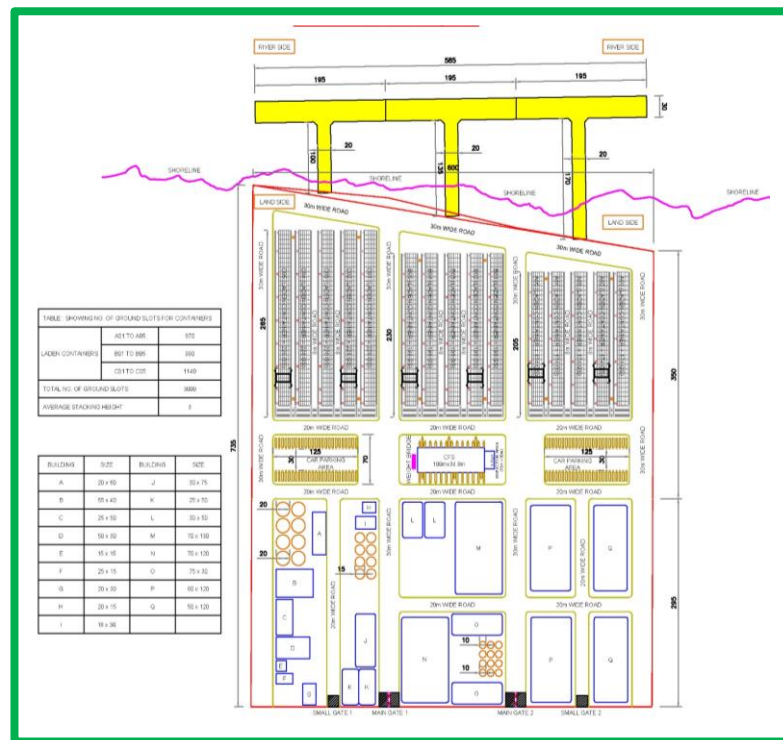


ENVIRONMENTAL MANAGEMENT PLAN

FOR

MYANMAR AGRO ALLIANCE TERMINAL COMPANY LIMITED



PREPARED BY:

**ENVIRONMENTAL CONSERVATION AND CONSULTANT ENGINEERS
ASSOCIATION (YANGON)**

PREPARED FOR:

MAAT COMPANY LIMITED

JUNE, 2020

LETTER OF ENDORSEMENT BY THE PROJECT PROPONENT

This Environmental Management Plan (EMP) for Myanmar Agro Alliance Terminal Company Limited was prepared by Environmental Conservation Consulting Engineers Association (Yangon) on behalf of Myanmar Agro Alliance Terminal Company Limited. I hereby issue my letter of endorsement to confirm:

- (a) the accuracy and completeness of the EMP;
- (b) that the EMP has been prepared in strict compliance with applicable laws including the EIA Procedure; and
- (c) that the Project will at all times comply fully with the commitments, mitigation measures, and plans in the EMP Report.

Signed

Name :
Position :
Organization :

LETTER OF ENDORSEMENT BY THE THIRD PARTY

This Environmental Management Plan has been done with reasonable skills, care and diligence in accordance with the stipulations of Environmental Impact Assessment Procedure (Paragraph 76-82). I hereby signed this report on behalf of the Environmental Conservation and Consulting Engineers Association of Myanmar Engineering Society (Yangon) to certify that all the information in it are true and convincing to the best of our knowledge.

Signed



Name : U YAN NAING AUNG

Position : PUBLIC RELATION OFFICER
.....

Organization : ENVIRONMENTAL CONSERVATION
.....
CONSULTING ENGINEERS ASSOCIATION

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LIST OF ABBREVIATIONS

| | |
|------|-------------------------------------------------------|
| BOD | Biochemical Oxygen Demand |
| COD | Chemical Oxygen Demand |
| EMP | Environmental Management Plan |
| GM | General Manager |
| DGM | Deputy General Manager |
| HOD | Head of Department |
| MAAT | Myanmar Agro Alliance Terminal |
| MEMs | Mitigation and Enhancement Measures |
| NEQG | National Environmental Quality (Emissions) Guidelines |
| NSRs | Noise Sensitive Receivers |
| SLM | Sound Level Meter |
| TSS | Total Suspended Solids |
| UV | Ultra Violet |

အနှစ်ချုပ် အစီရင်ခံစာ

နိဒါန်း

Myanmar Agro Alliance Terminal Company Limited ၏ ဆိပ်ခံတံတား တည်ဆောက်ရေး စီမံကိန်းကို အကွက်အမှတ်(၂၇)တွင် ရင်းနှီးမြှုပ်နှံမှု ရရှိထားသော Myanmar Edible Oil Industrial Public Co., Ltd. (MEICO)၊ အကွက်အမှတ်(၂၈)တွင် ရင်းနှီးမြှုပ်နှံမှု ရရှိထားသော Myanmar Agribusiness Public Co., Ltd. (MAPCO) နှင့် အကွက်အမှတ်(၂၉)တွင် ရင်းနှီးမြှုပ်နှံခွင့် ရရှိထားသူ Myanma Agricultural and General Development Public Co., Ltd (MAGDPL) တို့မှ Integrated business plan ကို ပူးပေါင်းရေးဆွဲ၍ အကောင်အထည်ဖော်ဆောင်ရွက်သွားမည်ဖြစ်ပြီး၊ Container Cargo ကို အခြေပြု၍ ကုမ္ပဏီ(၃)ခုမှ ပူးပေါင်းဆောင်ရွက်သွား မည်ဖြစ်ပါသည်။ ကုန်းတွင်းပိုင်းရှိ အကွက်(၃)ကွက်တွဲတွင် ကုမ္ပဏီ အသီးသီး၏ မူလရည်မှန်းချက်အတိုင်း သက်ဆိုင်ရာကုန်စည်များ သိုလှောင်ခြင်း၊ ထုတ်လုပ်ခြင်း၊ ဖြန့်ဖြူးခြင်း စသည့်ဆိပ်ကမ်း ဆိုင်ရာလုပ်ငန်းများနှင့် စက်မှုသီးနှံထုတ်လုပ်ခြင်းလုပ်ငန်းများကို ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။ ဆိပ်ကမ်းအား စီမံခန့်ခွဲအုပ်ချုပ်ခြင်း (Port Management) နှင့်ပတ်သတ် ၍ Container Yard နှင့် Jetty Terminal အတွက် ဘုံအဖွဲ့မှ Management and Operation ပြုလုပ်မည်ဖြစ်ပြီး နောက်ခံကုမ္ပဏီ တစ်ခု ခြင်း၏ သီးခြား Compound အတွင်း ကုမ္ပဏီတစ်ခုခြင်းမှ ဆိပ်ကမ်း ဆိုင်ရာဆောင်ရွက်ချက် (Port Functions) ဘဏ္ဍာရေးစီမံခန့်ခွဲမှု (Financing)၊ ဈေးကွက်ယှဉ်ပြိုင်မှု (Marketing and Market Competition) သီးခြားလည်ပတ်ခြင်းနှင့် သီးခြားစီမံခန့်ခွဲခြင်း (Separate Operation and Management) ကို ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။ အစိုးရဌာနဆိုင်ရာများ၊ ဝန်ကြီးဌာနများနှင့်ပတ်သတ်၍ တရားဝင်ဆက် သွယ်ခြင်း၊ ဦးဆောင်ဦးရွက်ပြု၍ ဆောက်ရွက်ခြင်းများကို ဘုံအဖွဲ့မှ (MAAT)မှ ဆောက်ရွက်သွားမည် ဖြစ်ပါသည်။ စီမံကိန်း အကောင်အထည်ဖော်ဆောင်ရွက်ရာတွင် ရင်းနှီးမြှုပ်နှံမှု ဆောင် ရွက်လိုသည့် Investor မှ အဆိုပြုချက် စတင်တင်ပြခြင်းမှစ၍ ဝန်ကြီးဌာန မှတစ်ဆင့် ခွင့်ပြုချက်အဆင့်ဆင့်ရရှိပြီးနောက်၊ စတင် တည်ဆောက်သည့် ကာလတစ်လျှောက်လုံးနှင့် တည်ဆောက်ပြီးစီး၍ Operation ကာလအထိ တိုင်အောင် မြန်မာ့ဆိပ်ကမ်း အာဏာပိုင်သို့ ခွင့်ပြုချက် တောင်းခံဆောင် ရွက်ရပါသည်။ လစဉ် လုပ်ငန်းတိုးတက်မှု/ လုပ်ငန်းဆောင်ရွက်ပြီးမြောက် ချက်များ/ သင်္ဘောအဝင်/ အထွက်စာရင်းများ/ တွန်းသင်္ဘောတောင်း ခံခြင်းများကို မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်သို့ တင်ပြ၍ ဆောင်ရွက်ရခြင်း ဖြစ်ပါသည်။

တည်နေရာ

Myanmar Agro Alliance Terminal Company Limited ၏ ၅၈၅ မီတာအရှည်ရှိသော ဆိပ်ခံတံတား တည်ဆောက်ရေး စီမံကိန်းကို သီလဝါဆိပ်ကမ်းဧရိယာ၊ မြေကွက်အမှတ် (၂၇)၊ (၂၈)၊ (၂၉)၊ ကျောက်တန်းမြို့နယ် ရန်ကုန်တိုင်းဒေသကြီးတွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည် ဖြစ်ပါသည်။ စီမံကိန်းသည် ရန်ကုန်မြစ်၏ အရှေ့ဘက်အခြမ်းတွင်တည်ရှိပါသည်။

ဥပဒေရေးရာသုံးသပ်ချက်

ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း လုပ်ငန်းများ ဆောင်ရွက်ရာတွင် အောက်ဖော်ပြပါ ပြဋ္ဌာန်းချက်များ၊ လမ်းညွှန်ချက်များနှင့် အပြည်ပြည်ဆိုင်ရာ လမ်းညွှန်ချက်များအား ကိုးကားလုပ်ဆောင်ခဲ့ပြီး Myanmar Agro Alliance Terminal Co., Ltd မှ ထိုဥပဒေပြဋ္ဌာန်းချက်များကို လိုက်နာဆောင်ရွက်ရမည် ဖြစ်ပါသည်။

- (၁) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂)၊ ပုဒ်မ ၇ (က)၊ ၁၄၊ ၁၅၊ ၂၄၊ ၂၉
- (၂) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေများ (၂၀၀၄) (နည်း ၆၉)
- (၃) ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ် ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ၊ ၂၀၁၅ (အပိုဒ် ၁၀၂ မှ ၁၁၀၊ ၁၁၃၊ ၁၁၅၊ ၁၁၇)
- (၄) အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး(ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅)
- (၅) တိုင်းရင်းသားလူမျိုးများ အခွင့်ရေးကာကွယ် စောင့်ရှောက်ရေးဥပဒေ(၂၀၁၅) (ပုဒ်မ ၅)
- (၆) မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ဥပဒေ၊ ၂၀၁၆ (ပုဒ်မ ၅၀(ဃ)၊ ၅၁၊ ၆၅(စ) မှ (ထ)၊ ၇၃)
- (၇) မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှုနည်းဥပဒေများ၊ ၂၀၁၇(နည်း ၂၀၂၊ ၂၀၃၊ ၂၀၆၊ ၂၁၂)
- (၈) ပုပ္ဖလိကစက်မှုလုပ်ငန်းဥပဒေ၊ ၁၉၉၀(ပုဒ်မ ၄၊ ၁၃(ခ)(စ)(ဆ)၊ ၁၅(က)(ခ))
- (၉) ဓာတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများ အန္တရာယ်မှ တားဆီးကာကွယ်ခြင်းဥပဒေ၊ ၂၀၁၃ (ပုဒ်မ ၁၅၊ ၁၆၊ ၁၇၊ ၂၂၊ ၂၇)
- (၁၀) မြန်မာ့မီးသတ်တပ်ဖွဲ့ဥပဒေ၊ ၂၀၁၅ (ပုဒ်မ ၂၅)
- (၁၁) ရေနံနှင့်ရေနံထွက်ပစ္စည်းဆိုင်ရာဥပဒေ၊ ၂၀၁၇ (ပုဒ်မ ၉ (က) (င)၊ ၁၀(ခ)၊ (လောင်စာဆီ/ သယ်) ပုဒ်မ ၁၁၊ (ကန် ဖြင့်လှောင်လျှင်) ပုဒ်မ ၁၀(က)(ဂ)(ဃ))

- (၁၂) မော်တော်ယာဉ်ဥပဒေ၊ ၂၀၁၅
- (၁၃) စံချိန်စံညွှန်းသန်မှတ်ခြင်းဆိုင်ရာဥပဒေ ၊ ၂၀၁၄ (ပုဒ်မ ၁၇၊ ၁၉၊ ၂၆)
- (၁၄) ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၁၅ (ပုဒ်မ ၃၇၊ ၃၄)
- (၁၅) မြန်မာအင်ဂျင်နီယာကောင်စီဥပဒေ၊ ၂၀၁၃ (ပုဒ်မ ၃၇၊ ၃၄)
- (၁၆) ရှေးဟောင်းဝတ္ထုပစ္စည်းကာကွယ်ထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၁၅ (ပုဒ်မ ၁၂)
- (၁၇) ရှေးဟောင်းအဆောက်အအုံကာကွယ်ထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၁၅ (ပုဒ်မ ၁၂၊ ၁၅၊ ၂၀(ခ))
- (၁၈) ပို့ကုန်သွင်းကုန်ဥပဒေ၊ ၂၀၁၂ (ပုဒ်မ ၇) (ရှိလျှင်)
- (၁၉) အလုပ်သမားအဖွဲ့အစည်းဥပဒေ၊ ၂၀၁၁
- (၂၀) အလုပ်သမား အငြင်းပွားမှုဖြေရှင်းရေးဥပဒေ၊ ၂၀၁၂
- (၂၁) အလုပ်အကိုင်နှင့် ကျွမ်းကျင်မှုဖွံ့ဖြိုး တိုးတက်ရေးဥပဒေ၊ ၂၀၁၃
- (၂၂) အနည်းဆုံးအခကြေးငွေဥပဒေ၊ ၂၀၁၃
- (၂၃) အခကြေးငွေပေးချေရေးဥပဒေ၊ ၂၀၁၆
- (၂၄) Workmen Compensation Act, 1983
- (၂၅) ခွင့်နှင့်အလုပ်ပိတ်ရက်များဥပဒေ၊ ၁၉၅၁
- (၂၆) လူမှုဖူလုံရေးဥပဒေ၊ ၂၀၁၂
- (၂၇) မြန်မာနိုင်ငံ ပြည်သူ့ကျန်းမာရေးဥပဒေ၊ ၁၉၇၂(ပုဒ်မ ၃၊ ၅)
- (၂၈) ကူးစက်ရောဂါများကာကွယ်နှိမ်နင်းရေးဥပဒေ၊ ၁၉၉၅ (ပုဒ်မ ၃(က)(င)၊ ၄ ၊ ၁၁)
- (၂၉) ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက်ပစ္စည်း သောက်သုံးမှုထိန်းချုပ် ရေးဥပဒေ၊ (ပုဒ်မ ၉)
- (၃၀) ရန်ကုန်တိုင်းဒေသကြီးစည်ပင်သာယာရေးအဖွဲ့ဥပဒေ၊ ၂၀၁၈
- (၃၁) ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၀၆ (ပုဒ်မ ၈(က)၊ ၁၁၊ ၁၉၊ ၂၁(ခ)၊ ၂၂၊ ၂၄(ခ))
- (၃၂) ရေချိုငြိမ်းလုပ်ငန်းဥပဒေ (၁၉၉၁)
- (၃၃) စားသုံးသူအကာအကွယ်ပေးရေးဥပဒေ (၂၀၁၄)
- (၃၄) လုပ်ငန်းခွင်အန္တရာယ်ကင်းရှင်းရေးနှင့်ကန်မာရေးဆိုင်ရာဥပဒေ (၂၀၁၉)
- (၃၅) လျှပ်စစ်ဥပဒေ (၂၀၁၄)

(၃၅) မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်ဥပဒေ (၂၀၁၅)

(၃၆) Myanmar Merchant Shipping Act

(၃၇) သဘာဝဘေးအန္တရာယ်ဆိုင်ရာစီမံခန့်ခွဲမှုဥပဒေ

ဆိပ်ခံတံတားတွင်ပါဝင်မည့်အရာများ

ဆိပ်ခံတံတားအမျိုးအစား

MAAT Company Limited မှ Reinforced Concrete Jetty with reinforced concrete superstructure on prestressed concrete spun-piles အမျိုးအစားရှိသော ဆိပ်ခံတံတားကို တည်ဆောက်မည် ဖြစ်ပါသည်။ ကုန်သွယ်ရေးအခြေပြုဘက်စုံသုံးဆိပ်ခံတံတား (Container Based Multipurpose Jetty Terminal)ကို တည်ဆောက်မည်ဖြစ်ရာ Steel Pipe Pile များကိုအောက်ခံ Deep Foundation အဖြစ် အသုံးပြု၍ အပေါ်မှ Steel Super Structure ဖြင့်တည်ဆောက်နိုင်သော်လည်း ရန်ကုန်မြစ်သည် Tidal Effect ကို ခံစားရသည်ဖြစ်၍ Steel Structure ကိုသုံးခြင်းဖြင့် သံချေးစားဆွေးမြေမှု မြန်ဆန်လာမည် ဖြစ်ပါသည်။ သို့ဖြစ်ပါ၍ သံကူကွန်ကရစ် ဆိပ်ခံတံတား (R.C Jetty) ကိုသာ တည်ဆောက်မည် ဖြစ်ပါသည်။ ၎င်းအပြင် ရန်ကုန်မြစ်အတွင်း တည်ဆောက် သည့် ဆိပ်ခံတံတားများအား မြစ်တွင်းသို့တိုးထွက်၍ မြေဖို့တည် ဆောက်သည့် Soil Type မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်မှ ခွင့်ပြုခြင်းမရှိ သည့်အတွက် Pile Type Jetty သာ တည်ဆောက်သွားမည် ဖြစ်ပါသည်။ ဆိပ်ခံတံတား၏အရှည် နှင့်အကျယ် တို့မှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

| | |
|--------------------------------------|---------|
| Overall Jetty Length (Plot 27,28,29) | = 585m |
| Jetty Head Width | = 30 m |
| Jetty Approach Width | = 20 m |
| Each Jetty Length | = 195 m |
| Distance Between (Plot 26 & 27) | = 5 m |
| Distance Between (Plot 29 & 30) | = 5.5 m |

ဆိပ်ကမ်းတွင်ဆိုက်ကပ် နိုင်သောသင်္ဘောအမျိုးအစားများ

MAAT Company Limited ၏ ဆိပ်ခံတံတားတွင် ဆိပ်ကပ်မည့်သင်္ဘောအမျိုးအစားများမှာ Container Vessels, General Cargo Vessels, Bulk Cargo Vessels နှင့် Oil Cargo Vessels တို့ဖြစ်ကြပါသည်။ ဆိပ်ခံတံတား၏ စုစုပေါင်း အလျားအရ တန်ချိန် ၃၀၀၀၀ ရှိသော ရေယာဉ် (၂) စီး နှင့် တန်ချိန် ၁၅,၀၀၀ ရှိသော ရေယာဉ် (၁) စီး ဆိုက် ကပ်နိုင်ပါသည်။ (သို့မဟုတ်) တန်ချိန် ၂၀,၀၀၀ ရှိသော ရေယာဉ် (၃) စီး တစ်ပြိုင်တည်း ဆိုက်ကပ်နိုင်ပါသည်။ ရေယာဉ်၏ အရှည်နှင့် အကျယ်တို့မှာအောက်ပါအတိုင်း ဖြစ်ပါသည်။

| | |
|------------------------------------|--------------------------|
| Length Over All (LOA) | = 203M (JPN - Standard) |
| Length Between Perpendicular (LBP) | = 151M (JPN - Standard) |
| Molded Breadth | = 30.6M (JPN - Standard) |
| Full Loaded Draft | = 11.2M (JPN - Standard) |

လက်ရှိပတ်ဝန်းကျင်အခြေအနေ

(၁) အကျိုးသက်ဆိုင်သူများ

ဒေသခံများ၊ အစိုးရအဖွဲ့အစည်းများ၊ စီမံကိန်းအဆိုပြုသူ နှင့် စီမံကိန်းနှင့် သက်ဆိုင်သည့် အခြားအဖွဲ့အစည်းများ (ဥပမာ- အစိုးရမဟုတ်သည့် အဖွဲ့အစည်းများ) ကို စီမံကိန်း၏ အကျိုးသက်ဆိုင်သူများ (Stakeholders) ဟူ၍ သတ်မှတ်ထားပါသည်။

ဇယား (၁) စီမံကိန်းအတွက်အကျိုးသက်ဆိုင်သူများ

| စဉ် | အကျိုးသက်ဆိုင်သူအုပ်စု | အကျိုးသက်ဆိုင်သူ | စိတ်ဝင်စားမှု | | စိတ်ဝင်စားမှု |
|-----|------------------------|------------------|---------------|--------------|---------------|
| | | | ပမာဏ | အကြောင်းရင်း | |
| ၁ | ဒေသခံများ | အေးမြသီတာ | နိမ့် | နီးကပ်ခြင်း | ညစ်ညမ်းမှု |
| | | ရွှေပြည်သာယာ | နိမ့် | နီးကပ်ခြင်း | စွန့်ပစ်ရေ |
| | | သီတာမြိုင် | နိမ့် | နီးကပ်ခြင်း | |

| | | | | | |
|---|-----------------------|----------------------------------------------|--------------|---------------------------------------|----------------------------------------------------------------------------------------------|
| | | | | | - အလုပ်အကိုင်အခွင့်အလမ်း - CSR |
| ၂ | အစိုးရ ဌာနများ | အထွေထွေ အုပ်ချုပ်ရေး ဦးစီးဌာန | အလယ် အလတ် | အုပ်ချုပ်ရေး | - အုပ်ချုပ်ရေး - ပူးပေါင်းဆောင်ရွက်ရေး - CSR |
| | | မြို့နယ်ပညာရေးမှူးရုံး | နိမ့် | CSR | - CSR |
| | | မြေစာရင်းဦးစီးဌာန | နိမ့် | မြေအရှုပ် အရှင်းမရှိ | - ပတ်ဝန်းကျင်ညစ်ညမ်းမှု |
| | | ကျန်းမာရေးဦးစီးဌာန | နိမ့် | CSR | - မြေယာအရှုပ်အရှင်း |
| | | မြို့နယ်ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာန | အလယ် အလတ် | - | - ရေမြောင်းစနစ် - ဒေသခံပြည်သူများ |
| | | မြို့နယ်မီးသတ်တပ်ဖွဲ့ | မြင့် | မီးဘေး အန္တရာယ်ကာကွယ် ထားရှိမှု | - အလုပ်အကိုင်အခွင့်အလမ်း ရရှိနိုင်မှု - မြို့ပြစီမံခန့်ခွဲမှု အစီအစဉ် |
| | | မြို့နယ်စည်ပင်သာယာရေး ကော်မတီ | မြင့် | - | - အစိုင်အခဲစွန့်ပစ် ပစ္စည်း - ရေမြောင်းစနစ် - ရေဆိုးထုတ်လွှတ်မှု - ရေအသုံးပြုမှု |
| ၃ | လုပ်ငန်း အဆိုပြုသူ | စီမံကိန်းအဖွဲ့ တည်ဆောက်ရေးအဖွဲ့ | မြင့် | စီမံကိန်းပိုင်ရှင် | - လုပ်ငန်းလည်ပတ် ရေးနှင့် စီမံခန့်ခွဲရေး - တည်ဆောက်ရေး |

| | | | | | |
|---|-------|------|---|---|-------|
| | | | | | - EMP |
| ၄ | အခြား | မရှိ | - | - | - |

(၂) စီမံကိန်း၏သက်ရောက်ရေးဇယားများ

စီမံကိန်း၏ သက်ရောက် ရေးဇယားများကို စီမံကိန်း၏ အကျိုးသက်ဆိုင်သူများ (Stakeholders) လေ့လာစစ်ဆေးမှု ရလဒ်များပေါ်တွင် အခြေခံ၍ နယ်ပယ်ပိုင်းခြား သတ်မှတ်ပါသည်။ နယ်ပယ်ပိုင်းခြား သတ်မှတ်ထားမှုများကို အောက်ပါဇယား တွင်ဖော်ပြထားပါသည်။

ဇယား (၂). နယ်ပယ်ပိုင်းခြားသတ်မှတ်ထားမှုများ

| စဉ် | ကဏ္ဍ | သက်ရောက်ရေးဇယား | ဆက်နွှယ်နေသည့်အကြောင်းအချက်များ |
|-----|-------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| ၁ | လူနေရပ်ကွက်/ကျေးရွာများ | အေးမြသီတာ | - ပတ်ဝန်းကျင်ညစ်ညမ်းမှု |
| | | ရွှေပြည်သာယာ | - စွန့်ပစ်ရေ |
| | | သီတာမြိုင် | - အလုပ်အကိုင်အခွင့်အလမ်း ရရှိနိုင်မှု - CSR |
| ၂ | မြေထုပတ်ဝန်းကျင် | အနီးနားရှိစိုက်ပျိုးမြေများ၊ စီမံကိန်းပတ်ဝန်းကျင် | - စွန့်ပစ်ပစ္စည်းများ - ရေသွယ်မြောင်းများ - မြေထုညစ်ညမ်းမှုဆိုင်ရာများ - လမ်းအသုံးပြုမှု - မြေထုမညီညာမှုများ |
| ၃ | ဇီဝပတ်ဝန်းကျင် | စီမံကိန်းဇရိယာ၊ ပတ်ဝန်းကျင်ရှိ လယ်ယာမြေများ၊ ရန်ကုန်မြစ် | ညစ်ညမ်းမှုများ |

| | | | |
|---|-------------------------|-------------------------------------------------------------|--------------------------------------------------------------------|
| ၄ | လေထုနှင့်အသံဆူညံမှု | စီမံကိန်းဧရိယာနှင့် စီမံကိန်း အနီးရှိ ကျေးရွာများ | - ဆူညံသံနှင့်တုန်ခါမှုများ - လေထုအရည်အသွေး |
| ၅ | ရေထုပတ်ဝန်းကျင် | စီမံကိန်းဧရိယာနှင့် စီမံကိန်းဧရိယာအနီးရှိ ကျေးရွာများ | - ရေအသုံးပြုမှု - ရေအရည်အသွေး - စွန့်ပစ်ရေ |
| ၆ | လူမှုစီးပွားပတ်ဝန်းကျင် | စီမံကိန်းဧရိယာအနီးရှိ ကျေးရွာများ | - အလုပ်အကိုင်ရရှိမှုများ - ပတ်ဝန်းကျင်အကျိုးပြု လုပ်ငန်းများ |

(၃) လေအရည်အသွေး

လက်ရှိစီမံကိန်းပတ်ဝန်းကျင်၏ လေထုအရည်အသွေးသိရှိနိုင်စေရန်အတွက် လေထုဖိအား၊ ကာဗွန်ဒိုင်အောက်ဆိုဒ်၊ ဟိုက်ဒရိုဂျင် ဆာလဖိုက်ဒ်၊ မီသိန်း၊ နိုက်ဒရိုဂျင်ဒိုင်အောက်ဆိုဒ်၊ အိုဇုန်း၊ PM₁₀၊ PM_{2.5}၊ စိုထိုင်းဆ၊ ဆာလဖာဒိုင် အောက်ဆိုဒ်၊ ဆိုလာဓာတ်ရောင်ခြည်၊ အပူချိန်၊ လေတိုက်နှုန်း နှင့် လေတိုက်ရာအရပ်တို့ကို တိုင်းတာခဲ့ပါသည်။

လေထုအရည်အသွေးအား အမှတ် (၁) မှတ်လျှင် (၈) နာရီတိုင်းတာခဲ့ပြီး စီမံကိန်းဧရိယာ အတွင်းတွင်းတွင် တိုင်းတာခဲ့ခြင်း ဖြစ်ပါသည်။ တိုင်းတာမှုများကို စိမ်းလမ်းအမိမြေ လေထုအရည်အသွေး တိုင်းတာ ဆန်းစစ်သည့်အဖွဲ့မှ ၂၀၂၀ခုနှစ်၊ ဇန်နဝါရီတွင် တိုင်းတာခဲ့ပြီး တိုင်းတာမှု ရလဒ်များကို Table (19) တွင်ဖော်ပြထားပါသည်။

(၄) ရေအရည်အသွေး

MAAT သည် လယ်ယာ ထွက်ကုန်နှင့် ဆီထွက်သီးနှံကုန်ပစ္စည်းများ တင်/ချ ခေတ်မီဘက်စုံသုံး အပြည်ပြည် ဆိုင်ရာ ဆိပ်ခံတံတားနှင့် ဆက်စပ်သော စီးပွားရေးအဆောက်အအုံ များကို တည်ဆောက်ခြင်း နှင့် လုပ်ငန်းလည်ပတ်ခြင်းတို့တွင် အသုံးပြုရန်အတွက် ရေကို ဘန်ဘွေးကုန်းနှင့် သီလဝါဆည်တို့မှ ရယူသုံးစွဲရန် ရည်ရွယ်ထားရှိပါသည်။ စီမံကိန်းပတ်ဝန်းကျင်၏ လက်ရှိရေအရည်အသွေးကို သိရှိနိုင်စေရန် အတွက်

စီမံကိန်းဧရိယာ အနောက်ဘက်ရှိ ရန်ကုန်မြစ်ရေ နှင့် စီမံကိန်းဧရိယာအရှေ့ဘက်ရှိမြောင်းတို့မှ ရေနမူနာ (၂) ခု ကောက်ယူခဲ့ပြီး ရေအရည်အသွေး တိုင်းတာမှုများ ပြုလုပ်ခဲ့ပါသည်။ ရေအရည်အသွေးတိုင်းတာရာတွင် ရေများ၏ ချဉ်ဖန်ကိန်း၊ ဇီဝဆိုင်ရာ အောက်ဆီဂျင်လိုအပ်ချက်၊ ဓာတုဆိုင်ရာအောက်ဆီဂျင်လိုအပ်ချက်၊ ဆိုင်းကြွအနည်၊ စုစုပေါင်းနိုက်ဒရိုဂျင်၊ မီးစုန်းဓါတ်၊ စက်ဆီနှင့် ချောဆီ၊ စုစုပေါင်းပိုးအရေအတွက် တို့အားတိုင်းတာပြီး တိုင်းတာမှုရလဒ်များကို Table (15 နှင့် 16) တို့တွင် ဖော်ပြ ထားပါသည်။

(၅) မြေအရည်အသွေး

Table (27) နှင့် (28) တို့တွင် ဖော်ပြထားသော စီမံကိန်းဧရိယာအတွင်းမှ ကောက်ယူ ထားသည့်မြေကို တိုင်းတာထားသော မြေတိုင်းတာမှုရလဒ်များအရ လက်ရှိမြေအရည်အသွေးမှာ အယ်ကာလီဓါတ် အနည်းငယ် ရှိကြောင်း တွေ့ရှိရပါသည်။

(၆) မြေမျက်နှာသွင်ပြင်

ကျောက်တန်းမြို့နယ်သည် သန်လျင်-ကျောက်တန်း ကားလမ်းဘေး ဝဲယာ ပတ်ဝန်းကျင်တစ်လျှောက် မှာ တောင်ကုန်း၊ တောင်ကြောများဖြစ်ပြီး ပျမ်းမျှအားဖြင့် ကျန်ဧရိယာအားလုံးမှာ လယ်ယာစိုက်ပျိုးလုပ်ကိုင် နိုင်သည့် မြေနိမ့်လွင်ပြင်များဖြစ်ပါသည်။ ကျောင်းတန်းမြို့နယ်သည် မြစ်၊ ချောင်းများပေါများသည့် ဒေသ တစ်ခု ဖြစ်ပြီး၊ မြစ်ချောင်းများသည် အနောက်မှ အရှေ့သို့ စီးဆင်းလျက်ရှိပါသည်။ ထင်းရှူးသောချောင်းမှာ မှော်ဝန်းချောင်းဖြစ်ပြီး ရန်ကုန်မြစ်ဝမှဖြတ်၍ အနောက်မှ အရှေ့သို့ စီးဆင်းပါသည်။ ကျောက်တန်း မြို့နယ်သည် ပင်လယ်ရေမျက်နှာပြင်အထက် (၂၀) ပေတွင်တည်ရှိပြီး အမြင့်ဆုံးနေရာမှာ မီးသတ်စခန်းရုံး နေရာ ဖြစ်၍ အနိမ့်ဆုံးနေရာမှာ မှော်ဝန်းချောင်းကမ်းဘေးမှ ကျေးရွာများဖြစ်ပါသည်။

(၇) ရာသီဥတု

ကျောက်တန်းမြို့နယ်သည် ပူအိုက်စွတ်စိုသော ရာသီဥတုရှိပြီး နှစ်စဉ်ပျမ်းမျှအပူချိန် (၃၂.၃) ဒီဂရီစင်တီဂရိတ် ရှိပါသည်။ ဧပြီလသည် ကျောက်တန်းမြို့နယ်၏ အပူဆုံးလဖြစ်ပြီး အပူချိန် (၃၇) ဒီဂရီစင်တီ ဂရိတ်ရှိ၍ ဇန်နဝါရီလမှာမူ ကျောက်တန်းမြို့နယ်၏ အအေးဆုံးလဖြစ်ပြီး အပူချိန် (၁၇.၉) ဒီဂရီစင်တီ ဂရိတ် ရှိပါသည်။ နှစ်စဉ် ပျမ်းမျှမိုးရေချိန်မှာ (၂၂၃.၄၂) မီလီမီတာ ဖြစ်ပါသည်။ ဇူလိုင်လသည် မိုးရွာသွန်းမှု

အများဆုံးလ ဖြစ်ပြီး ထိုလအတွင်း (၂၆.၂) ရက်ခန့် မိုးရွာသွန်းပါသည်။ ဖေဖော်ဝါရီလသည် မိုးရွာသွန်းမှု အနည်းဆုံးလ ဖြစ်ပြီး ပျမ်းမျှမိုးရေချိန်မှာ (၂) မီလီမီတာခန့် ရှိပါသည်။

(၈) ဇီဝပတ်ဝန်းကျင်

ကျောက်တန်းမြို့နယ်အတွင်းတွင် ပေါက်ရောက်သည့် သဘာဝပေါက်ပင်များမှာ လမု၊ ကန့်ပလား၊ ကနစို၊ သင်ပေါင်း၊ မကျည်း၊ ဗျိုက်ပင်၊ ကုက္ကိုလ်၊ ပေါက်ပန်းဖြူ၊ သီဟိုဠ်၊ မရမ်း၊ သရက်၊ သပြေပင်များ နှင့် ဝါးပင်များ ထူထပ်စွာ ပေါက်ရောက်ပါသည်။ ကျောက်တန်းမြို့နယ်အတွင်းတွင်း တောရိုင်းတိရိစ္ဆာန်များမရှိပါ။ အသေးစိတ်ကို Table (30 to 40) တွင်ဖော်ပြထားပါသည်။

(၉) လူမှုစီးပွားပတ်ဝန်းကျင်

ကျောက်တန်းမြို့နယ်သည် ရပ်ကွက် (၉) ခု၊ ကျေးရွာ (၃၂) ရွာဖြင့် ဖွဲ့စည်းထားသော မြို့နယ်တစ်ခု ဖြစ်ပါသည်။ ကျောက်တန်းမြို့နယ်အတွင်းတွင် အိမ်ခြေ ၃၂၉၇၆ အိမ်ရှိပြီး လူဦးရေ ၁၃၂၇၆၅ ဦး ရှိပါသည်။ ဗမာလူမျိုးအများစု နေထိုင်ကြပြီး ဗုဒ္ဓဘာသာကို ကိုးကွယ်သူများ ဖြစ်ကြပါသည်။ ကရင်လူမျိုးများ ဒုတိယ အများဆုံး နေထိုင်ကြပြီး ဗုဒ္ဓဘာသာကို ကိုးကွယ်ကြပါသည်။ ခရစ်ယာန်ဘာသာကို ကိုးကွယ်သူ အနည်းငယ် ရှိပြီး အစ္စလာမ်နှင့် ဟိန္ဒူဘာသာကို ကိုးကွယ်သူ အနည်းစုရှိပါသည်။

မြို့နယ်အတွင်းရှိဒေသခံ ပြည်သူလူထုသည် စိုက်ပျိုးရေးလုပ်ငန်းကို အဓိကထား လုပ်ကိုင် ဆောင်ရွက်ကြပါသည်။ ထို့အပြင် ပင်လယ်ငါးဖမ်းလုပ်ငန်းများကို လည်းစီးပွားဖြစ် လုပ်ကိုင်ကြပါသည်။ ကျောက်တန်းမြို့နယ်သည် မြန်မာနိုင်ငံအတွင်းရှိ ဒေသများသို့ ကုန်းလမ်း၊ ရေလမ်း၊ ရေကြောင်းလမ်းများဖြင့် သွားလာနိုင်ပြီး လမ်းပန်းဆက်သွယ်ရေး ကောင်းမွန်သောမြို့နယ်ဖြစ်ပါသည်။ မြို့နယ်၏အဓိကထွက်ကုန်မှာ ဆန်၊ စပါးဖြစ်ပြီး ရန်ကုန်မြို့သို့အများဆုံး တင်ပို့ရောင်းချပါပြီး စားသောက်ကုန်နှင့် အဝတ်အထည် ပစ္စည်း များကို အခြားဒေသများမှ အဓိကထားတင်သွင်း ရပါသည်။ ကျောက်တန်းမြို့နယ်တွင် အစိုးရဝန်ထမ်း (၄၆၇၂) ဦး၊ ဝန်ဆောင်မှုလုပ်ငန်းတွင် အလုပ်လုပ်ကိုင်သူ (၁၁၁၃၀) ဦး၊ စိုက်ပျိုးရေး လုပ်ငန်းလုပ်ကိုင်သူ (၁၀၉၉၀) ဦး၊ မွေးမြူရေးလုပ်ငန်းလုပ်ကိုင်သူ (၉၆၃၈) ဦး၊ အရောင်းအဝယ်လုပ်ငန်း လုပ်ကိုင်သူ (၈၅၉၃) ဦး၊ စက်မှုလက်မှု လုပ်ငန်းလုပ်ကိုင်သူ (၅၅၄၃) ဦး၊ ရေလုပ်ငန်းလုပ်ကိုင်သူ (၃၂၁) ဦး၊ ကျပန်းလုပ်ကိုင်သူ (၁၈၈၂၈) ဦး နှင့် အခြားလုပ်ငန်း လုပ်ကိုင်သူ (၃၂၄၇၂) ဦးခန့်ရှိပါသည်။

ကျောက်တန်းမြို့နယ်တွင် အထက်တန်းကျောင်း (၁၃) ကျောင်း၊ အလယ်တန်းကျောင်း (၂၃) ကျောင်းနှင့် မူလတန်းကျောင်း (၇၆) ကျောင်းတည်ရှိပါသည်။ ကျောက်တန်းမြို့နယ်၏ ကျောင်းနေအရွယ် ကလေးများကျောင်းအပ်နှံမှုရာခိုင်နှုန်းမှာ (၁၀၀) ရာခိုင်နှုန်းဖြစ်ပြီး ၂၀၁၇ ခုနှစ်စစ်တမ်းများအရ တက္ကသိုလ် ဝင်တန်းအောင်မြင်မှုမှာ (၃၇.၅၅) ရာခိုင်နှုန်းဖြစ်ပါသည်။ မြို့နယ်အတွင်း အသက် (၁၅) နှစ် နှင့်အထက်လူဦးရေ (၁၄၇၂၀၆) ဦး ရှိပြီး စာတတ်မြောက်သူဦးရေ (၁၄၇၂၀၆) ဦးဖြစ်ပါသဖြင့် စာတတ်မြောက်မှု ရာခိုင်နှုန်းမှာ (၁၀၀) ရာခိုင်နှုန်းဖြစ်ပါသည်။

ကျောက်တန်းမြို့နယ်တွင် တွင်းရေနှင့် မြစ်ရေကိုအဓိကအသုံးပြုကြပြီး တွင်းရေနှင့် ရေသန့်ကို အဓိကထား သောက်သုံးကြပါသည်။ လျှပ်စစ်မီးရရှိသည့်နေရာများတွင် လျှပ်စစ်မီးကိုအဓိကအသုံးပြုကြပြီး လျှပ်စစ်မီးမရရှိသည့် ကျေးရွာများတွင် ဖယောင်းတိုင်မီး၊ ရေနံဆီမီး နှင့် ဆိုလာမီးတို့ကိုအသုံးပြုကြပြီး ထမင်းဟင်း ချက်ပြုတ်ရန် ထင်းကို လောင်စာအဖြစ် အသုံးပြုကြပါသည်။ ကျောက်တန်းမြို့နယ်အတွင်းတွင် ဆေးရုံ (၅) ရုံ၊ ကျေးလက်ဆေးပေးခန်း (၁) ခု နှင့် ကျေးလက်ကျန်းမာရေးဌာနခွဲ (၄၇) ခုရှိပါသည်။

သက်ရောက်မှု ဆန်းစစ်ခြင်းနှင့် ကုစားခြင်း

ဇယား (၃) သက်ရောက်မှုများနှင့် ကုစားရန် နည်းလမ်းများ

| သက်ရောက်မှု | ရင်းမြစ် | ကုစားခြင်း |
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| ရေအရည်အသွေး | <ul style="list-style-type: none"> - မြေတူးခြင်း - အနည်အနှစ်များတူးဖော်ခြင်း - အနည်အနှစ်များဖယ်ရှားခြင်း - မိလ္လာအညစ်အကြေးများ စွန့်ပစ်ခြင်း - အိမ်သုံးစွန့်ပစ်ရေ - သင်္ဘောများမှမိလ္လာအညစ်အကြေးများ | <ul style="list-style-type: none"> - သောင်တူးဖော်ခြင်းအစီအစဉ်အားစနစ်တကျ ရေးဆွဲခြင်း - သောင်တူးဖော်ခြင်းမှ ထွက်ရှိလာသော နုန်းအနည်အနှစ်များကို စနစ်တကျ စွန့်ပစ်ခြင်း - ရန်ကုန်မြစ်နှင့် ရေမြောင်း များ ထဲသို့ အမှိုက်စွန့်ပစ်မှုများ ရှောင်ရှားရန် ၄။ ရေစီးရေလာ ကောင်းမွန် စေရန် ရေမြောင်းများ ဖောက်လုပ်ခြင်း |

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| | <p>-သင်္ဘောဆေးခြင်း</p> <p>မှထွက်ရှိသည့် ရေများ</p> <p>- မိုးရေများ</p> | <p>- အလုပ်သမားများအား ရေများ</p> <p>ချွေတာ သုံးစွဲတတ် စေရန်</p> <p>အသိပညာပေးခြင်း</p> <p>- စွန့်ပစ်ရေများကို NEQG</p> <p>သတ်မှတ်ချက် များနှင့်အညီ စွန့်ပစ်ခြင်း</p> <p>- စီမံကိန်းနှင့် ဆက်စပ်လျက် ရှိသော</p> <p>ရေနုတ်မြောင်းများ နှင့်</p> <p>စွန့်ပစ်ရေအရည်အသွေးများကို ပုံမှန်</p> <p>ထိန်းသိမ်းမှုများ ပြုလုပ်ရန်၊</p> <p>- oil/grit or oil/water separators</p> <p>များတပ်ဆင်ခြင်း</p> <p>- oil/water separators များအား</p> <p>ပုံမြန်ပြုပြင်</p> <p>ထိန်းသိမ်းမှုများပြုလုပ်ခြင်း</p> <p>- သင်္ဘောများဆေးကြော ခြင်း မှ</p> <p>ထွက်ရှိလာသော ရေများအား</p> <p>ရန်ကုန်မြစ် အတွင်းသို့ တိုက်ရိုက်</p> <p>စွန့်ပစ်ခြင်းမှ ရှောင်ရှားရန်</p> <p>- YCDC မှသတ်မှတ်ချက် များ အတိုင်း</p> <p>မိလ္လာ အညစ် အကြေးများ စွန့်ပစ်ရန်</p> |
| <p>လေထုညစ်ညမ်းမှု</p> | <p>- စက်များမောင်နှင်ခြင်း</p> <p>- ဆောက်လုပ်ရေးလုပ်ငန်းသုံး</p> <p>ပစ္စည်းများ</p> | <p>- ဖုန်မှုန့်နှင့် အမှုန်အမွှားများ</p> <p>လွင့်ပျံ့နိုင်သည့် နေရာများကို</p> <p>အနည်းဆုံး တစ်နေ့နှစ်ကြိမ်</p> <p>ရေဖြန်းရန်</p> |

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| | <ul style="list-style-type: none"> - ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ပစ္စည်းများ သယ်ယူပို့ဆောင်ခြင်း - ဆောက်လုပ်ရေးလုပ်ငန်းများ လုပ်ဆောင်ခြင်း - ပစ္စည်းများသယ်ယူ ပို့ဆောင်ခြင်း - သင်္ဘောများမောင်းနှင်ခြင်း | <ul style="list-style-type: none"> - လုပ်ငန်းခွင်ဧရိယာအတွင်း တစ်နာရီ ၁၅ကီလိုမီတာ နှုန်းဖြင့်မောင်းနှင်ရန် - လုပ်သားများအတွက် လိုအပ်သည့် လုပ်ငန်းခွင်အန္တရာယ်ကာကွယ်ရေး ပစ္စည်းများ စီစဉ်ပေးခြင်း - လုပ်ငန်းခွင်အန္တရာယ်ကာကွယ်ရေး ပစ္စည်းများ အသုံးပြုခြင်း နှင့်ပတ်သတ်၍ ပညာပေးအစီအစဉ်များ ပြုလုပ်ပေးခြင်း - တည်ဆောက်ရေးလုပ်ငန်းများ လုပ်ဆောင် နေသည့် နေရာတွင် နေ့စဉ်သန့်ရှင်းရေး ပြုလုပ်ပေးခြင်း - စက်ပစ္စည်းကိရိယာများအား ပုံမှန် ပြုပြင်၊ ထိန်းသိမ်းမှုများပြုလုပ်ရန် - ပစ္စည်းများအား စနစ်တကျ ဖုံးအုပ် ၍ သိုလှောင်၊ သိမ်းဆည်းရန် - ပို့ဆောင်ရေး ယာဉ်များအား လိုအပ်သော အဖုံး၊ အကာများ တပ်ဆင် ထားခြင်း - cargo transfer များအား ပုံမှန် ပြုပြင် ထိန်းသိမ်းမှုများ ပြုလုပ်ခြင်း |
| <p>အစိုင်အခဲစွန့်ပစ်ပစ္စည်း</p> | <ul style="list-style-type: none"> - မြေတူးခြင်း - အနည်အနှစ်များတူးဖော်ခြင်း | <ul style="list-style-type: none"> - မြေသားများကို စနစ်တကျ စွန့်ပစ်ခြင်း |

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| | <ul style="list-style-type: none"> - အနည်အနှစ်များဖယ်ရှားခြင်း နှင့် သယ်ယူပို့ဆောင်ခြင်း - ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ပစ္စည်း အပိုင်းအစများ သယ်ယူ ပို့ဆောင်ခြင်း - စီမံကိန်းလုပ်ငန်းလုပ်ဆောင်ရန် ရှင်းလင်းရေး လုပ်ငန်းများ လုပ်ဆောင်ခြင်း - အမှိုက်စများ - အထွေထွေစွန့်ပစ်ပစ္စည်းများ | <ul style="list-style-type: none"> - အစိုင်အခဲစွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုစနစ် ရေးဆွဲခြင်း - အမှိုက်ပုံးများ လုံလောက်စွာ ထားရှိ ပေးခြင်း - YCDC မှခွင့်ပြုချက်ရရှိထားသော အမှိုက်ပုံတွင် စနစ်တကျစွန့်ပစ်ခြင်း - ပုံမှန်သန့်ရှင်းရေးပြုလုပ်ပေးခြင်း - သင်္ဘောပေါ်မှအမှိုက်များအား ဆိပ်ကမ်းမှ သတ်မှတ်ထားသော နေရာတွင် စနစ်တကျ စွန့်ပစ်ရန် |
| <p>ဆူညံသံနှင့်တုန်ခါမှု</p> | <ul style="list-style-type: none"> -စက်ပစ္စည်းများမောင်းနှင်ခြင်း - ပိုင်ရှိက်ခြင်း - ဆောက်လုပ်ရေးလုပ်ငန်းများ လုပ်ဆောင်ခြင်း - သယ်ယူပို့ဆောင်ရေး လုပ်ငန်းများ လုပ်ဆောင်ခြင်း - ဆောက်လုပ်ရေးလုပ်ငန်းများ လုပ်ဆောင်ခြင်း | <ul style="list-style-type: none"> - စက်ပစ္စည်းများအား ပုံမှန် ပြုပြင် ထိန်းသိမ်းမှုများ ပြုလုပ်ခြင်း - အသံဆူညံမှုနည်းသော စက်ပစ္စည်း ကိရိယာများ ရွေးချယ်အသုံးပြုရန် - တုန်ခါမှုနည်းသော ပစ္စည်း ကိရိယာများ ရွေးချယ်အသုံးပြုရန် - သောင်တူးဖော်မည့်အချိန်ဇယားနှင့် ပိုင်ရှိက်မည့်အချိန်ဇယားများပြုလုပ် ထားခြင်း - forklifts and reach-stackers များတွင် ရော်ဘာတာယာများ တပ်ဆင်ခြင်း |

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| | | <ul style="list-style-type: none"> - ဒီဇယ်အင်ဂျင်များအစား လျှပ်စစ်ပါဝါများ အစားထိုးသုံးစွဲခြင်း - အချက်ပေးသံစနစ်များမှ ဆူညံသံများ |
| <p>ဇီဝမျိုးစုံမျိုးကွဲအပေါ် ထိခိုက်နိုင်မှု</p> | <ul style="list-style-type: none"> - သောင်တူးဖော်ခြင်း လုပ်ငန်းများ - စီမံကိန်းမြေရေယာ ရှင်းလင်းခြင်း - ဆောက်လုပ်ရေးလုပ်ငန်းများ လုပ်ဆောင်ခြင်း | <ul style="list-style-type: none"> - သောင်တူးဖော်ခြင်းလုပ်ငန်းများအား အချိန်ဇယားဖြင့် စနစ်တကျ ဆောင်ရွက်ရန် |
| <p>ဇလဗေဒဆိုင်ရာထိခိုက်မှု</p> | <ul style="list-style-type: none"> - သောင်တူးဖော်ခြင်း လုပ်ငန်းများ - အနည်အနှစ်များဖယ်ရှားခြင်း | <ul style="list-style-type: none"> - သောင်တူးဖော်ခြင်းလုပ်ငန်းများကို စနစ်တကျဆောင်ရွက်ရန် |
| <p>လုပ်သားပြည်သူ့ကျန်းမာရေးနှင့် လုပ်ငန်းခွင်ဘေးအန္တရာယ် ကင်းရှင်းရေး</p> | <ul style="list-style-type: none"> - ရွှေ့လားနေသည့်စက်ပစ္စည်းများနှင့် ထိတွေ့နိုင်မှု - ဆောက်လုပ်ရေးလုပ်ငန်းများ - ကြီးမားသော စက်ပစ္စည်းများနှင့် ထိခိုက်နိုင်မှု | <ul style="list-style-type: none"> - လုပ်ငန်းခွင်သုံး တစ်ကိုယ်ရေ ကာကွယ်ရေးပစ္စည်း (PPE) များ လုံလောက်စွာထားရှိပြီး စနစ်တကျ ကိုင်တွယ် အသုံးပြုရေး ကြပ်မတ်ကွပ်ကဲရန်၊ - လုပ်ငန်းခွင် အန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာများကို လုပ်သားများအား ပညာပေးပြီး စနစ်တကျ လိုက်နာကျင့်သုံး စေရေး ကြပ်မတ်ကွပ်ကဲရန်၊ - လုပ်ငန်းခွင် အန္တရာယ်ကင်းရှင်းရေးအရာရှိ တစ်ဦးထားရှိပြီး လုပ်ငန်းခွင် |

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| | | <p>အန္တရာယ် ကင်းရှင်းရေးလုပ်ငန်းများ စနစ်တကျ ဆောင်ရွက်ရန်၊ - လုပ်ငန်းလည်ပတ်ရာတွင် လုပ်ငန်းခွင် အန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ လုပ်ထုံး လုပ်နည်းများ ရေးဆွဲ ထားရှိရန်</p> |
| <p>ဘေးအန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများ</p> | <p>- စက်ပစ္စည်းများတွင် အသုံး ပြုသည့် စက်ဆီ၊ ချောဆီများ ယိုစိမ့်မှု</p> | <p>- လောင်စာဆီများကိုစနစ်တကျ သိုလှောင် ထားရှိခြင်း - လောင်စာဆီသိုလှောင်ထားရှိသည့် ပစ္စည်း များအား ပုံမှန်စစ်ဆေးခြင်း - စက်ပစ္စည်း နှင့် အင်ဂျင်များအားများ စနစ်တကျမောင်းနှင်ခြင်း - စက်ပစ္စည်း နှင့် အင်ဂျင်များအားများ အမြဲမပြတ်စစ်ဆေးခြင်း</p> |

ခန့်မှန်း ကုန်ကျစရိတ်

သက်ရောက်မှု ကုစားရန်နည်းလမ်းများ၊ အကောင်အထည်ဖော်ဆောင်ရွက်ရမည့် အစီအစဉ် များကို EMP အစီရင်ခံစာတွင် အသေးစိတ်တင်ပြထားပါသည်။ MAAT Co., Ltd အနေဖြင့် တစ်လုံးတည်း ကုန်ကျစရိတ် ကျပ် ၁၆,၁၀၀,၀၀၀ နှင့် နှစ်စဉ်ကုန်ကျစရိတ် ၁၅,၉၀၀,၀၀၀ ကျပ်ကို EMP အကောင်အထည် ဖော်ရာတွင် အသုံးပြုရန် လျာထားပါသည်။

လူထုတွေ့ဆုံပွဲ

ပထမအကြိမ် တွေ့ဆုံပွဲကို ၂၀၁၄ ခုနှစ်၊ ဩဂုတ်လ (၈) ရက်နေ့တွင် ရန်ကုန်တိုင်းဒေသကြီး၊ ကျောက်တန်းမြို့နယ် ရွှေမှော်ဝန်းခန်းမတွင် ကျင်းပပြုလုပ်ခဲ့ပါသည်။ လူထုတွေ့ဆုံပွဲသို့ သီတာမြိုင်၊ ရွှေပြည်သာယာ၊ ရွှေပြည်သာယာ (ဘေးပေါက်)၊ ကျောက်တန်း နှင့် အေးမြသီတာကျေးရွာများမှ

ရပ်မိရပ်ဖများ၊ သက်ဆိုင်ရာဌာနများမှ တာဝန်ရှိသူများ နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး အတိုင်ပင်ခံ အင်ဂျင်နီယာအသင်း (ရန်ကုန်) အပါအဝင် စုစုပေါင်း (၅၀) ဦးခန့် တက်ရောက်ခဲ့ပါသည်။

ပထမအကြိမ်လူထုတွေ့ဆုံပွဲ တက်ရောက်သူများ၏ ဆွေးနွေးချက်များမှာ အောက်ပါအတိုင်း ဖြစ်ပါသည်။

- (၁) ၂၇၊၂၈၊၂၉ တို့တွင် စီမံကိန်းများတည်ဆောက်ပါက ၃၀ မှ ၃၃ အထိ အကွက်များတွင် လယ်ယာလုပ်ကိုင် သည့် လယ်သမားများကို ထိခိုက်နစ်နာမည်ဖြစ်ပါသဖြင့် အဆိုပါအကွက်များအတွက် လုပ်ကိုင်ကြမည့် လုပ်ငန်းရှင်များပါ တပါတည်းစုပေါင်းညှိနှိုင်းကြစေလိုကြောင်း
- (၂) စီမံကိန်းများလုပ်ဆောင်မည်ဆိုပါကဒေသခံများကို ဦးစွာ အသိပေးစေလိုပြီး ကျောက်မီးသွေးခါတ်အား လျှပ်စစ်ခါတ်အားပေးစက်ရုံ၊ ပလတ်စတစ်စက်ရုံ၊ အလွန်ညစ်ညမ်းသည့်စက်ရုံများ တည်ဆောက်မည် ဆိုပါက လက်ခံနိုင်မည်မဟုတ်ကြောင်း
- (၃) အကွက် (၃၃-၃၄) မှ လုပ်ငန်းများသည် ဒေသခံများနှင့် တိုင်ပင်ညှိနှိုင်းမှု မရှိကြပါကြောင်း နှင့် အဆိုပါ စီမံကိန်းများကြောင့် အနီးအပါးရှိ တောင်သူလယ်သမားများ ထိခိုက်နစ်နာရပါကြောင်း။
- (၄) မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်အဖွဲ့နှင့် ဒေသခံတောင်သူများ ၂၀၁၄ခုနှစ်၊ မေလကလယ်ယာမြေကိစ္စ စာချုပ်ချုပ်ဆိုခဲ့သော်လည်း အဆိုပါစာချုပ် ပျက်ပြယ်သွားသဖြင့်တောင်သူများမှာ ထိခိုက်နစ်နာ ကြရပါကြောင်း
- (၅) နောင်တွင်ပြုလုပ်မည့်စီမံကိန်းများအနေဖြင့် မိမိတို့ဆောင်ရွက်မည့်လုပ်ငန်းများကို ဒေသခံများအား ချပြဆွေးနွေးပြီးမှ ဆောင်ရွက်ကြစေလိုပါကြောင်း။
- (၆) ယခုစီမံကိန်းအနေဖြင့် တောင်သူလယ်သမားများနှင့်မည်သို့ညှိနှိုင်းမည်၊ နစ်နာကြေး မည်မျှ ပေးအပ်မည်၊ မည်သည့်အချိန်တွင် ပေးအပ်မည် စသည့်အစီအစဉ်များကိုသိရှိလိုပါကြောင်း
- (၇) ယခုစီမံကိန်းတွင် ဘေးပေါက်ကျေးရွာရှိ ရေလုပ်သားများ ရေလုပ်ငန်းလုပ်ကိုင်ကြသည့် နေရာများတွင် ဆောက်လုပ်မည် ဖြစ်သောကြောင့် အဆိုပါရေလုပ်သားများ၏ နစ်နာမှုများကို ထည့်သွင်း စဉ်းစား ပေးစေ လိုပါကြောင်း
- (၈) သီလဝါဆိပ်ကမ်းနယ်မြေတွင် တည်ဆောက်မည့် စီမံကိန်းများအားလုံး ဒေသခံများနှင့် တပြိုင်နက်တည်း တွေ့ဆုံပြီးဆွေးနွေးကြစေလိုပါကြောင်း

(၉) ၂၇၂၈၂၉ တို့တွင် လယ်သမား (၉) ဦးမှာ လွန်ခဲ့သည့် (၃) နှစ် မှ ယခုအချိန်ထိ နစ်နာမှုများ ကြုံတွေ့နေရသဖြင့် အဆိုပါနစ်နာမှုများအား ဖြေရှင်းပေးစေလိုပါကြောင်း

(၁၀) အဆိုပါလယ်ယာမြေများ နေထိုင်ကြရသည့် လယ်သမားမိသားစုများ ပြန်လည်နေရာချထားရေးကို ဦးစားပေးစေလိုပါကြောင်း

(၁၁) ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းမှ တွေ့ရှိချက်များကို အချက်အလက်များ ဖြန့်ဝေပေးစေလိုပါကြောင်း

(၁၂) ယခုစီမံကိန်း (၃) ခုနှင့်ဒေသခံများ ဆက်သွယ်ဆောင်ရွက်နိုင်မည့် ဆက်သွယ်ရေးလမ်းကြောင်းတစ်ခု ဖော်ဆောင် ပေးစေလိုပါကြောင်း

ဒုတိယအကြိမ် လူထုတွေ့ဆုံပွဲကို ၂၀၁၅ခုနှစ်၊ မေလ ၁၀ ရက်နေ့တွင် ရန်ကုန်တိုင်းဒေသကြီး၊ ကျောက်တန်းမြို့နယ် ရွှေမှော်ဝန်းခန်းမတွင် ကျင်းပပြုလုပ်ခဲ့ပါသည်။ လူထုတွေ့ဆုံပွဲသို့ သီတာမြိုင်၊ ရွှေပြည်သာယာ၊ ရွှေပြည်သာယာ (ဘေးပေါက်)၊ ကျောက်တန်း နှင့် အေးမြသီတာကျေးရွာများမှ ရပ်မိရပ်ဖများ၊ သက်ဆိုင်ရာဌာနများမှ တာဝန်ရှိသူများ နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး အတိုင်ပင်ခံ အင်ဂျင်နီယာအသင်း (ရန်ကုန်) အပါအဝင် စုစုပေါင်း (၇၈) ဦးခန့် တက်ရောက်ခဲ့ပါသည်။

EXECUTIVE SUMMARY

Introduction

MAAT Co., Ltd is planned to construct the jetty with the length of 585 m in Thilawa Port Area. MAAT Jetty Project will be developed by cooperating of Myanmar Edible Oil Industrial Public Co., Ltd (MAAT) from Plot (27), Myanmar Agribusiness Public Corporation Limited (MAPCO) from Plot (28) and Myanmar Agricultural and General Development Public Co., Ltd (MAGDPL) from Plot (29). The construction work will be started within 2020. MAAT Co., Ltd will be operated the jetty at Plot No. 27, 28 and 29, Thilawa Port Area, Kyaukttan Township, Yangon, Myanmar. In its completion, grain storage, distribution and container vessels cargo operation will be developed. The three plots will be carried out grain storage and cargo terminal operation by separating work.

