



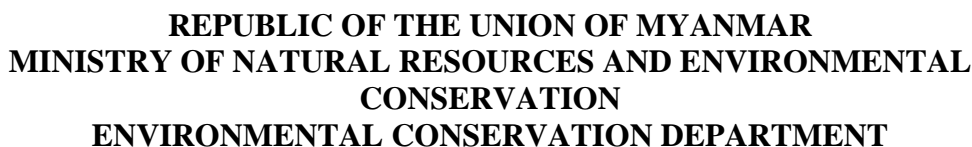
Monitoring Report of PTTEPI's Yangon Office Building (Construction Phase) during July - December 2020

PTTEP International Limited (PTTEPI)



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This is the official submission form of Monitoring Report under *Environmental Impact Assessment Procedure Notification No.616/2015*. This form shall be completed in its entirety and submitted to the Environmental Conservation Department, Ministry of Natural Resources and Environmental Conservation, along with all required Monitoring Report according to the issued Environmental Compliance Certificate (ECC).

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Project Title	PTTEPI's Yangon New Office Building
Project Location (Address)	No. (2), Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon.
ECC number	Letter No. Forest 3(2)/ 6(D) (3423/2017) dated on 25 th October 2017

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Validation of Project scale and predicted impact

In case of any change of the project scale or parameters of the predicted impacts, the proponent shall provide the status of the changes as in the following table. If the changes are significant, the Ministry may request additional survey to the proponent as to update the issued ECC.

Items (scale, predicted impact)	Scale / Parameters at the survey phase	Actual scale / parameters	Remark

Signature (Representative of the project proponent)

I, the undersigned Proponent (or representative, there of), hereby state that the information provided in/with the application and the report ensure that the Monitoring Report are undertaken in a professional manner and in accordance with EIA Procedure Notification No. 616/2015 and any applicable legislations issued or adopted by the Ministry.

Signature:



Date of
submission:
(dd/mm/yyyy)

Print
name:

Hsu Myat Maw

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Date received:

Project Identification Number:

The proponent submitted the reports
with the forms of;

☐

Paper copy

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Recorded by:

Additional comments, notes or recommendations (attached if necessary):

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Executive Summary

အစီရင်ခံစာအကျဉ်းချုပ်

PTTEPI သည် စောင့်ကြည့်စစ်ဆေးခြင်းအစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန (ECD) ကို တင်ပြခြင်း အပါအဝင် ပတ်ဝန်းကျင်ဆိုင်ရာထိခိုက်မှုလျော့ပါးရေးနှင့် စောင့်ကြည့်စစ်ဆေးခြင်းအစီအမံများကို လိုက်နာဆောင်ရွက်ရန် တာဝန်ရှိပါသည်။ ထို့ကြောင့် PTTEPI သည် စီမံကိန်းပိုင်ရှင်အနေဖြင့် အသိအမှတ်ပြု တတိယ အဖွဲ့အစည်း ဖြစ်သော REM-UAE ဓာတ်ခွဲခန်းနှင့် အကြံပေးကုမ္ပဏီ(REM-UAE)ကို ထိခိုက်မှုလျော့ပါးရေး အစီအမံများ လိုက်နာဆောင်ရွက်မှုစစ်ဆေးခြင်းနှင့် ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်း(IEE)တွင် ပါရှိသော ပတ်ဝန်းကျင်ဆိုင်ရာစီမံခန့်ခွဲမှု အစီအစဉ်တွင်ဖော်ပြထားသည့် အကြိမ်အရေအတွက်အတိုင်း စောင့်ကြည့်စစ်ဆေးခြင်း လုပ်ငန်းများဆောင်ရွက်ခြင်း ကို ပြုလုပ်စေခဲ့ပါသည်။ ၎င်းတွင် စီမံကိန်းအနေဖြင့် ထိခိုက်မှုလျော့ပါးရေးဆိုင်ရာနည်းလမ်းများနှင့် စောင့်ကြည့် စစ်ဆေးခြင်း ဆိုင်ရာနည်းလမ်းများကို လိုက်နာဆောင်ရွက်ခြင်း အခြေအနေအား စစ်ဆေးမှုများ ပါဝင်ပါသည်။

ကမ္ဘာနှင့်အဝှမ်းတွင် Covid-19 ကပ်ရောဂါဖြစ်ပွားလျက်ရှိရာ မြန်မာနိုင်ငံသည်လည်း အလားတူ ရင်ဆိုင်နေရပါ သည်။ PTTEP မြန်မာအဖွဲ့အနေဖြင့် အဖွဲ့အစည်းလုပ်ငန်းနေရာများတွင် Covid-19 ရောဂါပြန့်ပွားမှုကိုတားဆီးရန် အထူးဦးစားပေး ဆောင်ရွက်လျက်ရှိပြီး အစိုးရ၏လမ်းညွှန်ချက်များနှင့်အညီ Covid-19 ဖြစ်ပွားမှု များပြားသည့်ကာ လအတွင်း လူတစ်ယောက်စီတိုင်း အန္တရာယ်ကင်းစေရန် ဘေးကင်းလုံခြုံရေးအစီအမံများနှင့် လျော့ပါးရေးအစီအစဉ်များ သေချာစွာ စီမံထားရှိပါသည်။ ရန်ကုန်ရုံး အဆောက်အအုံ ဆောက်လုပ်ရေးလုပ်ငန်း အပါအဝင် လုပ်ငန်းခွင်နေရာများအားလုံးတွင် ဘေးကင်းလုံခြုံရေး အစီအမံများကို တင်းကြပ်စွာဆက်လက်ကျင့်သုံးနေဆဲဖြစ်သည်။ PTTEPI ရန်ကုန်ရုံး တည်ဆောက်ရေး ကာလတွင် ဖြစ်နိုင်ခြေရှိသော ပတ်ဝန်းကျင်ဆိုင်ရာ ပြဿနာရပ်များနှင့် မရှိမဖြစ်သက်ရောက်မှုများအတွက် ပတ်ဝန်းကျင် ထိခိုက်မှုလျော့ပါးရေးအစီအမံများ အကောင်အထည်ဖော်ခြင်းဆိုင်ရာစစ်ဆေးမှုကို REM-UAE က စီမံကိန်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာ အကြံပေးအဖြစ် PTTEPI နှင့် အဓိကကန်ထရိုက်တာ (KST ကုမ္ပဏီအုပ်စု) တို့မှ ကိုယ်စားလှယ်များအား Desktop စစ်ဆေးခြင်းနှင့် ဗီဒီယို အစည်းအဝေးများ ပြုလုပ်ခြင်း ကို ၂၀၂၀ခုနှစ် ဒီဇင်ဘာလ ၁၁ရက်နေ့တွင် ဆောင်ရွက်ခဲ့ပါသည်။

စစ်ဆေးခြင်း၏ရည်ရွယ်ချက်မှာ IEE အစီရင်ခံစာတွင်ဖော်ပြထားသော ထိခိုက်မှုလျော့ပါးရေးနှင့် စောင့်ကြည့် စစ် ဆေးခြင်း အစီအမံများအပါအဝင် ပတ်ဝန်းကျင်ဆိုင်ရာစီမံခန့်ခွဲမှုအစီအစဉ်၏ ထိရောက်မှုကိုအကဲဖြတ် ရန်ဖြစ် သည်။ စာရင်းစစ်ရလဒ်များကို အစီရင်ခံစာတွင်မှတ်တမ်းတင်ထားပြီး တိုးတက်အောင်ဆောင်ရွက်ရန်အတွက် ဖြစ်နိုင် ခြေရှိသောပြဿနာများ၊ အတားအဆီးများ နှင့် အကြံပြုချက်များကို သတ်မှတ်ဖော်ပြထားပါသည်။

အကဲဖြတ်ခြင်းဖြစ်စဉ်တွင် (၁) PTTEP site မှ REM-UAE သို့ပေးပို့သော စစ်တမ်းကောက်ယူမှုဓာတ်ပုံများ၊ (၂) တာဝန်ရှိသူများ ကိုမေးမြန်းခြင်းနှင့် (၃) စာရွက်စာတမ်းများစစ်ဆေးခြင်း တို့ပါဝင်ပါသည်။

IEE တွင်ဖော်ပြထားသည့်အတိုင်း ပတ်ဝန်းကျင်ဆိုင်ရာစောင့်ကြည့်စစ်ဆေးမှုကိုပြုလုပ်ခဲ့သည်။ ၎င်းသည် အမှုန် အမွှားဆိုင်ရာ စောင့်ကြည့်စစ်ဆေးခြင်း၊ ဆူညံသံအဆင့်စောင့်ကြည့်စစ်ဆေးခြင်း၊ မကျေနပ်ချက်တိုင်ကြားမှု ယန္တရား ကိုစောင့်ကြည့်ခြင်း၊ ပြည်သူနှင့်လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့်လုံခြုံရေးစောင့်ကြည့်ခြင်းတို့ဖြစ်သည်။ အမှုန် အမွှားဆိုင်ရာ စောင့်ကြည့်စစ်ဆေး ခြင်း နှင့် ဆူညံသံအဆင့်စောင့်ကြည့်စစ်ဆေးခြင်းကို ၂၀၂၀ ပြည့်နှစ်၊

ဒီဇင်ဘာလ ၁၁ ရက်မှ ၁၅ ရက်အတွင်းတွင် တိုင်းတာရေးနေရာ (၃) နေရာတွင် ပြုလုပ်ခဲ့သည်။ ရန်ကုန်ရုံး အဆောက်အအုံဆောက်လုပ်ရေး ကာလအတွင်းဖြစ်သော ၂၀၂၀ပြည့်နှစ်၊ ဇူလိုင်လမှဒီဇင်ဘာလအတွင်းတွင် မကျေနပ်ချက် တိုင်ကြားမှုယန္တရား စောင့်ကြည့်စစ်ဆေးခြင်း နှင့် အများပြည်သူနှင့်လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့်ဘေးကင်းရေး စောင့်ကြည့်စစ်ဆေးခြင်းတို့ကိုလည်း PTTEPIက အကောင်အထည်ဖော် ဆောင်ရွက်ခဲ့ပါသည်။

၁။ စီမံကိန်း အကြောင်းအရာ

PTTEPI (ရန်ကုန်)ရုံး အဆောက်အအုံသည် အမှတ် (၂)၊ ဆည်မြောင်းရိပ်သာလမ်း၊ ၈ မိုင်ခွဲ၊ မရမ်းကုန်းမြို့နယ်၊ ရန်ကုန်တွင် တည်ရှိသော လက်ရှိ PTTEPI အပြည်ပြည်ဆိုင်ရာ လီမိတက် (ရန်ကုန်ရုံးခွဲ) နေရာတွင် တည်ရှိမည် ဖြစ်သည်။ စီမံကိန်းနေရာသည် ဆည်မြောင်းရိပ်သာလမ်း၏ တောင်ဘက်နှင့် ပြည်လမ်း၏ အနောက်ဘက်တွင် တည်ရှိပြီး ၂၃၇၁.၄၆ စတုရန်းမိုင် ကျယ်ဝန်းသည်။ အဆောက်အအုံ ၇ ခု (အဆောက်အအုံ အမှတ် ၁ မှ အမှတ် ၇ အထိ) ရှိပြီး ကားပါကင် ပါဝင်ပါသည်။ အဆောက်အအုံအသစ်ကို လက်ရှိ အဆောက်အအုံ ၄ ခု နေရာတွင် အစားထိုး တည်ဆောက်သွားပါမည်။ ၎င်းအဆောက်အအုံ အမှတ်များမှာ (၁)၊ (၂)၊ (၄) နှင့် (၅) တို့ဖြစ်ပြီး ကားပါကင်ပါရှိ မည်ဖြစ်ပါသည်။ အဆောက်အအုံ အမှတ် (၃)၊ (၆) နှင့် (၇) ၏ ငှားထားသော ဧရိယာများကို ပိုင်ရှင်သို့ ပြန်လည်အပ်နှံသွားမည်ဖြစ်ပါသည်။

၂။ စီမံကိန်းတွင် ပါဝင်သည့် အကြောင်းအရာများ

၂.၁ အဆောက်အအုံအမျိုးအစားနှင့် အတွင်းပိုင်းလုပ်ငန်းလုပ်ဆောင်မှုဧရိယာအစီအစဉ်အနေအထား

စီမံကိန်းသည် PTTEP အပြည်ပြည်ဆိုင်ရာလီမိတက် (ရန်ကုန် လီမိတက်) ဖြစ်ပြီး အထပ် ၁၂ ထပ်ခွဲရှိသော အဆောက်အအုံတစ်ခုဖြစ်ပါသည်။ စုစုပေါင်း ၅၂.၈၅ မီတာ မြင့်ပြီး လုပ်ငန်းဆောင်ရွက်သော ဧရိယာမှာ ၁၈၇၆၀ စတုရန်း ကီလိုမီတာ ကျယ်ဝန်းပါသည်။ ထိုအထဲတွင် ကားအစီးရေ ၁၁၀ ဆန့်သော ကားပါကင် ပါရှိပါသည်။ အဆောက်အအုံအတွင်းမှ လုပ်ငန်းဆောင်ရွက်သည့် ဧရိယာကို အောက်ပါအတိုင်း ခွဲခြားနိုင်ပါသည်။

- B2၊ B1 နှင့် ၁ လွှာ၊ ၂ လွှာ၊ ၃ လွှာ တို့ရှိ ကားပါကင် ဧရိယာများ
- ၃ လွှာတွင် ရှိသော အစားအသောက်စားရာ နေရာ
- ၄ လွှာ မှ ၁၁ လွှာအထိ ရုံးဧရိယာများ

၂.၂ မသန်စွမ်းများအတွက်စီစဉ်ထားရှိမှုပုံစံများ

Universal Design concept အပေါ်ကို အခြေခံ၍ မသန်စွမ်းများအတွက် စီစဉ်ထားရှိမှုများ ပြုလုပ်ထားပါသည်။

- မသန်စွမ်းများနှင့်သက်ကြီးရွယ်အိုများအတွက် အဆောက်အအုံအတွင်းလာရောက်ရာတွင် အဆင်ပြေစေနိုင် ရန်အတွက် Basement 1 နှင့် ထပ်ခိုး နေရာတွင် ထားရှိပေးပါသည်။
- မသန်စွမ်းများ နှင့် သက်ကြီးရွယ်အိုများအတွက် အိမ်သာများကို မြေညီထပ်တွင်ထားပေးပါသည်။

၂.၃ အတွင်းပိုင်း အသုံးချ နေရာများ တည်ရှိပုံ စနစ်

အတွင်းပိုင်းအသုံးချနေရာများ တည်ရှိပုံစနစ်တွင် ယာဉ်ကြောစနစ်၊ ရေအထောက်အပံ့စနစ် နှင့် အဆောက်အဦးသုံး ရေ၊ စွန့်ပစ်ရေသန့်စင်မှု၊ လျှပ်စစ် စနစ်၊ အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှု၊ မီးအန္တရာယ် ကာကွယ်ရေးနှင့် သတိပေးမှုစနစ်၊ လေဝင်လေထွက်နှင့်လေအေးပေးစက်စနစ်၊ ဓာတ်လျှောက်စနစ်နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးတို့ ပါဝင်ပါသည်။

၃။ လက်ရှိ လုပ်ငန်းဆောင်ရွက်မှု အခြေအနေ

အဆောက်အဦးအဟောင်းကို ဖြိုဖျက်ပြီးချိန်တွင် PTTEPI သည် ရုံးအဆောက်အဦးအသစ်ကို ၂၀၁၈ ခုနှစ် ဇန်နဝါရီလမှ စ၍ တည်ဆောက်ခြင်းပြုလုပ်ပြီး ၂၀၂၁ ခုနှစ် ဧပြီလတွင် ပြီးစီးမည်ဟု ခန့်မှန်းထားပါသည်။

၄။ လိုက်နာဆောင်ရွက်မှု အခြေအနေ

စာရင်းစစ်နှင့်စောင့်ကြည့်စစ်ဆေးခြင်းရလဒ်များအရ စီမံကိန်းသည် တည်ဆောက်ရေးကာလအတွင်း ၂၀၂၀ ခုနှစ်၊ ဇူလိုင်လ မှ ဒီဇင်ဘာလတွင် အခြေအနေရှိသောထိခိုက်မှုလျော့ပါးရေးအစီအမံများ (the mitigation that have situation) နှင့်ပတ်သက်ပြီး ၁၀၀ရာခိုင်နှုန်း လိုက်နာဆောင်ရွက်မှုရှိသည်ကိုတွေ့ရပါသည်။ သို့သော် စစ်ဆေးမှု ကာလ အတွင်း အခြေအနေမရှိသောထိခိုက်မှုလျော့ပါးရေးအစီအမံ (the mitigation that do not have situation) အချို့ရှိပြီး ၎င်းမှာ လျော့ပါးရေးအစီအမံများအားလုံး၏ ၂၂ ရာခိုင်နှုန်းဖြစ်ပါသည်။

PTTEPI သည် IEE တွင် ဖော်ပြထားသော ထိခိုက်မှုလျော့ပါးရေး နည်းလမ်းအများစုကို လိုက်နာဆောင်ရွက်မှု ရှိပါသည်။ ဆောက်လုပ်ရေးကာလအတွက် လျော့ပါးရေးအစီအမံများကိုအောက်တွင် အကျဉ်းချုပ် ဖော်ပြထားပါသည်။

၄.၁ ဆောက်လုပ်ရေးကာလအတွင်း ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှု လျော့ပါးရေးနည်းလမ်းများနှင့် ပတ်သက်၍ လိုက်လျောညီထွေဖြစ်မှု

စီမံကိန်းသည် ဘိုးပိုင်ရိုက်ခြင်း (piling) နှင့် အုတ်မြစ်ချခြင်း (foundation) လုပ်ငန်းများပြီးဆုံးခဲ့ပါသည်။ ၂၀၂၀ ခုနှစ် ဇူလိုင်-ဒီဇင်ဘာလအတွင်းအဓိကလုပ်ဆောင်မှုများမှာ ကိုယ်ထည်ပုံစံဖော်ပြခြင်း (structural) လုပ်ငန်းပိုင်း နှင့် အခြေခံအဆောက်အဦးဆိုင်ရာလုပ်ငန်း (M&Eလုပ်ငန်းများ နှင့် အချောသတ်လုပ်ငန်းများ) ဖြစ်ပါသည်။

