) | Maxium Permitted Level (ppm) |
|--------------------------|--------------------------|------------------------------|
| Nickel (Ni) | Not detected | 35 |
| Chromium (Cr) | Not detected | 100 |
| Cadmium (Cd) | Not detected | 0.8 |
| Lead (Pb) | Not detected | 85 |
| Iron (Fe) | 900.2 | 250 |

ppm - parts per million

- Source of reference standard: F.A.O Soil Bulletin 65 & guidelines used in Netherland.

LIVE Environmental Assessment Group

No.72, Baho Road, Sanchaung Township, Yangon, Myanmar. Ph: 09 799170072, 09 420107816, 09 5014535

Project Name: KMIC Industrial Complex
Site Address: Kyar Kan Su Village, Hlegu Township, Yangon, Myanmar.
Site Location: Latitude 17° 6' 37'' N and Longitude 96° 8' 34'' E
Start Date & Time: 17-7-2019 / 8:55 am **Reported Date:** 25-7-2019
Reg.No: July 1911

| Air | | | | |
|---|-----------------------|--------|-----------|--------|
| Parameter | Reference Value | Result | Guideline | Remark |
| PM ₁₀ (24 Hr) µg/m ³ | 50 µg/m ³ | 41.7 | WHO | |
| PM _{2.5} (24 Hr) µg/m ³ | 25 µg/m ³ | 20.4 | WHO | |
| NO ₂ (1 Hr) µg/m ³ | 200 µg/m ³ | 66.5 | WHO | |
| SO ₂ (24 Hr) µg/m ³ | 20 µg/m ³ | 26.6 | WHO | |
| O ₃ (8 Hr) µg/m ³ | 100 µg/m ³ | 10.9 | WHO | |
| CO (8 Hr) ppb | 9000 ppb | 196.3 | US.EPA | |

Instruments : Hazscanner

Signed by



Dr. Khaing Khaing Soe

LIVE Environmental Assessment Group

No.72, Baho Road, Sanchaung Township, Yangon, Myanmar. Ph: 09 799170072, 09 420107816, 09 5014535

Project Name: KMIC Industrial Complex
Site Address: Kyar Kan Su Village, Hlegu Township, Yangon, Myanmar.
Site Location: Latitude 17° 6' 37'' N and Longitude 96° 8' 34'' E
Start Date & Time: 17-7-2019 / 8:55 am **Reported Date:** 25-7-2019
Reg.No: July 1911

| Air | | | | |
|---------------------|-----------------|--------|----------------|--------|
| Parameter | Reference Value | Result | Guideline | Remark |
| VOCS (1 Hr) ppb | 44 ppb | 41 | California EPA | |
| HC ppm | | 504 | | |
| CH ₄ ppm | | 4569 | | |
| RH % | | 50 | | |
| WDir Deg. | | 166 | | |
| WSpM kph | | 0.33 | | |

Instruments : Hazscanner

Signed by



Dr. Khaing Khaing Soe

Appendix 10: Noise Level Result (July 2019)

LIVE Environmental Assessment Group

No.72, Baho Road, Sanchaung Township, Yangon, Myanmar. Ph: 09 799170072, 09 420107816, 09 5014535

Project Name: KMIC Industrial Complex
Site Address: Kyar Kan Su Village, Hlegu Township, Yangon, Myanmar.
Site Location: Latitude 17° 6' 37'' N and Longitude 96° 8' 34'' E
Start Date & Time: 17-7-2019 / 8:55 am **Reported Date:** 25-7-2019
Reg.No: July 1911

| Noise | | | | | |
|------------------------------|-------|-------|-------------------------------|-------|-------|
| <i>L_{eq} in dBA</i> | | | <i>L_{max} in dBA</i> | | |
| Day | Night | Total | Day | Night | Total |
| 42 | 33 | 40.8 | 27 | 22.6 | 26 |

| Receptor | One Hour LAeq (dBA) ^a | |
|---|--|--|
| | Day Time 07:00 – 22:00 (10:00 - 22:00 for Public holidays) | Night Time 22:00 – 07:00 (22:00 - 10:00 for Public holidays) |
| Residential, institutional educational | 55 | 45 |
| Industrial, commercial | 70 | 70 |

National Environmental Quality (Emission) Guidelines
 Instruments : Sound Level Meter (Extech)

Signed by



Dr. Khaing Khaing Soe

Appendix 11: Water Test Result (Ground Water 2)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
 Tel: +9567-431139, 431138, +951-221387, 210844,
 Fax: +9567-431139, +951-223824

| | |
|---|---------------------------------|
| Sample Name: Water | Received Date: 11.7.2019 |
| | Reported Date: 5.8.2019 |
| | Reg no: 200/2019 |
| Site Name: GW2 Ground Water တက္ကတိုင်းရွာ စာသင်ကျောင်း အဝိုင်းတွင်းရေ။ | |

| Analyses | Ref: value | Unit | Result | Method |
|------------------------------------|------------|---------------------------|--------|---|
| Color | 15 | *TCU | 1 | Platinum Cobalt Method |
| Turbidity | 5 | *NTU | 0.1 | Absorption Method |
| Arsenic | 0.05 | mg/L | 0.013 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Copper | 2 | mg/L | 0.003 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Fluoride | 1.5 | mg/L | 0 | SPADNS Method |
| Lead | 0.01 | mg/L | 0.002 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Manganese | 0.4 | mg/L | 1.864 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Magnesium | 150 | mg/L | 31.48 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Chloride | 250 | mg/L | 2.2 | Argentometric Method |
| Total Hardness | 500 | mg/L as CaCO ₃ | 241 | Unit Dose Vials Method |
| Iron | 1 | mg/L | 3.154 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| pH | 6.5 – 8.5 | | 6.6 | Ion selected Electrode Method |
| Sulphate | 250 | mg/L | 0 | Barium Chloride Method |
| Total Dissolved Solid | 1000 | mg/L | 175 | Ion selected Electrode Method |
| Zinc | 3 | mg/L | 0 | Zincon Method |
| Mercury | 0.001 | mg/L | 0.00 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Bacterial Growth (Total Coliform) | 3 | *CFU/100ml | 5 | Compact Dry Plate |
| Bacterial Growth (Faecal Coliform) | 0 | *CFU/100ml | 1 | Compact Dry Plate |
| Chlorine (Residual) | 4 | mg/L | 0 | DPD Tablet Method |
| Electro conductivity | - | µmhos/cm | 250 | Ion selected Electrode Method |
| Nitrate | - | mg/L | 0 | Zinc Reduction Method |
| Phenol | - | mg/L | 0 | Aminoantipyrine Method |

*TCU- True Color Unit , *1 MPN (Most Probably Number) = 1 CFU (Coliform Forming Unit)

*NTU- Nephelometric Turbidity Unit, Reference: National Drinking Water Quality Standard

Tested by

oml
 OH (Lab)
 Daw Ohnmar Hla
 MLT - I

Checked by

ayethinn
 Daw Aye Aye Thinn
 Laboratory Officer

Signed by

Dr. Kay Khine Aye
 Dr. Kay Khine Aye
 Deputy Director
 Occupational and Environmental Health Division

OEHD lab results - 2019/Drinking Water

Appendix 12: Water Test Result (Ground Water 1)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
 Tel: +9567-431139, 431138, +951-221387, 210844,
 Fax: +9567-431139, +951-223824

| | |
|--|---------------------------------|
| Sample Name: Water | Received Date: 10.7.2019 |
| | Reported Date: 5.8.2019 |
| | Reg no: 199/2019 |
| Site Name: GW1 Ground Water Project Area အနီး: Tube Well ဦးကျော်စွာရိပ်ခြံ။ | |

| Analyses | Ref: value | Unit | Result | Method |
|------------------------------------|------------|---------------------------|--------|---|
| Color | 15 | *TCU | 1 | Platinum Cobalt Method |
| Turbidity | 5 | *NTU | 0.1 | Absorption Method |
| Arsenic | 0.05 | mg/L | 0.006 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Copper | 2 | mg/L | 0.000 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Fluoride | 1.5 | mg/L | 0 | SPADNS Method |
| Lead | 0.01 | mg/L | 0.0012 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Manganese | 0.4 | mg/L | 0.103 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Magnesium | 150 | mg/L | 9.674 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Chloride | 250 | mg/L | 1.4 | Argentometric Method |
| Total Hardness | 500 | mg/L as CaCO ₃ | 228 | Unit Dose Vials Method |
| Iron | 1 | mg/L | 1.688 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| pH | 6.5 – 8.5 | | 6.4 | Ion selected Electrode Method |
| Sulphate | 250 | mg/L | 0 | Barium Chloride Method |
| Total Dissolved Solid | 1000 | mg/L | 126 | Ion selected Electrode Method |
| Zinc | 3 | mg/L | 0 | Zincon Method |
| Mercury | 0.001 | mg/L | 0.161 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Bacterial Growth (Total Coliform) | 3 | *CFU/100ml | 7 | Compact Dry Plate |
| Bacterial Growth (Faecal Coliform) | 0 | *CFU/100ml | 2 | Compact Dry Plate |
| Chlorine (Residual) | 4 | mg/L | 0 | DPD Tablet Method |
| Electro conductivity | - | µmhos/cm | 180 | Ion selected Electrode Method |
| Nitrate | - | mg/L | 0 | Zinc Reduction Method |
| Phenol | - | mg/L | 0 | Aminoantipyrine Method |

*TCU- True Color Unit , *1 MPN (Most Probably Number) = 1 CFU (Coliform Forming Unit)

*NTU- Nephelometric Turbidity Unit, Reference: National Drinking Water Quality Standard

Tested by

OH (Lab)
 Daw Ohnmar Hla
 MLT - I

OEHD lab results -2019/Drinking Water

Checked by

Daw Aye Aye Thinn
 Laboratory Officer

Signed by

Dr. Kay Khine Aye
 Deputy Director
 Occupational and Environmental Health Division

Appendix 13: Water Test Result (Kalihtaw Dam)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
 Tel: +9567-431139, 431138, +951-221387, 210844,
 Fax: +9567-431139, +951-223824

| | |
|-------------------------------------|---------------------------------|
| Sample Name: Water | Received Date: 10.7.2019 |
| | Reported Date: 5.8.2019 |
| | Reg no: 198/2019 |
| Site Name: SW3 Kali Htaw Dam | |

| Analyses | Ref: value | Unit | Result | Method |
|------------------------------------|------------|---------------------------|--------|---|
| Color | 15 | *TCU | 1 | Platinum Cobalt Method |
| Turbidity | 5 | *NTU | 0.1 | Absorption Method |
| Arsenic | 0.05 | mg/L | 0.011 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Copper | 2 | mg/L | 0.000 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Fluoride | 1.5 | mg/l | 0 | SPADNS Method |
| Lead | 0.01 | mg/L | 0.0009 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Manganese | 0.4 | mg/L | 0.56 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Magnesium | 150 | mg/L | 10.57 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Chloride | 250 | mg/L | 0.5 | Argentometric Method |
| Total Hardness | 500 | mg/L as CaCO ₃ | 189 | Unit Dose Vials Method |
| Iron | 1 | mg/L | 5.804 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| pH | 6.5 – 8.5 | | 6.6 | Ion selected Electrode Method |
| Sulphate | 250 | mg/L | 1.0 | Barium Chloride Method |
| Total Dissolved Solid | 1000 | mg/L | 77 | Ion selected Electrode Method |
| Zinc | 3 | mg/L | 0 | Zincon Method |
| Mercury | 0.001 | mg/L | 0.00 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Bacterial Growth (Total Coliform) | 3 | *CFU/100ml | 5 | Compact Dry Plate |
| Bacterial Growth (Faecal Coliform) | 0 | *CFU/100ml | 1 | Compact Dry Plate |
| Chlorine (Residual) | 4 | mg/L | 0.01 | DPD Tablet Method |
| Electro conductivity | - | µmhos/cm | 110 | Ion selected Electrode Method |
| Nitrate | - | mg/L | 0 | Zinc Reduction Method |
| Phenol | - | mg/L | 0.04 | Aminoantipyrine Method |

*TCU- True Color Unit , *1 MPN (Most Probably Number) = 1 CFU (Coliform Forming Unit)

*NTU- Nephelometric Turbidity Unit, Reference: National Drinking Water Quality Standard

Tested by

Checked by

Signed by

OH (Lab)
 Daw Ohnmar Hla
 MLT - I

Daw Aye Aye Thinn
 Daw Aye Aye Thinn
 Laboratory Officer

Dr. Kay Khine Aye
 Dr. Kay Khine Aye
 Deputy Director

Occupational and Environmental Health Division

OEHD lab results -2019/Drinking Water

Appendix 14: Water Test Result (Drain Water 1)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
 Tel: +9567-431139, 431138, +951-221387, 210844,
 Fax: +9567-431139, +951-223824

| | |
|---|--------------------------|
| Sample Name: Waste Water | Received Date: 10.7.2019 |
| | Reported Date: 5.8.2019 |
| | Reg no: 202/2019 |
| Site Name: DW1 Drain Water Project Area အနီးမြောင်းရေ | |

| Analyses | Ref. Value | Unit | Results | Method |
|------------------------------------|------------|---------------------------|---------|---|
| pH | 6-9 | - | 6.3 | Ion Selected Electrode Method |
| BOD | 30 | mg O ₂ /L | 10.5 | 5 Day BOD Test Method |
| COD | 125 | mg/L | 26 | Close Reflex Method |
| Total Dissolved Solid | - | mg/L | 35 | Ion selected Electrode Method |
| Nitrate | - | mg/L | 0 | Zinc Reduction Method |
| Mercury | 0.01 | mg/L | 0.000 | *ICP-OES |
| Arsenic | 0.1 | mg/L | 0.015 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Oil and Grease | 10 | mg/L | 5.07 | Standard method |
| Phenol | 0.5 | mg/L | 0 | Aminoantipyrine Method |
| Sulphate | - | mg/L | 0 | Barium Chloride Method |
| Chloride | - | mg/L | 0.9 | Argentometric Method |
| Chromium | 0.5 | mg/L | 0.00 | *ICP-OES |
| Cadmium | 0.1 | mg/L | 0.00 | *ICP-OES |
| Lead | 0.1 | mg/L | 0.0003 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Turbidity | - | *NTU | 0.1 | Absorption Method |
| Iron | 3.5 | mg/L | 3.276 | *ICP-OES |
| Total Chlorine | 0.2 | mg/L | 0.09 | DPD Tablet Method |
| Copper | 0.5 | mg/L | 0.00 | *ICP-OES |
| Bacterial Growth (Total Coliform) | 400 | *CFU/100ml | 0 | Compact Dry Plate |
| Bacterial Growth (Faecal Coliform) | - | *CFU/100ml | 0 | Compact Dry Plate |
| Fluoride | 20 | mg/L | 0 | SPADNS Method |
| Manganese | - | mg/L | 0.712 | *ICP-OES |
| Magnesium | - | mg/L | 1.669 | *ICP-OES |
| Total Hardness | - | mg/L as CaCO ₃ | 0 | Unit Dose Vials Method |
| Color | - | *TCU | 1 | Platinum Cobalt Method |
| Electro conductivity | - | µmhos/cm | 50 | Ion selected Electrode Method |

*TCU- True Color Unit, *1 MPN (Most Probably Number) = 1 CFU (Coliform Forming Unit)

*NTU- Nephelometric Turbidity Unit, Reference: National Environmental Quality (Emission) Guidelines

*ICP-OES- Inductively Coupled Plasma- Optical Emission Spectrometric Method

Tested by

Checked by

Signed by

OH
 OH (Lab)
 Daw Ohnmar Hla
 MLT- I

ayethin
 Daw Aye Aye Thinn
 Laboratory Officer

Dr. Kay Khaing Aye
 Dr. Kay Khaing Aye
 Deputy Director
 Occupational and Environmental Health Division

OEH Laboratory Results- 2019/ Waste Water

Appendix 15: Water Test Result (Drain Water 2)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
 Tel: +9567-431139, 431138, +951-221387, 210844,
 Fax: +9567-431139, +951-223824

| | |
|---|--------------------------|
| Sample Name: Waste Water | Received Date: 10.7.2019 |
| | Reported Date: 5.8.2019 |
| | Reg no: 203/2019 |
| Site Name: DW2 Drain Water Zore 3 လမ်းနှင့် ငါးဆူတောင် ဆောင်နှစ်ပင် ကားလမ်းထောင့် မြောင်းရေ | |

| Analyses | Ref: Value | Unit | Results | Method |
|------------------------------------|------------|---------------------------|---------|---|
| pH | 6-9 | - | 6.4 | Ion Selected Electrode Method |
| BOD | 30 | mg O ₂ /L | 8.2 | 5 Day BOD Test Method |
| COD | 125 | mg/L | 12 | Close Reflex Method |
| Total Dissolved Solid | - | mg/L | 7 | Ion selected Electrode Method |
| Nitrate | - | mg/L | 0 | Zinc Reduction Method |
| Mercury | 0.01 | mg/L | 0.000 | *ICP-OES |
| Arsenic | 0.1 | mg/L | 0.016 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Oil and Grease | 10 | mg/L | 2.76 | Standard method |
| Phenol | 0.5 | mg/L | 0.21 | Aminoantipyrine Method |
| Sulphate | - | mg/L | 3.0 | Barium Chloride Method |
| Chloride | - | mg/L | 1.2 | Argentometric Method |
| Chromium | 0.5 | mg/L | 0.058 | *ICP-OES |
| Cadmium | 0.1 | mg/L | 0.000 | *ICP-OES |
| Lead | 0.1 | mg/L | 0.0005 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Turbidity | - | *NTU | 0.1 | Absorption Method |
| Iron | 3.5 | mg/L | 6.259 | *ICP-OES |
| Total Chlorine | 0.2 | mg/L | 0.16 | DPD Tablet Method |
| Copper | 0.5 | mg/L | 0.008 | *ICP-OES |
| Bacterial Growth (Total Coliform) | 400 | *CFU/100ml | 0 | Compact Dry Plate |
| Bacterial Growth (Faecal Coliform) | - | *CFU/100ml | 0 | Compact Dry Plate |
| Fluoride | 20 | mg/L | 0 | SPADNS Method |
| Manganese | - | mg/L | 0.184 | *ICP-OES |
| Magnesium | - | mg/L | 7.992 | *ICP-OES |
| Total Hardness | - | mg/L as CaCO ₃ | 6 | Unit Dose Vials Method |
| Color | - | *TCU | 1 | Platinum Cobalt Method |
| Electro conductivity | - | µmhos/cm | 10 | Ion selected Electrode Method |

*TCU- True Color Unit , *1 MPN (Most Probably Number) = 1 CFU (Coliform Forming Unit)

*NTU- Nephelometric Turbidity Unit , Reference: National Environmental Quality (Emission) Guidelines

*ICP-OES- Inductively Coupled Plasma- Optical Emission Spectrometric Method

Tested by

omlt
 OH (Lab)
 Daw Ohnmar Hla
 MLT - J

Checked by

Daw Aye Aye Thinn
 Laboratory Officer

Signed by

Dr. Kay Khaing Aye
 Deputy Director
 Occupational and Environmental Health Division

OEHD Laboratory Results- 2019/ Waste Water

Appendix 16: Water Test Result (Drain Water 3)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.

Tel: +9567-431139, 431138, +951-221387, 210844,

Fax: +9567-431139, +951-223824

| | |
|---|--------------------------|
| Sample Name: Waste Water | Received Date: 11.7.2019 |
| | Reported Date: 5.8.2019 |
| | Reg no: 204/2019 |
| Site Name: DW3 ငါးဆူတောင် ရွာကန်နယ်ပင် ကားလမ်းဘေး Project Area အနီး မြောင်းရေ | |

| Analyses | Ref. Value | Unit | Results | Method |
|------------------------------------|------------|---------------------------|---------|---|
| pH | 6-9 | - | 7.0 | Ion Selected Electrode Method |
| BOD | 30 | mg O ₂ /L | 2.2 | 5 Day BOD Test Method |
| COD | 125 | mg/L | 6 | Close Reflex Method |
| Total Dissolved Solid | - | mg/L | 14 | Ion selected Electrode Method |
| Nitrate | - | mg/L | 0 | Zinc Reduction Method |
| Mercury | 0.01 | mg/L | 0.000 | *ICP-OES |
| Arsenic | 0.1 | mg/L | 0.015 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Oil and Grease | 10 | mg/L | 1.23 | Standard method |
| Phenol | 0.5 | mg/L | 0.38 | Aminantipyrine Method |
| Sulphate | - | mg/L | 5.0 | Barium Chloride Method |
| Chloride | - | mg/L | 1.4 | Argentometric Method |
| Chromium | 0.5 | mg/L | 0.013 | *ICP-OES |
| Cadmium | 0.1 | mg/L | 0.000 | *ICP-OES |
| Lead | 0.1 | mg/L | 0.0001 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Turbidity | - | *NTU | 1.0 | Absorption Method |
| Iron | 3.5 | mg/L | 10.96 | *ICP-OES |
| Total Chlorine | 0.2 | mg/L | 0.11 | DPD Tablet Method |
| Copper | 0.5 | mg/L | 0.000 | *ICP-OES |
| Bacterial Growth (Total Coliform) | 400 | *CFU/100ml | 10 | Compact Dry Plate |
| Bacterial Growth (Faecal Coliform) | - | *CFU/100ml | 2 | Compact Dry Plate |
| Fluoride | 20 | mg/L | 0 | SPADNS Method |
| Manganese | - | mg/L | 1.334 | *ICP-OES |
| Magnesium | - | mg/L | 8.008 | *ICP-OES |
| Total Hardness | - | mg/L as CaCO ₃ | 11 | Unit Dose Vials Method |
| Color | - | *TCU | 5 | Platinum Cobalt Method |
| Electro conductivity | - | µmhos/cm | 20 | Ion selected Electrode Method |

*TCU- True Color Unit , *1 MPN (Most Probably Number) = 1 CFU (Coliform Forming Unit)

*NTU- Nephelometric Turbidity Unit , Reference: National Environmental Quality (Emission) Guidelines

*ICP-OES- Inductively Coupled Plasma- Optical Emission Spectrometric Method

Tested by

Checked by

Signed by

OH (Lab)
Daw Ohnmar Hla
MLT - I

Daw Aye Aye Thinn
Daw Aye Aye Thinn
Laboratory Officer

Dr. Kay Khaing Aye
Dr. Kay Khaing Aye
Deputy Director
Occupational and Environmental Health Division

OEHD Laboratory Results- 2019/ Waste Water

Appendix 17: Water Test Result (Drain Water 4)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
 Tel: +9567-431139, 431138, +951-221387, 210844,
 Fax: +9567-431139, +951-223824

| | |
|---|--------------------------|
| Sample Name: Waste Water | Received Date: 11.7.2019 |
| | Reported Date: 5.8.2019 |
| | Reg no: 205/2019 |
| Site Name: DW4 ငရိုးရိပ်ဆည်ရေမြောင်း အနီး မြောင်းရေ | |

| Analyses | Ref: Value | Unit | Results | Method |
|------------------------------------|------------|---------------------------|---------|---|
| pH | 6-9 | - | 6.4 | Ion Selected Electrode Method |
| BOD | 30 | mg O ₂ /L | 24.4 | 5 Day BOD Test Method |
| COD | 125 | mg/L | 14 | Close Reflex Method |
| Total Dissolved Solid | - | mg/L | 14 | Ion selected Electrode Method |
| Nitrate | - | mg/L | 0 | Zinc Reduction Method |
| Mercury | 0.01 | mg/L | 0.000 | *ICP-OES |
| Arsenic | 0.1 | mg/L | 0.012 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Oil and Grease | 10 | mg/L | 0.59 | Standard method |
| Phenol | 0.5 | mg/L | 0.03 | Aminoantipyrine Method |
| Sulphate | - | mg/L | 0 | Barium Chloride Method |
| Chloride | - | mg/L | 0.7 | Argentometric Method |
| Chromium | 0.5 | mg/L | 0.000 | *ICP-OES |
| Cadmium | 0.1 | mg/L | 0.000 | *ICP-OES |
| Lead | 0.1 | mg/L | 0.0017 | Atomic Absorption Spectrophotometer (Graphite Furnace Method) |
| Turbidity | - | *NTU | 1.0 | Absorption Method |
| Iron | 3.5 | mg/L | 4.463 | *ICP-OES |
| Total Chlorine | 0.2 | mg/L | 0.08 | DPD Tablet Method |
| Copper | 0.5 | mg/L | 0.001 | *ICP-OES |
| Bacterial Growth (Total Coliform) | 400 | *CFU/100ml | 15 | Compact Dry Plate |
| Bacterial Growth (Faecal Coliform) | - | *CFU/100ml | 3 | Compact Dry Plate |
| Fluoride | 20 | mg/L | 0 | SPADNS Method |
| Manganese | - | mg/L | 0.546 | *ICP-OES |
| Magnesium | - | mg/L | 4.65 | *ICP-OES |
| Total Hardness | - | mg/L as CaCO ₃ | 0 | Unit Dose Vials Method |
| Color | - | *TCU | 5 | Platinum Cobalt Method |
| Electro conductivity | - | µmhos/cm | 20 | Ion selected Electrode Method |

*TCU- True Color Unit , *1 MPN (Most Probably Number) = 1 CFU (Colliform Forming Unit)

*NTU- Nephelometric Turbidity Unit , Reference: National Environmental Quality (Emission) Guidelines

*ICP-OES- Inductively Coupled Plasma- Optical Emission Spectrometric Method

Tested by

omh
 OH (Lab)
 Daw Ohnmar Hla
 MLT - I

Checked by

ayethin
 Daw Aye Aye Thinn
 Laboratory Officer

Signed by

Dr. Kay Khaing Aye
 Dr. Kay Khaing Aye
 Deputy Director
 Occupational and Environmental Health Division

Appendix 18: Water Test Result (Drinking Water)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
 Tel: +9567-431139, 431138, +951-221387, 210844,
 Fax: +9567-431139, +951-223824

| | |
|--|---------------------------------|
| Sample Name: Drinking Water | Received Date: 10.4.2019 |
| Address: Nyaung Hnitpin Industrial Complex Project, Hlegu Township. | Reported Date: 10.5.2019 |
| Site Name: ပုဇွန်တောင်ချောင်း လက်ဝဲကျေးရွာအနီး | Reg no: 108/2019 |

| Analyses | Ref: value | Units | Results | Method |
|-------------------------|------------|---------------------------|---------|---|
| Arsenic ✓ | 0.05 | mg/L | 0 | Arsenator |
| Chloride ✓ | 250 | mg/L | 1.0 | Argentometric Method |
| Color ✓ | 15 | *TCU | 5 | Platinum Cobalt Method |
| Chlorine | 4 | mg/L | 0.14 | DPD Tablet Method |
| Copper ✓ | 2 | mg/L | 0.005 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Fluoride ✓ | 1.5 | mg/L | 0.0 | SPADNS Method |
| Hardness ✓ | 500 | mg/L as CaCO ₃ | 68 | Unit Dose Vials Method |
| Iron ✓ | 1 | mg/L | 0.09 | Bipyridyl Method |
| Lead ✓ | 0.01 | mg/L | 0.000 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Mercury ✓ | 0.001 | mg/L | 0.000 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Magnesium ✓ | 150 | mg/L | 16.80 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Nitrate ✓ | 50 | mg/L | 0.0 | Zinc Reduction Method |
| pH ✓ | 6.5 – 8.5 | | 7.9 | Ion selected Electrode Method |
| Sulphate ✓ | 250 | mg/L | 3 | Barium Chloride Method |
| Turbidity ✓ | 5 | *NTU | 1.0 | Absorption Method |
| Total Dissolved Solid ✓ | 1000 | mg/L | 140 | Ion selected Electrode Method |
| Zinc ✓ | 3 | mg/L | 1 | Zincon Method |
| BOD ✓ | - | mgO ₂ /L | 58.1 | 5 Day BOD Test Method |
| COD ✓ | - | mg/L | 18.8 | Close Reflex Method |
| Oil and Grease ✓ | - | mg/L | 2.62 | Standard method |
| Electro conductivity ✓ | - | μS/cm | 200 | Ion selected Electrode Method |
| Phosphate ✓ | - | mg/L | 2 | Vanadomolybdophosphoric Acid Method |

*TCU – True Color Units , *NTU- Nephelometric Turbidity Unit

Reference: National Drinking Water Quality Standard

Tested by

Checked by

Signed by

(Signature)
 OH (Lab)
 aw Ei Thwe Phyo
 MLT - G(II)

(Signature)
 Daw Aye Aye Thinn
 Laboratory Officer

(Signature)
 Dr. Kay Khaing Aye
 Deputy Director
 Occupational and Environmental Health Division

Appendix 19: Water Test Result (Drinking Water)



Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.

Tel: +9567-431139, 431138, +951-221387, 210844,

Fax: +9567-431139, +951-223824

| | |
|---|---------------------------------|
| Sample Name: Drinking Water | Received Date: 10.4.2019 |
| Address: Nyaung Hnitpin Industrial Complex Project, Hlegu Towndhip. | Reported Date: 10.5.2019 |
| Site Name: ကြာအင်းဆောင်း (၆)မိုင်(၂)စာလုံ ရန်ကုန်-မန္တလေး အမြန်လမ်းအနီး။ | Reg no: 107/2019 |

| Analyses | Ref: value | Units | Results | Method |
|-----------------------|------------|---------------------------|---------|---|
| Arsenic | 0.05 | mg/L | 0 | Arsenator |
| Chloride | 250 | mg/L | 4.9 | Argentometric Method |
| Color | 15 | *TCU | 10 | Platinum Cobalt Method |
| Chlorine | 4 | mg/L | 0.07 | DPD Tablet Method |
| Copper | 2 | mg/L | 0.008 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Fluoride | 1.5 | mg/L | 0.0 | SPADNS Method |
| Hardness | 500 | mg/L as CaCO ₃ | 57 | Unit Dose Vials Method |
| Iron | 1 | mg/L | 0.19 | Bipyridyl Method |
| Lead | 0.01 | mg/L | 0.000 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Mercury | 0.001 | mg/L | 0.000 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Magnesium | 150 | mg/L | 14.32 | Inductively Coupled Plasma- Optical Emission Spectrometric Method |
| Nitrate | 50 | mg/L | 0.0 | Zinc Reduction Method |
| pH | 6.5 – 8.5 | | 7.2 | Ion selected Electrode Method |
| Sulphate | 250 | mg/L | 8 | Barium Chloride Method |
| Turbidity | 5 | *NTU | 0.1 | Absorption Method |
| Total Dissolved Solid | 1000 | mg/L | 196 | Ion selected Electrode Method |
| Zinc | 3 | mg/L | 2 | Zincon Method |
| BOD | - | mgO ₂ /L | 20.5 | 5 Day BOD Test Method |
| COD | - | mg/L | 8.3 | Close Reflex Method |
| Oil and Grease | - | mg/L | 1.06 | Standard method |
| Electro conductivity | - | μS/cm | 280 | Ion selected Electrode Method |
| Phosphate | - | mg/L | 3 | Vanadomoybdophosphoric Acid Method |

*TCU – True Color Units , *NTU- Nephelometric Turbidity Unit

Reference: National Drinking Water Quality Standard

Tested by

Checked by

Signed by

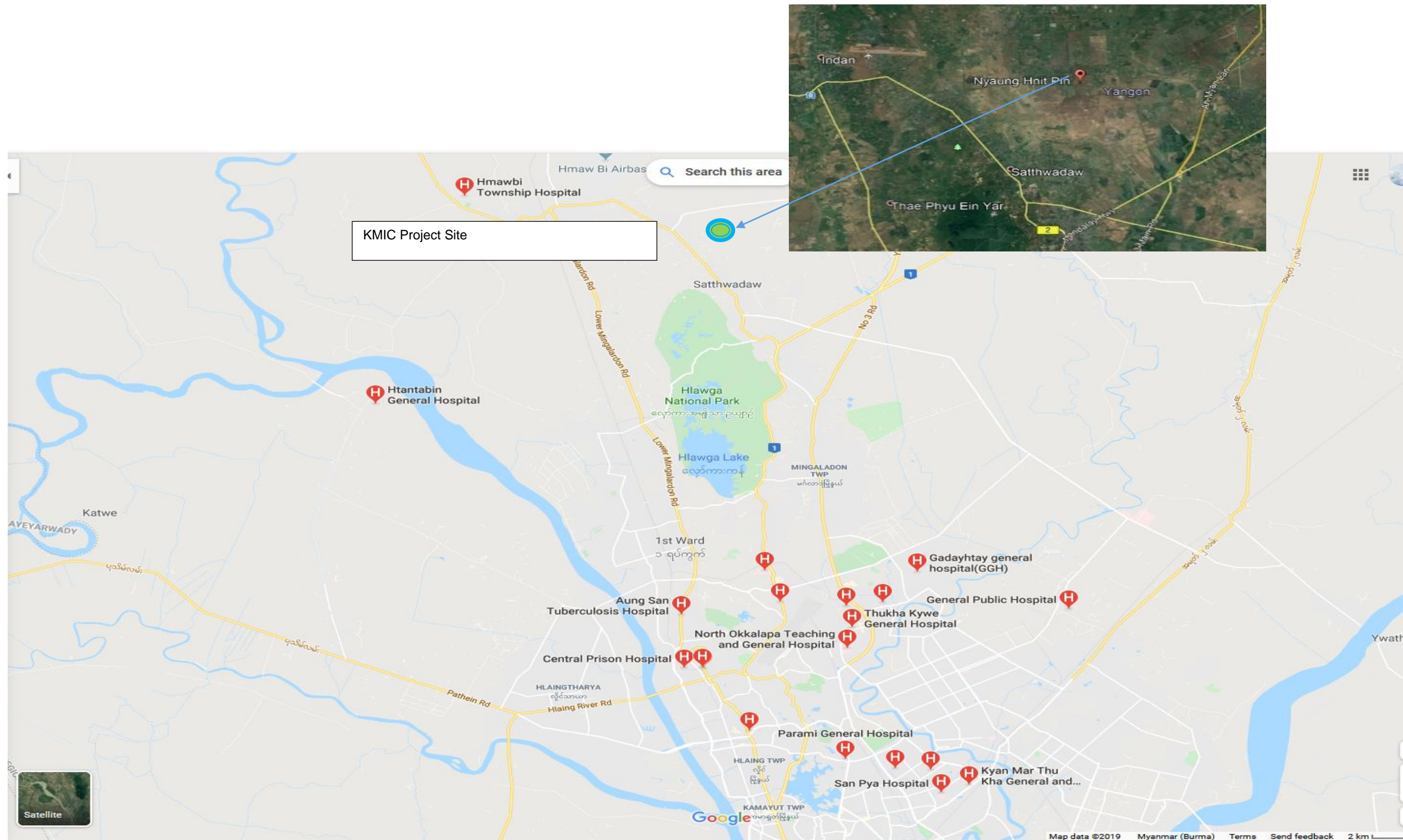
OH (Lab)
Daw Ei Tun Phyo
MLT - GC(II)