Project Location

MAAT Jetty is located on plot 27, 28 and 29, Thilawar Port Area, Kyauktan Township, Yangon Region. It is on the East bank of Yangon River and about 25 km from Yangon-Thanyin Bridge No.1. There are three villages namely Thida Myaing, Shwepyi Tharyar, and Aya Mya Thida exist within 7 kilometers of the project area. The project is part of Thilawar Port Area which has a total of 37 equal size plots along the East bank of Yangon River which is about 20 km from river mouth.

Policies and Legal Framework Overview

The project proponent will be followed the following Laws, Rules and Procedures.

1. City of Yangon Development Law (2018)
2. EIA Procedures (2015)
3. Employment and Skill Development Law (2013)
4. Environmental Conservation Law (2012)
5. Environmental Conservation Rules (2014)
6. Inland Vessel Law, (2015)
7. Myanmar Investment Law (2016)
8. Myanmar Investment Rules (2017)
9. Myanmar Fire Bridgate Law (2015)

10. Myanmar Port Authority Law (2015)
11. Myanmar Merchant Shipping Act
12. Myanmar Merchant Shipping (Wireless Telegraphy) Rules (1937)
13. Myanmar Registration of Ships Act
14. Multimodal Transport Law
15. National Environmental Quality (Emission) Guidelines (NEQG) (2015)
16. Natural Disaster Management Law (2013)
17. Occupational Safety and Health Law (Draft, 2019)
18. The Automobile Law (2015)
19. The Carriers Act, (1989)
20. The Conservation of Water Resources and River Law (2006)
21. The Control of Smoking and Consumption of Tobacco Product Law (2006)
22. The Electricity Law (2014)
23. The Ethnic Rights Protection Law (2015)
24. The Export and Import Law (2012)
25. The Freshwater Fisheries Law (1991)
26. The Labour Organization Law (2011)
27. The Labour Dispute Settlement Law (2012)
28. The Minimum Wages Law (2013)
29. The Myanmar Coastal and Inland Water Transport Service License Law (2015)
30. The Myanmar Territorial Sea and Maritime Zones Law
31. The Payment of Wages Act (2016)
32. The Petroleum and Petroleum Product Law (2017)
33. The Prevention of Hazards from Chemical and Related Substances Law (2017)
34. The Private Industrial Enterprise Law (1990)
35. The Prevention and Control of Communicable Diseases Law (2013)
36. The Public Health Law (1972)
37. The Social Security Law (2012)

MAAT Jetty Project Components

Types of Jetty

The type of jetty will be constructed from MAAT Company Limited for Plot 27, 28 and 29 of Thilawa Port Area is Reinforced Concrete Jetty with reinforced concrete superstructure on prestressed concrete spun-piles. Although container based jetty terminal can be constructed with steel pipe pile as deep foundation and steel structure as upper foundation but steel structure could be affected for corrosion because of Yangon Tidal. Therefore, MAAT Co., Ltd will be constructed the R.C Jetty. Moreover, Myanmar Port Authority is not permitted to construct the soil type jetty which filled with soil into the river. So, MAAT Co., Ltd will be constructed pile type jetty in the MAAT Jetty Project. The Length and width of the jetty are as follows and the layout of MAAT Jetty is shown in Figure 3.

| | |
|--------------------------------------|---------|
| Overall Jetty Length (Plot 27,28,29) | = 585m |
| Jetty Head Width | = 30 m |
| Jetty Approach Width | = 20 m |
| Each Jetty Length | = 195 m |
| Distance Between (Plot 26 & 27) | = 5 m |
| Distance Between (Plot 29 & 30) | = 5.5 m |

Types of Vessels

The types of vessels which will be arrived to MAAT Jetty is Container Vessels, General Cargo Vessels, Bulk Cargo Vessels and Oil Cargo Vessels. After the construction of Jetty, two nos of the vessels with the size of 30000 DWT, and one nos of 15000 DWT vessel can be arrived to the Jetty at the same time or three nos of 20000 DWT vessels arrived at the same time. The detail size of the vessels are as follows.

| | |
|------------------------------------|--------------------------|
| Length Over All (LOA) | = 203M (JPN - Standard) |
| Length Between Perpendicular (LBP) | = 151M (JPN - Standard) |
| Molded Breadth | = 30.6M (JPN - Standard) |
| Full Loaded Draft | = 11.2M (JPN - Standard) |

Description of The Environment

(a) Stakeholder Analysis

Stakeholders are categorized in four groups such as local people, government organizations, project proponent and other interested groups such as NGOs according to UNEP EIA MANUAL Guideline. Analysis was based on primary impact factors such as involvement in land acquisition, vicinity to the project, common use of utilities such as water and infrastructures. Paragraph 49 (g) of the EIA procedures stipulates that the scoping shall identify potentially affected communities and other stakeholders with an interest in the Project. The following table shows level of interest by stakeholders on the project.

Table A. Stakeholders of MAAT Jetty Project Project

| Sr. | Stakeholder Group | Stakeholder | Interest Level | | Interest |
|-----|-------------------------|------------------------------------------|----------------|-------------------------------|---------------------------------------------|
| | | | Level | Reason | |
| 1 | Local People | Aye Mya Thida | Low | Vicinity | - Pollution |
| | | Shwe Pyi Tharyar | Low | Vicinity | - Waste Water |
| | | Thida Myaing | Low | Vicinity | - Job opportunity - CSR |
| 2 | Government Organization | General Administration Office Department | Medium | - For administrative relation | - Administration - Coordination - CSR |
| | | YCDC | Medium | -City Development | |
| | | Department of planning | High | - Storm water issue | |
| | | Township Educational Office | Low | - Only relevant for CSR | |
| | | Land Records Department | Low | - No land related issue | |
| | | Township Health Department | Low | - Only relevant for CSR | |

| | | | | | |
|---|-----------|-------------------------------------------------------|--------|-----------------|-------------------------------------------------------|
| | | Township Environmental Conservation Department | Medium | - | |
| | | Township Fire-brigade | Low | - | |
| 3 | Proponent | Project management Project construction contractor | High | - Project Owner | - Operation and Management - Construction - EMP |

(b) Project Affected Area

Project affected area is demarcated based on the results of stakeholder analysis. Affected human settlements, noise environment, biological environment, hydrological regime and land environment are shown in the following table.

Table B. Project Affected Area

| Sr. | Category | Location | Factor |
|-----|---------------------------|------------------------------------------|-----------------------------------------------|
| 1 | Human Settlements | Aye Mya Thida | - Pollution |
| | | Shwe Pyi Tharyar | - Waste Water |
| | | Thida Myaing | - Job opportunity - CSR |
| 2 | Land Environment | Nearby farmlands | - Pollution - Waste Water - Access road |
| 3 | Biological Environment | Project area | - Loss of Flora and Fauna |
| 4 | Air and Noise Environment | Within Project area and nearby community | - Noise levels |
| 5 | Water Environment | Within Project area | - Water usages |
| | | Yangon River | - Water quality - Waste water |

(c) Air Quality

The parameters for air Quality surveys were atmospheric pressure, CO₂, H₂S, CH₄, NO₂, O₃, PM₁₀, PM_{2.5}, Relative Humidity, SO₂, solar radiation, Temperature, Wind direction, and Wind speed.

The air quality survey results obtained every minute at each survey site were combined to make daily average values (24 hours or 8 hours or 1 hour or 10 minutes) for further evaluation and comparison with corresponding standard values. The result from Air Quality Survey is shown in Table 19.

(d) Water Quality

Water supply for MAAT Jetty Project Project will be obtained from Banbwagon and Thilawa Dam. Suspended solids, BOD, COD, Oil and Grease and pH were analyzed for baseline wayer quality. Quality. To know the current water quality of the surrounding environment, water samples were collected from Yangon River and Project's east side drain. PH, BOD, COD, TSS, Total Nirogen, Total Phosphorus, Oil and Grease and Total Coliform Bacteria were analyzed for current water quality. All water samples were analyzed for their physiochemical properties in ALARM Ecological Laboratory and the result are as shown in Table 15 and 16.

(e) Soil Quality

According to test results as shown in Table 27 and 28, pH value of SS which was collected from the boundary of project is 7.53 which falls under classification of slightly alkaline conditions.

(f) Biodiversity

Biodiversity includes two portions, which are the study of vegetation (flora) and the study of living animals (fauna). Biodiversity includes two portions, which are the study of vegetation (flora) and the study of living animals (fauna). The natural vegetation and wildlife from Kyauktan Township is in Table (30 to 40).

(g) Topography

Kyauttan township is found the steep hills on the left and right side of the Thanlyin-Kyauktan Road and the other area of Kyakttan township is flat. A lot of rivers and creeks are situated within the Kyauktan Township and these rivers and creeks are

flow from west to east. Among them, Maw Wun creek is the famous creek which flows from west to east by passing through Yangon estuary. Kyauktan Township is located at an average height of 20 feet above sea level.

(h) Climate and Precipitation

Kyauktan has a wet and dry climate with an average annual temperature of 32.3°C. April is the hottest month of the year with 37°C and January is the coldest month of the year with 17.9°C. The average annual precipitation is about 223.42 mm. Rainfall has its top in July with the highest number of 26.2 days. The lowest rainfall occurs during February, with an average of 2 mm.

(i) Socio Economic Component

(i) Living Condition

A household baseline survey was conducted for the stakeholder village tracks surrounding the proposed project site that constitute the area of influence. There are 2189 households in the three wards and a full census of all households was taken yielding an estimated stakeholder population of 9693. Shwe Pyi Thar Yar is the largest ward with a population of 3716.

Bamar is the largest ethnic group in the Kyauktan Township, representing approximately 99.79 percent of Township's population. Kayin is the second largest ethnic group, representing approximately 0.13 percent. There are few Kachin, Kayar, Chin, Mon, Rakhine, and Shan who reside in Kyauktan Township. 0.23 percent of Chinese and 2.59 percent of Indian was lived within the Kyauktan Township.

The religions of the people in Kyauktan Township are predominantly Buddhism. The composition of the population by religion is 87.9% Buddhist, 6.2% Christian, 4.3% Islam, 0.5% Hindu, 0.8% Animist, 0.2% other religion and 0.1% no religion.

The proportion of the productive working population between 15 to 64 years of age in Kyauktan Township is 69% and the proportion of children aged 14 and below together with the proportion of the elderly aged 65 and over are less than the proportion of the working age group population. In Kyauktan Township, 30.7% of the employed persons aged 15-64 are skilled agricultural, forestry and fishery workers and is the highest proportion, followed by 21.4% in elementary occupation. Other professions

reported included managers, professionals, technicians and associate professionals, clerical support workers, service and sale workers, craft and related trades workers, plant and machine operators and assemblers and other categories.

(ii) Education and Infrastructure

There are 14 B.E.H.S schools, 23 B.E.M.S schools and 76 B.E.P.S schools in Kyauktan Township. School attendance in Kyauktan Township drops after age 9 for both males and females. Compared to the union, the school attendance of males and females in Kyauktan Township is higher from school going age to age 11 and lower in age 12 onwards that of the union. The literacy rate of those aged 15 and over in Kyauktan Township is 95.2%. The literacy rate for youth aged 15-24 is 97.4% with 97.3% for females and 97.5% for males.

The majority of the households in Kyauktan Township are living in bamboo houses (45.0%) followed by households in wooden houses (39.2%). Some 43.3% of urban households live in wooden houses and 51.1% of rural households live in bamboo houses. Improved sources of drinking water (tap water/piped, tube well, borehole, protected well/spring and bottled water/ water purifier) are used by 26.7 % of households and some 69.3% of the households use water from pond/lake and 12% use water from protected well/spring. Some 73.3% of households use water from unimproved sources. In rural areas, 89.7% of households use water from unimproved sources for drinking water.

As the source of lighting, 33.1% of the households in Kyauktan Township use electricity for lighting. This proportion belongs to nine lowest townships group compared to other townships in Yangon region. The percentage of households that use electricity in Yangon Region is 69.3%. The households in Kyauktan Township mainly use wood-related fuels for cooking with 58.4% using firewood and 6.5% using charcoal. Only 21.3% of households use electricity for cooking. For health services and facilities, there are 5 hospitals, 1 clinic and 847 village health departments in Kyauktan Township.

Impact Assessment and Mitigation

Rating matrix method is used to assess the significance level of the identified environmental impacts of the MAAT Jetty Project on its environment. There are five

parameters considered for the activities of the Projects and the consequences resulted from the said activities. System of rating is described in detailed as follows.

Table C. Environmental Aspect and Impact

| Impacts | Impact Source | Mitigation |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction | | |
| Water Quality | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Discharge of sewage - Domestic waste water | <ol style="list-style-type: none"> 1. Dredging management plan should be adopted 2. Dredged materials should be disposed to designated area systematically 3. Avoiding washing the sweepings into street or storm drain 4. Regular monitoring of drainage water at the outlets toward the Yangon river 5. Training workers to minimize water use and clean equipment in a manner that minimizes discharges to receiving waters 6. To build adequate drainages in the project area |
| Air Emission | <ul style="list-style-type: none"> - Driving machine and moving machinery - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris - Construction activities | <ol style="list-style-type: none"> 1. Places of dust emission during earth works must be sprayed with water at least two times a day 2. A speed limit of 15 km/hr must be set for vehicles travelling within the project site 3. Providing necessary PPE for workers 4. Regular inspection and supervision of the use of PPE 5. Regular sweeping of material handling areas 6. Regular inspection and maintenance of machines and equipments |

| | | |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Solid Waste | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Transportation and storage of construction materials and debris - Removal of vegetation and tree cutting - Debris disposal - General waste from labour camp | <ol style="list-style-type: none"> 1. Systematic disposal of waste at waste disposal site 2. Operational design and planning for the reduction of solid waste production should be implement 3. Hazardous and non-hazardous waste management plan should be adopted 4. Providing adequate skips and waste bins 5. Carrying out regular cleaning works |
| Noise and Vibration | <ul style="list-style-type: none"> -Driving machines and moving machinery - Piling - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris - Construction activities | <ol style="list-style-type: none"> 1. Preventing unnecessary mechanical noise by carrying out regular maintenance work for vehicle and machinery 2. Selecting equipment with lower sound power levels 3. Installing vibration isolation for mechanical equipment 4. Coordinating and scheduling offshore piling and dredging activities 5. Employing observers during offshore piling and dredging activities 6. Using soft-start/slow ramp-up during pile driving and dredging activities |
| Biodiversity | <ul style="list-style-type: none"> - Dredging activities - Removal of vegetation and tree cutting - Construction activities | <ol style="list-style-type: none"> 1. Areas of high biodiversity value and/or areas used by aquatic life for feeding and breeding and as migration routes should be identified 2. The timing of dredging activities should consider seasonal factors such as migration periods |

| | | |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 3. Monitoring of dredged materials not to pollution of water |
| Hydrology | - Dredging activities - Removal of sediments | 1. Monitoring of dredging and dredged materials |
| OSH | - Contact with moving machinery and equipment - Handling of heavy machinery and equipment - Construction activities | 1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Educating workers with workplace safety practices 4. Regular inspection and supervision for following workplace safety practices 5. SOP of emergency preparedness and response plan should be implemented 6. Providing necessary OSH trainings for workers 7. Setting, educating, monitoring and control of a vehicle speed limit of 15 km/hr within project compound 8. Installing and regular maintenance of back gear warning alarm in every vehicle 9. Regular maintenance of vehicles |
| Operation | | |
| Water Quality | - Mixing of dredging and disposal of dredged materials - Ship sewage - Domestic Waste water - Vessel cleaning water - Storm water | 1. Avoid installing storm drainage catch basins that discharge directly into surface waters 2. Install filter mechanisms to prevent sediment and particulates from reaching the surface water 3. Install oil/grit or oil/water separators in all runoff collection areas 4. Regularly maintain oil/water separators and trapping catch basins |

| | | |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>5. Avoid directly discharge of vessel washing water to the river</p> <p>6. Sewage from ships should be collected and treated on-site or off-site according to the recommendations of YCDC</p> |
| Air Emission | <ul style="list-style-type: none"> - Driving machine and moving machinery - Handling of heavy machinery and equipment - Transportation and storage of materials - Fumes emissions from vessels | <p>1. Cover storage and handling areas, where practicable</p> <p>2. Regularly sweep docks and handling areas</p> <p>3. A speed limit of 15 km/hr must be set for vehicles travelling within the project site</p> <p>4. Ensure that hatches are covered when material handling is not being conducted</p> <p>5. Cover transport vehicles</p> <p>6. Maintain cargo transfer equipment in good working condition to reduce air emissions</p> <p>7. Encourage reduced engine idling during on- and off-loading activities</p> |
| Solid Waste | <ul style="list-style-type: none"> - General waste from vessels | <p>1. Information should be available for ship captains to identify solid waste reception facilities and acceptable handling procedures at ports</p> <p>2. Discharge of solid waste from vessels should be prohibited while in port in accordance with the regulations announced from Myanmar Port Authorith and YCDC</p> <p>3. Food waste from ships delivered to the port</p> <p>4. Systematic disposal of waste</p> <p>5. Providing adequate skips and waste bins</p> <p>6. Carrying out regular cleaning works</p> |

| | | |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Noise and Vibration | <ul style="list-style-type: none"> -Driving machines and moving machinery - Handling of heavy machinery and equipment - Transportation and storage of materials | <ol style="list-style-type: none"> 1. Establishing noise deflection walls 2. Replacing forklifts and reach-stackers with gantry cranes with rubber tires 3. Substituting diesel engines with electric power 4. Reducing noise from warning bells 5. Insulating machinery |
| Hydrology | <ul style="list-style-type: none"> - Dredging activities - Removal of sediments | <ol style="list-style-type: none"> 1. Monitoring of dredging and dredged materials |
| OSH | <ul style="list-style-type: none"> - Contact with moving machinery and equipment - Handling of heavy machinery and equipment - Accidents with heavy machinery and equipment | <ol style="list-style-type: none"> 1. Development of, and compliance with, traffic regulation and rules 2. Preparation of working rules in the port area and provision of education to port workers 3. Providing necessary PPE for workers 4. Regular inspection and supervision of the use of PPE 5. Installation of proper signboard for safety and security 6. Minimize the risk of free fall of materials by installing telescoping arm loaders and conveyors; inspect all slings before use 7. Preparation of security boats, life jackets, medical box and so on |
| Hazardous materials and oil | <ul style="list-style-type: none"> - Spillage of fuel, oil, used oil | <ol style="list-style-type: none"> 1. Systematic storage of fuel 2. Regular inspections of fuel storage materials 3. Systematic operation of driving machines and engines 4. Regular inspections and monitoring of driving machines and engines |

Characteristics of the impacts are evaluated based on eight particular basis five of which are used in the assessment of the significance level of the impacts.

Table D. Characteristics of the Impacts

| IMPACTS | CHARACTERISTICS | | | | | | | |
|---------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| | Nature | Impact Source | Impact Receptor | Severity | Duration | Spatial Scope | Frequency | Probability |
| Construction | | | | | | | | |
| Water Quality | Negative | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Discharge of sewage | Local environment | Impact severity is significant for local community | Contamination of water will occur in jetty construction life | Contamination of water will occur along the Yangon River | Impact on water quality occurs daily continuously | Contamination of water effect is possible |

| | | | | | | | | |
|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------|
| | | - Domestic waste water | | | | | | |
| Air Emissions | Negative | - Driving machine and moving machinery - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris - Construction activities | Workers and local environment | Impact severity is significant for construction workers and local community | Dust, particulate and fumes will be emitted in construction period | Impact will occur within construction project area | Activity that cause the impact occurs daily intermittently | Emission of dust, particulates and fumes are possible |

| | | | | | | | | |
|-------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------|---------------------------------------|
| Solid waste/waste | Negative | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Transportation and storage of construction materials and debris - Removal of vegetation and tree cutting - Debris disposal | Local environment | Impact severity is potentially harmful if the sediments and dredged materials are managed systematically | Impact from solid waste will occur in construction project life | Local area could be affected by solid waste mismanagement | Solid waste impact occurs daily intermittently | Impact from solid wastes are possible |
|-------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------|---------------------------------------|

| | | | | | | | | |
|---------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------|
| | | - General waste from labour camp | | | | | | |
| Noise and vibration | Negative | -Driving machines and moving machinery - Piling - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris | Workers and local environment | Impact severity is significant for operation workers | Noise and vibration hazard will occur in construction period | Noise hazard will occur within the whole project compound and underwater | Activity that cause the impact occurs daily intermittence in construction period | Noise hazards are possible |

| | | | | | | | | |
|--------------|----------|---------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|-------------------------------------|
| | | Construction activities | | | | | | |
| Biodiversity | Negative | - Dredging activities - Removal of sediments - Removal of vegetation and tree cutting | Ecosystem | Impact severity is potentially harmful for ecosystem | Impact on ecosystem will occur in both jetty construction and operation life | Ecosystem could be affected by dredging activities | Impact on ecosystem will occur daily continuously | Impact on biodiversity are possible |
| Hydrology | Negative | - Dredging activities - Removal of sediments | Costal hydrology | Impact severity is slightly harmful for coastal hydrology | Impact on Hydrology will occur in both jetty construction and operation life | Yangon river could be affected by the effect of hydrology | Impact on hydrology will occur daily continuously | Impact on hydrology is possible |
| OSH | Negative | - Contact with moving machinery and equipment | Workers | Impact severity is harmful for workers | OSH hazard will occur in both construction and operation project life | OSH hazard will occur at the project area of activity | Activity that cause the impact occurs daily intermittently | OSH hazards are possible |

| | | | | | | | | |
|------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| | | - Handling of heavy machinery and equipment - Construction activities | | | | | | |
| Operation | | | | | | | | |
| Water Quality | Negative | - Mixing of dredgind and disposal of dredged materials - Ship sewage - Domestic Waste water - Vessel cleaning water - Storm water | Local environment | Impact severity is significant for local community | Contamination of water will occur in project operation life | Contamination of water will occur along the Yangon River | Impact on water quality occurs daily continuously | Contamination of water effect is possible |

| | | | | | | | | |
|-------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------|
| Air Emissions | Negative | <ul style="list-style-type: none"> - Driving machine and moving machinery - Handling of heavy machinery and equipment - Transportation and storage of materials - Fumes emissions from vessels | Workers and local environment | Impact severity is significant for construction workers and local community | Dust, particulate and fumes will be emitted in operation period | Impact will occur within project area | Activity that cause the impact occurs daily intermittently | Emission of dust, particulates and fumes are possible |
| Solid waste/waste | Negative | - General waste from vessels | Local environment | Impact severity is potentially harmful if solid wastes are discharged systematically | Impact from solid waste will occur in construction period | Local area could be affected by solid waste mismanagement | Solid waste impact occurs daily intermittently | Impact from solid wastes are possible |

| | | | | | | | | |
|---------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------|
| Noise and vibration | Negative | -Driving machines and moving machinery - Handling of heavy machinery and equipment - Transportation and storage of materials Construction activities | Workers and local environment | Impact severity is significant for operation workers | Noise and vibration hazard will occur in construction period | Noise hazard will occur within the whole project compound and underwater | Activity that cause the impact occurs daily intermittence in construction period | Noise hazards are possible |
| Hydrology | Negative | - Dredging activities - Removal of sediments | Costal hydrology | Impact severity is slightly harmful for coastal hydrology | Impact on Hydrology will occur in both jetty construction and operation life | Yangon river could be affected by the effect of hydrology | Impact on hydrology will occur daily continuously | Impact on hydrology is possible |

| | | | | | | | | |
|-----------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------|
| OSH | Negative | <ul style="list-style-type: none"> - Contact with moving machinery and equipment - Handling of heavy machinery and equipment - Accidents with heavy machinery and equipment | Workers | Impact severity is harmful for workers | OSH hazard will occur in both construction and operation project life | OSH hazard will occur at the project area of activity | Activity that cause the impact occurs daily intermittently | OSH hazards are possible |
| Hazardous materials and oil | Negative | <ul style="list-style-type: none"> - Spillage of fuel, oil, used oil | Local environment | Impact severity is significant on local environment | Hazardous materials and oil hazards will occur in project life | Hazardous materials and oil hazard will occur at the local environment | Activity that cause the impact occurs daily continuously | Hazardous materials and oil hazards possible |

Table E. Mitigation and Enhancement Measures (MEMS)

| Impacts | Impact Source | Mitigation |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water Quality | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Discharge of sewage - Domestic waste water - Ship sewage - Domestic Waste water -Vessel cleaning water - Storm water | <ol style="list-style-type: none"> 1. Dredging management plan should be adopted 2. Dredged materials should be disposed to designated area systematically 3. Avoiding washing the sweepings into street or storm drain 4. Regular monitoring of drainage water at the outlets toward the Yangon river 5. Training workers to minimize water use and clean equipment in a manner that minimizes discharges to receiving waters 6. To build adequate drainages in the project area 7. Avoid by installing storm drainage catch basins that discharge directly into surface waters 8. Install oil/grit or oil/water separators in all runoff collection areas 9. Regularly maintain oil/water separators and trapping catch basins 10. Avoid directly discharge of vessel washing water to the river 11. Sewage from ships should be collected and treated on-site or off-site according to the recommendations of YCDC |
| Air Emission | <ul style="list-style-type: none"> - Driving machine and moving machinery - Operation of construction machinery - Handling of heavy machinery and equipment | <ol style="list-style-type: none"> 1. Places of dust emission during earth works must be sprayed with water at least two times a day 2. A speed limit of 15 km/hr must be set for vehicles travelling within the project site 3. Providing necessary PPE for workers |

| | | |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> - Transportation of construction materials and debris - Construction activities - Transportation and storage of materials - Fumes emissions from vessels | <ol style="list-style-type: none"> 4. Regular inspection and supervision of the use of PPE 5. Regular sweeping of material handling areas 6. Regular inspection and maintenance of machines and equipments 7. Cover storage and handling areas, where practicable 8. Ensure that hatches are covered when material handling is not being conducted 9. Cover transport vehicles 10. Maintain cargo transfer equipment in good working condition to reduce air emissions |
| Solid Waste | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Transportation and storage of construction materials and debris - Removal of vegetation and tree cutting - Debris disposal - General waste from labour camp - General waste from vessels | <ol style="list-style-type: none"> 1. Systematic disposal of waste at waste disposal site 2. Operational design and planning for the reduction of solid waste production should be implement 3. Hazardous and non-hazardous waste management plan should be adopted 4. Providing adequate skips and waste bins 5. Carrying out regular cleaning works 6. Information should be available for ship captains to identify solid waste reception facilities and acceptable handling procedures at ports 7. Discharge of solid waste from vessels should be prohibited while in port in accordance with the regulations announced from Myanmar Port Authorith and YCDC 8. Food waste from ships delivered to the port |

| | | |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Noise and Vibration | <ul style="list-style-type: none"> -Driving machines and moving machinery - Piling - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris - Construction activities - Transportation and storage of materials | <ol style="list-style-type: none"> 1. Preventing unnecessary mechanical noise by carrying out regular maintenance work for vehicle and machinery 2. Selecting equipment with lower sound power levels 3. Installing vibration isolation for mechanical equipment 4. Coordinating and scheduling offshore piling and dredging activities 5. Employing observers during offshore piling and dredging activities 6. Using soft-start/slow ramp-up during pile driving and dredging activities 7. Replacing forklifts and reach-stackers with gantry cranes with rubber tires 8. Substituting diesel engines with electric power 9. Reducing noise from warning bells 10. Insulating machinery |
| Biodiversity | <ul style="list-style-type: none"> - Dredging activities - Removal of vegetation and tree cutting - Construction activities | <ol style="list-style-type: none"> 1. Areas of high biodiversity value and/or areas used by aquatic life for feeding and breeding and as migration routes should be identified 2. The timing of dredging activities should consider seasonal factors such as migration periods 3. Monitoring of dredged materials not to pollution of water |
| Hydrology | <ul style="list-style-type: none"> - Dredging activities - Removal of sediments | <ol style="list-style-type: none"> 1. Monitoring of dredging and dredged materials |

| | | |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OSH | <ul style="list-style-type: none"> - Contact with moving machinery and equipment - Handling of heavy machinery and equipment - Construction activities - Accidents with heavy machinery and equipment | <ol style="list-style-type: none"> 1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Educating workers with workplace safety practices 4. Regular inspection and supervision for following workplace safety practices 5. SOP of emergency preparedness and response plan should be implemented 6. Providing necessary OSH trainings for workers 7. Setting, educating, monitoring and control of a vehicle speed limit of 15 km/hr within project compound 8. Installing and regular maintenance of back gear warning alarm in every vehicle 9. Regular maintenance of vehicles 10. Development of, and compliance with, traffic regulation and rules 11. Installation of proper signboard for safety and security 12. Minimize the risk of free fall of materials by installing telescoping arm loaders and conveyors; inspect all slings before use 13. Preparation of security boats, life jackets, medical box and so on |
| Hazardous materials and oil | <ul style="list-style-type: none"> - Spillage of fuel, oil, used oil | <ol style="list-style-type: none"> 1. Systematic storage of fuel 2. Regular inspections of fuel storage materials 3. Systematic operation of driving machines and engines 4. Regular inspections and monitoring of driving machines and engines |

Projected Budgets

Projected budget for implementation of EMP management actions and monitoring requirements could be summarized from detailed particulars described in previous section of the report. MAAT Company Limited will allocate 16,100,000 kyats total of one-time cost and 15,900,000 kyat of annual recurring cost for successful implementation and monitoring of the EMP.

Table F. Project Budgets for Implementation and Monitoring of EMP

| Sr. | Management Actions | Budget |
|-----|--------------------------------------------------------------------------------------------------------------|--------------|
| 1 | Monitoring of drainage water at the outlets towards the Yangon river to meet NEQG guidelines | 1,000,000/yr |
| 2 | Construction of dedicated drainage network for storm water and surface water run off | 1,000,000 |
| 3 | Installation of sediment traps along water drainages including fascines, silt facines and vegetation traps | 500,000 |
| 4 | Installing oil-grit/sand-grit sperator | 4,200,000 |
| 5 | Providing face mask, hand glove, safety boot and helmet adequately for workers working at construction areas | 600,000/yr |
| 6 | Regular sweeping at construction areas | 300,000/yr |
| 7 | Carrying out regular maintenance of machines and equipment | 5,000,000/yr |
| 8 | Covering of materials storage and handling area where practicable | 500,000 |
| 9 | Installing cover in transport vehicles | 500,000 |
| 10 | Providing adequate waste bins both on the vessels and jetty | 300,000/yr |
| 11 | Regular inspection and maintenance of vehicle and machinery | 1,000,000/yr |
| 12 | Incorporating silencer/ Muffler with engines and generator sets | 1,000,000 |
| 13 | Providing 50 necessary PPE for workers | 3,000,000 |
| 14 | Checking workplace daily | 500,000/yr |
| 15 | Providing necessary OSH training | 500,000 |
| 16 | Implementation of SOP for emergency preparedness and response plan | 800,000/yr |

| | | |
|----------------------|--------------------------------------------------------------------------------------|--------------|
| 17 | Providing necessary OSH trainings for workers | 4,000,000/yr |
| 18 | Installing and regular maintenance of back gear warning alarm in every vehicle | 600,000 |
| 19 | Carrying out annual overall regular maintenance of vehicles | 2,400,000/yr |
| 20 | Installation of proper signboard within the project compound for safety and security | 300,000 |
| 21 | Fuels should be stored with glass, stone or metal receptacle with secure cap | 1,000,000 |
| 22 | Providing of security boats, life jackets, medical box and so on | 3,000,000 |
| Total One Time Cost | | 16,100,000 |
| Total Recurring Cost | | 15,900,000 |

Public Consultation and Disclosure

First public meeting for releasing project information to general public requesting their comments and suggestions on the project was carried out on November 8th, 2014 at Shwe Hmaw Wun Hall, Kyauktan Township. There were about 50 people from local community, employees from the project, representatives from the project and representative from Myanmar Engineering Society attended the public meeting and participated in open discussion.

Second public meeting for releasing ESIA study results to general public requesting their comments and suggestions was carried out on May 10th, 2015 at the same venue. There were about 77 people from local community employees from the project, representatives from the project and representatives from Myanmar Engineering Society attended the public meeting and participated in open discussion.

Results from Public Consultations

Discussions of the local people in the meeting could be summarized as follows.

- (1) Would like to request project proponents from plot 30-33 to make discussions with local farmers as the farmers were affected by those projects
- (2) Local people needed to be informed firstly for new projects and objection will be made for polluting industries such as coal or plastic related factories

- (3) Project proponents from plot 33 and 34 do not discuss with local people and local farmers were affected by them
- (4) Local farmers were affected as an agreement for farmlands between Myanmar Port Authority and local farmers made in May, 2004 was broken
- (5) Future projects were requested to inform local community firstly
- (6) Would like to know that how the current projects will discuss with local farmers, paid compensation and set time frame to settle
- (7) Impact on local fishermen should be considered as the project will take place where fishermen from Bay Pauk village are doing fisheries
- (8) Requested all the project proponents in the whole Thilawar Port Area make a public meeting with local people and make discussions
- (9) There are nine farmers within the area of plot (27, 28 and 29) who were affected since the last three years and requested to handle the impact on them
- (10) Requested to provide resettlement for the farmers who were living on those farmlands
- (11) Requested to delineate the findings of ESIA study
- (12) Requested to provide a communication channel between the project and affected farmers

Discussions in the second public meeting are:

- (1) Requested to know whether EIA study is done and the results are delineated or not
- (2) Requested to know how the impacts on farmlands will be mitigated
- (3) Requested to know how the impacts on fishermen will be mitigated
- (4) Requested to address the discussions of local people in EIA report

A representative from MES discussed that:

1. The translated executive summary delivered to you is the result of EIA study
2. Mitigation measures for the impacts on farmers and fishermen were delineated in the report and also in the translated executive summary
3. Discussion of local people are addressed both in the ESIA report and in the translated summary as you all can see

Environmental Management Plan

For

Myanmar Agro Alliance Terminal's Jetty Project

1 Introduction

1.1 Project Background

MAAT Co., Ltd is planned to construct the jetty with the length of 585 m in Thilawa Port Area. The construction work will be started within 2020. MAAT Co., Ltd. will be operated the jetty at Plot No. 27, 28 and 29, Thilawa Port Area, Kyaukttan Township, Yangon, Myanmar. In its completion, the container vessels, general cargo vessels, bulk cargo vessels and oil cargo vessels will be arrived to the jetty.

Environmental Management Plan for the project was prepared by ECCEA from December 2019 to January 2020. The EMP was prepared in accordance with the stipulations in paragraph 76 – 82 of the EIA procedures.

1.2 Project Proponent

MATT Co., Ltd is private company limited by shares. The estimated project value for the jetty is US\$49,696,978.

Table 1. Information of MAAT Co., Ltd

| Sr. | Particular | Name/ Address |
|-----|-------------------|------------------------------------------------------------------------------------------------------|
| 1 | Company Name | MATT Co., Ltd |
| 2 | Jetty Location | Plot No. 27, 28 and 29, Thilawa Port Area, Kyaukttan Township, Yangon, Myanmar |
| 3 | Company Address | No.100, Wardan Street and Kan Nar Street, Wardan Port Area, Seikkan (Port) Township, Yangon, Myanmar |
| 4 | Project Ownership | JV |
| 5 | Company Type | Private Company Limited by shares |
| 6 | Registration No | 107314024 |
| 7 | Registration Date | 30/3/2017 |

Table 2. List of Directors of MAAT Co., Ltd

| Sr. | Name | Nationality, NRC No. / PP No. | Position |
|-----|-------------------|----------------------------------|----------|
| 1. | U Thaung Win | 12/SaKhaNa(N)029036 | Director |
| 2. | U Kyaw Soe Han | 12/DaKaNa(N)002906 | Director |
| 3. | U Myint Kyu | 12/LaMaTa(N)004199 | Director |
| 4. | U Aung Win | 12/PaZaTa(N)012991 | Director |
| 5. | U Maung Maung Aye | 12/LaMaTa(N)023748 | Director |
| 6. | U Ye Min Aung | 12/TaMaNa(N)094582 | Director |
| 7. | U Than Myint | 12/LaMaTa(N)027772 | Director |
| 8. | U Tun Lwin | 12/LaMaTa(N)013763 | Director |
| 9. | U Hla Oo | 12/KaHaNa(N)020288 | Director |

1.3 Presentation of the Environmental and Social Experts

Environmental Conservation and Consulting Engineers Association (ECCEA) will be the third party for EMP study and reporting for MAAT Jetty EMP team consists of the following core team and sector-wise participants.

Table 3. ECCEA Team Member

| Sr. | Name | Registration/ License No by ECD | Contac Detail | Area of Expertise |
|-----|---------------------------|---------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------|
| 1. | U Soe Myint | 0165 | N0.92, Kant Kaw Myaing Lane 2, Block 33, Nort dagon Tsp, Yangon (09-401600255) | Facilitation, Socio-Economy & OSH |
| 2. | Dr. Maung Maung Hlaing | 0191 | N0. 14 (I), Y.T.U Compound, East Gyogone, Insein Township, Yangon (09-5052179) | Cultural Heritage Impact Assessment |

| | | | | |
|----|--------------------------|------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| 3. | U Khin Maung Htaey | 0151 | N0. 660 (B), 9 th Street South, East Gyogone Qtr, Insein Township, Yangon (09-51801824) | Sanitation System |
| 4. | Daw Htay Htay Win | 0145 | No. 140/7, U Wizarya Lane, Myaynigone, Sanchaung Township, Yangon (09-5301824) | Soil Assessment |
| 5. | Daw Mu Mu Aye | 0049 | No.10, Block (52), May Flower Street, Nawaday Garden Housing, Hlaing Tharyar Tsp, Yangon (095028189) | Biodiversity Assessment |
| 6. | U Yan Naing Aung | 0107 | N0. 14 (A), Y.T.U Compound, East Gyogone, Insein Township, Yangon (09-797508797) | Waste Management, Impact Assessment & Mitigation Plan |
| 7. | Dr. Htin Lin | 0214 | 6 (A), Staff housing, Y.T.U Compound, East Gyogone, Insein Township, Yangon (09-400410533) | Traffic Impact Analysis |
| 8. | U Myint Maung Maung Than | 0159 | F Hall Teachers Hostel, Y.T.U Compound, East Gyogone, Insein Township, Yangon (09-400410533) | Noise & Vibration Air Quality Assessment & EMP Drafting |
| 9. | U Phyto Maung Maung | 0162 | No.36, Room 12, Baho Road, Aung Chan Thar Ward, Sanchaung Tsp, Yangon | Public Consultation & Social Survey |

| | | | | |
|----|------------------|------|-------------------------------------------------------------------------------------------------|------------------------------------------|
| | | | (09-420069013) | |
| 10 | U Lin Thura Aung | 0157 | N0.36, Thuta Street, Ward No.4, South Okkalapa Tsp, Yangon (09-402644319) | Pollution Control Scoping & TOR Drafting |
| 11 | U Kyaw Zin Latt | 0154 | MES Buiding, Hlaing Universities Campus, Hlaing Township, Yangon (09-4202644319) | Geological Assessment |
| 12 | U Aung Kyaw Lin | 0117 | No.99, 1 st Floor, Seikkanthar Street, Kyauktata Township, Yangon (09-4505442734) | Legal Analysis |

Table 4. Project Contact Person of ECCEA

| Sr | Name | Contact number | Email Address |
|----|------------------|----------------|------------------------------------------------------------------------|
| 1 | U Soe Myint | (959)401600255 | sm260859@gmail.com |
| 2 | U Yan Naing Aung | (959)797508797 | yannaingaug123@gmail.com |

2 Project's Policies, Legal Requirements and Institutional Arrangements

2.1 Environmental Policy

MAAT is committed to carrying out MAAT Jetty Project in an environmentally responsible manner. The company will fulfill its environmental commitment by:

- Ensuring compliance with applicable environmental legislations
- Adopting appropriate mitigation measures for adverse environment impacts caused by company's activities
- Continually improving processes and ways of production which reduce levels of environment impact through energy, water and natural resources conservation
- Raising staff consciousness and their competence in environmental protection

2.2 Project Commitments

MAAT Company Limited is committed to carry out its jetty operation activities in compliance with standing laws, rules, procedures, orders, guidelines and notifications of the Republic of the Union of Myanmar.

2.2.1 Laws and Rules

The project proponent will be followed the following Laws, Rules and Procedures.

1. City of Yangon Development Law (2018)
2. EIA Procedures (2015)
3. Employment and Skill Development Law (2013)
4. Environmental Conservation Law (2012)
5. Environmental Conservation Rules (2014)
6. Inland Vessel Law, (2015)
7. Myanmar Investment Law (2016)
8. Myanmar Investment Rules (2017)
9. Myanmar Fire Bridgate Law (2015)
10. Myanmar Port Authority Law (2015)
11. Myanmar Merchant Shipping Act
12. Myanmar Merchant Shipping (Wireless Telegraphy) Rules (1937)
13. Myanmar Registration of Ships Act
14. Multimodal Transport Law
15. National Environmental Quality (Emission) Guidelines (NEQG) (2015)
16. Natural Disaster Management Law (2013)
17. Occupational Safety and Health Law (Draft, 2019)
18. The Automobile Law (2015)
19. The Carriers Act, (1989)
20. The Conservation of Water Resources and River Law (2006)
21. The Control of Smoking and Consumption of Tobacco Product Law (2006)
22. The Electricity Law (2014)
23. The Ethnic Rights Protection Law (2015)
24. The Export and Import Law (2012)
25. The Freshwater Fisheries Law (1991)

26. The Labour Organization Law (2011)
27. The Labour Dispute Settlement Law (2012)
28. The Minimum Wages Law (2013)
29. The Myanmar Coastal and Inland Water Transport Service License Law (2015)
30. The Myanmar Territorial Sea and Maritime Zones Law
31. The Payment of Wages Act (2016)
32. The Petroleum and Petroleum Product Law (2017)
33. The Prevention of Hazards from Chemical and Related Substances Law (2017)
34. The Private Industrial Enterprise Law (1990)
35. The Prevention and Control of Communicable Diseases Law (2013)
36. The Public Health Law (1972)
37. The Social Security Law (2012)
38. Unification of Certain Rules of Law with respect to Collision between Vessels

2.2.2 Legal Commitment for MAAT

The detail of legal commitment will be compliance from MAAT is as follow.

| Sr. | Para- | Stipulation | Commitment |
|-----|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Environmental Conservation Law | | |
| 1.1 | 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. | Wherever a point source of pollution occurs in MAAT Jetty Terminal Project, MAAT shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards. |
| 1.2 | 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 | MAAT shall ensure the owner or occupier of any business, material or place within MAAT Jetty Terminal Project which causes a point source |

| | | | |
|-----|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 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. | 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, arrangements shall be made to dispose the wastes in accord with environmentally sound methods. |
| 1.4 | 22 | The owner or occupier of the category of business, work- site or Project, workshop stipulated by the Ministry under section 21 shall apply for the prior permission to the Ministry in accord with the stipulations. | MAAT shall apply for the prior permission to the Ministry of Natural Resources and Environmental Conservation in accord with the stipulations. |
| 1.5 | 26 | The holder of the prior permission shall affect insurance according to the category of his business, work-site or Project, workshop for any accident that may cause impact on the environment, in accord with the existing law. | MAAT upon receiving the prior permission of MONREC shall affect insurance according to the category of its business, work-site or Project, workshop for any accident that may cause impact on the environment, in accord with the existing law. |
| 1.6 | 28 | No one shall, without the prior permission, operate business, work-site or Project, workshop which is required to obtain the prior permission under this Law. | MAAT shall never, without the prior permission, operate business, work-site or Project, workshop which is required to obtain the prior permission under the Environmental Conservation Law. |
| 1.7 | 29 | No one shall violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law. | MAAT shall never violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under the Environmental Conservation Law. |

| | | | |
|-----|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.8 | 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. | MAAT shall never, without permission of the Ministry, import, export, produce, store, carry or trade any material which causes impact on the environment prohibited by the Ministry (MONREC). |
| 2 | Environmental Conservation Rules | | |
| 2.1 | 69 | (a) No one shall emit, ask to emit, dispose, ask to dispose, pile and ask to pile, by any means, hazardous waste or hazardous substances stipulated by notification according to any rules in this rules at any place which may affect the public directly or indirectly. (b) No one shall, except for the permission of the Ministry for the interests of the people, carry out any activity which can damage the ecosystem and ecosystem services. | (a) MAAT shall never emit, ask to emit, dispose, ask to dispose, pile and ask to pile, by any means, hazardous waste or hazardous substances stipulated by notification according to any rules in the environmental conservation rules at any place which may affect the public directly or indirectly. (b) MAAT shall never, except for the permission of the Ministry for the interests of the people, carry out any activity which can damage the ecosystem and ecosystem services. |
| 3 | Environmental Impact Assessment Procedures | | |
| 3.1 | 3 | Pursuant to Section 21 of the Law and Articles 52, 53 and 55 of the Rules, all Projects and Project expansions undertaken by any ministry, government department, organization, corporation, board, development committee and organization, local government or authority, company, cooperative, institution, enterprise, firm, partnership or individual (and/or all Projects, field sites, factories and | MAAT shall undertake EIA to obtain an ECC in accordance with EIA Procedure. |

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| | | <p>businesses including expansions of such Projects, field sites, factories and businesses identified by the Ministry, which may cause impact on environmental quality and are required to obtain Prior Permission in accordance with Section 21 of the Law, and Article 62 of the Rules) having the potential to cause Adverse Impacts, are required to undertake IEE or EIA or to develop an EMP, and to obtain an ECC in accordance with this Procedure.</p> | |
| 3.2 | 84 | <p>All Projects and activities, whether categorized in Annex 1 ‘Categorization of Economic Activities for Assessment Purposes’ as requiring an IEE, an EIA, nor neither: (i) are obliged to obtain all required authorizations, permits, licenses and approvals and to comply with all applicable laws, regulations, procedures, ministerial directives, zoning, planning requirements, and other governmental requirements, and (ii) shall remain subject to any environmental and/or social conditions which the Ministry may impose as a condition to the commencement or continuation of construction or operation of that Project or activity.</p> | <p>MAAT should be committed as: (i) to obtain all required authorizations, permits, licenses and approvals and to comply with all applicable laws, regulations, procedures, ministerial directives, zoning, planning requirements, and other governmental requirements, and (ii) shall remain subject to any environmental and/or social conditions which the Ministry may impose as a condition to the commencement or continuation of construction or operation of that Project or activity.</p> |

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| 3.3 | 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. | Upon receipt of the written approval from the relevant authority, MAAT 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. |
| 3.4 | 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. | MAAT committed to 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. |
| 3.5 | 106 | The Project Proponent shall, during all phases of the Project (pre-construction, construction, operation, | MAAT shall, during all phases of the Project (pre-construction, construction, operation, |

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| | | 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. | 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. |
| 3.6 | 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. | MAAT 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. |
| 3.7 | 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. | Within ten (10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the MAAT 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. |

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| 3.8 | 113 | <p>For purposes of monitoring and inspection, the Project Proponent:</p> <p>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</p> <p>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.</p> | <p>For purposes of monitoring and inspection, the MAAT</p> <p>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</p> <p>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.</p> |
| 3.9 | 115 | <p>In the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements, the Project shall grant full and immediate access to the Ministry at any time as may be required by the Ministry.</p> | <p>In the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements, the MAAT shall grant full and immediate access to the Ministry at any time as may be required by the Ministry.</p> |
| 4 | National Environmental Quality (Emissions) Guidelines | | |
| 4.1 | 6 | <p>Provisions of the general and applicable industry-specific Guidelines shall be reflected in project environmental management plan (EMP) and environmental compliance</p> | <p>The MAAT commitment to take necessary measures to avoid, minimize and control adverse impacts to human health and safety, and the environment through</p> |

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| | | <p>certificate (ECC) and together constitute a project's commitment to take necessary measures to avoid, minimize and control adverse impacts to human health and safety, and the environment through reducing the total amount of emissions generation; to adopting process modifications, including waste minimization to lower the load of pollutants requiring treatment; and as necessary, to apply treatment techniques to further reduce the load of contaminants prior to release or discharge.</p> | <p>reducing the total amount of emissions generation; to adopting process modifications, including waste minimization to lower the load of pollutants requiring treatment; and as necessary, to apply treatment techniques to further reduce the load of contaminants prior to release or discharge.</p> |
| 4.2 | 7 | <p>Recognizing that these Guidelines are intended to prevent pollution through reducing the mass of pollutants emitted to the environment, dilution of air emissions and effluents to achieve maximum permitted values is not acceptable. Specified guideline values should be achieved, without dilution, at least 95 percent of the time that a project is operating, to be calculated as a proportion of annual operating hours.</p> | <p>The MAAT shall not use a dilution of air emissions and an effluent to achieve maximum permitted values is not acceptable.</p> |
| 4.3 | 9 | <p>As specified in the EIA Procedure, all projects are obliged to use, comply with and refer to applicable national guidelines or standards or international standards adopted by the Ministry. These Guidelines will henceforth be applied by the Ministry</p> | <p>The MAAT complies with and refers to applicable national guidelines or standards or international standards adopted by the Ministry.</p> |

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| | | in satisfying this requirement until otherwise modified or succeeded by other guidelines or standards. | |
| 4.4 | 12 | As specified in the EIA Procedure, projects shall engage in continuous, proactive and comprehensive self-monitoring of the project and comply with applicable guidelines and standards. For purposes of these Guidelines, projects shall be responsible for the monitoring of their compliance with general and applicable industry-specific Guidelines as specified in the project EMP and ECC. | As specified in the EIA Procedure, the MAAT shall engage in continuous, proactive and comprehensive self-monitoring of the project and comply with applicable guidelines and standards. |
| 4.5 | 13 | Air emissions, noise, odor, and liquid / effluent discharges will be sampled and measured at points of compliance as specified in the project EMP and ECC. | Air emissions, noise, odor, and liquid / effluent discharges will be sampled and measured at points of compliance as specified in the project EMP and ECC. |
| 5 | The Ethnic Rights Protection Law | | |
| 5.1 | 5 | The matters of projects shall completely be informed, coordinated and performed with the relevant local ethnic groups in the case of development works, major projects, businesses and extraction of natural resources will be implemented within the area of ethnic groups. | The matters projects of MAAT shall completely be informed, coordinated and performed with the relevant local ethnic groups in the case of development works, major projects, businesses and extraction of natural resources will be implemented within the area of ethnic groups. |
| 6 | Myanmar Investment Law | | |
| 6.1 | 50 | d) The investor shall register the land lease contract at the Office of Registry | d) The MAAT shall register the land lease contract at the Office of |

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| | | of Deeds in accordance with the Registration Act. | Registry of Deeds in accordance with the Registration Act. |
| 6.2 | 51 | <p>The investor:</p> <p>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.</p> <p>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.</p> <p>shall appoint only citizens for works which does not require skill.</p> <p>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.</p> <p>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.</p> | <p>The MAAT</p> <p>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.</p> <p>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.</p> <p>shall appoint only citizens for works which does not require skill.</p> <p>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.</p> <p>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</p> |

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| | | <p>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.</p> | <p>employees and occupational terms and conditions in the employment contract.</p> <p>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.</p> |
| 6.3 | 65 | <p>The Investor:</p> <p>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.</p> <p>g) shall abide by applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage.</p> <p>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.</p> <p>i) shall close and discontinue the investment only after payment of compensation to employees in</p> | <p>The MAAT</p> <p>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.</p> <p>g) shall abide by applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage.</p> <p>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.</p> <p>i) shall close and discontinue the investment only after payment of</p> |

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| | <p>accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce.</p> <p>j) shall pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason.</p> <p>k) shall pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease and death due to the work.</p> <p>l) shall supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar.</p> <p>m) shall respect and comply with the labor laws.</p> <p>n) shall have the right to sue and to be sued in accordance with the laws.</p> <p>o) shall pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural</p> | <p>compensation to employees in accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce.</p> <p>j) shall pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason.</p> <p>k) shall pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease and death due to the work.</p> <p>l) shall supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar.</p> <p>m) shall respect and comply with the labor laws.</p> <p>n) shall have the right to sue and to be sued in accordance with the laws.</p> <p>o) shall pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic</p> |
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| | | <p>resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement.</p> <p>p) shall allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment.</p> <p>q) shall take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.</p> | <p>losses caused by logging or extraction of natural resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement.</p> <p>p) shall allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment.</p> <p>q) shall take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.</p> |
| 6.4 | 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. | The MAAT 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. |
| 7 | Myanmar Engineering Council Law | | |

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| 7.1 | 34 | If, whoever has received a registration certificate, is found to have breached any rules contained in the registration certificate or violated any prohibition contained in a rule, order or directive enacted under this law or in any stipulation of this law, the executive committee may take the following administrative actions- giving a warning; assessing a suitable fine; suspending the registration certificate cancelling the registration certificate. | If the construction engineer of MAAT is found to have breached any rules contained in the registration certificate or violated any prohibition contained in a rule, order or directive enacted under this law or in any stipulation of this law, the executive committee may take the following administrative actions- giving a warning; assessing a suitable fine; suspending the registration certificate; cancelling the registration certificate. |
| 7.2 | 37 | No one shall perform any engineering work and Technological work which are specified as being dangerous to the public by a rule enacted under this law without having received a registration certificate issued by the council, except for engineers appointed in a government department or an organization in the performance of their duties. | The construction of MAAT shall not perform any engineering work and Technological work which are specified as being dangerous to the public by a rule enacted under this law without having received a registration certificate issued by the council, except for engineers appointed in a government department or an organization in the performance of their duties. |
| 8 | The Export and Import Law | | |
| 8.1 | 7 | A person who obtained any license shall not violate the conditions contained in the license. | The MAAT shall not violate the conditions contained in the license. |
| 9 | The Labour Organization Law | | |

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| 9.1 | 17 | <p>The labour organizations shall have the right to carry out freely in drawing up their constitution and rules, in electing their representatives, in organizing their administration and activities or in formulating their programmes. The Labour Organizations have the right to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and to submit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached.</p> | <p>The MAAT should be followed the labour organizations law which shall have the right to carry out freely in drawing up their constitution and rules, in electing their representatives, in organizing their administration and activities or in formulating their programmes. The Labour Organizations have the right to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and to submit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached.</p> |
| 9.2 | 18 | <p>The labour organization has the right to demand the relevant employer to re-appoint a worker if such worker is dismissed by the employer and if there is cause to believe that the reasons of such dismissal were based on labour organization membership or activities, or were not in conformity with the labour laws.</p> | <p>The MAAT is followed the labour organization law which has the right to demand the relevant employer to re-appoint a worker if such worker is dismissed by the employer and if there is cause to believe that the reasons of such dismissal were based on labour organization membership or activities, or were not in conformity with the labour laws.</p> |
| 9.3 | 29 | <p>The employer shall recognize the labour organizations of his trade as the organizations representing the workers</p> | <p>The MAAT should be followed the recognize the labour organizations of his trade as the organizations representing the workers</p> |

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| 9.4 | 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. | The MAAT 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. |
| 9.5 | 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. | The MAAT 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. |
| 9.6 | 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. | The MAAT shall never, without permission of the relevant conciliation body, lock-out a public utility service or service which is not included in public utility service. |
| 9.7 | 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 | The MAAT shall never: (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 |

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| | | 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. | 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. |
| 10 | The Settlement of Labour Dispute Law | | |
| 10.1 | 38 | No employer shall fail to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause. | The MAAT shall never fail to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause. |
| 10.2 | 39 | No employer shall alter the conditions of service relating to workers concerned in such dispute at the consecutive period before commencing the dispute within the period under investigation of the dispute before the Arbitration Body or Tribunal, to affect the interest of such workers immediately. | The MAAT committed shall never alter the conditions of service relating to workers concerned in such dispute at the consecutive period before commencing the dispute within the period under investigation of the dispute before the Arbitration Body or Tribunal, to affect the interest of such workers immediately. |
| 10.3 | 40 | Any employer who violates any prohibition contained in sections 38 and 39 shall, on conviction, be punished with a fine for a minimum of one lakh kyats. | The MAAT shall never commit violates any prohibition contained in sections 38 and 39. |
| 11 | Employment and Skill Development Law (2013) | | |
| 11.1 | 5 | (1) If the employer has appointed the employee to work for an employment, the employment agreement shall | (1) If the MAAT has appointed the employee to work for an employment, the employment agreement shall be followed within |