- **လေထုညစ်ညမ်းမှု** - စီမံကိန်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှုလျော့ပါးရေးအစီအမံများကို တင်းကြပ်စွာလိုက်နာခဲ့သည်။ တာဝန်ရှိဝန်ထမ်းမှနေ၍ ဆောက်လုပ်ရေးဧရိယာတဝိုက်ကို ခြောက်သွေ့ရာသီတွင် တစ်နေ့လျှင် အနည်းဆုံး ၂ ကြိမ် (သို့မဟုတ်) ၂ ကြိမ်ထက်ပို၍ရေဖြန်းခြင်း (သို့မဟုတ်) ရာသီဥတုအခြေအနေကိုလိုက်၍ ဆောင်ရွက်စေပါသည်။ လမ်းကိုသည် ကောင်းမွန်သော အခြေအနေရှိနေအောင်စစ်ဆေးပါသည်။ အမှုန်အမွှားများ ပျံ့လွင့်ခြင်း နှင့် ဆောက်လုပ်ရေးဧရိယာဝန်းကျင် နှင့် သယ်ယူပို့ဆောင်ရေးလမ်းကြောင်း တစ်လျှောက်ရှိ လူထုအပေါ် ထိခိုက်မှုများကို လျော့ချရန်အတွက် PVC mesh sheet များ ကာရံပေးထားပါသည်။ ၂၀၂၀ခုနှစ် ဇူလိုင်လမှ ဒီဇင်ဘာလအတွင်း အဓိကလုပ်ငန်းလှုပ်ရှားမှုများမှာ

ကိုယ်ထည်ပုံစံဖော်ခြင်း (structural) လုပ်ငန်းပိုင်းနှင့် အခြေခံအဆောက်အအုံဆိုင်ရာလုပ်ငန်း (M&E လုပ်ငန်းများနှင့် အချောသပ်ခြင်းလုပ်ငန်းများ) ဖြစ်ပါသည်။ ယင်းလုပ်ငန်းများတွင် လုပ်ငန်းအချောသတ် (finished) ပစ္စည်း များသယ်ယူပို့ဆောင်ခြင်းများကိုအများဆုံးပြုလုပ်ရပါသည်။ သို့ရာတွင် စီမံကိန်းတွင် ပစ္စည်းများ သယ်ယူ ပို့ဆောင်ရသည့်အခါများရှိပါက အစီအမံတွင်ဖော်ပြထားသည့်အတိုင်း ပစ္စည်းများသယ်ယူပို့ ဆောင်ရာတွင် ထရပ်ကားများကို အကာအရံများဖုံးအုပ်ထားပါသည်။ ထို့အပြင် ကန်ထရိုက်တာမှနေ၍ အလုပ်သမားများကို ဖုန်မှုန့်ကာ နှာခေါင်းစည်းများ ထောက်ပံ့ပေးပြီး လုပ်ငန်းများ လုပ်ဆောင်နေချိန်တွင် တပ်ဆင်အသုံးပြု စေပါသည်။

- **ဆူညံသံအလွန်အကျွံဖြစ်ခြင်း နှင့် တုန်ခါမှု** - ကန်ထရိုက်တာသည် အနီးဝန်းကျင်ရှိ လူထုအပေါ် ဆူညံသံဖြင့် ထိခိုက်မှုမရှိစေရန် အလုပ်သမားများအနေဖြင့် ဆူညံသံ နှင့် တုန်ခါမှုမြင့်မားသော လုပ်ငန်းများကို နေ့ဘက် (9 a.m. – 5 p.m.) တွင်သာဆောင်ရွက်ရန် နေ့စဉ် သတိပေးစကားများပြောကြားရာတွင် အထူးဂရုပြု၍ သတိပေးပါသည်။ ကန်ထရိုက်တာသည် အလုပ်သမားများကို နားကာပစ္စည်း (ear muffs) များ ထောက်ပံ့ ပေးပြီး ဆူညံသံ နှင့် တုန်ခါမှု မြင့်မားစွာဖြစ်ပေါ်စေသော ဆောက်လုပ်ရေးလုပ်ငန်းများ လုပ်ဆောင်ချိန်တွင် သေချာအသုံးပြုရန် ကြီးကြပ်ကွပ်ကဲပါသည်။ ထို့အပြင် ဆူညံသံကိုတားဆီးရန်အကာအကွယ်အဖြစ် (metal sheet) ကို ဆောက်လုပ်ရေးလုပ်ငန်း ခွင်ဝန်းကျင်တွင် တပ်ဆင်ထားပြီး အနီးဝန်းကျင်ရှိ လူထုအပေါ်ဆူညံ သံသက်ရောက်မှုကို လျော့ကျစေပါသည်။
- **ယာဉ်အသွားအလာ** - ကန်ထရိုက်တာသည် အနီးအနားရှိ ဒေသခံပြည်သူများကို ဆောက်လုပ်ရေး အစီအစဉ်နှင့် ဆောက်လုပ်ရေးပစ္စည်းများနှင့်စက်ယန္တရားကြီးများ သွားလာမှုလမ်းကြောင်းကို အသိပေးထားပါ သည်။ ၂၀၂၀ ခုနှစ် ဇူလိုင် - ဒီဇင်ဘာလအတွင်းအဓိကလုပ်ဆောင်မှုများမှာ ကိုယ်ထည်ဖော်ခြင်း (structural) လုပ်ငန်း၊ ကွန်ကရစ်ဆိုင်ရာ လုပ်ငန်းများ နှင့် အချောသတ်ပစ္စည်း (finished materials) များကို အဓိကအသုံးပြုသော အဆောက်အအုံဆိုင်ရာ (infrastructure)လုပ်ငန်းများ ဖြစ်ပါသည်။ အကယ် ၍ ဆောက်လုပ်ရေးဆိုင်ရာပစ္စည်းများကို သယ်ယူပို့ဆောင်ရန်ရှိပါက လျော့ပါးရေး အစီအမံများတွင် ဖော်ပြ ထားသည့်အတိုင်း သယ်ယူပို့ဆောင်ရေးကားကို ဖုံးအုပ်၍ မောင်းနှင်စေပြီး ယာဉ်အသွားအလာကို ထိန်းညှိ ရန် အလံကိုင်အချက်ပြဝန်ထမ်း (flag man) ကိုလည်း ထားရှိပေးထား ပါသည်။ ထို့အပြင် အများပြည်သူ ဆိုင်ရာလမ်းမ (ဆောက်လုပ်ရေးဧရိယာ အရှေ့ဘက်ရှိ) နှင့် ဆောက်လုပ်ရေးလုပ်ငန်းဧရိယာအတွင်းတွင် သတိပေးဆိုင်းဘုတ်များကို ထင်ထင်ရှားရှားပြသထား ပါသည်။ လမ်းများပျက်စီးခြင်းမှကာကွယ်ရန် ပစ္စည်း အလွန်အကျွံတင်ဆောင်ခြင်း မပြုရန် ကန်ထရိုက်တာက တင်းကြပ်စွာထိန်းသိမ်းကွပ်ကဲပါသည်။ ဆောက် လုပ်ရေးဧရိယာ အရှေ့ဘက်ရှိ ပြည်သူပိုင်လမ်းမှာ ကောင်းမွန်သောအခြေအနေတွင်ရှိပြီး အနီးနားဝန်းကျင်ရှိ ပြည်သူလူထုမှ တိုင်ကြားခြင်းများမရှိပါ။
- ကန်ထရိုက်တာသည် ခရီးအသွားအလာစီမံခန့်ခွဲမှုနှင့် သယ်ယူပို့ဆောင်ရေး ဘေးကင်းလုံခြုံမှုအစီအစဉ်ကို ပြုစုထားပြီးအလုပ်သမားများကို ယင်းအစီအစဉ်အတိုင်း လိုက်နာစေသည်။ အရေးပေါ်တုံ့ပြန်မှုအစီအစဉ် ကိုလည်းပြုစုထားပြီး ၎င်းတွင် ထိခိုက်မှု၊ မီးအန္တရာယ်၊ နှင့် ရှေးဦးသူနာပြု

စသည့်အကြောင်းအရာများပါဝင် သည်။ ကန်ထရိုက်တာသည် မူးယစ်ဆေးဝါး နှင့် အရက်သုံးစွဲခြင်း ထိန်းချုပ်မှုမူဝါဒကို ပြုစုထားပြီး အလုပ်သမားများကို လိုက်နာစေသည်။ အရက်သောက်ထားခြင်းရှိ/မရှိကို လုပ်ငန်းမစမီတွင် အလုပ်သမားများကို နေ့စဉ်စစ်ဆေးသည်။ သုညရာခိုင်နှုန်းထက်ကျော်လွန်သော အရက်ပမာဏသုံးစွဲထားခြင်းကို တွေ့ပါက အလုပ်သမားကို အလုပ်လုပ်ခြင်းမှ ရပ်နားစေမည်။ မူးယစ်ဆေးဝါးသုံးမှု ရှိ/မရှိ စမ်းသပ်ခြင်းပြုလုပ်ရာတွင် အလုပ်သမားများ၊ အင်ဂျင်နီယာများ နှင့် လုံခြုံရေးဝန်ထမ်းများအပါအဝင် ဝန်ထမ်းအားလုံးကို ပုံမှန် မဟုတ် သော (random) အစီအစဉ်အတိုင်း ရွေးချယ်၍ စစ်ဆေးမှုများ ပြုလုပ်ခဲ့သည် (ပတ်လျှင် ၁ကြိမ်၊ နမူနာ ၈ခု)။ စမ်းသပ်မှုပြုလုပ်ရာတွင် သုံးစွဲထားသည်ဟု တွေ့ရှိပါက ထိုအလုပ်သမားအား အစိုးရအသိအမှတ်ပြု ဌာနတွင် ပြန်လည်ထူထောင်ရေးများနှင့်အကြံပြုဆွေးနွေးခြင်းတို့ကို ဆောင်ရွက်စေပါသည်။ သို့သော် ၂၀၂၀ ခုနှစ် ဇူလိုင် - ဒီဇင်ဘာလအတွင်း မူးယစ်ဆေးဝါးသုံးစွဲမှုစစ်ဆေးခြင်းများအရ ဝန်ထမ်းများအားလုံးသည် မူးယစ်ဆေးဝါးသုံးစွဲထားခြင်းမရှိကြောင်း စစ်ဆေးတွေ့ရှိခဲ့ပါသည်။

- **အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း**

- **အန္တရာယ်မရှိသောစွန့်ပစ်ပစ္စည်း** - ကန်ထရိုက်တာသည် ဆောက်လုပ်ရေးပစ္စည်းများ ယာယီသိုလှောင်ရန် အတွက် နေရာထားရှိပေးပါသည်။ စွန့်ပစ်ပစ္စည်းစွန့်ပစ်ရာသီးသန့်ပုံးများတွင် အဖုံးအကာများ ပါရှိပြီး အောက်ပါအတိုင်း ပုံးအမျိုးအစား (၅) မျိုးရှိပါသည်။ ၎င်းတို့မှာ အခြေခံစွန့်ပစ်ပစ္စည်း (အပြာရောင်)၊ ပြန်လည်အသုံးပြုနိုင်သော စွန့်ပစ်ပစ္စည်း (အဝါရောင်)၊ အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း (အနီရောင်)၊ အော်ဂဲနစ် စွန့်ပစ်ပစ္စည်း (အစိမ်းရောင်) နှင့် ဇီဝဆိုင်ရာ အန္တရာယ်ရှိသည့် စွန့်ပစ်ပစ္စည်းတို့ ဖြစ်ပါသည်။ ထွက်ရှိသည့် စွန့်ပစ်ပစ္စည်းပမာဏကို မှတ်တမ်းထားရှိပါသည်။ ကန်ထရိုက်တာသည် စွန့်ပစ်ပစ္စည်း စုဆောင်းစွန့်ပစ်ရန်အတွက် ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးကော်မတီ (YCDC) နှင့် ပူးပေါင်း၍ ဆောက်လုပ်ရေးဧရိယာထဲတွင် အကြွင်းအကျန်များ မကျန်ရှိအောင် ဆောင်ရွက် ရှိပါသည်။ ထို့အပြင် အလုပ်သမားများအား ဆောက်လုပ်ရေးဧရိယာအတွင်း အမှိုက်မီးရှို့မှုများမပြုလုပ်ရန် တားမြစ်ထားပါသည်။

- **အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်း** - အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းများထည့်သည့်ပုံး (အနီရောင်) ကို ဆောက်လုပ်ရေးဧရိယာတွင် ထားရှိပေးထားပါသည်။ သို့သော် ၂၀၂၀ ခုနှစ် ဇူလိုင် - ဒီဇင်ဘာလ ဆောက်လုပ်ရေးကာလအတွင်းတွင် အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း ထွက်ရှိမှု မရှိပါ။ အကယ်၍ အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း ထွက်ရှိမှုရှိပါက ၎င်းတို့ကို စုဆောင်း၍ စွန့်ပစ်ရန် လိုင်စင်ရလုပ်ငန်း (သို့မဟုတ်) အစိုးရအဖွဲ့အစည်းများနှင့် ပူးပေါင်းဆောင်ရွက်ပါမည်။

- **စွန့်ပစ်ရေ** - ကန်ထရိုက်တာသည် အလုပ်သမား ၄၂၀ ယောက်အတွက် ဆောက်လုပ်ရေးဧရိယာအတွင်း (ပထမထပ်နှင့်ဒုတိယထပ်)တွင် ယာယီအိမ်သာ ၉ လုံး၊ ဆောက်လုပ်ရေးဧရိယာအနောက်ဘက်တွင် အိမ်သာ ၂လုံး မှ ၃လုံး၊ နှင့် PTTEPI ရုံးအတွင်းတွင် အိမ်သာ ၉ လုံးထားရှိပေးထားပါသည်။ ကန်ထရိုက်တာသည် စီမံကိန်းဧရိယာမှ ရေဆိုးစွန့်ပစ်မှုမပြုလုပ်ခင်တွင် စွန့်ပစ်ရေကို ထိန်းထားရန်အတွက် ဆောက်လုပ်ရေးဧရိယာအတွင်းတွင် ရေဆင်းစနစ်တစ်ခုကို ထားရှိပါသည်။ အလုပ်သမားများ အားလုံးကို စွန့်ပစ်ပစ္စည်းများကို သင့်လျော်စွာ စနစ်တကျ စွန့်ပစ်စေသည်။ ဆောက်လုပ်ရေးဧရိယာအတွင်းတွင်

စွန့်ပစ်ပစ္စည်းများကို အမျိုးအစားခွဲခြား၍ စွန့်ပစ်ရန်အတွက် အမှိုက်ပုံးအသီးသီးလည်း ထားရှိ ပေးထားပါသည်။

- **လူမှုစီးပွားရေး** - ကန်ထရိုက်တာသည် အလုပ်ခန့်အပ်မှု လုပ်ထုံးလုပ်နည်း နှင့် အလုပ်ခေါ်စာအရ ရန်ကုန်မြို့နှင့် အနီးအနားရှိမြို့များမှ ဒေသခံလူထုကို ခန့်အပ်ရန် သတ်မှတ်ထားပါသည်။ ကန်ထရိုက်တာသည် အလုပ်သမားများနှင့် အနီးဝန်းကျင်ရှိလူထုနှင့် ပဋိပက္ခဖြစ်ပွားခြင်းမှ ကာကွယ်ရန် လုပ်ငန်းစဉ်များစဉ်းစားကမ်းများကို အလုပ်သမားများအား ချမှတ်ပေးထားပြီး ထိုအတိုင်းလိုက်နာစေပါသည်။ ထို့အပြင် နေ့စဉ်လုပ်ငန်းများ စတင်မလုပ်ဆောင်မီတွင် လိုက်နာဆောင်ရွက်ရမည့် အချက်များကို ခေါင်းဆောင် (သို့မဟုတ်) ဘေးကင်းလုံခြုံရေးအရာရှိက သတိပေး ပြောကြားပေးပါသည်။ ကန်ထရိုက်တာသည် အနီးဝန်းကျင်ရှိ လူထုအား ဆောက်လုပ်ရေးအစီအစဉ်နှင့် ဆောက်လုပ်ရေးပစ္စည်းများ သယ်ယူပို့ဆောင်ရေး နှင့် စက်ယန္တရားကြီးများသွားရာ လမ်းကြောင်းအခြေအနေများကို အသိပေးထားပါသည်။ စစ်ဆေးမှုများ ပြုလုပ်ရန် အတွက် မြို့ပြအင်ဂျင်နီယာ ၁၂ ယောက်နှင့် ဘေးအန္တရာယ်လုံခြုံရေးဆိုင်ရာ ဝန်ထမ်း ၇ ယောက်ကို ဆောက်လုပ်ရေးကာလ တစ်လျှောက်တွင် ထားရှိထားပါသည်။ PTTEPI သည် မကျေနပ်ချက်ဖြေရှင်းခြင်းစနစ်လက်စွဲရှိပြီး သက်ဆိုင်သည့်သူများထံမှ လက်ခံရရှိသော မကျေနပ်ချက်များကို ချက်ချင်း ဖြေရှင်းပါ သည်။ စီမံကိန်းအကြောင်းအရာဖော်ပြချက်ဆိုင်ရာဘုတ်ကို ဆောက်လုပ်ရေးဧရိယာအရှေ့တွင် စိုက်ထူပြသ ထားပြီး ၎င်းတွင် စီမံကိန်းအသေးစိတ်အချက်အလက်များဖြစ်သော စီမံကိန်းအမည်၊ ပိုင်ရှင်၊ အကြံပေး၊ ကန်ထရိုက်တာ၊ ဆောက်လုပ်ရေးကာလ နှင့် အရေးပေါ်ဖုန်းနံပါတ်တို့ကို ဖော်ပြထားပါသည်။ သို့ရာတွင် ၂၀၂၀ခုနှစ်၊ ဇူလိုင်လမှ ဒီဇင်ဘာလအတွင်း မကျေနပ်ချက်တိုင်ကြားမှု လုံးဝမရှိခဲ့ပါ။

- **လူထု ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး**

- **ကျန်းမာရေး** - စီမံကိန်း၏ IEE တွင် ပါရှိသည့် ထိခိုက်မှုလျော့ပါးရေးနည်းများကို စေ့စေ့စပ်စပ် အကောင်အထည်ဖော်လျက်ရှိပါသည်။
- **ဘေးအန္တရာယ်ကင်းရှင်းရေး** - ဆောက်လုပ်ရေးကာလအတွင်း အမြင့်တွင် အလုပ်လုပ်ရခြင်း၊ အပူချိန်များသောအလုပ်များလုပ်ရခြင်းနှင့် ကန့်သတ်ဧရိယာများ(confined space)တွင် အလုပ်လုပ်ရခြင်းကဲ့သို့သော လုပ်ငန်းများအတွက် အလုပ်ခွင့်ပြုစနစ် (Work Permit System) ရှိသည်။ ထို့အပြင် ကန်ထရိုက်တာသည် HSE မူဝါဒများကိုချမှတ်ထားပြီး အလုပ်သမားများကို လိုက်နာဆောင်ရွက်စေပါသည်။ အလုပ်သမားများအားလုံးကို သင့်လျော်သော တစ်ကိုယ်ရည် အကာအကွယ်ပစ္စည်းများ(PPE) ထောက်ပံ့ပေးထားပြီး အလုပ်လုပ်ချိန်တွင် လိုက်နာအသုံးပြုစေသည်။ ထို့အပြင် နှစ်စဉ် SSHE သင်တန်းအစီအစဉ်ပါ အချက်အလက်များအတိုင်း သင်တန်းပေးခြင်း ရှိသည်။ ကန်ထရိုက်တာ/ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာအရာရှိမှနေ၍ အလုပ်သမားများကို Tool box talk နေ့စဉ်ပြုလုပ်ပြောပြပေးသည်။ ဆေးပညာတတ်ကျွမ်းသည့်သူ တစ်ယောက် ဆေးခန်းတွင် ၂၄ နာရီပတ်လုံး အလှည့်ကျစနစ်ဖြင့် အမြဲတမ်းရှိပြီး ဆေးဘက်ဆိုင်ရာ ကုသမှုများ၊ ရှေးဦးသူနာပြုစုပေးခြင်းများ ပြုလုပ်ပေးသည်။ စီမံကိန်းမှနေ၍ အရေးပေါ်ကိစ္စရပ်များရှိလာပါက