Daw Aye Aye Thinn
Laboratory Officer

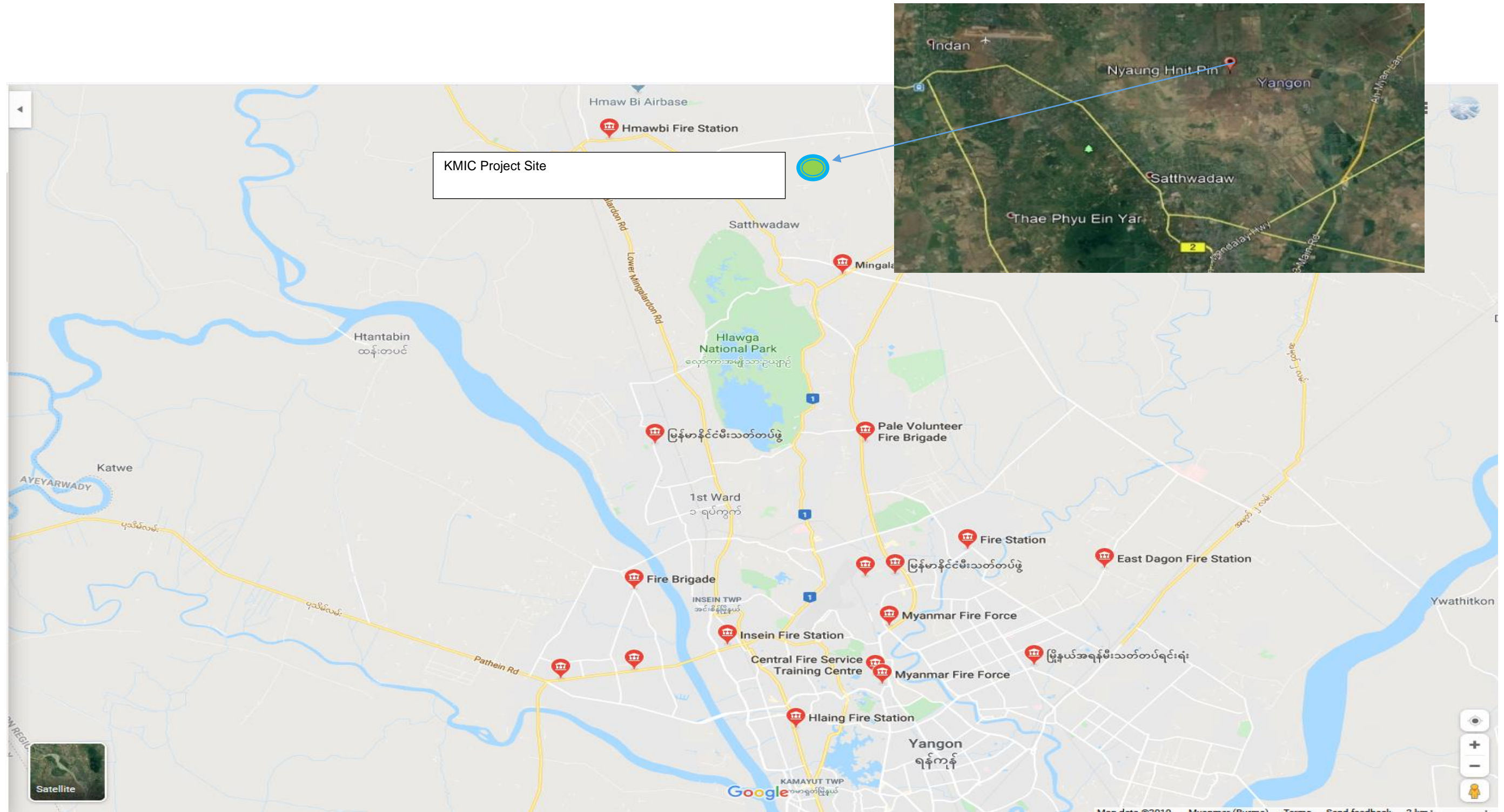
Dr. Kay Khaing Aye
Deputy Director
Occupational and Environmental Health Division

OEHD Laboratory Results- 2019/ Drinking Water (Nyaung Hnitpin)

Appendix 20: Hospitals around Project Site



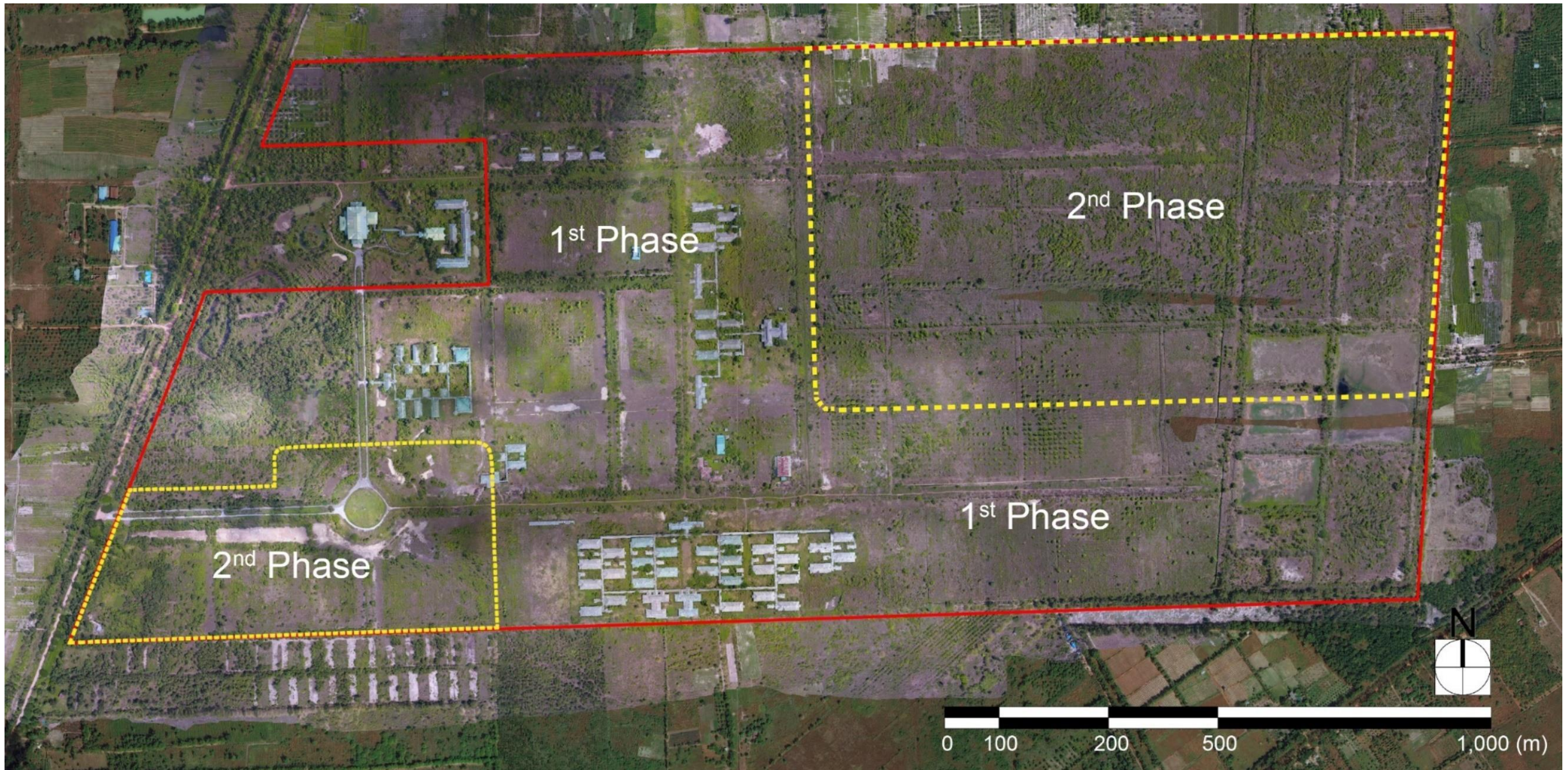
Appendix 21: Fire Brigades around Project Site



Appendix 22: Aerial Photo of Existing Project Site (taken by MSR Drone Team)



Appendix 23: Aerial Photo of Existing Project Site showing Project Phased Plots (taken by MSR Drone Team)



Appendix 24: Project Summary

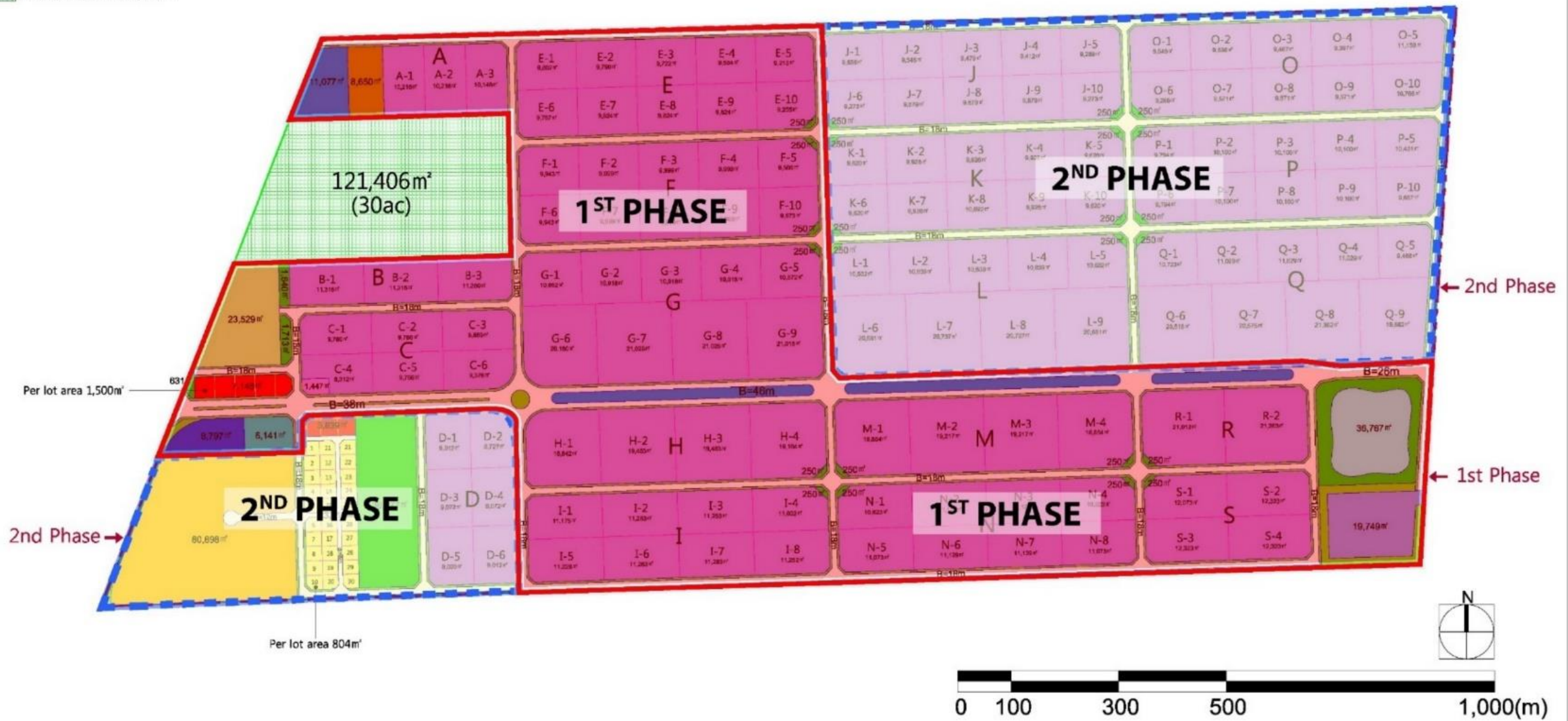
| | | |
|----------------------------|-----------|------|
| Industrial Area | 1,593,119 | 70.8 |
| Residential Area | 80,898 | 3.6 |
| Villa | 23,810 | 1.1 |
| Commercial Area | 10,987 | 0.5 |
| Technopark (IT Park) | 23,529 | 1.0 |
| Gas Station | 1,447 | 0.1 |
| Public Facility Site | 515,498 | 22.9 |
| Road | 258,588 | 11.4 |
| Retention Canal | 25,062 | 1.1 |
| Park | 82,928 | 3.7 |
| Buffer Green Belt | 94,506 | 4.2 |
| Management Center | 8,797 | 0.4 |
| Public Support Facility | 6,141 | 0.3 |
| Substation | 8,650 | 0.4 |
| Wastewater Treatment Plant | 19,749 | 0.9 |
| Water Purification Plant | 11,077 | 0.5 |

| | Total | 1st Phase | 2nd Phase |
|--------------------------|-----------|-----------|-----------|
| Total | 2,249,288 | 100.0 | 1,273,514 |
| Industrial Area | 1,593,119 | 70.8 | 876,708 |
| Residential Area & Villa | 104,708 | 4.7 | - |
| Commercial Area | 10,987 | 0.5 | 7,148 |
| Other Facility Site | 540,474 | 24.0 | 389,658 |

Master Plan

S = 1 : 8,000

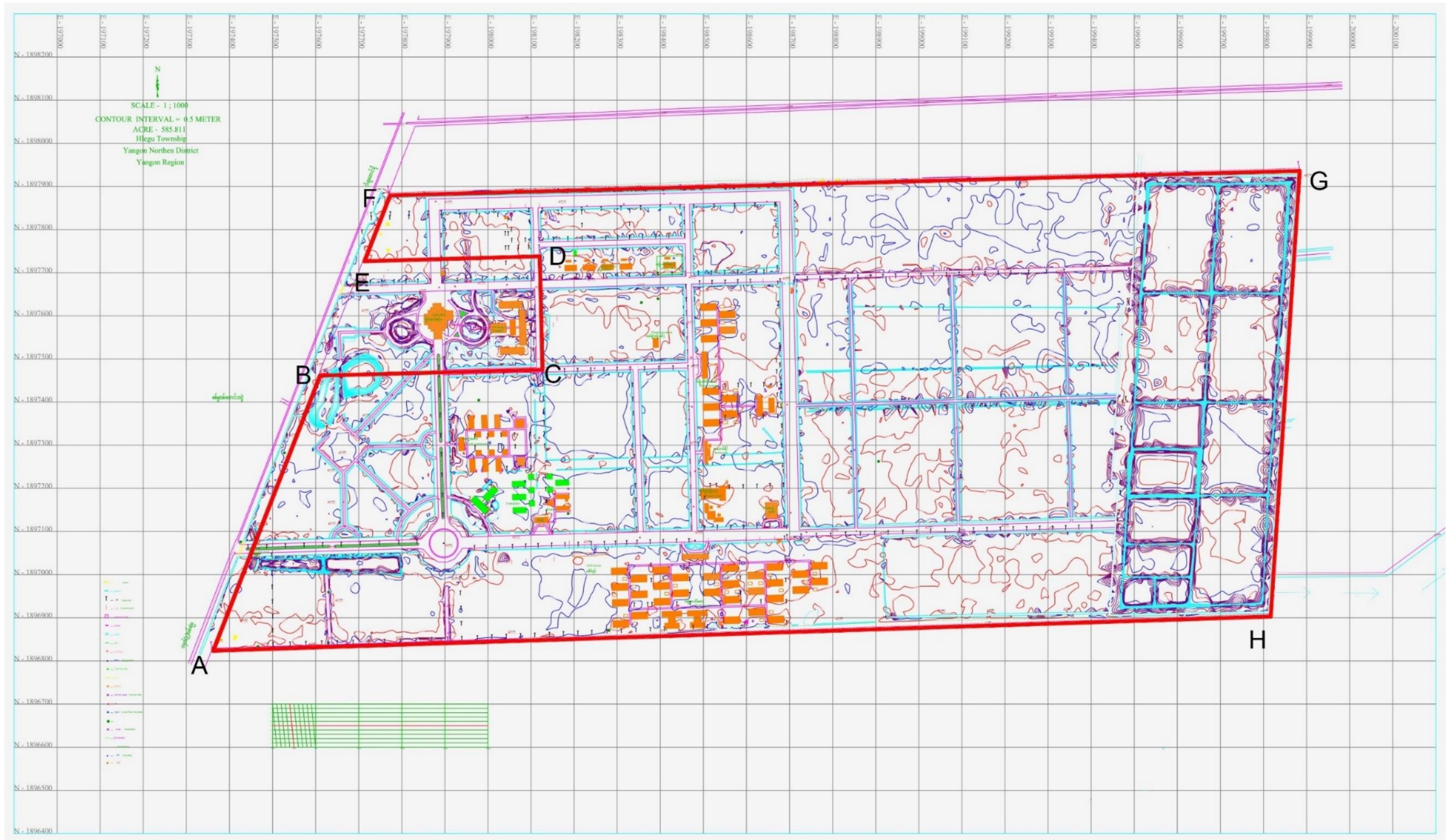
※ Exclusion site : 121,406 m²



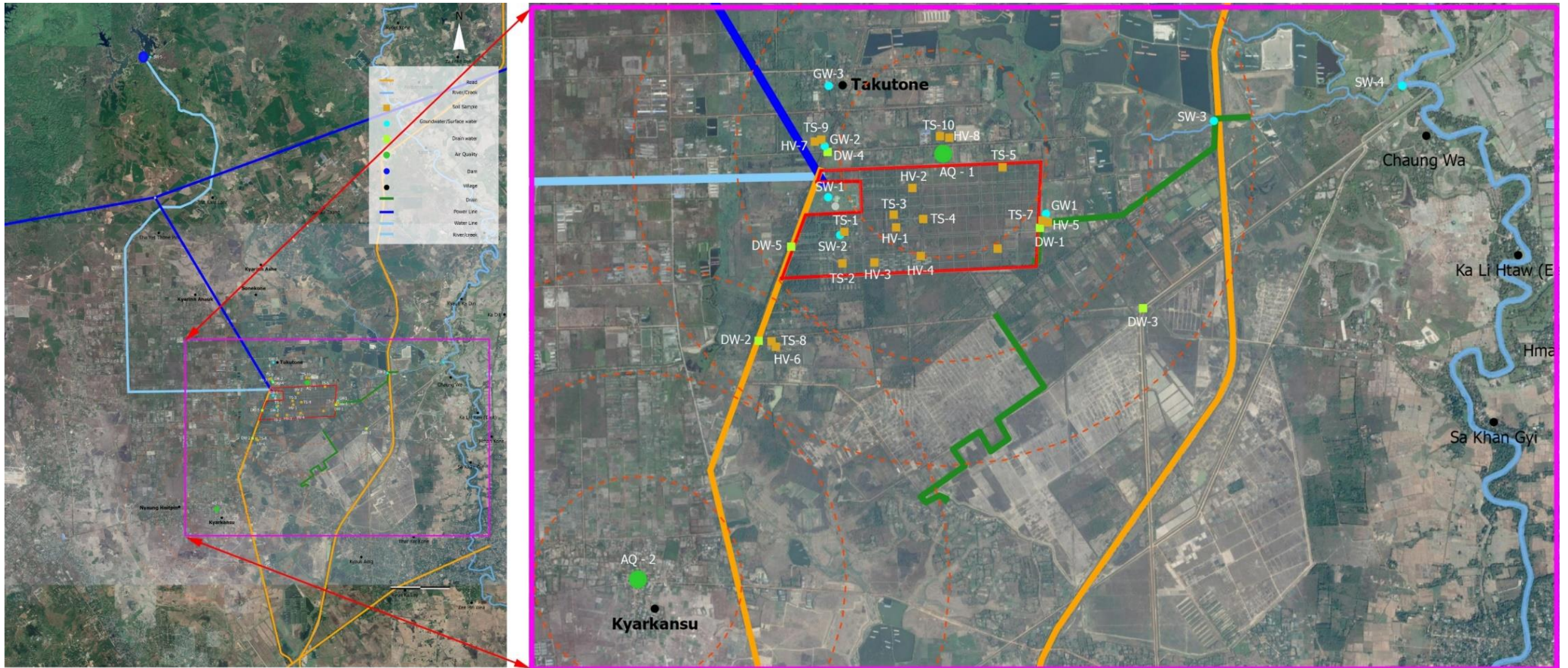
Appendix 25: Project Layout Plan (Artist Impression)



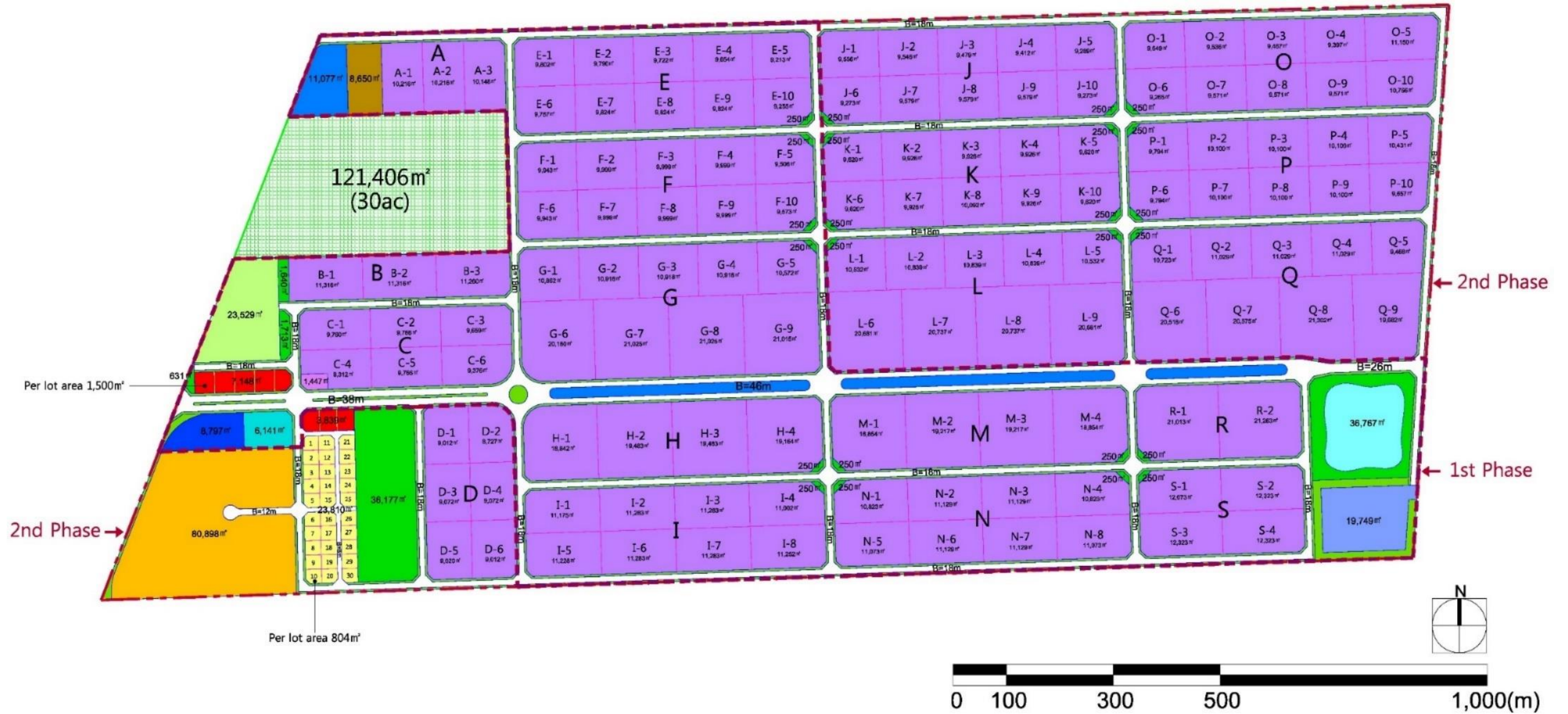
Appendix 26: Topographical Map of Project Site



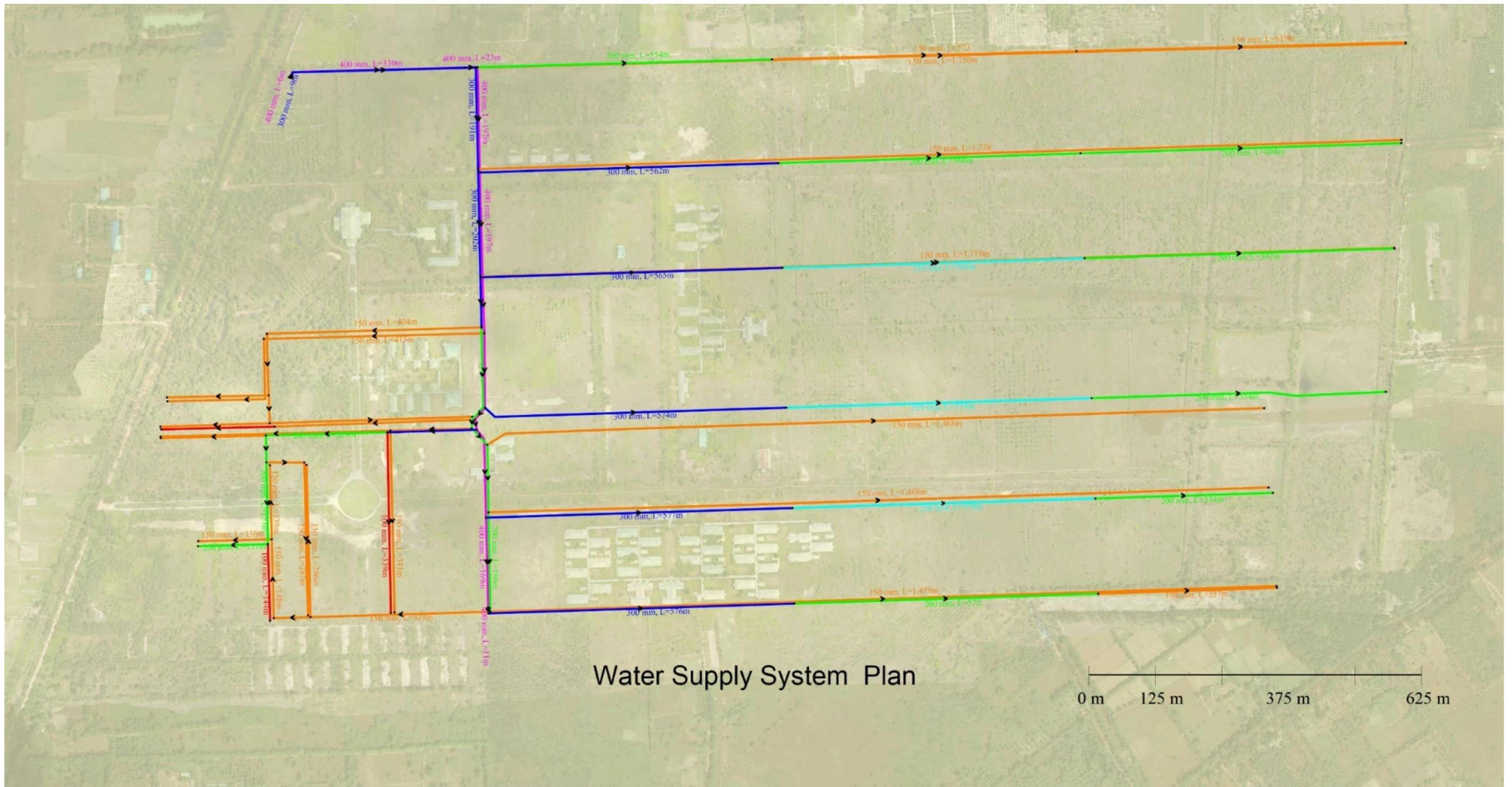
Appendix 27: Study Limit Map



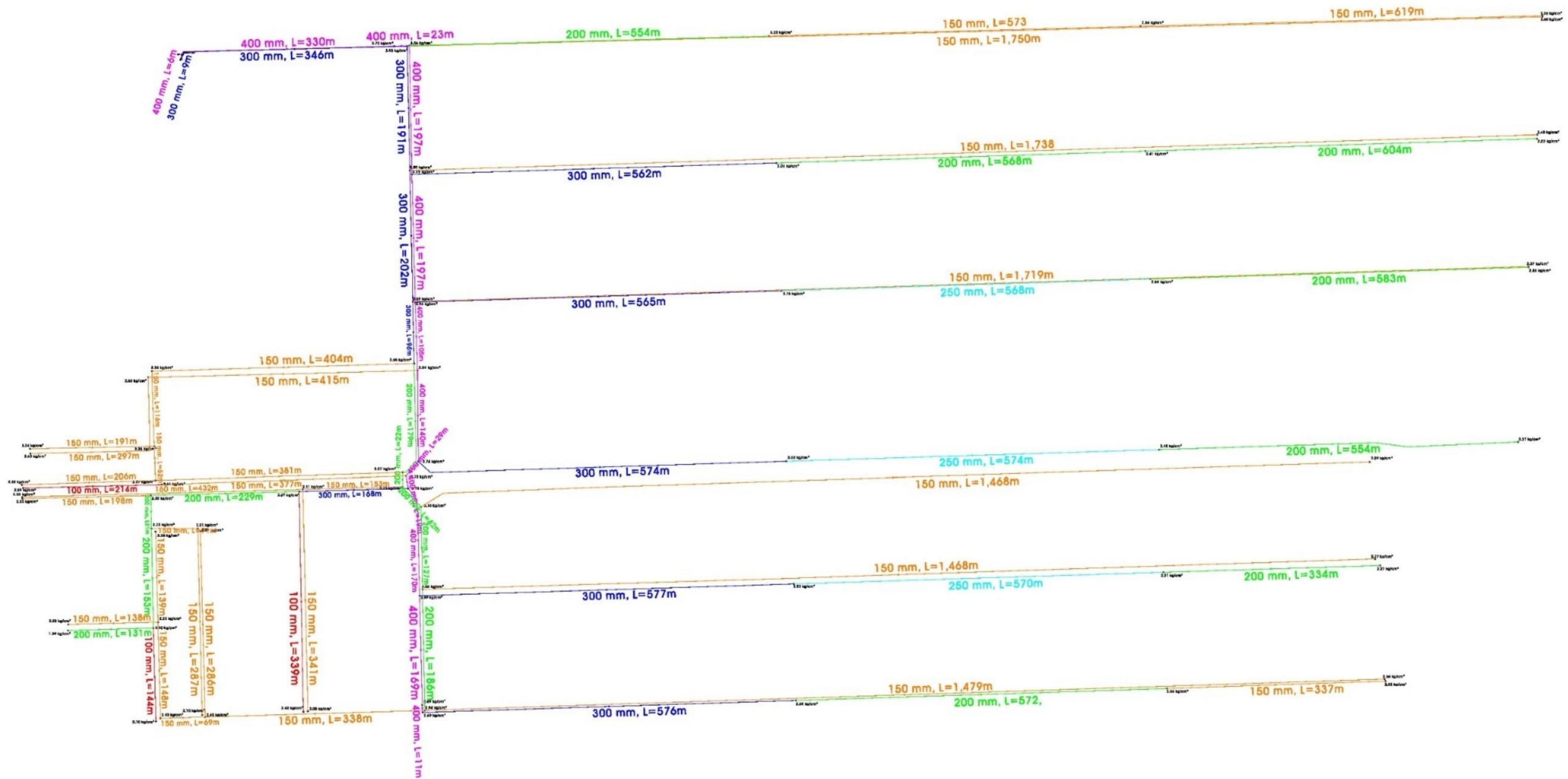
Appendix 28: Lot Layout and Land Use Plan Drawing