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| | | be made within 30 days. But it shall not be related with government department and organization for a permanent employment. | 30 days. But it shall not be related with government department and organization for a permanent employment. |
| 11.2 | 14 | The employer shall carry out the training program in accord with the work requirement in line with the policy of the skill development team to develop the skill relating to the employment for the workers who are proposed to appoint and working at present. | The MAAT shall ever carry out the training program in accord with the work requirement in line with the policy of the skill development team to develop the skill relating to the employment for the workers who are proposed to appoint and working at present. |
| 11.3 | 15 | <p>The Employer:</p> <p>(a) shall carry out the training for each work or compounding the work individually or group-wise by opening on-job training, training systematically at worksite, sending outside training and training by using information technology system, for arranging the training program to enhance the employment skill of the workers;</p> <p>(b) appointing the youths of 16 years as apprentice, shall arrange the training for technology relating to the employment systematically in accord with the regulations prescribed by the skill development team.</p> | <p>The MAAT should be made following this;</p> <p>a) shall carry out the training for each work or compounding the work individually or group-wise by opening on-job training, training systematically at worksite, sending outside training and training by using information technology system, for arranging the training program to enhance the employment skill of the workers;</p> <p>(b) appointing the youths of 16 years as apprentice, shall arrange the training for technology relating to the employment systematically in accord with the regulations prescribed by the skill development team.</p> |

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| 11.4 | 29 | <p>The fund management committee shall have the right to use the fund for any of the following matter in accord with the regulation stipulated by the skill development team:</p> <p>(a) sending to any part time or full-time training for the skill development of the employee, opening the training and supporting or giving loan to the employer who shall extend the training program;</p> <p>(b) reissuing after scrutinizing in accord with the stipulations if asking to pay the expenses incurred relating to the training for the said employees;</p> <p>(c) performing other matters stipulated by the skill development team</p> | <p>The MAAT is agreed to use the fund for any of the following matter in accord with the regulation stipulated by the skill development team:</p> <p>(a) sending to any part time or full-time training for the skill development of the employee, opening the training and supporting or giving loan to the employer who shall extend the training program;</p> <p>(b) reissuing after scrutinizing in accord with the stipulations if asking to pay the expenses incurred relating to the training for the said employees;</p> <p>(c) performing other matters stipulated by the skill development team</p> |
| 11.5 | 30 | <p>(a) The employer of the industry and service business shall put in to the fund monthly as put in fees without fail for the total wages of the subordinates and the supervisors' salary for not less than 0.5%;</p> <p>(b) Put in money paid under subsection</p> <p>(c) shall not be deducted from the wage and salary of the employees.</p> | <p>(a) The MAAT of the industry and service business shall put in to the fund monthly as put in fees without fail for the total wages of the subordinates and the supervisors' salary for not less than 0.5%;</p> <p>(b) Put in money paid under subsection</p> <p>(c) shall not be deducted from the wage and salary of the employees.</p> |
| 11.6 | 31 | The skill development team: | The MAAT should be made to development team: |

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| | | <p>(a) relating to the put in money which is to be paid to the fund by the employer under section 30, sub-section</p> <p>(b) shall specify based on the work sector, type of work, size of work and number of employees;</p> <p>(c) shall have the right to exempt from putting into the fund if any employer can submit secure reason.</p> | <p>(a) relating to the put in money which is to be paid to the fund by the employer under section 30, sub-section</p> <p>(b) shall specify based on the work sector, type of work, size of work and number of employees;</p> <p>(c) shall have the right to exempt from putting into the fund if any employer can submit secure reason.</p> |
| 11.7 | 38 | <p>If any employer is convicted of committing any of the following matters, he shall be punished with imprisonment for not more than six months or with a fine or with both:</p> <p>(a) failing to sign employment agreement under section 5, sub-section (a);</p> <p>(b) failing to pay put in money under section 30, sub-section</p> | <p>The MAAT should be convicted of committing any of the following matters, he shall be punished with imprisonment for not more than six months or with a fine or with both:</p> <p>(a) failing to sign employment agreement under section 5, sub-section</p> <p>(b) failing to pay put in money under section 30, sub-section</p> |
| 12 | Minimum Wages Law | | |
| 12.1 | 12 | <p>The employer:</p> <p>(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law;</p> <p>(b) may pay more than the minimum wage stipulated under this Law;</p> <p>(c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;</p> | <p>The MAAT</p> <p>(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law;</p> <p>(b) may pay more than the minimum wage stipulated under this Law;</p> <p>(c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;</p> |

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| | | <p>(d) shall pay the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;</p> <p>(e) in paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker</p> | <p>(d) shall pay the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;</p> <p>(e) in paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker</p> |
| 12.2 | 13 | <p>The employer:</p> <p>(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law;</p> <p>(b) may pay more than the minimum wage stipulated under this Law;</p> <p>(c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;</p> <p>(d) shall pay the minimum wage to the workers working in the commercial,</p> | <p>The MAAT</p> <p>(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law;</p> <p>(b) may pay more than the minimum wage stipulated under this Law;</p> <p>(c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;</p> <p>(d) shall pay the minimum wage to the workers working in the</p> |

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| | | <p>production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;</p> <p>(e) in paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker</p> | <p>commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;</p> <p>(e) in paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker</p> |
| 12.3 | 22 | <p>Any employer:</p> <p>(a) shall not fail to pay the workers the minimum wage stipulated under this Law;</p> <p>(b) shall not pay to the workers less than the minimum wages and other benefits which is entitled by the worker under section 14;</p> <p>(c) relating to the accounts, schedules, documents and lists of wage of the workers:</p> <p>(i) shall not make false entry, deceitful recording or false and deceitful reporting;</p> | <p>The MAAT</p> <p>(a) shall not fail to pay the workers the minimum wage stipulated under this Law;</p> <p>(b) shall not pay to the workers less than the minimum wages and other benefits which is entitled by the worker under section 14;</p> <p>(c) relating to the accounts, schedules, documents and lists of wage of the workers:</p> <p>(i) shall not make false entry, deceitful recording or false and deceitful reporting;</p> |

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| | | <p>(ii) shall not fail to report to the relevant department in accord with the stipulations;</p> <p>(iii) shall not fail to produce when required by the inspection officer;</p> <p>(d) shall not fail to go and accept inspection when summoned by the inspection officer;</p> <p>(e) shall not obstruct or interfere with the inspection officer who inspects on duty.</p> | <p>(ii) shall not fail to report to the relevant department in accord with the stipulations;</p> <p>(iii) shall not fail to produce when required by the inspection officer;</p> <p>(d) shall not fail to go and accept inspection when summoned by the inspection officer;</p> <p>(e) shall not obstruct or interfere with the inspection officer who inspects on duty.</p> |
| 12.4 | 23 | Any employer who violates any of the prohibitions contained in section 22 shall, on conviction, be punished with imprisonment for a term not exceeding one year or with fine not exceeding 5 lakhs or with Both. | The MAAT shall never commit violates any of the prohibitions contained in section 22. |
| 12.5 | 24 | <p>Any employer:</p> <p>(a) shall not violate any term and condition contained in the minimum wage notification;</p> <p>(b) shall not fail to inform the workers relating to the rates of minimum wage concerning to his workers among the rates of minimum wage stipulated under this Law and announce at the place where the workers are able to see it in the work centre and workplace.</p> | <p>The MAAT</p> <p>(a) shall not violate any term and condition contained in the minimum wage notification;</p> <p>(b) shall not fail to inform the workers relating to the rates of minimum wage concerning to his workers among the rates of minimum wage stipulated under this Law and announce at the place where the worker is able to see it in the work centre and workplace;</p> |
| 12.6 | 25 | Any employer who violates any prohibition contained in section 24 shall, on conviction, be punished with imprisonment for a term not | The MAAT shall never commit violates any prohibition contained in section 24. |

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| | | exceeding six months or with fine not exceeding kyat 3lakhs or with both. | |
| 13 | The Payment of Wages Law | | |
| 13.1 | 3 | <p>The employer must</p> <p>(a) Pay in local currency or foreign currency recognized by the Central Bank of Myanmar. This may be in cash, check or deposit into the bank account of Employee.</p> <p>(b) Moreover, pay can be in the means of...</p> <p>(1) Totally in cash or half the cash and half in things set according to the local price to those employees working in trade, manufacturing and service sectors.</p> <p>(2) Totally in cash or half the cash and half in things set as local price according to local traditions or common agreement to those working in agriculture and livestock sectors. But this must be for the sake of the employees and their families. And, it also must be reasonable/fair.</p> <p>(3) An employee shall receive the payment for 60 days when he/she is in Alternative Civil Service.</p> | <p>The MAAT must</p> <p>(a) Pay in local currency or foreign currency recognized by the Central Bank of Myanmar. This may be in cash, check or deposit into the bank account of Employee.</p> <p>(b) Moreover, pay can be in the means of...</p> <p>(1) Totally in cash or half the cash and half in things set according to the local price to those employees working in trade, manufacturing and service sectors.</p> <p>(2) Totally in cash or half the cash and half in things set as local price according to local traditions or common agreement to those working in agriculture and livestock sectors. But this must be for the sake of the employees and their families. And, it also must be reasonable/fair.</p> <p>(3) An employee shall receive the payment for 60 days when he/she is in Alternative Civil Service.</p> |
| 13.2 | 4 | <p>An employer must pay for</p> <p>(a) Part-time, daily, weekly or other part-time job, temporary or piecework when the work is done OR at the agreed time.</p> | <p>The MAAT must pay for</p> <p>(a) Part-time, daily, weekly or other part-time job, temporary or piecework when the work is done OR at the agreed time.</p> |

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| | | <p>(b) According to the Article (a), the time frame shall not exceed one month.</p> <p>(c) Wages for the permanent work must pay per monthly basis. If so...</p> <p>(1) Must pay at the end of the payment period when there are not more than 100 workers.</p> <p>(2) If there are 100 workers and above, pay must not be administered later than 5 days after the end of the payment period.</p> <p>(d) Upon termination, wages must be paid within 2 days from the date of termination.</p> <p>(e) If a resignation letter is submitted, wages must be paid at the ending day of the payment period.</p> <p>(f) If an employee dies, wages must be paid to the legally recognized heir within 2 working days after the day he/she has died.</p> <p>(g) All wages must be paid during the working day.</p> | <p>(b) According to the Article (a), the time frame shall not exceed one month.</p> <p>(c) Wages for the permanent work must pay per monthly basis. If so...</p> <p>(1) Must pay at the end of the payment period when there are not more than 100 workers.</p> <p>(2) If there are 100 workers and above, pay must not be administered later than 5 days after the end of the payment period.</p> <p>(d) Upon termination, wages must be paid within 2 days from the date of termination.</p> <p>(e) If a resignation letter is submitted, wages must be paid at the ending day of the payment period.</p> <p>(f) If an employee dies, wages must be paid to the legally recognized heir within 2 working days after the day he/she has died.</p> <p>(g) All wages must be paid during the working day.</p> |
| 13.3 | 5 | <p>If the owner encounters difficulty to pay the wages according to Section 4 sub-section (c) because of significant happenings, including natural disaster, the employer must report to the Department with solid evidence that wages will be paid at the mentioned day upon the workers' agreement.</p> | <p>The MAAT is agreed encounters difficulty to pay the wages according to Section 4 sub-section (c) because of significant happenings, including natural disaster, the company must follow the report to the Department.</p> |

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| 13.4 | 7 | <p>The Employer</p> <p>Can deduct from wages for absences except when such absence is during a public holiday or entitled leave, according to the law.</p> <p>Accommodation charges and transportation charges, meal allowances, charges for water and electricity, taxes and errors in payment shall be allowed for deduction.</p> <p>Can deduct from pre-issued, expensed and saved (or) contributed amount according to the law upon the employee contract.</p> <p>The Employer can deduct with the judgment of the Court of Arbitrator Jury Council.</p> | <p>The MAAT</p> <p>Can deduct from wages for absences except when such absence is during a public holiday or entitled leave, according to the law.</p> <p>Accommodation charges and transportation charges, meal allowances, charges for water and electricity, taxes and errors in payment shall be allowed for deduction.</p> <p>Can deduct from pre-issued, expensed and saved (or) contributed amount according to the law upon the employee contract.</p> <p>The Employer can deduct with the judgment of the Court of Arbitrator Jury Council.</p> |
| 13.5 | 8 | The Employer cannot deduct except the deduction in accordance with Section 7 and Section 11. | The MAAT cannot deduct except the deduction in accordance with Section 7 and Section 11. |
| 13.6 | 9 | The total amount of other deductions, except when the employee fails to perform their duties, shall not be more than 50% of the employee's wages. | The total amount of other deductions, except when the employee fails to perform their duties, MAAT agreed not be more than 50% of the employee's wages. |
| 13.7 | 10 | <p>The Employer must</p> <p>(a) According to Section 11 of this Act, get permission from the Department concerning "why" and "how" prior to making deductions from wages.</p> | <p>The MAAT must</p> <p>(a) According to Section 11 of this Act, get permission from the Department concerning "why" and "how" prior to making deductions from wages.</p> |

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| | <p>(b) Permissions stated in sub-section (a) shall be publicly posted.</p> <p>(c) Fines must not exceed the value of damage caused by the action or cost of performance failure of the employee.</p> <p>(d) According to Section 4 of this Act, when making a specific deduction</p> <p>(1) Do not deduct without allowing an appeal from the Employee.</p> <p>(2) Do not deduct more than 5% of the monthly wages.</p> <p>(e) No deduction is allowed from a worker under 16 years old.</p> <p>(f) The timeframe for deductions shall be set upon an agreement from both sides.</p> <p>(g) Deductions shall be carried out within the limited timeframe upon the agreement of the Township Arbitration Council set in accordance with Law.</p> <p>(h) Every deduction must be well documented.</p> <p>(i) You must submit a monthly report to the Department concerning deductions.</p> <p>(j) Fines deducted according to Section 11 sub-section (b) must be used for the social welfare of the employees upon discussion with a registered labor organization</p> | <p>(b) Permissions stated in sub-section (a) shall be publicly posted.</p> <p>(c) Fines must not exceed the value of damage caused by the action or cost of performance failure of the employee.</p> <p>(d) According to Section 4 of this Act, when making a specific deduction</p> <p>(1) Do not deduct without allowing an appeal from the Employee.</p> <p>(2) Do not deduct more than 5% of the monthly wages.</p> <p>(e) No deduction is allowed from a worker under 16 years old.</p> <p>(f) The timeframe for deductions shall be set upon an agreement from both sides.</p> <p>(g) Deductions shall be carried out within the limited timeframe upon the agreement of the Township Arbitration Council set in accordance with Law.</p> <p>(h) Every deduction must be well documented.</p> <p>(i) You must submit a monthly report to the Department concerning deductions.</p> <p>(j) Fines deducted according to Section 11 sub-section (b) must be used for the social welfare of the employees upon discussion with a registered labor organization</p> |
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| 13.8 | 11 | Employers shall fine for the following actions or performance failure by the employees... Direct damage which is either intentional or due to negligence or due to the failure of the employee concerned with company property to take proper care. A breach of the employment contract or breach of any rules for which a fine had been previously set. | The MAAT shall fine for the following actions or performance failure by the employees... (a)Direct damage which is either intentional or due to negligence or due to the failure of the employee concerned with company property to take proper care. (b)A breach of the employment contract or breach of any rules for which a fine had been previously set. |
| 13.9 | 22 | All Employers are not allowed to breach any terms stated in Sections 4,5,8,9 and 11. | The MAAT is never committed to breach any terms stated in Sections 4,5,8,9 and 11. |
| 14 | The Social Security Law | | |
| 14.1 | 48 | (a) The employer shall effect insurance by registering for employment injury benefit insurance system contained in section 45 at the relevant township social security office and pay contribution to employment injury benefit fund in accord with stipulations in order that workers applied to provisions of compulsory registration may obtain the employment injury benefits; (b) The employers may effect insurance by registering voluntarily for insurance of the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system, by paying stipulated | (a) The MAAT shall effect insurance by registering for employment injury benefit insurance system contained in section 45 at the relevant township social security office and pay contribution to employment injury benefit fund in accord with stipulations in order that workers applied to provisions of compulsory registration may obtain the employment injury benefits; (b) The MAAT may effect insurance by registering voluntarily for insurance of the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system, by paying |

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| | | <p>contribution to employment injury benefit insurance fund;</p> <p>(c) When registering to effect insurance for employment injury benefit in accord with sub-sections (a) and (b), the worker shall submit medical certificate.</p> | <p>stipulated contribution to employment injury benefit insurance fund;</p> <p>(c) When registering to effect insurance for employment injury benefit in accord with sub-sections (a) and (b), the worker shall submit medical certificate.</p> |
| 14.2 | 51 | <p>The employer:</p> <p>(a) shall pay contribution monthly to Employment Injury Benefit Fund at the rates stipulated under section 50. Moreover, he shall also bear the expenses for paying as such;</p> <p>(b) shall pay defaulting fee stipulated under section 88, in addition to the contribution if fails to contribute after effecting insurance for employment injury benefit.</p> | <p>The MAAT</p> <p>(a) shall pay contribution monthly to Employment Injury Benefit Fund at the rates stipulated under section 50. Moreover, he shall also bear the expenses for paying as such;</p> <p>(b) shall pay defaulting fee stipulated under section 88, in addition to the contribution if fails to contribute after effecting insurance for employment injury benefit.</p> |
| 14.3 | 53 | <p>The employers and workers shall co-ordinate, co-operate and carry out with the Board or insurance agent departments in carrying out workers' occupational safety measures and keeping health plan in order to prevent employment accident, or employment injury or disease contracting and death in addition to safety and educational work of the workers.</p> <p>The costs of medical care regarding employment injury resulting from criminal action or omission of the employer, or resulting from</p> | <p>The MAAT is made this following rule;</p> <p>The employers and workers shall co-ordinate, co-operate and carry out with the Board or insurance agent departments in carrying out workers' occupational safety measures and keeping health plan in order to prevent employment accident, or employment injury or disease contracting and death in addition to safety and educational work of the workers.</p> |

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| | | employer's failure to keep occupational safety plans and protections; and other benefits under this Law shall be borne without fail by the employer in accord with the stipulations. | The costs of medical care regarding employment injury resulting from criminal action or omission of the employer, or resulting from employer's failure to keep occupational safety plans and protections; and other benefits under this Law shall be borne without fail by the employer in accord with the stipulations. |
| 14.4 | 54 | <p>(a) The employer shall report to the relevant township social security office immediately if a serious employment accident occurs to his insured worker. There shall not be any delay without sufficient cause to report as such.</p> <p>(b) A team of officers and other staff who inspect the establishments, if it is found out the employment injury, death, and contracting disease, shall report to the relevant township social security office in accord with the stipulations.</p> | <p>The MAAT is made this following rule;</p> <p>(a) The employer shall report to the relevant township social security office immediately if a serious employment accident occurs to his insured worker. There shall not be any delay without sufficient cause to report as such.</p> <p>(b) A team of officers and other staff who inspect the establishments, if it is found out the employment injury, death, and contracting disease, shall report to the relevant township social security office in accord with the stipulations.</p> |
| 14.5 | 55 | The insured person who, by reason of employment injury, became incapable to work which involves reduction or suspension of earnings; free medical care and temporary disability benefit of 70 per cent of average wage during four months prior to employment | The MAAT must made the insured person who, by reason of employment injury, became incapable to work which involves reduction or suspension of earnings; free medical care and temporary disability benefit of 70 per cent of |

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| | | accident shall be entitled, commencing from the date of incapacity for work, to a maximum of 12 months upon medical certificate. | average wage during four months prior to employment accident shall be entitled, commencing from the date of incapacity for work, to a maximum of 12 months upon medical certificate. |
| 14.6 | 56 | <p>(a) The temporary disability benefit under section 55 shall be terminated from the date on which the insured person becomes capable for work within 12 months. (b) If an insured person continues to be incapable to work after the expiration of 12 months period of temporary disability benefit, it shall be converted into permanent disability pension.</p> <p>(c) If permanent disability for work of an insured person can be expected by the medical certificate even during 12 months while temporary disability benefit has been enjoyed, it has the right to terminate the temporary disability benefit, convert into permanent disability benefit and enjoy it.</p> | <p>The MAAT is committed this following rule;</p> <p>(a) The temporary disability benefit under section 55 shall be terminated from the date on which the insured person becomes capable for work within 12 months.</p> <p>(b) If an insured person continues to be incapable to work after the expiration of 12 months period of temporary disability benefit, it shall be converted into permanent disability pension.</p> <p>(c) If permanent disability for work of an insured person can be expected by the medical certificate even during 12 months while temporary disability benefit has been enjoyed, it has the right to terminate the temporary disability benefit, convert into permanent disability benefit and enjoy it.</p> |
| 14.7 | 57 | The insured person has the right to enjoy, owing to an employment accident, permanent partial disability cash benefit if there is likely to cause partial loss of capacity for work; or | The MAAT must be committed to make the insured person has the right to enjoy, owing to an employment accident, permanent partial disability cash benefit if there |

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| | | <p>permanent total disability cash benefit if there is likely to cause total loss of capacity for work. As regards that benefit, fixation for a month benefit which may be enjoyed in accord with section 58 shall be calculated upon 70 per cent of a months' average wage during four months before employment injury occurs, in relation to percentage of loss of capacity for work decided by the Medical Board.</p> | <p>is likely to cause partial loss of capacity for work; or permanent total disability cash benefit if there is likely to cause total loss of capacity for work. As regards that benefit, fixation for a month benefit which may be enjoyed in accord with section 58 shall be calculated upon 70 per cent of a months' average wage during four months before employment injury occurs, in relation to percentage of loss of capacity for work decided by the Medical Board.</p> |
| 14.8 | 58 | <p>The person who suffers loss of capacity to work may enjoy permanent disability benefit calculated basing upon 70 per cent of a months' average wage contained in section 57, in relation to percentage of loss of capacity for work, as specified hereunder:</p> <p>(a) in cases in which the degree of incapacity is less than 20 per cent, the right to enjoy monthly cash benefit entitled to such person for five years in lump sum;</p> <p>(b) in cases in which the degree of incapacity is above 20 per cent to 75 per cent, the right to enjoy monthly cash benefit entitled to such person for seven years in installment or in lump</p> | <p>The MAAT must never committed to breach section 58.</p> |

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| | | <p>sum, according to the desire of that person;</p> <p>(c) in cases in which the degree of incapacity is above 75 per cent, the right to enjoy monthly cash benefit entitled to such person for nine years in installment or in lump sum or in monthly installment until death, according to the desire of that person;</p> <p>(d) if the medical certificate is submitted that permanently disabled person contained in sub-section (c) requires the constant attendance of another person, the right to enjoy the supplement of 10 per cent of his benefit in installment, or in lump sum, or in monthly installment until death, according to the desire of that person, in addition to the benefit contained in sub-section (c).</p> | |
| 14.9 | 65 | <p>The employer:</p> <p>(a) has the right to reimbursement out of benefits granted under this Law, for payments made as social obligation for an insured person 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 person during a period of sickness benefit, or maternity benefit, or employment injury benefit under this Law exceeds the normal wages of that insured</p> | <p>The MAAT should be committed this following rule;</p> <p>(a) has the right to reimbursement out of benefits granted under this Law, for payments made as social obligation for an insured person in cases of health care, medical treatment and other matters entitled to benefit;</p> <p>(b) if the total amount of wages and cash benefit paid to the insured person during a period of sickness benefit, or maternity benefit, or</p> |

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| | | <p>person; 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.</p> | <p>employment injury benefit under this Law exceeds the normal wages of that insured person; 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.</p> |
| 14.1 0 | 66 | <p>(a) The employer, subject to health care and medical treatment in accord with sections 67 and 68:</p> <p>(i) shall not remove or terminate the insured person from work or reduce his wage level during the period during which an insured person is enjoying any of the sickness benefit or maternity benefit or temporary disability benefit due to employment injury under this Law;</p> <p>(ii) shall not reduce or deduct wages and fees of his worker because of liability for contribution payable under this Law;</p> <p>(b) The insured person, as regards his injury due to employer's violation of restrictions under sub-section (a), may submit the matter to the relevant township social security office for settlement in accord with the stipulations.</p> | <p>The MAAT should be committed this following rule;</p> <p>(a) The employer, subject to health care and medical treatment in accord with sections 67 and 68:</p> <p>(i) shall not remove or terminate the insured person from work or reduce his wage level during the period during which an insured person is enjoying any of the sickness benefit or maternity benefit or temporary disability benefit due to employment injury under this Law;</p> <p>(ii) shall not reduce or deduct wages and fees of his worker because of liability for contribution payable under this Law;</p> <p>(b) The insured person, as regards his injury due to employer's violation of restrictions under sub-section (a), may submit the matter to the relevant township social security office for settlement in accord with the stipulations</p> |
| 15 | Project Act | | |

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| 15.1 | 13 | <p>(1) Every Project and the compound there of shall be kept clean and kept free from effluvia arising from any drain, privy or other nuisance, and in particular-</p> <p>(a) Accumulations of dirt and refuse shall be removed daily by sweeping or by any other effective method from the floors, benches of work-rooms and from stair-cases and passages, and disposed of in a suitable manner;</p> <p>(b) The floor of every work-room shall be cleaned at least once a week by washing, using disinfectant where necessary, or by some other effective method,</p> <p>(c) When there is likelihood of water collecting on the floor in the course of any manufacturing process, effective means of drainage shall be provided and maintained;</p> <p>(d) All inside walls and partitions, all ceilings or reverse side of roof of work rooms, all walls, reverse side of roof of passages and all staircases shall either: -</p> <p>(i) Be kept whitewashed or colourwashed and such washing shall be repeated at least once in every twelve months; or</p> | <p>The MAAT is committed this following rule;</p> <p>(1) Every Project and the compound there of shall be kept clean and kept free from effluvia arising from any drain, privy or other nuisance, and in particular-</p> <p>(a) Accumulations of dirt and refuse shall be removed daily by sweeping or by any other effective method from the floors, benches of work-rooms and from stair-cases and passages, and disposed of in a suitable manner;</p> <p>(b) The floor of every work-room shall be cleaned at least once a week by washing, using disinfectant where necessary, or by some other effective method,</p> <p>(c) When there is likelihood of water collecting on the floor in the course of any manufacturing process, effective means of drainage shall be provided and maintained;</p> <p>(d) All inside walls and partitions, all ceilings or reverse side of roof of work rooms, all walls, reverse side of roof of passages and all staircases shall either: -</p> <p>(i) Be kept whitewashed or colourwashed and such washing</p> |
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| | | <p>(ii) Where they are painted or varnished, be repainted or revarnished at least once is every three years. In such cases where they have smooth and unwashable surface, they shall at least once in every 12months, be washed with hot water and soap or other suitable detergent or cleaned by such other method as may be approved by the Chief Inspector.</p> <p>(e) The dates on which white or colour washing, paintings or varnishings as required by clause (d) are carried out shall be entered in the register prescribed by the President.</p> <p>(2) The President may by order exempt any Project or class of factories from any of the provisions of sub-section (1) and specify alternative methods for keeping the Project in a clean state.</p> | <p>shall be repeated at least once in every twelve months; or</p> <p>(ii) Where they are painted or varnished, be repainted or revarnished at least once is every three years. In such cases where they have smooth and unwashable surface, they shall at least once in every 12months, be washed with hot water and soap or other suitable detergent or cleaned by such other method as may be approved by the Chief Inspector.</p> <p>(e) The dates on which white or colour washing, paintings or varnishings as required by clause (d) are carried out shall be entered in the register prescribed by the President.</p> <p>(2) The President may by order exempt any Project or class of factories from any of the provisions of sub-section (1) and specify alternative methods for keeping the Project in a clean state</p> |
| 15.2 | 14 | <p>(1) Effective arrangements shall be made in every Project for the disposal of wastes and effluences due to the manufacturing process carried on therein.</p> <p>(2) The President may make rules prescribing the arrangements to be made under subsection</p> | <p>The MAAT should be followed the laws and regulations approved in section 14.</p> |

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| | | (1) requiring that the arrangements made in accordance with sub-section (1) shall be approved by such authority as may be prescribed. | |
| 15.3 | 23 | <p>In every Project the following shall be securely fenced by safe-guards of substantial construction which shall be constantly maintained and kept in position while the parts of the machinery they are fencing are in motion or in use; -</p> <p>(a) Prime movers; -</p> <p>(i) Every moving part of a prime mover and every flywheel directly connected to a prime mover whether the prime mover or flywheel is in the engine house or not.</p> <p>(ii) The headrace and tailrace of every water –wheel and water turbine.</p> <p>(iii) Every part of an electric generator, motors or rotary converters will not be fenced unless it is in such position or of such construction as to be as safe to every person employed or working in the Project as it would be if securely fenced.</p> <p>(b) Transmission machinery; -</p> <p>Every part of transmission machinery unless it is in such position or of such construction as to be as safe to every person employed in the Project as it would be if securely fenced.</p> <p>(c) Other machinery; -</p> | The MAAT should be followed the laws and regulations approved in section 23. |

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| | | <p>(i) Every dangerous part of any other machinery unless it is in such position or of such construction as to be as safe to every person employed or working in the Project as it would be if securely fenced.</p> <p>(ii) Any part of a stock-bar which projects beyond the head-stock of a lathe.</p> | |
| 15.4 | 37 | <p>In respect of any such manufacturing process carried on in any Project as may be prescribed, being a process, which involves-</p> <p>(a) Risk of injury to the eyes from particles or fragments thrown off in the course of the process, or</p> <p>(b) Risk to the eyes by reason of exposure to excessive light, the President may by rules require that effective screens or suitable goggles shall be provided for the protection of persons employed on, or in the immediate vicinity of, the process.</p> | The MAAT should be followed the laws and regulations approved in section 37. |
| 15.6 | 60 | <p>(1) No adult worker shall be required to work in a Project on a Sunday unless-</p> <p>(a) he has had or will have a full holiday on one of the three days immediately before or after that Sunday, and</p> <p>(b) the manager of the Project has, before that Sunday or the day</p> | The MAAT should be followed the laws and regulations approved in section 60. |

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| | <p>substituted therefore, under clause (a), whichever is earlier</p> <p>(i) delivered at the office of the Inspector a notice of his intention to require the worker to work on the Sunday and of the day to be substituted</p> <p>therefore, and</p> <p>(ii) displayed in the Project a notice to that effect for not less than 24hours before any of such two days whichever is earlier and until the expiry of such two days whichever is later. Provided that no substitution shall be made, which will cause any worker to work for more than ten consecutive days without a full holiday.</p> <p>(2) Notices given under sub-section (1) may be cancelled by a notice delivered at the office of the Inspector and a notice displayed close to notice of working period put up under section67, not later than the day before the Sunday or the holiday to be cancelled, whichever is earlier.</p> <p>(3) Where in accordance with the provision of sub-section (1), any worker works on a Sunday and has had a holiday on one of the three days immediately before the same, that Sunday shall, for the purpose of</p> | |
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| | | calculating his weekly hours of work, be included in the preceding week. | |
| 15.7 | 73 | <p>(1) Where a worker in a Project works for more hours than those specified in section 59 and 62, he shall in respect of the overtime so worked be entitled to be paid at the rate of twice his ordinary rate of wages and shall also be entitled to C.L.A. if any at the usual rate for the days he has so worked overtime.</p> <p>(2) Where workers in a Project are paid on a piece rate-basis, the Chief Inspector, in consultation with the employer concerned and the representative of the workers, shall fix time rates as nearly as possible, equivalent to the average rate of earnings of those workers, and for the purposes of this section, the section, the rates so fixed shall be deemed to be the ordinary rates of wages of those workers.</p> <p>(3) The President may prescribe the registers to be maintained in a Project for the purpose or securing compliance with the provisions of this section.</p> <p>Explanation: - The term "Wages" shall, for the purpose of calculating wages for overtime payable under this section, mean the bare wages without any allowances</p> | The MAAT should be followed the laws and regulations approved in section 73. |

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| 15.8 | 75 | No child who has not completed his thirteen year shall be required or allowed to work in any Project | The MAAT should be followed the laws and regulations approved in section 75. |
| 16 | The Workman's Compensation Act | | |
| 16.1 | 3 | <p>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 in accordance with the provisions of this Chapter : 3 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 willful 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 willful 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</p> <p>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] 1 2 3 Schedule III. contracts any disease specified therein as an</p> | The MAAT should be followed the laws and regulations approved in section 3. |

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| | <p>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.</p> <p>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 :</p> <p>Provided that the compensation shall be recoverable front the employer who last employed the workman during the said twelve months in the employment to the nature of which the disease was due.</p> <p>The President of the Union, after giving, by notification in the Gazette, not less than three months' notice of his intention so to do, may, by a like</p> | |
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| | <p>notification, add any description of employment to the employments specified in [List A of] 2 Schedule III, and shall specify in the case of the employments so added the diseases which shall be deemed for the purposes of this section to be occupational diseases peculiar to those employments respectively, and the provisions of sub-section (2) shall thereupon apply as if such diseases had been declared by this Act to be occupational diseases peculiar to those employments.</p> <p>The President of the Union, after giving, by notification, not less than three months' notice of his intention to do so. may. by a like notification add any diseases to the occupational diseases specified in List B of Schedule III. and the provisions of sub-section (i) shall thereupon apply as if such diseases had been declared by this Act to be occupational diseases.</p> <p>Save as provided by sub-sections (2) and (i), no compensation shall be payable to a workman in respect of any disease unless the disease is directly attributable to a specific injury by accident arising out of and in the course of his employment.</p> | |
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| | | <p>Nothing herein contained shall be deemed to confer any right to compensation on a workman in respect of any injury if he has instituted in a civil Court a suit for damages in respect of the injury against the employer or any other person ; and no suit for damages shall be maintainable by a workman in any Court of law in respect of any injury (a) if he has instituted a claim to compensation in respect of the injury before a Commissioner ; or (b) if an agreement has been come to between the workman and his employer providing for the payment of compensation in respect of the injury in accordance with the provisions of. this Act.</p> | |
| 16.2 | 8 | <p>(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 dependant advances on account of compensation</p> | <p>The MAAT should be followed the laws and regulations approved in section 8.</p> |

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| | <p>not exceeding an aggregate of one hundred rupees, and so much of such aggregate as does not exceed the compensation payable to that dependant shall be deducted by the Commissioner from such compensation and repaid to the employer.</p> <p>(2) Any other sum amounting to not less than ten rupees which is payable as compensation may be deposited with the Commissioner on behalf of the person entitled thereto.</p> <p>(3) The receipt of the Commissioner shall be a sufficient discharge in respect of any compensation deposited with him.</p> <p>(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 twenty-five rupees, 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 dependant in such manner as he thinks fit, calling upon the dependants to appear before him on such date as he may fix for determining the distribution of the compensation. If</p> | |
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| | <p>the Commissioner is satisfied after any inquiry which he may deem necessary, that no dependant 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.</p> <p>(5) Compensation deposited in respect of a deceased workman shall, subject to any deduction made under subsection (4). be apportioned among the dependants 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 dependant.</p> <p>(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.</p> <p>(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</p> | |
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| | <p>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 dependant of the workman or to any other person whom the Commissioner thinks best fitted to provide for the welfare of the workman(fl) 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 dependant 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 dependant 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</p> | |
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| | | <p>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 dependant of any sum already paid to him.</p> <p>(9) Where the Commissioner varies any order under sub-section (<S) 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.</p> | |
| 17 | The Leave and Holidays Act | | |
| 17.1 | 3 | <p>(1) Every employee shall be granted by his employer the following public holidays with full wages or pay.</p> <p>(2) If any public 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</p> | <p>MAAT shall be granted by his employer the following public holidays with full wages or pay.</p> |
| 18 | Public Health Law | | |
| 18.1 | 10 | <p>Any person referred to in section 9(1) under the law to any health and related provisions</p> <p>Failure to comply or</p> <p>If a violation occurs or</p> <p>If an attempt is made to commit a crime or</p> | <p>The MAAT should be followed the laws and regulations approved in section 10.</p> |

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| | | <p>Whether it is knowable or not, there are good reasons- either to violate that law or to violate it.</p> <p>The person to break the law while the company is a corporation. Each person in charge of the company shall be deemed to have committed the offense. Accordingly, such prosecution.</p> | |
| 19 | Prevention and Control of Communicable Diseases Law | | |
| 19.1 | 3 | <p>In order to prevent the outbreak of Communicable Diseases, the Department of Health shall implement the following project activities: -</p> <p>(a) immunization of children by injection or orally</p> | <p>In order to prevent the outbreak of Communicable Diseases, the MAAT shall implement the following project activities: -</p> <p>(a) immunization of children by injection or orally</p> |
| 19.2 | 4 | <p>When a Principal Epidemic Disease of a Notifiable Disease occurs; -</p> <p>(a) immunization and other necessary measures shall be undertaken by the Department of Health, in order to control the spread there of;</p> <p>(b) the public shall abide by the measures undertaken by the Department of Health under sub-section (a).</p> | <p>When a Principal Epidemic Disease of a Notifiable Disease occurs; -</p> <p>(a) MAAT shall be undertaken by the Department of Health, in order to control the spread there of;</p> <p>(b) MAAT shall abide by the measures undertaken by the Department of Health under sub-section (a).</p> |
| 19.3 | 11 | <p>In order to prevent and control the spread of a Principal Epidemic Disease, the Health Officer may undertake the following measures; -</p> <p>(a) investigation of a patient or any other person required;</p> <p>(b) medical examination;</p> | <p>In order to prevent and control the spread of a Principal Epidemic Disease, the Health Officer may undertake the following measures; -</p> <p>(a) investigation of a patient or any other person required;</p> <p>(b) medical examination;</p> |

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| | | (c)causing laboratory investigation of stool, urine, sputum and blood samples to be carried out; (d)causing investigation by injection to be carried out; (e) carrying out other necessary investigations; | (c)causing laboratory investigation of stool, urine, sputum and blood samples to be carried out; (d)causing investigation by injection to be carried out; (e)carrying out other necessary investigations; |
| 20 | The Control of Smoking and Consumption of Tobacco Product Law | | |
| 20.1 | 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 | The MAAT shall: (a) keep the caption and mark referring that it is a non-smoking area at the place mentioned in section 6. (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. (c) supervise and carry out measures so that shall never smoke at the non-smoking area. (d) accept the inspection when the supervisory body comes to the place for which he is responsible |
| 21 | Yangon City Development Committee Laws (2018) | | |
| 21.1 | 32 | Prohibition of the cleaning and its operations (d) Construction work in the city boundaries; business and factories whether own a workshop or not. Do not neglect the responsibility of taking necessary measures so as not to | Prohibition of the cleaning and its operations (D) MAAT shall, do not neglect the responsibility of taking necessary measures so as not to pollute the environment as a result of our activities. |

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| | | pollute the environment as a result of our activities. (g) Business within the city boundaries; Project who wants to set up the workshop it complies with environmental regulations business, not Project establishment shall be established. | (G) MAAT shall obey the environmental regulations. |
| 22 | Freshwater Fisheries Law | | |
| 22.1 | 33 | No one shall operate a fishery without a lease license or permission issued under this Law | MAAT shall never operate a fishery without a lease license or permission issued under this Law |
| 22.2 | 34 | No one shall do the following in any freshwater fisheries waters: - (a) catching fish or causing mischief with explosive substance, poison, chemicals and dangerous material of a like nature; (b) catching fish by a prohibited method and fishing implement; (c) catching fish of a prohibited species and size; (d) catching fish during a prohibited period and at a prohibited place. | MAAT shall never do the following in any freshwater fisheries waters: - (a) catching fish or causing mischief with explosive substance, poison, chemicals and dangerous material of a like nature; (b) catching fish by a prohibited method and fishing implement; (c) catching fish of a prohibited species and size; (d) catching fish during a prohibited period and at a prohibited place. |
| 22.3 | 35 | No one shall, after purchasing by fishery auction or after being granted tender license fail to pay within the prescribed period fishery rent, tender fee, license fee and fines due, without the permission of the Department. | MAAT shall never, after purchasing by fishery auction or after being granted tender license fail to pay within the prescribed period fishery rent, tender fee, license fee and fines due, without the permission of the Department. |
| 22.4 | 36 | No one shall erect, construct, place, maintain or use any obstruction such | MAAT shall never erect, construct, place, maintain or use any |

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| | | as a dam, bank or weir in a fresh water fisheries waters without the permission of the Department. | obstruction such as a dam, bank or weir in a fresh water fisheries waters without the permission of the Department. |
| 22.5 | 37 | A person who has obtained permission to operate a fishery shall not violate any condition contained in a lease, tender license or fishing implement license. | MAAT who has obtained permission to operate a fishery shall not violate any condition contained in a lease, tender license or fishing implement license. |
| 22.6 | 38 | No one shall do the following within the boundary of a fishery or fishery creek: - (a) cutting undergrowth or setting on fire habitate of fish; (b) impairing the natural condition of a fishery so as to disrupt the flow of water in the main fishery. | MAAT shall never do the following within the boundary of a fishery or fishery creek: - (a) cutting undergrowth or setting on fire habitate of fish; (b) impairing the natural condition of a fishery so as to disrupt the flow of water in the main fishery. |
| 22.7 | 39 | No one shall cultivate agricultural crops within the boundary of a fishery creek. | MAAT shall never cultivate agricultural crops within the boundary of a fishery creek. |
| 22.8 | 40 | No one shall cause harassment of fish and other aquatic organisms or pollution of the water in a freshwater fisheries water. | MAAT shall never cause harassment of fish and other aquatic organisms or pollution of the water in a freshwater fisheries water. |
| 22.9 | 41 | No one shall alter the quality of water, volume of water or the water-course in a leasable fishery, reserved fishery and creeks contiguous thereto or in water-courses. | MAAT shall never alter the quality of water, volume of water or the water-course in a leasable fishery, reserved fishery and creeks contiguous thereto or in water-courses. |
| 23 | The Conservation of Water Resources and Rivers Law | | |
| 23.1 | 8 | No person shall: | MAAT shall never: |

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| | | (a) carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks. | (a) carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks. |
| 23.2 | 11 | <p>No person shall:</p> <p>(a) dispose of engine oil, chemical, poisonous material and other materials which may cause environmental damage, or dispose of explosives from the bank or from a vessel which is plying, vessel which has berthed, anchored, stranded or sunk.</p> <p>(b) catch aquatic creatures within river-creek boundary, bank boundary or waterfront boundary with poisonous materials or explosives.</p> <p>(c) dispose of disposal soil and other materials from panning for gold, gold mineral dredging or resource production in the river and creek, into the river and creek or into the water outlet gully which can flow into the river and creek.</p> | <p>MAAT shall never:</p> <p>(a) dispose of engine oil, chemical, poisonous material and other materials which may cause environmental damage, or dispose of explosives from the bank or from a vessel which is plying, vessel which has berthed, anchored, stranded or sunk.</p> <p>(b) catch aquatic creatures within river-creek boundary, bank boundary or waterfront boundary with poisonous materials or explosives.</p> <p>(c) dispose of disposal soil and other materials from panning for gold, gold mineral dredging or resource production in the river and creek, into the river and creek or into the water outlet gully which can flow into the river and creek.</p> |
| 23.3 | 19 | No one shall dispose of any substance into the river-creek that may cause damage to waterway or change of watercourse from the bank or vessel which is plying, vessel which has berthed, anchored, stranded or sunk. | MAAT shall never dispose of any substance into the river-creek that may cause damage to waterway or change of watercourse from the bank or vessel which is plying, vessel which has berthed, anchored, stranded or sunk. |
| 23.4 | 21 | No one shall: | MAAT shall never: |

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| | | (b) drill well or pond or dig earth without the permission of the Directorate. | (b) drill well or pond or dig earth without the permission of the Directorate. |
| 23.5 | 22 | No one shall, without the permission of the Directorate, pile sand, shingle and other heavy materials for business purposes in the bank area and waterfront area. | MAAT shall never, without the permission of the Directorate, pile sand, shingle and other heavy materials for business purposes in the bank area and waterfront area. |
| 23.6 | 24 | No one shall: (b) violate the conditions prescribed by the Directorate so as not to cause water pollution and change of watercourse in rivers and creeks. | MAAT shall never: (b) violate the conditions prescribed by the Directorate so as not to cause water pollution and change of watercourse in rivers and creeks. |
| 24 | Electricity law | | |
| 24.1 | 46 | No person shall operate the electrical installation and repair without obtaining the electrical professional certificate. | The MAAT shouldn't operate the electrical installation and repair without obtaining the electrical professional certificate |
| 24.2 | 47 | No person shall operate the generation, transmission, connection of electric power without obtaining the electrical safety certificate. | The MAAT shouldn't operate the generation, transmission, connection of electric power without obtaining the electrical safety certificate |
| 24.3 | 50 | No permit holder shall sell, mortgage, lease, exchange or transfer by any other means the permit the whole or any part of the business contained in the permit without the approval of the relevant Government department or Government organization which has issued the permit. | The MAAT shouldn't be committed to breach section 50. |
| 24.4 | 56 | Whoever violates the prohibition contained in section 46 shall, on | The MAAT shouldn't be committed to breach section 56 |

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| | | conviction, be punished with fine from a minimum of fifty thousand kyats to a maximum of three hundred thousand kyats. | |
| 24.5 | 57 | Whoever violates the prohibition contained in section 47 shall, on conviction, be punished with fine from a minimum of three hundred thousand kyats to a maximum of one million kyats | The MAAT shouldn't be committed to breach section 57 |
| 24.6 | 60 | Any permit holder who violates the prohibition contained in section 50 shall, on conviction, be punished with fine from a minimum of one hundred thousand kyats to a maximum of five hundred thousand kyats. If he violates subsequently such offence, he shall be punished with imprisonment from a minimum of one year to a maximum of three years and shall also be liable to a fine | The MAAT shouldn't committed to breach section 60 |
| 25 | Fire Bridge Law | | |
| 25.1 | 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. | MAAT shouldn't fail to abide by the directives of fire safety issued under section 16 by the head of the relevant Township Department of Fire Services. |
| 25.2 | 24 | The owner or manager of the Project, workshop, bus terminal, airport, port, hotel, motel, lodgings, condominium, market, department, organization or business exposed to fire hazard shall, | MAAT shall, in accord with the directive of the Department of Fire Services: (a) not fail to form the Reserve Fire Brigade; |

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| | | 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. | (b) not fail to provide fire safety equipment. |
| 25.3 | 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 | MAAT shouldn't 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 |
| 25.4 | 31 | No person shall form, reorganize or dissolve the Auxiliary Fire Brigade without the direction or permission of the Department of Fire Services. | MAAT shouldn't form, reorganize or dissolve the Auxiliary Fire Brigade without the direction or permission of the Department of Fire Services. |
| 25.5 | 32 | No person shall form or dissolve the Reserve Fire Brigade without the direction or permission of the Department of Fire Services. | MAAT shouldn't form or dissolve the Reserve Fire Brigade without the direction or permission of the Department of Fire Services. |
| 26 | Prevention of Hazard from Chemical and Related Substances Law | | |
| 26.1 | 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. | MAAT shall never produce, treat and formulate, use, possess, store, distribute, sell, transport, import or export the chemical or related substances prohibited by the Central Leading Board. |
| 26.2 | 34 | No one shall operate the chemical and related substances business without licence. | MAAT shall never operate the chemical and related substances business without licence. |
| 26.3 | 35 | No one shall use the chemical or the related substances which are | MAAT shall never use the chemical or the related substances which are |

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| | | unregistered or annulled from the registered list or not met to the quality and norm in the chemical and related substance business. | unregistered or annulled from the registered list or not met to the quality and norm in the chemical and related substance business. |
| 27 | Myanmar Investment Rules (2017) | | |
| 27.1 | 7 | <p>The investor does not require applying for a permit under subsection (d) of section 36 of the Law in the following circumstances:</p> <p>(a) leasing or receiving a license for the land or building for a term of 5 years or less;</p> <p>(b) sub-leasing such state-owned land or building by the investor from any of the following persons in a manner permitted under lease agreement, agreement or other agreement:</p> <p>(i) a person who has previously obtained the right to use the stateowned land or buildings from the government department and government organization in accordance with the laws of the Union, including the Law; and</p> <p>(ii) a person authorized to sub-lease or sub-license the state-owned land or building in accordance with the approval of the government department and government organization.</p> | MAAT will be complied described in section 7 of the Myanmar Investment Rule |
| 27.2 | 28 | A person who desires to invest may submit an investment screening application to the Commission for | MAAT will be complied described in section 28 of the Myanmar Investment Rule. |

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| | | <p>non-binding guidance on the kinds of the following proposed investments:</p> <p>(a) businesses required to submit a proposal to the Commission under section 36 of the Law;</p> <p>(b) businesses likely to be submitted to the Pyidaungsu Hluttaw for approval under section 46 of the Law;</p> <p>(c) investment activities restricted under section 42 of the Law and its related notification;</p> <p>(d) investment activities involved in investment promoted sectors; or</p> <p>(e) investment activities prohibited under section 41 of the Law.</p> | |
| 27.3 | 29 | <p>In the investment screening application, the investor shall:</p> <p>(a) fully disclose the nature of the investment;</p> <p>(b) disclose all information which appropriate person may consider in the assessment of the Commission; and</p> <p>(c) right fully disclose information</p> | MAAT will be complied described in section 29 of the Myanmar Investment Rule |
| 27.4 | 96 | <p>Where the investor makes investment in more than one zone;</p> <p>(a) the zone in which more than 65% of the value of the investment is invested shall be deemed as the location of investment.</p> <p>(b) if more than 65% of the total value of the investment is invested in:</p> | MAAT will be complied described in section 96 of the Myanmar Investment Rule. |

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| | | <p>(1) zone 1 and zone 2, the investment shall be deemed to be in zone 2;</p> <p>(2) zone 2 and zone 3, the investment shall be deemed to be in zone 3; and</p> <p>(3) zone 1 and zone 3, the investment shall be deemed to be in zone 3.</p> | |
| 27.5 | 113 | Before to the investor enjoys benefits of any taxexemption or relief under sections 75 and 78 of the Law, the investor shall apply the Internal Revenue Department to accept the tax assessment for the relevant assessment year | MAAT will be complied described in section 113 of the Myanmar Investment Rule. |
| 27.6 | 116 | The investor who is in the application process or has already obtained the permit or endorsement may submit the land use application for investment. | MAAT will be complied described in section 116 of the Myanmar Investment Rule. |
| 27.7 | 117 | <p>The following facts shall be included at least in the land use application and the Commission may request the other necessary facts from the investor;</p> <p>(a) area, type and location of the land or buildings;</p> <p>(b) the facts relating to the owners of the land or buildings;</p> <p>(c) recommendation or similar document or permission obtained from Region or State Government, the government department or government organization to approve the change of land use to perform investment;</p> | MAAT will be complied described in section 117 of the Myanmar Investment Rule. |

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| | | <p>(d) whether investors require to make significantly alteration of topography or elevation of the proposed land according to the subsection (f) of section 65 or not;</p> <p>(e) the period for right to use the proposed land; and</p> <p>(f) the land or buildings lease agreements (draft).</p> | |
| 27.8 | 157 | The investor may also submit an endorsement application to the Commission as well as Region or State Committee for investments that the Region or State Committees can be issued endorsement under rule 155. | MAAT will be complied described in section 157 of the Myanmar Investment Rule. |
| 27.9 | 170 | <p>The investor shall deliver the notice to the Investment Assistance Committee if he has a grievance or dispute matters relating to the following facts:</p> <p>(a) a decision made incorrectly by the government department and government organization relating to the investment;</p> <p>(b) wrongfully refusal on the application to obtain the permit and license, to register or to obtain approval, by the government department and government organization; or</p> <p>(c) causing any legal right, protection or approval void.</p> | MAAT will be complied described in section 170 of the Myanmar Investment Rule. |
| 28 | Automobile Law | | |

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| 28.1 | 45 | <p>No one is allowed to drive, request someone to drive, or park, motor vehicles in public places under the following conditions:</p> <p>(a) The motor vehicle is not registered.</p> <p>(b) The registration has been suspended, revoked or expired; the registration card is not displayed</p> <p>(c) The registration card has been revoked or is expired</p> | <p>The MAAT will not be allowed to drive, request someone to drive, or park, motor vehicles in public places under the following conditions:</p> <p>(a) The motor vehicle is not registered.</p> <p>(b) The registration has been suspended, revoked or expired; the registration card is not displayed.</p> <p>(c) The registration card has been revoked or is expired.</p> |
| 28.2 | 46 | <p>No one is allowed to drive, or allow to drive, motor vehicles in public places without risk insurance for others. This prohibition does not extend to passengers.</p> | <p>The MAAT will not be allowed to drive, or allow to drive, motor vehicles in public places without risk insurance for others. This prohibition does not extend to passengers.</p> |
| 28.3 | 47 | <p>(a) No one is allowed to drive a motor vehicle in public places without carrying the driving license with him/her.</p> <p>(b) No one is allowed to drive a motor vehicle in public places without a driving license.</p> <p>(c) The owner of, and the person responsible for, a motor vehicle is not allowed to give permission to someone without a driving license to drive in public places.</p> | <p>The MAAT will comply the section 47.</p> |
| 28.4 | 48 | <p>No one is allowed to drive, or allow to drive, a motor vehicle in public places if the vehicle does not match with the</p> | <p>The MAAT is not allowed to drive, or allow to drive, a motor vehicle in public places if the vehicle does not</p> |

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| | | drivable types as recorded in the driving license. | match with the drivable types as recorded in the driving license. |
| 28.5 | 49 | No one is allowed to do the following in public places: (a) Driving above the speed limit or below the minimum speed. (b) Driving a motor vehicle which endangers others. (c) Driving a motor vehicle after the consumption of narcotic drugs or alcohol. | The MAAT is not allowed to do the following in public places: (a) Driving above the speed limit or below the minimum speed. (b) Driving a motor vehicle which endangers others. (c) Driving a motor vehicle after the consumption of narcotic drugs or alcohol. |
| 28.6 | 50 | No one is allowed: (a) To operate a business of manufacturing, selling or equipping motor vehicles without a business license. (b) To operate a business of maintaining or repairing motor vehicles without a business license | The MAAT is not allowed: (a) To operate a business of manufacturing, selling or equipping motor vehicles without a business license. (b) To operate a business of maintaining or repairing motor vehicles without a business license. |
| 28.7 | 51 | No one is allowed to offer motor vehicle driving training without business driving license. | The MAAT is not allowed to offer motor vehicle driving training without business driving license. |
| 28.8 | 52 | No one is allowed to operate a private business of inspecting motor vehicles without a business license | The MAAT isn't allowed to operate a private business of inspecting motor vehicles without a business license |
| 28.9 | 53 | No one is allowed to do the following: (a) Making a motor vehicle registration number plate undistinguishable. (b) [Altering] a motor vehicle registration number plate so that it can be confused [with others]. | The MAAT isn't allowed to do the following: (a) Making a motor vehicle registration number plate undistinguishable. |

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| | | (c) Using a fake motor vehicle registration number plate on the vehicle. | (b) [Altering] a motor vehicle registration number plate so that it can be confused [with others]. (c) Using a fake motor vehicle registration number plate on the vehicle. |
| 28.1 0 | 54 | No one is allowed to do the following: (a) Working as a motor vehicle assistant without assistant permit. (b) Driving a motor vehicle while in an inappropriate mental or physical state. (c) Driving a motor vehicle loaded above the loading capacity. (d) Failing to wear a helmet while driving a motorcycle (e) Failing to wear a safety belt while driving vehicles; this includes passengers. (f) Driving a motor vehicle in places reserved for pedestrians. (g) Changing, without legal permission or reasons backed up by evidence, the original type of a vehicle, its main parts, or the facts in a motor vehicle inspection certificate. (h) Driving a motor-cycle without back mirror or silencer over the shock absorber. | The MAAT isn't allowed to do the following: (a) Working as a motor vehicle assistant without assistant permit. (b) Driving a motor vehicle while in an inappropriate mental or physical state. (c) Driving a motor vehicle loaded above the loading capacity. (d) Failing to wear a helmet while driving a motorcycle (e) Failing to wear a safety belt while driving vehicles; this includes passengers. (f) Driving a motor vehicle in places reserved for pedestrians. (g) Changing, without legal permission or reasons backed up by evidence, the original type of a vehicle, its main parts, or the facts in a motor vehicle inspection certificate. (h) Driving a motor-cycle without back mirror or silencer over the shock absorber. |

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| 28.1 1 | 55 | <p>The law prohibits anyone who has motor vehicle from doing the following:</p> <p>(a) Failing to request to change the name of the registered person within 30 days starting from the date of selling or transferring the motor vehicle from one owner to another.</p> <p>(b) Failing to request to change the name of the registered person within 30 days starting from the date of the inheritance if the motor vehicle has been inherited.</p> <p>(c) Describing wrong facts, changing or excluding the real facts in a motor vehicle sale and transfer contract when applying to change the registered person.</p> | The MAAT will be complied described in section 55. |
| 28.1 2 | 56 | No one is allowed to use, or request to use, an official document for one motor vehicle if this document was given by the administration department for another vehicle. | The MAAT will not be allowed to use, or request to use, an official document for one motor vehicle if this document was given by the administration department for another vehicle. |
| 28.1 3 | 57 | No one is allowed to drive, or work as an assistant, by using the driving license or assistant permit of another person. | The MAAT will not be allowed to drive, or work as an assistant, by using the driving license or assistant permit of another person. |
| 29 | Occupational Safety and Health Law | | |
| 29.1 | 26 | The Employer shall be responsible to: - | The MAAT shall be responsible to: - |