လက်ခံဆောင်ရွက်ပေးနိုင်ရန် ဝိတိုရိယဆေးရုံနှင့် ညှိနှိုင်းဆောင်ရွက်ထားပါသည်။ ထို့အပြင် အရေးပေါ်ကိစ္စရပ်များဖြေရှင်းရန်အတွက် အရေးပေါ်တုံ့ပြန်ရေးလုပ်ငန်းစဉ်နှင့်သင်တန်းကိုလည်း စီစဉ်ပေးထားပါသည်။ အလုပ်သမားများကို အန္တရာယ်ရှိနိုင်မှုများကို သတိပေးရန်အတွက် ဆောက်လုပ် ရေးဧရိယာအတွင်းတွင် သတိပေးဆိုင်းဘုတ်များကို တပ်ဆင်ပေးထားပါသည်။ ထို့အပြင် ကန်ထရိုက်တာသည် ဘေးကင်းလုံခြုံစိတ်ချရသော လုပ်ငန်းခွင်တစ်ခုကို ထိန်းသိမ်းထားနိုင်ရန်အတွက် အလုပ်ရပ်ဆိုင်းမှုမူဝါဒ (Stop Work Policy) ကိုလည်း ချမှတ်ပေးထားပါသည်။ စစ်ဆေးရေး အစီအစဉ်အတိုင်း စက်ပစ္စည်းကိရိယာများကို ပုံမှန်စစ်ဆေး၍ ပြုပြင်ထိန်းသိမ်းမှုများ ပြုလုပ်သည်။ ထို့အပြင် ဆောက်လုပ်ရေးဧရိယာတွင် မီးသတ်ကိရိယာများကို ထားရှိပေးထားပြီး လစဉ်စစ်ဆေး သည်။ ဆေးလိပ်သောက်ခြင်းကို ဆောက်လုပ်ရေးဧရိယာ၏ အရှေ့ဘက်နှင့် အနောက်ဘက်တို့တွင် ထားရှိပေးသည်။

၄.၂ ပတ်ဝန်းကျင်ဆိုင်ရာစောင့်ကြည့်စစ်ဆေးခြင်းရလဒ်

ဤစီမံကိန်းသည် ကနဦးပတ်ဝန်းကျင်ဆိုင်ရာဆန်းစစ်ချက် (IEE) တွင်ဖော်ပြထားသော ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြည့်စစ်ဆေးခြင်းကို အပြည့်အဝလိုက်နာဆောင်ရွက်ခြင်းရှိပါသည်။ ၎င်းတို့တွင် အမှုန်အမွှားစောင့်ကြည့် စစ်ဆေးခြင်း၊ ဆူညံသံအဆင့်အတန်းစောင့်ကြည့်စစ်ဆေးခြင်း၊ တိုင်ကြားချက်ကိုင်တွယ်ဖြေရှင်းမှုစနစ်အား စောင့်ကြည့်စစ်ဆေးခြင်း၊ လူထုနှင့်လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှုစောင့်ကြည့်စစ်ဆေးခြင်းတို့ ပါဝင်ပါသည်။ အသေးစိတ်ကို အောက်တွင် ဖော်ပြထားပါသည်။

(၁) အမှုန်အမွှားများပျံလွင့်မှုစောင့်ကြည့်စစ်ဆေးခြင်း

အမှုန်အမွှားနမူနာကောက်ယူစစ်ဆေးခြင်းများကို ဆောက်လုပ်ရေးနေရာအတွင်းတွင် ၂၀၂၀ ခုနှစ် ဒီဇင်ဘာလ ၁၁ ရက်နေ့ မှ ၁၅ရက်နေ့အတွင်းတွင် နေရာ ၃ နေရာတွင် ပြုလုပ်ခဲ့ပါသည်။ ၎င်းနေရာ၃ခုမှာ ဆောက်လုပ်ရေးဧရိယာခြံစည်း ရိုး၏မြောက်ဘက် (A1)၊ ဆောက်လုပ်ရေးဧရိယာခြံစည်း ရိုး၏အနောက်ဘက် (A2) နှင့် ဆောက်လုပ် ရေးဧရိယာ ခြံစည်းရိုး၏ အရှေ့တောင်ဘက် (A5) တို့ဖြစ်ပါသည်။ PTTEPI ရုံးအနောက်ဘက်ရှိအိမ်နေရာမှလွဲ၍ TSP ၏ ရလဒ်အများစုမှာ ကမ္ဘာ့ဘဏ်အုပ်စု၏ ထိတွေ့ဝန်းကျင်ဆိုင်ရာ လေထုအရည်အသွေး (Ambient Air Quality of WORLD BANK GROUP) နှင့် ကိုက်ညီမှုရှိပါသည်။ ဆောက်လုပ်ရေးလုပ်ငန်းခြံစည်းရိုးအရှေ့တောင်ဘက် (A5) အမှတ်ရာတွင် စံသတ်မှတ်ချက်များနှင့်ကိုက်ညီမှု မရှိပါ။ ၁၀ မိုက်ခရိုနီအောက်သေးငယ်သောအမှုန်အမွှား (PM 10) အတွက်ရလဒ်များမှာ တိုင်းတာရေးအမှတ်နေရာ (station) အားလုံးတွင် PM10 သည် $50 \mu\text{g}/\text{m}^3$ ထက် ကျော်လွန်မှု မရှိသင့်ဟုသတ်မှတ်ထားသည့် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် (EQEG) ထက်ကျော်လွန်နေသည်ကို တွေ့ရှိရပါသည်။ သို့သော် ၁၀ မိုက်ခရိုနီအောက်သေးငယ်သောအမှုန်အမွှား (PM 10) အတွက်ရလဒ်များကို WHO နှင့် IFC ၏ ထိတွေ့ဝန်းကျင် လေထုအရည်အသွေး စံသတ်မှတ်ချက်များ နှင့် နှိုင်းယှဉ်ကြည့်သောအခါ ၎င်း၏သတ်မှတ်ချက်ဖြစ်သော "PM10 သည် $150 \mu\text{g}/\text{m}^3$ ထက် မကျော်လွန်သင့်" ဟူသော စံသတ်မှတ်ချက်နှင့်ကိုက်ညီမှုရှိပါသည်။ IOP Conference Series: Earth and Environmental Science. 496. 012003. 10.1088/1755-1315/496/1/012003 ၏ ရန်ကုန်မြို့နှင့်တောင်ကြီးမြို့တို့တွင် ရာသီအလိုက်နှင့် ဒေသ

အလိုက် အမှုန်အမွှားပျံလွင့်မှုအခြေအနေများတွင် ဖော်ပြထားခြင်းအရ ရန်ကုန်မြို့တွင် PM10 ပါဝင်မှုများသည် စိုစွတ်ရာသီထက် ခြောက်သွေ့ရာသီတွင် သိသာထင်ရှားစွာ ပိုမိုများပြားပါသည်။ ရန်ကုန်မြို့ရှိ အဓိက PM အရင်းအမြစ်မှာ မော်တော်ယာဉ်များမှ ထုတ်လွှတ်မှုများကြောင့် ဖြစ်ပါသည်။ ထို့ကြောင့် Total Suspended Particulate (TSP) ရလဒ်များသည် WHO နှင့် IFC ၏ ထိတွေ့ဝန်းကျင် လေထုအရည်အသွေးစံသတ်မှတ်ချက်များနှင့်ကိုက်ညီမှုမရှိပါ။ ၁၀ မိုက်ခရိုနီအောက်သေးငယ်သောအမှုန်အမွှား (PM 10) အတွက် ရလဒ်များသည် EQEG နှင့်ကိုက်ညီမှု မရှိခြင်းသည် အများဆိုင်ရာလေထုအရည်အသွေး (public air quality) ၏ သက်ရောက်မှုများကြောင့်လည်း ဖြစ်ပါသည်။ အကြောင်းမှာ အများဆိုင်ရာလေထုအရည်အသွေးသည် အထူးသဖြင့် ခြောက်သွေ့ရာသီတွင် တစ်နှစ်ထက် တစ်နှစ် စံသတ်မှတ်ချက်ထက် ပိုမိုမြင့်တက်မှုများ မြင့်မားလာလျက်ရှိသောကြောင့်ဖြစ်ပါသည်။ သို့သော်လည်း ဤစီမံကိန်းတွင် ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့ပါးရေး အစီအစဉ်များဖြစ်သော ရေဖြန်းခြင်း နှင့် ဆောက်လုပ်ရေး ဧရိယာပတ်လည်တွင် PVC mesh sheet များ ကာရံခြင်း တို့ပြုလုပ်ကာ ပတ်ဝန်းကျင်လေထုအပေါ် ထိခိုက်နိုင်သည့် အမှုန်အမွှားလွင့်ခြင်းမှ ကာကွယ်ရန် နှင့် လျော့ချရန် စီမံထားရှိပါသည်။

၂၀၂၀ခုနှစ် ဒီဇင်ဘာလ၏ အမှုန်အမွှားများပျံလွင့်မှုစောင့်ကြည့်စစ်ဆေးခြင်းရလဒ်များကို မူလအချက်အလက်များ (baseline data)များနှင့် နှိုင်းယှဉ်ကြည့်ပါက တိုင်းတာရေးအမှတ်နေရာအားလုံးရှိ Total Suspended Particulate (TSP) နှင့် ၁၀ မိုက်ခရိုနီအောက်သေးငယ်သောအမှုန်အမွှား (PM 10) အတွက်ရလဒ်များမှာ မူလအချက်အလက်များ (baseline data) ထက် ကျော်လွန်နေသည်ကိုတွေ့ရပါသည်။ <https://aqicn.org/data-platform/register/> ရှိ အများဆိုင်ရာလေထုအရည်အသွေးအချက်အလက်အရ ၂၀၂၀ခုနှစ် ဒီဇင်ဘာလရှိ ရန်ကုန်မြို့၏ လေထုအရည်အသွေးညွှန်းကိန်း (AQI) သည် များသောအားဖြင့် လိမ္မော်ရောင် နှင့် အနီရောင် (ကျန်းမာရေးအတွက်မသင့်လျော်) သော အခြေအနေတွင်ရှိပြီး ခြောက်သွေ့ရာသီတွင် တစ်နှစ်ထက်တစ်နှစ် ညွှန်းကိန်းများ ပိုမိုမြင့်တက်လျက်ရှိပါသည်။

(၂) ဆူညံသံအဆင့်အတန်းစောင့်ကြည့်စစ်ဆေးခြင်း

ဆူညံသံအဆင့်အတန်းစောင့်ကြည့်စစ်ဆေးခြင်းကို ဆောက်လုပ်ရေး ဧရိယာ နှင့် PTTEPI ရန်ကုန်ရုံး အဆောက်အအုံ၏ ဆောက်လုပ်ရေးဧရိယာတွင် ၂၀၂၀ ခုနှစ် ဒီဇင်ဘာလ ၁၁ ရက်နေ့မှ ၁၅ ရက်နေ့အထိ တိုင်းတာရေးနေရာ ၃ခုတွင် ပြုလုပ်ခဲ့ပါသည်။ ၎င်းနေရာ ၃ခုမှာ ဆောက်လုပ်ရေးဧရိယာခြံစည်း ရိုး၏မြောက်ဘက် (N1)၊ ဆောက်လုပ်ရေး ဧရိယာခြံစည်း ရိုး၏အနောက်ဘက် (N2) နှင့် ဆောက်လုပ်ရေးဧရိယာ ခြံစည်းရိုး၏ အရှေ့တောင်ဘက် (N5) တို့ဖြစ်ပါသည်။ ထိုနေရာများအားလုံးရှိ နေ့အချိန် နှင့် ညအချိန် LAeq-1 hr တန်ဖိုးသည် အမျိုးသားပတ်ဝန်းကျင် အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် (၂၀၁၅) တွင်ပါရှိသော စက်မှု/စီးပွား ဆိုင်ရာ ဧရိယာများအတွက် စံနှုန်း ဖြစ်သည့် 70 dB(A) ထက် မကျော်လွန်ဘဲ ကိုက်ညီမှုရှိပါသည်။

သို့သော်လည်း နေ့ဘက်ဆောက်လုပ်ရေးလုပ်ငန်းများလုပ်ကိုင်ရာမှ ဆိုးရွားစွာအသံဆူညံမှု ထွက်ပေါ်ခြင်းကဲ့သို့သော အလွန်အကျွံအသံဆူညံခြင်းကြောင့် အနီးနားဝန်းကျင်ရှိလူထုအား ထိခိုက်မှုမရှိစေရန် စီမံကိန်းအနေဖြင့် ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုလျော့ပါးရေးနည်းလမ်းများကို ပြုစုထားပါသည်။ PTTEPI သည် ဆောက်လုပ်ရေး ဧရိယာပတ်လည်တွင် အနီးရှိလူထုအား အသံကြောင့်ထိခိုက်မှုမရှိစေရန်အတွက် အသံကာပစ္စည်းများ (သတ္တုပြား) များကို

တပ်ဆင်ထားပါသည်။ ထို့အပြင် PTTEPI သည် ဆူညံသံအဆင့်အတန်း စောင့်ကြည့်စစ်ဆေးမှု ပြုလုပ်ခြင်းကို ထိခိုက်မှုလျော့ပါးရေးအစီအမံတွင် ဖော်ပြထားသည့်အတိုင်း စဉ်ဆက်မပြတ် ဆက်လက် လုပ်ဆောင်သွားမည်ဖြစ်ပါသည်။

(၃) တိုင်ကြားချက်ကိုင်တွယ်ဖြေရှင်းမှုစနစ်အား စောင့်ကြည့်စစ်ဆေးခြင်း

PTTEPI (ရန်ကုန်) ရုံးအတွက် တိုင်ကြားချက် ကိုင်တွယ်ဖြေရှင်းခြင်းစနစ် စောင့်ကြည့်လေ့လာခြင်းကို PTTEPI က ၂၀၂၀ ခုနှစ် ဇူလိုင်လမှ ဒီဇင်ဘာလအတွင်း ဆောင်ရွက်ခဲ့ပါသည်။ ဆောက်လုပ်ရေးကာလတစ်လျှောက်တွင် မည်သို့သော မကျေနပ်ချက်ထုတ်ဖော်ခြင်းမျိုးမှ မရှိပါ။

(၄) အများပြည်သူ နှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းမှုအတွက်စောင့်ကြည့်စစ်ဆေးခြင်း

PTTEPI (ရန်ကုန်) ရုံး အဆောက်အဦး ၏ ဆောက်လုပ်ရေးကာလအတွက် လူထု နှင့် လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှု စောင့်ကြည့်စစ်ဆေးခြင်း များကို ၂၀၂၀ ခုနှစ် ဇူလိုင်လမှ ဒီဇင်ဘာလအထိ ကန်ထရိုက်တာ က ဆောင်ရွက်ခဲ့ပါသည်။ ဆောက်လုပ်ရေးကာလအတွင်းတွင် မတော်တဆဖြစ်မှု စုစုပေါင်း ၉ ခုရှိခဲ့ပါသည်။ ၎င်းတို့မှာ near miss ဖြစ်ရပ် ၄ ခု၊ ရှေးဦးသူနာပြုဆိုင်ရာဖြစ်ရပ် ၁ ခု၊ ပစ္စည်းပြုတ်ကျခြင်းဖြစ်ရပ် ၁ ခု၊ Slip & Trip ဖြစ်ရပ် ၁ ခု၊ ပျောက်ဆုံးမှုဖြစ်ရပ် ၁ ခု၊ နှင့် အခြားဖြစ်ရပ် ၁ ခု တို့ဖြစ်ပါသည်။ အလားတူဖြစ်ရပ်များ ပြန်လည် ဖြစ်ပေါ်ခြင်းမရှိစေရန် ပြုပြင်ရေးလုပ်ဆောင်မှုများကို ဆောင်ရွက်ရန် အဆိုပြုထားပါသည်။

Executive Summary

PTTEPI has the responsibility to follow the environmental mitigation and monitoring measures including submits the monitoring report to ECD . Therefore, PTTEPI, as the project owner, has assigned a qualified third party, REM-UAE Laboratory and Consultant Company Limited to perform compliance audit of the mitigation measures and perform the monitoring at frequency specified in the IEE's environmental management plan which the project has complied both on the mitigation measures and the environmental monitoring.

As the world faces the Covid-19 pandemic, and Myanmar is no exception. PTTEP Myanmar Asset has set a very high priority on preventing the spread of the COVID-19 on its organization grounds and put safety measures and mitigation plans that comply with Government's instructions to ensure everyone is safe during the COVID-19 outbreak. Safety measures continue to be strictly enforced at all operating sites including Yangon Office Building Construction site. The environmental mitigation measures implementation audit which considered environmental issues and essential impacts that may occur during construction phase of PTTEPI's Yangon Office Building has to conducted as destop audit and video conference to PTTEP's Yangon Office Building on December 11, 2020 by REM-UAE, as the environmental consultant of the project together with the representation from PTTEP and Main Contractor (KST Group of Companies Limited).

The objective of the audit was to assess the effectiveness of implementation of the Environmental Management Plan, including both mitigation and monitoring measures, defined in the IEE report. Audit results have been documented in the report and specified to covers potential problems, obstacles and recommendations for improvement.

The evaluation process includes (1) PTTEP team supporting site survey photos to REM-UAE, (2) personnel interview, and (3) document review.

For environmental monitoring was conducted as specified in IEE which including Fugitive dust monitoring, Noise level monitoring, Grievance mechanism monitoring, Public and occupational health and safety monitoring. Fugitive dust monitoring and Noise level monitoring were monitored 3 stations during December 11-15, 2020. While Grievance mechanism monitoring, Public and occupational health and safety monitoring for construction phase during July - December 2020 of PTTEPI's Yangon Office Building were done by PTTEPI.

1. Project Description

The PTTEPI's Yangon Office Building will replace the existing building of PTTEP International Limited (Yangon Branch) which is located at No. 2, Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon. The project site is located on the south of the Sei-Myaung Yeiktha Street and the west of the Pyay Road, Mayangon Township, Yangon, covering 2,371.46 sq.m. There are 7 Buildings (Building 1 to Building 7) with car park space. The new building will be constructed to replace the 4 existing Buildings i.e. Building 1, Building 2, Building 4, Building 5 including car park space. The rented area of existing Building 3, Building 6 and Building 7 will be returned to the owner.

2. Project Components

2.1 Type of Building and Internal Function Area Arrangement

The project is a 12 ½ storey office building of PTTEP International Limited (Yangon Branch) with total height of 52.85 meters, function area of 18,760.0 sq.m. and internal parking area for 110 cars.