Appendix 30: Water Supply System



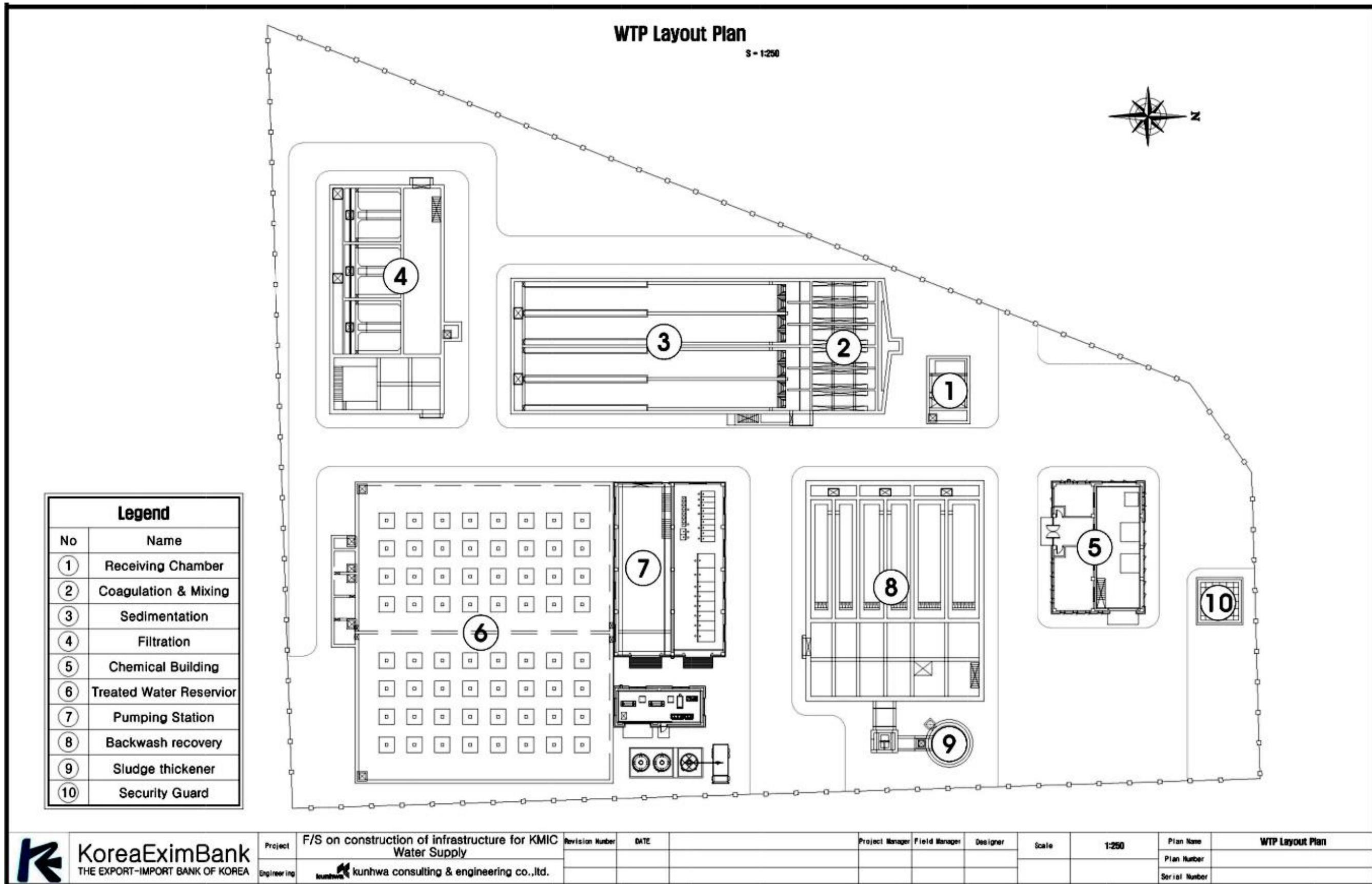
Appendix 31: Water Supply System showing pipe details



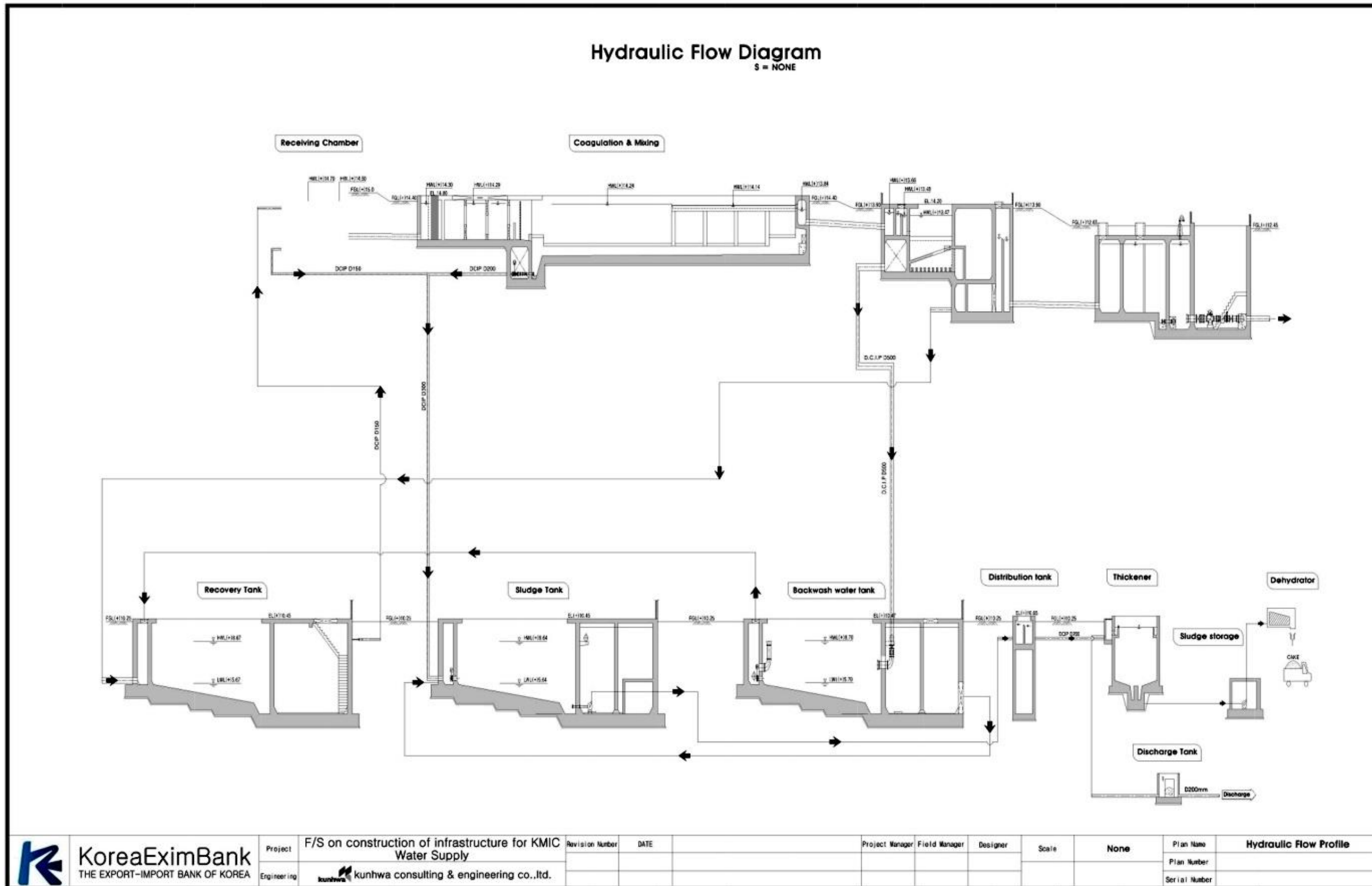
Appendix 32: Location Map of Water Purification Plant



Appendix 33: Water Purification Plant Layout Plan



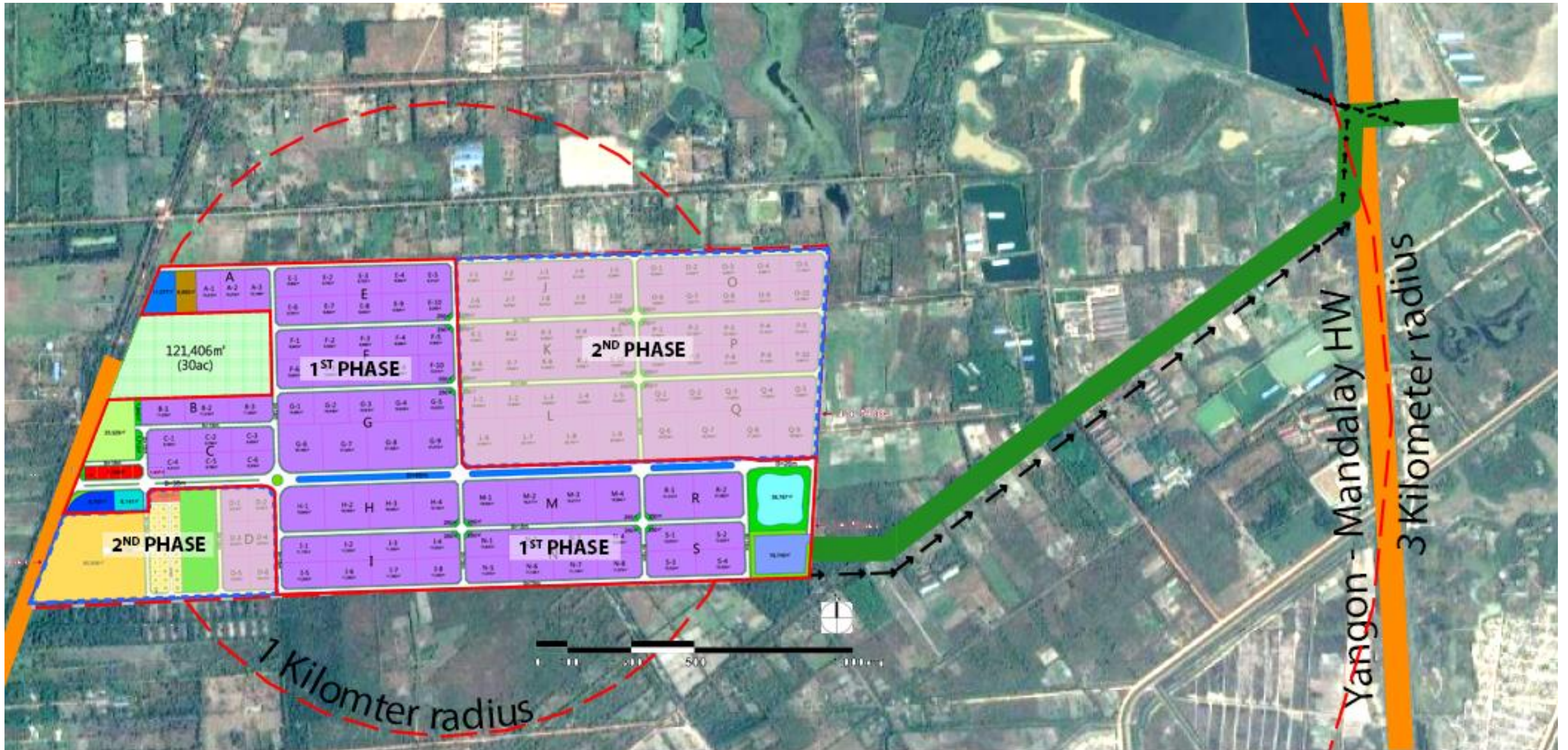
Appendix 34: Hydraulic Flow Diagram



Appendix 35: Wastewater Treatment Plant Location Map



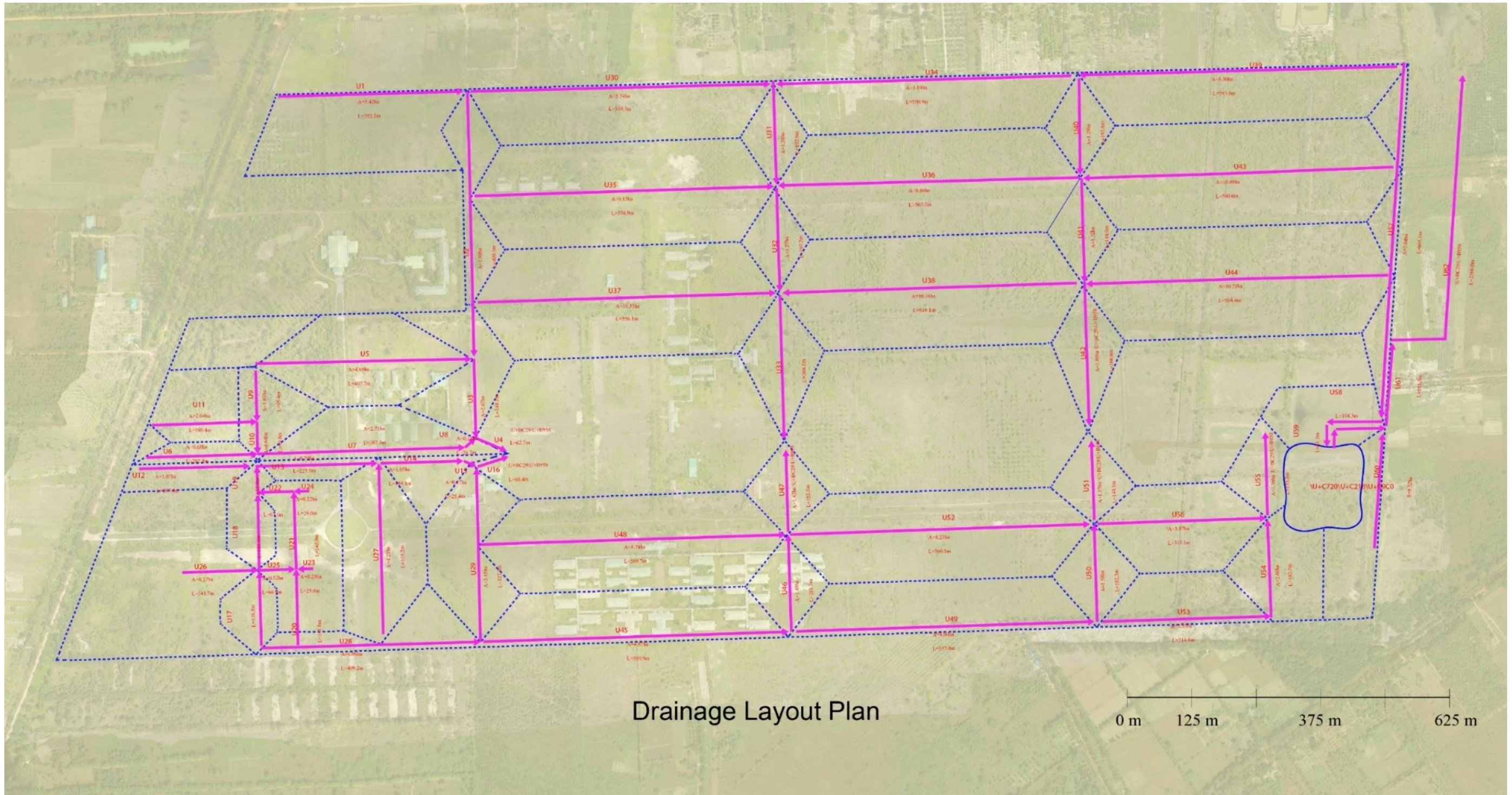
Appendix 36: Proposed Drainage



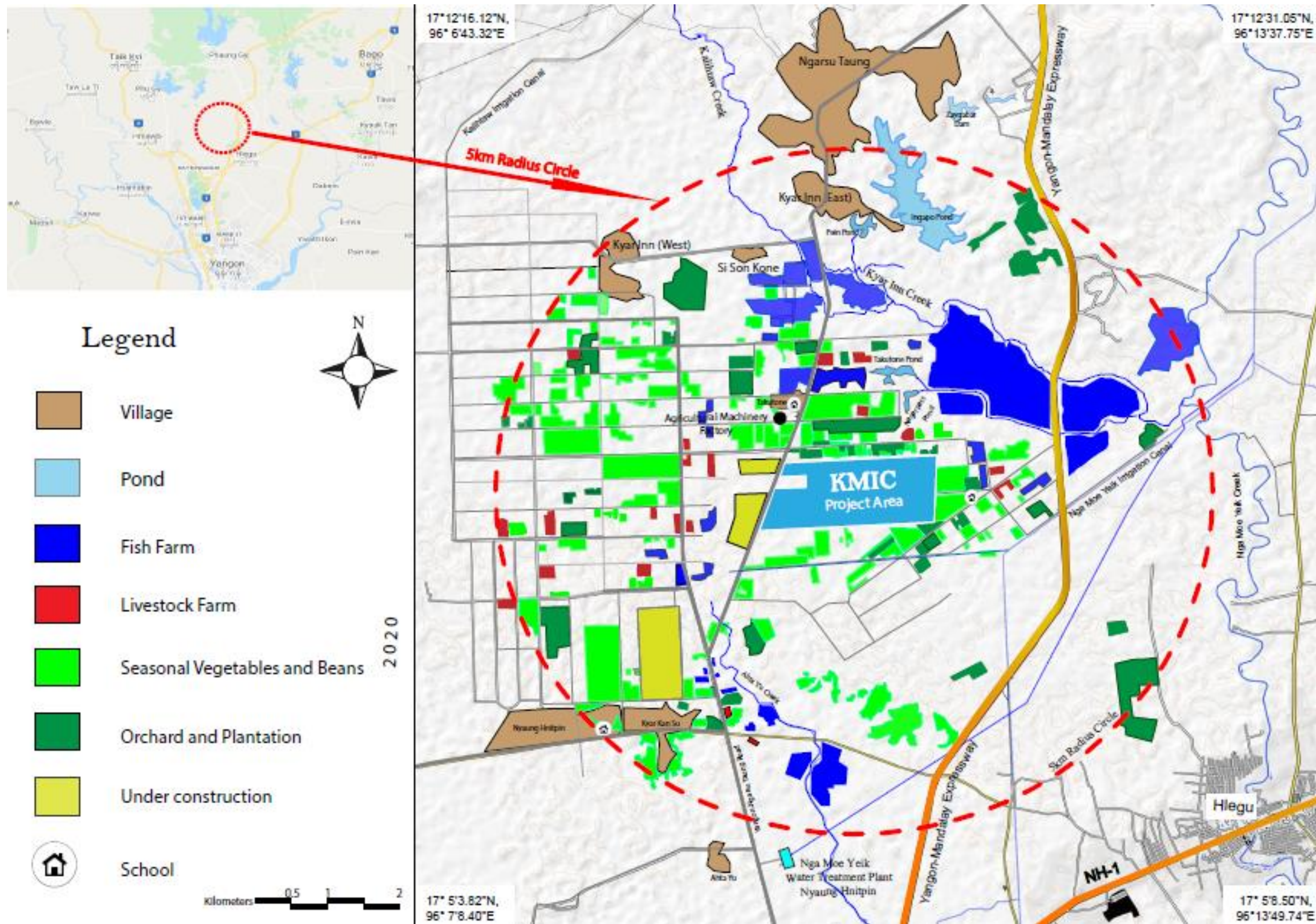
Appendix 37: Wastewater System Plan



Appendix 38: Drainage Layout Plan



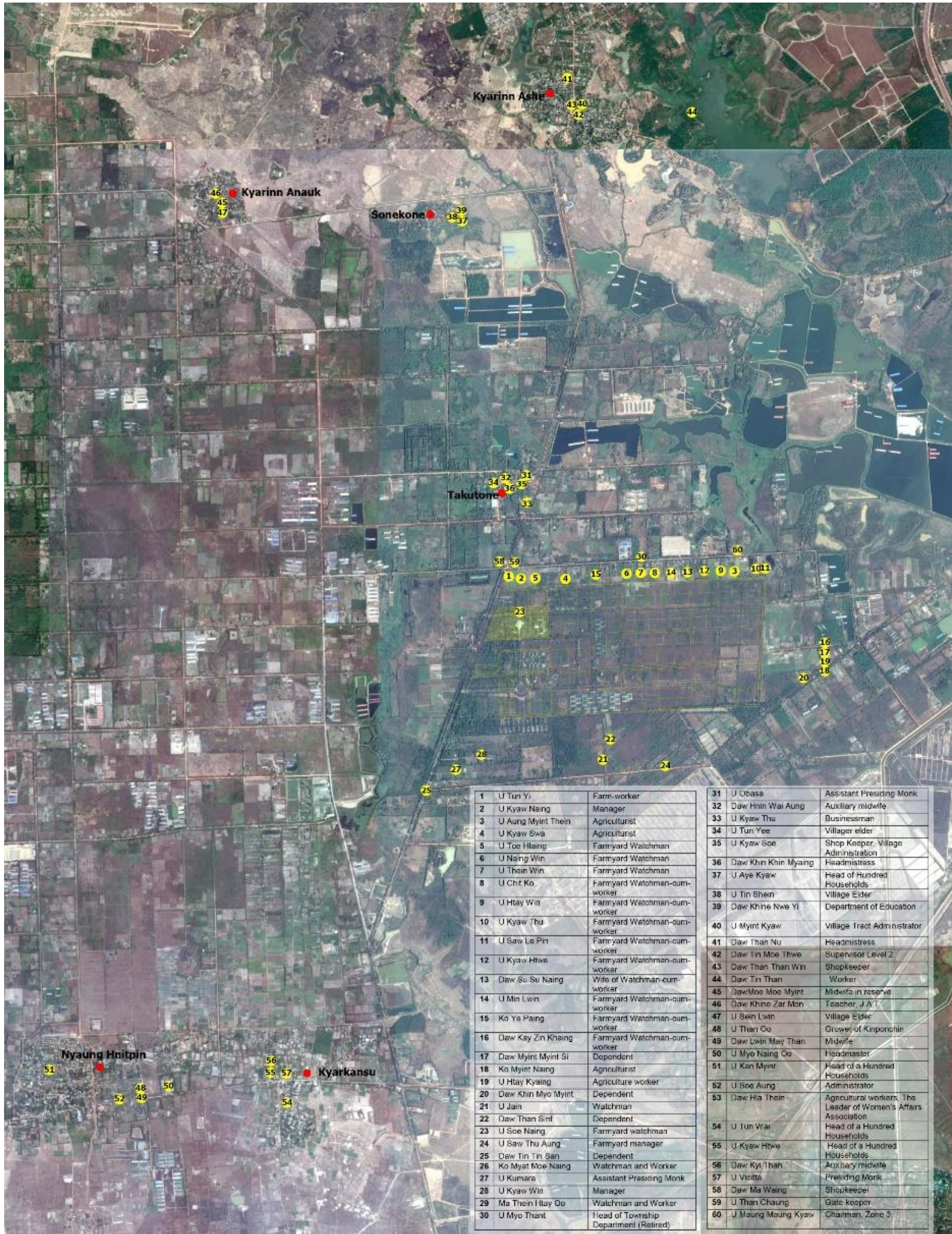
Appendix 40: Land Use Map of Surrounding Areas of Project Site



Appendix 42: Land Holding Map



Appendix 43: Interviewees List and their Locations Map



KMIC Development Co., Ltd မှ ရန်ကုန်တိုင်းဒေသကြီး၊ လှည်းကူးမြို့နယ်ရှိ ညောင်နှစ်ပင်ရေယာတွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ကိုးရီးယား-မြန်မာ စက်မှုလုပ်ငန်းနယ်မြေစီမံကိန်းအတွက် တင်ပြလာသည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာအပေါ် စိစစ်တွေ့ရှိချက်နှင့် သုံးသပ်အကြံပြုချက်များ

| စဉ် | စိစစ်တွေ့ရှိချက်များ | သုံးသပ်အကြံပြုချက်များ | လိုက်နာဆောင်ရွက်ချက်များ (ပြင်ဆင်ချက်များ) |
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| ၁။ | အစီရင်ခံစာအကျဉ်းချုပ် | | |
| က | <p>အစီရင်ခံစာအကျဉ်းချုပ် (Executive Summary) ကို အင်္ဂလိပ်/မြန်မာ နှစ်ဘာသာဖြင့် ဖော်ပြထားသော်လည်း အောက်ပါအချက်များကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p> <ul style="list-style-type: none"> - စီမံကိန်းရှိ ကုန်းနေ၊ ရေနေသတ္တဝါများ၊ သစ်ပင်ပန်း မန်များ၊ မြေအသုံးချမှုဆိုင်ရာ အချက်အလက်များ ကို မှတ်တမ်းရယူပြုစုခဲ့ပြီး နေရာဒေသ၏ ဖြစ်စဉ် သမိုင်း၊ ယခင်နှင့်လက်ရှိ ရှိနေသည့် သစ်ပင်နှင့် တိရိစ္ဆာန်များဆိုင်ရာ အချက်အလက်များကို ရရှိနိုင် ရန် ဒေသခံများနှင့် တွေ့ဆုံခြင်းတို့ကို ဆောင်ရွက်ခဲ့ကြောင်း ဖော်ပြထားသော်လည်း သိသာထင်ရှားသော ပတ်ဝန်းကျင်ဆိုင်ရာ အဓိကအချက်အလက် များကို ထည့်သွင်းဖော်ပြပေးရန် လိုအပ်ပါသည်။ - လူမှုစီးပွားရေးဆိုင်ရာအချက်အလက်များ ရယူခြင်း နှင့်ပတ်သက်၍ လူထုတွေ့ဆုံ | <p>အကျဉ်းချုပ်အစီရင်ခံစာတွင် အောက်ပါ အချက်အလက် များကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်-</p> <ul style="list-style-type: none"> - စီမံကိန်းရှိ ကုန်းနေ၊ ရေနေသတ္တဝါများ၊ သစ်ပင်ပန်းမန် များ၊ မြေအသုံးချမှုဆိုင်ရာ အချက်အလက်များကို မှတ်တမ်းရယူပြုစုခဲ့ပြီး နေရာဒေသ၏ ဖြစ်စဉ်သမိုင်း၊ ယခင်နှင့် လက်ရှိ ရှိနေသည့် သစ်ပင်နှင့် တိရိစ္ဆာန်များ ဆိုင်ရာ အချက်အလက်များကို ရရှိနိုင်ရန် ဒေသခံများနှင့် တွေ့ဆုံခြင်းတို့ကို ဆောင်ရွက်ခဲ့ကြောင်း ဖော်ပြထား သော်လည်း သိသာထင်ရှားသော ပတ်ဝန်း ကျင်ဆိုင်ရာ အဓိက အချက်အလက်များကို ထည့်သွင်း ဖော်ပြပေး ရန်၊ - လူမှုစီးပွားဆိုင်ရာ အချက်အလက်များ ရယူခြင်းနှင့် ပတ်သက်၍လူထုတွေ့ဆုံဆွေးနွေးပွဲဆောင်ရွက်ခဲ့သည့် အချိန်ကာလ၊ နေရာ၊ ကျေးရွာ ၆ ရွာ၏ အမည်နှင့် လူမှု စီးပွားရေးအခြေအနေဆိုင်ရာ | <p>စီမံကိန်းရှိ ကုန်းနေ၊ ရေနေသတ္တဝါများ၊ သစ်ပင်ပန်းမန် များ၊ မြေအသုံးချမှုဆိုင်ရာ အချက်အလက်များကို မှတ်တမ်း ရယူ ပြုစုခဲ့ပြီး နေရာဒေသ၏ ဖြစ်စဉ်သမိုင်း၊ ယခင်နှင့် လက်ရှိ ရှိနေ သည့် သစ်ပင်နှင့် တိရိစ္ဆာန်များ ဆိုင်ရာ အချက်အလက် များကို ရရှိနိုင်ရန် ဒေသခံများနှင့် တွေ့ဆုံခြင်းတို့ကို ဆောင်ရွက် ခဲ့ကာ သိသာထင်ရှားသော ပတ်ဝန်း ကျင်ဆိုင်ရာ အဓိက အချက် အလက်များကို အစီရင်ခံစာအကျဉ်းချုပ် (မြန်မာ ဘာသာ) စာမျက်နှာ (၂၁) နှင့် အစီရင်ခံစာအကျဉ်းချုပ် (အင်္ဂလိပ် ဘာသာ) စာမျက်နှာ (၅၇) တွင် ဖော်ပြ ထားပါ သည်။</p> <p>လူမှုစီးပွားဆိုင်ရာ အချက်အလက်များ ရယူခြင်းနှင့် ပတ်သက် ၍ လူထုတွေ့ဆုံဆွေးနွေးပွဲဆောင်ရွက်ခဲ့သည့် အချိန် ကာလ၊ နေရာ၊ ကျေးရွာ ၆ ရွာ၏ အမည်နှင့် လူမှု စီးပွားရေးအခြေ အနေ ဆိုင်ရာ အချက်အလက်များကို</p> |

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| | <p>ဆွေးနွေးခြင်း ဆောင်ရွက်ခဲ့သည့် အချိန်ကာလ၊ နေရာ၊ ကျေးရွာ ၆ ရွာ၏ အမည်နှင့် လူမှုစီးပွားအခြေအနေဆိုင်ရာ အချက်အလက်များကို အကျဉ်းချုပ် ထည့်သွင်းဖော်ပြပေး ရန် လိုအပ်ပါသည်။</p> <p>- ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်နိုင်မှု အခြေအနေများ၊ ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများကို လျော့ပါးစေနိုင်မည့် နည်းလမ်းများနှင့် ကြွင်းကျန်သက်ရောက်မှုများ၊ ဆက်စပ် သက်ရောက်မှုများ၊ အစားထိုးနည်းလမ်းများ၊ လျှော့ချမည့်နည်းလမ်းများ၊ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်ဆိုင်ရာ အဓိက အချက်အလက်များကို အကျဉ်းချုပ် ထည့်သွင်း ဖော်ပြပေးရန် လိုအပ်ပါသည်။</p> | <p>အချက်အလက်များကို အကျဉ်းချုပ် ထည့်သွင်းဖော်ပြပေးရန်၊</p> <p>- ဖြစ်ပေါ်လာနိုင် သည့် ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှု အခြေအနေများ၊ ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများကို လျော့ပါး စေနိုင်မည့်နည်းလမ်းများနှင့် ကြွင်းကျန် သက်ရောက်မှု များ၊ ဆက်စပ်သက်ရောက်မှုများ၊ အစားထိုး နည်းလမ်းများ၊ လျှော့ချမည့် နည်းလမ်းများ၊ ပတ်ဝန်းကျင် စီမံခန့် ခွဲမှုအစီအစဉ်နှင့် စောင့်ကြပ် ကြည့်ရှုမည့် အစီအစဉ်ဆိုင်ရာ အဓိကအချက်အလက် များကို အကျဉ်းချုပ် ထည့်သွင်းဖော်ပြပေးရန်။</p> | <p>အကျဉ်းချုပ်အဖြစ် အစီရင်ခံစာအကျဉ်းချုပ် (မြန်မာ ဘာသာ) စာမျက်နှာ (၂၆ - ၂၇) နှင့် အစီရင်ခံစာ အကျဉ်းချုပ် (အင်္ဂလိပ် ဘာသာ) စာမျက်နှာ (၆၀ - ၆၁) တွင် ဖော်ပြ ထားပါ သည်။</p> <p>ဖြစ်ပေါ်လာနိုင် သည့် ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှု အခြေ အနေများ၊ ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု များကို လျော့ပါး စေနိုင်မည့်နည်းလမ်းများနှင့် ကြွင်းကျန် သက်ရောက် မှု များ၊ ဆက်စပ်သက်ရောက်မှုများ၊ အစားထိုး နည်းလမ်းများ၊ လျှော့ချ မည့် နည်းလမ်းများ၊ ပတ်ဝန်းကျင် စီမံခန့် ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြပ် ကြည့်ရှုမည့် အစီအစဉ်ဆိုင်ရာ အဓိက အချက် အလက် များကို အကျဉ်းချုပ်အဖြစ် အစီရင်ခံစာအကျဉ်းချုပ် (မြန်မာ ဘာသာ) စာမျက်နှာ (၂၇ - ၅၃) နှင့် အစီရင်ခံစာ အကျဉ်းချုပ် (အင်္ဂလိပ် ဘာသာ) စာမျက်နှာ (၆၁-၇၄) တွင် ဖော်ပြထားပါသည်။</p> |
| <p>၂။</p> | <p>မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာ မူဘောင်များ</p> | | |
| <p>(က)</p> | <p>အခန်း ၂ မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာ မူဘောင် များတွင် စီမံကိန်းဆိုင်ရာဥပဒေများကို ဖော်ပြထား သော်လည်း စီမံကိန်းပိုင်ရှင်မှ လိုက်နာရန်လိုအပ်သည့် အပိုဒ်ကိုသာညွှန်း၍ လိုက်နာမည်ဖြစ်ကြောင်းကို ရေး</p> | <p>- စီမံကိန်းပိုင်ရှင်မှ လိုက်နာမည့် သက်ဆိုင်ရာ ဥပဒေများ၏ အပိုဒ်ကိုသာညွှန်း၍လိုက်နာမည်ဖြစ်ကြောင်း ကို ရေးသား ဖော်ပြရန်၊</p> <p>- ဥပဒေများကို ကူးယူဖော်ပြခြင်းမပြုဘဲ စီမံကိန်း</p> | <p>သုံးသပ်အကြံပြုချက်များအတိုင်း CHAPTER 2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK</p> <p>2.1 Project relevant Local Laws, Rules, Guidelines and Procedures စာမျက်နှာ (၈၄-၁၃၀) တွင် ပြင်ဆင်ဖော်ပြ ထားပါသည်။</p> |