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| | <p>(a) arrange as required to assess the risks of Workplace, Process and machines and materials used thereat;</p> <p>(b) arrange as required to assess the likelihood of occurrence of hazards at the Workplace and to the environment;</p> <p>(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 subsections (a), (b) and (c);</p> <p>(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;</p> <p>(f) prescribe precautionary plans and plans for emergency;</p> <p>(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;</p> | <p>(a) arrange as required to assess the risks of Workplace, Process and machines and materials used thereat;</p> <p>(b) arrange as required to assess the likelihood of occurrence of hazards at the Workplace and to the environment;</p> <p>(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 subsections (a), (b) and (c);</p> <p>(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;</p> <p>(f) prescribe precautionary plans and plans for emergency;</p> <p>(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;</p> |
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| | <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(l) display Occupational Safety and Health instructions, danger signs, notices, posters and signage for directions in accordance with stipulations;</p> | <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(l) display Occupational Safety and Health instructions, danger signs, notices, posters and signage for</p> |
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| | | <p>(m) arrange to be complied with precautions when entering restricted hazardous Workplaces;</p> <p>(n) arrange to disseminate Occupational Safety and Health manuals and guidelines issued by the relevant Ministries for knowledge, technology, information and skills not only to Workers but also to related persons or raise their awareness or knowledge thereof; (o) lay down the fire safety plan, perform fire drilling and train Workers to use fire extinguishers systematically;</p> <p>(p) allow the Chief Inspection Officer and Inspection Officers to enter Workplaces, inquire, request documents and information or seize exhibits;</p> <p>(q) cause Workers to work only for the specified working hours if they have to work in Hazardous Industry/Business and Workplace; and</p> <p>(r) Incur the expenses for Occupational Safety and Health matters.</p> | <p>directions in accordance with stipulations;</p> <p>(m) arrange to be complied with precautions when entering restricted hazardous Workplaces;</p> <p>(n) arrange to disseminate Occupational Safety and Health manuals and guidelines issued by the relevant Ministries for knowledge, technology, information and skills not only to Workers but also to related persons or raise their awareness or knowledge thereof; (o) lay down the fire safety plan, perform fire drilling and train Workers to use fire extinguishers systematically;</p> <p>(p) allow the Chief Inspection Officer and Inspection Officers to enter Workplaces, inquire, request documents and information or seize exhibits;</p> <p>(q) cause Workers to work only for the specified working hours if they have to work in Hazardous Industry/Business and Workplace; and</p> <p>(r) Incur the expenses for Occupational Safety and Health matters.</p> |
| 29.2 | 27 | No Employer shall dismiss or demote a Worker: - | The MAAT shall never dismiss or demote a Worker: - |

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| | | <p>(a) during any period before a medical certificate is issued by the Registered Doctor for occupational injury or by the Recognized Doctor for contact with Occupational Disease;</p> <p>(b) because the said Worker has addressed a complaint for hazardous or health detrimental condition;</p> <p>(c) because the said Worker has conducted the responsibilities of Occupational Safety and Health Committee; or</p> <p>(d) because the said Worker has refused to work in any condition where an Occupational Accident or Occupational Disease is about to occur.</p> | <p>(a) during any period before a medical certificate is issued by the Registered Doctor for occupational injury or by the Recognized Doctor for contact with Occupational Disease;</p> <p>(b) because the said Worker has addressed a complaint for hazardous or health detrimental condition;</p> <p>(c) because the said Worker has conducted the responsibilities of Occupational Safety and Health Committee; or</p> <p>(d) because the said Worker has refused to work in any condition where an Occupational Accident or Occupational Disease is about to occur</p> |
| 29.3 | 28 | <p>If any Worker who has been injured due to an 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</p> | <p>If any Worker who has been injured due to an Occupational Accident or contacted with Occupational Disease is not covered under the Social Security Law 2012, the MAAT must pay for medical expenses to check the extent of capacity reduction and class of disability of such Worker</p> |
| 29.4 | 29 | <p>The Employer: -</p> <p>(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</p> | <p>The MAAT -</p> <p>(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</p> |

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| | | <p>Doctor in accordance with the needs and nature of the Industry/Business;</p> <p>(b) must, without delay, employ any Worker who has been prohibited or restricted to work subject to subsection (a) in his/her original position or at the relevant Workplace upon his/her submission of health improvement evidence; and</p> <p>(c) must make necessary arrangements in the Workplace in order not to damage health of female Workers who are pregnant or breast-feed.</p> | <p>with the needs and nature of the Industry/Business;</p> <p>(b) must, without delay, employ any Worker who has been prohibited or restricted to work subject to subsection (a) in his/her original position or at the relevant Workplace upon his/her submission of health improvement evidence; and</p> <p>(c) must make necessary arrangements in the Workplace in order not to damage health of female Workers who are pregnant or breast-feed.</p> |
| 30 | The Petroleum and Petroleum Product Law (2017) | | |
| 30.1 | 30 | Any person shall, without the relevant licence, not carryout any business activities or measures required to obtain licence under this law | The MAAT will, without the relevant licence, not carry out any business activities or measures required to obtain licence under this law |
| 30.2 | 31 | <p>Any licensee:</p> <p>a. shall not violate any prohibition contained in the rules, regulations, bye-laws, notifications, orders, directives, procedures and conditions or fail the duty to implement;</p> <p>b. shall not use a receptacle and transport vehicles and pipelines that contains any dangerous petroleum and petroleum product without saliently mentioning in writing of warning signs;</p> | <p>The MAAT</p> <p>a. will not violate any prohibition contained in the rules, regulations, bye-laws, notifications, orders, directives, procedures and conditions or fail the duty to implement;</p> <p>b. will not use a receptacle and transport vehicles and pipelines that contains any dangerous petroleum and petroleum product without</p> |

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| | | <p>c. shall not import, transport, store and sell and distribute the dangerous petroleum and petroleum product, or non-dangerous petroleum and petroleum product except by the means stipulated in this law;</p> <p>d. shall not have the right to carry out without undertaking the environmental impacts, in operating petroleum and petroleum product business activities;</p> <p>e. shall not distribute and sell petroleum and petroleum products which do not fulfill or are not in conformity with the standard, quality and measurement</p> | <p>saliently mentioning in writing of warning signs;</p> <p>c. will not import, transport, store and sell and distribute the dangerous petroleum and petroleum product, or non-dangerous petroleum and petroleum product except by the means stipulated in this law;</p> <p>d. will not have the right to carry out without undertaking the environmental impacts, in operating petroleum and petroleum product business activities;</p> <p>e. will not distribute and sell petroleum and petroleum products which do not fulfill or are not in conformity with the standard, quality and measurement</p> |
| 30.3 | 32 | <p>Any person who carries out a petroleum and petroleum product business activities shall not refuse if an authorized officer or organization asks to provide suitable help, to inspect the petroleum and petroleum product, receptacle, and machine-powered vehicle machinery, vessel or pipeline that transports and to take sample of petroleum and petroleum product at any place of import, export, storage, refining, sale and distribution of any petroleum and petroleum product, or at the time of transport .,</p> | <p>The MAAT will be carried out a petroleum and petroleum product business activities will not refuse if an authorized officer or organization asks to provide suitable help, to inspect the petroleum and petroleum product, receptacle, and machinepowered vehicle, machinery, vessel or pipeline that transports and to take sample of petroleum and petroleum product at any place of import, export, storage, refining, sale and distribution of any petroleum and petroleum product, or at the time of transport.</p> |

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| 30.4 | 33 | Any person who manages a petroleum and petroleum product business activities shall not fail to report immediately to the nearest authority concerned and provide information relating to any accident if an explosion or fire occurs due to any petroleum and petroleum product business activities, or it is likely to cause fire at or near to the place where petroleum and petroleum product is stored | The MAAT will be managed a petroleum and petroleum product business activities will not fail to report immediately to the nearest authority concerned and provide information relating to any accident if an explosion or fire occurs due to any petroleum and petroleum product business activities, or it is likely to cause fire at or near to the place where petroleum and petroleum product is stored |
| 31 | The Private Industrial Enterprise Law | | |
| 31.1 | 3 | Private Industrial Enterprises shall be conducted in accordance with the following basic principles: - (a) to enhance the higher proportion of the manufacturing value added in the gross national product and value of services, and to increase the production of the respective economic enterprises which are related to the industrial enterprise; (b) to acquire modern technical know-how for raising the efficiency of industrial enterprises and to establish the sale of finished goods produced by the industrial enterprise not only in the local market, but also in the foreign market; (c) to cause utilization by relying mainly as local natural resources; | The MAAT will be conducted in accordance with the following basic principles: - (a) to enhance the higher proportion of the manufacturing value added in the gross national product and value of services, and to increase the production of the respective economic enterprises which are related to the industrial enterprise; (b) to acquire modern technical know-how for raising the efficiency of industrial enterprises and to establish the sale of finished goods produced by the industrial enterprise not only in the local market, but also in the foreign market; |

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| | | <p>(d) to cause narrowing down of the gap between rural development and urban development by causing the development and improvement of industrial enterprises;</p> <p>(e) to cause opening up of more employment opportunities;</p> <p>(f) to cause avoidance of or reduction of the use of technical know-how which cause environmental pollution;</p> <p>(g) to cause the use of energy in the most economical manner.</p> | <p>(c) to cause utilization by relying mainly as local natural resources;</p> <p>(d) to cause narrowing down of the gap between rural development and urban development by causing the development and improvement of industrial enterprises;</p> <p>(e) to cause opening up of more employment opportunities;</p> <p>(f) to cause avoidance of or reduction of the use of technical know-how which cause environmental pollution;</p> <p>(g) to cause the use of energy in the most economical manner.</p> |
| 32 | Inland Vessel Law | | |
| 32.1 | 28 | <p>No one:</p> <p>(a) shall load on board or transport any dangerous goods without informing to the ship owner or master;</p> <p>(b) shall load on board or carry by vessel any dangerous goods without marking distinctly the particular of goods outside the package in which the dangerous goods contains or by violating any terms and conditions stipulated by the department to be complied in carrying or transporting cargo by classifying the level of danger according to the type of dangerous goods.</p> | <p>The MAAT never</p> <p>(a) shall load on board or transport any dangerous goods without informing to the ship owner or master;</p> <p>(b) shall load on board or carry by vessel any dangerous goods without marking distinctly the particular of goods outside the package in which the dangerous goods contains or by violating any terms and conditions stipulated by the department to be complied in carrying or transporting cargo by classifying the level of danger according to the type of dangerous goods.</p> |

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| 32.2 | 29 | <p>The ship owner or the master:</p> <p>(a) has the right to discharge any dangerous goods including the parceland luggage if the carrier of cargo violates any prohibition in Section 28 and loads any dangerous goods on board of inland water or any goods in the package may cause danger to the vessel and passengers;</p> <p>(b) shall not be sued under the criminal or civil proceeding and are not liable to compensate for those goods discharged under sub-section (a).</p> | <p>The MAAT</p> <p>(a) has the right to discharge any dangerous goods including the parceland luggage if the carrier of cargo violates any prohibition in Section 28 and loads any dangerous goods on board of inland water or any goods in the package may cause danger to the vessel and passengers;</p> <p>(b) shall not be sued under the criminal or civil proceeding and are not liable to compensate for those goods discharged under sub-section (a).</p> |
| 32.3 | 30 | <p>Any ship owner or master:</p> <p>(a) shall not ply or operate the vessel without arrangement of life-safety appliance according to the number of passengers which is permitted for safety of passengers;</p> <p>(b) shall not load the passenger or the cargo exceeding the limited number of passengers according to the type of passenger vessel and cargo vessel or until the load line's limit is submerged;</p> <p>(c) shall not fail to make the load line's limit in accord with the stipulations;</p> <p>(d) shall not change the load line's limit without permission, obliterate or</p> | <p>The MAAT</p> <p>(a) shall not ply or operate the vessel without arrangement of life-safety appliance according to the number of passengers which is permitted for safety of passengers;</p> <p>(b) shall not load the passenger or the cargo exceeding the limited number of passengers according to the type of passenger vessel and cargo vessel or until the load line's limit is submerged;</p> <p>(c) shall not fail to make the load line's limit in accord with the stipulations;</p> <p>(d) shall not change the load line's limit without permission, obliterate</p> |

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| | | <p>disfigure or blur the mark of load line's limit;</p> <p>(e) shall not ply or operate the vessel with the load line's limit which is changed, obliterated or disfigured or blurred by any person;</p> <p>(f) shall not load the cargo and the passenger on the roof and by the side of the vessel or other prohibited places on board.</p> | <p>or disfigure or blur the mark of load line's limit;</p> <p>(e) shall not ply or operate the vessel with the load line's limit which is changed, obliterated or disfigured or blurred by any person;</p> <p>(f) shall not load the cargo and the passenger on the roof and by the side of the vessel or other prohibited places on board.</p> |
| 32.4 | 32 | No ship owner shall transport passengers and cargo on board without life insurance for passengers and insurance for damage and loss of cargo according to the existing law. | The MAAT shall never transport passengers and cargo on board without life insurance for passengers and insurance for damage and loss of cargo according to the existing law. |
| 33 | Myanmar Port Authority Law | | |
| 33.1 | 28 | <p>No one:</p> <p>(a) shall load on board or transport any dangerous goods without informing to the ship owner or master;</p> <p>(b) shall load on board or carry by vessel any dangerous goods without marking distinctly the particular of goods outside the package in which the dangerous goods contains or by violating any terms and conditions stipulated by the department to be complied in carrying or transporting cargo by classifying the level of danger according to the type of dangerous goods.</p> | <p>The MAAT never</p> <p>(a) shall load on board or transport any dangerous goods without informing to the ship owner or master;</p> <p>(b) shall load on board or carry by vessel any dangerous goods without marking distinctly the particular of goods outside the package in which the dangerous goods contains or by violating any terms and conditions stipulated by the department to be complied in carrying or transporting cargo by classifying the level of danger according to the type of dangerous goods.</p> |

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| 33.2 | 29 | <p>The ship owner or the master:</p> <p>(a) has the right to discharge any dangerous goods including the parcel and luggage if the carrier of cargo violates any prohibition in Section 28 and loads any dangerous goods on board of inland water or any goods in the package may cause danger to the vessel and passengers;</p> <p>(b) shall not be sued under the criminal or civil proceeding and are not liable to compensate for those goods discharged under sub-section (a).</p> | <p>The MAAT:</p> <p>(a) has the right to discharge any dangerous goods including the parcel and luggage if the carrier of cargo violates any prohibition in Section 28 and loads any dangerous goods on board of inland water or any goods in the package may cause danger to the vessel and passengers;</p> <p>(b) shall not be sued under the criminal or civil proceeding and are not liable to compensate for those goods discharged under sub-section (a).</p> |
| 33.3 | 30 | <p>Any ship owner or master:</p> <p>(a) shall not ply or operate the vessel without arrangement of life-safety appliance according to the number of passengers which is permitted for safety of passengers;</p> <p>(b) shall not load the passenger or the cargo exceeding the limited number of passenger according to the type of passenger vessel and cargo vessel or until the load line's limit is submerged;</p> <p>(c) shall not fail to make the load line's limit in accord with the stipulations;</p> <p>(d) shall not change the load line's limit without permission, obliterate or disfigure or blur the mark of load line's limit;</p> <p>(e) shall not ply or operate the vessel with the load line's limit which is</p> | <p>The MAAT:</p> <p>(a) shall not ply or operate the vessel without arrangement of life-safety appliance according to the number of passengers which is permitted for safety of passengers;</p> <p>(b) shall not load the passenger or the cargo exceeding the limited number of passenger according to the type of passenger vessel and cargo vessel or until the load line's limit is submerged;</p> <p>(c) shall not fail to make the load line's limit in accord with the stipulations;</p> <p>(d) shall not change the load line's limit without permission, obliterate or disfigure or blur the mark of load line's limit;</p> |

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| | | <p>changed, obliterated or disfigured or blurred by any person;</p> <p>(f) shall not load the cargo and the passenger on the roof and by the side of the vessel or other prohibited places on board;</p> | <p>(e) shall not ply or operate the vessel with the load line's limit which is changed, obliterated or disfigured or blurred by any person;</p> <p>(f) shall not load the cargo and the passenger on the roof and by the side of the vessel or other prohibited places on board;</p> |
| 33.4 | 32 | No ship owner shall transport passengers and cargo on board without life insurance for passengers and insurance for damage and loss of cargo according to the existing law. | The MAAT shall never transport passengers and cargo on board without life insurance for passengers and insurance for damage and loss of cargo according to the existing law. |
| 34 | Myanmar Merchant Shipping Act | | |
| 34.1 | 291 | <p>No person shall, in any port in which there is a person exercising the profession of a ship surveyor and holding a certificate granted under section 290. exercise such profession in such port unless he holds a certificate granted under that section:</p> <p>Provided that nothing herein contained shall prevent any person employed by Lloyd's Register of British and Foreign Shipping or Bureau Veritas from discharging any of the duties of such employment, or apply to any person specially exempted by the President of the Union from the operation of this section.</p> | <p>The MAAT shall never, in any port in which there is a person exercising the profession of a ship surveyor and holding a certificate granted under section 290. exercise such profession in such port unless he holds a certificate granted under that section:</p> <p>Provided that nothing herein contained shall prevent any person employed by Lloyd's Register of British and Foreign Shipping or Bureau Veritas from discharging any of the duties of such employment, or apply to any person specially exempted by the President of the Union from the operation of this section.</p> |

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| 34.2 | 292 | Any person exercising the profession of a ship surveyor in contravention of the provisions of section 291 shall be liable to a fine not exceeding one thousand rupees and shall be incapable of maintaining any suit for any fee or reward for anything done by him. | The MAAT exercising the profession of a ship surveyor in contravention of the provisions of section 291 shall be liable to a fine not exceeding one thousand rupees and shall be incapable of maintaining any suit for any fee or reward for anything done by him. |
| 34.3 | 293 | Any person appointed or authorized under this Act to survey a ship may, in the execution of his duties, go on board the ship and inspect the same and every part thereof. and the machinery. equipments and cargo, and may require the unloading or removal of any cargo, ballast or tackle. | The MAAT appointed or authorized under this Act to survey a ship may, in the execution of his duties, go on board the ship and inspect the same and every part thereof. and the machinery. equipments and cargo, and may require the unloading or removal of any cargo, ballast or tackle. |
| 34.4 | 295 | No suit or other legal proceeding shall lie against any person for anything which is in good faith done or intended to be done under this Act. | No suit or other legal proceeding shall lie against MAAT for anything which is in good faith done or intended to be done under this Act. |
| 35 | Myanmar Merchant Shipping (Wireless Telegraphy) Rules | | |
| 35.1 | 10 | (2) No person shall be deemed to be an operator or a watcher within the meaning of these rules unless he is duly certificated , nor shall he be deemed to be duly certificated unless he is the holder of a valid certificate of such grade as is hereby prescribed or of a higher grade , that is to say (a) on board a British ship registered in Myanmar an operator should hold a certificate of competency as defined in | (2) The MAAT shall never be deemed to be an operator or a watcher within the meaning of these rules unless he is duly certificated , nor shall he be deemed to be duly certificated unless he is the holder of a valid certificate of such grade as is hereby prescribed or of a higher grade , that is to say (a) on board a British ship registered in Myanmar an operator should hold a certificate |

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| | | <p>Rule 2 of the Myanmar Wireless Telegraph Rules , 1937 , of the Second Class , and a watcher shall hold a watcher's certificate granted by the Director - General , Posts and Telegraphs ; (b) on board a foreign ship an operator shall hold a certificate showing that he is a qualified operator and a watcher , a watcher's certificate being in either case a certificate granted by an authority empowered in that behalf by the laws of the country in which the ship is registered and recognised by the Director - General , Posts and Telegraphs as equivalent to the like certificate granted by him .</p> | <p>of competency as defined in Rule 2 of the Myanmar Wireless Telegraph Rules , 1937 , of the Second Class , and a watcher shall hold a watcher's certificate granted by the Director - General , Posts and Telegraphs ; (b) on board a foreign ship an operator shall hold a certificate showing that he is a qualified operator and a watcher , a watcher's certificate being in either case a certificate granted by an authority empowered in that behalf by the laws of the country in which the ship is registered and recognised by the Director - General , Posts and Telegraphs as equivalent to the like certificate granted by him .</p> |
| 36 | Myanmar Registration of Ships Act | | |
| 36.1 | 18 | <p>Every person who shall apply for a certificate of the registry of any ship shall produce to the person authorized to grant such certificate a true and full particular under the hand of the builder of such ship, or in case the want of such certificate can be satisfactorily accounted for, then to produce other sufficient evidence of the proper denomination, and of the time when. and the place where, such ship was built, and also an exact account of the tonnage of such ship, and shall also make and subscribe a</p> | <p>The MAAT shall apply for a certificate of the registry of any ship shall produce to the person authorized to grant such certificate a true and full particular under the hand of the builder of such ship, or in case the want of such certificate can be satisfactorily accounted for, then to produce other sufficient evidence of the proper denomination, and of the time when. and the place where, such ship was built, and also an exact account of the tonnage of such ship, and shall</p> |

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| | | declaration before the person or persons hereinbefore authorized to grant such certificate that the ship for which such certificate is required is the same with that which is so described by the builder as aforesaid. | also make and subscribe a declaration before the person or persons hereinbefore authorized to grant such certificate that the ship for which such certificate is required is the same with that which is so described by the builder as aforesaid. |
| 37 | Multimodal Transport Law | | |
| 37.1 | 33 | The consignor shall be deemed that he has guaranteed that all particulars of the nature of the goods, their marks, numbers, weight, volume and quantity and statement of the dangerous character of the goods are accurate as described by himself or by the person who operates on behalf of him to be included them in the multimodal transport document at the commencing time of taking responsibility by the multimodal transport operator. | The MAAT shall be deemed that he has guaranteed that all particulars of the nature of the goods, their marks, numbers, weight, volume and quantity and statement of the dangerous character of the goods are accurate as described by himself or by the person who operates on behalf of him to be included them in the multimodal transport document at the commencing time of taking responsibility by the multimodal transport operator. |
| 37.2 | 34 | The consignor shall put label, tag or sticker showing danger on dangerous goods in accord with the stipulations. | The MAAT shall put label, tag or sticker showing danger on dangerous goods in accord with the stipulations. |
| 37.3 | 36 | No person shall refer or carry out the provisions of section 35 if the multimodal transport operator has known the dangerous characteristics of goods during the period, he has taken responsibility. | The MAAT shall never refer or carry out the provisions of section 35 if the multimodal transport operator has known the dangerous characteristics of goods during the period, he has taken responsibility. |

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| 37.4 | 39 | The consignor shall remain to pay even though the multimodal transport document has been transferred by him. | The MAAT shall remain to pay even though the multimodal transport document has been transferred by him. |
| 38 | The Carriers Act | | |
| 38.1 | 8 | Notwithstanding anything hereinbefore contained, every common carrier shall be liable to the owner for loss of or damage to any property delivered to such carrier to be carried where such loss or damage shall have arisen from the criminal act of the carrier or any of his agents or servants and shall also be liable to the owner for loss or damage to any such property, other than property to which the provisions of section 3 apply and in respect of which the declaration required by that section has not been made, where such loss or damage has arisen from the negligence of the carrier or any of his agents or servants. | Notwithstanding anything hereinbefore contained, the MAAT shall be liable to the owner for loss of or damage to any property delivered to such carrier to be carried where such loss or damage shall have arisen from the criminal act of the carrier or any of his agents or servants and shall also be liable to the owner for loss or damage to any such property, other than property to which the provisions of section 3 apply and in respect of which the declaration required by that section has not been made, where such loss or damage has arisen from the negligence of the carrier or any of his agents or servants. |
| 39 | The Myanmar Coastal and Inland Water Transport Service License Law | | |
| 39.1 | 14 | A person who obtains the service license: (a) shall pay prescribed service license fee to the Central Supervising Body or the relevant Regional Supervising Body; (b) comply with stipulated terms and conditions according to category of service license; | The MAAT who obtains the service license: (a) shall pay prescribed service license fee to the Central Supervising Body or the relevant Regional Supervising Body; (b) comply with stipulated terms and conditions according to category of service license; |

| | | | |
|------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | (c) shall, after expiring the term of service license, apply to renew the term of license according to the stipulations, if desirous to continue the water transport service. | (c) shall, after expiring the term of service license, apply to renew the term of license according to the stipulations, if desirous to continue the water transport service. |
| 40 | The Myanmar Territorial Sea and Maritime Zones Law | | |
| 40.1 | 30 | No one shall move any objects, including ancient objects and historic objects at the seabed of the contiguous zone without the prior permission of the Government. | No one shall move any objects, including ancient objects and historic objects at the seabed of the contiguous zone without the prior permission of the Government. |
| 40.2 | 31 | No one shall act any of the followings in the exclusive economic zone without the prior permission of the Government: (a) exploration; (b) exploitation of natural resources; (c) doing research; (d) excavating or drilling for any purpose; (e) establishing, maintaining or using artificial island, off-shore terminal, installations and structures. | No one shall act any of the followings in the exclusive economic zone without the prior permission of the Government: (a) exploration; (b) exploitation of natural resources; (c) doing research; (d) excavating or drilling for any purpose; (e) establishing, maintaining or using artificial island, off-shore terminal, installations and structures. |
| 40.3 | 32 | No one shall act any of the followings in the continental shelf without the prior permission of the Government: (a) exploration; (b) exploitation of natural resources; (c) doing research; (d) searching, excavating or drilling for any purpose; (e) establishing, maintaining or using artificial island, off-shore terminal, installations and structures; | No one shall act any of the followings in the continental shelf without the prior permission of the Government: (a) exploration; (b) exploitation of natural resources; (c) doing research; (d) searching, excavating or drilling for any purpose; (e) establishing, maintaining or using artificial island, off-shore |

| | | |
|--|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| | (f) extending or maintaining submarine cables and pipelines | terminal, installations and structures; (f) extending or maintaining submarine cables and pipelines |
|--|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|

2.2.3 National Standards and Guidelines

National Environmental Quality (Emission) Guidelines (NEQG) for waste water and noise levels are referenced in this EMP report. Followings are the environmental standards and guidelines adopted by EMP team. The project proponent will be discharged the waste water from the project by following the National Standard and Guidelines.

Table 5. Environmental Standards for Wastewater Discharge (NEQG)

| Sr. | Parameter | Unit | Guideline Value |
|-----|-------------------------|---------------|-----------------|
| 1 | 5-day BOD | mg/l | 50 |
| 2 | COD | mg/l | 250 |
| 3 | Oil and grease | mg/l | 10 |
| 4 | pH | Standard unit | 6-9 |
| 5 | Temperature increase | °C | <3 |
| 6 | Total coliform bacteria | 100 ml | 400 |
| 7 | Total nitrogen | mg/l | 10 |
| 8 | Total phosphorus | mg/l | 2 |
| 9 | Total suspended solids | mg/l | 50 |

Table 6. Noise Level Standard (NEQG)

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

Table 7. Air Quality Standard (NEQG)

| Sr. | Parameter | Averaging Period | Guideline Value µg/m³ |
|------------|-------------------|-------------------------|---------------------------------------------|
| 1 | Nitrogen dioxide | 1-year | 40 |
| | | 1-hour | 200 |
| 2 | Ozone | 8-hour daily Maximum | 100 |
| 3 | PM ₁₀ | 1-year | 20 |
| | | 24 hour | 50 |
| 4 | PM _{2.5} | 1-year | 10 |
| | | 24 hour | 25 |
| 5 | Sulfur dioxide | 24-hour | 20 |
| | | 10-minute | 500 |

2.2.4 International Standards and Guidelines

The general Environmental, Health, and Safety (EHS) Guidelines of IFC is technical reference document with general examples of Good International Industry Practice (GIIP). The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. The applicability of the EHS Guidelines is tailored for (MAAT) by taking accounts the results of the environmental assessment.

Internationally accepted environmental standards and guidelines for ambient air, waste water, noise levels and environmental monitoring parameters are referenced in this EMP report. Following is the environmental standards and guidelines adopted by EMP team.

Table 8. Environmental Standards and Guidelines Referenced in this Report

| Sr. | Standards/Guidelines | Reference |
|------------|-------------------------------------|------------------|
| 1 | Environmental monitoring programmed | IFC |
| 2 | Occupational safety and health | IFC |

2.2.5 International Convention and Recommendation from ILO

1. Labor Inspection Convention, 1947 (No.81)
2. Employment Injury Benefits Convention, 1964 (No.121)
3. Working Environment (Air Pollution, Noise and Vibration) Convention, (No.148)
4. Occupation Safety and Health Convention, 1981 (No.155)
5. Occupation Safety and Health Services Convention, 1985 (No.161)
6. Safety and Health in Construction Convention, 1988 (No.161)
7. Prevention of Major Industrial Accidents Convention, 1993 (No.174)
8. Labor Inspection Recommendation, 1947 (No.81)
9. Protection of Workers' Health Recommendation, 1953 (No.97)
10. Welfare Facilities Recommendation, 1956 (No.202)
11. Employment Injury Benefits Recommendation, 1964 (No.121)
12. Working Environment (Air Pollution, Noise and Vibration) Recommendation, 1977 (No.156)
13. Safety and Health in Construction Recommendation, 1988 (No.175)
14. Prevention of Major Industrial Accidents Recommendation, 2001 (No.192)

The goal of this principles is to protect safety and health by prevention and controls of hazards. This principle can get not only to ensure the well-being of workers but also contribute positively to productivity. MAAT will compliance with the convention and recommendation during Project operation life.

3 Project Description

3.1 Introduction

MAAT Co., Ltd is planned to construct the jetty with the length of 585 m in Thilawa Port Area. MAAT Jetty Project will be developed by cooperating of Myanmar Edible Oil Industrial Public Co., Ltd (MAAT) from Plot (27), Myanmar Agribusiness Public Corporation Limited (MAPCO) from Plot (28) and Myanmar Agricultural and General Development Public Co., Ltd (MAGDPL) from Plot (29). The construction work will be started within 2020. MAAT Co., Ltd will be operated the jetty at Plot No. 27, 28 and 29, Thilawa Port Area, Kyaukttan Township, Yangon, Myanmar. In its

completion, grain storage, distribution and container vessels cargo operation will be developed. The three plots will be carried out grain storage and cargo terminal operation by separating work.

3.2 Project Location

MAAT Jetty is located on plot 27, 28 and 29, Thilawar Port Area, Kyauktan Township, Yangon Region. It is on the East bank of Yangon River and about 25 km from Yangon-Thanyin Bridge No.1. There are three villages namely Thida Myaing, Shwepyi Tharyar, and Aya Mya Thida exist within 7 kilometers of the project area. The project is part of Thilawar Port Area which has a total of 37 equal size plots along the East bank of Yangon River which is about 20 km from river mouth. The coordinates of MAAT Jetty Project boundary are as follows.

Table 9. Coordinate Points of MAAT Jetty Project Boundary

| Sr | Point | Coordinate | |
|----|-------|----------------|----------------|
| | | Lattitude | Longtitude |
| 1 | A | 16° 37'38.16"N | 96° 16'15.03"E |
| 2 | B | 16° 37'21.98"N | 96° 16'10.85"E |
| 3 | C | 16° 37'27.93"N | 96° 15'47.12"E |
| 4 | D | 16° 37'43.76"N | 96° 15'51.51"E |



Figure 1. Location of MMAT Jetty Project

သီလဝါတန်းနားဒေသတွင် ဆိပ်ကမ်းများနေရာချထား၍ ဖွံ့ဖြိုးရေးလုပ်ငန်းများ ဆောင်ရွက်နေမှုပြပုံ

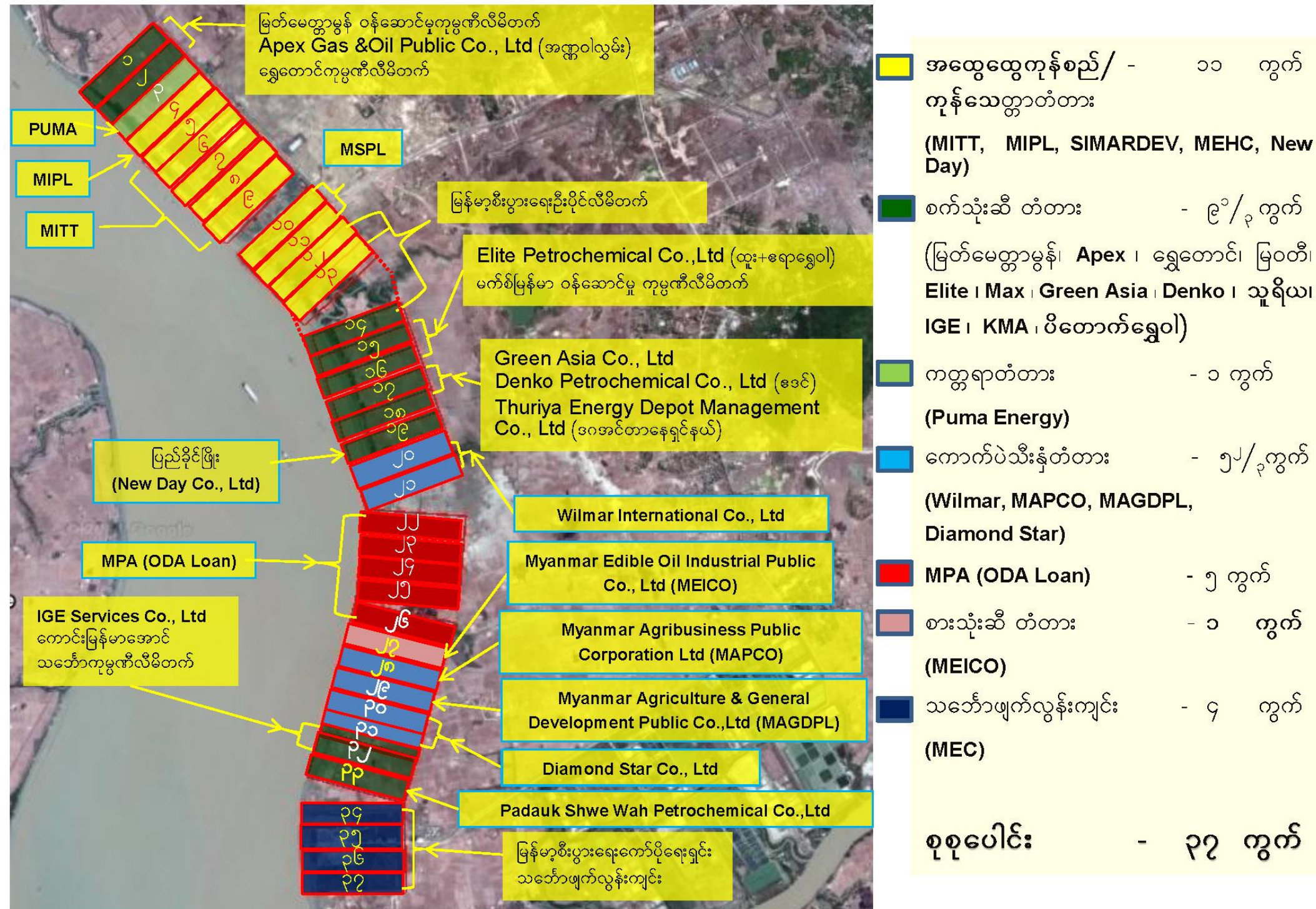


Figure 2. Current Condition of the Project and Surrounding Environment

3.3 Jetty Construction and Operation Activities

3.3.1 Dredging and Disposal of Dredged Materials

The dredging process is a combination of digging the soil in the water bed and removing or extracting that soil from excavated surface. The types of dredging methods can be classified into three categories depending upon how the debris is extracted from the site. The dredging methods include (i) Mechanical Dredging, (ii) Hydraulic Dredging and (iii) Mastering Ship's Navigation Dredging. MAAT Co., Ltd will be used Mechanical Dredging Method for MAAT Jetty Project.

3.3.1.1 Mechanical Dredging

Mechanical dredging is the process in which the sediments are picked up using mechanical tools such as buckets, grabs, etc. MAAT Co., Ltd will be used grab dredger for MAAT Jetty Construction project.

Grab Type Dredger is a stationary dredger which has a grab as a dredging tool (Two equivalent scoops or shell operated hydraulically). Due to its design, it is also known as clamshell dredger. There can be different designs of the grab and it can be used deep water dressing.

Mechanical dredging is carried out near the shore line and it is used for removing sediment on land or shoreline. The dredgment sediment is picked up and will be placed in the pot hole which is situated the parallel side of the Thilawa Port. In construction of MAAT jetty, MAAT Co., Ltd wil be dredged from 12 m depth and the dredgment sediments will be discharged (35000-40000) m³ and the estimated dedging time will be about 2 months. Sice the dredging will be done near the short line; the sediment will be directly transfer to pot hole with split types hopper barges.

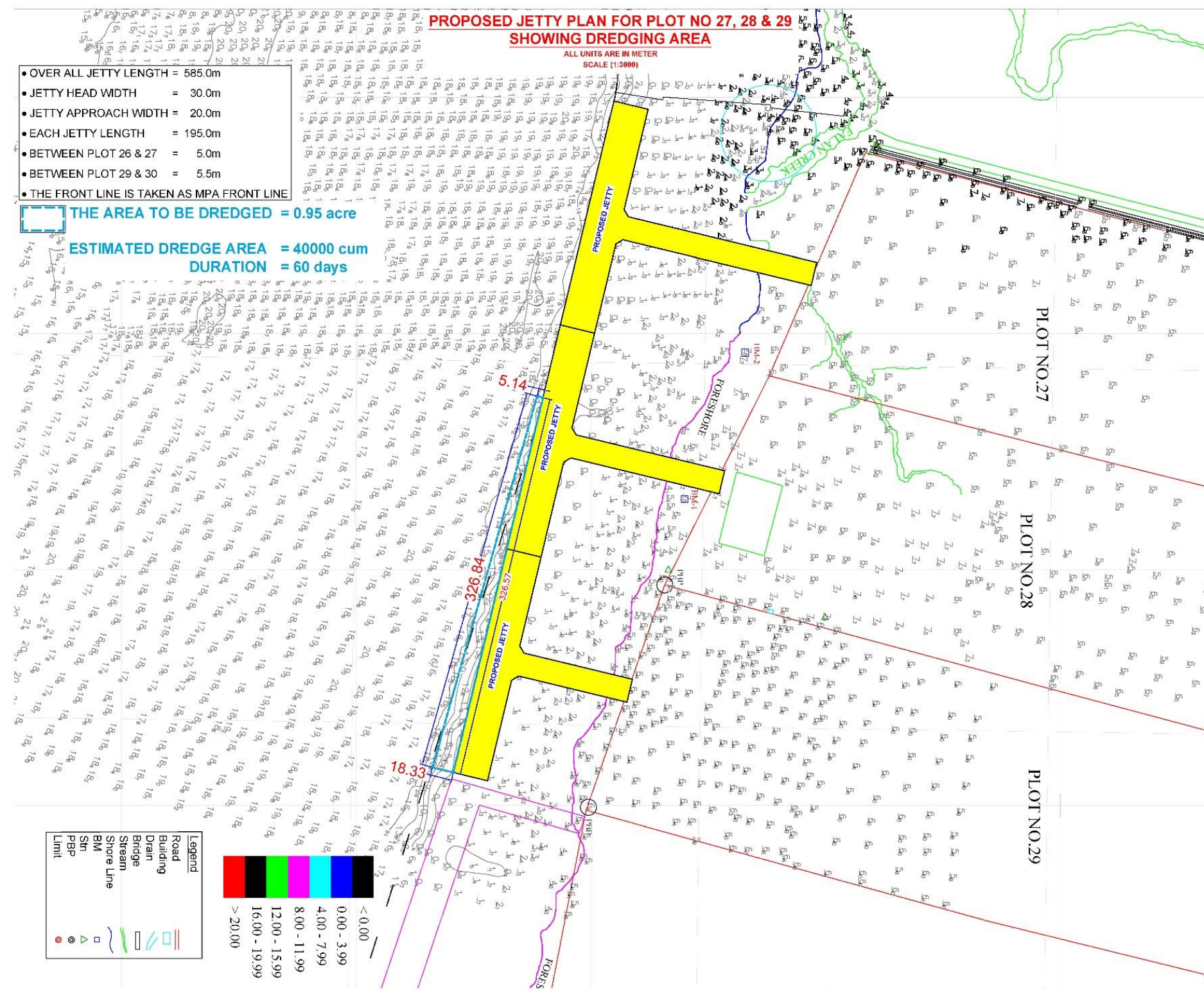


Figure 3. Map of Dredging Area

3.3.2 Excavation/Blasting and Disposal of Crushed Material

Installation of pier columns / piles and other underwater foundations and construction of harbor basins and access channels will be required excavation of sediment and underlying material. Soft material can be excavated using conventional means such as flight augers, however, excavation of hard materials will be involved blasting. Foundations can penetrate natural low-permeability layers and facilitate vertical migration of saline water and contaminants. As with dredging, these construction activities also cause turbidity and generate crushed material and other debris requiring disposal. The use of explosives can be released nitrogen and blasted material into the water. Other contaminants, including metals and petroleum products, can also be released from sediments. Uncontaminated material will be disposed of in open water, or used to construct breakwaters and other features, or for land reclamation. Contaminated material will be placed in a confined disposal facility.

3.3.3 Civil Construction Works

Piers, wharves, and similar structures create the ship berths and provide the platforms for waterside cargo handling. These structures are typically constructed of concrete, or steel. Filled structures, such as breakwaters, are crucial elements of port design and constitute sizable areas of artificial shoreline often projected into a bay, harbor, or estuary. Rubble mound breakwaters are used and constructed by dumping rocks (or debris) of various size distributions from dump truck, barges, or from fall pipes by barges.

3.3.4 Components of MAAT Jetty

The type of jetty will be constructed from MAAT Company Limited for Plot 27, 28 and 29 of Thilawa Port Area is Reinforced Concrete Jetty with reinforced concrete superstructure on prestressed concrete spun-piles. Although container based jetty terminal can be constructed with steel pipe pile as deep foundation and steel structure as upper foundation but steel structure could be affected for corrosion because

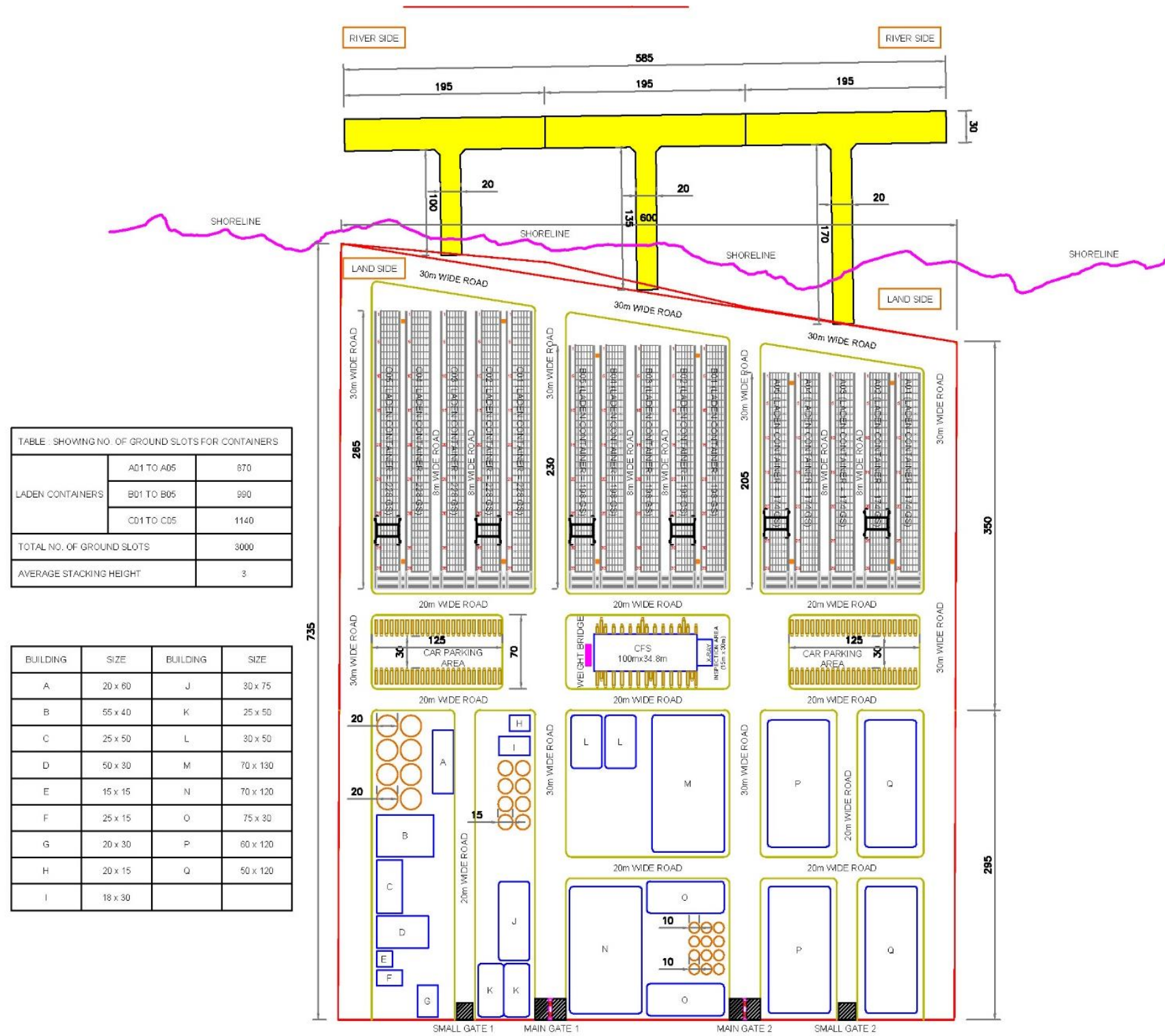
of Yangon Tidal. Therefore, MAAT Co., Ltd will be constructed the R.C Jetty. Moreover, Myanmar Port Authority is not permitted to construct the soil type jetty which filled with soil into the river. So, MAAT Co., Ltd will be constructed pile type jetty in the MAAT Jetty Project. The Length and width of the jetty are as follows and the layout of MAAT Jetty is shown in Figure 3.

| | |
|--------------------------------------|---------|
| Overall Jetty Length (Plot 27,28,29) | = 585m |
| Jetty Head Width | = 30 m |
| Jetty Approach Width | = 20 m |
| Each Jetty Length | = 195 m |
| Distance Between (Plot 26 & 27) | = 5 m |
| Distance Between (Plot 29 & 30) | = 5.5 m |

3.3.5 Vessels Types and Numbers

The types of vessels which will be arrived to MAAT Jetty is Container Vessels, General Cargo Vessels, Bulk Cargo Vessels and Oil Cargo Vessels. After the construction of Jetty, two nos of the vessels with the size of 30000 DWT, and one nos of 15000 DWT vessel can be arrived to the Jetty at the same time or three nos of 20000 DWT vessels arrived at the same time. The detail size of the vessels are as follows.

| | |
|------------------------------------|--------------------------|
| Length Over All (LOA) | = 203M (JPN - Standard) |
| Length Between Perpendicular (LBP) | = 151M (JPN - Standard) |
| Molded Breadth | = 30.6M (JPN - Standard) |
| Full Loaded Draft | = 11.2M (JPN - Standard) |



CONCEPTUAL LAYOUT OF CONTAINER YARD

Figure 4. Layout of Conatiner Yard

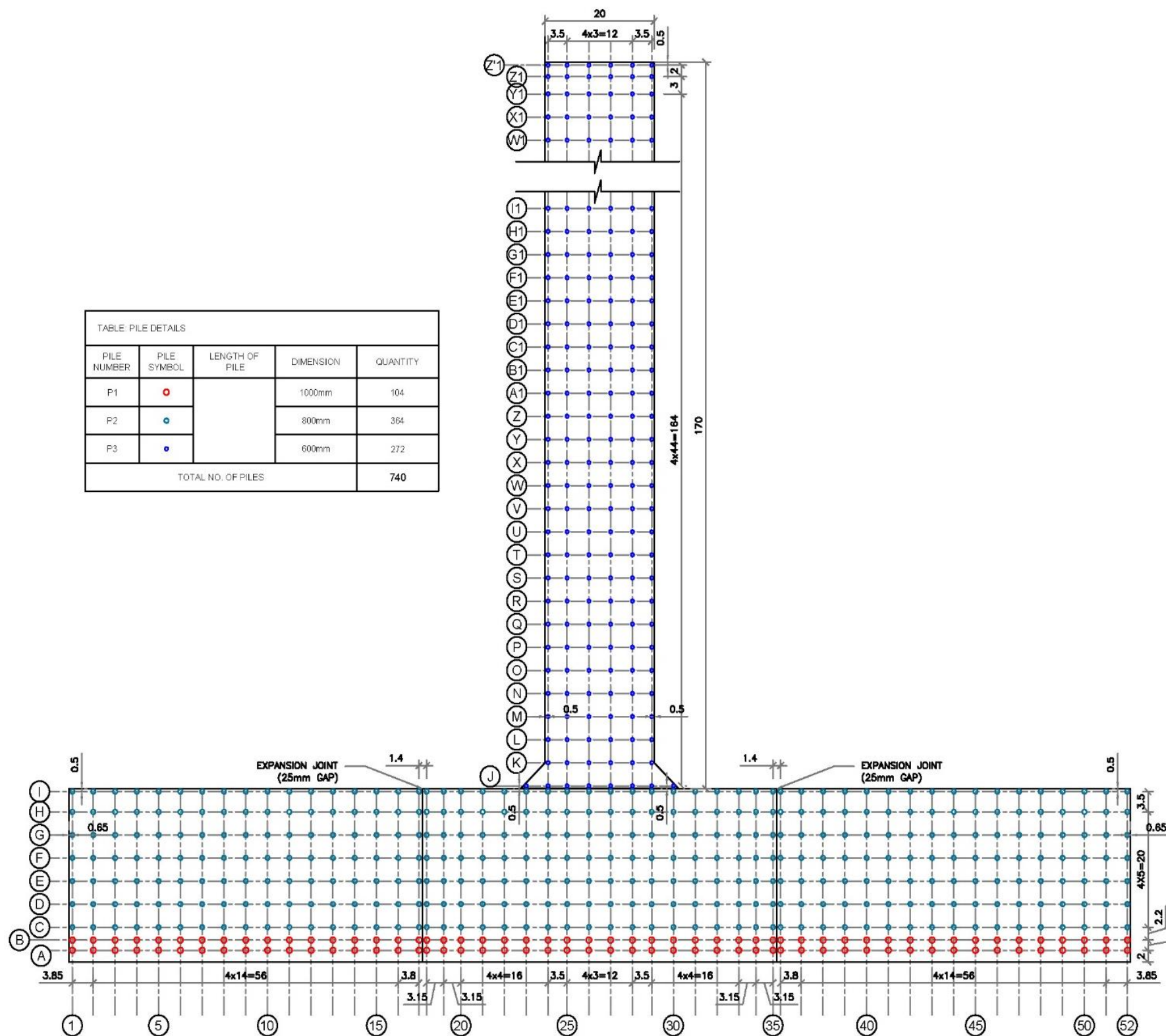


Figure 5. Piling Layout of the Jetty

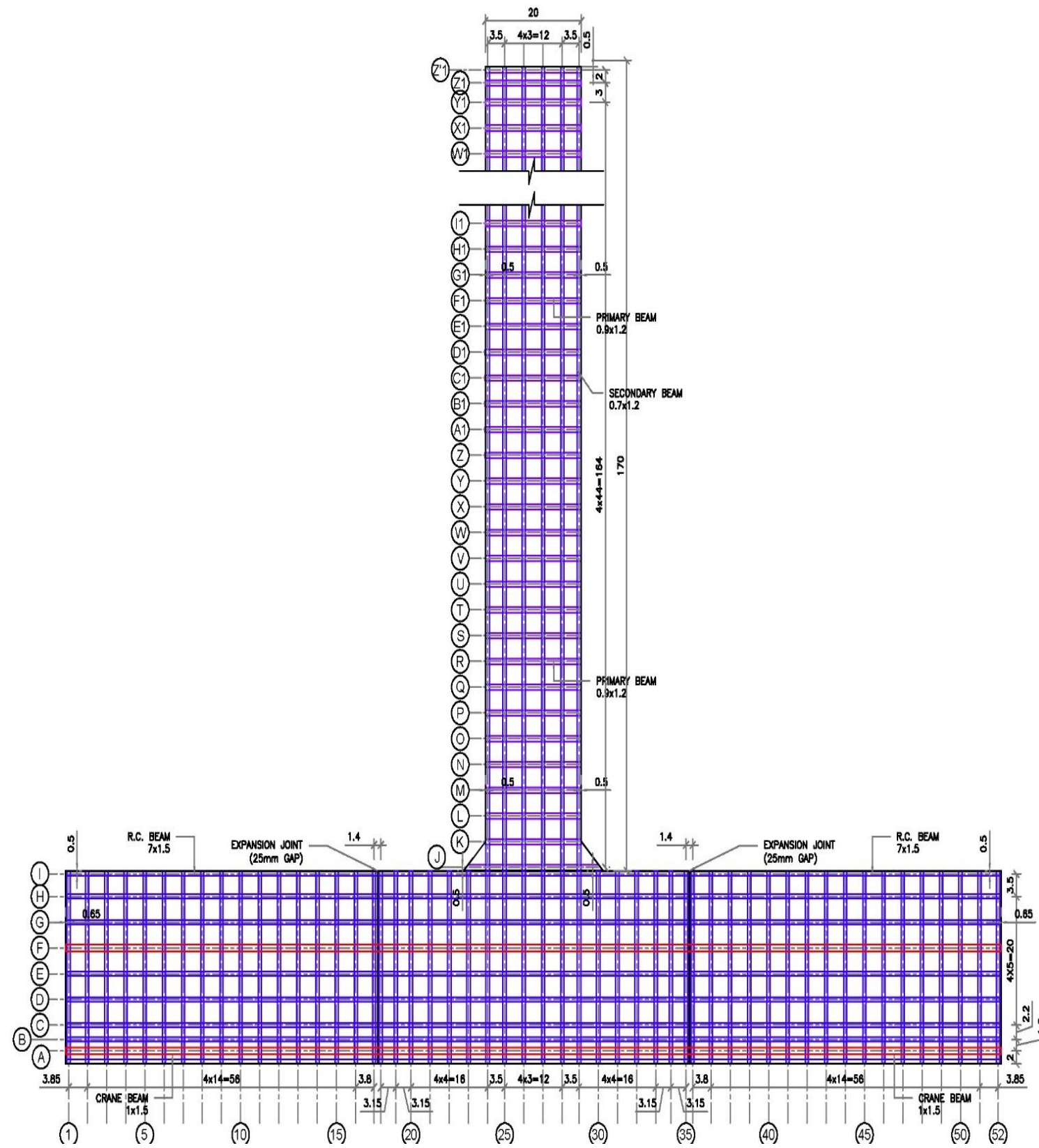


Figure 6. Structural Layout of the Jetty

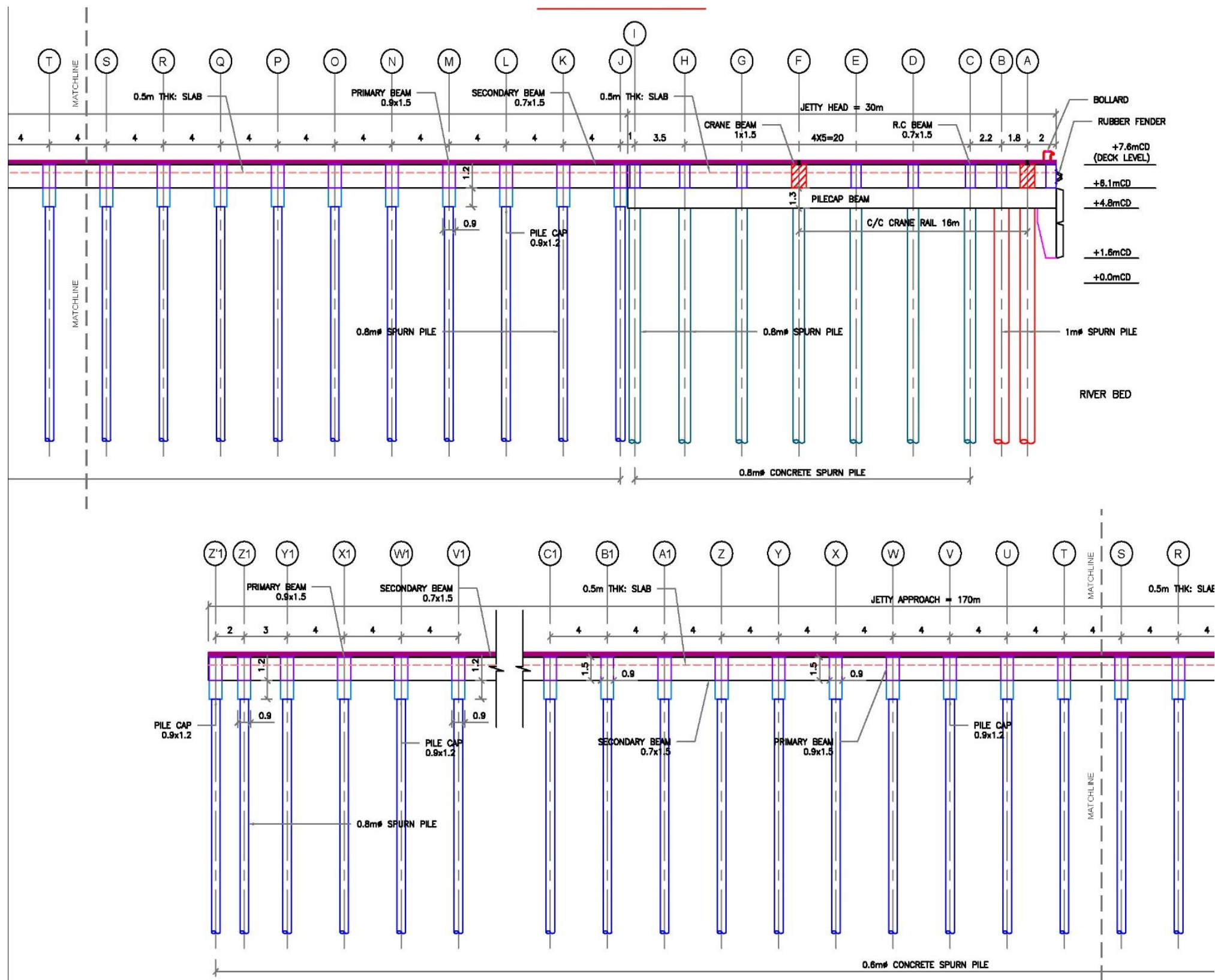


Figure 7. Site Elevation of the Jetty

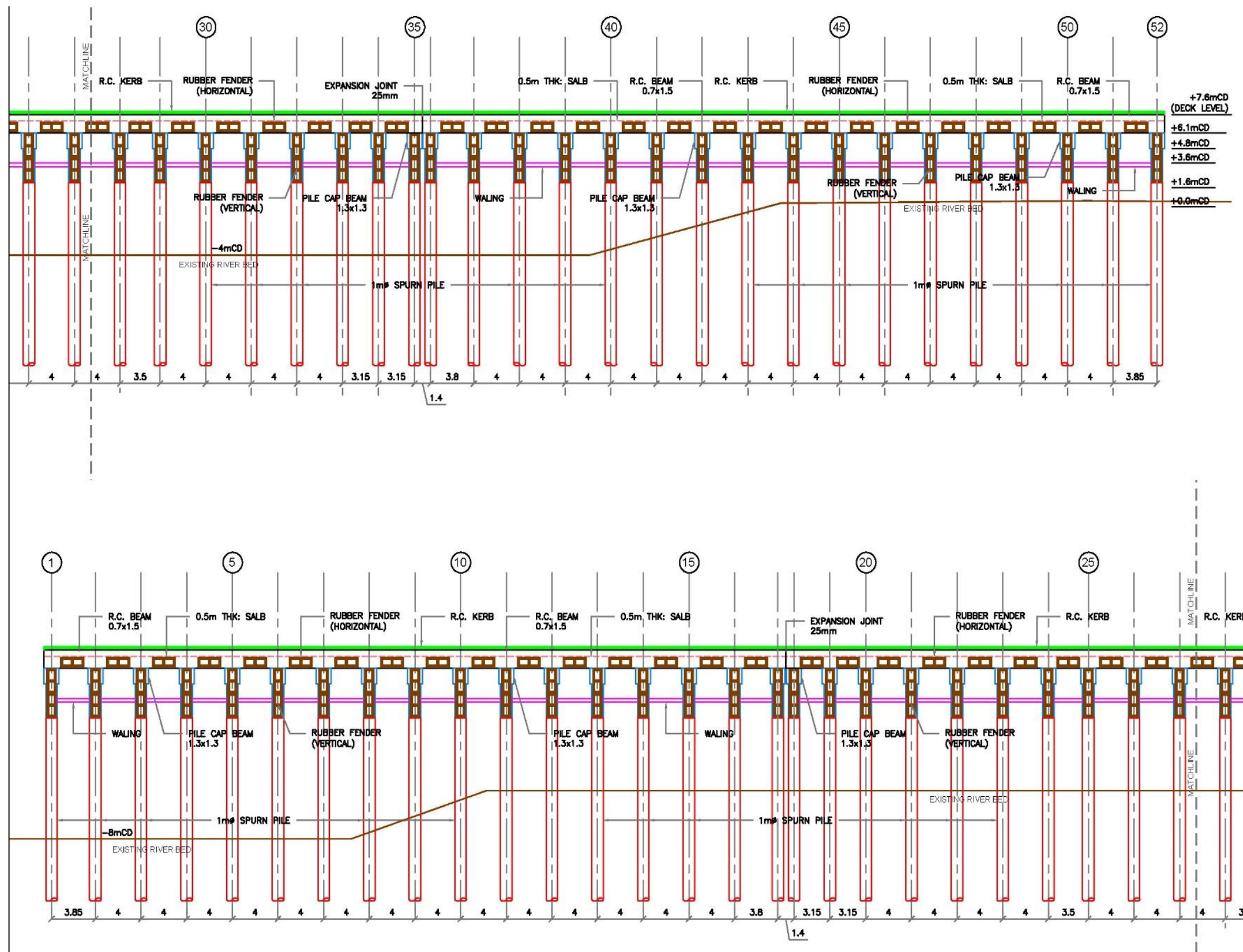


Figure 8. Front Elevation of the Jetty

3.3.6 Materials Loading and Unloading

MAAT Company Limited will be exported and imported the container yard mainly. Import container will be unloading from vessels loading to truck with quay crane and loading to truck. After loading to truck, the container will be transported to container yard. And then, the container will be conveyed to the Container Freight Station (CFS) from the yard and classified the materials to deliver the outside. The loading and unloading procedure of export container will be the same procedure with imported container loading/unloading procedure. But the export container should be passed the X-ray.