The function area within the building can be divided as follows: -

- Parking areas are on B2, B1 and floor 1, 2, 3;
- Canteen is on floor 3; and
- Office areas are on floors 4-11

2.2 Design of Facilities for the Disabled

The design of facilities for the disabled of this office building has been based on Universal Design concept.

- Car parking lots for the disabled and elders are provided on Basement 1 and Mezzanine to facilitate convenient accessibility into the building.
- Toilets for the disabled and elders are provided on the ground floor.

2.3 Internal Utilities System

Internal utilities system is comprised of traffic system, water supply system and water for domestic use, wastewater treatment, electricity system, solid waste management, fire protection and warning system, ventilation and air condition system, lift system, and safety.

3. Status of Current Operation

Once the demolition of old building finished, PTTEPI started the construction of new office building since January 2018 and expected to complete in April 2021.

4. Compliance Status

The audit and monitoring results determined that the project completely complied on the Mitigation Measures during July - December 2020 in construction phase with 100% for the mitigation that have situation. However, there are some mitigation that do not have situation during the audit period equal to 2.2% of all mitigation measure.

PTTEPI complied with most of the mitigation measures prescribed in the IEE. Mitigation Measures in Construction Phase are summarized below.

4.1 Environmental Mitigation Measures Compliance Result in Construction Phase

The project has finished piling and foundation work, the main activity during July - December 2020 structural work and infrastructure work (M&E activities and Finishing work).

- **Air Pollution** - The project complied with the environmental mitigation measures strictly such as assigned staff to spray water around construction area at least twice a day or more in dry season or depending on the atmospheric conditions and the existing road was in a good condition. The project provided PVC mesh sheets around the construction areas in order to prevent dust dispersion and reduced effected to the communities nearby the construction site and along the transportation route. The main activity during July - December 2020 was structural work and infrastructure work (M&E activities and Finishing work) which mostly used finished material. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure. Moreover, the contractor provided dust masks for workers and controlled all worker wear dust mask during working.
- **Excessive Noise and Vibration** - The contractor emphasized workers in toolbox talk which provided in daily before working to carried out the construction activities with high noise and vibration level at day time (9 a.m. – 5 p.m.) in order to reduce noise and vibration impact to nearby communities. The contractor provided ear muffs for workers and controlled to use during working in high noise area. Moreover, Noise barrier (metal sheet) was installed around the construction site to reduce noise impact to nearby communities.
- **Traffic** - The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. The project has finished piling and foundation work, the main activity during July - December 2020 was structural work, concrete work and infrastructure work which mostly used finished material. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area and the contractor provided flag man to give the signal and facilitate the traffic during transportation as specified in measure. Moreover, warning signs were installed and can be clearly seen at the public road (in front of the construction area) and within

construction area. Routine inspection and preventive maintenance for all vehicles conducted as per the inspection plan. The contractor has strictly controlled of overloaded heavy vehicles to prevent road deterioration. Moreover, the public road (in front of the construction area) was in good condition and there was no complaint from nearby communities.

- The contractor provided journey management and transportation safety procedure and enjoined workers to follow regulation. The emergency response procedure was set up including incident, fire action, first aid action. The contractor prepared drug and alcohol abuse policy and enforced all workers to follow. Alcohol testing was conducted before working every day. The worker will immediately stop working if alcohol is found more than 0%. For drug testing, all staffs including workers, engineers and safety staffs were random tested (1time/week maximum 8 samples), the staff who found to be positive in drug testing shall be required to undergo rehabilitation and counseling in government accredited center. However, during July - December 2020 there were no staff found positive in drug test.
- **Solid Waste**
 - Non- Hazardous Waste - The contractor provided temporary storage area for construction materials. separate waste containers with cover are provided for 5 types; general waste (blue), recycle waste (yellow), hazardous waste (red), organic waste (green) and biohazard infectious waste. The quantity of waste was recorded by contractor. The contractor cooperated with YCDC to collect and dispose of waste in order to prevent residual waste in construction area. Moreover, the constructor enforced all workers not to burn any wastes in the construction area.
 - Hazardous Waste - Hazardous waste container (red) was provided at the construction area. However, there are no hazardous waste during construction phase in July - December 2020. If there are occurred, the contractor will cooperate with licensed contractor or authorities to collect and dispose.
- **Wastewater** - The contractor has provided 9 temporary toilets within construction area (1st and 2nd floor), 2-3 toilets at the back of construction area and 9 toilets within PTTEPI Office for 420 workers. The contractor installed drainage system in the construction area to hold wastewater before discharged out of the project. The contractor enforced all worker to dispose of waste properly including provided separate waste containers with cover for waste collection in the construction area.
- **Social and Economic** - The contractor considered to hired local people in Yangon and nearby city as per recruitment procedure and announcement. The contractor provided work regulation and enforced all workers to follow in order to prevent the conflict between workers and nearby communities. Moreover, tool box talk was provided in daily before working by the header of contractor/safety officer. The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. 12 Civil engineers and 7 safety staffs were provided to closely inspect construction activities throughout

the construction period. PTTEPI provided grievance handling guideline to receive any complaints from the stakeholder and resolve the complaint in the immediate. Project's signboard was installed in front of the construction area to inform the project details such as project name, owner, consultant, contractor, period of construction and emergency contact number. However, there was no any complaints during July - December 2020.

- **Public health and safety**

- **Health** – The project strictly implemented mitigation measures as per IEE report.
- **Safety** - Work permit system was implemented for specific work during construction period such as working at height, hot work, and confined space. Moreover, the contractor has provided HSE Policy and enforced all workers to follow. The contractor provided suitable PPE and sufficiently for all workers and controlled to use PPE during working. In addition, the training was regularly performed as per the annual SSHE Training Plan. Tool box talk was provided in daily before working by the header of contractor/safety officer. The medic person was stand by 24/7 (day-night shift) at medic room for medical treatment included first aid kit and medical supplies. The project also coordinates with Victoria hospital for admission in case of accidents Moreover, emergency respond procedure and training were provided to respond in emergency case. Warning signs were installed in construction area to warns workers from dangers. Moreover, the contractor has provided Stop Work Policy to maintain a safe and secure work environment. Routine inspection and preventive maintenance for all equipment were conducted as per inspection plan. Moreover, Firefighting equipment were provided in the construction area and inspected monthly. Smoking areas was provided in the west and in front of construction area.

4.2 Environmental Monitoring Result

The project has completely complied the environmental monitoring as specified in IEE, including Fugitive dust monitoring, Noise level monitoring, Grievance mechanism monitoring, Public and occupational health and safety monitoring. The details as follow;

1) Fugitive Dust Monitoring

Fugitive dust samples were monitored at construction site during December 11-15, 2020 at 3 stations North of construction fence (A1), West of construction fence (A2) and South-east of construction fence (A5). Most of the results of TSP have complied with Ambient Air Quality of WORLD BANK GROUP except House behind PTTEPI Office: South-east of construction fence (A5) station hasn't complied with the standard. For the results of Particulate matter less than 10 Micron (PM- 10) found that all stations exceeded the National Environmental Quality (Emission) Guideline (EQEG) which determined that PM10 should not exceed 50 µg/m³.

However, when comparison the results of Particulate matter less than 10 Micron (PM-10) with the Ambient Air Quality Standard of WHO and IFC found that all results have complied the standard which determined that PM10 should not exceed $150 \mu\text{g}/\text{m}^3$.

As reported in Seasonal and regional variation of particulate matter dispersion in Yangon City and Taunggyi City, Myanmar. IOP Conference Series: Earth and Environmental Science. 496. 012003. 10.1088/1755-1315/496/1/012003, PM10 concentrations were significantly higher during the dry season as compared to the wet season in Yangon. The major source of PM in Yangon was vehicular exhaust. Thus, Total Suspended Particulate (TSP) results which have not complied with the Ambient Air Quality of WORLD BANK GROUP and Particulate matter less than 10 Micron (PM-10) results which have not complied with the EQEG probability effect from the public air quality since the public air quality are also higher than the standard and increasing year by year especially in dry season. However, the project provided environmental mitigation measure to prevent and reduce the impacts on air quality from dust dispersion resulting from project activities including water spraying, PVC mesh sheets around the construction areas.

The comparison of fugitive dust monitoring results in the construction phase in December 2020 and baseline data found that most of the results of Total Suspended Particulate (TSP) and Particulate matter less than 10 Micron (PM-10) of all stations have higher than baseline data according to the public air quality in <https://aqicn.org/data-platform/register/> shown that the air quality index (AQI) in Yangon during December 2020 were mostly orange and red (unhealthy) and higher than the standard and increasing year by year especially in dry season.

2) Noise Level Monitoring

Noise level monitoring of PTTEPI's Yangon Office Building were monitored at construction site during December 11-15, 2020 at 3 stations North of construction fence (N1), West of construction fence (N2) and South-east of construction fence (N5). The result of L_{Aeq} -1 hr daytime and night-time of all stations are complied with EQEG, 2015 for Industrial/Commercial Area which determined L_{Aeq} -1 hr daytime and night-time not more than 70 dB(A).

However, the project provided environmental mitigation measure to reduce the impacts on excessive noise to disturb the nearby communities including carried out the construction activities with high noise level only at day time. PTTEPI also installed noise barrier (metal sheet) around the construction site to reduce noise impact to nearby communities. In addition, PTTEPI will continually monitor noise level as specified in the measure.

3) Grievance Mechanism Monitoring

Grievance mechanism monitoring results for construction phase of PTTEPI's Yangon Office Building during July - December 2020 were done by PTTEPI. There was no any complaint from the community throughout the construction period.

4) Public and Occupational Health and Safety Monitoring

Public and occupational health and safety monitoring results for construction phase of PTTEPI's Yangon Office Building were done by the contractor during July - December 2020. There were total 9 cases of incident from project activity in the construction period including 4 cases of near miss, 1 case of first aid case, 1 case of drop object, 1 case of Slip & Trip, 1 case of other and 1 stolen case. Corrective actions were proposed/implemented to prevent reoccurrence.

Chapter 1

Introduction

Chapter 1

Introduction

1.1 Introduction

PTTEP International Limited (PTTEPI) plans to construct new office building in Yangon in order to support the expansion of company's E&P business in Myanmar. The new office building will replace the existing office building located at No. (2), Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon. Regarding the determination about PTTEPI's new office building construction project, Initial Environmental Examination (IEE) shall be required in accordance with Myanmar EIA Procedure, 2015. The IEE Report for PTTEPI's Yangon Office Building was submitted and approved by Environmental Conservation Department (ECD) of Ministry of Natural Resources and Environment Conservation (MONREC) on November 25th, 2017, according to the letter no.(Forest) 3(2)/16(D) (3423/2017) (Appendix A). As per commitment in IEE Report, PTTEPI has the responsibility to follow the environmental mitigation and monitoring measures including submits the monitoring report to ECD. Therefore, PTTEPI, as the project owner, has assigned a qualified third party, REM-UAE Laboratory and Consultant Company Limited to perform compliance audit of the mitigation measures and perform the monitoring at frequency specified in the IEE's environmental management plan and report the results to ECD as prescribing in IEE.

This report is the monitoring report of PTTEPI's Yangon Office Building (Construction Phase) during July - December 2020.

1.2 Objective

The main objectives of this report are:

- To evaluate the effectiveness of implementation of the Environmental Management Plan, including both mitigation and monitoring measures, defined in the IEE report; and
- To report any potential problems or obstacles and propose recommendation for improvement in order to ensure the effectiveness of the prevention and mitigation measures.

1.3 Briefly Information of The Project

The project site is located in the area of the existing PTTEPI's Yangon Office Building (so-called existing Building), covering 2,371.46 sq.m. There are 7 PTTEPI Buildings (Building 1 to Building 7) with car park space. The new building will be constructed to replace the 4 existing PTTEPI Buildings i.e. Building 1, Building 2, Building 4, Building 5 including car park space (Figure 1-2) The rented area of existing Building 3, Building 6 and Building 7 will be returned to the landowner.

1.4 General Information and Project Location

The PTTEPI's Yangon Office Building will replace the existing building of PTTEP International Limited (Yangon Branch) which is located at No. 2, Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon.

The project site is located on the south of the Sei-Myaung Yeiktha Street and the west of the Pyay Road, Mayangon Township, Yangon. An Aerial view of project location is presented in Figure 1-1. The general information and project location concluded as follow:

- 1) Project Name: PTTEPI's Yangon Office Building
Construction Phase
- 2) Project Location: No. (2), Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon
- 3) Project Owner: PTTEP International Limited (Yangon Branch)
- 4) Report Preparation: REM-UAE Laboratory and Consultant Company Limited
- 5) Period of Construction: Tentatively 30 Months (2018 – 2021)

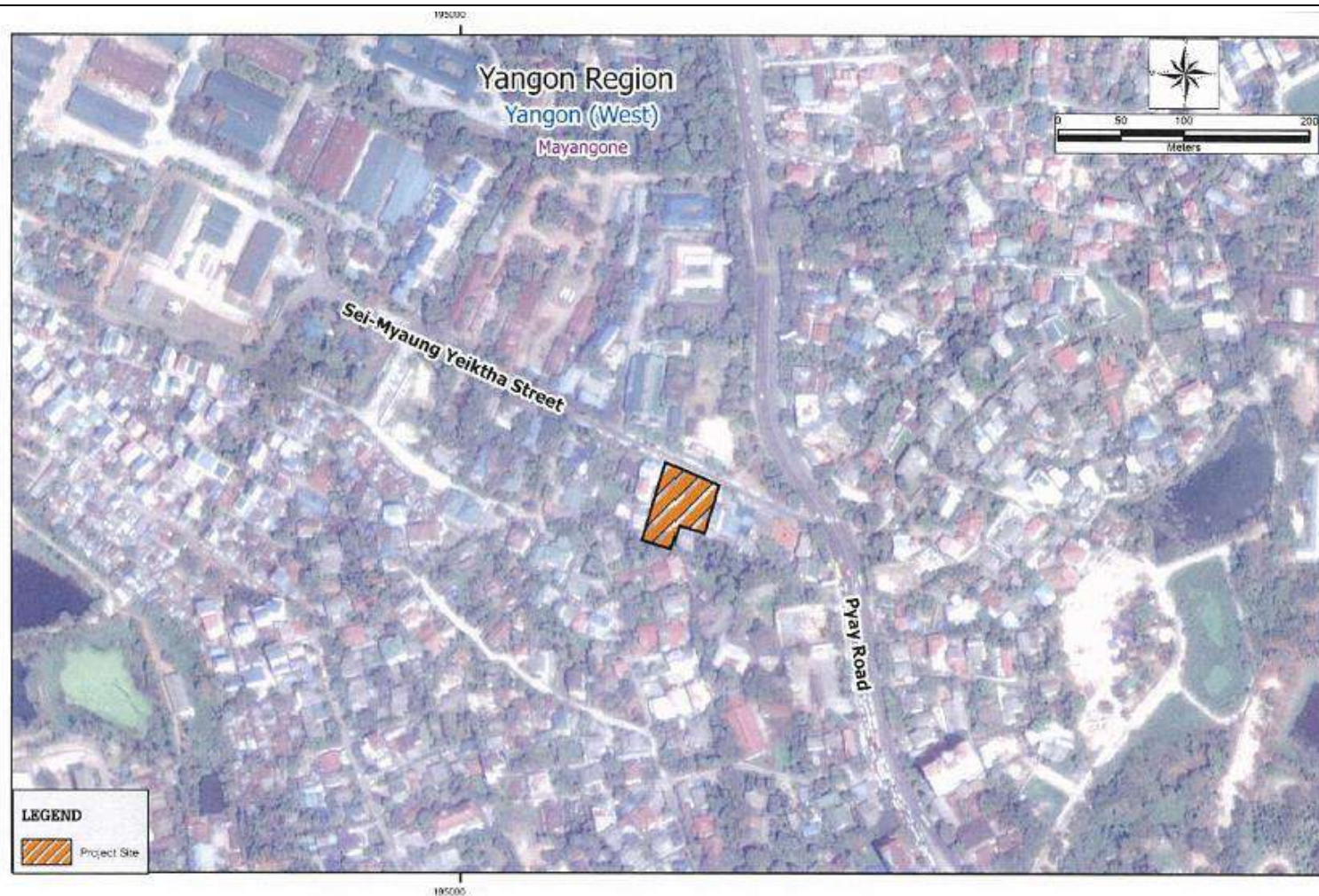


Figure 1-1 Project Location

Reference: Initial Environmental Examination (IEE) for PTTEPI's Yangon Office Building Construction, May 2017

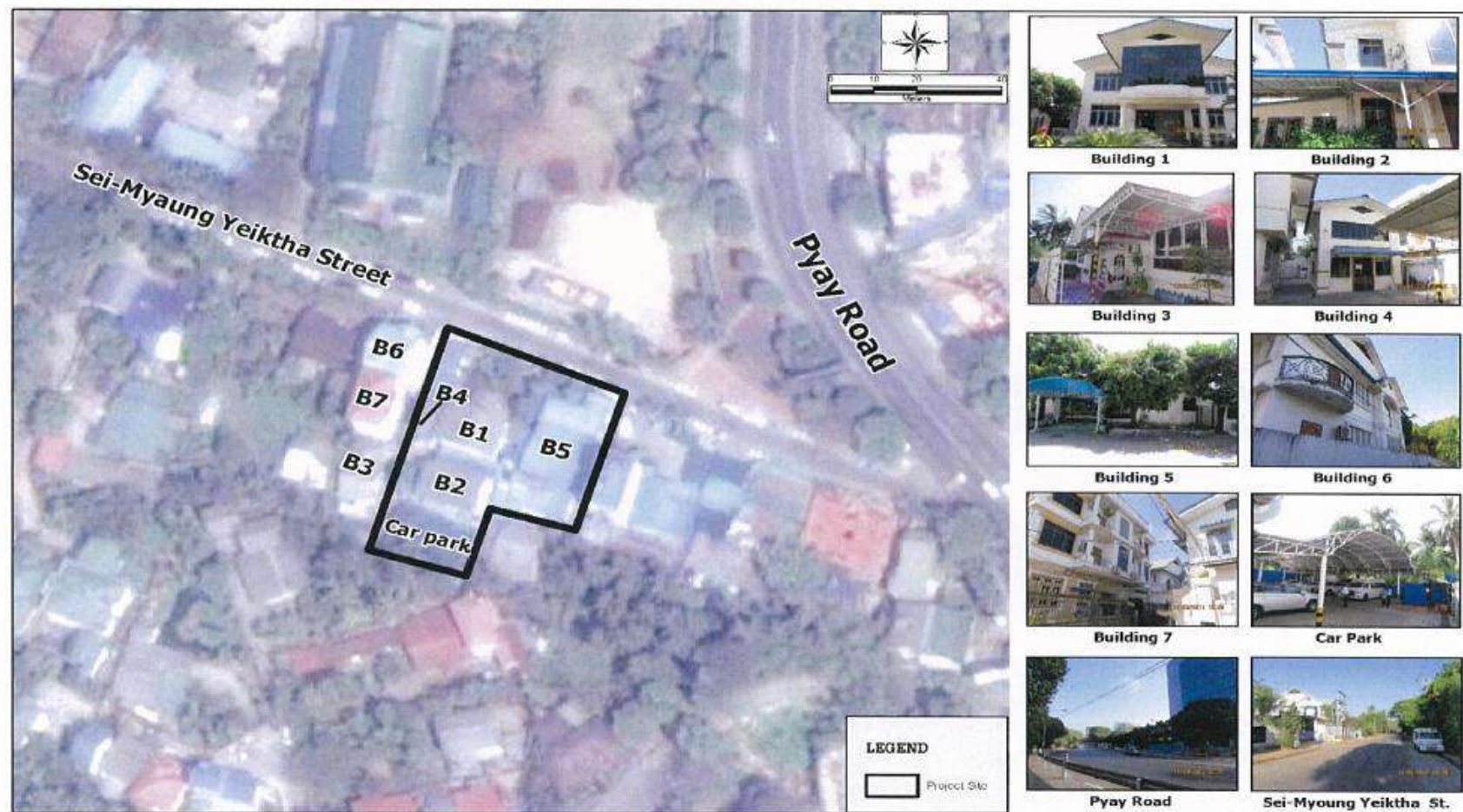


Figure 1-2 Site Condition

Reference: Initial Environmental Examination (IEE) for PTTEPI's Yangon Office Building Construction, May 2017

1.5 Status of Current Operation

Once the demolition of old building finished, PTTEPI started the construction of new office building since January 2018 and expected to complete in April 2021. The main activity during July - December 2020 was structural work and infrastructure work (M&E activities and Finishing work). The example for construction activity as shown in Figure 1-3.