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| | သားဖော်ပြရန်လိုအပ်ပါသည်။ | ပိုင်ရှင်မှ လိုက်နာမည့် ဖော်ပြချက်ဖြင့် ဖော်ပြရန်၊ - အလုပ်သမားရေးရာ ဥပဒေများ၏ အမည်၊ ခုနှစ်တို့ လွဲမှားနေ၍ ပြန်လည်ပြင်ဆင်ရန်၊ | |
| (ခ) | စီမံကိန်းဆောင်ရွက်သူ၏ ကန်ထရိုက်သဘာဝနှင့် အခြားကတိကဝတ်များကို ဖော်ပြရန်လိုအပ်ပါသည်။ | စီမံကိန်းဆောင်ရွက်သူ၏ ကန်ထရိုက်သဘာဝနှင့် အခြားကတိကဝတ်များကို ဖော်ပြရန်၊ | စီမံကိန်းဆောင်ရွက်သူ၏ ကန်ထရိုက်သဘာဝနှင့် အခြားကတိ ကဝတ်များကို 2.4 Contractual and other Commitments စာမျက်နှာ (၁၃၄-၁၃၇) တွင် ဖော်ပြထားပါသည်။ |
| (ဂ) | အစီရင်ခံစာတွင် စီမံကိန်းပိုင်ရှင်က လိုက်နာရမည့် ဥပဒေ ဆိုင်ရာကတိကဝတ်များအဖြစ်ဖော်ပြထားခြင်းမရှိ သည်ကို တွေ့ရှိရပါသည်။ | အစီရင်ခံစာတွင် စီမံကိန်းပိုင်ရှင်က လိုက်နာရမည့် ဥပဒေဆိုင်ရာကတိကဝတ်များအဖြစ်ဖော်ပြထားခြင်း မရှိသည့်အတွက် ဥပဒေပါ ပုဒ်မအညွှန်း၊ နည်းဥပဒေများပါ နည်းဥပဒေအညွှန်း၊ လုပ်ထုံးလုပ်နည်းပါ အပိုဒ်အညွှန်း များကို သေချာစွာဖတ်ရှု၍ စီမံကိန်းနှင့်သက်ဆိုင်သည့် လိုက်နာရမည့် ဥပဒေကတိကဝတ်များကို တိကျစွာ ဖော်ပြရန် (ဥပမာ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေပုဒ်မ ၇ (ဏ) တွင်ပြဋ္ဌာန်းထားသည့် ဝန်ကြီးဌာနက ဆောင်ရွက် နိုင်သည့် လုပ်ငန်းသုံးရပ်အနက် ယခုစီမံကိန်းနှင့် သက်ဆိုင် သည့် လုပ်ငန်းတစ်ရပ်အတွက် ကတိကဝတ် အဖြစ် အောက်ပါ အတိုင်း ဖော်ပြရန်လိုအပ်မည် ဖြစ်ပါသည်။ | သုံးသပ်အကြံပြုချက်များအတိုင်း စီမံကိန်းပိုင်ရှင်က လိုက်နာ ရမည့် ဥပဒေဆိုင်ရာ ကတိကဝတ်များ ကို 2.5 Legal Commitments စာမျက်နှာ (၁၃၇ - ၁၄၀) တွင် ဖော်ပြထား ပါသည်။ |

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| | | <p># စီမံကိန်းပိုင်ရှင်သည် စီမံကိန်းကြောင့် ပတ်ဝန်းကျင် ထိခိုက်မှုကိုဖြစ်ပေါ်စေပါက ဝန်ကြီးဌာနက သတ်မှတ်ထားသောလျော်ကြေးကို ပေးလျော်ပါမည်။ ပုဒ်မ ၇ (ဏ))</p> <p>-ယခုစီမံကိန်းသည် စက်မှုဇုန် စတင်တည်ထောင်သည့် စီမံကိန်းဖြစ်ပါက သေချာစွာရှင်းလင်းဖော်ပြရန်၊</p> <p>-စက်မှုဇုန်အတွက်မြေကို စက်မှုဇုန်ဥပဒေပုဒ်မ ၃၁ အရ သက်ဆိုင်ရာအစိုးရအဖွဲ့က ရယူပေးခြင်း ဟုတ်/မဟုတ်</p> <p>စီမံကိန်းပိုင်ရှင်နှင့်သေချာစွာဆွေးနွေးပြီးမှ မှန်ကန်အောင် ဖော်ပြရန်၊</p> <p>- အလားတူပင် စက်မှုဇုန်အတွက် အဓိက လိုအပ်သည့် အချက်များနှင့် သက်ဆိုင်သည့် ဥပဒေများ စီမံကိန်းပိုင်ရှင် နှင့် သေချာစွာညှိနှိုင်းဆွေးနွေး၍ ဖော်ပြရန်၊</p> | <p>ယခုစီမံကိန်းသည် စက်မှုဇုန် စတင်တည်ထောင်သည့် စီမံကိန်းဖြစ်ကာ စီမံကိန်းပိုင်ရှင်က စက်မှုဇုန်နှင့် ပတ်သက်ပြီး မည်သို့သော လုပ်ငန်းများကို အကောင်အထည်ဖော်ဆောင်ရွက် မည် နှင့် စက်မှုဇုန်အတွက်မြေကို မည်သို့ ရယူထားသည်ကို</p> <p>CHAPTER 2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK , Introduction စာမျက်နှာ (၈၃ -၈၄) တွင် ဖော်ပြထားပါသည်။</p> <p>စက်မှုဇုန်အတွက် အဓိက လိုအပ်သည့် အချက်များနှင့် သက်ဆိုင်သည့် ဥပဒေများကို စီမံကိန်းပိုင်ရှင်နှင့် သေချာစွာ ညှိနှိုင်းဆွေးနွေး၍ ဖော်ပြထားပါသည်။</p> |
| ၃။ | စီမံကိန်းအကြောင်းအရာဖော်ပြချက်များ | | |

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| <p>(က)</p> | <p>စီမံကိန်း၏ တည်ဆောက်ခြင်း၊ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်ခြင်း၊ လုပ်ငန်းရပ်စဲခြင်း၊ လုပ်ငန်းပိတ်သိမ်းခြင်း အဆင့်များအတွက် ကြာမြင့်မည့် ကာလ၊ စတင်/ ပြီးစီးမည့်ရက်များအား ခန့်မှန်း ဖော်ပြထားသည့် စီမံ ကိန်း အကောင်အထည်ဖော် အချိန်ဇယား (Project Implementation Schedule) အား ဖော်ပြရန်လိုအပ်ပါ သည်။</p> | <p>စီမံကိန်း၏ တည်ဆောက်ခြင်း၊ လုပ်ငန်းလည်ပတ်ဆောင် ရွက်ခြင်း၊ လုပ်ငန်းရပ်စဲခြင်း၊ လုပ်ငန်းပိတ်သိမ်းခြင်း အဆင့်များအတွက် ကြာမြင့်မည့် ကာလ၊ စတင်/ ပြီးစီး မည့်ရက်များအား ခန့်မှန်းဖော်ပြထားသည့် မံကိန်း အကောင်အထည်ဖော် အချိန်ဇယား (Project Implementation Schedule) အား ဖော်ပြရန်၊</p> | <p>စီမံကိန်း၏ တည်ဆောက်ခြင်း၊ လုပ်ငန်းလည်ပတ်ဆောင်ရွက် ခြင်း၊ လုပ်ငန်းရပ်စဲခြင်း အဆင့်များအတွက် ကြာမြင့်မည့် ကာလ၊ စတင်/ ပြီးစီး မည့်ရက်များအား ခန့်မှန်းဖော်ပြထား သည့် မံကိန်း အကောင်အထည်ဖော် အချိန်ဇယား (Project Implementation Schedule) အား 3.4.2 Implementation Time Schedule စာမျက်နှာ (၁၄၈ - ၁၄၉) တွင် ဖော်ပြထားပါသည်။</p> <p>ယခုစီမံကိန်းသည် စက်မှုဇုန် စတင်တည်ထောင်ရန် လိုအပ်သည့် အခြေခံအဆောက်အအုံ (Infrastructure) ကိုသာ တည်ဆောက်သည့် လုပ်ငန်း ဖြစ်ပါသည်။</p> |
| <p>(ခ)</p> | <p>ပုံ ၃.၆ Map of Project Site and Surrounding Villages တွင် ၅ ကီလိုမီတာအချင်းဝက်နှင့် ၃ ကီလို မီတာအချင်းဝက်အတွင်းရှိ စီမံကိန်းတည်နေရာနှင့် အနီး ပတ်ဝန်းကျင်ရှိ ကျေးရွာများကို ဖော်ပြထားပါသည်။ သို့ရာတွင် အစီရင်ခံစာ၌ စီမံကိန်းအနီးပတ်ဝန်းကျင်တွင် စိုက်ပျိုးရေးဇုန်တစ်ခုတည်ထောင်ထားပြီး ဟင်းသီး ဟင်းရွက် စိုက်ခင်းများ၊ ရာသီပေါ်သီးနှံများ စိုက်ပျိုးထား ရှိကြောင်း၊ ကျေးရွာများအပါအဝင်</p> | <p>စီမံကိန်းတည်နေရာ၊ ဆက်စပ်နေရာများ၊ အနီးစပ်ဆုံး မြစ်/ချောင်းများ၊ ဇုန် ၃ ဝန်းကျင်ရှိ အခြားမြေအသုံးချ မှုများ (စိုက်ခင်း၊ ဇုန်ဧရိယာ၊ လူနေအိမ်ရာ၊ ချောင်း စသည်) အပါအဝင် ဆက်စပ်နေရာအားလုံးကို layout Map ဖြင့် ရှင်းလင်းစွာ ဖော်ပြရန်၊</p> | <p>စီမံကိန်းတည်နေရာ၊ ဆက်စပ်နေရာများ၊ အနီးစပ်ဆုံး မြစ်/ ချောင်းများ၊ ဇုန် ၃ ဝန်းကျင်ရှိ အခြားမြေအသုံးချ မှုများ (စိုက် ခင်း၊ ဇုန်ဧရိယာ၊ လူနေအိမ်ရာ၊ ချောင်း စသည်) ပါဝင်သည့် ဆက်စပ်နေရာအားလုံး၏ မြေပုံကို Figure 3.7: Land Use Map of Surrounding Areas of Project Site စာမျက်နှာ (၁၄၆) တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။</p> |

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| | <p>ပတ်ဝန်းကျင်နေရာ တော်တော်များများအား စိုက်ပျိုးရေးနှင့် မွေးမြူရေးဇုန် များအဖြစ် သတ်မှတ်ထားပြီး ငါးမွေးမြူရေးကန်များ၊ poultry keeping farms များကို စီမံကိန်းတည်နေရာ အနီးတွင် သတ်မှတ်တည်ထောင်ထားရှိကြောင်း ဖော်ပြ ထားပါသည်။ သို့ဖြစ်ပါ၍ ဇုန် ၃ ဝန်းကျင်ရှိ အခြားမြေ အသုံးချမှုများ (စိုက်ခင်း၊ ဇုန်ဧရိယာ၊ လူနေအိမ်ရာ၊ ချောင်း စသည်) တို့နှင့်ပတ်သက်၍ ထည့်သွင်းဖော်ပြ ပေးရန် လိုအပ်ပါသည်။</p> | | |
| <p>(ဂ)</p> | <p>မွေးမြူရေးနှင့်စိုက်ပျိုးရေးဇုန်တွင် ဧက (၁၀၀၀၀)ခန့် ကျယ်ဝန်းသော ညောင်နှစ်ပင်ဧရိယာတွင် စိုက်ပျိုးရေး ဇုန် ၃ ဇုန်ကို ထူထောင်ထားကြောင်းနှင့် အဆိုပါ မြေ နေရာများတွင် သီးနှံစိုက်ပျိုးခင်းများ၊ စပါးစိုက်ခင်းများ နှင့် ငါးမွေးမြူရေးကန်များ၊ ကြက်ဘဲမွေးမြူရေးခြံများ ထူထောင်ထားကြောင်း ဖော်ပြထားသဖြင့် အဆိုပြု စီမံကိန်းအနေဖြင့် အဆိုပါလုပ်ငန်းများ၏ စီးပွားရေး၊ လူမှုရေး၊ ကျန်းမာရေးနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အချက် အလက်များကို ဖော်ပြရန်နှင့် ထိခိုက်မှု ဆန်းစစ်ခြင်း အခန်းကဏ္ဍတွင်</p> | <p>မွေးမြူရေးနှင့်စိုက်ပျိုးရေးဇုန်တွင် ဧက (၁၀၀၀၀) ခန့် ကျယ်ဝန်းသော ညောင်နှစ်ပင်ဧရိယာတွင် စိုက်ပျိုးရေးဇုန် ၃ ဇုန်ကို ထူထောင်ထားကြောင်းနှင့် အဆိုပါ မြေနေရာ များတွင် သီးနှံစိုက်ပျိုးခင်းများ၊ စပါးစိုက်ခင်း များနှင့် ငါးမွေးမြူရေးကန်များ၊ ကြက်ဘဲ မွေးမြူရေး ခြံများ ထူထောင်ထားကြောင်း ဖော်ပြထားသဖြင့် အဆိုပြု စီမံကိန်း အနေဖြင့် အဆိုပါလုပ်ငန်းများ၏ စီးပွားရေး၊ လူမှုရေး၊ ကျန်းမာရေးနှင့် ပတ်ဝန်းကျင် ဆိုင်ရာ အချက် အလက်များကို ဖော်ပြရန်နှင့် ထိခိုက်မှုဆန်းစစ်ခြင်း အခန်းကဏ္ဍတွင် ထည့်သွင်း စဉ်းစားရန်၊</p> | <p>ဇုန် ၃ ဇုန် ၏ စီးပွားရေး၊ လူမှုရေး၊ ကျန်းမာရေးနှင့် ပတ်ဝန်း ကျင်ဆိုင်ရာ အချက်အလက်များကို 4.11.3.5.7 Profile of Agriculture and Livestock Zone No. (1) စာမျက်နှာ (၃၂၆ - ၃၂၉) 4.11.3.5.8 Profile of Livestock and Agricultural Zone No. (2) စာမျက်နှာ (၃၂၉ -၃၃၁) 4.11.3.5.9 Profile of Livestock and Agricultural Zone No. (3) စာမျက်နှာ (၃၃၁ -၃၃၅) တို့တွင် ဖော်ပြထားပါသည်။ အဆိုပြုစီမံကိန်းကြောင့် အဆိုပါလုပ်ငန်းများအပေါ် သက်ရောက်နိုင်မှုကို ထိခိုက်မှုဆန်းစစ်ခြင်း အခန်းကဏ္ဍ</p> |

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| | <p>ထည့်သွင်းစဉ်းစားရန် လိုအပ်နေသည် ကို စိစစ်တွေ့ရှိရပါသည်။</p> | | <p>5.3.4.2 Potential Environmental Impacts during Construction Phase Impacts on Agricultural and Livestock Zones စာမျက်နှာ (၃၄၈)</p> <p>5.3.4.3 Potential Environmental Impacts during Operation Phase Impacts on Agricultural and Livestock Zones စာမျက်နှာ (၃၅၃-၃၅၄)</p> <p>5.3.4.4 Potential Environmental Impacts during Decommissioning/Closure Phase Impacts on Agricultural and Livestock Zones စာမျက်နှာ (၃၅၅-၃၅၆) တို့တွင် ထည့်သွင်းစဉ်းစားထားပါသည်။</p> |
| (ဃ) | <p>ရေလိုအပ်ချက် စာမျက်နှာ ၈၅ အပိုဒ်ခွဲ ၃.၈.၂ Water Resource and Usage တွင် စီမံကိန်းအဆိုပြုသူအနေဖြင့် မွေးမြူရေး နှင့်စိုက်ပျိုးရေးဇုန်အတွက် ၂၀၀၁ ခုနှစ်တွင် တည် ဆောက်ထားသည့် ကလီထော်ဆည်မှ စီမံကိန်းအတွက် လိုအပ်သည့် ရေကိုရယူရန် ရည်ရွယ်ထားကြောင်းနှင့် အဆိုပါဆည်မှ စိုက်ပျိုးမြေ ၉၀၀၀ ဧကအား</p> | <ul style="list-style-type: none"> - စီမံကိန်းအတွက်လိုအပ်သည့် ရေအရင်းအမြစ် နှင့်ပတ်သက်၍ အခြား Alternative Source အား ထည့်သွင်းစဉ်းစားသင့်ကြောင်းနှင့် ပိုမိုသေချာသည့် ရေရယူ သုံးစွဲမည့် အစီအစဉ်များနှင့် စက်မှုဇုန်လုပ်ငန်းဖြစ်၍ စီမံကိန်း အတွက်လိုအပ်သော ရေရယူသုံးစွဲရန် သက်ဆိုင် ရာ မှ ခွင့်ပြုထားသော အထောက် အထားများကို ထည့် သွင်းဖော်ပြရန်၊ - စီမံကိန်းတစ်ခုလုံး | <p>မြေအောက်ရေ ထုတ်ယူသုံးစွဲခြင်း သည် Company policy နှင့် မကိုက်ညီသည့်အတွက် ထည့်သွင်းစဉ်းစားခြင်း မပြုပါ။</p> <p>စီမံကိန်း အတွက်လိုအပ်သော ရေရယူသုံးစွဲရန် သက်ဆိုင်ရာမှ ခွင့်ပြုထားသော အထောက်အထားကို 3.8.2.6 Meeting Minutes related to Water Supply from Kalihtaw Dam စာမျက်နှာ (၁၇၉ - ၁၈၁) တွင် ထည့် သွင်းဖော်ပြထားပါသည်။</p> |

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| <p>ထောက်ပံ့ နေကြောင်း ဖော်ပြထားပါသည်။ သို့ရာတွင် အဆိုပါစီမံကိန်းအနီးရှိ ဒေသခံပြည်သူများ အနေဖြင့် စိုက်ပျိုးရေးလုပ်ငန်းများအတွက် ဆည်မှ ရေရ ယူသုံးစွဲနိုင်ခြင်းမရှိကြောင်း ဆွေးနွေးဖော်ပြထားသည့် အတွက် အခြား Alternative Source အား ထည့်သွင်း စဉ်းစားသင့်ကြောင်းနှင့် ပိုမိုသေချာသည့် ရေရယူ သုံးစွဲ မည့် အစီအစဉ်များကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။ စာမျက်နှာ ၆၆ ဇယား ၃.၄.၂ Implementation Time Schedule တွင် စီမံကိန်းအဆင့်အလိုက် တည်ဆောက် မည့် စက်ရုံများ၊ အဆောက်အဦများနှင့် ပတ်သက်၍ ဖော်ပြထားသော်လည်း စီမံကိန်းတစ်ခုလုံး အပြည့်အဝ လည်ပတ်ပါက ရေ မည်မျှလိုမည်၊ စီမံကိန်းအဆင့် အလိုက် မည်မျှလို အပ်မည်ကို ဖော်ပြထားခြင်း မရှိ ကြောင်း စိစစ်တွေ့ရှိရပါသည်။</p> | <p>အပြည့်အဝလည်ပတ်ပါက ရေ မည်မျှလိုမည်၊ စီမံကိန်းအဆင့်အလိုက် မည်မျှလို အပ်မည်ကို ဖော်ပြရန်၊</p> | <p>စီမံကိန်းတစ်ခုလုံး အပြည့်အဝလည်ပတ်ပါက ရေ မည်မျှ လိုမည်၊ စီမံကိန်းအဆင့်အလိုက် မည်မျှလိုအပ်မည်ကို 3.8.2.1 Estimated Water Demand During Construction စာမျက်နှာ (၁၇၅) 3.8.2.2 Water Supply for Operation Phase စာမျက်နှာ (၁၇၅) 3.8.2.4 Determining Water Demand (LPCD) စာမျက်နှာ (၁၇၆ -၁၇၇) 3.8.2.5 Determining Water Demand (LPD) စာမျက်နှာ (၁၇၇ - ၁၇၈) တို့တွင် ထည့်သွင်း ဖော်ပြ ထားပါသည်။</p> |
| <p>(c) လျှပ်စစ်လိုအပ်ချက် အခန်း ၃.၈.၃ Power Supply</p> | <p>စီမံကိန်းအတွက် လျှပ်စစ်လိုအပ်ချက်နှင့်ပတ်သက်သည့် သက်ဆိုင်ရာ</p> | <p>စီမံကိန်းအတွက် လျှပ်စစ်လိုအပ်ချက်နှင့်ပတ်သက်သည့် သက်ဆိုင်ရာ တိုင်းဒေသကြီးအစိုးရအဖွဲ့၊ ဌာနများဖြင့်</p> |

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| <p>တွင်အဆိုပြုစီမံကိန်း၏ လုပ်ငန်းလည်ပတ်မည့် ကာလအတွက် လိုအပ်သည့် လျှပ်စစ်ဓာတ်အား ၅၀ MWအား လျှပ်စစ်နှင့် စွမ်းအင် ဝန်ကြီးဌာနမှ ထောက်ပံ့ပေးသွားမည်ဖြစ်ကြောင်း ဖော်ပြထားသည့်အတွက် သက်ဆိုင်ရာ တိုင်းဒေသကြီးအစိုးရအဖွဲ့၊ ဌာနများဖြင့် ညှိနှိုင်းဆောင်ရွက် ထားမှု/ခွင့်ပြုချက်များ စသည်တို့ကို ဖော်ပြထားခြင်း မရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။</p> | <p>တိုင်းဒေသကြီးအစိုးရအဖွဲ့၊ ဌာနများဖြင့် ညှိနှိုင်းဆောင်ရွက်ထားမှု/ခွင့်ပြုချက်များကို ပြည့်စုံစွာ ဖော်ပြရန်။</p> | <p>ညှိနှိုင်းဆောင်ရွက်ထားမှု/ခွင့်ပြုချက်များကို 3.8.3.1 Official Letters between Department of Urban and Housing Development and Department of Power Transmission and Control for Power Supply စာမျက်နှာ (၁၈၄ - ၁၈၈) တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။</p> |
| <p>(စ) - စာမျက်နှာ ၇၆ အပိုဒ်ခွဲ ၃.၇.၅ Wastewater and Sewage Collection and Disposal တွင် စွန့်ပစ် ရေသန့်စင်နိုင်သည့် ပမာဏမှာ တစ်ရက်လျှင် ၈၀၀၀ ကုဗမီတာခန့်ဖြစ်ကြောင်းနှင့် စွန့်ပစ် ရေဆိုးသန့်စင် စက်ရုံ တည်ဆောက်မည့်နေရာအား Project Layout Plan တွင် ဖော်ပြထားသော်လည်း Wastewater Treatment Plant ၏ Wastewater Collection System and Design သန့်စင် ဆောင်ရွက်ပုံအဆင့်ဆင့် (Process Flow Diagram) နှင့်အတူ Wastewater Treatment Plant မှ သန့်စင်မည့် စက်ရုံစွန့်ပစ်ရေ (Industrial Wastewater) နှင့် ပတ်သက်သည့် အချက်အလက်များကို အသေးစိတ်ဖော်ပြရန်၊</p> <p>- ထို့အပြင် စွန့်ပစ်ရေဆိုးသန့်စင်စက်ရုံသည် စက်မှုဇုန်လည်ပတ်ခြင်းကာလတွင် စက်ရုံမှ ထွက်ရှိ လာ မည့် စွန့်ပစ်ရေများကို သန့်စင်နိုင်သည့် Capacity မှာ လုံ လောက်ခြင်းရှိ/မရှိ ဖော်ပြရန်နှင့် အကယ်၍ လုံလောက် မှုမရှိပါက တိုးချဲ့ဆောင်ရွက်မည့် အစီအစဉ်များကို ထည့်</p> | <p>- Wastewater Treatment Plant ၏ Waste water Collection System and Design သန့်စင်ဆောင် ရွက်ပုံအဆင့်ဆင့် (Process Flow Diagram) နှင့်အတူ Wastewater Treatment Plant မှ သန့်စင်မည့် စက်ရုံ စွန့်ပစ်ရေ (Industrial Wastewater) နှင့် ပတ်သက်သည့် အချက်အလက်များကို အသေးစိတ်ဖော်ပြရန်၊</p> <p>- ထို့အပြင် စွန့်ပစ်ရေဆိုးသန့်စင်စက်ရုံသည် စက်မှုဇုန်လည်ပတ်ခြင်းကာလတွင် စက်ရုံမှ ထွက်ရှိ လာ မည့် စွန့်ပစ်ရေများကို သန့်စင်နိုင်သည့် Capacity မှာ လုံ လောက်ခြင်းရှိ/မရှိ ဖော်ပြရန်နှင့် အကယ်၍ လုံလောက် မှုမရှိပါက တိုးချဲ့ဆောင်ရွက်မည့် အစီအစဉ်များကို ထည့်</p> | <p>Wastewater Treatment Plant ၏ Wastewater Collection System and Design သန့်စင်ဆောင် ရွက်ပုံအဆင့်ဆင့် (Process Flow Diagram) နှင့်အတူ Wastewater Treatment Plant မှ သန့်စင်မည့် စက်ရုံ စွန့်ပစ် ရေ (Industrial Wastewater) နှင့် ပတ်သက် သည့် အချက်အလက်များ၊ စွန့်ပစ် ရေဆိုးသန့်စင် စက်ရုံသည် စက်မှုဇုန် လည်ပတ်ခြင်း ကာလတွင် စက်ရုံမှထွက်ရှိလာမည့် စွန့်ပစ်ရေများကို သန့်စင်နိုင်သည့် Capacity မှာ လုံလောက်ခြင်းရှိကြောင်း နှင့် နောက်ဆုံး စွန့်ပစ် မည့် Drainage Discharged Water ၏ အရည်အသွေး (ရည်မှန်းစံချိန်စံညွှန်း) များကို Figure 3.25: Wastewater treatment plant flow diagram</p> |

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| <p>အလက်များကို အသေးစိတ်ဖော်ပြရန်လိုအပ်ပါသည်။</p> <ul style="list-style-type: none"> - ထို့အပြင် စွန့်ပစ်ရေဆိုးသန့်စင်စက်ရုံသည် စက်မှုဇုန် လည်ပတ်ခြင်းကာလတွင် စက်ရုံမှ ထွက်ရှိ လာမည့် စွန့်ပစ်ရေများကို သန့်စင်နိုင်သည့် Capacity မှာ လုံလောက်ခြင်းရှိ/မရှိ ဖော်ပြရန်နှင့် အကယ်၍ လုံ လောက်မှုမရှိပါက တိုးချဲ့ဆောင်ရွက်မည့် အစီအစဉ် များကို ထည့်သွင်းဖော်ပြပေးရန် လိုအပ်ပါသည်။ | <p>သွင်းဖော်ပြပေးရန်၊ နောက်ဆုံးစွန့်ပစ်မည့် Drainage Discharged Water ၏ အရည်အသွေး (ရည်မှန်းစံချိန်စံညွှန်း) များကို ဖော်ပြရန်၊</p> | <p>Figure 3.26: Wastewater System Plan Figure 3.27: Drainage Layout Plan စာမျက်နှာ (၁၆၃ - ၁၆၄)၊ Appendices 37, 38 စာမျက်နှာ (၆၃၁ - ၆၃၂) 3.7.5.2.1 Wastewater Collection Design စာမျက်နှာ (၁၆၄ - ၁၆၅) 3.7.5.2.2 Wastewater Collection Plan စာမျက်နှာ (၁၆၆ - ၁၆၈) တို့တွင် ဖော်ပြထားပါသည်။</p> |
| <p>(ဆ) စွန့်ထုတ်မှုများ (Effluents) စီမံကိန်းကြီးတစ်ခုလုံးအတွက် Wastewater Treatment Plant ကို တည်ဆောက်နိုင်ရန် ခန့်မှန်း တွက်ချက်ရာတွင် စက်မှုဇုန်တွင် လက်ခံရင်းနှီးမြှုပ်နှံ မည့် စီမံကိန်းလုပ်ငန်းအမျိုးအစားနှင့် ပမာဏ/အရွယ် အစားပေါ်မူတည်၍ တွက်ချက်ရမည်ဖြစ်သဖြင့် စက်မှု ဇုန် တစ်ခုလုံးအတွက် လက်ခံရင်းနှီးမြှုပ်နှံနိုင်သည့်/ လက်ခံရင်းနှီးမြှုပ်နှံရန် ရည်ရွယ်ထားသည့် လုပ်ငန်း ပမာဏကို ခန့်မှန်း၍ စွန့်ထုတ်မှုများ (Effluents) ကို ခန့်မှန်းတွက်ချက်တင်ပြရန် လိုအပ်ပါသည်။</p> | <p>စက်မှုဇုန်တစ်ခုလုံးအတွက် လက်ခံရင်းနှီးမြှုပ်နှံနိုင်သည့်/ လက်ခံရင်းနှီးမြှုပ်နှံရန် ရည်မှန်းထားသည့် လုပ်ငန်း ပမာဏကို ခန့်မှန်း၍ စွန့်ထုတ်မှုများ (Effluents) ကိုခန့်မှန်း တွက်ချက်တင်ပြရန်၊</p> | <p>စက်မှုဇုန်တစ်ခုလုံးအတွက် လက်ခံရင်းနှီးမြှုပ်နှံနိုင်သည့်/ လက်ခံ ရင်းနှီးမြှုပ်နှံရန် ရည်ရွယ်ထားသည့် လုပ်ငန်း ပမာဏကို ခန့်မှန်း၍ စွန့်ထုတ်မှုများ (Effluents) ကို ခန့်မှန်းတွက်ချက် ထားခြင်းကို 3.7.5.2.2 Wastewater Collection Plan Domestic Wastewater Flows (m³/day) ဇယား Industrial Wastewater Flows (m³/day) ဇယား စာမျက်နှာ (၁၆၇ - ၁၆၈) တွင် ဖော်ပြထားပါသည်။</p> |

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| (ဇ) | <p>ထုတ်လွှတ်မှုများ (Emissions) စီမံကိန်းမှထွက်ရှိမည့် ဓါတ်ငွေ့နှင့်အမှုန် ထုတ်လွှတ်မှု (ဥပမာ။ ထုတ်လုပ်ရေးလုပ်ငန်းစဉ် (Process)၊ လွင့်ထွက် မှု (Fugitive)၊ ရုပ်ကြွင်းလောင်စာ လောင်ကျွမ်းမှု (Burning Fossil Fuel)၊ ယာဉ်သွားလာခြင်း (Traffic) တို့မှ ထုတ်လွှတ်မှုများ၊ ကုန်ကြမ်းပစ္စည်းများ သယ်ပို့ ကိုင်တွယ်ရာမှ ထွက်ရှိမည့် ဖုန်မှုန့်များနှင့် အနံ့များ) အမျိုးအစားများနှင့် ထွက်ရှိမည့် ပမာဏအား သတ်မှတ်၊ ဖော်ထုတ်တင်ပြထားခြင်း မရှိပါ။</p> | <p>စီမံကိန်းမှထွက်ရှိမည့် ဓါတ်ငွေ့နှင့် အမှုန်ထုတ်လွှတ်မှု (ဥပမာ။ ထုတ်လုပ်ရေးလုပ်ငန်းစဉ် (Process)၊ လွင့်ထွက်မှု (Fugitive)၊ ရုပ်ကြွင်းလောင်စာ လောင်ကျွမ်းမှု (Burning Fossil Fuel)၊ ယာဉ်သွားလာခြင်း (Traffic) တို့မှ ထုတ် လွှတ်မှု များ၊ ကုန်ကြမ်းပစ္စည်းများ သယ်ပို့ကိုင်တွယ်ရာမှ ထွက်ရှိမည့် ဖုန်မှုန့်များနှင့် အနံ့များ) အမျိုးအစားများနှင့် ထွက်ရှိမည့် ပမာဏအား သတ်မှတ်၊ ဖော်ထုတ် တင်ပြရန်၊ (CMP စနစ်ဖြင့် အထည်ချုပ် လုပ်ငန်းများသာ လက်ခံမည် ဆိုပါကလည်း Emissions မရှိပါက မရှိကြောင်း ဖော်ပြရန် လိုအပ်ပါသည်)</p> | <p>စက်မှုဇုန်တစ်ခုလုံးတွင် လာရောက် ရင်းနှီးမြှုပ်နှံမည့် လုပ်ငန်း များ၏ မည်သည့် အချက်အလက်များကိုမျှ ယခုအချိန်တွင် မသိရှိနိုင်သေးပါ။ လက်ခံရင်းနှီးမြှုပ်နှံရန် ရည်ရွယ်ထားသည့် လုပ်ငန်း အမျိုးအစား ယေဘုယျ အကြမ်းဖျဉ်း ဖော်ပြချက်သာ ရှိပါသည်။ (ဥပမာ - အစားအစာနှင့် အဖျော်ယမကာလုပ်ငန်း၊ လျှပ်စစ် ပစ္စည်းနှင့် ကွန်ပျူတာ တပ်ဆင်ခြင်းလုပ်ငန်း) သို့ဖြစ်ပါ၍ စီမံကိန်းမှထွက်ရှိမည့် ဓါတ်ငွေ့နှင့် အမှုန် ထုတ် လွှတ်မှု အမျိုးအစားများနှင့် ထွက်ရှိမည့် ပမာဏအား သတ်မှတ် ဖော်ထုတ် တင်ပြရန် မဖြစ်နိုင်သေးပါ။ ယခုစီမံကိန်းသည် စက်မှုဇုန် စတင်တည်ထောင်ရန် လို အပ်သည့် အခြေခံအဆောက်အအုံ (Infrastructure) ကိုသာ တည်ဆောက်သည့် လုပ်ငန်းဖြစ်ပါသည်။</p> |
| (ဈ) | <p>- စီမံကိန်းအကောင်အထည်ဖော်မည့် အချိန် ကာလအား ဖော်ပြထားခြင်းမရှိသည်ကို စိစစ်တွေ့ ရှိရ ပါသည်။ - တည်ဆောက်ရေးကာလအတွက် လုပ်သား အရေအတွက်နှင့် မည်သို့စီစဉ်ဆောင်ရွက်ထားသည် ကိုလည်းကောင်း၊ စီမံကိန်းတွင် အသုံးပြုမည့် ကုန်ကြမ်း ပစ္စည်းများနှင့် ပတ်သက်၍လည်းကောင်း</p> | <p>- တည်ဆောက်ရေးကာလအတွက် လုပ်သား အရေအတွက်နှင့် မည်သို့စီစဉ်ဆောင်ရွက်ထားသည်ကို လည်းကောင်း၊ စီမံကိန်းတွင် အသုံးပြုမည့် ကုန်ကြမ်း ပစ္စည်းများ နှင့် ပတ်သက်၍လည်းကောင်း ဖော်ပြရန်၊ - စီမံကိန်းအတွက် မြေယာပိုင်ဆိုင်မှုဆိုင်ရာ အချက်အလက်များဖြစ်သည့် မြေရာဇဝင်၊ ပိုင်ဆိုင်မှု</p> | <p>တည်ဆောက်ရေးကာလအတွက် လုပ်သား အရေအတွက်နှင့် မည်သို့စီစဉ်ဆောင်ရွက်ထားသည်ကို 3.9 Estimated Number of Workers for Construction Phase စာမျက်နှာ (၁၈၉) 3.10 Plan for coordination between contractors for the safety of workers on worksite စာမျက်နှာ (၁၈၉)</p> |