The container yard will be operated by plot 27, 28 and 29. In the inner part, plot 27, 28 and 29 will be operated bulk terminal operation process separately. Myanmar Edible Oil Industrial Public Co., Ltd. (MAAT) will be operated edible oil terminal operation process, on plot (27), Myanmar Agribusiness Public Co., Ltd. (MAPCO) will be operated grain and food product terminal operation process on plot (28) and Myanmar Agricultural and General Development Public Co., Ltd (MAGDPL) will be operated agricultural product terminal operation process on plot (29) respectively. 3 Nos of Quayside Gantry Crane, 6 Nos & 24 Nos of RTG Crane with Tractor and Chassis system, 3 Nos of Empty Container Handling equipment, 6 Nos of Fork Lifts and 3 Nos of Reach Stacker will be used loading/unloading process.

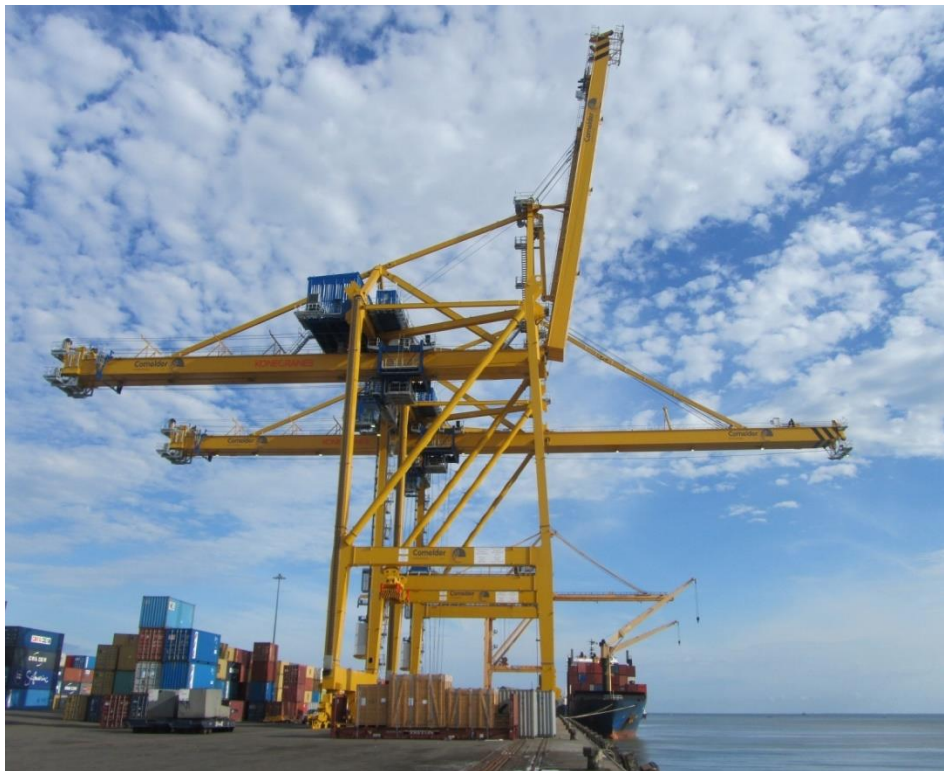


Figure 9. Quay side Gantry Crane (40.6-ton Capacity)

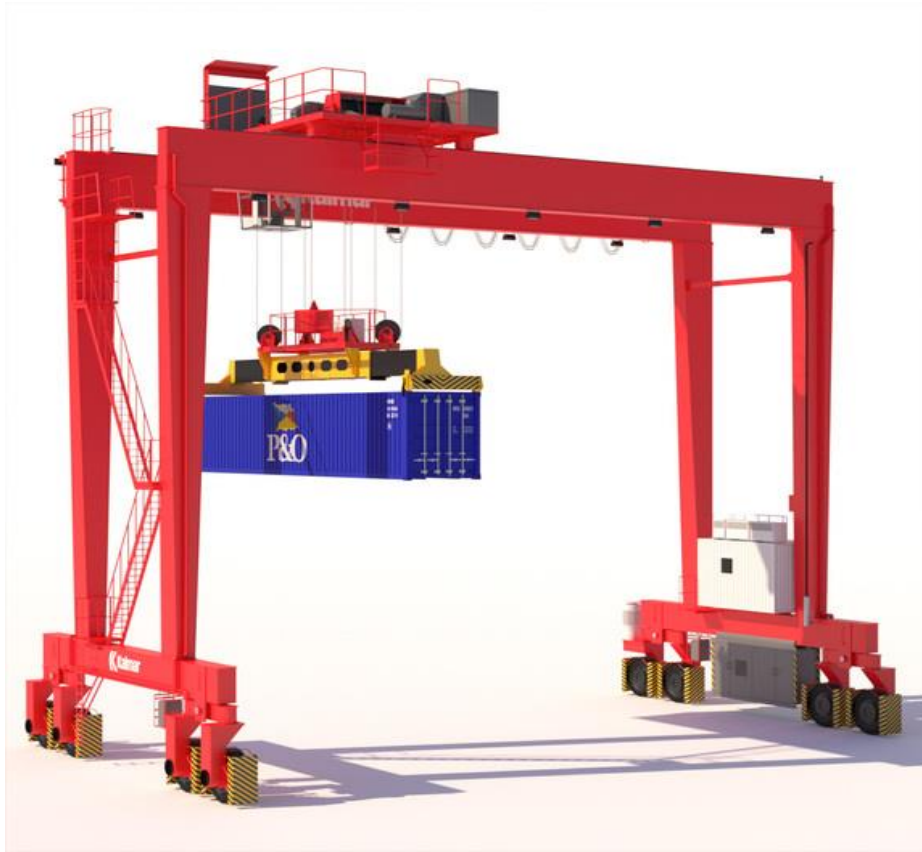


Figure 10. RTG Crane (40.6-ton Capacity)



Figure 11. Reach Stacker (5 High, 42-ton Capacity)



Figure 12. Forklift (2.5 ~ 3 ton)



Figure 13. Terminal Tractor



Figure 14. Terminal Chassis

3.4 Operational Workforce and Machines

The work force during operation for the MAAT Jetty Project is 27 members including managing director, general manager, deputy general manager and executive (12) members. The project will operate in three shifts per day and the workers work 8 hrs per shift. The workers are working 26 days per month and 312 days per year. The project operates the machine in 24 hr per day, 28 days per month and 300 days per year. The employment list for the MAAT Jetty is shown in following table.

Table 10. Labour Plan for the Entire Project

| No. | Position | No. of Employee |
|-------|------------------------|-----------------|
| 1. | Managing Director | 1 |
| 2. | General Manager | 2 |
| 3. | Deputy General Manager | 3 |
| 4. | Manager | 4 |
| 5. | Supervisor | 6 |
| 6. | Executive | 12 |
| Total | | 27 |

3.5 Water, Electricity and Fuel Supply

The raw water source for MAAT Jetty Project is surface water from Banbwegon and Thilawa Dam. Estimated water usage for the project is 30000 gals /day.

MAAT will be purchased electricity from government power source from MESC. The electrical power consumption for the project will be about 315 kWh per day.

MAAT will be used diesel 5000 gal and engine oil 50 gal per year. MAAT will have filled the fuel and engine oil from outside support and will not be stored the diesel and engine oil within the project compound.

4 Description of the Surrounding Environment

4.1 Setting the Study Limits

The EMP study focusing the project area and its vicinity within the range 5 km around the project from the centerline of the project area that can be effected by the project. In the project area, there was no villages 5 km from the centerline of the project. Therefore, EMP team surveyed the nearest villages around the project area which includes Aye Mya Thida (8 km from the project), Shwe Pyi Tharyar (6.7 km from the project) and Thida Myaing (7 km from the project) villages of Kyauktan Township, Yangon.



Figure 15. EMP Study Area for The MAAT Jetty Project

4.2 Methodology and Objectives

The EMP study for the project includes analysis on baseline data from local, government organization, MIC proposal of the MAAT and the master plan and other documents obtained from the project proponent.

Primary data collections include direct observation, interview, individual/target group consultation, public meeting, sampling and laboratory analysis on physicochemical parameters of water from the project area, listing biological resources such as flora and fauna, secondary data collection on demography, socioeconomics, occupation and education.

EMP study for MAAT Jetty Terminal Project is performed by ECCEA with the following specific objectives as to investigate the legality of the project; to study the background environmental and socioeconomic profile of the area; to release project information for the general public; to study the environmental, social and socioeconomic issues likely to occur; and to devise mitigation and enhancement measures for key environmental and social impacts.

4.3 Stakeholder Analysis

Stakeholders are categorized in four groups such as local people, government organizations, project proponent and other interested groups such as NGOs according to UNEP EIA MANUAL Guideline. Analysis was based on primary impact factors such as involvement in land acquisition, vicinity to the project, common use of utilities such as water and infrastructures. Paragraph 49 (g) of the EIA procedures stipulates that the scoping shall identify potentially affected communities and other stakeholders with an interest in the Project. The following table shows level of interest by stakeholders on the project.

Table 11. Stakeholders of MAAT Jetty Terminal Project

| Sr. | Stakeholder Group | Stakeholder | Interest Level | | Interest |
|-----|-------------------|------------------|----------------|----------|---------------|
| | | | Level | Reason | |
| 1 | Local People | Aye Mya Thida | Low | Vicinity | - Pollution |
| | | Shwe Pyi Tharyar | Low | Vicinity | - Waste Water |

| | | | | | |
|---|----------------------------|-------------------------------------------------------------|------------------|-------------------------------------|----------------------------------------------------------|
| | | Thida Myaing | Low | Vicinity | - Job opportunity - CSR |
| 2 | Government Organization | General Administration Office Department | Medium | - For administrative relation | - Administration - Coordination - CSR |
| | | YCDC | Medium | -City Development | |
| | | Department of planning | High | - Storm water issue | |
| | | Township Educational Office | Low | - Only relevant for CSR | |
| | | Land Records Department | Low | - No land related issue | |
| | | Township Health Department | Low | - Only relevant for CSR | |
| | | Township Environmental Conservation Department | Not yet estd: | - | |
| | | Township Fire- brigade | Low | - | |
| 3 | Proponent | Project management Project construction contractor | High | - Project Owner | - Operation and Management - Construction - EMP |

4.4 Project Affected Area

Project affected area is demarcated based on the results of stakeholder analysis. Affected human settlements, noise environment, biological environment and land environment are shown in the following table.

Table 12. Project Affected Area

| Sr. | Category | Location | Distance from Project | Factor |
|------------|---------------------------|------------------------------------------|--------------------------------|-----------------------------------------------|
| 1 | Human Settlements | Aye Mya Thida | 8 km | - Pollution |
| | | Shwe Pyi | 6.7 km | - Waste Water |
| | | Tharyar | | - Job opportunity |
| | | Thida Myaing | 7 km | - CSR |
| 2 | Land Environment | Nearby farmlands | Within 3 km around the project | - Pollution - Waste Water - Access road |
| 3 | Biological Environment | Project area | Within 3 km around the project | - Loss of Flora and Fauna |
| 4 | Air and Noise Environment | Within Project area and nearby community | Within 3 km around the project | - Noise levels |
| 5 | Water Environment | Within Project area | Project Area | - Water usages - Water quality |
| | | Yangon River | Along the Yagon river | - Waste water |

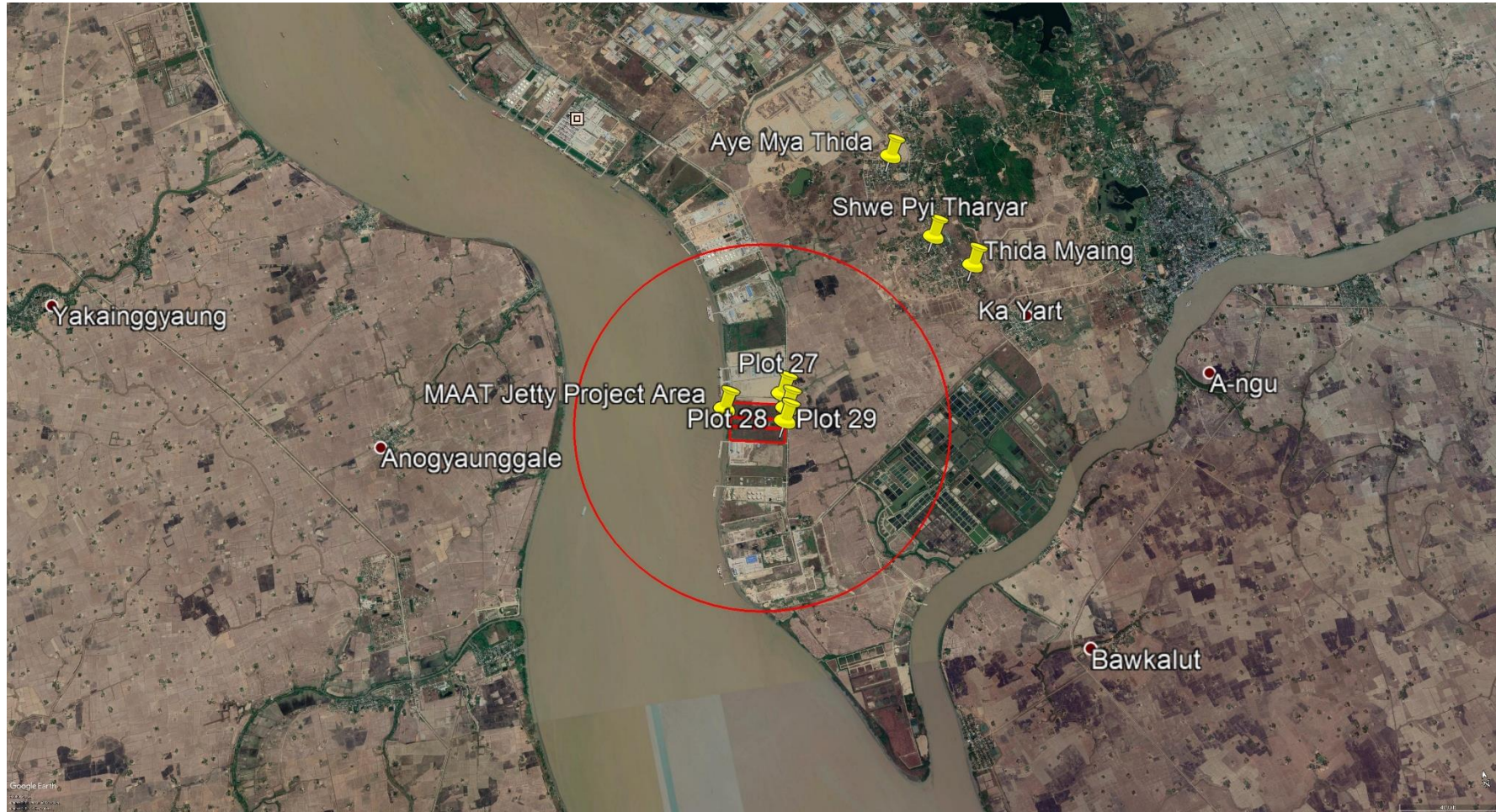


Figure 16. Project Affected Area of MAAT Jetty Terminal Project

4.5 Water Quality

For analysis of Physiochemical properties of river water and surface water of the project environment, water was sampling from six points from Yangon River and Drainage channel in front of the project compound in 2015. To know the current condition of surrounding environment, two sample were collected from Yangon River and Drainage Channel from 2020.

Table 13. Location of Baseline Water Sampling Point

| Sr. | Sample Name | Coordinates | | Location |
|-----|-------------|----------------|----------------|------------------|
| | | Latitude(N) | Longitude(E) | |
| 1 | RW1 | 16° 37'42.03"N | 96° 15'46.57"E | Yangon River |
| 2 | RW2 | 16° 37'36.82"N | 96° 15'45.40"E | Yangon River |
| 3 | RW3 | 16° 37'42.03"N | 96° 15'46.57"E | Yangon River |
| 4 | WS1 | 16° 37'29.04"N | 96° 16'15.09"E | Drainage Channel |
| 5 | WS2 | 16° 37'29.04"N | 96° 16'29.04"E | Drainage Channel |
| 6 | WS3 | 16° 37'23.92"N | 96° 16'12.24"E | Drainage Channel |

Table 14. Location of Current Water Sampling Point

| Sr. | Sample Name | Coordinates | | Location |
|-----|---------------|----------------|----------------|------------------|
| | | Latitude(N) | Longitude(E) | |
| 1 | River Watre | 16° 37'42.03"N | 96° 15'46.57"E | Yangon River |
| 2 | Surface Water | 16° 37'42.03"N | 96° 15'46.57"E | Drainage Channel |

4.5.1 Baseline Water Quality

The baseline water quality status in the region is established by analyzing samples at six locations consisting of three surface water samples from Yangon River and 3 surface water samples from roadside channel in front of the project. The criteria for the selection of sites was determined on the project location, agricultural land, slope of the land surface, topographical land upstream and downstream of the project, channels adjacent to irrigated fields, potential areas of polluted water and the location of the drainage and its discharge system. All water samples were analyzed for their physiochemical properties in Myanma Scientific and Technological Research Department (MSTRD) laboratory and the result are as shown in the following table.

Table 15. Results of Baseline Water Quality Analysis

| Test | Unit | Water Samples | | | | | | |
|---------------------------------|------|---------------|-----|------|------|------|------|------|
| | | IFC | WS1 | WS2 | WS3 | RW1 | RW2 | RW3 |
| Suspended Solids | Ppm | 50 | 160 | 200 | 180 | 222 | 188 | 180 |
| Biochemical Oxygen Demand (BOD) | Ppm | 30 | 5 | 2.8 | 2.4 | 0.1 | 0.2 | 0.8 |
| Chemical Oxygen Demand (COD) | Ppm | 125 | 12 | 8 | 6 | 14 | 10 | 16 |
| Oil and Greases | Ppm | 10 | ND | ND | ND | ND | ND | ND |
| pH | pH | 6-9 | 8.1 | 8.02 | 8.04 | 8.04 | 8.03 | 8.13 |

By comparing the laboratory analysis results with IFC guideline values, suspended solids content of all six water samples are higher than IFC value. WS 1, 2 and 3 are water samples from roadside channel and RW 1, 2 and Yangon River water. Other physiochemical properties of all samples are in accordance with IFC guideline values. The properties are baseline water quality of the existing environment before the implementation of the project. The project proponent is obliged to control the quality of sanitary or industrial waste water discharged from the project in accordance with IFC guideline value by applying necessary wastewater treatments.



Figure 17. Baseline Water Sampling Point



Figure 18. Collecting of Current Baseline Water Samples

4.5.2 Current Water Quality

To know the current water quality of the surrounding environment, water samples were collected from Yangon River and drain from the east side of the project. The current waste water quality could be seen in the following table. In first column, NEQG guideline values for waste water could be seen. pH value of both current water quality river water and surface water were 7.4. The BOD and COD result of current river water and surface water are about 12 mg/l, 88.3 mg/l and 4 mg/l, 36.5 respectively. From the analysis, the result of BOD, Total Nitrogen and Total Coliform Bacteria was within the limit of NEQG. TSS value of both river water and surface water were above the limit. All the samples are analyzed by ALARM Ecological Laboratory.

Table 16. Waste Water Quality Analysis Results

| Sr. | Particular | Unit | NEQG | River Water | Surface Water | Remark |
|-----|-----------------------------|------|------|-------------|---------------|-----------------|
| 1 | pH | - | 6-9 | 7.4 | 7.4 | Normal |
| 2 | Total Suspended Solid (TSS) | mg/l | 50 | 60 | 560 | Above the limit |
| 3 | BOD | mg/l | 50 | 12 | 4 | Normal |
| 4 | COD | mg/l | 250 | 88.3 | 36.5 | Normal |
| 5 | Total Nitrogen | mg/l | 10 | <5 | <5 | Normal |
| 6 | Total Phosphorous | mg/l | 2 | 0.08 | <0.02 | Normal |

| | | | | | | |
|---|--------------------------|--------|-----|-----|-----|--------|
| 7 | Oil and Grease | mg/l | 10 | 1 | 1 | Normal |
| 8 | Total Choliform Bacteria | 100 ml | 400 | 360 | 217 | Normal |



Figure 19. Current Water Sampling Points



Figure 20. Current Water Sampling Photo

4.6 Air Quality

4.6.1 Survey Item

The parameters for air Quality surveys were atmospheric pressure, CO₂, H₂S, CH₄, NO₂, O₃, PM₁₀, PM_{2.5}, Relative Humidity, SO₂, Solar radiation, Temperature, Wind direction, Wind speed and Power. Air Monitoring was measured in one location within the Project Compound.

Table 17. Location of Air Sample (AS) of the Project

| Sr. | Sample Name | Coordinates | | Location |
|-----|-------------|----------------|----------------|------------------|
| | | Latitude(N) | Longitude(E) | |
| 1 | AS Point | 16° 37'30.51"N | 96° 16'13.16"E | Project Compound |

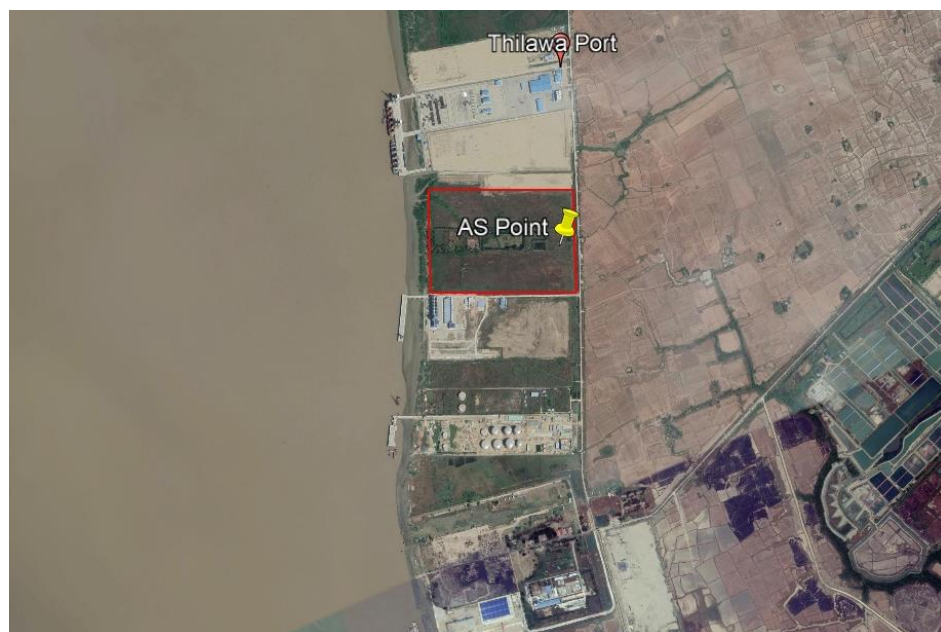


Figure 21. Air Monitoring Station

4.6.2 Survey Methodology

Sampling and analysis of ambient air quality were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air survey data. Sampling rate or air quality data were measured automatically every one minute and directly read and recorded onsite for measured parameters (SO₂, NO₂, CO₂, CO, H₂S, O₃, CH₄, PM₁₀, PM_{2.5}), as shown in following table. Sampling

pump was operated at 2 L/min. Different analysis methods are integrated in the instrument, such as Particulates 90° Infrared Light Scattering for particulate matters (PM₁₀, PM_{2.5}), electrochemical sensors for toxic gases (SO₂, NO₂, CO, H₂S), NDIR (optional sensor) for (CO₂, CH₄) and Gas Sensing Semiconductor- GSS technology (optional sensor) for O₃.

Table 18. Sampling and Analysis Method for Air Quality

| No | Parameter | Analysis Method |
|----|-------------------------------------|-----------------|
| 1 | Atmospheric pressure | On site reading |
| 2 | Carbon Dioxide (CO ₂) | On site reading |
| 3 | Hydrogen Sulfide(H ₂ S) | On site reading |
| 4 | Methane (CH ₄) | On site reading |
| 5 | Nitrogen Dioxide (NO ₂) | On site reading |
| 6 | Ozone (O ₃) | On site reading |
| 7 | PM (2.5) | On site reading |
| 8 | PM (10) | On site reading |
| 9 | Relative Humidity | On site reading |
| 10 | Sulphur Dioxide (SO ₂) | On site reading |
| 11 | Solar Radiation | On site reading |
| 12 | Temperature | On site reading |
| 13 | Wind Direction | On site reading |
| 14 | Wind Speed | On site reading |

4.6.3 Identification of Air Pollutants and Its Impacts

The proposed MAAT Jetty Project will be operated the machines by the time monitoring the air quality. Therefore, the air station is set on to collect data of the current air quality impacted by operational works and moving vehicles for the transportation of loads. Therefore, the site has to measure the surrounding air quality to know whether SO₂, NO₂, CO₂, CO, H₂S, PM_{2.5} and PM₁₀ are exceeding the limiting amount of National Environmental Quality Emission Guideline or not. The impacts of pollutants are defined below.

Carbon Monoxide (CO) is a toxic gas that cannot be seen or smelled. All people are at risk for CO poisoning. Unborn babies, infants, the elderly, and people with chronic heart disease, anemia, or respiratory problems are generally more at risk than others. Breathing CO can cause headache, dizziness and vomiting nausea. If CO levels are high

enough, unconscious or death may become. Exposure to moderate and high levels of CO over long periods of time has also been linked with increased risk of heart disease.

Carbon Dioxide (CO₂) is the primary greenhouse gas pollutant, accounting for nearly three-quarters of global greenhouse gas emissions. Carbon pollution leads to long lasting changes in our climate, such as rising global temperatures, rising sea level, changes in weather and precipitation patterns and changes in ecosystems, habitats and species diversity. Children, older adults, people living in poverty may be at risk from the health impacts of climate change.

Nitrogen Dioxide (NO₂) is a nasty-smelling gas. The main effect of breathing in raised levels of nitrogen dioxide is the increased likelihood of respiratory problems. Nitrogen dioxide inflames the lining of the lungs, and it can reduce immunity to lung infections. This can cause problems such as wheezing, coughing, colds, flu and bronchitis. Increased levels of nitrogen dioxide can have significant impacts on people with asthma because it can cause more frequent and more intense attacks. Children with asthma and older people with heart disease are most at risk.

Sulfur Dioxide (SO₂) is an invisible gas and has a nasty, sharp smell. It reacts easily with other substances to form harmful compounds, such as sulfuric acid, sulfurous acid and sulfate particles. Sulfur dioxide affects human health when it is breathed in. It irritates the nose, throat and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest. The effects of sulfur dioxide are felt very quickly and most people would feel the worst symptoms in 10 or 15 minutes after breathing in. Those most at risk of developing problems if they are exposed to sulfur dioxide are people with asthma or similar conditions.

Ozone (O₃) has a strong odor. Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. It can also reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue.

Particulate matter (PM) consists of microscopically small solid particles or liquid droplets suspended in the air. The smaller the particles, the deeper they can penetrate in to the respiratory system and the more hazardous they are to breathe. Long-term exposure to current ambient PM concentrations may lead to a marked reduction in life expectancy. The reduction in life expectancy is primarily due to increase cardio-pulmonary and lung cancer mortality. Increases are likely in lower respiratory symptoms and reduced lung function in children, and chronic obstructive pulmonary disease and reduced lung function in adults.

4.6.4 Measurement of Air Quality Comparing with the Air Quality Guidelines

The regional air quality within the project area is overwhelmingly dominated by industries and residential. As the proposed project is located in the thilawa industrial zone. The air quality assessment with the air quality parameters including particulates (PM₁₀, PM_{2.5}), and CO₂, H₂S, CH₄, NO₂, O₃, PM_A, PM_B, Relative Humidity, SO₂, Solar radiation, Temperature, Wind direction, Wind speed would be monitored. The air quality impact assessment will consider air emissions in accordance with ECD's National Environmental Quality (Emission) Guidelines, WHO air quality standards and IFC air emissions standards. To assist relevant authorities to improving baseline information, simple air quality sampling was conducted at one site for 8 hours.

Table 19. Air Quality Results of MAAT Jetty Terminal Project

| No. | Parameter | Result | Unit | Avg Period | | Guideline Value |
|-----|--------------------------|--------|-------------------|------------|-------|-----------------|
| 1 | Nitrogen | | µg/m ³ | | year | 40 |
| | Dioxide | 105.23 | µg/m ³ | 1 | hour | 200 |
| 2 | Particulate | | µg/m ³ | | year | 20 |
| | Matter PM ₁₀ | 52.96 | µg/m ³ | 12 | hours | 50 |
| 3 | Particulate | | µg/m ³ | | year | 10 |
| | Matter PM _{2.5} | 36.32 | µg/m ³ | 12 | hours | 25 |
| 4 | Sulfur | | µg/m ³ | | hours | 20 |
| | Dioxide | 24.99 | µg/m ³ | 10 | mins | 500 |
| 5 | Ammonia | | µg/m ³ | | year | |
| | | 0.84 | µg/m ³ | 8 | hours | NG |
| 6 | Carbon | | ppm | | year | NG |
| | Dioxide | 236.99 | ppb | 12 | hours | |
| 7 | Carbon | | ppb | | year | NG |
| | Monoxide | 107.31 | ppb | 12 | hours | |
| 8 | Hydrocarbon | | ppm | | hour | NG |
| | | 10.48 | ppm | 12 | hours | |
| 9 | Methane | | ppm | | hour | NG |
| | | 20.65 | ppm | 12 | hours | |
| 10 | | | CPM | | hour | NG |

| | | | | | | |
|----|---------------------------------|--------|-----|----|-------|----|
| | Atomic Radiation | 11.94 | CPM | 12 | hours | |
| 11 | Temperature | | °C | | hour | NG |
| | | 31.94 | °C | 12 | hours | |
| 12 | Volatile Organic Compound (VOC) | | ppb | | hour | NG |
| | | 0.126 | ppb | 12 | hours | |
| 13 | Wind Speed | | Kph | | hour | NG |
| | | 1.58 | Kph | 12 | hours | |
| 14 | Wind Direction | | Deg | | hour | NG |
| | | 194.49 | Deg | 12 | hours | |
| 15 | Relative Humidity | | RH% | | hour | NG |
| | | 39.95 | RH% | 12 | hours | |

4.7 Existing Noise Environment

4.7.1 Sources of the noise

Since the place for measuring noise levels is a Project which produces beer, the noises produced are governed by the sound of the machine operated and by the workers.

4.7.2 Noise Measurement Method

Handheld quick assessment method is used for the sound level by measuring the sound pressure. A tripod is used for mounting the SLM where the SLM is mounted and pointed towards the source of the noise.

4.7.3 Noise Measurement Location

Normally, when undertaking a noise assessment, it is essential to make note of the following on a site map:

- location of noise source
- background noise measurement location
- source noise measurement location
- topography between noise source and sensitive receivers.

The location of noise measurements for the project is shown in following figure and table.



Figure 22. Location of NSRs within Project Compound

Table 20. Location of NSRs within Project Compound

| Sr. | NSRs | Locations | |
|-----|------|----------------|----------------|
| | | Latitude | Longitude |
| 1 | P1 | 16° 37'30.32"N | 96° 16'14.11"E |
| 2 | P2 | 16° 37'37.62"N | 96° 16'15.74"E |
| 3 | P3 | 16° 37'21.85"N | 96° 16'12.14"E |
| 4 | P4 | 16° 37'30.85"N | 96° 16'9.34"E |
| 5 | P5 | 16° 37'35.96"N | 96° 15'49.19"E |
| 6 | P6 | 16° 37'30.22"N | 96° 15'47.83"E |
| 7 | P7 | 16° 37'40.29"N | 96° 15'50.41"E |

4.7.4 Results of the noise

The result of the noise is totally governed by the Project operation and at P1 and P2, and the workers, the wind and the Lorries there as very few cars pass through. Measurements results are shown in Table.

Table 21. Noise Measurement Results

| Sr. | NSRs | Locations | | One Hour L _{Aeq} (dBA) |
|-----|------|----------------|----------------|---------------------------------|
| | | Latitude | Longitude | |
| 1 | P1 | 16° 37'30.32"N | 96° 16'14.11"E | 65 |
| 2 | P2 | 16° 37'37.62"N | 96° 16'15.74"E | 65 |
| 3 | P3 | 16° 37'21.85"N | 96° 16'12.14"E | 68 |
| 4 | P4 | 16° 37'30.85"N | 96° 16'9.34"E | 50 |
| 5 | P5 | 16° 37'35.96"N | 96° 15'49.19"E | 54 |
| 6 | P6 | 16° 37'30.22"N | 96° 15'47.83"E | 55 |
| 7 | P7 | 16° 37'40.29"N | 96° 15'50.41"E | 57 |



Figure 23. Noise Level Meter for Measuring Noise

4.8 Meteorology

4.8.1 Topography and Climate

The study area is located Thilawa Port Area, Kyauktan Township, Yangon Region, Myanmar. The proposed site is currently occupied by near villages, cultivated land. Therefore, the topography is no major differences in altitude. The climate of project area is located in tropical wet and dry climate. The detail of Hydrological condition of MAAT is shown in Appendix G.

4.8.2 Temperature

Yangon has a tropical monsoon climate with very wet summers due to the southwest monsoon which starts from mid-May and lasts until mid-October. The warmest month with the highest average high temperature is April (37°C) and the

month with the lowest average high temperature is August (29.6°C). The month with the highest average low temperature is May (25°C) and the coldest month with the lowest average low temperature is January (17.9°C).

Table 22. Average Temperature of Yangon

| Sr | Month | Average High Temperature | Average Low Temperature |
|----|-----------|--------------------------|-------------------------|
| 1 | January | 32.2°C | 17.9°C |
| 2 | February | 34.5°C | 19.3°C |
| 3 | March | 36°C | 21.6°C |
| 4 | April | 37°C | 24.3°C |
| 5 | May | 33.4°C | 25°C |
| 6 | June | 30.2°C | 24.5°C |
| 7 | July | 29.7°C | 24.1°C |
| 8 | August | 29.6°C | 24.1°C |
| 9 | September | 30.4°C | 24.2°C |
| 10 | October | 31.5°C | 24.2°C |
| 11 | November | 32°C | 22.4°C |
| 12 | December | 31.5°C | 19°C |

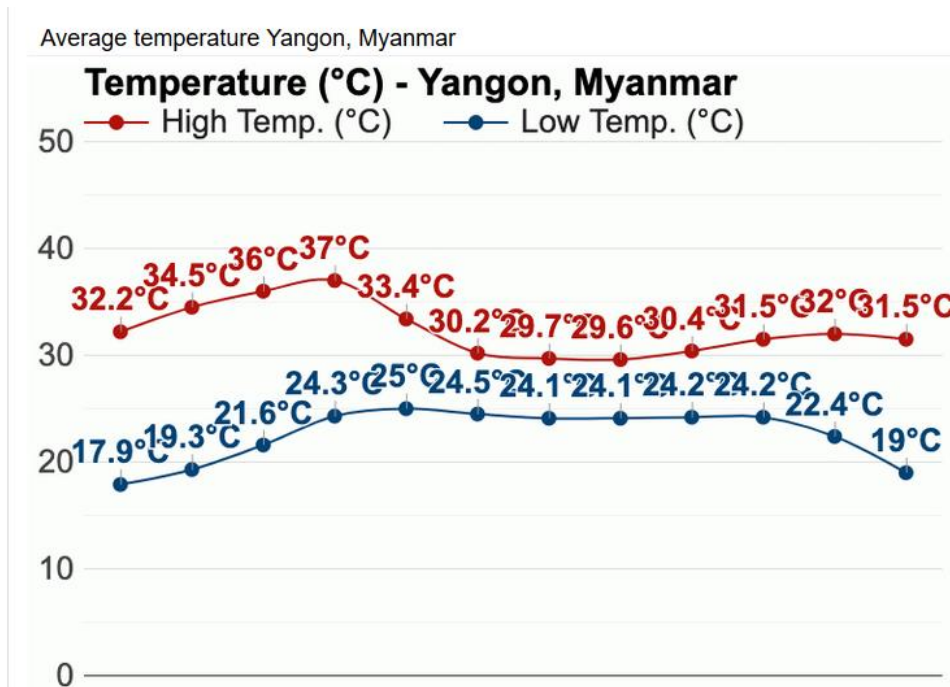


Figure 24. Temperature Graph of Yangon

4.8.3 Rainfall

A lot of rain falls in the months of May, June, July, August, September and October. Yangon has dry periods in December January, February, March and April. The wettest month with the highest rainfall is August (602 mm) and the driest month with the lowest rainfall is February (2 mm). The month with the highest number of rainy days is July (26.2 days) and the months with the lowest number of rainy days are January, February and December (0.2 days).

Table 23. Average Rainfall and Rainfall Days of Yangon

| Sr | Month | Average Rainfall | Average Rainfall Days |
|----|-----------|------------------|-----------------------|
| 1 | January | 5 mm | 0.2 days |
| 2 | February | 2 mm | 0.2 days |
| 3 | March | 7 mm | 0.4 days |
| 4 | April | 15 mm | 1.6 days |
| 5 | May | 303 mm | 12.6 days |
| 6 | June | 547 mm | 25.3 days |
| 7 | July | 559 mm | 26.2 days |
| 8 | August | 602 mm | 26.1 days |
| 9 | September | 368 mm | 19.5 days |
| 10 | October | 206 mm | 12.2 days |
| 11 | November | 60 mm | 4.8 days |
| 12 | December | 7 mm | 0.2 days |

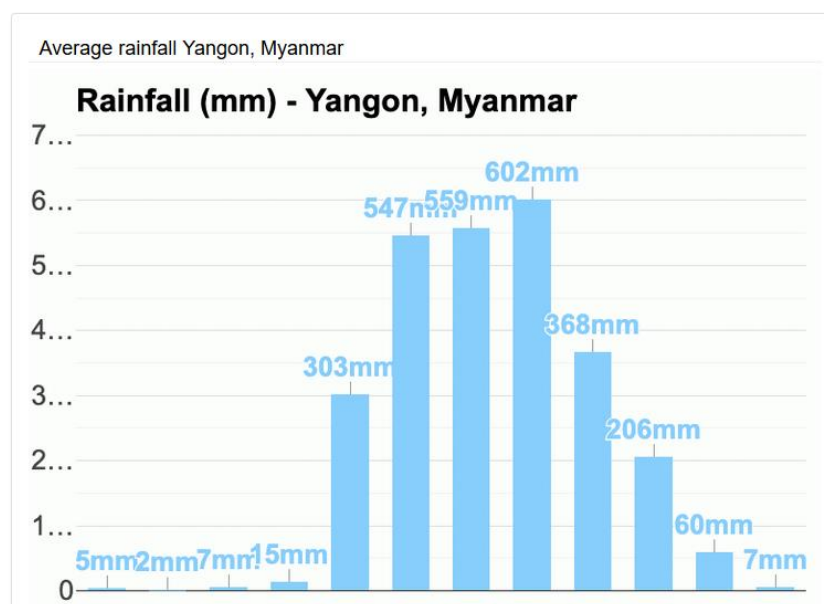


Figure 25. Rainfall Graph of Yangon

Average rainfall days Yangon, Myanmar

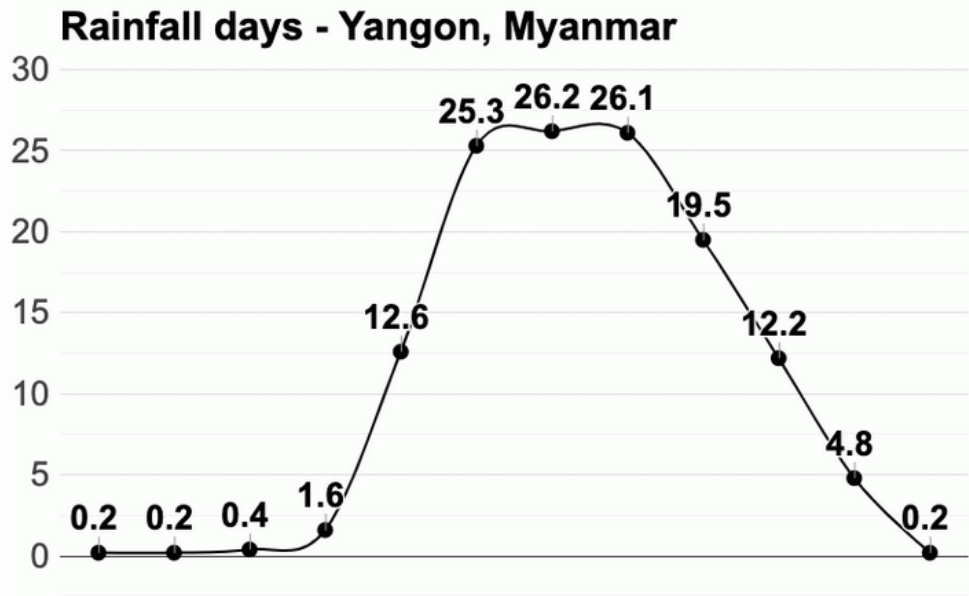


Figure 26. Rainfall Days Graph of Yangon

4.8.4 Humidity

In 2019, August is the most humid and January is the least humid month in Yangon. The month with the highest relative humidity is August (87%) and the lowest relative humidity is January (62%).

Table 24. Average Humidity of Yangon

| Sr | Month | Average Relative Humidity |
|----|-----------|---------------------------|
| 1 | January | 62% |
| 2 | February | 66% |
| 3 | March | 69% |
| 4 | April | 66% |
| 5 | May | 73% |
| 6 | June | 85% |
| 7 | July | 86% |
| 8 | August | 87% |
| 9 | September | 85% |
| 10 | October | 78% |
| 11 | November | 71% |
| 12 | December | 65% |

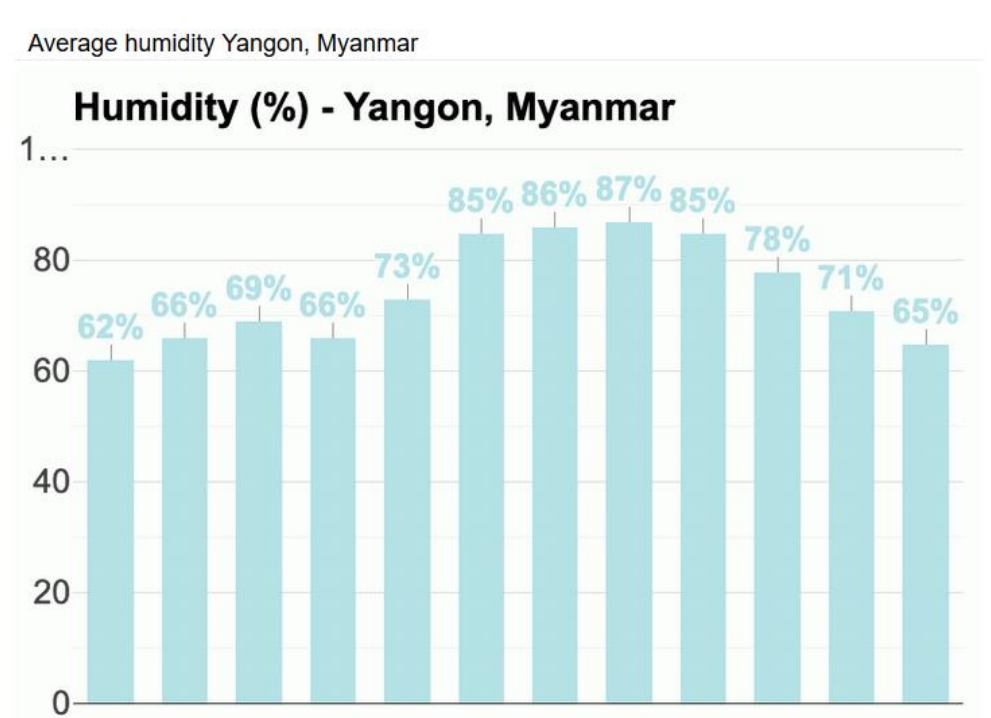


Figure 27. Humidity Graph of Yangon

4.8.5 Daylight/ Sunshine

Sunshine hours of Yangon is range from 2:29 daily in July to 9:44 to each day in January. The longest day of the year is 13:10 hr and the shortest day is 11:1 hr long. The longest day is 2:00 longer than the shortest day. The month with the longest day in June (average daylight: 13.1 h) and the month with the shortest day in December (average daylight: 11.1 h). Months with the most sunshine are January, February and April (average sunshine: 9.7 h) and the month with the least sunshine is July (average sunshine: 2.5 h).

Table 25. Average Daylight and Sunshine Hours of Yangon

| Sr | Month | Average Daylight | Average Sunshine |
|----|----------|------------------|------------------|
| 1 | January | 11.3 hr | 9.7 hr |
| 2 | February | 11.6 hr | 9.7 hr |
| 3 | March | 12.1 hr | 9.4 hr |
| 4 | April | 12.5 hr | 9.7 hr |
| 5 | May | 12.9 hr | 5.8 hr |
| 6 | June | 13.1 hr | 2.7 hr |

| | | | |
|----|-----------|---------|--------|
| 7 | July | 13 hr | 2.5 hr |
| 8 | August | 12.7 hr | 3 hr |
| 9 | September | 12.2 hr | 3.2 hr |
| 10 | October | 11.8 hr | 6.5 hr |
| 11 | November | 11.3 hr | 9.3 hr |
| 12 | December | 11.1 hr | 9.3 hr |

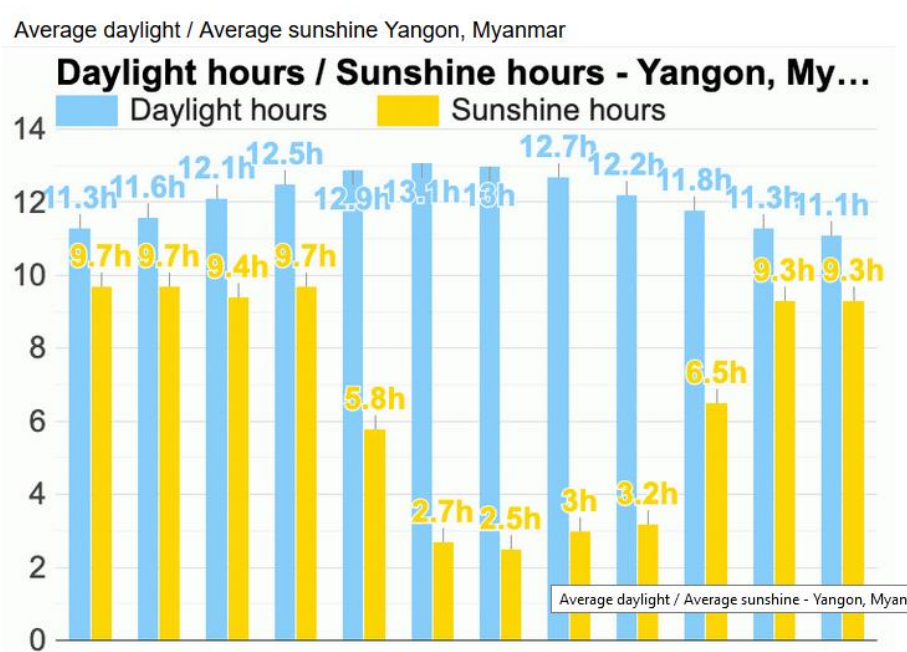


Figure 28. Day Light and Sunshine Hours graph of Yangon

4.8.6 UV Index

Months with the highest UV index of Yangon are March, April, May, June, July, August and September (UV index 12) and the month with the lowest UV index is December (UV index 8).

Table 26. Average UV Index of Yangon

| Sr | Month | Average UV Index |
|----|----------|------------------|
| 1 | January | 9 |
| 2 | February | 11 |
| 3 | March | 12 |
| 4 | April | 12 |
| 5 | May | 12 |

| | | |
|----|-----------|----|
| 6 | June | 12 |
| 7 | July | 12 |
| 8 | August | 12 |
| 9 | September | 12 |
| 10 | October | 11 |
| 11 | November | 9 |
| 12 | December | 8 |

Average UV index Yangon, Myanmar

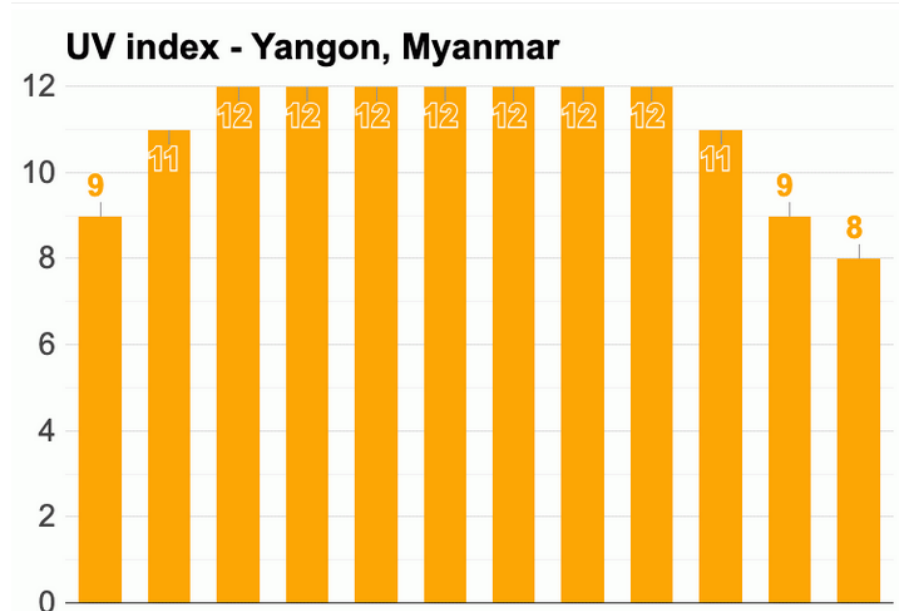


Figure 29. UV Index Graph of Yangon

4.9 Geology and Soil

As part of the ESIA study, specialist geological input is required in order to identify potential environmental impacts on the geological environment within the study area. The detail of Geology and Soil Test Report is shown in Appendix H. The following broad scope of work has been given:

- ❖ Carry out a desk study of available information pertaining to the geology and physical aspects of the study area;
- ❖ Prepare a brief report which describes the location, physical characteristics and geology of the study area and identifies potential environmental impacts on the geological environment that are likely to be associated with the proposed activity.

4.9.1 Limitations

Information provided in the specialist report has been based on information provided by the developer, published scientific literature and maps. The study area was visited to investigate geology, soil types and physical aspects of the study area. There is no detailed geotechnical investigation (trial pits, soil testing) or verification of the existing geological mapping was conducted. This report is generally discussed the potential environmental impacts on geological environment in study area. The information provided in this report is deemed adequate for this ESIA Report.

Geological features, such as caves, addits, middens, worship rocks, etc. which are important from heritage standpoint are not covered in this report. Besides, geohydrological assessments also do not form part of this study. No prominent geological feature (geosites), such as fossil sites, prominent rock outcrops or features are present according to the previous literatures and there are no other known geo-sites within the study area.

4.9.2 Topography and Climate

The topography of study area is quite flat, with no major differences in altitude. The climate of the Yangon and its surrounding area (including proposed area) is temperature with hot summer days and cool winter days. The average temperature is between 25.05°C to 30.65°C. Annual rainfall is approximately between 0.2 inches to 23.7 inches.

4.9.3 Geology and Soil Type

There are two main physiographic types, namely the elevated tract and plain. Plain area mostly consists of homogeneous recent alluvium (mud and marsh). Alluvium is largely made up of a kind of mud which is homogeneous and somewhat sandy and of uniform grey colour. The regional geology of project and surrounded area consists of Pliocene Irrawaddy Formation mainly composed of loose sandstone and intercalated with numerous layers of clay and Oligocene to Miocene of Pegu Group composed of alternating beds of sandstone and shales. The alluvium consists essentially of yellowish grey, bluish grey, brownish grey, sands and clay. The project area lies in recent Alluvium according to the Geological Map of Thanlyin – Kyauktan Area.

There are two major geological features around the study area such as the Sagain Fault and Thanlyin Fault, mapped on the 1:1,000,000 scale on the tectonic map of Myanmar and its surrounding region in the research area. Besides, there are uncertain faults around the project area according to the geological map of the Thanlyin – Kyauktan Area. The anticipated seismic intensity of the proposed area is located in a strong zone of the deterministic seismic hazard map of Myanmar. The equivalent modified Mercalli Scale Classes are VIII. The probable range of ground acceleration is 0.2 to 0.3g.

4.9.4 Geological Assessment

The proposed activity may have certain impacts on the geological environment, and this needs to be assessed as an integral part of the broader EMP study. The geological environment includes the parent rock and the soil overburden. Important or prominent geological features (geosites) that contribute to the aesthetic scenery of geological interest in the area, such as fossil sites, prominent rock outcrops or features must also be considered in the impact study.

Geological features, such as caves, addits, middens, worship rocks, etc. which are important from a heritage standpoint are not covered in this report as they are covered in the Heritage Impact Assessment. Besides, geohydrological assessments also do not form part of this study.

4.9.4.1 Geosites

There are no fossil assemblages according to the previous literatures and there are no other known geo-sites within the study area.

4.9.4.2 Rock degradation

There would not be potential impact on rock degradation during construction activity because the study area lies on an alluvium unit and no outcrop are observed.

4.9.4.3 Soil degradation

Soil degradation is the removal, alteration or damage to soil and soil-forming processes which can be due to natural processes, such as erosion, or human influence during construction activity. The preservation of the natural soil is important to maintain environmental status.

Potential negative impacts relating to soil degradation are anticipated for the proposed activity. Such impacts include excavation, displacement or importation of soil, stockpiling, mixing, wetting, compaction and pollution of soil, soil erosion and sedimentation.

Soil erosion is the process of the lowering of the natural ground level by wind or water and may occur as a result of, inter alia, chemical process and/or physical transport on the land surface. Soil erodibility potential is the erosion when soils are exposed to water (and/or wind) during or as a result of land-disturbing activities. Erosion potential is determined by the erodibility of the soil (type and structure), vegetative cover, topography, climate (rainfall and wind), and the nature of land-clearing. Generally, soils with faster infiltration rates, higher levels of organic matter and improved soil structure have a greater resistance to erosion. Sand, sandy loam and loam textured soils tend to be less erodible than silt, very fine sand, and certain clay textured soils. Besides, erodibility potential is generally increased where low-plasticity, fine-grained, unconsolidated soils occur, such as Quaternary and Recent sediments. Water erosion potential is generally higher in areas of high relief and at the base of steep slopes where hydraulic energy is higher. No severe water erosion features are occurred in the project area.

4.9.5 Conclusion

The geological scoping study has discussed geological features such as soil types, geologic structure and geosites. Besides, the potential negative impacts on geologic environment of proposed area has identified that degradation of the natural soil is the main geological impact associated with the proposed activity. The possible mitigation of impacts has discussed for Environmental Management and Planning. According to an overview of the discussed geological characteristics of the site, the main potential negative impacts that have been identified are considered to be low impacts to geologic environments if the possible mitigation of impacts will be carried out successfully.

4.9.6 Soil Quality

Soil sample was collected within the Project Compound to record the current condition of soil. The location of soil sampling point was Latitude 16°37'31.36" N and

Longitude 96°16'10.60" E. The sample was analyzed for their physiochemical properties in Soil Laboratory, Land Use Department of Ministry of Agriculture and Irrigation. Typical issues relating to soil pH could be seen in the table below.

Potential negative impacts by the project relating to soil degradation may have occurred in the early project construction works. Such impacts include excavation, displacement or importation of soil, stockpiling, mixing, wetting, compaction and pollution of soil, soil erosion and sedimentation. But the anticipated impacts on soil may have been occurred only to a limited area within the project compound.