Figure 1-3 PTTEPI's Yangon Office Building in construction phase during July - December 2020

1.6 Compounds nearby the Project Site

There are a number of buildings, houses and utilized areas nearby the project site. Information about buildings, houses, roads and office adjacent to project site is present in Table 1-1.

The existing land use around 500 meters adjacent to the project site is the mix of residential, religious and commercial areas; i.e. restaurant, house, temple, hotel and offices.

Table 1-1 Built-up Area Adjacent to the Project Site

Geographic Location	Name	Nature
North	- Ministry of Agriculture, Livestock and Irrigation	Government Office
	- Bamboo Threat Make Buddha Statue (Phra Inn San Temple)	Religious place
	- Sei-Myaung Yeiktha Street	Street
East	- Yangon Yoma Hotel	Hotel
	- Lucky Seven Restaurant	Restaurant
	- Basic Education Primary School (B.E.P.S.), Mayangone Township	School
	- Pyay Road	Road
South	- House (1 Storey) near car park of PTTEPI Building	Local Residence
	- House (2 Storeys) near car park of PTTEPI Building	Local Residence
	- Road Transportation Administration Department	Government Office
	- Kyaik Waing Pagoda Road	Road
West	- House (2 Storeys) near car park of PTTEPI Building 6	Local Residence
	- Bealanga Myanmar Pte Ltd.	Office
	- House (1 storey)	Local Residence

1.7 Project Components

1.7.1 Type of Building and Internal Function Area Arrangement

The project is a 12 ½ storey office building of PTTEP International Limited (Yangon Branch) with total height of 52.85 meters (Figure 1-4), function area of 18,760.0 sq.m. or 190,700 sq.ft.; and internal parking area for 110 cars.

The project building is located on Sei-Myaung Yeiktha Street. The street's width is 7.0 m.

It branches off from the main road namely Pyay road. The project building has been designed with the total height complying with legal setback requirement from Sei-Myaung Yeiktha Street. The highest point of the building is at an altitude of 73.5 meters from Mean Sea Level while the highest point of Shwedagon Pagoda is at an altitude of 127.10 meters from Mean Sea Level. According to YCDC's regulations concerning visual impact, the height of building to be constructed in the vicinity of important cultural site has to be controlled to avoid visual obstruction and decrease of aesthetic quality of the cultural site.

The building has been designed with consideration on seismic risk and safety. Moreover, the design is modern, easy for maintenance, compatible with surrounding physical context and environmental friendly. All facilities and utility systems have been provided for servicing working staff and clients.

The function area within the building can be divided as follows- :

- Parking areas are on B2, B1 and floors 1, 2, 3
- Canteen is on floor 3
- Office areas are on floors 4-11

Central area/facilities such as corridor, stair, toilet, mechanical room, lift, etc. are provided on every floor. The details of function areas on each floor of the building can be summarized as follows- :

- Basement 2 (B2) consists of stair, lift, corridor, mechanical room and parking lots with total function area of 1,330.50 sq.m.
- Basement 1 (B1) consists of stair, lift, corridor, mechanical room and parking lots with total function area of 1,203.50 sq.m.
- Ground floor consists of stair, lift, corridor, lobby and information, mechanical room, toilet, janitor room, mail room, telephone, operator room, cashier room, entrance, drop-off and ramp parking with toilet function area of 1,518.00 sq.m.
- Mezzanine floor consists of stair, lift, corridor, lobby, mechanical room, security, housekeeping, toilet, storage room and car parking lots with total function area of 542.00 sq.m.
- The 1st floor consists of stair, lift, corridor, lobby, mechanical room, G&G Server room, infrasturure room, IT & Communication room, and car parking lots with total function area of 1,154.00 sq.m.
- The 2nd floor consists of stair, lift, corridor, lobby, mechanical room, driver room, quiet driver room, storage room, and car parking lots with total function area of 1,157.00 sq.m.
- The 3rd floor consists of stair, lift, corridor, lobby, mechanical room, canteen & pantry, cooking room, toilet, etc. with total function area of 1,163.00 sq.m.
- The 4th floor consists of stair, lift, corridor, lobby, mechanical room, meeting area, mail & photocopy room, pantry & maid room, toilet, etc. with total function area of 1,059.00 sq.m.
- The 5th floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, etc. with total function area of 1,062.00 sq.m.
- The 6th floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, library room, etc. with total function area of 1,161.00 sq.m.
- The 7th floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, library room, etc. with total function area of 1,161.00 sq.m.

- The 8th floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, etc. with total function area of 1,062.00 sq.m.
- The 9th floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, etc. with total function area of 1,062.00 sq.m.
- The 10th floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, emergency response room, pantry & maid room, toilet, etc. with total function area of 1,447.00 sq.m.
- The 11th floor consists of stair, lift, corridor, lobby, mechanical room, executive office space are, pantry & maid room, toilet, roof garden, etc. with total function area of 1,161.00 sq.m.
- The 12th and 12 ½ floor consists of stair, lift, corridor, lobby, mechanical room, pantry, toilet, roof slab etc. with total function area of 1,417.00 sq.m.

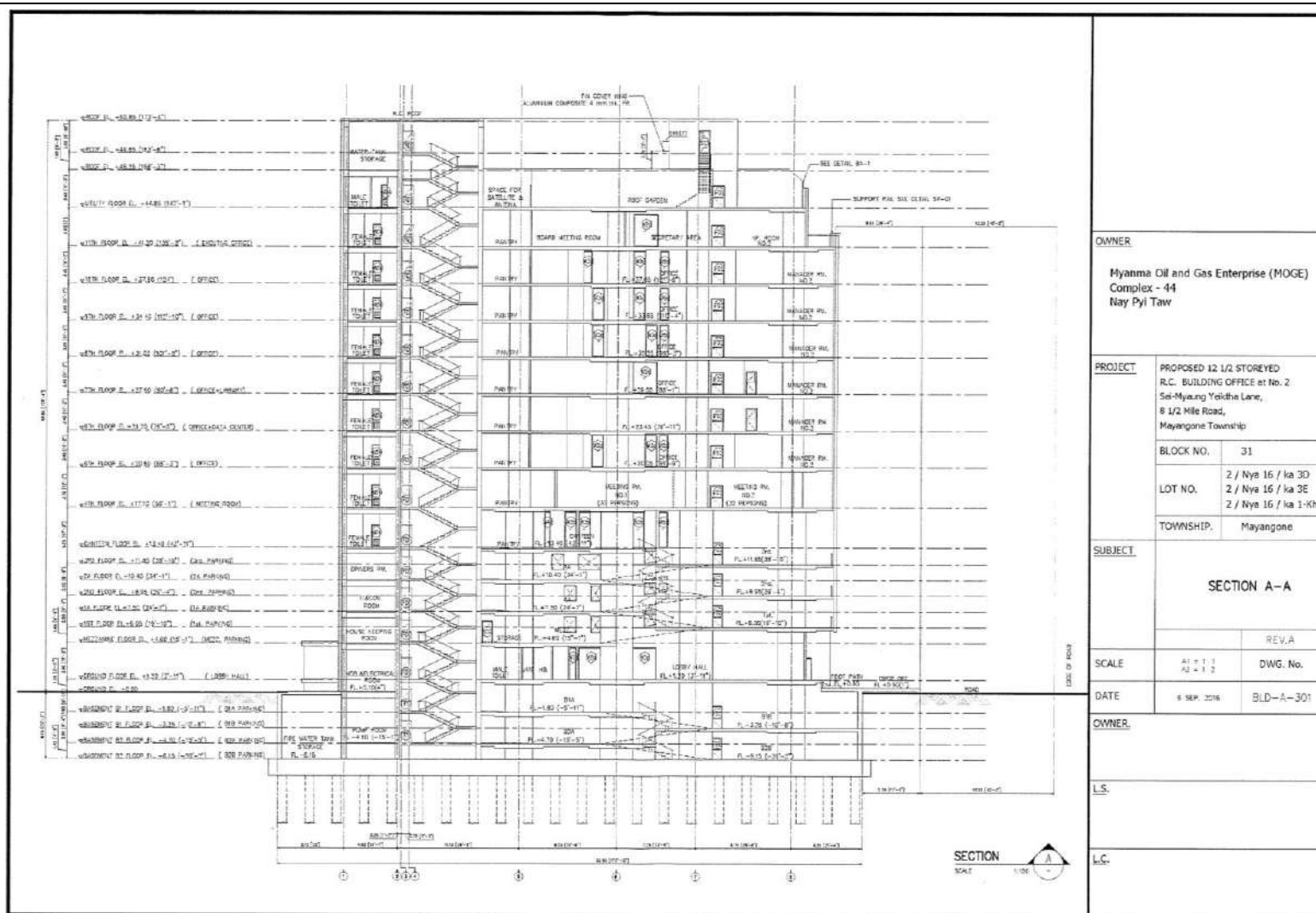


Figure 1-4 Height of PTTEPI's Yangon Office Building

1.7.2 Design of Facilities for the Disabled

The design of facilities for the disabled of this office building has been based on Universal Design concept

- 1) Car parking lots for the disabled and elders are provided on Basement 1 (B1) and Mezzanine to facilitate convenient accessibility into the building.
- 2) Toilets for the disabled and elders are provided on the ground floor.

1.7.3 Internal Utilities System

The project has provided facilities and utilities system as follow- :

1) Traffic System

(1) Entrance, Exit and Internal Road

Entrance and exit have been designed with total width of 4.5 meters and 6.0 meter, respectively to join with Sei-Myaung Yeiktha Street on the North of the building. Sei-Myaung Yeiktha Street is a public road with width of 7.0 meters branching off from the main road namely Pyay road on the East of the building.

(2) Parking Lots

According to YCDC prescription, area required for car parking is 1 lot / 200 sq.m. of floor area of the building (106 parking lots). Therefore, the project has provided 110 parking lots comprising 108 lots for PTTEP staff and clients on B2, B1, Mezzanine, floor 1, floor 2, and floor 3 and 2 lots for the disabled on B1 and Mezzanine.

2) Water Supply System and Water for Domestic Use

(1) Water Source

The project would use groundwater for domestic use and fire fighting. The groundwater would be stored in the 3 storage tanks on B2 comprising 1 raw water storage tank with capacity of 30,000 UK gallons, 1 fire water storage tank with capacity of 30,000 UK gallons, and 1 cold water storage tank with capacity of 30,000 UK gallons, there is a filter system for production of tap water for domestic use within the building.

(2) Quantity of Water Demand

In operation period the water demand for domestic use will be 22,884 UK gallon/day while water demand for firefighting will be 22,300 UK gallon for 60 minutes.

(3) Water Distribution System

The project has 2 separated water distribution systems comprising domestic use system and fire water system.

- **Domestic Use System:** Groundwater will be contained in storage tank with capacity of 30,000 UK gallon. There is a float valve in the storage tank to control automatic function of water pump. Groundwater will be pumped to be stored in the tank with 15,000 UK gallons capacity on the roof floor and then water will be distributed to each floor via pipes by gravity. Since there would be problem on decreased pressure of pump for water distribution, the project has Provided Booster Pumps (PBS) to increase pressure for water distribution on floor 7 to Roof Floor.
- **Fire Water Distribution System:** Groundwater will be pumped to storage tank with capacity of 10,000 UK gallon at roof floor. Fire water will be distributed via main type to distribute water for firefighting equipment i.e. Fire Hose Cabinet: FHC, Sprinkler System on every floor by fire water pump with capacity of 833 UK gallon/minute.

3) Wastewater Treatment

(1) Total Volume of Wastewater

During operation period, total volume of wastewater to be generated from activities in the building has been estimated at 20,596 UK gallons/day.

(2) Wastewater and Sewage Collection System within the Building

All type of sewage drained from toilet, bathroom and other areas in which there is water usage would be collected into main wastewater collection pipes for further sending to the project wastewater treatment system.

(3) Wastewater Treatment System

The project wastewater treatment system is of Activated Sludge Treatment Process: A/S type installed on floor B1 with capacity of 21,000 UK gallons/day. This capacity could accommodate wastewater volume to be generated in the project (20,596 UK gallons/day). BOD of wastewater would be 250 mg/l; the efficiency of the treatment plant is 92% , therefore BOD of the treated wastewater would be less than 20 mg/l. The treated wastewater shall be discharged into public drain in front of the project site.

4) Electricity System

The project would receive electric power via main transmission line of EPC 2 sets of Oil Type Transformer with capacity of 2,000 KVA will be installed to distribute to several parts of the building. The total electric power demand of the project is 1,800 KVA.

Moreover, the project would provide 2 sets of supporting Generator with capacity of 1,000 KVA which could automatically function in case EPC Electric Supply System fail. The supporting generators would be able to generate electric power for at least 8 hours.

5) Water Drainage and Flood Protection

(1) Internal Drainage System

- **Waste Pipe:** Within the building, there will be wastewater drainage pipe with 4-inch diameter to collect wastewater to send to the project wastewater treatment system.
- **Soil Pipe:** Within the Building there will be soil pipe with 6-inch diameter to drain sewage.
- **Wastewater Pipes from Kitchen and Dish Washing Sink:** Within the building there will be drainage pipe with 4-inch diameter to drain wastewater from cooking in kitchen area into the project wastewater treatment system.

(2) Rain Water Drainage System

Internal rain water drainage system consists of drainage pipes with diameter of 0.3 m. , 0.4 m. and slope of 1: 1,000 to collect rain water in the project area to drain into 5 manholes in front part of the project area prior to discharge outside.

(3) Flood Protection

The project site is located on Sei-Myaung Yeiktha Street. This area has never been suffered from flood problems. However, the project has already provided internal rainwater drainage system in connection with public drainage system outside the project area to prevent flood problem.

6) Solid Waste Volume

(1) Solid Waste Volume

Solid waste to be generated within the building consist of wet solid waste, e.g. food debris, dry solid waste e.g. paper, plastic bag, hazardous waste e.g. fluorescent tube, battery. Solid waste generates from 300 staff will be 135 kg/day.

(2) Solid Waste Management

Waste bins will be provided on each floor to receive wet solid waste, dry solid waste, hazardous waste and recycle waste. Each of waste bin will be lined with black plastic waste bag.

Cleaning staff will be assigned to collect solid waste from waste bins on each floor and transport via emergency lift to be stored in solid waste storage area outside the building to wait for solid waste truck of YCDC to get for further disposal every day.

7) Fire Protection and Warning System

The project has provided fire protection and fire warning system.

8) Ventilation and Air Condition System

(1) Ventilation System

The project ventilation systems consist of natural ventilation system and mechanical ventilation system. The mechanical ventilation system is provided in stair, toilet, canteen, kitchen, lift area, and car parking.

(2) Air Condition System

The project air condition system is Chilled Water System using Air Cooled Liquid Chiller with total capacity of 489 tons. The system is provided in meeting room, canteen, etc.

9) Lift System

There are 3 lifts comprising 2 passengers lifts with loading capacity of 1,350 kg/for 18 passengers and speed of 1.75 m/ second and 1 firefighting lift normally used for passengers but during fire incident fireman can use this lift. The firefighting lift has loading capacity of 750 kg for 12 passengers and speed of 1.00 m/second.

10) Safety

There would be security guards within the building and to facilitate entry/ exit of PTTEPI staff and clients for 24 hours. Moreover, there would be close-circuit television system, entrance and exit control system and security room in the front part of the building. In case of emergency, the building control staff and security guards would promptly be informed.

1.8 Environmental Monitoring and Mitigation Measure Implementation Compliance

As the world faces the Covid-19 pandemic, and Myanmar is no exception. PTTEP Myanmar Asset has set a very high priority on preventing the spread of the COVID-19 on its organization grounds and put safety measures and mitigation plans that comply with Government's instructions to ensure everyone is safe during the COVID-19 outbreak. Safety measures continue to be strictly enforced at all operating sites including Yangon Office Building Construction site. The environmental mitigation measures implementation audit which considered environmental issues and essential impacts that may occur during construction phase of PTTEPI's Yangon Office Building was conducted as desktop audit and video conference on December 11, 2020 by REM-UAE, as the environmental consultant of the project together with the representation from PTTEP and Main Contractor (KST Group of Companies Limited). The results are described in Chapter 2 .The results of environmental monitoring measures are presented in Chapter 3 and the conclusion is summarized in Chapter 4.

Chapter 2
Environmental Mitigation Measures
Implementation Compliance Audit

Chapter 2

Environmental Mitigation Measures Implementation Compliance Audit

Environmental Mitigation Measures Implementation Compliance audit was carried out by REM-UAE Laboratory and Consultant Company Limited together with representatives from PTTEPI. The audit conducted against the mitigation measures specified in Initial Environmental Examination (IEE) as detailed in Appendix B.

As the Covid-19 pandemic, Audit of construction phase was performed as desktop audit and video conference to PTTEP's Yangon Office Building on December 11, 2020 and document checking by setting 4 levels of evaluation as follows;

- Completely complied on the Mitigation Measures (✓) refers the project can complete comply with the measure without any barriers.
- Mostly complied on the Mitigation Measures (✓) refers the project can mostly comply with the measure without any barriers.
- Do not complied on the Mitigation Measures (✗) refers the project cannot comply with the measure because of some barriers.
- Do not have situation follows the Mitigation Measures (NA) refers during the project operations do not have any of situation follow the Mitigation Measures.