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| | <p>ဖော်ပြထားခြင်းမရှိသည်ကို စိစစ်တွေ့ရှိရပါသည်။</p> <p>- စီမံကိန်းအတွက် မြေယာပိုင်ဆိုင်မှုနှင့် ပတ်သက်သည့် အချက်အလက်များကို ဖော်ပြထားခြင်းမရှိသည်ကို စိစစ်တွေ့ရှိရပါသည်။</p> | <p>အထောက်အထား၊ လက်ရှိမြေအသုံးချမှုပုံစံ တို့ကို ဖော်ပြရန်၊</p> | <p>3. 11 Welfare Plan for Workers စာမျက်နှာ (၁၉၀ - ၁၉၄)</p> <p>3.12 Employment of staff and workers စာမျက်နှာ (၁၉၄)</p> <p>3.13 Management and staff စာမျက်နှာ (၁၉၄ - ၁၉၅) တို့တွင် ဖော်ပြထားပါသည်။</p> <p>စီမံကိန်းတွင်အသုံးပြုမည့် ကုန်ကြမ်းပစ္စည်းများနှင့် ပတ်သက်၍ 3.14 Raw materials, equipment and machineries for construction စာမျက်နှာ (၁၉၅ - ၂၀၁) တွင် ဖော်ပြထားပါသည်။</p> <p>စီမံကိန်းအတွက် မြေယာပိုင်ဆိုင်မှုဆိုင်ရာ အချက်အလက်များ ဖြစ်သည့် မြေရာဇဝင်၊ ပိုင်ဆိုင်မှု အထောက်အထား၊ လက်ရှိ မြေအသုံးချမှုပုံစံ တို့ကို 3.3.1 Land Holding Certificate စာမျက်နှာ (၁၄၆ - ၁၄၇) တွင် ဖော်ပြထားပါသည်။</p> |
| (ည) | <p>အလုပ်သမားရေးရာအစီအမံများနှင့် ပတ်သက်၍ အစီရင်ခံစာတွင်ဖော်ပြထားခြင်း မရှိသည်ကို တွေ့ရှိရပါသည်။</p> | <p>အလုပ်သမားများ၏ ဘေးအန္တရာယ်ကင်းရှင်းရေးအတွက် contractor အချင်းချင်း ဘေးအန္တရာယ်ကင်းရှင်းစွာ ချိတ်ဆက်ဆောင်ရွက်မည့် အစီအမံများ၊ အလုပ်သမားများ အတွက် သက်သာချောင်ချိရေးအစီအမံများ၊ အလုပ်သမား</p> | <p>အလုပ်သမားများ၏ ဘေးအန္တရာယ်ကင်းရှင်းရေးအတွက် contractor အချင်းချင်း ဘေးအန္တရာယ်ကင်းရှင်းစွာ ချိတ်ဆက် ဆောင်ရွက်မည့် အစီအမံများ၊ အလုပ်သမား များအတွက် သက်သာချောင်ချိရေး အစီအမံများ၊ အလုပ်သမား ငှားရမ်းမှု အစီအစဉ်များကို</p> <p>3.10 Plan for coordination between contractors</p> |

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| | | <p>ငှားရမ်းမှုအစီအစဉ်များ အလုပ်သမားများ၏ ဘေးအန္တရာယ်ကင်းရှင်းရေး၊ ကျန်းမာရေးနှင့် အလုပ်သမားရေးရာ ရပိုင်ခွင့်များအတွက် တာဝန်ယူဆောင်ရွက်ပေးမည့် ပုဂ္ဂိုလ်၏အမည်ကို ထည့်သွင်း ဖော်ပြရန်။</p> | <p>for the safety of workers on worksite စာမျက်နှာ (၁၈၉)</p> <p>3. 11 Welfare Plan for Workers စာမျက်နှာ (၁၉၀ - ၁၉၄)</p> <p>3.12 Employment of staff and workers စာမျက်နှာ (၁၉၄)</p> <p>3.13 Management and staff စာမျက်နှာ (၁၉၄ - ၁၉၅) တို့တွင် ဖော်ပြထားပါသည်။</p> <p>အလုပ်သမားများ၏ ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ ကျန်းမာရေး နှင့် အလုပ်သမားရေးရာ ရပိုင်ခွင့်များအတွက် တာဝန်ယူ ဆောင်ရွက်ပေးမည့် ပုဂ္ဂိုလ်၏အမည်ကို 3.13.1 Responsible Person of KMIC Development Co., Ltd. for Social Issues စာမျက်နှာ (၁၉၅) တွင် ဖော်ပြထားပါသည်။</p> |
| <p>၄။</p> | <p>အခြားဆောင်ရွက်နိုင်မှုများ</p> | | |
| <p>(က)</p> | <p>အဆိုပြုစီမံကိန်းအတွက် ကြောင်းကျိုးညီညွတ်သည့် အခြားဆောင်ရွက်နိုင်သည့် နည်းလမ်းများအား နှိုင်းယှဉ်ခြင်းနှင့် ရွေးချယ်ခြင်းအတွက် အသုံးပြုမည့် နည်းစနစ်များ (Methods) နှင့် အစားထိုးနည်းလမ်းများကို အောက်ပါ အချက်အလက်များအပေါ် အခြေခံ၍</p> | <p>အဆိုပြုစီမံကိန်းအတွက် ကြောင်းကျိုးညီညွတ်သည့် အခြားဆောင်ရွက်နိုင်သည့် နည်းလမ်းများအား နှိုင်းယှဉ် ခြင်းနှင့် ရွေးချယ်ခြင်းအတွက် အသုံးပြုမည့်နည်း စနစ်များ (Methods) နှင့် အစားထိုးနည်းလမ်းများကို အောက်ပါ အချက်အလက်များအပေါ် အခြေခံ၍</p> | <p>ယခုစီမံကိန်းသည် စက်မှုဇုန် စတင်တည်ထောင်ရန် လိုအပ် သည့် အခြေခံအဆောက်အအုံ (Infrastructure) ကိုသာ တည်ဆောက်သည့် လုပ်ငန်းဖြစ်ပါသည်။ စက်မှုဇုန်တစ်ခုလုံးတွင် လာရောက် ရင်းနှီးမြှုပ်နှံမည့် လုပ်ငန်း များ၏ မည်သည့် အချက်အလက်များကိုမျှ ယခုအချိန်တွင် မသိရှိနိုင်သေးပါ။ လက်ခံရင်းနှီးမြှုပ်နှံရန်</p> |

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| <p>အောက်ပါအချက်အလက်များအပေါ် အခြေခံ၍ အခြားဆောင်ရွက်နိုင်မှုများကို ဖော်ပြရန်လိုအပ်ပါသည်</p> <ul style="list-style-type: none"> - တည်နေရာဆိုင်ရာ အစားထိုးနည်းလမ်းများ - အကောင်အထည်ဖော်မည့် စီမံကိန်း အရွယ်အစား အမျိုးမျိုး - စီမံကိန်း၏ဒီဇိုင်းနှင့် အသေးစိတ်ပုံစံအမျိုးမျိုး - စီမံကိန်းတွင် အသုံးပြုမည့် အစားထိုးနည်းပညာ များ၊ နည်းစနစ်များ - စီမံကိန်းအဆင့်အလိုက်အသုံးပြုမည့် အစားထိုး နည်းလမ်းများ (ကြိုတင်တည်ဆောက်ရေးအဆင့်၊ တည်ဆောက်ရေးအဆင့်၊ လုပ်ငန်းလည်ပတ်သည့် အဆင့်၊ ရပ်ဆိုင်း၊ ပိတ်သိမ်းပြီးနောက်အဆင့်) - စီမံကိန်းအတွက် အဆိုပြုထားသည့် အခြား ဆောင်ရွက်နိုင်သော နည်းလမ်းများနှင့် ဖြစ်နိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်နိုင်မှုများအား နည်းလမ်း တခု ချင်းအပေါ် အခြေခံ၍ နှိုင်းယှဉ်ဖော်ပြခြင်း၊ - ရွေးချယ်ထားသည့် | <p>အခြားဆောင်ရွက် နိုင်မှုများကို ဖော်ပြရန်-</p> <ul style="list-style-type: none"> - တည်နေရာဆိုင်ရာ အစားထိုးနည်းလမ်းများ - အကောင်အထည်ဖော်မည့် စီမံကိန်း အရွယ်အစား အမျိုးမျိုး - စီမံကိန်း၏ ဒီဇိုင်းနှင့် အသေးစိတ်ပုံစံ အမျိုးမျိုး - စီမံကိန်းတွင် အသုံးပြုမည့် အစားထိုးနည်းပညာများ၊ နည်းစနစ်များ - စီမံကိန်းအဆင့်အလိုက်အသုံးပြုမည့် အစားထိုး နည်းလမ်းများ (ကြိုတင်တည်ဆောက်ရေးအဆင့်၊ တည်ဆောက်ရေးအဆင့်၊ လုပ်ငန်းလည်ပတ်သည့် အဆင့်၊ ရပ်ဆိုင်း၊ ပိတ်သိမ်းပြီးနောက်အဆင့်) - စီမံကိန်းအတွက် အဆိုပြုထားသည့် အခြား ဆောင် ရွက်နိုင်သော နည်းလမ်းများနှင့် ဖြစ်နိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်နိုင်မှုများအား နည်းလမ်း တခုချင်းအပေါ် အခြေခံ၍ နှိုင်းယှဉ်ဖော်ပြခြင်း၊ ရွေးချယ်ထားသည့် အစားထိုးနည်းလမ်းအတွက် အကြောင်းအကျိုးဆီလျော်သည့် ခိုင်လုံသော အကြောင်းပြချက်များ ဖော်ပြခြင်း | <p>ရည်ရွယ်ထားသည့် လုပ်ငန်း အမျိုးအစား ယေဘုယျ အကြမ်းဖျဉ်း ဖော်ပြချက်သာ ရှိပါသည်။ (ဥပမာ - အစားအစာနှင့် အဖျော်ယမကာလုပ်ငန်း၊ လျှပ်စစ် ပစ္စည်းနှင့် ကွန်ပျူတာ တပ်ဆင်ခြင်းလုပ်ငန်း) အဆိုပြုစီမံကိန်းအတွက် အစားထိုးနည်းလမ်းများကို လက်ရှိ ရှိနေသော အချက်အလက်များပေါ် အခြေခံ၍ 3.15 Alternatives စာမျက်နှာ (၂၀၁ - ၂၀၂) တွင် ဖော်ပြထား ပါသည်။</p> |
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| | <p>အစားထိုးနည်းလမ်းအတွက် အကြောင်းအကျိုးဆီလျော်သည့် ခိုင်လုံသော အကြောင်းပြချက်များ၊</p> | | |
| <p>၅။</p> | <p>အနီးပတ်ဝန်းကျင်ဆိုင်ရာအချက်များ</p> | | |
| <p>(က)</p> | <p>အခန်း(၄)တွင် စီမံကိန်းဆိုင်ရာ လက်ရှိပတ်ဝန်းကျင် အချက်အလက်များ ဖော်ပြထားသော်လည်း စာမျက်နှာ ၁၆၅ တွင် လူထုတွေ့ဆုံဆွေးနွေးပွဲ တက်ရောက်သူ တစ်ဦးမှ စီမံကိန်းအနီးပတ်ဝန်းကျင်တွင် စတီးစက်ရုံ တစ်ခုရှိကြောင်း ပြောကြားထားသည့်အတွက် စီမံကိန်း ဆိုင်ရာ လေ့လာသည့် နယ်ပယ်ဧရိယာ (Study Area) ၅ ကီလိုမီတာ အချင်းဝက်အတွင်း တည်ရှိနေသည့် Existing Projects/ Project Effected Persons/ Households/ Land/ Other infrastructure စသည် တို့ကို ဖော်ပြထားသည့်ပတ်ဝန်းကျင် အခြေအနေပြ မြေပုံနှင့် အချက်အလက်များကို ဖော်ပြရန် လိုအပ် ပါသည်။</p> | <p>စီမံကိန်းဆိုင်ရာ လေ့လာသည့် နယ်ပယ်ဧရိယာ (Study Area) ၅ ကီလိုမီတာ အချင်းဝက်အတွင်း တည်ရှိနေသည့် Existing Projects/ Project Effected Persons / Households/ Land/ Other infrastructure/ စက်မှုဇုန် နေရာ၊ အနီးဆုံးကျေးရွာများ၊ အင်း/အိုင်/ချောင်း/မြောင်း စသည် တို့ကို ဖော်ပြ ထားသည့်ပတ်ဝန်းကျင် အခြေအနေပြ မြေပုံနှင့် အချက်အလက်များကို ဖော်ပြရန်၊</p> | <p>စီမံကိန်းဆိုင်ရာ လေ့လာသည့် နယ်ပယ်ဧရိယာ (Study Area) ၅ ကီလိုမီတာ အချင်းဝက်အတွင်း တည်ရှိနေသည့် Existing Projects/ Project Effected Persons / Households/ Land/ Other infrastructure/ စက်မှုဇုန် နေရာ၊ အနီးဆုံး ကျေးရွာ များ၊ အင်း/အိုင်/ချောင်း/မြောင်း စသည် တို့ကို ဖော်ပြ ထားသည့် ပတ်ဝန်းကျင် အခြေအနေပြ မြေပုံ ကို Figure 4.2: Map of surrounding areas of project site (within 5 km radius) စာမျက်နှာ (၂၀၄) တွင်လည်းကောင်း အချက်အလက် များကို 4.11.3 Social Environmental Baseline Data Collection စာမျက်နှာ (၂၇၇ - ၃၃၅) တွင်လည်းကောင်း ဖော်ပြ ထားပါသည်။ စီမံကိန်းအနီးပတ်ဝန်းကျင်တွင် စတီးစက်ရုံရှိသည်ဟု အင်တာ ဗျူးတွင် ဖြေထားခြင်းမှာ ဒေသအခေါ် (အပြော) အတိုင်း ထည့်သွင်း ဖော်ပြထားခြင်းဖြစ်ပြီး အမှန်မှာ လယ်ယာသုံး အထောက်အကူပစ္စည်း လက်တွန်းထွန်းစက် အဟောင်းများ ပြန်လည် ပြုပြင်တပ်ဆင်သည့်</p> |

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| | | | <p>အလုပ်ရုံသတ်မှတ်ပါသည်။ 4.11.3.4 Interviews with Villagers – Interviewee (Daw Ma Waing) ပြောဆိုချက် စာမျက်နှာ (၂၈၁) တွင် ပြန်လည် ပြင်ဆင်ဖော်ပြပြီးဖြစ်ပါသည်။</p> |
| (ခ) | <p>- အခန်း ၄ တွင် Geology, Tectonics, Hydrogeology, Climate စသည့် ကိစ္စရပ်များ (Issues) သည် ရန်ကုန်မြို့ကို အခြေခံနေသည့် အချက်အလက် များ ဖြစ်နေပါသည်။ သို့ဖြစ်ပါ၍ စီမံကိန်း ဧရိယာအား အခြေခံသည့် အချက်အလက်များဖြစ်သင့်ပါသည်။</p> <p>- စာမျက်နှာ ၉၆ မှ ၁၀၄ အထိ ဖော်ပြထားသည့် အချက်အလက်များသည် Rainfall, Temperature, Wind direction, Wind speed, Relative Humidity တို့သည် မည်သည့်ဒေသ၊ မည်သည့် နေရာမှ ကောက်ယူထား ကြောင်း ဖော်ပြရန်လိုအပ်ပါသည်။</p> <p>- လူမှုစီးပွားဆိုင်ရာစစ်တမ်း (Social Survey) ကောက်ယူထားသည့် ရလဒ်များအရ ကျေးရွာများ (တကူတုန်း၊ ဆီဆုံကုန်း၊</p> | <p>- အခန်း ၄ တွင် စီမံကိန်းဧရိယာကို အခြေပြုထား သည့် Geology, Tectonics, Hydrogeology, Climate ဆိုင်ရာ အခြေခံအချက်အလက်များ ဖော်ပြရန်၊</p> <p>- စာမျက်နှာ ၉၆ မှ ၁၀၄ အထိ ဖော်ပြထားသည့် အချက်အလက်များသည် Rainfall, Temperature, Wind direction, Wind speed, Relative Humidity တို့သည် မည်သည့်ဒေသ၊ မည်သည့် နေရာမှကောက်ယူ ထား ကြောင်းနှင့် အစီရင်ခံစာတွင် အထက်ဖော်ပြပါ Issues များအတွက် Primary နှင့် Secondary Data များ နှစ်ခု စလုံးအား ထည့်သွင်းဖော်ပြချက်များကို ပြန်လည် ဆန်းစစ် ဖော်ပြရန်၊</p> <p>- အနီးပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက် အလက် များအပိုင်းတွင် ရေလွှမ်းမိုးခံရခြင်းဆိုင်ရာ</p> | <p>စီမံကိန်းဧရိယာကို အခြေပြုထား သည့် Geology, Tectonics, Hydrogeology, Climate ဆိုင်ရာ အခြေခံအချက်အလက်များ ဖော်ပြထားပါသည်။ စာမျက်နှာ (၂၀၆ - ၂၁၅)</p> <p>Rainfall, Temperature, Wind direction, Wind speed, Relative Humidity အချက်အလက်များသည် စီမံကိန်းနှင့် အနီးဆုံး မှော်ဘီမိုးလေဝသစခန်းမှ ရယူထားသည် ကို 4.6 Climate စာမျက်နှာ (၂၀၈) တွင်ဖော်ပြထားပါသည်။</p> <p>Primary data ကို 4.11.1.1 Air Quality and Sound Level Measuring Location စာမျက်နှာ (၂၂၅ - ၂၂၅) နှင့် 4.11.1.1.5 Air Quality Results စာမျက်နှာ (၂၂၅ - ၂၂၉) တွင်ဖော်ပြထား ပါသည်။</p> <p>ရေလွှမ်းမိုးခံရခြင်းဆိုင်ရာ အချက်အလက်များနှင့် ထည့်သွင်း စဉ်းစားခြင်းများကို 4.11.3.3.1 Causes of</p> |

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| <p>ကြာအင်းအနောက်၊ ကြာအင်း အရှေ့နှင့် ညောင်နှစ်ပင်ကျေးရွာ) များသည် ရေလွှမ်းမိုးခြင်းဒဏ်အား ခံစားရပြီး ဇန် ၃ မှာ ရေလွှမ်းမိုးမှုခံရခြင်း မရှိကြောင်း ဖြေကြားထားသည့်အတွက် အစီရင်ခံစာ၏ အခြေခံအချက်အလက်များ ကောက်ယူခြင်း အပိုင်းတွင် ရေလွှမ်းမိုးခံရခြင်းဆိုင်ရာ အချက်အလက်များ ဖော်ပြ ထားခြင်းမရှိခြင်းကြောင့် ကောက်ယူထွက်ချက် ဖော်ပြ ရန် နှင့် ထည့်သွင်းစဉ်းစားခြင်းများ ဆောင်ရွက်ရန်လို အပ် ပါသည်။</p> <p>- လူထုတွေ့ဆုံဆွေးနွေးပွဲဆိုင်ရာ ရလဒ်များအရ ဒေသခံပြည်သူများအနေဖြင့် စီမံကိန်းကြောင့် ယာဉ် ကြော ပိတ်ဆို့မှုများနှင့် ပတ်သက်၍ စိုးရိမ်ပူပန်မှုများ ရှိသည့်အတွက် ယာဉ်လမ်းကြောင်းဆိုင်ရာ စစ်တမ်း ကောက်ယူခြင်းများ ဆောင်ရွက်ရန် လိုအပ်ပါသည်။</p> | <p>အချက်အလက်များ ကိုကောက်ယူထွက်ချက် ဖော်ပြရန် နှင့် ထည့်သွင်းစဉ်းစားခြင်းများဆောင်ရွက်ရန်၊</p> <p>လူထုတွေ့ဆုံဆွေးနွေးပွဲဆိုင်ရာ ရလဒ်များအရ ဒေသခံ ပြည်သူများအနေဖြင့် စီမံကိန်းကြောင့် ယာဉ်ကြောပိတ် ဆို့မှုများနှင့် ပတ်သက်၍ စိုးရိမ်ပူပန်မှုများရှိသည့် အတွက် ယာဉ်လမ်းကြောင်းဆိုင်ရာ လေ့လာဆန်းစစ်မှု ရလဒ်များ အရ တည်ဆောက်ရေးကာလနှင့် လုပ်ငန်းလည်ပတ်ခြင်း ကာလတို့အတွက် Medium Level ဖြစ်နေသည့်အတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် တွင် Construction အဆင့်အတွက်သာ ရေးဆွဲဖော်ပြထားသဖြင့် Operation ကာလအတွက်ပါ စီမံခန့်ခွဲမှု အစီအစဉ်ကို ထည့်သွင်း ရေးဆွဲရန်၊</p> | <p>Flood စာမျက်နှာ (၂၇၉) တွင်ဖော်ပြထားပါသည်။</p> <p>Operation ကာလအတွက် ယာဉ်ကြောပိတ်ဆို့မှုများနှင့် ပတ်သက်၍ လျော့ပါးစေရေး နည်းလမ်းများကို 5.4.2.1 Mitigation Measures for Physical Environmental Impacts, Increased Traffic Flow ခေါင်းစဉ်ဖြင့် စာမျက်နှာ (၃၈၇) တွင်ဖော်ပြထားပါသည်။</p> <p>Operation ကာလအတွက် ယာဉ်ကြောပိတ်ဆို့မှုများနှင့် ပတ်သက်၍ စီမံခန့်ခွဲမှု အစီအစဉ်ကို 8.7.7 Traffic Management Plan စာမျက်နှာ (၅၁၇ - ၅၂၂) တွင် ထည့်သွင်း ရေးဆွဲထားပါသည်။</p> |
| <p>(ဂ) ရေအရည်အသွေးတိုင်းတာခြင်း Water Treatment Plant တည်ဆောက်မည့် နေရာ အတွက် Intake Pointနှင့် Wastewater Treatment Plantမှ အဆိုပြုစွန့်ထုတ်မည့်နေရာတွင်</p> | <p>- Water Treatment Plant တည်ဆောက်မည့် နေရာ အတွက် Intake Point နှင့် Wastewater Treatment Plantမှ အဆိုပြု စွန့်ထုတ် မည့်နေရာတွင် ရေအရည် အသွေးနှင့် ပတ်သက်၍</p> | <p>Water Treatment Plant တည်ဆောက်မည့် နေရာ အတွက် Intake Point ကို ကလီထော်ဆည် မှယူမည် ဖြစ်၍ ထိုဆည်မှ ရေနမူနာကို ကောက်ယူစစ်ဆေး ဖော်ပြထားပါသည်။</p> |

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| <p>ရေအရည် အသွေး နှင့် ပတ်သက်၍ အခြေခံအချက်အလက်များ တိုင်းတာရန် လိုအပ်ကြောင်း စိစစ်တွေ့ရှိရသည်။ ထို့အတူ အဆိုပြု ရေဆိုးသန့်စင်မည့် စက်ရုံ၏တည်နေရာ၊ Capacity၊ စွန့်ထုတ်မည့် နေရာနှင့် ပတ်သက်သည့် အနီးပတ်ဝန်းကျင် အခြေအနေများ၊ အကြောင်းအရာများ ကို ထည့်သွင်းဖော်ပြရန် လိုအပ် နေပါသည်။ ကလီထော်ချောင်းအတွင်းသို့ စွန့်ပစ်သွားမည်ဖြစ်ကြောင်း ဖော်ပြထားသည့်အတွက် အဆိုပါချောင်းနှင့် ပတ်သက် သည့် အချက်အလက်များကို ထည့်သွင်းဖော်ပြပေးရန် လိုအပ်ပါသည်။</p> | <p>အခြေခံအချက်အလက်များ တိုင်းတာရန်၊</p> <ul style="list-style-type: none"> - အဆိုပြုရေဆိုးသန့်စင်မည့် စက်ရုံ၏ တည်နေရာ၊ Capacity၊ စွန့်ထုတ်မည့်နေရာနှင့် ပတ်သက်သည့် အနီးပတ်ဝန်းကျင်အခြေအနေများ၊ - အကြောင်းအရာ များကို ထည့်သွင်းဖော်ပြရန်နှင့် - ကလီထော်ချောင်းအတွင်းသို့ စက်မှုဇုန်မှသန့်စင်ပြီး စွန့်ပစ်အရည်များကို စွန့်ပစ်သွားမည်ဖြစ်ကြောင်း ဖော်ပြထားသည့်အတွက် အဆိုပါချောင်းနှင့် ပတ်သက် သည့် အချက်အလက်များကို ထည့်သွင်းဖော်ပြပေးရန်၊ | <p>Table 4. 31: Summary of Surface water (Drinking Water) quality measurement and water quality criteria (July 2019) - SW-5, Drinking water (Kalihtaw Dam) စာမျက်နှာ (၂၄၀ -၂၄၁) တွင် ဖော်ပြထား ပါသည်။</p> <p>Wastewater Treatment Plant မှ အဆိုပြုစွန့်ထုတ်မည့် နေရာ (၃ နေရာ) ၏ ရေအရည်အသွေး ကောက်ယူ စစ်ဆေးခြင်းကို</p> <p>Table 4.28: Water Sample Collection Locations (20 July 2019) စာမျက်နှာ (၂၃၄)</p> <p>SW-3 Drinking water (Kyarinn Creek)</p> <p>SW-4 Drinking water (Pazung Taung Creek)</p> <p>DW-1 Existing drain, near proposed Wastewater Treatment Plant area</p> <p>ရေအရည်အသွေးနှင့် ပတ်သက်၍ အခြေခံအချက်အလက် များ တိုင်းတာခြင်း၏ ရလဒ်ကို</p> <p>Table 4.31: Summary of Surface water (Drinking Water) quality measurement and water quality criteria (July 2019) – SW 3, SW 4 စာမျက်နှာ (၂၄၀ - ၂၄၁)</p> |
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| | | | <p>Table 4.32: Summary of Wastewater/Drain Water quality measurement and water quality criteria (July 2019) – DW 1 စာမျက်နှာ (၂၄၁ - ၂၄၂) တို့တွင် ဖော်ပြထားပါသည်။</p> <p>အဆိုပြုရေးဆိုးသန့်စင်မည့် စက်ရုံ၏ တည်နေရာ၊ Capacity နှင့် ပတ်သက်သည့် အကြောင်းအရာ များကို Figure 3.24: Wastewater Treatment Plant Location Map စာမျက်နှာ (၁၆၂) နှင့် 3.7.5.2.2 Wastewater Collection Plan စာမျက်နှာ (၁၆၆ - ၁၆၈) တွင် ဖော်ပြထားပါသည်။</p> <p>စက်မှုဇုန်မှသန့်စင်ပြီး စွန့်ပစ်အရည်များသည် ကြာအင်းချောင်း သို့ စွန့်ပစ်သွားမည် ဖြစ်ပါသည် (ကလီထော်ချောင်းမဟုတ်ပါ)။ အစီရင်ခံစာတွင် ပြန်လည် ပြင်ဆင်ပြီးဖြစ်ပါသည်။ ထိုကြာအင်းချောင်းသည် အမြန်လမ်းကျော်ပြီးနောက် ကလီထော်ချောင်း နှင့်ဆုံပြီး ပုဇွန်တောင်ချောင်းသို့ စီးဆင်း ပါသည်။</p> |
| (ဃ) | <p>"Sewage from every habitat area will be collected to wastewater treatment plant and treated water will be disposed along the</p> | <p>"Sewage from every habitat area will be collected to wastewater treatment plant and treated water will be disposed along</p> | <p>ကလီထော်ဆည်နှင့် ချောင်းတို့သည် တူညီမှုမရှိပါ။ ကလီထော်ဆည်သည် ကလီထော်ချောင်းဖျားတွင် တည်ရှိပါ သည်။ ကလီထော်ဆည်မှ ဆက်လက်</p> |

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| <p>back drainage which leads to Kalihtaw creek.” ဟု ဖော်ပြထားသည့်အတွက် ကလီထော်ဆည်နှင့် ချောင်း သည် တူညီမှု ရှိ/မရှိနှင့် စွန့်ပစ်ရေ စွန့်ပစ်မည့်နေရာ သည် ကလီထော်ချောင်း ဖြစ်သည့်အတွက် အဆိုပါ ချောင်းနှင့် ပတ်သက်သည့် အခြေခံအချက်အလက်များ နှင့် စွန့်ပစ်မည့်နေရာ (ခန့်မှန်း) နေရာတွင် တိုင်းတာ စစ်ဆေးရန် လိုအပ်ပါသည်။</p> | <p>the back drainage which leads to Kalihtaw creek.” ဟု ဖော်ပြထားသည့်အတွက် ကလီထော် ဆည်နှင့် ချောင်း သည် တူညီမှု ရှိ/မရှိနှင့် စွန့်ပစ်ရေ စွန့်ပစ်မည့် နေရာ သည် ကလီထော်ချောင်း ဖြစ်သည့် အတွက် အဆိုပါ ချောင်း နှင့် ပတ်သက်သည့် အခြေခံ အချက်အလက် များနှင့် စွန့်ပစ်မည့်နေရာ (ခန့်မှန်း) နေရာတွင် တိုင်းတာစစ်ဆေးရန်၊</p> | <p>စီးဆင်းသည့် ကလီထော် ချောင်းသည် ပုဇွန်တောင် ချောင်း/ငမိုးရိပ်ချောင်းသို့ စီးဝင်ပါ သည်။ စက်မှုဇုန်မှသန့်စင်ပြီး စွန့်ပစ်အရည်များသည် ကြားအင်း ချောင်း သို့ စွန့်ပစ်သွားမည် ဖြစ်ပါသည်။ ထိုနေရာမှ ရေနမူနာ (SW 3) ကို ကောက်ယူ စစ်ဆေးတိုင်းတာ ထားပါသည်။ ၎င်းကိုအထက်တွင် ဖော်ပြထားပြီး ဖြစ်ပါသည်။</p> |
| <p>(c) လေအရည်အသွေးတိုင်းတာခြင်း</p> <p>စာမျက်နှာ ၁၁၁ အခန်း ၄.၁၁.၁.၁ Air Quality and Sound Level တွင်၂၀၁၇ ခုနှစ် ဧပြီလ၌ လေအရည် အသွေးတိုင်းတာမှုတစ်ကြိမ်နှင့် ၂၀၁၉ ခုနှစ် ဇူလိုင်လ ၌ လေအရည်အသွေးတိုင်းတာမှုတစ်ကြိမ် စုစုပေါင်း နှစ်ကြိမ်ပြုလုပ်ခဲ့ကြောင်း၊ AQ 1 အား စီမံကိန်း ဧရိယာ အနီးရှိ လယ်ယာမြေတွင် တိုင်းတာထားခြင်း ဖြစ်ကြောင်းနှင့် AQ 2 အား ကြာကန်စု ကျေးရွာရှိ ဘုန်းကြီးကျောင်း (လေညာ) တွင် တိုင်းတာ ခဲ့ကြောင်း၊ AQ1 ၏ လေအရည်အသွေး အား</p> | <p>လေထုအရည်အသွေးနှင့်ပတ်သက်၍ အခြေခံ အချက် အလက်များအား အဆိုပါနေရာများတွင် ထပ်မံကောက် ယူရန်နှင့် အဆိုပြုစက်မှုဇုန်တည်ဆောက်မည့်နေရာကို လွှမ်းမိုးနိုင်သည့် Sample များ ပိုမိုကောက်ယူခြင်းများ ဆောင်ရွက်ရန်၊</p> | <p>လေအရည်အသွေးနှင့်ပတ်သက်၍ အခြေခံ အချက်အလက် များအား အဆိုပါနေရာများတွင် ထပ်မံကောက်ယူခြင်းကို EMP plan modified လုပ်ခြင်းနှင့် ၆လ တစ်ကြိမ် ပြုလုပ်မည့် Monitoring program တို့တွင် ပိုမိုထပ်မံ ကောက်ယူသွား ပါ မည်။</p> <p>အဆိုပြု စက်မှုဇုန် တည်ဆောက်ခြင်းလုပ်ငန်းသည် အခြေခံ အဆောက်အအုံ (Infrastructure) ကို ဖော်ဆောင်သည့် လုပ်ငန်း ဖြစ်ခြင်း၊ အနီးဆုံးရွာသည် ၂ ကီလိုမီတာခန့်ဝေးခြင်း၊ စီမံကိန်း ပတ်ဝန်းကျင်သည် စိုက်ပျိုးရေးဇုန်များ ဖြစ်ခြင်း တို့ကြောင့် လက်ရှိကောက်ယူထားသော Sample များသည်</p> |