Figure 30. Soil Sampling Photo

According to test results, pH value of SS which was collected from the Proposed Project is 7.53 which falls under classification of slightly alkaline conditions. Under this condition, following phenomena would occur:

- Above a pH of 7.0 there is an increase in the availability of Iron, Manganese, Zinc, Cobalt, and Copper
- Increased risk of ammonia volatilization
- First increasing availability of Phosphorus and Boron, but deficiencies may occur at higher pH values
- Insoluble Calcium-Phosphates may be formed at higher pH
- Electric conductivity is generally high at higher pH values

Table 27. Results of Soil Quality Analysis

| Sample | Moist- ure % | pH Soil: Water 1:2:5 | Texture | | | | Organic Carbon | Humus % | Total N | Exchangeable cations | | | Available Nutrients | |
|--------|--------------------|-------------------------------|-----------|-----------|-----------|------------|-------------------|------------|------------|-------------------------|----|---|------------------------|------------------|
| | | | Sand % | Silt % | Clay % | Total % | | | | Ca | Mg | K | P | K ₂ O |
| | | | | | | | | | | | | | | |

Table 28. Interpretation of Soil Quality Results

| Sample | pH Soil: Water | Texture | Organic Carbon | Total N | Exchangeable cations | | | Available Nutrients | |
|--------|----------------------|---------|-------------------|---------|----------------------|-----|------|---------------------|------------------|
| | | | | | Ca | Mg | K | P | K ₂ O |
| SS | Slightly Alkaline | Clay | Very Low | Medium | Medium | Low | High | Medium | High |

Table 29. Soil pH and Associated Impacts

| pH value | Soil classification | Impact interpretation |
|-----------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ≤ 5.5 | Strongly acidic | <ul style="list-style-type: none"> • Possible Aluminum toxicity and excess availability of Cobalt, Cupper, Iron, Manganese, and Zinc • Deficient in Calcium, Potassium, Nitrogen, Magnesium, Phosphorous, and Sulphur • Boron deficiency below pH of 5 • Molybdenum becomes more available with decreasing pH • Bacterial and actinomycete activity is reduced along with a predominance of fungi • Mineralization of organic matter and nitrification are restricted • Below a pH of 3, functioning of cell membranes is impaired, resulting in leakage of elements |
| 5.5 - 7.3 | Moderately acidic, slightly acidic, and neutral soils | <ul style="list-style-type: none"> • Preferred pH range for most crops, lower end of range may be too acidic for some • pH between the range of 6.0 and 7.0 hampers phosphorous fixation • Neutral pH favors the fixation of molecular Nitrogen by free living soil microorganisms and by symbiotic microorganisms • Above a pH value of 7.0 the availability of Iron, Manganese, Zinc, Cobalt, and Cupper declines |
| 7.3 - 8.5 | Slightly alkaline and Moderately alkaline soils | <ul style="list-style-type: none"> • Above a pH of 7.0 there is an increase in the availability of Iron, Manganese, Zinc, Cobalt, and Copper • Increased risk of ammonia volatilization • First increasing availability of Phosphorus and Boron, but deficiencies may occur at higher pH values • Insoluble Calcium-Phosphates may be formed at higher pH • Electric conductivity is generally high at higher pH values |

| | | |
|-------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ≥ 8.5 | Strongly to very strongly alkaline | <ul style="list-style-type: none"> • Calcium and magnesium are liable to become unavailable to most crops • Often high sodium levels lead to toxicity and structural damage • Toxicity of bicarbonates and other anions • Possible Boron toxicity common in saline and or sodic soils • Availability of most micronutrients and of Iron, Manganese, Zinc, Copper, and Cobalt is reduced, except for Molybdenum • Decreased |
|-------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Figure 31. Location of Soil Sampling Point

4.10 Biodiversity

The proposed area situated at the one side of Yangon River that occupied 40 acres approximately. Impacts on Biodiversity had been surveyed two portions the first one is flora surveyed including microscopic aquatic planktons and the second is fauna surveyed conducted and designated the 5 km radius of the project site as indirect impact

area including mangroves and mangrove related species. Impacts on biodiversity would be safe or reduced by the proposed mitigation measures.

4.10.1 Introduction

The directed impact area of the construction site is at the bank of Yangon River for jetty construction and construction of warehouses for agricultural products. For trading export and import agricultural products by shipping a jetty would be constructed and those will conduct the project sites, i.e, building for preparing, processing, arranging and storage.

Losing habitats and microhabitat will impact negatively to biodiversity of direct and indirect impact areas. Apart from adverse effects of project sites, construction and anthropogenic factors may also interfere the habitats and the rich of biodiversity in the indirect impact area. The trading ships those producing noise pollution may also be serious for the seasonal breeding and feeding habit of fish, reproductive behavior and performances of all the animals roosted in the project area.

4.10.2 Purposes of the Project

- To assess the ecosystem that affects the flora and fauna those inhabited in the direct project site and indirect area of the project
- To study and record the flora and fauna of the project sites
- To identify the flora and fauna of the project sites
- To collect and identify the microscopic plankton of the epipelagic zone of water body near the project sites
- To identify the potential impacts, recommend the mitigation measures and management plan

4.10.3 Materials and Methods

4.10.3.1 *Methods for flora Survey*

Diversity of project species (flora) has been recorded by the following methods in the study area.

Random plotting to cover the direct impact and indirect impact area has been designated and navigated by the Global Positioning System (GPS). Different size of squares (quadrate) such as 1x1m² for herbs, 4x4m² for shrubs and 50x50m² transecting

for small trees and trees were conducted and applied for data collection of flora including mangrove species.

Materials used in flora survey were string for quadrat and transecting, camera for taking photographs, GPS and different size of plastic boxes and field note books.

Collected data was arranged and entry has been carried in excel work (2010) for assessment of floral diversity after field survey.



Figure 32. Biodiversity Surveying Area

4.10.3.2 Result and findings for flora

Recorded species of flora have been mentioned with their families and respective habitat type in Table 9.





Figure 33. Overview Projection of Indirect and Direct Impact Zone

Table 30. Checklist of the Projects in the Study Area

| No. | Scientific Name | Common Name | Family Name | Habitat |
|-----|---------------------------------------------|----------------------|---------------|---------|
| 1. | <i>Acanthus ilicifolius</i> L. | Kha-yar | Acanthaceae | S |
| 2. | <i>Ageratum canyzoides</i> L. | Khwe-thay-pan | Asteraceae | H |
| 3. | <i>Alocasia macrorrhizos</i> (L) G.Don | Pein | Araceae | H |
| 4. | <i>Alternanthera sessilis</i> (L.) R.Br. | Pa-zun-sar-yaing | Amaranthaceae | H |
| 5. | <i>Avicennia marina</i> ((Forsk) Vierh | Tha-me-ywet- leit | Avicenniaceae | T |

| | | | | |
|-----|--------------------------------------------|--------------------|----------------|---------|
| 6. | <i>Avicennia officinalis</i> L. | Tha-me-ywet-wine | Avicenniaceae | T |
| 7. | <i>Azadirachla indica</i> A.Juss. | Ta-ma | Meliaceae | ST |
| 8. | <i>Caladium humboldtion</i> | Pein-kyar | Aracaeae | H |
| 9. | <i>Chrysopogon acicularis</i> (Retz.) Trin | Nauk-poe-myet | Poaceae | Graes. |
| 10. | <i>Coccinia grandis</i> (L.) J.Voigh. | Kin-pon | Cucurbitaceae | CL |
| 11. | <i>Cocos nucifera</i> L. | Ohn | Arecaceae | T |
| 12. | <i>Colocasia antiquorum</i> Schott. | Pein | Araceae | H |
| 13. | <i>Commelina nudiflora</i> L. | Myet-kyut | Commelinaceae | H |
| 14. | <i>Costus speciosus</i> Sm. | Pha-lan-taung-hmwe | Costaceae | H |
| 15. | <i>Eclipta alba</i> (L.) Hassk | Kyeik-hamn | Asteraceae | H |
| 16. | <i>Eichhornia crassipes</i> (Mart.) Solms | Be-da | Pontederiaceae | Aquatic |
| 17. | <i>Eleusine indica</i> Gaertn. | Sin-ngo-myet | Poaceae | Grass |
| 18. | <i>Erythrina</i> sp. | Ka-thit | Fabaceae | ST |
| 19. | <i>Excoecaria agallocha</i> L. | Tha-yaw | Euphorbiaceae | ST |
| 20. | <i>Ficus hispida</i> L. | Kha-aung | Moraceae | ST |
| 21. | <i>Hibiscus similis</i> Blum. | Tha-man | Malvaceae | ST |
| 22. | <i>Hygrophila phlomoides</i> Nees | Mi-chaung-kun-phet | Acanthaceae | S |
| 23. | <i>Hibiscus similis</i> Blum. | Tha-man | Malvaceae | ST |
| 24. | <i>Hygrophila phlomoides</i> Nees. | Mi-chaung-kun-phet | Acanthaceae | S |
| 25. | <i>Ipomoea batatas</i> Lam. | Ka-zun-gyi | Convolvulaceae | CL |
| 26. | <i>Ipomoea fistulosa</i> Mart.ex Choisy | La-tha-ka-zun | Convolvulaceae | CL |
| 27. | <i>Ipomoea sagittata</i> Poir. | Kon-ka-zun | Convolvulaceae | H |
| 28. | <i>Jasminum</i> sp. | Sa-be | Oleaceae | S |
| 29. | <i>Leucaena Leucocephala</i> (Lam.) De.Wit | Baw-za-gaing | Mimosaceae | ST |
| 30. | <i>Mangifera indica</i> L. | Tha-yet | Anacardiaceae | T |

| | | | | |
|-----|-----------------------------------------------|------------------------|----------------|---------|
| 31. | <i>Mimosa pudica</i> L. | Hti-ka-yon | Mimosaceae | H |
| 32. | <i>Momordica charantia</i> L. | Kyet-hin-kha | Cucurbitaceae | CL |
| 33. | <i>Moringa pterygosperma</i> Gaertn. | Dan-tha-lun | Moringaceae | ST |
| 34. | <i>Musa malaccensis</i> Ridl. | Phi-gyan-nget- pyaw | Musaceae | H |
| 35. | <i>Musa sapientum</i> L. | Yakhaing-nget- pyaw | Musaceae | H |
| 36. | <i>Nymphaea pubescens</i> Byrn. f. | Kyar-phyu | Nymphaeaceae | Aquatic |
| 37. | <i>Nymphaea pubescens</i> Willd. | Kyar-ni | Nymphaeaceae | Aquatic |
| 38. | <i>Oroxylum indicum</i> (L.) Kurz. | Kyaung-sha | Bignoniaceae | ST |
| 39. | <i>Pithecellobium dulce</i> (Roxb.) Benth. | Kala-ma-gyi | Mimosaceae | ST |
| 40. | <i>Pulchea indica</i> (L.) Less. | Kha-ru | Asteraceae | S |
| 41. | <i>Psidium guajava</i> L. | Ma-la-kar | Myrtaceae | ST |
| 42. | <i>Samanea saman</i> (Jacq.) Merr. | Ko-kko | Mimosaceae | T |
| 43. | <i>Senna siamea</i> (Lam.) Irwin & Barneby | Me-za-li | Caesalpinaceae | T |
| 44. | <i>Sesbania paludosa</i> Roxb. | Nyan | Fabaceae | S |
| 45. | <i>Sonneratia caseolaris</i> (L.) Engl. | La-mu | Sonneratiaceae | T |
| 46. | <i>Syzygium grande</i> (Wight) Walp | Tha-bye | Myrtaceae | ST |
| 47. | <i>Portia catappa</i> L. | Ban-da | Combretaceae | T |
| 48. | <i>Wattakaka volubilis</i> (L.f.) Stapf. | Gwe-dauk | Asclepiadaceae | CL |
| 49. | <i>Rhizophora apiculata</i> | Not Known | Rhizophora | T |
| 50. | <i>Rhizophora mucronata</i> | Not known | Rhizophora | T |
| 51. | <i>Bruguiera cylindrical</i> | Not Known | Rhizophora | T |
| 52. | <i>Acacia auriculiformis</i> | Ma-Lay-Sha padaduk | Mimosaceae | T |
| 53. | <i>Tamarindus indica</i> L. | Ma-gyi | Caesalpinaceae | T |

*T=Tree, *ST=Small Tree, *H= Herbs, *S= Shrub, *Cl= Climber



(A). *Sonneratia caseolaris*



(B). *Avicennia marina*



(C). *Rhizophora apiculata*



(D). *Avicennia alba*



(E). *Bruguiera cylindrical*



(F). *Rhizophora mucronata*

Plate I (A). Recorded mangrove species from indirect project area

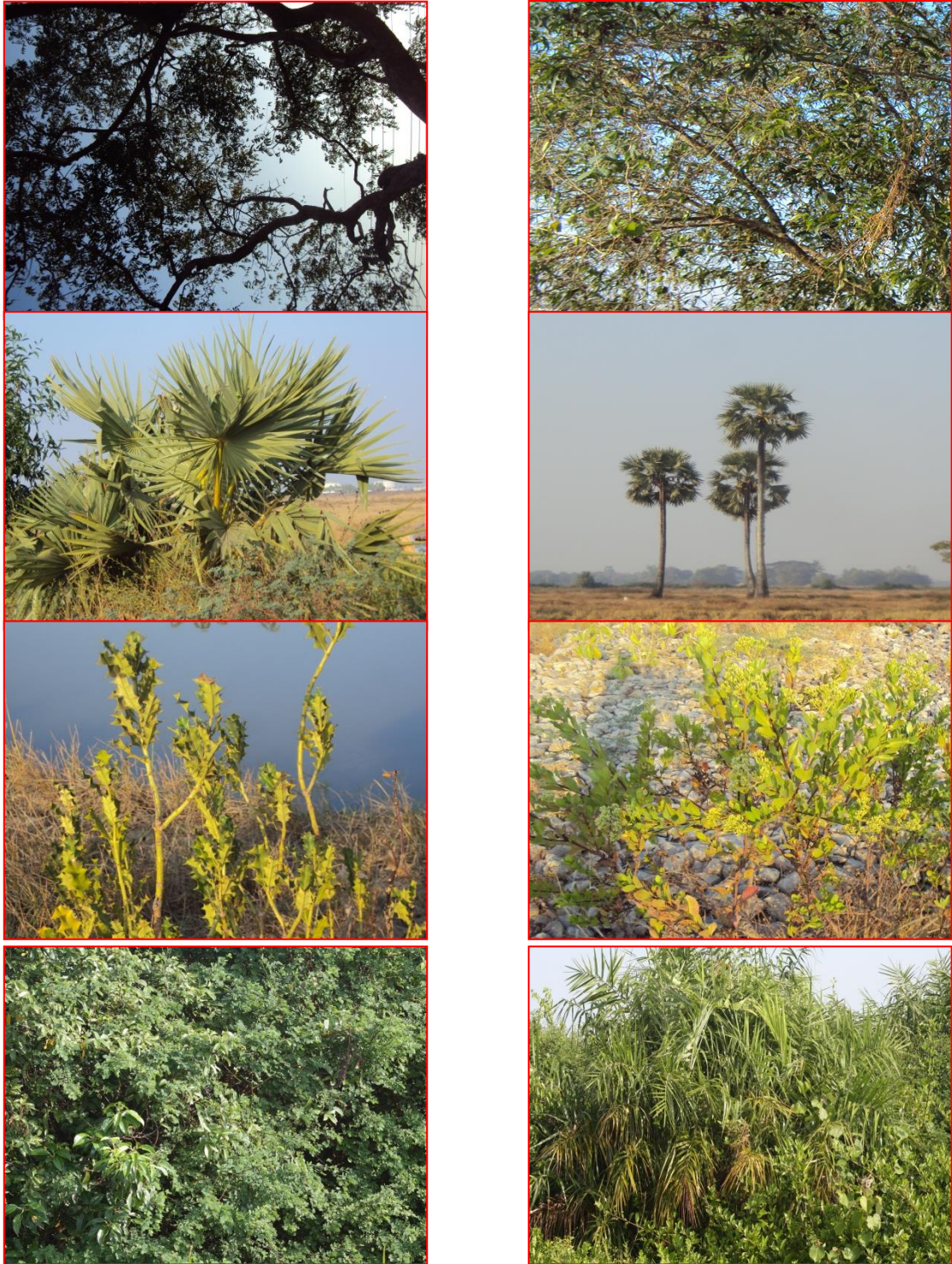


Plate I (B). Recorded species of mangrove associate species and tree species from indirect project area

4.10.3.3 Materials and Methods of Plankton Survey

Sampling method to collect water containing planktons have been carried out to guarantee a representative diversity of microscopic planktons such as phytoplanktons and zooplanktons of integrated samples from the different collection sites in front of jetty. It has been taken from the 0.5 m below the surface water that is the epipelagic zone of main currents of Yangon River. Samples obtaining from filtration method were fixed and preserved with acetone for identifying with microscopic assessment.

4.10.3.4 Results and Findings for Planktons

Total of four species of phytoplanktons; *Binuclearia spp*, *Hormidium spp*, *Sirogunium spp* and *Gloeocystis gigas* while other four species of zooplankton; *Lecane depressa*, *Trichocerca longiseta*, *Notholca Spp* and *Brachionus forficula* are described in plate II (A) and (B).



(A). *Binuclearia spp*.



(B). *Hormidium spp*.



(C). *Sirogunium spp*.



(D). *Gloeocystis gigas*

Plate II(A). Recorded species of Phytoplanktons from water body nearby the project, Yangon River



(A). *Lecane depressa*



(B). *Trichocerca longiseta*



(C). *Notholca Spp*



(D). *Brachionus Forficula*

Plate II(B). Recorded species of zooplanktons from water body nearby the project, Yangon River

4.10.3.5 Materials and Methods of Fauna Survey

Field studies of the direct impact area and indirect impact area were designated to record vertebrate species, i.e, fishes, amphibians, reptiles, birds and mammals. Some information and data were based on survey with the help of local people and fishermen. The larger fishes and herperto fauna such as frogs and toads were recorded their morphometric and morphological characters and identified urgently with the aids of field guide. Based on interviews, some species those were difficult to catch had been also recorded as information within study period. Specimen collection dealt with insects, butterflies, dragonflies and damselflies were caught, identified and some had been carried as voucher specimens to identify later. Direct count method was applied to record and identify the different bird species with the aid of binoculars. Collected

voucher specimens had been identified and those of the field were arranged and categorized in respective taxon with references.

4.10.3.6 Results and Findings of Fauna

Total of (49) species regarding to insects, (butterfly, dragonfly and damselfly), shrimps and prawns (4) species, fishes (25) species, amphibians (8) species, reptiles (6) and bird (35) species were recorded and identified in this assessment report of biodiversity. Up to IUCN red list and CITES, most of the species are least concern (LC) as conservation status but two species of birds *Milvus milvus* (Red kite) and *Mycteria leucocephala* (Painted stork) were nearly threatened (NT) to be extinct in the project areas.

| | Order | Family | Species | % |
|-----------------------|-------|--------|---------|-------------|
| Butterfly | 1 | 8 | 30 | 23.62204724 |
| Dragonfly & Damselfly | 1 | 2 | 19 | 14.96062992 |
| Fish and crustacean | 9 | 17 | 29 | 22.83464567 |
| Frog & Toad | | 4 | 8 | 6.299212598 |
| Lizard & Skink | | 4 | 4 | 3.149606299 |
| Snake | | 1 | 2 | 1.57480315 |
| Bird | 10 | 24 | 35 | 27.55905512 |
| Total | 21 | 60 | 127 | 100 |

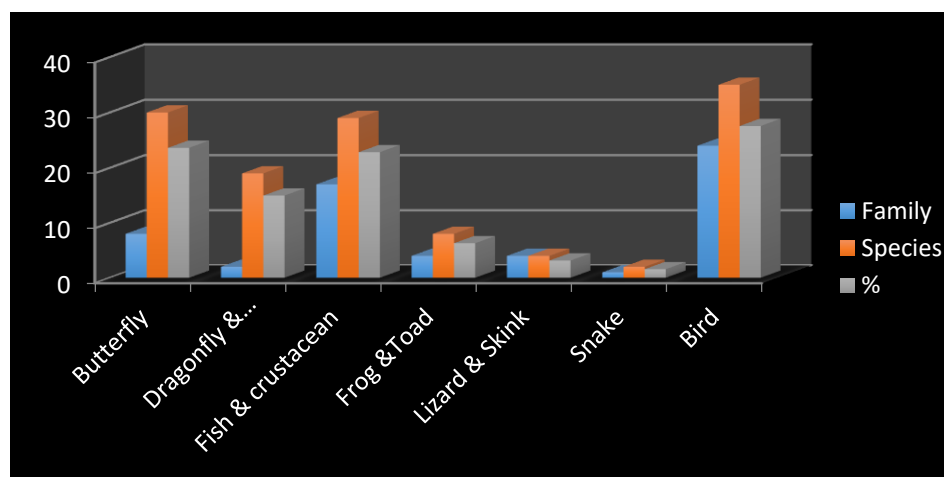


Figure 34. Species Composition of Different Taxa with Respective Family

(a) Insect fauna

A total of (49) species of insects including butterflies, dragonflies, damselflies represented with (10) families under the order Lepidoptera and Odonata were collected and identified (Table 10 and 11). Although no endemic or endangered species were recorded the collected species and population size was small.

Table 31. Butterfly Species of Order Lepidoptera from Thilawar Project Area

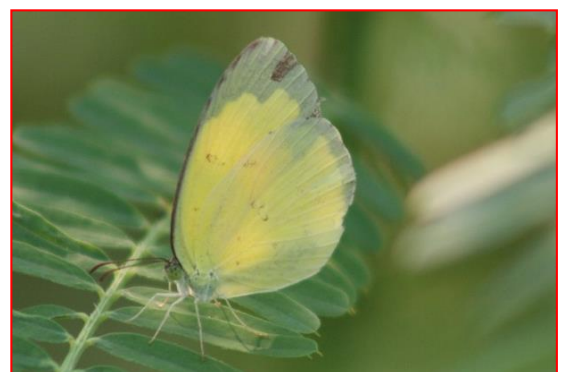
| Family | Scientific Name | Observed Numbers | | | |
|--------------|---------------------------------------|------------------|--------|---------|-------|
| | | Day I | Day II | Day III | Total |
| Papilionidae | <i>Papilio polytes romulus</i> | 5 | 6 | 4 | 15 |
| | <i>Papilio memnon agenor</i> | 3 | 3 | 2 | 8 |
| | <i>Papilio demoleus demoleus</i> | 7 | 5 | 3 | 15 |
| | <i>Graphium sarpedon sarpedon</i> | 2 | 4 | 7 | 13 |
| | <i>Graphium eurypylus cheronus</i> | 8 | 2 | 4 | 14 |
| Pieridae | <i>Catopsilia scylla scylla</i> | 10 | 6 | 4 | 20 |
| | <i>Catopsilia crocale crocale</i> | 4 | 7 | 3 | 14 |
| | <i>Catopsilia pomona</i> | 4 | 5 | 2 | 11 |
| | <i>Catopsilia pyranthe pyranthe</i> | 3 | 2 | 2 | 7 |
| | <i>Eurema blanda</i> | 3 | 2 | 1 | 6 |
| | <i>Ixias pyrene</i> | 2 | 6 | 7 | 15 |
| | <i>Appias lycnida</i> | 1 | 1 | 2 | 4 |
| | <i>Hebomoia glaucippe glaucippe</i> | 1 | 2 | 1 | 4 |
| Danaiidae | <i>Danaus plexippus</i> | 6 | 7 | 3 | 16 |
| | <i>Danaus limniace leopardus</i> | 4 | 2 | 1 | 7 |
| | <i>Danaus chrysippus</i> | 7 | 4 | 2 | 13 |
| | <i>Euploea core</i> | 3 | 3 | 4 | 10 |
| Satyridae | <i>Elymnias hyermnestra undularis</i> | 4 | 2 | 2 | 8 |
| | <i>Ypthima ceylonica ceylonica</i> | 6 | 6 | 4 | 16 |
| | <i>Mycalesis visala visala</i> | 3 | 3 | 2 | 8 |
| | <i>Mycalesis perseoides</i> | 2 | 1 | 1 | 4 |
| Amathusiidae | <i>Discophora sondaica</i> | 1 | 1 | 3 | 5 |

| | | | | | |
|-------------|--------------------------|---|---|---|----|
| Nymphalidae | <i>Junonia atlites</i> | 8 | 4 | 6 | 18 |
| | <i>Junonia almana</i> | 5 | 4 | 4 | 13 |
| | <i>Neptis soma</i> | 2 | 2 | 1 | 5 |
| | <i>Hypolimnas bolina</i> | 2 | 1 | 4 | 7 |
| Riodanidae | <i>Abisara echerius</i> | 2 | 3 | 2 | 7 |
| Hesperiidae | <i>Gangara thyrsis</i> | 1 | 4 | 2 | 7 |
| | <i>Caltoris cormasa</i> | 4 | 3 | 1 | 8 |
| | <i>Erionota thrax</i> | 1 | 1 | 2 | 4 |

Table 32. Damselfly and Dragonfly Species of Order Odonata

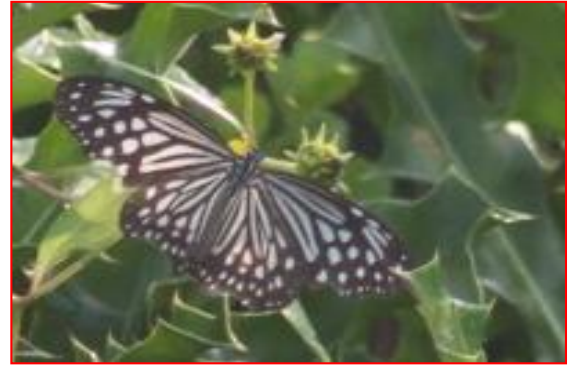
| Order | Suborder/ Family | Scientific Name | Total length (mm) | Wingspan (mm) | | Observed Numbers | |
|---------|------------------------------------|------------------------------------------|-------------------------|------------------|--------------|---------------------|-----------|
| | | | | Fore wing | Hind wing | Day I | Day II |
| Odonata | I. Zygoptera / Coenagriidae | 1. <i>Ceriagrion auranticum</i> | 36-37 | 18-21 | 17-20 | 4 | 3 |
| | | 2. <i>Ceriagrion coromandelianum</i> | 37-38 | 17-21 | 16-20 | 3 | 1 |
| | | 3. <i>Ischnura senegalensis</i> | 25-27 | 14-16 | 13-15 | 2 | 2 |
| | | 4. <i>Copera marginipes</i> | 26-28 | 14-15 | 12-13 | 1 | 3 |
| | II. Anisoptera | 1. <i>Ictinogomphaus rapax</i> | 55-57 | 40-42 | 39-41 | 7 | 9 |
| | | 2. <i>Acisoma panarpoides</i> | 20-22 | 16-21 | 15-20 | 11 | 8 |
| | | 3. <i>Aethriamanta brevipennis</i> | 23-25 | 23-26 | 22-25 | 4 | 6 |
| | | 4. <i>Brachythemis contaminata</i> | 28-32 | 22-25 | 20-23 | 4 | 7 |
| | | 5. <i>Bradinopyga germinate</i> | 38-40 | 33-36 | 32-35 | 3 | 2 |
| | | 6. <i>Crocothemis servilia</i> | 39-42 | 27-38 | 25-37 | 2 | 6 |
| | | 7. <i>Diplacodes trivialis</i> | 32-40 | 22-24 | 21-23 | 2 | 3 |
| | | 8. <i>Diplacodes nebulosa</i> | 35-41 | 17-19 | 16-19 | 1 | 3 |
| | | 9. <i>Libellula fulva</i> | | | | 1 | 1 |

| | | | | | | |
|------------------------------|-------------------------------------------------|-------|-------|-------|---|---|
| Libellulidae | 10. <i>Neurothemis tullia</i> | 29-37 | 20-23 | 19-22 | 4 | 3 |
| | 11. <i>Neurothemis fulvia</i> | 36-44 | 27-32 | 26-31 | 6 | 7 |
| | 12. <i>Orthetrum Sabina</i> | 46-48 | 31-36 | 29-35 | 2 | 1 |
| | 13. <i>Pantala flavescens</i> | 47-48 | 39-41 | 38-40 | 2 | 2 |
| | 14. <i>Potamarcha obscure</i> | 45-47 | 33-37 | 32-35 | 5 | 2 |
| | 15. <i>Rhyothemis phyllis</i> <i>phyllis</i> | 38-40 | 33-37 | 28-36 | 8 | 6 |
| | 16. <i>Phyothemis</i> <i>obsolescens</i> | 36-39 | 31-32 | 29-31 | 2 | 6 |
| | 17. <i>Sympetrum</i> <i>fonscolombi</i> | 40-43 | 30-33 | 29-32 | 2 | 2 |
| | 18. <i>Trithemis</i> <i>pallidinervis</i> | 45-48 | 30-36 | 29-32 | 4 | 5 |
| 19. <i>Tholymis tillarga</i> | 46-48 | 33-37 | 31-36 | 7 | 5 | |

(A). *Papilio polytes romulus*(B). *Graphium sarpedon sarpedon*(C). *Catopsilia Pomona*(D). *Catopsilia pyranthe pyranthe*



(E). *Appias lyncida*



(F). *Danaus limniace leopardus*

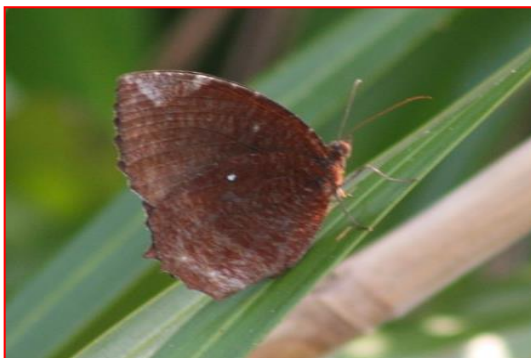
Plate III (A). Recorded species of butterflies from Thilawar project area



(F). *Danaus plexippus*



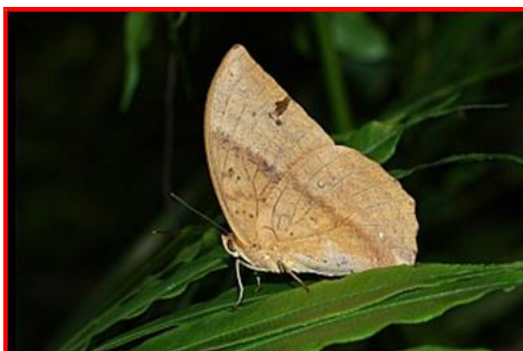
(G). *Myscalesis visala visala*



(H) *Euploea core*



(I). *Abisara echerius*



(J). *Discophora sondaica*



(K). *Hypolimnas bolina*



(L). *Gangara thyrasis*

PlateIII (B). Recorded species of butterflies from Thilawar project area



(A). *Ceriagrion auranticum*



(B). *Ceriagrion coromandelianum*



(C). *Ischnura senegalensis*



(D). *Copera marginipes*

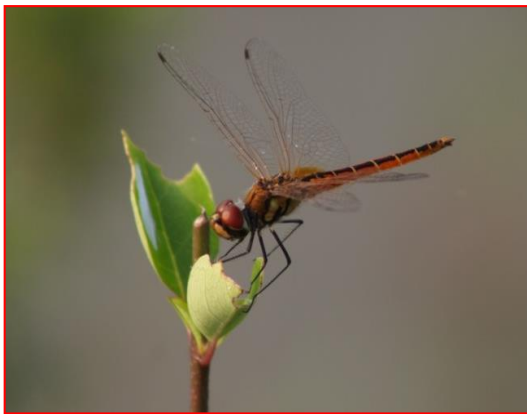
Plate III(C). Recorded species of damselfies from Thilawar project area



(A). *Ictinogomphus rapax*



(B). *Acisoma panarpoides*



(C). *Hemianar epiphiger*



(D). *Diplacodes trivialis*



(E). *Orthetrum sabina*



(F). *Neurothemis tullia*

Plate III(D). Recorded species of dragonflies from Thilawar Project area



(G). *Rhyothemis phyllis*



(H). *Crocothemis servilia*



(I). *Brachythemis contaminata*



(J). *Neurothemis fulvis*



(K). *Trithemis pallidinervis*



(L). *Tholymis trllarga*

Plate III(E). Recorded species of dragonfly from Thilawar project area

(b) Crustaceans (Palaemonidae)

A total of four species of freshwater prawns under the family Palaemonidae were recorded. A few species of Palaemonidae may occur due to the limited collection of project area and seasonal occurrence.



(A). *Macrobrachium rosenbergi*



(B). *Macrobrachium lamarrei*



(D). *Macrobrachium nipponense*



(E). *Macrobrachium malcolmsonii*

Plate IV (A). Recorded species of Palaemonidae from Thilawar project area

(c) Fishes

Local fishermen of this project helped for the collection of data. Total of (25) fish species included in (16) families under (8) order were recorded (Table 12). Average size (cm) and weight (g) of recorded species with their respective fishing gears and species composition (%) in different families were also mentioned (Table 13 and 14). Some larger species could be taken photo and identified in the field and other small species were collected as specimen voucher. Some species were recorded as interview surveys.

Table 33. Species Composition of Fish Species

| Sr. No | Order | Family | Scientifics name | Common name | Vernacular Name |
|--------|-------------------|------------------|--------------------------------|----------------------|--------------------|
| 1 | Osteoglossiformes | Notopteridae | <i>Notopterus notopterus</i> | Bronze feather back | Nga-phe |
| 2 | Cypriniformes | Cyprinidae | <i>Osteobrama belangeri</i> | Carplet | Nga-phe-oung |
| 3 | | | <i>Puntius sophore</i> | Soft fin swamp barb | Nga-khone-ma |
| 4 | | | <i>Amblypharyngo don mola</i> | Mola carplet | Nga-peh-phyu |
| 5 | | | <i>Esomus danricus</i> | Flying barb | Nga-mort-tort |
| 6 | | Cobitidae | <i>Lepidocephalus guntea</i> | Loach | Nga-thalei-htoe |
| 7 | Siluriformes | Bagridae | <i>Mystus cavasius</i> | Gangetic mystus | Nga-zin-yaing Kywe |
| 8 | | | <i>Mystus pulcher</i> | Pulcher mystus | Nga-zin-yaing |
| 9 | | Clariidae | <i>Clarias batrachus</i> | Magur | Nga-khu |
| 10 | | Heteropneustidae | <i>Heteropneustes fossilis</i> | Stinging catfish | Nga-gyee |
| 11 | | Pangasiidae | <i>Pangasius pangasius</i> | Pangas catfish | Nga-htan |
| 12 | Beloniformes | Belonidae | <i>Xenentodon cancila</i> | Fresh water gar fish | Nga-phaung-yoe |
| 13 | Perciformes | Ambassidae | <i>Parambassis ranga</i> | Indian glassy fish | Nga-sin-zat |
| 14 | | Cichlidae | <i>Oreochromis mossambica</i> | Tilapia | Tilapia |
| 15 | | Gobiidae | <i>Glossogobius giuris</i> | Tank goby | Ka-tha-poe |

| | | | | | | |
|----|--------------------|-----------------|--------------------------------|------------------------------|-----------------------|-----------------------|
| 16 | | Anabantidae | <i>Anabas testudineus</i> | Climbing perch | Nga-byay-ma | |
| 17 | | Belontiidae | <i>Colisa labiosus</i> | Thick-liooed gorami | Nga-phinthalet | |
| 18 | | | <i>Trichogaster pectoralis</i> | Gorami | Japan-nga | |
| 19 | Channiformes | Channidae | <i>Channa gachua</i> | Brown snake head | Nga-yant-gaung-to | |
| 20 | | | | <i>Channa striatus</i> | Striped snake head | Nga-yant |
| 21 | | | | <i>Channa punctatus</i> | Spotted snake head | Nga-pa-naw |
| 22 | Clupeiformes | Clupeidae | <i>Hilsa ilisha</i> | Hilsa herring | Nga-thalot | |
| 23 | Mastacembeliformes | Mastacembelidae | <i>Macrognathus siamensis</i> | One-striped spiny eel | Nga-mway-htoe | |
| 24 | | | | <i>Macrognathus zebrinus</i> | Burmese sping eel | Nga-mway-htoe-kyansit |
| 25 | | | | <i>Mastacembelus dayi</i> | The black spotted eel | Nga-mway-htoe-pyauk |

Table 34. Size of Fish Species Caught by Different Fishing Gears

| Sr. No | Catch Species | Set gillnet | | Long line | | Fish Trap | |
|--------|------------------------------|-------------|--------|-----------|--------|-----------|--------|
| | | TL (cm) | BW (g) | TL (cm) | BW (g) | TL (cm) | BW (g) |
| 1. | <i>Notopterus notopterus</i> | 12.8 | 11.3 | 11.6 | 23.1 | | |
| 2. | <i>Osteobrama belangeri</i> | 18.6 | 120.1 | | | | |
| 3. | <i>Puntius sophore</i> | 10.0 | 7.2 | 6.0 | 3.6 | 6.1 | 5.2 |
| 4. | <i>Amblypharyngodon mola</i> | 7.8 | 7.7 | | | 6.5 | 4.5 |
| 5. | <i>Esomus danricus</i> | 9.0 | 9.4 | | | 8.7 | 14.7 |
| 6. | <i>Lepidocephalus guntea</i> | 7.1 | 7.5 | | | | |
| 7. | <i>Mystus cavasius</i> | 10.5 | 9.3 | | | 9.5 | 7.7 |
| 8. | <i>Mystus pulcher</i> | 10.0 | 9.0 | | | 8.2 | 6.8 |

| | | | | | | | |
|-----|--------------------------------|------|-------|------|------|------|------|
| 9. | <i>Clarias batrachus</i> | 20.6 | 90.6 | | | 16.0 | 67.5 |
| 10. | <i>Heteropneustes fossilis</i> | 19.4 | 51.2 | | | | |
| 11. | <i>Pangasius pngasius</i> | 78 | 1450 | | | | |
| 12. | <i>Xenentodon cancila</i> | 20.8 | 16.7 | | | | |
| 13. | <i>Parambasis ranga</i> | 11.5 | 8.3 | | | | |
| 14. | <i>Oreochromis mossambica</i> | 18.7 | 161.8 | | | | |
| 15. | <i>Glossogobius giuris</i> | 10.3 | 13.4 | 8.7 | 9.1 | 9.0 | 9.2 |
| 16. | <i>Anabas testudineus</i> | 13.2 | 60.0 | | | 11.8 | 23.8 |
| 17. | <i>Colisa labiosus</i> | 7.9 | 4.6 | | | 6.4 | 4.9 |
| 18. | <i>Trichogaster pectoralis</i> | 12.9 | 57.6 | | | 12.4 | 58.2 |
| 19. | <i>Channa gachua</i> | | | 12.7 | 40.7 | | |
| 20. | <i>Channa punctatus</i> | | | 18.2 | 75.8 | 13.5 | 52.0 |
| 21. | <i>Channa striatus</i> | 21.5 | 104.8 | 18.4 | 74.9 | | |
| 22. | <i>Hilsa ilisha</i> | 35 | 1.5kg | | | | |
| 23. | <i>Macrognathus siamensis</i> | 11.6 | 19.3 | | | 12.8 | 20.0 |
| 24. | <i>Macrognathus zebrinus</i> | 13.5 | 21.3 | | | 12.0 | 18.7 |
| 25. | <i>Mastacembelus dayi</i> | 14.1 | 22.6 | | | 13.4 | 20.4 |

Table 35. Species Composition in Different Families of Fish

| Order | Family | No. of species | % |
|-------------------|------------------|----------------|----|
| Osteoglossiformes | Notopteridae | 1 | 4 |
| Cypriniformes | Cyprinidae | 4 | 16 |
| Siluriformes | Cobitidae | 1 | 4 |
| | Bagridae | 2 | 8 |
| | Clariidae | 1 | 4 |
| | Heteropneustidae | 1 | 4 |
| | Pangasiidae | 1 | 4 |
| Beloniformes | Belonidae | 1 | 4 |
| Perciformes | Ambassidae | 1 | 4 |
| | Cichlidae | 1 | 4 |
| | Gobiidae | 1 | 4 |

| | | | |
|--------------------|-----------------|----|-----|
| | Anabantidae | 1 | 4 |
| | Belontiidae | 2 | 8 |
| Channiformes | Channidae | 3 | 12 |
| Clupeiformes | Clupeidae | 1 | 4 |
| Mastacembeliformes | Mastacembelidae | 3 | 12 |
| Total | | 25 | 100 |

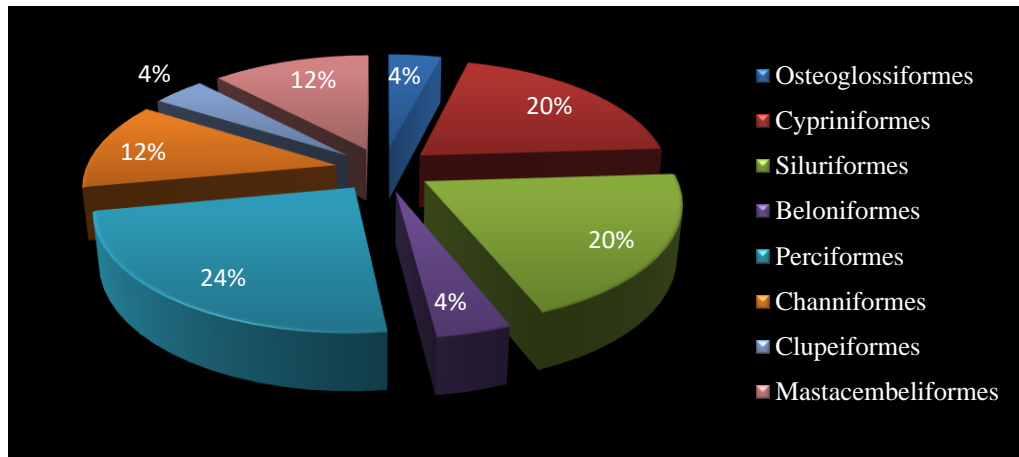


Figure 35. Species Composition Percent in Different Families of Fish



Notopterus notopterus



(B) *Osteobrama belangeri*



(C) *Puntius sophore*



(D) *Aplypharyngodon mola*



(E) *Esomus danricus*



(F) *Lepidocephalus guntea*



(G) *Mystus cavasius*



(H) *Mystus pulcher*

Plate V (A). Recorded fish species from study area



(I) *Clarias batrachus*



(J) *Heteropneustes fossilis*



(K) *Xenentodon cancila*



(L) *Pangasius pangasius*



(M) *Tenulosa ilisua*



(N) *Parambassis ranga*



(O) *Oreochromis mossambica*



(P) *Glossogobius guris*



(Q) *Anabas testudineus*

Plate V (B). Recorded fish species from study area



(R) *Colisa labiosus*

(S) *Trichogaster pectoralis*(T) *Channa gachua*(U) *Channa punctatus*(V) *Channa striatus*(W) *Macroganathus siamensis*(X) *Macroganathus zebrinus*(Y) *Mastacembelus dayi*

Plate V (C). Recorded fish species from study area

(d) Herpto fauna

A total of (8) species of amphibians under (4) families and (6) species of reptiles under (4) families were recorded and reported in Table (15). Because of seasonal occurrence within the study period, the species and population number are few in project sites. Up to conservation status of IUCN and CITES, all of these species are not serious for extinction.

Table 36. Systematic Position of Herpetofauna

| Family | Scientific Name | Common Name | Vernacular Name | Habitat |
|----------------|-----------------------------------|----------------------------|------------------------|---------------|
| Bufonidae | <i>Duttaphrynus melanostictus</i> | Asian common toad | Phar-pyok | Near pond |
| | <i>Ingerophrynus macrotis</i> | Large ear toad | Hpar pyok thay | ground |
| Microhylidae | <i>Kaloula pulchra</i> | Banded bull frog | Phar-kyaung | ground |
| | <i>Microhyla ornata</i> | Ornate narrow mouthed frog | The'phar | Near pond |
| Dicroglossidae | <i>Fejervarya limnocharis</i> | Paddy frog | Sar-phar | paddy field |
| | <i>Hoplobatrachus tigerina</i> | Indian bullfrog | Kaing phar | Mud |
| | <i>Ocidozyga lima</i> | Green puddle frog | Phar -han-lat | Marshes |
| Rhacophoridae | <i>Polypedates leucomystax</i> | Common tree frog | Phar-pyan | tree |
| Gekkonidae | <i>Hemidactylus frenatus</i> | Common house gecko | Eing-myaung | bushes |
| Agamidae | <i>Calotes versicolor</i> | Garden fence lizard | Taut-tat | trunk |
| | <i>Calotes mystaceus</i> | Blue crested lizard | Poat thin nyo | trunk |
| Scincidae | <i>Mabuya multifasciata</i> | Common sun skink | Kyal-pyar-kinlate-shaw | Storage house |
| Colubridae | <i>Xenochrophis piscator</i> | Chequered keel back | Yal-mwayppyauk-Ma | water |
| | <i>Ptyas mucosus</i> | Banded rat snake | Lin-mway | field |



(A). *Duttaphrynus melanostictus*



(B). *Hoplobatrachus tigerina*



(C). *Kaloula pulchra*



(D). *Fejervarya limnocharis*



(E). *Polypedates leucomystax*



(F). *Calotes versicolor*



(G). *Ptyas mucosus*

Plate VI. Recorded species of Herptofauna from Thilawar project area

A total of (10) order of (24) families representing (35) species were identified in direct and indirect impact area of the project sites (Table. 16). Their population with different activities patterns such as flying (Fl), feeding (Fe) and perching (Table. 17), their microhabitats and some ecological data (Table. 18) and species composition (%) in different families of birds (Table. 19) were also described. Although no more tree and just paddy field were present in this area, mangroves support the richness of bird species for their foraging, roosting and nesting habitats. Two species of *Milvus milvus* (Red kite) and *Mycteria leucocephala* (Paintedstork) were nearly threatened (NT) and others were least concern (LC) up to IUCN red list and CITES.

Table 37. Systematic Position of Avifauna

| Order | Family | Scientific Name | Common Name | Vernacular Name |
|---------------------------|---------------|-------------------------------|-----------------------|-----------------|
| I. Coraciiformes | Alcedinidae | <i>Alcedo atthis</i> | Common Kingfisher | Pain-nyin |
| | Halcyonidae | <i>Halcyon pileata</i> | Tree Kingfisher | Pain-nyin |
| | Meropidae | <i>Merops orientalis</i> | Green bee eater | Pa-zin-hto |
| II. Cuculiformes | Centropodidae | <i>Centropus sinensis</i> | Greater Coucal | Boat |
| | Cuculidae | <i>Hierococcyx varius</i> | Common hawk Cockoo | |
| III. Apodiformes | Apodidae | <i>Cypsiurus balasiensis</i> | Asian Plam Swift | Moe-sar |
| IV. Columbiformes | Columbidae | <i>Columba livia</i> | Rock Pigeon | Kho |
| | | <i>Streptopelia chinensis</i> | Spotted Dove | Jo-le-Pyauk |
| | | <i>Streptopelia decaocto</i> | Collared Dove | Jo-le-pat |
| V. Charadriiformes | Sternidae | <i>Sterna albifrons</i> | Little Tern | Myit-Twe |

| | | | | |
|-----------------------------|--------------|------------------------------|-----------------------|-------------------|
| | Scolopacidae | <i>Numenius phaeopus</i> | Whimbrel | |
| VI. Falconiformes | Accipitridae | <i>Milvus migrans</i> | Black kite | Son |
| | | <i>Milvus milvus</i> | Red kite | Son |
| | | <i>Elanus caeruleus</i> | Black winged kite | Son |
| VII. Ciconiiformes | Ciconiidae | <i>Mycteria leucocephala</i> | Painted stork | Nghet-kyar |
| VIII. Pelecaniformes | Ardeidae | <i>Ardeola grayii</i> | Indian Pond Heron | Byine-ouk |
| | | <i>Egretta garzetta</i> | Little Egret | Tharya-wadibyine |
| | | <i>Bulbulcus ibis</i> | Cattle egret | Kywe-kyaung-byine |
| | | <i>Mesophoyx intermedia</i> | Intermediate egret | Byine |
| | | <i>Ardea alba</i> | Common egret | |
| IX. Passeriformes | Corvidae | <i>Corvus splendens</i> | House Crow | Kyi-kan |
| | | <i>Corvus macrorhynchos</i> | Large-billed Crow | Taw-kyi-kan |
| | Aegithinidae | <i>Aegithiria tiphia</i> | Common Iora | Shwe-pyi-soe |
| | Estrildidae | <i>Lonchura atricapilla</i> | Chestnut munia | |
| | Motacillidae | <i>Anthus rufulus</i> | Paddyfield pipit | |
| | Muscicapidae | <i>Copsychus saularis</i> | Oriental Magpie Robin | Tha-paik-lwe |
| | Sturnidae | <i>Acridotheres fuscus</i> | Jungle Myna | Taw-za-yet |
| | Hirundinidae | <i>Hirundo rustica</i> | Barn Swallow | Pyan-hlwar |
| | Pycnonotidae | <i>Pycnonotus cafer</i> | Red-Vented Bulbul | But-phin-ni |

| | | | | |
|--------------------|--------------|-----------------------------|-----------------------|---------------|
| | | <i>Pycnonotus blanfordi</i> | Streak-eared Bulbul | But-chwe |
| | Cisticolidae | <i>Prinia flaviventris</i> | Yellow-bellied Prinia | Hngget-let-ma |
| | Lanidae | <i>Lanius cristatus</i> | Brown Shrike | |
| | Passeridae | <i>Passer domesticus</i> | House Sparrow | Eain-sar |
| | | <i>Passer montanus</i> | Eurasian Tree Sparrow | Thit-pin-Sar |
| X. Charadriiformes | Scolopacidae | <i>Tringa tetanus</i> | Common redshank | |

Table 38. Activity Patterns of Birds from Survey of Thilawar Project Area

| No | Scientific Name | Activity Patterns | | | Observed Number | | |
|-----|-------------------------------|-------------------|---|----|-----------------|--------|---------|
| | | Fl | P | Fe | Day I | Day II | Day III |
| 1. | <i>Alcedo atthis</i> | | * | | 1 | 4 | 3 |
| 2. | <i>Halcyon pileata</i> | | * | * | 3 | 2 | 2 |
| 3. | <i>Merops orientalis</i> | * | * | | 3 | 3 | 4 |
| 4. | <i>Centropus sinensis</i> | | * | | 2 | 2 | 2 |
| 5. | <i>Hierococyx varius</i> | * | * | | 1 | 1 | 2 |
| 6. | <i>Cypsiurus balasiensis</i> | | * | | 4 | 6 | 4 |
| 7. | <i>Columba livia</i> | | * | * | 20 | 12 | 18 |
| 8. | <i>Streptopelia chinensis</i> | | * | | 4 | 3 | 2 |
| 9. | <i>Streptopelia decaocto</i> | | * | | 2 | 1 | 3 |
| 10. | <i>Sterna albifrons</i> | * | * | | 2 | 3 | 3 |
| 11. | <i>Numenius phaeopus</i> | * | * | | 2 | 1 | 1 |
| 12. | <i>Milvus migrans</i> | * | | | 3 | 2 | 2 |
| 13. | <i>Milvus milvus</i> | * | | | 2 | 1 | 1 |
| 14. | <i>Elanus caeruleus</i> | * | * | | 1 | 1 | 1 |
| 15. | <i>Mycteria leucocephala</i> | * | | | 1 | 1 | 1 |
| 16. | <i>Ardeola grayii</i> | * | * | | 4 | 4 | 2 |

| | | | | | | | |
|-----|-----------------------------|----|----|---|-----|-----|-----|
| 17. | <i>Egretta garzetta</i> | * | * | | 1 | 2 | 2 |
| 18. | <i>Bulbulcus ibis</i> | * | * | | 3 | 4 | 3 |
| 19. | <i>Mesophoyx intermedia</i> | * | * | | 3 | 5 | 7 |
| 20. | <i>Ardea alba</i> | * | * | | 13 | 16 | 10 |
| 21. | <i>Corvus splendens</i> | * | * | | 20 | 25 | 20 |
| 22. | <i>Corvus macrorhynchos</i> | * | * | | 2 | 4 | 2 |
| 23. | <i>Aegithiria tiphia</i> | * | * | * | 1 | 2 | 1 |
| 24. | <i>Lonchura atricapilla</i> | | * | | 2 | 2 | 1 |
| 25. | <i>Anthus rufulus</i> | | * | | 2 | 3 | 1 |
| 26. | <i>Copsychus saularis</i> | * | * | * | 4 | 5 | 2 |
| 27. | <i>Acridotheres fuscus</i> | * | * | | 22 | 31 | 18 |
| 28. | <i>Hirundo rustica</i> | * | | | 12 | 18 | 18 |
| 29. | <i>Pycnonotus cafer</i> | * | * | | 6 | 8 | 10 |
| 30. | <i>Pycnonotus blanfordi</i> | * | * | | 4 | 6 | 11 |
| 31. | <i>Prinia flaviventris</i> | * | * | | 3 | 3 | 4 |
| 32. | <i>Lanius cristatus</i> | | * | | 2 | 2 | 1 |
| 33. | <i>Passer domesticus</i> | * | * | | 15 | 22 | 18 |
| 34. | <i>Passer montanus</i> | * | * | | 2 | 4 | 3 |
| 35. | <i>Tringa totanus</i> | | * | * | 2 | 2 | 4 |
| | Total number | 24 | 31 | 5 | 174 | 211 | 187 |

** Fl=flying, Fe=feeding, P=perching

Table 39. Microhabitat and Ecological Data of Birds from Survey Area

| No | Scientific Name | Microhabitat | | | | Seasonal status | | | Conservation Status | | |
|----|------------------------------|--------------|-----|---|----|-----------------|----|----|---------------------|----|----|
| | | T | S&B | M | OF | RE | WV | MI | TH | NT | LC |
| 1. | <i>Alcedo atthis</i> | * | | | | * | | | | | * |
| 2. | <i>Halcyon pileata</i> | * | | | | * | | | | | |
| 3. | <i>Merops orientalis</i> | * | | | | * | | | | | * |
| 4. | <i>Centropus sinensis</i> | | * | | | * | | | | | * |
| 5. | <i>Hierococcyx varius</i> | * | | | | * | | | | | * |
| 6. | <i>Cypsiurus balasiensis</i> | * | | | | * | | | | | * |

| | | | | | | | | | | | |
|-----|-------------------------------|---|---|---|---|---|---|---|---|--|---|
| 7. | <i>Columba livia</i> | * | | | | * | | | | | * |
| 8. | <i>Streptopelia chinensis</i> | * | | | | * | | | | | * |
| 9. | <i>Streptopelia decaocto</i> | * | | | | * | | | | | * |
| 10. | <i>Sterna albifrons</i> | | | * | * | | | * | | | * |
| 11. | <i>Numenius phaeopus</i> | | | | * | | | * | | | * |
| 12. | <i>Milvus migrans</i> | * | | | | | * | | | | * |
| 13. | <i>Milvus milvus</i> | * | | | | | * | | * | | * |
| 14. | <i>Elanus caeruleus</i> | * | | | | | * | | | | * |
| 15. | <i>Mycteria leucocephala</i> | | * | * | | * | | | * | | |
| 16. | <i>Ardeola grayii</i> | | * | * | | * | | | | | * |
| 17. | <i>Egretta garzetta</i> | | * | * | | * | | | | | * |
| 18. | <i>Bulbulcus ibis</i> | | * | * | | * | | | | | * |
| 19. | <i>Mesophoyx intermedia</i> | | | * | | * | | | | | * |
| 20. | <i>Ardea alba</i> | | | * | | * | | | | | * |
| 21. | <i>Corvus splendens</i> | * | | | | * | | | | | * |
| 22. | <i>Corvus macrorhynchos</i> | * | | | | * | | | | | * |
| 23. | <i>Aegithiria tiphia</i> | * | * | | | * | | | | | * |
| 24. | <i>Lonchura atricapilla</i> | * | | | | | | | | | |
| 25. | <i>Anthus rufulus</i> | * | | | | | | | | | |
| 26. | <i>Copsychus saularis</i> | * | | | | * | | | | | * |
| 27. | <i>Acridotheres fuscus</i> | * | * | | | * | | | | | * |
| 28. | <i>Hirundo rustica</i> | * | | | | * | | | | | * |
| 29. | <i>Pycnonotus cafer</i> | | * | | | * | | | | | * |
| 30. | <i>Pycnonotus blanfordi</i> | | * | | | * | | | | | * |
| 31. | <i>Prinia flaviventris</i> | | * | | | * | | | | | * |
| 32. | <i>Lanius cristatus</i> | * | | | | | | | | | |
| 33. | <i>Passer domesticus</i> | * | | | | * | | | | | * |
| 34. | <i>Passer montanus</i> | * | | | * | * | | | | | * |
| 35. | <i>Tringa totanus</i> | | | * | * | | * | | | | * |
| | Total number | | | | | | | | | | |

* T. Trees; S&B. Shrubs and bushes; OF. Open field; M. Marshes;

*TH= threatened, NT= near threatened, LC= least concern

*RE= resident, WV= winter visitor, MI= migrate

Table 40. Different Taxa of Avifauna Collected

| Order | Family | No. of species | % |
|------------------------|---------------|----------------|-------|
| Coraciiformes | Alcedinidae | 1 | 2.85 |
| | Halcyonidae | 1 | 2.85 |
| | Meropidae | 1 | 2.85 |
| Cuculiformes | Centropodidae | 1 | 2.85 |
| | Cuculidae | 1 | 2.85 |
| Apodiiformes | Apodidae | 1 | 2.85 |
| Columbiformes | Columbidae | 3 | 8.57 |
| Charadriiforme | Sternidae | 1 | 2.85 |
| | Scolopacidae | 1 | 2.85 |
| Falconiformes | Accipitridae | 3 | 8.57 |
| Ciconiiformes | Ciconiidae | 1 | 2.85 |
| Pelicaniformes | Ardeidae | 5 | 14.28 |
| Passeriformes | Corvidae | 2 | 5.71 |
| | Aegithinidae | 1 | 2.85 |
| | Estrildidae | 1 | 2.85 |
| | Motacillidae | 1 | 2.85 |
| | Muscicapidae | 1 | 2.85 |
| | Sturnidae | 1 | 2.85 |
| | Hirundinidae | 1 | 2.85 |
| | Pycnonotidae | 2 | 5.71 |
| | Cisticolidae | 1 | 2.85 |
| | Lanidae | 1 | 2.85 |
| | Passeridae | 2 | 5.71 |
| Charadriiformes | Scolopacidae | 1 | 2.85 |
| Total | | 35 | 100 |

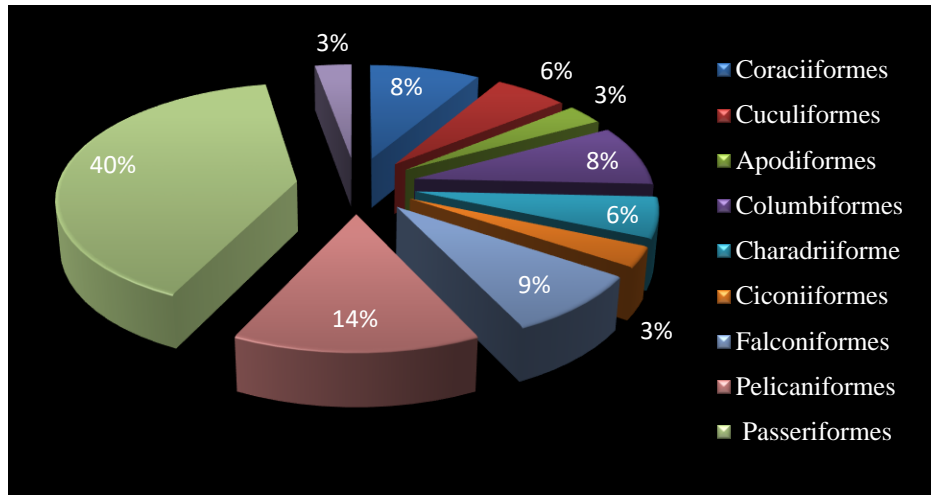
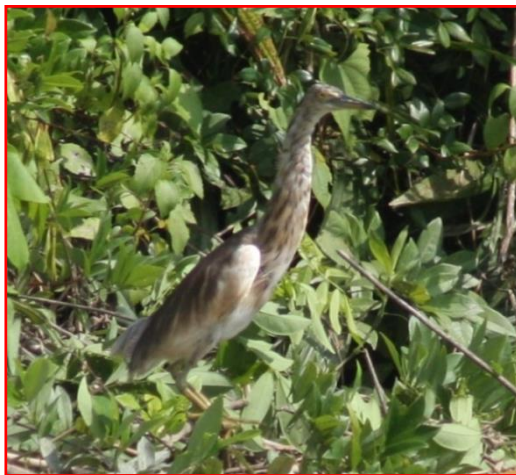


Figure 36. Species Composition in Different Families of Birds



(A). *Ardeola grayii*



(B). *Egretta garzetta*



(C). *Mesophoyx intermedia*



(D). *Bulbulcus ibis*



(F). *Ardea alba*

Plate VII (A). Recorded species of avifauna from Thilawar project area



(G). *Alcedo atthis*



(H). *Merops orientalis*



(I). *Hierococcyx varius*



(J). *Streptopelia decaocto*



(K). *Numenius phaeopus*



(L). *Mycteria leucocephala*

Plate VII (B). Recorded species of avifauna from Thilawar project area



(M). *Acridotheres fuscus*



(N). *Lanius cristatus*



(O). *Lonchura atricapilla*



(P). *Prinia flaviventris*



(Q). *Anthus rufulus*



(R). *Copsychus saularis*

Plate VII (C). Recorded species of avifauna from Thilawar project area



(S). *Milvus milvus*



(T). *Milvus migrans*



(U). *Elanus caeruleus*



(V). *Tringa tetanus*

(W) *Aegithiria tiphia*(X). *Cypsiurus balasiensis*

Plate VII (D). Recorded species of avifauna from Thilawar project area

(e) Mammals

A total of (4) mammals; mouse, rat, mongoose and squirrel were recorded as information and they could not have identified because of interview survey during limited study period.