Myanmar



REM-UAE Office (Thailand)

**Figure 2-1 Mitigation Measures Compliance Audit
(Desktop Audit and video conference to PTTEP's Yangon Office Building)**

In case found that project does not comply with the mitigation measures, REM- UAE Laboratory and Consultant Company Limited will identify the cause of problems, barriers and solutions ways. However, the project have a 100% compliance with mitigation measure that have situation the details are shown in Table 2-1 as followed;

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
Environmental Mitigation Measures							
Air Pollution	<ul style="list-style-type: none"> Impacts on air quality from dust dispersion resulting from foundation and structural work cause adverse effected to the communities nearby the construction site and along the transportation route. 	<ul style="list-style-type: none"> Water spraying twice a day at and around the construction areas 	Project Site	Construction Phase	✓	The project has assigned staff to spray water around construction area at least twice a day or more in dry season or depending on the atmospheric conditions.	Figure 2-2 and Appendix J
		<ul style="list-style-type: none"> Polyester/ PVC mesh sheet should be covered around the construction areas 			✓	The project provided PVC mesh sheets around the construction areas in order to prevent dust dispersion and reduced effected to the communities nearby the construction site and along the transportation route.	Figure 2-3
		<ul style="list-style-type: none"> Cover construction materials by tarpaulin during transportation, materials should be dampened, if necessary, before transportation 			✓	The main activity during July - December 2020 was structural work and infrastructure work (M&E activities and Finishing work) which mostly used finished material. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure.	-
		<ul style="list-style-type: none"> Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of construction or disturbance 			NA	The project will rehabilitate the disturbed areas after completion of construction.	-

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
		<ul style="list-style-type: none"> Dust masks should be provided (where applicable) to specified construction workers. 			✓	The contractor provided dust masks for workers and controlled all worker wear dust mask during working.	Figure 2-4
Excessive Noise and Vibration	<ul style="list-style-type: none"> Impacts on excessive noise and vibration from foundation and structural work to disturb the nearby communities. 	<ul style="list-style-type: none"> Provide noise protection equipment such as ear muff, ear plugs to the construction workers working in the area 	Project Site	Construction Phase	✓	The contractor provided ear muffs for workers and controlled to use during working in high noise area.	Figure 2-4
		<ul style="list-style-type: none"> Try to carry out construction activities with high noise and vibration level at day time, some activities need to be carried out in the nighttime. 			✓	The main activity during July - December 2020 was structural work and infrastructure work (M&E activities and Finishing work). The contractor emphasized all workers in daily toolbox talk before working to carried out the construction activities with high noise and vibration level at daytime (9 a.m. – 5 p.m.) in order to reduce noise and vibration impact to nearby communities. However, there was no any complaints during July - December 2020.	Figure 2-5 Appendix J
		<ul style="list-style-type: none"> Install metal sheet as temporary noise barrier at construction site to reduce noise impact nearby communities 			✓	Noise barrier (metal sheet) was installed around the construction site to reduce noise impact to nearby communities.	Figure 2-6

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
Traffic	<ul style="list-style-type: none"> The increasing number of vehicle especially heavy truck and trailer for construction materials and heavy equipment at day time might cause traffic congestion. Increased number of heavy truck and trailer might cause damage along the construction transportation route. 	<ul style="list-style-type: none"> Inform concerned authorities and local people about the construction plan with transportation route for construction materials and heavy vehicles. 	Project Site	Construction Phase	✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. Moreover, the project has provided flag man to give the signal and facilitate the traffic during transportation.	Appendix D-2 and Appendix J
		<ul style="list-style-type: none"> All Project drivers and transportation activities have to follow the laws related to transportation of Myanmar and follow PTTEPI's driving Policy which include vehicle safety rules and journey management. 			✓	The contractor provided journey management and transportation safety procedure and enjoined workers to follow regulations. Moreover, all project drivers required to prepare a journey management plan and report to duty officer, operator/coordinator once arrived at the rest stop and destination.	Appendix F-1 and Appendix F-2

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
		<ul style="list-style-type: none"> Install warning signs that can be clearly seen to show the access road and construction area. 			✓	Warning signs were installed and can be clearly seen at the public road (in front of the construction area) and within construction area.	Figure 2-7
		<ul style="list-style-type: none"> Avoiding/ lessening mobilization of material and equipment at day time. 			✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. Moreover, avoiding transportation of materials and equipment at day time.	Appendix D-2
		<ul style="list-style-type: none"> Prepare security guard and signal man at guard house close to access road to give the sign in and out of vehicle from project area. 			✓	Security guard are stationed at guardhouse in front of construction area for 24 hr. (2 shift) and the project also provided signal man while transportation of construction materials to give the sign in and out of vehicle/truck from project area.	Figure 2-8 Figure 2-9 and Appendix J
		<ul style="list-style-type: none"> Carry out regular, routine check and maintenance of vehicles following safety instruction. 			✓	Routine inspection and preventive maintenance for all vehicles as per inspection plan.	Appendix E-4
		<ul style="list-style-type: none"> Strictly control on over loading of heavy truck to prevent damage on road surface. 			✓	The contractor has strictly controlled of overloaded heavy vehicles to prevent road deterioration. Moreover, the public road (in front of the construction area) was in good condition and there was no complaint from nearby communities.	Figure 2-10

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
		<ul style="list-style-type: none"> Cover construction materials by tarpaulin during transportation to prevent falling and spreading of materials. 			✓	The main activity during July - December 2020 was structural work and infrastructure work (M&E activities and Finishing work) which mostly used finished material. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure.	Appendix J
		<ul style="list-style-type: none"> In case of accident, the concerned sections must be promptly follow the emergency response plan. 			✓	The emergency response procedure was set up including incident, fire action, first aid action. Moreover, the project provided muster point opposite the construction area.	Figure 2-11 and Appendix E-3
		<ul style="list-style-type: none"> Test alcohol and drug on drivers before transportation. 			✓	The contractor prepared drug and alcohol abuse policy and enforced all workers to follow. Alcohol testing was conducted before working every day. The worker will immediately stop working if alcohol is found more than 0%. For drug testing, all staffs including workers, engineers and safety staffs were random tested (1 time/week maximum 8 samples), the staff who found to be positive in drug testing shall be required to undergo rehabilitation and counseling in government accredited center. However, during July - December 2020 there were no staff found positive in drug test.	Figure 2-12 Appendix H-1 and Appendix H-2

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
Solid waste	<ul style="list-style-type: none"> Improper management of construction waste will cause the adverse effect to the environmental. 	Non-Hazardous Waste <ul style="list-style-type: none"> Provide storage area for construction materials. 	Project Site	Construction Phase	✓	The contractor has provided temporary storage area for construction materials.	Figure 2-13
		<ul style="list-style-type: none"> Prepare proper waste bins or containers covered with garbage bag for waste collection at the construction site. 			✓	Waste containers with cover are provided at the construction area for 5 types; general waste (blue) , recycle waste (yellow) , hazardous waste (red) , organic waste (green) and biohazard infectious waste. Moreover, the quantity of waste was recorded by contractor.	Figure 2-14 and Appendix G-2
		<ul style="list-style-type: none"> Inform concerned authorities (YCDC) to collect and dispose of waste every day. 			✓	The contractor cooperated with YCDC to collect and dispose waste everyday to prevent residual waste in construction area.	Appendix G-1
		<ul style="list-style-type: none"> If possible, reuse construction residues such as wood scrap and steel, or inform concerned authorities to collect and dispose. 			✓	The contractor cooperated with YCDC to collect and dispose waste everyday to prevent residual waste in construction area.	Appendix G-1
		<ul style="list-style-type: none"> Prohibit burning waste in construction area. 			✓	The constructor enforced all workers not to burn any wastes in the construction area. Moreover, the contractor has provided separate waste containers with cover at the construction area.	Figure 2-14 and Appendix G

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
		Hazardous Waste • Separate hazardous waste from solid waste and store the specific containers with clear label.			✓	The contractor has provided separate waste containers with cover for waste collection at the construction area. However, there are no hazardous waste during construction phase in July - December 2020.	Figure 2-14
		• Hazardous waste will be disposed by licensed contractor or authorities			✓	Hazardous waste container (red) was provided at the construction area. However, there are no hazardous waste during construction phase in July - December 2020. In case of hazardous waste generated, the project will strictly implement as specified in the measure.	Appendix G-1
Wastewater	• Improper management of sanitary system within the site will caused the adverse effect to the environmental	1) Wastewater from workers • Provide appropriate sanitary facilities in construction site and properly maintained for construction workers.	Project Site	Construction Phase	✓	The contractor has provided 9 temporary toilets within construction area (1 st and 2 nd floor), 2-3 toilets at the back of construction area and 9 toilets within PTTEPI Office for 420 workers.	Figure 2-15
		2) Surface runoff • Provide temporary drainage system to hold wastewater before being discharged out of the project.			✓	The contractor provided temporary drainage system in the construction area to hold wastewater before discharged out of the project.	Figure 2-16 and Appendix G-3

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
		<ul style="list-style-type: none"> Prohibit to throw and dispose of waste from demolition close to drainage system to obstruct the flow of surface runoff. 			✓	The project has finished demolition, the main activity during July - December 2020 was structural work and infrastructure work (M&E activities and Finishing work) which mostly used finished material. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure. However, the contractor enforced all worker to dispose of waste properly including provided separate waste containers with cover for waste collection in the construction area.	Appendix C
Social and economic	Positive Impact <ul style="list-style-type: none"> The project employment would boost up the local economy. Generate income in nearby communities by related business. 	<ul style="list-style-type: none"> Consider to recruit the qualified person in Yangon. 	Project Site/ House nearby construction site	Construction Phase	✓	The contractor considered to hired local people in Yangon and nearby city as per recruitment procedure and announcement.	Appendix I
	<ul style="list-style-type: none"> An employment opportunity for the locals. 	<ul style="list-style-type: none"> Inform the workers about regulations during construction period in order to prevent the conflict between workers and nearby communities. 			✓	The contractor provided work regulation and enforced all workers to follow in order to prevent the conflict between workers and nearby communities. Moreover, toolbox talk was provided in daily before working by the header of contractor/safety officer.	Figure 2-5 Appendix J

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
	Negative impact <ul style="list-style-type: none"> Fugitive dust, excess noise, soil erosion and transportation of materials during construction will cause inconveniences to the livelihood of the residents living nearby the construction site. There might be problem arising from conflicts between the host and the workers. 	<ul style="list-style-type: none"> Promote relationship between the project and nearby communities. 			✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people.	Appendix D-2
		<ul style="list-style-type: none"> Distribute project information to people for their better understanding and positive attitude towards the project 			✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people.	Appendix D-2
		<ul style="list-style-type: none"> Implement all measures to mitigate dust, excess noise, waste management and transportation. 			✓	The project strictly implemented mitigation measures as per IEE report.	Appendix B
		<ul style="list-style-type: none"> Provide skillful and experienced engineers to closely inspect construction activities and duty permanently during the entire construction period. 			✓	The contractor provided 12 civil engineer and 7 safety staff to closely inspect construction activities throughout the construction period.	Figure 2-17

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
		<ul style="list-style-type: none"> Assign project staff with 24/ 7 available telephone number to handle any complaint/ issue from surrounding. In case of any damage by project activities PTTEPI will investigate and solve the problem. 			✓	PTTEPI provided grievance handling guideline to receive any complaints from the stakeholder and resolve the complaint in the immediate. Moreover, project' s signboard was installed in front of the construction area to inform the project details such as project name, owner, consultant, contractor, period of construction and emergency contact number. However, there was no any complaints during July - December 2020.	Figure 2-18 and Appendix D-1
		<ul style="list-style-type: none"> Install signboard in front of the Project site in order to inform about construction area with the name of the Project, Contractor company, permission license, PTTEP representative name and telephone number etc. 			✓	Project' s signboard was installed in front of the construction area to inform the project details such as project name, owner, consultant, contractor, period of construction and emergency contact number.	Figure 2-18
Public health and safety	On Local People nearby Project Site Unsuitable management during construction may have impact on local people health due to pollution and accident. They are:	Health Strictly implement mitigation measures for Air Quality, Noise, Waste Management, and Transportation during construction phase	Project Site/ House nearby construction site	Construction Phase	✓	The project strictly implemented mitigation measures for Air Quality, Noise, Waste Management, and Transportation during construction phase as per IEE report. Moreover, the contractor has provided HSE Policy and enforced all workers to follow.	Appendix B and Appendix E-1

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
	<ul style="list-style-type: none"> Dust diffusion, increased noise level, and unsuitable waste management during construction activities; and Accident from construction materials, heavy equipment, and worker transportation to construction area. 	Safety <ul style="list-style-type: none"> Implement work permit system for specific work 			✓	Work permit system was implemented for specific work during construction period such as working at height, hot work, and confined space. Moreover, the contractor has provided HSE Policy and enforced all workers to follow.	Appendix E-1 and Appendix E-6
		<ul style="list-style-type: none"> Provide all concerned staff with Personal Protective Equipment (PPE) such as helmets, safety shoes, glasses, gloves, etc. during construction phase. 			✓	The contractor provided PPE sufficiently for all workers and controlled to use PPE suitably with work.	Figure 2-4
		<ul style="list-style-type: none"> Provide safety training for workers. 			✓	The training was regularly performed as per the annual SSHE Training Plan. Moreover, the contractor has provided tool box talk in daily before working by the header of contractor/safety officer.	Figure 2-5 Appendix E-5 and Appendix J
	On Workers <ul style="list-style-type: none"> Increased pollution in working zone of project site such as dust diffusion, excess noise. 	<ul style="list-style-type: none"> Provide sufficient first aid kits at the construction area and coordinate with nearby hospital for admission in case of accidents. 			✓	The medic person was stand by 24/7 (day-night shift) at medic room for medical treatment included first aid kit and medical supplies. The project also coordinates with Victoria hospital for admission in case of accidents Moreover, emergency respond procedure and training were provided to respond in emergency case.	Figure 2-19

**Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEPI's Yangon Office Building**

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Remarks/ Reference
	<ul style="list-style-type: none"> Carelessness of workers may cause fire, injuries and death. 	<ul style="list-style-type: none"> Install appropriate warning signs, markings and safety signs. 			✓	The contractor has installed warning signs and safety sign in construction area to warns workers from dangers. Moreover, the contractor has provided Stop Work Policy to maintain a safe and secure work environment.	Figure 2-7 and Appendix E-2
		<ul style="list-style-type: none"> Regular checking all equipment to ensure it can be used without defect. 			✓	Routine inspection and preventive maintenance for all equipment were conducted as per inspection plan.	Appendix E-4
		<ul style="list-style-type: none"> Firefighting equipment and portable fire extinguishers shall be properly provided in construction area. 			✓	The contractor has provided firefighting equipment in the construction area and inspected monthly.	Figure 2-20
		<ul style="list-style-type: none"> Provide smoking area in the construction zone. 			✓	The contractor has provided smoking areas in the west and in front of construction area.	Figure 2-21



Figure 2-2 Water Spray

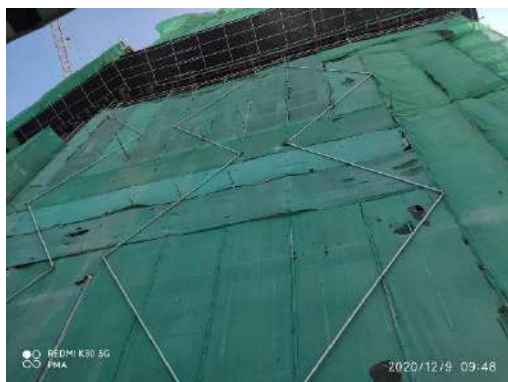


Figure 2-3 PVC Mesh Sheet



Figure 2-4 Personal Protective Equipment (PPE)



Figure 2-5 Example of Tool Box Talk



Figure 2-6 Noise Barrier



Figure 2-7 Warning Sign



Figure 2-8 Security Guard



Figure 2-9 Signal Man



**Figure 2-10 Public Road
(In front of the construction area)**



Figure 2-11 Muster Point



Figure 2-12 Alcohol Test



Figure 2-13 Storage Area



Figure 2-14 Waste Containers



Figure 2-15 Toilets



Figure 2-16 Temporary Drainage System



Figure 2-17 Civil Engineer and Safety Staff



Figure 2-18 Signboard in front of the Construction Area



Figure 2-19 Medic Room and Medic Person



Figure 2-20 Firefighting Equipment Inspection



Figure 2-21 Smoking area

Chapter 3

Environmental Monitoring Results

Chapter 3

Environmental Monitoring Results

Environmental monitoring was conducted as requirement specified in IEE which the project has assigned REM-UAE Laboratory and Consultant Company Limited to performed the environmental monitoring. This chapter presents the environmental monitoring results of PTTEPI's Yangon Office Building during construction phase, the detail is presented as follow;

3.1 Environmental Monitoring Plan

Environmental monitoring for PTTEPI's Yangon Office Building during construction phase is shown in Table 3-1.

Table 3-1 Environmental Monitoring Plan of PTTEPI's Yangon Office Building in Construction Phase during July - December 2020

Environmental Quality	Parameter	Duration/Frequency of Monitoring	Location	Implemented	
				Complied	Not complied
1.Environmental Issues					
1.1 Fugitive Dust	<ul style="list-style-type: none">• Total Suspended Particulate (TSP)• Particulate Matter less than 10 micron (PM10)	<u>Duration</u> 2 consecutive days during construction period including weekday and weekend <u>Frequency</u> Twice a year during construction period	<ul style="list-style-type: none">• 1 station at construction site : North of construction fence (A1)• 2 stations at buildings nearby construction site, comprising: 1) PTTEPI Building 7 : West of construction fence (A2) 2) House behind PTTEPI Office : South- east of construction fence (A5)	<ul style="list-style-type: none">• Monitored by REM- UAE Laboratory and Consultant Co. , Ltd. during December 11-15, 2020. The result as shown in Section 3.2.1.	-
1.2 Noise	<ul style="list-style-type: none">• LAeq-1 hr (day time)• LAeq-1 hr (night-time)	<u>Duration</u> 2 consecutive days during construction period including weekday and weekend <u>Frequency</u> Twice a year during construction period	<ul style="list-style-type: none">• 1 station at construction site : North of construction fence (N1)• 2 stations at buildings nearby construction site, comprising: 1) PTTEPI Building 7 : West of construction fence (N2) 2) House behind PTTEPI Office : South- east of construction fence (N5)	<ul style="list-style-type: none">• Monitored by REM- UAE Laboratory and Consultant Co. , Ltd. during December 11-15, 2020. The result as shown in Section 3.3.4.	-

Table 3-1 (Cont.) Environmental Monitoring Plan of PTTEPI's Yangon Office Building in Construction Phase during July - December 2020

Environmental Quality	Parameter	Duration/Frequency of Monitoring	Location	Implemented	
				Complied	Not complied
2. Social Issues					
2.1 Grievance Mechanism	<ul style="list-style-type: none">Complaints from stakeholders/neighborsComplaints' resolution is undertaken in a timely manner	Throughout construction period	<ul style="list-style-type: none">House nearby construction site	<ul style="list-style-type: none">Monitored by PTTEPI throughout construction phase. The result as shown in Section 3.4.2.	-
2.2 Public and Occupational Health and Safety	<ul style="list-style-type: none">Incident/accident records	Throughout construction period	<ul style="list-style-type: none">Construction site and working areasHouse nearby construction site	<ul style="list-style-type: none">Monitored by PTTEPI throughout construction phase. The result as shown in Section 3.5.3.	-

3.2 Fugitive Dust Monitoring

Fugitive dust monitoring was conducted by REM-UAE Laboratory and Consultant Company Limited on December 11-13, 2020 and December 13-15, 2020. The detail as shown in Table 3-2.