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| <p> နွေရာသီတွင်တိုင်းတာခဲ့ပြီး AQ2 အား မိုးရာသီတွင် တိုင်းတာခဲ့ကြောင်း၊ ပထမအကြိမ် တိုင်းတာမှုတွင် PM_{2.5} ၊ PM₁₀ နှင့် ဆာလဖာဒိုင် အောက်ဆိုဒ်ဓာတ် ငွေ့ မှ လည်းကောင်း၊ ဒုတိယ အကြိမ်တိုင်းတာမှုတွင် ဆာလဖာဒိုင်အောက်ဆိုဒ်၏ ပါဝင်မှုနှုန်းမှာ အမျိုး သား ပတ်ဝန်းကျင် အရည်အသွေး ထုတ်လွှတ်မှု လမ်းညွှန်ချက်များပါ ရည်ညွှန်းတန်ဖိုး များထက် ကျော်လွန်နေပြီး နိုက်ထရိုဂျင်အောက်ဆိုဒ်၊ ကာဗွန် မိုနောက်ဆိုဒ်၊ အိုဇုန်းနှင့် VOCs တို့သည် ရည်ညွှန်း တန်ဖိုးများ အောက် လျော့နည်းနေကြောင်း၊ PM₁₀ နှင့် PM_{2.5} တန်ဖိုးများသည် နှိုင်းယှဉ်စံနှုန်း (ရည်ညွှန်း စံနှုန်း) ထက် နွေရာသီတွင်ကျော်လွန်နေပြီး မိုးရာသီ တွင် လျော့နည်းလျက်ရှိကြောင်း၊ သို့ရာတွင် အဆိုပါ နှိုင်းယှဉ်ချက်သည် Reasonable မဖြစ်ကြောင်း၊ လေအရည်အသွေးတိုင်းတာသည့် နေရာနှစ်ခုသည် တိုင်းတာသည့် အချိန်ကာလ၊ နေရာတူညီခြင်း မရှိ ခြင်းကြောင့် အဆိုပါ </p> | | <p> အထက်ဖော်ပြပါ လုပ်ငန်းများမစတင်မီ တည်ရှိသော လေထု အရည်အသွေးကို မှတ်တမ်းတင်ရန် အခြေခံအချက်အလက် ကောက်ယူခြင်း အတွက် လုံလောက်မှုရှိပါသည်။ </p> |
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| | <p>Parameter များ၏ တန်ဖိုး ကျော်လွန်ခြင်းအကြောင်း အရင်းအား ထည့်သွင်း စဉ်းစားရန်ခက်ခဲကြောင်း၊ သို့ဖြစ်ပါ၍ လေထုအရည် အသွေးနှင့်ပတ်သက်၍ အခြေခံ အချက်အလက်များ ထပ်မံကောက်ယူရန်နှင့် အဆိုပြုစက်မှုဇုန် တည် ဆောက်မည့်နေရာကို လွှမ်းမိုးနိုင်သည့် Sample များ ပိုမိုကောက်ယူ ခြင်းများ ဆောင်ရွက်ရန် လိုအပ်နေ သည် ကို စိစစ်တွေ့ရှိရပါသည်။</p> | | |
| <p>(စ)</p> | <p>ဇီဝပတ်ဝန်းကျင်လေ့လာမှုနယ်ပယ်အဖြစ် ၃ ကီလိုမီတာ မီတာအချင်းဝက်အတွင်းရှိ နေရာဒေသများကို အဓိကထား၍လေ့လာသတ်မှတ်သွားမည်ဖြစ် ကြောင်း စိစစ်တွေ့ရှိရပါသည်။ သို့ရာတွင် လူမှု ပတ်ဝန်းကျင်လေ့လာမှုနယ်ပယ်အနေအဖြစ် ၅ ကီလိုမီတာအချင်းဝက်အားလေ့လာသွားမည်ဖြစ် သော်လည်း ဇီဝပတ်ဝန်းကျင်လေ့လာမှုနယ်ပယ် အဖြစ် ၃ ကီလိုမီတာအချင်းဝက်အတွင်းလေ့လာ သွားမည်ဖြစ်ကြောင်းဖော်ပြထားသည့်အတွက်</p> | <p>ဇီဝပတ်ဝန်းကျင်လေ့လာမှုနယ်ပယ်အဖြစ် ၃ ကီလိုမီတာ အချင်းဝက်အတွင်းရှိ နေရာဒေသများကို အဓိကထား၍ လေ့လာသတ်မှတ်သွားမည်ဖြစ်ကြောင်း စိစစ်တွေ့ရှိ ရပါသည်။ သို့ရာတွင် လူမှုပတ်ဝန်းကျင် လေ့လာမှု နယ်ပယ်အနေအဖြစ် ၅ ကီလိုမီတာအချင်းဝက် လေ့လာ သွားမည်ဖြစ်သော်လည်း ဇီဝပတ်ဝန်းကျင် လေ့လာမှု နယ်ပယ်အဖြစ် ၃ ကီလိုမီတာ အချင်းဝက် အတွင်းလေ့လာ သွားမည်ဖြစ်ကြောင်းဖော်ပြထားသည့်အတွက် မည်သည့် အကြောင်းများကြောင့် လေ့လာသတ်မှတ်</p> | <p>နယ်ပယ်တိုင်းတာသတ်မှတ်ရာတွင် ဇီဝပတ်ဝန်းကျင် လေ့လာမှု နယ်ပယ်အဖြစ် ၃ ကီလိုမီတာ အချင်းဝက် အတွင်း လေ့လာ သတ်မှတ်ခြင်းသည် စီမံကိန်း အမှန်တကယ်ဖော်ဆောင်မည့် သတ်မှတ်ဧရိယာသည် ၅၅၅.၈၁ ဧက သာရှိပြီး ကီလိုမီတာ အနေဖြင့် အချင်းဝက် ၁ ကီလိုမီတာ သာသာ ရှိပါသည်။ အဓိက ဇီဝပတ်ဝန်း ကျင် ထိခိုက် နစ်နာမှုသည် စီမံကိန်း တည်ဆောက် ရေးကာလ (၃နှစ်) အတွင်းသာဖြစ်ပြီး စီမံကိန်းမှ ထွက်လာနိုင် သည့် (ခန့်မှန်း) ထုတ်လွှတ်မှုများ (Potential Impacts) များကို ထိန်းသိမ်းနိုင်ရန်၊ ဇီဝပတ်ဝန်းကျင် ဆိုင်ရာ လေ့လာဆန်းစစ်ခြင်း ကို စီမံကိန်း၏ပြင်ပ</p> |

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| | <p>မည်သည့် အကြောင်းများကြောင့် လေ့လာသတ်မှတ် သည့် ဧရိယာ ကွာခြားကြောင်းနှင့် အကယ်၍ လုံလောက် သည့်အကြောင်းပြချက်မရှိပါက လေ့လာမှု ဧရိယာအား ထပ်တိုးလေ့လာ ဆန်းစစ် ခြင်းများ ပြုလုပ်ရန်လိုအပ်ပါသည်။</p> | <p>သည့်ဧရိယာ ကွာခြားကြောင်းနှင့် အကယ်၍ လုံလောက်သည့် အကြောင်းပြချက် မရှိပါက လေ့လာမှုဧရိယာအား ထပ်တိုးလေ့လာဆန်းစစ်ခြင်းများ ပြုလုပ်ဆောင်ရွက်ရန်၊</p> | <p>အချင်းဝက် ၂ ကီလိုမီတာ အထိ ထပ် ဆောင်း လေ့လာ ဆန်းစစ်ထားပါသည်။ လူမှုပတ်ဝန်းကျင်လေ့လာမှုနယ်ပယ် အချင်းဝက် ၅ ကီလိုမီတာ သတ်မှတ်လေ့လာခြင်းသည် စီမံကိန်း (ဆောက်လုပ်ရေးကာလ၊ လုပ်ငန်းလည်ပတ်သည့်ကာလ) ကြောင့် စီမံကိန်းမှ ၅ ကီလို မီတာ အချင်းဝက် အကွာအဝေးအတွင်းရှိ ကျေးရွာ ၆ ရွာရှိ ဒေသခံများ၏ လူမှုရေး၊ စီးပွားရေးနှင့် ကျန်းမာရေးဆိုင်ရာ ထိခိုက်မှုများ မဖြစ် ပေါ်နိုင်အောင် လက်ရှိအခြေခံစစ်တမ်းကို ၅ ကီလိုမီတာ အချင်းဝက် အထိ တိုးမြှင့်ကောက်ယူ ထားခြင်း ဖြစ်ပါသည်။ သို့ဖြစ်ပါ၍ ၃ ကီလိုမီတာအချင်းဝက် အတိုင်းအတာ ကောက်ယူခြင်းသည် ဇီဝပတ်ဝန်းကျင်လေ့လာမှုနယ်ပယ် အတွက် လုံလောက်မှုရှိပါသည်။</p> |
| (ဆ) | <p>ရေအရည်အသွေးတိုင်းတာစစ်ဆေးရန် ရေနမူနာ စုစုပေါင်း ၁၂ မျိုးကို ၂၀၁၇ ခုနှစ် ဧပြီလနှင့် ၂၀၁၉ ခုနှစ် ဇူလိုင်လတို့တွင် ကောက်ယူခဲ့ကြောင်း၊ မြေပေါ်ရေ/ သောက်ရေအတွက် ရေနမူနာ ၅ မျိုးကို ရေကန်၊ ရန်ကုန်-မန္တလေးအမြန်လမ်းအနီး (၆.၂မိုင်) ရှိ ကြာအင်း ချောင်း၊ လက်ပံဝဲကျေးရွာအနီး ပုဇွန်တောင်ချောင်း၊</p> | <p>ကောက်ယူခဲ့သည့် ရေကန်အမည်၊ စွန့်ပစ်ရေနမူနာ တိုင်းတာခြင်းသည် မည်သည့်နေရာ (Source) မှ ဖြစ် ကြောင်း နှင့် ရေတွင်းရေ (မြေအောက်ရေ) ၂ နေရာသည် မည်သည့်နေရာများမှဖြစ်ကြောင်း၊ ရေဆိုးစွန့်ပစ်မည့် ခန့်မှန်းတည်နေရာအားလည်း အခြေခံအချက်အလက် တိုင်းတာကောက်ယူခြင်းများ ဆောင်ရွက်ရန်၊</p> | <p>ကောက်ယူခဲ့သည့် ရေနမူနာများ၏ အမျိုးအမည်၊ တည်နေရာ များနှင့် အခြေခံအချက်အလက် တိုင်းတာ ကောက်ယူခြင်းများကို 4.11.1.3.1 Water Samples Collection Locations စာမျက်နှာ (၂၃၄ - ၂၃၇) တွင် ဇယားများ၊ ပုံများနှင့်တကွ ဖော်ပြထား ပါသည်။ အခြေခံအချက်အလက်တိုင်းတာကောက်ယူခြင်း</p> |

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| | <p>ကလီထော်ရေလျှောင့်တမံတို့မှ ကောက်ယူခဲ့ကြောင်း၊ စွန့်ပစ်ရေနမူနာ ၅ မျိုးနှင့် မြေအောက်ရေ (ရေတွင်းရေ) နမူနာ ၂ မျိုးကိုလည်း ကောက်ယူခဲ့ကြောင်း ဖော်ပြထား သော်လည်း ကောက်ယူခဲ့သည့်ရေကန်အမည်နှင့် စွန့်ပစ်ရေ နမူနာတိုင်းတာခြင်းသည် မည်သည့်နေရာ (Source) မှဖြစ်ကြောင်းနှင့် ရေတွင်းရေ (မြေအောက် ရေ) ၂ နေရာသည် မည်သည့်နေရာများမှဖြစ်ကြောင်း၊ ရေဆိုးစွန့်ပစ်မည့် ခန့်မှန်းတည်နေရာအားလည်း အခြေခံအချက်အလက်တိုင်းတာကောက်ယူခြင်း များ ဆောင်ရွက်ရန်လိုအပ်ပါသည်။</p> | | <p>ရလဒ်များကို 4.11.1.3.3 Water Quality Results စာမျက်နှာ (၂၃၇ -၂၄၂) တွင် ဇယားများနှင့်တကွ ဖော်ပြထားပါသည်။</p> <p>ကောက်ယူခဲ့သည့် နေရာတွင် အမည်ရှိပါက ထိုအမည် များကို ဖော်ပြထားပြီး အမည်သတ်မှတ်ထားခြင်း မရှိသည့် နေရာများ ကို အမည်မဖော်ပြထားပါ။</p> |
| <p>(ဇ)</p> | <p>မြေအရည်အသွေးတိုင်းတာခြင်း မြေဆီလွှာ အရည် အသွေးနှင့် ပတ်သက်၍ မြေဆီလွှာ အာဟာရဓါတ်သည် ကောင်းမွန်သော အနေအထားတွင် ရှိကြောင်းနှင့် သတ္တု ပါဝင်မှုတွင် နီကယ်၊ ခရိုမီယမ်၊ ကယ်ဒမီယမ်နှင့် ခဲပါဝင်မှု တို့ကိုမတွေ့ရှိရဘဲ သံဓာတ် ပါဝင်မှု မှာ ပမာဏ ၂၄၀ ppm ထက် များစွာကျော်လွန် နေကြောင်း ဖော်ပြထားသည်ကို စိစစ် တွေ့ရှိရသည့် အတွက် မည်သည့်အကြောင်းများကြောင့် ကျော်လွန်နေ</p> | <p>မြေဆီလွှာအရည်အသွေးနှင့် ပတ်သက်၍ မြေဆီလွှာ အာဟာရဓါတ်သည် ကောင်းမွန်သော အနေအထားတွင် ရှိကြောင်းနှင့် သတ္တုပါဝင်မှုတွင် နီကယ်၊ ခရိုမီယမ်၊ ကယ်ဒမီယမ်နှင့် ခဲပါဝင်မှုတို့ကိုမတွေ့ရှိဘဲ သံဓာတ် ပါဝင်မှုပမာဏ ၂၄၀ ppm ထက် များစွာကျော်လွန်နေ ကြောင်း ဖော်ပြထားသည်ကိုစိစစ်တွေ့ရှိရသည့်အတွက် မည်သည့် အကြောင်းများကြောင့် ကျော်လွန်နေသည်ကို စိစစ်ဖော်ထုတ်ရန်၊</p> | <p>မြေဆီလွှာအရည်အသွေးနှင့် ပတ်သက်၍ သံဓာတ် ပါဝင်မှု ပမာဏ ၂၄၀ ppm ထက် များစွာကျော်လွန် နေခြင်းမှာ ဂဝံမြေ အမျိုးစား (soft lateritic soils) ဖြစ်၍ သံဓာတ်များနေခြင်း ဖြစ်ပါသည်။</p> <p>Rationale for having higher concentration of Iron စာမျက်နှာ (၂၄၈) တွင်ဖော်ပြထားပါသည်။</p> |

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| | သည်ကို စိစစ်ဖော်ထုတ်ရန် လိုအပ်ပါ သည်။ | | |
| (ဈ) | လူမှုစီးပွားအခြေအနေများကိုဖော်ပြခြင်း စီမံကိန်းအနီးရှိ ကျေးရွာ (ဒေသခံ) များ၏လက်ရှိ ကျန်းမာရေးဆိုင်ရာအချက်အလက်များလေ့လာဆန်းစစ်ထားခြင်းမရှိသည်ကို တွေ့ရှိရပါသည်။ စက်မှုဇုန်စီမံကိန်းဖြစ်၍ကျန်းမာရေးဆိုင်ရာ လိုအပ်သော အခြေခံအချက်အလက်များကို ကောက်ယူဖော်ပြရန် လိုအပ်ပါသည်။ | စက်မှုဇုန်စီမံကိန်းဖြစ်၍ စီမံကိန်းအနီးရှိ ကျေးရွာ (ဒေသခံ) များ၏ ကျန်းမာရေးဆိုင်ရာ လိုအပ်သော အခြေခံ အချက် အလက်များကို ကောက်ယူဖော်ပြရန်။ | စီမံကိန်းအနီးရှိ ကျေးရွာ (ဒေသခံ)များ၏ ကျန်းမာရေး ဆိုင်ရာ လိုအပ်သော အခြေခံအချက်အလက်များ ကောက်ယူထားခြင်း ကို CHAPTER 6. HEALTH IMPACT ASSESSMENT 6.3 Public Health in Project Area စာမျက်နှာ (၃၉၉ - ၄၀၁) တွင်ဖော်ပြထားပါသည်။ |
| ၆။ | အဓိကဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှုများနှင့် ထိခိုက်မှုလျော့ချရေးလုပ်ငန်းများ | | |
| (က) | လေအရည်အသွေးအပေါ်သက်ရောက်နိုင်မှု တည်ဆောက်ရေးကာလနှင့် လုပ်ငန်းလည်ပတ်ချိန် အတွက် ထိခိုက်နိုင်မှုများနှင့်ထိခိုက်မှုလျော့နည်းစေမည့် နည်းလမ်းများကို ဖော်ပြထားသည်။ အဆိုပါဖော်ပြချက်များသည် ယေဘုယျဖော်ပြချက်များ ဖြစ်သဖြင့် စီမံကိန်းအတွင်းလက်ခံဆောင်ရွက်မည့် လုပ်ငန်းများအပေါ်မူတည်၍ ဖြစ်ပေါ်နိုင်သော လေထုအပေါ် ညစ်ညမ်းနိုင်မှုကို ခန့်မှန်းပမာဏများနှင့် အတူ ဖော်ပြရန် လိုအပ်ပါသည်။ လုပ်ငန်းလည်ပတ်ချိန်ကာလအတွက် စက်မှုဇုန်အတွင်း လာရောက်ရင်းနှီးမြှုပ်နှံမည့် | - လုပ်ငန်းလည်ပတ်ချိန်ကာလအတွက် စက်မှုဇုန် အတွင်း လာရောက်ရင်းနှီးမြှုပ်နှံမည့် လုပ်ငန်းများတွင် Air Emission အတွက် စည်းကမ်း သတ်မှတ်ချက်များကို ဖော်ထုတ် သတ်မှတ်ရန်နှင့် -စီမံကိန်းအတွင်းလက်ခံဆောင်ရွက်မည့် လုပ်ငန်း အမျိုး အစားများအပေါ်မူတည်၍ ဖြစ်ပေါ်နိုင်သော လေထုအပေါ် ညစ်ညမ်းနိုင်မှုကို ခန့်မှန်းပမာဏများနှင့် အတူဖော်ပြရန်။ | စက်မှုဇုန်တစ်ခုလုံးတွင် လာရောက် ရင်းနှီးမြှုပ်နှံမည့် လုပ်ငန်း များ၏ မည်သည့် အချက်အလက်များကိုမျှ ယခုအချိန်တွင် မသိရှိနိုင်သေးပါ။ လက်ခံရင်းနှီးမြှုပ်နှံရန် ရည်ရွယ်ထားသည့် လုပ်ငန်း အမျိုးအစား ယေဘုယျ အကြမ်းဖျဉ်း ဖော်ပြချက်သာ ရှိပါသည်။ (ဥပမာ - အစားအစာနှင့် အဖျော်ယမကာလုပ်ငန်း၊ လျှပ်စစ် ပစ္စည်းနှင့် ကွန်ပျူတာ တပ်ဆင်ခြင်းလုပ်ငန်း) သို့ဖြစ်ပါ၍ စီမံကိန်းအတွင်းလက်ခံဆောင်ရွက်မည့် လုပ်ငန်း အမျိုးအစားများအပေါ်မူတည်၍ ဖြစ်ပေါ်နိုင်သော လေထု အပေါ် ညစ်ညမ်းနိုင်မှုကို ခန့်မှန်းပမာဏများနှင့် အတူဖော်ပြရန် မဖြစ်နိုင်သေးပါ။ |

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| | <p>လုပ်ငန်း များတွင် Air Emission အတွက်စည်းကမ်းသတ်မှတ်ချက် ဖော်ထုတ်သတ်မှတ်ရန် လိုအပ်ပါသည်။</p> | | <p>လုပ်ငန်းလည်ပတ်ချိန်ကာလအတွက် စက်မှုဇုန် အတွင်း လာရောက် ရင်းနှီးမြှုပ်နှံမည့် လုပ်ငန်းများတွင် Air Emission အတွက် NEQEG နှင့် WHO စံနှုန်းများ အတိုင်း လိုက်နာ ဆောင်ရွက်ရန် သတ်မှတ်ပါမည်။</p> <p>5.4.2.1 Mitigation Measures for Physical Environmental Impacts</p> <p>Air Pollution (including Dust Emission) စာမျက်နှာ (၃၇၈ - ၃၇၉) တွင်ဖော်ပြထားပါသည်။</p> |
| (ခ) | <p>Water Quality</p> <p>-စာမျက်နှာ ၁၅၇ အပိုဒ်ခွဲ ၄.၁၁.၂.၁.၄ တွင် စီမံကိန်းအနီး ပတ်ဝန်းကျင်ရှိ အင်းနှင့် Wetland တို့တွင် ငါးနှင့်အခြား ရေနေသတ္တဝါဂေဟစနစ်နှင့် ပတ်သက်၍ လေ့လာခဲ့ကြောင်း ဖော်ပြထားသော်လည်း လေ့လာခဲ့ သော အင်း Wetland အမည်အား ဖော်ပြထားခြင်းမရှိခြင်း၊ ရေဆိုး စွန့်ပစ်စက်ရုံမှ ထွက်ရှိလာမည့်ရေများကို စွန့်ပစ်မည့် ကလီထော်ချောင်း နှင့်ပတ်သက်သည့် အချက်အလက် များ (ရေအရည်အသွေး၊ ငါးနှင့်အခြားရေနေသတ္တဝါ ဂေဟစနစ်စသည်) တို့နှင့်ပတ်သက်သော အချက်</p> | <p>- စီမံကိန်းအနီးပတ်ဝန်းကျင်ရှိ အင်းနှင့် Wetland တို့တွင် ငါးနှင့်အခြားရေနေသတ္တဝါဂေဟစနစ်နှင့် ပတ်သက်၍ လေ့လာခဲ့သည့် အင်း /Wetland အမည်အား ဖော်ပြရန်၊ ရေဆိုးစွန့်ပစ်စက်ရုံမှ ထွက်ရှိလာမည့်ရေများကို စွန့်ပစ် မည့် ကလီထော်ချောင်းနှင့်ပတ်သက်သည့် အချက် အလက်များ (ရေအရည်အသွေး၊ ငါးနှင့် အခြားရေနေ သတ္တဝါ ဂေဟစနစ်စသည်) တို့ နှင့် ပတ်သက်သော အချက်အလက်များကိုဖော်ပြရန်၊ -ရေထုညစ်ညမ်းမှုနှင့်ပတ်သက်၍ တွက်ချက် ဖော်ပြရာ တွင် စွန့်ပစ်ရေဆိုး စွန့်ထုတ်မည့် ကလီထော်ချောင်းနှင့် ပတ်သက်၍ Aquatic</p> | <p>စီမံကိန်းအနီးပတ်ဝန်းကျင်တွင် အင်းကျိုး/အင်းပျက် အသေး တစ်ခု သာရှိပြီး၊ အခြားသောအင်းများတွင် ငါးမွေးမြူရေး ကန်များသာ ရှိပါသည်။</p> <p>ယခုအစီရင်ခံစာတွင်ပါဝင်သည့် Wetland သည် ရေမြှုပ်ကွင်းများ (Flooded plain/ Flooded rice field) များကို ဆိုလိုရင်းသာဖြစ်ပါသည်။ 4.11.2.1.4 Fish and Prawn Fauna စာမျက်နှာ (၂၆၉) တွင် ဖော်ပြထား ပါသည်။</p> <p>ရေထုညစ်ညမ်းမှုနှင့် ပတ်သက်၍ စီမံကိန်းမှ စွန့်ထုတ်မည့် ရေများ သည် အမျိုးသားပတ်ဝန်းကျင် အရည်အသွေး ထုတ်လွှတ်မှုလမ်းညွှန်ချက်များပါ</p> |

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| | <p>အလက်များကိုဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>-ရေထုညစ်ညမ်းမှုနှင့်ပတ်သက်၍ တွက်ချက်ဖော်ပြရာ တွင် စွန့်ပစ်ရေဆိုး စွန့်ထုတ်မည့် ကလီထော်ချောင်း နှင့်ပတ်သက်၍ Aquatic Ecosystem/Life နှင့် ပတ်သက်၍ လေ့လာထားခြင်းမရှိသဖြင့် Impact Assessment ဆိုးကျိုးသက်ရောက်နိုင်ကြောင်း ကို လေ့လာဖော်ပြရန်နှင့် ပြုလုပ်ရာတွင်အခြေခံအချက် အလက်ကောက်ယူမှုနှင့် ကျိုးကြောင်းဆီလျော် ကိုက်ညီ မှုရှိရန် လိုအပ်ပါသည်။</p> <p>-စာမျက်နှာ ၂၃၈ တွင် Changes to Flora and Fauna အပေါ်ထိခိုက်နိုင်မှုများနှင့် ပတ်သက်၍ လျှော့ချမည့် အစီအစဉ်များအရ Native Species များကို ပြန်လည် စိုက်ပျိုးသွားမည်ဖြစ်ကြောင်းနှင့် ထိန်းသိမ်းသွားမည် ဖြစ်ကြောင်း ဖော်ပြထားသည့်အတွက် အဆိုပါပြန်လည် ထိန်းသိမ်းမည့်အစီအစဉ်များ (Restoration and Conservation Plans) များကိုဖော်ပြရန် လိုအပ်ပါသည်။</p> | <p>Ecosystem/Life နှင့် ပတ်သက် ၍ လေ့လာထားခြင်းမရှိသဖြင့် Impact Assessment ဆိုးကျိုးသက်ရောက်နိုင်ကြောင်းကိုလေ့လာဖော်ပြရန် နှင့် ပြုလုပ်ရာတွင်အခြေခံအချက်အလက်ကောက်ယူမှုနှင့် ကျိုးကြောင်းဆီလျော်ကိုက်ညီမှုရှိရန်၊</p> <p>-စာမျက်နှာ ၂၃၈ တွင် Changes to Flora and Fauna အပေါ်ထိခိုက်နိုင်မှုများနှင့် ပတ်သက်၍ လျှော့ချမည့် အစီအစဉ်များအရ Native Species များကို ပြန်လည် စိုက်ပျိုးသွားမည်ဖြစ်ကြောင်းနှင့် ထိန်းသိမ်းသွားမည်ဖြစ် ကြောင်း ဖော်ပြထားသည့် အတွက် အဆိုပါပြန်လည် ထိန်းသိမ်းမည့် အစီအစဉ်များ (Restoration and Conservation Plans) များကို ဖော်ပြရန်၊</p> | <p>ရည်ညွှန်းတန်ဖိုးများနှင့် အညီ သန့်စင်ပြီးမှ ချောင်းအတွင်းသို့ စွန့်ထုတ်မည် ဖြစ်ပါ သဖြင့် မူလရေနေ သတ္တဝါ၊ ရေနေ အပင်များကို ထိခိုက်နိုင်မှု မရှိပါ။ ၎င်းသန့်စင်ပြီးသားရေ စွန့်ထုတ်မည့် နေရာမှ ရေနမူမှာ အခြေခံအချက်အလက်များကိုလည်း ကောက်ယူ ဆန်းစစ် ထားပါသည်။ ထိုကောက်ယူဆန်းစစ်ချက်များကို ရည်ညွှန်း အခန်း၊ စာမျက်နှာတို့ဖြင့် အထက်တွင် ဖော်ပြထားပြီး ဖြစ်ပါသည်။</p> <p>Buffer Green Belt (area of 94,775 sq.m), 4.2% of total project land area ပြုလုပ်သွားပါမည်။ Table 3. 4: Project Summary စာမျက်နှာ (၁၅၁) တွင် ဖော်ပြ ထားပါသည်။</p> |
| (ဂ) | မိလ္လာစနစ်နှင့် ပတ်သက်၍ | မိလ္လာစနစ်နှင့် ပတ်သက်၍ | မိလ္လာစနစ်နှင့် ပတ်သက်၍ တည်ဆောက်ရေးကာလတွင် |

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| | <p>တည်ဆောက်ရေးကာလတွင် အသုံးပြုမည့် လုပ်သား/ဝန်ထမ်း အရေအတွက် (ခန့်မှန်း) ကိုဖော်ပြ၍ စွန့်ပစ်ပစ္စည်းနှင့် မိလ္လာရေဆိုးများ ထားရှိ ဆောင်ရွက်မည့် ယာယီ (Sanitation System) ကို ဖော်ပြရန်လိုအပ်ပါသည်။</p> | <p>တည်ဆောက်ရေးကာလတွင် အသုံးပြုမည့် လုပ်သား/ဝန်ထမ်းအရေအတွက် (ခန့်မှန်း) ကို ဖော်ပြ၍ စွန့်ပစ်ပစ္စည်းနှင့် မိလ္လာရေဆိုးများ ထားရှိ ဆောင်ရွက်မည့် ယာယီ (Sanitation System) ကို ဖော်ပြရန်။</p> | <p>အသုံးပြုမည့် လုပ်သား/ဝန်ထမ်းအရေအတွက် (ခန့်မှန်း) ကို ဖော်ပြ၍ စွန့်ပစ်ပစ္စည်းနှင့် မိလ္လာရေဆိုးများ ထားရှိဆောင်ရွက် မည့် ယာယီ (Sanitation System) ကို 3.7.5 Wastewater and Sewage Collection and Disposal 3.7.5.1 Construction Phase စာမျက်နှာ (၁၅၉ - ၁၆၁) တွင် ဖော်ပြထားပါသည်။</p> |
| (ဃ) | <p>Waste (စွန့်ပစ်ပစ္စည်းထွက်ရှိမှု) စွန့်ပစ်ပစ္စည်း (Hazardous Waste)၊ စွန့်ပစ်ရေ နှင့် ပတ်သက်၍ စီမံကိန်းအနီးဒေသခံများ၊ စက်မှုဇုန်တွင် ပါရှိသည့် Residential/ Apartment အတွင်း နေထိုင်သူ များနှင့် စက်မှုဇုန်ရှိ ဝန်ထမ်း/လုပ်သားများအပေါ် ကျန်းမာရေး ထိခိုက်နိုင်မှုများ ကို လေ့လာဆန်းစစ်ရန် လိုအပ်ကြောင်း စိစစ် တွေ့ရှိရပါသည်။</p> | <p>စွန့်ပစ်ပစ္စည်း (Hazardous Waste)၊ စွန့်ပစ်ရေ နှင့် ပတ်သက်၍ စီမံကိန်းအနီးဒေသခံများ၊ စက်မှုဇုန်တွင် ပါရှိသည့် Residential Apartment အတွင်း နေထိုင်သူ များနှင့်စက်မှုဇုန်ရှိ ဝန်ထမ်း/လုပ်သားများအပေါ် ကျန်းမာ ရေး ထိခိုက်နိုင်မှုများကို လေ့လာ ဆန်းစစ်ဖော်ပြရန်။</p> | <p>စွန့်ပစ်ပစ္စည်း (Hazardous Waste)၊ စွန့်ပစ်ရေနှင့် ပတ်သက် ၍ စီမံကိန်းအနီးဒေသခံများ၊ စက်မှုဇုန်တွင် ပါရှိသည့် Residential Apartment အတွင်း နေထိုင်သူ များနှင့် စက်မှုဇုန် ရှိ ဝန်ထမ်း/လုပ်သားများ အပေါ် ကျန်းမာရေးထိခိုက်နိုင်မှုများကို လေ့လာ ဆန်းစစ်ခြင်းကို CHAPTER 6. HEALTH IMPACT ASSESSMENT 6.6 Community Health and Safety စာမျက်နှာ (၄၁၁ - ၄၁၄) တွင် ဖော်ပြထားပါသည်။</p> |
| (င) | <p>Soil Contamination (မြေထုညစ်ညမ်းမှု) နှင့် ပတ်သက် ၍ EIA ဆောင်ရွက်သည့်အဆင့် တွင် ထိခိုက်နိုင်မှုကို ဆန်းစစ်ဖော်ထုတ် တင်ပြရန် လိုအပ်ပါသည်။ -ဇယား ၅.၃.၄.၂ Potential Environmental</p> | <p>- Soil Contamination (မြေထုညစ်ညမ်းမှု) နှင့်ပတ်သက် ၍ EIA ဆောင်ရွက်သည့်အဆင့်တွင် ထိခိုက်နိုင်မှုကို ဆန်းစစ်ဖော်ထုတ် တင်ပြရန်။ - ဇယား ၅.၃.၄.၂ Potential Environmental Impacts During Construction Phase တွင် Emergency risk (earthquake, risk of fire)</p> | <p>Soil Contamination (မြေထုညစ်ညမ်းမှု) နှင့်ပတ်သက်၍ EIA ဆောင်ရွက်သည့် အဆင့်တွင် ထိခိုက်နိုင်မှုကို ဆန်းစစ်ဖော်ထုတ် တင်ပြထားခြင်းကို 5.3.4.2 Potential Environmental Impacts during Construction Phase ဇယား စာမျက်နှာ (၃၄၂) Soil Contamination စာမျက်နှာ (၃၄၃)</p> |