4.10.4 Impacts and Mitigation

Biodiversity of direct and indirect impact areas of the project with Jetty, port and building will be facing with disturbance for their sustainability.

4.10.4.1 Impacts and Mitigation on Planktons

Settlement of inhabitants in the project area and those of upstream will release and their effluent waste materials those may be also drained into the river. It may also change the freshwater capacity nearby and leading to the unfavorable conditions for aquatic biomass. The richness of aquatic microbes is the biological indicators for the purity of water body. Planktons including phytoplankton and zooplankton are the lower trophic levels of food chain and food web for the higher trophic level such as fishes. Small fish will feed on the planktons, those will be taken again by the middle-sized fishes and crustaceans such as shrimps and prawns and then those will be also fed by the largest carnivorous fishes in the river food chain. To increase the blooming and growth of planktons those may reduce dissolved oxygen, the effluent wastes of the

project sites should be treated and processed in settlement tanks and filtration tank and then the chemical free wastes should be discharged into water body. Abundance of planktons should be measured and recorded regularly as biological indicators from water body nearby the projects.

4.10.4.2 *Impacts on Flora*

Direct and indirect impact areas of the project have no more tree type of habitat apart from aside of the main way of vehicles. Since the project area has already cleaned up compound, no or little impact for insect diversity especially butterflies and moth, those are inhabited in just grass land. Small mangroves those inhabited at the northern side and south westernside of the projects should be conserved for sustainable because those support the organic debris for feeding and breeding of small fishes and certain crustaceans and then those may break the high tide. Ecologically and medicinally importance of one tamarind tree and also only one neem tree has been left in the project area.

No more trees of the indirect impact area may affect negatively the climate condition of this area. Trees absorb atmospheric carbon dioxide causing global warming and used radiant (heat) energy of the sun in their photosynthetic process. Lacking of trees cannot check out carbon dioxide concentration and leading to increase the temperature in this region. Significant level of higher carbon dioxide concentration may also change the acidity of the river water later. Root system of large trees may sustain both water retention and soil erosion. Lacking trees in the direct and indirect impact area of this project will also erode the top soil layers flowing into Yangon River and tributaries of it near the project and leading to increase sedimentation and deposition.

4.10.4.3 *Mitigation of Impact on Flora*

The project would like to propose concerning with flora

- To reproject growing tree especially wind break species for sustainable the climate, conserve the top soil layer and habitat of some birds and insect species
- To reproject and conserve mangrove and associated species for buffering zone between fresh and salt water and then for feeding and breeding ground of small fishes and some crustaceans

- To conserve urgently two ecologically and medicinally important species, tamarind and neem trees those left one individual respectively in the project zone

4.10.4.4 Impacts on Fauna

Water pollution caused by the anthropogenic effects of inhabitants, noise pollution of trading ship those harbored the jetty and habitat destruction may be concerned and threatened for the species diversity and population abundance of individual species inhabited at the project area and nearby.

There will be only minor impact on some species of insects, butterflies, dragonflies and damsel flies in the project zone because it has been cleaned up. Several impacts will affect negatively the species diversity and population abundance at the proposed area.

- Bushes those are habitats for diversity and abundance of insect species will be cleaned up by the indirect impact zone of the project.
- Noise pollution of the ship harbored to the jetty is main cause to threaten the feeding and breeding habits of recorded fish species of Yangon River. It will also be negative impact for most of other species such as birds those may get stress.
- No more tall trees and changing other habitat types by human of the project zone may affect relatively the behaviors of birds concerning with mobility, foraging, and courtship and roosting for nesting. This will be seriously for two species *Milvus milvus* (Red kite) and *Mycteria leucocephalas* (Painted stork), those are facing with nearly threatened (NT), up to IUCN checklists within the project zone.
- Human sewage and waste water discharging from the project zone and upstream of it may flow into Yangon River and then the freshwater capacity and physio-chemical parameters may be also changed. This situation will improper and unfit for the physiological process of all aquatic organisms including microscopic planktons to all fish species.
- Diversity of the fauna mentioned sustainable condition but development of the project zone and anthropogenic factors may alter their natural habitat later.

4.10.4.5 Mitigation of Impacts on Fauna

- Noise pollution of project construction and trading ship should be minimized.
- Tree types must be reprojected for sustainable condition of the climate and habitat for different species of fauna.
- Mangrove forest must be conserved for feeding and breeding ecosystem of some small fishes and crustaceans and buffer zone of tide between salts and freshwater.
- Waste water of inhabitants should be discharged after treatment with settling and / or filtrating.
- Inhabitants and all authorized persons must pay special attention to conserved the two bird species, *Milvus milvus* (Red kite) and *Mycteria leucocephala* (Painted stork) those were nearly threatened (NT) in IUCN checklists.

4.10.5 Discussion and Conclusion for Biodiversity and Biosafety for the Project Zone

Although (54) species of flora, (8) species of planktons and (127) species of fauna have been recorded, the population number of most species are very little in the construction sites and indirect impact area. No more tall trees species reveals that the project zone is extremely fragile and need to conserve urgently for sustainable. Because of fish species diversity, normal range of their length and weight, small groups of local fishermen, very little or no fishing pressure found in Yangon River and its tributaries connecting with the project zone. Two species of fishes, *Pangasius pangasius* (Nga-tan) and *Tenualosa hilisa* (Nga-tha-lauk) are the largest species and their catch provide regular income for the food and shelter of small group of fishermen nearby but very little recorded number of some species such as one of popular Asian catfish, *Clarias batrachus* (Nga-Khu), *Notopterus notopterus* (Nga-phe) and *Mastacembelus dayi* (Nga-mway-htoe) may be due to overfishing, habitat destruction and climate change. Conservation of two nearly threatened (NT) bird species *Milvus milvus* (Red kite) and *Mycteria leucocephala* (Painted stork) should be noticed and planned by authorized person and local inhabitants and immigrants of the project zone. Because of extinction of one of native bird species, Stork in Japan, artificial breeding practice had ever been tried to increase the stork population with “**Annual Schedule of Stork Growing Farming System**” which was expensed of so much. Less number of almost all species of projection has sparsely grown up but the exception of small mangrove forest and paddy field in the proposed area. Reprojection of tall wind-break trees and

conservation of mangrove forest on each side of the construction site will be the green ecosystem for most of the animal species and cleaning atmosphere by absorbing carbon dioxide and releasing oxygen in photosynthesis.

Stakeholder taking part in project site and the Thilawa Economic Zone should care the animal welfare dealt with the state in which animals live with happiness and delight and without any distress and discomfort in their real life as wild.

4.11 Socioeconomics

Socio-economic factors are lifestyle components and measurements of both financial viability and social standing. They directly influence social privilege and levels of financial independence. Factors such as health status, income, environment and education are studied by sociologists in terms of how they each affect human behaviors and circumstances.

4.11.1 Living conditions

A household baseline survey was conducted for the stakeholder village tracks surrounding the proposed project site that constitute the area of influence. There are 2189 households in the three wards and a full census of all households was taken yielding an estimated stakeholder population of 9693. Shwe Pyi Thar Yar is the largest ward with a population of 3716.

Bamar is the largest ethnic group in the Kyauktan Township, representing approximately 99.79 percent of Township's population. Kayin is the second largest ethnic group, representing approximately 0.13 percent. There are few Kachin, Kayar, Chin, Mon, Rakhine, and Shan who reside in Kyauktan Township. 0.23 percent of Chinese and 2.59 percent of Indian was lived within the Kyauktan Township.

The religions of the people in Kyauktan Township are predominantly Buddhism. The composition of the population by religion is 87.9% Buddhist, 6.2% Christian, 4.3% Islam, 0.5% Hindu, 0.8% Animist, 0.2% other religion and 0.1% no religion.

The proportion of the productive working population between 15 to 64 years of age in Kyauktan Township is 69% and the proportion of children aged 14 and below together with the proportion of the elderly aged 65 and over are less than the proportion of the working age group population. In Kyauktan Township, 30.7% of the employed

persons aged 15-64 are skilled agricultural, forestry and fishery workers and is the highest proportion, followed by 21.4% in elementary occupation. Other professions reported included managers, professionals, technicians and associate professionals, clerical support workers, service and sale workers, craft and related trades workers, project and machine operators and assemblers and other categories.

4.11.2 Education and Infrastructure

There are 14 B.E.H.S schools, 23 B.E.M.S schools and 76 B.E.P.S schools in Kyauktan Township. School attendance in Kyauktan Township drops after age 9 for both males and females. Compared to the union, the school attendance of males and females in Kyauktan Township is higher from school going age to age 11 and lower in age 12 onwards that of the union. The literacy rate of those aged 15 and over in Kyauktan Township is 95.2%. The literacy rate for youth aged 15-24 is 97.4% with 97.3% for females and 97.5% for males.

The majority of the households in Kyauktan Township are living in bamboo houses (45.0%) followed by households in wooden houses (39.2%). Some 43.3% of urban households live in wooden houses and 51.1% of rural households live in bamboo houses. Improved sources of drinking water (tap water/piped, tube well, borehole, protected well/spring and bottled water/ water purifier) are used by 26.7 % of households and some 69.3% of the households use water from pool/pond/lake and 12% use water from protected well/spring. Some 73.3% of households use water from unimproved sources. In rural areas, 89.7% of households use water from unimproved sources for drinking water.

As the source of lighting, 33.1% of the households in Kyauktan Township use electricity for lighting. This proportion belongs to nine lowest townships group compared to other townships in Yangon region. The percentage of households that use electricity in Yangon Region is 69.3%. The households in Kyauktan Township mainly use wood-related fuels for cooking with 58.4% using firewood and 6.5% using charcoal. Only 21.3% of households use electricity for cooking. For health services and facilities, there are 5 hospitals, 1 clinic and 847 village health departments in Kyauktan Township.

4.11.3 Age and Sex

Children under five years are 5.15% of total population where elderly over 65 years' accounts about 6.77%. Together these two age groups which are solely dependent on other age groups sums up more than 11.92% of total population in the area. More than 72.75% of the people living in the study area falls under the age group of 16 years to 64 years. This group is mainly consisting of workforces of local community.

Table 41. Age Groups and Sex of Local Community

| Sr. | Age Group | Male % | Female % | Total % |
|-----|-----------|--------|----------|---------|
| 1 | <5 | 3.470 | 6.63 | 5.15 |
| 2 | 5 to 15 | 15.773 | 14.92 | 15.32 |
| 3 | 16 to 64 | 73.817 | 71.82 | 72.75 |
| 4 | >65 | 6.940 | 6.63 | 6.77 |
| | | 100 | 100 | 100 |

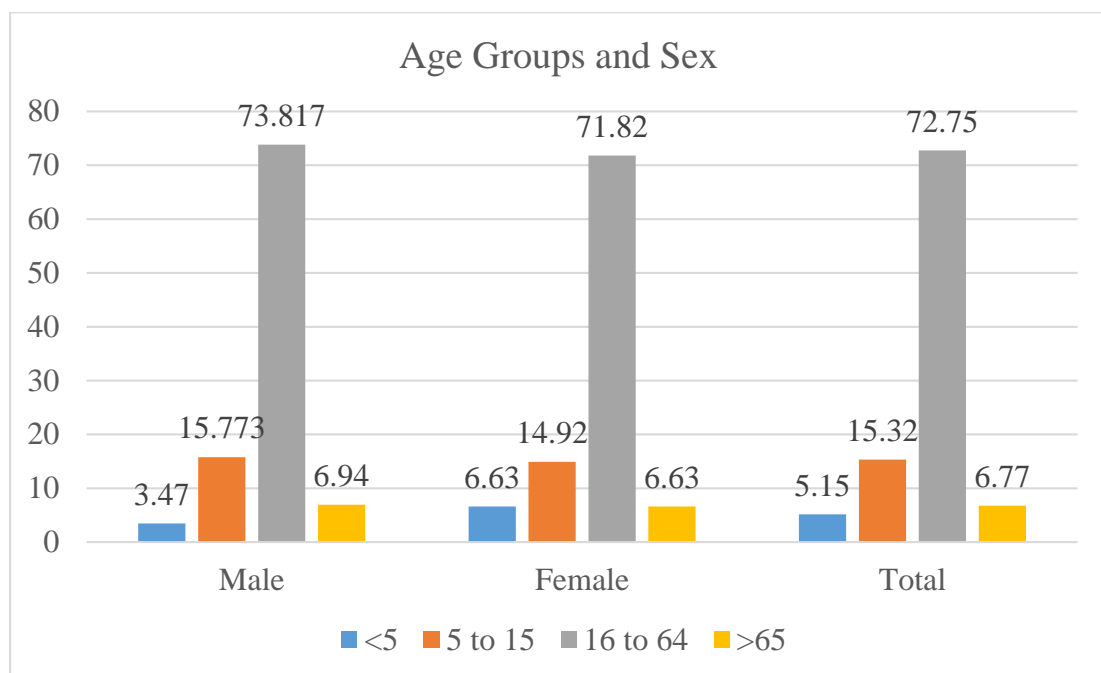


Figure 37. Age Groups and Sex

There are 114 females in every 100 male population as the gender ratio of male to female goes 46.69:53.31. Gender ratio could be seen in the following pie chart.

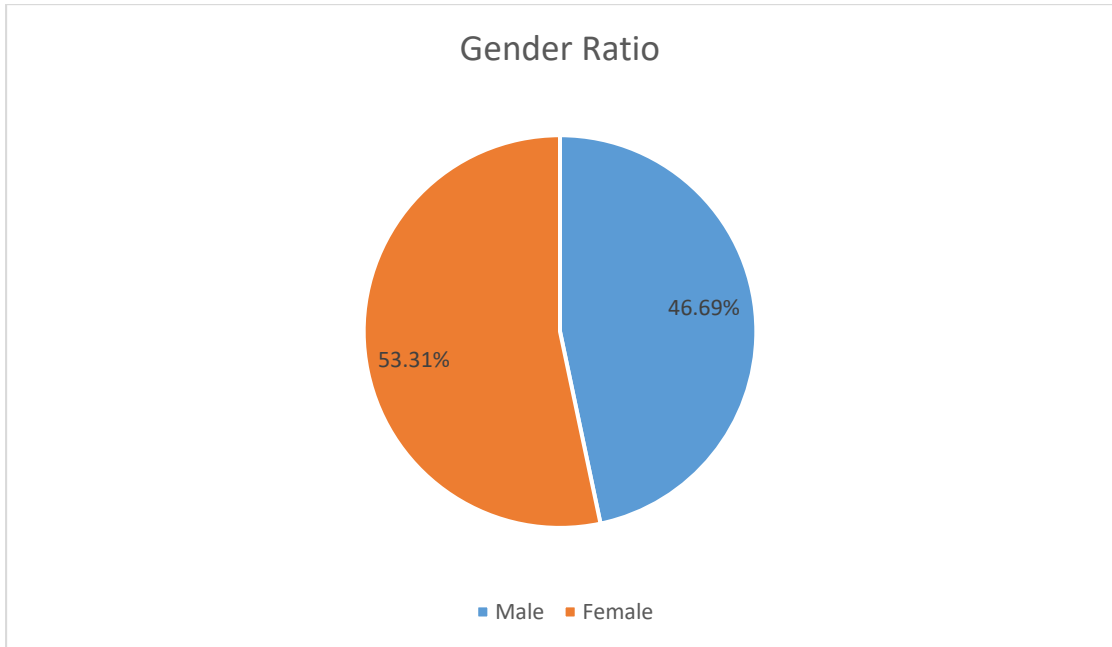


Figure 38. Gender Ratio

4.11.4 Educational Attainment

Around 52.96% the people in local community attained only primary level education. Only 3.95% of the local people are graduated. About 34.65% remaining are middle and high school levels. Current educational attainment levels show the local community's past education condition. Future education of the community could be seen in school enrollment section.

Table 42. Educational Attainment Levels of Local Community

| Sr. | Educational Attainment | Male % | Female % | Total % |
|-----|------------------------|--------|----------|---------|
| 1 | No Education | 5.97 | 10.73 | 8.44 |
| 2 | Primary | 52.24 | 53.98 | 52.96 |
| 3 | Middle School | 22.76 | 19.72 | 21.36 |
| 4 | High School | 14.93 | 11.76 | 13.29 |
| 5 | Graduate | 4.10 | 3.81 | 3.95 |
| | | 100.00 | 100.00 | 100 |

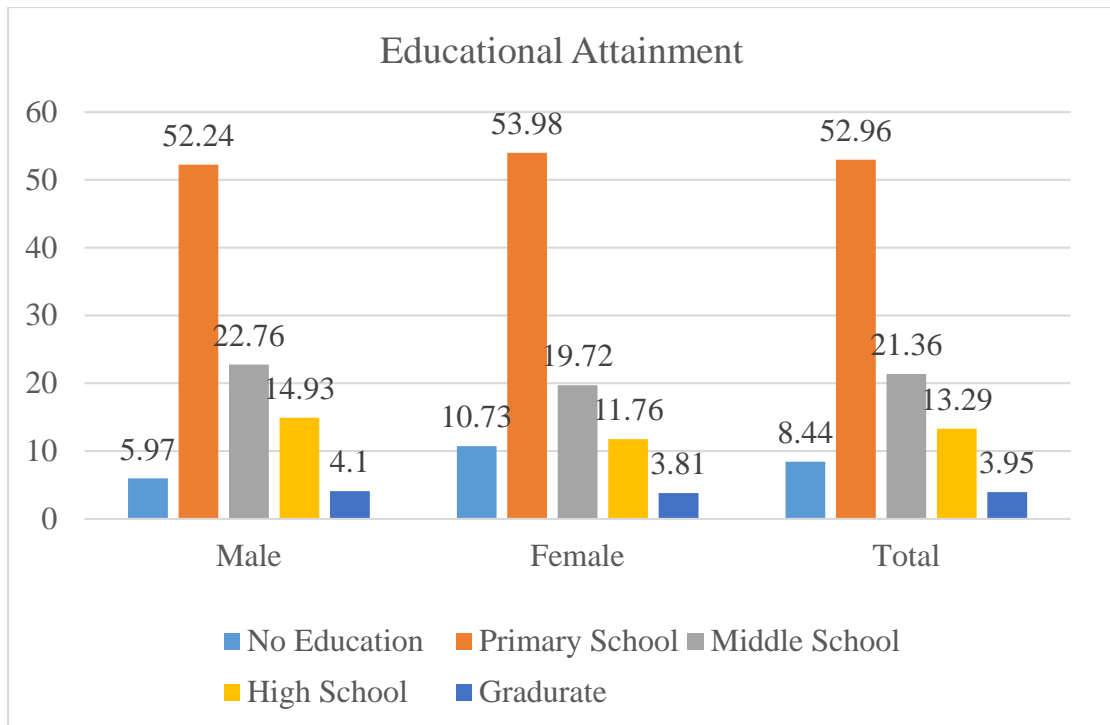


Figure 39. Educational Attainment

4.11.5 School Enrollment

About 34.94% of schooling children are in primary schools. Together primary and middle school level children accounts up to nearly 32.53%. About 17% of school children are attending high school and another nearly 26.51% are in degree level and graduate levels is 4.82%.

Table 43. School Enrollment Conditions

| Sr | Enrollment | Male % | Female % | Total % |
|----|---------------|--------|----------|---------|
| 1 | Primary | 29.41 | 38.78 | 34.94 |
| 2 | Middle | 29.41 | 34.69 | 32.53 |
| 3 | High | 38.24 | 18.37 | 26.51 |
| 4 | University | 0.00 | 8.16 | 4.82 |
| 5 | Post Graduate | 2.94 | 0.00 | 1.20 |
| | | 100 | 100 | 100 |

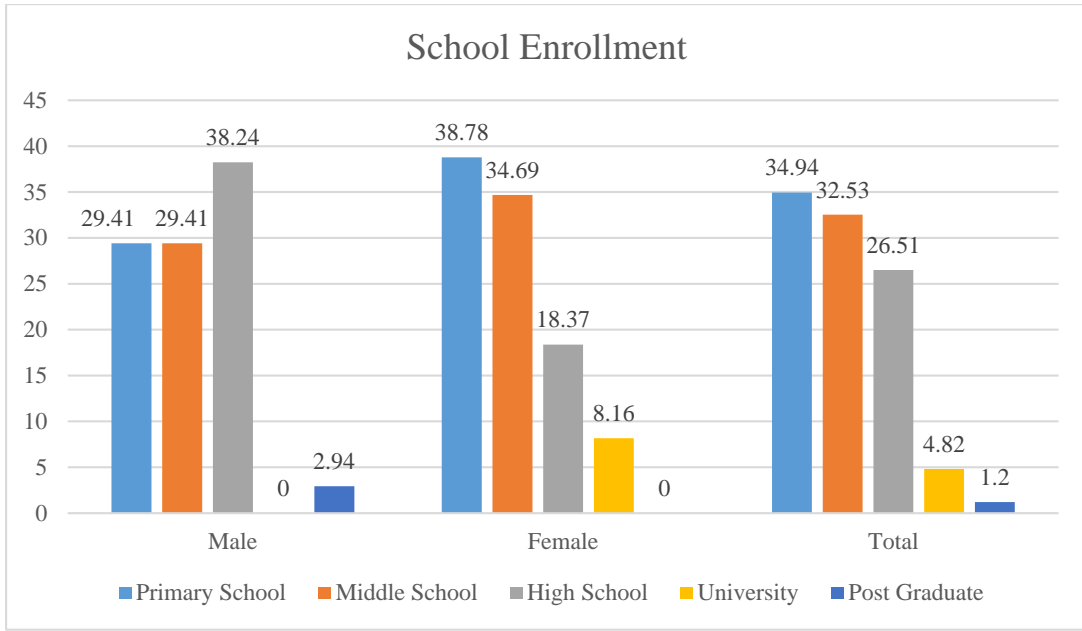


Figure 40. School Enrollment

4.11.6 Industry of Employment

Employment in private businesses is the most conspicuous living with about 19.35% of the people in the local area is working. Second most dominant type of business is agriculture with about 15.75% of population. Approximately 12.52% of the people in the resident area is working in manual labour.

Table 44. Industry of Employment of Local Community

| Sr. | Industry of Employment | Male % | Female % | Total % |
|-------|----------------------------------|--------|----------|---------|
| 1 | Manual Labour | 21.40 | 3.97 | 12.52 |
| 2 | Dependent | 17.51 | 53.07 | 35.86 |
| 3 | Agriculture | 24.51 | 6.86 | 15.75 |
| 4 | Employment in private businesses | 18.68 | 20.58 | 19.35 |
| 5 | Cottage Industry | 5.45 | 2.53 | 3.98 |
| 6 | Retail Trade | 7.39 | 10.11 | 8.54 |
| 7 | Civil Service | 2.72 | 2.53 | 2.66 |
| 8 | Board Country | 0.78 | 0.36 | 0.57 |
| 9 | Fishery | 1.56 | 0.00 | 0.76 |
| Total | | 100 | 100 | 100 |

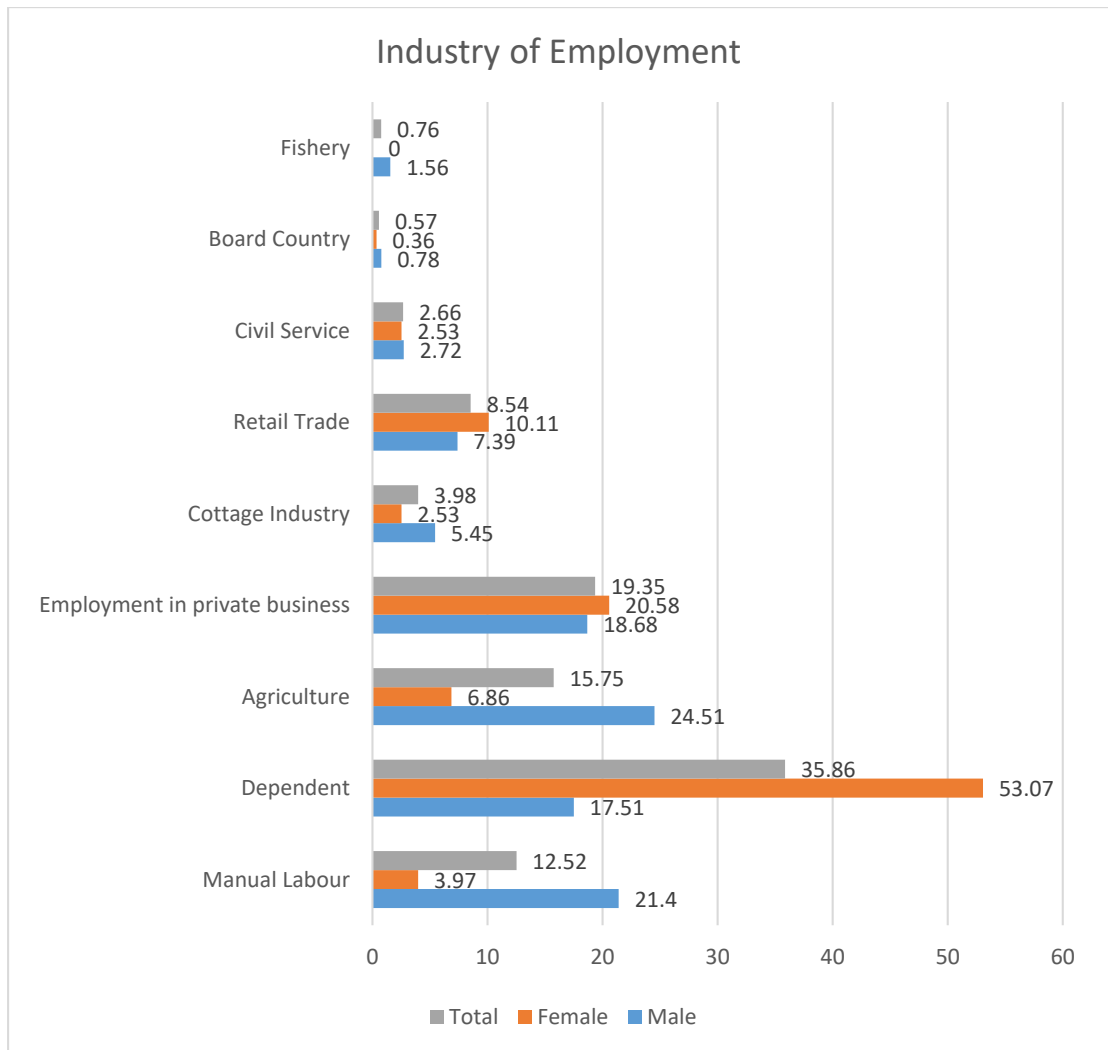


Figure 41. Industry of Employment

4.11.7 Ethnic Races

The area is dominated by Bamar (80.71%) and there are a few Kayin national races (2.504%) and Tamil races (16.49) together with about 0.295% of other.

Table 45. Ethnic Races

| Races | male % | Female % | Total % |
|-------|--------|----------|---------|
| Bamar | 81.01 | 80.44 | 80.71 |
| Kayin | 3.16 | 1.93 | 2.504 |
| Tamil | 15.19 | 17.63 | 16.49 |
| Other | 0.63 | 0.00 | 0.295 |
| | 100.00 | 100 | 100 |

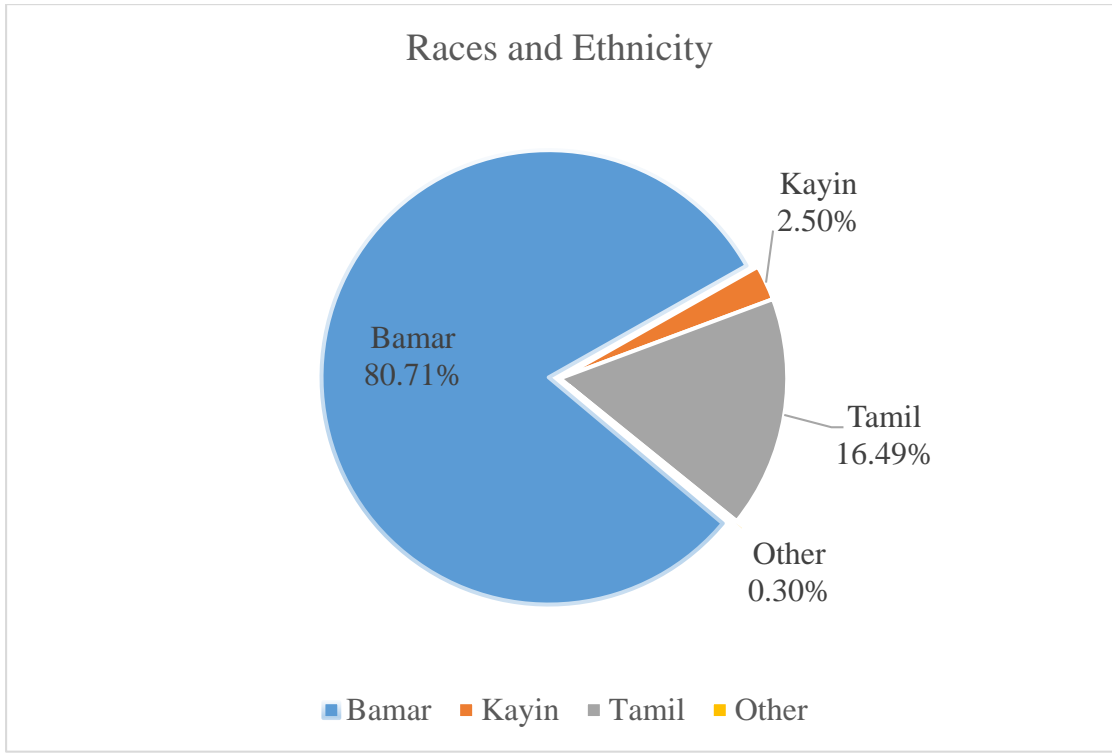


Figure 42. Ethnic Races

5 Impact Assessment/Mitigation and Monitoring Plan

Rating matrix method is used to assess the significance level of the identified environmental impacts of the MAAT Jetty Project on its environment. There are five parameters considered for the activities of the Projects and the consequences resulted from the said activities. System of rating is described in detailed as follows.

Frequency of activity has considered the repetitiveness of various project activities and how this may impact on the various receptors of the impacts. The following ratings have been used.

The probability of the impact occurring refers to how often the aspect impacts or may impact either positively or negatively on the environment. After describing the probability, the findings have been indicated on the following scale:

The severity of environmental aspect has been determined by the degree of change to the baseline environment, and has included consideration of the following factors:

- The reversibility of the impact;
- The sensitivity of the receptor to the stressor;
- The impact duration, its permanency and whether it increases or decreases with time;
- Whether the aspect is controversial or would set a precedent; and
- The threat to environmental and health standards and objectives.

The spatial scope for each aspect, receptor and impact has been defined. The geographical coverage (spatial scope) description has taken account of the following factors:

- The physical extent/distribution of the aspect, receptor and the anticipated impact; and
- The nature of the baseline environment within the area of impact.

Duration refers to the length of time that the aspect may cause a change either positively or negatively on the environment. The environmental assessment has distinguished between different time periods by assigning a rating to duration based on the following scale:

Table 46. Impact Rating Table

| Severity | Value | Duration | Value | Spatial Scope | Value | Frequency | Value | Probability | Value |
|------------------------------|--------------|-----------------------|--------------|----------------------|--------------|---------------------|--------------|--------------------|--------------|
| Insignificant/non-harmful | 1 | One day to one month | 1 | Activity specific | 1 | Annual or less | 1 | Almost impossible | 1 |
| Small/potentially harmful | 2 | One month to one year | 2 | Within right of way | 2 | Bi-annual | 2 | Highly unlikely | 2 |
| Significant/slightly harmful | 3 | One year to ten years | 3 | Local area | 3 | Monthly | 3 | Unlikely | 3 |
| Great/ harmful | 4 | Life of operation | 4 | National | 4 | Daily Intermittence | 4 | Possible | 4 |
| Disastrous/ deadly harmful | 5 | Permanent | 5 | Global | 5 | Daily Continuous | 5 | Definitely | 5 |

Table 47. Rating Matrix

| | Consequence (Severity + Spatial Scope + Duration) | | | | | | | | | | | | | | |
|------------------------------------|---------------------------------------------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| Activity (Frequency + Probability) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
| | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 |
| | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 | 52 | 56 | 60 |
| | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
| | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 | 84 | 90 |
| | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 | 91 | 98 | 105 |
| | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 | 104 | 112 | 120 |
| | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 | 117 | 126 | 135 |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |

Table 48. Significance Levels

| Sr. | Color Code | Value | Rating |
|-----|------------|---------|-------------|
| 1 | | 1-25 | Very Low |
| 2 | | 26-50 | Low |
| 3 | | 51-75 | Low-Medium |
| 4 | | 76-100 | Medium-High |
| 5 | | 101-125 | High |
| 6 | | 126-150 | Very High |

Table 49. Environmental Aspect and Impact

| Sr. | Activity List | Aspect | Impact |
|---------------------|--------------------------------------------|-------------------|-------------------------------------|
| Construction | | | |
| 1 | Dredging and Disposal of dredged Materials | Digging the soil | Solid waste, contamination of water |
| | | Removing the soil | Solid waste, contamination of water |

| | | | |
|---|-----------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| | | Excavation the sediment | Solid waste, contamination of water, bottom sediment |
| | | Driving machine and moving machinery | Physical hazard, exhaust gas emissions, noise and vibration |
| 2 | Construction of jetty | Piling | Noise and vibration, soil erosion |
| | | Removal of sediments and their transportation | Hydrology, Biodiversity, soil quality, soil erosion, water contamination |
| | | Operation of construction machinery | Noise and vibration, physical hazard, vehivle hazard, exhaust gas emission |
| | | Handling of heavy machinery and equipment | Noise and vibration, physical hazard, vehivle hazard, exhaust gas emission |
| | | Transportation of construction materials and debris | Dust, solid waste, noise, exhaust gas emission |
| 3 | Construction of access road, temporary office/ building and toilet | Transportation and storage of raw materials and construction debris | Dust, solid waste, noise, exhaust gas emission |
| | | Removal of vegetation and tree cutting from project site | Biodiversity, solid waste |
| | | Debris disposal | Solid waste, visual |
| | | Construction activities | Dust, solid waste, noise and vibration, physical |

| | | | |
|------------------|----------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------|
| | | | hazard, exhaust gas emission |
| 4 | Construction labour camp | Discharge of sewage | Waste water, water contamination |
| | | Solid waste generation | General solid waste |
| Operation | | | |
| 5 | Material loading/unloading | Loading to/Unloading from truck | Physical and vehicle hazard |
| | | Transportation and storage of materials | Dust and vehicular exhaust generation, solid waste, noise, traffic increase, physical hazard |
| | | Handling of heavy material, machinery and equipment | Noise and vibration, physical hazard, vehicle hazard, exhaust gas emission |
| | | Generation of waste, sewage and contaminated run-off | Waste water, soil and ground water contamination |
| | | Spillage of fuel, oil, used oil | Soil and ground water contamination, waste water, hazardous materials and oil |
| 6 | Berthing of Barges | Reduced water circulation near jetty area | Water quality |
| | | Discharge of sewage and waste to Yangon River | Water quality, water contamination and waste water generation |
| | | Washing and cleaning of vessels | Water quality, water contamination and waste water generation |

Characteristics of the impacts are evaluated based on eight particular basis, five of which are used in the assessment of the significance level of the impacts.

Table 50. Characteristics of the Impacts

| IMPACTS | CHARACTERISTICS | | | | | | | |
|---------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| | Nature | Impact Source | Impact Receptor | Severity | Duration | Spatial Scope | Frequency | Probability |
| Construction | | | | | | | | |
| Water Quality | Negative | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Discharge of sewage | Local environment | Impact severity is significant for local community | Contamination of water will occur in jetty construction life | Contamination of water will occur along the Yangon River | Impact on water quality occurs daily continuously | Contamination of water effect is possible |

| | | | | | | | | |
|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------|
| | | - Domestic waste water | | | | | | |
| Air Emissions | Negative | - Driving machine and moving machinery - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris - Construction activities | Workers and local environment | Impact severity is significant for construction workers and local community | Dust, particulate and fumes will be emitted in construction period | Impact will occur within construction project area | Activity that cause the impact occurs daily intermittently | Emission of dust, particulates and fumes are possible |

| | | | | | | | | |
|--------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------|
| <p>Solid waste/waste</p> | <p>Negative</p> | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Transportation and storage of construction materials and debris - Removal of vegetation and tree cutting - Debris disposal | <p>Local environment</p> | <p>Impact severity is potentially harmful if the sediments and dredged materials are managed systematically</p> | <p>Impact from solid waste will occur in construction project life</p> | <p>Local area could be affected by solid waste mismanagement</p> | <p>Solid waste impact occurs daily intermittently</p> | <p>Impact from solid wastes are possible</p> |
|--------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------|

| | | | | | | | | |
|---------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------|
| | | - General waste from labour camp | | | | | | |
| Noise and vibration | Negative | -Driving machines and moving machinery - Piling - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris | Workers and local environment | Impact severity is significant for operation workers | Noise and vibration hazard will occur in construction period | Noise hazard will occur within the whole project compound and underwater | Activity that cause the impact occurs daily intermittence in construction period | Noise hazards are possible |

| | | | | | | | | |
|--------------|----------|---------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|-------------------------------------|
| | | Construction activities | | | | | | |
| Biodiversity | Negative | - Dredging activities - Removal of sediments - Removal of vegetation and tree cutting | Ecosystem | Impact severity is potentially harmful for ecosystem | Impact on ecosystem will occur in both jetty construction and operation life | Ecosystem could be affected by dredging activities | Impact on ecosystem will occur daily continuously | Impact on biodiversity are possible |
| Hydrology | Negative | - Dredging activities - Removal of sediments | Costal hydrology | Impact severity is slightly harmful for coastal hydrology | Impact on Hydrology will occur in both jetty construction and operation life | Yangon river could be affected by the effect of hydrology | Impact on hydrology will occur daily continuously | Impact on hydrology is possible |
| OSH | Negative | - Contact with moving machinery and equipment | Workers | Impact severity is harmful for workers | OSH hazard will occur in both construction and operation project life | OSH hazard will occur at the project area of activity | Activity that cause the impact occurs daily intermittently | OSH hazards are possible |

| | | | | | | | | |
|------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| | | <ul style="list-style-type: none"> - Handling of heavy machinery and equipment - Construction activities | | | | | | |
| Operation | | | | | | | | |
| Water Quality | Negative | <ul style="list-style-type: none"> - Mixing of dredgind and disposal of dredged materials - Ship sewage - Domestic Waste water -Vessel cleaning water - Storm water | Local environm ent | Impact severity is significant for local community | Contamination of water will occur in project operation life | Contamination of water will occur along the Yangon River | Impact on water quality occurs daily continuously | Contamination of water effect is possible |

| | | | | | | | | |
|-------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------|
| Air Emissions | Negative | <ul style="list-style-type: none"> - Driving machine and moving machinery - Handling of heavy machinery and equipment - Transportation and storage of materials - Fumes emissions from vessels | Workers and local environment | Impact severity is significant for construction workers and local community | Dust, particulate and fumes will be emitted in operation period | Impact will occur within project area | Activity that cause the impact occurs daily intermittently | Emission of dust, particulates and fumes are possible |
| Solid waste/waste | Negative | - General waste from vessels | Local environment | Impact severity is potentially harmful if solid wastes are discharged systematically | Impact from solid waste will occur in operation period | Local area could be affected by solid waste mismanagement | Solid waste impact occurs daily intermittently | Impact from solid wastes are possible |

| | | | | | | | | |
|---------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------|
| Noise and vibration | Negative | -Driving machines and moving machinery - Handling of heavy machinery and equipment - Transportation and storage of materials Construction activities | Workers and local environment | Impact severity is significant for operation workers | Noise and vibration hazard will occur in operation period | Noise hazard will occur within the whole project compound and underwater | Activity that cause the impact occurs daily intermittence in operation period | Noise hazards are possible |
| Hydrology | Negative | - Dredging activities - Removal of sediments | Costal hydrology | Impact severity is slightly harmful for coastal hydrology | Impact on Hydrology will occur in both jetty construction and operation life | Yangon river could be affected by the effect of hydrology | Impact on hydrology will occur daily continuously | Impact on hydrology is possible |

| | | | | | | | | |
|-----------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------|
| OSH | Negative | <ul style="list-style-type: none"> - Contact with moving machinery and equipment - Handling of heavy machinery and equipment - Accidents with heavy machinery and equipment | Workers | Impact severity is harmful for workers | OSH hazard will occur in both construction and operation project life | OSH hazard will occur at the project area of activity | Activity that cause the impact occurs daily intermittently | OSH hazards are possible |
| Hazardous materials and oil | Negative | <ul style="list-style-type: none"> - Spillage of fuel, oil, used oil | Local environment | Impact severity is significant on local environment | Hazardous materials and oil hazards will occur in project life | Hazardous materials and oil hazard will occur at the local environment | Activity that cause the impact occurs daily intermittently | Hazardous materials and oil hazards possible |

Table 51. Assessment of the Significance of the Impacts without MEMs

| Sr | Impact | Severity | Duration | Spatial Scope | Frequency | Probability | Total Rating | Significance Level |
|---------------------|-----------------------------|----------|----------|---------------|-----------|-------------|--------------|--------------------|
| Construction | | | | | | | | |
| 1 | Water Quality | 3 | 3 | 3 | 5 | 5 | 90 | Medium-High |
| 2 | Air Emission | 3 | 3 | 3 | 5 | 4 | 81 | Medium-High |
| 3 | Solid waste | 3 | 4 | 3 | 5 | 5 | 100 | Medium-High |
| 4 | Noise and vibration | 3 | 3 | 2 | 4 | 4 | 64 | Low-Medium |
| 5 | Biodiversity | 3 | 4 | 3 | 5 | 4 | 90 | Medium-High |
| 6 | Hydrology | 3 | 4 | 3 | 5 | 4 | 90 | Medium-High |
| 7 | OSH | 3 | 4 | 1 | 4 | 4 | 64 | Low-Medium |
| Operation | | | | | | | | |
| 1 | Water Quality | 3 | 4 | 3 | 5 | 4 | 90 | Medium-High |
| 2 | Air Emission | 3 | 4 | 2 | 4 | 4 | 72 | Low-Medium |
| 3 | Solid waste | 3 | 4 | 3 | 4 | 4 | 80 | Medium-High |
| 4 | Noise and vibration | 3 | 4 | 3 | 4 | 4 | 80 | Medium-High |
| 5 | Hydrology | 3 | 4 | 3 | 5 | 4 | 90 | Medium-High |
| 6 | OSH | 4 | 4 | 2 | 4 | 4 | 80 | Medium-High |
| 7 | Hazardous materials and oil | 3 | 4 | 3 | 4 | 4 | 80 | Medium-High |

5.1 Summary of Impacts and Mitigation Measures

Table 52. Mitigation and Enhancement Measures (MEMs)

| Impacts | Impact Source | Mitigation |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction | | |
| Water Quality | <ul style="list-style-type: none"> - Digging the soil - Removing the soil - Excavation the sediment - Removal of sediments and their transportation - Discharge of sewage - Domestic waste water | <ol style="list-style-type: none"> 1. Dredging management plan should be adopted 2. Dredged materials should be disposed to designated area systematically 3. Avoiding washing the sweepings into street or storm drain 4. Regular monitoring of drainage water at the outlets toward the Yangon river 5. Training workers to minimize water use and clean equipment in a manner that minimizes discharges to receiving waters 6. To build adequate drainages in the project area |
| Air Emission | <ul style="list-style-type: none"> - Driving machine and moving machinery - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris - Construction activities | <ol style="list-style-type: none"> 1. Places of dust emission during earth works must be sprayed with water at least two times a day 2. A speed limit of 15 km/hr must be set for vehicles travelling within the project site 3. Providing necessary PPE for workers 4. Regular inspection and supervision of the use of PPE 5. Regular sweeping of material handling areas 6. Regular inspection and maintenance of machines and equipments |
| Solid Waste | <ul style="list-style-type: none"> - Digging the soil - Removing the soil | <ol style="list-style-type: none"> 1. Systematic disposal of waste at waste disposal site |

| | | |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> - Excavation the sediment - Removal of sediments and their transportation - Transportation and storage of construction materials and debris - Removal of vegetation and tree cutting - Debris disposal - General waste from labour camp | <ol style="list-style-type: none"> 2. Operational design and planning for the reduction of solid waste production should be implement 3. Hazardous and non-hazardous waste management plan should be adopted 4. Providing adequate skips and waste bins 5. Carrying out regular cleaning works |
| Noise and Vibration | <ul style="list-style-type: none"> -Driving machines and moving machinery - Piling - Operation of construction machinery - Handling of heavy machinery and equipment - Transportation of construction materials and debris - Construction activities | <ol style="list-style-type: none"> 1. Preventing unnecessary mechanical noise by carrying out regular maintenance work for vehicle and machinery 2. Selecting equipment with lower sound power levels 3. Installing vibration isolation for mechanical equipment 4. Coordinating and scheduling offshore piling and dredging activities 5. Employing observers during offshore piling and dredging activities 6. Using soft-start/slow ramp-up during pile driving and dredging activities |
| Biodiversity | <ul style="list-style-type: none"> - Dredging activities - Removal of vegetation and tree cutting - Construction activities | <ol style="list-style-type: none"> 1. Areas of high biodiversity value and/or areas used by aquatic life for feeding and breeding and as migration routes should be identified 2. The timing of dredging activities should consider seasonal factors such as migration periods 3. Monitoring of dredged materials not to pollution of water |

| | | |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hydrology | <ul style="list-style-type: none"> - Dredging activities - Removal of sediments | <ol style="list-style-type: none"> 1. Monitoring of dredging and dredged materials |
| OSH | <ul style="list-style-type: none"> - Contact with moving machinery and equipment - Handling of heavy machinery and equipment - Construction activities | <ol style="list-style-type: none"> 1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Educating workers with workplace safety practices 4. Regular inspection and supervision for following workplace safety practices 5. SOP of emergency preparedness and response plan should be implemented 6. Providing necessary OSH trainings for workers 7. Setting, educating, monitoring and control of a vehicle speed limit of 15 km/hr within project compound 8. Installing and regular maintenance of back gear warning alarm in every vehicle 9. Regular maintenance of vehicles |
| Operation | | |
| Water Quality | <ul style="list-style-type: none"> - Mixing of dredging and disposal of dredged materials - Ship sewage - Domestic Waste water - Vessel cleaning water - Storm water | <ol style="list-style-type: none"> 1. Avoid installing storm drainage catch basins that discharge directly into surface waters 2. Install filter mechanisms to prevent sediment and particulates from reaching the surface water 3. Install oil/grit or oil/water separators in all runoff collection areas 4. Regularly maintain oil/water separators and trapping catch basins 5. Avoid directly discharge of vessel washing water to the river |

| | | |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 6. Sewage from ships should be collected and treated on-site or off-site according to the recommendations of YCDC |
| Air Emission | <ul style="list-style-type: none"> - Driving machine and moving machinery - Handling of heavy machinery and equipment - Transportation and storage of materials - Fumes emissions from vessels | <ol style="list-style-type: none"> 1. Cover storage and handling areas, where practicable 2. Regularly sweep docks and handling areas 3. A speed limit of 15 km/hr must be set for vehicles travelling within the project site 4. Ensure that hatches are covered when material handling is not being conducted 5. Cover transport vehicles 6. Maintain cargo transfer equipment in good working condition to reduce air emissions 7. Encourage reduced engine idling during on- and off-loading activities |
| Solid Waste | <ul style="list-style-type: none"> - General waste from vessels | <ol style="list-style-type: none"> 1. Information should be available for ship captains to identify solid waste reception facilities and acceptable handling procedures at ports 2. Discharge of solid waste from vessels should be prohibited while in port in accordance with the regulations announced from Myanmar Port Authority and YCDC 3. Food waste from ships delivered to the port 4. Systematic disposal of waste 5. Providing adequate skips and waste bins 6. Carrying out regular cleaning works |
| Noise and Vibration | <ul style="list-style-type: none"> -Driving machines and moving machinery | <ol style="list-style-type: none"> 1. Establishing noise deflection walls 2. Replacing forklifts and reach-stackers with gantry cranes with rubber tires |

| | | |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> - Handling of heavy machinery and equipment - Transportation and storage of materials | <ol style="list-style-type: none"> 3. Substituting diesel engines with electric power 4. Reducing noise from warning bells 5. Insulating machinery |
| Hydrology | <ul style="list-style-type: none"> - Dredging activities - Removal of sediments | <ol style="list-style-type: none"> 1. Monitoring of dredging and dredged materials |
| OSH | <ul style="list-style-type: none"> - Contact with moving machinery and equipment - Handling of heavy machinery and equipment - Accidents with heavy machinery and equipment | <ol style="list-style-type: none"> 1. Development of, and compliance with, traffic regulation and rules 2. Preparation of working rules in the port area and provision of education to port workers 3. Providing necessary PPE for workers 4. Regular inspection and supervision of the use of PPE 5. Installation of proper signboard for safety and security 6. Minimize the risk of free fall of materials by installing telescoping arm loaders and conveyors; inspect all slings before use 7. Preparation of security boats, life jackets, medical box and so on |
| Hazardous materials and oil | <ul style="list-style-type: none"> - Spillage of fuel, oil, used oil | <ol style="list-style-type: none"> 1. Systematic storage of fuel 2. Regular inspections of fuel storage materials 3. Systematic operation of driving machines and engines 4. Regular inspections and monitoring of driving machines and engines |

Table 53. Assessment of the Significance of the Impacts with MEMs

| Sr | Impact | Severity | Duration | Spatial Scope | Frequency | Probability | Total Rating | Significance Level |
|---------------------|-----------------------------|----------|----------|---------------|-----------|-------------|--------------|--------------------|
| Construction | | | | | | | | |
| 1 | Water Quality | 3 | 3 | 3 | 4 | 4 | 72 | Low-Medium |
| 2 | Air Emission | 3 | 3 | 3 | 4 | 4 | 72 | Low-Medium |
| 3 | Solid waste | 2 | 4 | 3 | 4 | 4 | 72 | Low-Medium |
| 4 | Noise and vibration | 2 | 3 | 2 | 4 | 3 | 49 | Low |
| 5 | Biodiversity | 2 | 4 | 3 | 3 | 3 | 54 | Low-Medium |
| 6 | Hydrology | 2 | 4 | 3 | 3 | 3 | 54 | Low-Medium |
| 7 | OSH | 2 | 4 | 1 | 4 | 3 | 49 | Low |
| Operation | | | | | | | | |
| 1 | Water Quality | 2 | 4 | 3 | 4 | 4 | 72 | Low-Medium |
| 2 | Air Emission | 2 | 4 | 1 | 4 | 3 | 49 | Low |
| 3 | Solid waste | 2 | 4 | 2 | 4 | 4 | 64 | Low-Medium |
| 4 | Noise and vibration | 2 | 4 | 2 | 4 | 3 | 56 | Low-Medium |
| 5 | Hydrology | 2 | 4 | 3 | 4 | 3 | 63 | Low-Medium |
| 6 | OSH | 3 | 4 | 2 | 4 | 3 | 63 | Low-Medium |
| 7 | Hazardous materials and oil | 2 | 4 | 3 | 4 | 4 | 72 | Low-Medium |

5.2 Management and Monitoring Plan

Management and Monitoring Plans are to address and satisfy directly for all applicable environmental management and monitoring issues which are

1. Water Quality
2. Air Emissions
3. Solid Waste
4. Noise and Vibration
5. Biodiversity
6. Hydrology
7. OSH
8. Hazardous Materials and Oil

5.2.1 Water Quality

Yangon river water can be contaminated by dredging and disposal of dredged materials. The contaminated water can be discharged the suspended solids from dredging, vessel washing water, sewage and domestic water.

Table 54. Objective and Legal Requirements for Water Quality

| | | |
|---|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Objectives | To carry out operation and maintenance of existing waste water treatment system so that treated water is in compliance with NEQG guideline values |
| 2 | Legal Requirements | 1. Environmental Conservation Law Paragraph (14, 15) 2. NEQG Paragraph (2.3.1.8) |
| 3 | Mitigation Measure | 1. Dredging management plan should be adopted 2. Dredged materials should be disposed to designated area systematically 3. Avoiding washing the sweepings into street or storm drain 4. Regular monitoring of drainage water at the outlets toward the Yangon river 5. Training workers to minimize water use and clean equipment in a manner that minimizes discharges to receiving waters |

| | |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>6. To build adequate drainages in the project area</p> <p>7. Avoid installing storm drainage catch basins that discharge directly into surface waters</p> <p>8. Install filter mechanisms to prevent sediment and particulates from reaching the surface water</p> <p>9. Install oil/grit or oil/water separators in all runoff collection areas</p> <p>10. Regularly maintain oil/water separators and trapping catch basins</p> <p>11. Avoid directly discharge of vessel washing water to the river</p> <p>12. Sewage from ships should be collected and treated on-site or off-site according to the recommendations of YCDC</p> |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 55. Management Actions for Water Quality

| Sr. | Mitigation Measures | Management Actions |
|------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 1 | Dredging management plan should be adopted | 1. Implementation of Dredging Management Plan |
| 2 | Dredged materials should be disposed to designated area systematically | 1. Dredged materials should be designated at pot hole recommendation by Port Authority |
| 3 | Avoiding washing the sweepings into street or storm drain | 1. Avoiding washing the sweepings into Yangon River |
| 4 | Regular monitoring of drainage water at the outlets toward the Yangon river | 1. Monitoring of drainage water at the outlets towards the Yangon river to meet NEQG guidelines |
| 5 | Training workers to minimize water use and clean equipment in a manner that minimizes discharges to receiving waters | 1. Training workers to minimize water use and clean equipment in a manner that minimizes discharges to receiving waters |

| | | |
|----|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 6 | To build adequate drainages in the project area | 1. Construction of dedicated drainage network for storm water and surface water run off |
| | | 2. Installation of sediment traps along water drainages including fascines, silt facines and vegetation traps |
| 7 | Avoid by installing storm drainage catch basins that discharge directly into surface waters | 1. Installing storm water drainage catch basins |
| 8 | Install oil/grit or oil/water separators in all runoff collection areas | 1. Installing oil-grit/sand-grit separator |
| 9 | Regularly maintain oil/water separators and trapping catch basins | 1. Regularly inspection and maintenance of oil/water separators and trapping catch basins |
| 10 | Avoid directly discharge of vessel washing water to the river | 1. Educationg the workers for avoiding directly discharge of vessels washing water to the river |
| | | 2. Implementation SOP for vessel washing |
| | | 3. Regular inspection at the time vessel washing |
| 11 | Sewage from ships should be collected and treated on-site or off-site according to the recommendations of YCDC | 1. Sewage should be collected by the recommendation of YCDC |
| | | 2. Regular monitoring and maintenance of discharge water in compliance with NEQG guidelines |

Table 56. Implementation Plan for Water Quality

| Sr. | Management Action | Frequency | Duration | Responsibility |
|-----|--------------------------------------------|-----------|--------------|-------------------------|
| 1 | Implementation of Dredging Management Plan | Once | Project life | Construction Contractor |

| | | | | |
|---|----------------------------------------------------------------------------------------------------------------------|---------|--------------|-------------------------|
| 2 | Dredged materials should be designated at pot hole recommendation by Port Authority | Weekly | Project life | Construction Contractor |
| 3 | Avoiding washing the sweepings into Yangon River | Daily | Project life | MAAT |
| 4 | Monitoring of drainage water at the outlets towards the Yangon river to meet NEQG guidelines | Monthly | Project life | MAAT |
| 5 | Training workers to minimize water use and clean equipment in a manner that minimizes discharges to receiving waters | Once | Project life | MAAT |
| 6 | Construction of dedicated drainage network for storm water and surface water run off | Once | Project life | MAAT |
| 7 | Installation of sediment traps along water drainages including fascines, silt facines and vegetation traps | Once | Project life | MAAT |
| 8 | Installing oil-grit/sand-grit sperator | Once | Project life | MAAT |
| 9 | Regularly inspection and maintenance of oil/water separators and trapping catch basins | Weekly | Project life | MAAT |

| | | | | |
|----|----------------------------------------------------------------------------------------------|---------|--------------|------|
| 10 | Educationg the workers for avoiding directly discharge of vessels washing water to the river | Once | Project life | MAAT |
| 11 | Implementation SOP for vessel washing | Once | Project life | MAAT |
| 12 | Regular inspection at the time vessel washing | Weekly | Project life | MAAT |
| 13 | Regular monitoring and maintenance of discharge water in compliance with NEQG guidelines | Monthly | Project life | MAAT |

Table 57. Monitoring Plan for Waste Water Generation

| Sr. | Parameter | Location | Frequency | Responsibility |
|------------|----------------------------------|----------------------------------|------------------|-----------------------|
| 1 | 5- day Biochemical Oxygen Demand | Final discharge from the project | Monthly | MAAT |
| 2 | Chemical Oxygen Demand (COD) | Final discharge from the project | Monthly | MAAT |
| 3 | pH | Final discharge from the project | Monthly | MAAT |
| 4 | Total Coliform bacteria | Final discharge from the project | Monthly | MAAT |
| 5 | Total Suspended solids | Final discharge from the project | 6 Monthly | MAAT |
| 6 | Total Nitrogen | Final discharge from the project | 6 Monthly | MAAT |
| 7 | Total Phosphorous | Final discharge from the project | 6 Monthly | MAAT |
| 8 | Oil and Grease | Final discharge from the project | 6 Monthly | MAAT |

Table 58. Projected Budget for Water Quality

| Sr. | Management Actions | Budget |
|------------|----------------------------------------------------------------------------------------------------------------------|---------------|
| 1 | Implementation of Dredging Management Plan | - |
| 2 | Dredged materials should be designated at pot hole recommendation by Port Authority | - |
| 3 | Avoiding washing the sweepings into Yangon River | - |
| 4 | Monitoring of drainage water at the outlets towards the Yangon river to meet NEQG guidelines | 1,000,000/yr |
| 5 | Training workers to minimize water use and clean equipment in a manner that minimizes discharges to receiving waters | - |
| 6 | Construction of dedicated drainage network for storm water and surface water run off | 1,000,000 |
| 7 | Installation of sediment traps along water drainages including fascines, silt facines and vegetation traps | 500,000 |
| 8 | Installing oil-grit/sand-grit separator | 4,200,000 |
| 9 | Regularly inspection and maintenance of oil/water separators and trapping catch basins | - |
| 10 | Educationg the workers for avoiding directly discharge of vessels washing water to the river | - |
| 11 | Implementation SOP for vessel washing | - |
| 12 | Regular inspection at the time vessel washing | - |

5.2.2 Air Emissions

The main sources of emission from the project was dust emissions from piling, transporting and storage of materials. The other emissions from the project is fumes emissions from driving machines and vehicles. The emissions of fugitive dust from earth works and processing equipment should be compliance with NEQG Guideline.