Table 3-2 Fugitive Dust Quality Monitoring Plan

Environmental Quality	Parameter	Location	Period
Fugitive Dust	<ul style="list-style-type: none"> Total Suspended Particulate (TSP) Particulate Matter less than 10 Micron (PM10) 	<ul style="list-style-type: none"> 1 station at construction site : North of construction fence (A1) 2 stations at buildings nearby construction site, comprising: <ol style="list-style-type: none"> PTTEPI Building 7 : West of construction fence (A2) House behind PTTEPI Office : South- east of construction fence (A5) 	December 11-13, 2020 December 11-13, 2020 December 13-15, 2020

3.2.1 Fugitive Dust Monitoring Station

The detail and coordinate of fugitive dust monitoring station as shown in Table 3-3 and Figure 3-1.

Table 3-3 Fugitive Dust Monitoring Stations in Construction Phase (December 2020)

Monitoring Station	Coordinate (UTM Datum WGS 84)		
	Zone	East (X)	North (Y)
1. Construction site : North of construction fence (A1)	47Q	195196	1867483
2. PTTEPI Building 7 : West of construction fence (A2)	47Q	195157	1867474
3. House behind PTTEPI Office : South-east of construction fence (A5)	47Q	195185	1867447



Figure 3-1 Fugitive Dust Monitoring Station

3.2.2 Fugitive Dust Analysis Method

Details of fugitive dust monitoring including parameters and analysis methods are shown in Table 3-4.

Table 3-4 Sampling Method, Analysis Method and Standard Methods for Fugitive Dust Monitoring

Parameters	Sampling Method	Analysis Method	Standard Methods
1. Total Suspended Particulate (TSP)	High Volume Air Sampler	Gravimetric Method	40 CFR-Chapter I-Part 50, Appendix B
2. Particulate matter less than 10 Micron (PM-10)	High Volume PM-10 Air Sampler	Gravimetric Method	40 CFR-Chapter I-Part 50, Appendix J

3.2.3 Fugitive Dust Monitoring of PTTEPI's Yangon Office Building

Fugitive dust samples were monitored at PTTEPI Building 7 and House behind PTTEPI Office during December 11-13, 2020. Construction site was monitored during December 13-15, 2020 as shown in Figure 3-2.



Construction site : North of construction fence (A1)



PTTEPI Building 7 : West of construction fence (A2)



House behind PTTEPI Office : South-east of construction fence (A5)

Figure 3-2 Fugitive Dust Monitoring

3.2.4 Fugitive Dust Monitoring Result

Referring to analysis number T20AU841-0001 to T20AU841-0006 fugitive dust samples were conducted during December 11-15, 2020 in construction phase which monitored at Construction site and PTTEPI Building 7 on December 11-13, 2020 and House behind PTTEPI Office was monitored during December 13-15, 2020.

Fugitive dust monitoring results found that Total Suspended Particulate (TSP) of Construction site : North of construction fence (A1) during December 12-13, 2020 and PTTEPI Building 7 : West of construction fence (A2) have complied with Ambient Air Quality of WORLD BANK GROUP, whereas TSP of House behind PTTEPI Office: South-east of construction fence (A5) haven't complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed 230 $\mu\text{g}/\text{m}^3$. For the results of Particulate matter less than 10 Micron (PM-10) found that all stations exceeded the National Environmental Quality (Emission) Guideline (EQEG) which determined that PM10 should not exceed 50 $\mu\text{g}/\text{m}^3$. However, when comparison the results of Particulate matter less than 10 Micron (PM-10) with the Ambient Air Quality Standard of WHO and IFC found that all results have complied the standard which determined that PM10 should not exceed 150 $\mu\text{g}/\text{m}^3$.

As reported in Seasonal and regional variation of particulate matter dispersion in Yangon City and Taunggyi City, Myanmar. IOP Conference Series: Earth and Environmental Science. 496. 012003. 10.1088/1755-1315/496/1/012003, PM10 concentrations were significantly higher during the dry season as compared to the wet season in Yangon. The major source of PM in Yangon was vehicular exhaust. Thus, Total Suspended Particulate (TSP) results which have not complied with the Ambient Air Quality of WORLD BANK GROUP and Particulate matter less than 10 Micron (PM-10) results which have not complied with the EQEG probability effect from the public air quality since the public air quality are also higher than the standard and increasing year by year especially in dry season. However, the project provided environmental mitigation measure to prevent and reduce the impacts on air quality from dust dispersion resulting from project activities including water spraying, PVC mesh sheets around the construction areas.

The comparison of fugitive dust monitoring results in the construction phase in December 2020 and baseline data found that most of the results of Total Suspended Particulate (TSP) and Particulate matter less than 10 Micron (PM-10) of all stations have higher than baseline data according to the public air quality in <https://aqicn.org/data-platform/register/> shown that the air quality index (AQI) in Yangon during December 2020 were mostly orange and red (unhealthy) and higher than the standard and increasing year by year especially in dry season.

Fugitive dust monitoring results are shown in Table 3-5. The analysis results, certificate for laboratory instrument and approval registration certificate of laboratory are shown in Appendix K, L and M.

Table 3-5 Fugitive Dust Monitoring Results during Baseline (in 2017) and Construction Phase in 2020

Stations	Date	Result	
		Total Suspended Particulate (TSP)	Particulate matter less than 10 Micron (PM-10)
1. Construction site : North of construction fence (A1)	March 12-13, 2017 ^{1/}	58.4	26.6
	March 13-14, 2017 ^{1/}	74.3	37.3
	December 11-12, 2020	298	112
	December 12-13, 2020	221	101
2. PTTEPI Building 7 : West of construction fence (A2)	March 12-13, 2017 ^{1/}	45.2	30.1
	March 13-14, 2017 ^{1/}	62.5	39.2
	December 11-12, 2020	225	112
	December 12-13, 2020	203	93
3. House behind PTTEPI Office : South-east of construction fence (A5)	March 10-11, 2017 ^{1/}	40.3	20.2
	March 11-12, 2017 ^{1/}	43.7	24.4
	December 13-14, 2020	314	115
	December 14-15, 2020	319	112
National Environmental Quality (Emission) Guideline (EQEG) ^{2/}		-	50
Ambient Air Quality Standard of WHO and IFC^{3/}		-	<u>150</u>
Ambient Air Quality of WORLD BANK GROUP^{4/}		230	-
Unit		µg/m³	µg/m³

Remark:

^{1/} Baseline data from Initial Environmental Examination (IEE) for PTTEPI's Yangon Office Building Construction

^{2/} National Environmental Quality (Emission) Guideline Myanmar, 2015

^{3/} WHO Ambient Air Quality Guideline Stated on Environmental, Health, and Safety Guideline: Environmental Air Emissions and Ambient Quality of International Finance Corporation, 2007

^{4/} Pollution Prevention and Abatement Handbook (WORLD BANK GROUP) Effective July 1998.

3.3 Noise Level Monitoring

Noise monitoring of PTTEPI's Yangon Office Building as per specified in IEE was conducted by REM-UAE Laboratory and Consultant Company Limited in construction phase. The detail as shown in Table 3-7.

Table 3-6 Noise Level Monitoring Plan

Environmental Quality	Parameter	Location	Period
Noise	<ul style="list-style-type: none"> • LAeq-1 hr (day time) • LAeq-1 hr (night-time) 	<ul style="list-style-type: none"> • 1 station at construction site : North of construction fence (N1) • 2 stations at buildings nearby construction site, comprising: <ol style="list-style-type: none"> 1) PTTEPI Building 7 : West of construction fence (N2) 2) House behind PTTEPI Office : South-east of construction fence (N5) 	December 11-13, 2020 December 11-13, 2020 December 13-15, 2020

3.3.1 Noise Level Monitoring Station

The detail and coordinate of noise level monitoring station as shown in Table 3-7 and Figure 3-3.

Table 3-7 Noise Level Monitoring Stations in Construction Phase (July 2020)

Monitoring Station	Coordinate (UTM Datum WGS 84)		
	Zone	East (X)	North (Y)
1. Construction site : North of construction fence (N1)	47Q	195200	1867481
2. PTTEPI Building 7 : West of construction fence (N2)	47Q	195152	1867468
3. House behind PTTEPI Office : South-east of construction fence (N5)	47Q	195188	1867438

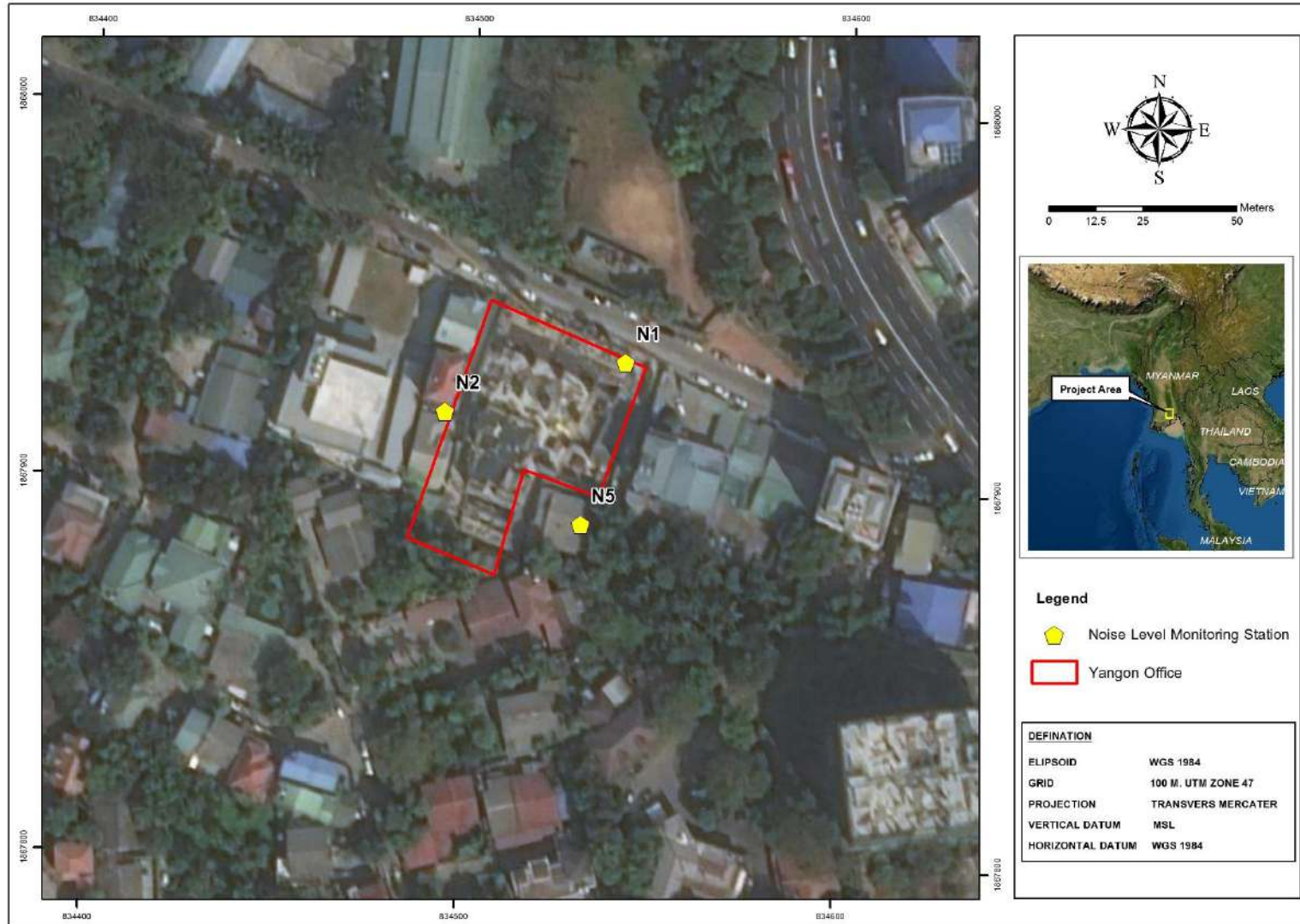


Figure 3-3 Noise Level Monitoring Station

3.3.2 Noise Level Analysis Method

Details of noise level monitoring including parameters and analysis methods are shown in Table 3-8.

Table 3-8 Parameters and Analyses Methods for Noise Level Monitoring

Parameters	Sampling Method	Analysis Methods	Standard Methods
<ul style="list-style-type: none"> L_{Aeq}-1 hr (day time) L_{Aeq}-1 hr (night-time) 	Integrated Sound Level Meter	Integrated Sound Level Meter	ISO 1996/1

3.3.3 Noise Level Monitoring of PTTEPI's Yangon Office Building

Noise level monitoring of PTTEPI's Yangon Office Building were monitored at Construction site and PTTEPI Building 7 during December 11-13, 2020. House behind PTTEPI Office was monitored during December 13-15, 2020 as shown in Figure 3-4.



Construction site : North of construction fence (N1)



PTTEPI Building 7 : West of construction fence (N2)



House behind PTTEPI Office : South-east of construction fence (N5)

Figure 3-4 Noise Level Monitoring

3.3.4 Noise Level Monitoring Results

Referring to analysis number T20AU842-0001 to T20AU842-0006 noise level monitoring were conducted during December 11-15, 2020 in construction phase which monitored at Construction site and PTTEPI Building 7 on December 11-13, 2020 and House behind PTTEPI Office was monitored during December 13-15, 2020.

Noise level monitoring results found that The L_{Aeq} -1 hr daytime of Construction site : North of construction fence (N1), PTTEPI Building 7 : West of construction fence (N2) and House behind PTTEPI Office : South-east of construction fence (N5) were in ranged of 55.5-68.5, 53.9-67.8 and 51.8-62.4 dB(A), respectively. While The L_{Aeq} -1 hr night-time of N1, N2 and N5 were ranged from 57.3-65.3, 56.8-69.1 and 52.7-62.3 dB(A), respectively. All of the result of L_{Aeq} -1 hr daytime and L_{Aeq} -1 hr night-time has complied with EQEG, 2015 for Industrial/ Commercial Area which determined L_{Aeq} -1 hr daytime and night-time not more than 70 dB(A).

However, the project provided environmental mitigation measure to reduce the impacts on excessive noise to disturb the nearby communities including carried out the construction activities with high noise level only at day time. PTTEPI also installed noise barrier (metal sheet) around the construction site to reduce noise impact to nearby communities. In addition, PTTEPI will continually monitor noise level as specified in the measure.

The comparison of noise level monitoring results in construction phase December 2020 and baseline data found that the result of L_{Aeq} -1 hr daytime and L_{Aeq} -1 hr night-time of 3 stations were higher than baseline data. However, all of the result of L_{Aeq} -1 hr daytime and night-time in construction phase in December 2020 has complied with EQEG, 2015 for Industrial/ Commercial Area which determined L_{Aeq} -1 hr daytime and night-time not more than 70 dB(A). In addition, the project has continually monitoring, as specified in the measure for surveillance of environmental impact from the project construction activity.

The comparison of noise level monitoring results were summarized as Table 3-9.

The analysis results, certificate for laboratory instrument and approval registration certificate of laboratory are shown in Appendix K, L and M.

Table 3-9 Noise Level Monitoring Results between Baseline (in 2017) and Construction Phase in 2020

Stations	Date	Result ^{1/}	
		L _{Aeq} -1 hr (day time) 07.00-22.00	L _{Aeq} -1 hr (night-time) 22.00-07.00
1. Construction site : North of construction fence (N1)	March 12-13, 2017 ^{1/}	55.0-63.2	53.0-59.7
	March 13-14, 2017 ^{1/}	55.9-61.2	51.8-62.5
	December 11-12, 2020	57.6-68.5	57.3-65.3
	December 12-13, 2020	55.5-65.9	59.9-64.0
2. PTTEPI Building 7 : West of construction fence (N2)	March 12-13, 2017 ^{1/}	61.2-63.2	61.6-62.8
	March 13-14, 2017 ^{1/}	60.9-63.5	62.4-64.8
	December 11-12, 2020	53.9-67.8	56.8-67.2
	December 12-13, 2020	54.2-64.1	61.0-69.1
3. House behind PTTEPI Office : South-east of construction fence (N5)	March 10-11, 2017 ^{1/}	51.5-58.0	51.1-55.8
	March 11-12, 2017 ^{1/}	50.9-57.0	52.2-56.1
	December 13-14, 2020	51.8-62.3	52.7-61.3
	December 14-15, 2020	53.7-62.4	53.8-62.3
National Environmental Quality (Emission) Guideline of Myanmar for Industrial/Commercial Area		70.0	70.0
Unit		dB(A)	dB(A)

Remark: ^{1/} Baseline data from Initial Environmental Examination (IEE) for PTTEPI's Yangon Office Building Construction

3.4 Grievance Mechanism Monitoring

Grievance mechanism monitoring was conducted for construction phase of PTTEPI's Yangon Building during July - December 2020 in construction phase by PTTEPI. The detail as shown in Table 3-10.

Table 3-10 Grievance Mechanism Monitoring Plan

Environmental Quality	Parameter	Location	Period
Social	<ul style="list-style-type: none"> Complaint from stakeholders/ neighbors Comliants' resolution is undertaken in a timely manner 	- House nearby construction site	Throughout construction period

3.4.1 Grievance Mechanism Monitoring Methods

Grievance mechanism monitoring is the investigation of complaints from the community. PTTEPI provided grievance handling guideline to receive any complaints from the stakeholder and resolve the complaint in the immediate (Appendix D-1). If any damage occurs, PTTEPI will be responsible to solve and track them. In addition, problem's cause will be analyzed to prevent same problem occuring again. Grievance handling process is shown in Figure 3-5.



Figure 3-5 Grievance Handling Process

3.4.2 Grievance Mechanism Monitoring Result

Grievance mechanism monitoring results for construction phase of PTTEPI's Yangon Office Building during July - December 2020 were done by PTTEPI. There was no any complaint from the community throughout the construction period.

3.5 Public and Occupational Health and Safety Monitoring

Public and occupational health and safety monitoring was conducted for construction phase of PTTEPI's Yangon Office Building during July - December 2020 by the contractor. The detail as shown in Table 3-13.

Table 3-11 Public and Occupational Health and Safety Monitoring Plan

Environmental Quality	Parameter	Location	Period
Public and Occupational Health and Safety	<ul style="list-style-type: none"> Incident/ accident records 	<ul style="list-style-type: none"> Construction site and working areas House nearby construction site 	Throughout construction period

3.5.1 Public and Occupational Health and Safety Monitoring Method

Emergency Response Plan and training program on Safety, Health and Environment and other concerned safety standards have been provided to the contractor for follow. Public and occupational health and safety monitoring was conducted by recording the incident and accident during working time; including causes, accident level, and performed mitigation measures. Monitoring program and report were conducted throughout construction period following the specified measures in IEE report.