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| <p>Impacts During Construction Phase တွင် Emergency risk (earthquake, risk of fire) တို့နှင့်ပတ်သက်၍ ဆန်းစစ် ခြင်းများ ဆောင်ရွက်ထားသော်လည်း ရေလွှမ်းမိုးခြင်း (Flood) အန္တရာယ်နှင့်ပတ်သက်၍ တွက်ချက်ဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>-စာမျက်နှာ ၂၁၈ တွင် (-) လက္ခဏာသည် negative impacts ဖြစ်ကြောင်းဖော်ပြထားသဖြင့် negative သည် အလားအလာရှိသည့် စီမံကိန်းကြောင့် ထိခိုက် နိုင်မှုများဟု အဓိပ္ပာယ်ရသည့်အတွက် အဆိုပါ လက္ခဏာနှင့်ပတ်သက်၍ ပြန်လည်သတ်မှတ် ဖော်ပြ ရန်လိုအပ်ပါသည်။</p> | <p>တို့နှင့်ပတ်သက်၍ ဆန်းစစ်ဆောင်ရွက်ထားသော်လည်း ရေလွှမ်းမိုးခြင်း (Flood) နှင့်ပတ်သက်၍ တွက်ချက်ဖော်ပြရန်၊</p> <p>- စာမျက်နှာ ၂၁၈ တွင် (-) လက္ခဏာသည် negative impacts ဖြစ်ကြောင်းဖော်ပြထားသဖြင့် negative သည် အလားအလာရှိသည့် စီမံကိန်းကြောင့် ထိခိုက် နိုင်မှုများဟု အဓိပ္ပာယ်ရသည့်အတွက် အဆိုပါ လက္ခဏာ နှင့်ပတ်သက်၍ ပြန်လည်သတ်မှတ်ဖော်ပြရန်၊</p> | <p>5.3.4.3 Potential Environmental Impacts during Operation Phase ဇယား စာမျက်နှာ (၃၄၉) Soil Contamination စာမျက်နှာ (၃၅၀)</p> <p>5.3.5 Risk Assessment</p> <p>5.3.5.1 Construction Phase ဇယား စာမျက်နှာ (၃၅၇ - ၃၅၈)</p> <p>5.3.5.2 Operation Phase ဇယား စာမျက်နှာ (၃၅၈ - ၃၅၉)</p> <p>5.4.1 Mitigation Measures for Construction Phase</p> <p>5.4.1.1 Mitigation Measures for Physical Environmental Impacts Soil Contamination စာမျက်နှာ (၃၆၁)</p> <p>5.4.2 Mitigation Measures for Operation Phase</p> <p>5.4.2.1 Mitigation Measures for Physical Environmental Impacts Soil Contamination စာမျက်နှာ (၃၇၇)</p> <p>8.1 Environmental Management and Monitoring Plan (Construction and Operation Phases) ဇယား စာမျက်နှာ (၄၄၈)</p> <p>8.3 Environmental Monitoring Plan with estimated budget (Construction Phase)</p> |
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| | | | <p>ဇယား စာမျက်နှာ (၄၆၆)</p> <p>8.4 Environmental Monitoring Plan with estimated budget (Operation Phase)</p> <p>ဇယား စာမျက်နှာ (၄၆၈) တို့တွင် အသီးသီး ဖော်ပြထားပါသည်။</p> <p>ရေလွှမ်းမိုးခြင်း (Flood) နှင့်ပတ်သက်၍ 5.3.4.2 Potential Environmental Impacts during Construction Phase ဇယား စာမျက်နှာ (၃၄၂) တွင် Emergency risk (earthquake, risk of fire) တို့နှင့်အတူ ထည့်သွင်းတွက်ချက်ဖော်ပြထားပါသည်။</p> <p>(-) လက္ခဏာသည် negative impacts ဖြစ်ကြောင်း ဖော်ပြ ထားပါသည်။ သို့ရာတွင် ထိုလက္ခဏာကြောင့် ရှုပ်ထွေးမှုများ ဖြစ်ပေါ် မလာစေရန်အတွက် (-) လက္ခဏာကို ဖော်ပြခြင်း မရှိ တော့ပါ။ ထို့အပြင် စာလုံး အတိုကောက်များ ဖြစ်သည့် PE, SE, BE တို့ကို လည်း ဖော်ပြခြင်း မရှိတော့ပါ။</p> <p>- PE အစား Negative Impacts on Physical Environment</p> <p>- BE အစား Negative Impacts on Biological Environment</p> |
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| | | | <p>- SE အစား Negative Impacts on Social Environment</p> <p>ဟူ၍သာ သက်ဆိုင်ရာ ဇယားအသီးသီးတွင် ပြောင်းလဲ ပြင်ဆင် ဖော်ပြထားပါသည်။ ဤနည်းအားဖြင့် ပိုမို ရှင်းလင်း နားလည် စေပါသည်။</p> |
| (စ) | <p>Offensive Odor နှင့်ပတ်သက်၍ လုပ်ငန်း လည်ပတ် ချိန်တွင် အထည်ချုပ်စက်ရုံစသည် လုပ်ငန်းတို့မှ ထွက်ရှိနိုင်မည့် ဓါတုပစ္စည်း/ စွန့်ပစ်အရည်များကြောင့် အနံ့ထွက်ရှိမှုနှင့်ပတ်သက်၍ ဖော်ထုတ်တင်ပြရန်နှင့် KMIC စီမံကိန်းတွင် Central Wastewater Treatment Plant ပါရှိသည်မှန်သော်လည်း ၎င်း ရေဆိုးသန့်စင် စက်ရုံသို့ ရေဆိုးများမပို့မီ သက်ဆိုင်ရာ စက်ရုံအသီးသီး က ဦးစွာသန့်စင်ခြင်း ရှိ/မရှိ နှင့် အကယ်၍ Central Wastewater Treatment Plant သို့ ပို့ဆောင်သန့်စင် မည်ဖြစ်ပါက Drainage System အားဖော်ပြရန်နှင့် မည်သို့ စီမံခန့်ခွဲသွားမည်ဖြစ်ကြောင်း ဖော်ပြရန် လိုအပ် ပါသည်။</p> | <p>Offensive Odor နှင့်ပတ်သက်၍ လုပ်ငန်း လည်ပတ် ချိန် တွင် အထည်ချုပ်စက်ရုံစသည်လုပ်ငန်းတို့မှ ထွက်ရှိ နိုင်မည့် ဓါတုပစ္စည်း စွန့်ပစ်အရည်များကြောင့် အနံ့ ထွက်ရှိမှုနှင့် ပတ်သက်၍ ဖော်ထုတ်တင်ပြရန်နှင့် KMIC စီမံကိန်းတွင် Central Waste Water Treatment Plant ပါရှိသည် မှန်သော်လည်း ၎င်းရေဆိုး သန့်စင်စက်ရုံ သို့ ရေဆိုးများ မပို့မီ သက်ဆိုင်ရာ စက်ရုံအသီးသီးက ဦးစွာသန့်စင်ခြင်း ရှိ/မရှိ နှင့် အကယ်၍ Central Waste Water Treatment Plant သို့ ပို့ဆောင်သန့်စင်မည်ဖြစ်ပါက Drainage System အားဖော်ပြရန်နှင့် မည်သို့ စီမံခန့်ခွဲသွားမည် ဖြစ်ကြောင်း ဖော်ပြရန်၊</p> | <p>စက်မှုဇုန်တစ်ခုလုံးတွင် လာရောက် ရင်းနှီးမြှုပ်နှံမည့် လုပ်ငန်း များ၏ မည်သည့် အချက်အလက်များကိုမျှ ယခုအချိန်တွင် မသိရှိနိုင်သေးပါ။ လက်ခံရင်းနှီးမြှုပ်နှံရန် ရည်ရွယ်ထားသည့် လုပ်ငန်း အမျိုးအစား ယေဘုယျ အကြမ်းဖျဉ်း ဖော်ပြချက်သာ ရှိပါသည်။ (ဥပမာ - အစားအစာနှင့် အဖျော်ယမကာလုပ်ငန်း၊ လျှပ်စစ် ပစ္စည်းနှင့် ကွန်ပျူတာ တပ်ဆင်ခြင်းလုပ်ငန်း) သို့ဖြစ်ပါ၍ Offensive Odor နှင့်ပတ်သက်၍ လုပ်ငန်း လည်ပတ်ချိန်တွင် အထည်ချုပ်စက်ရုံစသည်လုပ်ငန်းတို့မှ ထွက်ရှိ နိုင်မည့် ဓါတုပစ္စည်း စွန့်ပစ်အရည်များကြောင့် အနံ့ ထွက်ရှိမှုနှင့် ပတ်သက်၍ ဖော်ထုတ်တင်ပြရန် မဖြစ်နိုင်သေးပါ။</p> <p>KMIC စီမံကိန်းတွင် Central Waste Water Treatment Plant ပါရှိပြီး ထိုရေဆိုး သန့်စင်စက်ရုံ သို့ ရေဆိုးများ မပို့မီ သက်ဆိုင် ရာ စက်ရုံအသီးသီးက ဦးစွာသန့်စင်ခြင်း ရှိမည် ဖြစ်ကြောင်းကို</p> |

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| | | | <p>3.7.5 Wastewater and Sewage Collection and Disposal</p> <p>3.7.5.2 Operation Phase (Note) စာမျက်နှာ (၁၆၈) တွင် ဖော်ပြထားပါသည်။</p> <p>Drainage System နှင့် မည်သို့ စီမံခန့်ခွဲသွားမည်ကို</p> <p>Figure 3.25: Wastewater treatment plant flow diagram</p> <p>Figure 3.26: Wastewater System Plan</p> <p>Figure 3.27: Drainage Layout Plan</p> <p>စာမျက်နှာ (၁၆၃ - ၁၆၄) နှင့်</p> <p>3.7.5.2.1 Wastewater Collection Design စာမျက်နှာ (၁၆၄ - ၁၆၅)</p> <p>3.7.5.2.2 Wastewater Collection Plan စာမျက်နှာ (၁၆၆ - ၁၆၈) တို့တွင် ဖော်ပြထားပါသည်။</p> |
| (ဆ) | <p>စာမျက်နှာ ၂၁၇ အပိုဒ်ခွဲ 5.3.4.2 Potential Environmental Impacts during Construction Phase တွင် Occupational health and safety (Risk of injuries and accidents to workers) ဆန်းစစ်ရာ တွင် Significant Level of Impact = 4 (Medium) ဖြစ်နေသော်လည်း Impact Level လျော့ချရေး အစီအမံ များမပါရှိသည်ကို</p> | <p>စာမျက်နှာ ၂၁၇ အပိုဒ်ခွဲ 5.3.4.2 Potential Environmental Impacts during Construction Phase တွင် Occupational health and safety (Risk of injuries and accidents to workers) ဆန်းစစ်ရာတွင် Significant Level of Impact = 4 (Medium) ဖြစ်နေသော်လည်း Impact Level လျော့ချရေး အစီအမံများ ထည့်သွင်း ဖော်ပြ ရန်၊</p> | <p>Occupational health and safety (Risk of injuries and accidents to workers) အတွက် Impact Level လျော့ချရေး အစီအမံများ ကို</p> <p>5.4.1 Mitigation Measures for Construction Phase</p> <p>5.4.1.3 Mitigation Measures for Social Environmental Impacts</p> <p>Occupational health and safety (Risk of injuries</p> |

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| | စိစစ်တွေ့ရှိရပါသည်။ | | and accidents to workers) စာမျက်နှာ (၃၆၇ - ၃၇၄) တွင် ထည့်သွင်းဖော်ပြထားပါသည်။ |
| ၇။ | ကျန်းမာရေးဆိုင်ရာသက်ရောက်မှုဆန်းစစ်ခြင်း (Health Impact Assessment) | | |
| (က) | <p>-ကျန်းမာရေးအခြေခံအချက်အလက်များနှင့် ပတ်သက်၍ ဆေးခန်းအဆောက်အဦများနှင့်ကျန်းမာရေးဝန်ထမ်းစာရင်းများကိုသာ ဖော်ပြပြီး အခြားအချက်အလက် များ (ဒေသတွင်းအဖြစ်များသောရောဂါများ၊ ဖြစ်ပွားနှုန်း စသည်ဖြင့်) အားပြည့်စုံစွာ ဖော်ပြထားခြင်း မရှိသည်ကို စိစစ်တွေ့ရှိရပါသည်။</p> <p>-စီမံကိန်းလုပ်ငန်းခွင်ရှိ လုပ်သားများ၏ ကျန်းမာရေး ဘေးအန္တရာယ်ကင်းရှင်းရေး (Occupational Health and Safety-OHS) အပေါ်သက်ရောက်မှုအား လက်တွေ့ဆန်စွာ ဆန်းစစ်လေ့လာဖော်ပြထားခြင်း မရှိသည်ကိုစိစစ်တွေ့ရှိရပါသည်။</p> <p>-စီမံကိန်းအနီးပတ်ဝန်းကျင်ရှိ ပြည်သူလူထု ကျန်းမာ ရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (Community Health and Safety-CHS) အပေါ်သက်ရောက်မှုအား လက်တွေ့ဆန်စွာ</p> | <p>- အစီရင်ခံစာတွင်လိုက်နာမည့် ဥပဒေနည်းဥပဒေများတွင် “ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက်ပစ္စည်း သောက်သုံးမှု ထိန်းချုပ်ရေးဥပဒေ (၂၀၀၆) “ အားဖြည့်စွက်ဖော်ပြရန်၊</p> <p>- ကျန်းမာရေးဆိုင်ရာထိခိုက်မှုဆန်းစစ်ရာတွင် အမှန်တကယ် အသုံးပြုရန်လိုအပ်သည့် ကျန်းမာရေး အခြေခံ အချက်အလက်များကို တိကျခိုင်လုံသော ကိုးကားချက် များ (သက်ဆိုင်ရာ Township Health Profile) နှင့်တကွ ဖြည့်စွက်ဖော်ပြရန်၊</p> <p>- Primary Data ကောက်ယူဖော်ပြပါက လူပုဂ္ဂိုလ်ဆိုင်ရာ Health Survey ဖြစ်သဖြင့် မြန်မာနိုင်ငံအသိအမှတ်ပြု “သုတေသနကျင့်ဝတ်နှင့် ကျွမ်းကျင်မှုပိုင်းဆိုင်ရာ ဆန်းစစ် သုံးသပ်မှုဘုတ်အဖွဲ့ (Institutional Research Board) ခွင့်ပြုချက်နှင့် Survey အချက်အလက်များ (e.g Study Design, Questionnaires, Finding, etc.) အား ပြည့်စုံစွာဖော်ပြရန်၊</p> | <p>“ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက်ပစ္စည်း သောက်သုံးမှု ထိန်းချုပ်ရေးဥပဒေ (၂၀၀၆) “အား 2.1.16 The Control of Smoking and Consumption of Tobacco Product Law (2006) စာမျက်နှာ (၁၀၅) တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။</p> <p>ကျန်းမာရေးဆိုင်ရာထိခိုက်မှုဆန်းစစ်ရာတွင် ကျန်းမာရေး အခြေခံအချက်အလက်များကို Township Health Profile နှင့်တကွ ဖြည့်စွက်ဖော်ပြထားပါသည်။</p> <p>6.2 Public Health in Hlegu Township and Hmawbi Township စာမျက်နှာ (၃၉၇ - ၃၉၉) တွင် ဖော်ပြထားပါသည်။</p> <p>လူပုဂ္ဂိုလ်ဆိုင်ရာ Health Survey မဟုတ်သောကြောင့် သုတေသနကျင့်ဝတ်နှင့် ကျွမ်းကျင်မှုပိုင်းဆိုင်ရာ ဆန်းစစ် သုံးသပ်မှုဘုတ်အဖွဲ့ ခွင့်ပြုချက် ရယူရန် မလိုအပ်ပါ။</p> <p>Occupational Health and Safety-(OHS) အတွက်လိုက်နာ ရမည့် Guidelines များ Policies</p> |

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| <p>ဆန်းစစ်လေ့လာဖော်ပြထားခြင်း မရှိသည်ကို စိစစ်တွေ့ရှိရပါသည်။</p> <p>-Industrial Complex တွင်လာရောက်လုပ်ကိုင်မည့် စက်ရုံများကြောင့် ဖြစ်ပေါ်လာနိုင်သော Cumulative Health Impacts အားတိကျသေချာစွာ ဆန်းစစ် လေ့လာ ဖော်ပြထားခြင်း မရှိသည်ကို စိစစ်တွေ့ရှိရ ပါသည်။</p> <p>-အရေးပေါ်အခြေအနေ တုန့်ပြန်မှု အစီအမံများ (Emergency Response Plans) နှင့် Traffic Impacts နှင့်ပတ်သက်၍ ပြည့်စုံလုံလောက်စွာ ဆန်းစစ်လေ့လာဖော်ပြထားခြင်း မရှိသည်ကို စိစစ် တွေ့ရှိရပါသည်။</p> | <p>-ဖော်ပြထားသော Occupational Health and Safety-(OHS) အတွက်လိုက်နာရမည့် Guidelines များ Policies များအတိုင်း တိကျစွာလိုက်နာဆောင်ရွက်ရန်၊</p> <p>-သက်ဆိုင်ရာ ကန်ထရိုက်များ၊ ရင်းနှီးမြှုပ်နှံသူများမှ အဆိုပါချမှတ်ထားသော Guidelines များ Policies များအား အမှန်တကယ် လိုက်နာဆောင်ရွက်ခြင်းရှိ၊ မရှိကို စီမံကိန်းပိုင်ရှင်မှ တာဝန်ယူ ကြီးကြပ်ရန်နှင့် လိုက်နာမှု မရှိပါက အရေးယူမည့်အစီအစဉ်များအား တိကျစွာ ဖော်ပြပေးရန်၊</p> <p>-လုပ်ငန်းခွင်ရှိလုပ်သားများအပေါ် သက်ရောက်နိုင်သော Health Impact များ (e.g Health Impact due to air,water,soil, noise, vibration, communicable and non-communicable diseases, road traffic accident, etc)၊ ကာကွယ်လျော့ချပေးမှုများ (mitigation Measures) စောင့်ကြည့်မှုအစီအစဉ်များ (Monitoring Plans) နှင့်၎င်းအစီအစဉ်များအတွက် အသုံးစရိတ် လျာထားမှုများအား လုပ်ငန်းအဆင့်အလိုက် (Pre-construction, Construction, Operation, Demolishing, etc.)</p> | <p>များအတိုင်း တိကျစွာ လိုက်နာဆောင်ရွက်ရန်ကို 6.4 Occupational Health and Safety (OHS) [Accidents and Diseases] စာမျက်နှာ (၄၀၁ - ၄၀၂) တွင် ဖော်ပြထားပါသည်။</p> <p>လုပ်ငန်းခွင်ရှိလုပ်သားများအပေါ် သက်ရောက်နိုင်သော Health Impact များ၊ ကာကွယ်ပေးမှုများ (mitigation Measures) စောင့်ကြည့်မှုအစီအစဉ်များ (Monitoring Plans) များကို လုပ်ငန်းအဆင့်အလိုက် ဖော်ပြထား ပါသည်။</p> |
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| | | <p>တိကျသေချာစွာလေ့လာဆန်းစစ်၍ ဖြည့်စွက်ဖော်ပြရန်၊ -လုပ်ငန်းခွင်တွင်ရွှေ့ပြောင်း လုပ်သားများရှိပါက ၎င်းတို့၏ ကျန်းမာရေးနှင့် လုံခြုံရေးကို စဉ်းစား ဆောင်ရွက်ပေးရန် နှင့် ၎င်းတို့အပါအဝင် လုပ်ငန်းခွင်ရှိ လုပ်သားများ၏ ကျန်းမာရေးနှင့်ထိခိုက်ဒဏ်ရာရရှိမှုများအား အရေးပေါ်ကုသနိုင်ရေးအတွက် လုပ်ငန်းခွင်ရှိ ဆေးခန်းအား ၁၉၇၁ ခုနှစ်၊ အလုပ်ရုံ (သူနာပြုရေးဆိုင်ရာ) ညွှန်ကြားချက်များ နှင့်အညီ စနစ်တကျဆောင်ရွက်ထားရှိရန်နှင့် ဆေးခန်းမှ ထွက်ရှိသော Medical Wastes များအား ကျန်းမာရေးနှင့် အားကစားဝန်ကြီးဌာနမှ ထုတ်ပြန်ထားသော ညွှန်ကြားချက်များနှင့်အညီ စနစ်တကျစွန့်ပစ်ရန်၊ -Periodic Medical Examination ပြုလုပ်စဉ် လုပ်သား များတွင် Occupational diseases များတွေ့ရှိလျှင် လည်းကောင်း လုပ်သားများအတွင်း ကူးစက်ရောဂါ တမျိုးမျိုး ပျံ့နှံ့မှုဖြစ်ပွားလျှင်လည်းကောင်း၊ သက်ဆိုင်ရာ တိုင်းဒေသကြီး/ပြည်နယ်ပြည်သူ့ကျန်းမာရေးဦးစီး</p> | <p>လုပ်ငန်းခွင်တွင်ရွှေ့ပြောင်း လုပ်သားများရှိပါက ၎င်းတို့၏ ကျန်းမာရေးနှင့် လုံခြုံရေးကို ဆောင်ရွက်ပေးရန်နှင့် ကျန်းမာ ရေးနှင့် ထိခိုက်ဒဏ်ရာရရှိမှုများအား အရေးပေါ် ကုသနိုင်ရေး အတွက် လုပ်ငန်းခွင်ရှိဆေးခန်းအား ၁၉၇၁ ခုနှစ်၊ အလုပ်ရုံ (သူနာပြုရေးဆိုင်ရာ) ညွှန်ကြားချက်များ နှင့်အညီ စနစ်တကျ ဆောင်ရွက်ထားရှိရန်နှင့် ဆေးခန်းမှထွက်ရှိသော Medical Wastes အား ကျန်းမာရေးနှင့်အားကစားဝန်ကြီးဌာနမှ ထုတ်ပြန်ထားသော ညွှန်ကြားချက်များနှင့်အညီ စနစ်တကျ စွန့်ပစ်ရန် ဖြည့်စွက်ဖော်ပြထားပါသည်။ Periodic Medical Examination ပြုလုပ်စဉ် လုပ်သားများတွင် Occupational diseases များတွေ့ရှိလျှင်လည်းကောင်း၊ လုပ်သားများအတွင်း ကူးစက်ရောဂါတမျိုးမျိုး ပျံ့နှံ့မှုဖြစ်ပွား လျှင်လည်းကောင်း သက်ဆိုင်ရာတိုင်းဒေသကြီး/ ပြည်နယ် ပြည်သူ့ကျန်းမာရေး ဦးစီးဌာနသို့ အကြောင်းကြား၍ ညွှန်ကြား ချက်များနှင့်အညီ ပူးပေါင်းဆောင်ရွက်ရန် ဖော်ပြထားပါသည်။ စီမံကိန်းအနီးပတ်ဝန်းကျင်နေ ပြည်သူလူထုအပေါ်</p> |
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| | | <p>ဌာနသို့ အကြောင်းကြား၍ ညွှန်ကြားချက်များနှင့်အညီ ပူးပေါင်း ဆောင်ရွက်ရန်၊ စီမံကိန်းအနီးပတ်ဝန်းကျင်နေ ပြည်သူလူထု အပေါ် သက်ရောက်နိုင်သော Health Impact များ (e.g Health Impact due to air,water,soil, noise, vibration, communicable and non- communicable diseases, road traffic accident, etc)၊ ကာကွယ်လျော့ချပေးမှုများ (mitigation Measures) ၊ စောင့်ကြည့်မှုအစီအစဉ်များ (Monitoring Plans)၊ အရေးပေါ် တုံ့ပြန် ဆောင်ရွက်မှု အစီအစဉ်များ (Emergency Response Plan) နှင့် ၎င်းအစီအစဉ်များအတွက် အသုံးစရိတ် လျာထား မှုများ အား လုပ်ငန်းအဆင့်အလိုက် (Preconstruction, Construction, Operation, Demolishing, etc.) တိကျသေချာစွာလေ့လာဆန်းစစ်၍ ဖြည့်စွက်ဖော်ပြရန်၊ Industrial Complex တွင်လာရောက်လုပ်ကိုင်မည့် စက်ရုံများကြောင့် ဖြစ်ပေါ်လာနိုင်သော Cumulative Health Impacts အားတိကျသေချာစွာ လေ့လာဆန်းစစ် ၍</p> | <p>သက်ရောက် နိုင်သော Health Impact များ၊ ကာကွယ်ပေးမှုများ (mitigation Measures) ၊ စောင့်ကြည့်မှုအစီအစဉ်များ (Monitoring Plans) ကို 6.6 Community Health and Safety စာမျက်နှာ (၄၁၁ - ၄၁၄) တွင် ဖြည့်စွက်ဖော်ပြထား ပါသည်။ ဖြစ်ပေါ်လာနိုင်သော Cumulative Health Impacts နှင့် စပ်လျဉ်း၍ 6.7 Cumulative Impact and Residual Impact စာမျက်နှာ (၄၁၅) တွင် ဖော်ပြထားပါသည်။ Emergency Response Plans ကို 6.8 Emergency Response Plan and Training စာမျက်နှာ (၄၁၅ - ၄၁၆) တွင် ဖြည့်စွက် ဖော်ပြထားပါသည်။ Health Impact Assessment- သီးသန့် Chapter တစ်ခုအဖြစ် CHAPTER 6. HEALTH IMPACT ASSESSMENT စာမျက်နှာ (၃၉၇ - ၄၃၁) တွင် ဖော်ပြထားပါသည်။</p> |
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| | | <p>ဖြည့်စွက်ဖော်ပြရန်နှင့် လိုအပ်သော ကာကွယ်လျော့ချ ပေးမှုအစီအမံများ (Mitigation Measures)အား စနစ်တကျ ရေးဆွဲအကောင်အထည်ဖော် ဆောင်ရွက်ရန်၊ အရေးပေါ်အခြေအနေ တုံ့ပြန်မှုအစီအမံများ (Emergency Response Plans) ကို လုပ်သားများအား ပုံမှန်လေ့ကျင့်မှုများ ပြုလုပ်ပေးရန်နှင့် အရေးပေါ် အခြေ အနေ ဖြစ်ပွားပါက သက်ဆိုင်ရာ အစိုးရအဖွဲ့အစည်းများ အား အချိန်မီအကြောင်းကြား၍ အလျင်အမြန် တုံ့ပြန် ဆောင်ရွက်ရန်၊</p> <p>-Traffic Congestion, Road Traffic Accidents and Injuries တို့နှင့်ပတ်သက်၍ သက်ရောက်နိုင်မှုများကို ဒေသတွင်း RTA ဖြစ်ပွားမှုနှုန်း၊ ထိခိုက်ဒဏ်ရာရမှုနှင့် သေဆုံးမှုနှုန်းများအပေါ် အခြေခံပြီး တိကျ သေချာစွာ လေ့လာဆန်းစစ်ဖော်ပြရန်နှင့် သက်ဆိုင်ရာ Mitigation Measures) များ စနစ်တကျ ရေးဆွဲကာ အကောင် အထည်ဖော် ဆောင်ရွက်ရန်၊</p> <p>(အထက်ဖော်ပြပါအကြံပြုချက်များအား သက်ဆိုင်ရာ ကျွမ်းကျင်သည့် ကျန်းမာရေးပညာရှင်များမှ တိကျ</p> | |
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| | | <p>သေချာစွာ ဆန်းစစ်လေ့လာပြီး Health Impact Assessment-HIA process (cover all health impacts of workers and communities, risks, cumulative impacts and residual impacts for health that potentially could arise out of the project) နှင့် (Public Health Management Plan) စသည်ဖြင့် ခေါင်းစဉ်ခွဲများဖြင့် သီးသန့် Chapter တစ်ခုအဖြစ် ခွဲခြား ဖော်ပြရန်၊</p> | |
| <p>စ။</p> | <p>ဆက်စပ်သက်ရောက်မှုများကိုဆန်းစစ်ခြင်း (Cumulative Impact Assessment)</p> | | |
| <p>(က)</p> | <p>အခန်း ၆ Cumulative Impact Assessment တွင် ကြွင်းကျန်ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းစဉ်များနှင့် ပတ်သက်၍ ပြည့်စုံစွာ ဖော်ပြထား ခြင်း မရှိသည်ကို တွေ့ရှိရပါသည်။</p> | <p>ကြွင်းကျန်သက်ရောက်မှုများနှင့်ပတ်သက်၍ လျော့ပါး စေရေး နည်းလမ်းများ ဆောင်ရွက်ပြီးနောက် ကျန်ရှိနေဆဲ ဖြစ်သော ထိခိုက်မှုများနှင့် အန္တရာယ်များပါဝင်သည့် ကြွင်းကျန်သက်ရောက်မှုများနှင့် ၎င်းတို့၏အန္တရာယ်များ ကို အောက်ဖော်ပြပါ လုပ်ငန်းစဉ်များနှင့်အတူ သက်ဆိုင် ရာ စည်းမျဉ်းများ၊ စံနှုန်းများ၊ လမ်းညွှန်ချက်များနှင့် နှိုင်းယှဉ်၍ စနစ်တကျ ဆန်းစစ်ထားခြင်း ရှိ/မရှိ</p> <ul style="list-style-type: none"> -နည်းစနစ်နှင့်ချဉ်းကပ်နည်း (ထိခိုက်မှုများကို သတ်မှတ် ဖော်ထုတ်ခြင်းနှင့် ဆန်းစစ်ခြင်း (Impact Identification and Analysis) | <p>အကြံပြုချက်တွင် ဖော်ပြထားသည့် လုပ်ငန်းစဉ်များနှင့်အတူ သက်ဆိုင်ရာ စည်းမျဉ်းများ၊ စံနှုန်းများ၊ လမ်းညွှန်ချက်များနှင့် နှိုင်းယှဉ်၍ ကြွင်းကျန် သက်ရောက်မှုများကို CHAPTER 7. CUMULATIVE IMPACT ASSESSMENT စာမျက်နှာ (၄၃၂ - ၄၄၇) တွင် ဆန်းစစ်ထားပါသည်။</p> |

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| | | <p>အတွက် ချဉ်းကပ် နည်းနှင့် နည်းစနစ်များအား ဖော်ပြထားခြင်းရှိ/မရှိ)</p> <p>-လက်ရှိနှင့်အနာဂတ်ကာလ ဖွံ့ဖြိုးရေးလုပ်ငန်းများ အကြောင်း ရှင်းလင်းဖော်ပြချက် (လက်ရှိနှင့် အနာဂတ်ကာလတွင် ဆောင်ရွက်မည့် ပုဂ္ဂလိက/ အစိုးရ စီမံကိန်းလုပ်ငန်းများနှင့် ဖွံ့ဖြိုးရေးလုပ်ငန်း များအား သက်ဆိုင်သည့်မြေပုံများနှင့်အတူ ရှင်းလင်း ဖော်ပြထားခြင်း ရှိ/မရှိ)</p> <p>-ဖြစ်နိုင်သောဆက်စပ်သက်ရောက်မှုများကို သတ်မှတ် ဖော်ထုတ်ခြင်းနှင့်ဆန်းစစ်ခြင်း (စီမံကိန်းဧရိယာ အတွင်းရှိ ပတ်ဝန်းကျင် အစိတ်အပိုင်းများ အပေါ်ဖြစ်ပေါ်နိုင်သော ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်ထားခြင်း ရှိ/မရှိ) (စီမံကိန်းဧရိယာ ပြင်ပရှိ ပတ်ဝန်းကျင် အစိတ်အပိုင်းများ အပေါ်ဖြစ်ပေါ်နိုင်သော ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်ထား ခြင်း ရှိ/မရှိ)</p> <p>-ဆက်စပ်သက်သက်ရောက်မှုများအပေါ်</p> | |
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| | | <p>စီမံကိန်း၏ လွှမ်းမိုးမှု (စီမံကိန်းသည် ဆက်စပ်သက်ရောက်မှုများ အပေါ် သိသာထင်ရှားစွာ လွှမ်းမိုးနေကြောင်းနှင့် အရှိန်မြှင့်စေကြောင်း ဖော်ပြထားခြင်း ရှိ/မရှိ) -လျော့ပါးစေသည့်နည်းလမ်းများ (စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် ဆက်စပ်သက်ရောက်မှုများကို လျော့ချရန်သင့်လျော်သည့်နည်းလမ်းများအား ဖော်ပြထားခြင်း ရှိ/မရှိ)</p> | |
| <p>(ဉ) အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် အများပြည်သူ့ထုတ်ဖော်တင်ပြခြင်း</p> | | | |
| <p>(က)</p> | <p>စာမျက်နှာ (၁၃၉) ၌ Community Grievance Mechanism (CGM) နှင့်ပတ်သက်၍ ဆောင်ရွက်မည့် အဖွဲ့အစည်းကို ဖော်ပြထားသော်လည်း မည်သို့တိုင်ကြားနိုင်သည်နှင့် မည်သို့ဖြေရှင်း ပေးမည်၊ ဖော်ပြထားသော မကျေနပ်ချက်များကို လက်ခံခြင်း၊ သုံးသပ်ခြင်းနှင့် ဖြေရှင်းပေးနိုင်ရေး အတွက် နစ်နာမှု ဖြေရှင်းရေး လုပ်ငန်းစဉ် (Grievance Redress Mechanism) တစ်ရပ်ကို ဖော်ပြထားခြင်းမရှိသဖြင့်ဖော်ပြရန်လိုအပ်ပါသည်။</p> | <p>-အစီရင်ခံစာအား Website တွင်လွှင့်တင်ရန်နှင့် ထို Website လိပ်စာအား အစီရင်ခံစာတွင်ထည့်သွင်း ဖော်ပြ ရန်၊ - မကျေနပ်ချက်များကို လက်ခံခြင်း၊ သုံးသပ်ခြင်းနှင့် ဖြေရှင်းပေးနိုင်ရေးအတွက် နစ်နာမှုဖြေရှင်းရေး လုပ်ငန်း စဉ် (Grievance Redress Mechanism) ကိုဖော်ပြရန်</p> | <p>အစီရင်ခံစာအား http://www.mykmic.com တွင် လွှင့်တင် သွားမည်ဖြစ်ပြီး ထို Website လိပ်စာအား အစီရင်ခံစာတွင် 9.5 Website Address for uploading EIA Report စာမျက်နှာ (၅၄၇) တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။ မကျေနပ်ချက်များကို လက်ခံခြင်း၊ သုံးသပ်ခြင်းနှင့် ဖြေရှင်းပေး နိုင်ရေးအတွက် နစ်နာမှုဖြေရှင်းရေး လုပ်ငန်းစဉ် (Grievance Redress Mechanism) ကို 9.6 Community grievances redress mechanism စာမျက်နှာ (၅၄၇ - ၅၄၈) တွင် ထည့်သွင်း</p> |