Table 59. Objective and Legal Requirements for Air Emissions

| | | |
|---|--------------------|------------------------------------------------------------------------------|
| 1 | Objectives | To provide a regular air quality monitoring and gas leakage detection system |
| 2 | Legal Requirements | 1. Environmental Conservation Law Paragraph (14, 15) |

| | | |
|---|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 2. NEQG Paragraph (1.1) |
| 3 | Mitigation Measure | <ol style="list-style-type: none"> 1. Places of dust emission during earth works must be sprayed with water at least two times a day 2. A speed limit of 15 km/hr must be set for vehicles travelling within the project site 3. Providing necessary PPE for workers 4. Regular inspection and supervision of the use of PPE 5. Regular sweeping of material handling areas 6. Regular inspection and maintenance of machines and equipments 7. Cover storage and handling areas, where practicable 8. Ensure that hatches are covered when material handling is not being conducted 9. Cover transport vehicles 10. Maintain cargo transfer equipment in good working condition to reduce air emissions |

Table 60. Management Actions for Air Emissions

| Sr. | Mitigation Measures | Management Actions |
|-----|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 1 | Places of dust emission during earth works must be sprayed with water at least two times a day | 1. Checking workplace daily |
| 2 | A speed limit of 15 km/hr must be set for vehicles travelling within the project site | 1. Checking workplace daily for speed of limit 15 km/hr |
| 3 | Providing necessary PPE for workers | 1. Providing face mask, hand glove, safety boot and helmet adequately for workers working at construction areas |
| 4 | Regular inspection and supervision of the use of PPE | 1. Educating workers about workplace safety practices and use of PPE |
| | | 2. Regular inspection and supervision of PPE usage |
| 5 | Regular sweeping of material handling areas | 1. Regular sweeping at construction areas |
| | | 2. Regular inspection and supervision of sweeping and cleaning works |

| | | |
|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 6 | Regular inspection and maintenance of machines and equipments | 1. Carrying out regular maintenance of machines and equipment |
| 7 | Cover storage and handling areas, where practicable | 1. Covering of storage and handling area where practicable |
| 8 | Ensure that hatches are covered when material handling is not being conducted | 1. Regular inspection of material handling area |
| 9 | Cover transport vehicles | 1. Installing cover in transport vehicles |
| 10 | Maintain cargo transfer equipment in good working condition to reduce air emissions | 1. Regular inspection and maintenance of cargo transfer equipment |

Table 61. Implementation Plan for Air Emissions

| Sr. | Management Action | Frequency | Duration | Responsibility |
|------------|--------------------------------------------------------------------------------------------------------------|------------------|-----------------|-----------------------|
| 1 | Checking workplace daily | Daily | Project Life | MAAT |
| 2 | Checking workplace daily for speed of limit 15 km/hr | Daily | Project Life | MAAT |
| 3 | Providing face mask, hand glove, safety boot and helmet adequately for workers working at construction areas | Annually | Project Life | MAAT |
| 4 | Educating workers about workplace safety practices and use of PPE | Once | Project Life | MAAT |
| 5 | Regular inspection and supervision of PPE usage | Daily | Project Life | MAAT |
| 6 | Regular sweeping at construction areas | Daily | Project Life | MAAT |
| 7 | Regular inspection and supervision of sweeping and cleaning works | Daily | Project Life | MAAT |

| | | | | |
|----|-------------------------------------------------------------------|--------|--------------|------|
| 8 | Carrying out regular maintenance of machines and equipment | Weekly | Project Life | MAAT |
| 9 | Covering of materials storage and handling area where practicable | Daily | Project Life | MAAT |
| 10 | Regular inspection of material handling area | Daily | Project Life | MAAT |
| 11 | Installing cover in transport vehicles | Once | Project Life | MAAT |
| 12 | Regular inspection and maintenance of cargo transfer equipment | Daily | Project Life | MAAT |

Table 62. Monitoring Plan for Air Emissions

| Sr. | Parameter | Location | Frequency | Responsibility |
|------------|-------------------|-------------------------|------------------|-----------------------|
| 1 | Nitrogen dioxide | Within project compound | Bi-annually | MAAT |
| 2 | Ozone | Within project compound | Bi-annually | MAAT |
| 3 | PM ₁₀ | Within project compound | Bi-annually | MAAT |
| 4 | PM _{2.5} | Within project compound | Bi-annually | MAAT |
| 5 | Sulfur dioxide | Within project compound | Bi-annually | MAAT |

Table 63. Project Budget for Air Emissions

| Sr. | Management Actions | Budget |
|------------|--------------------------------------------------------------------------------------------------------------|---------------|
| 1 | Checking workplace daily | - |
| 2 | Checking workplace daily for speed of limit 15 km/hr | - |
| 3 | Providing face mask, hand glove, safety boot and helmet adequately for workers working at construction areas | 600000/yr |

| | | |
|----|-------------------------------------------------------------------|--------------|
| 4 | Educating workers about workplace safety practices and use of PPE | - |
| 5 | Regular inspection and supervision of PPE usage | - |
| 6 | Regular sweeping at construction areas | 300000/yr |
| 7 | Regular inspection and supervision of sweeping and cleaning works | - |
| 8 | Carrying out regular maintenance of machines and equipment | 5,000,000/yr |
| 9 | Covering of materials storage and handling area where practicable | 500000 |
| 10 | Regular inspection of material handling area | - |
| 11 | Installing cover in transport vehicles | 500000 |
| 12 | Regular inspection and maintenance of cargo transfer equipment | - |

5.2.3 Solid Waste

Dredged materials and sediments are the main solid wastes produced by jetty construction and operation activities. (35000-40000) m³ of dredged materials was extracted from dredging activities. MAAT will be discharged these dredged materials to the pot hole by the recommendation of Myanmar Port Authority.

Table 64. Objective and Legal Requirements for Solid Waste

| | | |
|---|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Objectives | To prevent and reduce environmental impacts from solid waste by providing a systematic management plan |
| 2 | Legal Requirements | 1. Environmental Conservation Law Paragraph (14, 15) 2. 1951 Project Act Paragraph (14A) |
| 3 | Mitigation Measure | 1. Systematic disposal of waste at waste disposal site 2. Operational design and planning for the reduction of solid waste production should be implemented 3. Hazardous and non-hazardous waste management plan should be adopted 4. Providing adequate skips and waste bins 5. Carrying out regular cleaning works |

| | |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>6. Information should be available for ship captains to identify solid waste reception facilities and acceptable handling procedures at ports</p> <p>7. Discharge of solid waste from vessels should be prohibited while in port in accordance with the regulations announced from Myanmar Port Authority and YCDC</p> <p>8. Food waste from ships delivered to the port</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 65. Management Actions for Solid Waste

| Sr. | Mitigation Measures | Management Actions |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1 | Systematic disposal of waste at waste disposal site | 1. Systematic disposal of (35000-4000) m ³ of dredged sediments at port hole recommendations by Myanmar Port Authority |
| 2 | Operational design and planning for the reduction of solid waste production should be implemented | 1. Implementation for SOP for solid waste management procedure |
| 3 | Hazardous and non-hazardous waste management plan should be adopted | 1. Implementation of hazardous and non-hazardous waste management plan |
| 4 | Providing adequate skips and waste bins | 1. Providing adequate waste bins both on the vessels and jetty |
| 5 | Carrying out regular cleaning works | 1. Checking workplace daily |
| 6 | Information should be available for ship captains to identify solid waste reception facilities and acceptable handling procedures at ports | 1. Checking workplace daily |
| 7 | Discharge of solid waste from vessels should be prohibited while in port in accordance with the regulations implemented from Myanmar Port Authority and YCDC | 1. Implementation of solid waste management plan by the regulations of Myanmar Port Authority and YCDC |

| | | |
|---|---------------------------------------------|-----------------------------|
| 8 | Food waste from ships delivered to the port | 1. Checking workplace daily |
|---|---------------------------------------------|-----------------------------|

Table 66. Monitoring Plan for Solid Waste

| Sr. | Management Action | Frequency | Duration | Responsibility |
|-----|-------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-------------------------|
| 1 | Systematic disposal of (35000-4000) m ³ of dredged sediments at pot hole recommendations by Myanmar Port Authority | Weekly | Project life | Construction Contractor |
| 2 | Implementation for SOP for solid waste management procedure | Once | Project life | Construction Contractor |
| 3 | Implementation of hazardous and non-hazardous waste management plan | Once | Project life | Construction Contractor |
| 4 | Providing adequate waste bins both on the vessels and jetty | Once/Annual recheck | Project life | Admin Dept |
| 5 | Checking workplace daily | Daily | Project life | MAAT |
| 6 | Implementation of solid waste management plan by the regulations of Myanmar Port Authority and YCDC | Once | Project Life | MAAT |

Table 67. Projected Budget for Solid Waste

| Sr. | Management Actions | Budget |
|-----|--------------------------------------------------------------------------------------------------------------------------------|--------|
| 1 | Systematic disposal of (35000-40000) m ³ of dredged sediments at pot hole recommendations by Myanmar Port Authority | - |
| 2 | Implementation for SOP for solid waste management procedure | - |

| | | |
|---|-----------------------------------------------------------------------------------------------------|------------|
| 3 | Implementation of hazardous and non-hazardous waste management plan | - |
| 4 | Providing adequate waste bins both on the vessels and jetty | 300,000/yr |
| 5 | Checking workplace daily | - |
| 6 | Implementation of solid waste management plan by the regulations of Myanmar Port Authority and YCDC | - |

5.2.4 Noise and Vibration

Noise emissions are commonly associated with all jetty construction and operation activities. Noise is produced during all phase of construction. The most vibration emissions from quarrying project site was vibrated from piling activities.

Table 68. Objective and Legal Requirements for Noise and Vibration

| | | |
|---|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Objectives | To prevent and reduce occupational hazard from noise and vibration by implementing a systematic management plan |
| 2 | Legal Requirements | 1. NEQG paragraph (1.3) |
| 3 | Mitigation Measure | <ol style="list-style-type: none"> 1. Preventing unnecessary mechanical noise by carrying out regular maintenance work for vehicle and machinery 2. Selecting equipment with lower sound power levels 3. Installing vibration isolation for mechanical equipment 4. Coordinating and scheduling offshore piling and dredging activities 5. Employing observers during offshore piling and dredging activities 6. Using soft-start/slow ramp-up during pile driving and dredging activities 7. Replacing forklifts and reach-stackers with gantry cranes with rubber tires 8. Substituting diesel engines with electric power 9. Reducing noise from warning bells 10. Insulating machinery |

Table 69. Management Actions for Noise and Vibration

| Sr. | Mitigation Measures | Management Actions |
|-----|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 1 | Preventing unnecessary mechanical noise by carrying out regular maintenance work for vehicle and machinery | 1. Regular inspection and maintenance of vehicle and machinery |
| 2 | Selecting equipment with lower sound power levels | 1. Using equipment with lower sound power levels |
| 3 | Installing vibration isolation for mechanical equipment | 1. Installing vibration isolation in piling equipments |
| 4 | Coordinating and scheduling offshore piling and dredging activities | 1. Implementation of schedule for piling and dredging activities |
| 5 | Employing observers during offshore piling and dredging activities | 1. Setting vehicle speed limit of 15 km/hr within project compound |
| 6 | Using soft-start/slow ramp-up during pile driving and dredging activities | 1. Using soft-start/slow ramp-up during pile driving and dredging activities |
| 7 | Replacing forklifts and reach-stackers with gantry cranes with rubber tires | 1. Replacing forklifts and reach-stackers with gantry cranes with rubber tires |
| 8 | Substituting diesel engines with electric power | 1. Substituting diesel engines with electric power |
| 9 | Reducing noise from warning bells | 1. Warning bell should be used for necessary condition |
| 10 | Insulating machinery | 1. Incorporating silencer/ Muffler with engines and generator sets |
| | | 2. Checking workplace daily for physical condition of silencer/muffer |

Table 70. Monitoring Plan for Noise and Vibration

| Sr. | Management Action | Frequency | Duration | Responsibility |
|------------|-----------------------------------------------------------------------------|------------------|-----------------|-------------------------|
| 1 | Regular inspection and maintenance of vehicle and machinery | Monthly | Project Life | Admin Dept |
| 2 | Using equipment with lower sound power levels | Once | Project Life | MAAT |
| 3 | Installing vibration isolation in piling equipments | Once | Project life | MAAT |
| 4 | Implementation of schedule for piling and dredging activities | Once | Project life | Construction Contractor |
| 5 | Setting vehicle speed limit of 15 km/hr within project compound | Daily | Project life | MAAT |
| 6 | Using soft-start/slow ramp-up during pile driving and dredging activities | Once | Project life | Construction Contractor |
| 7 | Replacing forklifts and reach-stackers with gantry cranes with rubber tires | Daily | Project life | MAAT |
| 8 | Substituting diesel engines with electric power | Once | Project life | MAAT |
| 9 | Warning bell should be used for necessary condition | Daily | Project life | MAAT |
| 10 | Incorporating silencer/ Muffler with engines and generator sets | Once | Project life | MAAT |

| | | | | |
|----|--------------------------------------------------------------------|-------|--------------|------|
| 11 | Checking workplace daily for physical condition of silencer/muffer | Daily | Project life | MAAT |
|----|--------------------------------------------------------------------|-------|--------------|------|

Table 71. Projected budget for Noise and Vibration

| Sr. | Management Actions | Budget |
|-----|-----------------------------------------------------------------------------|--------------|
| 1 | Regular inspection and maintenance of vehicle and machinery | 1,000,000/yr |
| 2 | Using equipment with lower sound power levels | - |
| 3 | Installing vibration isolation in piling equipments | - |
| 4 | Implementation of schedule for piling and dredging activities | - |
| 5 | Setting vehicle speed limit of 15 km/hr within project compound | - |
| 6 | Using soft-start/slow ramp-up during pile driving and dredging activities | - |
| 7 | Replacing forklifts and reach-stackers with gantry cranes with rubber tires | - |
| 8 | Substituting diesel engines with electric power | - |
| 9 | Warning bell should be used for necessary condition | - |
| 10 | Incorporating silencer/ Muffler with engines and generator sets | 1,000,000 |
| 11 | Checking workplace daily for physical condition of silencer/muffer | - |

5.2.5 Biodiversity

Loss of flora and fauna can be occurred by land clearing activities. This can cause the impacts on biodiversity. To prevent this condition, employess couldn't be harvested projects for personal use and project owners should be recultivation for damaging trees. For aquatic life, dredged sediments shoulbe be discharged to the pot hole systematically.

Table 72. Objective and Legal Requirements for Biodiversity

| | | |
|---|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Objectives | To reclaim ecosystems as may be possible which are starting to degenerate and disappear |
| 2 | Legal Requirements | 1. Environmental Conservation Law Paragraph (14, 15, 16) |
| 3 | Mitigation Measure | 1. Areas of high biodiversity value and/or areas used by aquatic life for feeding and breeding and as migration routes should be identified 2. The timing of dredging activities should consider seasonal factors such as migration periods 3. Monitoring of dredged materials not to pollution of water |

Table 73. Management Actions for Biodiversity

| Sr. | Mitigation Measures | Management Actions |
|-----|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Areas of high biodiversity value and/or areas used by aquatic life for feeding and breeding and as migration routes should be identified | 1. Areas of high biodiversity value and/or areas used by aquatic life for feeding and breeding and as migration routes should be identified |
| 2 | The timing of dredging activities should consider seasonal factors such as migration periods | 1. The timing of dredging activities should consider seasonal factors such as migration periods |
| 3 | Monitoring of dredged materials not to pollution of water | 1. Implementation SOP for dredging and management of dredged materials |

Table 74. Monitoring Plan for Biodiversity

| Sr. | Management Action | Frequency | Duration | Responsibility |
|-----|-------------------------------------------------------|-----------|--------------|-------------------------|
| 1 | Areas of high biodiversity value and/or areas used by | Once | Project Life | Hydrological Consultant |

| | | | | |
|---|----------------------------------------------------------------------------------------------|--------|--------------|-------------------------|
| | aquatic life for feeding and breeding and as migration routes should be identified | | | |
| 2 | The timing of dredging activities should consider seasonal factors such as migration periods | Montly | Project Life | Hydrological Consultant |
| 3 | Implementation SOP for dredging and management of dredged materials | Once | Project Life | Construction Contractor |

Table 75. Projected Budget for Biodiversity

| Sr. | Management Actions | Budget |
|------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1 | Areas of high biodiversity value and/or areas used by aquatic life for feeding and breeding and as migration routes should be identified | - |
| 2 | The timing of dredging activities should consider seasonal factors such as migration periods | - |
| 3 | Implementation SOP for dredging and management of dredged materials | - |

5.2.6 Hydrology

Marine hydrology such as flow of river could be effected by dismanagement of dredged sediments.

Table 76. Objective and Legal Requirements for Hydrology

| | | |
|---|--------------------|------------------------------------------------------|
| 1 | Objectives | To prevent marine hydrology |
| 2 | Legal Requirements | 1. Environmental Conservation Law Paragraph (14, 15) |
| 3 | Mitigation Measure | 1. Monitoring of dredging and dredged materials |

Table 77. Management Actions for Hydrology

| Sr. | Mitigation Measures | Management Actions |
|------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 1 | Monitoring of dredging and dredged materials | 1. Implementation SOP for dredging and management of dredged materials 2. Checking workplace daily |

Table 78. Monitoring Plan for Hydrology

| Sr. | Management Action | Frequency | Duration | Responsibility |
|------------|---------------------------------------------------------------------|------------------|-----------------|-------------------------|
| 1 | Implementation SOP for dredging and management of dredged materials | Once | Project Life | Construction Contractor |
| 2 | Checking workplace daily | Daily | Project Life | MAAT |

Table 79. Projected Budget for Chemical Hazard

| Sr. | Management Actions | Budget |
|------------|---------------------------------------------------------------------|---------------|
| 1 | Implementation SOP for dredging and management of dredged materials | - |
| 2 | Checking workplace daily | - |

5.2.7 OSH

Physical injury can be occurring during jetty construction and operation activities. All of the activities of jetty project site should be compliance with OSH Law, Public Health Law, Environmental Conservation laws, Rules and EIA Procedures.

Table 80. Objective and legal requirements for OSH

| | | |
|---|--------------------|--------------------------------------------------------------------------------------------------------------------|
| 1 | Objectives | To prevent and reduce occupational hazard by the implementation of a systematic OSH management and monitoring plan |
| 2 | Legal Requirements | 1. 1951 Project Act (Chapter 3, Chapter 4) 2. OSH Law Paragraph (12, Chapter 8, Chapter 10) |

| | | |
|---|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Mitigation Measure | <ol style="list-style-type: none"> 1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Educating workers with workplace safety practices 4. Regular inspection and supervision for following workplace safety practices 5. SOP of emergency preparedness and response plan should be implemented 6. Providing necessary OSH trainings for workers 7. Setting, educating, monitoring and control of a vehicle speed limit of 15 km/hr within project compound 8. Installing and regular maintenance of back gear warning alarm in every vehicle 9. Regular maintenance of vehicles 10. Development of, and compliance with, traffic regulation and rules 11. Installation of proper signboard for safety and security 12. Minimize the risk of free fall of materials by installing telescoping arm loaders and conveyors; inspect all slings before use 13. Preparation of security boats, life jackets, medical box and so on |
|---|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 81. Management Actions for OSH

| Sr. | Mitigation Measures | Management Actions |
|-----|-------------------------------------------------------|-------------------------------------------|
| 1 | Providing necessary PPE for workers | 1. Providing 50 necessary PPE for workers |
| 2 | Regular inspection and supervision of the use of PPE. | 1. Checking workplace daily |

| | | |
|----|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Educating workers with workplace safety practices | 1. Providing necessary OSH training |
| 4 | Regular inspection and supervision for following workplace safety practices | 1. Daily inspection and supervision for conforming workplace safety practices |
| 5 | SOP of emergency preparedness and response plan should be implemented | 1. Implementation of SOP for emergency preparedness and response plan |
| 6 | Providing necessary OSH trainings for workers | 1. Providing necessary OSH trainings for workers |
| 7 | Setting, educating, monitoring and control of a vehicle speed limit of 15 km/hr within project compound | 1. Setting vehicle speed limit of 15km/hr within project compound 2. Educating drivers for safe driving practice within drive compound 3. Monitoring and control of the vehicle speed limit of 15 km/hr within project compound |
| 8 | Installing and regular maintenance of back gear warning alarm in every vehicle | 1. Installing and regular maintenance of back gear warning alarm in every vehicle |
| 9 | Regular maintenance of vehicles | 1. Carrying out regular maintenance of vehicles |
| 10 | Development of, and compliance with, traffic regulation and rules | 1. Compliance of traffic regulation and rules |
| 11 | Installation of proper signboard for safety and security | 1. Installation of proper signboard within the project compound for safety and security |
| 12 | Minimize the risk of free fall of materials by installing telescoping arm loaders and conveyors; inspect all slings before use | 1. Installing telescoping arm loaders and conveyors |
| 13 | Preparation of security boats, life jackets, medical box and so on | 1. Providing of security boats, life jackets, medical box and so on |

Table 82. Monitoring Plan for OSH

| Sr. | Management Action | Frequency | Duration | Responsibility |
|------------|---------------------------------------------------------------------------------------|-----------------------------|-----------------|-----------------------|
| 1 | Providing 50 necessary PPE for workers | Once/ Required as necessary | Project life | MAAT |
| 2 | Checking workplace daily | Daily | Project life | MAAT |
| 3 | Providing necessary OSH training | Once | Project life | MAAT |
| 4 | Daily inspection and supervision for conforming workplace safety practices | Daily | Project life | MAAT |
| 5 | Implementation of SOP for emergency preparedness and response plan | Once | Project life | MAAT |
| 6 | Providing necessary OSH trainings for workers | Once | Project Life | MAAT |
| 7 | Setting vehicle speed limit of 15km/hr within project compound | Daily | Project Life | MAAT |
| 8 | Educating drivers for safe driving practice within drive compound | Once | Project Life | MAAT |
| 9 | Monitoring and control of the vehicle speed limit of 15 km/hr within project compound | Daily | Project Life | MAAT |
| 10 | Installing and regular maintenance of back gear warning alarm in every vehicle | Once | Project Life | MAAT |
| 11 | Carrying out regular maintenance of vehicles | Monthly | Project Life | MAAT |

| | | | | |
|----|--------------------------------------------------------------------------------------|----------------------------|--------------|------|
| 12 | Compliance of traffic regulation and rules | Daily | Project Life | MAAT |
| 13 | Installation of proper signboard within the project compound for safety and security | Once | Project Life | MAAT |
| 14 | Installing telescoping arm loaders and conveyors | Once | Project Life | MAAT |
| 15 | Providing of security boats, life jackets, medical box and so on | Once/necessary as required | Project Life | MAAT |

Table 83. Projected budget for OSH

| Sr. | Management Actions | Budget |
|------------|---------------------------------------------------------------------------------------|---------------|
| 1 | Providing 50 necessary PPE for workers | 3,000,000 |
| 2 | Checking workplace daily | 500,000/yr |
| 3 | Providing necessary OSH training | 500,000 |
| 4 | Daily inspection and supervision for conforming workplace safety practices | - |
| 5 | Implementation of SOP for emergency preparedness and response plan | 800000/yr |
| 6 | Providing necessary OSH trainings for workers | 4,000,000/yr |
| 7 | Setting vehicle speed limit of 15km/hr within project compound | - |
| 8 | Educating drivers for safe driving practice within drive compound | - |
| 9 | Monitoring and control of the vehicle speed limit of 15 km/hr within project compound | - |
| 10 | Installing and regular maintenance of back gear warning alarm in every vehicle | 600,000 |
| 11 | Carrying out annual overall regular maintenance of vehicles | 2,400,000/yr |
| 12 | Compliance of traffic regulation and rules | - |

| | | |
|----|--------------------------------------------------------------------------------------|-----------|
| 13 | Installation of proper signboard within the project compound for safety and security | 300,000 |
| 14 | Installing telescoping arm loaders and conveyors | - |
| 15 | Providing of security boats, life jackets, medical box and so on | 3,000,000 |

5.2.8 Hazardous Materials and Oil

The storage of fuels can cause the leakage or accidentally releases from tanks, and pipes during loading of fuel and driving machines. The storage of these materials can also be the risk of fire, soil erosion and explosion due to the flammable and combustible nature of the materials stored.

Table 84. Objective and Legal Requirements for Hazardous Materials and Oil

| | | |
|---|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Objectives | To carry out safety for petroleum and petroleum product activities without environmental impacts |
| 2 | Legal Requirements | 1. Petroleum and petroleum products law paragraph (11,12, 16, 17, 18) |
| 3 | Mitigation Measure | 1. Systematic storage of fuel 2. Regular inspections of fuel storage materials 3. Systematic operation of driving machines and engines 4. Regular inspections and monitoring of driving machines and engines |

Table 85. Management Actions for Hazardous Materials and Oil

| Sr. | Mitigation Measures | Management Actions |
|-----|------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1 | Systematic storage of fuel | 1. Fuels should be stored with glass, stone or metal receptacle with secure cap |
| 2 | Regular inspections of fuel storage materials | 1. Regular inspections of fuel storage materials for oil leakage |
| 3 | Systematic operation of driving machines and engines | 1. Educating the employess for the systematic operation of driving machines and engines |

| | | |
|---|-----------------------------------------------------|-----------------------------------------------------------------------|
| 4 | Regular inspections of driving machines and engines | 1. Regular inspections and monitoring of driving machines and engines |
|---|-----------------------------------------------------|-----------------------------------------------------------------------|

Table 86. Monitoring Plan for Hazardous Materials and Oil

| Sr. | Management Action | Frequency | Duration | Responsibility |
|-----|--------------------------------------------------------------------------------------|----------------------|--------------|----------------|
| 1 | Fuels should be stored with glass, stone or metal receptacle with secure cap | Once/ annual recheck | Project life | MAAT |
| 2 | Regular inspections of fuel storage materials for oil leakage | Daily | Project life | MAAT |
| 3 | Educating the employess for the systematic operation of driving machines and engines | Once | Project life | MAAT |
| 4 | Regular inspections and monitoring of driving machines and engines | Daily | Project life | MAAT |

Table 87. Projected Budget for Hazardous Materials and Oil

| Sr. | Management Actions | Budget |
|-----|--------------------------------------------------------------------------------------|-----------|
| 1 | Fuels should be stored with glass, stone or metal receptacle with secure cap | 1,000,000 |
| 2 | Regular inspections of fuel storage materials for oil leakage | - |
| 3 | Educating the employess for the systematic operation of driving machines and engines | - |
| 4 | Regular inspections and monitoring of driving machines and engines | - |

5.3 Projected Budgets

Projected budget for implementation of EMP management actions and monitoring requirements could be summarized from detailed particulars described in

previous section of the report. MAAT Company Limited will allocate 16,100,000 kyats total of one-time cost and 15,900,000 kyats of annual recurring cost for successful implementation and monitoring of the EMP.

Table 88. Project Budgets for Implementation and Monitoring of EMP

| Sr. | Management Actions | Budget |
|------------|--------------------------------------------------------------------------------------------------------------|---------------|
| 1 | Monitoring of drainage water at the outlets towards the Yangon river to meet NEQG guidelines | 1,000,000/yr |
| 2 | Construction of dedicated drainage network for storm water and surface water run off | 1,000,000 |
| 3 | Installation of sediment traps along water drainages including fascines, silt facines and vegetation traps | 500,000 |
| 4 | Installing oil-grit/sand-grit separator | 4,200,000 |
| 5 | Providing face mask, hand glove, safety boot and helmet adequately for workers working at construction areas | 600,000/yr |
| 6 | Regular sweeping at construction areas | 300,000/yr |
| 7 | Carrying out regular maintenance of machines and equipment | 5,000,000/yr |
| 8 | Covering of materials storage and handling area where practicable | 500,000 |
| 9 | Installing cover in transport vehicles | 500,000 |
| 10 | Providing adequate waste bins both on the vessels and jetty | 300,000/yr |
| 11 | Regular inspection and maintenance of vehicle and machinery | 1,000,000/yr |
| 12 | Incorporating silencer/ Muffler with engines and generator sets | 1,000,000 |
| 13 | Providing 50 necessary PPE for workers | 3,000,000 |
| 14 | Checking workplace daily | 500,000/yr |
| 15 | Providing necessary OSH training | 500,000 |
| 16 | Implementation of SOP for emergency preparedness and response plan | 800,000/yr |
| 17 | Providing necessary OSH trainings for workers | 4,000,000/yr |
| 18 | Installing and regular maintenance of back gear warning alarm in every vehicle | 600,000 |
| 19 | Carrying out annual overall regular maintenance of vehicles | 2,400,000/yr |

| | | |
|----------------------|--------------------------------------------------------------------------------------|------------|
| 20 | Installation of proper signboard within the project compound for safety and security | 300,000 |
| 21 | Fuels should be stored with glass, stone or metal receptacle with secure cap | 1,000,000 |
| 22 | Providing of security boats, life jackets, medical box and so on | 3,000,000 |
| Total One Time Cost | | 16,100,000 |
| Total Recurring Cost | | 15,900,000 |

6 Public Consultation and Disclosure

6.1 Objective

In order to acquire public opinion on the implementation of MAAT Jetty project, public consultation works were done firstly disclosing related project information in local community. Public consultation and information disclosure work for MAAT Jetty project were carried out with the following objectives:

- (a) To disseminate the project information, benefits and disadvantages of the project to general public so that they could understand the trade-offs;
- (b) To be able to gain meaningful contribution of informed public; and
- (c) To achieve greater trust of general public with the project proponent by disseminating relevant information.

6.2 Public Consultation Methodology and Approach

6.2.1 Personal Interviews

Personal interviews with local authorities from the three quarters within 5 km of project area were exercised to collect their opinion and suggestions. Then, interested persons from local community were consulted firstly disseminating project information to them and then acquiring their comments and suggestions.

6.2.2 Open Discussion

An agenda was provided for open discussion with local people and representatives from ESIA team and project proponent in both public meetings which were collectively held for three port projects of plot 27, 28 and 29 at Shwe Hmaw Wun

Hall of Kyauktan. Results from the open discussion sessions of the two public meetings are shown in later section.

6.2.3 Information Disclosure

(a) Presentation

Representatives from project proponent and ESIA teams gave presentations about their respective scope of works before general public in both public meetings.

(b) Translated Executive Summary

After the draft ESIA report was compiled, executive summary of the report was translated into Myanmar and the translated documents were delivered to local people and local authorities for their review and comments.

6.3 Public Consultation Meetings

First public meeting for releasing project information to general public requesting their comments and suggestions on the project was carried out on November 8th, 2014 at Shwe Hmaw Wun Hall, Kyauktan Township. There were about 50 people from local community, employees from the project, representatives from the project and representative from Myanmar Engineering Society attended the public meeting and participated in open discussion.

Second public meeting for releasing ESIA study results to general public requesting their comments and suggestions was carried out on May 10th, 2015 at the same venue. There were about 77 people from local community employees from the project, representatives from the project and representatives from Myanmar Engineering Society attended the public meeting and participated in open discussion.

6.3.1 Results of Consultations

Discussions of the local people in the meeting could be summarized as follows.

- (1) Would like to request project proponents from plot 30-33 to make discussions with local farmers as the farmers were affected by those projects
- (2) Local people needed to be informed firstly for new projects and objection will be made for polluting industries such as coal or plastic related factories

- (3) Project proponents from plot 33 and 34 do not discuss with local people and local farmers were affected by them
- (4) Local farmers were affected as an agreement for farmlands between Myanmar Port Authority and local farmers made in May, 2004 was broken
- (5) Future projects were requested to inform local community firstly
- (6) Would like to know that how the current projects will discuss with local farmers, paid compensation and set time frame to settle
- (7) Impact on local fishermen should be considered as the project will take place where fishermen from Bay Pauk village are doing fisheries
- (8) Requested all the project proponents in the whole Thilawar Port Area make a public meeting with local people and make discussions
- (9) There are nine farmers within the area of plot (27, 28 and 29) who were affected since the last three years and requested to handle the impact on them
- (10) Requested to provide resettlement for the farmers who were living on those farmlands
- (11) Requested to delineate the findings of ESIA study
- (12) Requested to provide a communication channel between the project and affected farmers

Discussions in the second public meeting are:

1. Requested to know whether EIA study is done and the results are delineated or not
2. Requested to know how the impacts on farmlands will be mitigated
3. Requested to know how the impacts on fishermen will be mitigated
4. Requested to address the discussions of local people in EIA report

A representative from ECCEA discussed that:

1. The translated executive summary delivered to you is the result of EIA study
2. Mitigation measures for the impacts on farmers and fishermen were delineated in the report and also in the translated executive summary
3. Discussion of local people are addressed both in the ESIA report and in the translated summary as you all can see

6.4 Information Disclosure

6.4.1 Presentation in Public Meeting

Following activities were performed to disseminate the information relating to the project and ESIA works for general public in various stages of ESIA works.

- A. Representative from the project proponent performed a presentation about the project in first public meeting



- B. A representative from ECCEA gave a presentation about ESIA implementation in Myanmar.



C. A representative from ECCEA delineated Biodiversity procedures and work plans to general public.



D. Representative from ECCEA performed a presentation about the implementation of EISA study process for MAAT Jetty project in second public meeting



E. ECCEA representative briefed the general public on the findings from Biodiversity study in the second public meeting.



F. Public Comments and Suggestion

- (a) Suggestion letters in which general public can put their comments and suggestions for the project were delivered in first public meeting
- (b) Open discussion and consultation works were exercised in both public meetings

G. Dissemination of Results from ESIA Studies

- (a) Executive summary of draft ESIA reports translated into Myanmar was delivered to general public in second public meeting
- (b) Translated executive summary was also delivered to ward administration office so that local community could be freely accessible

6.4.2 Public Comments and Suggestion

- (a) Suggestion letters in which general public can put their comments and suggestions for the project were delivered in first public meeting
- (b) Open discussion and consultation works were exercised in both public meetings

6.4.3 Dissemination of Results from EMP Studies

- (a) Executive summary of draft EMP reports translated into Myanmar was delivered to general public meeting
- (b) Translated executive summary was also delivered to ward administration offices so that community could be freely accessible

6.5 CSR Program of MAAT Co., Ltd

The project will provide about two percent of its annual net profit for carrying out CSR programs in local community. Educational sector, health sector, social affairs, economic sector, infrastructural sector, disaster aid programmes for Thida Myaing, Shwephi Tharyar, and Aya Mya Thida wards will be included in CSR programmes. CSR programme will be executed in coordination with the local community and administrative bodies. Programmes for employers such as social welfare, health care, educational aid, and professional development trainings must also be included in CSR programme.

7 Environmental and Social Management Plan

7.1 Environmental Management Team

An Environmental Management Team will be established for successful implementation of the environmental management plan. MAAT Company Limited is responsible for complete implementation of the EMP and will carry out environmental monitoring programme which is part of the EMP. The team consists of managing director, general manager and three of deputy general manager. The objectives of the Environmental Management Team are:

- (a) To assure systematic implementation of EMP throughout Project life, and
- (b) To monitor and review effectiveness of EMP regularly

Table 89. Environmental Management Team

| Sr. | Representative | Number |
|------------|-----------------------|---------------|
| 1 | Managing Manager | 1 |
| 2 | General Manager (1) | 1 |
| 3 | General Manager (2) | 1 |

| | | |
|---|---------------|---|
| 4 | Operation DGM | 1 |
| 5 | Admin DGM | 1 |
| 6 | Finance DGM | 1 |

7.1.1 Roles and Responsibilities

7.1.1.1 General Manager (1)

GM1 is responsible for overall achievement of environmental management objectives. He has to report to MD for regular progress, compliance, non-compliance and corrective actions for the course of implementation of EMP. He has to lead the regular EMP review process together with the environmental management team so that effectiveness of EMP is assured.

7.1.1.2 GM2

GM2 is responsible for overseeing day to day activities of the EMP. He has to direct DGMs to the right path of implementation of EMP and report back to project manager for progress, compliance, non-compliance and corrective actions for the course of implementation of EMP.

7.1.1.3 Deputy General Managers

DGMs are responsible for carrying out day to day activities of the EMP. They have to direct employees or carrying out inspection works of the implementation of EMP and report back to deputy project managers and project manager for progress, compliance, non-compliance and corrective actions for the course of implementation of EMP.

7.2 Training, Awareness and Competence

This plan describes the provisions of training to ensure that any people working for or on behalf of MAAT Co., Ltd involved in the activities covered by the scope of the EMP are properly trained to carry out their assigned duties in a manner that will not cause deviation from company environmental policy.

This procedure applies to EMP related training for staff and any persons working for or on behalf of MAAT Co., Ltd involved in the activities covered by the scope of the EMP. MAAT Co., Ltd will ensure that all people performing tasks for or

on behalf of the organization have had an appropriate assessment for their potential to cause a significant environmental impact and the associated competence required.

The DGMs shall ensure that people working for or on behalf of the company within the scope of EMP are competent on the basis of appropriate education, training or experience. The Project Manager shall identify training needs for people working for or on behalf of the company to ensure individual competence to implement the EMP effectively.

Table 90. Training Requirement

| Sr. | Training Topics | Trainee | Duration |
|------------|-----------------------------|----------------------------------------------|-----------------|
| 1 | OSH Training | Supervisors, Operators, Workers and Security | 40 hours |
| 2 | EMP Training | Environmental management team | 40 hours |
| 3 | Emergency Response Training | All employee | 16 hours |
| 4 | First Aid Training | All employee | 20 hours |
| 5 | Fire Fighting Training | All employee | 40 hours |

7.3 Communication

This plan ensures a consistent and efficient approach to internal communication and external complaints relating to the environment. The procedure applies to all documents established under the EMP of MAAT Jetty. The documents under the EMP include but are not limited to:

- EMP Report
- Mitigation Measures and Management Actions
- Environmental Monitoring Programme
- Registers of Legal and Other Requirements
- External documents including legislation, professional guides and code of practices, etc.

7.3.1 Responsibility

- The general manager (1) is responsible for dealing with complaints.

- The general manager (2) is responsible for ensuring that all communications relating to the environment are processed correctly.
- All staffs are responsible for putting forward suggestions on environmental matters.

7.3.2 External Communications

Communications to be handled according to this procedure include correspondence, conservations and meeting with relevant interested parties.

The person receiving the communication shall be noted the time and date, relevant address/telephone number and details of communication. Details shall be passed to the GM1 who will determine the response and whether the corrective action is required. If the communication is significant, the GM1 shall inform the chief executive officer as soon as possible.

The GM2 shall be responsible for maintaining records, responses and corrective action in a separate file designated for that purpose.

7.3.3 Internal Communications

The primary means of communication is through team briefings, supported as appropriate by use of notice boards and memos. Suggestions for environmental improvements are made through the company suggestion scheme.

7.4 Document Management

This procedure describes the control system for preparing, approving, distributing, revising and updating documents that are required under the Environmental Management Plan (EMP).

This procedure applies to all documents established under the EMP of MAAT Jetty. The documents under the EMP include but are not limited to:

- Impact Mitigation
- Management Actions
- Environmental Monitoring Programme
- EMP Forms, Checklists and Guidelines
- Registers of Legal and Other Requirements

- External documents including legislation, professional guides and code of practices, etc.

7.4.1 Responsibility

7.4.1.1 *General Manager (1)*

The GM1 shall approve and sign all EMP documents, include the Environmental Policy, EMP report and Other Requirements. In the absence of GM1 GM2 shall approve and sign the EMP documents.

7.4.1.2 *General Manager (2)*

The GM2 is responsible for the EMP document control system. The GM2 shall ensure that only controlled and current copies of documents are used and distribute the controlled EMP documents to relevant personnel. The GM2 shall also maintain and update the Master List of Documents.

7.4.1.3 *Heads of Departments (HODs)*

HODs shall review relevant EMP documents and procedures, ensure that their subordinates are familiar with the EMP documents related to them, and report any proposed changes to the EMP documents and forms to the Environmental Management Team.

7.5 Emergency Preparedness and Response Plan

The project prepared a systematic fire prevention and emergency response plan. The emergency response plan of MAAT project is following;

- (a) Establishing an emergency team and their responsibilities
- (b) MAAT will be implemented port emergency preparedness and response plan comply with the law provided by Myanmar Port Authority
- (c) Appointment of an emergency coordinator who will direct the execution of emergency procedures in accordance with the situation
- (d) Procedures for notification and raising of alarms
- (e) Procedures for evacuation, rescue and First-Aid Treatment
- (f) Means of communication with the relevant government response agencies such as FBD, Police, MOL and GRG key personnel

- (g) The firefighting team exits within the project compound
- (h) Fire extinguishing equipment will be provided for jetty

7.6 Occupational Safety and Health Plan

This procedure describes the responses in case of emergency or fire hazard that suddenly occurs in the project compound.

7.6.1 Introduction

Occupational health and safety issues during the construction and decommissioning of ports are common to those of largest infrastructure and industrial facilities. These issues include, among others, exposure to dust and hazardous materials that may be present in construction materials and demolition waste, hazardous materials in other building components, and physical hazards associated with the use of heavy equipment.

Proponent and its construction contractors are obliged to implement all reasonable precautions to protect the health and safety of workers and employees. This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety.

Specific occupational health and safety issues relevant to port operations primarily include the following:

1. Physical hazards
2. Chemical hazards
3. Confined spaces
4. Exposure to organic and inorganic dust
5. Exposure to noise

7.6.2 General Approach

Port operation activities should be conducted in accordance with applicable international regulations and standards, including:

1. International Labour Organization (ILO) Code of Practice for Safety and Health in Ports (2005);
2. General Conference of the International ILO Convention concerning Occupational Safety and Health in Dock Work, C-152, (1979);

3. General Conference of the ILO Recommendation concerning Occupational Safety and Health in Dock Work, R-160;
4. IMO Code of Practice for Solid Bulk Cargo (BC Code);
5. International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (IBC Code);
6. International Code for the Safe Carriage of Grain in Bulk (International Grain Code);
7. Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code);
8. International Maritime Dangerous Goods Code (IMDG Code).

Proponent should hire contractors that have the technical capability to manage the occupational health and safety issues of employees, extending the application of the hazard management activities through formal procurement agreements. Preventive and protective measures should be introduced according to the following order of priority:

1. Eliminating the hazard by removing the activity from the work process.
2. Controlling the hazard at its source through use of engineering controls.
3. Minimizing the hazard through design of safe work systems and administrative or institutional control measures.
4. Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE.

7.6.3 Physical Hazard

The main sources of physical hazards at ports are associated with cargo handling and use of associated machinery and vehicles which typically are slips, trips, and falls; contact with falling/moving objects; and lifting/over-exertion. Other injuries may occur due to contact with, or capture in, moving machinery (e.g. dump trucks, front loaders, forklifts). Activities related to maintenance of equipment represent a significant source of exposure to physical hazards. General recommendations for managing physical hazards are as follows.

1. Separation of people from vehicles and making vehicle passageways one-way, to the extent practical
2. Locating means of access to ensure suspended loads do not pass overhead, to the extent practical

3. Constructing the surface of port areas to be: of adequate strength to support the heaviest expected loads; level, or with only a slight slope; free from holes, cracks, depressions, unnecessary curbs, or other raised objects; continuous; and skid resistant
4. Providing safe access arrangements suitable for the sizes and types of vessels calling at their facilities. These access arrangements should include guard rails and / or properly secured safety nets to prevent workers from falling into the water between the ship's side and the adjacent quay
5. Effectively guarding every weatherdeck and 'tween- deck' hatchway to an adequate height when open
6. Avoiding placing cargo on, or allowing passage of vehicles over, any hatch cover that is not of adequate strength for that purpose
7. As far as is reasonably practicable, preventing workers from working in the part of a hold where a trimming machine or grab is operational
8. Inspecting and approving all slings before use
9. Clearly marking (indicating its own weight) all lifting beams and frames, vacuum lifting, or magnetic lifting device which does not form an integral part of a lifting appliance and every other item of loose gear weighing more than 100 kilograms (kg)
10. Inspecting disposable pallets and similar disposable devices before use and avoiding re-use of such disposable devices
11. Equipping lifting appliances with means of emergency escape from the driver's cabin and a safe means for the removal of an injured or ill driver
12. Risk of free fall of materials should be minimized by installing telescoping arm loaders and conveyors
13. Materials handling operations should follow a simple, linear layout to reduce the need for multiple transfer points.

7.6.3.1 Over-Exertion

Over-exertion, and ergonomic injuries and illnesses, such as repetitive motion, over-exertion, and manual handling, are among the most common causes of injuries. Recommendations for their prevention and control include:

- (1) Training of workers in lifting and materials handling techniques including the placement of weight limits above which mechanical assists or two-person lifts are necessary
- (2) Planning work site layout to minimize the need for manual transfer of heavy loads
- (3) 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
- (4) Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks

7.6.3.2 *Slips and Falls*

Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time in accidents.

Recommended methods for the prevention of slips and falls from, or on, the same elevation include:

- (1) Implementing good house-keeping practices, such as the sorting and placing loose materials or debris in established areas away from foot paths
- (2) Cleaning up excessive waste debris and liquid spills regularly
- (3) Locating electrical cords and ropes in common areas and marked corridors
- (4) Use of slip retardant footwear

7.6.3.3 *Work in Height*

Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury. If fall hazards exist, a fall protection plan should be in place which includes one or more of the following aspects, depending on the nature of the fall hazard:

- (1) Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any height if the risk includes falling into

operating machinery, into water or other liquid, into hazardous substances, or through an opening in a work surface

- (2) Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds (also described in this section in Working at Heights above), as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. The tie in point of the fall arresting system should also be able to support 5000 pounds
- (3) Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces

7.6.3.4 *Struck by Object*

Construction and demolition activities may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities.

Techniques for the prevention and control of these hazards include:

- (1) Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels
- (2) Conducting sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable
- (3) Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap
- (4) Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged
- (5) 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
- (6) Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes

7.6.3.5 *Moving Machinery*

Vehicle traffic and use of lifting equipment in the movement of machinery and materials may pose temporary hazards, such as physical contact, spills, dust, emissions, and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Center-articulated vehicles create a significant impact or crush hazard zone on the outboard side of a turn while moving. Techniques for the prevention and control of these impacts include:

- (1) Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic
- (2) Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle
- (3) Ensuring moving equipment is outfitted with audible back-up alarms
- (4) Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations.

7.6.3.6 *Chemical Hazard*

Port workers may be exposed to chemical hazards especially if their work entails direct contact with fuels or chemicals, or depending on the nature of bulk and packaged products transferred in port activities. Work with fuels may present a risk of exposure to volatile organic compounds (VOC) via inhalation or skin contact during normal use or in the case of spills. Fuels, flammable liquid cargo, and flammable dust may also present a risk of fire and explosions.

Chemical hazards represent potential for illness or injury due to single acute exposure or chronic repetitive exposure to toxic, corrosive, sensitizing or oxidative substances. They also represent a risk of uncontrolled reaction, including the risk of fire and explosion, if incompatible chemicals are inadvertently mixed. Chemical hazards can most effectively be prevented through a hierarchical approach that includes:

1. Replacement of the hazardous substance with a less hazardous substitute

2. Implementation of engineering and administrative control measures to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits
3. Keeping the number of employees exposed, or likely to become exposed, to a minimum
4. Communicating chemical hazards to workers through labeling and marking according to national and internationally recognized requirements and standards, including the International Chemical Safety Cards (ICSC), Materials Safety Data Sheets (MSDS), or equivalent. Any means of written communication should be in an easily understood language and be readily available to exposed workers and first-aid personnel
5. Training workers in the use of the available information (such as MSDSs), safe work practices, and appropriate use of PPE

7.6.3.7 *Confined Spaces*

As in any industry sector, confined space hazards can be potentially fatal. The potential for accidents among port workers may vary among port facilities and activities, including cargo handling, and may include ship cargo holds, silos, sewage tanks, and water tanks. Port operators should implement confined space entry procedures as described. With specific reference to access into cargo holds, confined space entry programs should include procedures that prevent or minimize the use of combustion equipment, including fueling activities, in the interior of cargo holds and that provide for alternative means of egress.

Examples of confined spaces that may be present include: silos, vats, hoppers, utility vaults, tanks, sewers, pipes, and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited. The occupational hazards associated with confined spaces should be prevented according to the following recommendations:

- (1) Controlling site-specific factors which may contribute to excavation slope instability including, for example, the use of excavation dewatering, side-walls support, and slope gradient adjustments that eliminate or minimize the risk of collapse, entrapment, or drowning

- (2) Providing safe means of access and egress from excavations, such as graded slopes, graded access route, or stairs and ladders
- (3) Avoiding the operation of combustion equipment for prolonged periods inside excavations areas where other workers are required to enter unless the area is actively ventilated

7.6.4 Dust and Particulate

Potential exposure to fine particulates is associated with handling of dry cargo and from roads. Occupational health and safety impacts associated with nuisance dust in ports are similar to those for other industries, and their prevention and control are discussed.

1. Maintaining levels of contaminant dusts, vapors and gases in the work environment at concentrations below TWA-TLV's (threshold limit value)—concentrations to which most workers can be exposed repeatedly (8 hours/day, 40 hrs/week, week-afterweek), without sustaining adverse health effects.
2. Developing and implementing work practices to minimize release of contaminants into the work environment including:
 - i. Direct piping of liquid and gaseous materials
 - ii. Minimized handling of dry powdered materials;
 - iii. Enclosed operations
 - iv. Local exhaust ventilation at emission / release points
 - v. Vacuum transfer of dry material rather than mechanical or pneumatic conveyance
 - vi. Indoor secure storage, and sealed containers rather than loose storage

7.6.5 Noise

Noise sources in ports may include cargo handling, including vehicular traffic, and loading/unloading containers and ships. Occupational exposures should be managed as described.

1. 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. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB (C).

2. The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB (A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB (A).
3. Although hearing protection is preferred for any period of noise exposure in excess of 85 dB (A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.⁶⁵
4. Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible
5. Periodic medical hearing checks should be performed on workers exposed to high noise levels

7.6.6 Industrial Vehicle Driving and Site Traffic

Poorly trained or inexperienced industrial vehicle drivers have increased risk of accident with other vehicles, pedestrians, and equipment. Industrial vehicles and delivery vehicles, as well as private vehicles on-site, also represent potential collision scenarios. Industrial vehicle driving and site traffic safety practices include:

- (1) Training and licensing industrial vehicle operators in the safe operation of specialized vehicles such as forklifts, including safe loading/unloading, load limits
- (2) Ensuring drivers undergo medical surveillance
- (3) Ensuring moving equipment with restricted rear visibility is outfitted with audible back-up alarms
- (4) Establishing rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures (e.g. prohibiting operation of forklifts with forks in down position), and control of traffic patterns or direction
- (5) Restricting the circulation of delivery and private vehicles to defined routes and areas, giving preference to 'one-way' circulation, where appropriate

7.6.7 Fire and Explosion

Fires and or explosions resulting from ignition of flammable materials or gases can lead to loss of property as well as possible injury or fatalities to project workers. Prevention and control strategies include:

- (1) Storing flammables away from ignition sources and oxidizing materials.
Further, flammables storage area should be:
 - i. Remote from entry and exit points into buildings
 - ii. Away from facility ventilation intakes or vents
 - iii. Have natural or passive floor and ceiling level ventilation and explosion venting
 - iv. Use spark-proof fixtures
- (2) Be equipped with fire extinguishing devices and self-closing doors, and constructed of materials made to withstand flame impingement for a moderate period of time
- (3) Providing bonding and grounding of, and between, containers and additional mechanical floor level ventilation if materials are being, or could be, dispensed in the storage area
- (4) Where the flammable material is mainly comprised of dust, providing electrical grounding, spark detection, and, if needed, quenching systems
- (5) Defining and labeling fire hazards areas to warn of special rules (e.g. prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment)
- (6) Providing specific worker training in handling of flammable materials, and in fire prevention or suppression

7.6.8 Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) provides additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems.

PPE is considered to be a last resort that is above and beyond the other facility controls and provides the worker with an extra level of personal protection. Table 61 presents general examples of occupational hazards and types of PPE available for different purposes. Recommended measures for use of PPE in the workplace include:

- (1) Active use of PPE if alternative technologies, work plans or procedures cannot eliminate, or sufficiently reduce, a hazard or exposure
- (2) Identification and provision of appropriate PPE that offers adequate protection to the worker, co-workers, and occasional visitors, without incurring unnecessary inconvenience to the individual
- (3) Proper maintenance of PPE, including cleaning when dirty and replacement when damaged or worn out. Proper use of PPE should be part of the recurrent training programs for employees

Table 91. Summary of Recommended Personal Protective Equipment

| Objective | Workplace Hazards | Suggested PPE |
|-------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eye and face protection | Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation. | Safety Glasses with side-shields, protective shades, etc. |
| Head protection | Falling objects, inadequate height clearance, and overhead power cords. | Plastic Helmets with top and side impact protection. |
| Hearing protection | Noise, ultra-sound. | Hearing protectors (ear plugs or ear muffs). |
| Foot protection | Falling or rolling objects, pointed objects. Corrosive or hot liquids. | Safety shoes and boots for protection against moving & falling objects, liquids and chemicals. |
| Hand protection | Hazardous materials, cuts or lacerations, vibrations, extreme temperatures. | Gloves made of rubber or synthetic materials (Neoprene), leather, steel, insulating materials, etc. |
| Respiratory protection | Dust, fogs, fumes, mists, gases, smokes, vapors. | Facemasks with appropriate filters for dust removal and air purification (chemicals, mists, vapors and gases). Single or multi-gas personal monitors, if |
| | Oxygen deficiency | Portable or supplied air (fixed lines). On-site rescue equipment. |

| | | |
|---------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Body/leg protection | Extreme temperatures, hazardous materials, biological agents, cutting and laceration. | Insulating clothing, body suits, aprons etc. of appropriate materials. |
|---------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------|

7.7 Fire Protection Plan

The jetty will be prepared a systematic fire prevention and fire emergency response plan. The fire safety plan for the jetty is as following;

(a) Educating the Labourers

- Educating the labourers for the bad effects of fire breaking out
- Explaining about the main sources of fire
- Showing film about fire victims during lunch-time (It will act like a lesson as well as recreation)
- Hanging big posters of fire breaking out on the wall and sticker with signs of warning on the notice board

(b) Preparations

Things mentioned below will be kept in the place which the workers can easily get.

- Water tank with full of water
- Fire extinguisher
- Sand bucket
- Fire hook
- Fire stick

(c) Rules to Follow

- Smoking is not allowed
- Pieces of snack-packing paper are to be thrown away in the bin systematically
- Electrical lines must be checked not to leave without switching off when working hours is over or when there is blackout
- Matches must not be used near the machines
- Cooking is allowed only in the dinning room during lunch time
- Cooking is allowed only the dinning room during lunch time

- Petrol, diesel and other things which can easily cause fire because of heat especially in summer, should be kept in a particular place

8 Conclusions and Recommendations

Eight key environmental impacts can be occurred from the project objectivities. But MAAT can be reduced and monitored on theses environmental impacts by following specifically the impacts management and monitoring plan described in section 5.2. On the other hand, there will be left to be investigated positive impacts such as Job Opportunities and surrounding villages can be developed by CSR program of the Project.

8.1 Mangement Review

A process that will review the results of the implementation of EMP by the analysis of the monitoring results to ensure that the mitigation measures and management actions are fully satisfied with the minimum side effects to the environment is required. The GM1 shall work with all DGMs to carry out analysis and evaluation of monitoring results in compliance with set environmental standard values. The GM1 has the overall responsibility for ensuring that this EMP is implemented to ensure the Project operation is in compliance with applicable environmental legislations.

The managing director of MAAT Jetty project will be the responsible person of management review process. He shall be supported by all GMs and various functional DGMs.