3.5.2 Public and Occupational Health and Safety Monitoring Results

Public and occupational health and safety monitoring results for construction phase of PTTEPI's Yangon Office Building were done by the contractor during July - December 2020. There were total 9 cases of incident from project activity in the construction period including 4 cases of near miss, 1 case of first aid case, 1 case of drop object, 1 case of Slip & Trip, 1 case of other and 1 stolen case. The details as shown in Table 3-12. Corrective actions were proposed/implemented to prevent reoccurrence.

Table 3-12 Summarization of Incident Cases

No.	Activity/Package	Incident date & time	Root Case	Preventance action	Incident one-line summary
1	Near miss	02.07. 2020 08:50 AM	<ul style="list-style-type: none"> Failure to provide site requirement (catch board) 	<ul style="list-style-type: none"> Refresh training to involved persons Provided scaffold catch platform 	<ul style="list-style-type: none"> Dropped object of rebar
2	Dropped objects	09.07.2020 10:19 AM	<ul style="list-style-type: none"> Failure to provide site requirement (catch board) 	<ul style="list-style-type: none"> Refresh training to involved persons, Provided scaffold catch platform 	<ul style="list-style-type: none"> Wire sling was falling down from 8th floor to ground. Dropped objects wire sling hit to the dust fence net at the ramp-7 area.
3	Stolen MCCB form onsite electrical DB	30.07.2020 01:00 PM	<ul style="list-style-type: none"> Failure to provide logout/tagout system 	<ul style="list-style-type: none"> Provided logout/tagout system 	<ul style="list-style-type: none"> Stolen moulded case circuit breaker (MCCB) at 6th floor main electrical DB.
4	Near miss (Dropped objects)	07.08.2020 02:40 PM	<ul style="list-style-type: none"> Poor material storage. Lack of drop object prevention. 	<ul style="list-style-type: none"> Refresh training of drop object incident and manual handling training Installed drop object prevention system onsite 	<ul style="list-style-type: none"> Dropped object (12 mm diameter* 4 feet length formwork tiding-rod was fallen from 10th Floor to 4th floor stair 1)
5	First-aid	14.08.2020 03:00 PM	<ul style="list-style-type: none"> Lack of information communication Lack of knowledge pinch point 	<ul style="list-style-type: none"> Refresh training to scaffold erector team Provided impact gloves 	<ul style="list-style-type: none"> Pinch between scaffold vertical pole and U-jet plate
6	Others	16.09.2020 12:36 PM		<ul style="list-style-type: none"> Closely supervision onsite (to wear face mask, social distancing) 	<ul style="list-style-type: none"> secondary contact with Covid-19 positive person.

Table 3-12 Summarization of Incident Cases

No.	Activity/Package	Incident date & time	Root Case	Preventance action	Incident one-line summary
7	Near miss (Dropped objects)	20.11.2020 08:50 AM	<ul style="list-style-type: none"> Poor material storage. Lack of drop object prevention. 	<ul style="list-style-type: none"> Close supervision at the working at height Need to check and do not allow to keep loose materials on the external scaffold and at the edge of the building. 	<ul style="list-style-type: none"> One of the GI hollow pipe dropped from height and hit to the ground near the ATT's staff.
8	Slip & Trip	21.11.2020 04:50 PM	<ul style="list-style-type: none"> Lack of Signage system 	<ul style="list-style-type: none"> Need to put warning signage for wetting floor Need to educate office cleaner 	<ul style="list-style-type: none"> Slipped and fell down from first floor to the ground floor
9	Near miss (Dropped objects)	07.12.2020 04:45 PM	<ul style="list-style-type: none"> Poor material storage. Lack of drop object prevention. 	<ul style="list-style-type: none"> Close supervision at the task Need to check and do not allow to keep loose materials near the opening hole and at the edge of the building. Need to cover the opening hole 	<ul style="list-style-type: none"> Brick was fallen from height and hit the 4th floor slab

Chapter 4
Environmental Mitigation Measures Compliance
Audit and Environmental Monitoring Result

Chapter 4

Environmental Mitigation Measures Compliance Audit and Environmental Monitoring Result

From the implementation of Environmental Mitigation Measures Compliance Audit and Environmental Monitoring in construction phase of PTTEPI's Yangon Office Building, it was found that the project has implemented the measures as specified in IEE and the results are summarized as following details:

4.1 Environmental Mitigation Measures Compliance Audit and Environmental Monitoring Result

Environmental Mitigation Measures Implementation Compliance audit was carried out by REM-UAE Laboratory and Consultant Company Limited together with representatives from PTTEPI. The audit conducted against the mitigation measures specified in Initial Environmental Examination (IEE).

Audit and document checking by setting 4 levels of evaluation as follows;

- Completely complied on the Mitigation Measures (✓) refers the project can complete comply with the measure without any barriers.
- Mostly complied on the Mitigation Measures (✓) refers the project can mostly comply with the measure without any barriers.
- Do not complied on the Mitigation Measures (✗) refers the project cannot comply with the measure because of some barriers.
- Do not have situation follows the Mitigation Measures (NA) refers during the project operations do not have any of situation follow the Mitigation Measures

In case found that the project does not comply with the mitigation measures, REM-UAE Laboratory and Consultant Company Limited will identify the cause of problems, barriers and solutions ways.

The results determined that the project completely complied on the Mitigation Measures during July - December 2020 in construction phase with 100% for the mitigation that have situation. However, there are some mitigation that do not have situation during the audit period equal to 2.2% of all mitigation measure. The results are shown in Figure 4-1.

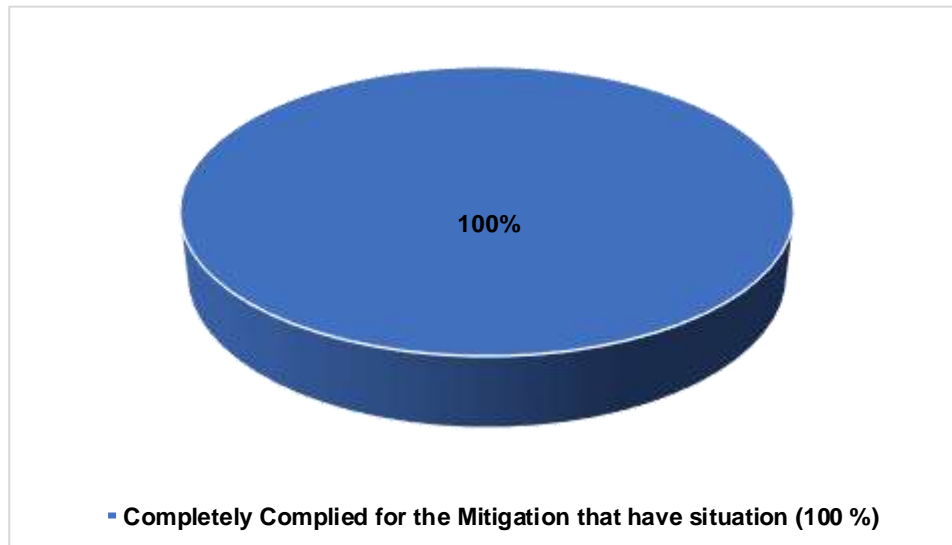


Figure 4-1 The Results of Environmental Mitigation Measures Compliance in Construction Phase during July - December 2020

4.1.1 Environmental Mitigation Measures Compliance Result in Construction Phase

The project has finished pilling and foundation work, the main activity during July - December 2020 was structural work and infrastructure work (M&E activities and Finishing work).

- Air Pollution** - The project complied with the environmental mitigation measures strictly such as assigned staff to spray water around construction area at least twice a day or more in dry season or depending on the atmospheric conditions and the existing road was in a good condition. The project provided PVC mesh sheets around the construction areas in order to prevent dust dispersion and reduced effected to the communities nearby the construction site and along the transportation route. The main activity during July - December 2020 was structural work, concrete work and infrastructure work which mostly used finished material. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure. Moreover, the contractor provided dust masks for workers and controlled all worker wear dust mask during working.
- Excessive Noise and Vibration** - The contractor emphasized workers in toolbox talk which provided in daily before working to carried out the construction activities with high noise and vibration level at day time (9 a.m. – 5 p.m.) in order to reduce noise and vibration impact to nearby communities. The contractor provided ear muffs for workers and controlled to use during working in high noise area. Moreover, Noise barrier (metal sheet) was installed around the construction site to reduce noise impact to nearby communities.

- **Traffic** - The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. The project has finished piling and foundation work, the main activity during July - December 2020 was structural work and infrastructure work (M&E activities and Finishing work) which mostly used finished material. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area and the contractor provided flag man to give the signal and facilitate the traffic during transportation as specified in measure. Moreover, warning signs were installed and can be clearly seen at the public road (in front of the construction area) and within construction area. Routine inspection and preventive maintenance for all vehicles conducted as per the inspection plan. The contractor has strictly controlled of overloaded heavy vehicles to prevent road deterioration. Moreover, the public road (in front of the construction area) was in good condition and there was no complaint from nearby communities.

The contractor provided journey management and transportation safety procedure and enjoined workers to follow regulation. The emergency response procedure was set up including incident, fire action, first aid action. The contractor prepared drug and alcohol abuse policy and enforced all workers to follow. Alcohol testing was conducted before working every day. The worker will immediately stop working if alcohol is found more than 0%. For drug testing, all staffs including workers, engineers and safety staffs were random tested (1time/week maximum 8 samples), the staff who found to be positive in drug testing shall be required to undergo rehabilitation and counseling in government accredited center. However, during July - December 2020 there were no staff found positive in drug test.

- **Solid Waste**
 - **Non-Hazardous Waste** - The contractor provided temporary storage area for construction materials. separate waste containers with cover are provided for 5 types; general waste (blue), recycle waste (yellow), hazardous waste (red), organic waste (green) and biohazard infectious waste. The quantity of waste was recorded by contractor. The contractor cooperated with YCDC to collect and dispose of waste in order to prevent residual waste in construction area. Moreover, the constructor enforced all workers not to burn any wastes in the construction area.
 - **Hazardous Waste** - Hazardous waste container (red) was provided at the construction area. However, there are no hazardous waste during construction phase in July - December 2020. If there are occurred, the contractor will cooperate with licensed contractor or authorities to collect and dispose.
- **Wastewater** - The contractor has provided 9 temporary toilets within construction area (1st and 2nd floor), 2-3 toilets at the back of construction area and 9 toilets within PTTEPI Office for 420 workers. The contractor installed drainage system in the construction area to hold wastewater before discharged out of the project.

The contractor enforced all worker to dispose of waste properly including provided separate waste containers with cover for waste collection in the construction area.

- **Social and Economic** - The contractor considered to hired local people in Yangon and nearby city as per recruitment procedure and announcement. The contractor provided work regulation and enforced all workers to follow in order to prevent the conflict between workers and nearby communities. Moreover, tool box talk was provided in daily before working by the header of contractor/safety officer. The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. 12 Civil engineers and 7 safety staffs were provided to closely inspect construction activities throughout the construction period. PTTEPI provided grievance handling guideline to receive any complaints from the stakeholders and resolve the complaint in the immediate. Project's signboard was installed in front of the construction area to inform the project details such as project name, owner, consultant, contractor, period of construction and emergency contact number. However, there was no any complaints during July - December 2020.
- **Public health and safety**
 - **Health** – The project strictly implemented mitigation measures as per IEE report.
 - **Safety** - Work permit system was implemented for specific work during construction period such as working at height, hot work, and confined space. Moreover, the contractor has provided HSE Policy and enforced all workers to follow. The contractor provided suitable PPE and sufficiently for all workers and controlled to use PPE during working. In addition, the training was regularly performed as per the annual SSHE Training Plan. Tool box talk was provided in daily before working by the header of contractor/safety officer. The medic person was stand by 24/7 (day-night shift) at medic room for medical treatment included first aid kit and medical supplies. The project also coordinates with Victoria hospital for admission in case of accidents Moreover, emergency respond procedure and training were provided to respond in emergency case. Warning signs were installed in construction area to warns workers from dangers. Moreover, the contractor has provided Stop Work Policy to maintain a safe and secure work environment. Routine inspection and preventive maintenance for all equipment were conducted as per inspection plan. Moreover, Firefighting equipment were provided in the construction area and inspected monthly. Smoking areas was provided in the west and in front of construction area.

4.2 Environmental Monitoring Result

The project has completely complied the environmental monitoring as specified in IEE, including Fugitive dust monitoring, Noise level monitoring, Grievance mechanism monitoring, Public and occupational health and safety monitoring as shown in Figure 4-2.

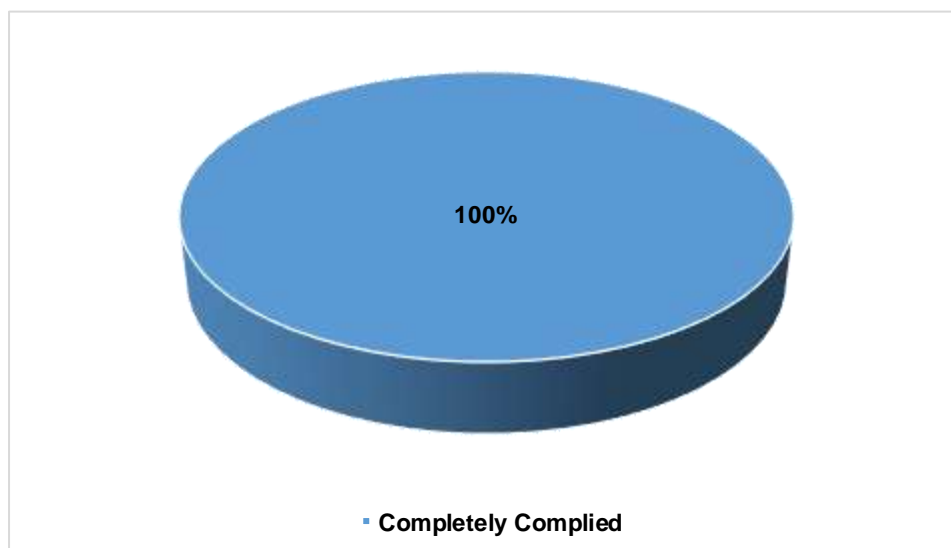


Figure 4-2 The Results of Environmental Monitoring in Construction Phase during July - December 2020

4.2.1 Fugitive Dust Monitoring

Fugitive dust samples were monitored in construction phase during December 11-15, 2020 which monitored at Construction site and PTTEPI Building 7 on December 11-13, 2020 and House behind PTTEPI Office was monitored during December 13-15, 2020.

Fugitive dust monitoring results found that Total Suspended Particulate (TSP) of Construction site: North of construction fence (A1) during December 12-13, 2020 and PTTEPI Building 7 : West of construction fence (A2) have complied with Ambient Air Quality of WORLD BANK GROUP, whereas TSP of House behind PTTEPI Office: South-east of construction fence (A5) haven't complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed $230 \mu\text{g}/\text{m}^3$. For the results of Particulate matter less than 10 Micron (PM-10) found that all stations exceeded the National Environmental Quality (Emission) Guideline (EQEG) which determined that PM10 should not exceed $50 \mu\text{g}/\text{m}^3$. However, when comparison the results of Particulate matter less than 10 Micron (PM-10) with the Ambient Air Quality Standard of WHO and IFC found that all results have complied the standard which determined that PM10 should not exceed $150 \mu\text{g}/\text{m}^3$.

As reported in Seasonal and regional variation of particulate matter dispersion in Yangon City and Taunggyi City, Myanmar. IOP Conference Series: Earth and Environmental Science. 496. 012003. 10.1088/1755-1315/496/1/012003, PM₁₀ concentrations were significantly higher during the dry season as compared to the wet season in Yangon. The major source of PM in Yangon was vehicular exhaust. Thus, Total Suspended Particulate (TSP) results which have not complied with the Ambient Air Quality of WORLD BANK GROUP and Particulate matter less than 10 Micron (PM-10) results which have not complied with the EQEG probability effect from the public air quality since the public air quality are also higher than the standard and increasing year by year especially in dry season. However, the project provided environmental mitigation measure to prevent and reduce the impacts on air quality from dust dispersion resulting from project activities including water spraying, PVC mesh sheets around the construction areas.

The comparison of fugitive dust monitoring results in the construction phase in December 2020 and baseline data found that most of the results of Total Suspended Particulate (TSP) and Particulate matter less than 10 Micron (PM-10) of all stations have higher than baseline data according to the public air quality in <https://aqicn.org/data-platform/register/> shown that the air quality index (AQI) in Yangon during December 2020 were mostly orange and red (unhealthy) and higher than the standard and increasing year by year especially in dry season.

4.2.2 Noise Level Monitoring

Noise level monitoring of PTTEPI's Yangon Office Building were conducted during July 1-5, 2020 in construction phase which monitored at Construction site and PTTEPI Building 7 on December 11-13, 2020 and House behind PTTEPI Office was monitored during December 13-15, 2020. The results of noise level are summarized as below;

Noise level monitoring results found that The L_{Aeq-1} hr daytime of Construction site : North of construction fence (N1), PTTEPI Building 7 : West of construction fence (N2) and House behind PTTEPI Office : South-east of construction fence (N5) were in ranged of 55.5-68.5, 53.9-67.8 and 51.8-62.4 dB(A), respectively. While The L_{Aeq-1} hr night-time of N1, N2 and N5 were ranged from 57.3-65.3, 56.8-69.1 and 52.7-62.3 dB(A), respectively. All of the result of L_{Aeq-1} hr daytime and L_{Aeq-1} hr night-time has complied with EQEG, 2015 for Industrial/ Commercial Area which determined L_{Aeq-1} hr daytime and night-time not more than 70 dB(A).

However, the project provided environmental mitigation measure to reduce the impacts on excessive noise to disturb the nearby communities including carried out the construction activities with high noise level only at day time. PTTEPI also installed noise barrier (metal sheet) around the construction site to reduce noise impact to nearby communities. In addition, PTTEPI will continually monitor noise level as specified in the measure.

The comparison of noise level monitoring results in construction phase December 2020 and baseline data found that the result of L_{Aeq-1} hr daytime and L_{Aeq-1} hr night-time of 3 stations were higher than baseline data. However, all of the result of L_{Aeq-1} hr daytime

and night-time in construction phase in December 2020 has complied with EQEG, 2015 for Industrial/ Commercial Area which determined LAeq-1 hr daytime and night-time not more than 70 dB(A). In addition, the project has continually monitoring, as specified in the measure for surveillance of environmental impact from the project construction activity.

4.2.3 Grievance Mechanism Monitoring

Grievance mechanism monitoring results for construction phase of PTTEPI's Yangon Office Building during July - December 2020 were done by PTTEPI. There was no any complaint from the community throughout the construction period.

4.2.4 Public and Occupational Health and Safety Monitoring

Public and occupational health and safety monitoring results for construction phase of PTTEPI's Yangon Office Building were done by the contractor during July - December 2020. There were total 9 cases of incident from project activity in the construction period including 4 cases of near miss, 1 case of first aid case, 1 case of drop object, 1 case of Slip & Trip, 1 case of other and 1 stolen case. Corrective actions were proposed/implemented to prevent reoccurrence.