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| ၁၀။ | ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် စောင့်ကြပ်ကြည့်ရှုစစ်ဆေးမှုအစီအစဉ် | | |
| (က) | <p>ဇယား (၇.၁) နှင့် ဇယား (၇.၂)တွင် တည်ဆောက်ရေး ကာလ၊ လုပ်ငန်းလည်ပတ်ချိန်နှင့် လုပ်ငန်းပိတ်သိမ်းချိန် ကာလတို့အတွက် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်ကို ဖော်ပြထားသော်လည်း အောက်ဖော်ပြပါ စီမံခန့်ခွဲမှု အစီအစဉ်များကို အသေးစိတ် ရေးဆွဲဖော်ပြရန် လိုအပ် ကြောင်း စိစစ်တွေ့ရှိရပါသည်။</p> <ol style="list-style-type: none"> 1.Waste Management Plan (Including hazardous & Non-hazardous waste) 2.Wastewater Management Plan 3.Air Pollution/ Noise Pollution Control Management Plan 4.Water Quality Management and Monitoring Plan 5.Energy and Water Efficiency Plan 6.Traffic Management Plan 7.Corporate Social Responsibility Programme (CSR) | <p>အစီရင်ခံစာတွင် အောက်ဖော်ပြပါစီမံခန့်ခွဲမှု အစီအစဉ် များကို အသေးစိတ်ရေးဆွဲဖော်ပြရန်လိုအပ်ကြောင်း စိစစ် တွေ့ရှိရပါသည်။</p> <ol style="list-style-type: none"> 1.Waste Management Plan (Including hazardous & Non-hazardous waste) 2.Wastewater Management Plan 3.Air Pollution/ Noise Pollution Control Management Plan 4.Water Quality Management and Monitoring Plan 5.Energy and Water Efficiency Plan 6.Traffic Management Plan 7. Corporate Social Responsibility Programme (CSR) | <p>အောက်ဖော်ပြပါစီမံခန့်ခွဲမှု အစီအစဉ်များကို အသေးစိတ် ရေးဆွဲဖော်ပြထားပါသည်။</p> <ol style="list-style-type: none"> 8.7.1 Waste Management Plan (Hazardous & Non-hazardous waste) စာမျက်နှာ (၄၇၅ - ၄၈၅) 8.7.2 Wastewater Management Plan စာမျက်နှာ (၄၈၆ - ၄၉၃) 8.7.3 Air Pollution Control Management Plan စာမျက်နှာ (၄၉၃ - ၄၉၉) 8.7.4 Noise Pollution Control Management Plan စာမျက်နှာ (၄၉၉ - ၅၀၄) 8.7.5 Water Quality Management and Monitoring Plan စာမျက်နှာ (၅၀၄ - ၅၁၁) 8.7.6 Energy and Water Efficiency Plan စာမျက်နှာ (၅၁၁ - ၅၁၇) 8.7.7 Traffic Management Plan စာမျက်နှာ (၅၁၇ - ၅၂၂) 8.7. 8 Corporate Social Responsibility (CSR) Programme စာမျက်နှာ (၅၂၂ - ၅၂၄) |

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| <p>(ခ) အစီရင်ခံစာ၏ စာမျက်နှာ ၈၀-၈၁ တွင် စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲခြင်းနှင့်ပတ်သက်၍ လုပ်ငန်းလည်ပတ်သည့် ကာလတွင် Non-hazardous waste နှင့် ဘေးအန္တရာယ် ရှိစွန့်ပစ်ပစ္စည်းများကို Developer များမှ စီမံခန့်ခွဲရမည် ဖြစ်ကြောင်းနှင့် စွန့်ပစ်ပစ္စည်းများကို သန့်စင်ခြင်း ကိစ္စရပ်များ ကို KMIC JVC မှ ငှားရမ်းထားသည့် Professional Company နှင့်အတူ စီမံခန့်ခွဲ သွားမည် ဖြစ်ကြောင်းဖော်ပြထားပါသည်။ ထို့အတူ ဘေးအန္တရာယ် ရှိ စွန့်ပစ်ပစ္စည်းများကို Professional Company မှ လာရောက်သိမ်းဆည်းခြင်း မပြုမီ အချိန် အထိ သက်ဆိုင်ရာ အသီးသီးမှ သိမ်းဆည်းသွားမည် ဖြစ်ကြောင်း ဖော်ပြထားပါသည်။ သို့ရာတွင် KMIC အနေဖြင့် အဆိုပြု Professional Company နှင့် ပတ်သက်သည့် အချက်အလက်များ၊ သဘောတူညီချက်/ ကတိကဝတ်များနှင့် အတူ Final Disposal Site သို့မပို့ဆောင်မီ စီမံကိန်းဧရိယာအတွင်း မည်သို့သိုလှောင် သိမ်းဆည်းမည်၊ Domestic Waste များကို မည်သည့် နေရာတွင် Vermi-</p> | <p>- KMIC အနေဖြင့် အဆိုပြု Professional Company နှင့် ပတ်သက်သည့် အချက်အလက်များ၊ သဘော တူညီချက်/ ကတိကဝတ်များနှင့် အတူ Final Disposal Site သို့မပို့ဆောင်မီ စီမံကိန်းဧရိယာ အတွင်း မည်သို့သိုလှောင်သိမ်းဆည်းမည်၊ Domestic Waste များကို မည်သည့်နေရာတွင် Vermi-composing ပြုလုပ်မည်၊ မည်သည့်နေရာ၌ အမှိုက် ကျင်း ထားရှိမည် စသည်တို့ပါဝင်သော Waste Management Plan ကို အသေးစိတ်ဖော်ပြပေးရန်၊ Hazardous Waste နှင့်ပတ်သက်၍ စီမံကိန်းမှ လိုက်နာ မည့် Hazardous Waste ဆိုင်ရာ စည်းမျဉ်းများ၊ စီမံခန့်ခွဲမှု နည်းလမ်းများ၊ ကိုင်တွယ်/ သိုလှောင် သိမ်းဆည်းခြင်းနှင့် နောက်ဆုံးစွန့်ပစ်မည့်နေရာ စသည်တို့ ကို ပြည့်စုံစွာ ဖော်ပြရန်၊</p> | <p>ပတ်ဝန်းကျင်စီမံခန့်ခွဲရေးလုပ်ငန်းတာဝန်ခံအဖွဲ့ (မြို့ပြ ပတ်ဝန်း ကျင်ထိန်းသိမ်းရေးနှင့် သန့်ရှင်းရေး)၊ ရန်ကုန်မြို့တော် စည်ပင် သာယာရေးကော်မတီ၏ သဘောထားမှတ်ချက်များအရ စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲခြင်းနှင့်ပတ်သက်၍ ကော်မတီအနေဖြင့် ဆောင်ရွက်ပေးနိုင်မည့် နည်းလမ်းများ၊ အစီအစဉ်များ အတိုင်း လိုက်နာဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။</p> <p>3.7.6 Solid Waste Management System</p> <p>3.7.6.1 Construction Phase</p> <p>Non-hazardous solid waste management plan</p> <p>Hazardous solid waste management plan</p> <p>စာမျက်နှာ (၁၆၈ - ၁၆၉)</p> <p>3.7.6.2 Operation Phase</p> <p>Non-Hazardous Solid Waste Management Plan</p> <p>Hazardous Solid Waste Management Plan</p> <p>စာမျက်နှာ (၁၆၉ - ၁၇၁) တို့တွင် ဖော်ပြထားပါသည်။</p> |
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| | <p>composing ပြုလုပ်မည်၊ မည်သည့် နေရာ၌ အမှိုက်ကျင်းထားရှိမည် စသည်တို့ပါဝင်သော Waste Management Plan ကို အသေးစိတ် ဖော်ပြ ပေးရန် လိုအပ်ပါသည်။ (**Hazardous and Non-hazardous Waste များ စီမံခန့်ခွဲခြင်းဆိုင်ရာ ကိစ္စရပ် များသည် စက်မှုဇုန်တွင် ထည့်သွင်းစဉ်းစား ရမည့် အချက်များဖြစ်သည့်အတွက် ပိုမိုတိကျသည့် အစီအစဉ် (Plans) များကို ဖော်ပြပေးရန် လိုအပ်ပါသည်။)</p> | | |
| (ဂ) | <p>လူမှုစီးပွားစစ်တမ်းကောက်ယူခြင်းဆိုင်ရာ ရလဒ်များ အရ စီမံကိန်းအနီးရှိ ကျေးရွာများတွင် စာသင်ကျောင်း၊ ကျေးလက်ဆေးပေးခန်းများ လိုအပ်လျက် ရှိကြောင်း ဖော်ပြထားပြီး စာမျက်နှာ ၂၂ တွင် Existing Social Infrastructures and Services တွင် “The social infrastructures will be improved due to the project (for instance a new school will be built for the project as part of CSR Program)” တွင် ထောက်ပံ့ပေးသွားမည်ဖြစ်ကြောင်း ဖော်ပြထားသော် လည်း အစီရင်ခံစာတွင်</p> | <p>အစီရင်ခံစာတွင် စီမံကိန်းဆိုင်ရာ Corporate Social Responsibility (CSR) Programme နှင့် ပတ်သက်၍ ထည့်သွင်းဖော်ပြရန်၊</p> | <p>Existing social infrastructures and services ခေါင်းစဉ် အောက်တွင် Corporate Social Responsibility Programs of Project Proponent ခေါင်းစဉ် ခွဲဖြင့် (CSR) Programme နှင့် ပတ်သက်၍ စာမျက်နှာ (၃၄၇) တွင် အကျဉ်းဖော်ပြထားပါသည်။</p> <p>Corporate Social Responsibility (CSR) Programme နှင့် ပတ်သက်၍ အသေးစိတ်ကို 8.7.8 Corporate Social Responsibility (CSR) Program စာမျက်နှာ (၅၂ - ၅၄) တွင် ဖော်ပြထားပါသည်။</p> |

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| | <p>Corporate Social Responsibility (CSR) Programme နှင့်ပတ်သက်၍ ထည့်သွင်းဖော်ပြထားခြင်းမရှိသည်ကို စိစစ်တွေ့ရှိရပါသည်။</p> | | |
| (ဃ) | <p>ဒေသခံများ၏ အလုပ်အကိုင်အခွင့်အလမ်းနှင့် အသက်မွေးဝမ်းကြောင်းဆိုင်ရာ သင်တန်းများ ဆောင်ရွက်ပေးရန် လိုအပ်သဖြင့် ၎င်းနှင့်သက်ဆိုင်သည့် လေ့ကျင့်ပညာပေးရေးဆိုင်ရာများကို ဖော်ပြရန် လိုအပ်ကြောင်း စိစစ်တွေ့ရှိရပါသည်။</p> | <ul style="list-style-type: none"> - ဒေသခံများ၏ အလုပ်အကိုင်အခွင့်အလမ်းနှင့် အသက်မွေးဝမ်းကြောင်းဆိုင်ရာ သင်တန်းများ ဆောင်ရွက်ပေးမည့် အစီအစဉ်ကို ဖော်ပြရန်၊ ဒေသခံများအား အလုပ်အကိုင်ခန့်ထားရေးနှင့် ပတ်သက်၍ ဖော်ပြရန်၊ - အလုပ်သမားများ၏ လုပ်ငန်းခွင်ထိခိုက်မှုများ၊ ထိန်းချုပ်ကာကွယ်ရေးနည်းလမ်းများ၊ ဘေးအန္တရာယ် ကင်းရှင်းစွာ လုပ်ငန်းဆောင်ရွက်မှု အစီအမံများ၊ ဆောင်ရွက်မည့်ပုံစံများပါဝင်သည့် Occupational Safety and Health Management Plan ကို ပြည့်စုံစွာ ထည့်သွင်းဖော်ပြရန်၊ | <p>ဒေသခံများ၏ အလုပ်အကိုင်အခွင့်အလမ်းနှင့် အသက်မွေးဝမ်းကြောင်းဆိုင်ရာ သင်တန်းများ ဆောင်ရွက်ပေးမည့် အစီအစဉ် များနှင့် ပတ်သက်ပြီး 3.12 Employment of staff and workers စာမျက်နှာ (၁၉၄) တွင် ဖော်ပြထားပါသည်။</p> <p>အလုပ်သမားများ၏ လုပ်ငန်းခွင်ထိခိုက်မှုများ၊ ထိန်းချုပ်ကာကွယ်ရေးနည်းလမ်းများ၊ ဘေးအန္တရာယ် ကင်းရှင်းစွာ လုပ်ငန်းဆောင်ရွက်မှု အစီအမံများ၊ ဆောင်ရွက်မည့် ပုံစံများကို 3. 11 Welfare Plan for Workers စာမျက်နှာ (၁၉၀ - ၁၉၄) 3.13 Management and staff စာမျက်နှာ (၁၉၄ - ၁၉၅) တို့တွင် ဖော်ပြထားပါသည်။</p> <p>Occupational health and safety procedures များကို 3.13 Management and staff စာမျက်နှာ (၁၉၄ - ၁၉၅) နှင့် Occupational health and safety (Risk of injuries</p> |

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| | | | <p>and accidents to workers) စာမျက်နှာ (၃၆၇ - ၃၇၄) တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p> |
| (c) | <p>စောင့်ကြပ်ကြည့်ရှုစစ်ဆေးခြင်း</p> <p>ဇယား ၇.၃ နှင့် ဇယား ၇.၄ Environmental Monitoring Plan with estimated budget (Construction Phase and Operation Phase) တို့တွင် သက်ဆိုင်ရာနယ်ပယ်အလိုက် စောင့်ကြည့် စစ်ဆေးမည့် အစီအစဉ်နှင့် ရန်ပုံငွေများကို ဖော်ပြ ထားပါသည်။</p> | <ul style="list-style-type: none"> - စီမံကိန်းလုပ်ငန်းအစိတ်အပိုင်းများမှ ထွက်ရှိလာသည့် waste water source အလိုက် Monitoring ပြုလုပ်ရန်၊ - လေအရည်အသွေး၊ ရေအရည်အသွေးနှင့် အသံဆူညံ မှုကို တိုင်းတာစောင့်ကြည့်မည့်နေရာများကို Coordinate အမှတ်များနှင့်အတူ တိုင်းတာမည့် Parameters များ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် များအား အကောင်အထည်ဖော်ဆောင်မည့် အဖွဲ့အစည်း (Organization Structure for EMP implementation Team) များကိုလည်း ထည့်သွင်း ဖော်ပြရန်၊ | <p>စီမံကိန်းလုပ်ငန်းအစိတ်အပိုင်းများမှ ထွက်ရှိလာသည့် waste water source အလိုက် Monitoring ပြုလုပ်သွားမည် ဖြစ်ပြီး real-time monitoring indicator ဖြင့် Monitoring ပြုလုပ်သွားပါမည်။ ဤ အချက်ကို Increased wastewater generation စာမျက်နှာ (၃၈၂) တွင် ထည့်သွင်းဖော်ပြထား ပါသည်။</p> <p>လေအရည်အသွေး၊ ရေအရည်အသွေးနှင့် အသံဆူညံမှုကို တိုင်းတာစောင့်ကြည့်မည့်နေရာများကို Coordinate အမှတ်များနှင့်အတူ တိုင်းတာမည့် Parameters များကို Table 8.5: Air Quality Monitoring Locations and Parameters to be measured စာမျက်နှာ (၄၉၉) Table 8.7: Noise Monitoring Locations and Parameters to be measured စာမျက်နှာ (၅၀၄) Table 8.9: Water Quality Monitoring Locations စာမျက်နှာ (၅၁၀) Table 8.10: Parameters of Water Quality to be measured</p> |

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| | | <p>စာမျက်နှာ (၅၁၁) တို့တွင် ဖော်ပြထားပါသည်။</p> <p>ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များအား အကောင်အထည် ဖော်ဆောင်မည့် အဖွဲ့အစည်း (Organization Structure for EMP implementation Team) ကို 8.5.1 Organization Structure for Environmental Management Plan Implementation Team စာမျက်နှာ (၄၇၂ - ၄၇၃) တွင် ဖော်ပြထားပါသည်။</p> |
| <p>၁၁။</p> | <p>အထွေထွေအကြံပြုချက်များ</p> | |
| <p>(က)</p> | <p>စက်မှုဇုန်စီမံကိန်းအတွင်း လာရောက်ရင်းနှီးမြှုပ်နှံမည့် စီမံကိန်းအသီးသီးသည် ၎င်းတို့ဆောင်ရွက်မည့် လုပ်ငန်းအမျိုးအစားနှင့် အရွယ်အစားအပေါ်မူတည်၍ လုပ်ငန်းအမျိုးအစား တစ်ခုချင်းအလိုက် လိုအပ်သော IEE၊ EIA နှင့် EMP တို့ကို ဆောင်ရွက်နိုင်ရန် သက်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဆောင်ရွက်ရန်၊ စက်မှုဇုန်စီမံကိန်းအတွင်း လာရောက်ရင်းနှီးမြှုပ်နှံမည့် စီမံကိန်းအသီးသီးသည် ၎င်းတို့ဆောင်ရွက်မည့် လုပ်ငန်းအမျိုးအစားနှင့် အရွယ်အစားအပေါ်မူတည်၍ လုပ်ငန်းအမျိုးအစား တစ်ခုချင်းအလိုက် လိုအပ်သော IEE၊ EIA နှင့် EMP တို့ကို ဆောင်ရွက်နိုင်ရန် သက်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဆောင်ရွက်သွားပါမည်။</p> | |
| <p>(ခ)</p> | <p>ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) အခန်း (၉) အပိုဒ်ခွဲ ၁၀၈ အရ “စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၏ ဇယားပါအတိုင်း စောင့်ကြပ်ကြည့်ရှုမှုအစီရင်ခံစာကို ဝန်ကြီးဌာနသို့ (၆)လ တစ်ကြိမ် (သို့မဟုတ်) ဝန်ကြီးဌာနက သတ်မှတ်ထားသည့်အတိုင်း တင်ပြရမည်” ဟု ဖော်ပြပါရှိသည့်အတိုင်း စောင့်ကြပ် ကြည့်ရှုမှုအစီရင်ခံစာအား ဝန်ကြီးဌာနသို့ တင်ပြမည့် အစီအစဉ်ကို ထည့်သွင်းဖော်ပြရန်၊ စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၏ ဇယားပါအတိုင်း စောင့်ကြပ်ကြည့်ရှုမှုအစီရင်ခံစာကို ဝန်ကြီးဌာနသို့ (၆)လ တစ်ကြိမ် တင်ပြပါမည်။ 8.5.2 Submission of Monitoring Report စာမျက်နှာ (၄၇၄) တွင် ဖော်ပြထားပါသည်။</p> | |
| <p>(ဂ)</p> | <p>ဤအစီရင်ခံစာကို ပေးပို့ထားသော အကြံပြုချက်များကို ပြင်ဆင်ပြီး ပြန်လည်တင်ပြသည့်အခါ ပြင်ဆင်ချက်ဇယားတစ်ခု ပြုစု၍ နောက်ဆက်တွဲတစ်ခုအဖြစ် ထည့်သွင်းဖော်ပြရန်နှင့် ပြင်ဆင်ချက်ဇယားတွင် အခန်း၊ အပိုဒ်၊ အကြံပြုချက်၊ ပြင်ဆင်ချက် (သို့) ဖြေရှင်းချက်၊ ဒုတိယအကြိမ်အစီရင်ခံစာ၏ စာမျက်နှာတို့ကို</p> | |

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| | <p>ဖော်ပြပေးပါရန်၊ ဤအစီရင်ခံစာကို ပေးပို့ထားသော အကြံပြုချက်များကို ပြင်ဆင်ပြီး ပြန်လည်တင်ပြသည့်အခါ ပြင်ဆင်ချက်ဇယားတစ်ခု ပြုစု၍ ပြင်ဆင်ချက်ဇယားတွင် အခန်း၊ အပိုဒ်၊ အကြံပြုချက်၊ ပြင်ဆင်ချက် (သို့) ဖြေရှင်းချက်၊ ဒုတိယအကြိမ်အစီရင်ခံစာ၏ စာမျက်နှာတို့ကို ဖော်ပြပေးထားပါသည်။</p> |
| (ဃ) | <p>ဒေသခံများ၏ တုန့်ပြန်မှု/စိုးရိမ်မှုများနှင့်ပတ်သက်၍ စီမံကိန်းပိုင်ရှင်မှ ဆောင်ရွက်ပေးမည့် အစီအစဉ်နှင့် ကတိကဝတ်များ ထည့်သွင်းဖော်ပြပေးရန်နှင့် အဆိုပါအချက်များကို List of Commitment စာရင်းတွင် ဖော်ပြရန်၊ အစီရင်ခံစာ၏ အခန်းအသီးသီးတွင် ပါရှိသည့် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များအား စာရင်းပြုစု၍ List of Commitment အား ထည့်သွင်းဖော်ပြရန်။ ဒေသခံများ၏ တုန့်ပြန်မှု/စိုးရိမ်မှုများနှင့်ပတ်သက်၍ စီမံကိန်းပိုင်ရှင်မှ ဆောင်ရွက်ပေးမည့် အစီအစဉ်နှင့် ကတိကဝတ်များနှင့် အစီရင်ခံစာ၏ အခန်းအသီးသီးတွင် ပါရှိသည့် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များအား စာရင်းပြုစု၍ အဆိုပါအချက်များကို List of Commitment စာရင်းတွင် ထည့်သွင်းဖော်ပြထားပါသည်။ 9.7 List of Commitments စာမျက်နှာ (၅၄၈ - ၅၆၇) တွင် ဖော်ပြထားပါသည်။</p> |

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| <p>KMIC Development Co., Ltd မှ Korea-Myanmar Industrial Complex (KMIC) စက်မှုဇုန် စီမံကိန်းအတွက် ဒုတိယအကြိမ် ပြန်လည်ပြင်ဆင်တင်ပြလာသော ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (Environmental Impact Assessment – EIA) အစီရင်ခံစာအပေါ် သက်ဆိုင်ရာဌာနများ၏ သဘောထားမှတ်ချက်များနှင့် စီမံကိန်းပိုင်ရှင်၏ ပြန်လည်ဖြည့်စွက်ပြင်ဆင်ဖော်ပြချက်များ</p> | |
| <p>အလုပ်ရုံနှင့်အလုပ်သမားဥပဒေစစ်ဆေးရေးဦးစီးဌာန</p> | |
| <p>(က) Chapter 2၊ Project relevant local laws, Rules and Institutional Framework ခေါင်းစဉ်အောက်တွင် “The Leave and Holidays Rules (2018)” သာ ပါဝင်သဖြင့် “The Leave and Holidays Act, 1951 (Amended in 2014)” ကို ထပ်မံဖြည့်စွက်ဖော်ပြရန်၊</p> | <p>Chapter 2၊ Project relevant local laws, Rules and Institutional Framework ခေါင်းစဉ် အောက် တွင် “2.1.19 The Leave and Holidays Act, 1951 (Amended in 2014)” ကို ထပ်မံ ဖြည့်စွက် ဖော်ပြထားပါသည်။ (စာမျက်နှာ ၁၁၁ - ၁၁၂)</p> |
| <p>(ခ) Chapter 2၊ Policies of Project Proponent (Developer)</p> | <p>Chapter 2၊ Policies of Project Proponent (Developer)</p> |

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| <p>ခေါင်းစဉ်အောက်တွင် Fair Employment System နှင့် Creating Healthy and Enjoyable Workplace ကိစ္စရပ်များသာပါဝင်သဖြင့် အလုပ်သမားများအတွက် ဘေးအန္တရာယ်ကင်းရှင်းရေး ဆိုင်ရာ အကြောင်းအရာများကိုလည်း ထည့်သွင်းဖော်ပြရန်၊</p> | <p>ခေါင်းစဉ်အောက်ရှိ Fair Employment System နှင့် Creating Healthy and Enjoyable Workplace ကိစ္စရပ်များ အောက်တွင် အလုပ်သမားများအတွက် ဘေးအန္တရာယ်ကင်းရှင်းရေး ဆိုင်ရာ အကြောင်းအရာများကို Creating Safe Work Environment ခေါင်းစဉ်ဖြင့် ထည့်သွင်းဖော်ပြ ထားပါသည်။ (စာမျက်နှာ ၁၄၁)</p> |
| <p>(ဂ) Chapter 6၊ Public Health and Safety Monitoring and Management Plan ခေါင်းစဉ်အောက်တွင်လည်း ကျန်းမာရေးဆိုင်ရာကိစ္စရပ်များအတွက် ဆောင်ရွက်မည့် အစီအမံများကိုသာ စိစစ်တွေ့ရှိရပြီး ခေါင်းစဉ်နှင့်ကိုက်ညီမှုရှိစေရန် ဘေးအန္တရာယ်ကင်းရှင်း ရေးဆိုင်ရာ အစီအမံများကိုလည်း ထည့်သွင်းဖော်ပြရန်၊</p> | <p>Chapter 6၊ Public Health and Safety Monitoring and Management Plan ခေါင်းစဉ်အောက်တွင် ဘေးအန္တရာယ် ကင်းရှင်း ရေးဆိုင်ရာ အစီအမံများကိုလည်း Table 6. 15: Health and Safety Monitoring and Management Plan ၏ နောက်ဆက်တွဲ ဇယား တစ်ခု ဖြင့် ထည့်သွင်းဖော်ပြ ထားပါသည်။ (စာမျက်နှာ ၄၂၀ - ၄၂၄)</p> |
| <p>စီမံကိန်းရေးဆွဲရေးဦးစီးဌာန</p> | |
| <p>(က) စီမံကိန်းအနီးနေထိုင်သူများအတွက် ဆူညံသံလျှော့ချနိုင်စေရန် ညအချိန်လုပ်ငန်းဆောင်ရွက် မှုများကို ကြီးကြပ်မည့်အစီအစဉ်များ ထည့်သွင်းဖော်ပြရန်၊</p> | <p>စီမံကိန်းအနီးနေထိုင်သူများအတွက် ဆူညံသံလျှော့ချနိုင်စေရန် ညအချိန်လုပ်ငန်းဆောင်ရွက် မှုများအား ကြီးကြပ်မည့် အစီအစဉ်များကို 6.10 Noise Control Measures for Night Work ဖြင့် ထည့်သွင်း ဖော်ပြ ထားပါသည်။ (စာမျက်နှာ ၄၂၅ - ၄၂၆)</p> |
| <p>(ခ) စီမံကိန်းအတွင်းနှင့် ပတ်ဝန်းကျင်တွင် လျှပ်စစ်အန္တရာယ်ကာကွယ်ရေးအတွက် စီမံကြီးကြပ် မှုများကို ထည့်သွင်းဖော်ပြရန်၊</p> | <p>စီမံကိန်းအတွင်းနှင့် ပတ်ဝန်းကျင်တွင် လျှပ်စစ်အန္တရာယ် ကာကွယ်ရေးအတွက် စီမံကြီးကြပ် မှုများကို 6.11 Control Measures for Electrical Hazards ခေါင်းစဉ်ဖြင့် ထည့်သွင်း ဖော်ပြ ထားပါသည်။ (စာမျက်နှာ ၄၂၆ - ၄၃၀)</p> |
| <p>(ဂ) Chapter 2. Policy, Legal and Institutional Framework တွင် စီမံကိန်းနှင့် ပတ်သက်၍ လိုက်နာဆောင်ရွက်ရန် လိုအပ်မည့်</p> | <p>Chapter 2. Policy, Legal and Institutional Framework တွင် စီမံကိန်းနှင့် ပတ်သက်၍ လိုက်နာဆောင်ရွက်ရန် လိုအပ်မည့်</p> |

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| <p>မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ဥပဒေ (၂၀၁၅) ၊ ယာဉ် အန္တရာယ်ကင်းရှင်းရေးနှင့်မော်တော်ယာဉ်စီမံခန့်ခွဲမှုဥပဒေ (၂၀၂၀) ၊ ယာဉ်ကျေးမှုအမွေအနှစ် ဒေသများကာကွယ်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၉) ၊ လယ်ယာမြေဥပဒေ (၂၀၁၂) ၊ မြေလွတ်၊ မြေလပ်နှင့်မြေရိုင်းများဥပဒေ (၂၀၁၂) နှင့် ရန်ကုန်တိုင်းဒေသကြီးစည်ပင်သာယာရေးအဖွဲ့ များဥပဒေတို့ကို ထည့်သွင်းဖော်ပြရန်၊</p> | <p>မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ဥပဒေ (၂၀၁၅)၊ ယာဉ်အန္တရာယ် ကင်းရှင်းရေးနှင့်မော်တော်ယာဉ်စီမံခန့်ခွဲမှုဥပဒေ(၂၀၂၀)၊ယာဉ် ကျေးမှုအမွေအနှစ် ဒေသများကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၉)၊ လယ်ယာမြေဥပဒေ (၂၀၁၂) ၊ မြေလွတ်၊ မြေလပ်နှင့် မြေရိုင်းများဥပဒေ(၂၀၁၂)နှင့်ရန်ကုန်တိုင်းဒေသကြီး စည်ပင် သာယာရေး အဖွဲ့ များဥပဒေတို့ကို</p> <p>2.1.26 Myanmar Fire Brigade Law (2015)</p> <p>2.1.27 Vehicle Safety and Motor Vehicle Management Law (2020)</p> <p>2.1.28 Vacant, Fallow and Virgin Land Management Law (2012)</p> <p>2.1.29 Farm Land Law (2012)</p> <p>2.1.30 Protection and Preservation of Cultural Heritage Regions Law (2019)</p> <p>2.1.31 Yangon City Development Committee (YCDC) Law (2018)</p> <p>ခေါင်းစဉ်များဖြင့် ထည့်သွင်း ဖော်ပြထားပါသည်။ (စာမျက်နှာ ၁၂၀ - ၁၃၀)</p> |
| <p>(ဃ) အပိုဒ်ခွဲ ၄.၁.၂ Biological Environmental Baseline Data Collection တွင် ဖော်ပြထား သော အပင်များနှင့် တိရစ္ဆာန်မျိုးစိတ်များအတွက် ကာကွယ်ထိန်းသိမ်းနိုင်မည့် နည်းလမ်းများ ကို ထည့်သွင်းဖော်ပြရန်၊</p> | <p>အပိုဒ်ခွဲ ၄.၁.၂ Biological Environmental Baseline Data Collection တွင် ဖော်ပြထား သော အပင်များနှင့် တိရစ္ဆာန် မျိုးစိတ်များအတွက် ကာကွယ်ထိန်းသိမ်းနိုင်မည့် နည်းလမ်းများ</p> |

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| | <p>ကို 4.11.2.5 Protection Measures of Animal and Plant Species ခေါင်းစဉ် ဖြင့် ထည့်သွင်းဖော်ပြ ထားပါသည်။ (စာမျက်နှာ ၂၇၂ - ၂၇၅)</p> |
| <p>ပြည်သူ့ကျန်းမာရေးဦးစီးဌာန၊ လုပ်ငန်းခွင်နှင့်ပတ်ဝန်းကျင်ကျန်းမာရေးဌာနခွဲ</p> | |
| <p>လုပ်ငန်းခွင်ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်များနှင့်စပ်လျဉ်း၍</p> | |
| <p>(က) Section 6.5.2 Expected Mitigation Measures for OHS တွင် “၁၉၅၁ ခုနှစ်၊ အလုပ်ရုံများအက်ဥပဒေပုဒ်မ (၄၇) ၊ ပုဒ်မခွဲ (၃) အရ အလုပ်သမား တစ်ရောင်းဆယ်ထက်ပို၍ ခိုင်းစေသော အလုပ်ရုံတိုင်းတွင် ပြဋ္ဌာန်းထားသည့် ပစ္စည်းများနှင့်တကွ ပြဋ္ဌာန်းသည့် အကျယ်အဝန်းရှိသော ဆေးခန်းတစ်ခု ထားရှိရမည်။ ထိုဆေးခန်းကို ပြဋ္ဌာန်းထားသည့် ဆရာဝန်နှင့် သူနာပြုဆရာမ များက ကြီးကြပ်စီမံရမည်” ဟု ဖြည့်စွက်ရေးသားပေးရန်၊</p> | <p>အကြံပြုချက် အတိုင်း ဖြည့်စွက်ရေးသားထားပါသည်။ (စာမျက်နှာ ၄၀၃)</p> |
| <p>(ခ) Management of medical waste from worksite medical service တွင် “EMP published by MOHS” အစား “Health Care Waste Management Guideline, 2019 published by MOH” ဟု ပြင်ဆင်ရေးသားပေးရန်၊</p> | <p>အကြံပြုချက် အတိုင်း “Health Care Waste Management Guideline, 2019” published by Ministry of Health (MOH) ဟု ပြင်ဆင်ရေးသားထားပါသည်။ (စာမျက်နှာ ၄၀၃)</p> |
| <p>(ဂ) သက်ဆိုင်ရာကန်ထရိုက်များ၊ ရင်းနှီးမြှုပ်နှံသူများမှ အဆိုပါချမှတ်ထားသော Guideline များ၊ Policies များအား အမှန်တကယ်လိုက်နာဆောင်ရွက်ခြင်း ရှိ/မရှိကို စီမံကိန်းပိုင်ရှင်မှ တာဝန်ယူကြီးကြပ်ရန်နှင့် လိုက်နာမှုမရှိပါက အရေးယူမည့် အစီအစဉ်များအား တိကျစွာ ဖော်ပြပေးရန်။</p> | <p>သက်ဆိုင်ရာကန်ထရိုက်များ၊ ရင်းနှီးမြှုပ်နှံသူများမှ အဆိုပါ ချမှတ်ထားသော Guideline များ၊ Policies များအား အမှန် တကယ်လိုက်နာဆောင်ရွက်ခြင်း ရှိ/မရှိကို စီမံကိန်းပိုင်ရှင်မှ တာဝန်ယူကြီးကြပ်မည်ဟု ဖော်ပြထားပါသည်။ လိုက်နာမှုမရှိပါက အရေးယူမည့် အစီအစဉ်များအား တိကျစွာ ဖော်ပြထားပါသည်။ 6.12 Actions for Violation of Policies, Guidelines and Control Measures (စာမျက်နှာ ၄၃၁)</p> |

